Guideline for Green Management Program (GMP) to Promote Environmental Management of Corporations

(A Graduate Sub-major Program for Environmental Leadership Development)

(Version 2010)

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Working Group

"Building Green MBA/MOT for Active Environmental Management"

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Introduction

Progress of Mankind and Global Environment

In the 19th and 20th centuries, mankind demonstrated remarkable "progress." The world population reached approximately seven times the population in 1800; the average life expectancy greatly increased thanks to scientific and technological advancement; daily life became tremendously convenient and rich; and the global economic scale expanded exponentially. Such an increase of population and richness of the 20th century was based on the premise that "resources are inexhaustible and the global environment is infinite." In this sense, the market economy in the past, which is still present now, demands economic development and growth and can be described as a "one-way socioeconomic system" that stands on mass-production, mass-consumption and mass-disposal.

However, "resources and the global environment are both exhaustible." The progress of global warming, the loss of biodiversity and the increase of resource consumption due to human activities are greatly affecting the foundation of human survival and threaten our sustainability. According to *Global Green New Deal*, a report published by the United Nations Environment Programme (UNEP) in February 2009, the greenhouse gas emissions in the world would increase by 45% by 2030 and the mean air temperature would rise by 6ºC if the current conditions last and no measures are taken. The *Stern Review* (2006) that has put together the results of an investigation under the Chancellor of the Exchequer in UK also notes that a 5-6ºC air temperature increase could cause damage equivalent to 5-10% of the global GDP or 10% of GDP in developing countries.

Today, we stand at a crossroads where mankind 100 years from now will judge our decisions at the beginning of the 21st century as right or wrong. When we look 100 years forward in efforts to solve environmental problems such as global warming, it is crucial to pursue our society's transformation into a socioeconomic system that coexists with the global ecosystem. In this shared goal with the international community, it is now being anticipated that Japan will take an integrated approach to a low carbon, recycling and natural symbiotic society, while leading the global community to build a sustainable society.

Toward a Sustainable Society

A "sustainable society" is defined in Japan's *Strategy for an Environmental Nation in the 21st Century* (2007) as "a society in which a healthy and productive environment is preserved at the global and local levels, through which people around the world can enjoy and appreciate their happy lives, and in which such an environment is handed down to future generations." It describes an emphasis on the

following three key points: Keeping environmental loads below the environment's carrying capacity; minimizing consumption of resources and promoting recycling; and realizing the coexistence of nature and mankind. Thus, the perspective for "a sustainable society" regards the sustainability of the global environment and sustainable development, as well as human evolution, as two sides of the same coin and intends to maintain sustainability for both the earth's environment and its human inhabitants.

In *Our Common Future*, a report published in 1987 by the World Commission on the Environment and Development chaired by then-Prime Minister of Norway, Gro Harlem Brundtland, "sustainable development" is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Further explanation follows, "a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations."

In this present age, we are required to bring together all kinds of wisdom and to make diverse efforts proactively for the purpose of founding a sustainable society.

UN's Education for Sustainable Development and Japan

In building a sustainable society, it is essential to develop environmental leaders in charge of green innovation and environmental issues in every organization including universities, corporations, governments and NGOs/NPOs. It is also necessary for each citizen to gain basic knowledge on environmental and sustainability issues, understand their significance and acquire skills as well as attitudes for addressing such issues.

At the Johannesburg Summit in 2002, Japan proposed the concept of a United Nations Decade of Education for Sustainable Development (UNDESD). In December of the same year, the proposal to designate 10 years from 2005 as UNDESD was unanimously adopted at the 57th UN General Assembly.

In order to implement specific measures for promoting UNDESD in a comprehensive and effective manner, the Japanese government established an interministerial collaboration and put together *Action Plan for United Nations Decade of Education for Sustainable Development* in 2006. The Action Plan defines ESD as follows:

"The foundation for sustainability consists of generation equality, regional equality, gender equality, social tolerance, poverty alleviation, environmental conservation and restoration, conservation of natural resources, a society for justice and peace, etc. Sustainable development promotes the environmental conservation, economic development and social development … in harmony. Such

development does not happen unless each one of us acts consciously in daily life or through economic activities. Thus, it is important for us to become aware that each individual is tied to the international community, future generations and the environment, and to transform our actions. The education for achieving this is called ESD.

The objective of ESD is also described as a process that "incorporates principles, values and actions required for sustainable development into education and learning, bringing a transformation of actions for realizing an environmentally, economically and socially sustainable future."

Japan's Efforts in Environmental Leadership Development

In two of its cabinet decisions, *Strategy for an Environmental Nation in the 21st Century* and *Innovation 25*, Japan has incorporated the idea of environmental leadership development that can be mobilized domestically and internationally as one of the priorities.

Based on these decisions, the Ministry of the Environment, Japan (MOEJ) established a review committee consisting of key figures from universities, corporations and NGOs/NPOs, which formulated *Vision for Environmental Leadership Development for Asian Sustainability in Higher Education* ("Vision for Environmental Leadership Development for Asian Sustainability") in March 2008. In order to put it into practice, the following three projects are to be developed with Environmental Leadership Initiatives for Asian Sustainability (ELIAS) in collaboration with relevant ministries: 1) developing and promoting environmental leadership development programs for each industrial field through the collaboration of industry, academia, government, and private sectors; 2) establishing an environmental consortium for leadership development through the collaboration of industry, academia, government, and private sectors; and 3) strengthening networks of universities in Asia that undertake the tasks in environmental leadership development.

Based on 2) above, experts from industrial, academic, government and private sectors in the field of e environmental leadership development launched the Preparatory Meeting on Environmental Consortium for Leadership Development in March 2009. After two years of effort, the Environmental Consortium for Leadership Development ("EcoLeaD") was established in March 2011.

In order to bring solutions to various environmental issues and build a sustainable society, every participant including businesses, consumers and administrations must voluntarily and positively undertake efforts to support the environment in a cooperative and collaborative manner. The efforts by business operators who play a major role in the socioeconomic system are especially important. However, according to a survey conducted by the MOEJ, universities have not fully established a system to foster environmental leaders that meet the needs in the field even though businesses, governments and NGOs/NPOs are in need of environmental leaders with systematic knowledge, a bird's-eye viewpoint, an ability to conceptualize ideas, an ability to plan, an ability to implement plans,

and an ability to promote socioeconomic innovations. In particular, comprehensive graduate-level programs in environmental management to foster environmental leaders for promoting environmental management in the corporate and governmental fields were found to be scarce.

October 2010 marked the 10th Conference of the Parties to the Convention on Biological Diversity (CBD COP10) in Nagoya, Aichi Prefecture. At the Convention, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) and the Strategic Plan for Biodiversity 2011-2020 (Aichi Target) were adopted, urging businesses to take a serious approach to biodiversity conservation in addition to their environmental efforts in reducing carbon dioxide and increasing recycling.

Furthermore, ISO26000 Guidance on Social Responsibility was published in November 2010. The Guidance encourages corporations to integrate their social responsibility efforts as well as environmental conservation into the building blocks of business management.

In response to such demand, the MOEJ and EcoLeaD took advantage of a consortium that consisted of diverse organizations and established working groups with university educators and environmental personnel from corporations as well as an advisory committee steered by top business executives with experience in progressive environmental management. The objective of those functions was to build program contents for Building Green MBA/MOT for Active Environmental Management, with the understanding and recognition that, for greening business activities, the top priority should be placed on the development of environmental leaders with "environmental management capacity," which includes: *basic ability of environmental management* (systematic knowledge and a bird's-eye viewpoint concerning the global environment and its issues); *practical ability of environmental management* (ability to practice active environmental management based on understanding of environmental policy frameworks and policymaking process, knowledge in environmental management, skills in environmental management tools, life cycle thinking, etc.); and *strategic environmental thinking* (ability to create new business, policy and technology that realize both the reduction of environmental loads and the increase of added values by back casting while being aware of corporations' social responsibility and collaborating with diverse stakeholders).

The Guidelines for Green Management Program (GMP) to Promote Environmental Management of Corporations (A Graduate Sub-major Program for Environmental Leadership Development) (Version 2010) (hereinafter "GMP Guideline") has been prepared for fostering environmental leaders capable of greening corporate and governmental management and business activities as well as those who promote and take charge of environmental management through not only business schools but also a wide range of Master's degree programs in humanities and science.

The GMP Guideline expects that students acquire "environmental management capacity" consisting of basic ability of environmental management, ability to take actions on behalf of the environment and strategic environmental thinking as a "sub-major" (six programs) during their Master's programs. It

compiles the fundamental principles of the program, program structures and specific contents of each program based on corporate professionals. To assume corporate social responsibility, the GMP Guideline also incorporates ideas and methods for integrating social and environmental considerations into organizational activities and daily decision-making.

Within the constraint of “finite resources and global environment,” a role of businesses in realizing a sustainable society was never more important than it is now. In building a sustainable society, we believe that the GMP Guideline will be the tools for fostering environmental leaders who will become the active leaders of structural transformation within corporations and governments based on their “environmental management capacity.”

Chapter 1 Portrait of Environmental Leaders

1. Basic Idea of Environmental Leadership Development

1) Definition and Elements of Environmental Leaders

According to the Vision for Environmental Leadership Development for Asian Sustainability, environmental leaders are “people who have the foundation of their own experiences and ethical views, are able to consider the importance and urgency of environmental issues, have strong intentions to promote a sustainable society that realizes comprehensive improvement of the environment, society and economy through their own professions, citizen actions, etc., and can bring social transformation with their leadership.” For environmental leaders to be able to plan and implement specific projects in building a sustainable society through their professions, they are required to exhibit three qualifications: “Strong motivation to take an initiative in building a sustainable society,” “expertise” and “leadership.”

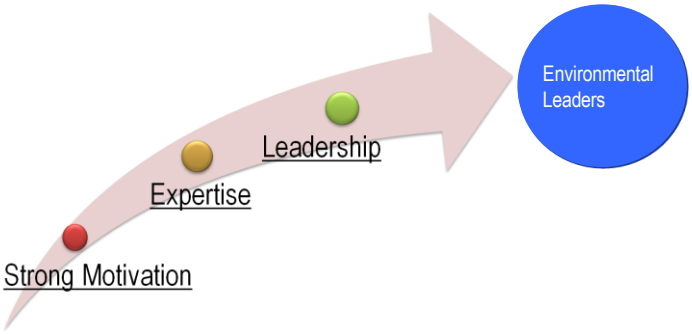


Figure 1: Three Major Elements Required for Environmental Leaders

More specific descriptions of each element are as follows:

- Strong Motivation
  - Enthusiasm that enables a person to understand and work with the complexity and diversity of building a sustainable society

- Expertise
  - Knowledge and experiences in fields other than environmental issues (such as law, management and technology)
  - Ability to understand the relationship between one’s expertise and the environment and utilize such expertise for environmental conservation

- Leadership
  - Ability to conceptualize ideas and implement plans in order to integrate environmental

conservation into socioeconomic activities

- Ability to influence involved parties, bring about consensus and mobilize an organization;
- A bird's eye viewpoint to apprehend business, policy and technology from various aspects of the environment, economy and society

2) Necessity of T-shaped Environmental Leadership Development

The Vision for Environmental Leadership Development for Asian Sustainability describes so-called T-shaped environmental leadership development as effective for nurturing the qualities environmental leaders should possess. In such development, each individual enhances one's expertise in a specific field such as legal studies and engineering, in a vertical direction, while acquiring cross-sectional knowledge in environmental conservation fields. In addition, students will internalize and integrate environmental perspectives in their own areas of expertise using a bird's-eye viewpoint or ability to overview in a panoramic way.

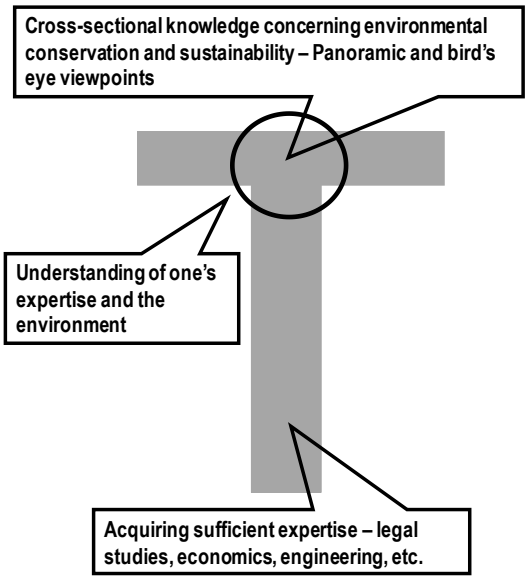


Figure 2: T-shaped System Required for Environmental Leaders

For fostering such environmental leaders, education that provides opportunities to learn cross-sectional knowledge concerning environmental conservation, especially interdisciplinary knowledge for incorporating environmental aspects into socioeconomic system in corporate management as well as a bird's eye viewpoint is effective. It is also important to provide education that integrates said knowledge into one's expertise.

Environmental leaders are expected to build a foundation at universities on which they expand their T-shaped ability gradually with continuous learning and experiences through practice as professionals.

The gradual expansion of the T-shaped ability can be described as follows:

(1) Through general education courses at universities, environmental leaders are fostered; such individuals will have basic knowledge concerning environmental issues, which help them form a foundation, and an ability to take actions for solving environmental issues, or in other words, “environmental ability.”

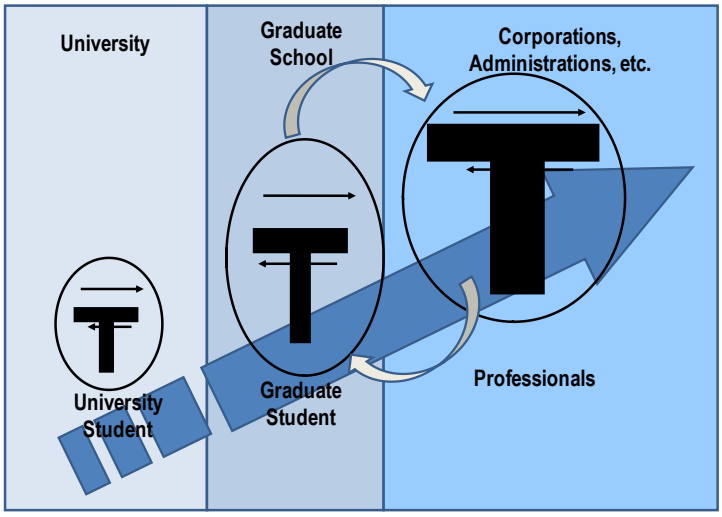


Figure 3: Gradual Expansion of T-shaped System

(2) The vertical part of the T, i.e. a foundation for an area of expertise, is developed through specialized courses.

(3) The expertise represented by the vertical part of the T is strengthened through professional practices in a corporation or a government after one has graduated from a university.

(4) After deepening one’s expertise through professional practice in a corporation, a government, etc., or directly after graduating from a university, students will enter a Master’s program. They will learn practical ability including specialized knowledge concerning environmental management and various tools for promoting environmental management, enhance a bird's eye viewpoint concerning sustainability as well as knowledge and skills of their areas of expertise, and will improve practical skills for providing solutions to various environmental issues and local challenges (i.e. grow the width and length of both vertical and horizontal axes of the T).

2. Relationship between Corporate Activities and Environmental Issues

Incorporating environmental solutions into a socioeconomic system is a challenge not only for corporations but for every organization including administrations, NGOs/NPOs, consumers and ordinary citizens. However, businesses are particularly important in undertaking vigorous environmental management efforts and environmental leadership development since business activities have a comparatively significant influence on the environment. This, and the sections following describe environmental management as it should be addressed by the operating body of

business activities. By replacing “corporations,” “corporate management” and “corporate activities” with “services,” “service management,” “service provisions,” we believe that the GMP Guideline can be utilized as a reference for administrations and NGOs/NPOs that act as operating bodies of providing services.

1) Steps of Environmental Response in Corporate Activities

In response to serious air pollution and devastating industrial pollution as in the case of Minamata disease during the high-growth period of the Japanese economy, Japan implemented one of the most stringent pollution regulations in the world. Efforts in environmental considerations by many corporations started as a response to such environmental regulations and now have brought about pollution prevention technology at the world’s highest standards.

The two Oil Shocks in the 1970’s also severely affected corporations in Japan as the country has few resources. Following immense efforts, companies that were hard-pressed to take energy-saving measures developed energy conservation technology at the global top level.

After the1990’s, as various global environmental issues were aggravated, landfill spaces decreased, illegal dumping increased and resources were exhausted due to increasing resource consumption. As a result, civil consciousness concerning environmental issues improved and many Japanese companies initiated active management to consider environmental measures by voluntarily responding to the environment in a diverse way, including building environmental management systems and implementing environmental communication (please refer to Material 1).

Today in the 21st century, human activities that add to environmental loads are still expanding. Global warming is progressing, resource consumption is increasing and biodiversity is declining, which all threaten the sustainability of mankind. At the same time, a global recession started in 2008 after Lehman’s fall and economic recovery has become the most urgent issue.

Instead of making economic recovery a priority and postponing environmental measures, it is critical that we anticipate a society 100 years from now, and realize that mankind is a part of the global ecosystem. Thus, we must transform our current socioeconomic system into a sustainable society in which environmental conservation and creation efforts are rewarded economically to promote coexistence with nature. The so-called “Green New Deal” is a global movement for finding keys to overcome the recession by creating new businesses and employment concerning environmental measures. There now are more corporations conforming to the movement and thriving in environmental management with the understanding that “environmental efforts” are part of their social responsibility as well as opportunities to increase their corporate values.

Response to environmental issues in corporate activities can be roughly organized in the following phases:

(1) Compliance - corporations respond to environmental regulations such as pollution control
(2) Energy/Resource Conservation - corporations undertake energy and resource conservation efforts in response to the exhaustion of resources and energy as well as their price increase
(3) Management by Voluntary Environmental Consideration - corporations make voluntary environmental considerations
(4) Active Environmental Management - corporations practice environmental management in order to increase corporate values and actively build a sustainable society as they recognize social responsibility

With regard to “Active Environmental Management,” various elemental concepts have been proposed in Japan and abroad. For example:

- Cleaner Production, Clean Technology, Pollution Prevention, etc.: Technology or a process that reduces the environmental load through every step - obtaining materials, disposing of products and recycling - as opposed to technology that reduces air or water pollutants where they enter the environment (end-of-pipe treatment). Load reduction occurs during the manufacturing process of a production system and is generally integrated into production technology. This practice brings about both production improvement and environmental conservation.
- Zero Emission: An industrial recycling system that produces zero waste emissions by utilizing waste from an industrial manufacturing process for materials in other industries. The United Nations University is the originator of this concept and efforts to expand it are underway at corporations as well as in municipalities.
- Inverse Manufacturing: A system that designs and manufactures products with consideration to the post-consumer flow - “recover, disassemble, sort, reuse” - rather than the conventional manufacturing process – “design, produce, use, dispose.” Since this system is based on the premise that products will be recycled, the reuse of parts or recycling of raw materials is effectively addressed. Some companies have already undertaken efforts to recover usable parts, incorporating them into new products, and to recycle raw materials.
- Factor X: To multiply resource productivity (productivity of goods/services per resource investment) by X, i.e. to reduce resources and energy necessary for obtaining the same goods or services by 1/X. This idea serves as an indicator for eco-efficiency. For example, Factor 10 by Dr. Schmidt-Bleek of the Wuppertal Institute for Climate, Environment and Energy is based on a calculation that an average of a tenfold reduction in resource consumption in industrialized countries is necessary for reducing the global material and resource flow by 50%.

2) Direction of Socioeconomic Activities in the 21st Century

The Basic Environmental Plan states “the important issue to be addressed in the 21st century is to pursue sustainable development and improve environmental and economic aspects

comprehensively."[1]

In order to solve environmental issues in socioeconomic activities and incorporate environmental efforts into a socioeconomic system, it is necessary that the market itself appreciate the value of the environment and "innovations" of technological specifications, economic activity patterns and business models are brought about. Realizing the following transformation of socioeconomic activities is anticipated:

- More "values" to be created from less material investment and disposal
- Socioeconomic values to be created while respecting the natural systems or ecosystems

To respond to such transformation and incorporate it to the socioeconomic activities of each organization requires the following efforts in the market:

- Values must be formed so that the environment is highly appreciated in the market, and motivation of each socioeconomic group in environmental efforts is to be improved
- Environmental information concerning products and companies must be provided in a clear manner, disseminated among the market participants, appreciated and utilized in decision-making
- A system for promoting technology with a smaller environmental load and the innovation of a viable business model
- Environmental risks should be assessed and managed, while their prevention and minimization of damages pursued at each organization

3) What is Environmental Management?

Based on the discussion above, the GMP Guideline defines environmental management as **"management that creates highly value-adding products and services and maximizes corporate values as a whole while minimizing environmental loads and resource and energy consumption to promote a sustainable society that integrates the environment into a socioeconomic system."** Specifically, environmental management includes the following efforts:

- Clarifying the role of corporations in building a sustainable society with regard to stakeholders, and assume social responsibility
- Clarifying the relationship between corporate activities and the global environment while taking responsibility for the overall life cycle of products and services; clarifying corporate relations with the global environment at each stage of the life cycle
- Making constant efforts to minimize the tradeoffs among individual environmental issues
- Demonstrating accountability through environmental communication and information disclosure
- In a production process and product design, achieving both the reduction of environmental loads and the improvement of productivity and yield, minimizing the generation of environmental loads as well as resource and energy consumption, and increasing product and corporate values
- Controlling and preventing environmental risks and minimizing damages

[1] *The Third Basic Environmental Plan*, p.88. MOEJ.

- Promoting active environmental business in planning, development, production and sales of products and services with less environmental loads
- Actively undertaking efforts in biodiversity conservation in consideration of environmental reliance and influence of product and service life cycles as a whole

3. Elements of Environmental Management

For companies to create highly value-adding products and services, maximize corporate values as a whole, minimize the environmental load, resource and energy consumption and the loss of biodiversity, all while appropriately performing environmental management, the following characteristics are necessary from environmental leaders:

1) Knowledge and Understanding of Environmental Issues

First, when practicing environmental management, systematic knowledge of the global system, as well as a fundamental knowledge of the relationship between the global system and mankind and the resulting environmental issues is essential. It is also necessary to understand how corporate activities and environmental issues relate to each other based on the above-mentioned knowledge, and have a bird's-eye viewpoint that enables understanding of causal structure in environmental issues and specifies the axis of problems. In addition, an ability to take initiatives to solve environmental issues is critical.

2) Knowledge and Understanding of Environmental Policy Framework and the Trends

Second, corporations are required to go beyond the minimum compliance of various environmental regulations and practice active and progressive environmental management with the understanding of social background in which such regulations are implemented. Particularly, the recent environmental policies include voluntary efforts such as administrative agencies preparing guidelines and calling for responses or economic efforts such as environmental taxation. These efforts typically take the form not only of regulating direct emissions or certain actions but also regulating a framework that enforces preparation of a plan, selecting personnel in charge and reporting achievements as well as setting environmental report guidelines.

At the same time, environmental policies of the EU and the United States, the international framework concerning global warming prevention or biodiversity conservation, and efforts made by international NGOs such as the International Organization for Standardization and GRI (Global Reporting Initiative) substantially influence the environmental policy in Japan. Moreover, in the globalized economy, Japanese export companies are regulated directly by foreign governments, requiring support for responding to the international framework and environmental policies in other countries.

It is further required that a bird's-eye viewpoint be taken to understand trends and prepare for any

changes not only in implemented or would-be-implemented policies, but also in policies that may be implemented in the mid- to long-term.

Therefore, when practicing environmental management, companies need to have a bird's-eye viewpoint with regard to the framework, principles, and trends and backgrounds of domestic and global environmental policies that are necessary for corporate activities as well as the ability to envision and have insight on future trends.

3) Knowledge, Understanding and Ability Concerning a System for Appropriate Environmental Management

Third, in order for companies to practice environmental management appropriately, a management system for preparing, controlling, assessing, and continuously improving policies, goals and plans for environmental management itself is necessary, in other words, a mechanism.
For achieving both the reduction of the environmental load and the improvement of productivity and yield while minimizing generated environmental loads and the consumption of resources and energy, it is especially important to understand input and output of corporate activities from physical quantities and costs, set goals and control and reduce the input/output. Since corporate activities generally consist of activities by many and diverse members reaching in many directions and fields, an environmental management system that appropriately controls corporate activities is essential.

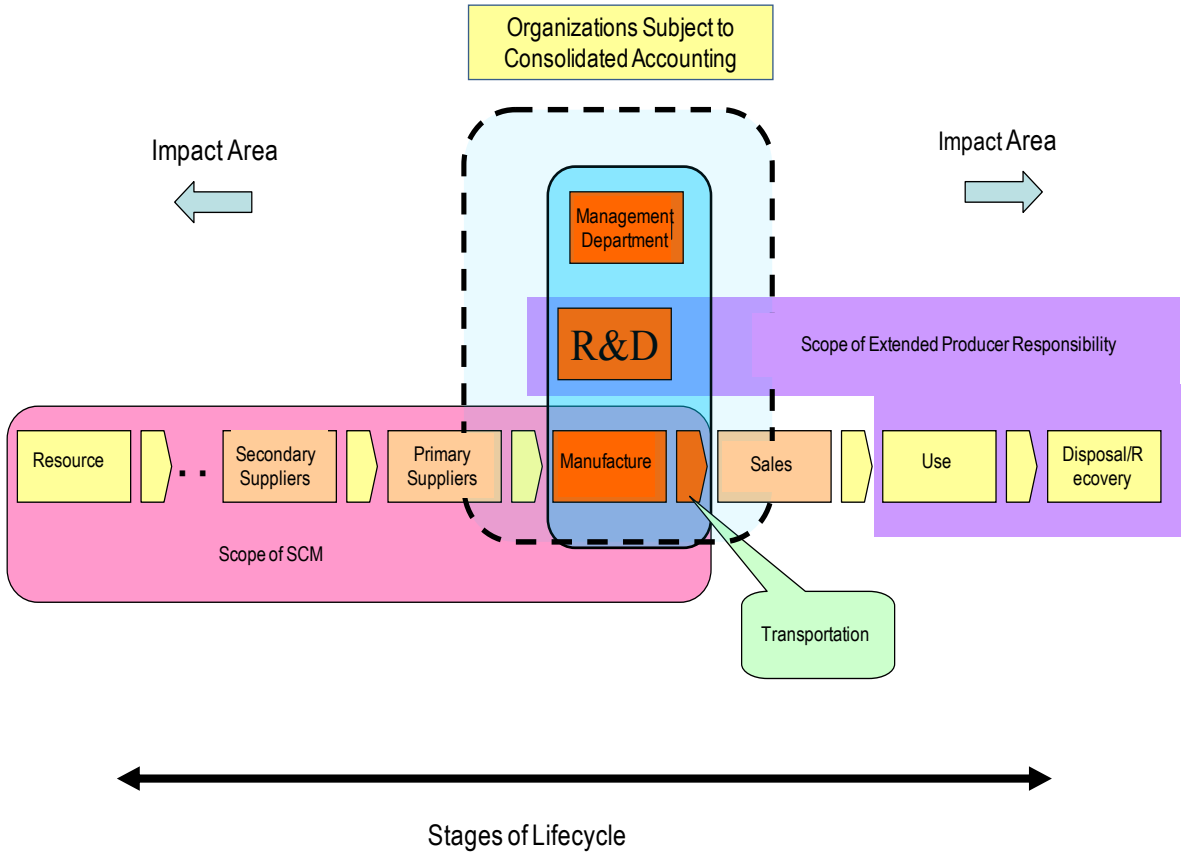


Figure 4: Scope of Environmental Considerations that Expands as Point of View within Environmental Management Widens (Source: *Environmental Report Guidelines 2007*, p.18. MOEJ)

As indicated in Figure 4, a business that provides products, for example, is required to undertake efforts over the entire lifecycle of the product, including its supply chain and value chain that go beyond organizations subject to a consolidated accounting.

There are also various risks in corporate management. In environmental management, it is necessary to have an environmental risk management system that controls and prevents such risks as well as minimizes damages.

The other essential element for a company to survive in this society is environmental communication. This allows a corporation to achieve accountability and provide stakeholders in an appropriate manner with necessary and useful information for their decision making.

Regarding the goal of realizing a low-carbon, recycling and symbiotic society, knowledge in environmental management and effective tools for such management as well as an ability to utilize such knowledge is critical for developing environmental management strategies that conserve while generating profits.

4) Knowledge, Understanding and Ability Concerning the Business Model for Appropriate Environmental Business

Environmental business refers to, in most cases, planning and development, production and sales of “eco-products,” i.e. products and services that have relatively low environmental loads, that have relatively high eco-efficiency, and that can reduce or mitigate environmental loads.

In the planning, development, production and sales of eco-products, the environmental load status of the entire product/service life cycle needs to be measured and evaluated. It is also necessary that the results of such measurement and evaluation, environmental conservation effects, etc. be displayed or provided in a clear manner.

Thus, in order to practice environmental business appropriately, knowledge and ability with regard to Life Cycle Assessment (LCA), which is an evaluation method for eco-products, LCA’s environmental labels that provide information, carbon footprint, and the Ecological Rucksack are required. Management skills are also important in making products with added value, as well as establishing manufacturing processes and building organizational structure based on lifecycle thinking, and familiarity with the environmental influences and technical solutions that affect products and services.

5) Knowledge, Understanding and Competence to Achieve Sustainable Governance

(1) Corporate management and stakeholders

A company conducts business while interacting with diverse stakeholders including clients,

shareholders, business partners and employees. (Major stakeholders with regard to corporate activities are described in Figure 5.) In this modern society where globalization of the economic society has progressed, it is necessary to respond not only to domestic stakeholders but also to stakeholders in the global society.

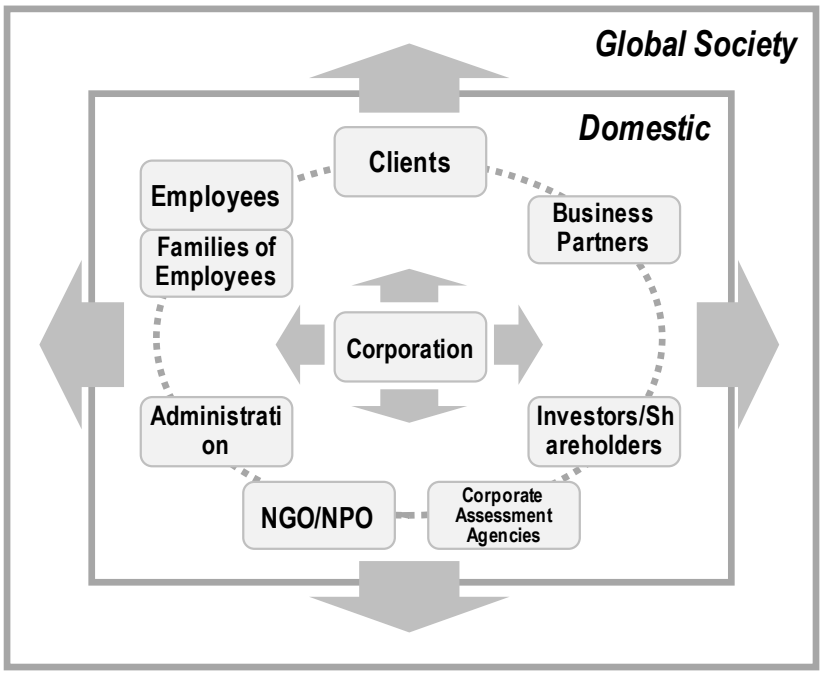


Figure 5: Corporate Management and Stakeholders

ISO26000 "Guidance on Social Responsibility"[2] published in November 2010 takes the perspective of a multi-stakeholder approach in which the realization of a sustainable society cannot be achieved by a single sector and multi-stakeholders (administration, corporations, civil society) need to work collaboratively. In such environmental management, an ability to achieve collaborative efforts by holding dialogue with stakeholders and engaging stakeholders is required.

(2) Corporate Management and the Triple Bottom Line

Instead of solely assessing financial performances of a company, building a sustainable society also requires the concept of "the Triple Bottom Line," comprehensive assessment of environmental, social and economic aspects of corporate activities (Figure 6).

Efforts in environmental management need to be done based on the Triple Bottom Line; in particular, efforts are necessary in not the "environmental" but also "social" aspects such as employment, occupational safety and health, human rights, regional and community contributions, corporate

[2] ISO26000 *Guidance on Social Responsibility*: A guide that the International Standard Organization developed over 5 years with the participation of nearly 500 diverse stakeholders comprising 6 categories (corporations, consumers, unions, the government, NGOs and other key figures). It is significant in that it outlines a system for creating procedures based on various existing concepts related to social responsibility. For many organizations in the world to practice social responsibility, this guide serves as a common textbook, giving many hints for practicing organizational social responsibility. Regarding social responsibility, 7 core themes are identified including organizational governance, human rights, labor practices, the environment, fair business practices, consumer challenges, participation to communities and development of communities. Chapter 6 of the guide lists more than 400 specific actions.

governance, corporate ethics, fair trade, protection of personal information, consumer protection and product safety.

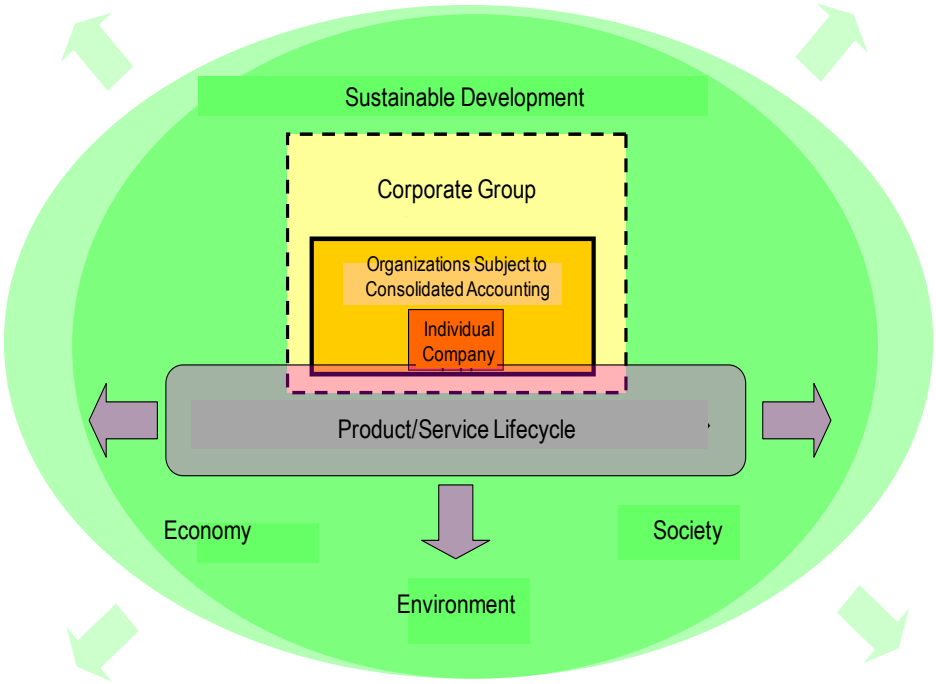


Figure 6: Triple Bottom Line in Corporate Management (Source: Supporting material for *Environmental Report Guidelines*, MOEJ)

(3) Corporate Social Responsibility

The following two elements, in addition to recognizing the stages of lifecycles where corporate activities as described above have an influence, are indispensable to a company's environmental management:

- Recognition of various stakeholders and stakeholder engagement
- Recognition of the Triple Bottom Line --- environment, society and economy

Corporations are social entities and should act for the benefit of stakeholders as a whole instead of solely pursuing their own benefits or economic rationality. They are required to understand the concept of Corporate Social Responsibility (CSR), in which corporations are responsible for social aspects such as legal compliance, environmental conservation, human rights advocacy and consumer protection.

Such corporate social responsibility is delineated into 10 principles of the "Global Compact,"[3] a representative example of global frameworks. Socially Responsible Investment (SRI)[4], which follows

[3] Global Compact: A framework advocated by UN that encourages corporate leaders, along with UN, workers and the civil society, to participate in a global initiative in supporting 10 principles of human rights, labor and environmental fields. As of October 2009, 7,765 companies from 134 countries (including 95 companies from Japan) participate in this framework. The principles concerning the environmental field (Principles 7-9) are as follows: A corporation should (Principle 7) support a preventive approach toward environmental issues, (Principle 8) take the initiative in assuming more responsibility with regard to the environment, and (Principle 9) promote development and dissemination of environmentally-friendly technology.

[4] Socially Responsible Investment (SRI): Although there is no established global definition, it is narrowly defined as "an investment method that assesses corporate responses to the environment and social activities, i.e. corporate social responsibility, in addition to financial analysis, when determining companies to be invested." In a broader sense, SRI

the Global Compact, is also expanding.

In addition, ISO26000 requires corporations to include social responsibility efforts into the core of their management principles.

Thus any approach to environmental management needs to be taken based on considering corporate social responsibility.

6) Ability to Bring about Solutions

Environmental issues, which are the result of ballooning human activities pursuant to convenience and comfort, require a global lifestyle transformation for solutions to be realized. Management based on the Triple Bottom Line is also indispensable for corporations and administration. In order to provide certain solutions to environmental challenges which corporations and administration are facing under environmental restrictions, a forecasting method for seeking solutions by building up from the current situation is not sufficient. What is necessary is a back casting method, in which the fundamental axis of problems is identified based on systematic environmental knowledge. Likewise, a bird's-eye viewpoint is critical to examine current possibilities for realizing a future as it should be. In order to practice environmental management appropriately, it is necessary to develop knowledge and abilities to create solutions such as new business, policies and technology that presuppose reduction of environmental loads, and to increase added values for corporations and products using the back casting method.

4. Requirements of "Environmental Management Capacity"

On the basis of the above-mentioned elements, "environmental management capacity" consisting of 1) basic ability of environmental management, 2) practical ability of environmental management and 3) strategic environmental thinking are necessary for corporations to promote and lead future environmental efforts.

(1) Basic ability of environmental management: Knowledge about the global environment and its issues as well as the ability to utilize that knowledge, while taking a bird's-eye viewpoint to identify where the axis of environmental issues exists. Specifically, it consists of the following requirements:

- Systematic and cross-sectional knowledge and understanding of the global environment and its issues for perceiving the full picture
- Bird's eye viewpoint to understand the relationship between environmental issues and corporate management as well as identify the axis of environmental issues for solutions based on

is described as "a flow of money based on social considerations and investment activities that enable such a flow," including 1) screening (investment for shares and bonds based on assessment of environmental and social aspects of target stocks), 2) shareholders' action (demanding a company to act socially from shareholders' perspective through a dialogue with top management, exercise of voting rights or submission of shareholders' agenda), and 3) community investment (investment and financing for economic support mainly for local low-income groups, as opposed to the previous two activities that mainly target large corporations).

systematic and cross-sectional knowledge
- Ability to take initiative for actions based on one's own thinking toward environmental issues

(2) Practical ability of environmental management: Knowledge and abilities for environmental management built upon acquired basic skills such as: Utilization of practical knowledge about environmental management including an environmental management system and the Life Cycle Assessment; knowledge of environmental policies for practicing environmental management; and the ability to envision and have insight on future trends. In particular, it consists of the following requirements:

- Bird's eye understanding of frameworks, principles, trends and backgrounds of Japanese, foreign and international environmental policies necessary for corporate activities
- Ability to understand the frameworks and overall picture of environmental policies including their objectives and envision future trends
- Ability to understand the roles of each organization - corporations, administrations and NGO/NPOs - as well as the significance of cooperation and collaboration between them in order to take the initiative in examining and proposing solutions, considering how a transition to a sustainable society can materialize through environmental policies
- Basic knowledge of environmental management
- Ability to develop environmental management strategies for simultaneously cultivating environmental conservation and generating benefits to realize a low-carbon, recycling society
- Knowledge and abilities to utilize valid tools for environmental management such as environmental management systems, environmental marketing, environmental reports and environmental accounting
- Ability to practice environmental management while considering market trends such as Socially Responsible Investment
- Knowledge concerning the relationship between biodiversity and corporate activities as well as legal systems including regulations on toxic chemical substances and the Green Purchase Act, and an ability to build a business model based on a risk management perspective and various environmental elements
- Management ability to provide value-added environmental products, manufacturing processes and organizational structures using concepts and assessment tools based on the concept of product lifecycle

(3) Strategic environmental thinking: Abilities that include ingenuity and a vision for incorporating the environment into a socioeconomic system and organizational foundations of corporations and municipalities; transforming social structure itself, and leading the development of a sustainable society by optimizing the use of knowledge and abilities that build upon basic ability of environmental management; practical ability of environmental management. Requirements are as follows:

- Knowledge and ability to recognize corporate social responsibilities and manage corporations in accordance with social governance based on qualities such as flexible, broad-view thinking, precise situational awareness and the ability to take action

- Ability to identify stakeholders' expectations and bring about collaboration and their involvement through dialogues with them
- New problem-solving ability to work with multi-stakeholders of the global society
- Knowledge and abilities to discover the fundamental axis of problems from a bird's-eye viewpoint and bring about solutions based on back casting thinking for solving environmental challenges
- Ability to create new businesses, policies and technology that presume both the reduction of environmental loads and the increase of added value

When acquiring the skills described above, it is important to sharpen one's abilities gradually, starting with the "basic ability of environmental management" and moving on to the "practical ability of environmental management" and the "strategic environmental thinking."

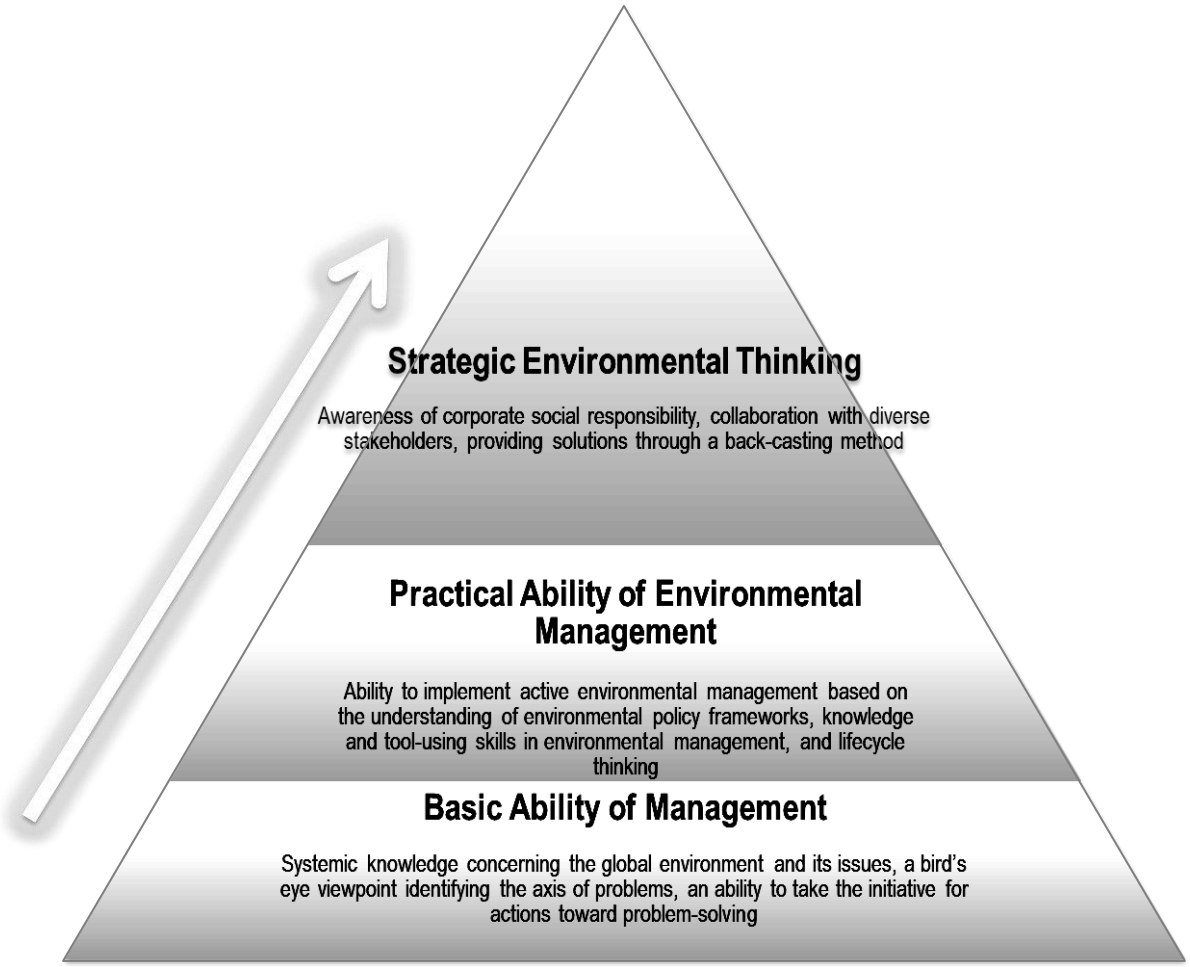


Figure 7: Three Fields of Environmental Management Capacity

In order to teach the three foundations of environmental management, "the basic ability of environmental management," "the practical ability of environmental management" and "the strategic environmental thinking," the GMP Guideline provides a course consisting of six programs based on the requirements for environmental management capacity: 【1】 Overview of global environmental studies, 【2】 Environmental policy, 【3】 Environmental management, 【4】 Sustainable business practices, 【5】 Governance for sustainable development, and 【6】 Methods for solutions.

Chapter 2 Outline of the GMP (Green Management Program) Guideline

1. Objectives of the GMP Guideline

In order to promote environmental management and strengthen human resources for such a field, the GMP Guideline summarizes the basic program philosophy, program structure and specific contents of each program for the learning and training of “environmental management capacity” through a sub-major (six programs) in the Master’s degree program. The “environmental management capacity” consists of the following characteristics: “Basic ability of environmental management” that include systematic knowledge and a bird’s-eye viewpoint concerning the global environment and its issues; “practical ability of environmental management” that implements active environmental management based on the understanding of environmental policy frameworks and policy making processes, knowledge and tool-using skills in environmental management and life cycle thinking; and “strategic environmental thinking” which brings about new business, policies and technology by being aware of corporate social responsibility, promoting collaboration with diverse stakeholders and using back casting thinking.

2. Targets for the GMP Guideline

The GMP Guideline has been developed for future executives in large, medium and small companies as well as students (at a graduate level) who are seeking employment in environmental fields.

3. Use of the GMP Guideline

The GMP Guideline is prepared for the use as a sub-major program for training environmental leaders during Master’s degree courses in Japan. The GMP Guideline is for MBA/MOT programs that mainly target employees (including professional graduate schools) as well as a wide range of graduate schools in economics, management, legal studies, science and engineering and agriculture.

The GMP Guideline is designed to create interdisciplinary, synergistic results when the characteristics of courses in the major are incorporated, such as MBA + GMP sub-major or science and engineering major + GMP sub-major. The relationship between courses in the major and the GMP Guideline (e.g. credits to graduate) is determined by each graduate school.

It is also possible to design a credit-transfer system with other graduate schools depending on each school’s conditions.

4. Structure of Programs in the GMP Guideline

Based on the requirements for “environmental management capacity” in the GMP Guideline, the course consists of the following six programs:

【1】 Overview of global environmental studies
【2】 Environmental policy
【3】 Environmental management
【4】 Sustainable business practices
【5】 Governance for sustainable development
【6】 Methods for solutions

First, in 【1】 Overview of global environmental studies, students develop “basic ability of environmental management” by acquiring systematic knowledge and a bird’s-eye viewpoint concerning the global environment and its issues as well as the ability to take initiative to solve environmental issues. Then in the three core programs, 【2】 Environmental policy, 【3】 Environmental management and 【4】 Sustainable business practices, the students develop “practical ability of environmental management” by cultivating their capacity to implement active environmental management based on the understanding of environmental policy frameworks as well as the knowledge and skills in environmental management, and lifecycle thinking.

In 【5】 Governance for sustainable development and 【6】 Methods for solutions, students develop “strategic environmental thinking” in order to solve environmental issues by learning the awareness of corporate social responsibility, collaboration with diverse stakeholders and methods to bring about solutions through back casting thinking.

Gradual learning through three courses aims to develop “environmental leaders with environmental management capacity” to incorporate the relevant environmental concerns into a socioeconomic system and create new business, policies and technology for realizing both the reduction of environmental loads and the increase of product, service and corporate values.

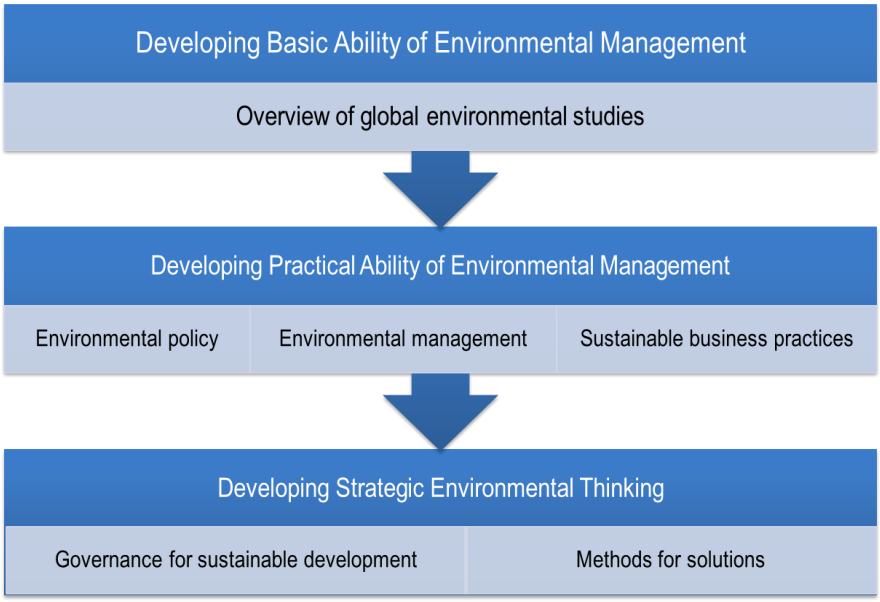


Figure 8: Structure of Programs in the GMP Guideline

Each stage in learning "environmental management capacity" in the GMP Guideline is summarized below:

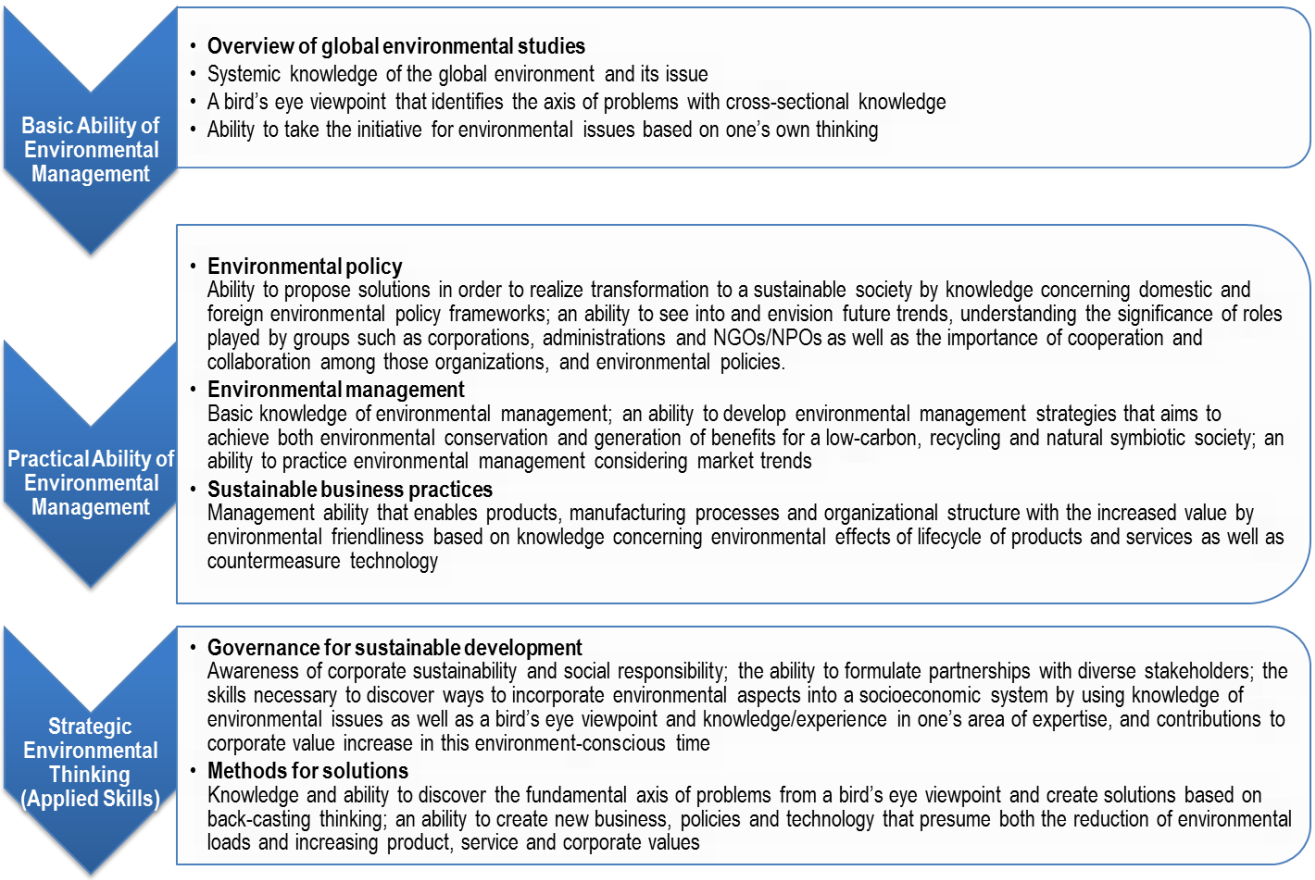


Figure 9: GMP Guideline and Each Stage in Learning "Environmental Management Capacity"

Six programs of the GMP Guidelines are structured assuming 15 classes (units) per class are offered over two semesters. The curriculum model is designed as follows:

(1) (First semester of the first year): 【1】 Overview of global environmental studies
(2) (Second semester of the first year): 【2】 Introduction to Environmental Policy, 【3】 Introduction to Environmental management, 【4】 Sustainable business practices
(3) (First semester of the second year): 【5】 Governance for sustainable development, 【6】 Methods for solutions

Points to note with regard to program structure

The program of the GMP Guidelines is structured in a way that knowledge and skills are acquired gradually, thus in principle, it is preferable to take courses chronologically, i.e. (1) → (2) → (3) above.

When structuring a program using the GMP Guidelines, it is important to coordinate and control the overall program from the preparation stage to the class practice stage by establishing a program committee, etc. in order to ensure consistency through all the classes and programs while giving consideration to linkage between classes and programs as well as balance among academic fields. In particular, when one program is taught by multiple instructors based on the collective-teaching system, a coordinator should be assigned to manage the specific contents of each class.

Furthermore, upon opening a program based on the GMP Guidelines, it is essential to provide guidance with regard to the purpose of the program as a whole, the contents to be learned, ("basic ability of environmental management," "practical ability of environmental management" and "strategic environmental thinking"), relevance and attainable goals (assessment indicators) of each program.

5. The Structure of Each Class

Each of the six programs of the GMP Guideline consists of 15 classes. A class is then structured by educational goals and a summary of educational contents based on the goals (basic contents, important points, descriptions of basic contents, keywords, additional contents and their keywords). Specific structure of each class is as follows:

■ Objectives

Describes a summary of educational contents and descriptions of "knowledge," "skill" and "ability" which should be acquired in the corresponding classes.

■ Outline of Educational Contents

1. Basic Contents

This section explains basic content in each class, including "background" and "causal structure." It provides a model of a 90-minute lesson from an "introduction" to a "conclusion"

for each class and a guideline for time distribution when teaching the content.

*Example of the basic contents

(1) Introduction (10 minutes)

(2) XXX (30 minutes)

(3) YYY (40 minutes)

(4) Conclusion (10 minutes)

The Points of this Class

Points to be presented when teaching each class are explained in this section.

2. Description of the Basic Contents

This section describes specific contents to be taught for each “basic content.”

3. Keywords for the Basic Contents

Keywords for the “basic contents” are explained if applicable.

4. Additional Contents (if necessary)

Contents that can be utilized depending on a situation or taught as an addition are listed with some details.

5. Additional Keywords (when necessary)

Keywords for additional contents are explained in this section if applicable.

6. Summary of the GMP Guideline’s Six Programs

Summary of each program of the GMP Guideline and requirements for environmental management capacity to be acquired are as follows:

【1】 Overview of global environmental studies

This program consists of **9 basic classes** and **6 itemized discussions on environmental issues**.

First, perspectives to examine environmental issues are developed in “Introduction: What are environmental problems?” (Basic 1).

Next, in order to learn “The relationship between the earth and mankind; environmental issues and measures,” the relationship between population growth and environmental issues as well as threats by human activities upon ecosystems are studied in “History of the earth and mankind and environmental issues” (Basic 2), “Global system and ecosystem” (Basic 3), “Resources and global capacity” (Basic 4), and “History of environmental measures” (Basic 5). Pollution and countermeasures in Japan and environmental issues and responses at the global scale are also

studied. Students will then comprehend the overall picture of the relationship between the earth and mankind, environmental issues and countermeasures.

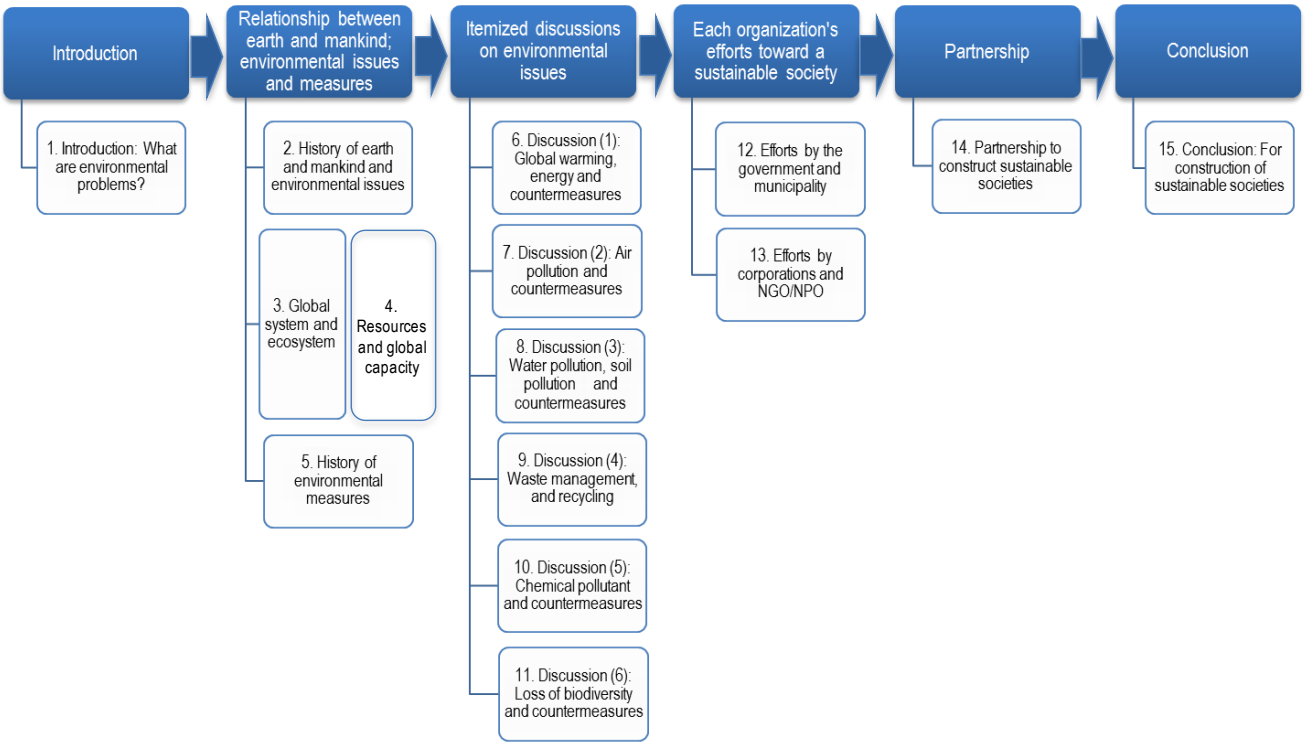
Actions for solving environmental issues are promoted by learning individual problems. See “Global warming, energy and countermeasures” (Discussion 1), “Air pollution and countermeasures” (Discussion 2), “Water pollution, soil pollution and countermeasures” (Discussion 3), “Waste management, and recycling” (Discussion 4), “Chemical pollutant and countermeasures” (Discussion 5), “Loss of biodiversity and countermeasures” (Discussion 6).

Additionally, in “Each organization's efforts toward a sustainable society (Efforts by the government and municipality - Basic 6 - and Efforts by corporations and NGO/NPO - Basic 7),” students study cases and learn the roles and responsibility of efforts by the government, municipalities (administrations), corporations and NGOs/NPOs. In “Partnership to construct sustainable societies” (Basic 8), students deepen their understanding of roles and responsibilities of diverse organizations consisting of a society as well as the significance of collaboration between the organizations.

At the end in “Conclusion: For construction of sustainable societies” (Basic 9), students understand the overall picture of environmental issues covered in each class and the concept of sustainability while reviewing the understanding of relevance between one’s own actions and environmental issues.

【Requirements for Environmental Management Capacity】

- Systematic and cross-sectional knowledge and understanding of the global environment and its issues in order to perceive an overall picture;
- A bird's eye viewpoint that enables understanding of the relationship between environmental issues and corporate management as well as an ability to identify the axis of problems associated with environmental issues based on systematic and cross-sectional knowledge
- Ability to take the initiative to examine environmental issues based on one’s own thinking



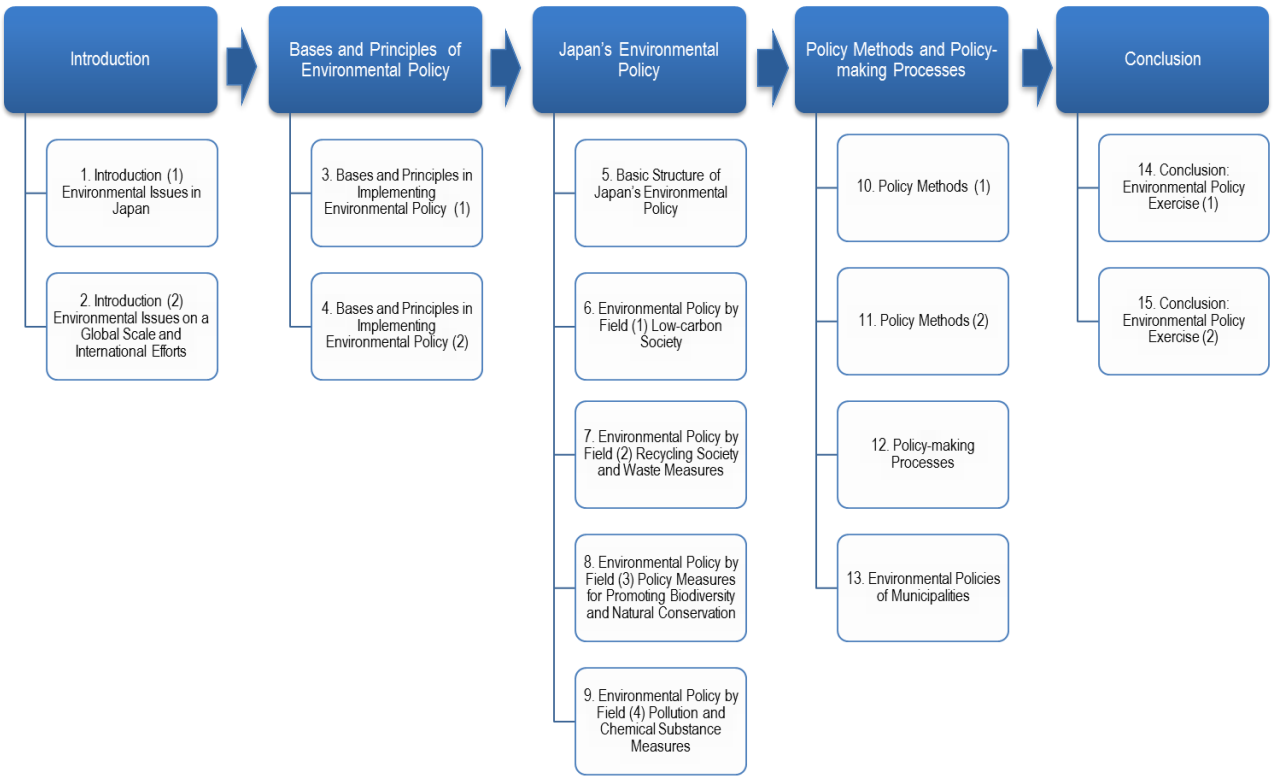
【2】 Environmental policy

In this program, students learn and gain the understanding of domestic and international frameworks, philosophies, principles and trends of environmental policies from a bird's-eye viewpoint, while assessing environmental policy contents that are related to corporate activities. Particularly, in order to take appropriate responses to diverse environmental policies and regulations, students deepen their understanding of the preparation, planning, backgrounds and reasons for such policies and regulations as well as policy-making processes. Global trends in environmental issues are also studied for developing abilities to envision and have insight on significant trends and the future direction of society.

First, students review the history and structure of domestic and foreign environmental issues and measures to strengthen the understanding of the bases and principles that provide a foundation for formulating and implementing environmental policies. Next, students will examine basic philosophies and the structure of current environmental policies in Japan, which is illustrated in the Basic Environmental Act. Further, students will examine the current situation and issues with regard to the structure of problems, policy philosophy, goals, organizations, policy methods for each of the main four environmental policy fields (low-carbon society, recycling society, waste measures, biodiversity conservation and natural protection policies), and measures on pollution and chemical substances. In addition, upon learning about policy formulation, goals, organizations and methods of environmental policy by municipalities, students develop abilities to take the initiative in proposing solutions through policy-making exercises in which they assess current policies from their own viewpoints, identify issues and make proposals for solving the issues.

【Requirements for Environmental Management Capacity】

- Understanding a big-picture of the frameworks, principles, trends and backgrounds of domestic and international environmental policies that are necessary for corporate activities;
- Ability to comprehend the frameworks, overall picture as well as goals of environmental policies and to envision and have insight on future trends;
- Ability to take the initiative in examining and proposing solutions based on the understanding of roles played by each organization (i.e. corporations, administrations, NGO/NPOs), significance of cooperation and collaboration, and how to realize the transition to a sustainable society through environmental policies



【3】 Environmental management

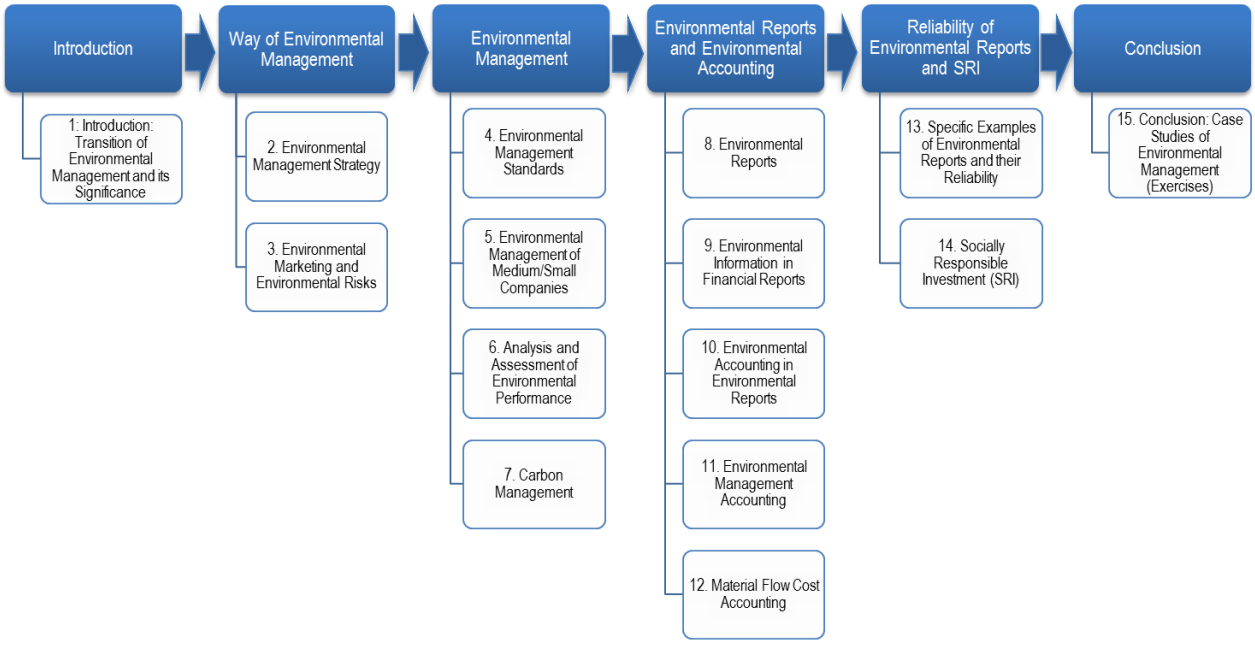
Students deepen their understanding of environmental management as a whole by learning philosophies of environmental management, which consider the realization of a low-carbon, recycling and symbiotic society as new business opportunities and aims to achieve environmental preservation and the increase of value by environmentally friendly products and processes, and by gaining basic knowledge and practical abilities concerning management tools in addition to the ability to understand environmental reports.

First, in order to understand why “environmental management” is necessary, students review the transition of environmental management that began as a corporate response to pollution. They then can comprehend that the future philosophy for corporate management includes active environmental management founded on the goal of realizing a low-carbon, recycling and symbiotic society. Students then examine management strategies from an active environmental management perspective while

verifying corporate values that can be linked to environmental marketing and its effects, as well as factors linked to environmental risks and their damages. Next, the class discusses carbon management from various perspectives such as: Environmental management system standards for controlling corporate efforts in environmental preservation; analysis and assessment methods and information of environmental performances that provide criteria for decision-making in environmental management; and how to reduce corporate greenhouse gas emissions. Students also learn the significance and framework of environmental reports (a part of environmental communication), and study environmental information that is incorporated into financial reports as the awareness of environmental risks increases. Furthermore, students learn external environmental accounting for the purpose of information disclosure, the concept of environmental cost in management accounting for solving unique problems within a corporation, material flow cost accounting that reconfigures corporate information systems and accounting calculation methods from an environmental perspective. After examining a system to ensure reliability of environmental reports, students will learn the Socially Responsible Investment method and domestic and foreign efforts of SRI. Students will then deepen the understanding of environmental management as a whole through the analysis of practical cases of reports that illustrate the reality of this component.

【Requirements for Environmental Management Capacity】

- Basic knowledge of environmental management;
- Ability to develop environmental management strategies that aims to simultaneously achieve environmental preservation and creation of benefits to realize a low-carbon, recycling and symbiotic society;
- Knowledge and ability to utilize effective tools for environmental management systems, environmental marketing, environmental reports and environmental accounting;
- Ability to practice environmental management alongside market trends, such as Socially Responsible Investment.



【4】 Sustainable business practices

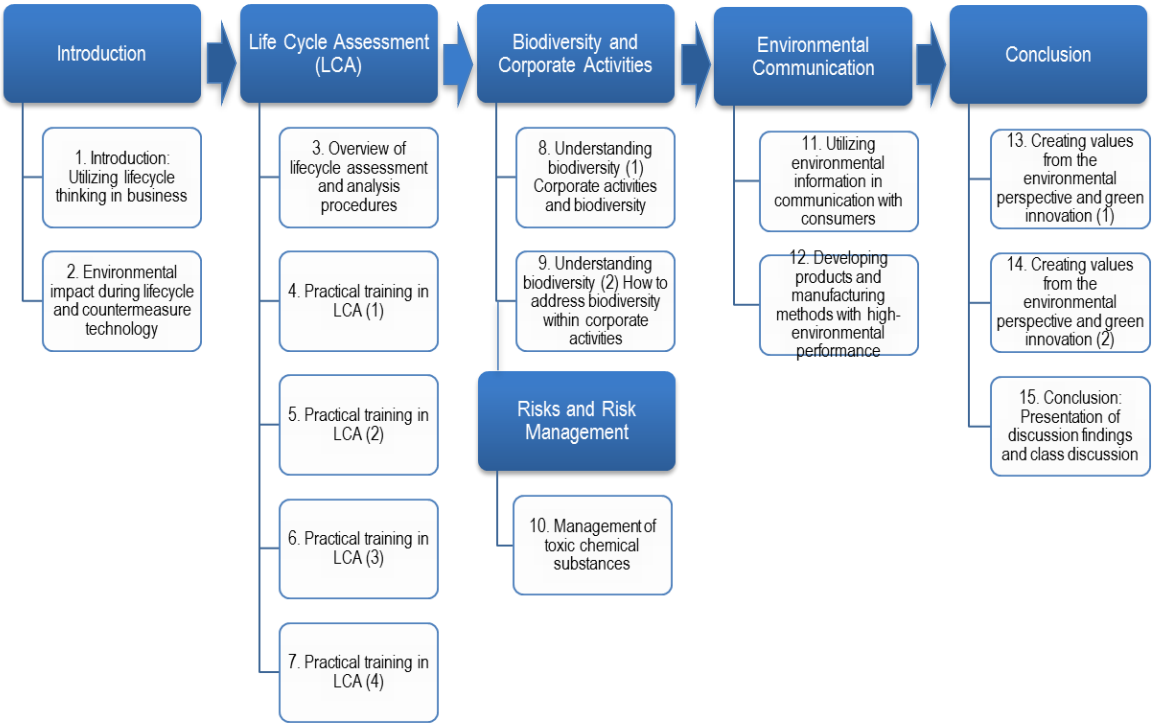
This program prepares students for concepts and assessment tools based on lifecycle thinking, and helps them acquire knowledge and skills concerning the development of products and manufacturing methods with added values in an environmental context as well as building organizations. The goal of this program is to develop environmental leaders who can propose business models that realize green innovation by applying the knowledge and skills in practical scenarios.

Students first study the concept of “lifecycle thinking” that provides the basic principle for sustainable businesses. In this process, students learn from practical cases how corporate values can increase through designing and delivering products and services based on lifecycle thinking, and examine the causes of major global environmental issues, their influence on human beings and ecosystems, the current measures and their significance. Next, students will learn the summary and analysis procedures of lifecycle assessment (LCA). Students will have four practical training sessions where they actually set goals - set the scope of research, perform inventory analyses, perform impact assessment, interpret results -in order to acquire the ability to utilize LCA to increase corporate values by developing products with high environmental performance. Based on the understanding of why corporations need to address biodiversity conservation, students examine that products and services with the consideration of biodiversity bring about new business opportunities and that sustainable material procurement is important. They also study risk management as a general principle in the course of learning chemical risks and compliance risks in the management of toxic chemical substances. Additionally, students have opportunities to study the outline and standards of environmental labeling and the Green Purchase Act while examining environmental communication

and marketing cases where such standards are utilized. Finally, students build and propose business models with regard to green innovation in diverse fields such as products, services, organizations and business processes. The class will evaluate the models and engage in comprehensive discussion on green innovation that strives for the creation of values from an environmental perspective.

【Requirements for Environmental Management Capacity】

- Knowledge and abilities to utilize valid tools for environmental management such as LCA;
- Knowledge concerning the relationship between biodiversity and corporate activities as well as legal systems such as regulations on toxic chemical substances and the Green Purchase Act; Ability to build business models based on diverse environmental factors and risk management perspectives;
- Management ability to build products with added values, manufacturing processes and organizational structure in an environmental context by using concepts and assessment tools based on lifecycle thinking.



【5】 Governance for sustainable development

Students learn basic ideas and philosophies in governance necessary for decision-making with regard to corporate environmental management, while developing “values” for corporations to assume social responsibility and accountability as well as to practice business management based on social governance through case studies.

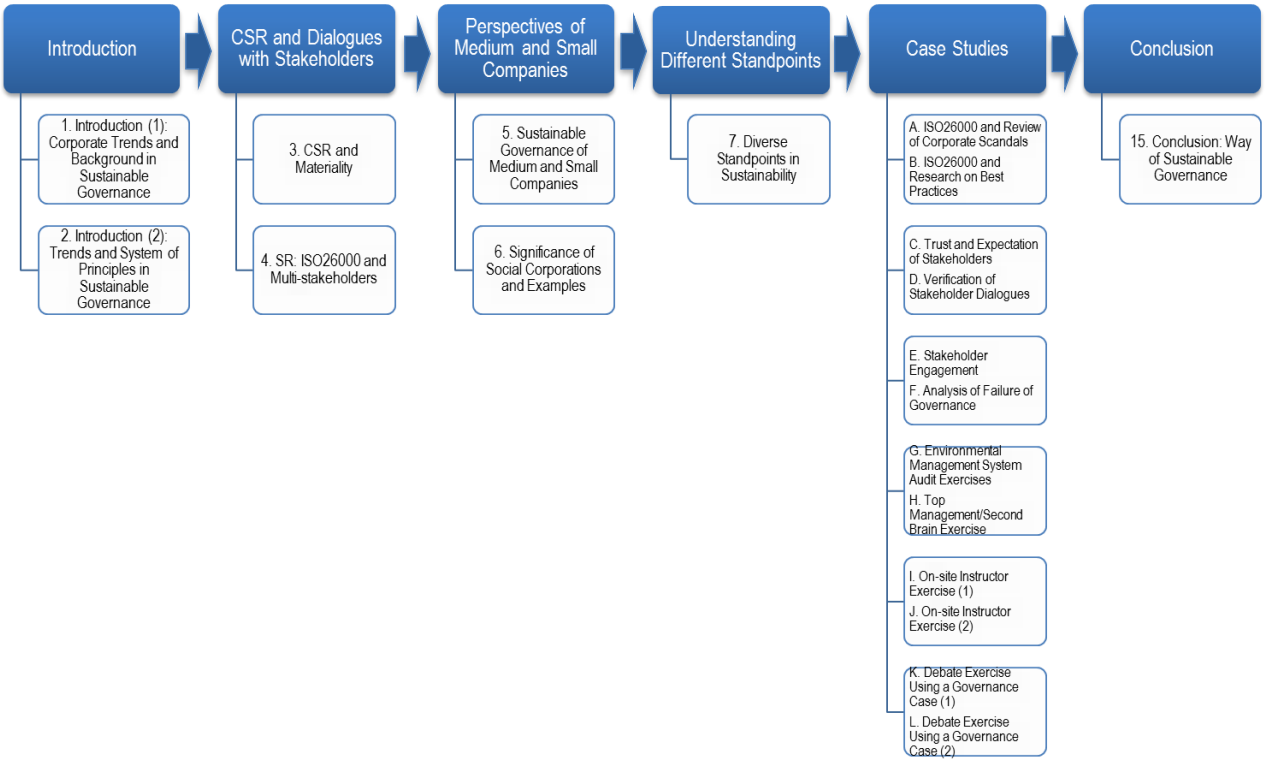
In the first half of the course, students discuss future trends by examining the background of concept formulation of sustainable governance from the perspectives of time (past, present, future), space (phenomena in Japan and abroad), and organizations (corporations and diverse stakeholders) and

with a focus on the Global Compact, ISO26000 and social capitals. Students then learn the importance of dialogues and cooperation with stakeholders by studying the following topics: Relationship between CSR and materiality; the Triple Bottom Line of the Global Reporting Initiative (GRI) Guidelines; specific contents of GRI's economic, social and environmental indicators and corporate management based on CSR that incorporates such indicators; philosophy of multi-stakeholders as well as stakeholder engagement that make the core of ISO26000; and roles of corporations as players in forming a sustainable society. Furthermore, in order to expand CSR and environmental management among medium and small companies where most efforts are needed, students examine specific measures for effectively disclosing the environmental information of products and services. They also examine progressive cases in Japan and abroad to strengthen their understanding of the significance of "social corporations" as the new business model for medium to small companies, which will become the focus of a social system reform for realizing sustainable governance, and explore the possibility of such reform.

In the latter half of the course, based on the contents of the GMP Guideline's four programs that are expected to be completed (【1】 Overview of global environmental studies, 【2】 Environmental policy, 【3】 Environmental management and 【4】 Sustainable business practices), students are engaged in practical applications through case studies including workshops, and will develop abilities to implement actual tasks on CSR in order to further develop their ability for strategic environmental thinking.

【Requirements for Environmental Management Capacity】

- Building upon qualifications including flexible thinking with a broad perspective, accurate contextual awareness and a consistent ability to take actions, the knowledge and ability to practice corporate management in accordance with the awareness of corporate social responsibility and social governance
- Ability to identify stakeholders' expectations and bring about collaboration through dialogues with stakeholders and stakeholder engagement
- Ability to solve new issues among multi-stakeholders in the global society



【6】 Methods for solutions

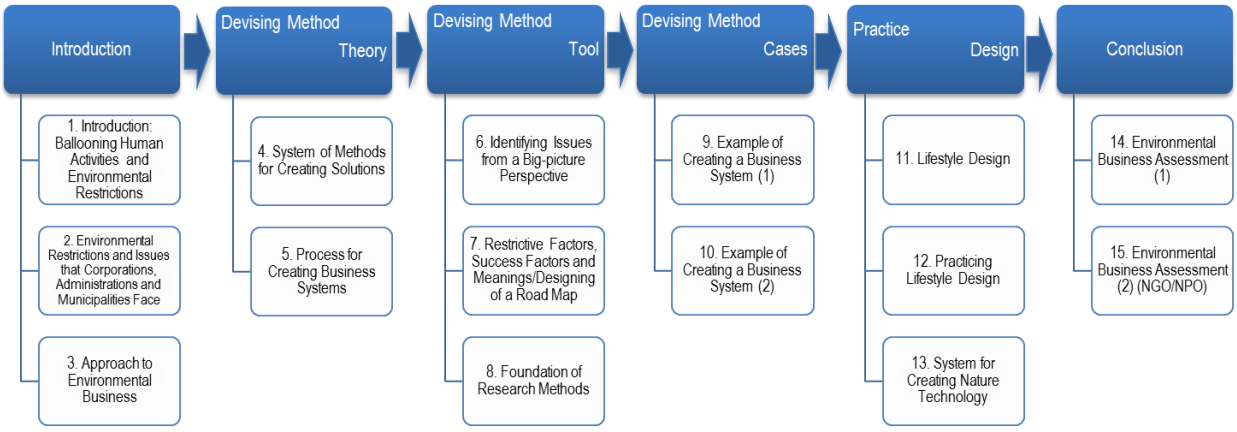
Students learn the process of creating new business, policies and technology by discovering fundamental issues based on a bird's-eye viewpoint and using a thought process for generating solutions (such as the simple question method and the back casting method) in order to solve environmental issues which corporations, administrations and municipalities face under environmental restrictions. In order to obtain these skills, students will repeat devising businesses, etc. virtually. Also, analyzing actual cases of corporations and administrations in environmental issues and simulating what kind of decisions were made by using the back casting method will help students discover fundamental problems from a bird's-eye viewpoint and train themselves in thought processes that create solutions. In particular, the class objective is to cultivate effective work practices to solve environmental issues by addressing problems in actual cases of corporations, administrations or municipalities.

Students first understand the thought framework of this program including: Environmental issues as the result of ballooning human activities; importance of lifestyle transformation toward solutions; the global environmental mega-trend encouraging corporations, administrations and municipalities to practice management based on the Triple Bottom Line; and the possibility of new business creation that ensures rich life under environmental restrictions by using back casting thinking. Students then learn a solution-creation method for business, policies and technology as well as a process to create business systems. After studying valid tools for creating solutions and specific cases of business systems creation, students learn the meanings and processes of the lifestyle design method that promotes innovation under environmental restrictions, they will actually design products, and will then assess them in the class. In addition, students will investigate cases in nature technology as an

example of technology solutions. And finally, students examine and assess actual cases by large corporations, social corporations, NGOs/NPOs in recent environmental businesses by using back casting thinking.

【Requirements for Environmental Management Capacity】

- Knowledge and abilities to discover the fundamental axis of problems from a bird's-eye viewpoint and create solutions based on back casting thinking in order to solve environmental issues
- Ability to create new business, policies and technologies that presuppose both the reduction of environmental loads and increase of value by environmentally friendly products and processes



Chapter 3 Contents of Six Programs in the GMP Guideline

【1】 Overview of global environmental studies

"*Guidelines for T-shaped Environmental Leadership Development Program to Cultivate "Environmental Ability" (An Undergraduate Foundation Program) (Version 2010)*" (hereinafter "the Environmental Ability Guideline"), which were reviewed and prepared separately from the GMP Guideline, will be used for this program. For specific educational contents of its 15 classes, please refer to the Environmental Ability Guideline.

The Environmental Ability Guideline is presented as an educational guiding principle mainly for general education courses at universities to foster T-shaped environmental leaders with basic environmental knowledge and an ability to take action for solving environmental issues, i.e. "environmental ability." The Environmental Ability Guideline is not intended to target a particular department; it is designed for use in a wide range of departments, both humanities and sciences, and for developing basic environmental knowledge and abilities required for corporations.

The GMP Guideline identifies "Overview of global environmental studies" as a program in which students develop their basic knowledge and skills with regard to global environment issues in order to acquire "basic ability of environmental management" that lay the foundation for environmental management capacity. The outline of its educational goals and program structure is described in the following sections:

1. Educational Goals

- To develop abilities and attitudes that enable understanding, decision-making and actions concerning how individuals and society should behave when attempting to build a sustainable society based on a bird's eye viewpoint of the overall environmental issues as well as an understanding of environmental issues, human activity and the interrelation and complexity of individual issues.

- To understand current environmental issues in addition to scientific, economic and social elements necessary for learning the causal structure and systems within the issues; to develop abilities and attitudes that enable understanding, decision-making and actions regarding environmental policies for solving environmental issues, the role of each organization and the efforts of corporations as well as NGOs/NPOs.

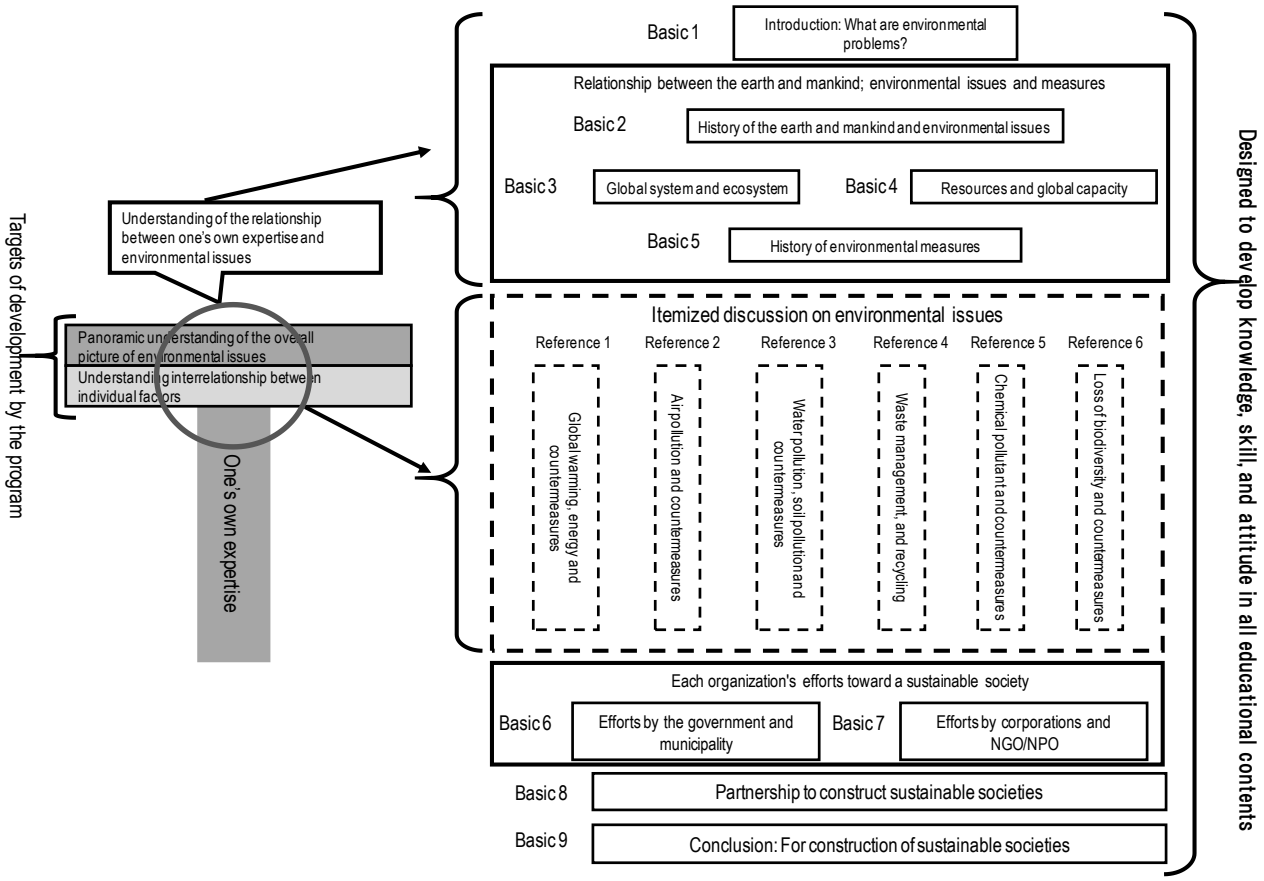


Figure 10: Relation between the T-shaped Environmental Leadership Development and the Contents of Environmental Education (Source: *Guidelines for T-shaped Environmental Leadership Development Program to Cultivate "Environmental Ability" (An Undergraduate Foundation Program) (Version 2010)*, p.16)

2. The Structure of the Program

The program consists of **nine basic classes** and **six itemized discussions on environmental issues**. **Basic classes** are organized into the following nine topics: "Introduction: What are environmental problems? (Basic 1)"; "The relationship between the earth and mankind; environmental issues and measures (Basic 2-5)"; "Each organization's efforts toward a sustainable society (Basic 6-7)"; "Partnership to construct sustainable societies (Basic 8)"; "Conclusion: For construction of sustainable societies (Basic 9)". These basic classes and 6 itemized discussions are combined to encompass the whole program.

"Introduction: What are environmental problems?" (Basic 1): Students comprehend the relationship with fringe issues as well as organize and generate their viewpoints regarding environmental issues after understanding an historical review of environmental issues, the process of problem generation, and other diverse elements to consider the cause of and solution to the problems.

"The relationship between the earth and mankind; environmental issues and measures" are organized into the following four basic classes.

“History of the earth and mankind and environmental issues” (Basic 2): After understanding the relation between population growth and environmental issues, as well as the interrelations between the development of human society and the increase in the consumption of energy resources, students will nurture environmental ethics for building a sustainable society.

“Global system and ecosystem” (Basic 3) and “Resources and global capacity” (Basic 4): Students will learn that global systems, ecosystems, etc. are in critical condition due to human activities and will consider how society should proceed, while considering environmental topics such as: The earth’s 4.6 billion year history and the scientific mechanism at work within the global system; ecosystem services carried through the earth’s ecosystems; availability of natural resources; environmental carrying capacity, etc.

“History of environmental measures” (Basic 5): Students will explore pollution problems and countermeasures in Japan as well as environmental issues generated at the global level and their corresponding measures. Students will learn lessons from the experience of pollution problems and from global environmental issues under present circumstances and their future outlook.

Students will then learn about environmental issues as a whole from the viewpoints of natural history, history of mankind and culture, or human socioeconomic activities; comprehend the general summary of the programs of “the earth” and “mankind”, its interdependence and causative relations from a wide perspective; cultivate the capacity to think on one’s own and make their own decisions, and develop the attitude to proactively and independently begin building a sustainable society.

It is widely held that to encourage action toward environmental solutions, one should learn and comprehend individual environmental problems in detail using itemized discussions (1-6) after first understanding the relation between the earth and mankind, as well as an overview of environmental issues and measures. **“Itemized discussions of environmental issues”** are composed of **“Global warming, energy and countermeasures” (Discussion 1), “Air pollution and countermeasures” (Discussion 2), “Water pollution, soil pollution and countermeasures” (Discussion 3), “Waste management, and recycling” (Discussion 4), “Chemical pollutant and countermeasures” (Discussion 5) and “Loss of biodiversity and countermeasures” (Discussion 6)**. Furthermore, one must understand not only scientific mechanisms but also the relationship between human socioeconomic activities and environmental issues, and, over the course of each class, cultivate the ability to think on one’s own and generate an attitude to take action. For example, “countermeasures” in each class of the educational contents include international treaties, political measures such as laws and policies, and the actions taken by each individual in addition to scientific technical measures.

“Each organization's efforts toward a sustainable society” (“Efforts by the government and municipality,” Basic 6 and “Efforts by corporations and NGO/NPO” Basic 7): Students learn about the efforts of government/local municipalities (administration), corporations, NGOs/NPOs and their roles and responsibilities including examples. The classes provide students the opportunity to

understand and have firsthand knowledge of these efforts by inviting representatives from organizations etc. who can describe practical measures they have implemented.

“Partnership to construct sustainable societies” (Basic 8): Students will be engaged in research/discussion, understand the roles and responsibilities of diverse organizations which compose a society, comprehend the importance of these organizations’ efforts for a sustainable society through collaboration, and develop an attitude to take action on one’s own.

“Conclusion: For construction of sustainable societies” (Basic 9): Students will understand the general summary of the environmental issues learned thus far and the concept of sustainability, and explore the relevance between one’s own behavior and environmental issues. Students will be able to explain the actions to be taken, and will be encouraged to carry them out, after comprehending the overall structure, interrelationships, and complexities of the issues.

The Environmental Ability Guideline considers the “Itemized discussions on environmental issues” as options. However, students should be advised that the 6 classes in “Itemized discussions on environmental issues” become prerequisite when using them as Guideline for one of the 6 GMP programs, “Overview of global environmental studies,” in order to develop the “basic ability of environmental management” that are the basis on which environmental management capacity stands.

【2】 Environmental Policy

1. Educational Goals

Students will study and understand the framework, philosophy, principles and trends of domestic and international environmental policy from a bird's eye viewpoint, while learning the elements of environmental policy related to corporate activities. They will also deepen their understanding of the background, reasons and policy-making processes of preparing, planning, enacting and revising environmental policy regulations and laws in response to changes in environmental issues. Additionally, students will study international trends in environmental issues, strengthening their abilities to envision and develop insights on major trends and directions of future society. In order for students to respond actively to the development and practices of environmental policies, they will also engage in policy measure exercises in order to develop the ability to take the initiative in assessing the current situation on issues concerning environmental policies as well as proposing solutions.

2. Structure of the Program

1) Introduction (1) Environmental Issues in Japan
Students will comprehend the goals and structure of the program as well as the history and structure of environmental issues and proactive measures in Japan. (Specific Topics) Four Major Cases of Pollution, Basic Law for Environmental Pollution Control, Establishment of the Environment Agency, Urban and Lifestyle-Related Pollution, Global Environmental Issues, Basic Environment Law, Establishment of the MOEJ, etc.

2) Introduction (2) Environmental Issues on a Global Scale and International Efforts
Students deepen their understanding of the emergence of environmental issues on a global scale and the history and structure of international efforts. (Specific Topics) United Nations Conference on the Human Environment (Stockholm Conference), World Commission on Environment and Development (Brundtland Commission), United Nations Conference on Environment and Development (Earth Summit), World Summit on Sustainable Development (WSSD), etc.

3) Bases and Principles in Implementing Environmental Policy (1)
Students deepen their understanding of the principles that provide the foundation for formulating and implementing environmental policy. (Specific Topics) (Principles concerning implementation stages)

Proactive principle, preventive principle, source control principle, (Principles concerning operating bodies) polluter-pays principle

4) Bases and Principles in Implementing Environmental Policy (2)
(Operating bodies) Principle of extended producer responsibility, principle of designer responsibility, (Cooperation among operating bodies) Collaboration principle, subsidiarity principle, importance of citizen participation

5) Basic Structure of Japan's Environmental Policy
Students learn the basic philosophy and structure of current environmental policy in Japan and examine future issues. (Specific Topics) Basic Environment Law, Basic Environment Plan, Strategy for an Environmental Nation in the 21st Century

6) Environmental Policy by Field: This class discusses 4 major fields in environmental policy. The class examines the current situation and issues of each field by looking at its issue structure, philosophy of political measures, goals, organizations and policy methods.
Environmental Policy by Field (1) (Low-carbon society)
(Specific Topics) Structure of climate change issues, scientific mechanism (IPCC report, etc.), economic and social assessment, international frameworks (Framework Convention on Climate Change, Kyoto Protocol, Kyoto Mechanism, the international framework since 2012), domestic measures (Law Concerning the Promotion of the Measures to Cope with Global Warming, Action Plan for a Low-Carbon Society, Law Regarding the Rationalization of Energy Use), future issues (Draft for Basic Law Concerning Measures to Cope with Global Warming, Taxation for Global Warming Measures, Japan's Voluntary Emissions Trading Scheme, Feed-in Tariffs for Renewable Energy), etc.

7) Environmental Policy by Field (2) Recycling Society and Waste Measures
(Specific Topics) Philosophy of a recycling society, current situation of waste measures (the Basic Act for Establishing a Sound Material-Cycle Society, the Fundamental Plan for Establishing a Sound Material-Cycle Society, laws and regulations concerning waste and recycling), future issues

8) Environmental Policy by Field (3) Policy Measures for Promoting Biodiversity and Natural Conservation
(Specific Topics) Philosophy of biodiversity and natural conservation, international frameworks (Convention on Biological Diversity/Nagoya Protocol/Aichi Target, etc.), domestic measures (Basic

Act on Biodiversity, National Strategy on Biological Diversity, Citizen Participation Guidelines for Biodiversity, Nature Conservation Law, Natural Parks Law), future issues

9) Environmental Policy by Field (4) Chemical pollutant and countermeasures
(Specific Topics) Structure of pollution and chemical substance issues, goals of pollution and chemical substance measures, current situation of domestic measures scheme and methods (Air Pollution Control Law, Noise Regulation Law, Vibration Regulation Law, Offensive Odor Control Law, Water Pollution Control Law, Soil Contamination Countermeasures Law, Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management (PRTR), international trends (EU's directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment / Restriction of Hazardous Substances Directive/RoHS, REACH, etc.), future issues

10) Policy Methods (1)
Students deepen their understanding of various policy methods used as environmental policy tools. They also study the possibility of combining such policy methods (policy mix). (Specific Topics) Direct control methods, framework control methods, economic methods

11) Policy Methods (2)
Voluntary effort methods, informational methods, procedural methods, significance and examples of policy mix

12) Policy-making Processes
Actual process of environmental policy-making (enactment process of laws and conventions), consensus-forming of stakeholders, relationship between science and policy measures/politics, roles of professionals, roles and involvement of corporations and citizens, significance of information disclosure, etc.

13) Environmental Policy of Municipalities
Goals, organizations and means of environmental policy by municipalities, basic environmental ordinances, pollution control agreements, various cases of environmental policy by progressive municipalities

14) Conclusion: Environmental Policy Exercise (1)

Students choose a particular policy field, assess the current policy measures from their unique points of view, identify issues, prepare and present policy proposals toward solutions, and discuss the contents among students as well as with instructors

15) Conclusion: Environmental Policy Exercise (2)
Same as above

3. Points to Note

Instructors should help students strengthen their comprehension of individual environmental policy systems and schemes and systems in general, so a dynamic process of how a sustainable society can materialize. From this perspective, students need to make efforts not only in acquiring knowledge about the current environmental policy situation, but also in understanding backgrounds, circumstances and issues. Also, instructors should cultivate attitudes in students that enable them to understand the significance of each participant's role, including that of governments, municipalities, corporations and citizens, and the cooperation between them. Students should also be encouraged to voluntarily take part in the advancement of environmental policy. It is also important to make considerations toward developing abilities to examine and actively propose solutions to environment problems. Thus instructors should notify students during the introduction that "Environmental Policy Exercise (1)" and "Environmental Policy Exercise (2)" require that each student identify a policy measure issue, prepare solutions, then present and discuss their findings in a class to be held on the 14th and 15th sessions.

2.1 Introduction (1): Environmental Issues in Japan

■ Goal

The instructors clarify the goals and structure of this topic.
The goal of this topic is to deepen understanding about the individual system and scheme as well as the overall system of environmental policy measures, while understanding a dynamic process of the transformation to a sustainable society.
In order to trace the historical transition of environmental issues and policies, the class will study the emergence of environmental issues mainly in post-war Japan and the response processes through which students deepen their comprehension of the history and structure of environmental issues and countermeasures.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction: Goal and structure of the program (10 minutes)
(2) Occurrence and response process of environmental issues (15 minutes)
(3) Discussion on causes of industrial pollution, background of slow response by municipalities and the government, organizations that took leading roles in solving issues (15 minutes)
(4) Lessons learned from industrial pollution and assessment of Japan's system to manage industrial pollution (20 minutes)
(5) Changes in types of environmental issues and the necessity of environmental policy innovation (20 minutes)
(6) Conclusion: Direction and issues for the future (10 minutes)

Main Points in This Class

First, instructors should clarify the aim and overall structure of the program. Students need to make an effort not only to acquire knowledge about the current situation of environmental policy but likewise, try to understand backgrounds, circumstances and issues surrounding the policies. Also, instructors should cultivate attitudes in students that enable them to understand the significance of each participant's role, including that of governments, municipalities, corporations and citizens, and the cooperation between them. Students should also be encouraged to voluntarily take part in the advancement of environmental policy. It is also important to make considerations toward developing abilities to examine and actively propose solutions to environment problems.
Next, instructors should categorize post-war Japan into 4 periods based on socioeconomic conditions, types of environmental issues and the progress of establishing legal systems and measures, then discuss the emergence of environmental issues and the response process regarding them in post-war Japan.
Instructors should facilitate a class examination of questions including: What caused tragic industrial pollution as in the four major pollution cases? Why were responses from municipalities and the government delayed? Which organizations took the leading role in solving issues?
Students will then have an opportunity to assess lessons learned from industrial pollution problems and Japan's systems to manage industrial pollution.
Finally, the class will review changes in types of environmental issues and the necessity of environmental policy innovation by focusing on the expansion of urban and lifestyle-related pollution, the transition from a waste-disposing into a recycling society, and the pragmatization of global environmental issues.

2. Description of the Basic Contents

(1) Introduction (10 minutes)
The instructors clarify the goal and structure of the program.

The aim of the program is to deepen the understanding of the individual system and scheme as well as the overall system of environmental policy, while understanding the dynamic process of transformation into a sustainable society.

In order to trace the historical transition of environmental issues and policies, the class will study the emergence of environmental issues mainly in post-war Japan and the response processes through which students deepen their comprehension of the history and structure of environmental issues and measures.

Students need to make efforts not only in acquiring knowledge about the current situation of environmental policy but also in understanding backgrounds, circumstances and issues surrounding those policies.

Also, instructors should cultivate attitudes in students that enable them to understand the significance of participant's role, including that of governments, municipalities, corporations and citizens, and the cooperation between them. Students should also be encouraged to voluntarily take part in the advancement of environmental policy. It is also important to make considerations toward developing abilities to examine and actively propose solutions to environment problems.

(2) Occurrence and response process of environmental issues in post-war Japan (15 minutes)

In order to trace the historical transition of environmental issues and policies, the class will study the emergence of environmental issues mainly in post-war Japan and the response processes following that phenomenon. Based on socioeconomic conditions, types of environmental issues and the progress of establishing legal systems and countermeasures, the following 4 periods are reviewed:

Post-war years of recovery and the first half of the high-growth period (occurrence and escalation of industrial pollution) (until mid 1960's)

Second half of the high-growth period (formulation of environmental policy) (late 1960's to early 1970's)

Low-growth period and urban and lifestyle-related pollution (stagnation of legislative procedures and policy-making in the environmental field) (late 1970's to 1990)

Globalization of environmental issues and new challenges in environmental policy (1990 to present)

(3) Discussion about causes of industrial pollution, the background of slow responses from municipalities and the government, organizations that took leading roles in solving the issues (15 minutes)

Main legal systems

Concept of polluter responsibility, cost burden → Polluter-pays Principle, Law Concerning Pollution-Related Health Damage Compensation and other Measures

Focus on direct regulatory instruments

Trend in pollution prevention investments

Municipality/citizen's movements that played important roles

(4) Lessons learned from industrial pollution and assessment of Japan's system against industrial pollution (20 minutes)
Importance of proactive measures → Environmental Assessment System (nearly 20 years behind from the institutionalization in Europe and the United States)
Relationship between prevention of pollution and economy → Role of pollution prevention investment
Cases: Measures against air pollution, Minamata disease, etc.
(5) Changes in types of environmental issues and the necessity of environmental policy innovations (20 minutes)
Environmental policy now faces new challenges as urban and lifestyle-related pollution expanded; the focus has shifted from waste disposal to a recycling society, and global environmental issues have emerged.
Establishment of the Basic Environment Law and the MOEJ
Diversification of policy methods (land use measures, economic measures, planning methods), necessity of policy mix
Concept of Extended Producer Responsibility
Environmental issues that go beyond national borders, global environmental issues
Other issues that Japanese society faces today (e.g. low birthrate and longevity, population decline, depopulation, deterioration of Satoyama, employment and economic stimulation by environmental investment) and a perspective of new environmental policy integration
(6) Conclusion (10 minutes)

3. Keywords in the Basic Contents

(1) Introduction: sustainable society
(2) Occurrence and response process of environmental issues: high-growth period, industrial pollution, urban and lifestyle-related pollution, global environmental issues
(3) Discussion about causes of industrial pollution, background of slow response by municipalities and the government, organizations that took leading roles in solving the issues: Polluter-pays Principle, Law Concerning Pollution-Related Health Damage Compensation and other Measures, direct regulatory instruments, pollution prevention investment, pollution prevention ordinances, citizens' movement
(4) Lessons learned from industrial pollution and an assessment of Japan's system against industrial pollution: proactive prevention, environmental assessment, air pollution in Yokkaichi, Minamata disease
(5) Changes in types of environmental issues and the necessity for environmental policy innovations: urban and lifestyle-related pollution, recycling society, Basic Environmental Law, MOEJ, land use measures, economic measures, planning methods, policy mix, Extended Producer Responsibility

2.2 Introduction (2): Global Environmental Issues and International Efforts

■ Goal

As reflected in the instances of global warming, biodiversity issues and toxic chemical contamination, today's environmental issues have become complex and diverse; in terms of a scientific mechanism, relevant fields, space and scale and involved parties, coordination between the various parties and related policies is required in order to realize a solution. Also, formulation of policy measures concerning environmental issues and the organizations to implement them are becoming diverse and multilayered. For solving these environmental issues, students should strengthen their comprehension of history, structure regarding how the issues occurred and international efforts.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction: (5 minutes)
(2) Contents and significance of the United Nations Conference on the Human Environment (Stockholm Conference) (10 minutes)
(3) Contents and significance of the report by the World Commission on Environment and Development (Brundtland Commission) (10 minutes)
(4) Contents and significance of the Earth Summit (15 minutes)
(5) Overview of the international environmental regime (15 minutes)
(6) Issues the international environmental regime faces (15 minutes)
(7) Case study (15 minutes)
(8) Conclusion: Future issues and direction (5 minutes)

Main Points in This Class

In today's society, globalization and ecological/economical interdependency is further deepening. The international community is now facing the issue of how to secure "global public benefits" such as a sound global environment in which the survival of present and future generations lies and becomes the foundation of a sustainable society. The class explores the history of how the international community has addressed this issue.
Students examine the contents and significance of the Stockholm Conference (1972), the Brundtland Report and its "sustainable development" concept, and the United Nations Conference on Environment and Development in Rio de Janeiro (Earth Summit) (1992) as specific study materials. Students then review the current international environmental regime and examine why actions based on international coordination generate restrictions.

In addition, the class will discuss the process of international framework building including actual cases of measures against acid rain, ozone layer protection measures and measures against global warming, examine them comparatively, and discuss future issues.

2. Description of the Basic Contents

(1) Introduction (5 minutes)

In today's society, globalization and ecological/economical interdependency is further deepening. Students learn that the international community is now facing the issue of how to secure "global public benefits" such as a sound global environment in which the survival of present and future generations lies and becomes the foundation of a sustainable society.

(2) Contents and significance of United Nations Conference on the Human Environment (Stockholm Conference) (10 minutes)

For the purpose of addressing industrial pollution mainly in developed countries, the United Nations Conference on the Human Environment was held (1972) and a series of environmental diplomacy measures was developed. Students will study the awareness of issues and the background of the time.

(3) Contents and significance of the report by the World Commission on Environment and Development (Brundtland Report) (10 minutes)

The Brundtland (World Commission on Environmental and Development) Report in 1987, "Our Common Future," raised the issues with regard to the reality of global environmental degradation and inequality of wealth, and conflicts in the existing system of segmented sovereign states. The Commission called for the concept of "sustainable development," which became the central theme of the Earth Summit and significantly influenced the international discussion of the environment and development.

(4) Contents and significance of the Earth Summit (15 minutes)

With the United Nations Conference on Environment and Development (Earth Summit) being held 20 years from the Stockholm Conference (1992), an agenda for large-scale, major environmental issues was defined at the international community level: A systematic series of initiatives under "Agenda 21," which comprises an action plan aiming for sustainable development of the global society in the 21st century, "Framework Convention on Climate Change" and "Convention on Biological Diversity," which are so-called twin conventions, and "Rio Declaration on Environment and Development," which determined action principles for states and individuals.

(5) Overview of international environmental regime (15 minutes)

In response to the Agenda at Rio de Janeiro, numerous efforts including international conferences, negotiations and action plans as well as treaties and protocols have been made and countless international environmental laws were established. In this session, students review an international

environmental regime. Unfortunately, when considering specific actions and achievements in improving sustainable development and global environmental issues, one must acknowledge that the regime has produced few substantive outcomes.

(6) Issues the international environmental regime faces (15 minutes)

Why does international collaboration have limitations? Students learn the following issues: In comparison to domestic environmental issues, problem structure is abstract, consensus of each member state is necessary, and it is difficult to formulate a consensus between developed and developing countries to share the responsibility (coordinating the interest between north and south such as development assistance to extremely low-income countries).

(7) Case study (15 minutes)

Students study the processes of formulating international frameworks of measures against acid rain, ozone layer protection measures and measures against global warming in comparison with the following perspectives:

- Warning from the scientific community → international collaborative research, international science panels
- Outreach by international agencies, the epistemic community
- Initiative by leading countries
- Conclusion of framework conventions
- Considerations to developing countries
- Considerations to technical and economic influence
- Conclusion of protocols

(8) Conclusion (5 minutes)

3. Keywords in the Basic Contents

(1) Introduction: globalization, ecologic and economic interdependence

(2) Contents and significance of United Nations Conference on the Human Environment (Stockholm Conference): United Nations Conference on the Human Environment (Stockholm Conference), Declaration of the United Nations Conference on the Human Environment, United Nations Environment Programme (UNEP)

(3) Contents and significance of the report by World Commission on Environment and Development (Brundtland Commission): Brundtland Commission (World Commission on Environment and Development), Our Common Future, sustainable development

(4) Contents and significance of Earth Summit: Agenda 21, Framework Convention on Climate Change, Convention on Biological Diversity, Rio Declaration on Environment and Development

(5) Overview of international environmental regime: international environmental regime

(6) Issues the international environmental regime faces: common but different responsibilities

(7) Case study: measures against acid rain, ozone layer protection measures, measures against global warming, scientific panel, epistemic community, framework convention, protocol, leading country

2.3 Principles in Environmental Policy (1)

■ **Goal**

Understanding principles that provide bases for a system is indispensable to formulate environmental policy; thus 2 sessions will be devoted to this topic. The first session discusses principles and responsible bodies in the implementation stages of measures. The goal is that students understand the contents of principles based on a historic background of the principles.

■ **Summary of Educational Contents**

1. Basic Contents

(1) Introduction: Explanation of differences between policy measures and countermeasures (5 minutes)
(2) Explanation of summary of principles concerning stages where measures ought to be implemented (5 minutes)
(3) Proactive principles (10 minutes)
(4) Preventive principles (10 minutes)
(5) Other principles concerning implementing stages of proactive environmental measures (5 minutes)
(6) Explanation of the summary of principles concerning organizations that should practice proactive environmental measures (5 minutes)
(7) Polluter-pays Principle (25 minutes)
(8) Principle of Extended Producer Responsibility (15 minutes)
(9) Principle of Designer Responsibility (5 minutes)
(10) Conclusion (5 minutes)

Main Points in This Class

With regard to rules that are to be formulated in environmental policy, students learn who should take responsibility at which stage.

2. Description of the Basic Contents

(1) Introduction: Explanation of differences between policy measures and countermeasures (5 minutes)

Principles in environmental policy describe specifically how social rules concerning environmental issues should be. Before discussing principles, instructors should talk about the difference between countermeasures and policy measures. Countermeasures refer to specific actions that an individual organization takes toward environmental conservation, while policy measures serve to create and change social rules so that organizations that should practice measures can do so at appropriate stages. Instructors should be explicit so that students understand who should take measures and the timing thereof.

(2) Explanation of the summary of principles concerning stages when countermeasures should be implemented (5 minutes)

Students review principles concerning stages when measures should be taken including the proactive principle, preventive principle, source control principle, principle of integrated pollution prevention and control.

(3) Proactive principle (10 minutes)

This principle refers to the idea that environmental issues must be avoided proactively, as once they happen, it is too late.

(4) Preventive principle (10 minutes)

This principle refers to the idea that, with regard to uncertain environmental issues, preemptive measures should be taken to avoid potential severe and irreversible impact even when scientific knowledge is not enough to prove such impact is eminent.

(5) Other principles concerning implementing stages of measures (5 minutes)

The source control principle means that whenever possible, priority measures should be taken at the source of an artifact's lifecycle. The class will also review the principle of integrated pollution prevention and control, such as the "no-data no-market" principle, "no net loss" principle, etc.

(6) Explanation of summary of principles concerning organizations that should practice measures

Students review the polluter-pays principle, the Principle of extended producer responsibility and the principle of designer responsibility as principles related to organizations that should take measures.

(7) Polluter-pays Principle (25 minutes)

This principle refers to the idea that cost related to pollution prevention and removal should be the responsibility of the polluter and the government should not cover such cost. In the explanation of the principle, instructors should clarify who polluters are as well as the cost that they should be responsible for, and exceptions to the principle.

(8) Principle of Extended Producer Responsibility (15 minutes)

This principle describes that a producer of a product should take physical and economic responsibility for the environmental load of the product even after it has been used. Instructors explain who producers are as well as the significance of the principle.

(9) Principle of Designer Responsibility (5 minutes)

The principle represents the idea that a person that determines the design of an artifact should be responsible for mitigating environmental impact through its life cycle.
(10) Conclusion (5 minutes)

3. Keywords in the Basic Contents

proactive principle, preventive principle, polluter-pays principle, principle of extended producer responsibility

4. Additional Contents

Topics that may be discussed are as follows: handling of the preventive principle based on the criticism that the principle could conceal protectionism (e.g. genetically modified crops and mad cow disease); and the handling of Extended Producer Responsibility (e.g. Law for Promotion of Sorted Collection and Recycling of Containers and Packaging).

5. Additional Keywords

genetic recombination, Law for Promotion of Sorted Collection and Recycling of Containers and Packaging

2.4 Principles in Environmental Policy (2)

■ Goal

Students deepen their understanding of principles that provide a foundation for formulating and implementing environmental policy. This second session's intent is for students to gain understanding based on historic background of principles related to implementing institutions.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction (5 minutes)
(2) Explanation of summary of principles concerning organizations that should implement policy measures (5 minutes)
(3) Contents of the subsidiarity principle (10 minutes)
(4) Subsidiarity principle and decentralization (15 minutes)
(5) Subsidiarity principle and revision of public-private role assignment (15 minutes)
(6) Contents of the collaborative principle (10 minutes)
(7) Necessity of citizen participation (10 minutes)
(8) Development of a citizen participation system (15 minutes)

(9) Conclusion (5 minutes)

Main Points in This Class

Students enhance their understanding of which organization should formulate environmental policies, and in what way. Especially, students should understand that a centralized system of decision-making has been changing significantly in both aspects of decentralization and enhanced stakeholders' participation.

2. Description of Basic Contents

(1) Introduction (5 minutes), (2) Explanation of summary of principles concerning organizations that should implement policy measures (5 minutes)

Principles in environmental policy indicate specifically how social rules concerning environmental issues should be implemented/used. Instructors should explain that students are to understand who should formulate social rules concerning environmental issues in the second session on principles.

(3) Contents of the subsidiarity principle (10 minutes)

First, instructors explain the subsidiarity principle. This can be utilized in either way: as setting relevant standards that can be managed by the private sector, and the administration should be involved as a complementary role only when the private sector cannot handle the matter, or alternatively making a foundational rule that a municipality should be responsible for matters that the it can manage and a regional administrative organization should become involved in a complementary role only when the more local administrative organization cannot handle the matters. The historic background of this principle should also be mentioned.

(4) Subsidiarity principle and decentralization (15 minutes)

Instructors explain the single legislative package for decentralization and the discussion on decentralization.

(5) Subsidiarity principle and revision of public-private assignment (15 minutes)

The class briefly reviews the trend in the revision of public-private assignment such as operation sorting.

(6) Contents of the collaborative principle (10 minutes)

Next, instructors explain the collaborative principle. This principle requires implementing organizations to share knowledge and work with stakeholders on equal terms at each stage of policy measure planning, drafting and implementing. The historic background should also be discussed.

(7) Necessity of citizen participation (10 minutes)

Instructors explain the importance of citizen participation in environmental policy based upon the discussion from the previous classes. Explanation should be given from policy makers' viewpoints and citizens' arguments with regard to why citizen participation is necessary.

(8) Development of a citizen participation system (15 minutes)
Additionally, instructors explain the institutionalization of public comments and system development concerning participation such as public voting.
(9) Conclusion (5 minutes)

3. Additional Contents

Discussion may include the following topics: arguments concerning decentralization and revision of public-private role assignment including the evaluation of recent consolidation of municipalities, validation of desired and undesired outcomes of a regional system or evaluation on operation sorting; arguments concerning the collaborative principle such as securing a consistency within citizen participation or effects of public comments within a parliamentary democracy system.

4. Additional Keywords

consolidation of municipalities, regional system, operation sorting, parliamentary democracy, public comments

2.5 Basic Structure of Japan's Environmental Policy

■ Goal

Students learn the background, purposes, basic philosophy, principles, and guiding principles of policy as well as programs of the Basic Environment Law, which is the center of the environmental policy in Japan.
Students also review the overall picture of policy measures systemized through the progress of the Basic Environment Law enactment and the Basic Environment Plan and learn legal systems and policy measures substantiating new principles and methods.
Students then review the substantiation of the major policy measures and legal systems in each field after the Basic Environment Law = the Basic Environment Plan. Furthermore, the class will examine development strategies of an economic society that uses environmental measures as its driving force.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction: Background and goals for establishing the Basic Environment Law (15 minutes)
(2) Basic philosophy and responsibility of the Basic Environment Law; guiding principles and programs of policy (30 minutes)
(3) Basic Environmental Plan, Strategy for an Environmental Nation in the 21st Century, development of environmental policy in each field (30 minutes)

(4) Conclusion: Development of environmental policy that leads the progress of the economic society (15 minutes)

Main Points in This Class

- The Basic Environment Law was enacted for the purpose of unifying traditional pollution countermeasures and natural protection measures, promoting international coordination and realizing a sustainable society in response to environmental policy issues of the globalization era.
- The basic philosophy, responsibilities of states and other organizations, guiding principles of policy and diverse programs stipulated in the Basic Environment Law have been developed and systemized as long-term goals, principles, policy methods and programs in each field of environmental policy, and further substantiated as policy measures and legal systems in each field.
- The class will discuss green innovation, which is an economic growth strategy with the goal of realizing economic recovery and a positive cycle of the environment and economy by utilizing outstanding environmental technology, expanding environmental industry and building a sustainable society.

2. Description of Basic Contents

(1) Introduction: Background and goals of establishing the Basic Environment Law (15 minutes)

- Traditional environmental policy was implemented in accordance with two fundamental laws, Basic Law for Environmental Pollution and the Nature Conservation Law. It achieved certain outcomes in overcoming serious pollution and protecting outstanding nature.
- In later years, as socioeconomic activities had expanded and changed, delays in improving urban and lifestyle-related pollution, increases in waste, the threat of environmental contamination by chemical substances and changes in the natural environment became issues. In addition, global environmental issues have surfaced and international efforts have been required.
- Today’s environmental issues are expanding from the regional level to global issues beyond national borders and into environmental issues beyond generations. As the target regions for environmental policy become extensive, it is important to understand the environment itself comprehensively, utilize diverse policy methods for environmental issues deriving from normal business activities and people’s lives, revisit an economic/social system and behavioral patterns, and take active efforts toward global environmental conservation.
- The Earth Summit prompted the enactment of the Basic Environment Law in response to these issues.

(2) Basic philosophy and responsibility of the Basic Environment Law; guiding principles and programs of policy (30 minutes)

- Three fundamental philosophies of the Basic Environment Law: Instructors will explain environmental policy in detail in the context of why and how the environment should be preserved, in particular, when a sustainable society should be built. The class also learns the roles = responsibilities that should be assumed by states, local public authorities, business operators and citizens.
- Instructors then recapitulate the guiding principles for preparing and implementing policy aiming to substantiate the basic philosophies as well as the significance and goals of diverse programs, especially policy not included in the Basic Law for Environmental Pollution.

(Contrast to the Basic Law for Environmental Pollution)

The environment should be perceived as an interconnected system rather than as separate events.

The goal should be to assume responsibility not only for the current but future generations and to contribute to the world.

Reduction of loads on the environment caused by human activities should be aimed for rather than damage prevention. Instructors should explain in detail the definition of “loads on the environment,” which is the major concept here.

Transformation into a sustainable socioeconomic system should be achieved by using diverse policy methods not only by regulations.

Efforts should be done through fair role-sharing and cooperation/participation of each organization.

Global environmental conservation should be addressed through international coordination.

(3) Basic Environmental Plan, Strategy for an Environmental Nation in the 21st Century, development of environmental policy in each field (30 minutes)

- Students review the Basic Environment Plan, which outlines government-wide, comprehensive and long-term policy concerning environmental conservation in accordance with the Environmental Basic Law.

The 1st Basic Environment Plan (1994) defined “recycling, symbiosis, participation, international efforts” as long-term goals and indicated the outline of policy, the role of each participant and procedure of policy methods.

“Recycling” here refers to the realization of a socioeconomic system based on recycling of materials; in order to prevent environmental degradation that derives from the loss of material cycles of nature due to loads on the environment. Within this system, resource and energy use would be recycled and streamlined and waste generation would be controlled at every stage of socioeconomic activities. In this sense, the term has a broader interpretation than the concept of the later Basic Law for Establishing the Recycling-Based Society.

In order to put its philosophy into practice and secure viability, the 2nd Basic Environment Plan (2000) defined “Polluter-pays principle, eco-efficiency, preventive tactics, environmental risks” as the guiding principles for environmental policy. It also delineated 11 strategic programs such as measures against global warming.

The 3rd Basic Environment Plan (2006) aimed for a positive cycle of the environment and economy. It defined 10 key policy measure programs as well as progress control based on goals and indicators that are quantitative to a maximum extent.

“Strategy for an Environmental Nation in the 21st Century” (2007) clarified eight key strategies including the global leadership with a long-term goal for reducing greenhouse gasses by half by 2050. This was to develop efforts in realizing a sustainable society by integrating “a low-carbon society, a recycling society and a natural symbiotic society” to address three crises of the global environment.

- Students learn the position of environmental policy principles in the Basic Environment Plan as well as the formulation and development of legal systems. Examples: Polluter-pays Principle, Extended Producer Responsibility, preventive principle, etc.
- Students will review “recycling” in the context of the enactment of the Basic Act for Establishing a Sound Material-Cycle Society (2000) and establishment of related legal systems and “symbiosis” in the context of the establishment of advanced legal systems through the preparation of the National Strategy for the Conservation and Sustainable Use of Biological Diversity as well as the enactment of the Basic Act on Biodiversity (2008) (more explanation will be provided in class descriptions of each field).

(4) Conclusion: Development of environmental policy that leads the progress of the economic society (15 minutes)

- With the recent global economic crisis, the “Green New Deal” that perceives environmental measures as a driving power for economic growth has been introduced in many countries.
- Students will examine the significance of the “green growth” strategy that helps economic recovery and generates a positive cycle of the environment and economy by utilizing outstanding environmental technology, expanding environmental industry and building a low-carbon society.
- Students will discuss the goals, policy packages and specific measures of strategies for the environmental nation based on the green innovation, which was included in the New Growth Strategy (2010).

3. Keywords in the Basic Contents

(2) basic philosophy of environmental policy, fair role-sharing, society that can achieve sustainable development while attaining healthy economic growth with a low environmental load, proactively prevent disruption to environmental conservation based on solid scientific knowledge

(3) recycling, symbiosis, participation, international efforts (4 long-term goals), eco-efficiency, prevention principle, environmental risk, positive cycle of the environment and economy, comprehensive improvement of the environment, economy and society

4. Additional Contents

Instructors will review the significance, summary and future issues of the enactment of the Environmental Impact Assessment Law as one of substantiation of the Basic Environment Law.

5. Additional Keywords

Environmental Impact Assessment Law
assessment estimation of research on environmental impact by business, self-control of business operators, sharing of environmental information and appropriate environmental considerations, environmental considerations for permission and authorization, cross compliance, business assessment and strategic environmental assessment, draft revision of the 2010 law

2.6 Environmental Policy by Field (1) (Low-carbon society)

■ Goal

Among environmental issues, climate change in particular has a significant impact on socioeconomy. The characteristic of this issue is that achieving consensus is extremely difficult since climate change directly relates to the foundation for survival of humankind and the tools for its solution are deeply related to the interests of members of a society. In this class, students first comprehend the scientific mechanism of the issue and its gradual impact on social economy. Students then revisit the history of policy measure formulation for climate change and deepen their understanding of international frameworks such as the Kyoto Protocol as well as individual policy methods. Additionally, students learn that the fundamental solution of this issue is not limited to a simple, technical emission reduction policy of greenhouse gasses, rather that the solution will lead to a low-carbon social economy, which is the transformation into a new society based on the integration of environmental, economic and social aspects, and that comprehensive policy measure that covers the environment and economy is essential to promote dramatic changes in industrial structure and lifestyle.

Summary of Educational Contents

1. Basic Contents

(1) Characteristics of the Climate Change Issue (5 minutes)
(2) Scientific Mechanism (10 minutes)
(3) International Frameworks, etc. (20 minutes)

(4) Examples of Foreign Measures (10 minutes)

(5) Domestic Measures (30 minutes)

(6) Assessment from the Economic and Social Aspects (10 minutes)

(7) Conclusion (5 minutes)

Main Points in This Class

Instructors should pay attention so that students, upon understanding the severity and complexity of the climate change issue as well as the difficulty of solutions, learn the necessity of a transition to a low-carbon society by introducing policy measures that incorporate not only the environment but also economy and society.

2. Description of the Basic Contents

(1) Characteristics of Climate Change Issue (5 minutes)

Instructors will discuss the unique characteristics of the climate change issue that are different from traditional problems of pollution and urban and lifestyle-related pollution. Such characteristics include: extensive influence on issues related to time and space; the degree of severity with which it affects the foundation for survival of humankind; the speed of the progress; the difficulty in coordinating interests that emerge along with the necessity of having a society- and economy-wide structural revolution and in adjusting disparities between generations as well as developed and developing countries; and the necessity of decision-making despite scientific uncertainty.

(2) Scientific Mechanism (10 minutes)

The class will briefly review the scientific mechanism of the climate change issue based on the IPCC Fourth Assessment Report. Students also deepen their understanding of the stabilization of greenhouse gas concentrations to stop damage and harm from climate change at a certain level, as well as the emission levels of greenhouse gases for each target year necessary for such stabilization. Instructors will explain how policy-making should be implemented when there is scientific uncertainty.

(3) International Frameworks, etc. (20 minutes)

Focusing on the Framework Convention on Climate Change and the Kyoto Protocol, instructors provide a summary of goals in each state (region), the Kyoto Mechanism, issues between developed and developing countries and issues of funding. Instructors will also touch upon the international framework from 2012, which is now being discussed at COP, and its key arguments as well as reasons that explain why obtaining a consensus for the international framework has been moving slowly. In addition, the class will be introduced to a discussion on the trend of building a sustainable and low-carbon society that has been underway since the Earth Summit.

(4) Examples of Foreign Measures (10 minutes)

The class will discuss the actions and measures taken mainly by major countries and regions (such as EU) since the enactment of the Kyoto Protocol. In particular, instructors will introduce cases in EU and Germany where environmental, economic and social goals such as measures against climate change, energy security, strengthening of international competitiveness are integrated, and the way in which many policy measures are centered and combined around economic measures.

(5) Domestic Measures (30 minutes)

Instructors will explain framework plans including the Law Concerning the Promotion of the Measures to Cope with Global Warming, the Kyoto Protocol Target Achievement Plan and the Action Plan for Building a Low-Carbon Society, while discussing individual policy measures such as the Law Regarding the Rationalization of Energy Use as well as Feed-in Tariffs for Renewable Energy. In the discussion, students will learn what main policy measures have been introduced to industrial, home/business and transportation sectors. Additionally, instructors will explain other systems such as taxation for measures against global warming, emissions trading systems and the Feed-in Tariffs for Renewable Energy for Global Warming Measures based on the Draft Basic Law for Prevention of Global Warming, whose review and introduction is now underway, as well as the eco-point system and a tax break that strives to realize the reduction of greenhouse gases.

(6) Assessment from Economic and Social Aspects (10 minutes)

For solving the climate change issues and moving to a low-carbon society, whether fair and effective policy methods can be introduced becomes the key issue. The important points are: how long-term policy measures that can influence corporate and consumer's investment behaviors can be established; how policy means that utilize the market mechanism can be introduced; and if composite goal-setting and policy methods for economic and social issues such as energy security and employment in addition to the climate change can be introduced. These points will then improve social receptivity for policy measures. From these perspectives, students will obtain, analyze and explain information regarding the effectiveness of policy measures in Japan and other countries as well as the extent of the progress in corporate and public responses.

(7) Conclusion (5 minutes)

Instructors will take questions from students and make sure that they understand the points described in the goal at the beginning of this class.

3. Keywords in the Basic Contents

low-carbon society, low-carbon economy, climate change, global warming

4. Additional Contents

Instructors introduce that, in this contemporary time when the environment and resources face more constraints and the economic situation is changing dramatically, the concept of a so-called green

growth theory is emerging. This concept refers to the idea that investment to new technology and business models that overcome constraints are the keys for future economic development.

5. Additional Keywords

green growth, green investment

2.7 Environmental Policy by Field (2) Recycling Society and Waste Measures

■ Goal

Instructors will explain how the waste issue has become a social problem in the history of Japan while reviewing the historical transition of waste treatment. Especially, students will understand the transition of legal systems related to waste since the Meiji era from the perspective of quantitative/qualitative changes within the categories of general and industrial waste. Students will also learn the treatment system for general waste by municipalities as well as efforts by business operators in handling industrial waste, and comprehend what kind of issues have emerged.
In the post-war high-growth period, waste sharply increased and proper disposal for public health through incineration and landfill was prioritized. The delay in efforts such as reducing waste and recycling is now being revisited and the 3R (reduce, reuse, recycle) measures are emphasized today. Students will understand these circumstances in the context of dioxin issues, shortage of final disposal sites and resource/energy issues.
Based on historical background, students will learn the framework of current legal systems concerning waste and recycling, waste generator responsibility and extended producer responsibility. Students will also understand that active efforts in waste and recycling are indispensable in corporate activities.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction: Historical Transition of Waste Treatment and Waste Treatment of One's Residential Area (15 minutes)
(2) Transition of Legal Systems Concerning Waste and Related Issues (30 minutes)
(3) Frameworks of Current Legal Systems Concerning Waste and Recycling; Waste Generator Responsibility and Extended Producer Responsibility (30 minutes)
(4) Conclusion: Future issues and Direction (15 minutes)

Main Points in This Class

First, upon understanding that the waste treatment and recycling methods have not been dramatically changed in essence since the Jomon Era and that waste treatment had been the key policy challenge for territory management since the Sengoku Era, students will learn that current general waste treatment is under municipality responsibility, the treatment is different in each municipality, and industrial waste treatment is the responsibility of business operators.

Along with the transition of legal and treatment systems, instructors will explain that responses to waste issues in Japan were initiated from the public health point of view and moved on to the 3R efforts. Students will also learn the definition of waste, waste categories, changes in waste treatment responsibility, and in particular, how the responsibility of business operators has been strengthened.

Students will raise the awareness that the waste issue is a resource/energy issue as well as a pollution issue at the same time. They will explore the background of this issue including lifestyle, and the pursuing of convenience and comfort as well as economic activities by producers and distributors who contribute to such lifestyle. Students further study the current legal frameworks concerning waste and recycling and reinforcement of waste generator responsibilities and the Extended Producer Responsibility.

Finally, students will examine how companies should respond to the trend in which waste generator responsibility and the Extended Producer Responsibility are being strengthened.

2. Description of the Basic Contents

(1) Introduction: Historical Transition of Waste Treatment and Waste Treatment of One's Residing Area (15 minutes)

- Instructors will explain that waste treatment in Japan is based on the ideas that "waste (unwanted goods) is collectively disposed in a place a certain distance from a living space" and that "usable goods are reused and recycled," systems which remain almost the same since the Jomon Era.
- The class will be introduced to shell mounds in the Jomon Era, township proclamations by warlords during the Sengoku Era and proclamations by the town officers of the Edo Shogunate. In particular, instructors will explain how the public sector (the Edo Shogunate) was involved in waste treatment and violators were given penalties, the existence of professional waste disposers and waste disposal through sea-fill.
- Students will examine waste treatment, especially the forms of sorting waste, types, collection frequency in their living areas and municipalities of their hometowns in order to understand the difference among municipalities.

(2) Transition of Legal Systems Concerning Waste and Issues (30 minutes)

- Instructors will explain incidents in which the historical transition of the waste issue created social problems (War on Waste in Tokyo, industrial waste issue in Toshima Ward, etc.) and their social backgrounds. Students will learn that the waste issue has been surfaced as a negative asset of economic development and an abundance lifestyle.
- Instructors will explain measures taken in Japan to respond to the waste issue by using the change in legal systems (Sewage Cleaning Law → Waste Disposal Law → Waste Management and Public Cleansing Act). With regard to the current treatment/disposal system, general waste treatment by municipalities, efforts in industrial waste by business operators and the management system for Special Management Industrial Waste will be introduced as specific examples and as much as possible.
- Additionally, instructors will explain the circumstances where the revision of the Waste Disposal and Public Cleansing Law has consistently strengthened waste generator responsibilities and measures against illegal dumping, and recycling has become the focus. They will also explain that in addition to appropriate disposal practices, the 3R efforts have gradually become more important as issues emerged from these processes (such as the dioxin problem, tightening of disposal sites, business operator responsibility, resource/energy issues).

(3) Frameworks of Current Legal Systems Concerning Waste and Recycling; Waste Generators Responsibility and Extended Producer Responsibility (30 minutes)

- Students will learn the Basic Act for Establishing a Sound Material-Cycle Society, the definition of a recycling society, basic principles of cyclical use and disposal of renewable resources and the outline of the 2nd Fundamental Plan for Establishing a Sound Material-Cycle Society.
- Students will comprehend the summary of the Law for the Promotion of Effective Utilities of Resources and its role-sharing with the Waste Disposal and Public Cleansing Law.
- Students will learn the outline of individual recycling laws including: Law for Promotion of Sorted Collection and Recycling of Containers and Packaging, Law for Recycling of Specified Kinds of Home Appliances, Law Concerning Recycling of Materials from Construction Work, Law Concerning the Promotion of Recycling Food Cyclical Resources, Law Concerning Recycling Measures of End-of-life Vehicles, and Law Concerning the Recovery and Destruction of Fluorocarbons.
- Students will understand the ideas of waste generator responsibility and the extended producer responsibility.
- Students will study international efforts such as Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal and Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.

(4) Conclusion: Future issues and Direction (15 minutes)

- Students will understand that active waste and recycling efforts are indispensable for corporate activities.
- Students will examine how companies should respond to the trend that strengthens waste generator responsibility and the Extended Producer Responsibility as well as to the building of a recycling society.

2.8 Environmental Policy by Field (3) Biodiversity Conservation and Natural Conservation

■ Goal

Students will explore the origin, characteristics and richness of the natural environment in Japan and understand the current situation of the natural environment that has significantly changed due to the influence of development and human activities.

Students will review the progress of domestic and foreign policy measures concerning environmental conservation and understand the outline and development of the current legal systems.

Diverse organisms have evolved and survived in connection with each other over the long history of the earth. Students will learn the importance of this biodiversity that supports every life and its livelihood.

In order to realize a “natural symbiotic society” where biodiversity is conserved and its benefits are passed on to future generations, students will examine ways to promote the “mainstreaming” of biodiversity through local actions by diverse organizations, especially by the participation of business operators, based on the National Strategy for the Conservation and Sustainable Use of Biological Diversity.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction: Origin, Characteristics and Current Situation of Natural Environment in Japan (15 minutes)

(2) Policy Measure System for Environmental Conservation; Development of Policy Measures Based on the Philosophy of Biodiversity (30 minutes)

(3) Outline and Progress of Legal Systems Concerning the Conservation of Outstanding Natural Areas (20 minutes)

(4) Outline and Progress of Legal Systems Concerning the Protection and Management of Wildlife (10 minutes)

(5) Conclusion: Future Issues and Direction (15 minutes)

Main Points in This Class

- Although the natural environment in Japan is diverse with a long archipelago, extensive forests, changes of four seasons and satoyama, it faces various crises due to the influence of development and human activities.
- The legal systems for environmental conservation are categorized into the system based on land use regulations (zoning) and one based on the protection and management of wildlife. Also, international treaties that protect nature and organisms have been developed.
- Since the Earth Summit, environmental conservation policy measures have significantly progressed with biodiversity as the core philosophy. Systematization of a wide range of policy measures in accordance with the National Strategy for the Conservation and Sustainable Use of Biological Diversity, revision and enactment of laws as well as policy strengthening has been achieved.
- Based on the goals, strategies, basic policy and action plans defined in the National Strategy for the Conservation and Sustainable Use of Biological Diversity that aims for a "natural symbiotic society," students will examine ways to incorporate (or mainstream) biodiversity into socioeconomic activities by promoting local and specific efforts through actions by various organizations, especially the participation of business operators.

2. Description of the Basic Contents

(1) Introduction: Origin, Characteristics and Current Situation of Natural Environment in Japan (15 minutes)

- Using materials compiled by the MOEJ, such as "The Nature of Japan," instructors will introduce the origin of the natural environment in Japan, its richness and diversity. Topics include: a long archipelago stretching north and south; high mountain range; extensive forests (67% of the national land); diverse species; changes of four seasons; satoyama that has been maintained by people, etc.
- However, the natural environment has been influenced by human activities and now faces the following four crises: degradation of ecosystems due to development; deterioration of satoyama nature due to lack of maintenance; disruption of ecosystems due to exotic species; predicted extinction of species and ecosystem degradation due to the influence of global warming. (Source: National Strategy for the Conservation and Sustainable Use of Biological Diversity)

(2) Policy Measure System for Environmental Conservation; Development of Policy Measure Based on the Philosophy of Biodiversity (30 minutes)

- The policy measures for environmental conservation have been formulated as a legal system based on the zoning method that regulates human activities by designating outstanding natural areas, and one based on the protection and management of wildlife. International treaties for marsh protection and regulating international trade of species, etc. have also been developed.

- Through the enactment of the Basic Environment Law, the implementation of the Convention on Biological Diversity and the preparation and revision of the National Strategy for the Conservation and Sustainable Use of Biological Diversity, conservation of biodiversity and sustainable use became the core philosophy for the overall policy measures in environmental conservation. The philosophy significantly contributed to the systematization of policy as well as the revision and enactment of laws.
- Students will understand the significance of biodiversity, the outline of the Convention on Biological Diversity, the development of the National Strategy for the Conservation and Sustainable Use of Biological Diversity, and the revision, etc. of the legal system in response to these laws.
  . In the long history of the earth, various organisms evolved and survived, associated with each other. Benefits of biodiversity (ecosystem services) support each life and its livelihood.
  . Biodiversity has three levels (diversity of species, diversity of genes, and diversity of ecosystem).
  . Law revisions and new laws that substantiate the philosophy of biodiversity will be described in (3) and (4). -- Law for the Promotion of Nature Restoration, Invasive Alien Species Act, Basic Act on Biodiversity, National Parks Law (2009 revision)

(3) Outline and Progress of Legal Systems Concerning the Conservation of Outstanding Natural Areas (20 minutes)

- Students will use the National Parks Law as an example of natural reserves (zoning) and review its purpose and policy methods.

. Zoning system that can designate private land as a park area. The system has developed as a core system within Japan's natural conservation. The class will review recent law revision, specifically one related to biodiversity conservation.

- There are also the Nature Conservation Law, the Forest Law, the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, etc.
- Instructors will introduce the Law for the Promotion of Nature Restoration, which is a new policy measure for involved organizations to work collaboratively on a project that regenerates the once-lost natural environment.

(4) Outline and Progress of Legal Systems Concerning the Protection and Management of Wildlife (10 minutes)

- Students will review a legal system based on the protection and management of wildlife, such as the Wildlife Protection and Hunting Law, the Law for the Conservation of Endangered Species of Wild Fauna and Flora and Convention on International Trade in Endangered Species of Wild Fauna and Flora, etc.

- Instructors will explain the key points of the Invasive Alien Species Act that substantiates the Convention on Biological Diversity and the Basic Act on Biodiversity, which is a lawmaker-initiated legislation.

(5) Conclusion: Future Issues and Direction (15 minutes)

- In reality, biodiversity is declining in Japan as well as on a global scale. (UN Millennium Ecosystem Assessment 2005, Global Biodiversity Outlook Ver.3 2010, Japan Biodiversity Outlook 2010)
- How can we promote the realization of a “natural symbiotic society” that conserves biodiversity and passes on its benefits? Students will explore this challenge based on the National Strategy for the Conservation and Sustainable Use of Biological Diversity, which stands on a long-term perspective, promotes the understanding of biodiversity, and incorporates biodiversity conservation and sustainable use into socioeconomic activities through local actions by various organizations. Using the “Guidelines for Private Sector Engagement in Biodiversity,” the class will discuss the needs of business operators’ efforts in integrating biodiversity into a part of their management strategies and ways to promote the participation of business operators.

3. Keywords in the Basic Contents

(2) Policy Measure System for Environmental Conservation; Policy Measure Development Based on the Philosophy of Biodiversity

biodiversity, three levels of biodiversity, ecosystem services

(3) Outline and Progress of Legal Systems Concerning the Conservation of Outstanding Natural Areas

outstanding natural landscape, conservation and use, zoning system and publicly-owned parks

natural park (national park, quasi-national park, prefectural natural park)

wilderness area, nature conservation area, prefectural nature conservation area

protection forest

(4) Outline and Progress of Legal Systems Concerning the Protection and Management of Wildlife

Red List, game species, Wildlife Protection Project Plan, Wildlife Protection Area

national endangered species of wild fauna and flora, international endangered species of wild fauna and flora, Convention on International Trade in Endangered Species of Wild Fauna and Flora

Invasive Alien Species, Uncategorized Alien Species

4. Additional Contents

Instructors will introduce international efforts such as the Nagoya Protocol by the Conference of the Parties to the CBD (COP10), the Aichi Target, SATOYAMA Initiative and discuss their significance and future issues as well as risks and chances of corporate activities.

5. Additional Keywords

Access and Benefit Sharing (ABS)

The Economics of Ecology and Biodiversity (TEEB)

2.9 Environmental Policy by Field (4) Pollution and Chemical Substance Measures

■ Goal

Students will get knowledge of basic goals, principles and methods for the legal system against pollution that has been formulated and strengthened in response to the occurrence and intensification of pollution issues.

With regard to policy measures that have responded to the structural change of environmental contamination, students will learn the background, policy measure goals and methods of urban and lifestyle-related pollution, environmental contamination that has surfaced, and assessment/management of environmental risks posed by chemical substances.

What are the current challenges in environmental contamination and chemical substance issues? What kinds of efforts are necessary to solve those issues? Students will consider a long-term direction and international trends of environmental policy, investigate and discuss efforts that should be made based on role-sharing and cooperation among the government, municipalities, business operators and citizens.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction: Outline of Legal System Concerning Prevention of Pollution and Environmental Contamination (10 minutes)

(2) Goals, Principles and Methods of Key Legal Systems Based on Emission Regulation (20 minutes)

(3) Measures against Urban and Lifestyle-related Pollution and Emerging Environmental Contamination (20 minutes)

(4) Assessment and Management of Environmental Risks of Chemical Substances (20 minutes)

(5) Conclusion: Direction and International Trends of Environmental Policy and Future Issues (20 minutes)

Main Points in This Class

- In response to the occurrence and intensification of pollution issues, measures against pollution has been formulated and strengthened mainly through the emission regulation of contaminants. The legal system that was drastically revised and enacted during the Pollution Diet has served as

a framework. Students will learn the basics of the legal system for pollution prevention using prevention measures for air and water pollution as examples.

- Law revision and enactment has been accomplished as urban and lifestyle-related pollution, sewage, ground water contamination, toxic air pollutants, and urban soil contamination became apparent. System expansion and strengthening was conducted to reduce environmental risks that derive from the manufacture and use of chemical substances.
- Such progress aims for the substantiation of philosophy, principles and methods of the Basic Environment Law.
- Not only the prevention of damage but also the reduction of environmental loads, preventive efforts in responding to uncertain environmental risks, comprehensive contamination management and substantiation of source control measures are needed. In addition to regulatory methods, the application of inductive methods, voluntary efforts and informational methods as well as staying in accordance with international trends, information disclosure and citizens participation are also needed.

2. Description of the Basic Contents

(1) Introduction: Outline of Legal System Concerning Prevention of Pollution and Environmental Contamination (10 minutes)

The framework for the legal system of pollution measures started with local measures, which were gradually legalized and systematized, as well as enacted through the policy measure framework based on the Basic Law for Environmental Pollution, enactment of individual laws, and drastic revision during the Pollution Diet. The framework expands its policy measure target as the situation of environmental contamination changes, and other policy methods have been developing as well.

(2) Goals, Principles and Methods of Key Legal Systems Based on Emission Regulation (20 minutes)

- Using materials from the MOEJ homepage, etc, instructors will explain the basic system including the Air Pollution Control Law and the Water Pollution Control Law.

. Concept and rationale of establishing environmental standards that provide the goals of pollution measures

. Emission regulations, emission standards and standards for area-wide total pollutant load control of pollutants, and their relationship with environmental standards

. Scope and changes of controlled substances; measures that secure regulations, etc.

. Establishment of facilities, such as a sewage system, for pollution prevention; systems such as a pollution prevention plans

Strengthening the above pollution measures have succeeded in stabilizing serious industrial pollution problems.

(3) Measures against Urban and Lifestyle-related Pollution and Surfacing Environmental Contamination (20 minutes)

- Urban and lifestyle-related pollution such as air pollution and water contamination caused by concentration of population, economic activities and transportation in cities have emerged.

. Measures against urban air pollution include efforts such as regulations for reducing emissions of nitric oxides and suspended particulates in accordance with the Law Concerning Special Measures to Reduce the Total Amount of Nitrogen Oxides and Particulate Matter Emitted from Motor Vehicles in Specified Areas and building a transportation system that has a lower environmental load.

. Measures for domestic wastewater include projects such as the planned establishment of local sewage treatment facilities and educational programs. Measures in enclosed water areas have also been enhanced.

- In response to ground water contamination that surfaced in the 1980's, the Ban on the Permeation of Effluent into the Ground and effluent purification measures were introduced.
- As more cases of soil contamination at factory sites emerged, the Soil Contamination Countermeasures Law was enacted and implemented. The Law was later revised based on changes in circumstances.
- New policy measures that substantiate the philosophy and methods of the Basic Environment Law have been developed. The control measures for non-soot toxic air pollutants that present long-term health risk are an adaptation of a preventive effort, and the regulation of volatile organic compounds that cause suspended particulates and oxidants is a method combining voluntary efforts by business operators and emission regulations.

(4) Assessment and Management of Environmental Risks of Chemical Substances (20 minutes)

- Reduction of environmental risks that derive from manufacture and use of diverse chemical substances is a critical international issue.
- The Law Concerning the Examination and Regulation of Manufacture, etc of Chemical Substances started with a regulation for manufacture and use of chemical substances with persistence, accumulability and long-term toxicity (PCB, DDT, etc.) and has been revised drastically.

. By reflecting international trends, the Law is evolving into a system that has expansive target substances and regulation methods, protection of fauna and flora in addition to human health, and all the existing chemical substances within its scope of risk management.

- The Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management (PRTR Law) is an important policy measure of informational and voluntary effort methods. The Law promotes effective reduction of environmental risks due to chemical substances by investigating and registering the

emissions/amount of movement of chemical substances through business operators, and aggregating and publishing data through the government.

(5) Conclusion: Direction and International Trends of Environmental Policy and Future Issues (20 minutes)

- Pollution measures have been formulated and implemented based on regulation methods for each environmental medium in order to prevent significant pollution. Systems have been revised in response to situation changes in environmental contamination.
- Today, pollution measures have progressed from damage prevention to ones that aim for building a sustainable society with a lower environmental load. In order to achieve this goal, scientific assessment of environmental contamination risks, policy measure frameworks of risk management, preventive efforts, source control measures rather than emission regulation (end-of-pipe measures), and application of policy measure principles and methods such as EU's Integrated Pollution Prevention and Control (IPPC) that include air, water and soil as a whole have become important.
- For the aquatic environment, efforts in establishing healthy water cycles to promote environmental conservation have been implemented to protect a sound aquatic environment including water quality, water quantity, waterfront and aquatic organisms and their sustainable use.
- It is important that the government, municipalities, business operators and citizens share environmental information and carry out long-term efforts based on role-sharing and cooperation. Efforts that link to the realization of a low-carbon, recycling society have been a challenge.
- It is also necessary to achieve coordination with international efforts including chemical substance management.
- Based on the issues and trends described above, students will examine and discuss future efforts.

3. Keywords in the Basic Contents

(1) Goals, Principles and Methods of Key Legal Systems Based on Emission Regulation

seven classic cases of pollution, environmental standards, emission standards, standards for area-wide total pollutant load control, pollution prevention plan

removal of the economic harmony article, health protection and living environment conservation, ecosystem conservation

(Air Pollution Control Law) soot generation facility, K-value regulation, emission standards, standards for area-wide total pollutant load control

(Water Pollution Control Law) specified facility, specified installation, emission standards

(2) Measures against Urban and Lifestyle-related Pollution and Emerging Environmental Contamination

Urban air pollution issue, measures for domestic wastewater, Law Concerning Special Measures to Reduce the Total Amount of Nitrogen Oxides and Particulate Matter Emitted from Motor Vehicles in Specified Areas, low-emission vehicle
preventive efforts (preventive principle), measures against toxic air pollutants
(3) Assessment and Management of Environmental Risks of Chemical Substances
new chemical substances, general chemical substances, specified chemical substances, priority assessment chemical substances
environmental risk (possibility of affecting human health and living environment as well as ecosystems through the environment)
risk assessment, risk management, risk communication

2.10 Policy Methods (1)

■ **Goal**

Students deepen the understanding of various policy methods used as tools for environmental policy measures as well as the combination of such policy methods (policy mix).
The class will discuss direct regulatory instruments, framework regulatory instruments and economic methods.

■ **Summary of Educational Contents**

1. Basic Contents

(1) Introduction: Titles and Summary of Various Policy Methods and Policy Mix of Environmental Policy Measures (15 minutes)
(2) Summary and Examples of Direct Regulatory Instruments, Framework Regulatory Instruments, and Economic Methods (60 minutes)
(3) Conclusion: Effects and Issues of Policy Measures (15 minutes)

2. Description of Basic Contents

(1) Introduction: Titles and Summary of Various Policy Methods and Policy Mix of Environmental Policy Measures (15 minutes)

- Students will learn the concept behind policy measure development indicated in the Basic Environment Plan: “To utilize every policy instrument appropriately such as various systems to incorporate environmental considerations into socioeconomic systems, environmental investment, environmental education and learning, providing information and promoting science and technology while developing new policy tools, improving existing policy means and expanding

the scope of application," and "to formulate policy packages by appropriately combining policies from the best policy-mix perspective and bring out synergetic effects."

- The class will go over the summary of six specific policy methods, titles of direct regulatory instruments, framework regulatory instruments, economic methods, voluntary effort methods, informational methods, procedural methods and initiative methods

(2) Summary and Examples of Direct Regulatory Instruments, Framework Regulatory Instruments, Economic Methods (60 minutes)

- Direct regulatory instrument: A method to indicate minimum environmental standards that a society as a whole should meet, achieving this by using control tools based on laws and regulations. Students will comprehend that the method is applied mainly to national minimum necessity that requires a society to secure a certain level of conservation, such as sustenance of life and health.
- Examples of application are as follows: emission standards for sulfur oxide and soot/dusts in accordance with the Air Pollution Control Act; area-wide total pollutant load control; emission standards in accordance with the Water Pollution Control Act; various regulations related to waste treatment facilities; emission standards; prohibition of illegal dumping; and prohibition of use of specified chemical substances.
- Framework regulatory instrument: Instead of directly prohibiting, restricting or obligating a specific act, this policy measure obligates people to meet goals or follow certain steps and procedures. It attempts to achieve regulatory goals by mandating preparation and disclosure of a plan. The method is characterized in that preventive or advance measures can be taken effectively while utilizing the originality and ingenuity of parties who receive regulations. Specifically what extent of the environmental load would be reduced is left to the voluntarism of business operators. Business operators will need to understand their own emission status and examine issues in order to prepare a plan and set reduction goals, which results in a reduction of environmental loads.
- Examples of application that will be explained are: Chemical substance registration in accordance with the PRTR Law; submission of energy-saving plans in accordance with the Law Regarding the Rationalization of Energy Use; chemical substance regulations in accordance with the Air Pollution Control Law; registration of new chemical substances in accordance with the Law Concerning the Examination and Regulation of Manufacture, etc of Chemical Substances; Law Concerning the Promotion of the Measures to Cope with Global Warming that mandates municipalities to prepare plans to cope with global warming; application of the Waste Disposal and Public Cleansing Law such as the requirements or conditions that business operators involved in operation order placement and article purchases to introduce and establish an environmental management system (the obligation of plan preparation for waste generators who

emit a large quantity of waste stipulated in the Waste Disposal and Public Cleansing Law, Article 12 (Management by Businesses) Line 7).

- Instructors should especially explain that the PRTR Law and the Law Regarding the Rationalization of Energy Use have achieved significant effects.
- Economic method: A method that presupposes the market mechanism and attempts to achieve policy goals by giving economic incentives to environmental conservation efforts as well as inducing actions of each organization that meet economic rationality. It is considered that this method can contribute to the integration of the environment and economy, which is necessary for the establishment of a sustainable society.
- Examples of application include: Fee-based waste disposal; industrial waste tax; environmental tax, including fossil fuel consumption tax and carbon tax; green purchase by administrations; application of the Extended Producer Responsibility (Law for Promotion of Sorted Collection and Recycling of Containers and Packaging, Law for Recycling of Specified Kinds of Home Appliances, etc.); deposit refund system; subsidy; and tax incentives.

(3) Conclusion: Effects and Issues of Policy Measures (15 minutes)

- Students study the effects and issues involved with each method.

2.11 Policy Methods (2)

■ Goal

The direct regulatory instruments, framework regulatory instruments, economic methods and initiative methods will be discussed in this class. Using policy measures and policies for corporations, students will learn the significance and examples of policy mix.

■ Summary of Educational Contents

1. Basic Contents

(1) Summary and examples of the voluntary effort method, the informational method, the procedural method, and the initiative method (70 minutes)

(2) Conclusion: Significance and examples of policy mix (20 minutes)

2. Description of Basic Contents

(1) Summary and examples of the voluntary effort method, the informational method, the procedural method, and the initiative method (70 minutes)

- Voluntary effort method: An environmental conservation effort in which business operators set certain goals regarding their own actions. This method has the advantage of providing an incentive to technological renovation and leading to enhanced environmental awareness as well

as environmental education and learning. The voluntary effort is one of key policy methods that utilize expertise, creativity and ingenuity of business operators to tackle complicated environmental issues quickly and flexibly. Students will learn that it can be utilized for actively addressing global environmental issues, industrial waste issues and chemical substance issues.

- Examples of application include: Japan Economic Federation's global warming measures; "Responsible Care" by the chemical industry; recycling, etc. by steel and aluminum can industry groups (promotion to prepare action goals related to containers and packaging by Industrial Structure Council of Ministry of Economy, Trade and Industry); "Guideline for Environmental Reports," "Environmental Accounting Guidelines" and "EcoAction 21 Guidelines" by the MOEJ.
- Informational method: In order that various stakeholders such as consumers and investors can voluntarily and actively assess and choose business operators who are active in environmental conservation efforts, or products with a low environmental load, this method promotes environmentally friendly actions from each organization by encouraging disclosure and provision of environmental information related to business activities, products and services.
- Students will learn the examples of application including: environmental reports; environmental accounting; environmental labels; carbon footprint; Life Cycle Assessment (LCA); and environmental rating.
- Procedural method: A method that combines the decision-making opportunities for environmental considerations at each decision-making process of an organization and the criteria for decisions regarding such considerations. Students will understand that this method achieves a significant effect on incorporating environmental considerations in an organization's action.
- Students will learn the examples of application such as: dissemination of environmental management systems; environmentally sensitive design; strategic environmental assessment, Life Cycle Assessment (LCA); and environmental impact assessment.
- Initiative method: A method in which an administration takes action with environmental considerations and promotes business operators to take a similar path; a new market is formed by an administrative effort; and the demand for environmentally friendly products is created and lower prices are induced.
- Students will learn the examples of application including: the government's action plan for environmental initiatives; the Green Purchase Act; laws on global warming prevention; the Law Concerning Environmental Consideration (Law Concerning the Promotion of Business Activities with Environmental Consideration by Specified Corporations, etc., by Facilitating Access to Environmental Information, and Other Measures/Environmental Consideration Law) (law concerning environmental reports, the Green Contract Law).

(2) Conclusion: Significance and examples of policy mix (20 minutes)

Students will learn the significance and examples of policy mix based on policy measures and policies concerning corporations.

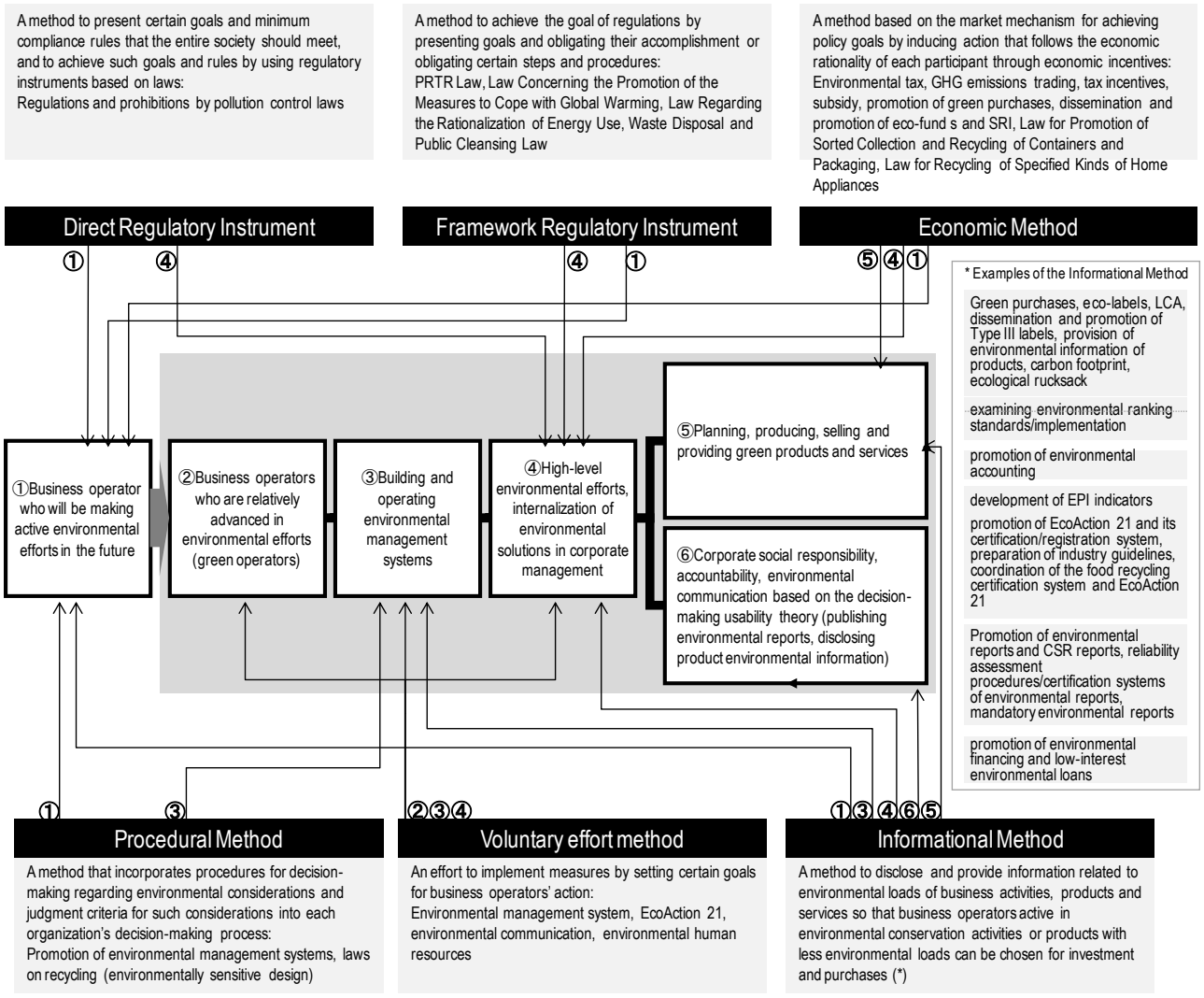


Figure 11: Policy Mix of Environmental Policy

2.12 Policy-Making Process

■ Goal

Historically, most environmental policy measures have developed in the process of resolving environmental issues after they had happened. Environmental issues are difficult in a sense that they derive from complicated interrelationship between the act of the human society and its foundation - the environment – and the solution requires coordination of numerous social members' interests based on scientific knowledge. Environmental issues also contain uncertainty found in climate change, etc. where global damage is expected to surface. At this point, it is extremely difficult to formulate environmental policy measures in how to respond to the issues in advance. In this class, students will deepen their understanding of the current policy measure formulation processes while

revisiting the history of environmental policy measures. The program also aims to provide students opportunities to become aware of the limits and issues as well as ideals of future policy measure formulation processes including how international policy measure frameworks should be made.

■ Summary of Educational Contents

1. Basic Contents

(1) Historical formulation of Japan's environmental policy measures (15 minutes)

(2) Formation process of laws, etc. (25 minutes)

(3) Important points in the formation process of environmental policy measures (40 minutes)

(4) Conclusion (10 minutes)

Main Points in This Class

Students will learn the actual process of forming policy measures and its limits as well as issues. The class will discuss how the formulation of policy measures should be structured.

2. Description of Basic Contents

(1) Historical formulation of Japan's environmental policy measures (15 minutes)

Instructors will explain pollution incidents and actions to solve them such as negotiations between companies and affected farmers in the Ashio Copper Mine Mineral Pollution Incident and the Besshi Copper Mine Mineral Pollution Incident. Instructors will also review the occurrence of severe pollution such as Minamata disease and the Yokkaichi asthma incidents as well as the history of the Four Major Pollution Cases. The class will review, placing special emphasis on the leading roles played by municipalities and courts as well as the formation process of environmental policy measures by the central and regional governments. Instructors should also mention the transition from recent administration-initiated policy measure formation to government-initiated policy measure formation.

(2) Formation process of laws, etc. (25 minutes)

Students will learn the actual law-making process in Japan including: Awareness and prior study of necessary policy measures sought by an agency; consultation to a committee; drafting and deliberation between involved agencies; public comments from the citizens and incorporation of such comments; investigation by the Legislative Bureau; deliberation with the majority party; cabinet approval and submission to the Diet; deliberation and amendment at the Diet; and voting. At the same time, the class will touch upon the preparation process of cabinet and ministerial orders. Instructors also discuss the procedures and flow of pre-deliberation, negotiation, consensus and conclusion of international laws such as the Kyoto Protocol.

(3) Important points in the formation process of environmental policy measures (40 minutes)

The actual process of policy measure formation has changed over time both in Japan and abroad. The class will study important points by using cases. The key examples are as follows:

- Types of proposition of policy measures
  (Incident follow-up; initiative by an involved agency; government initiative; multi-agency initiative)
- Review and analysis of scientific knowledge
  (Preparation of environmental and regulatory standards, goal-setting for reducing greenhouse gases)
- Relationship between politicians/political parties and administrations
  (Roles of the top three officials of each agency, roles of panels)
- Involvement and roles of experts, NGOs/NPOs and citizens in forming policy measures
  (Committees, review meetings, study groups, public hearings, public comments, etc.)
- Involvement and roles of corporations in forming policy measures
  (Participation in committees, policy proposals by economic organizations)
- Roles of information disclosure/public comments in the formation process of policy measures
  (Historic development of information disclosure, contribution to policy measure formatting)
- Significance and roles of committees
  (Contribution to and issues in consensus making)
- Cooperation and coordination among involved agencies
  (Issues of inter-institutional policy measure formation)
- Negotiating power and national consensus concerning international treaties, etc.
  (Relationships between the Ministry of Foreign Affairs and other agencies, coordination in response policy of the government)

(4) Conclusion (10 minutes)

Instructors will receive questions from students and make sure that they have gained the understanding of points listed in the goals.

3. Keywords in the Basic Contents

Mine pollution issues, Four Major Pollution Cases, coordination among involved agencies, cabinet approval, diet deliberation, investigation by the Legislative Bureau, committees, public comments, conclusion of a treaty

4. Additional Contents

Policy measure formation is deeply related to a government organization in charge of the process. Especially, organizational restructure is a critical issue since an environmental administration did not originally have any organization in charge and the target of the environmental administration is transitioning from pollution issues to global environmental issues as well as to issues covering the

environment and economy. Instructors will explain this issue by introducing organizations in charge of the environment in other countries.

5. Additional Keywords

Restructure of organizations in charge of environmental affairs

2.13 Environmental Policy Measures of Municipalities

■ Goal

Progressive municipalities that took the initiative in addressing serious industrial pollution issues in post-war Japan and their movement pushed the institutional response by the country. Even today, regional activities have initiated efforts in regional as well as global environmental issues such as global warming. It is municipalities that play a central role in building sustainable local societies. In this class, students will discuss the establishment of sustainable local societies by understanding goals, organizations and means of environmental policy measures of municipalities, basic environmental ordinances, agreements on pollution prevention, and different examples of environmental policy measures of progressive municipalities.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction (5 minutes)

(2) Trajectory of progressive environmental policy measures by municipalities (20 minutes)

(3) Progress of decentralization and environmental governance; role sharing between the country and regions (15 minutes)

(4) Changes of characteristics of environmental issues and the need for environmental policy measure innovation by municipalities (20 minutes)

(5) Case Study: Measures against global warming by municipalities (20 minutes)

6) Conclusion: Future issues and direction (10 minutes)

Main Points in This Class

In today's society, economic activities are even more unified through globalization. On the other hand, the movement of decentralization toward independence and autonomy has become active. Regions in Japan have shifted from the period of expansion and growth to that of maturity and depopulation through diversified and complicated environmental issues. Students will discuss environmental policy measures of municipalities required at this turning point by revisiting the trajectory of progressive environmental policy measures of municipalities, examining the progress of decentralization and the

trend in environmental governance, and study appropriate role sharing between the country and regions. The students will then review changes of characteristics of environmental issues and the need and possibility of environmental policy measure innovation by municipalities. Finally, the students will review future issues through progressive cases by municipalities in global warming, etc.

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Instructors will introduce issues in environmental policy measures required for today's municipalities.

(2) Trajectory of progressive environmental policy measures by municipalities (20 minutes)

Students will examine the trajectory of progressive environmental policy measures of municipalities according to the following themes:

- Initiatives in industrial pollution measures by municipalities: Pollution prevention ordinances, pollution prevention agreements, environmental impact assessment system
- Low-growth period and urban and lifestyle-related pollution, promotion of waste/recycling measures
- Comprehensive environmental policy measures by municipalities in the globalization era: Formation of a sustainable local society

(3) Progress of decentralization and environmental governance; role sharing between the country and regions (15 minutes)

- Regional society as a "place" of human life
- Subsidiarity principle as a self-government principle and efforts by regional areas

(4) Changes of characteristics of environmental issues and the need for environmental policy measure innovation by municipalities (20 minutes)

- Goals, organizations, means and financial resources of environmental policy measures by municipalities
- Basic environmental ordinances, basic plans
- Environmental policy measures based on partnership (principle of collaboration); roles and the role of collaboration among citizens, corporations, NPOs and administrations
- New movement (for example, a trend in regional environmental tax as a unique policy measure of municipalities, fee-based waste collection, business hour regulations of dispensing machines and convenience stores)

5) Case study: Measures against global warming by municipalities (20 minutes)

- Preparation of a plan: Preparing, setting goals and integrating measures for global warming prevention plan

- Activities for preventing global warming as a business operator: Initiatives in action plans, setting quantitative goals, less energy use for governmental agencies, waste treatment, water and wastewater facility projects, and operation of public schools and hospitals
- Approach to citizens and business operators: Dissemination, enlightenment, subsidy and support
- Public projects to address global warming, establishing a social system: Regulations (mandatory reduction), economic means (carbon tax), etc.

At this moment the second and third measures are taken widely; however, the fourth measures are still scarce.

Case studies should be flexibly chosen depending on the interests of instructors and students. Examples include efforts for biodiversity (biodiversity conservation strategy) and renewable energy in addition to global warming.

(6) Conclusion (10 minutes)

3. Keywords in the Basic Contents

(2) Pollution prevention ordinances, pollution prevention agreements, environmental impact assessment ordinances

(3) Progress of decentralization and environmental governance; role sharing between the country and regions: Subsidiarity principle

(4) Changes of characteristics of environmental issues and the need for environmental policy measure innovation by municipalities: Basic environmental ordinances and plans, local Agenda 21, principle of collaboration, regional environmental tax

2.14 Conclusion (1): Environmental Policy Exercise (1)

Each student will choose a specific field of policy measures. The student will assess the current status, identify issues, prepare and present policy measure proposals for solutions from the student's unique point of view. The student will discuss the contents with other students as well as the instructor.

2.15 Conclusion (2): Environmental Policy Exercise (2)

Same as above

【3】 Environmental Management

1. Educational Goals

To develop the ability to understand environmental reports by learning philosophies of environmental management, which consider the realization of a low-carbon society as new business opportunities and aims to simultaneously achieve environmental preservation and the increase of value, and by gaining practical abilities concerning management tools.

2. Structure of the Program

1) Introduction: Transition of Environmental Management and its Significance

The class will review the following topics: pollution in the late 1960's and environmental issues after 1990; responses of Japanese companies to those issues (stages such as responding to regulations, environmental conservation, environmental managements) and the interrelationship among principles behind such stages (polluter-pays principle, extended producer responsibility, preventive principle or efforts, low-carbon principle, etc.); active environmental management as a future corporate management principle; and overview of management tools.

2) Environmental Management Strategy

Students will learn management strategies from the perspective of active environmental management.

3) Environmental Marketing and Environmental Risks

From the perspective of active environmental management, students will study various positive and negative "assets" of corporations and "corporate value" as the sum of the assets. From the perspective of "environmental and sustainable issues," students will also learn ideas that can be linked to environmental marketing and their effects as well as factors that can become environmental risks and their possible damage. Students will then understand that a proactive response to environmental and sustainable issues is critical to the practice of corporate social responsibility and the improvement of social reliability.

4) Environmental Management Standards

The class will focus on ISO14000 series. Students will learn the standards of its environmental management system, site-related standards such as environmental audit and environmental performance, product/service standards such as LCA and environmental labels.

5) Environmental Management of Medium/Small Companies (EcoAction 21, etc.)

Students will study EcoAction 21, which is a unique standard (guideline) prepared by the MOEJ in order to achieve and promote the systematic management of medium/small companies' environmental efforts. Students will also deepen their understanding of systems implemented in local areas.

6) Analysis and Assessment of Environmental Performance

The class will review methods to analyze and assess the results of environmental management represented by quantity index, currency and comprehensive indicators (eco-efficiency, LIME, factors, etc.).

7) Carbon Management

Regarding the world's pressing issue, global warming, instructors will explain the content of the Kyoto Protocol and the overview of the emissions trading system in Japan. Students will study how corporations should address greenhouse gas emission reduction and gain an understanding of carbon management.

8) Environmental Reports

Students will learn the significance and necessity of environmental reports as well as the institutional background that supports such reports. Students will then discuss the Guideline for Environmental Reports 2007, which offers the guiding principles for the practical application of environmental reports, and the GRI Sustainability Reporting Guidelines.

9) Environmental Accounting in Financial Reports

The class will discuss the environmental accounting information (asset retirement obligations, contingent obligations pertaining to soil contamination, etc, emission quotas) listed in corporate financial reports.

10) Environmental Accounting in Environmental Reports

By reviewing the contents of domestic and foreign guidelines such as the Environmental Accounting Guideline prepared by the MOEJ, students will discuss the structure, objectives and operating bodies of accounting that environmental accounting practices conform to.

11) Environmental Management Accounting

Students will gain an understanding of how environmental management and accounting has developed internationally, what is the scope of environmental cost, which is the key concept of environmental management and accounting, and what kind of methods are available in environmental management and accounting.

12) Material Flow Cost Accounting

Students will learn the basics of how the accounting of material flow cost has developed in Japan and abroad and what kind of calculating structure the accounting of material flow cost has, as well as how the accounting of material flow cost is used at Japanese companies and the international standardization of the accounting of material flow cost.

13) Specific Examples of Environmental Reports and their Reliability

Students will compare the characteristics of actual award-winning environmental reports. Students will also comprehend the system of securing the reliability of the reports.

14) Socially Responsible Investment (SRI)

Students will understand what kinds of methods are available for socially responsible investment and what kinds of efforts have been made in Japan and abroad.

15) Conclusion: Case Studies of Environmental Management

Instructors will check the students' level of understanding of environmental management in general, including the principles, strategies and methods of active environmental management through research, reporting and discussion on cases of environmental reports prepared and published by corporations.

3. Points to Note

First, in order for students to understand why "environmental management" is necessary, instructors will point to a social goal of realizing a low-carbon society behind corporate management and explain active environmental management and strategies to achieve environmental conservation and profit generation. The class will then review decision-making methods and information (information regarding pollutant load and currency) indispensable to environmental management. Finally, instructors should pay attention so that students can deepen their understanding of environmental management as a whole through the analysis of environmental reports with results of environmental management.

3.1 Introduction: Transition of Environmental Management and its Significance

■ Goal

Students will examine how corporations have made efforts against pollution in the late 1960's and environmental issues after 1990, what kinds of thoughts or principles dominated such efforts, and how future efforts should be implemented.

The class will categorize environmental management into the following four stages and learn the contents and relationship with dominant principles for each stage:

- Response to regulations (polluter-pays principle)
- Response to energy/resource saving (economic motives)
- Environmentally-conscious management based on voluntary response (extended producer responsibility, preventive principle)
- Active environmental management (realization of a low-carbon, recycling and natural symbiotic society, social responsibility)

At the end of the class, instructors will introduce the outline of the subsequent class contents of "Environmental management."

■ **Summary of Educational Contents**

1. Basic Contents

(1) Introduction: Description of the class outline for “Environmental management” and the contents for “Transition of environmental management” (15 minutes)

(2) Stage of response to regulations: Enactment of pollution-related laws and ordinances; status of corporate response (20 minutes)

(3) Stage of energy/resource saving: Overview of efforts made in response to the Oil Crises (10 minutes)

(Corporate efforts at this stage can be included in “Stage of response to regulations” as unavoidable response to external factors.)

(4) Stage of environmentally-conscious management based on voluntary response: Overview of voluntary corporate efforts against environmental issues after 1990 (20 minutes)

(5) Stage of active environmental management: Corporate efforts for a sustainable society (15 minutes)

(6) Conclusion: Brief introduction to the next class content (session) (10 minutes)

Main Points in This Class

It is important that students understand the following points:

- Quality of environmental issues is changing according to time and periods, and ways of handling issues and the contents of corporate management are also changing;
- At the base of these changes, there also exist changes in basic concepts or principles accepted by a society concerning how environment issues are handled;
- Corporate management and basic concepts or principles are closely related;
- Active environmental management that aims to realize a low-carbon, recycling and natural symbiotic society will be emphasized in future corporate management.

2. Description of the Basic Contents

(1) Introduction: Description of the class outline for “Environmental management” and the contents for “Transition of environmental management” (15 minutes)

Instructors will mention that “Environmental management” is categorized into five areas of study: transition and strategies of environmental management, environmental management, environmental reports and accounting, reliability of environmental reports and SRI, and case studies. Instructors will also briefly introduce the overview of each category and explain the significance of discussing the transition of environmental management at the beginning of this class.

(2) Stage of response to regulations: Enactment of pollution-related laws and ordinances; status of corporate response (20 minutes)

Instructors will discuss the following topics in order to explain that corporate efforts to pollution issues were unavoidable for corporate survival under laws and regulations:

- Overview of pollution issues including the four key pollution cases in the late 1960's;
- Explanation of history of pollution-related law and ordinance enactment by the country and municipalities as well as the polluter-pays principle, etc. behind the enactment;
- Increase in pollution-related investment over time as corporate efforts to deal with the tightening of regulations and its comparison to GDP (GNP).

(3) Stage of energy/resource saving: Overview of efforts made at the Oil Crises (10 minutes)

- Instructors will give a general outline of resource price hikes triggered by the surging oil price during the two Oil Crises and resulting price increase of commodities including land. Instructors will point out that companies, for their survival, had no choice but to make energy and resource-saving efforts driven by economic motivation such as reduction and reuse of resource input, the shift to low-cost resources, or reduction of resource input depleted in the manufacturing process. The class will also learn that the energy and resource-saving activity during this time became the precursor of such activity after 1990.

(4) Stage of environmentally-conscious management based on voluntary response: Overview of voluntary corporate efforts against environmental issues after 1990 (20 minutes)

- Students will examine the difference between environmental issues after the 1990's and pollution issues in the 1960's (scale of affected areas, time until an issue surfaced, or the level of difficulty in indentifying cause-effect relationship), while challenges in regulatory responses are pointed out.
- Instructors will introduce the following topics: Necessity of response based on the preventive principle (preventive measures); establishing and operating an environmental management system, which is a voluntary effort based on corporate social responsibility; practicing environmental accounting; issuing environmental reports, etc.
- Instructors will also mention that regulatory instruments such as the enactment of various recycling laws based on the extended producer responsibility principle are now being used.

(5) Stage of active environmental management: Corporate efforts for a sustainable society (15 minutes)

- Instructors will point out that the realization of a low-carbon, recycling and natural symbiotic society is essential for future sustainable development, and that consumer lifestyle needs to be transformed into one based on environmental conservation.
- Instructors will also mention that revolutionary changes are necessary in the following areas: the core of product and service provision by companies is expected to shift to one based on environmental conservation; management systems and performance assessment systems, etc.

need to be changed from an environmental conservation perspective; in all, the primary business line has to shift to environmental conservation management.

- Instructors will note that the revolutionary changes of corporate management are accomplished by active environmental management with two goals, which are: simultaneous achievement of environmental conservation and profit generation; increase of social responsibility including human rights and labor practices as well as corporate values.
- The class will learn that the standardization of material flow cost accounting (ISO14051), which is one of the control methods to achieve environmental conservation and profit generation, is being underway following Japan's lead.

(6) Conclusion: Brief introduction of the next class content (session) (10 minutes)

- Instructors will briefly summarize the transition of environmental management based on the four-stage theory.
- Instructors will inform students that, in the Environmental management, sessions will cover management strategy, marketing, management systems, performance, accounting, reporting (information disclosure) and investment, and that the students will check their level of understanding in environmental management through case studies as class exercises in the final session.

3. Keywords in the Basic Contents

(2) Stage of response to regulations

- Four Key Pollution Cases, polluter-pays principle

(3) Stage of response to energy/resource saving

- Oil Crises

(4) Stage of environmentally-conscious management based on voluntary response

- Difference between environmental issues and pollution; extended producer responsibility; preventive principle (preventive measure); voluntary efforts; environmental management system, ISO14001; EcoAction 21; environmental performance assessment; environmental accounting; LCA; environmental report; environmental label, etc.

(5) Stage of active environmental management

- Realization of a low-carbon, recycling and natural symbiotic society, material flow cost accounting, corporate social responsibility, ISO26000

4. Additional Contents

As there is a wide range of thought concerning environmental management in addition to concepts introduced in this class, instructors may ask students about opinions on and images of environmental management and have a discussion.

3.2 Environmental Management Strategy

■ Goals

The class will study management strategies from the perspective of active environmental management. Students will understand the following points:

- How does a company gain competitive advantages through environmental responses?
- What kind of management strategies have progressive companies taken?

To help their understanding, the class will study the relationship between environmental management and management strategy from the following three perspectives:

- Specific examples of cost reduction and quality improvement by correcting inefficiency
- Roles of top management in developing environmental management capacity for organizations
- Relationship between environmental regulations and environmental management

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction: Learning the relationship between environmental response and corporate competitiveness based on the Porter Hypothesis (15 minutes)

(2) Winning competitive advantages through environment efforts: Understanding competitive advantages gained by cost reduction and quality improvement based on environmentally-conscious management (25 minutes)

(3) Organizational capacity concerning the environment and the function of top management: Learning the roles of top management in developing an organization's environmental management capacity (20 minutes)

(4) Environmental regulation and environmental management: Studying the direct and indirect influence of environmental regulation as an incentive for corporate efforts in environmental management (15 minutes)

(5) Conclusion: Understanding challenges and outlooks of corporate management through the environment (15 minutes)

Main Points in This Class

- Environmental response by companies does not necessarily incur additional costs or weaken competitiveness. By actively developing management based on environmental consciousness taken in every detail of corporate management, it is possible to increase competitiveness. Environmentally-conscious management improves competitiveness through cost reduction and quality improvement by correcting inefficiency. Using examples, students will understand that

environmental considerations are taken in the primary business of a company through the introduction of an accounting system and product strategies.

- In order to achieve competitive advantages through environmentally-conscious management, development of environmental management capacity of an organization becomes necessary. The initiative by a top management team is crucial; students will learn its role in setting a long-term vision, coordinating resistance in the organization, and allocating human and physical management resources.
- The influence of environmental regulation is important as an incentive for corporate efforts in environmental management. Although voluntary efforts that make environmental considerations without regulations have attracted attention in recent years, many of them have strategic intentions such that companies take regulations as a threat or try to take action in advance. Students will understand environmental strategies from a broader social perspective.

2. Description of the Basic Contents

(1) Introduction (15 minutes)

- Regarding the relationship between environmental response and corporate competitiveness, students will learn that responding to environmental regulations does not always weaken the competitiveness of domestic industries due to additional costs, and that companies with active and voluntary responses have increased competitiveness through innovation.
- Students will understand the theoretical background including the Porter Hypothesis.

(2) Winning competitive advantages through environment efforts (25 minutes)

- Students will understand environmentally-conscious management by studying cases. Specifically, they will learn about the following topics: cost reduction by correcting inefficiency through material flow cost accounting; improvement of products and functionality through development and dissemination of LED light bulbs; and resulting new competitive advantages in the market.

(3) Organizational capacity concerning the environment and the function of top management (20 minutes)

- In order to link environmental response to a competitive advantage, organizational behavior has to change. Students will learn that the role of top management is crucial in such a change since environmental response involves great uncertainty and strategies need to be formulated from a long-term perspective.
- Students will study cases and learn about specific management activities such as the establishment of a long-term vision, coordination of resistance within the organization, allocation of human and physical management resources.

(4) Environmental regulation and environmental management (15 minutes)

- Students will understand that environmental regulation has important influence directly and indirectly on incentives for environmental management efforts by companies.
- Students will study corporate cases in which environmental innovation was achieved by responding to environmental regulation as an entire company, and in which environmentally-conscious products were made in expectation of the future carbon market.

(5) Conclusion: Understanding challenges and outlooks of corporate management through environment efforts (15 minutes)

- By reflecting environmental perspectives in every detail of corporate activities, progressive companies are gaining competitive advantages through cost reduction and quality improvement.
- Not only efforts on the corporate side that conduct management activities but product and financial markets that assess the activities are also expected to change. Further advanced strategies for environmental management are anticipated in which new markets are formulated by the active disclosure of environmental information and collaboration with stakeholders such as environmental groups.

3. Keywords in the Basic Contents

(2) Winning corporate competitiveness through environment efforts

Material flow cost accounting, environmentally-conscious products, the Porter Hypothesis

(3) Organizational capacity concerning the environment and the function of top management

Long-term vision, resistance within an organization, allocation of management resources

(4) Environmental regulation and environmental management

Environmental regulation, carbon market, the government

4. Additional Contents

(1) Environmental Innovation

(2) Green Consumers

5. Additional Keywords

(1) Environmental innovation

The Porter Hypothesis, economic results

(2) Green consumers

Green Purchase Law, John Elkington, civil society

3.3 Environmental Marketing and Environmental Risks

■ Goal

From the perspective of active environmental management, students will learn the various positive/negative “assets” of companies and the sum of such assets as “corporate values”; from the perspective of “environmental/sustainable issues,” they will understand factors that can be linked to environmental marketing and its effect as well as factors that can become environmental risks and damages. Students will learn that response to environmental/sustainable issues is extremely important in terms of carrying out corporate social responsibility and improving social reliability.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction (environmental marketing and environmental risk) (10 minutes)

(2) Examples of environmental marketing and corporate values (30 minutes)

(3) Environmental risks and way of environmental risk management (30 minutes)

(4) Conclusion (to increase corporate values) (20 minutes)

Main Points in This Class

- Students will learn the following topics: companies have diverse assets including hard, intangible, or currency-convertible assets; the sum of such “assets” formulates a “corporate value”; the “corporate value” can become a “brand power” for business partners, clients and the entire market and society, which enables effective environmental marketing; negative assets are “risks” and possibly cause damage to the corporation.
- Students will study the environmental awareness of ordinary citizens and consumers concerning “green purchases,” the transition of market shares due to the recent eco-point system and eco-car tax deduction, and the backgrounds of each.
- Students will examine cases such as environmental businesses, environmental products and services, environmental advertisement of products and services in newspapers and magazines and learn what kind of environmental marketing and businesses exist.
- Students will look into green and CSR purchase standards including supply chains such as consumer-electronics manufacturers, and, from the perspective of environmental risks, understand what large corporations expect from business partners and why.
- Students will study how environmental risk management should be conducted.
- Students will understand corporate values based on the response to environmental and sustainable issues. They will examine important points in environmental marketing efforts

(development and sales side), green purchases (purchase and procurement side) and conducting environmental risk management, and develop an ability to think about assuming corporate social responsibility and improving social reliability.

2. Description of the Basic Contents

(1) Introduction (environmental marketing and environmental risk) (10 minutes)

- Students will learn the following topics: companies have diverse assets including hard, intangible, or currency-convertible assets; the sum of such “assets” formulates a “corporate value”; the “corporate value” can become a “brand power” for business partners, clients and the entire market and society, which enables effective environmental marketing; negative assets are “risks” and possibly cause damage to the corporation.
- Diverse “assets” of companies include not only hard fixed assets such as facilities and equipment as well as financial assets such as money, goods and patents but also people, technology, information and brand names. These assets can be conceptually categorized into positive and negative assets.
- For example, when considering “environmental assets,” competitive environmental products bring large profits to companies under the progress of green purchases; such products also bring diverse benefits as a company is determined to be amenable to working on environmental issues.
- On the other hand, once a company causes an environmental accident or violates environmental laws, it not only damages the corporate image but incurs tremendous loss. If the energy efficiency or resource productivity (e.g. material yield) is low, productivity does not improve and cost reduction will not be achieved.
- In order to make such efforts and apply environmental marketing and environmental risk management appropriately, the establishment and operation of an environmental management system (EMS) is indispensable. Furthermore, EMS needs to be operated within the corporate-wide management system.

(2) Examples of environmental marketing and corporate values (30 minutes)

- As the environmental awareness of ordinary citizens and consumers concerning “green purchases” has improved since the 1990’s, the Eco Mark first appeared followed by the enactment of the Green Purchase Law, eco-points, eco-car tax benefits, and carbon-footprint displays. Students will understand that such environmentally-conscious products have gained certain legitimacy in the market and that environmental marketing has won an important position in corporate management.
- Students will research diverse examples of environmental businesses found on the webpage of the Eco-Products Exhibition (and learn that a number of companies are addressing environmental business such as consumer goods, services, equipments and systems, and

infrastructure). They will also understand that companies list environmental products and services (such as home electric appliances, automobiles, container and packaging, stationary, and transportation systems) in their corporate environmental reports and that they use environmental marketing to improve corporate values.

- Students will also learn that companies are actively using environmental advertisement in newspapers, magazines and television broadcasting for their products and services as well as for corporate environmental efforts. Students will use examples from the Environmental Advertising Competitions (Nikkei Advertising Awards).
- From the recent survey results on the environmental awareness of citizens and consumers concerning “green purchases,” instructors will present examples and explain that the Japanese citizens and consumers have advanced environmental awareness and they have an intention to buy environmentally-conscious products actively, while such awareness does not necessarily lead to actual product purchases (“eco” only would sell to a small part of citizens and consumers; certain functions or specific effects and profits for purchasers are necessary).
- Students will examine examples to understand that a number of companies are developing, selling and actively advertising different environmentally-conscious products and services and that some products have high environmental performances while others are questionable, indicating that the perspectives and standards of environmental considerations are diverse.

(3) Environmental risks and way of environmental risk management (30 minutes)

- Students will understand that the green purchases including supply chains of home electronic appliances, etc. as well as CSR purchases now include standards concerning the environment of purchase/procurement partners and their efforts in CSR in addition to standards concerning the environment of products to be purchased. Students will learn the reasons and objectives of such standard establishment (including environmental CSR risks, response to compliance risks and cost reduction of business partners).
- Risks refer to “a possibility to lose a certain social and economic value or a possibility not to gain such a value.” Companies deal with many risks such as administrative, technical, production/sales, environmental, information, compliance and international risks.
- Environmental risks involve environmental contaminant spills due to accidents or disasters, emission of environmental contaminants that exceed standard values, environmental destruction due to accidents and development, violation of environmental laws, illegal disposal of generated wastes, resistance (protest) of environmental NGOs/NPOs, etc., competition with other companies’ environmental products, and demands of green/CSR purchases from business partners.

- An accident, a disaster or unexpected incidents certainly happen. Therefore, environmental risk management is necessary to predict risks, assess them, prevent such risks or minimize any damage (people, social or economic) in case they do happen.
- Environmental risk management consists of: (1) predicting risks; (2) assessing risks; (3) formulating a plan for damage prevention and mitigation (fail-safe); (4) preparing the plan and implementing education and training; (5) assessing and revising the plan after an accident, etc.

(4) Conclusion (to increase corporate values) (20 minutes)

Students will learn the following topics and discuss the practices of corporate social responsibility and the improvement of social reliability: points for addressing environmental marketing (development/sales side) (mere compliance to a certain environmental standards will not ensure sales expansion; a lifecycle perspective is necessary; it should be verifiable and justifiable; there are guidelines for advertisement, etc.); points for putting green purchases into practice (purchase/procurement side) (the environment of business partners and their CSR efforts should be checked in addition to the compliance of products and services to a certain environmental standards. An audit should be conducted if necessary); points for conducting environmental risk management (establishment and operation of environmental risk management).

3. Keywords in the Basic Contents

(1) Environmental marketing, environmental risks, assets, corporate values, brand, energy efficiency, resource productivity, environmental management system, corporate social responsibility (reliability)

(2) Green purchase/procurement, Eco Mark, Green Purchase Law, eco-point system, eco-car tax benefits, eco products, environmental advertisement

(3) Supply chain, green purchase standards, CSR purchase standards, environmental risk management, risk assessment, fail-safe, damage control

4. Additional Contents

(1) Eco Mark standards

(2) Green Purchase Law standards

(3) Examples of environmental risks (environmental accidents, violation of environmental laws, etc.)

5. Additional Keywords

Valdez Principles

3.4 Environmental Management Standards

■ Goal

The class aims to deepen students' understanding of environmental management standards centering on the Environmental Management System Standards (ISO14001) that are internationally incorporated by a number of companies as a system to systematically manage environmental conservation efforts. Students will learn the following topics:

- Background of issuance of the environmental management standards by the International Standardization Organization (ISO)
- Overview of the Environmental Management System Standards
- Other environmental management standards, etc.

■ Educational Contents

1. Basic Contents

(1) Introduction: Background of the issuance of ISO14000 series (20 minutes)

(2) Overview of EMS standards: Review of EMS standards based on ISO14001 (30 minutes)

(3) Audit/assessment-related standards: Introduction of auditing standards (ISO19011) and environmental performance evaluation standards (ISO14031) (10 minutes)

(4) Product/service-related standards: Introduction of LCA Standards (ISO14040) and environmental labeling standards (ISO14020) (10 minutes)

(5) Other environment-related ISO standards: Environmental assessment standards for sites and organizations (ISO14015), environmental communication standards (ISO14063), material flow cost accounting standards (ISO14051), etc. (10 minutes)

(6) Conclusion (10 minutes)

Main Points in This Class

Students will deepen their understanding of the following points:

- Reasons for the need to issue environmental management standards as international standards
- Contents and roles of the Environmental Management System (EMS) standards (ISO14001) that form the structural part of the environmental management standards (PDCA cycle, environmental performance, continuous improvement, etc.)
- Contents of other standards such as auditing, assessment, products and services and their relationship with EMS standards

Students will then examine the companies' efforts in environmental management standards, especially the EMS standards, from the perspective of active environmental management.

. Description of the Basic Contents

(1) Introduction: Background of the issuance of ISO14000 series (20 minutes)

The following topics outline the motivation (background) of the issuance of international environmental standards:

- The need for comprehensive management of increasing environmental laws
- Increased interests in environmental auditing around the 1990's
- Response to the expanding standards and programs such as national standards of BS7750 and EMAS, the Responsible Care Standards of the International Council of Chemical Associations (ICCA), voluntary initiatives of the Blue Angel in Germany and Eco Mark in Japan
- Success of ISO9000, international standards for quality assurance
- Awareness of corporate social responsibility by business managers

Instructors will briefly introduce the following topics:

- The Technical Committee and six subcommittees (Environmental Management System- EMS, Environmental Auditing - EA, Environmental Labeling - EL, Environmental Performance Assessment - EPA, Life Cycle Assessment or originally Life Cycle Analysis - LCA, terminology and definitions - T&D) that examine international environmental standards (TC207) were established within ISO in 1993; relationship between ISO-issued (enacted) standards and the Japanese industrial standards, JISQ

(2) Overview of EMS standards: Review of EMS standards based on ISO14001 (30 minutes)

- Instructors will explain keywords in ISO14001 such as PDCA cycle, environmental performance and continuous improvement.
- Instructors will introduce the assessment and registration (certification) system based on ISO14001 (including self-declaration of compliance) and the number of assessment/registration cases in Japan as well as in the world.
- The class will touch upon ISO14004 (and ISO14005, ISO14006).

(3) Audit/assessment-related standards: Introduction of auditing standards (ISO19011) and environmental performance evaluation standards (ISO14031) (10 minutes)

- Instructors will briefly introduce the background in which the environmental auditing standards (ISO14010, 14011, 14012, etc.) are combined with the quality assurance standards (ISO10011-1, -2, -3) and replaced altogether with ISO19011 as well as the contents of ISO19011.
- Instructors will briefly explain that the environmental performance evaluation standards (ISO14031) operate based on the PDCA cycle.

(4) Product/service-related standards: Introduction of LCA standards (ISO14040) and environmental label standards (ISO14020) (10 minutes)

- Introduction of LCA Standards (ISO14040, ISO14044)

- Introduction of Environmental Label Standards (ISIO14020, ISO14021, ISO14024, ISO14025)
- Introduction of Japan's Eco Mark and German's Blue Angels, etc. in relation to ISO14024

(5) Other environment-related ISO standards: Environmental assessment standards for sites and organizations (ISO14015), environmental communication standards (ISO14063), material flow cost accounting standards (ISO14051), etc. (10 minutes)

- Brief introduction of ISO14015
- Brief introduction of ISO14063
- Brief introduction of ISO14051

(6) Conclusion (10 minutes)

- Instructors should emphasize the need for international standards concerning corporate environmental management.
- It should be also pointed out that ISO14001 efforts, which are at the core of international standards, intend to improve environmental performance through continuous improvement of systems under the PDCA cycle.
- From the perspective of active environmental management, instructors will promote the establishment and operation of EMS based on ISO14001 (from the reduction of use and disposal of paper, waste and electricity to environmental response within a company's primary business).
- Report on EMS practices by students from companies with EMS and a question-and-answer session

3. Keywords in the Basic Contents

(1) Introduction: Background of the issuance of ISO14000 series

- International Organization for Standardization (ISO), TC207, quality assurance standards (ISO9000 series), Japan Industrial Standards (JIS)

(2) Overview of EMS standards: Review of the EMS standards based on ISO14001

- PDCA cycle, environmental performance, continuous improvement, assessment and registration (certification) system, self-declaration of compliance, JISQ14001, Japan Accreditation Board (JAB), assessment and registration agency (certification agency)

(3) Audit/assessment-related standards: Introduction of auditing standards (ISO19011) and environmental performance evaluation standards (ISO14031)

- Environmental auditing, environmental performance evaluation, PDCA cycle, JISQ19011, JISQ14031

(4) Product/service-related standards: Introduction of LCA standards (ISO14040) and environmental label standards (ISO14020)

- LCA, environmental labels, Eco Mark, Blue Angels, JISQ14040, JISQ14020

(5) Other environment-related ISO standards: Environmental assessment standards for sites and organizations (ISO14015), environmental communication standards (ISO14063), material flow cost accounting standards (ISO14051; FDIS stage), etc.

- Site assessment, environmental assessment, environmental communication, material flow cost accounting, cost accounting, JISQ14015, JISQ14063

4. Additional Contents

(1) As a precedent of ISO's environmental management standards, instructors will point out socially responsible accounting (there are similar terminologies such as corporate social accounting and social auditing) developed in the US in the 1970's.

(2) The class will also review EU's Environmental Management and Auditing System (EMAS) and the UK's BS7750 that were established around the same time as ISO's environmental management standards were issued.

5. Additional Keywords

- Socially responsible accounting, corporate social accounting, social auditing, etc.
- EMAS, BS7750, etc.

3.5 Environmental Management Standards of Medium/Small Companies (EcoAction 21, etc.)

■ Goal

This program aims to deepen students' understanding of EcoAction 21, Japan's unique standards and guidelines, established by the MOEJ in order to manage systematically and promote environmental efforts by medium and small companies. Students will learn the following topics:

- Overview of the *EcoAction 21 Guidelines*, prepared by the MOEJ, and its certification/registration system
- Overview of the regional certification of environmental management systems
- Overview of the certification systems concerning environmental efforts by different sectors

■ Educational Contents

1. Basic Contents

(1) Introduction: Overview of different guidelines and systems such as EcoAction 21, KES, LAS-E (10 minutes)

(2) Overview of the *EcoAction 21 Guidelines* and the certification/registration system (40 minutes)

(3) Introduction of regional efforts such as KES and Michinoku EMS (15 minutes)

(4) Introduction of LAS-E (environmental municipality standards) and the Green Management Certification (transportation businesses) (15 minutes)

Main Points in This Class

In this class students will understand the following topics based on EcoAction 21 and discuss their social roles as well as roles within supply (value) chains:

- Why have guidelines and systems for medium/small companies, regions and sectors been established?
- Comparison of the above guidelines and systems with ISO14001 standards/certification and registration system
- Characteristics of each guideline and system

2. Description of the Basic Contents

(1) Introduction: Overview of different guidelines and systems such as EcoAction 21, KES, LAS-E (10 minutes)

- Issues in ISO14001 standards and its certification/registration system in Japan
- History of EcoAction 21 (environmental activity assessment program)
- Overview of various on-going efforts in each region
- Overview of various on-going efforts by each sector

(2) Overview of the *EcoAction 21 Guidelines* and the certification/registration system (40 minutes)

- Characteristics of the *EcoAction 21 Guidelines* (an environmental management system that is easy, effective and efficient to use, understanding of environmental performance and environmental efforts as essential factors, preparation and publication of environmental activity reports as essential factors, and a need for efforts that cover the entire organization and its activities)
- Outline of the certification/registration system (roles of the central and regional offices, reviewers, etc.)
- Outline of guidelines for each industry (industrial waste treatment service providers, food-related business operators, building constructors, universities, municipalities)
- Transitions in numbers of certification registration, number of certification/registration by employee number and industry
- Comparison of the above information with ISO14001 standards as well as its certification/registration system

(3) Introduction of regional efforts such as KES and Michinoku EMS (15 minutes)

- Instructors will introduce the many levels of certification and registration systems (KES – City of Kyoto, Michinoku EMS – City of Sendai, HES – Hokkaido, M-EMS – Mie Prefecture, Iimusu 21 – City of Iida, etc.)

(4) Introduction of LAS-E (the environmental municipality standards) and the Green Management Certification (transportation businesses) (15 minutes)

- Introduction of LAS-E, Green Management Certification (transporters), Japan Federation of Printing Industries (JFPI)'s Green Standard (printers)

(5) Conclusion (10 minutes)

- A need for environmental management of small and medium companies
- Roles of environmental management at the regional level
- Roles of environmental management within supply (value) chains

3. Keywords in the Basic Contents

Common contents: EcoAction 21, supply (value) chain

Regional: KES (City of Kyoto), Michinoku EMS (City of Sendai), HES (Hokkaido), M-EMS (Mie Prefecture), Iimusu 21 (City of Iida)

Sector: LAS-E (environmental municipality standards), Green Management Certification (transporters), JFPI's Green Standard (printers)

4. Additional Contents

- ISO14005: environmental management system – guiding principles for the gradual implementation of an environmental management system including the use of environmental performance assessment
- EU's Environmental Management and Auditing System (EMAS)

5. Additional Keywords

- ISO14005, EMAS

3.6 Environmental Performance Analysis and Assessment

■ Goal

Students will learn the key environmental performance indicators, the calculation method of the indicators, various methods for environmental performance analysis/assessment, and points and issues of conducting an analysis and assessment.

■ **Educational Contents**

1. Basic Contents

(1) Introduction: Significance of an environmental performance analysis and assessment (10 minutes)

(2) Environmental performance indicators: Specific indicators (15 minutes)

(3) Calculation methods: Calculation methods for key environmental performance indicators (15 minutes)

(4) Analysis/assessment methods: Various methods of environmental performance analysis/assessment (25 minutes)

(5) Points and issues: Points and issues of environmental performance analysis and assessment (15 minutes)

(6) Conclusion: (10 minutes)

Main Points in This Class

- Instructors will explain that it is important for business operators to understand and assess environmental performance adequately in order to promote environmental considerations, and that the Environmental Performance Evaluation (EPE) was issued as ISO14031 in 1999.
- Instructors will explain calculation and assessment methods for the key environmental performance indicators. They should point to the environmental performance indicators and calculation methods, descriptions about LIME and JEPIX, which are eco-efficiency and integration methods included in the *Environmental Reporting Guidelines (2007)* issued by the MOEJ, and the usefulness of the document as a reference.
- Instructors will also introduce Life Cycle Assessment, carbon footprint, ecological rucksacks, etc.

2. Descriptions of the Basic Contents

(1) Introduction: Significance of an environmental performance analysis and assessment (10 minutes)

Instructors will look at why environmental performance analyses/assessments are necessary for corporate environmental reports and business operators' environmental considerations. Instructors will explain such necessity in the context of environmental management systems that require constant improvement of environmental performance. Instructors will also discuss this topic from the perspective of comparison with competitors.

(2) Environmental performance indicators: Specific indicators (15 minutes)

Instructors will introduce key environmental performance indicators by using the information and indicators (OPI: Operational Performance Indicators) that represent "3. Information and Indicators that Describe the Status of Activities for Environmental Impacts and Reduction Measures (OPI)," p.67 of the *Environmental Reporting Guidelines (2007)*.

(3) Calculation methods: Calculation methods for key environmental performance indicators (15 minutes)

Environmental performance indicators can be obtained by direct measurement and calculation or alternative methods (for example, energy-derived CO2 emissions are calculated by multiplying fuel consumption by carbon coefficients). Instructors will explain major calculation methods and introduce "【Reference Material】 5. General Calculation Examples for Indicators," p.12 of the *Environmental Reporting Guidelines (2007)*, as a useful material.

(4) Analysis/assessment methods: Various methods of environmental performance analysis/assessment (25 minutes)

When analyzing environmental performance, the environmental load performance (absolute value) will be observed to see if it is constantly improving. The improvement status of the environmental load per class, which is obtained by dividing the environmental load performance with a production volume or the amount of sales, should also be examined. Assessing both the absolute amount and the amount per class is important.

Also, methods to integrate different environmental loads for comparison include LIME and JEPIX. Instructors will explain that the eco-efficiency is calculated by dividing benefit by environmental load, the economic values of the amount of sales and increased value are used as alternative indicators for the benefit, and the concept of the eco-efficiency was proposed by the World Business Council for Sustainable Development.

In addition, instructors will discuss the background of the concepts such as Factor 4 and Factor 10 (for sustainable development). Students will learn that the concept of a "factor," when mathematized becomes a ratio between the eco-efficiency of a reference product or year and that of a subject product or year (improvement rate of the eco-efficiency). Instructors will also point out that ISO14045, an ISO guiding document concerning the eco-efficiency, is expected to be issued in 2011.

Finally, the class will review the backgrounds and contents of assessment methods such as Life Cycle Assessment (LCA), carbon footprint (CFP), ecological rucksack and ecological footprint.

(5) Points and Issues: Points and issues of environmental performance analysis and assessment (15 minutes)

The amount of an environmental load substance defined in the Air Pollution Control Law can be obtained by multiplying a volume of gas emissions by concentration. Instructors will explain that the volume of dry gas emissions should be used for the gas emissions and actual measurement of concentration, not an O2-converted value, should be used for concentration. Instructors will also point to the differences between the O2-converted concentration and actual measurement of concentration as well as the amount of dry gas emissions and wet gas emissions.

The amount of an environmental load substance defined in the Water Pollution Control Law can be obtained by multiplying a volume of effluent by concentration. Instructors will explain that the point of

measurement for the effluent volume and the point of water sampling for the concentration analysis must be the same. Instructors will also point out that it is desirable to hire a certified measuring company for sampling water in order to ensure transparency when an external measuring company will be in charge of measurement and analyses.

When analyzing and assessing environmental performance indicators, especially when comparing environmental performance with other companies, it is necessary to pay careful attention to ensure the same calculation methods for environmental performance indicators as well as the same aggregation range (boundary).

Instructors will also point out that an environmental load does not necessarily decrease even when a factor value has improved (Factor 2: x4 benefits, x2 environmental load).

(6) Conclusion: (10 minutes)

Instructors will note the difference between individual environmental performance indicators disclosed in environmental reports and other concepts such as LCA, eco-efficiency, factors, the ecological rucksack and the ecological footprint.

3. Keywords in the Basic Contents

(1) Introduction: Significance of an environmental performance analysis and assessment

- Environmental performance, environmental performance indicators, *Environmental Reporting Guidelines (2007)*

(2) Environmental performance indicators: Specific indicators

- Total energy input, total material input, water resource input, total product yield, greenhouse gas emissions, air pollutant load, chemical substance emissions/migration, total emission of wastes, etc., final volume of waste disposal, total volume of effluent, etc.
- Water Pollution Control Law, Air Pollution Control Law, Noise Regulation Law, Vibration Regulation Law

(3) Calculation methods: Calculation method for key environmental performance indicators

- Environmental measurement method, certified environmental measurement company, certificate of environmental measurement, CO2 emission factor, Global Warming Potential

(4) Analysis/assessment methods: Various methods of environmental performance analysis/assessment

- Per class, eco-efficiency, factor, Factor 4, Factor 10, LIME, JEPIX, Life Cycle Assessment (LCA), carbon footprint (CFP), ecological rucksack, ecological footprint

4. Additional Contents

- Instructors will mention the *GRI Guidelines G3 (2006)* in addition to the *Environmental Reporting Guidelines (2007)* issued by the MOEJ.

- Although not commonly considered to be environmental performance information, environmental risk information such as PCB storage quantity, soil and underground water contamination, and asbestos in buildings should be mentioned.
- Instructors should pay attention to the trend of the Review Committee on Corporate Environmental Information Disclosure Scheme, which has been held since December 2010 by the MOEJ.

5. Keywords of Additional Contents

- PCB, soil and groundwater contamination, asbestos, Review Committee on Corporate Environmental Information Disclosure Scheme

3.7 Carbon Management

■ Goal

Regarding measures against the world's pressing global warming issue, instructors will summarize the contents of the Kyoto Protocol and the emissions trading system in Japan and explain carbon management from the viewpoint of how corporate greenhouse gas emission reduction should be addressed.

■ Educational Contents

1. Basic Contents

(1) Introduction: Significance of carbon management (10 minutes)
(2) Background: Kyoto Protocol and Japan's emissions trading system (15 minutes)
(3) Carbon management I: Definition (10 minutes)
(4) Carbon management II: Narrow definition (15 minutes)
(5) Carbon management III: Broad definition (30 minutes)
(6) Conclusion: (10 minutes)

Main Points in This Class

- Instructors will explain the content of the Kyoto Protocol, the overview of Japan's emissions trading system until 2012, and the Post-Kyoto trend.
- Instructors will note the need for corporate efforts in greenhouse gas reduction.
- Carbon management should be defined and explained in a narrow sense as literal CO_2 management that focuses on controlling material quantity and in a broad sense as management that aims for the optimization by controlling GHG (six greenhouse gases) and making considerations for economic rationality.

2. Description of the Basic Contents

(1) Introduction: Significance of carbon management (10 minutes)

Instructors will explain carbon management from the viewpoint of how companies should address the global warming issue.

(2) Background: Kyoto Protocol and Japan's emissions trading system (15 minutes)

Instructors will discuss the content of the Kyoto Protocol and Japan's implemented tactics to achieve reduction targets (Kyoto Protocol Target Achievement Plan) as well as the emissions trading system (a trial implementation; the only mandatory system has been implemented in Tokyo).

(3) Carbon management I: Definition (10 minutes)

The class will learn that there are narrow and broad interpretations of carbon management, with the former indicating CO2 control and the latter representing management that considers GHG reduction.

(4) Carbon management II: Narrow definition (15 minutes)

The carbon management in a narrow sense refers to CO2 control, including the following key contents:

a. Keeping track of CO2 emissions from businesses
b. Setting reduction targets (total amount or per class)
c. Reviewing and implementing reduction policies
d. Reviewing the purchase of emission credits in order to achieve the targets

(5) Carbon Management III: Broad definition (30 minutes)

Carbon management in a broad sense refers to management that makes consideration to GHG reduction and includes the following key contents:

a. Keeping track of greenhouse gas emissions in addition to CO2 emissions (from businesses and consolidated subsidiaries)
b. Setting reduction targets for greenhouse gas emissions
c. Reviewing reduction policies (not only business operators and consolidated subsidiaries but supply chains should be taken into consideration)
d. Analyzing and assessing cost-effectiveness of a reduction policy
e. Considering the effects of enhanced corporate image by appealing (disclosing) GHG reduction.
f. Making comprehensive judgment including emission credit purchase to achieve GHG reduction targets, investment for GHG reduction, economic effects by reduction and effects of enhanced image.

(6) Conclusion: (10 minutes)

Instructors will explain the carbon regulations posed on corporations and the significance of carbon management in narrow and broad senses.

3. Keywords in the Basic Contents

(1) Introduction: Significance of carbon management

- Carbon management, emissions trading system, carbon tax (tax against global warming)

(2) Background: Kyoto Protocol and Japan's emissions trading system

- Kyoto Protocol, CDM, JI, emissions trading system, cap-and-trade system, Tokyo Metropolitan Ordinance on Environmental Preservation, Kyoto Protocol Target Achievement Plan

(3) Carbon management III: Broad definition

- GHG, 0.5 gas, 5.5 gas, Kyoto credit

4. Additional Contents

- Instructors will comment on the difference between carbon management and energy management (ISO50001)
- Instructors will also point to carbon offset and carbon offset products.

5. Additional Keywords

- Energy management (ISO50001), carbon offset

3.8 Environmental Reporting

■ Goal

Students will understand the significance of and the need for environmental reporting and study the system background that supports environmental reporting. Students will then examine the *Environmental Reporting Guidelines (2007)* by the MOEJ and the *GRI Sustainability Reporting Guidelines* that work as guiding principles for practical work of environmental reporting.
In environmental reporting considered as a part of environmental communication, the practical environmental management of corporations will be disclosed as environmental information. In order to understand the disclosed contents appropriately, it is indispensable to have common foundation of awareness (platform) between senders and receivers. In this class, students will learn basic rules and frameworks that are necessary to build this common foundation of awareness.

■ Educational Contents

1. Basic Contents

(1) Introduction: Significance and background of environmental reporting (25 minutes)

(2) Environmental information disclosure systems: Discussion on information disclosure systems including environmental reporting (15 minutes)

(3) Outline of the MOEJ's *Environmental Reporting Guidelines*: Overall framework and the structure of individual indicators (20 minutes)
(4) *GRI Sustainability Reporting Guidelines*: Establishment of GRI and the concept of the triple bottom line (20 minutes)
(5) Conclusion: Format and direction of environmental reporting (10 minutes)

Main Points in This Class

- Students will learn the concepts that provide theoretical supports and the institutional background of environmental reporting. By learning the background of establishing environmental reporting and the concepts that promote it, students will be able to picture future environmental reporting.
- Students will gain solid awareness of basic philosophy (formulation of a sustainable society) for individual guidelines concerning environmental reporting. Students will understand the framework that provides a foundation for the guidelines and study basic principles that need to be complied.
- Students will deepen their insight on the assessment method based on the three aspects (triple bottom line) – "economy/environment/society" in the GRI guidelines, or "environmental/society/governance" in the Principles for Responsible Investment (2006). Students will also review stakeholder engagement that promotes the involvement of diverse stakeholders and the materiality issue that examine the level of impact on stakeholders.
- There have been a wide range of efforts not only in contents but in formats and disclosure methods for environmental reporting. Also, visualizing who would be the readers (recipients) and examining how environmental reports are used in actual cases leads to the discovery of stakeholders' needs in environmental reporting. This enhances the usability of environmental reporting.

2. Description of the Basic Contents

(1) Introduction: Significance and background of environmental reporting (25 minutes)
Students will learn the background that has created the need for environmental reporting as well as theoretical grounds. First, students will discuss responsibility to report/explain (accountability). This is a concept based on the membership of the environment, which, as "natural assets" and "environmental values" represent, is considered as an object with values. This can also be explained as a required reporting obligation for monitoring by using the agency model. Legitimacy in which environmental information disclosure formulates a foundation for corporate social survival can be used as a basis of argument.

It is important to present various ways of thinking that support the need for environmental reporting and to encourage students to examine what kind of environmental reporting is required for such ways of thinking.

(2) Environmental information disclosure systems: Discussion on information disclosure systems including environmental reporting (15 minutes)

In some cases, environmental reporting is embedded in an information disclosure system. Reporting obligations required by various environmental regulations are part of the examples, including PRTR concerning the emissions of chemical substances, the Soil Contamination Countermeasures Law and the Law Concerning the Promotion of the Measures to Cope with Global Warming. Also, in different parts of the world such as the EU, the preparation and verification of environmental reports is required for the certification of EMAS, or environmental/social information that could give significant impact on corporate performance needs to be included in annual corporate reports (Accounting Modernization Directive).

(3) Outline of the MOEJ's *Environmental Reporting Guidelines*: Overall framework and the structure of individual indicators (20 minutes)

Based on the MOEJ's *Environmental Reporting Guidelines*, instructors will facilitate students' understanding of general principles which environmental reporting should comply. Instructors will then explain the Basic Information (BI), Environmental Performance Indicators (EPI) and Social Performance Indicators (SPI) in environmental reporting. Instructors can also provide an opportunity to study the concept of business management by clarifying value chains of business activities. Additionally, it is important to point to the input to and output from business activities as well as the material balance in order to guide students to the concept of mass-balance and lifecycle thinking.

(4) *GRI Sustainability Reporting Guidelines*: Establishment of GRI and the concept of the triple bottom line (20 minutes)

Instructors will indicate that environmental activities by the European and American NGOs/NPOs, including GRI, have been pushing forward the efforts in global environmental issues. Especially, instructors should emphasize the importance of coordinating corporate, social and global-development sustainability in the same direction by redefining corporate activities from the three aspects of "economy, environment, society" (triple bottom line) in the *GRI Sustainable Reporting Guidelines*. Students should also take note that reporting based on "environment/society/governance" in the Principles of Responsible Investment (2006) has increased, which indicates the significant expansion of the multifaceted assessment method that utilizes the triple bottom line.

In addition, instructors should encourage students to become aware of the importance of giving consideration to stakeholder engagement, which promotes the involvement of diverse stakeholders,

and the significance of environmental information's impact on stakeholders' decision making (materiality).

(5) Conclusion: Format and direction of environmental reporting (10 minutes)

Through the basic understanding of environmental reporting and discussions concerning the structures and characteristics of various guidelines, students will be able to discuss the future of environmental reporting. It is helpful if students not only read an environmental report provided in the classroom, but they are encouraged to build and propose philosophical models of environmental reporting.

3. Keywords in the Basic Contents

(1) Introduction: Significance and background of environmental reporting

- Accountability, legitimacy
- Valdez Principles, CERES Principles

(2) Environmental information disclosure systems: Discussion on information disclosure systems including environmental reporting

- Environmental regulations, the Environmental Consideration Law, the Law Concerning the Promotion of the Measures to Cope with Global Warming
- Environmental assessment, PRTR
- Environment-Friendly Company Survey

(3) Outline of the MOEJ's *Environmental Reporting Guidelines*: Overall framework and the structure of individual indicators

- General reporting principles
- Basic Information (BI), Environmental Management Indicators (MPI), Operation Performance Indicators (OPI)
- Social Performance Indicators (SPI)
- Material balance

(4) *GRI Sustainability Reporting Guidelines*: Establishment of GRI and the concept of the triple bottom line

- Triple bottom line, economy/environment/society, environment/society/governance
- Stakeholder engagement
- Materiality

4. Additional Contents

Environmental management standards such as EMAS require preparation and verification of environmental reports, while other approaches emphasize the self-initiative of corporations. It is

important to discuss the advantages and disadvantages of different approaches. It is also useful to examine informational needs of different stakeholders.

5. Additional Keywords

- Environmental reporting by stakeholder

3.9 Environmental Information in Financial Reports

■ Goal

As environmental issues have increasingly more influence on corporate financial state and performance, financial and non-financial information concerning environmental issues are now embedded in corporate financial reports and annual reports in order to better understand the contents of those reports. Students will learn that environmental debt and risks are being considered by investors in the process of decision making, and that corporate values are directly linked to appropriate analyses, assessments and disclosure of environmental risks, etc. even for the companies that conduct financial reporting.

■ Educational Contents

1. Basic Contents

(1) Introduction: Overview of environmental information in financial reports (10 minutes)
(2) Disclosure in other countries: Trends in the European Union and the disclosure system in the United States (20 minutes)
(3) Disclosure in Japan: Disclosure of climate change information in the system disclosure documents (20 minutes)
(4) Toward international integrated reporting: International trends and the basic framework (20 minutes)
(5) Conclusion: Coordination and integration of financial and environmental reporting (10 minutes)

Main Points in This Class

- The basic of financial reporting is to utilize financial information of corporate financial status and operating results for investors' decision-making process. However, climate change risks such as global warming have become significant risk factors in corporate management, as they can heighten the uncertainty of business continuation; such non-financial information has been required in financial reporting. Students will understand the history and background of such a trend.

- Students will take note of the contents and formats of how non-financial information is utilized in financial reporting. Many reporting frameworks now use ESG (Environment/Society/corporate Governance) as the three aspects of the triple bottom line. Regarding non-financial information, explanation based on the Key Performance Indicators (KPIs) related to each company's business is required in many cases. Students should pay attention to the fact that these trends in turn require companies to collect, prepare and assess non-financial information based on the above indicators.
- Integrated reporting can be considered not as a unification of reporting formats of financial and non-financial information, but as a preparation of new sustainability strategies that combine the two types of information in addition to accountability concerning the implementing status of such strategies.

2. Description of the Basic Contents

(1) Introduction: Overview of environmental information in financial reports (10 minutes)

Students will study non-financial information listed in annual reports and securities reports. Non-financial information includes strategies, business risks, sustainability information, corporate governance status, information on intangible assets, etc. Discussions are underway to add environmental information such as climate change risks to non-financial information.

Also, students will learn that disclosed contents in financial reports will be accompanied by public responsibility unlike information in environmental reports prepared voluntarily by companies.

(2) Disclosure in other countries: Trends in the European Union and the disclosure system in the United States (20 minutes)

Since the 2000's, the EU has provided advisory for listing environmental information in annual reports. As the Accounting Modernization Directive (2003) required the disclosure of Key Performance Indicators (KPIs) concerning environmental issues, etc., legal systems for accounting in the member states are now being organized. Also, the Climate Disclosure Standard Board (CDSB) launched at the Davos Forum in 2007 issued a public draft "*CDSB Reporting Framework*" (2007), which proposed the disclosure of climate change risks and GHG emissions in financial reports.

On the other hand, in the United States, disclosure of environmental debt has been practiced since the implementation of environmental regulations such as the Superfund Act (1980) and the interpretations of disclosure based on cases subject to environmental regulations have been put together by the Financial Accounting Standards Board (FASB). In February 2010, the Securities and Exchange Commission (SEC) issued the interpretations that require public companies to disclose climate change information.

(3) Disclosure in Japan: Disclosure of climate change information in the institutional disclosure documents (20 minutes)

With the *CDSB Reporting Framework Exposure Draft* as a start, the Japanese Institute of Certified Public Accountants (JICPA) also issued "*Recommendations on the Disclosure of the Climate Change-Related Information in the Regulatory Filing*" (2009). This provides guiding principles for the scope and objectives of institutional disclosure of corporate information concerning climate change, qualitative characteristics of the information, boundaries of reports, etc.

(4) Toward international integrated reporting: International trends and the basic framework (20 minutes)

In August 2010, Accounting for Sustainability (A4S), which was established by the Prince of Wales, and GRI launched the International Integrated Reporting Committee (IIRC). The Committee establishes an international reporting framework that incorporates the triple bottom line reporting based on ESG (Environment/Society/Governance) into financial reporting. In order to formulate a foundation for providing information disclosed by the Committee, the *GRI Sustainability Reporting Guidelines* (G3) are now being revised to fit the new framework (G4).

The International Accounting Standards Board (IASB) issued the *IFRS Practice Statement* in December 2010 to process non-financial information concerning ESG in the section equivalent to the management commentary of a financial report.

(5) Conclusion: Coordination and integration of financial and environmental reporting (10 minutes)

It is indicated that non-financial information is utilized to enhance the level of understanding a financial report. In the future, it is possible that a company is required to prepare a sustainability strategy that incorporates financial and non-financial information as well as an integrated report ("one report") that explains the strategy.

3. Keywords in the Basic Contents

(1) Introduction: Overview of environmental information in financial reports (10 minutes)

(2) Design of institutional arrangements in other countries: Trends in the European Union and the disclosure system in the United States (20 minutes)

- Accounting Modernization Directive
- Key Performance Indicators (KPIs)
- Climate Disclosure Standard Board (CDSB)
- Financial Accounting Standards Board (FASB), Securities and Exchange Commission (SEC)

(3) Design of Institutional Arrangements in Japan: Disclosure of climate change information in the system disclosure documents (20 minutes)

- Japanese Institute of Certified Public Accountants (JICPA)

(4) Toward international integrated reporting: International trends and the basic framework (20 minutes)

- International Integrated Reporting Framework, Connected Report

- International Accounting Standards Board (IASB)
- International Integrated Reporting Committee (IIRC)
- Management commentary

(5) Conclusion: Coordination and integration of financial and environmental reporting (10 minutes)

- Sustainability strategy, one report

4. Additional Contents

The class may focus on environmental accounting information (asset retirement obligation, contingency liability concerning soil contamination, accounting procedures for emissions trading, etc.) listed in corporate financial statements. Students will analyze a company's responses to environmental issues from the perspective of accounting procedure, assess the increase of economic burdens (environmental debt), impact on corporate performance and the status of practical responses, and examine gaps and limitations of the current accounting standards as well as necessary accounting standards.

5. Additional Keywords

- Environmental assets, environmental debt, environmental cost
- Asset retirement obligation, contingency liability, emissions trading

3.10 Environmental Accounting in Environmental Reports

■ Goal

By reviewing the contents of the guidelines in Japan and in foreign countries including the MOEJ's *Environmental Accounting Guidelines*, students will discuss the structure, objectives and responsible bodies of accounting with which environmental accounting practices comply.

Specifically, by using the framework of the MOEJ's *Environmental Accounting Guidelines* as a basic tool, students will learn (1) objectives and functions, (2) general requirements and (3) components of environmental accounting. Also, instructors will introduce the *SIGMA Environmental Accounting Guide*, which is a part of the tool kit for the UK's *SIGMA Guidelines (Sustainability – Integrated Guidelines for Management)* as an example of an environmental accounting guideline in foreign countries so that students can learn the direction and diversity of environmental accounting approaches.

■ Educational Contents

1. Basic Contents

(1) Introduction: Objectives and functions of the MOEJ's *Environmental Accounting Guidelines* (10 minutes)
(2) General requirements for environmental accounting information: Qualitative characteristics of environmental accounting information (10 minutes)
(3) Components of environmental accounting I: Environmental conservation cost (25 minutes)
(4) Components of environmental accounting II: Effect of environmental conservation and economic effect of environmental conservation measures (25 minutes)
(5) Environmental accounting in foreign countries: Concepts of the UK's *SIGMA Environmental Accounting Guide*, etc. (15 minutes)
(6) Conclusion: Discussion on environmental accounting framework (5 minutes)

Main Points in This Class

- It is important that students understand that the MOEJ's *Environmental Accounting Guidelines* uses "cost-benefit performance" as its basic frame. At the same time, instructors should note that not all the environmental accounting methods are discussed within the framework of "cost-benefit performance."
- Students will learn that environmental accounting information consists of what represents financial performance by monetary units such as "environmental conservation cost" and "economic effects of environmental conservation measures," and what represents environmental performance in physical units such as "environmental conservation effects." Thus, it is noted that environmental performance information described qualitatively is not necessarily rejected.
- There is also an attempt to indicate environmental conservation effects in currency, which can be achieved either by a method that estimates the cost of environmental damage or by another method that calculates additional cost necessary to avoid expected damage (damage avoided). It is important that students discuss these methods along with the advantages/disadvantages of monetary conversion.
- Instructors will use foreign environmental accounting guidelines to introduce that there are various approaches in environmental accounting.

2. Description of the Basic Contents

(1) Introduction: Objectives and functions of the MOEJ's *Environmental Accounting Guidelines* (10 minutes)

The MOEJ's *Environmental Accounting Guidelines* use materials and data obtained from business management information including environmental management systems in which companies build environmental accounting information.

This is how environmental accounting information can play a double role of internal and external functions.

(2) General requirements for environmental accounting information: Qualitative characteristics of environmental accounting information (10 minutes)

Instructors will facilitate students' comprehensive understanding of general requirements for environmental accounting information. Instructors should note that these requirements do not serve only as environmental accounting information, but as requirements with versatility applicable to financial reporting as well as business management in general. It is helpful to encourage students to understand the versatility and applicability of those requirements as a business management method.

(3) Components of environmental accounting I: Environmental conservation cost (25 minutes)

Students will understand the source of environmental conservation cost and the concept of cost classification. Through this process, instructors can facilitate students to look at classification based on different environmental measures. Instructors should also point out that the basis of environmental conservation cost recognition follows that of objectives. Students will understand the mechanism in which issues concerning comparability, etc. are generated.

(4) Components of environmental accounting II: Effect of environmental conservation and economic effect of environmental conservation measures (25 minutes)

As for environmental conservation effects, students should pay attention to the fact that the effects are indicated as physical information and will understand that such information enables them to be linked to environmental performance assessment, various indicators, environmental impact assessment or environmental assessment. As a result, students will be able to indicate that the framework of "cost-benefit performance" adopted in the *Environmental Accounting Guidelines* can be applicable to many areas as a versatile tool.

Regarding practical economic effects, students will discuss the possibility of coordination with financial reporting; regarding expected effects, they will look at the possibility of cross-usage of accounting information with lifecycle costing. Although the GMP Guidelines do not discuss social cost, instructors can indicate the relationship between environmental accounting and social cost by showing students that the reduction of social cost as a result of promoting environmental conservation activities can be described as an expected effect.

Also, instructors will introduce attempts of monetary conversions including a method that estimates the cost of environmental damage and one that calculates additional cost required to avoid expected damage (damage avoided). It is important to discuss the disadvantages/advantages of these methods as well as benefits/issues of monetary conversions.

(5) Environmental accounting in foreign countries: Concepts of the UK's *SIGMA Environmental Accounting Guide*, etc. (15 minutes)

In order to study environmental accounting efforts in foreign countries, instructors will introduce "*SIGMA Environmental Accounting Guide*" in the UK's *SIGMA Guidelines (2003)*. When referring to this guide, instructors will note that measurement methods and concepts for handling cost and expenses concerning the environment are not standardized, and there is no linkage established with conventional financial accounting concepts.

(6) Conclusion: Discussion on environmental accounting framework (5 minutes)

For the process of establishing environmental accounting, there is no standardized framework and the process relies upon try-and-error. In that sense, instructors can also encourage students to picture new environmental accounting designs, i.e. what are necessary for promoting a new development of "environmental accounting."

3. Keywords in the Basic Contents

(1) Introduction: Objectives and functions of the MOEJ's *Environmental Accounting Guidelines*

- Efficiency and effectiveness, internal functions and external functions

(2) General requirements for environmental accounting information: Qualitative characteristics of environmental accounting information

- Fitness for purpose; importance
- Reliability; legitimacy, substantiality, neutrality, completeness, deliberation
- Clarity
- Comparability, verifiability

(3) Components of environmental accounting I: Environmental conservation cost

- Cost within a business area; pollution prevention cost, global environmental conservation cost, resource recycling cost
- Upstream/downstream cost
- Management activity cost
- Research and development cost
- Social activity cost
- Environmental damage response cost

(4) Components of environmental accounting II: Effect of environmental conservation and economic effect of environmental conservation measures

- Real effect, estimated effect

(5) Environmental accounting in foreign countries: Concepts of the UK's *SIGMA Environmental Accounting Guide*, etc.

- *SIGMA Guidelines*, *Environmental Accounting Guide*

4. Additional Contents

Regarding practical environmental accounting of corporations, some industry and corporate groups have established their own environmental accounting guidelines based on the MOEJ's *Environmental Accounting Guidelines*.

5. Additional Keywords

Environmental accounting guidelines by industry, sustainability accounting, etc.

3.11 Environmental Management Accounting

■ Goal

In order to link the environment and management on corporate site, it is important to utilize accounting, which is an economic calculation system for a company. The accounting area concerning the environment has developed as environmental accounting. The goal of this class is to understand environmental management accounting, which is one component of management accounting, used in accordance with business objectives when making decisions and managing tasks concerning the environment. The class will focus on the following points:

- How has environmental management accounting developed internationally?
- What is the range of environmental cost, which is the central concept of environmental management accounting?
- What kind of methods does environmental management accounting have?

Material flow cost accounting will be explained in the next section "3.12 Material Flow Cost Accounting."

■ Educational Contents

1. Basic Contents

(1) Introduction (10 minutes)

(2) Development of environmental management accounting in Japan and foreign countries (10 minutes)

(3) Scope of environmental cost (20 minutes)

(4) System and methods of environmental management accounting (40 minutes)

(5) Conclusion (10 minutes)

Main Points in This Class

- Development of environmental management accounting methods has been supported by the government agencies of the developed countries, and has seen important achievements.

Students should understand that the development of environmental management accounting methods represents the fact that they are not only beneficial for a single company, but also effective for the entire society.

- The system of environmental management accounting is a collective entity of various methods and each method is different in importance for each company. Investment decisions, target costing, budget and performance assessment have seen many years of technical development in each traditional management accounting field. It is important for students to know how corporate decision making can be transformed into an environmental-conscious one by incorporating environment-related information.

2. Description of the Basic Concepts

(1) Introduction (10 minutes)

Although both external environmental accounting and environmental management accounting are components of environmental accounting, their contents are significantly different. While external environmental accounting aims for information disclosure, environmental management accounting is a method to resolve unique issues within a company. The class will clarify the differences between external environmental accounting and environmental management accounting.

(2) Development of environmental management accounting in Japan and foreign countries (10 minutes)

The validity of environmental management accounting as a means to promote environmental management is widely recognized by the international community and a number of government and international agencies have made efforts in developing methods. In this program, instructors will focus on the environmental accounting project of the US Environmental Protection Agency, quantitative environmental accounting in Germany, the United Nations Division of Sustainable Development (UNDSD), International Federation of Accountants, and efforts by the Ministry of Economy, Trade and Industry.

(3) Scope of environmental cost (20 minutes)

In order to understand the content of environmental management accounting, it is necessary to know the range of environmental cost covered by environmental management accounting. Upon classifying the cost into the following seven categories, instructors will explain the scope of environmental cost indicated in the documents by the US Environmental Protection Agency and International Federation of Accountants: (1) Environmental conservation cost; (2) cost of raw materials and energy; (3) processing cost allocated to waste; (4) processing cost allocated to products; (5) cost of energy generated when using products; (6) cost generated when disposing/recycling products; and (7) social cost as environmental load.

(4) System and methods of environmental management accounting (40 minutes)

Instructors will explain the system of environmental management accounting by showing the relationship between the method that adds environmental factors to the existing management accounting method and the comprehensive method that has its own database. Instructors will also discuss the four specific methods – environmentally-conscious decision for facility investment, environmentally-conscious target costing, environmental budget matrix, and environmentally-conscious performance assessment.

(5) Conclusion (10 minutes)

Environmental management accounting is an effective measure to coordinate the environment and economy in management activities and decision-making processes within a company. It not only transforms management decision-making processes into environmentally-conscious ones but functions as an information system concerning the environment and economy. Instructors will explain future possibility of development in which lifecycle cost and social cost are appropriately incorporated in to such an information system.

3. Keywords in the Basic Content

(2) Development of environmental management accounting in Japan and foreign countries

- US Environmental Protection Agency, EMAN, UN Division of Sustainable Development, International Federation of Accountants, Ministry of Economy, Trade and Industry, international standardization

(3) Scope of environmental cost

- Environmental cost, social cost, lifecycle cost, full-cost accounting

(4) System and methods of environmental management accounting

- Environmentally-conscious decision-making processes concerning facility investment, environmentally-conscious cost targeting, environmental budget matrix, environmentally-conscious performance assessment

4. Additional Contents

(1) Lifecycle costing

5. Additional Keywords

(1) Lifecycle costing

- Lifecycle management, Life Cycle Assessment

3.12 Material Flow Cost Accounting

■ Goal

Material flow cost accounting is a comprehensive accounting technique that measures by physical and monetary units how the materials move within a manufacturing process. Students will learn the following basic knowledge in this class:

- How material flow cost accounting has been developed in Japan and foreign countries
- What kind of calculation structure material flow cost accounting has

Students also aim to understand the following topics:

- How material flow cost accounting is utilized by Japanese corporations
- International standardization of material flow cost accounting

■ Description of Educational Contents

1. Basic Contents

(1) Introduction (10 minutes)
(2) Development of material flow cost accounting in Japan and foreign countries (10 minutes)
(3) Calculation structure of material flow cost accounting (30 minutes)
(4) Examples of corporate material flow cost accounting (20 minutes)
(5) International standardization of material flow cost accounting (10 minutes)
(6) Conclusion: Significance of material flow cost accounting (10 minutes)

Main Points in This Class

- Students will learn that material flow cost accounting is a method that attempts to restructure corporate information systems and accounting calculation methods from the environmental perspective, not just partially adding such a perspective to the existing management accounting methods.
- In the corporate examples of material flow cost accounting, various developments have been seen in accordance with the objectives of its use. Students will study that material flow cost accounting has a significant feature to support both environment and economy in a long term in addition to the reduction of environmental load and costs in a short term.

2. Description of the Basic Contents

(1) Introduction (10 minutes)

Instructors will clarify the characteristics and significance of the *Environmental Accounting Guidelines* issued by the MOEJ and will discuss the meaning of environmental management accounting based

on the differences between external environmental accounting and environmental management accounting. Instructors will then explain various methods of environmental management accounting (environmentally-conscious facility investment decisions, performance assessment and budget management, lifecycle costing, etc.) and the differences of material flow cost accounting from those methods within the environmental management accounting system.

(2) Development of material flow cost accounting in Japan and foreign countries (10 minutes)

Based on the history of material flow cost accounting that emerged in Germany from Eco-balance, instructors will explain the UN Division of Sustainable Development that puts emphasis on material flow, the characteristics of the guidance for environmental management accounting issued by the International Federation of Accountants as well as the efforts made by Japan's Ministry of Economy, Trade and Industry.

(3) Calculation structure of material flow cost accounting (30 minutes)

Instructors will explain the calculation structure of material flow cost accounting based on the following points:

- Difference between traditional cost accounting and material flow cost accounting
- Relationship between yield management and material flow cost accounting

(4) Examples of corporate material flow cost accounting (20 minutes)

Instructors will review corporate examples of actual implementation and explain the following two points:

- What kind of information became clear when material flow cost accounting was implemented
- What kind of improvements were proposed

Also, if possible, the class will invite personnel in charge of adopting material flow cost accounting in companies to explain specific efforts. Students will have an opportunity to make questions and get answers concerning their efforts.

(5) International standardization of material flow cost accounting (10 minutes)

Instructors will explain the history and the current status in which material flow cost accounting was internationally standardized as a method to link environmental conservation activities and corporate economic activities to ISO family such as ISO14001. Instructors will also explain the characteristics of international standardization (the overall framework should be indicated; the international standardization is not to aim for third-party certification but to provide valid guidance to industry including small and medium companies).

(6) Conclusion: Significance of material flow cost accounting (10 minutes)

Material flow cost accounting has a nature as a management accounting tool that approaches management issues emerged from the perspective of environmental considerations. However, it is a tool that creates a new management accounting field rather than adding environmental consideration aspects to the existing management accounting. In other words, it is a tool that overcomes the limit

of existing production management and management accounting information. Instructors will explain such significance of material flow cost accounting.

3. Keywords in the Basic Contents

(2) Development of material flow cost accounting in Japan and foreign countries

Eco-balance, Workbook on Environmental Management Accounting Methods

(3) Calculation structure of material flow cost accounting

Material loss, system cost, waste treatment cost, physical quantity center, positive product, negative product, yield, in-process, flow cost matrix

(4) Examples of corporate material flow cost accounting

Visualization, PDCA cycle

(5) International standardization of material flow cost accounting

Environmental management system, ISO14001, third-party certification

4. Additional Contents

(1) Extensibility of material flow cost accounting

5. Additional Keywords

(1) Extensibility of material flow cost accounting

Supply chain, Life Cycle Assessment (LCA)

3.13 Specific Examples and Reliability of Environmental Reports

■ Goal

Students will compare characteristics of environmental reports that have won awards by reviewing specific examples. Also, instructors will explain a mechanism that assures the reliability of environmental reports.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction: Specific examples and reliability (15 minutes)

(2) Specific examples: Comparison of award-winning reports (25 minutes)

(3) Reliability: Environmental Consideration Law (15 minutes)

(4) Third-party opinion: Significance and actual cases (10 minutes)

(5) Third-party review: Significance and actual cases (15 minutes)

(6) Conclusion (10 minutes)

The Main Points in This Class

- Specific examples of environmental reports will be introduced so that students will understand strong points of award-winning environmental reports.
- Objectives and contents of the Environmental Consideration Law and tactics to improve reliability of the *Environmental Reporting Guidelines* (2007) will be explained.
- Significance and difference between third-party review and opinion as a reliability-improving method will be explained.

2. Description of the Basic Contents

(1) Introduction: Specific examples and reliability (15 minutes)

Regarding Japan's two major award systems for environmental reports ("Environmental Communication Awards" sponsored by the MOEJ and the Global Environmental Forum; "Green Reporting Awards – Environmental Report Awards" co-sponsored by Toyo Keizai and the Green Reporting Forum), instructors will explain when the systems were established and what kinds of awards are included. Instructors will also discuss methods to assure reliability of environmental report contents and the significance of assuring reliability.

(2) Specific examples: Comparison of award-winning reports (25 minutes)

Instructors will choose a few environmental reports that won awards in the latest awarding, compare them and explain differences and valuable points.

(3) Reliability: Environmental Consideration Law (15 minutes)

Instructors will discuss the objectives of implementing the Environmental Consideration Law while explaining the overview of third-party opinion as well as third-party review. Instructors will also clarify that the key two elements of reliability is that important information is included without missing (completeness) and that the accuracy of the information exceeds a certain level (accuracy). Instructors will point to that "6. Preparation Process and Measures to Improve Reliability and Content of Environmental Reporting" in p.23 of the *Environmental Reporting Guidelines* (2007) by the MOEJ includes various and specific measures to improve reliability.

(4) Third-party opinion: Significance and actual cases (10 minutes)

This refers to the opinions (remarks, feedbacks) given by environmental experts, university professors, representatives of environmental NGOs/NPOs, etc. by reviewing environmental reports and observing environmental conservation activity sites. This is conducted to seek for advice from the viewpoint of information completeness among other things concerning reliability, as well as to obtain judgment by experts as assessment of environmental conservation activities. Thus, instructors should explain the difference of third-party opinion with third-party review described below. Also,

instructors will, by using examples, note that a third-party opinion report is submitted to a company, which is commonly included in the last pages of its environmental report and present examples.

(5) Third-party review: Significance and actual cases (15 minutes)

Regarding information listed in an environmental report (particularly quantitative information), instructors will explain that a third-party institution shall review the completeness of important information and the accuracy of information and the conclusion on the reliability of the listed information will be presented in a third-party review report. This report will be submitted to a company in the same way as the third-party opinion report and included in the last pages of the environmental report. Specific examples should also be presented. Students will learn that third-party review is considered to be a part of assurance affairs, which include a high-level assurance – reasonable assurance affairs – and a mid-level assurance – limited assurance affairs. Reviews for current environmental reports are mostly limited assurance affairs.

Instructors should point to the history and activity objectives of the Japanese Association of Assurance Organizations for Sustainability Information (the former Japanese Association of Assurance Organizations for Environmental Information), an association of third-party review institutions.

(6) Conclusion (10 minutes)

Instructors will briefly explain the two major environmental report award systems, the objectives and contents of the Environmental Consideration Law, methods of reliability assurance, and differences between third-party opinion and review.

3. Keywords in the Basic Contents

(1) Introduction: Specific examples and reliability

- Award system, third-party opinion, third-party review

(3) Reliability: Environmental Consideration Law

- Environmental Consideration Law, assurance affairs

(5) Third-party review: Significance and actual cases

- The Japanese Association of Assurance Organizations for Sustainability Information, assurance affairs, reasonable and limited assurance affairs

4. Additional Contents

- Instructors will mention the Special Award for Excellence in Reliable Reporting (of Environmental Communication Awards).

5. Additional Keywords

- The Japanese Association of Assurance Organizations for Sustainability Information, Special Award for Excellence in Reliable Reporting

3.14 Socially Responsible Investment

■ Goal

Many companies face pressure from the capital market, which influences their corporate activities. Thus, in order to promote environmental management, corporate efforts in environmental issues must be appropriately assessed in the capital market. Traditionally, in a field called socially responsible investment, corporate efforts in environmental and social issues have been assessed and reflected in investment activities. In this class, students will learn the following topics:

- What kinds of methods are available for socially responsible investment
- What kinds of efforts in socially responsible investment have been made in Japan and foreign countries

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction (10 minutes)
(2) Methods of socially responsible investment (20 minutes)
(3) Socially responsible investment in Japan (20 minutes)
(4) Socially responsible investment in foreign countries (30 minutes)
(5) Conclusion: Significance of socially responsible investment (10 minutes)

Main Points in This Class

- In order to promote environmental management, corporate considerations to the environment need to be appropriately assessed in the capital market. Students will be expected to understand to what extent the real-world capital market has incorporated considerations to environmental and social issues into their assessment.

2. Description of the Basic Contents

(1) Introduction (10 minutes)

What socially responsible investment target for its assessment is not limited to environmental issues but widely ranges from human rights and employee issues to corporate relations with local communities. In this class, instructors will explain the origin of socially responsible investment including Christian influence and trends in the United States and the United Kingdom as well as the

current situation in which its capital scale has expanded significantly in the United States and Europe since the 1990's.

(2) Methods of socially responsible investment (20 minutes)

The class will review three representative methods of socially responsible investment: (1) Social screening; (2) social shareholder behaviors; and (3) community investment. Regarding (1) social screening, negative and positive screening will be explained; (2) social shareholder behaviors, submission of agenda in general shareholders' meetings, voting rights and direct dialogues with management teams; and (3) community investment, methods to supply necessary fund for low-income individuals and small companies.

(3) Socially responsible investment in Japan (20 minutes)

In 1999, Eco-Fund was issued for the first time in Japan. Although funds that respond to various social needs have been issued since then, their scale is very limited. However, surveys on SRI and corporate assessment based on social responsibility do have influences; thus, the class will review the contents of such influences. Also, students will learn about specific shareholder behaviors and community investment efforts by NPO banks, etc. in Japan.

(4) Socially responsible investment in foreign countries (30 minutes)

The United Nations issued the Principles for Responsible Investment calling for incorporation of environmental and social issues as well as corporate governance into fund operations by institutional investors. In addition, the Carbon Disclosure Project started in 2000 and research on climate-change issues and corporate risks has been underway. Instructors will also explain efforts in Europe and the Equator Principles.

(5) Conclusion: Significance of socially responsible investment (10 minutes)

Investment is generally considered to be an act of placing the highest priority on profit. However, the concept of socially responsible investment and profit encompasses diverse perspectives, for example, that the pursuit of social benefit and profitability can be achieved simultaneously, and that considerations to social benefit will bring profitability. At the same time, social responsibility by investors needs to be revisited. Instructors will explain such topics in the class.

3. Keywords in the Basic Contents

(1) Methods of socially responsible investment

Social screening, positive screening, negative screening, social shareholder behavior, community investment

(2) Socially responsible investment in Japan

Eco-Fund, NPO bank, environmentally-conscious lending

(3) Socially responsible investment in foreign countries

The United Nations Environment Programme, Global Compact, Carbon Disclosure Project, the Equator Principles

4. Additional Contents

(1) CSR banking

5. Additional Keywords

(1) Environmentally-conscious lending, investments in environmental projects

3.15 Conclusion: Case Studies in Environmental Management

■ Goal

Instructors will check the level of students' general understanding of environmental management, including the philosophy, strategies and methods of active environmental management through research, presentation and discussion on actual cases of environmental reports that have been prepared and published by companies.

■ Educational Contents

1. Basic Contents

Students will be divided into two or three groups. Each group will give presentation and the class will discuss their research findings.

(1) Environmental report by industry (20-30 minutes, depending on the number of groups)

(When a company to which a student belongs prepares an environmental report, it is preferable to choose such a report for a group research topic.)

(2) Debate and conclusion of case study findings (30 minutes)

(The time frame for presentation should be 30 minutes per group when there are two groups and 20 minutes when there are three groups. Alternatively, debate can follow immediately after presentation.)

Main Points of This Class

- Through the case studies, it is important for students to acquire skills and aptitudes concerning the analysis of information described in environmental reports. Students should be able to read and fully understand environmental reports.
- When a student is employed by a company that prepares an environmental report, the student will be encouraged to link the research findings to the improvement of their company's environmental report contents.

- Students will understand the reality of environmental management of a company through case studies.
- Students will compare the above research results with the level of environmental management of their companies and examine the possibility to apply such findings.

2. Description of the Basic Contents

(1) Environmental report by industry (20-30 minutes, depending on the number of groups)

*The following points should be noted in case studies:

- Compliance with the MOEJ's *Environmental Reporting Guidelines* (general reporting principles, basic requirements, Basic Information [BI], indicators related to environmental management - Management Performance Indicators [MPI], indicators related to business activities - Operational Performance Indicators [OPI], and indicators concerning social efforts, etc. - Social Performance Indicators [SPI]); comparison between environmental reports within each group
- Comparative studies of commitment by management top executives, environmental management philosophies and strategies, environmental policies, purposes and objectives
- Comparison between topics and articles that attract interests
- Advantages/disadvantages and points to be improved of each environmental report
- Total scores of environmental reports (perspectives that the evaluation takes should be selected from the following list: Active environmental management, compliance to the guidelines, readers of environmental reports (consumers, local residents, investors, etc.)

(2) Discussion and conclusion of case study findings (30 minutes)

*Discussion and conclusion of case study findings

Based on the results of presentation and discussion, students will summarize the levels of active environmental management of the subject companies and the issues of their environmental reports.

3. Additional Contents

- Research and presentation of environmental reports from the viewpoints of the GRI Guidelines and other perspectives

【4】 Sustainable Business Practices

1. Educational Goal

Students will learn concepts and assessment tools based on lifecycle thinking. They will also acquire knowledge and skills concerning the development of products and manufacturing methods with environmentally-increased values as well as the establishment of organizations. The class aims to develop human resources who can apply such knowledge and skills for practical scenarios and who can propose business models to realize green innovation.

2. Structure of the Program

1) Introduction: Utilizing lifecycle thinking in business

Students will learn the following topics through the example of Carbon Footprint of Products (CFP):

- Understanding the product lifecycle, “Cradle to Grave”
- Understanding environmental impacts that occur outside the areas of production or use of a product
- Communication between manufacturers and consumers through environmental information display
- Improvement of products and manufacturing by understanding activities with a high environmental load

2) Environmental impact during lifecycle and countermeasure technology

Students will study causes of typical global environmental issues, their impact on mankind and ecosystems and current measures/countermeasures. The areas of impact can include: global warming, ozone layer depletion, acidification of soil/lakes, eutrophication of closed water and oceans, resource exhaustion, and biodiversity. Technology that addresses these issues includes renewable energy, recycling, carbon dioxide storage, fluorocarbon regulation, purification of emissions and discharge, energy-efficient housing, hybrid and electric vehicles, etc. Instructors will discuss the significance of these examples.

3) Overview of lifecycle assessment and analysis procedures

In conformity to ISO14040, students will learn the four-step implementing procedures of LCA. They will follow the procedures using examples in the order of goal and scope setting, inventory analysis (LCI), environmental impact assessment (LICA) and interpretation of results. Students will also learn the importance of functional units and system boundaries.

4) – 7) Practical training in LCA (four consecutive sessions)

Students will practice goal and scope setting, deciding on a lifecycle system that fits the scope, processes within the system and visualization of their linkage, inventory data collection, inventory

analysis, impact assessment, and interpretation of results. They will also gain knowledge in available database and analysis software.

The sessions will put emphasis on goal and scope setting as well as the interpretation of results. Examples of problems may include identification of a process that has significant contribution to the environment, shifts in environmental load due to material changes, recycling effects, etc. Depending on students, cooking and the use of home appliances can be used as examples.

8) Understanding biodiversity (1) Corporate activities and biodiversity

Students will examine why companies need to address biodiversity conservation from two perspectives - receiving ecosystem services, and environmental risks.

9) Understanding biodiversity (2) How to address biodiversity within corporate activities

Students will study perspectives for companies to address biodiversity conservation, and new rules as well as international trends for such perspectives, by focusing on economic mechanisms, particularly on raw material procurement and certification systems, direct payment and tradable permissions.

10) Management of toxic chemical substances

Students will study the basics including legal systems such as the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances, PRTR, MSDS, RoHS and REACH, risk assessment, hazard management and risk management, risk-benefit analysis, etc. As an advanced study, students will also learn risk management as a general term (risk = frequency of occurrence x impact level; application to accidents and businesses).

11) Utilizing environmental information in communication with consumers

Students will learn types, definitions and actual examples of environmental labels. Instructors will introduce Type I (Eco Mark), Type III (Eco Leaf), CFP, and guidelines for the Green Purchase Law as well as ones issued by the Green Purchase Network (GPN), through which students will study the role of green purchases and environmental information provisions. Students will discuss ways to promote products with high-environmental performances to consumers, including the utilization of Type II (labels).

12) Developing products and manufacturing methods with high-environmental performance

Students will learn the following topics through actual cases: Criteria for judgment for the Green Purchase Law; Eco Mark certification standards; product development in conformity with GPN guidelines; development of highly environmentally-conscious products that use LCA and QFDE; development of environmentally-conscious products, chemical substance management and improvement of the manufacturing process through supply chain collaborations.

13) – 14) Creating values from the environmental perspective and green innovation

For new product development related to tasks and expertise of students, appeal for consumers, improvement of organizations and supply chains, and green innovation through overseas project

expansion, students will build a business model from proposal to implementation. The class will take a group-discussion format.

15) Conclusion: Presentation of discussion findings and class discussion

The class will have a comprehensive discussion on business models that enable green innovation.

3. Points to Note

For practical training in LCA, themes and procedures will be selected depending on the background and areas of students' expertise. Instructors should give thorough consideration to individual projects vs. group projects, commercially available software vs. Excel and providing data vs. conducting research. Instructors should also consider spending approximately 1 hour for students to learn how to use computers and software. Teaching assistants may be assigned.

Explanation should be based on actual examples as much as possible.

4.1 Introduction: Utilizing Lifecycle Thinking in Business

■ Goal

The basis of business is to pursue profits. However, it is no use if too much emphasis is placed on the pursuit of short-term profits and the environment itself that provides the business foundation ends up being destroyed. In other words, business from now on needs to hold a broad view in terms of time and space, and to revisit its own acts from a sustainable perspective.

In order to achieve sustainable business, what principles should be followed when acting? In this class, students will aim to learn the concept of "lifecycle thinking," which can be the principle for sustainable business, and to become capable of applying lifecycle thinking to actual business scenarios.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction (Sustainability and global environmental issues) (20 minutes)

(2) Product lifecycle and environmental load (20 minutes)

(3) Environmental load shift and trade-offs (20 minutes)

(4) Communication through lifecycle (15 minutes)

(5) Conclusion (Sustainable business based on lifecycle thinking) (15 minutes)

Main Points in This Class

- To understand sustainability from three perspectives– the environment, society and economy

- To obtain basic knowledge of global warming which is one global environmental issue
- To learn the specifics of product and technology lifecycles and to become aware that environmental load occurs in each stage
- To recognize that production and consumption activities and the natural environment are closely connected to each other through product lifecycle.
- To understand that it is necessary to capture changes of environmental load due to changes in production activity through product lifecycle, and that improvement which is expected to reduce load could possibly increase the load (the reverse case is possible).
- To recognize that the cooperation of actors related to the entire lifecycle is imperative for the reduction of environmental load

2. Description of the Basic Contents

(1) Introduction (20 minutes)

- Instructors will explain that it is necessary to understand sustainability from three aspects of the environment, society and economy in future business by introducing corporate environmental reports and CSR reports, etc.
- Instructors will show that both public and private sectors, especially in developing countries, need initiatives to consider not only environment conservation but also socioeconomic development.
- Instructors will explain that global warming is an inevitable problem when addressing sustainability from the environmental aspect and provide basic knowledge on its mechanism and impact.

(2) Product lifecycle and environmental load (20 minutes)

- All products start from resources taken from the earth, and these products are manufactured from such resources, used and disposed of when they become valueless. Instructors will mention not only industrial products such as automobiles, but agricultural products in regard to the entire flow of product lifecycle and emissions of GHG (CO2, CH4, N2O, etc.) in each stage to facilitate students' specific awareness.
- Environmental issues include not only global warming, but the protection of the ozone layer and biodiversity, etc. Instructors will show that it is necessary to think about other environmental issues through product lifecycle similarly to greenhouse gases.
- Additionally, instructors will briefly introduce lifecycle assessment which is based on the above idea.

(3) Environmental load shift and trade-offs (20 minutes)

- For example, introduction of energy-saving products reduces GHG emissions when used, but this also increases the possibility of GHG emissions when manufactured. Instructors will

explain the possibility of new technology, product and process introduction generating shift and trade-offs between lifecycle stages.

- Instructors will present the shifts and trade-offs not only between lifecycle stages but also between different environmental loads.

(4) Communication through lifecycle (15 minutes)

- Instructors will explain that various actors are involved in one product lifecycle, and information sharing and cooperation between those actors (collaboration between manufacturers, between a manufacturer and consumers, etc.) is necessary for reduction of environmental load by using examples of carbon footprint, etc.

(5) Conclusion (15 minutes)

- Instructors will summarize and check students' understanding that lifecycle thinking is indispensable for environmental load reduction and discuss sustainable business based on such thinking.

  *Offering various policies for greenhouse gas reduction

  *Product design in consideration of lifecycle

  *Provision of environmental information based on lifecycle thinking to consumers, etc.

3. Keywords in the Basic Contents

(2) Product lifecycle and environmental load

Lifecycle assessment, cradle-to-grave

(3) Environmental load shift and trade-offs

Technology development, product design

(4) Communication through lifecycle

Carbon footprint, supply chain, environmental information

4. Additional Contents

As an introduction, it is sufficient if sustainability and lifecycle thinking are conceptually understood, but instruct on specific methods if possible. Although the class focuses on the environmental aspect, instructors may also mention the application of lifecycle thinking to actual businesses after discussing relations between the environmental and socioeconomic aspects.

(1) Overview of lifecycle assessment method

(2) Various analysis and assessment methods based on lifecycle thinking

(3) Trade-offs between the environmental and socioeconomic aspects

(4) Various applications of lifecycle thinking in business

5. Additional Keywords

(1) Overview of lifecycle assessment method

ISO14040 series, inventory analysis, impact assessment

(2) Various analysis and assessment methods based on lifecycle thinking

Energy analysis, material flow analysis, MIPS

(3) Trade-offs between the environmental and social economic aspect

External cost, cost benefit analysis, sustainability indicators, sustainable development in the developing countries

(4) Various applications of lifecycle thinking in business

Corporate social responsibility (CSR), environmental report, GHG protocol

4.2 Environmental Impact from Lifecycle and Its Countermeasure Technologies

■ Goal

Students will aim to understand the following topics in corporate management in the 21st century:

- The importance of and need for efforts in environmental issues based on lifecycle thinking
- Typical causes of global environmental issues and the impact on humans and ecosystem thereby
- Advantages in currently-conducted countermeasure technologies, and product/service design and procurement based on lifecycle thinking, and how they can increase corporate value

Students will also be able to gain the following skills:

- The active and voluntary consideration and summarizing of the current socioeconomic system, which aims to increase companies' earnings and development, and of causal structure of environmental issues (ability to recognize relationship between corporate activities and behaviors of socioeconomic systems, consumers, etc.)
- To take initiatives in considering and summarizing factors when making decisions concerning product design, material purchase, sales, investment for countermeasure technology, etc.

Students will obtain the basic knowledge described below:

- Areas of impact and countermeasure technology to be assessed for environmental impact posed by lifecycle
- Actual cases of product design based on lifecycle environmental impact assessment of Japanese companies (mainly major corporations)
- Overview of companies' tools to conduct environmental efforts based on a lifecycle

perspective (ISO14040 and related tools).

Students will develop the ability to act based on lifecycle thinking for product design, material purchase, product sales, investment, etc.

■ Summary of Educational Contents

1. Basic Contents

(1) Introduction: Efforts for environmental issues based on lifecycle thinking (10 minutes)

(2) Causes of global environmental issues and impact on humans and ecosystem (30 minutes)

(3) Cases of countermeasure technology (30 minutes)

(4) Conclusion: Advantages of design and procurement of products and services based on lifecycle thinking (20 minutes)

Main Points in This Class

- To learn typical global environmental issues, impact on humans and the ecosystem and currently-conducted measures
- To examine areas of impact, including global warming, ozone layer depletion, acidification of soil and lakes, eutrophication of enclosed water and sea areas, depletion of resources, etc.
- To list renewable energy, recycling, CO2 sequestration, emission and effluent purification, energy-efficient housing, hybrid and electric vehicles as examples of countermeasure technologies, and discuss the significance thereof.

2. Description of the Basic Contents

(1) Introduction: Efforts for environmental issues based on lifecycle thinking (10 minutes)

Why are efforts on environmental issues based on lifecycle thinking important and needed? What kind of advantages can companies obtain through efforts in environmental issues based on lifecycle thinking?

(2) Causes of global environmental issues and impact on humans and ecosystem (30 minutes)

Instructors will discuss global warming, ozone layer depletion, acidification of soil and lakes, eutrophication of enclosed water and sea areas, depletion of resources, etc. as representative global environmental issues, and explain such causes and impact on humans and ecosystem. Instructors will specifically explain the fact that every person is a victim and victimizer as well as explain the conflicts between developed and developing countries since such environmental issues are induced by any human economic activities.

(3) Cases of countermeasure technology (30 minutes)

Instructors will list renewable energy, recycling, CO2 sequestration, emission and effluent purification, energy-efficient housing, hybrid and electric vehicles as examples of

countermeasure technologies, and discuss their significance. Especially, instructors will explain the following points:

1) Renewable energy: Manufacturing of products with energy that does not emit greenhouse gases, such as green electricity, etc.

2) Recycling: Significant reduction of environmental load by collecting and recycling materials from used products.

3) Emission and effluent purification: Impacts from toxic gas emission and eutrophication can be reduced; however, there are trade-offs since global warming increases due to energy consumption.

4) Energy-efficient housing and hybrid and electric vehicles: Instructors will point out that, although load generally increases in the production stage, reduction of energy consumption in the stage of product use can achieve environmental load reduction in lifecycle and consumers' total cost reduction.

(4) Conclusion: Advantages of design and procurement of products and services based on lifecycle thinking (20 minutes)

Instructors will summarize the reason efforts for environmental issues based on lifecycle thinking are important and needed, and what advantages companies can obtain, and whether they can increase corporate value.

3. Keywords in the Basic Contents

(2) Causes of global environmental issues and impact on humans and ecosystem (30 minutes)

Global warming, ozone layer depletion, acidification, eutrophication, resource exhaustion

(3) Cases of countermeasure technology (30minutes)

Renewable energy, recycling, CO2 sequestration, emission and effluent purification, energy-efficient housing, hybrid and electric vehicles

4. Additional Contents

(1) Contents of corporate responsibility in the Law Concerning the Promotion of the Measures to Cope with Global Warming and the Waste Disposal and Public Cleansing Law

(2) Overview of environmental accounting

(3) LCA method

(4) Eco-label, environmental label, green purchase, carbon footprint

(5) Overview of framework of policy to promote corporate environmental efforts

(6) Status of corporate environmental efforts in Japan

5. Additional Keywords

(2) Overview of environmental accounting

Environmental accounting

(4) Contents of Eco-label, environmental label, green purchase, carbon footprint

Eco-label, environmental label, green purchase, carbon footprint

4.3 Overview of Lifecycle Assessment and Analysis Procedures

■ Goal

It is easy to understand the concept of LCA, which presents quantitative environmental information that encompasses lifecycle. However, approaches to LCA show a large difference depending on assessment objectives in actual implementation. Although flexible assessment systems are expected to be applied in a wide range of uses, it is also necessary to understand that this can lead to misuse and misunderstanding. ISO defines the minimum rules for LCA implementation, and their contents are important normative guidelines for working-level personnel.

In this lecture, instructors will explain the implementation procedures of LCA by referring to ISO' guidelines.

Students will understand that LCA is conducted starting with goal and research scope setting, followed by an inventory analysis (LCI), impact assessment (LCIA), and interpretation of results. Explanation is given with cases in order to facilitate understanding.

Additionally, students will organize terms to be preliminarily known to facilitate understanding of specific examples included in <4.4-4.7 LCA Practical Training>.

■ Summary of Educational Contents

1. Basic Contents

(1) Significance of ISO (20 minutes)

Students will understand why international standards are necessary and what are regulated by international standards.

(2) LCA flow (60 minutes)

Instructors will explain contents to be practiced and results in regard to goal setting, assessment scope setting, inventory analysis, impact assessment, and interpretation. Instructors will also introduce critical reviews and reports. In order to facilitate understanding of the entire flow, explanation is provided with examples.

(3) Conclusion (10 minutes)

Main Points in This Class

- Understand what ISO defines and what it does not
- Understand the LCA flow
- Obtain and interpret the results of LCA and link them to environmental load reduction.
- List and understand words of minimum requirement in order to understand LCA (functional unit, standard flow, system boundary, etc.)

2. Description of the Basic Contents

(1) Introduction: Significance of ISO (20 minutes)

- Instructors will present multiple LCA assessment results. For example, the use of LCA and contents of results are different between TOYOTA and Toshiba. → LCA is an environmental impact assessment method which focuses on product lifecycle; however, not only contents of calculation but even contents of result may change depending on practitioners' intensions. Instructors will facilitate students' understanding that the approach to LCA analysis varies depending on objectives.
- However, it will be beyond control if all methods are certified at practitioners' free will. Minimum rules to be followed are necessary in order to avoid misunderstanding and misuse.
- International standards by ISO are used to fulfill the above objective along with LCA's international diffusion. → Instructors will encourage students to understand that it is essential to know important matters of ISO in order to understand LCA.
- Instructors will also touch upon ISO history (Standardization process in 1993, issued in 1997; reviewed in 2006).
- Instructors may mention other ISO standards and IEC if time permits.

(2) LCA flow (60 minutes)

Instructors will explain the flow of LCA with specific examples. (e.g. refrigerator, paper cup)

It is recommended to show the entire flow on one sheet at the beginning of the session.

- **Goal Setting**

. Define reasons for assessment, use of the results, and reporting targets.

. Present some of the above contents and show that the indicated results are different depending on such contents. Instructors should encourage students to understand that goal setting methods varies and have flexibility.

- **Assessment Scope Setting**

. Present examples of system boundaries. Instructors will explain that, although it is desirable to include everything, system boundaries may be adjusted if necessary, depending on the objectives and data collection status.

. Explain matters related to assessment targets (functional unit, standard flow, areas of impact, etc.). Instructors should emphasize that the focus is on functions.
. Explain matters related to assessment methods (types of data, impact assessment methods, types of review, etc.).
. Indicate that these contents are reflected in reports.

- **Inventory Analysis**

. Show input and output items and data organization from process data collection.
. Show methods of calculating environmental load from process data.
. Indicate that environmental load can be integrated by accumulation after showing a mass flow in regard to the process data accumulation method.
. Extract important process from inventory results; review and clarify points to be improved.

- **Impact Assessment**

. Review interpretation methods in case of obtaining multiple inventory data.
. Show that number of result items can be reduced by practicing impact assessment.
. Explain the practice of sequence in determining areas of impact, classifying, characterizing, normalizing, grouping and weighting.
. Present results obtained in each step with examples; explain contents found in the results.

- **Interpretation**

. Extract important items with contents obtained from the inventory analysis and impact assessment.
. Explain the significance of a sensitivity analysis and obtained results.
. Explain the significance of an uncertainty analysis and obtained results.
. Point out the importance of improving reliability by returning to and reviewing previous steps such as objectives and assessment scope, etc. from the result of interpretation.

- **Reports and Critical Review**

. Show report samples to present the image of a resulting report
. Explain a critical review as a security measure for the reliability and transparency of assessment results; present review report samples.

(3) Conclusion (10 minutes)

- Instructors will help students understand that LCA is practiced in accordance with ISO procedures and requirements, although LCA is practiced in various forms depending on objectives.
- Students will learn names of basic four steps, contents practiced in each step and results obtained.
- ISO has been discussing the establishment of frameworks for other environmental assessment in addition to LCA. Instructors will present related standards, such as carbon

footprint (14064), water footprint (14046), eco-efficiency (14045), etc. as well as TC207.

- As a class assignment, it is recommended to have students summarize LCA terms and contents of standard flow, functional units, basic flow, system boundaries, areas of impact, characterization, etc.
- It is also recommended to have students compare and summarize which results of LCA is presented by environmental information exhibited on corporate websites and at the Eco-Products exhibitions, etc., and what companies are trying to advertise from such results.

3. Keywords in the Basic Contents

(1) Significance of ISO

ISO14040、14044

(2) LCA flow

Objective setting, assessment scope setting, inventory analysis, impact assessment, interpretation, report, critical review, functional unit, standard flow, basic flow, system boundary, area of impact, characterization, normalization, grouping, weighting, required and optional factors, sensitivity check, uncertainty analysis.

4. Additional Contents

- ISO standards other than LCA in ISO 14000 series, which are related especially to assessment; additional explanation on CFP, WF, eco-efficiency and factors are recommended.
- LCA application to environmental label type III (Eco Leaf, EPD) may be added.
- It is also assumed that evaluation targeting organizations such as EPE, SCOPE3, etc. are included.

5. Additional Keywords

- Carbon footprint
- Water footprint
- Ecological footprint
- Eco-efficiency
- Factors
- Environmental performance assessment
- Environmental label type III

4.4 − 4.7 LCA Practical Training

■ About LCA Practical Training

Here, practical training of assessment methods for products and services based on lifecycle thinking will be conducted using LCA software, etc.

The following two types of training will be offered for the practical training:

(1) LCA Basic I: Training mainly for students in humanities courses (those who do not have basic knowledge of chemistry, physics, etc.) using simplified LCA software (including practical training of Microsoft Excel)

(2) LCA Basic II: Training mainly for students in sciences courses (those who have basic knowledge of chemistry, physics, etc.) using LCA software

In each type of practical training, it is required to have an environment where each student can use a computer and Microsoft Excel.

(1) LCA Basic I

■ Goal

In this practical training, the objective is to understand the most basic concept for LCA, “material balance” and “energy input and output” using a familiar example of cooking - “making potato croquette” - and to learn basic use of Microsoft Excel.

Next, students will compare CO2 emissions of different transportations and calculate food mileage by using Google Maps and data of CO2 emissions by transportation.

Then, students will compare CO2 emissions and resource consumption from manufacturing of beverage containers of different materials, using the simplified LCA database.

As a result, students will experience LCA to know what kind of method it is, and acquire skills to calculate and assess environmental load (mainly CO2 emissions) from their own actions and daily life.

■ Summary of Educational Contents

1. Basic Contents

(1) Cooking of potato croquette 1 (material balance and energy input/output)

(2) Cooking of potato croquette 2 (Calculation of calories and environmental load)

(3) Environmental load and food mileage by transportation

(4) Environmental load accompanying various actions, etc.

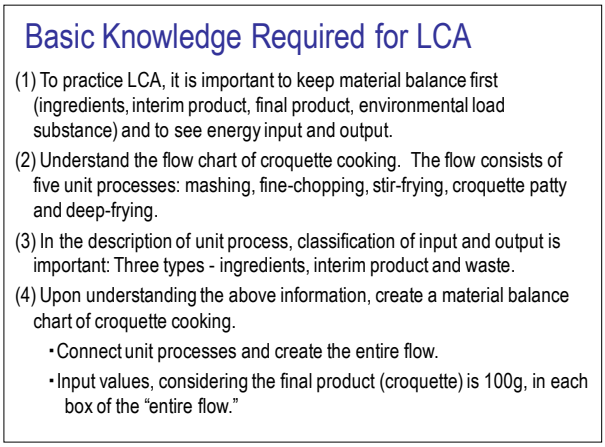
Main Points in This Class

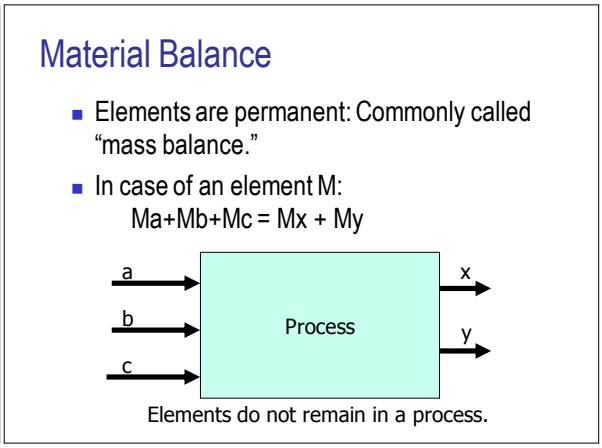
- Students will learn basic use of Microsoft Excel.
- Students will learn the concept of material balance and energy balance.
- Students will calculate and assess environmental load (mainly CO2 emission) from their own actions and daily life by using the simplified LCA method.

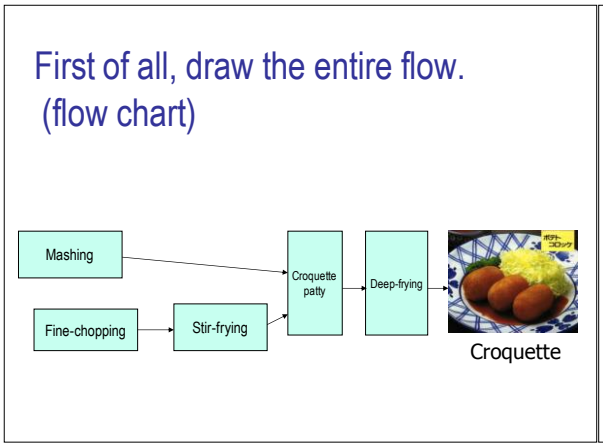
(The educational material for this practical training was developed by Dr. Itaru Yasui (Professor Emeritus at the University of Tokyo) for students who try LCA for the first time, specifically as a trial version of the material which can be understood by students in humanities courses. It was modified by Ken Morishita (Environmental Consortium for Leadership Development) and was tested at Sofia University.)

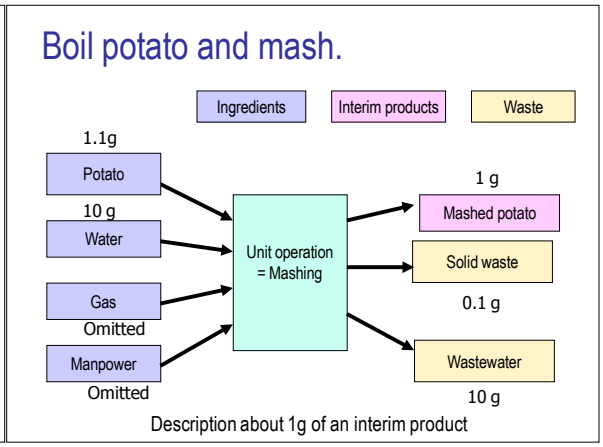
2. Description of the Basic Contents

(1) Cooking of Potato Croquette 1 (material balance and energy input/output)

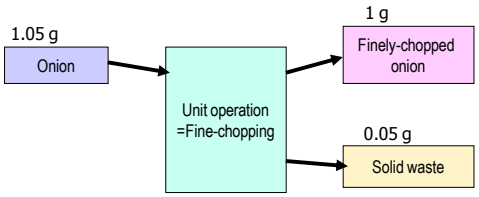




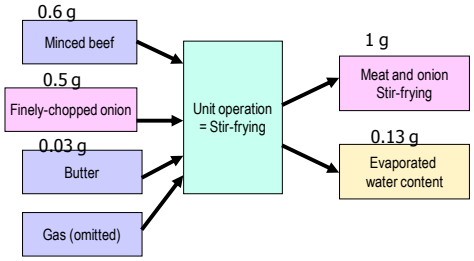




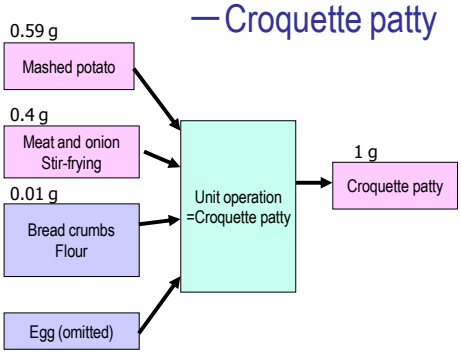
Fine-chopping of onion



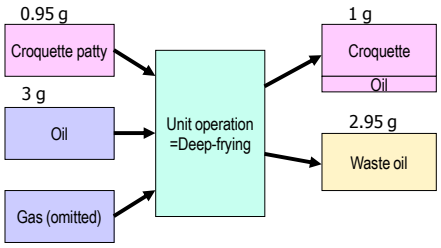
Stir-fry minced meat and onion



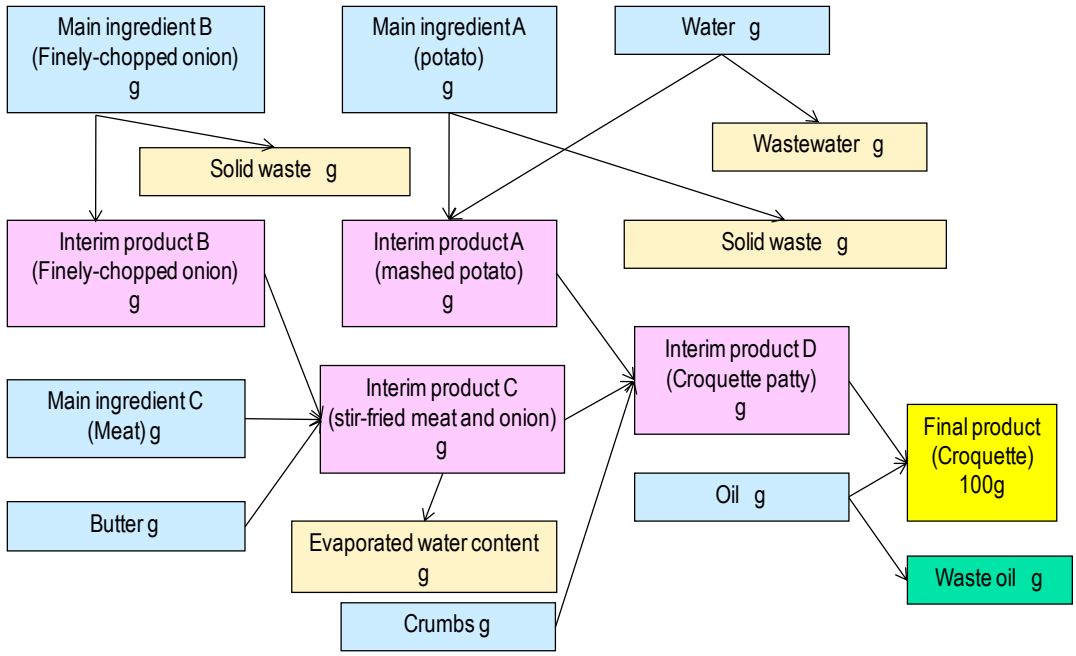
Mix, form and put batter on —Croquette patty



Deep-fry croquette



Entire Flow of Croquette Cooking



A: Why Croquette?

Anything can be used as an example to learn the basic concept and use of Excel. The reasons for using croquette this time are as follows:

- It is familiar food material, and anyone can understand its cooking process ("manufacturing process," if it is a product).
- It is easy to understand mass balance since the cooking process is divided into a few steps, and the relation between those steps is simple.
- In addition, gas consumption can be added.

B: Preparation of Material Balance of Croquette Making

- First, a flow by manual calculation is prepared for the entire croquette making.
- For example,

. First, think how many grams of potatoes are necessary for 100g of croquette. The value of how many grams of croquette patty are necessary for 100g of croquette is calculated by the following formula and manual calculation, (or by using Excel as a calculator) using the data of 0.95g of croquette patty for 1g of croquette in the final process of "deep-frying croquette":

Croquette patty (0.95g): Croquette (1g) = Croquette patty (X g): Croquette (100g)

1X = 100*0.95

X= 95

. In Excel, multiplication is indicated with *, and division with /.

C: Input Data into a Material Balance Table

- Input calculation results of the entire flow preparation work into "1. Material Balance Table."
- Calculate each "Total." Calculate by {SUM (cell designation: cell designation)}.
- Use the original cell for copying the same formula.
- Confirm that material balances match.

1. Material Balance Input Table (Unit: g)

Functional Unit: Croquette 100g

		Mashing	Fine-chopping	Stir-frying	Patty	Deep-frying	Total
Input	Potato	61.655					61.655
	Onion		19.950				19.950
	Minced beef			22.800			22.800
	Butter			1.140			1.140
	Flour				0.950		0.950
	Oil					300.000	3000.000
	Water	560.500					560.500
	Total	622.155	19.950	23.940	0.950	300.000	966.995
Output	Solid waste	5.605	0.950				6.555
	Wastewater	560.500					560.500
	Waste oil					295.000	295.000
	Evaporated water content				4.940		4.940
	Total	566.105	0.950	0.000	4.940	295.000	866.995

D: Input Data into a Unit Operation Input/Output Table

- Input data and make calculation in the same manner.
- Confirm that material balance matches.

2. Input/Output Table for Unit Operations (Output unit for each process: 1g)

		Mashing	Fine-chopping	Stir-frying	Patty	Deep-frying
Input	Potato	1.100				
	Onion		1.050			
	Minced beef			0.600		
	Butter			0.030		
	Flour				0.010	
	Oil					3.000
	Water	10.000				
	Finely-chopped onion			0.500		
	Stir-fried meat and onion				0.400	
	Mashed potato				0.590	
	Croquette patty					0.950
	Total	11.100	1.050	1.130	1.000	3.950
Output	Solid waste	0.100	0.050			
	Wastewater	10.000				
	Waste oil					2.950
	Evaporated water content			0.130		
	Total	10.100	0.050	0.130	0.000	2.950
Interim product	mashed potato	1.000				
	Finely-chopped onion		1.000			
	Stir-fried meat and onion			1.000		
	Croquette patty				1.000	
Final product	Croquette					1.000

E: Input Data to a Unit Operation Quantity Table

- Conducting such calculations manually or with a calculator cannot afford a large volume of calculation. Therefore, students will examine to what degree of volume of each “unit process”

operation (work volume) should be done, that is, how many units of each unit process should be controlled.

- The Unit Operation Quantity Table has “unit process” in vertical and horizontal columns, which are respectively connected to the initial stage to the final stage (from “mashing” to “deep-frying”).
- First, students will consider the result of “1” of “deep-frying” in the final unit process becomes “what” of “croquette patty.”

. -Understand the result of “mashing” only affects “croquette patty.”

. -In the same way, only process of “croquette patty” is related to “deep-frying” process.

. -Therefore, students will input 1 in the intersection of diagonals (light blue cell) and consider from where data will be input towards 1. In this case, only right and left columns are considered, not upper and lower rows.

. -In the same way, students will input the value of fine-chopping, stir-frying and croquette patty.

- As the result of “deep-frying,” 100 units of “croquette” are made. Students will examine what is the unit of “croquette patty” operation for obtaining this 100-unit croquette.
- In the same way, students will examine what is the unit of “stir-frying” for obtaining 95-unit “croquette patty.”

3. Preparation of a unit operation quantity table

Unit operation	Mashing	Fine-chopping	Stir-frying	Patty	Deep-frying
Mashing	1				
Fine-chopping		1			
Stir-frying		0.5	1		
Patty	0.59		0.4	1	
Deep-frying				0.95	1
Control Input	56.05	19	38	95	100

F: Data Input to Input/Output Table for Unit Operation (No. 2)

- Values of Table 2 in the unit process database will be simply input to the table above.
- Data can be moved by “=designating the corresponding cell in Table 2” for each cell.

4. Input/Output for Unit Operation (No. 2)

		Mashing	Fine-chopping	Stir-frying	Patty	Deep-frying
Input	Potato	1.100				
	Onion		1.050			
	Minced beef			0.600		
	Butter			0.030		
	Flour				0.010	
	Oil					3.000
	Water	10.000				
Output	Solid waste	0.100	0.050			
	Wastewater	10.000				
	Waste oil					2.950
	Evaporated water content			0.130		

G: Data Input to Unit Operation x Operation Quantity Table

- Using values of Tables 3 and 4, multiply values of database 4 by the operation quantity of 3.
- Simply state, for example, “potato unit operation (data) x operation quantity.”
- By applying this concept, a required amount when the final product amount is arbitrarily increased and decreased is easily obtained.
- For calculation, designate operation quantity as “absolute address.”
- When changing “100 of operation quantity” of the Unit Operation Quantity Table, the values in Table 5 also changes. This way, ingredients necessary for making croquettes of any given amount can be easily obtained.
- However, in the case of this table, students need to pay attention to the point that calculation is not possible for increasing the amount of meat included in the croquette, etc.

5. Unit Operation x Quantity in Unit Operation

		Mashing	Fine-chopping	Stir-frying	Patty	Deep-frying
Input	Potato	61.655				
	Onion		19.950			
	Minced beef			22.800		
	Butter			1.140		
	Flour				0.950	
	Oil					300.000
	Water	560.500				
Output	Solid waste	5.605	0.950			
	Wastewater	560.500				295.000
	Waste oil					
	Evaporated water content			4.940		

Note: Concept of Absolute Address in Excel

There is a concept called vector which considers multiple values collectively as one data. In order to conduct constant multiplication of this vector, absolute address is necessary. When copying an Excel formula from one cell to another, the formula described therein changes relatively. Therefore, it is necessary to use absolute address when conducting constant multiplication of vector in order to avoid any change in address of the constant. In case of multiplying many vectors by a constant given to each vector, process varies whether such vector is written in the vertical or horizontal direction, or whether absolute address is set horizontally or vertically.

(2) Cooking of Potato Croquette 2 (calculation of calories and environmental load)

H: Calculating Nutrition and Calories

- Calculate only the weight of amount to be consumed (here, it is assumed that 100g of croquette will be consumed).
- Calculate nutrient factors taken from each food by using a nutrient database.
- Input formula for calories
- In this case, a healthy “eco-croquette” with no egg yolk and a less amount of meat is assumed.

Handling of Dependent Properties (Database)

Nutrient factor/g	Carbohydrate	Protein	Fat
Potato	0.17	0.02	0.02
Onion	0.08	0.01	0.01
Minced beef	0	0.18	0.23
Butter	0	0.01	0.81
Flour	0.72	0.1	0.05
Oil	0	0	1

Calorie	Kcal/g	4	4	9	
Amount consumed	Nutrient factor	Carbohydrate	Protein	Fat	Calorie
	Ingredient				
56.050	Potato	9.5285	1.121	1.121	52.687
14.060	Onion	1.1248	0.1406	0.1406	6.327
28.800	Minced beef	0	4.104	5.244	63.612
1.140	Butter	0	0.0114	0.9234	8.3562
0.950	Flour	0.684	0.095	0.0475	3.5435
5.000	Oil	0	0	5	45
100.000	Total	11.3373	5.472	14.4765	179.5257

I: Understanding CO2 Emission Coefficients

- CO2 emission (emission coefficients) when using fossil fuel is calculated and announced by the MOEJ every year in accordance with the Law Concerning the Promotion of the Measures to Cope with Global Warming.

  The emission calculation method can be obtained from http://www.env.go.jp/earth/ghg-santeikohyo/material/ (Global Environmental Bureau, MOEJ).

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J: Environmental Load by Gas Consumption

- Environmental load by consumption of the most widely-used city gas is represented by the generation of CO2, NOx, and SOx per calorific value.
- Attention should be paid to whether CO2 generation volume is of carbon standard (t-C, naturally g-C is also possible) or of CO2 weight (t-CO2); however, emission coefficient of CO2 weight (t-CO2) is already announced, therefore, such value can be used.
- Therefore, it can be calculated by **Energy consumption x CO2 emission coefficient.**
  (In case of city gas: 1 m^3 × 2.23 t-CO2/ 1,000Nm^3)

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Environmental Load of Gas Consumption (Gas 1L)		
CO_2	g	2.23
CO_2	kg	0.00223
NO_x	g	0.003438
SO_x	g	6.88E-05

Preparation of a unit operation quantity table

Unit operation	Mashing	Fine-chopping	Stir-frying	Croquette patty	Deep-frying
Mashing	1				
Fine-chopping		1			
Stir-frying		0.5	1		
Croquette patty	0.59		0.4	1	
Deep-frying				0.95	1
Quantity in a unit operation	56.05	19	38	95	100

Input/Output for Unit Operation

Unit	Unit Operation / Ingredient	Mashing	Fine-chopping	Stir-frying	Croquette patty	Deep-frying
g	Potato	1.10				
g	Water	10.00				
g	Onion		1.05			
g	Minced beef			0.60		
g	Butter			0.03		
g	Flour				0.01	
g	Oil					3.00
g	Waste					
g	Solid waste	0.10	0.05			
g	Wastewater	10.00				
g	Evaporated water content			0.13		
g	Waste oil					2.95
Liter	Gas	0.50		0.10		0.60
kg	CO2	0.001115000		0.000223000		0.001338000
g	NOx	0.001718850		0.000343770		0.002062620
g	Sox	0.000034377		0.000006875		0.000041252

Unit operation x quantity in a unit operation

Unit	Ingredient / Total quantity of unit operations	Mashing	Fine-chopping	Stir-frying	Croquette patty	Deep-frying	Total
Unit	Ingredient						0
g	Potato	61.66	0.00	0.00	0.00	0.00	61.66
g	Water	560.50	0.00	0.00	0.00	0.00	560.50
g	Onion	0.00	19.95	0.00	0.00	0.00	19.95
g	Minced beef	0.00	0.00	22.80	0.00	0.00	22.80
g	Butter	0.00	0.00	1.14	0.00	0.00	1.14
g	Flour	0.00	0.00	0.00	0.00	0.00	0.95
g	Oil	0.00	0.00	0.00	0.00	300.00	300.00
		0.00	0.00	0.00	0.00	0.00	0.00
g	Waste	0.00	0.00	0.00	0.00	0.00	0.00
g	Solid waste	5.61	0.95	0.00	0.00	0.00	6.56
g	Wastewater	560.50	0.00	0.00	0.00	0.00	560.50
g	Evaporated water content	0.00	0.00	4.94	0.00	0.00	4.94
g	Waste oil	0.00	0.00	0.00	0.00	295.00	295.00
		0.00	0.00	0.00	0.00	0.00	0.00
Liter	Gas	28.03	0.00	3.80	0.00	60.00	91.83
kg	CO_2	0.062495750	0.00	0.008474000	0.00	0.133800000	0.2048
g	NO_x	0.096341543	0.00	0.013063260	0.00	0.206262000	0.3157
g	SO_x	0.001926831	0.00	0.000261265	0.00	0.004125240	0.0063

(3) Environmental Load by Transportation and Food Mileage

CO2 emission of transporting xx from yy University to zz.

■ Example of a precondition: 4 people, same activity with many pieces of luggage

(1) Travelling by 4-passenger gasoline vehicle for the entire trip

(2) Travelling by 4- passenger Prius for the entire trip

(3) Travelling by taxi, Shinkansen, and taxi

(4) Travelling by JR, Shinkansen, and taxi

(5) Travelling by airport shuttle, airplane, and airport shuttle

■ Calculation of travel distance 1: Using Google Map

- The simplest way is to search the entire trip by the “route and connection” button (or “get directions” button).
- First, right-click on the departure point and designate the “route from here.”
- In the same way, right-click the arrival point and designate the “route to here.”

■ Calculation of travel distance 1: Calculate distance by transportation

- In case of a railway, click “input” of JR fare list on JR East Japan http://www.jreast.co.jp/ and input the stations of departure and arrival.
- In case of expressway, input ICs of departure and arrival in the expressway fee and route search function of “DoraPura”: http://www.driveplaza.com/ .
- In case of an airplane, input airports of departure and arrival in each airline’s booking site: https://www.ana.co.jp/asw/index.jsp .

■ CO2 emission

- In regard to CO2 emission by transportation, see documents by the Ministry of Land, Infrastructure, Transport and Tourism. http://www.mlit.go.jp/sogoseisaku/environment/sosei_environment_tk_000007.html

■ Input in the Table of travel distance and CO2 emission

- First, check how much environmental load (CO2 in this case) is generated by what kind of transportation method when a person travels 1km.
- Input searched distances respectively into the tables of travel distance and CO2 emission.
- Next, input distances and primary units in tables (1) ~ (5).
- After inputting “distances and primary units,” calculate “CO2 emission.” Calculation formula is “= the corresponding cell * the corresponding cell.”
- The same formulas can be copied.
- Use “Σ” for the calculation of a sum.
- Memorize the method of cell formatting.
- Make a table and a graph of CO2 emission by transportation and compare the two.

Transportation (1) (4-passenger gasoline vehicle used for the entire trip)

Transportation route	Distance	Primary unit	Emission of carbon dioxide (kg-CO2)
Total			

Transportation Method (2) (4-passenger Prius used for the entire trip)

Transportation route	Distance	Primary unit	Emission of carbon dioxide (kg-CO2)
Total			

Transportation Method (3) (taxi, Shinkansen, taxi)

Transportation route	Distance	Primary unit	Emission of carbon dioxide (kg-CO2)
Total			

Transportation Method (4) (JR, Shinkansen, taxi)

Transportation route	Distance	Primary unit	Emission of carbon dioxide (kg-CO2)
Total			

Transportation Method (5) (airport shuttle, airplane, airport shuttle)

Transportation route	Distance	Primary unit	Emission of carbon dioxide (kg-CO2)
Total			

Comparison between each transportation method

Transportation Method	Emission of carbon dioxide (kg-CO2)
Transportation Method (1)	
Transportation Method (2)	
Transportation Method (3)	
Transportation Method (4)	
Transportation Method (5)	

■ **Food Mileage**

- In the same method, select multiple foods from different production areas, and calculate the food mileage.
- Compare the calculation results with CO2 emission from croquette cooking.

(4) Environmental Load from Various Actions

■ **Wattage of Electric and Electronic Devices**

- Electric and electronic devices have descriptions of wattage W (Watt) or kW (kilo Watt) and electricity consumption kWh.
- Electricity cost is generally 22 yen for 1kWh (the second stage fee of TEPCO; different by electric company and contract).
- 1kWh is electricity consumption when using a device of 1kW wattage for 1 hour.
- Electricity consumption is calculated by multiplication of electricity consumption and time of use.
- For example, in the case of television, if its description indicates the wattage of 200W, it makes electricity consumption of 1kWh in 5 hours, and the cost of electricity becomes 22 yen in 5 hours.
- In case of an electric pot, etc., if its description indicates the wattage of 800W, electricity will be used continuously at 800W until its content boils, but heat retention thereafter results in electricity consumption of 1 minute per 30 minutes.
- Provided that the time to boil is 6 minutes, electricity consumption is 0.08kWh (800W × 0.1h = 80Wh = 0.08kWh), and the cost of electricity will be 0.16 yen.
- In the case of an incandescent lamp with an indication of 100V 60W, the electricity consumption of 1 hour becomes 60W when used with electricity of 100V. Electricity consumption of 4-hour use of this incandescent lamp will be 60W × 4(h) = 240Wh.
- Wattage of electric and electronic devices is indicated in catalogs, products and instruction manuals.
- However, measurement of electricity consumption is usually based on optimal conditions, and in many actual cases consumption will be more.
- Annual electricity consumption is annual electricity consumption when used at the indicated wattage and under a fixed condition. The amount is usually set larger than an actual case.
- Therefore, especially products of which use is significantly different among users, such as air conditioners, tend to have excessive differences in annual electricity consumption between new and old models.
-

■ **Energy and CO2 Emission**

- There is 100ml of kerosene in hand. In order to obtain hot water of 40 degrees Celsius by boiling water of 10 degrees Celsius, how many liters of water is necessary? Assume that the efficiency

of heat transfer is 45%.

- How many kilograms of CO2 will be emitted?
- “How many liters” = x (L)
- First, when 100ml kerosene burns, it generates heat.

The problem above asks how many calories the calorific value of this heat will become, and how much CO2 will be emitted as a result.

→Calorific value per 1 liter of kerosene is 8767kcal, and CO2 emission is 2.489kg-CO2.

→Therefore, in case of 100ml, the calorific value will be 877kcal; 0.249kg-CO2.

- Since the entire part of the heat is not efficiently used, the obtained calorific value will be multiplied by efficiency, and the result will be used for heating water.
- Water: 1ml =1g
- 1 cal of heat increases 1 degree Celsius.

■ CO2 Emission from manufacturing

- If possible, students will use the simplified LCA database and try to calculate CO2 emission, resource consumption, and waste discharge, etc. from manufacturing.
- In this process, instructors will explain how to understand a “functional unit” as well as a “resource depletion coefficient.”

○ Functional Unit in LCA

For example, in order to compare CO2 emission from the manufacturing of materials in beverage containers, it is necessary to unify material volume required for 1 liter of drink and compare. This is called a “functional unit.” “Person/km” is also one of such functional units. Setting functional units is required when conducting assessment based on LCA.

○ How to Understand Resource Depletion Coefficient

All resources on earth are limited. They will be exhausted someday if they are continuously used. Assessment of the “resource depletion” state is to assess the impact of resource consumption. Consuming a large amount of resources of which reserve is small has the largest impact.

Resource depletion coefficient = “Reserve” / “Consumption”; the value when iron is 1.

Ultimate recoverable reserve is the reserve of petroleum and gas, etc. that exists underground. When actually developing resources in oilfields, etc., the amount which can be taken out to the surface is only a part of total resources that exist underground. Reserve that can be physically taken out by ignoring economic and technological conditions is called ultimate recoverable reserve.

Proven recoverable reserve is the reserve which fulfills conditions, that location of such resources is known, that it is minable by the current technology, and that such mining meets economic needs.

Collectable amount by the secondary method, such as injection of water and gas, is also generally included.

Reserve-production ratio is a value obtained by dividing a certain year's proven recoverable reserve (R: reserve) by such year's production volume (P: production), and is normally represented by R/P. It indicates for how many more years production is possible with the current production volume. Therefore, if a new site with resources is discovered (R becomes larger) or production volume becomes smaller (P becomes smaller), the ratio becomes larger.

Japan has actively recycled metal resources such as iron, copper, aluminum, etc. for a long time. However, rare metals which are used in various electric and electronic devices have been disposed, and not collected and recycled.

There is a tremendous amount of resources reserved in modern cities, and it is important to efficiently collect and recycle resources from such "urban mines." In this sense, it is a serious problem to simply dispose of electric and electronic devices. Japanese urban mines contain metal reserves which are equivalent to the world's consumption of two to three years. There are especially large reserves of lithium, which is battery material, and Pt, considered being indispensable as medium and fuel cell electrodes. The result of comparing resource reserves of the world and Japanese urban mines indicates that Japan is the largest resource country of gold, silver, lead and indium, and is ranked as the third largest resource country of copper, platinum and tantalum.

■ Assignments at the Conclusion

It is effective to give students the following assignments and conduct calculation and assessment:

- How many Kg-CO2 of CO2 emission does burning 375ml of petroleum generate?
- CO2 emission coefficient per 1kWh of electricity is 0.555kg-CO2/kWh.
- How many kg-CO2 of CO2 emissions does turning on a 60W incandescent lamp for 4 hours and using a 1000W toaster oven (OT) for 15 minutes generate?
- Select foods from different production areas at a supermarket, calculate the food mileage and compare CO2 emissions.
- Compare CO2 emissions from transportation between two points by different transportations.
- Select multiple home appliances and calculate CO2 emissions, per time of use and per year.
- Select equipments and containers, etc. of the same function but of different materials, set the functional units, and assess CO2 emission and resource depletion per functional unit.
- Calculate CO2 emission of "our family's" electricity use of the recent 1 month (http://www.tepco.co.jp/e-rates/individual/basic/charge/charge01-j.html), use of gas (http://home.tokyo-gas.co.jp/userguide/ryo-kin/keisan02_01.html) and gasoline consumption, etc. and determine your own global warming prevention action plan and CO2 reduction goals by referring to the MOEJ's Challenge 25 Campaign (http://www.challenge25.go.jp/index.html), URLs

of Japan Center for Climate Change Actions (http://www.jccca.org), the Energy Conservation Center (http://www.eccj.or.jp) and the worksheet of “What can be done with 1kgCO2?.” Practice such a plan at least for one week, and measure actual reduction of CO2 emission by this plan and assess your efforts. See (http://www.kyuden.co.jp/life_living_meter.html) for reading an electricity meter, and (http://www.sattetg.co.jp/stg/ryoukin_folder/kensin.html) for reading a gas meter.

(2) LCA Basic II

■ Goal

Students will practice goal and scope setting; determine a lifecycle system for the scope; complete visualization of processes within the system; collect inventory data; analyze inventory, impact and assess and interpret results. They will also gain knowledge of available database and analysis software.

The practical training will place emphasis on goal/scope setting and the interpretation of results. Example problems may include identification of processes that have significant contribution to environmental impact, changes of environmental load due to alteration of materials, and effects of recycling. Depending on the students, cooking and the use of home appliances may be included. For practical training, LCA software developed by Japan Environmental Management Association for Industry, MiLCA, will be used (http://www.jemai.or.jp/CACHE/lca_details_lcaobj308.cfm).

MiLCA is a support system for conducting Life Cycle Assessment (LCA). It provides calculation features necessary for basic LCA, such as inventory analysis, environmental assessment and integration. Its standard features also include an IDEA database.

The development concept of MiLCA is represented by “making environmental load visible throughout lifecycle.” When conducting environmental enhancement activities, it is important to extract effective improvement points and understand such effects quantitatively and from a perspective that encompasses the entire lifecycle. Thus, MiLCA was developed with the goals of “a. Support for highly-reliable data transfer between companies” and “b. Enhancement of secondary data.”

a. In supporting data transfer between companies, a function that enables import/export per process unit has been added. In 2011, MiLCA is expected to have a function for uploading to and searching in the central server as well as abstraction and aggregation functions for supporting concealing in middle processes. In addition, the free version can now use a data base that has been available for the paid version. This enables that those only providing LCA data does not need to purchase LCA software and database.

b. Inventory Database (IDEA) installed at the initial settings is one of the largest databases with more than 3000 process data. The data is prepared based on various statistic materials and literature and

includes almost all the data that has been sold in the past as a paid database from the Association. Data that is not included in IDEA have been replaced by data with higher quality. On the other hand, it also contains rough data prepared from estimation based on the idea that “it is better than zero environmental load.”

As a result, within this database, there is a mix of various data from those with high degree of accuracy and those with high degree of uncertainty. Additionally, although discovery and correction of errors have been achieved as much as possible, it is possible that errors at the time of preparing data could remain.

It is therefore expected to have corrections and revisions for the initially-installed database. A database revision will be conducted once every few months and please note that this will change calculation results. When using results, please confirm which version of the software (database) has been used.

The following applications of MiLCA are expected:

a. To understand potential environmental impact through product and service lifecycle as an approximate number, and extract points to be improved.
b. To use MiLCA as a benchmark for environmentally-conscious design (comparison of new and old products)
c. To conduct and publicize LCA or carbon footprint calculation as a self-declaration
d. To use MiLCA as a foundation for calculating emission when selling products/services as “carbon footprint off-set products (services)”
e. To utilize MiLCA as a secondary set of data for calculation based on various carbon footprint standards (GHG protocol, PAS2050)
f. To provide a company’s own data for its clients, etc. so that they can perform calculation described above.
g. To conduct various case studies for research purposes and publicize the results (for example, case studies by technology can be conducted and every data including preconditions can be published).

On the other hand, MiLCA is not available for the following uses:

a. Calculation for Eco Leaf: Eco Leaf’s common base units have to be applied. Review has been underway to integrate those units.
b. Calculation for the Carbon Footprint System Trial Project by the Ministry of Economy, Trade and Industry: It is necessary to use the common base units for carbon footprint provided, however, that is if the program holder, the Ministry of Economy, Trade and Industry approves.
c. Claiming advantages based on comparison between numeric values and the initially-installed data, or the comparison between initially-installed data to compare materials: IDEA is the

result of estimation, based on statistics and models, to obtain general environmental load. These results have different preconditions, which cause significant high uncertainty.

■ Outline of Educational Contents

1. Basic Contents

(1) Setting objectives and assessment scope (No.1, 90 minutes)

(2) Data collection, inventory analysis (No.2, 90 minutes)

(3) Impact assessment, reviewing objectives, assessment scope, and data (No.3, 90 minutes)

(4) Interpretation of results (No. 4, 90 minutes)

Main Points in This Unit

- To understand important points of modeling lifecycle of a subject product system (setting objectives and assessment scope)
- To learn basic LCA implementation methods using LCA software (inventory analysis)
- To change preconditions of case studies and check the influence on results (sensitivity analysis)
- To understand methods for appropriate interpretation of LCA results (interpretation)

2. Description of the Basic Contents

(1) Setting objectives and assessment scope (No.1, 90 minutes)

- Students will practice the setting of functional units, product systems, system boundaries and lifecycle modeling for different objectives. The example below examines the change of environmental load by waste paper recycling.
- Example: Students will examine if environmental load can be reduced by waste paper recycling. Instructors will explain items to study (functional units, product systems, system boundaries, areas of impact, impact assessment methods, initial data quality requirements, limitations, etc.) when setting assessment scope, and prepare a case study.
- Multiple scenarios can be considered, such as: When paper is made of material cultivated under appropriate management such as FSC; when paper material comes from a clear-cut forestry; and when paper uses byproduct. Various scenarios are also presented in a disposal stage, such as: simple incineration, heat recovery, land-fill, waste paper export, etc.

(2) Data collection, inventory analysis (No.2, 90 minutes)

- Students will use LCA software and database to obtain data for each process and perform calculation.
- Example: Possible reference materials include Japan Paper Association website, LCA Japan Forum, LCA database, LCA software MiLCA, etc. When extracting data from a database,

instructors will explain preconditions (efficiency of electric power generation, etc. in case of power generation from waste) instead of simply cite numerical values.

- Calculation will be conducted using multiple lifecycle scenarios when needed.

(3) Impact assessment, reviewing objectives, assessment scope, and data (No.3, 90 minutes)

- Upon reviewing impact assessment methods, students will conduct impact assessment based on the result of inventory analysis. Integration analysis will also be conducted depending on the level of their understanding. Results from multiple scenarios will be analyzed, and processes that particularly influence results and preconditions for modeling will be identified. Finally, objective and assessment scope setting and data in the practiced case study will be reviewed.
- Example: Students will assess global warming, amount of solid waste, and acidification. For example, CO2 from biomass cannot be evaluated to be “zero” as carbon neutral without conditions; preconditions will be changed to analyze influence on results. The class will examine the improvement of data quality for a process that particularly contributes to the results.

(4) Interpretation of results (No. 4, 90 minutes)

- Students will arrange the results into graphs, etc. to organize knowledge obtained from the case studies. A sensitivity analysis will also be conducted if necessary. Students will discuss proposals for further reducing environmental impact while learning the limitation of LCA results.
- Example: After organizing results from multiple scenarios, students will check methods for improvement, or processes that do not particularly contribute to results. Based on preconditions for calculation, students will discuss the limitation of LCA, such as conditions for using results of sensitivity analysis conducted under preconditions of calculation.

3. Keywords in the Basic Contents

(1) Setting objectives and assessment scope

ISO/JIS14040, ISO/JIS14044, functional unit, product system, system boundary, area of impact, environmental assessment method, initial data quality requirement, limit

(2) Data collection, inventory analysis

LCA Japan Forum Data Base, MiLCA

(3) Impact assessment, reviewing objectives, assessment scope, and data

Area of impact, characterization model, environmental mechanism, integration, LIME

(4) Interpretation of results

Sensitivity, limit, uncertainty, proposal

4. Additional Contents

(1) Inventory database of other countries

(2) Impact assessment model of other countries

4.8 Understanding Biodiversity (1) Corporate Activities and Biodiversity

■ Goal

Students will learn the reasons corporations address biodiversity conservation from two perspectives, benefit of ecosystem services and environmental risks.

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction: Relationship between corporate activities and biodiversity (10 minutes)

(2) Biodiversity and ecosystem services (20 minutes)

(3) Dependence and influence on ecosystem services (20 minutes)

(4) Corporate risks and new business opportunities (30 minutes)

(5) Conclusion (10 minutes)

Main Points in This Unit

Students will learn the following topics:

- Companies make efforts in biodiversity conservation not because their social contribution strengthens their reputation, but because corporate activities are not sustainable without healthy biodiversity and ecosystem services provided by such biodiversity.
- Without considerations to biodiversity, companies will destroy ecosystem services which provide a crucial foundation for their businesses.
- Therefore, failing to conserve biodiversity brings business risks, while the market for products and services with considerations of biodiversity is expanding and creating new business opportunities.

2. Description of the Basic Contents

(1) Introduction: Relationship between corporate activities and biodiversity (10 minutes)

Instructors will present specific examples to introduce students that many corporate activities are supported by biodiversity = blessings of nature.

(2) Biodiversity and ecosystem services (20 minutes)

Students will learn that various functions of ecosystem = ecosystem services are important for companies and human life, and that ecosystem services are materialized by biodiversity.

Based on the *Millennium Ecosystem Assessment*, students will learn the contents of four services that mankind receives from the ecosystem - supporting, provisioning, regulating, and cultural services

– and factors that constitute the well-being of ecosystem services – safety, basic materials for abundant life, health, etc.

(3) Dependence and influence on ecosystem services (20 minutes)

Through specific examples, students will study typical ecosystem services and how companies are dependent on these services as well as how ecosystem services influence companies. (15 minutes)

Students will discuss the relation between ecosystem services and one's own life. (5 minutes)

(4) Corporate risks and new business opportunities (30 minutes)

Instructors will explain and encourage students' understanding of what kind of business risks companies have when they fail to address biodiversity, while appropriate efforts in biodiversity bring business opportunities by using specific examples.

(5) Conclusion (10 minutes)

Students will discuss and summarize the relationship between ecosystem services and corporate activities based on the above basic contents.

3. Keywords in Basic Contents

(1) Biodiversity

(2) Ecosystem, Millennium Ecosystem Assessment, Global Biodiversity Outlook 3

(3) Ecosystem services, economic value of ecosystem services, Basic Act on Biodiversity, National Strategy on Biological Diversity, 10th Conference of the Parties to the CBD (COP10)

(4) Guidelines for Private Sector Engagement in Biodiversity, Roundtable on Sustainable Palm Oil (RSPO), the Corporate Ecosystem Services Review (ESR), Japan Business Initiative for Biodiversity

4.9 Understanding Biodiversity (2) How to Address Biodiversity within Corporate Activities

■ Goal

The class will focus on economic mechanism to understand perspectives that companies should have when addressing biodiversity conservation, and new rules as well as international flow for biodiversity conservation. Particularly, students will learn raw material procurement, certification systems, direct payment and tradable permits.

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction: Corporate perspectives in biodiversity conservation efforts (10 minutes)

(2) Approach to biodiversity conservation from the lifecycle perspective (20 minutes)

(3) Methods for biodiversity conservation by economic mechanism (50 minutes)

(4) Conclusion (10 minutes)

Main Points in This Unit

Students will learn the following points and examine approaches to biodiversity conservation that companies can take:

- In order for companies to make considerations to biodiversity, it is necessary to consider their dependence and influence on biodiversity throughout product and service lifecycle.
- Sustainable raw material procurement is particularly important since it is directly related to the objectives of the Convention on Biological Diversity.
- When companies address biodiversity, conservation methods based on economic mechanism have been utilized. These methods include certification systems, direct payment and tradable permits.

2. Description of the Basic Contents

(1) Introduction: Corporate perspectives in biodiversity conservation efforts (10 minutes)

Instructors will briefly introduce that the economic mechanism for conserving biodiversity has begun and is becoming successful.

Students will learn that corporate efforts in biodiversity includes risks such as greenwash (an activity in which a company looks away from its core business with extremely high environmental load and pretends that the company is environmentally conscious) and thus it is important to emphasize the relationship between the efforts and the core business, and not to make efforts as a simple social contribution.

(2) Approach to biodiversity conservation from the lifecycle perspective (20 minutes)

Instructors will indicate that companies have an influence on biodiversity throughout product and service lifecycle, and that companies should consider biodiversity through this lifecycle. Also, instructors will use examples to explain how companies work with biodiversity.

(3) Methods for biodiversity conservation by economic mechanism (50 minutes)

Instructors will present raw material procurement process, which creates typical indirect influences on biodiversity to discuss what kind of considerations should be and are actually made.

First, certification systems that indicate biodiversity-conscious raw materials include Forest Management Certification and Chain of Custody Certification for forest products. International systems for forest products include a certification program offered by the Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification Schemes (PEFC) and Japan has a system called the Sustainable Green Ecosystem Council (SGEC). For marine products, examples include fishing certification systems by the Marine Stewardship Council or the “Marine Eco Label,” and by its marine culture counterpart, the Aquaculture Stewardship Council. Instructors will explain the status of diffusion and reality of operation concerning these certification systems.

Next, in regard to ecosystem services other than the provision of physical things such as raw materials, instructors will give an overview of the Payment for Ecosystem Services (PES), a system that pays operation and maintenance costs, rather than compensation for services.
Finally, “tradable permits” refer to a method that allows buying and selling of “permits” necessary for using biological resources and ecosystem services at market. Instructors will explain mitigation banking that buys and sells biodiversity offsets (compensatory mitigation).
(4) Conclusion (10 minutes)
Instructors will summarize how companies should address biodiversity through corporate activities.

3. Keywords in the Basic Contents

(1) Economic mechanism, greenwash
(2) Lifecycle approach, supply chain
(3) Forest Management Certification (FMC), FSC, PEFC, CoC, SGEC, Rainforest Alliance, marine product certification, MSC, ASC, ethical consumer, PES (Payment for Ecosystem Services), payment system for ecosystem services, tradable permit, biodiversity offset (compensatory mitigation), biodiversity banking

4. Additional Contents

RSPO (CSPO), RTRS, palm oil, soy certification, agricultural products of tropical regions

4.10 Management of Toxic Chemical Substances

■ Goal

Students will learn methods to capture, assess, and manage business risks. Chemical substance risks include chemical risks concerning the environment, health and safety which derive from chemical hazard, and compliance risks concerning compliance to various laws and regulations. Managing such risks is important in relation to public safety and legal compliance. In regard to the chemical risks, students will learn concepts of chemical risk assessment and risk benefit analysis. Regarding compliance risks, students will review laws and regulations in Japan and other countries (Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances, PRTR, MSDS, RoHS, REACH, etc.) and learn the importance of compliance. Students will also learn the importance of information sharing in supply chains for chemical substance management and study examples of JAMP and IMDS. For an advanced study, students will learn risk management in a general term (risk = frequency of occurrence x degree of influence, application to accidents and businesses, etc.).

■ **Outline of Educational Contents**

1. Basic Contents

(1) Introduction: Importance of chemical substance risk management (15 minutes)

(2) Chemical substance risks and assessment (30 minutes)

(3) Legal systems for chemical substance management in Japan and abroad (15 minutes)

(4) Chemical substance management practices (20 minutes)

(5) Conclusion (10 minutes)

Main Points in This Class

- Among various business risks, chemical substances pose important issues from the viewpoints of the environment, health risks and legal compliance risks.
- Environmental, health and safety risks are represented by hazard x exposure. It is important to know endpoints as specific damage that can be assumed as a substance hazard.
- It is necessary to understand laws and regulations concerning chemical substances in Japan as well as regions where businesses are operated, and conduct management in compliance to those laws and regulations.
- Students will examine specific examples to learn that establishing voluntary efforts within company structure, including development, production and procurement, and collaborations within a supply chain are essential to chemical substance management.

2. Outline of the Basic Contents

(1) Introduction: Importance of chemical substance risk management (15 minutes)

From examples of environmental, health and safety risk issues caused by chemical substances, students will learn the importance of management. They will study examples, including pollution in the 1960s, social issues concerning asbestos and dioxin, influence of artifacts such as CFCs and flame retardants on the global environment and the risks that have changed laws and regulations, and product recall due to controlled substance contents to understand that chemical substance risks are real business problems.

(2) Chemical substance risks and assessment (30 minutes)

Using specific chemical substances as examples, students will learn risk assessment methods by studying chemical hazard information and endpoints based on the hazard information and usage. They will also learn risk benefit analysis, which enables discussion of benefit and risk trade-offs of chemical substances.

(3) Legal systems for chemical substance management in Japan and abroad (15 minutes)

Students will study the overview of the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances, PRTR, MSDS, RoHS, REACH, WEEE, risk phrases, etc.

(4) Chemical substance management practices (20 minutes)

Through examples, students will learn chemical substance management within an organization and by supply chains as well as risk communication with local communities and consumers. Examples may include the improvement of voluntary management through PDCA and management based on standardization such as JAMP, etc.

(5) Conclusion (10 minutes)

Students will summarize the two viewpoints of chemical substance management, chemical and compliance risks, and analyze and discuss current status and issues of organization to which they belong.

3. Keywords in the Basic Contents

(1) Chemical risk, compliance risk, pollution, asbestos, CFC

(2) Risk assessment, hazard, endpoint, risk benefit analysis

(3) Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances, J-Moss, RoHS, REACH, WEEE, risk phrase, preventive principle, hazard management, risk management

(4) Risk management, voluntary management, PDCA, risk communication, supply chain, JAMP

(5) Analysis of own organization

4. Additional Contents

(1) Details and transitions of laws in Japan, Europe and the United States

(2) Relation between risk management and impact assessment

(3) Details of JAMP, JGPSSI and IMDS as management methods for supply chains

(4) Physical risks

(5) Business risks

5. Additional Keywords

(1) Details and transitions of laws in Japan, Europe and the United States

Specified chemical substance, monitored chemical substance, SVHC

(2) Relation between risk management and impact assessment

LCIA, LIME, DAILY, integration

(3) Details of JAMP, JGPSSI and IMDS as management methods for supply chains

Article management

(4) Physical risks

Accident, explosion, fire

(5) Business risks

Technical risk, financial risk, risk concerning natural disasters, geopolitical risk

4.11 Utilizing Environmental Information in Communication with Consumers

■ Goal

Students will learn means to utilize information concerning a company's environmentally-conscious activities and products for business by communicating with consumers. In order to use environmental labels and various standards as communication means, students will study types, definitions and examples of environmental labels. Instructors will introduce Type I (Eco Mark), Type III (Eco Leaf), CFP, the Green Purchase Law and guidelines of the Green Purchasing Network (GPN) to discuss the role of green purchasing and environmental information provision. The class will discuss means, including Type II (labels), to appeal to consumers products with high environmental performances.

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction: Current status of environmental labels (15 minutes)
(2) Overview of environmental labels (20 minutes)
(3) Environmental information and green purchasing (20 minutes)
(4) Utilization of environmental communication (20 minutes)
(5) Conclusion (15 minutes)

Main Points in This Class

- Environmental labels are stipulated in the ISO14020 series. Especially, Types I and III require third-party certification. Carbon footprint also requires third-party certification.
- Although business operators voluntarily provide Type II labels, objectiveness is required. The environmental labeling guidelines by the MOEJ should be referenced. Information can be communicated clearly based on product characteristics.
- Environmental labels provide a function to promote environmentally-conscious design and another to provide environmentally-conscious design to consumers, with different label acquisition standards.
- Other than labels, communication can be achieved by meeting standards based on the Green Purchase Law or following the guidelines prepared by the Green Purchasing Network.

2. Outline of the Basic Contents

(1) Introduction: Current status of environmental labels (15 minutes)

Instructors will introduce environmental labels used in real market and explain that labels are flooding and they are not necessarily contributing to the selection of consumers even if visibility is high. Instructors will present such issues as well as cases in which communications with consumers through labels are successful.

(2) Overview of environmental labels (20 minutes)

Students will study classification, operation and roles of Types I, II and III of ISO14020 series and carbon footprint. They will also learn the Japanese Type I system, Eco Mark, Type III system, Eco Leaf, Type II system and other categories such as Green Mark and R Mark, Energy Star, certification marks such as FSC, and marks that are implemented independently by business operators.

(3) Environmental information and green purchasing (20 minutes)

Through examples, students will learn the standards of the Green Purchase Law, which aims green purchasing in the public sector, the guidelines set by Green Purchasing Network, information provision by Econet, and the establishment of standards for green purchasing by municipalities and corporations.

(4) Utilization of environmental communication (20 minutes)

Students will examine cases to learn success of communication and marketing through environmental labels and environmental reports as well as failure such as mislabeling.

(5) Conclusion (15 minutes)

Students will discuss how environmental labels can be used for products and services of their own organizations and how such labels can be useful for marketing.

3. Keywords in the Basic Contents

(1) Visibility, buying behavior

(2) ISO14020 series, Type I, II, III, Eco Mark, Eco Leaf, CFP, PCR

(3) Green Purchase Law, specified procurement item, GPN

(4) Marketing, environmental report

4. Additional Contents

(1) Eco Mark standards, formulation process of PCR of Eco Leaf and carbon footprint

(2) Other certification labels and water footprint

(3) Environmental labels and carbon footprint in foreign countries

(4) LCA and environmental labels

(5) Internet use

(6) Ethics of environmental labeling

5. Additional Keywords

(2) Other certification labels and water footprint

FSC, PEFC, MSC

(3) Environmental labels and carbon footprint in foreign countries

Blue Angel, EU Flower, Nordic Eco-label (Swan), Chinese environmental labeling, GEN

(4) LCA and environmental labels

Lifecycle and life stage

(5) Internet use

Econet, Eco Challenge Hotels, Green Purchasing Information Plaza

(6) Ethics of environmental labeling

Environmental mislabeling/false information, Gift Product Labeling Law, Japan Fair Trade Commission, environmental labeling guidelines, Eco X

4.12 Developing Products and Manufacturing Methods with High-Environmental Performance

■ Goal

Through examples, students will learn: criteria for judgment in the Green Purchase Law discussed in the previous session; criteria of Eco Mark certification; product development in accordance with the GPN guidelines, etc.; development of highly environmentally-conscious products using LCA and QFDE; development of environmentally-conscious products and chemical substance management through supply chain collaboration; and manufacturing process improvement.

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction: Importance of environmental considerations in a product development stage (10 minutes)

(2) Environmental considerations in product development process: Utilization methods of techniques such as LCA and QFDE in general product development process (35 minutes)

(3) Examples: Specific development practices and green purchasing (35 minutes)

(4) Conclusion (10 minutes)

Main Points in This Class

- To learn that the degree of freedom for designing is highest in a development stage, and thus it is important to incorporate considerations concerning environmental load of products and manufacturing process in a product development stage.
- To learn what kind of techniques and systems are used in general product-development process to achieve environmentally-conscious products.

- To study how involved parties (management, designers, sales staff, manufacturing staff, suppliers, clients, etc.) are related to development process of environmentally-conscious products.
- To learn also what kind of criteria for green and CSR purchasing administrative agencies and companies have established within supply chains and examine concepts behind such criteria.
- Instructors will introduce product development cases to help students to be able to picture specific images. Also, instructors should show not only final products such as cars and home appliances, but cases of companies dealing with materials, parts, etc. in the upstream and middle stream of a supply chain to indicate that environmentally-conscious process has been adopted, and is possible to be adopted, by companies of various industries.

2. Description of the Basic Contents

(1) Introduction: Importance of environmental considerations in a product development stage (10 minutes)

Instructors will explain the position and importance of a development process in a product lifecycle from development to mass production.

(2) Environmental considerations in product development process: Utilization methods of techniques such as LCA and QFDE in general product development process (35 minutes)

Instructors will explain techniques used in planning, concept design and detailed design stages of products and manufacturing processes. Instructors will also briefly introduce Japanese and foreign laws and regulations concerning chemical substance management and explain chemical substance management systems that are industry standards in accordance with such laws and regulations. Instructors will also explain the role of involved parties within and outside a company in the development process of products and manufacturing process.

(3) Examples: Specific development practices and green purchasing (35 minutes)

Students will learn that the green and CSR purchasing criteria including supply chains such as home appliance manufacturers now include not only criteria concerning the environmental aspects of products to be purchased but criteria concerning the environmental aspects and CSR efforts of companies from which products are purchased or procured. Students will then examine reasons and objectives of such criteria (environmental CSR risks, response to compliance risks, and cost reduction of partner companies).

Instructors will explain examples of development practices of companies with different characteristics such as position in a product supply chain (upstream, middle stream, downstream) and size (large corporations, medium and small size companies).

(4) Conclusion (10 minutes)

Instructors will review the importance of a development process for products and manufacturing process and facilitate students' ideas concerning how they can be involved in environmentally-conscious product development in real business scenarios.

3. Keywords in the Basic Contents

(2) DfE, ECD, eco-design, LCA, QFDE, check list, risk assessment, eco-efficiency, ISO/TR14062, IEC Guide 114

(3) CSR/environmental report, company's website

4. Additional Contents

(1) Environment-related laws and regulations and market trends including green purchasing in other countries

(2) Chemical substance management/assessment methods

5. Additional Keywords

(1) Environment-related laws and regulations and market trends including green purchasing in other countries

US EPEAT, the Integrated Product Policy (IPP), EUP (ErP), EU Flower, Blue Angel

(2) Chemical substance management/assessment methods

Risk assessment, PRTR, RoHS, REACH, IMDS, JGPSSI, JIG, JAMP

4.13 – 4.14 Creating Values from the Environmental Perspective and Green Innovation

First Session:

4.13 Creating Values from the Environmental Perspective and Green Innovation (1)

Second Session:

4.14 Creating Values from the Environmental Perspective and Green Innovation (2)

Third Session:

4.15 Conclusion: Presentation of Discussion Findings and Class Discussion

■ **Goal**

Students will build a business model concerning green innovation, from a proposal to practice. Green innovation includes new product development related to students' work and expertise, appeal to consumers, improvement of organizations and supply chains, and overseas business expansion. The sessions will be held in a group discussion format.

In these lectures, students will discuss what kind of green innovation will be possible by incorporating lifecycle thinking into familiar products (daily commodity such as an alarm clock, scales for body weight and materials, a flash light, etc. with a very little focus on an environmental aspect). Students will also examine, summarize and give a presentation on what is possible from the viewpoints of companies (product design), consumers (methods for using and disposing of a product), and administrations (policies, waste recovery).

Main Points of These Classes

- To examine ideas for improvement using familiar products. Through group work, students will organize various ideas according to the characteristics of improvements.
- To discuss what kind of green innovation will be possible by incorporating lifecycle thinking into familiar products (daily commodity such as an alarm clock, scales for body weight and materials, a flash light, etc. with a little focus on an environmental aspect). Students will also examine, summarize and give a presentation on what is possible from the viewpoints of companies (product design), consumers (methods for using and disposing of a product), and administrations (policies, waste recovery).
- To evaluate their ideas for improvement and discuss feasibility and resulting effects qualitatively and quantitatively
- To prepare, present and exchange opinions on proposals for improvement
- Instructors will divide students into groups, make them compete with each other, and comment on their work. Students in other groups will also offer remarks. By doing so, the class will extract issues and perspectives to be further added. The objective of this class is to gain more practical lifecycle thinking through discussion.

4.13 Creating Values from the Environmental Perspective and Green Innovation (1)

■ Outline of Educational Contents

1. Basic Contents

(1) Identifying target products and services, extracting ideas for improvement, mapping of ideas (90 minutes)

2. Description of the Basic Contents

(1) Identifying target products and services, extracting ideas for improvement, mapping of ideas (90 minutes)

Students will be divided into groups (each group will have around 6 people), discuss different products for different groups, and make a summary.

Students will discuss what kind of green innovation is possible by incorporating lifecycle thinking into familiar products from the viewpoints of roles played by companies, consumers and administrations.
Students will discuss ideas for improvement concerning familiar products (daily commodity such as an alarm clock, scales for body weight and materials, a flash light, etc. with a little focus on an environmental aspect), mobile phones, PET bottles, delivery services and other familiar services.
Students will use one sheet of sticky note for one idea. Instructors will encourage students to come up with as many ideas as possible.
Students will map the ideas into different development processes such as planning (business model), concept design, detailed design, production, sales/maintenance, etc. Ideas for improvement concerning performance itself will be organized into lifecycle stages including raw material harvest, production, use, disposal, etc.
Furthermore, ideas may be mapped according to characteristics such as ones that require investment but can achieve significant improvement effects, ones that require not much investment but certainly achieve improvement effects, and ones that require cooperation of partner companies and consumers thus are highly uncertain.

3. Keywords of the Basic Contents

(1) DfE, ECD, eco-design, LCA, QFDE, check list, risk assessment, eco-efficiency, mapping, cost-effectiveness

4.14 Creating Values from the Environmental Perspective and Green Innovation (2)

■ Outline of Educational Contents

1. Basic Contents

(1) Quality Function Deployment for Environment (QFDE), assessment of ideas for improvement using LCA, preparation of a proposal (90 minutes)

2. Description of the Basic Contents

(1) Quality Function Deployment for Environment (QFDE), assessment of ideas for improvement using LCA, preparation of a proposal (90 minutes)
Students will conduct QFDE or LCA for target products and services. They will then assess and discuss effects of particularly potential ideas using QFDE or LCA.
Based on the results of QFDE or LCA, students will brush up their ideas for improvement and prepare an improvement proposal.

3. Keywords in the Basic Contents

(1) QFDE, LCA, proposal, business model

4.15 Conclusion: Presentation of Discussion Findings and Class Discussion

■ Outline of Educational Contents

1. Basic Contents

(1) Group presentation, exchange of opinions (90 minutes)

2. Description of the Basic Contents

(1) Group presentation, exchange of opinions (90 minutes)

Each group will present its improvement proposal prepared in the previous session, <4.14 Creating Values from the Environmental Perspective and Green Innovation (2)> and the class will exchange opinions.

Presentation should be based on contents that students have been discussing. Instructors will comment on presentation while students in the other groups also offer remarks. By doing so, students will extract issues and perspectives to be further added. The objective of the class is to gain more practical lifecycle thinking through discussion.

Finally, based on knowledge gained in the group work, students will have a comprehensive discussion on business models that realizes green innovation.

【5】 Governance for sustainable development

1. Educational Goal

The aim of this program is to learn basic ways of thinking and the philosophy required in a company's decision making related to corporate environmental management, and through case studies, produce a "sense of value" for a company to fulfill its social responsibility and accountability, and continue its business management based on social governance,.

2. Structure of the Program

The first seven lessons will be in the form of a lecture and a variety of views for "sustainable governance" will be introduced and explained. In the next seven lessons, students will conduct their own research on the CSR issues through case studies, examine solutions, and discuss the results. The last class will be a summary.

1) Introduction (1): Trends and Backgrounds of Sustainable Governance

Students will understand the evolution and history of sustainable governance and obtain the skill to grasp matters from the perspectives of time, space and subject. As a result, students will develop an attitude that emphasizes a basic viewpoint and creative efforts to analyze, plan/practice, and review corporate management from an aspect of sustainable governance.

2) Introduction (2): Trends and Systems of Sustainable Governance

By learning about the existing principles and standards concerning sustainable governance such as Global Compact or ISO26000, and recent views such as social capital etc., students will build a foundation to assess and plan sustainable governance in a company.

3) CSR and Materiality

Students will learn the relationships between CSR and materiality, the triple bottom line and GRI, GRI indicators and materiality etc. in order to understand the significance of grasping how a company's CSR activities influence the economy, environment, and society, or in other words, the degree of influence it has on the value of a company (materiality), for sustainable governance.

4) SR: ISO26000 (Social Responsibility Standards) and Multi-Stakeholders

The ISO26000, issued in November 2010, is based on the multi-stakeholder approach which states that a sustainable society will not be achieved by a single sector but it requires the collaboration of multi-stakeholders (government, corporations and civil society). Here, students will systematically grasp multi-stakeholders related to a company including how, as a social entity, it makes considerations for a variety of social groups interconnected through its activities. Students will examine corporate activities and its expected functions through case studies and discuss corporate roles as a responsible party in building a sustainable society.

5) Sustainable Governance and the Viewpoints of Small and Medium Size Companies (1)
In relation to the diffusion of the CSR and environmental management system among small and medium size companies, students will understand the whole picture of efforts in the past, and discuss in what form the diffusion can be realized smoothly. In particular, given that the “disclosure of a product’s environmental information” is an effective means for small and medium size companies, students will learn assessment methods from the viewpoints of these companies based on lifecycle thinking such as environmentally-conscious design, LCA, environmental labels etc. Furthermore, students will consider response methods for the environmental information disclosure of products and services based on the characteristics (size, industry type, product type etc.) of small and medium size companies.
6) Sustainable Governance and the Viewpoints of Small and Medium Size Companies (2)
Based on the contents of the fifth lecture, and referring to the advanced examples both in the UK and in Japan, students will deepen their understanding of the significance of becoming a “social corporation” (social business, environmental community business) which is a new business model for small and medium size companies and the focal point of the social system reform for realizing sustainable governance in the future.
7) Various Standpoints Regarding Sustainability
There are different ideas and standpoints regarding sustainability: How a sustainable society can be achieved; how CO2 emission can be reduced; how environmental conservation and development can be achieved simultaneously; how big the difference is in “shared yet different degrees of responsibility,” etc. This class will use such a variety of ideas and standpoints as examples in order to understand what those “differences” are and what is in the background of these differences, and to “understand individual differences.”
8) – 14) Case Studies
CSR should not be just for large corporations and researchers. Any organization, including small and medium companies, should use ISO26000, etc. as easily-accessible tools, and make CSR permeate into their main businesses. Thus it requires the development of human resources who have the competence to achieve “on-site duties” to enlighten the general public with healthy CSR activities and to support small and medium companies etc. Therefore, in this program, students will aim to gain practical competence by adopting a series of “case studies” (including workshops) for training in which “real world” cases are used, instead of virtual training, to collect and analyze “on-site” information, and to achieve a level that students can enhance their competence to materialize proposed improvements for a “real product.” Students will choose either from the twelve themes shown in the list below, which are suggested in the guideline, or learn methodology to create one’s own themes, to conduct a case study.

<List of Themes>

A)	“Examining ISO26000 and the Company Scandals”
B)	“Case Study: ISO26000 and the Best Practices“
C)	Workshop (1) “Identifying Stakeholders and Their Trust and Expectations”
D)	Workshop (2) “Examining Stakeholder Dialogues“
E)	Workshop (3) “Practice of Stakeholder Engagement”
F)	Workshop (4) “Analyzing the Governance Failure”
G)	On-site Workshop (1) “Exercise: Supervising (and Correcting) Management Systems”
H)	On-site Workshop (2) “Exercise: Top Management Second Brain (Improving Management Systems)”
I)	On-site Instructor Exercise (1)
J)	On-site Instructor Exercise (2)
K)	Debate Exercise (1)
L)	Debate Exercise (2)

15) Conclusion

The fundamental goal of the lectures on sustainable governance is to learn the basic ways of thinking and philosophies expected during a company’s decision making stages regarding environmental management, as well as to develop a “sense of value” so the company fulfills its social responsibility and accountability, and manages its business in accordance with social governance. In the last session, the achievement of the abovementioned goal will be examined and confirmed through reports and discussions to help each student develop his/her voluntary efforts after they complete the program.

5.1. Introduction (1): Trends and Backgrounds of Sustainable Governance

■ Goal

In the first session on Introduction to Sustainable Governance, students will learn:

- The difference between sustainable governance, conventional CSR and environmental management
- How differently the history of sustainable governance has developed in Europe and the United States and Japan
- What has been behind the demand for sustainable governance

And students are expected:

- To acquire an attitude of taking an active and self-motivated role in sustainable governance in accordance with the characteristics of each company and the time and situation involved
- To obtain the skill to grasp sustainable governance comprehensively in the axis [perspective] of time (long term, future generations), space (issues both inside and outside Japan, lifecycle) and subject (a company's characteristics, diverse stakeholders).

For achieving the above skills, students will learn the basic knowledge of:

- Areas covered by this lecture regarding sustainable governance
- History and trends of corporate efforts in sustainable governance
- Review of backgrounds of sustainable governance

Students will develop an attitude that emphasizes the basic viewpoints and creative efforts in analyzing, planning/practicing, and reviewing corporate management from the perspective of sustainable governance.

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction – Scope of this lecture (10 minutes)

(2) History and trends of corporate efforts in sustainable governance (30 minutes)

(3) Review of background of sustainable governance (30 minutes)

(4) Conclusion (20 minutes)

Main Points in This Class

- Sustainable governance is not a conventional methodology, but it is a future-oriented and creative way of resolving issues that surround the companies.
- Sustainable governance is not receptive to CSR such as follow-up of regulations or prevention, but it is a forward-looking form of corporate management, acknowledging CSR as an opportunity for growth and promoting sustainable development from a long-term perspective.
- Depending on the characteristics of a company, such as its size, type of industry and location, sustainable governance has diverse goals and methods. Specifically, sustainable governance is required not only for multi-national companies in the developing countries, but also for the companies that have domestic operations (small and medium size companies, companies that are based outside cities).

2. Description of the Basic Contents

(1) Introduction – Scope of this lecture (10 minutes)

- Instructors will explain that the concept of sustainable governance encompasses the expansion

of the scope of CSR and development in the environmental management that are not confined to the conventional category. Instructors will then ask students what are the differences between a company's conventional CSR or environmental management and sustainable governance. As the class explores the answers, wide areas covered by sustainable governance and its versatility will be indicated.

- For example, instructors will explain differences in problems, rules and methods of CSR or environmental management and sustainable governance.
- Problems: Diversification of problems that involve companies and stakeholders.
- Rules: Response to the triple bottom line (not just environmental, but also economical and social aspects, especially social problems).
- Methods: Governance (governance that does not restrict itself to management that follows regulations or top-down style management, but emphasizes independence and democracy.)
- Furthermore, sustainable governance is defined by acknowledging and creating CSR with a future-oriented approach, based on a conventional CSR. At the start of the lecture, it is emphasized that the students are required to use free thinking unrestrained by conventional concepts.

(2) History and trends of corporate efforts in sustainable governance (30 minutes)

- After explaining the overview of CSR development in the US and the EU, instructors will review trends in Japan, particularly after the 1990's.
- The following overseas trends will be reviewed:
- USA: CSR led by SRI (Socially Responsible Investment), the Public Company Accounting Reform and Investor Protection Act, etc. to eradicate distrust for corporate accounting after the cases of Enron/Anderson, WorldCom, etc.
- EU: SRI led by the government such as the Pension Reform Act in the UK, etc., Green Paper 366 *Promoting a European. Framework for Corporate Social Responsibility*
- The following trends in Japan will be reviewed:
- The background of the efforts in environmental problems, etc. by the Keidanren (Japan Federation of Economic Organization) and the Japan Association of Corporate Executives
- Expansion of corporate environmental management and CSR (case studies)
- SRI trends based on the CSR rating
- Transition from environmental reports to sustainability reports and social and environmental reports

(3) Review of the background of sustainable governance (30 minutes)

- To examine the background of how sustainable governance has become necessary in the 2000's, instructors will explain the following three aspects:
  A. Company scandals developed into social problems since 1990's

B. Increased considerations for sustainable development

C. Transition toward a new growth axis

- A. Regarding the company scandals, instructors will introduce specific incidents involving large corporations such as accounting fraud and bankruptcy, bid-rigging and illegal bidding, hiding recalls, breach of legal responsibilities etc.
- B. Regarding the considerations for sustainable development, instructors will explain social trends and realities in which such consideration for environmental problems in developing countries, poverty, human rights, discrimination etc. have become necessary due to the globalization.
- C. As for the new growth axis, instructors will examine the following topics from a bird's eye viewpoint by using Japan's relevant visions and population/economic data: The present day is in a transition from the rapid economic growth period to a mature society; in the mature society, the transformation of concepts toward growth is required (from economic growth to economic and social growth).

(4) Conclusion (20 minutes)

- By reviewing the above (1) – (3), instructors will summarize the background of how sustainable governance has become a requirement from the axes of time (long term, future generations), space (issues both inside and outside the country, lifecycles) and subjects (a company's characteristics, diverse stakeholders).
- Finally, it will be emphasized that for sustainable governance, a future-oriented and creative approach, a positive attitude that regards CSR as a growth opportunity, flexibility and uniqueness that corresponds to the size, industry type, location and other characteristics of each company are important. Students' expected attitudes should also be reconfirmed in this lecture.

3. Keywords in the Basic Contents

(1) Stakeholder, triple bottom line, sustainability, governance, future-oriented, creativity

(2) Rio Summit, SRI, Public Company Accounting Reform and Investor Protection Act; Green Paper, Keidanren's Independent Environmental Activity Plan, multi-national companies, Sustainability Reporting Guidelines, CSR Self-Assessment Report of the Japan Association of the Corporate Executives, Keidanren's Charter of Corporate Behavior and its Implementation Guidance

(3) Corporate ethics, legal compliance, norm of international activities, globalization, mature society, new growth axis

4. Additional Contents

Students are encouraged to use newspaper and other resources to explore company scandals and problems that involve companies and companies that have grown through addressing sustainable

governance, to have more direct views of a company. From this perspective, the following additional contents have been provided:

(1) Scandals of major corporations and the details of the scandals (research results of newspaper articles, etc.)

(2) Integrative development of the environment and economy, reviews of a nation's strategy for a new growth axis, etc.

(3) Cases of companies that have developed based on sustainable governance

5. Additional Keywords

(1) Scandals of major corporations and the details of the scandals (research results of newspaper articles, etc.)

Accounting fraud, personal information leak, bid-rigging and illegal bidding, hiding recalls

(2) Integrative development of the environment and economy, reviews of a nation's strategy for a new growth axis, etc.

Integrative development of the environment and economy, new growth strategy

(3) Cases of companies that have developed based on sustainable governance

Corporate afforestation promotion; Environmentally Conscious Community Business, relational marketing, slow business

5.2 Introduction (2): Trends and systems of sustainable governance

■ Goal

In order to systematically perceive the principles of sustainable governance, students will learn the following topics:

- What principles and standards have been prepared concerning sustainable governance?
- Among the principles related to sustainable governance, what is the "Global Compact" advocated by the UN that has expanded internationally?
- What is ISO26000, a standard for sustainable governance?
- What are the new viewpoints and traditional cases concerning the principles of sustainable governance?

Students will also build a foundation for the following objectives:

- To understand perspectives necessary to discuss sustainable governance comprehensively and structurally
- To make assessments and plans etc., for sustainable governance of corporations.

For this purpose, students will obtain the basic knowledge of:

- The existing principles and standards concerning sustainable governance

- New viewpoints such as social capital, etc.

As a result, students will develop basic viewpoints and assessment skills to analyze, plan/practice and review corporate business management from the perspective of sustainable governance.

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (10 minutes)

(2) Global Compact (15 minutes)

(3) ISO 26000 (25 minutes)

(4) Social capital (15 minutes)

(5) Principles in Japanese traditions (15 minutes)

(6) Conclusion (10 minutes)

Main Points in This Class

- To systematically understand the assessment axis required for sustainable governance (organizational governance, human rights, labor, environment, justice, consumers, region/community, etc.)
- To systematically grasp the methodological principles of sustainable governance (transparency, ethics, compliance to laws and norms, considerations for stakeholders, human rights, etc.)
- To obtain a flexible attitude to learn about viewpoints that are not regarded as conventional assessment axes or principles, such as social capital, etc.

2. Description of the Basic Contents

(1) Introduction (10 minutes)

- Instructors will review specific corporate trends, history and backgrounds discussed in <5.1 Introduction (1)> and check the students' level of awareness concerning previously explained principles in social governance, such as "Global Compact," "ISO26000," etc.
- It will be suggested that there are concepts such as social capital etc., considered as a norm of social governance, and that Japanese traditions also offer wisdom

(2) Global Compact (15 minutes)

- Instructors will introduce the background of how the UN's Global Compact was prepared as well as its contents. Instructors will also explain the "Global Compact Japan Network," an associated local network based in each country and examine a real picture of the organization by explaining their specific activities.

(3) ISO 26000 (25 minutes)

- Instructors will explain the overview of the background and contents of the *Guidance on Social*

Responsibility, enacted as ISO26000. The difference between ISO26000 and the Global Compact is that consumer issues, community participation and development are presented as its core issue, and it has more specific actions for each subject.

(4) Social capital (15 minutes)

- Regarding the social capital introduced in the 1990's and discussing its relationship with corporate management since the 2000's, instructors will explain its contents, significance, etc. The class will discuss the expected roles and potential of social capital in sustainable governance.

(5) Principles in the Japanese traditions (15 minutes)

- Instructors will introduce family rules and teachings among Japanese merchants as a topic from which one can learn (the Omi merchants' "All is good if three sides are good," etc.). However, it is important to interpret the subject in today's context, rather than going back to the old traditions.

(6) Conclusion (10 minutes)

- Instructors will summarize the assessment axes to understand sustainable governance (organizational governance, human rights, labor, environment, justice, consumers, region/community, etc.) and the methodological principles (transparency, ethics, compliance to laws and norms, considerations for stakeholders, human rights, etc.) based on the sessions (1) – (5).

3. Keywords in the Basic Contents

(1) Global Compact (UN), Sustainability Reporting Guidelines (GRI), Guidelines for Multinational Enterprises (OECD); Sustainability through the Market (WBCSD), Guidelines for SRI Information Disclosure (Association of British Insurers), ISO26000, Responsible Care, Social Capital

(2) Global Compact Japan Network, human rights, labor standards, environment, corruption prevention

(3) Sustainable development, seven principles of social responsibility, identifying stakeholders/stakeholder engagement, seven core subjects (organizational governance, human rights, labor practices, environment, fair business practices, consumer issues, participation in communities/community development)

(4) Trust, reciprocity, network, coupled social capital, bridging social capital, relational marketing

(5) The Omi merchants' "All is good if three sides are good", Baigan Ishida, Yukichi Fukuzawa, Eiichi Shibusawa

4. Additional Contents

It is expected that students understand not just the principles as a concept, but also learn the embodiment of individual principles in practical uses through examples of corporate efforts, and experience the meaning of the principles. From this perspective, the following additional contents

may be considered:

(1) Review of the cases concerning corporations and community/human resource building (Community-inclusive ISO in Iida City etc.)

(2) Historical cases of sustainable governance (Sumitomo Copper Mine etc.)

5. Additional Keywords

(1) Review of the cases concerning corporations and community/human resource building (Community-inclusive ISO in Iida City etc.)

- Community, community contribution, mutual aid/mutual benefit

(2) Historical cases of sustainable governance (Sumitomo Copper Mine etc.)

- Environmental pollution caused by mining, Ashio/Besshi/Hitachi/Kosaka copper mines

5.3 CSR and Materiality

■ Goal

Students will learn how corporate CSR activities influence economic, environmental and social aspects, in other words, what kind of significance the understanding of the extent of influence on corporate value (materiality) has to sustainable governance.

■ Outline of Educational Contents

1. Basic contents

(1) Introduction: Relationship between CSR and materiality (10 minutes)

(2) Triple bottom line and GRI (40 minutes)

(3) GRI indicators and materiality (30 minutes)

(4) Conclusion: Sustainable governance and materiality (10 minutes)

Main Points in This Class

- To correctly recognize materiality in CSR
- To understand how the GRI guidelines are related to the triple bottom line

2. Description of the Basic Contents

(1) Introduction: Relationship between CSR and materiality (10 minutes)

Students will recognize the importance of materiality for sustainable corporate management.

(2) Triple bottom line and GRI (40 minutes)

Students will learn the triple bottom line, which is the framework of the GRI Sustainability Reporting Guidelines. Students will read sustainability reports and grasp the three aspects of a company -

economic, social and environmental.

(3) GRI indicators and materiality (30 minutes)

Students will understand the contents of the GRI indicators and deepen their understanding about the importance of CSR's economic, environmental and social influences on corporate management and materiality.

(4) Conclusion: Sustainable government and materiality (10 minutes)

3. Keywords in the Basic Contents

CSR, triple bottom line, materiality

CSR report, materiality report

5.4 SR: ISO26000 (Social Responsibility Standards) and Multi-Stakeholders

■ Goal

The ISO26000, issued in November 2010, is based on a multi-stakeholder approach that states a sustainable society will not be achieved by a single sector but it requires the collaboration of multi-stakeholders (government, corporations and civil society). Here, students will systematically grasp multi-stakeholders related to a company including how, as a social entity, it makes considerations for a variety of social groups interconnected through its activities. Students will examine corporate activities and their expected functions through case studies and discuss corporate roles as responsible parties in building a sustainable society.

■ Outline for Educational Contents

1. Basic Contents

(1) Introduction: Process of developing and issuing SR and ISO26000 (Guidance on Social Responsibility) (10 minutes)

(2) ISO26000 and a multi-stakeholder approach and stakeholder engagement (30minutes)

(3) Core subjects of ISO26000 and corporate involvement (30 minutes)

(4) Conclusion: Corporate roles in ISO26000 (20 minutes)

Main Points in This Class

- To understand the formulation process of ISO26000
- To correctly understand the relationship between companies and multi-stakeholders, and to examine corporate social responsibility toward the realization of a sustainable society

2. Description of the Basic Contents

(1) Introduction: Process of developing and issuing SR and ISO26000 (Guidance on Social Responsibility) (10 minutes)

Students will learn that ISO26000 was originally reviewed as a corporate social responsibility (CSR) standard, but was ultimately developed and issued as a universal SR standard targeting all types of organizations, not just companies. This was due to the recommendation by the ISO Strategic Advisory Group (SAG) that stated, “Corporations are not the only ones that should assume social responsibility.”

(2) ISO26000 and a multi-stakeholder approach and stakeholder engagement (30minutes)

One of the characteristics of ISO26000 is that it was established as a result of dialogues and consensus among the representatives of various stakeholders (governments, industries, labor circles, NGOs/NPOs, consumers, researchers and others) throughout the process of its formation. Such a process in establishing ISO standards was unprecedented, thus the coordination of conflicts of interests and opinions among the stakeholders and between developing and developed countries was difficult during the negotiation. Students will learn the significance of the multi-stakeholder approach, where judgments and consensus building are processed through a participation of various external stakeholders, and stakeholder engagement, an interactive process whereby diverse stakeholders, in order to clarify differences, exchange opinions to find a solution to problems from a shared standpoint and build trust for better management and decision making.

Instructors will help students become aware that it is a “new public era” when administrations, corporations and civil society, whether in Japan or overseas, fulfill their own roles and social responsibilities for a realization of a sustainable society.

(3) Core Subjects of ISO26000 and corporate involvement (30 minutes)

Instructors will explain the core subjects of ISO26000, which are organizational governance, fair business practices, human rights, labor practices, participation in communities, development and environment. Students will learn how companies are involved in these core subjects. Particularly, the class will focus on consumer issues and the environment to help students understand the roles of companies in the “Consumers Citizenship Education,” which is the practice of social responsibility, and the “Education for Sustainable Development.”

(4) Conclusion (20 minutes)

By reviewing the “Sustainable Value Chain” initiative by the World Business Council for Sustainable Development (WBCSD) and the Keidanren’s Charter of Corporate Behavior (the sixth edition; revised in September 2010), students will increase awareness of the significance of corporate leadership for building a sustainable society and that the collaboration with stakeholders is indispensable.

3. Keywords in the Basic Contents

ISO26000, multi-stakeholder approach, stakeholder engagement, Consumers Citizenship Education (CCE), Education for Sustainable Development (ESD), supply chain, sustainable value chain

5.5 Sustainable Governance and the Viewpoints of Small and Medium Size Companies (1)

■ Goal

In regard to the diffusion of the CSR and environmental management system among small and medium size companies, students will understand the whole picture of efforts that have been made in the past, and discuss how smooth diffusion can be realized. In particular, considering that the "disclosure of product environmental information" is an effective tool for small and medium size companies, students will learn assessment methods based on lifecycle thinking such as environmentally-conscious design, LCA, environmental labels etc. from the viewpoints of small and medium size companies. In addition, students will consider response methods for the environmental information disclosure of products and services based on the characteristics (size, industry type, product type etc.) of these companies.

■ Outline of the Educational Contents

1. Basic Contents

(1) Introduction (10 minutes)

(2) Assessment of conditions such as CSR in small and medium size companies (20 minutes)

(3) Regarding the method of environmental information disclosure (30 minutes)

(4) Response of small and medium size companies (by size, industry, products etc.) (20 minutes)

(5) Conclusion (10 minutes)

Main Points in This Class

- To recognize the necessity of sustainable governance based on actual conditions of small and medium size companies
- To correctly understand the actual conditions of CSR related efforts of small and medium size companies in recent years, such as supply chain CSR, etc.
- To understand the validity of the environmental information disclosure method for products and services as a communication means in corporate social contribution
- To understand the current introduction status of environmentally-conscious designs, LCA, environmental labels, etc. at corporate management and their future development
- To increase awareness of response methods to environmental information disclosure based on the characteristics of small and medium size companies (by size, industry, products etc.)

2. Description of the Basic Contents

(1) Introduction (10 minutes)

Students will learn that response to environmental management based on the shared acknowledgement of the importance of contributions in social responsibility, reduction of environmental load and environmental communication is crucial for the management of the small and medium size companies. Specifically, implementation of voluntary action plans and legal compliance is important. Instructors will clarify the position of small and medium size companies as members of a sustainable society with the goal of providing environmentally-conscious products and services, improving corporate values and evaluation, participating in environmental business, and improving management efficiency through environmental considerations.

(2) Assessment of conditions such as CSR in small and medium size companies (20 minutes)

Students will learn about the status of small and medium size companies' efforts in CSR and environmental management systems, etc., in comparison with large corporations, and supply chain CSR guidelines, etc. of large corporations.

(3) Regarding the method of environmental information disclosure (30 minutes)

- Students will learn that environmental information disclosure concerning products and services is an effective means for small and medium size companies. Specifically, students will study assessment methods based on lifecycle thinking such as environmentally-conscious designs, LCA, environmental labels, etc., and recognize that these methods are effective for small and medium size companies since the process of executive decision making is simple and supportive data collection is easy.
- Through efforts in lifecycle thinking, students will recognize the importance of involvement with diverse stakeholders. Students will also understand the importance of recognizing a product's environmental influence in the future by setting a boundary (area of assessment).

(4) Response of small and medium size companies (by size, industry, products etc.) (20minutes)

- Students will correctly understand specific directions of small and medium size companies' efforts through studying progressive examples concerning environmental information disclosure.

(5) Conclusion (10 minutes)

- Students will deepen their understanding of social significance and necessity of sustainable governance for small and medium size companies through the course of studies mentioned above.

3. Keywords in the Basic Contents

CSR, SRI, environmental management system, supply chain CSR, environmental management, voluntary action plan, legal compliance, product environmental information disclosure, lifecycle

thinking, environmentally-conscious design, LCA, environmental labels

4. Additional Contents

(1) Efforts by small and medium size companies in wholesale/retail and service industries

With the focus on successful cases, students will study specific examples of efforts in CSR and environmental information disclosure by small and medium size companies in wholesale/retail and service industries.

(2) Regarding global supply chain CSR

Based on the case of CSR guidelines for global supply chains, students will examine CSR of small and medium size companies in a global supply chain.

5.6 Significance of Social Companies and Actual Cases

■ Goal

Based on the contents of <5.5 Sustainable Governance in Small and Medium Size Companies>, students will deepen their understanding of significance of a “social company” (social business, environmental community business) as a new business model of small and medium size companies, which is the focal point of social system reform for achieving future sustainable governance. The class will refer to progressive cases in the UK and Japan.

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (10 minutes)

(2) Significance of environmental community business and specific cases (20 minutes)

(3) Introduction of social company systems in the Western countries such as the UK (30 minutes)

(4) Understanding issues in environmental community business (20 minutes)

(5) Conclusion (10 minutes)

Main Points in This Class

- To understand that system reform is indispensable to achieve future sustainable governance of small and medium companies
- To study the direction of specific system reform through case studies including the Community Interest Companies (CICs), the UK’s new system for social companies that started in 2005
- To heighten awareness of issues that Japanese environmental community business faces

2. Description of the Basic Contents

(1) Introduction (10 minutes)

Students will deepen their understanding that interests in “social companies” “social business” and “social entrepreneurs,” especially among the youth, are increasing and that such a trend is a global phenomenon, as well as issues of today’s socioeconomic system behind such a trend.

(2) Significance of environmental community business and specific cases (20 minutes)

Based on specific cases, instructors will explain what “environmental community business” is and what its current status is. Students will learn the overview of environmental community business.

(3) Introduction of social company systems in the Western countries such as the UK (30 minutes)

Students will learn social corporate systems in the Western countries such as the UK. Especially, students will refer to the basic mechanism and current statuses of the UK’s Community Interest Companies (CICs) launched in 2005, and discuss Japan’s social corporate system.

(4) Understanding issues in environmental community business (20 minutes)

In regard to Japan’s environmental community business as a new business model for small and medium size companies, students will specifically study and understand social needs, current issues and the direction of response to such issues.

(5) Conclusion (10 minutes)

Based on learned topics above, students will explore possibilities of social companies as new business models for small and medium size companies.

3. Keywords in the Basic Contents

Environmental community business, social company, Community Interest Company (CIC), NPO, social business

4. Additional Contents

(1) Social companies and NPOs

(2) Social company system in the UK and Italy

(3) Social business system in Japan

5. Additional Keywords

(1) Social companies and NPOs

Incorporated NPO, social market

(2) Social company system in the UK and Italy

Social co-operative, suitability test, charity

(3) Social business system in Japan

Legal personality, public support, social capital

5.7 Various Standpoints Regarding Sustainability

■ Goal

There are various standpoints and thoughts regarding sustainability as follows: How is a sustainable society built? What kind of means reduces emissions of greenhouse gases? How environmental conservation and development are achieved simultaneously? How much difference is there in "common but different responsibility"?

This class aims to examine various standpoints, thoughts, differences and ideas behind the differences from other people's perspective and understand "differences between perspectives."

■ Outline of Educational Content

1. Basic Contents

If possible, it is preferable to have students research on "various viewpoints and thoughts regarding sustainability" and students' opposing (different) ideas prior to this session.

(1) Introduction: Instructors will introduce some examples of "various viewpoints and thoughts regarding sustainability" or have each student (or each group) come up with examples. (15 minutes)

(2) Instructors will choose one example and, within each group, assign students to different views for debate. (45 minutes)

(3) Conclusion: Each group will present its debate results and the class will discuss the contents. (30 minutes)

Examples of "various viewpoints and thoughts regarding sustainability"

- Developed countries (the US, the EU, Japan, etc.) and developing or emerging countries (China, India, etc.), concerning greenhouse gas emission reduction
  → Students will have a discussion using data such as total emissions by country, per-capita emissions, emissions by country for the past 50 years and aggregated emissions, per-capita GNP, etc.
- Electric power industry and steel industry that have particularly high greenhouse gas emissions in Japan (with a large share of greenhouse gas emissions within the whole country's emissions) and electric/electronic industries as well as citizens groups
- → Students will have a discussion using data such as emissions by industry, electricity/fuel price by country, and emissions per unit
- Japan that conducts whaling for research and Greenpeace that opposes the whaling
- Developed and developing countries concerning biodiversity, etc.
- Beverage/food manufacturers and citizens groups concerning beverage and food packaging (extended producer responsibility regarding packaging)

- Paper/pulp industries in Indonesia and WWF (definition of forest with a high conservation value, conservation methods)
- Palm plantations in Indonesia and Malaysia, food/cosmetics industries that use palm oil, and WWF

5.8 – 5.14 Case Studies

■ Objectives (Positions) of This Program

- This program “Governance for sustainable development” is offered to “acquire practical ability” and to “develop strategic environmental thinking” after completing the four basic and core GMP programs (【1】 Overview of global environmental studies, 【2】 Environmental policy, 【3】 Environmental management, 【4】 Sustainable business practices).
- CSR should not be limited to large corporations or researchers. Any organizations including small to medium size companies need to apply CSR to their core businesses by using ISO26000, etc. as familiar tools. Thus it is necessary to develop human resources who have the capacity to promote healthy CSR activity among general public and to support small and medium size companies. Ultimately, this program aims to develop capacity to complete such “tasks on site.”
- This program adopts a “case study” format including workshops to achieve the above objectives.

■ Case Study Requirements

- Case study here includes the following elements to ensure “practicality”:

. “Three-Gen” Policy of “on-site (gen-ba), reality (gen-jitsu), and in-kind (gen-butsu)” will be practiced. In other words, instead of virtual training, the case study will target a “series of training” that aims for such a level where students can develop their capacity to use “real” cases, collect and analyze information “on-site” and materialize proposals of improvement for “in-kind” objects.

. Additionally, the case study is based on a “do-it-yourself” style (a workshop format in a broad definition). However, it is recommended to refer to various related materials and tools as well as to receive advice from experts.

. The case study aims to develop communication capacity and leadership by incorporating team activities into classes.

■ Goal for Ensuring “Capacity Improvement” (Overview of Assessment Indicators)

- To have a capacity level that enables self-development on site after completing this program. To be able to choose self-governing behaviors that help developing a modern trust society.
- To be able to offer analysis and proposal based on environmental assessment and CSR for core businesses within an organization

- To be able to create dialogues with others (self-guided dialogue to stakeholders with a comparative information disadvantage)
- To be able to build a valid network on one's own and utilize it in every direction
- A post for human resources with such a capacity can be a "second brain" for when top management directly steers EMS

■ Considerations for Case Study Operation in This Program

- It is important that the capacity level for developing human resources be built at the "required level" in the modern society and that practitioners do not rely upon a mere "possible level."
- With the condition that students' capacity assessment items and assessment criteria be clearly presented in advance, it is recommended that "education staff" and "assessment staff" be separated. It is also recommended that assessment be conducted by multiple "independent assessors" who are able to assess students' capacity level objectively. At the same time, a defense system against independent assessors should be established along side.

■ Case Study Menu

- First, targeting corporate anti-CSR tasks/activities in the "real" world and resulting incidents/accidents (scandals), case studies A) and B) are offered to students so they can experience ISO26000 as a familiar tool through examining the relationship between scandals and the contents of ISO26000.
- Next, case studies C) – F) (workshops 1-4) are offered so students can make the most important CSR keywords, "stakeholder" "stakeholder dialogue" "engagement" and "governance," more accessible to them and establish solid images of these words in students.
- In addition, on-site workshops 1 and 2 (case studies G) and H)) are offered so that students can experience hurdles in management and governance "on-site," and develop capacity to calmly analyze such challenges and lead to effective solutions.
- Furthermore, on-site instructor trainings (case studies I) and J)) are offered to develop capacity of enlightening and instructing general public and corporate employees.
- Finally, based on the above trainings, debate practices (case studies K) and L)) are offered to develop capacity to incorporate others' ideas into one's own thinking and sublate.

<List of Themes>

A)	ISO26000 and verification of corporate scandals
B)	ISO26000 and research on best practice cases
C)	Workshop 1: Stakeholders and identification of their trust/expectations
D)	Workshop 2: Verification of stakeholder dialogues
E)	Workshop 3: Stakeholder engagement practices
F)	Workshop 4: Analysis of governance failure
G)	On-site workshop 1: Management system auditing (and correction) practices
H)	On-site workshop 2: Top management second brain (management system improvement) practices
I)	On-site instructor training 1
J)	On-site instructor training 2
K)	Debate 1
L)	Debate 2

Theme	**A) ISO26000 and verification of corporate scandals**
Objectives	- Use examples of scandals to help students form images of ISO26000 articles - At the same time, help them understand the vulnerability of today's corporate and organizational governance as well as difficulty to solve such vulnerability - Facilitate students' full interpretation of the standards by recreating real situations to formulate a capacity foundation which enables students to utilize ISO26000
Prior study	(1) List up examples of corporate scandals (2) It is desirable to research corporate scandals so that each clause will have one or more examples; at least, have students study ten or more cases. (3) Link the examples and corresponding ISO26000 clauses and prepare a reference chart
Abstract <Time required>	(1) Presentation of results of the prior study <20 minutes> (a) Give a presentation on seven core issues of Clauses 6.2-6.8 of ISO26000 by matching corporate scandals and the clauses (2) Upon listening to other students' presentations, discuss the mechanisms of how scandals occur <40 minutes> (a) Discovery of "real causes" of scandals (b) Proposal (invention) of measures to remove the "real causes" (3) Upon listening to other students' presentations, sublate each assignment and lead discussion to a higher level of conclusion <30 minutes>
Instructors	- Instructor specialized in CSR: With an emphasis on capacity assessment, and transmission of the assessment results to students in the class - Assistant: Provides directions for the discussion
Textbooks	- ISO26000 (English version) - Original textbook (needs to be prepared)
Standards for assessment of results	- Level of understanding of ISO26000: Adequacy of the assignment - Motivation and activeness: Number of researched cases - Logicality: Adequacy of correspondence between the clauses and best practices - Activeness: Constructive criticism of other students' presentations - Expressiveness: Efforts to make counterparts understand
Note	Instruct preparation for the next class, "ISO26000 and research on best practice cases" . List up best practices, which are the opposite of scandals, and match the cases and corresponding ISO26000 clauses

Theme	**B) ISO26000 and research on best practice cases**
Objectives	- Use examples of best practices to help students form images of ISO26000 articles - At the same time, facilitate students' realization of intention, current status and issues of CSR emerging in modern companies - Make students understand specific difference between true and false best practices - Facilitate students' full interpretation of the standards by recreating real situations to formulate a capacity foundation which enables students to utilize ISO26000
Prior Study	(1) List up examples of best practices (2) It is desirable to research best practices so that each clause will have one or more examples; at least, have students study ten or more cases. (3) Link the examples and corresponding ISO26000 clauses and prepare a reference chart
Abstract	(1) Presentation of results of the prior study <20 minutes> (2) Upon listening to other students' presentations, provide inputs for improving each assignment <review 40 minutes, presentation 30 minutes>
Instructors	- Instructor specialized in CSR: With an emphasis on capacity assessment, and transmission of the assessment results to students in the class - Assistant: Provides directions for the discussion
Textbooks	- ISO26000 (English version) - Original textbook (needs to be prepared)
Standard for assessment of results	- Level of understanding of ISO26000: Adequacy of the assignment - Motivation and activeness: Number of researched cases - Logicality: Adequacy of correspondence between the clauses and best practices - Activeness: Participation in other students' presentations, constructive criticism (not mere objections) - Expressiveness: Efforts to make counterparts understand
Note	Instruct preparation for the next class, "Workshop 1: Stakeholders and identification of their trust/expectations" . ISO26000, 7.1-self study (individual) . Each team decides on a hypothetical company and collects information on its condition in advance . If time permits, each student should identify stakeholders of the hypothetical company

Theme	**C) Workshop 1: Stakeholders and identification of their trust/expectations**
Objectives	- To become positively involved in the team operation, lead collaboration, and cultivate the strength of all three team members - To learn classification of stakeholders, experience how stakeholders relate to each other, and study identification research methods - To learn that trust and expectation of stakeholders form the foundation of CSR and gain hands-on experience in identification research methods
Prior study	(1) ISO26000, 7.1 - Self-study (individual) (2) Each team will choose a hypothetical company and collect information of the company prior to the class. (3) If time permits, each person may identify stakeholders of the hypothetical company.
Abstract	Form teams with three students per group and complete the following tasks: (1) Identify stakeholders of the hypothetical company <20 minutes> (2) Identify trust and expectation of stakeholders <20 minutes> (3) Review the stakeholder classification based on the trust and expectation <20 minutes> (4) Present and discuss the results (upon listening to other students' presentations, provide inputs for improving each assignment) <10 minutes per team, total 30 minutes>
Instructors	- Instructor specialized in CSR: With an emphasis on ability assessment, and transmission of the assessment results to students in the class - Assistant: Provides directions for the discussion
Textbooks	- ISO26000 (English version) - Original textbook (to be prepared)
Standards for assessment of results	- Leadership: Level of contribution to the teamwork, positive motivation, competence to make counterparts understand - Motivation and activeness: Details of the stakeholder classification - Logicality: Adequacy of re-classification processes - Activeness: Participation in other students' presentations and constructive criticism - Expressiveness: Efforts to make counterparts understand
Note	Instruct preparation for the next class, "Workshop 2: Verification of stakeholder dialogues" . ISO26000, 7.1 - Self-study (individual) . Each team decides on an example of dialogue failure and collects information on the example in advance. . If time permits, each student should verify which ISO26000 clauses correspond to the issues of the example.

Theme	**D) Workshop 2: Verification of stakeholder dialogues**
Objectives	- To become positively involved in the team operation, lead collaboration, and cultivate the strength of all three team members - To experience stakeholder dialogues and the difficulties of realizing such dialogues - To develop an image of what stakeholder dialogues are and acquire methods of conducting dialogues with people having difficulty accessing information technology
Prior study	(1) ISO26000, 7.1 - Self-study (individual) (2) Each team will choose an example of dialogue failure and collect the information for the example in advance. (3) If time permits, each student may verify which ISO26000 clauses correspond to the issues of the example.
Abstract	Form teams with three students per group and complete the following tasks: (1) Verify the issues of the proposed example by applying ISO26000 <30 minutes> (2) Propose a proper form of a dialogue as examining interests among stakeholders <30 minutes> (3) Present and discuss the results (upon listening to other students' presentations, provide inputs for improving each assignment) <10 minutes per team, total 30 minutes>
Instructors	- Instructor specialized in CSR: With an emphasis on ability assessment, and transmission of the assessment results to students in the class - Assistant: Provides directions for the discussion
Textbooks	- ISO26000 (English version) - Original textbook (to be prepared)
Standards for assessment of results	- Leadership: Level of contribution to the teamwork, positive motivation, competence to make counterparts understand - Logicality: Adequacy of the proposed dialogue - Activeness: Participation in other students' presentations and constructive criticism - Expressiveness: Efforts to make counterparts understand
Note	Instruct preparation for the next class, "Workshop 3: Stakeholder engagement practices" . ISO26000, 7.1 - self-study (individual) . Each team decides on an example of engagement failure and collects information on the example in advance. . If time permits, each student should verify which ISO26000 clauses correspond to the issues of the example.

Theme	**E) Workshop 3: Stakeholder engagement practices**
Objectives	- To become positively involved in the team operation, lead collaboration, and cultivate the strength of all three team members - To experience stakeholder engagement, the difficulties of realizing such engagement, and the importance of effects when engagement is achieved - To develop an image of what stakeholder engagement is, acquire methods of conducting engagement and experience the interactivity of stakeholder engagement
Prior study	(1) ISO26000, 7.1 - Self-study (individual) (2) Each team will choose an example of engagement failure and collect the information for the example in advance. (3) If time permits, each student may verify which ISO26000 clauses correspond to the issues of the example.
Abstract	Form teams with three students per group and complete the following tasks: (1) Verify the issues of the proposed example by applying ISO26000 <30 minutes> (2) Propose a proper form of engagement as examining interests among stakeholders <30 minutes> (3) Present and discuss the results (upon listening to other students' presentations, provide inputs for improving each assignment) <three-team total 30 minutes>
Instructors	. Instructor specialized in CSR: With an emphasis on ability assessment, and transmission of the assessment results to students in the class . Assistant: Provides directions for the discussion
Textbooks	. ISO26000 (English version) . Original textbook (to be prepared)
Standards for assessment of results	. Leadership: Level of contribution to the teamwork, positive motivation, competence to make counterparts understand . Logicality: Adequacy of the proposed engagement . Activeness: Participation in other students' presentations and constructive criticism . Expressiveness: Efforts to make counterparts understand
Note	Instruct preparation for the next class, the ninth session, "Workshop 4: Analysis of governance failure" . ISO26000, 7.1 - self-study (individual) . Each team decides on an example of governance failure and collects information on the example in advance. . If time permits, each student should verify which ISO26000 clauses correspond to the issues of the example.

Theme	**F) Workshop 4: "Analysis of governance failure"**
Objectives	- To become positively involved in the team operation, lead collaboration, and cultivate the strength of all three team members - To experience governance, the difficulties of realizing such governance, and the importance of effects when governance is achieved - To develop an image of what governance is and acquire methods of conducting governance
Prior study	(1) ISO26000, 7.1 - Self-study (2) Each team will choose an example of governance failure and collect the information for the example in advance. (3) If time permits, each student may verify which ISO26000 clauses correspond to the issues of the example.
Abstract	Form teams with three students per group and complete the following tasks: (1) Verify the issues of the proposed example by applying ISO26000 <30 minutes> (2) Propose a proper form of governance as examining interests among stakeholders <30 minutes> (3) Present and discuss the results (upon listening to other students' presentations, provide inputs for improving each assignment) <10 minutes per team, total 30 minutes>
Instructors	. Instructor specialized in CSR: With an emphasis on ability assessment, and transmission of the assessment results to students in the class . Assistant: Provides directions for the discussion
Textbooks	. ISO26000 (English version) . Original textbook (to be prepared)
Standards for assessment of results	. Leadership: Level of contribution to the teamwork, positive motivation, competence to make counterparts understand . Logicality: Adequacy of the proposed governance . Activeness: Participation in other students' presentations and constructive criticism . Expressiveness: Efforts to make counterparts understand
Note	Instruct preparation for the next class, "On-site workshop 1: Management system auditing (and correction) practices" . Self-study of ISO14001 using a dedicated textbook . Self-study of the use of an audit checklist . Each team will collect information of a company subject to audit in advance.

Theme	**G) On-site workshop 1: Management system auditing (and correction) practices**
Objectives	- To study the significance of a management system - To understand the status and issues of management systems that are not in use - To study requirements for preventing reoccurrence
Prior study	(1) Self-study of ISO14001 using a dedicated textbook (2) Self-study of the use of an audit checklist (3) Each team will collect information of a company subject to audit in advance.
Abstract	Observe high-level, on-site management system audits of partner companies. (1) Students will study examples of non-compliance to learn the essential values of a management system and ISO14001. At the same time, students will study issues concerning governance. <30 minutes> (2) Students will learn the requirements for preventing reoccurrence of non-compliance by discovering true causes and preparing countermeasures necessary for corrective actions. <30 minutes> (3) After completing the prior study and a series of company visits, a test will be conducted. <30 minutes>
Instructors	- Instructor specialized in environment management systems and ISO14001 ➢ Responsible for the preparation of a textbook, the lecture and the test.
Textbooks	- ISO14001 (JISQ14001) - Original textbook for learning ISO14001 (to be prepared)
Standards for assessment of results	- Level of understanding: Test (self-assessment test) . More than 80 points is a pass . 70-79 points requires a supplementary exam . Less than 70 points indicates that the course must be taken again.
Note	Instruct preparation for the next class, “On-site workshop 2: Top management second brain (management system improvement) practices” . Individually create a report for the management system audit. . Individually create a proposal for improvement of the management system.

Theme	**H) On-site workshop 2: Top management second brain (management system improvement) practices**
Objectives	- To experience a management system audit and learn the key points of a management system functionality - To study the necessary conditions for improving (not correcting) the management system - To propose improvements for the management system of a subject company and develop competence in supporting the top management as a second brain
Prior study	(1) Individually create a report for the management system audit. (2) Individually create a proposal for improvement of the management system.
Abstract	Form teams with three students per group and complete the following tasks: (1) Create a proposal document for each team using the individually-created proposals produced previously based on the management system that students visited to observe audits. <Debate time 30 minutes> (2) Present the proposal for improvement. Listen to other students' presentations and provide inputs for improving each assignment. <20 minutes per team, total 60 minutes>
Instructors	. Instructor specialized in environmental management systems and ISO14001 . Instructor specialized in CSR: With an emphasis on ability assessment, and transmission of the assessment results to students in the class . Assistant: Provides directions for the discussion
Textbooks	. ISO14001 (JISQ14001) . Original text book for learning ISO14001 (to be prepared)
Standards for assessment of results	. Leadership: Level of contribution to the teamwork, positive motivation, competence to make counterparts understand . Logicality: Adequacy of the prepared proposal for improvement . Activeness: Participation in other students' presentations and constructive criticism . Expressiveness: Efforts to make counterparts understand
Note	Instruct preparation for the next class, "On-site instructor training 1" . Using the proposal for improvement that was created based on the discussion, students will prepare for training the company employees (PPT preparation, breakdown of responsibilities within team, rehearsal, preparation of handouts, etc.)

Theme	**I) On-site instructor training 1** **J) On-site instructor training 2**
Objectives	- To contribute to the company employees by explaining them the results of the on-site workshops (1) and (2) in an easy-to-understand manner and deepen the understanding of management systems and governance - To develop competence in supporting the top management as a second brain through the instructor experience
Prior study	- Using the proposal for improvement that was created based on the discussion, students will prepare for training the company employees (PPT preparation, breakdown of responsibilities within team, rehearsal, preparation of handouts, etc.)
Abstract	Form teams with three students per group and complete the following tasks: (1) Present the “Proposal for Improvement” to the company employees. <10 minutes x 3 teams = 30 minutes, (1) + (2)> (2) Upon listening to other students’ presentations on the proposals for improvement, provide inputs for improving each assignment. <20 minutes per team, total 60 minutes, (1) + (2)>
Instructors	. Instructor specialized in environmental management systems and ISO14001 . Instructor specialized in CSR: With an emphasis on ability assessment, and transmission of the assessment results to students in the class
Textbooks	. ISO14001 (JISQ14001) . Original textbook for learning ISO14001 (to be prepared)
Standards for assessment of results	. Leadership: Level of contribution to the teamwork, positive motivation, competence to make counterparts understand . Logicality: Adequacy of the prepared materials, improvement level of the second instructor training . Activeness: Participation in other students’ presentations and constructive criticism . Expressiveness: Efforts to make counterparts understand, level of responses to questions
Note	Instruct preparation for the next classes, “Debate 1 and 2” . Review of all the textbooks, outputs, and related materials . Prior collection of information of the companies and organizations under consideration for proposed themes

Theme	**K) Debate 1** **L) Debate 2**
Objectives	- In Debate 1, students will carry out debates in front of graduate advisors and guests to develop their explaining skills. - In Debate 2, students will debate against a team of one graduate advisor and one guest by theme, in front of external evaluators to help students develop high-level, specialized skills and logicality.
Prior study	(1) Review of all the textbooks, outputs, and related materials (2) Prior collection of information of the companies and organizations under consideration for proposed themes
Abstract	A graduate advisor will pair with a guest to become an “advising pair.” Students will debate with this advising pair concerning specific topics. <10 minutes x 9 students x 2 times [(1) + (2)]> (1) The guest is called upon a company/organization that faces governance-related issues. (2) Undertake confirmation hearing of related facts (3) Hearing of governance-related information (4) Analysis of issues
Instructors	- Instructor specialized in CSR (graduate advisor) ➢ Plays the role of a debate counterpart - A guest from a company - External evaluator
Textbooks	- ISO26000 (English version) - Original textbook (To be created)
Standards for assessment of results	- Information analysis ability - Activeness: Participation in other students’ presentations and constructive criticism (not mere objections) - Logicality: Leading discussion, convincing counterparts - Expressiveness/Ability to have a dialogue: Instead of running away from discussion, make efforts to win counterparts’ understanding as a person with access to information
Note	-

5.15 Conclusion: Sustainable Governance

■ Goal

The basic objectives of Governance for sustainable development are to study fundamental concepts and philosophies necessary for decision making in regard to corporate environmental management and, through case studies, to bring about a “sense of values” for companies to take social responsibility and accountability as well as to conduct corporate management based on social governance.

In the last session, whether the objectives above have been achieved will be verified and confirmed through student reports, debates, etc. Upon completing the class, students will independently bring what they have learned into their development of voluntary efforts.

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (10 minutes)

(2) Presentation of student assignments, question-and-answer session, exchange of opinions (60 minutes)

(3) Conclusion (20 minutes)

Main Points of This Class

- To verify that students have the right cognition and understanding
- To confirm through case studies etc. that students have gained practicality
- To link study results to students’ independent and voluntary efforts

2. Description of the Basic Contents

(1) Introduction (10 minutes)

- One week prior to this class, instructors will tell students to present assignments (A4 sheet, several sheets).

(Examples of assignment)

(A) What are the basic issues of sustainable governance?

(B) What should be one’s attitude from now (immediate action, long-term action)?

(C) Students’ evaluations of subject contents and the way the class progressed, opinions, and students’ self-assessment of understanding of the class.

- Concerning the above topic, instructors will copy each student’s submitted outline and distribute them to all the students in advance. Instructors will advise the specific direction of presenting topics. (If possible, based on the students’ reports, group the students and specify the location of their seating).
- The following paragraph explains the assessment standards for the feedback in (3).

(2) Presentation of student assignments, question-and-answer session, exchange of opinions (60 minutes) – time adjusted depending on the number of people

Each student will be given a couple of minutes to present the content of the assignment. The class will have a question-and-answer and opinion session every 2-3 presentations.

(3) Conclusion, feedback (20 minutes)

Instructors will give feedback to students concerning the contents of their presentations, questions and answers and opinion exchange with an emphasis on the following points:

- If issues are recognized appropriately
- If specific and appropriate suggestions concerning short, medium and long-term actions are provided
- If practical consciousness is developing

This class aims to develop practical environmental leaders who understand and are able to materialize the significance of sustainable governance based on other basic classes. The practicality toward solutions for environmental issues are fostered based on qualifications, including (1) flexible thinking with a broad perspective, (2) accurate contextual awareness, and (3) a consistent ability to take actions when students face specific issues. Therefore, the goal of this class is not the provision of uniform knowledge and solutions but the development of human resources who are capable of appropriately addressing various issues. In particular, developing a capacity to solve new issues in a global corporate society is critical.

3. Keywords in the Basic Contents

Practice, self-assessment, level of understanding

4. Additional Contents

(1) The class may invite a guest, a graduate student, etc. to hear personal experiences and opinions.

【6】 Methods for solutions

1. Educational Goals

Students will learn a process in which companies, administrations and municipalities under environmental constraints discover fundamental problems from a bird's-eye viewpoint, use thinking methods to bring about solutions (the simple question method, the back-casting method, etc.) and create new businesses, policy methods and technology in order to solve environmental issues that these entities face. Students will repeat devising businesses, etc. virtually on their own to gain such process and skills. Also, students will have training in the back-casting thinking method by which they will analyze actual corporate and administration cases in environmental issues, simulate how a decision is made, discover fundamental problems from a bird's-eye perspective and create solutions. Especially, students will develop practical skills to address environmental issues of companies, administrations and municipalities in actual scenarios and seek for solutions.
Sessions will be offered in the following structure:

2. Structure of the Program

1) Introduction: Ballooning Human Activities and Environmental Constraints
Students will recognize that humans face significant risks such as resources, energy, biodiversity, food supplies, water, population, climate changes, etc. and that endless ballooning of human activities has created such risks. Students will learn that it is crucial to bring about solutions that stop and scale down the ballooning while people can have a spiritually-rich life.
2) Environmental Constraints and Issues that Corporations, Administrations and Municipalities Face
Students will review how companies and administrations came to face global environmental issues and learn that those issues are becoming fundamental to companies as well as administrations and municipalities.
3) Approach to Environmental Business
Although the development of eco-technology has progressed, there are many things on which ecological, and environmental awareness of consumers is becoming extremely high; environmental degradation is accelerating. Students will learn the structure of this eco-dilemma, and understand that new businesses to be considered under the constraint of the global environment have to guaranty a spiritually-rich life. Students will learn that a back-casting thinking has a big possibility to achieve such businesses.
4) System of Methods for Creating Solutions
Upon understanding various issues of creating solutions, students will use examples and learn the overview of a solution-creating process of business systems, innovation of technology which is a

restrictive solution, and a mechanism in which green businesses and innovation are promoted by policy solutions.

5) Process for Creating Business Systems

Students will study a series of processes and concepts for creating business systems, including environmental background, problem setting, restrictive factors, success factors, business system building, verification, and roadmap preparation.

6) Identifying Issues from a Bird's Eye Viewpoint (Simple Question Method, Back-casting Method, etc.)

Students will recognize that solutions presuppose “problems.” Students will learn the simple-question and back-casting methods in order to find problems.

7) Restrictive Factors, Success Factors and Meanings/Designing of a Road Map

In regard to business system creation, students will learn methods to extract restrictive factors to solve preset problems and to prepare specific roadmaps to show success factors.

8) Foundation of Research Methods (Questionnaires, Hearing, Data Collection)

Students will study tools for business system creation, including methods for conducting questionnaires, basics of hearing methods, methods for designing questionnaires, and basics of statistical analysis.

9) Example of Creating a Business System (1)

Students will examine successful cases of business systems proposed after the process of business system creation and discuss why they are considered successful.

10) Example of Creating a Business System (2)

Students will examine failed cases of business systems proposed after the process of business system creation and discuss why they are considered failures.

11) Lifestyle Design

In order to transform innovation without constraint into green innovation, students will learn the meaning and processes of a lifestyle design method that applies the back-casting method.

12) Practicing Lifestyle Design

Based on environmental constraint conditions provided, students will have a hands-on experience of a series of lifestyle design processes, including setting social conditions and designing lifestyle to achieve spiritually-rich life. The class will discuss and evaluate the design’s social acceptability.

13) System for Creating Nature Technology

The nature technology creation system is not a traditional technology-oriented method but a lifestyle-oriented one. Students will learn that this system designs spiritually-rich lifestyle within strict environmental constraints using the back-casting method, finds necessary technology from the nature with a perfect cycle and “form” such technology. Students will study differences between the nature

technology creation system and the Industrial Revolution in the UK which succeeded by putting behind their view of nature.

14) Conclusion (1): Environmental Business Assessment (1) (Large Corporations)

Students will gain skills to assess new environmental business cases using the back-casting thinking. In particular, businesses by existing large corporations will be discussed in this class.

15) Conclusion (2): Environmental Business Assessment (2) (NGO/NPO)

Students will gain skills to assess new environmental business cases using the back-casting thinking. In particular, businesses by NGOs/NPOs, etc. will be discussed in this class.

6.1 Introduction: Ballooning Human Activities and Environmental Constraints

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (10 minutes)

(2) What are global environmental issues? (20 minutes)

(3) Ballooning of human activities (20 minutes)

(4) Mega trend of the global environment (30 minutes)

(5) Conclusion (10 minutes)

Main Points of This Class

- To recognize that humans face significant risks such as resources, energy, biodiversity, food supplies, water, population, climate changes, etc., excluding social scientific issues and that endless ballooning of human activities has created such risks.
- To learn at the same time that it is crucial to bring about solutions that stop and scale down the ballooning while people can have a spiritually-rich life.

2. Description of the Basic Contents

(1) Introduction (10 minutes)

At the Earth Summit in 1992, developed countries promised the creation of a sustainable society and have made efforts. However, the global environment degradation is accelerating. Students will discuss why it is accelerating and revisit what the global environment problems are.

(2) What are global environmental issues? (20 minutes)

Among several angles to examine global environmental issues, students will learn the issues based on expected time duration for human species to be able to survive on earth from a bird's-eye viewpoint.

(3) Ballooning of human activities (20 minutes)

It can be said that global environmental issues have created risks that originally were not involving dangers – resource and energy depletion, biodiversity degradation, imbalance of food and water distribution, rapid increase of population, and climate changes such as global warming. Students will learn that these issues unmistakably derive from the ballooning human activities and examine causes of such ballooning.

(4) Mega trend of the global environment (30 minutes)

Students will learn the current status of significant risks concerning global environmental issues, including resource and energy depletion, biodiversity degradation, imbalance of food and water distribution, rapid increase of population, and climate change such as global warming.

(5) Conclusion (10 minutes)

Students will learn that ballooning of human activities has created global environmental issues and that it is crucial to bring about solutions that stop and scale down the ballooning while people can have a spiritually-rich life.

3. Keywords in the Basic Contents

(1) Degradation of global environment

(2) Risks and issues

(3) Sustainable society, recycling society, structure of human greed

(4) Resource and energy depletion, biodiversity degradation, issues of water and food distribution, rapid population increase, climate change such as global warming

6.2 Environmental Constraints and Issues that Corporations, Administrations and Municipalities Face

■ Outline of Education Contents

1. Basic Contents

(1) Introduction (5 minutes)

(2) Influence of the global environment's mega trend on companies (50 minutes)

(3) Influence of the global environment's mega trend on administrations and municipalities (30 minutes)

(4) Conclusion (5 minutes)

Main Points of This Class

- To review how companies and administrations came to face global environmental issues and learn the position of global environmental issues in corporations and administrations

- To learn that those issues are becoming fundamental to companies as well as to administrations and municipalities

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will review how companies and administrations came to face global environmental issues and learn the position of global environmental issues in corporations and administrations

(2) Influence of the global environment's mega trend on companies (50 minutes)

Students will use the triple bottom line as a study material and historical views to study the essence of what it is to incorporate the environmental aspects into management, that is, differences of a business system based on the environment and that of the period when managements was based on responses to pollution.

(3) Influence of the global environment's mega trend on administrations and municipalities (30 minutes)

Based on a historic viewpoint, students will revisit policies in which administrations and municipalities had to be involved since the era of pollution. Students will learn how administrations and municipalities should be connected to a society concerning the global environment.

(4) Conclusion (5 minutes)

Students will learn that global environmental issues are becoming fundamental to companies as well as administrations and municipalities.

3. Keywords in the Basic Contents

(1) From pollution to global environmental issues, diversity of technology

(2) Business that stands on the environment as its foundation, to set a new track to change a business category, BOP strategies

(3) To acknowledge diversity, a small cycle makes a big cycle, strategies originated from Japan

6.3 Approach to Environmental Business

■ Outline of Education Contents

1. Basic Contents

(1) Introduction (5 minutes)

(2) Eco-dilemma issues (50 minutes)

(3) Solutions called environmental businesses (30 minutes)

(4) Conclusion (5 minutes)

Main Points of This Class

Although the development of eco-technology has progressed, there are many things on which ecological, and environmental awareness of consumers is becoming extremely high, environmental degradation is accelerating. Students will learn the structure of this eco-dilemma, and understand that new businesses to be considered within the constraints of the global environment have to guarantee a spiritually-rich life. Students will learn that a back-casting thinking has a big possibility to achieve such businesses.

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Development of eco-technology has progressed; it is not too much to say that many things are becoming ecological; the environmental awareness of consumers are extremely high; however, environmental degradation is accelerating – this is called eco-dilemma. Students will study the structure of the eco-dilemma and understand that if there is no significant change of direction, environmental degradation has a possibility to accelerate further.

(2) Eco-dilemma issues (50 minutes)

Students will study the structure of eco-dilemma in which environmental degradation accelerates despite the progress of eco-technology development and the improvement of consumers' environmental awareness. Students will examine factors to stop and scale down the ballooning of human activities upon guaranteeing the essence of spiritually-rich life, which plays an important role in business perspectives.

(3) Solutions called environmental businesses (30 minutes)

Lifestyle, which is the smallest factor of human activities, cannot be changed drastically by a forecasting thinking and thus it is difficult to stop and scale down the ballooning. By using several specific examples of lifestyle found using the back-casting method and technology necessary for such lifestyle, students will learn forms of businesses that can propose spiritually-rich life within environmental constraints.

(4) Conclusion (5 minutes)

New businesses to be considered within the constraints of the global environment have to guarantee a spiritually-rich life, and students will recognize that such life can be achieved by transforming their thinking methods.

3. Keywords in the Basic Contents

(2) Structure of eco-dilemma, eco-technology is an excuse for consumption, eco-point, eco-car tax reduction, toll-free highway, irreversibility of lifestyle values

(3) Forecasting, back-casting, uniformed technology, to live with spiritual richness, eco-dilemma to be accelerated if no measure is taken, new period when technology is responsible for lifestyle

6.4 System of Methods for Creating Solutions

■ **Outline of Educational Contents**

1. Basic Contents

(1) Introduction (5 minutes)

(2) Business solutions (30 minutes)

(3) Technology solutions (30 minutes)

(4) Political measure solutions (20 minutes)

(5) Conclusion (5 minutes)

Main Points of This Class

- To understand issues surrounding the creation of solutions (partially addressing issues; assuming the future is an extension of today; thinking negatively; thinking only of environmental load reduction)
- To observe a business system and learn the overview of a solution-creating process by using examples
- To observe technology and, using examples, learn the overview of innovation involving constraints
- To observe a political measure and learn a mechanism in which green businesses and innovation are promoted, by using examples
- To understand the importance of innovation of comprehensive optimization involving constraints
-

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Based on cases in which several consumer environmental issues were solved, students will learn a process of solving such issues. Also, students will discuss difficulty and causes of difficulty in proposing new solutions (partially addressing issues; assuming the future is an extension of today; thinking negatively; thinking only of environmental load reduction).

(2) Business solutions (30 minutes)

Using business cases in which ESCO and recycling enterprises lead to environmental load reduction, students will learn the mechanism that creates a win-win situation for stakeholders and environmental load reduction.

(3) Technology solutions (30 minutes)

Using technology cases in which environmentally-conscious products (air conditioners, refrigerators, etc.) and technologies (lithium ion batteries, solar power generation, etc.) lead to environmental load reduction, students will learn the mechanisms that include users' lifestyles and contribute to reduction.
(4) Political measure solutions (20 minutes)
Using cases in which environmental political measures promote or inhibit green innovation, students will learn the mechanisms that result in comprehensive solutions including political measures to contribute to environmental load reduction.
(5) Conclusion (5 minutes)
The class will revisit the needs for innovation of comprehensive optimization involving constraints in order to stop the ballooning of human activities.

3. Keywords in the Basic Contents

(1) Partial optimization, comprehensive optimization, constraints of solution creation
(2) Environmental load reduction, increasing added value, expansion of stakeholders, business system creation method
(3) Range of influence by technology, environmental innovation process, sustainable design, social innovation
(4) Political measures for promoting environmental innovation, environmental regulations and innovation
(5) Blocking the ballooning of human activities, comprehensive optimization

6.5 Process for Creating Business Systems

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (5 minutes)
(2) Business system creation process (40 minutes)
(3) Back-casting method (20 minutes)
(4) Value increase and environmental load reduction (20 minutes)
(5) Conclusion (5 minutes)

Main Points of This Class

- To understand a series of processes and concepts for creating business systems, including environmental background, problem setting, restrictive factors, success factors, business system building, verification, and roadmap preparation

- To understand why it is important to use the back-casting method for problem setting and business building and what would happen when the back-casting method is not used
- To learn the importance of trade-off relationships hidden behind environmental issues by using the simple-question method to search problems
- To know that it is important to consistently look at things from a bird's eye viewpoint in the process of business system creation
-

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will briefly review the contents of previous classes, including that the ballooning of human activities began to have influence on human activities in the form of environmental constraints, that some issues are now part of corporations, administrations and municipalities creating a mega trend of the global environment, that what can be done to solve environmental issues and approaches in which environmental businesses and political measures will solve such issues, and methods for solution creation.

(2) Business system creation process (40 minutes)

Students will understand a series of processes and concepts for creating business systems, including environmental background, problem setting, restrictive factors, success factors, business system building, verification, and roadmap preparation. In order to understand the environmental background, understanding the mega trend of the broad global environment from a bird's eye viewpoint is important. And in order to lead out new environmental businesses and environmental political measures, it is necessary to understand matters based on the back-casting, find trade-off relationships hidden behind environmental issues using the simple-question method, and clarify problem-setting.

(3) Back-casting method (20 minutes)

When searching for solutions, what always presents barriers is the present, and also a partial, narrow sight that constrain thought processes. In order to create solutions, a process is necessary so that it avoids thought constraints, builds a business system with a free imagination, and then examines constraints and success factors. When the forecasting method depicts a future based on the present, the back-casting method presents the present based on future environmental constraints and then depicts the future. Students will reconfirm that this back-casting thinking and a bird's eye viewpoint are important in the process of business system creation.

(4) Value increase and environmental load reduction (20 minutes)

A business system that resolves environmental issues is a combination of simple two factors: A factor that adds values and another that reduces environmental load reduction. These two factors compose the origins of profits in a business. Through existing environmental business cases, the

class will re-define the profit-creating mechanism from the perspectives of increasing added value and environmental load reduction.

(5) Conclusion (5 minutes)

Instructors will encourage students to become interested in existing businesses. Students will develop the habit to daily consider from a company president's perspective how a business should be rebuilt.

3. Keywords in the Basic Contents

(1) Ballooning of human activities, environmental constraints, mega trend in the global environment (population, resources, energy, water, food, biodiversity and global warming), environmental issues

(2) Environmental background, problem setting, restrictive factor, success factor, business system building, verification, roadmap preparation, bird's eye viewpoint, environmental business, environmental political measure, back-casting method, simple-question method, trade off, clarification of issues

(3) Back-casting method, forecasting method, problem finding, barrier, solution method

(4) Benefit sharing, win-win relationship, environmental load and expense, imbalance of increasing added value and environmental load reduction, stakeholder

(5) Self-contradiction, bird's eye viewpoint, back-casting

4. Additional Contents

Although this class is designed with an emphasis on environmental business creation, depending on students, it is effective to add environmental policy and technology creation.

(1) Method for environmental policy planning

Along with the understanding of basic knowledge and concepts within political measures, students will study the basic political measure tools. Students will then simulate system design and review in a practical manner to understand a method for environmental policy planning.

(2) Practices of technology creation methods

Nature technology aims to propose completely new product making and way of living that drastically reduces load on earth by observing nature from a scientific viewpoint and redesigning things necessary for humans. Students will understand the concept of nature technology, utilize the nature technology database and gain skills to set a direction for product development.

5. Additional Keywords

(1) Necessity of political measures, social acceptance, social efficiency, feasibility, monitoring possibility, long-term viewpoint

(2) Lifestyle design, function classification, things and matters, hard-to-give-up conveniences, environmental solution, nature technology database, lifestyle database

6.6 Identifying Issues from a Bird's Eye Viewpoint (the simple-question method, the back-casting method, etc.)

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (5 minutes)

(2) What problems are (20 minutes)

(3) Simple-question method (30 minutes)

(4) Back-casting method (30 minutes)

(5) Conclusion (5 minutes)

Main Points of This Class

- To understand that a solution has a “problem” to solve
- To learn that a wrong problem setting will prevent a problem from reaching a solution
- To understand the simple-question method and the back-casting method for problem finding
-

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will learn that a starting point of creating a solution lies in problem setting based on failed examples of solution creation when problem setting was not appropriate.

(2) What problems are (20 minutes)

By using multiple examples, students will understand the difference between so-called environmental problems and problems set for solution creation.

(3) Simple-question method (30 minutes)

Answering a simple question provides a lead to discover “invisible” constraints and trade-offs or an axis that connects the trade-offs (relationship between trade-offs). Therefore, it is effective to ask questions concerning “logicality” and “validity” of a phenomenon. This process is called a simple-question. Students will have training in problem setting using the simple-question method.

(4) Back-casting method (30 minutes)

Given the future’s severe environmental constraints, students will learn the back-casting method and its processes to review the present from a future social status, find an issue that does not allow the future to be an extension of the present, study methods to solve such an issue, and depict a lifestyle of the future.

(5) Conclusion (5 minutes)

Students will confirm that the simple-question method and the back-casting method can be achieved through day-to-day thought training.

3. Keywords in the Basic Contents

(1) Problem setting, general environmental problems, problems that corporations and administrations face, problem setting for solution creation

(2) Clear problem setting, unclear problem setting, position and issues

(3) Simple question, validity, logicality, hidden tradeoff relationship

(4) Environmental constraints, social status, finding issues, solution method, lifestyle design

(5) Effectiveness of training

6.7 Constraint Factors, Success Factors and Meanings/Designing of a Road Map

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (5 minutes)

(2) Leading out restrictive factors (30 minutes)

(3) Narrowing success factors (30 minutes)

(4) How to design a roadmap (20 minutes)

(5) Conclusion (5 minutes)

Main Points of This Class

- To understand a method to lead out restrictive factors that solve set problems in business system creation
- To understand a method to narrow down which factors are important among restrictive factors and which one is the contributing factor for success
- To learn how to draw a specific roadmap that shows success factors

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will propose a new business system, discuss why the system did not exist before, and learn the concept of restrictive factors.

(2) Leading out restrictive factors (30 minutes)

By using several examples, students will learn the relationship between set problems and restrictive factors. Students will understand a method to extract restrictive factors by discussing why the

particular problem is not currently solved. Similarly, by examining why a proposed new business system has not existed, students will understand a method to extract restrictive factors.

(3) Narrowing success factors (30 minutes)

Students will learn a process to narrow down a key factor for success from extracted restrictive factors by using several cases.

(4) How to design a roadmap (20 minutes)

Students will learn how to prepare a roadmap that indicates success factors by observing examples of roadmaps.

(5) Conclusion (5 minutes)

Students will review a series of processes, including problem setting based on the simple-question and back-casting methods, extracting restrictive factors, narrowing down success factors and preparing a roadmap.

3. Keywords in the Basic Contents

(1) Cause and effect, non-existent factor

(2) Set problem and its restrictive factors, bird's eye viewpoint

(3) Narrowing down restrictive factors, key factor for success (KFS), logicality

(4) Roadmap preparation process for time and restrictive axes and business system verification

(5) Needs for business system creation process and verification process

6.8 Foundation of Research Methods (Questionnaire, Interview, Data Collection)

■ Outline of Environmental Contents

1. Basic Contents

(1) Introduction (5 minutes)

(2) Foundation for research methods (20 minutes)

(3) Questionnaire design (30 minutes)

(4) Interview methods (30 minutes)

(5) Conclusion (5 minutes)

Main Points of This Class

- To understand tools for business system creation
- To learn the foundation of questionnaires and interview methods to handle the resulting data
- To understand the questionnaire design methods and the foundation of statistical analysis
- To gain knowledge to elicit information in an interview, learn note-writing skills, and learn how to handle confidential information

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will observe multiple examples of business system creation and learn tools for problem setting, survey needs and test hypotheses.

(2) Foundation for research methods (20 minutes)

Students will learn the backgrounds of questionnaires and interview methods to handle data. They will also study statistical analysis.

(3) Questionnaire design (30 minutes)

Students will study a questionnaire design process using a simple and specific example and gain knowledge of designing effective questionnaires, including methods for designing questions and options.

(4) Interview methods (30 minutes)

Students will learn the importance of an interview, the actual extraction methods of interviewees, methods for requesting an interview, knowledge of conducting an interview, interview note - writing skills, and how to handle information obtained from an interview.

(5) Conclusion (5 minutes)

Students will review how to observe on-site, methods for collecting information on-site, and the handling of data.

3. Keywords in the Basic Contents

(1) Survey for problem setting, survey on needs, hypothesis testing, statistical analysis, questionnaire, and interview

(2) Correlation, multiple regression analysis, significant difference, interview note, development of topics through discussion, facts and interpretations

(3) Paper questionnaire, web questionnaire, question item design, option design, parent population, selecting samples

(4) Method to select interviewees, methods for inquiry, practical knowledge, note-writing method, interview time management, limitation of an interview, politeness

(5) Things that are only visible on site, things that are not visible on site

6.9 Example of Creating a Business System (1)

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (5 minutes)

(2) Case of successful business system creation (60 minutes)

(3) Assessment of business system creation cases (20 minutes)

(4) Conclusion (5 minutes)

Main Points of This Class

- To examine a successful case of business systems proposed by following the process of business system creation and discuss why it is considered successful
- To assess a case of business system creation by students and learn assessment perspectives

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will review the flow of the business system creation process.

(2) Case of successful business system creation (60 minutes)

Students will examine a successful case of business system creation provided by instructors.

Students will train themselves to interpret why the case is considered to be desirable.

(3) Assessment of a business system creation case (20 minutes)

Students will examine another desirable case of business system creation provided by instructors.

Students will assess and discover why the case is considered to be desirable. Students will learn the assessment viewpoints.

(4) Conclusion (5 minutes)

Students will present specific assessment examples to prove why the business system creation cases shown in (3) are considered to be desirable.

3. Keywords in the Basic Contents

(1) Process of business system creation, problem setting, restrictive factor, success factor, business system building, roadmap

(2) Size and effect, novelty and innovation, continuousness, inducibility and empathy, regionality and sociality

(3) Originality, clarity of an issue, practicality, fact-base, balance

(4) Minimum condition to be met, requirement for a desirable environmental business system

6.10 Example of Creating a Business System (2)

■ **Outline of Educational Contents**

1. Basic Contents

(1) Introduction (5 minutes)

(2) Case of failed business system creation (60 minutes)

(3) Assessment of a business system creation case (20 minutes)

(4) Conclusion (5 minutes)

Main Points of This Class

- To examine a failed case of a business system proposed after following the process of business system creation and discuss why it is considered a failure
- To assess a case of business system creation by students and learn assessment perspectives

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will review the flow of the business system creation process.

(2) Case of failed business system creation (60 minutes)

Students will examine an undesirable case of business system creation provided by instructors.

Students will train themselves to interpret why the case is considered to be undesirable.

(3) Assessment of a business system creation case (20 minutes)

Students will examine another undesirable case of business system creation provided by instructors.

Students will assess and discover why the case is considered to be undesirable. Students will learn the assessment viewpoints.

(4) Conclusion (5 minutes)

Students will present specific assessment examples to prove why the business system creation cases shown in (3) are considered to be undesirable.

3. Keywords in the Basic Contents

(1) Process of business system creation, problem setting, restrictive factor, success factor, business system building, and roadmap

(2) Size and effect, novelty and innovation, continuity, inducibility and empathy, regionality and sociality

(3) Originality, clarity of an issue, practicality, fact-base, balance

(4) Conditions that the undesirable environmental business system does not meet

6.11 Lifestyle Design

■ **Outline of Educational Contents**

1. Basic Contents

(1) Introduction (5 minutes)

(2) What is lifestyle design? (30 minutes)

(3) Process of lifestyle design (30 minutes)

(4) Example of lifestyle design (20 minutes)

(5) Conclusion (5 minutes)

Main Points of This Class

- To understand a method for transforming unrestricted innovation into green innovation
- To learn the meaning and processes of a lifestyle design method that applies the back-casting method
- To observe examples of innovation used by lifestyle design companies and administrations and understand their differences from conventional innovation

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will learn the actual situation of current unrestricted innovation and examine why “lifecycle” has to be considered.

(2) What is lifestyle design? (30 minutes)

Students will learn the significance and the whole structure of the lifestyle design method in order to move unrestricted innovation to innovation within environmental constraints.

(3) Process of lifestyle design (30 minutes)

Students will set environmental constraints and social conditions and use the back-casting method to understand the process of the lifestyle design method for realizing spiritually-rich low environmental load life, and how to apply its outcome. Students will also study lifestyle requirements preferred by people.

(4) Example of lifestyle design (20 minutes)

Students will compare and observe specific desirable and undesirable cases and experience the assessment method for such examples.

(5) Conclusion (5 minutes)

Students will revisit and observe unrestricted innovation and why improvement is necessary.

3. Keywords in the Basic Contents

(1) Selection, broader concept of products and services, from suggestion of functions to lifestyle suggestion

(2) Innovation promotion method within constraints, environmental constraint requirements, social conditions, back-casting method, low environmental load, spiritually-rich life, lifestyle

(3) Environmental constraint setting, meaning of discussion on social conditions, focus of back-casting, skill improvement by training, difference between a solution and a lifestyle, novelty, social acceptability, natural factor, self-growth factor, integrated social factor, convenience factor, pleasure factor

(4) Lifestyle picture scroll at the National Science Museum, lifestyle in 2030, shared battery, dragonfly windmill, comfort to follow the natural rhythm

(5) Partial optimization and comprehensive optimization, lifestyle selection by environmental constraints

6.12 Practicing Lifestyle Design

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (5 minutes)

(2) Setting environmental constraints and social conditions (40 minutes)

(3) Lifestyle design (30 minutes)

(4) Lifestyle design assessment (10 minutes)

(5) Conclusion (5 minutes)

Main Points of This Class

- To have students experience a series of lifestyle design processes
- To gain back-casting skills
- To understand the importance of lifestyle design

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will review the flow of the lifestyle design process.

(2) Setting environmental constraints and social conditions (40 minutes)

Students will imagine or discuss social conditions based on given environmental constraints.

(3) Lifestyle design (30 minutes)

Under the social conditions set in (2), students will design what they like to realize in the future.

(4) Lifestyle design assessment (10 minutes)

Students will observe lifestyle design examples by other students, or examine other examples that have been prepared, discuss and assess the social acceptability of such lifestyle.

(5) Conclusion (5 minutes)

Students will review the importance of the back-casting method and revisiting lifestyle.

3. Keywords of the Basic Contents

(1) Environmental constraint, social condition, back-casting, barrier, problem-solving methods, lifestyle design, social acceptability

(2) Quantitative data, portrait of social conditions (not solutions), direction of social conditions, concreteness of social conditions, true meaning of social condition discussion

(3) Back-casting skills, design skills

(4) Social acceptability, applicability, inducibility effects

(5) Importance of back-casting and lifestyle

6.13 System for Creating Nature Technology

■ **Outline of Educational Contents**

1. Basic Contents

(1) Introduction (5 minutes)

(2) What is a system for creating nature technology? (30 minutes)

(3) Method for utilizing a database (20 minutes)

(4) Natural technology innovation case (30 minutes)

(5) Conclusion (5 minutes)

Main Points of This Class

Creation of technology must be lifestyle-oriented; and creation of technology without breaking away from nature is a challenge to a big transformation similar to an environmental industrial revolution. The nature technology is an example of such a challenge. Instructors will present specific development examples so that students understand the possibility of new value creation.

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will learn that creation of technology must be lifestyle-oriented and such creation without breaking away from nature is a challenge to a big transformation similar to an environmental industrial revolution.

(2) What is a system for creating nature technology? (30 minutes)
The nature technology creation system is not a traditional technology-oriented method but a lifestyle-oriented one. Students will learn that this system designs a spiritually-rich lifestyle within strict environmental constraints using the back-casting method, finds necessary technology from nature with a perfect cycle that "forms" such technology. Students will study differences between the nature technology creation system and the Industrial Revolution in the UK which succeeded by setting aside their consideration of nature.
(3) Method for utilizing a database (20 minutes)
In order to narrow down technology from lifestyle, use of the nature technology database is efficient. In this topic, students will learn how to use the database to study a specific example in technology creation.
(4) Natural technology innovation case (30 minutes)
Instructors will introduce examples of technologies that have emerged from the nature technology creation system, or under consideration.
(5) Conclusion (5 minutes)

3. Keywords in the Basic Contents

(1) To consider a spiritually-rich lifestyle within environmental constraints, back-casting, the UK's Industrial Revolution was a break-away from nature, Japan's industrial revolution was 100 years prior to the UK's, multitudinous gods, all beings – mountains, rivers, grass, trees, land, etc. – possess Buddha nature
(2) To extract technology from lifestyle, nature technology database
(3) No-electricity air conditioner modeled after soil, clean surface modeled after a snail, no-water tub that modeled after foam, a home farm based on microbial biodiversity

6.14 Conclusion (1): Environmental Business Assessment (1) (Large Corporations)

■ Outline of Educational Contents

1. Basic Contents

(1) Introduction (5 minutes)
(2) Business assessment method based on back-casting thinking (20 minutes)
(3) Assessment of an existing environmental business (60 minutes)
(4) Conclusion (5 minutes)

Main Points of This Class

- To gain skills for assessing new environmental business cases using back-casting thinking.
- In particular, businesses as existing large corporations will be discussed in this class.

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will observe and learn several cases of environmental businesses.

(2) Business assessment method based on back-casting thinking (20 minutes)

Based on existing provided environmental business, students will learn the perspective of assessing business by using back-casting thinking.

(3) Assessment of an existing environmental business (60 minutes)

In regard to the provided existing environmental business, each student will consider with back-casting thinking if the business is competitive under severe environmental constraints and is also able to shift its lifestyle to result in a low environmental load.

(4) Conclusion (5 minutes)

Instructors will introduce sample answers concerning how the existing environmental business is assessed, compare the sample answers with students' assessments to learn the difference.

3. Keywords in the Basic Contents

(1) New environmental business expectations, difference with the existing business

(2) Lifestyle, adequacy of focused environmental issues, a solution is lifestyle, factors causing ups/downs of environmental load

(3) Lifestyle suggestion, forecasting, today's extension, spiritual richness, social acceptability

(4) Lifestyle perspective, back-casting non-existence

6.15 Conclusion (2): Environmental Business Assessment (2) (NGO/NPO)

■Outline of Educational Contents

1. Basic Contents

(1) Introduction (5 minutes)

(2) Business assessment method based on back-casting thinking (20 minutes)

(3) Assessment of existing environmental business (60 minutes)

(4) Conclusion (5 minutes)

Main Points of This Class

- To gain skills for assessing new environmental business cases using back-casting thinking.

- In particular, businesses by NGOs/NPOs, etc. will be discussed.

2. Description of the Basic Contents

(1) Introduction (5 minutes)

Students will examine and learn several cases of environmental business.

(2) Business assessment method based on back-casting thinking (20 minutes)

Based on existing environmental business, students will learn the perspective of assessing business by back-casting thinking.

(3) Assessment of existing environmental business (60 minutes)

In regard to the provided existing environmental business, each student will assess using back-casting thinking whether the business is competitive under severe environmental constraints and also able to shift its lifestyle to result in a low environmental load.

(4) Conclusion (5 minutes)

Instructors will introduce sample answers concerning how the existing environmental business has been assessed, compare the sample answers with students' assessments to learn the difference.

3. Keywords in the Basic Contents

(1) New environmental business expectation, difference with the existing business

(2) Lifestyle, adequacy of focused environmental issues, a solution is lifestyle, factors causing increase and decrease of environmental load

(3) Lifestyle suggestion, forecasting, today's extension, spiritual richness, social acceptability

(4) Lifestyle perspective, back-casting non-existence

Material 1 The Situation of Japanese Corporations' Environmentally-Conscious Management

The MOEJ annually conducts “Environment-Friendly Company Survey” in order to establish environmentally-conscious activities in Japanese corporations, promote efforts for environmental conservation effectively, grasp and assess the actual state correctly and continuously, and spread the results. According to the survey result in 2009, the environmental management situations of Japanese corporations are as follows[5].

From these findings, it can be said that most major Japanese corporations practice efforts such as environmental management policy formulation, environmental management system establishment, and the practice of environmental communication, etc. and that these are established as environmentally-conscious management. It is considered significant to comprehend these as basic factors for environmentally-conscious management practices.

(1) Efforts toward environmental solutions and ideal corporate activities

Regarding efforts for environmental solutions and ideal corporate activities, the corporations etc. that answered “One of the social responsibilities of corporations (including corporate social responsibility (CSR), social contributions)” were the highest, 81%. The answers “Business Opportunity,” “Clearing laws and regulations,” “Important strategy that determines business performance,” “Irrelevant” were less than 10% (Figure 11).

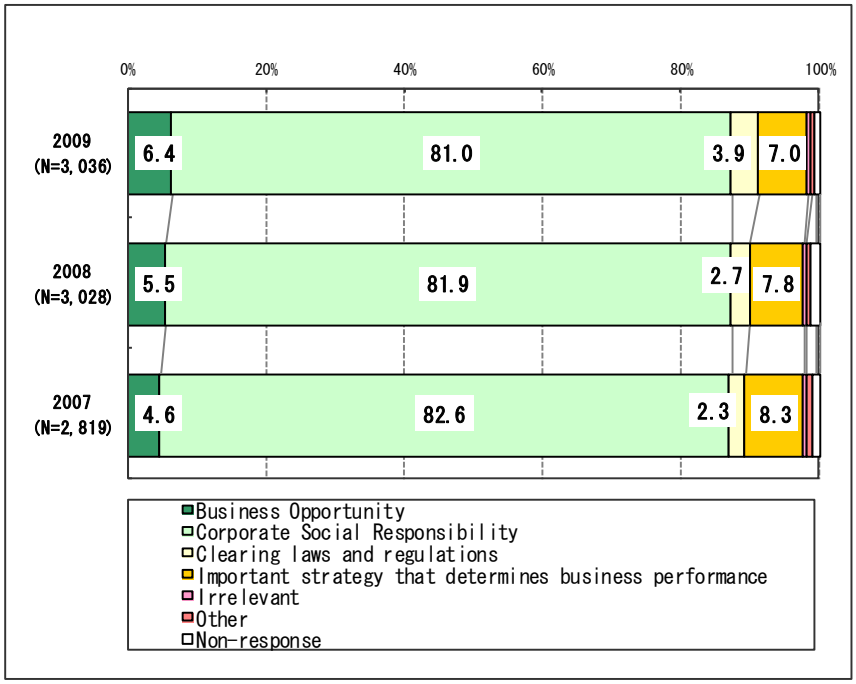

Figure 11: Efforts toward environmental solutions and ideal corporate activities

[5]The target of the survey was the 2,415 corporations listed on the 1st or 2nd part of each stock exchange in Tokyo, Osaka, Nagoya, and 4,282 unlisted corporations with more than 500 employees, for a total of 6,697 corporations. The effective recovery rate was 45.3 %.

(2) Environmental management policy formulation

Regarding environmental management policy formulation, the answers “Formulated” are more than 75.1% of the total (Figure 12).

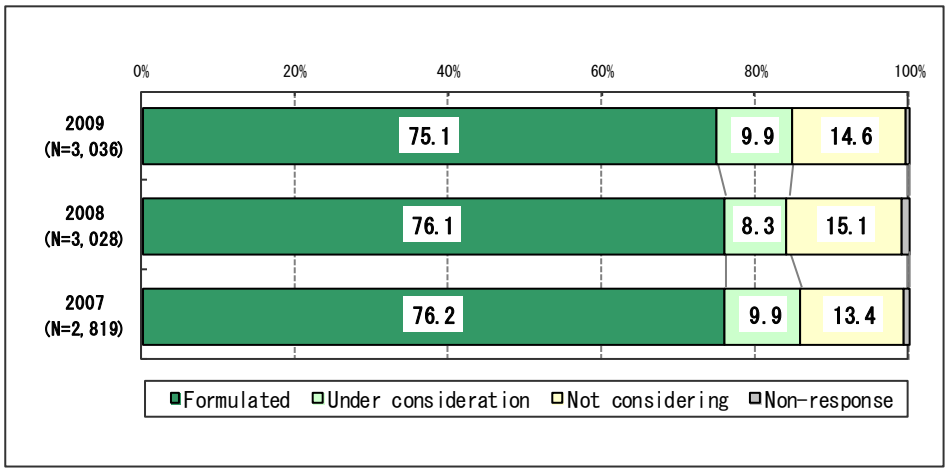

Figure 12: Environmental management policy formulation

(3) ISO14001 certification acquisition state

Regarding ISO14001 which is an international environmental management system standard, the rate of companies that answered “Acquired the certification (including certification only for a part of the offices)” was 77.9% in the listed companies, and 54.6% in the unlisted companies (Figure 13).

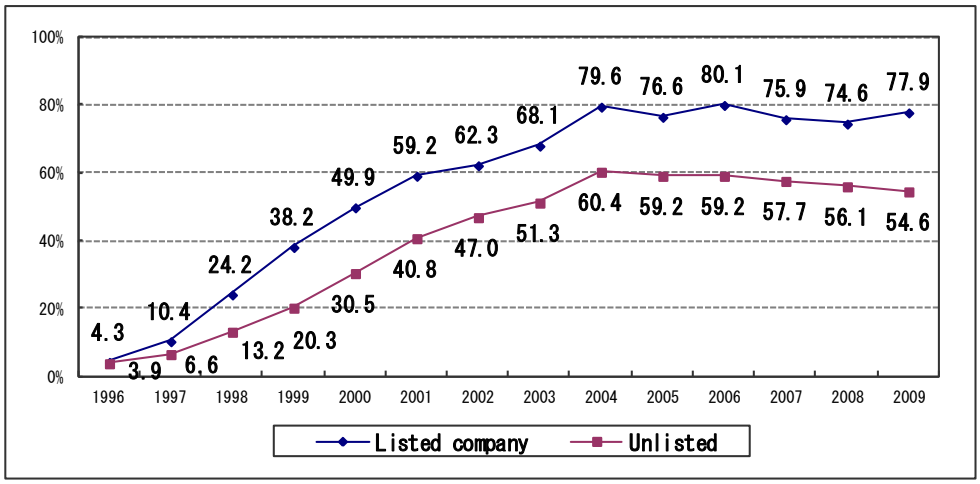

Figure 13: ISO14001 certification acquisition state

(4) The situation of directions for subsidiay regarding environmentally-conscious efforts

Regarding the directions or requests for environmentally-conscious efforts that apply to the company's environmental policy, excluding 2,253 companies that answered "No subsidy," The rate of the corporations that answered "Implemented" or "Implemented only for key susidiary companies" was 64.6%, which is more than half of the total. While "Under consideration" was 12.5%, "Not planning to implement" corporations were 22.0% (Figure 14).

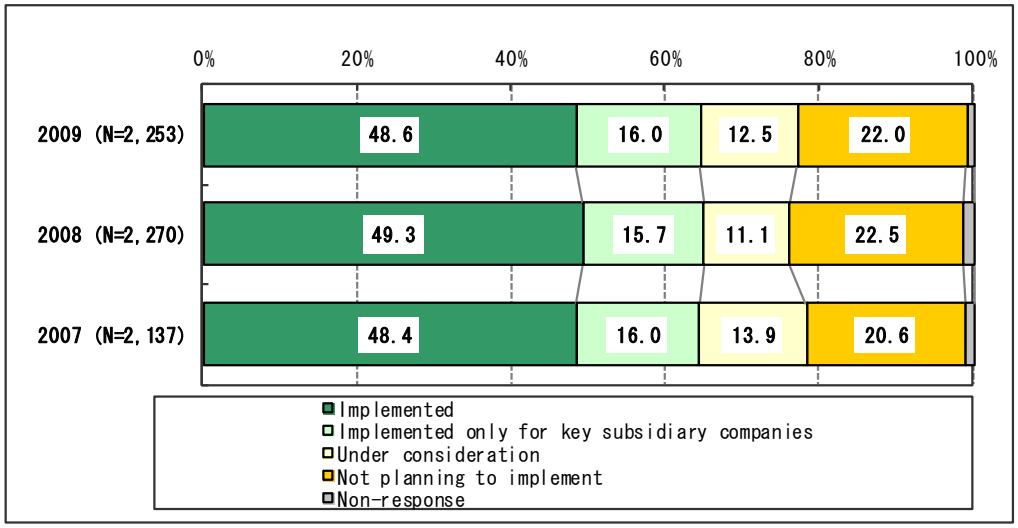

Figure 14: The situation of directions for subsidiary regarding environmentally-conscious efforts

(5) The situation of efforts regarding green purchasing

Regarding green purchasing, those who answered "Making selections upon preparing purchase guidelines" were 27.0%, "Making selections based on purchase prepared by industry groups" were 8.2%, "No purchase guidelines but considerations made upon purchasing" were 38.9%, and more than 70% corporations were purchasing environmentally-conscious materials (Figure 15).

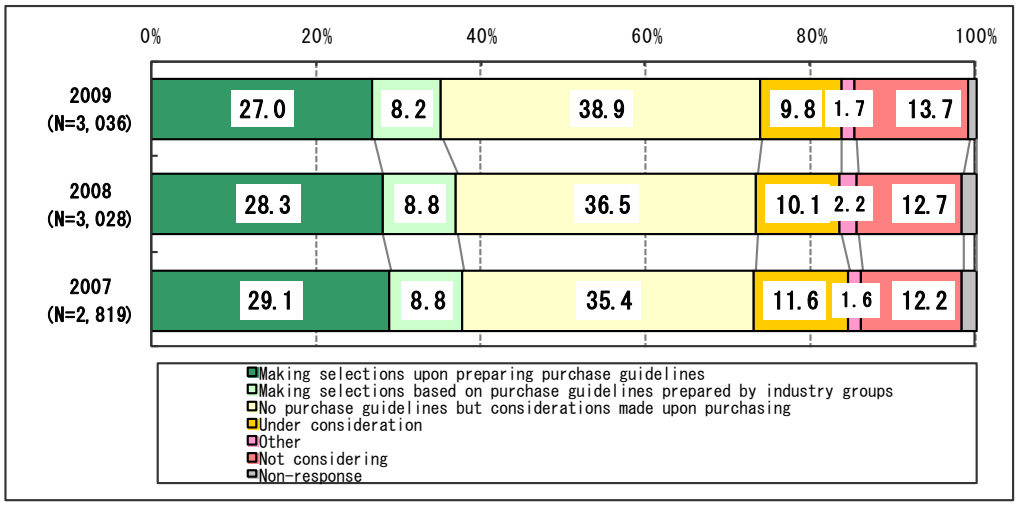

Figure 15: The situation of efforts regarding green purchasing

(6) The change in the situation of environmental accounting adoption

Regarding the situation of environmental accounting adoption, the corporations that answered “Has been applied” were 25.4%, which declined from the last year. Further, while the answers “Under consideration” were 9.1%, the corporations that answered “Not considering” were more than half of the total. In addition, approximately 10% of corporations answered “No knowledge regarding environmental accounting itself” (Figure 16).

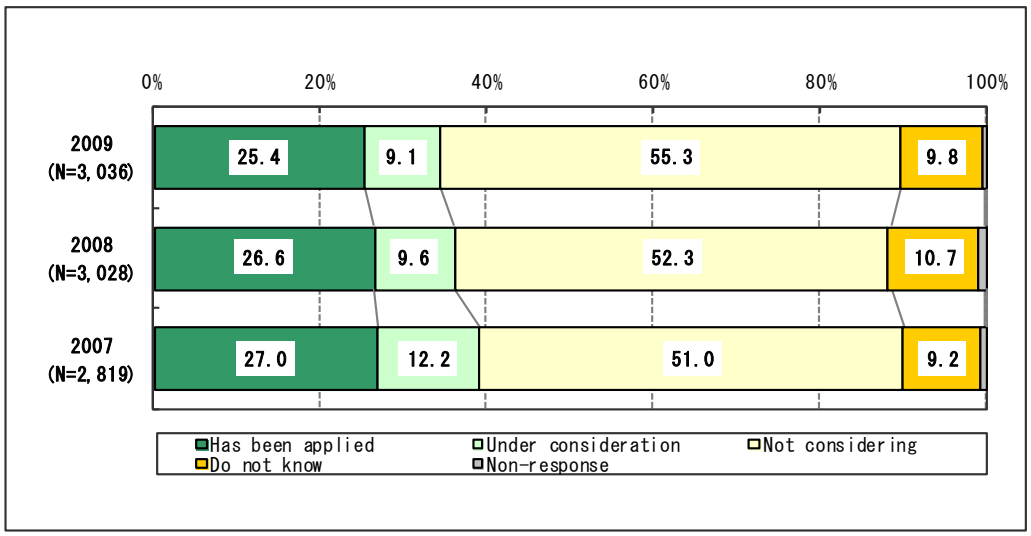

Figure 16: The situation of environmental accounting adoption

(7) Disclosure of information such as environmental data and efforts

Regarding disclosure of information such as environmental data and efforts, nearly half of the corporations, 50.3%, answered “Disclosing to the public.” On the other hand, more than 40% of corporations answered “Not disclosing.” In addition, the corporations that answered “Partly disclosing to the public” are 7.7% (Figure 17).

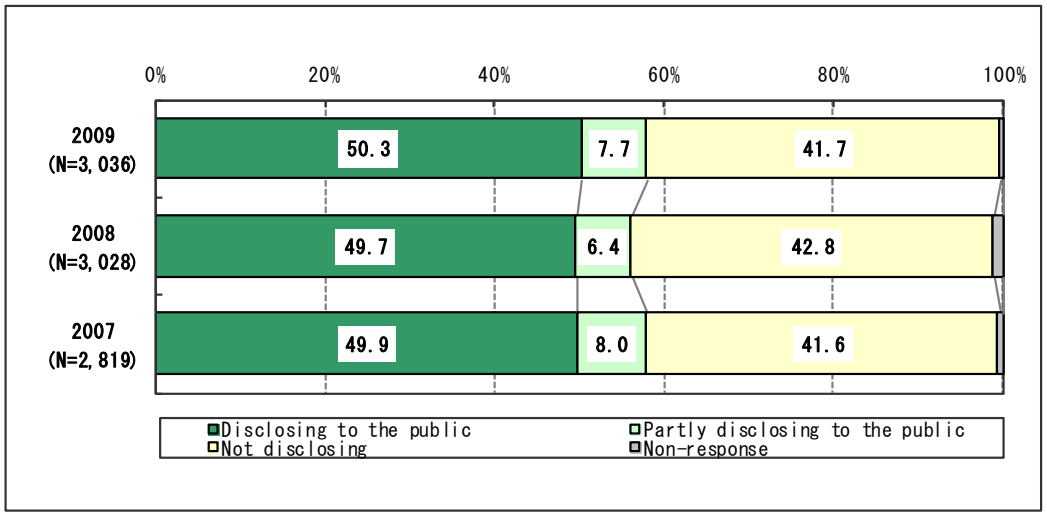

Figure 17: The situation of environmental data disclosure

(8) The state of creating and releasing an environmental report

Regarding creating and releasing an environmental report**,** the corporations that answered “Creating and releasing the environmental report (including a part of CSR report, sustainability report, etc.)” were 35.9%, which dropped approximately 2.4% from the last year (Figure 18).

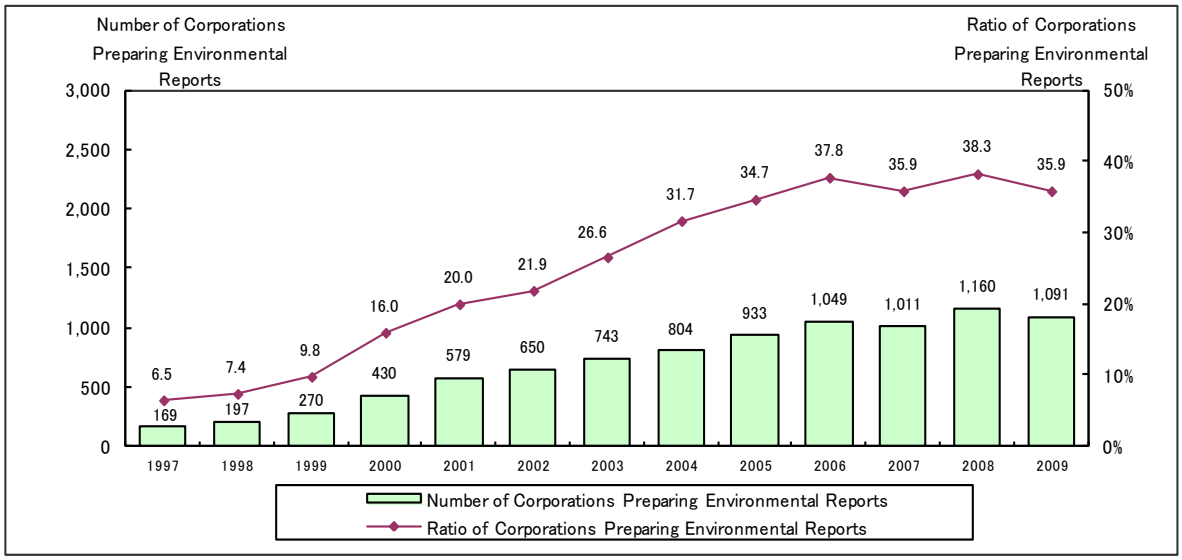

Figure 18: The change in the numbers of corporations that create environmental reports

(9) The position of environmental businesses

Regarding environmental businesses, the corporations that answered “Already developed business or are providing the service etc.” are 41.6%, which is the largest rate. Including “Planning hereafter” and “Would like to make efforts,” more than 60% of the corporations are positioning environmental businesses positively (Figure 19).

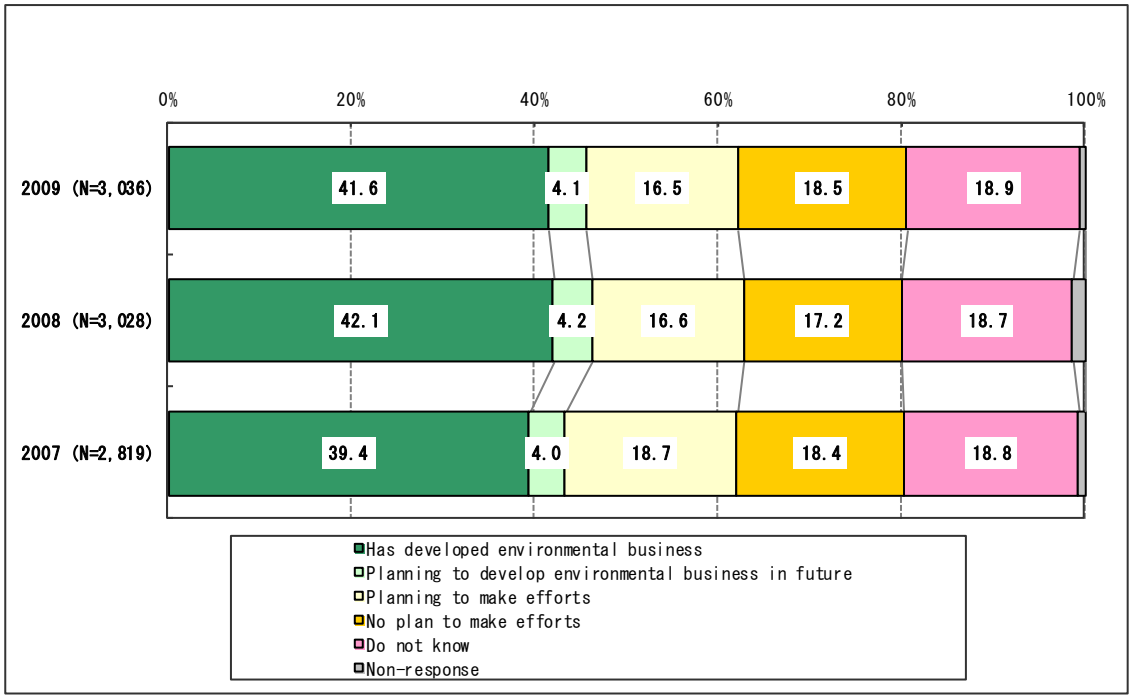

Figure 19: The position of environmental businesses

(10) The position of global warming prevention measures

Regarding the position of global warming prevention measures, “Has a policy and efforts have been made” is the highest, 59.4%. In addition, including “Has no policy but efforts have been made” 29.9%, nearly 90% of the corporations are making some kind of efforts (Figure 20).

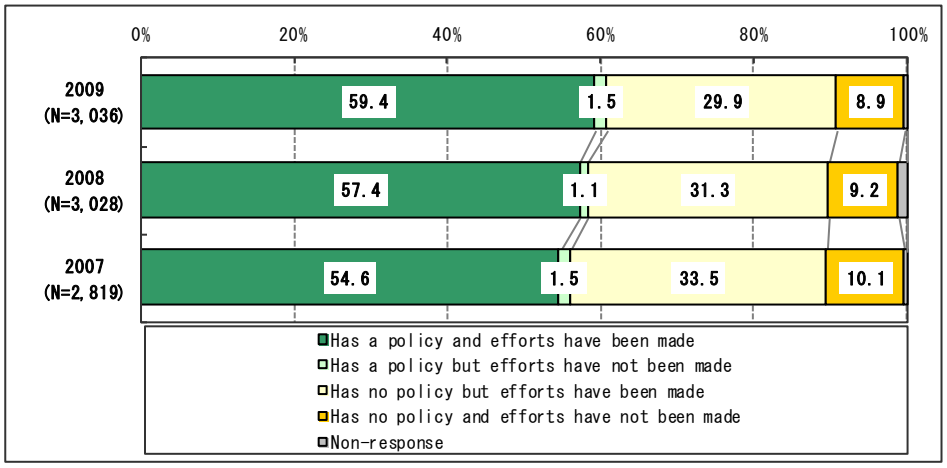

Figure 20: The position of global warming prevention measures

Material 2 Environmental Policy Framework

1.Environmental Methods in the Third Basic Environment Plan

"Chapter 2: Specific Implementation of Environmental Policies in the Present Quarter Century" of the *Third Basic Environment Plan* approved by the Cabinet in April 2006 describes the following:

"Upon implementing environmental policies, along with the development of new policy methods, improvement of existing policy methods and expansion of an application range, various mechanisms to incorporate environmental considerations into the following socioeconomic system as well as all policy means such as environmental investment/education/learning, providing information and the promotion of science and technology will be utilized appropriately. In such utilization, the effect of environmental conservation will be heightened to the maximum extent while the cost covered by a society as a whole will be minimized. In addition, from the perspective of the best policy mix (optimum combination), policies will be combined appropriately to form a policy package and exert a synergetic effect."

In specific, the Basic Environment Plan presents the following six policy methods:

(Mechanism for Environmental Considerations for Socioeconomy)

(1) **Direct regulatory instrument:** A method, using control tools based on laws and regulations, to indicate minimum environmental standards that society as a whole should meet. The method is applied mainly to a national minimum necessity that requires a society to secure a certain level, such as sustenance of life and health.

(2) **Framework regulatory instrument:** A method that achieves regulatory objectives by obligating people to meet goals or follow certain steps and procedures. It attempts to achieve regulatory goals by mandating preparation and disclosure of a plan. The method is effective when preventive or advance measures can be taken while utilizing the originality and ingenuity of parties who receive regulations.

(3) **Economic method:** A method that presupposes the market mechanism and attempts to achieve policy goals through economic incentives as well as leading the actions of each organization that meet economic rationality. It is considered that this method can contribute to the establishment of a sustainable society.

(4) **Voluntary effort method:** An effort in which business operators set certain goals regarding their own actions and implement measures. This method has the advantage of providing an incentive to technological renovation and leading to enhanced environmental awareness as well as

environmental education and learning. The voluntary effort is one of the key political methods that utilize expertise, creativity and ingenuity of business operators to tackle complicated environmental issues quickly and flexibly.

(5) **Informational method:** In order that investors can choose business operators who are active in environmental conservation efforts, or products with a low environmental load, by encouraging disclosure and provision of information such as environmental load related to business activities, products and services. This method promotes environmental considerations from each organization including providers of products and services.

(6) **Procedural method:** A method that combines the decision-making opportunities for environmental considerations at each decision-making step within an organization and the criteria for decisions regarding such considerations. This method achieves an effect on incorporating environmental considerations into an organization's action.

2.Framework of Policy Package for Promoting Corporate Environmentally-Conscious Actions and Environmental Management

The concept of a policy package based on the perspective of the best policy mix (optimal combination) advocated in the Basic Environment Plan was organized in the review meeting for "Greening Mechanism of Soioeconomy" in 2000 as part of a discussion reviewing the Basic Environment Plan.

Based on this concept of the best policy mix, the framework of a policy package for promoting corporate environmental management in order to incorporate the environmental aspects into Japan's socioeconomic system is described in Figure 21.

This framework is a combination of the EU's Integrated Product Policy (IPP) and Japan's own Integrated Business Policy (IBP).

The policy package framework for promoting corporate environmental management aims to develop corporate environmentally-conscious actions gradually and internalize environmental efforts into corporate management. Specifically, by using the "informational method," the framework focuses on efforts in planning, producing, selling, etc. of green products and services, and on promoting environmental information disclosure based on corporate social responsibility and accountability. *Environmental Reporting Guidelines*, *Environmental Accounting Guidelines*, *Guidelines for the Environmental Performance Indicators* and *EcoAction 21 Guidelines* by the MOEJ were formulated based on the above framework. As the dissemination status is indicated in Material 2, this framework

has generated certain achievements. In order to implement environmentally-conscious management, it is essential to understand this policy package framework for promoting corporate environmentally-conscious actions.

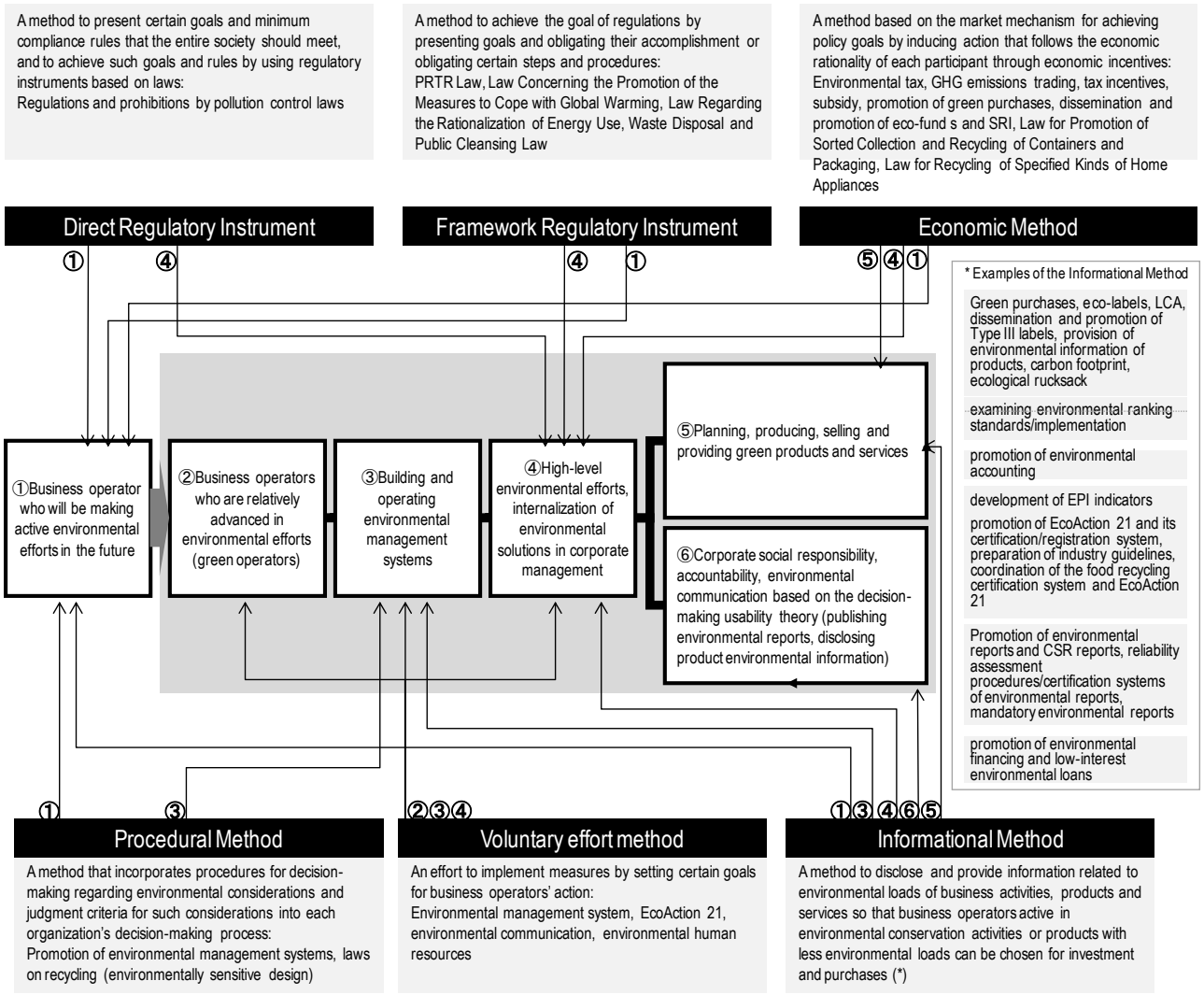

Figure 21: Policy Package Framework for Promoting Corporate Environmentally-Conscious Actions (Source: Figure corrected, p.43, *2001 Review Meeting Report on Promotion Measures for Environmental Reporting*, Aug 2002, MOEJ.)

In addition, since 2000, a series of laws concerning the government's priority on the environmental practices, such as Green Purchase Law, Environmental Consideration Law and Environmental Consideration Agreement Law. These laws further promote corporate voluntary efforts.

The MOEJ implemented its policies based on the system described in Figure 21. This is to promote corporate voluntary environmentally-conscious activities in accordance with the Environmental Consideration Law and is based on the idea that companies need to secure information reliability including the contents of efforts such as system establishment, understanding environmental loads, policy and goals as well as achievements. In implementing information sharing, promotion of

communication and corporate environmental management, the framework facilitates corporate assessment based on environmentally-conscious efforts as well as selection of products and services, which strengthens corporate awareness of social responsibility from the environmental aspect. In this way, the corporate responses to social responsibility and environmentally-conscious efforts are promoted and the framework realizes a “positive cycle of environment and economy” that incorporates the environment into a socioeconomic system.

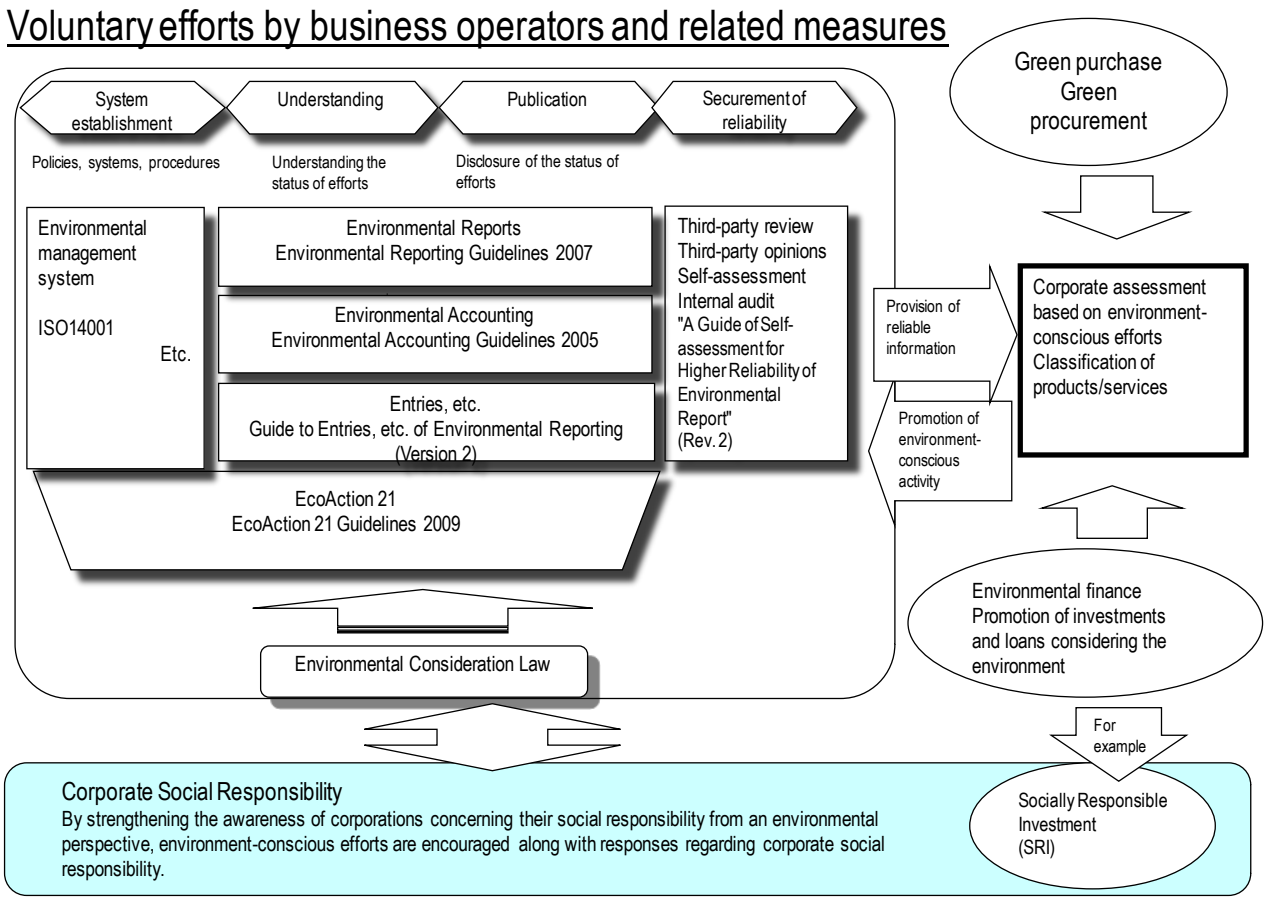

Figure 22: System of Measures for Promoting Voluntary Efforts of Business Operators (Figure revised, p.9, *Environmental Reporting Guidelines 2007*, MOEJ)

3.EU’s Framework of Environmental Policy

The EU’s Integrated Product Policy (IPP) is a political measure whose goal is to minimize environmental load caused by a product in every stage of its lifecycle.

- This is a comprehensive effort that utilizes various policy methods such as voluntary efforts, regulations, economic methods, environmental labels, and product design guidelines that encompass;

・Each stage of a product lifecycle including mining or harvesting of raw materials, production, distribution/sales, use, and disposal/recycle.

As the base for discussion on exploring an optimal policy method combination, the EU published a green paper concerning IPP in 2001. The key strategies in this publication are as follows:

(1) Utilization of a price mechanism: For market development of greener products, utilization of a price mechanism is the most effective method. The EU implemented reduction of VAT on products with environmental labels, extension of the producer responsibility concept into new fields, and the use of support measures based on the New Guidelines Concerning National Grant for Environmental Conservation (December 2000).
(2) Raising demands for greener products: Easily-accessible, easy-to-follow and reliable product information is needed. Various types of environmental labels and green purchasing by public institutions are promoted.
(3) Strengthening green production: Once a product is in the market, it is difficult to reduce its environmental impact. Thus, it is important to focus on environmentally-conscious design. Such strategies include preparation of product lifecycle information, improvement of distribution, proposal for environmental design guidelines, incorporation of environmental considerations into standardization processes, review of so-called “new approaches” such as the Packaging Directive and the Waste Electrical and Electronic Equipment Directive.
(4) Other supportive methods: Not primarily focusing on products, but as methods that provide opportunities to lifecycle approaches, environmental management/auditing systems, environmental accounting and environmental reports, etc. are promoted.

The EU’s IPP has its base in the Sixth Environmental Action Plan formulated in 2002 and encompasses a decade until 2012. This action plan emphasizes goal setting from a long-term perspective and further global approaches. The four priority fields include “climate change,” “nature and biodiversity,” “environment, health and quality of life,” and “natural resources and waste.”

Based on the priority fields, various political measures have been implemented:

Integrated Pollution Prevention and Control (IPPC) Directive; Environmental Impact Assessment (EIA) Directive; Strategic Environmental Assessment (SEA) Directive; Seveso II Directive; Eco-Management and Audit Scheme (EMAS); Emissions Trading System (EU-ETS); car emissions regulations and industrial voluntary regulations; IPP; Energy-Using Products (EUP); Waste Electrical and Electronic Equipment (WEEE) Directive; Restriction of Hazardous Substances (RoHS) Directive; End of Life

Vehicles (ELV) Directive; Registration, Evaluation, Authorization and Restriction of Chemical substances (REACH); Directive on Packaging and Packaging Waste (revised directive); and environmental taxation, etc.

In 2008, the European Commission presented Sustainable Consumption and Production (SCP). This further expands IPP to improve a product's environmental performance, particularly energy efficiency, in order to promote the distribution of such products in the market. SCP mainly determines a series of voluntary and obligatory actions concerning products, defines products with low environmental load, provides information to consumers using improved labeling, and supports purchases of such products through public procurement and financial incentives. Carbon footprint is implemented as one of the SCP's action packages.

In this way, the EU not only significantly influences Japan's environmental policy, but in this globalized economy, many Japanese companies also need to respond to environmental policy. Therefore, when implementing corporate environmentally-conscious management, it is indispensable to understand the contents and trends of the EU's environmental policy.

Material – 3 International Framework that Promotes Development of Human Resources Responsible for Environmental Management

As a part of international support measures for developing human resources who assume responsibility in environmental management, higher educational institutions have established third-party assessments/rankings from a sustainable perspective for worldwide business schools (MBA courses). This adds to principles and frameworks to which educational institutions voluntarily accept as their own social responsibility. The following sections introduce some of the representative examples of third-party assessments/rankings.

The Principles for Responsible Management Education

The Principles for Responsible Management Education (PRIME) stand on the philosophy of the Global Compact. It is a framework of principles that projects into a sustainable and global society, develop responsible leaders as educational institutions, and promote collaborations among industry, academic, governmental and private sectors.

Today, 270 higher educational institutions in the world (mainly business schools) have been associated with the Principles, including two institutions from Japan, Keio University Global Security Research Institute and Hosei Graduate School of Environmental Management. PRIME consists of the following six principles:

Principle 1: Purpose: We will develop the capabilities of students to be future generators of sustainable value for business and society at large and to work for an inclusive and sustainable global economy.

Principle 2: Values: We will incorporate into our academic activities and curricula the values of global social responsibility as portrayed in international initiatives such as the United Nations Global Compact.

Principle 3: Method: We will create educational frameworks, materials, processes and environments that enable effective learning experiences for responsible leadership.

Principle 4: Research: We will engage in conceptual and empirical research that advances our understanding about the role, dynamics, and impact of corporations in the creation of sustainable social, environmental and economic value.

Principle 5: Partnership: We will interact with managers of business corporations to extend our knowledge of their challenges in meeting social and environmental responsibilities and to explore jointly effective approaches to meeting these challenges.

Principle 6: Dialogue: We will facilitate and support dialog and debate among educators, students, businesses, government, consumers, media, civil society organizations and other interested groups and stakeholders on critical issues related to global social responsibility and sustainability.

We understand that our own organizational practices should serve as an example of the values and attitudes we convey to our students. (Source: Hosei University web page translated from original in English,

Sustainable MBA Ranking
Beyond Grey Pinstripes (2009-2010)

The Aspen Institute in the United States conducts an alternative survey on MBA rankings every two years, with an emphasis on the level of business schools' involvement in sustainability and corporate social responsibility (CSR). In the 2009-2010 survey, 149 business schools from total 24 countries participated and Schulich School of Business, York University (Canada), was chosen No.1 in the overall ranking.

Criteria for judgment adopted by the survey include the following four items:

1) Status of program offers in relevant subjects including social and environmental issues or ethics (whether there is an opportunity to study)
2) Total hours and status of course credits of relevant subjects (in reality, to what extent students are exposed to the class contents)
3) Within the relevant subject, connection between learning management with social impact and profit-making businesses (within the relevant subject, if there is a clear discussion with regard to the possibility of business to become a driving force of improving social and environmental conditions)
4) Number of publications of theses including social, environmental and ethical contents in management-related academic journals (related research by instructors)

Compared to the last survey in 2007, the ratio of subject number per business school that offers social/environmental subjects as electives increased by an average of 12% (approximately 2 subjects). Also, among all the subject schools, the ratio of business schools that require "subjects in business and social issues" showed an increase from 34% in 2001 to 69% in 2009.

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- Katsuhiko Shiraishi ICLEI Japan (2006) "A Guidebook for Sustainable Municipalities" (Koujinnotomo)

2. Video Materials

- NHK Eco Channel <http://www.nhk.or.jp/eco-channel/>
  “NHK Eco Channel” is NHK’s video site specialized for environmental information. It provides videos on environmental problems including global warming, climate change and waste problems, and also on various themes such as nature and eco-life, CSR, and environmental education. Many of those videos are around 2 to 10 minutes, which may be used partially in class (by playing on the website).

- Green TV JAPAN <http://www.japangreen.tv/>
  “Green TV JAPAN” is an environmental video medium which transmits contents on its website, as well as providing environmental video contents to various media and channels to actively promote popularization and edification for improvement of environmental awareness. Its website provides videos on themes of global warming, natural environment and biodiversity, etc. Most of those videos are within 10 minutes.
  They also support environmental education classes using Green TV in order to promote environmental education. Environmental education classes are provided by them using video programs transmitted on Green TV. They also dispatch instructors.

- Earth Vision Tokyo Global Environmental Film Festival <http://www.earth-vision.jp>
  “Earth Vision Tokyo Global Environmental Film Festival” started as the first global environmental film festival in Asia in 1992, when Earth Summit took place, and it aims to create a place to evoke motivation to think about global environmental through films. The films are not provided on the website, but can be rented with charge and purchased. Many of them are around 30 to 110 minutes, but there are some videos of 1 to 5 minutes.

- TVE Japan
  “TVE Japan” is a non-profit organization and an environmental NGO which produces and distributes environmental films. They do not provide their films on the website, but sell them. Many of them are comparably long, around 25 to 100 minutes.

3. Referential Websites

- Ministry of the Environment <http://www.env.go.jp>
- the Ministry of Economy, Trade and Industry <http://www.meti.go.jp>
- Environmental Consortium for Leadership Development（EcoLeaD） <http://www.eco-lead.jp>
- Japan Accreditation Board.(JAB) <http://www.jab.or.jp>
- Japan Environmental Education Forum (JEEF) <http://www.jeef.or.jp>
- Japanese Standards Association. <http://www.jsa.or.jp>
- The Energy Conservation Center, Japan <http://www.eccj.or.jp>

- The Japan Environmental Management Association for Industry (JEMAI) <http://www.jemai.or.jp/JEMAI_DYNAMIC/index.cfm>
- The Japanese Association of Assurance Organizations for Sustainability Information <http://j-sus.org>
- Keidanren (Japan Business Federation) ＜http://www.keidanren.or.jp/indexj.html＞
- The Japanese Society of Environmental Education <http://wwwsoc.nii.ac.jp/jsoee/>
- The Institute of Life Cycle Assessment, Japan <http://ilcaj.sntt.or.jp>
- Eco Mark Office, Japan Environment Association (JEA) <http://www.ecomark.jp>
- Eco Action 21 Central Office <http://www.ea21.jp/index.html>
- Green Purchasing Network <http://www.gpn.jp>
- Industrial Waste Information Network <http://www.sanpainet.or.jp>
- the Japan Center for Climate Change Actions (JCCCA). <http://www.jccca.org>
- EIC NET <http://www.eic.or.jp>
- "United Nations Decade of Education for Sustainable Development" <http://www.cas.go.jp/jp/seisaku/kokuren/keikaku.pdf>
- Principles for Responsible Management Education (PRME) <http://www.unprme.org/index.php> (English website) http://www.hosei-web.jp/gc/t02_7.html> (Japanese website in Hosei University website)
- Sustainable MBA Research Ranking by US Aspen Institute Aspen's Global 100: Beyond Grey Pinstripes 2009-2010 <http://www.beyondgreypinstripes.org./index.cfm>
- Global Compact <http://www.unglobalcompact.org> <http://www.ungcjn.org> (Japanese website of Global Compact Japan Network)

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