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ロシア・ウクライナ情勢による欧州海事業界への影響に関する調査

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はじめに

2022 年 2 月 24 日、ロシアによるウクライナ侵攻が始まり、本報告書執筆時点でまもなく 1 年が経過しようとしている。いまだウクライナ東部を中心に激しい戦闘が繰り広げられており、ミサイル攻撃などによりウクライナで死亡した市民は 7,000 人を超えている 。

ウクライナ侵攻は、世界的なインフレ率上昇、金利上昇、そして株式市場の急落など世界経済に影響を及ぼすだけでなく、海事業界にも様々な影響を及ぼしている。本調査報告書は、ロシアによるウクライナ侵攻の記録とともに、欧州海事業界にどのような影響を及ぼしたのかを取りまとめたものである。本調査報告書が関係各位の参考となれば幸いである。

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1. 概要

2022 年 2 月 24 日、ロシアのプーチン大統領は、国営テレビを通じて緊急演説し、ウクライナ東部における軍事作戦を開始すると表明した。演説後、ウクライナの首都キーウ近郊及びウクライナ東部各地で砲撃や空襲が開始され、ロシア軍によるウクライナ侵攻が始まった。ロシアによるウクライナへの軍事侵攻は、2014 年 3 月にクリミア半島を併合して以来となる。

国際通貨基金（IMF）の統計[1]によると、ロシアとウクライナの国内総生産（GDP）が世界全体に占める割合は合計で 2%ほどであり、経済規模としては一見すると大きいようには見えない。しかし、両国は主要な一次産品輸出国であり、経済協力開発機構（OECD）がまとめた報告書[2]によると、世界全体の小麦の 30%、トウモロコシや化学肥料、天然ガスの 20%、原油の 11%を両国で占めている。このウクライナ侵攻に伴い、原油や天然ガス、穀物などの国際価格の急騰、さらに当初ウクライナから穀物が輸出できなかったことにより、中東や北アフリカなどを中心に食糧不足などの混乱が生じた。こうした一次産品の価格高騰は、新型コロナウイルス感染拡大による影響から緩やかな回復基調であった世界の経済成長を鈍化させるだけではなく、インフレ圧力の上昇へとつながった。

ウクライナは小麦の輸出量で世界第 5 位[3]（2021 年）であり、その大半がウクライナ最大の輸出港である黒海沿岸のオデッサ港やチョルノモルスク港、ミコライフ港などから海上輸送されていた。しかし、ロシアによるウクライナ侵攻によって黒海が事実上封鎖され、侵攻直後から港には数百万トンともいわれる穀物が滞留し、ウクライナ産穀物の輸出は陸路や河川港を経由したものに限定されたことで輸出量が激減した。その後、2022 年 7 月にトルコと国連の仲介により、国連、トルコ、ウクライナ及びロシアの 4 者間で、黒海からのウクライナ産穀物の輸出合意である「黒海穀物イニシアティブ」が署名[4]されたが、合意直後のロシアによるオデッサ港への攻撃や、10 月には

[1] https://www.imf.org/external/datamapper/NGDPD@WEO/RUS/UKR
[2] https://www.oecd-ilibrary.org/sites/4181d61b-en/index.html?itemId=/content/publication/4181d61b-en
[3] https://www.fao.org/3/cb9236en/cb9236en.pdf
[4] https://news.un.org/en/story/2022/07/1123062

ロシア側による一方的な穀物輸出合意の履行の無期限停止が表明されるなど混乱を極めた。

欧州は、ウクライナ侵攻による影響が最も大きい地域とも言えるだろう。2020 年時点において、欧州連合（EU）の 27 カ国は、エネルギー需要全体の 24.4％をロシアからの輸入に依存しており、天然ガス輸入量の 41.1%、原油輸入量の 36.5%、石炭輸入量の 19.3%をロシアが占めていた[5]。しかし、ウクライナ侵攻以降、EU はロシアに対するエネルギー禁輸政策を進めており、ロシア産エネルギーからの脱却は欧州にとって重要な課題の一つである。欧州委員会（EC）は 5 月、天然ガスを中心としたロシア産化石燃料依存からの早期脱却計画「REPowerEU」計画の詳細を発表した[6] [7]。REPowerEU は、（１）エネルギーの効率化などによる省エネの向上、（２）エネルギー供給の多様化、（３）欧州における再生可能エネルギーへの移行の加速を通じた化石燃料の早期代替を計画の柱に位置付けている。

先進 7 カ国（G7）や北大西洋条約機構（NATO）を中心とした西側諸国ではロシアの軍事侵攻を受けて、半導体などのハイテク製品のロシアへの輸出停止や、ロシア産エネルギーの輸入停止、ロシアの個人・企業・銀行の資産凍結や一部銀行の国際銀行間通信協会（SWIFT）システムからの排除[8]など、ロシアに対して厳しい経済制裁を科した。制裁の目的は、ロシアの物資や戦費の調達を困難にし、資金不足によって継戦能力を奪うことである。

ロシアによるウクライナ侵攻は、海事業界にとっても大きな影響を及ぼした。侵攻開始時には、ウクライナ入港中の船舶等が留め置かれるなど、周辺海域における商船の安全運航が脅かされる状況になるとともに、船員交代、船舶保険、燃料価格など影響は広範囲となった。ロシア・ウクライナ発着の貨物が激減する一方で、遠距離からの代替調達によるトンマイルの船腹需要の増加、さらにはタンカーやガス船などで海運マーケットが高騰、LNG 船は欧州がパイプラインでのロシア産エネルギー脱却によ

[5] https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220328-2#:~:text=In%202020%2C%20the%20EU%20imported,and%2011%25%20solid%20fossil%20fuels.
[6] https://ec.europa.eu/commission/presscorner/detail/en/IP_22_1511
[7] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131
[8] https://www.consilium.europa.eu/en/press/press-releases/2022/03/02/russia-s-military-aggression-against-ukraine-eu-bans-certain-russian-banks-from-swift-system-and-introduces-further-restrictions/

る輸送需要が増加、プロダクト船もロシアから代替国による石油製品の需要が上昇する面もあった。

本調査報告書は、ロシアによるウクライナ侵攻が欧州海事業界にどのような影響を及ぼしたのかを取りまとめたものである。

2. ロシアによるウクライナ侵攻の背景

ロシアによるウクライナ侵攻が欧州海事業界にどのような影響を及ぼしたのかを述べる前に、まずはウクライナとロシアの関係性、そして侵攻に至った背景について整理する。

2.1 ウクライナとは

1991 年に旧ソ連の崩壊に伴って独立したウクライナは、国土面積が日本の約 1.6 倍となる 60 万 3,700 平方キロメートルで、首都はキーウにある。ロシアが一方的に「編入」を宣言した南部のクリミア半島（クリミア自治共和国とセヴァストーポリ特別市）を除いた人口は 4,159 万人（2021 年：ウクライナ国家統計局[9]）で、人口の約 78%はウクライナ人、約 17%はロシア系[10]となり、親欧米の西部・中部と、ロシア系の多い東部・南部に色分けされる。公用語はウクライナ語だが、親ロシア派の多いウクライナ東部・南部では第一言語はウクライナ語ではなく、ロシア語となるのも特徴である[11]。欧州連合（EU）とロシアの間に位置しており、ロシアからすれば欧州への玄関口ともなることから戦略的な要衝となっている。

ウクライナの西部や中部は、かつてオーストリアやポーランドの支配を受けたこともあり、欧米との関係を重視する傾向があるが、東部や南部はロシアの勢力下にあった期間が長いため、ロシアとは経済的に強く結びついていた。そのため、文化や産業も東西で異なり、西部は産業の中心は農業で、東部に比べて工業化は遅れている。一方で東部や南部は、ロシア向けの軍需・宇宙産業や精密機械、鉄鋼業が盛んな工業地帯である。なお、首都キーウの約 100 キロ北のベラルーシとの国境付近には、旧ソ連が建設したチョルノービリ（チェルノブイリ）原子力発電所[12]があり、1986 年 4 月に原子炉が水蒸気爆発する事故が発生している。

[9] http://www.ukrcensus.gov.ua/
[10] https://www.mofa.go.jp/mofaj/area/ukraine/data.html
[11] https://ca-voir.com/ukrainian-language-jp/
[12] https://chnpp.gov.ua/ua/

2.2　ロシアとの関係性

経済的な重要性や安全保障の観点から、ロシアと欧米諸国は旧ソ連崩壊後、ウクライナの政治に関与し続けていた。ロシアとウクライナは同じスラブ系民族で、歴史、文化、民族の面で強い結びつきがあり、旧ソ連をともに牽引してきた「兄弟国家」とも言える。ロシアは EU に対抗するため、旧ソ連のベラルーシやカザフスタン、アルメニア、キルギスとともに 5 カ国の関税同盟となる「ユーラシア経済連合」[13]を締結しており、ウクライナをこの同盟に引き入れようとしていた。

図 2.1　ユーラシア経済連合加盟諸国（ウィキメディア・コモンズより筆者作成）

2.3　クリミア危機

ロシアによるウクライナ侵攻の背景を理解するには、2014 年 2 月ヤヌコヴィッチ政権下で起きた政変である「クリミア危機」にまで遡る必要がある。

1991 年のソ連崩壊後、ウクライナでは親欧米派と親ロシア派の対立が激化し、たびたび政情不安に陥っていた。親ロシア派とされていた当時のヴィクトル・ヤヌコヴィッチ大統領は 2010 年の政権発足当初、前任のヴィクトル・ユーシェンコ元大統領の親

[13] https://www.investopedia.com/terms/e/eurasian-economic-union-eeu.asp

欧米路線を一部踏襲し、EU との包括的な協力策を盛り込んだ連合協定の締結を目指した。しかし、この動きに反発したロシアからの強い圧力により、2013 年 11 月に協定締結を土壇場で取り止めた。これに反発した親欧米派による反政府集会やデモが起こり、治安部隊との大規模な衝突に発展すると、2014 年 2 月ヤヌコヴィッチ元大統領はロシアへと亡命し、親欧米派の野党が暫定政権を樹立した[14]。

親欧米派の政権が発足すると、今度は東部と南部で親ロシア派の抗議運動が広がり、ロシア系住民が人口の 6 割を占めるクリミアではウクライナからの分離運動に発展。親ロシア派武装勢力が地方政府庁舎と最高議会などを占拠し、クリミア自治共和国及びセヴァストーポリ特別市を事実上掌握した親ロシア派は 2014 年 3 月 16 日、ロシアへの「編入」を前提とする独立宣言を議会で採択した上で、「ロシアへの編入」か「ウクライナの下での自治権拡大」を問う住民投票を実施[15]。結果は、「ロシアへの編入」賛成派が 96.77%と多数であったことから、投票日翌日となる 3 月 17 日にウクライナからの独立とクリミア共和国の樹立が発表されると、ロシアは直ちにクリミアを併合した[16]。なお、米国・英国・フランス・ドイツ・カナダ・イタリア・日本の先進主要 7 カ国（G7）はオランダのハーグで緊急首脳会談を開き、ロシアに対する経済制裁強化と主要 8 カ国（G8）の枠組みから同国を除外することを決定した[17]。

2.4　ドンバス戦争

2014 年 4 月、ウクライナ東部ドンバス地域にあるドネツク州及びルハンスク州の両地域において、親ロシア派武装勢力がウクライナからの独立を一方的に宣言[18]。それぞれ「ドネツク人民共和国」（DPR：Donetsk People's Republic）、「ルハンスク人民共和国」（LPR：Luhansk People's Republic）と名乗った。DPR と LPR は、同地域において準軍事組織を構成して分離派武装勢力となりウクライナ政府と対立、これを巡りウクライナ政府との紛争が生じることとなった。ウクライナ政府は、両分離派武装勢力をテロ組織とみなしており[19]、ドンバス地域における軍事行動に対して、「対テロ政策」と

[14] https://www.reuters.com/article/l3n0ls0vh-ukraine-crisis-idJPTYEA1M03I20140224
[15] https://www.reuters.com/article/ukraine-idJPKBN0DR0OM20140511
[16] https://www.cnn.co.jp/world/35045398.html
[17] https://edition.cnn.com/2014/03/24/politics/obama-europe-trip/index.html
[18] https://time.com/96102/ukraine-donetsk-independence-russia/
[19] https://www.kyivpost.com/post/7524

称する大規模な武力行使を行うとともに、ロシア軍がドンバス地域において両分離派武装勢力に加担し、大規模に軍事力を展開していると主張する一方でロシア側はこれを否定した[20]。

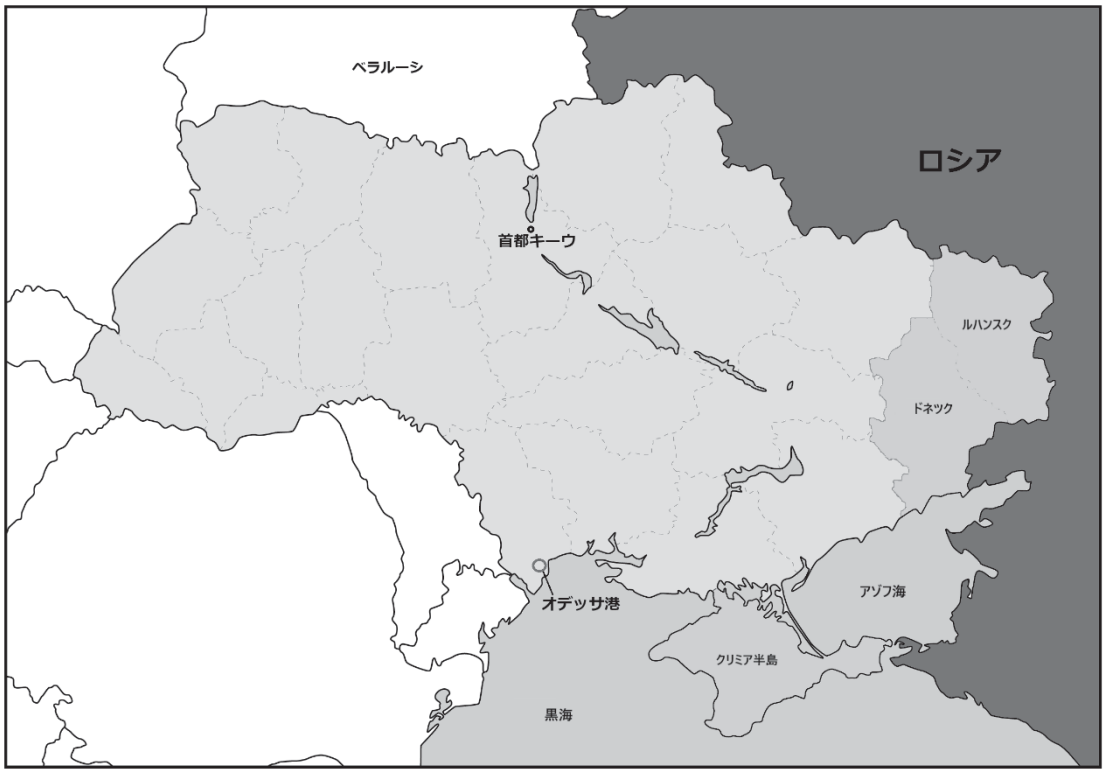

図 2.2　図下部のロシアが併合したクリミア半島と、図右の一方的な独立宣言をし、地域を実効支配している「ドネツク人民共和国（ドネツク州）」及び「ルハンスク人民共和国（ルハンスク州）」（筆者作成）

2014 年 7 月 17 日、オランダ・アムステルダムからマレーシア・クアラルンプールに向かっていたマレーシア航空 MH17 便が、ウクライナ東部ドネツク州上空を飛行中にロシア製ミサイルシステム「ブク」で撃墜され、乗客乗員 298 人全員が死亡するという痛ましい事件が起きた[21] [22]。オランダ主体の国際合同捜査チーム（JIT ：Joint

[20] https://www.wsj.com/articles/u-s-says-russia-firing-across-border-into-ukraine-1406231618
[21] http://edition.cnn.com/2014/09/09/world/europe/netherlands-ukraine-mh17-report/index.html?hpt=hp_t2
[22] https://jp.reuters.com/article/topNews/idJPKBN0FM1YV20140717

Investigation Team）は、撃墜に関与した分離派武装勢力に対してロシア政府高官が指示を出していたとみられると発表[23]していたが、ロシアは関与を否定している。

2.5　ミンスク議定書及びミンスク 2

2014 年 9 月 5 日、ドンバス地域における戦闘（ドンバス戦争）の停止について合意した「ミンスク議定書」がウクライナ、ロシア、ドネツク人民共和国、ルハンスク人民共和国間において調印された[24]。これは欧州安全保障協力機構（OSCE：Organization for Security and Cooperation in Europe）援助のもと、ロシアとウクライナの隣国となるベラルーシの首都ミンスクで調印され、これによりドンバス地域での即時休戦の実施を合意している。しかしドンバスにおける戦闘は再び勃発することとなり、ミンスク議定書による停戦は完全に崩壊した[25]。

これ以上の戦闘の拡大を避けるため、ドイツとフランスが仲介に乗り出し、2015 年 2 月 11 日夜、ベラルーシ・ミンスクにおいてウクライナ、ロシア、ドイツ、フランスの 4 カ国の首脳による和平交渉が夜を徹して行われ、ウクライナ東部を巡る紛争の停戦を目的としたパッケージとなる、いわゆる「ミンスク 2」に合意し[26]、2 月 15 日午前 0 時からの停戦の発効が発表、ウクライナ政府と親ロシア派武装勢力の停戦が実現した。ミンスク 2 の内容は 13 項目から構成され、全面停戦や OSCE による監視、ウクライナとロシア国境の管理回復、外国部隊・兵器・傭兵の撤退の他、ドネツク、ルハンスクの「独立宣言」した一部地域の地位を規定する特別地位法適用の恒久化、脱中央集権化などを軸にする憲法改正などがポイントになったが、停戦合意後も一部地域では緊張状態が続いた。

2.6　ミンスク 2 合意後のウクライナ政府の動き

[23] https://www.prosecutionservice.nl/topics/mh17-plane-crash/criminal-investigation-jit-mh17
[24] https://www.osce.org/ukraine-smm/123591
[25] https://www.theguardian.com/world/2015/jan/21/russia-ukraine-war-fighting-east
[26] https://www.chathamhouse.org/2020/05/minsk-conundrum-western-policy-and-russias-war-eastern-ukraine-0/minsk-2-agreement

ウクライナのペトロ・ポロシェンコ前大統領は 2018 年 4 月 12 日、ウクライナの首都キーウで行われた安全保障に関する国際フォーラムで演説し、独立国家共同体（CIS：Commonwealth of Independent States）の枠組みから離脱することを正式に表明した[27]。CIS は旧ソ連の構成共和国で形成された国家連合の独立国家共同体で、本部はベラルーシの首都ミンスクに置かれる[28]。EU 型地域同盟を目指しており、加盟国の最高指導者で構成される首脳会議が最高意思決定機関となる。加盟国の中心であるロシアは、北大西洋条約機構（NATO）の東方拡大に対抗して CIS の結束を強化したい意向であるが、各国の利害が一致せず、形骸化の傾向がみられる[29]。

CIS を離脱したウクライナは、NATO と EU への加盟を中心目標とし、2018 年 9 月ウクライナ議会は、外交政策の主要な目標とする憲法改正を承認し[30]、翌年 2019 年 2 月に同議会は、ウクライナの NATO と EU への加盟を支援するためにウクライナ憲法を変更することを賛成多数で可決した[31]。

2019 年 4 月、ウクライナ大統領選挙の決選投票で、現職であったポロシェンコ前大統領を破り当選したヴォロディーミル・ゼレンスキー氏が 5 月 20 日、第 6 代目となるウクライナ大統領に就任した[32]。ゼレンスキー大統領の中心的な選挙公約の一つは、ドンバス戦争を終わらせ、分離主義運動を解決することであった[33]。ゼレンスキー大統領はジョー・バイデン米合衆国大統領との電話会談で、NATO 加盟国に対してウクライナを支援するために NATO への加盟を早めることを促すよう求めたとされている[34]。

その後もウクライナ東部のドンバス地域では停戦違反が増加し対立が激化すると、2021 年 3 月、ウクライナ政府とゼレンスキー大統領は、ロシアによって 2014 年に併

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[27] https://web.archive.org/web/20180413043051/https://www.pravda.com.ua/news/2018/04/12/7177454/

[28] https://cis.minsk.by/

[29] https://www.nikkei.com/article/DGXZQOGR13DW30T11C22A0000000/

[30] https://apnews.com/article/dff40992fcc446f6808d02d03b35e4bc

[31] https://twitter.com/poroshenko/status/1097831162406412288?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwterm%5E1097831162406412288%7Ctwgr%5E3c8151e2fcb13063cc30cc31357e3ed6e55aa1fb%7Ctwcon%5Es1_&ref_url=https%3A%2F%2Fwww.ukrinform.jp%2Frubric-polytics%2F2643688-poroshenko-da-tong-ling-lu-qin-lue-kai-shinian-jing-guono-te-bie-guo-huinite-jia-meng-lu-xianni-guansuru-xian-fa-gai-zhengni-shu-ming.html

[32] https://www.rferl.org/a/29951792.html

[33] https://www.bbc.co.uk/news/world-europe-49903996

[34] https://www.ctvnews.ca/world/ukraine-s-zelensky-on-frontline-as-merkel-urges-putin-to-pull-back-troops-1.5379725

合されたクリミアの脱占領と再統合に向けた新国家戦略「クリミア・プラットフォーム」を開設[35]。同年 8 月には、プラットフォームの発足サミットがウクライナの首都キーウで開催され、40 以上の国・機関が参加した。このサミットで、「クリミア併合を容認せず、非難し続ける」との共同宣言が採択された[36]。

2021 年 9 月には、ウクライナとアメリカとの間で、「戦略的パートナーシップに関する共同声明」が両国政府から発表された[37] [38]。

2.7　ロシアと西欧米の動きと軍事侵攻

こうしたウクライナ政府の動きをけん制するように、ロシアはその後もウクライナとの国境地帯に大規模な軍を配置し続け、緊張状態が続いた。緊張が高まる中、ロシアは 2021 年 12 月に NATO とアメリカに対して、これ以上 NATO を東方拡大させない確約など、自国の「安全の保証」に関する条約案を提示[39]したが、NATO とアメリカ側は「全ての国が自らの道を選ぶ権利がある」（イェンス・ストルテンベルグ NATO 事務総長）、「NATO の門戸は開かれたままである」（アントニー・J・ブリンケン米国国務長官）として、ロシアの要求には応じないとの方針を明確にした[40] [41]。これ対してロシアは、ウクライナに対する侵攻計画を否定する一方で、NATO 不拡大などの要求で強硬姿勢を崩さず、ロシア側の要求が拒否された場合は、軍事技術的な措置を取ると警告した[42]。

情勢が緊迫する中、2022 年 2 月 21 日にプーチン大統領は、ドネツク、ルハンスク州で「建国宣言」を行った 2 つの地域を「ドネツク人民共和国」、「ルハンスク人民

[35] https://www.president.gov.ua/en/news/svyatkovi-zahodi-do-30-richchya-nezalezhnosti-ukrayini-triva-68593
[36] https://www.president.gov.ua/en/news/prezident-ukrayini-vidkriv-inavguracijnij-samit-krimskoyi-pl-70269
[37] https://www.president.gov.ua/news/spilna-zayava-shodo-strategichnogo-partnerstva-ukrayini-ta-s-70485
[38] https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/01/joint-statement-on-the-u-s-ukraine-strategic-partnership/
[39] https://mid.ru/ru/foreign_policy/rso/nato/1790803/?lang=en
[40] https://www.bbc.com/japanese/60136071
[41] https://www.ft.com/content/e75a76dd-0f49-4fb7-b974-cd764a1e19c1
[42] https://nypost.com/2021/12/21/putin-threatens-america-if-ukraine-allowed-to-join-nato/

共和国」として独立を承認する大統領令と、両国との相互援助条約に署名[43]。そして2022年2月24日、プーチン大統領は、国営テレビを通じて緊急演説し、ウクライナ東部における軍事作戦を開始すると表明し、演説後にウクライナに向けて大規模な進行を開始した。これに対して、国連総会は3月2日に開催した緊急特別会合において、ロシアに対して軍事行動の即時停止を求める決議案を141カ国の圧倒的多数で採択した[44]。

[43] https://edition.cnn.com/europe/live-news/ukraine-russia-news-02-21-22/h_fcf8c95f9e69b343087651747ab9acd1
[44] https://news.un.org/en/story/2022/03/1113152

3. ロシアに対する制裁

ロシアによるウクライナ侵攻は、人道的被害及び国際経済に大きな影響を与えるとともに、海事産業にも甚大かつ広範囲な影響を及ぼしたと考えられる。こうした影響としては、世界的なコロナウイルス感染拡大によるサプライチェーンの混乱、港湾の混雑、対ロシアの制裁措置、エネルギー安全保障、海上貿易パターンの変化などが挙げられる。

海事業界に影響を及ぼすロシアに対する制裁措置としては、とりわけ、カナダ[45]、アメリカ[46]、イギリス[47]、EU[48]によるロシア産の原油や石炭の輸入禁止、ロシア関係船舶の EU 域内港への寄港禁止[49]、国際船級協会連合（IACS：International Association of Classification Societies）[50]及びパリ MoU（ポートステートコントロールへの合意に関するパリ覚書）[51]へのロシアの加盟取り消し等が挙げられる。これに、その他の法的制裁として、個人及びロシアの銀行を含む事業体への資産凍結や渡航制限などの「個別制裁」、また、ロシア製品の輸入禁止、特定の製品・技術の輸出禁止、一部のコンサルティング・アドバイザリー業務の提供禁止などの「経済制裁」の数々が加わる。

3.1 REPowerEU

ロシアによるウクライナ侵攻を受けて、欧州委員会（EC）は 2022 年 5 月、欧州連合（EU）がロシア産化石燃料への依存を 2022 年末までに大幅に低下させ、2030 年よりも早い段階で脱却を目指すための、各種イニシアティブをまとめた新たなパッケージである「REPowerEU」計画を発表した[52]。脱却を急ぐ背景として、EU はロシア産化石燃料への高い依存度が挙げられる。EU の 27 カ国は、2020 年におけるエネルギー需要

[45] https://www.canada.ca/en/natural-resources-canada/news/2022/02/government-of-canada-moves-to-prohibit-import-of-russian-oil.html
[46] https://www.whitehouse.gov/briefing-room/presidential-actions/2022/03/08/executive-order-on-prohibiting-certain-imports-and-new-investments-with-respect-to-continued-russian-federation-efforts-to-undermine-the-sovereignty-and-territorial-integrity-of-ukraine/
[47] https://www.gov.uk/government/news/uk-to-phase-out-russian-oil-imports
[48] https://www.consilium.europa.eu/en/press/press-releases/2022/06/03/russia-s-aggression-against-ukraine-eu-adopts-sixth-package-of-sanctions/
[49] https://www.consilium.europa.eu/en/press/press-releases/2022/04/08/eu-adopts-fifth-round-of-sanctions-against-russia-over-its-military-aggression-against-ukraine/
[50] https://iacs.org.uk/news/iacs-council-withdraws-russian-register-s-membership-of-iacs
[51] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022D0762
[52] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131

全体の 24.4％をロシアからの輸入に依存しており、天然ガス輸入量の 41.1%、原油輸入量の 36.5%、石炭輸入量の 19.3%をロシアが占めている[53]。

REPowerEU の計画は、「ロシアによるウクライナ侵攻によって引き起こされた困難と、世界的なエネルギー市場の混乱に対する EU の対応策の一つ」と EC は述べている[54]。本パッケージには、EU 法令のほか、拘束力を有しないスキーム、各国政府が採用しうる勧告などが混在している。提案された措置は、いずれも厳密には対ロシア制裁にあたらない点を強調しておくことが重要である。むしろ、これらの一連の措置は、ロシアによるウクライナ侵攻が、エネルギー供給の安全保障とエネルギー価格にもたらす影響に対処することを目的としている。EU がロシアに科した法的制裁については、（海事業界に影響があるものを中心に）後に取り上げる。

「REPowerEU」計画は、EC のコミュニケーション（政策文書）として指針や方向性を示す位置づけであり、具体的には法令案（含む改正案）ごとに今後、欧州議会と EU 理事会の立法手続きを経ることになる。その構成は以下のとおりである。

- 「REPowerEU」計画に係るコミュニケーション（非立法措置）
- 「EU ‘Save Energy’」コミュニケーション（非立法措置）
- 「変化する世界における EU の対外エネルギー関係」共同コミュニケーション（非立法措置）
- 「湾岸諸国との戦略的パートナーシップ」共同コミュニケーション（非立法措置）
- 再生可能エネルギー指令（RED）およびエネルギー効率指令（EED）、建築物のエネルギー性能に関する指令（EPBD）の改正指令案（立法措置）
- 再生可能エネルギー（RES）プロジェクトに係る許可手続きの加速ならびに電力購入契約（PPA）の推進に関する勧告（非立法措置）
- 「EU 太陽光戦略」コミュニケーション（非立法措置）
- 復興・レジリエンス計画中の「REPowerEU」関連章に関する規則案（立法措置）
- エネルギー市場向けの緊急措置に係るコミュニケーション（非立法措置）

[53] https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220328-2#:~:text=In%202020%2C%20the%20EU%20imported,and%2011%25%20solid%20fossil%20fuels.
[54] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131

- 2022 年後半に EU は、ガスの共同購入やガス不足時の加盟国間の連帯強化、ガス価格上限設定に関する緊急規則を採択

「REPowerEU」は（１）エネルギーの効率化などによる省エネの向上、（２）エネルギー供給の多様化、（３）欧州における再生可能エネルギーへの移行の加速を通じた化石燃料の早期代替を計画の柱としており、これに投資の組み合わせを目指すものである。

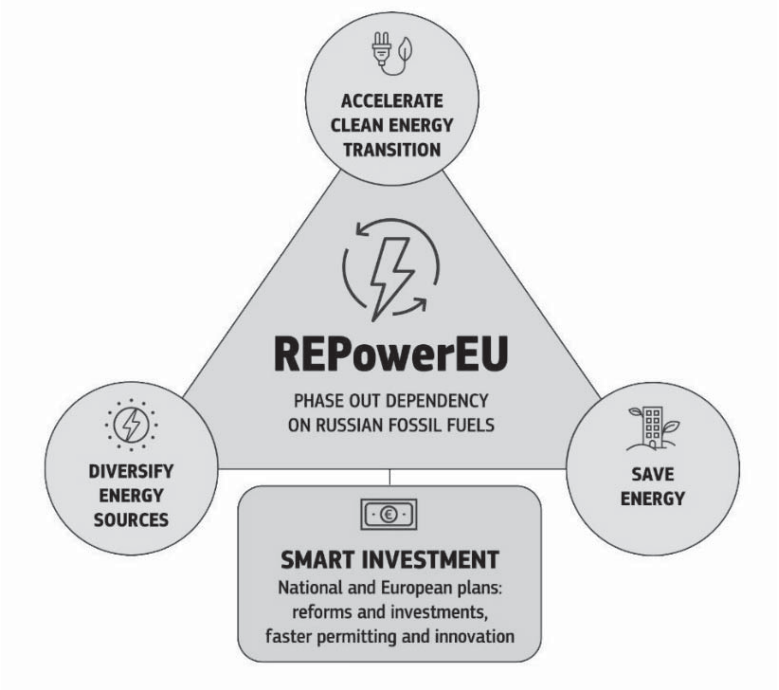


図 3.1　REPowerEU の構成（欧州委員会）

採用されたアプローチは、EU 全体として 2050 年までに気候中立を実現すべく前進し、各加盟国のニーズに応えるバランスのとれた様々な対応策を提案している。それは、現在 EU で立法手続きが進められている「Fit for 55[55]」提案の完全な実施を土台とした上で、再生可能エネルギーの移行の加速やエネルギー効率に関する目標の引き上げを提案するなど、さらに踏み込むことを提案している 。

再生可能エネルギーについては、最終エネルギー消費における割合の 2030 年目標を、現行の 40%から 45%への引き上げを提案。具体策として、迅速な展開が可能な技

[55] https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3541

術の 1 つとして太陽光発電（PV）を強化する EU 太陽光戦略を策定[56]し、現状の 2 倍以上となる 320 ギガワット以上の PV を 2025 年までに新設。2030 年までに約 600 ギガワット分の新設を目指すこととしている。また、エネルギー効率化目標については 2020 年を基準値として、想定使用量と比較した 2030 年までの改善目標を現行の 9%から 13%に引き上げることが提案[57]されている。

表 3.1　2030 年目標の変遷（いずれも最低目標値）（EC の資料を基に筆者作成）

項目	2014年合意	2018年改正	2021年提案 「Fit for 55」	2022年提案 「REPowerEU」
温室効果ガス（GHG）削減目標（1990年比）	40%削減	40%削減	55%削減	55%削減
再生可能エネルギー比率目標	27%	32%	40%	45%
エネルギー効率化目標	27%	32.5%	36% （2020年比で9%改善）	2020年比で13%改善

EC は、「REPowerEU」の目標達成には、「Fit for 55」提案の目標達成に必要な投資に加えて、2027 年までに 2,100 億ユーロの追加投資が必要であると試算している[58]。財源としては、国や EU の資金源だけではなく、民間資金を組み合わせて資金調達するとしており、EU レベルでは復興基金の中核政策「復興レジリエンス・ファシリティー（RRF：Recovery and Resilience Facility）」を挙げた。RRF は返済不要の補助金と融資から構成され、2,250 億ユーロ分の融資枠がまだ残っており、加盟国は REPowerEU の目標達成のために、新たな融資を 2023 年 8 月 31 日まで申請できる。さらに、「Fit for 55」枠組みと「REPowerEU」計画の実施により、EU は 2030 年までに年間のガス輸入費を 800 億ユーロ、原油輸入費を 120 億ユーロ、石炭輸入費を 17 億ユーロ削減できると試算している[59]。

「REPowerEU」計画のもうひとつの不可欠な要素として、EC は 2030 年までに域内で 1,000 万トンの再生可能エネルギーを用いた水素（グリーン水素）を生産するとともに、1,000 万トンのグリーン水素を輸入するという目標を設定している[60]。EC は、2030

[56] https://energy.ec.europa.eu/system/files/2022-05/COM_2022_221_2_EN_ACT_part1_v7.pdf
[57] https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/energy-efficiency-targets_en#:~:text=In%20May%202022%2C%20in%20the,primary%20energy%20consumption%2C%20respectively).
[58] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131
[59] https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_3132
[60] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2829

年までに 2,000 万トンの水素を生産、輸入、輸送するための水素インフラを整備するには取り組みの加速が必要であるという点を指摘しつつ、水素インフラに関する暫定的なニーズのマッピングを行い、いくつかの主要な水素輸入ルートの開拓を支援し、業界と協力して電解装置の生産能力を増強する予定であるとしており、グリーン水素の生産に必要な電解槽の製造業者など 20 社の最高経営責任者（CEO）とともに共同宣言に署名した[61]。風力発電（陸上と洋上の両方）は、再生可能エネルギーの普及を加速する上で、電力の直接利用とグリーン水素生産の両面で重要な役割を果たすことが期待されている。

正式には「REPowerEU」の一部には含まれていないものの、EC はエネルギーや海運分野を含む重要インフラの保護を強化するための措置も採択している。ノルドストリーム・パイプラインに対する最近の妨害行為[62]や、ロシアのウクライナ侵攻によって生じた新たなリスクに対応すべく、重要インフラの強靭性を高めるための EU 全体の協調的アプローチに関する理事会勧告 が採択された[63]。同勧告では、EU の現行の「海洋安全保障戦略[64] 」が改訂の時期を迎えており、同戦略を更新する際には重要な海洋インフラの保護に関してさらなる提案が含まれる予定であることが再確認されている。

さらに、重要な事業体の強靭性に関する指令[65]では、加盟国に対して、重要な事業体の強靭性を高めるための国家戦略を策定し、少なくとも 4 年ごとにリスク評価を実施し、運輸を含むいくつかの部門において基幹的なサービスを提供する重要な事業体を特定することを義務付けている。貯蔵システムおよび LNG システム、天然ガス精製・処理施設の事業者、ならびに原油の生産、精製、処理施設および貯蔵、輸送の事業者は、同指令の附属書に記載された基幹的サービスのカテゴリーに含まれる。

3.2　EU による対ロシアの法的制裁

前節で述べたように、ロシアによるウクライナへの違法な軍事侵攻を受けて、EU はロシア産化石燃料への依存に終止符を打つことを目的とするいくつかの戦略的決定を

[61] https://ec.europa.eu/docsroom/documents/50014
[62] https://www.nato.int/cps/en/natohq/official_texts_207733.htm?selectedLocale=en
[63] https://data.consilium.europa.eu/doc/document/ST-15623-2022-INIT/en/pdf
[64] https://data.consilium.europa.eu/doc/document/ST%2011205%202014%20INIT/EN/pdf
[65] https://data.consilium.europa.eu/doc/document/PE-51-2022-INIT/en/pdf

行っている。前節で詳述した「REPowerEU」計画は EU の戦略のひとつの要素だが、もうひとつの要素としてロシア政権に対する法的制裁の導入がある。ここでは、海事産業に影響を与える措置に注目し、各種エネルギー源を対象とする制裁、ならびに海運部門を特に対象とする制裁について整理する。

3.2.1 制裁の背景（EU）

EU は、2014 年のロシアによる違法なクリミア併合への対応として、2014 年 3 月にすでにロシアに対する法的制裁を発動していた[66]。その上で、2022 年のウクライナに対する未曾有の軍事攻撃を受けて、それらの制裁措置は EU による一連の制裁パッケージの導入を通じて徐々に強化されてきた。その全体的な目的は、ロシア経済を弱体化させるとともに、ロシアから重要な技術と市場を奪い、ウクライナに対する戦争を継続するロシアの能力を制限することにある。

制裁は EC によって提案され、27 の EU 加盟国すべてによって採択されて初めて適用可能となる。こうした制裁には全加盟国による全会一致の合意が必要になるため、その導入は時としてかなり困難な作業になっている。ロシアに対する立場や見解は加盟国間で異なり、中にはより厳格な制裁措置を支持する国もある。そうした中、ロシアによるウクライナ侵攻以降、EU はこれまで 9 つの対ロシア制裁パッケージを採択している[67]。加盟国は、違反を発見し罰則を科すことによって、EU による制裁の実施に責任を負っている。EC は、EU 全域での統一的な適用を確保するために、制裁の執行を監視する。この EU による対ロシア制裁は、個別制裁と経済制裁の形をとる。

個別制裁には個人および事業体に対する資産凍結と渡航制限が含まれ、制裁対象者は自らの資産にアクセスできなくなるほか、いかなる資金も利用できなくなり、また、EU への渡航が禁止される。

[66] https://www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/
[67] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014D0512-20221204

図 3.2　個人及び事業体に対する資産凍結と渡航制限イメージ（EU 理事会）

経済制裁にはロシア製品の輸入禁止、特定の製品・技術の輸出禁止、一部のコンサルティング・アドバイザリー業務の提供禁止が含まれる。こうした経済制裁が海事産業に最も大きな影響を及ぼしているため、以下ではこの点について詳述する。

3.2.2　製品の輸出入を対象とする経済制裁（EU）

上述のとおり、経済制裁が EU による対ロシア制裁の重要な一部となっており、ロシアに対して輸出入の制限が科されている。EU の事業者はロシアに対して特定の製品を販売することを禁止され、また、ロシアの事業者も EU に対して特定の製品を販売することが許されない。これは、ロシア経済を弱体化させると同時に、欧州の企業と市民に対する影響を可能な限り抑えることが目的となっている。輸出入の禁止措置は、EU 内の税関当局によって執行・実施される。

3.2.3　輸出入禁止の対象品目（EU）

輸出入禁止の対象品目の種類について概観するために、下に非網羅的なリストを示す。これらの製品の中には海上輸送されているものがあるため、海上貿易のフローに一部影響を及ぼしている。

現在実施中の法的制裁（輸出禁止）によって EU からロシアへの輸出ができない製品には、とりわけ以下が含まれる[68]。

- 最先端技術（先進半導体など）
- 石油精製に係る特定の製品・技術
- エネルギー産業向けの機器・技術・サービス
- 航空宇宙産業関連の製品・技術（ジェット燃料など）
- 航海機器・無線通信技術
- 民生目的と軍事目的の両方に使用可能な特定のデュアルユース品（ドローンなど）
- 奢侈品（贅沢品）
- 民生用火器およびその他の軍事資材

ロシアから EU に輸入することができない製品（輸出禁止）には、とりわけ以下が含まれる[69]。

- 原油（2022 年 12 月以降）および石油精製品（2023 年 2 月以降）（一部例外あり）
- 石炭およびその他の固体化石燃料
- 鉄鋼・鉄鋼製品・鉄
- 金
- セメント・木材・紙・プラスチック

エネルギー部門、特に原油と石油製品を対象とする制裁は、ロシア産原油の大半が海上輸送されていることから、海事業界に大きな影響を与えている。 これらの制裁は、EU の対ロシア制裁パッケージ第 6 弾の一環として 2022 年 6 月に採択された[70]。

[68] https://www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/sanctions-against-russia-explained/

[69] https://www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/sanctions-against-russia-explained/

[70] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2022.153.01.0053.01.ENG&toc=OJ%3AL%3A2022%3A153%3ATOC

より具体的には、これらの制裁によってロシアから EU に原油および一部の石油製品を購入、輸入、移送することが禁止されている。（筆者注：理事会規則 833/2014（2022 年改正）第 13 条により、制裁は EU 領域内および EU 籍船内、EU 加盟国国民、EU 加盟国の法律に基づいて設立された事業体、EU 域内で全部または一部が行われる事業に適用される。）

また、この制裁措置によって、EU の事業者は、原油または石油製品の海上輸送（第三国向けを含む）に関連する技術支援、仲介業務、融資、金融支援を提供することも禁じられている。実務上、これは EU の保険会社や再保険会社が（EU 向けか第三国向けかを問わず）ロシア産の原油及び石油精製品を輸送する船舶に保険を提供できなくなることを意味する。これらの制裁措置は、原油については 2022 年 12 月 5 日以降、その他の石油精製品については 2023 年 2 月 5 日以降適用される。

内陸国でロシアからの供給への依存度が特に高い EU 加盟国（ハンガリーやスロバキアなど）に対しては、パイプラインによる原油輸入について一時的な適用除外が認められた[71]。ブルガリアとクロアチアについても、それぞれロシア産の原油（2024 年末まで）と減圧軽油（2023 年末まで）の輸入について、個別の一時的な適用除外が認められた[72]。ロシア産原油の大半が海上輸送されていることに鑑みて、2022 年末までに EU によるロシア産原油輸入の約 90%がこれらの制裁の対象となり[73]、原油を原動力とするロシアの資金力に重大な影響を与えることになると予想された。

3.2.4　国際的な原油等の上限価格設定（EU）

ロシア産原油の販売による収入を制限すると同時に、現下の地政学的状況に起因する世界的な原油価格ショックを回避することを目的に、2022 年末に国際的な原油等に係る上限価格の設定について合意された[74]。EU 域外へのロシア産原油の供給を維持しつつ、ロシアが原油輸出から得る収入を抑制しロシアによる戦争継続を困難にすることが狙いである。価格上限は、EU および G7 諸国、オーストラリアから構成される国

[71] https://www.reuters.com/world/europe/best-we-could-get-eu-bows-hungarian-demands-agree-russian-oil-ban-2022-05-31/
[72] https://seenews.com/news/bulgaria-croatia-get-oil-ban-exemptions-as-eu-agrees-new-sanctions-against-russia-787039
[73] https://www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/sanctions-against-russia-explained/
[74] https://www.consilium.europa.eu/en/press/press-releases/2022/12/03/russian-oil-eu-agrees-on-level-of-price-cap/

際的な連合「プライス・キャップ連合」によって合意された。上限価格の水準に関しては、EU 加盟国間でも意見が対立していたが、原油の上限価格は 1 バレル 60 ドルに設定され、2022 年 12 月 5 日からの適用が開始された（原油輸入禁止措置の発効と同日）。

今回の措置に対しては、一部摘要の除外要件が設けられており、（1）適用時点（2022 年 12 月 5 日）以前にロシア産原油の購入契約が締結され、（2）適用時点前に船積みが行われ、（3）2023 年 1 月 19 日より前に船卸しが行われる、という全ての条件を満たす取引については規制の適用除外となる[75]。なお、日本がサハリン 2 事業を通じて生産された原油については、我が国のエネルギー安全保障の観点から、今回の原油価格上限設定の対象外となる[76]。

この価格上限設定は、EU（および他の G7 諸国）によって導入されたロシアの原油産業に対する制裁措置に適用除外を設けるものである。これにより、上限価格以下で購入される原油については、EU の事業者は第三国向けの重要なエネルギー供給に対して貿易や仲介、輸送、その他の関連サービスを提供することが可能になる[77]。海事部門にとって重要なのは、上限を上回るロシア産原油の海上輸送に関する保険は提供が禁止される点である。つまり、EU の保険会社は、原油の価格が上限価格を下回る限りにおいて、第三国向けのロシア産原油の輸送を支援することが可能になる。 現在、2023 年 2 月 5 日から石油精製品の輸入禁止措置が発効するのを前に、ロシア産石油製品について別途上限価格を設定する作業が進められている。この価格上限は、2022 年 10 月に、EU の対ロシア制裁パッケージ第 8 弾の一環として EU 法に組み込まれた[78]。

エネルギー・クリーンエア研究センター（CREA：Centre for Research on Energy and Clean Air）が 2023 年 1 月に公表したリサーチペーパー[79]によると、2022 年 12 月 5 日に発効した EU による原油輸入禁止と価格上限を理由にロシアの原油輸出が 12%低下したほか販売価格も 23%下落し、その結果ロシアの原油収入は 32%落ち込んでいる。CREA はまた、「ロシアはバルト海と黒海の港から自国の原油・石油製品を輸送する上

[75] https://home.treasury.gov/policy-issues/financial-sanctions/faqs/1094
[76] https://www.reuters.com/business/energy/japan-sets-price-cap-russian-crude-oil-excluding-sakhalin-2-2022-12-05/
[77] https://finance.ec.europa.eu/system/files/2022-12/guidance-russian-oil-price-cap_en_0.pdf
[78] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2022:259I:FULL&from=EN
[79] https://energyandcleanair.org/wp/wp-content/uploads/2023/01/CREA_Press-release_EU-oil-ban-and-price-cap-are-costing-Russia-EUR-160-mn_day-but-further-steps-can-multiply-the-impact.pdf

で、G7 諸国が所有する船舶あるいは保険提供者である船舶に代わる実質的な代替手段を見いだすことが出来ていない。」とも述べている[80]。さらに、今のところ価格上限によって価格の高騰は引き起こされていない。

世界的な原油価格の上限設定を受けて、プーチン・ロシア大統領は 12 月末に、価格上限設定国に対して 2023 年 2 月 1 日以降原油および石油製品の供給を 5 か月間禁止する大統領令に署名した[81]。

EU は、原油の輸入禁止に加えて、上記リストで挙げたように、ロシア産石炭の輸入に関しても制限措置を導入している。これは EU の対ロシア制裁パッケージ第 5 弾の一環として 2022 年 4 月に採択され[82]、EU にとってロシアのエネルギー産業を直接対象とする初の制裁となった。EU はロシアにとって最大の石炭輸出先（全輸出の 4 分の 1 を占める[83]）であるため、この措置はロシアに大打撃を与えると考えられた。EC は当時、この措置がロシアにとって年間 80 億ユーロの収入減少につながると予想した。この輸入禁止措置によって、EU の事業者は 2022 年 8 月以降、ロシア産またはロシアから輸出される石炭を EU へ向けて直接的あるいは間接的に購入、輸入、移送することを禁止されている。しかしながら、EU の事業者がロシア産石炭を第三国に輸送することは許されている。EU の事業者が、第三国向けのロシア産石炭の輸送に関連する保険を提供することも認められている。EU はこれまでのところ、英国等の他の国々とは異なり（後述参照）、ロシア産ガスに関しては輸入禁止措置を導入していない点には注意が必要である。

[80] https://energyandcleanair.org/publication/eu-oil-ban-and-price-cap-are-costing-russia-eur160-mn-day-but-further-measures-can-multiply-the-impact/
[81] https://www.bbc.co.uk/news/world-europe-64102180
[82] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022R0576
[83] https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_2333

図 3.3　エネルギー部門を対象とする EU の対ロシア制裁イメージ（EU 理事会）

3.2.5　海運業を対象とする制裁（EU）

上記で概説した海事産業の貿易パターンに影響を与えた経済制裁に加えて、EU はロシアの商船隊を特に対象とする制裁も導入している。EU は、対ロシア制裁パッケージ第 5 弾[84]の一環として、2022 年 4 月 16 日以降、ロシア籍船舶（2,800 隻超）に対して EU 域内の港湾へのアクセスを禁止することを決定した。EU はまた、2023 年 4 月 8 日以降、ロシア船級協会（RS：Russian Maritime Register of Shipping）の認証を受けているすべての船舶に対して EU 域内の港湾への寄港を禁止した。

しかしながら、これらの措置にはいくつかの適用除外が合意されており、加盟国当局はエネルギー製品、医薬品、医療製品、農産物、食料品、人道支援物資、一部の金属・肥料、民生原子力施設の機能に必要な核燃料およびその他の製品の輸入に関してはロシア籍船舶の寄港を許可することが認められている。また、避難場所を求めたり、海上の安全や海上における人命救助を理由に緊急寄港を行ったりする船舶も措置の対象とはならない。

[84] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2022.111.01.0001.01.ENG&toc=OJ%3AL%3A2022%3A111%3ATOC

入港禁止措置の目的は、ロシアを発着する海運を寸断することにより、ロシアの産業が重要製品を入手する手段を制限することであった。

EU はさらに、2022 年 10 月に採択された対ロシア制裁パッケージ第 8 弾[85]において、制裁の対象をロシア船級協会（RS）に拡大することを決定した。これは、RS を取引禁止の対象であるロシアの国有もしくは国の管理下にある企業のリストに追加する形で行われた。これにより、2022 年 10 月 7 日以降、EU の事業者は RS と直接的あるいは間接的にいかなる取引を行うことも禁止されている。同パッケージの一環として、EU は RS の承認を取り消すことも決定し、RS は EU 加盟国に代わって業務を行うことができなくなった。EU の取引禁止対象事業者リストには他の海事関連事業者も含まれており、ロシアの主要なタンカー船主 Sovcomflot は 2022 年 3 月にすでにリストに加えられていた。EU はさらに、ロシアに対する航海用機器・技術の輸出を禁止する制裁も導入している[86]。

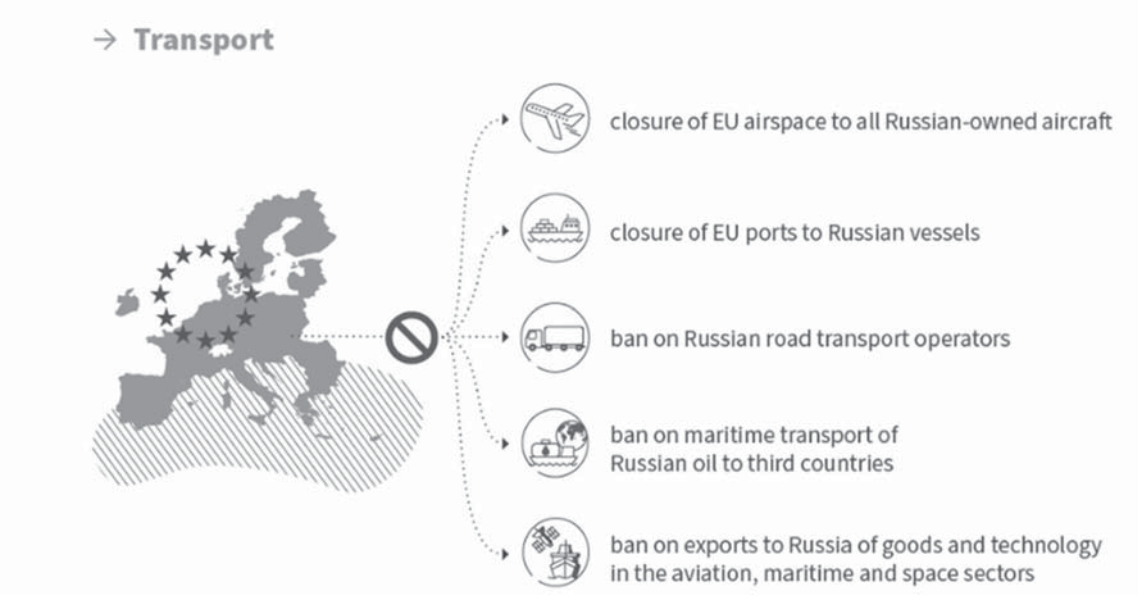


図 3.4　運輸部門を対象とする EU の対ロシア制裁イメージ（EU 理事会）

全体として、EU による対ロシア制裁は海運部門にかなり大きな影響をもたらしており、ロシア発のエネルギー輸送に関する制裁措置の導入が海上貿易のパターンに影響を与えている。EU による制裁は EU の事業者が一部のロシア産化石燃料の輸送とそれに関する保険の提供を行う余地を残している一方で、多くの事業者は EU（とその同盟

[85] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2022:259I:FULL&from=EN
[86] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32022R0394

国）によって導入された制裁への違反を回避するべく自粛の方針をとり、ロシアとの関係を断つ決定を行っている。

3.3 英国による対ロシアの法的制裁

上記で述べたように、EU はクリミアの違法な併合とウクライナ東部の不安定化におけるロシアへの対応として、2014 年にすでに制限措置の導入を開始していた。当時、英国はまだ EU に加盟していたため、そうした制裁の採択（と実施）にも関与していたが、英国の EU 離脱が決まると、英国はいわゆる「2019 年ロシア（制裁）（EU 離脱）規則[87]」を採択し、ブレグジット後も引き続き対ロシア制裁が適用されることを確保した。これらの規則は、一連の制裁パッケージの採択（現在までにパッケージ 17 に上る）を反映させるべく、2022 年を通じて改定された。

3.3.1 制裁の背景（英国）

2022 年 2 月にロシアがウクライナに対する違法な軍事侵略を開始して以降、英国は EU を含む同盟国と制裁方針について緊密に連携してきた。英国の考えは、「独自の制裁を科すことは可能な一方で、最大限の効果を得るためには同盟国、とりわけ EU および米国との連携がしばしば追求される。」というものである。そのため、同様の人物や事業体、部門を制裁の対象にしてきた。英国は EU と同様に、ロシアに対してウクライナの領土一体性を侵害あるいは脅かすなどの行動を停止するよう促すことを全体的な目的としつつ、金融や貿易、輸送、移住の面で制裁を科してきた。

2022 年 2 月にロシアがウクライナに対する違法な軍事侵略を開始して以降、英国は EU を含む同盟国と制裁方針について緊密に連携してきた。英国の考えは、「独自の制裁を科すことは可能な一方で、最大限の効果を得るためには同盟国、とりわけ EU および米国との連携がしばしば追求される。」というものである。そのため、同様の人物や事業体、部門を制裁の対象にしてきた。英国は、EU と同様に、ロシアに対してウクライナの領土一体性を侵害したり脅かしたりする行動を停止するよう促すことを全体的な目的としつつ、金融や貿易、輸送、移住の面で制裁を科してきた。

[87] https://www.legislation.gov.uk/uksi/2019/855/introduction/made

英国では、財務省の一部局である金融制裁執行局（OFSI：Office of Financial Sanctions Implementation）が国内における金融制裁の実施・執行に責任を負っている。英国の制裁は、英国全土とその領海、ならびに英国外にいる英国人（国民および法人）に適用される。英国は、個人や企業のほか、エネルギー部門などロシア経済の戦略的部門を対象とする金融・貿易制裁を導入している。EU の制裁に関する前節と同様に、以下では海事産業に最大の影響をもたらしているこれらの経済制裁を整理する。

3.3.2 製品の輸出入を対象とする経済制裁（英国）

2022 年中に次々と採択された制裁措置の一環として、英国は輸出入禁止措置を通じてロシア経済の主要部門に対する制限措置を科している。これらの禁止措置は広範囲の製品を対象としており[88]、それには特に以下が含まれる。

- エネルギー関連製品・サービス
- 石油精製製品・技術
- 石炭・石炭製品
- 原油・石油製品
- 海上製品・技術
- 鉄・鉄鋼製品
- 液化天然ガス

海上輸送される原油の割合が大きいため、EU の制裁と同様に、原油部門を対象とする制裁は海運部門にかなりの影響を与えている。英国政府は 2022 年 3 月にロシア産原油輸入の段階的停止を最初に発表し、同年末までにロシア産原油の輸入を段階的に停止する意思を明らかにした。その時点で、ロシアからの原油輸入は英国の全需要の 8%を占めていた[89]。

この最初の発表に続いて、英国は 2022 年 11 月、ロシア産原油・石油製品の英国への輸入を全面的に禁止する措置を採択し[90]、（EU の禁止措置に沿う形で）原油については 2022 年 12 月 5 日から、石油精製品については 2023 年 2 月 5 日から実施されるこ

[88] https://www.gov.uk/government/publications/russia-sanctions-guidance/russia-sanctions-guidance
[89] https://www.gov.uk/government/news/uk-to-phase-out-russian-oil-imports
[90] https://www.legislation.gov.uk/uksi/2022/1122/contents/made

とになった。これには、第三国向けあるいは第三国間の一部ロシア産原油・石油製品の海上輸送を対象とする関連サービス（保険など）の提供禁止も含まれる。

英国は 2022 年 4 月にすでに、「ロシアの石油生産・輸出能力を低下させるべく、石油産業の資金のみならず全体としての能力を標的にするために」、ロシアに対する重要な石油精製設備・触媒の輸出を禁止していた[91]。

3.3.3 国際的な原油等の上限価格設定（英国）

英国は、EU および他の G7 諸国、オーストラリアと連携して、2022 年後半に世界的な石油価格の上限設定導入に向けて取り組んだ。3.2.4「国際的な原油等の上限価格設定（EU）」でも触れたが、その目的は、「ロシアの収入を減少させ侵略戦争の資金を捻出する力を弱めると同時に、ロシアによる戦争が世界のエネルギー価格、とりわけ低・中所得国に与える影響を抑制すること[92]」であった。その後英国は、2022 年 11 月に石油の価格上限を法制化するための法律を成立させた[93]。これにより、石油の購入価格が合意された上限価格（60 ドル）を下回る限り、第三国の輸出入業者に対して英国の海事サービスを提供することが可能になった。EU のルールと同様に、石油の価格上限に関する法律は 2022 年 12 月 5 日に発効した。

英国政府は、2022 年 3 月に石油の輸入を同年末までに段階的に停止する意図を発表したのと同時に、ロシア産ガスの輸入停止を検討する意思も表明したが、その時点ではロシア産ガスは英国の供給の 4%を占めるにすぎなかった[94]。それから数ヶ月後の 2022 年 10 月、英国は 2023 年 1 月 1 日以降ロシア産液化天然ガス（LNG）の輸入を全面的に禁止する法律を制定した[95]。注目すべきは、こうした制裁措置に関係なく、英国は紛争開始以降ロシア産ガスをまったく輸入していない点である[96]。この輸入禁止措置によって、英国は、現時点ではロシア産ガスの輸入に関する制裁措置を導入していな

[91] https://www.legislation.gov.uk/uksi/2022/452/contents/made
[92] https://www.gov.uk/government/news/g7-finance-ministers-statement-on-russias-war-of-aggression-against-ukraine
[93] https://www.legislation.gov.uk/uksi/2022/1122/contents/made
[94] https://www.gov.uk/government/speeches/statement-on-the-phasing-out-of-russian-oil-imports
[95] https://www.legislation.gov.uk/uksi/2022/1110/contents/made
[96] https://commonslibrary.parliament.uk/research-briefings/cbp-9523/#:%7E:text=The%20UK%20imported%20no%20coal,the%20year%20to%20September%202022.

い EU とは異なるアプローチをとることになった。英国は、EU のルールに倣って、ロシア産石炭の輸入禁止措置[97]も導入している。この措置は、2022 年 8 月に発効した。

3.3.4 海運業を対象とする制裁（英国）

EU による制裁と同様に、英国はかなり早い時期（2022 年 3 月）に、「ロシアが所有、運航、管理、チャーター、登録する全船舶、あるいはロシア籍のすべての船舶に対して英国の港湾への入港を禁止する」法律を制定した[98] [99]。この禁止措置は 2022 年 3 月 1 日から適用が開始された。 加えて英国は、2022 年 3 月 24 日「ロシアの違法な侵攻を支援する」戦略的産業に対する制裁を採択した[100] [101]。これには、ロシア最大の海運会社であり炭化水素輸送の世界的リーダーである Sovcomflot に対する制裁が含まれている。

3.4 対ロシアの法的制裁の EU と英国の違い

ロシアに対する法的制裁に関しては、EU と英国は緊密に連携しているが、1 点大きな違いがある。すなわち、英国は液化天然ガス（LNG）とガスの輸入禁止措置を導入しているのに対して、EU はやがては排除する意思を示しつつも、依然としてロシアからガス（特に LNG）を輸入している。EU は、ロシアによるウクライナ侵攻以前からロシア産ガスへの依存度が高かったため、現実的なアプローチをとることを余儀なくされている。そうしたアプローチは「REPowerEU」戦略に反映されており、代替供給源の開拓と省エネ、再生可能エネルギー導入の加速を行いつつ、ロシアからのガス輸入を徐々に縮小する内容となっている。

当初、ロシアは有利な立場にあるように見られたが、EU の対応は功を奏し始めており、欧州が「エネルギー戦争に勝利を収めつつある」とする分析もある[102]。ロシアは

[97] https://www.legislation.gov.uk/uksi/2022/850/made
[98] https://www.legislation.gov.uk/uksi/2022/203/made
[99] https://www.legislation.gov.uk/uksi/2022/241/contents/made
[100] https://www.gov.uk/government/news/foreign-secretary-announces-65-new-russian-sanctions-to-cut-off-vital-industries-fuelling-putins-war-machine
[101] https://www.gov.uk/guidance/tariffs-on-goods-imported-into-the-uk
[102] https://www.politico.eu/article/europe-winning-energy-war-putin/

2022 年にはエネルギー価格高騰の恩恵を受けたものの、より長期的な財政見通しには陰りがみられる[103]。

[103] https://www.politico.eu/article/russia-eropean-union-energy-war-dents-kremlin-coffers/

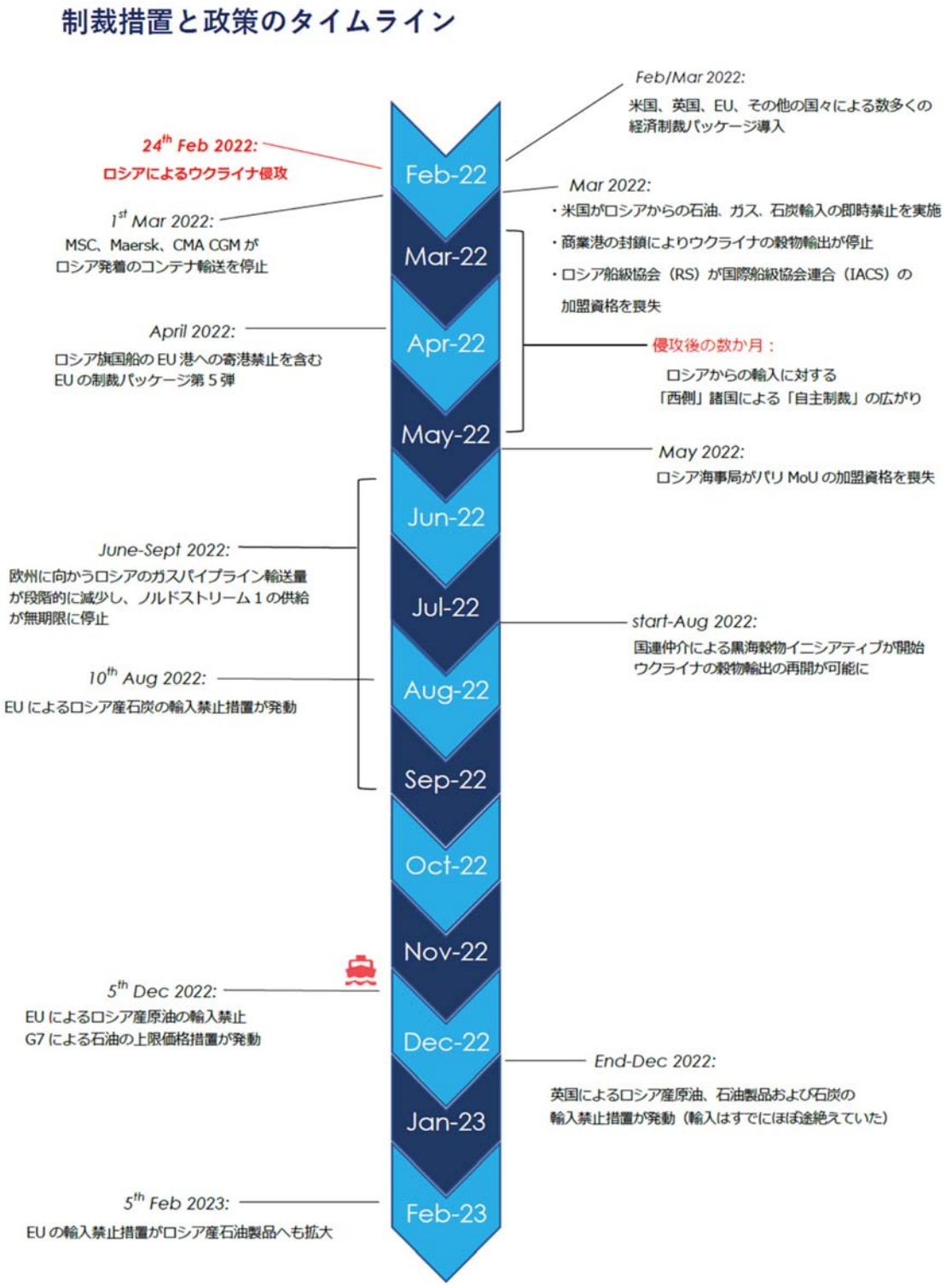
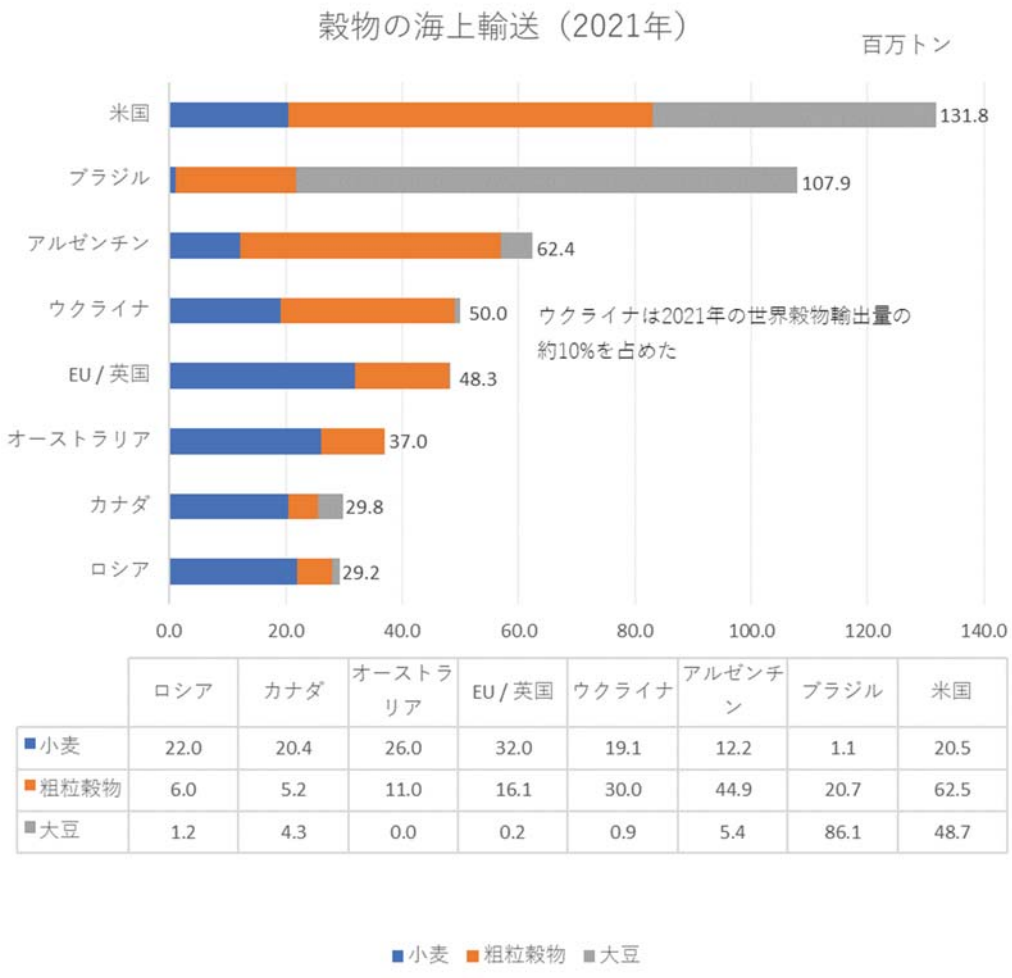


図 3.5　対ロシア制裁措置と政策のタイムライン（各種報道及び資料より筆者作成）

4. 穀物海上輸送

ウクライナは、世界の農業市場の重要な供給国であり、2021 年には世界の穀物海上輸送のおよそ 10%を占めており、米国、アルゼンチン、ロシアに次ぐ穀物の輸出大国となっている[104]。例えば、小麦の輸出量は世界第 5 位[105]（2021 年）であり、同 2021 年のウクライナの小麦輸出総額は 51 億ドルで、エジプト、インドネシア、トルコ、パキスタン、バングラデシュが主な輸出先であった[106]。それら穀物の大半の輸出はウクライナ最大の輸出港である黒海沿岸のオデッサ港やチョルノモルスク港、ミコライフ港などから海上輸送されていた。



	ロシア	カナダ	オーストラリア	EU / 英国	ウクライナ	アルゼンチン	ブラジル	米国
小麦	22.0	20.4	26.0	32.0	19.1	12.2	1.1	20.5
粗粒穀物	6.0	5.2	11.0	16.1	30.0	44.9	20.7	62.5
大豆	1.2	4.3	0.0	0.2	0.9	5.4	86.1	48.7

図 4.1　穀物の海上輸送（2021 年）（クラークソンより筆者作成）

[104] https://cepr.org/voxeu/columns/restarting-ukraines-agricultural-exports
[105] https://www.fao.org/3/cb9236en/cb9236en.pdf
[106] https://www.fas.usda.gov/sites/default/files/2022-04/Ukraine-Factsheet-April2022.pdf

4.1　船員及び船舶の安全確保

ロシアによるウクライナ侵攻開始後、ウクライナのオデッサ港を含め黒海の主要港は封鎖され、ウクライナの港や近海では約 2,000 人の船員及び 100 隻以上の船舶が身動きの取れない状況となった[107]。さらに、侵攻後 1 週間で、5 隻の一般商船が砲撃や機雷などによる直接的な被害を受け、その中には日本船主が保有するパナマ船籍のバルカーも被害を受けていた[108]。国際海事機関（IMO）は、2022 年 3 月 10 日、11 日に臨時理事会を開催し、暫定的な緊急措置として、黒海とアゾフ海の紛争地域から船員及び船舶を安全に避難させ、船員の命を守るための「海上回廊」を設置することに合意した[109]。

4.2　黒海穀物イニシアティブ

黒海の封鎖により、侵攻直後からウクライナの港には数百万トンともいわれる穀物が滞留し、ウクライナ産穀物の輸出は陸路や河川港を経由したものに限定されたことで輸出量が激減した。その後、2022 年 7 月にトルコと国連の仲介により、国連、トルコ、ウクライナ及びロシアの 4 者間で、黒海からのウクライナ産穀物（小麦やトウモロコシ、大麦、大豆）をはじめ、食料品（ヒマワリ油等）やアンモニアを含む肥料の安全な輸出再開と航路の合意である「黒海穀物イニシアティブ」が署名された[110]。

本イニシアティブによる穀物等は、黒海に面したウクライナの 3 つの主要港（オデッサ港、チョルノモルスク港、ユーズニー港）から海上輸送され、機雷のあるエリアを避けて黒海の国際海域に船舶を誘導し、ボスポラス海峡（トルコのヨーロッパ部分とアジア部分を隔てる海峡）に向かって運航する[111]。

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[107] https://mfame.guru/2000-seafarers-stranded-in-ukrainian-waters/
[108] https://www.tradewindsnews.com/casualties/fifth-commercial-ship-hit-in-black-sea-amid-ukraine-russia-conflict/2-1-1178559
[109] https://www.nautilusint.org/en/news-insight/news/imo-demands--safe-blue-corridor-for-ships-in-ukraine-war-zone/#:~:text=The%20International%20Maritime%20Organization%20(IMO,humanitarian%20deliveries%20to%20Ukraine%27s%20ports.
[110] https://news.un.org/en/story/2022/07/1123062
[111] https://www.un.org/sites/un2.un.org/files/black_sea_grain_initiative_full_text.pdf

輸出の実施を監視するための共同調整センター（JCC：Joint Coordination Centre）がトルコ・イスタンブールに設立され、ウクライナの港を出入りする船舶は、JCC の支援の下、合同チームによって無許可の貨物（武器等）が積まれていないかの検査が行われる[112]。

図 4.1　「黒海穀物イニシアティブ」の輸送ルート（国連）

[112] https://www.un.org/en/black-sea-grain-initiative/background

黒海穀物イニシアティブは署名した日から 120 日間有効で、一方の当事国が他方の当事国に対し合意を終了または修正する意図を通知しない限り、自動的に有効期間を延長することができる[113]。しかし、署名後もロシアによるオデッサ港への攻撃、さらに同年 10 月末にはロシア側による一方的な穀物輸出合意の履行の無期限停止が表明[114]されるなど混乱を極めていた。

ロシア外務省は、この無期限停止表明は、クリミア半島のセヴァストーポリ海軍基地にあるロシア黒海艦隊の船舶が、ウクライナ軍の攻撃を受け、民間船舶の安全が保障できないことを理由としていた[115]。その数日後ロシア国防省は、黒海穀物イニシアティブに復帰すると表明した[116]。クリミア半島の港湾をロシア軍への攻撃に使用しないことを保証した文書をウクライナ側から受け取り、この保証が十分である判断したためである。

上記の通り混乱は散見されたが、合意後の 10 月におけるウクライナの穀物輸出は、侵攻前の水準近くまで改善されている[117]。JCC は、黒海穀物イニシアティブによる輸送を JCC ホームページにて情報公開しており、本調査執筆時点で既に約 2,120 万トンもの貨物が 830 隻の船舶において輸送されている。主な輸出先はヨーロッパ及び中央アジア地域で全体の約 52%を占めている[118]。主な輸出相手国は中国、スペイン、トルコ、イタリア、オランダ、エジプトなどが挙げられる[119]。

[113] https://maritime-executive.com/article/un-confirms-black-sea-grain-initiative-was-extended-for-120-days#:~:text=UN%20Confirms%20Black%20Sea%20Grain%20Initiative%20was%20Extended%20for%20120%20Days,-UN%20Secretary%2DGeneral&text=UN%20officials%20confirmed%20that%20all,by%20the%20UN%20and%20Turkey.
[114] https://press.un.org/en/2022/sc15089.doc.htm
[115] https://mid.ru/ru/press_service/spokesman/official_statement/1835797/
[116] https://t.me/mod_russia/21420
[117] https://www.reuters.com/markets/europe/ukraine-oct-grain-exports-almost-return-pre-war-levels-ministry-2022-10-17/
[118] https://www.un.org/en/black-sea-grain-initiative/vessel-movements
[119] https://data.humdata.org/dataset/black-sea-grain-initiative-vessel-movements

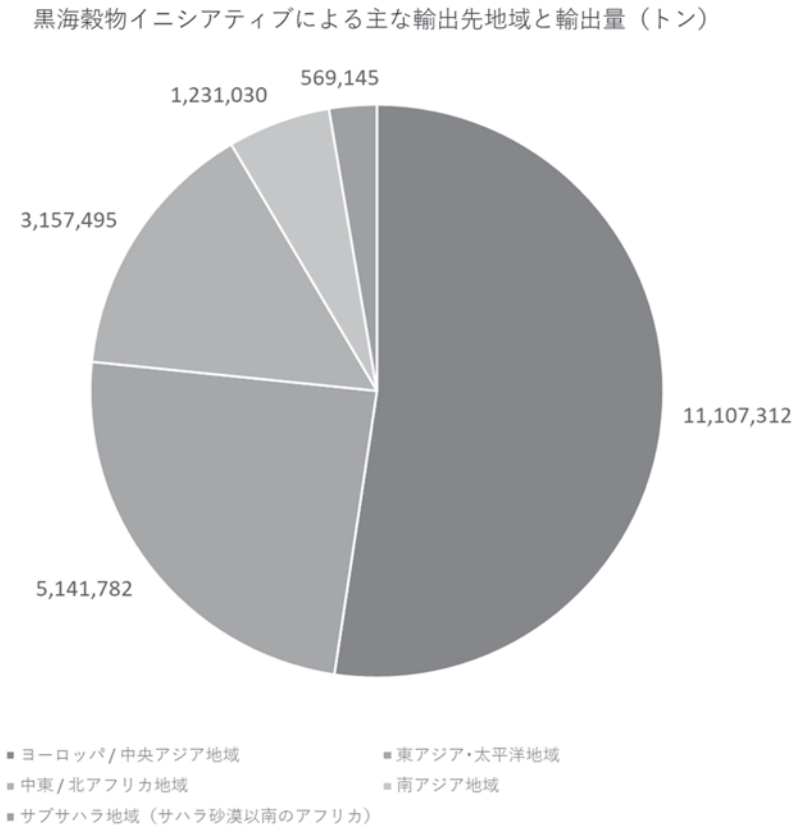

図 4.2　黒海穀物イニシアティブによる主な輸出先地域と輸出量

（JCC より筆者作成）

黒海穀物イニシアティブの合意は、2022 年 11 月 17 日にトルコのイスタンブールにおいて 120 日間延長された[120]。ウクライナ・インフラ省は、少なくとも 1 年間は同イニシアティブを延長し、さらにウクライナ南部のミコライフ港を合意の対象輸出港に含めることを関係国に求めた[121]。

ロシア側は、合意条件や範囲を変更することなく期間を延長することを認めたとする一方で、ロシア産の農作物輸出の正常化にも取り組むよう要請するとともに、合意が延長された 120 日間以内に解決されなければならないと訴えた[122]。国連のアントニオ・グテーレス事務総長は黒海穀物イニシアティブ輸出合意の延長を受け、「ウクライナからの穀物、食料品、肥料輸出の安全な航行を促進するため、すべての当事者による本合意の延長を歓迎する。国連は、重要な供給が今後も円滑に機能するように、

[120] https://www.un.org/en/black-sea-grain-initiative/operational-update-17-november-2022
[121] https://mtu.gov.ua/en/news/33838.html
[122] https://mid.ru/en/foreign_policy/news/1839126/

JCC とともに支援することに全力を尽くす。また、ロシアからの食料と肥料の輸出に関する障害を取り除くことにも全面的に取り組んでいる」とコメントした[123]。

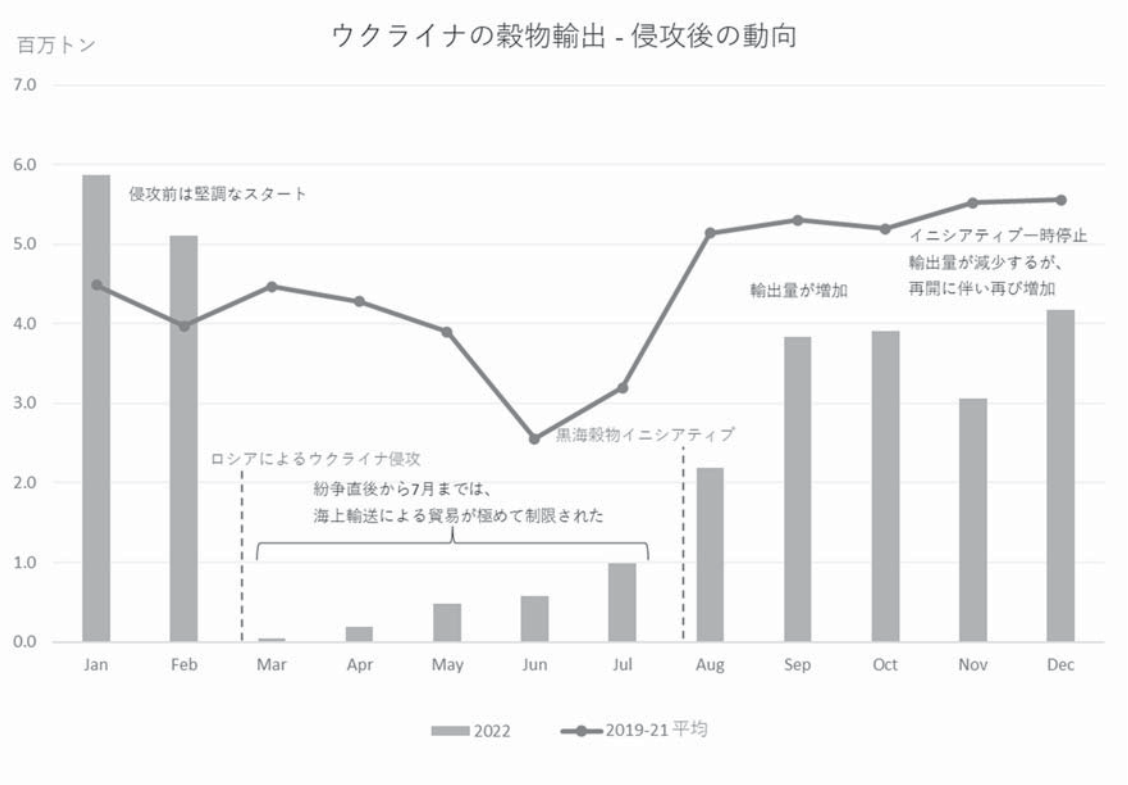

図 4.3 ウクライナの穀物輸出動向（クラークソンより筆者作成）

4.3　海上穀物貿易量

英国のクラークソンによると、月次海上穀物貿易指標（Monthly Global Seaborne Grain Trade Indicator）は 9 月-10 月の期間において、前年比で約 3%のプラスとなった。その背景には、黒海穀物イニシアティブによりウクライナからの穀物輸出が改善したことに加え、ブラジルの粗粒穀物（トウモロコシ）の収穫が好調だったなどのプラス材料がある。

[123] https://www.un.org/sg/en/content/sg/statement/2022-11-17/statement%C2%A0of%C2%A0the-secretary-general-%E2%80%93-the-renewal-of-the-black-sea-grain-initiative%C2%A0

クラークソンの最新の予測では、世界の海上穀物貿易量は 2022 年に約 3%後退するが、2023 年に約 5%の堅調な回復が続くと見込んでいる。一方で、2023 年第 1 四半期に迎える、黒海穀物イニシアティブの更新などの不確実性も残っている。

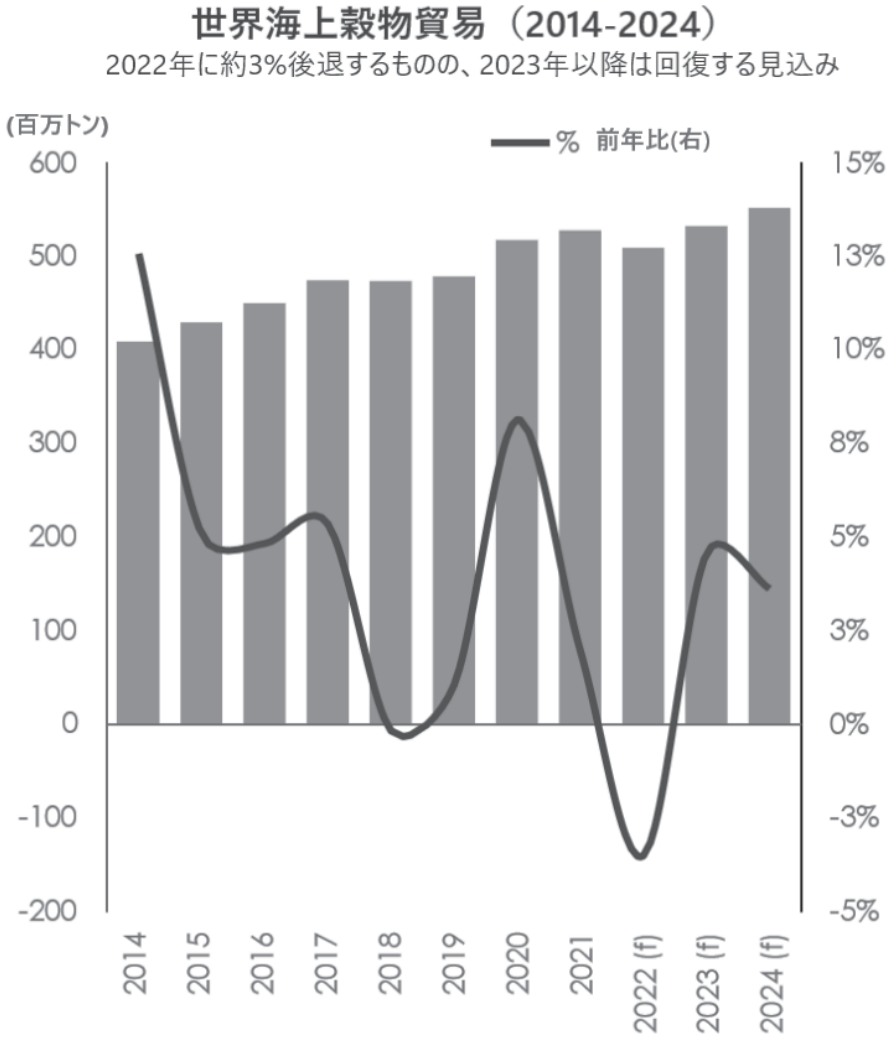

図 4.4　世界の海上穀物貿易量（2014-2024）（クラークソン）

5. エネルギー貿易と安全保障

2020 年は新型コロナウイルス感染拡大によりエネルギー需要が軽減し、エネルギー価格は下落した。2021 年は新型コロナウイルス感染拡大の落ち込みから経済回復に向かう中で、エネルギー需要が増加するとともにエネルギー価格も全体的に上昇した。しかし、2022 年 2 月のロシアによるウクライナ侵攻により、EU をはじめとする各国でロシア産エネルギーの禁輸政策が進められると、エネルギー価格の高騰に拍車をかけ、世界のエネルギー情勢は混迷を深めた。

2020 年時点において、欧州連合（EU）の 27 カ国は、エネルギー需要全体の 24.4％をロシアからの輸入に依存しており、天然ガス輸入量の 41.1%、原油輸入量の 36.5%、石炭輸入量の 19.3%をロシアが占めていた[124]。しかし、ウクライナ侵攻以降、EU はロシアに対するエネルギー禁輸政策を進めている。ロシア産エネルギーからの脱却と欧州におけるエネルギー供給の安全保障は重要な課題の一つであり、その政策の礎となるものが、3.1 にて挙げた REPowerEU 政策である。

5.1 原油

ロシアによるウクライナ侵攻後、原油価格は上昇し、侵攻後 1 ヶ月で WTI（米国南部産原油と中米産原油などの価格指標）、ブレント（北海産原油などの価格指標）、ドバイ（UAE 産原油などの価格指標）の全てが 100 ドル/バレルを超えた[125]。2021 年時点では、ロシアは世界の原油輸出全体の約 12％を占めており、世界 1 位であった[126]。原油価格高騰は、ロシアが戦争の当事者となり、各国のロシア産エネルギーの禁輸政策により原油の供給が行われなくなることへの警戒感（供給への不安）が原因である。

[124] https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220328-2#:~:text=In%202020%2C%20the%20EU%20imported,and%2011%25%20solid%20fossil%20fuels.
[125] https://www.eia.gov/todayinenergy/detail.php?id=51498
[126] https://www.iea.org/reports/russian-supplies-to-global-energy-markets/oil-market-and-russian-supply-2

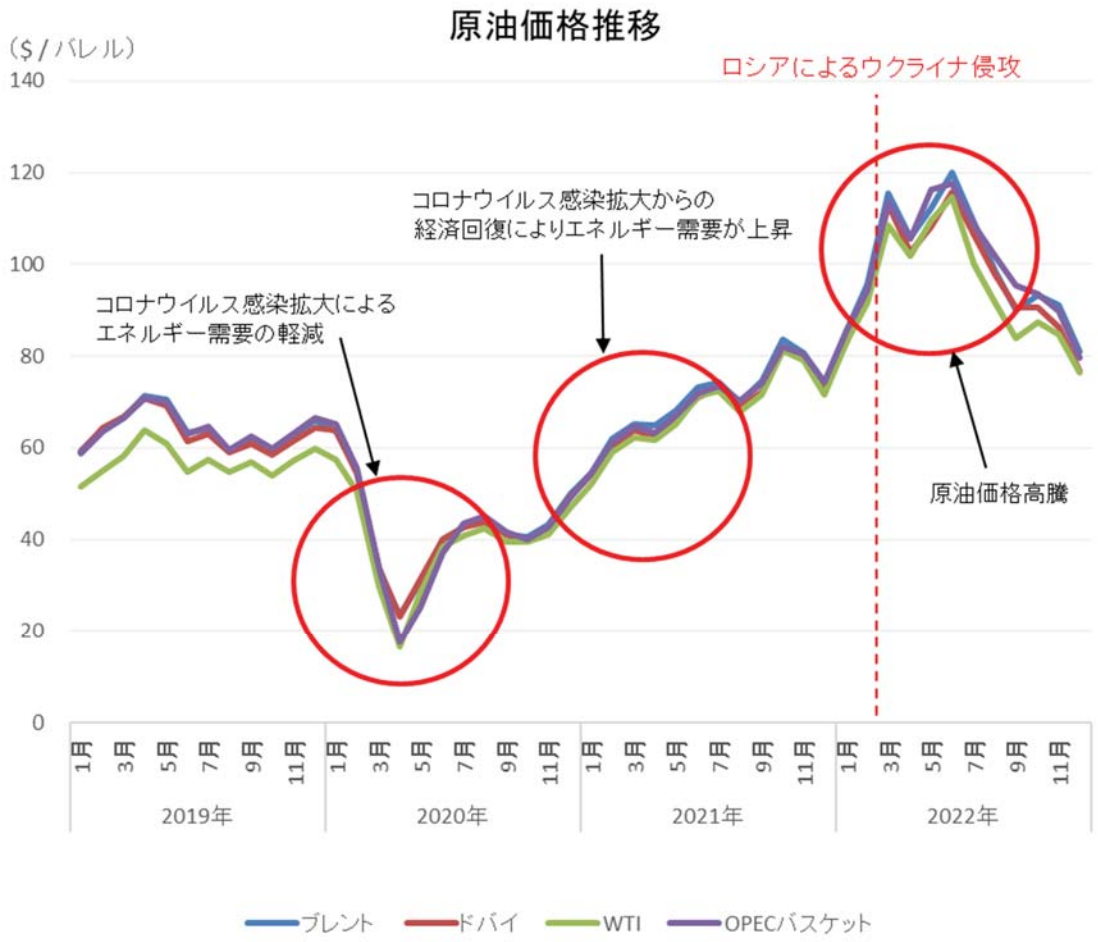

図 5.1　原油価格の推移（OPEC より筆者作成）

（筆者注：OPEC バスケットは、OPEC 諸国の代表的な原油価格を加重平均した値）

EU 等による原油と石油製品を対象とする法的制裁は、ロシア産原油の大半が海上輸送されていることから、海事業界に大きな影響を与えている一方で、輸送距離の増大（トンマイルの増加）をもたらすという現象も生じている[127]。クラークソンによると、ロシア産原油への EU の制裁措置によって、ロシアによる欧州への原油輸出量は大きく減少し、ロシアの輸出は次第にアジア（特にインド）へと向かっている。また、トンマイル増加の理由としては、欧州各国は中東、西アフリカ、米国、南米からの資源輸入量を増やすであろうことによる輸送距離の増大が考えられている。

[127] https://shippingwatch.com/carriers/Tanker/article13812913.ece

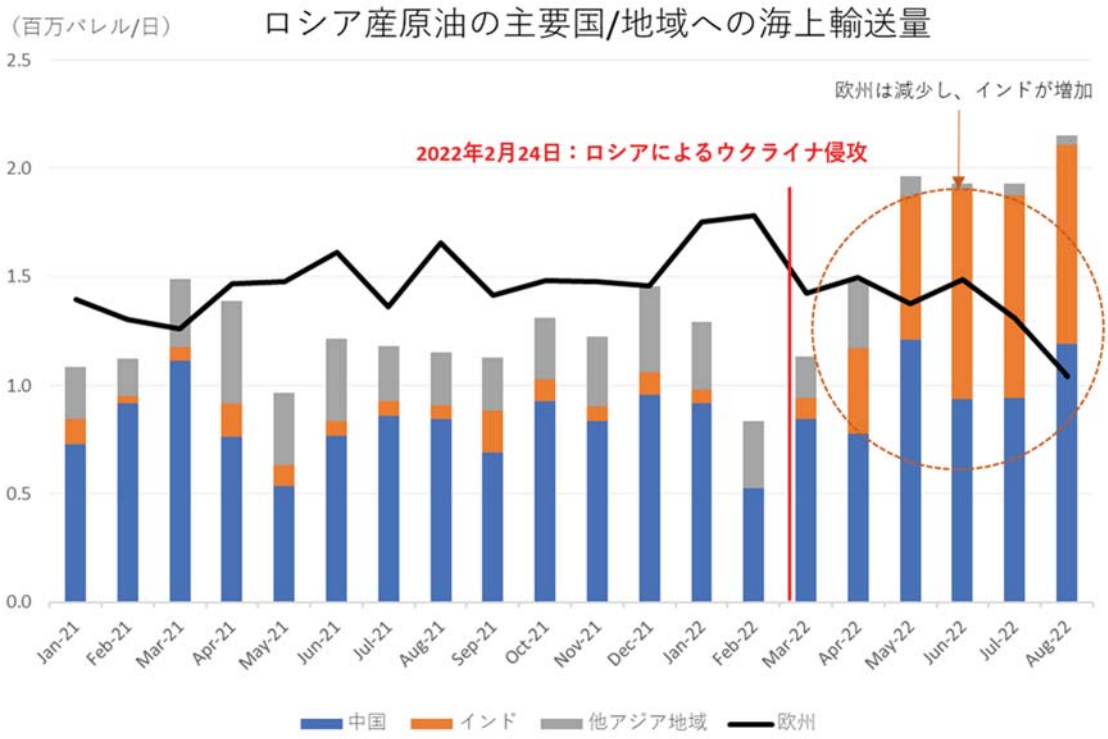

図 5.2　ロシア産原油の主要国/地域への海上輸送量（クラークソンより筆者作成）

図 5.3　海上石油貿易における平均輸送距離の増大（クラークソンより筆者作成）

5.2　天然ガス

ウクライナ侵攻後、EU のロシア産天然ガス輸入への依存が再び浮き彫りとなった。EU によるロシアからのパイプラインを経由した天然ガス輸入は 2021 年に年間で約 1,400 億立方メートルに達した。それに加え、約 150 億立法メートルが液化天然ガス（LNG）として輸入されていた[128]。

欧州は、2020 年時点において、天然ガス輸入量の 41.1%をロシアから輸入[129]していたが、上記からそのほとんどが天然ガスパイプラインによって輸入されていたことが分かる。ロシア産ガスからの脱却には、REPowerEU の柱である（１）エネルギーの効率化などによる省エネの向上、（２）エネルギー供給の多様化、（３）欧州における再生可能エネルギーへの移行の加速、が必要となるが、足元では LNG 輸送船による代替国からの輸入が考えられるだろう。一方で、LNG 輸入には受入基地で液体から気体に戻す再ガス化が必要となるが、欧州には再ガス化のための施設が不足しているという問題点もあった[130]。

ロシアによるウクライナ侵攻直前の 2022 年 2 月 21 日、ロシアのプーチン大統領は、「ドネツク人民共和国」、「ルハンスク人民共和国」の独立を承認する大統領令と、両国との相互援助条約に署名した[131]。これを受けて、ドイツのオラフ・ショルツ首相は、ロシアによる独立承認は「ミンスク 2 合意に反する国際法上重大な違反」と厳しく非難するとともに、ロシアとドイツを結ぶ天然ガスパイプライン「ノルドストリーム 2」の承認手続き停止を表明した[132]。「ノルドストリーム 2」は、天然ガス輸入の 50%以上をロシアからの供給に依存する[133]ドイツにとって重要なプロジェクトとなっていたが、地政学的なリスクなどからこれまでも稼働について議論されてきた[134]。

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[128] https://www.iea.org/reports/a-10-point-plan-to-reduce-the-european-unions-reliance-on-russian-natural-gas
[129] https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220328-2#:~:text=In%202020%2C%20the%20EU%20imported,and%2011%25%20solid%20fossil%20fuels.
[130] https://www.reuters.com/business/energy/brimming-european-lng-terminals-have-limited-space-more-gas-2022-02-17/
[131] https://edition.cnn.com/europe/live-news/ukraine-russia-news-02-21-22/h_fcf8c95f9e69b343087651747ab9acd1
[132] https://www.deutschland.de/en/videos/federal-government-halts-nord-stream-2-certification
[133] https://www.weforum.org/agenda/2022/08/energy-crisis-germany-europe/#:~:text=Germany%20has%20decided%20to%20replace,the%20end%20of%20June%202022.
[134] https://www.france24.com/en/europe/20220130-nord-stream-2-russia-germany-gas-pipeline-becomes-a-geopolitical-lever

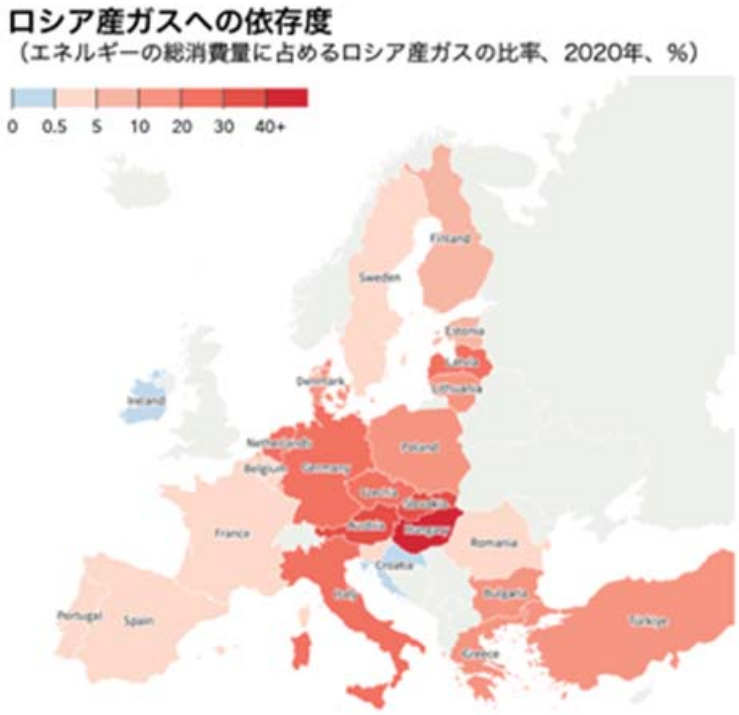


図 5.4　欧州のロシア産ガスの依存度（IMF）

天然ガスの主要市場は原油と同じく北米、欧州、アジアだが、価格決定方式は地域ごとによって異なる。原油のような指標（WTI、ブレント、ドバイなど）となるガス価格は存在（米国ヘンリーハブガス価格（HH）、オランダガス価格（TTF）、英国ガス価格（NBP）及び北東アジアのアセスメントされたスポット LNG 価格（JKM））するが、各国の天然ガス需給によって価格が決定されることが多い。すなわち、各国における LNG 輸入価格は、ガス需給の逼迫状況等によって異なると考えられる。

ロシアによるウクライナ侵攻後、欧州がロシア産天然ガスからの脱却を目指したことで、短期的な需給バランスが大きく崩れた結果、天然ガス価格は欧州のみならずアジアでも高値を付けた。

図 5.5　天然ガス価格推移（世界銀行より筆者作成）

上記に挙げたように、欧州では LNG 再ガス化のための受入れ施設が不足[135]していたが、LNG 輸入能力は今後 2024 年末までに 2021 年比で 34%まで拡大する見込みである[136]。欧州各国は再ガス化プロジェクトに着手している。

欧州の再ガス化プロジェクトの多くは、浮体式貯蔵・再ガス化装置（FSRU）を用船し、再ガス化した天然ガスを陸上のパイプラインに接続するためのターミナルを建設することにより、比較的短期間で開発することが可能である。欧州におけるその他の再ガス化プロジェクトは、既存の陸上ターミナルの容量及び処理能力を拡大させるものである。中でも、パイプラインでロシア産ガスへの依存度が高かったドイツは FSRU による LNG 受け入れに積極的である。パイプラインによる輸入を減らす一方で、これ

[135] https://www.reuters.com/business/energy/brimming-european-lng-terminals-have-limited-space-more-gas-2022-02-17/
[136] https://www.eia.gov/todayinenergy/detail.php?id=54780

まで 6 隻の FSRU を用船（ドイツ政府として 5 隻、民間コンソーシアムで 1 隻）し[137]、米国[138]やカタール[139]などから LNG 調達の長期契約を締結している。その他の EU 各国も FSRU の用船契約を締結している[140]。LNG 船のスポット用船料は高騰し、一時は日建てで 44 万ドル超となった[141]。

5.3 石炭

第 3 節で触れたように、EU 及び英国はロシアからの石炭の輸入を禁止している。特に EU は対ロシア制裁パッケージ第 5 弾[142]の一環として 2022 年 4 月に採択され、EU にとってロシアのエネルギー産業を直接対象とする最初の制裁となった。

ロシアのエネルギーから脱却する一方で、欧州としては REPowerEU 政策の柱の一つである「エネルギー供給の多様化」を目指すのだが、エネルギー不足への懸念が深刻化すると、エネルギー安全保障の観点から、短期的には原油や天然ガスの輸入よりも単価の安い石炭に一時期な回帰を見せることとなった[143]。

英国では、冬（2022 年冬）のエネルギー安全保障強化のために、発電大手の Drax 及び供給事業者の National Grid ESO が英国政府の要請を受け石炭火力発電所の稼働を一時的に延長することに合意した[144]。ドイツもまた、ガス消費量を抑える緊急措置を発表し[145]、代替策として石炭火力発電の稼働を増やした[146]。こうした石炭火力発電所の稼働延長や再稼働の動きは、EU 各国でも見られるが、あくまでエネルギー安全保障

[137] https://lngprime.com/europe/germanys-first-lng-terminal-starts-supplying-gas-to-grid/69441/
[138] https://www.bloomberg.com/news/articles/2022-06-21/germany-s-enbw-signs-long-term-deal-to-buy-lng-from-the-us
[139] https://www.reuters.com/business/energy/qatarenergy-conocophillips-sign-lng-supply-deal-germany-2022-11-29/
[140] https://www.eia.gov/todayinenergy/detail.php?id=54780
[141] https://splash247.com/lng-rates-climb-to-450000-a-day/
[142] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022R0576
[143] https://www.euronews.com/green/2022/06/24/all-the-european-countries-returning-to-dirty-coal-as-russia-threatens-to-turn-off-the-gas
[144] https://www.drax.com/investors/six-month-extension-of-coal-operations-at-request-of-uk-government/
[145] https://www.bmwk.de/Redaktion/DE/Pressemitteilungen/2022/07/20220721-bundesministerium-fur-wirtschaft-und-klimaschutz-legt-zusatzliches-energiesicherungspaket-vor.html
[146] https://www.dw.com/en/germany-reactivates-coal-fired-power-plant-to-save-gas/a-62893497

の支援のための緊急的措置であると考えられる。短期的ではあるが、こうした石炭への回帰の影響を受けて、石炭の価格も他のエネルギー源と同様に上昇した。

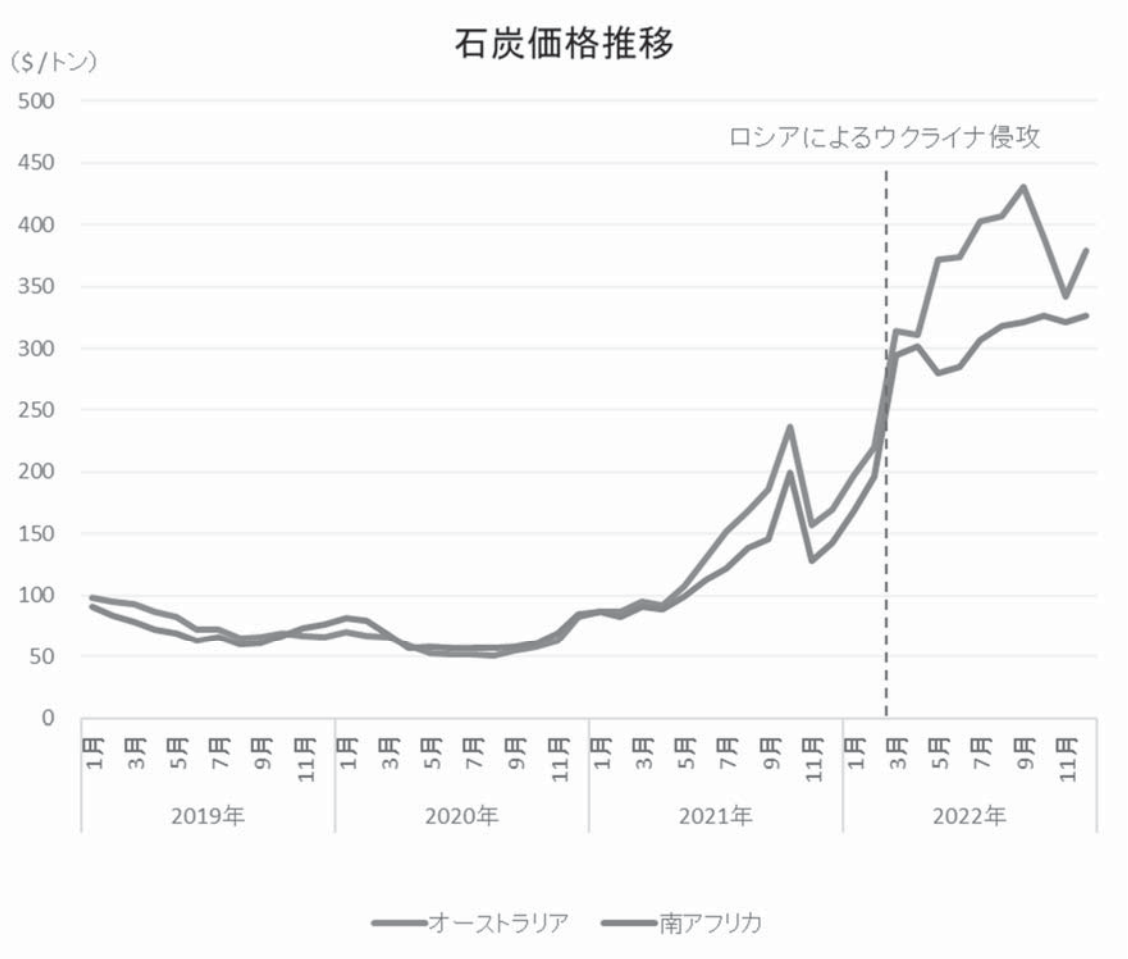


図 5.6　石炭価格推移（世界銀行より筆者作成）

クラークソンによると、欧州における石炭貿易は、オーストラリア、南アフリカ、インドネシアといったより遠方のサプライヤーからの輸入を増やし、欧州におけるトンマイルベースの石炭輸入は、2021 年比で約 2 倍の水準になると考えられている。

5.4　エネルギー安全保障

世界的にエネルギー価格が急騰し、各国がエネルギー源の確保に奔走する中、エネルギー安全保障が大きくクローズアップされた。このエネルギー問題の状況は、新型コロナウイルス感染拡大に始まったと考えられる。当時はロックダウン等の影響によ

り外出が制限され、主にサービス業界や産業界において特に石油の需要が大きく減った[147]。産油国は石油の需給バランスが崩れる中、OPEC+（中東、アフリカを中心とした産油国からなる石油輸出国機構（OPEC）の加盟国 13 カ国に、ロシアやメキシコなど 10 カ国を加えた組織）による生産調整が成立し[148]、投資と生産のペースを落とした。新型コロナウイルス感染拡大から世界経済が回復基調に向かう中、今度は石油の需要が供給を上回った。

この状況下、ロシアによるウクライナ侵攻によって、「石炭を段階的に廃止し、再生可能エネルギーを段階的に導入するエネルギー源の転換期において、ロシアの天然ガスに依存」していた欧州は、ロシアのエネルギーからの脱却を目指すことになるのだが、ロシアは欧州の制裁措置への報復として、欧州へのガス供給を大幅に削減した[149]。このような状況がエネルギー危機を招く大きな要因となったと考えられる。

欧州はロシアからの天然ガスのほとんどをパイプラインによって輸入していた[150]が、パイプラインはかつて、完全に地域的な燃料供給であった。しかし、LNG の台頭により天然ガス供給がグローバル化し、とある場所での危機が LNG 市場を通じて他の地域に波及する可能性が出てきたと考えられている[151]。

結果的にではあるが、ロシアからのガス供給の大幅な削減と、代替国からの LNG 輸入、REPowerEU 計画による再生可能エネルギーへの移行の加速などによって、2022 年 10 月時点では、欧州はロシア産ガスの依存度をこれまでの約 40%から 7.5%まで引き下げている[152]。

ロシアによるウクライナ侵攻を受けて、3.1 で述べたように、欧州委員会（EC）はロシア産エネルギー問題の対応策となる「REPowerEU」計画を発表した[153]。2022 年 5 月

[147] https://www.oecd.org/coronavirus/policy-responses/the-impact-of-coronavirus-covid-19-and-the-global-oil-price-shock-on-the-fiscal-position-of-oil-exporting-developing-countries-8bafbd95/
[148] https://www.ft.com/content/2a91fd26-c337-427f-8b24-9f53bc321bb2
[149] https://www.iea.org/news/natural-gas-markets-expected-to-remain-tight-into-2023-as-russia-further-reduces-supplies-to-europe
[150] https://www.iea.org/reports/a-10-point-plan-to-reduce-the-european-unions-reliance-on-russian-natural-gas
[151] https://www.imf.org/en/Publications/fandd/issues/2022/12/cafe-econ-in-search-of-energy-security
[152] https://www.aa.com.tr/en/europe/eu-has-reduced-share-of-russian-gas-imports-to-75-eu-commission-chief/2707526#:~:text=The%20European%20Union%20has%20reduced,in%20the%20country%27s%20capital%20Tallinn.
[153] https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131

にデンマークで開催された北海サミットでは、ドイツ、デンマーク、オランダ、ベルギーの 4 カ国が洋上風力発電の導入を大幅に加速させる誓約（コミットメント）を発表した[154]。この誓約では、北海における洋上風力発電ファームと電力グリッドを結び、複数の加盟国に接続するハイブリッド洋上風力提携プロジェクトを開発し、北海地域を「Green Power Plant of Europe」として発展させ、EU へのグリーン電力を供給することが定められている。上記 4 カ国における洋上風力の発電容量を、2030 年までに少なくとも合計 65 ギガワット、2050 年までに少なくとも合計 150 ギガワットまで拡大するという目標を掲げている[155]。150 ギガワットは現在の発電能力の 10 倍に相当するとともに、EU の気候中立達成のために必要な洋上風力発電容量の半分以上を北海地域が供給できることになる[156]。さらに、将来的には洋上風力発電によるグリーン水素の製造や地域における水素インフラの拡充に関する協力も強化していくとしている[157]。

[154] https://www.bmwk.de/Redaktion/DE/Downloads/Energie/20220518-declaration-of-energy-ministers.pdf?__blob=publicationFile&v=10
[155] https://investindk.com/insights/north-sea-summit-repowereu#:~:text=THE%20north%20sea%20summit,-On%20May%2018th&text=At%20the%20summit%2C%20Belgium%2C%20the,reach%20climate%20neutrality%20in%20Europe.
[156] https://www.iea.org/reports/renewables-2021
[157] https://www.bmwk.de/Redaktion/DE/Pressemitteilungen/2022/05/20220518-energieminister-der-vier-nordseeanrainerstaaten-unterzeichnen-kooperation.html

6. まとめ

ロシアとウクライナ両国のこれまでの複雑な歴史的な背景により、ロシアは強行的にウクライナに軍事侵攻を開始した。同じルーツを持つ兄弟国であり、元々はソ連の構成国であった両国だが、次第に親欧米路線へと舵を取るウクライナ政権に対して、かつての大国復活を目指して勢力を取り戻すことを狙っているロシアが圧力をかけ、違法な侵攻を開始したと考えられる。

両国は世界における重要な一次産品輸出国であり、世界全体の小麦の 30%、トウモロコシや化学肥料、天然ガスの 20%、原油の 11%を両国で占めていた。しかし、このウクライナ侵攻に伴い、原油や天然ガス、穀物などの国際価格は急騰した。こうした一次産品の価格高騰は、新型コロナウイルス感染拡大による影響から緩やかな回復基調であった世界の経済成長を鈍化させるだけではなく、インフレ圧力の上昇へとつながった。

穀物の輸出に関しては、侵攻直後から黒海が事実上封鎖されたことにより、ウクライナの港には数百万トンともいわれる穀物が滞留した。さらに、穀物が輸出できなかったことにより、中東や北アフリカなどを中心に食糧不足などの混乱が生じた。その後、トルコと国連の仲介により黒海からのウクライナ産穀物を中心とした貨物の安全輸出のための合意である「黒海穀物イニシアティブ」が署名され、同合意による穀物輸出は侵攻前の水準近くまで改善されるとともに、現在までに主に中国、スペイン、トルコ、イタリア、オランダ、エジプトなどに向けて約 2,120 万トンの穀物が 830 隻の船舶で輸出されている。一方で、2023 年第 1 四半期に迎える、黒海穀物イニシアティブの更新などの不確実性も残っている。

欧州連合（EU）の 27 カ国は、2020 年時点において、エネルギー需要においてロシアへの依存度が高く、需要全体の 24.4%をロシアからの輸入していた。エネルギー源ごとに見ると、天然ガス輸入量の 41.1%、原油輸入量の 36.5%、石炭輸入量の 19.3%をロシアが占めていた。しかし、ウクライナ侵攻以降、EU はロシアに対するエネルギー禁輸政策を進めており、欧州委員会（EC）はロシア産エネルギーからの脱却と対応策となる「REPowerEU」計画を発表した。EU がロシア産エネルギーへの依存を 2022 年末までに大幅に低下させ、2030 年より早い段階で脱却を目指すものである。
「REPowerEU」は（１）エネルギーの効率化などによる省エネの向上、（２）エネル

ギー供給の多様化、（３）欧州における再生可能エネルギーへの移行の加速を通じた化石燃料の早期代替を計画の柱としている。

ロシアによるウクライナ侵攻後、EU、英国、米国などを中心にロシアに対して厳しい法的制裁を科した。制裁の目的は、ロシアの物資や戦費の調達を困難にし、資金不足によってロシアから継戦能力を奪うことにある。さらに、ロシアの原油輸出から得る収入を制限するとともに、世界的な原油価格ショックを回避する目的で、国際的な原油等の上限価格を設定した。海事業界に影響を及ぼすロシアに対する制裁措置等としては、欧米によるロシア産の原油や石炭の輸入禁止、ロシア関係船舶の EU 域内港への寄港禁止 、国際船級協会連合（IACS） 及びパリ MoU へのロシアの加盟取り消し、設定した上限価格を上回る原油の海上輸送に関する保険提供の禁止等が挙げられる。

欧州は、ロシア産エネルギーからの脱却、ロシアに対するエネルギー禁輸政策、欧州の対ロシア制裁措置への報復となるロシアから欧州へのガス供給の大幅な削減、世界的なエネルギー価格高騰などから生じたエネルギー危機を招くこととなったが、代替国からの輸入や再生可能エネルギーへの移行の加速などを通じて、2022 年の冬を乗り越えることは出来た。

欧州各国による再生可能エネルギーへの移行は着実に進んでいると考えられ、各地域において新規のプロジェクトが開発される。ロシア産エネルギーからの脱却によって、欧州のグリーンエネルギーの推進は加速するだろう。

最後に、このロシアによる違法なウクライナ侵攻によって、多くの命が奪われ続けている。ウクライナの情勢に深く憂慮すると共に、様々な関係者の間で行われている平和的解決への努力が早期に実を結び、平穏な日常が取り戻せることを心から祈念している。

【付録】REPowerEU 計画関連文書

EUROPEAN
COMMISSION

Brussels, 18.5.2022
COM(2022) 230 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

REPowerEU Plan

{SWD(2022) 230 final}

Introduction

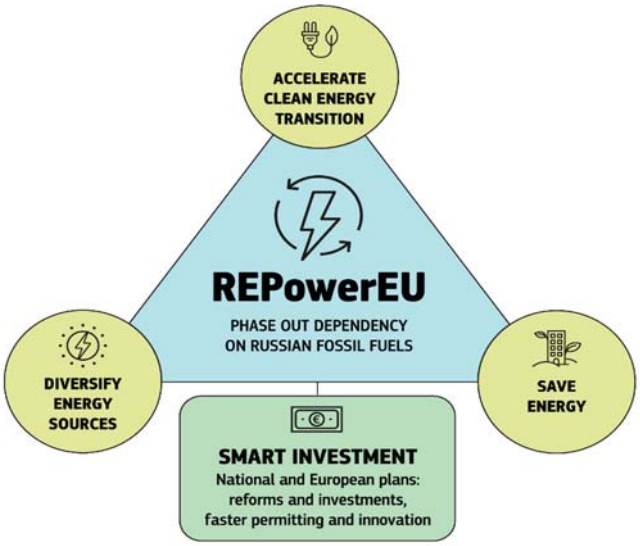
Russia's unprovoked and unjustified military aggression against Ukraine, has massively disrupted the world's energy system. It has caused hardship as a result of high energy prices and it has heightened energy security concerns, bringing to the fore the EU's over-dependence on gas, oil and coal imports from Russia. High amounts paid for Russia's fossil fuels are helping Russia sustain its war against Ukraine.

In March 2022, EU leaders agreed in the European Council[1] to phase out Europe's dependency on Russian energy imports as soon as possible. Drawing on the Commission's communication[2], they invited the Commission to swiftly put forward a detailed REPowerEU plan. Coal and oil imports are now to be covered by the sanctions regime. The recent gas supply interruptions to Bulgaria and Poland demonstrate the urgency to address the lack of reliability of Russian energy supplies.

REPowerEU is about rapidly reducing our dependence on Russian fossil fuels by fast forwarding the clean transition and joining forces to achieve a more resilient energy system and a true Energy Union.

We can significantly reduce our dependency on Russian fossil fuels already this year, and accelerate the energy transition. Building on the Fit for 55 package of proposals and completing the actions on energy security of supply and storage, this REPowerEU plan puts forward an additional set of actions to[3]:

- save energy;
- diversify supplies;
- quickly substitute fossil fuels by accelerating Europe's clean energy transition;
- smartly combine investments and reforms.



1 European Council Conclusions (24 and 25 March 2022)
2 Communication on REPowerEU: Joint European Action for more affordable, secure and sustainable energy, COM(2022) 108 final, (8.3.2022)
3 See the complete list of actions in Annex 1

Taken together, these actions will structurally transform EU's energy system. They require effective coordination between European regulatory and infrastructure measures, as well as national investment and reforms and joined-up energy diplomacy. They also require coordination between action on the demand side, to reduce energy consumption and transform industrial processes to replace gas, oil and coal with renewable electricity and fossil-free hydrogen, with action on the supply side to create the capacity and framework to roll out and produce renewable.

Fairness and solidarity are defining principles of the European Green Deal. Our joint action to accelerate the clean energy transition therefore reinforces the need for effective employment, skills and social policies, in line with the European Pillar of Social Rights.Dependence amongst Member States on Russian energy sources differs as the energy situationand energy mixes differ from one country to the other. The approach taken in this REPowerEU plan reflects these differences and proposes a variety of balanced responses corresponding to the specific Member States needs whilst moving the EU as a whole towards climate neutrality by 2050.

REPowerEU builds on the full implementation of the Fit for 55 proposals tabled last year without modifying the ambition of achieving at least -55 % net GHG emissions by 2030 and climate neutrality by 2050 in line with the European Green Deal. It will have a positive impact on EU's emission reduction over the decade. However, the fast phasing out of fossil fuel imports from Russia will affect the transition trajectory, or how we reach our climate target, compared to that under previous assumptions.

The REPowerEU plan cannot work without a fast implementation of all Fit for 55 proposals and higher targets for renewables and energy efficiency. In the new reality, the EU's gas consumption will reduce at a faster pace, limiting the role of gas as a transitional fuel. However, shifting away from Russian fossil fuels will also require targeted investments for security of supply in gas infrastructure and very limited changes to oil infrastructure alongside large-scale investments in the electricity grid and an EU-wide hydrogen backbone. In parallel, some of the existing coal capacities might also be used longer than initially expected, with a role for nuclear power and domestic gas resources too.

The public expects the EU and its Member States to follow through on the commitments made to reduce our dependence on Russian fossil fuels. 85% of people polled believe that the EU should reduce its dependency on Russian gas and oil as soon as possible. 84% agree that Russia's aggression against Ukraine makes it more urgent for EU Member States to invest in renewable energy[4].

While some Member States have already announced their intention to end fossil fuel imports from Russia**, no Member State can tackle this challenge on its own.** By carrying out joint needs assessments and planning, joint purchases and greater coordination, we will ensure that the phasing out of our dependency on Russian fossil fuels is both achievable and affordable for all Member States. Legislation on renewable and energy efficiency will help realise ambitious targets. A truly interconnected and resilient EU energy network will provide energy security for all. These actions constitute our plan to repower the EU.

[4] Flash Eurobarometer 506: EU's response to the war in Ukraine, 5 May 2022.

1. Energy savings

Savings are the quickest and cheapest way to address the current energy crisis. Reducing energy consumption cuts households' and companies' high energy bills in the short and long term, and decreases imports of Russian fossil fuels. Reducing energy consumption through higher efficiency is a vital component of the clean energy transition which increases the resilience of the EU economy and shields its competitiveness against high fossil fuel prices.

Saving energy will help our supplies go further in the critical months ahead, while investments are being rolled out. The accompanying EU Save Energy Communication presents a two-pronged approach: strengthening structural change with mid- to long-term energy efficiency measures and achieving immediate energy savings through behavioural changes.

Fit for 55 would lower our gas consumption by 30% by 2030, with more than a third of such savings coming from meeting the EU energy efficiency target. Updated modelling assesses the impact of the phase out of Russian fossil fuel dependence[5] in terms of higher energy prices and lower use of natural gas. A further reduction of energy consumption compared to the previous Energy Efficiency Directive proposal[6] and higher renewable energy targets would enable the EU to fully meet the REPowerEU objectives, with other parts of the Fit for 55 package unchanged.

- The Commission therefore proposes to increase to 13% the binding target in the Energy Efficiency Directive.

In addition, the Commission invites the Parliament and Council to enable additional savings and energy efficiency gains in buildings through the Energy Performance of Buildings Directive, and to uphold the ambition of the Commission proposal for a Regulation on Ecodesign for Sustainable Products[7], the rapid deployment of which will lead to further energy savings through improved energy and resource efficiency of a broad range of products.

Pending agreement on the legislative measures, immediate energy savings can be made by changing our behaviour. The European Commission has launched, in cooperation with the International Energy Agency (IEA), a nine-point plan "Playing my part" for reducing energy use in the EU. Based on input from stakeholders, the IEA estimates that these types of short-term energy saving measures could achieve a 5% reduction in the demand for gas (around 13 bcm) and in that for oil (around 16 mtoe).

Member States should also make full use of supporting measures such as reduced VAT rates for high efficiency heating systems and for insulation in buildings and other energy pricing measures, which encourage switching to heat pumps and purchase of more efficient appliances. Such measures should cushion social and distributional impacts, e.g. focusing on vulnerable households struggling to pay their energy bills and to manage the potential impact of the accelerated energy transition on the labour market, with immediate upskilling and reskilling needs.

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5 REPowerEU scenario in the staff working document Implementing the REPowerEU Action Plan: Investment Needs, Hydrogen Accelerator and Achieving the Bio-methane Targets, accompanying this communication.

6 COM(2021) 558 final, 14.7.2021

7 COM(2022) 142 final, 30.03.2022

Stepped up implementation and ambitious updating of **National Energy and Climate Plans (NECPs)** are key in delivering the REPowerEU objectives. NECPs have a crucial role in enhancing investor confidence and investment predictability. They provide a good framework for planning and encouraging the reduction of use of fossil fuels.

- The Commission intends to publish guidance later this year for the Member States' update of their NECPs in 2024 and will report progress on REPowerEU, among others, through the State of the Energy Union and Climate Action reports.

Regions and cities are playing a leading role in developing energy saving measures tailored to their local context. They should launch awareness and information and support schemes, energy audits and energy management plans, pledging savings targets, and ensure citizens' engagement such as through the European Mission on climate-neutral and smart cities or the European Urban Initiative under cohesion policy.

2. Diversifying energy imports

The EU has been working intensively with international partners for several months to diversify supplies[8] and mitigate the rise in energy prices.

Following the mandate by the European Council in March, the Commission and Member States have set up an **EU Energy Platform for the voluntary common purchase of gas, LNG and hydrogen.** On 5 May, the Commission and Bulgaria set up a first regional taskforce, as part of the EU's Energy Purchase Platform, in coordination with neighbours in the south east of Europe.

The EU Energy Platform will fulfil three functions supporting common purchase of gas:

- Demand aggregation and structuring: The demand pool will identify and aggregate contestable volumes based on expiring long-term contracts as well as flexible volumes under existing long-term gas contracts which could lead to roughly 30-70 bcm of demand in the short term. In addition, the Commission will encourage diversification of supply and will consider legislative measures to require such diversification over time. Demand pooling will be supported by electronic tools, which will make the process secure, automated and user friendly.
- Optimised and transparent use of the import, storage and transmission gas infrastructure maximising security of supply and replenishment of storage.
  A mechanism and an IT tool will be put in place to improve the transparency in infrastructure bookings i.e. remaining availability, secondary markets, rerouting and existing bottlenecks. The exchange of information will be in line with antitrust rules.
- International outreach: Joined up international outreach will focus on concluding long-term cooperation frameworks with trusted partners via binding or non-binding agreements that support the purchasing of gas and hydrogen and clean energy project development, while fully using the collective strength of the Union.

As a next step, the Commission will consider developing a voluntary operational 'joint purchasing mechanism' responsible for negotiating and contracting on behalf of participating Member States of the aggregated gas demand and competitive release to the market. Such mechanism could take the form of a Joint Venture or a business-owned entity, leveraging the

[8] EU-US_LNG_2022_2.pdf (europa.eu)

power of the European market. Such a construct will be subject to review of its impact on competition.

The Platform will also work through Regional Task Forces, which will identify needs and diversification of supply options and coordinate on contractual issues[9]. The Platform will set up a dedicated work stream with Member States on joint purchasing of hydrogen[10].

Industry expertise on the global energy market will be important for the success of the Platform. An Advisory Group will inform the Platform on issues such as LNG trade, financing, hedging and other elements along the value chain. The exchange of information will have to be compliant with antitrust rules.

In line with the conclusions of the European Council the EU Energy Platform is open for the Energy Community Contracting Parties (Western Balkans, Ukraine, Moldova, Georgia). The Platform should also benefit EU's partners in its close neighbourhood, partners who are committed to the EU's internal market rules and joint security of supply. The Platform will work closely with the Energy Community Secretariat to assist the Contracting Parties to make the most of the Platform.

The emergency synchronisation of the electricity grids of Ukraine and Moldova with Europe's grid mid-March shows the commitment to ensure Ukraine's and Moldova's interconnection with the EU's power grid. As soon as the necessary technical improvements are completed, it will allow Member States in the region to purchase excess electricity from Ukraine, thus compensating for some of the reduced gas imports.

With a full implementation of the REPowerEU plan, high prices, gas alternatives (sustainable biomethane, renewable hydrogen), further deployment of renewables, and structural demand measures such as energy efficiency, EU gas demand is expected to decrease at a faster rate than foreseen under Fit for 55. The EU will provide its international partners with long-term perspectives for mutually beneficial cooperation by integrating hydrogen and renewable energy development and trade, as well as cooperation on methane emission reduction strategies in the gas diversification efforts, as described in the External Energy Engagement Strategy[11].

Diversification options are also important for Member States currently dependent on Russia for nuclear fuel for their reactors serving either power generation[12] or non-power uses[13]. This requires working within the EU and with international partners to secure alternative sources of uranium and boosting the conversion, enrichment and fuel fabrication capacities available in Europe or in EU's global partners. In addition to diversifying external suppliers, continuing domestic natural gas production for Member States where this is possible can contribute to strengthen security of supply.

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9 On 5 May, the Commission and Bulgaria set up a first regional taskforce, as part of the EU's Energy Platform, in coordination with neighbours in the South East of Europe. Further Regional Task Forces, covering Central Eastern Europe, North-West and the Baltics will be proposed soon. In this context, it is important that the biggest energy markets of the EU, with access to diversification infrastructure such as LNG terminals, are active participants in the diversification and security of supply efforts of the Platform.

10 This dedicated hydrogen purchasing work stream will operationalise the European Global Hydrogen Facility, drawing on the experience of H2Global and of the Euratom Supply Agency, to be established under the EU Energy Platform.

11 EU external energy engagement in a changing world, JOIN(2022) 23, (18.05.2022)

12 Five Member States (Bulgaria, Czechia, Finland, Hungary, Slovakia) currently have VVER reactors operated on their territory, all fully reliant at present on fuel supplied by a Russian provider.

13 Medium Power Research Reactors (MPRRs), which include reactors in Czechia, Hungary, Poland, are characterised by their original Soviet design and are still dependent for fuel on the monopoly Russian manufacturer.

3. Substituting fossil fuels and accelerating Europe's clean energy transition

A massive speed-up and scale-up in renewable energy in power generation, industry, buildings and transport will accelerate our phasing out of Russian fossil fuels**.** It will also, over time, lower electricity prices and reduce fossil fuel imports.

Boosting renewable energy

- Based on its modelling of impacts and feasibility[14], the Commission is proposing **to increase the target in the Renewable Energy Directive to 45% by 2030, up from 40% in last year's proposal**. This would bring the total renewable energy generation capacities to 1236 GW by 2030, in comparison to 1067 GW by 2030 envisaged under Fit for 55 for 2030.
- **Solar** photovoltaics (PV) is one of the fastest technologies to roll out. That is why the Commission sets the **REPowerEU target of over 320 GW of solar photovoltaic newly installed by 2025**, over twice today's level, and almost 600 GW by 2030**.** As part of the increased ambition for solar, the Commission:
- presents the **EU solar strategy[15]** ;
- introduces the **European Solar Rooftop Initiative** anchored around a legally binding EU solar rooftop obligation for certain categories of buildings.

Wind energy, in particular offshore wind represents a significant future opportunity: resources are stable, abundant and public acceptance is higher. Europe is the global leader in offshore wind. To further strengthen the EU **wind** sector's global competitiveness, and achieve the REPowerEU ambition with fast wind energy deployment, supply chains need to be strengthened and permitting drastically accelerated.

The European Union should aim at doubling the current deployment rate of individual **heat pumps,** resulting in a cumulative 10 million units over the next 5 years. Member States can accelerate the deployment and integration of large-scale heat pumps, geothermal and solar thermal energy in a cost-effective way by:

- developing and modernising district heating systems which can replace fossil fuels in individual heating;
- clean communal heating, especially in densely populated areas and cities;
- exploiting industrial heat whenever available.

To strengthen the supply chains for solar, wind and heat pump technologies and make them more sustainable, the Commission will:

- enhance the regulatory framework and ensure life-cycle sustainability, by tabling, in the first quarter of 2023, ecodesign and energy labelling requirements for solar PVs, and by revising existing requirements for heat pumps.

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[14] Commission Staff Working Document Implementing the REPowerEU Action Plan: Investment needs, Hydrogen Accelerator and Biomethane Targets, accompanying this communication.

[15] EU solar energy strategy, COM(2022) 221, (18.05.2022)

- support efforts from Member States to pool their public resources via potential Important Projects of Common European Interest (IPCEI) focused on breakthrough technologies and innovation along the solar and wind energy and heat pumps value chains.

To promote the development of electricity storage capacities, the Commission proposes to consider storage assets as being in the overriding public interest and facilitate permitting for their deployment.

Accelerating hydrogen

Renewable hydrogen will be key to replace natural gas, coal and oil in hard-to-decarbonise industries and transport. REPowerEU sets a target of 10 million tonnes of domestic renewable hydrogen production and 10 million tonnes of renewable hydrogen imports by 2030. The Commission:

- calls upon the European Parliament and the Council to align the sub-targets for renewable fuels of non-biological origin under the Renewable Energy Directive for industry and transport with the REPowerEU ambition (75% for industry and 5% for transport)[16] and to rapidly conclude the revision of the Hydrogen and Gas Market package;
- will top-up Horizon Europe investments on the Hydrogen Joint Undertaking (EUR 200 million) to double the number of Hydrogen Valleys;
- publishes for public feedback **two Delegated Acts on the definition and production of renewable hydrogen;**
- intends to complete the assessment of the first Important Projects of Common European Interest on hydrogen by the summer;
- calls on industry to **accelerate the work on missing hydrogen standards**, in particular for hydrogen production, infrastructure and end-use appliances;
- will regularly report, in close cooperation with the Member States, starting in 2025, on hydrogen uptake, and the use of renewable hydrogen in hard-to-abate appliances in industry and transport.

Accelerated efforts are needed to deploy **hydrogen infrastructure** for producing, importing and transporting 20 million tonnes of hydrogen by 2030. Cross-border hydrogen infrastructure is still in its infancy, but the basis for planning and development has already been set by the inclusion of hydrogen infrastructure in the revised trans-European networks for energy. Total investment needs for key hydrogen infrastructure categories are estimated to be in the range of EUR 28 – 38 billion for EU-internal pipelines and 6 - 11 billion for storage.

To facilitate the **import of up to 10 million tonnes of renewable hydrogen**, the Commission will support the development of three major hydrogen import corridors via the Mediterranean, the North Sea area and, as soon as conditions allow, with Ukraine. Green Hydrogen Partnerships will facilitate the imports of green hydrogen while supporting the decarbonisation

[16] Commission Staff Working Document Implementing the REPowerEU Action Plan: Investment needs, Hydrogen Accelerator and Achieving the Bio-methane Targets, accompanying this communication.

in the partner countries. Other forms of fossil-free hydrogen, notably nuclear-based, also play a role in substituting natural gas (see map).

To help achieve these targets, the Commission will:

- map preliminary hydrogen infrastructure needs by March 2023, based on the TEN-E Regulation, in a process involving Member States, national regulatory authorities, ACER, ENTSOG, project promoters and other stakeholder;
- mobilise EU funding under CEF, Cohesion Policy and RRF;
- set up a dedicated work stream on joint renewable hydrogen purchasing under the EU Energy Platform.

Scaling up biomethane

Boosting sustainable **biomethane** production to 35 bcm by 2030 is a cost-efficient path to achieve our ambition to reduce imports of natural gas from Russia. To increase the capacity of biogas production in the EU and promote its conversion into biomethane, the estimated investment needs amount to EUR 37 billon euro over the period.

As outlined in the Biomethane Action Plan in the accompanying staff working document, the Commission proposes to address the main barriers to increased sustainable biomethane production and use and facilitation of its integration into the EU internal gas market by:

- establishing an industrial biogas and bio-methane partnership to stimulate the renewable gases value chain;
- taking additional measures to encourage biogas producers to create energy communities;
- providing incentives for biogas upgrading into bio-methane;
- promoting the adaptation and adjustment of existing and the deployment of new infrastructure for the transport of more bio-methane through the EU gas grid;
- addressing gaps in research, development and innovation;
- facilitating access to finance, and mobilise EU funding under CEF, Cohesion Policy, RRF and the Common Agricultural Policy.

The focus should be on sustainable production, ensuring that biomethane is produced from organic waste and forest and agricultural residues, to avoid impacts on land use and food security.

Bioenergy makes up 60% of the renewable energy in the EU. It is a domestically available and stable energy source but sustainable sourcing is key. Current estimates show a moderate but steady increase of biomass use until 2030. Prioritizing use of non-recyclable biomass waste and agricultural and forest residues will ensure a sustainable energy production that can contribute to the REPowerEU objectives.

Reducing fossil consumption in hard-to-abate industrial and transport sectors

Replacing coal, oil and natural gas in industrial processes will not only reduce carbon emissions, it will also strengthen industrial competitiveness by shielding industrial production from volatile fossil fuel markets and support international technology leadership.

Energy efficiency, fuel substitution, electrification, and an enhanced uptake of renewable hydrogen, biogas and biomethane by industry could save up to 35 bcm of natural gas by 2030 on top of what is foreseen under the Fit for 55 proposals. Production of non-metallic minerals, cement, glass and ceramics, production of chemicals and refineries provide the biggest opportunities for reducing fossil gas demand – almost 22 bcm.

There is also great potential for electrification of industry. Current technologies already enable industrial companies to reduce their reliance on fossil fuels. Opportunities to adopt electric technology will continue to expand as technologies improve and renewables are rolled out.

To support hydrogen uptake and electrification in industrial sectors, the Commission:

- will roll out carbon contracts for difference and dedicated REPowerEU windows under the Innovation Fund to support a full switch of the existing hydrogen production in industrial processes from natural gas to renewables and the transition to hydrogen-based production processes in new industrial sectors, such as steel production[17];
- publishes guidance to Member States on renewable energy and power purchase agreements[18] (PPAs);
- will, in cooperation with the EIB, develop a technical advisory facility under the InvestEU Advisory Hub to support PPA-financed renewable energy projects. To unlock industrial investment, the Commission will double the funding available for the 2022 Large Scale Call of the Innovation Fund this autumn to around EUR 3 billion. A specific REPowerEU window will support (1) innovative electrification and hydrogen applications in industry, (2) innovative clean tech manufacturing (such as electrolysers and fuel cells, innovative renewable equipment, energy storage or heat pumps for industrial uses), and (3) mid-sized pilot projects for validating, testing and optimising highly innovative solutions.

In transport, electrification can be combined with of the use of fossil-free hydrogen to replace fossil fuels. To enhance energy savings and efficiencies in the transport sector and accelerate the transition towards zero-emission vehicles, the Commission:

- will consider a legislative initiative to increase the share of zero emission vehicles in public and corporate car fleets above a certain size;
- calls on the co-legislators to swiftly adopt the pending proposals on alternative fuels and other transport related files supporting green mobility;
- will adopt in 2023 a legislative package on greening freight transport;

Delivering REPowerEU – with skilled people, raw materials and a complete regulatory framework

Achieving the REPowerEU goals will require diversifying the supply of renewable energy equipment and of critical raw materials, reducing sectoral dependencies, overcoming supply

[17] Based on REPowerEU, the Commission expects that around 30% of EU primary steel production will be decarbonized with renewable hydrogen by 2030, [requiring 1.4 million tonnes of renewable hydrogen and investments of EUR [18-20] bn to replace blast furnaces with direct reduced iron (DRI) processes fueled by renewable hydrogen.]

[18] Commission Recommendation on speeding up permit-granting procedures for renewable energy projects and facilitate Power Purchase Agreements, C(2022) 3219, SWD(2022) 149, (18.05.2022).

chain bottlenecks and expanding the EU's clean energy technology manufacturing capacity. While the EU is a global leader in electrolyser, wind and heat pump technologies, the EU solar panels and heat pumps market has seen increasing imports from Asia over the last years.

For heat pumps, a doubling of the deployment rate should be matched by a fast ramp up of the production of the necessary equipment, including, where necessary through facilitated access to finance.

Beyond ensuring suppliers diversification, strengthening circular economy models must be a priority. Support for research and innovation, including through Horizon Europe, will be provided to reduce materials consumption, enhance recyclability of renewable energy equipment and substitute critical raw materials.

To enhance industry's contribution to REPowerEU and reinforce its competitiveness, the Commission:

- will set up an **EU Solar Industry Alliance;**
- will work with industry to scale up electrolyser manufacturing capacities, as laid out in the Electrolyser Declaration[19];
- will intensify work on the supply of critical raw materials and prepare a legislative proposal. The Commission will step up ongoing EU policies and actions (e.g. implementation and negotiation of Free Trade Agreements, cooperation with like-minded partners, etc.) and reinforce the EU's monitoring capacity and help secure the supply of diverse critical raw materials. This initiative will aim to strengthen the European value chain through the identification of mineral resources and of critical raw materials projects in the European strategic interest, while ensuring a high level of environmental protection, including projects that promote a circular economy and resource efficiency

Accelerating and amplifying the deployment of renewables and increasing energy efficiency relies on a skilled workforce and strong supply chains to meet the increased demand for clean technology and roll-out in the construction sector. The clean energy transition offers ample job market opportunities and helps ensure reskilled jobs for transition sectors.

To address the skills shortages, the Commission:

- encourages stakeholders in renewable energy production (solar, wind, geothermal, biomass, heat pumps etc.) and permitting authorities to establish a **large-scale skills partnership** under the Pact for Skills[20];
- will support skills through ERASMUS + and the Joint Undertaking on Clean Hydrogen, with the launch of a large project to develop skills for the hydrogen economy.

Speeding up permitting and innovation

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19 Electrolyser Summit Joint Declaration. Electrolyser manufacturers in Europe committed to a tenfold increase of their capacity to manufacture electrolysers to 17.5 GW by 2025.

20 The Pact for Skills supports large-scale skills partnerships in different industrial ecosystems, including Energy Intensive Industries, Construction and Renewable Energy. The Pact gathers and inspires commitments from individual companies, training providers and social partners to upskill or reskill people of working age, such as developing skilled professionals and the reskilling of gas boiler installers in new technologies such as heat pumps, solar panels, etc.

Slow and complex permitting processes are a key obstacle to unleashing the renewables revolution and for the competitiveness of the renewable energy industry. Obtaining a permit can take up to 9 years for wind projects, and up to 4.5 years for ground-mounted solar projects. Varying permitting times between Member States demonstrate that national rules and administrative capacities complicate and slow down permitting.

- To help Member States exploit all possibilities for acceleration that exist within the legislative framework, the **Commission presents a Recommendation on permitting[21].**

It proposes measures to streamline procedures at national level, addresses ambiguities in the application of EU legislation and sets out good practices in Member States. It recommends participatory approaches that involve local and regional authorities and providing authorities with the necessary resources so as to facilitate the timely realisation of locally adapted investments.

- To kick-start the implementation of the Recommendation, the Commission will convene **renewable energy experts with environmental assessment experts from Member States on 13 June**.

High Level Summits hosted by Member States, such as the North Sea Summit in Denmark, will enhance the case for investment in cross-border wind parks and renewable projects.

Member States should as a matter of priority implement the permitting-related **Country Specific Recommendations** in the European Semester and already adopted Recovery and Resilience Plans. Equally, the full and rapid transposition by all Member States of the Renewable Energy Directive[22] is a matter of urgency to simplify permitting procedures.

- In order to support an acceleration of permitting procedures for renewable energy projects and related infrastructure, the Commission is **amending its proposal on the Renewable Energy Directive**[23] and asks the European Parliament and Council to ensure a swift agreement as part of the Fit for 55 package**.**

The revised proposal operationalises the principle of **renewable energy as an overriding public interest**, introduces the designation of **'go-to' areas[24]** and other ways to shorten and simplify permitting while also minimising potential risks and negative impacts on the environment. It also provides for the possibility to create **regulatory sandboxes** to foster innovation in the sector.

The Commission also calls on the Member States to speed up the transposition of the Electricity Directive to effectively allow consumers to participate in energy markets (individually or via

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[21] Commission Recommendation on speeding up permit-granting procedures for renewable energy projects and facilitate Power Purchase Agreements, C(2022) 3219, SWD(2022) 149, (18.05.2022).

[22] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast).

[23] Proposal for a Directive of the European Parliament and of the Council amending Directive (EU) 2018/2001 of the European Parliament and of the Council as regards the promotion of energy from renewable sources, COM (2022)222, (18.5.2022)

[24] Renewables go-to area' means a specific location, whether on land or sea, which has been designated by a Member State as particularly suitable for the installation of plants for the production of energy from renewable sources, other than biomass combustion plants.

energy communities or collective self-consumption schemes) to produce, self-consume, sell or share renewable energy.

4. Smart investment

The Commission's analysis indicates that REPowerEU entails additional investment of 210 billion euro between now and 2027, on top of what is needed to realise the objectives of the Fit for 55 proposals. Such investment will pay off. Implementation of the Fit for 55 framework and the REPowerEU plan will save **the EU EUR 80 billion in gas import expenditures, EUR 12 bn in oil import expenditures and EUR 1.7 bn in coal import expenditures per year** by 2030.

During the transition, the fast decoupling from Russian energy imports can lead to higher and more volatile energy prices. Targeted measures are needed to minimize volatility, keep prices in check and protect the individuals in or at risk of (energy) poverty in order to ensure a fair transition for all[25]. The Commission calls upon the European Parliament and the Council to adopt its proposal for a Social Climate Fund to support vulnerable households and small business in the transition.

4.1 European interconnection and infrastructure needs

The REPowerEU plan brings a **significant change to the energy system in terms of quantities and directions of energy flows.** This is the time to implement many long pending projects, with a particular focus on cross-border connections to build an integrated energy market that secures supply in a spirit of solidarity.

The **Trans-European energy networks (TEN-E)** framework has helped establish a more resilient European gas infrastructure based that enables more diversified supplies. Once the ongoing Projects of common interest and Projects of mutual interests are implemented, all Member States and Neighbouring countries will have access to at least three gas sources or to the global liquefied natural gas (LNG) market. In 2022 alone, gas PCIs with a total additional gas transmission capacity of 20 bcm/year have been or will be commissioned[26]. Very recently, a number of key projects co-financed by the EU were completed or launched, such as the Gas Interconnector Poland-Lithuania (GIPL)[27] of key importance to the Baltic region and a new

[25] See for example the proposal for a Council Recommendation on ensuring a fair transition towards climate neutrality (COM(2021) 801 final).

[26] In 2022 alone, PCIs with a total additional gas transmission capacity of 20 bcm/year have been or will be commissioned, e.g. the gas interconnector between Poland and Lithuania (the GIPL pipeline), the Poland-Slovakia interconnector, the Baltic Pipe between Poland and Denmark, the Greece-Bulgaria pipeline (IGB). LNG terminals in Cyprus (2 bcm/year) and Alexandroupolis Greece (5 bcm/year) are due to be operational in 2023. Moreover, several gas PCIs are expected to be completed in the coming years which include several storage projects in South Eastern Europe (Greece, Romania, Bulgaria) as well the LNG Gdansk in Poland (at least 6 bcm/year). Besides, the support of the expansion of the Southern Gas Corridor to 20 bcm per year will play a major role to secure gas supply for South Eastern Europe (Greece and Italy at the beginning) and the Western Balkans.

[27] Opened on 5 May, GIPL is a major EU project developed under the Baltic Energy Market Interconnection Plan (BEMIP). The 508-km-long pipeline connected Estonia, Finland, Latvia, and Lithuania to the gas market of the EU. Of some EUR 500 million spent on the project, the EU contributed ca. EUR 300 million.

liquefied natural gas terminal in Northern Greece that will help Europe and the Balkans become less reliant on Russian supplies[28].

The maps and project lists shown here are the result of analysis by the regional groups of the additional needs strictly linked to REPowerEU. They complement the existing list of projects of common interest, some of which, such as the Iberian interconnectors and connections for island Member States, have been under preparation for many years. These projects should now also be accelerated to complete the European infrastructure. The gas projects to be included in the REPowerEU chapters of the Recovery and Resilience Plans should build on the analysis of the needs currently represented on the maps below.

The regional assessment of additional gas infrastructure needs for REPowerEU shows that it will be possible to fully compensate the equivalent of Russian gas imports by a combination of demand reduction, a ramp up of domestic production of biogas/biomethane and hydrogen, and limited additions of gas infrastructure. The most important needs are linked to meet demand in Central and Eastern Europe[29], and in the northern part of Germany[30], as well as the reinforcement of the Southern gas corridor. This limited additional infrastructure, as described in annex 3, should solve the needs for the forthcoming decade, without leading to a lock-in of fossil fuels and stranded assets that inhibit the long-term transition to a climate-neutral economy.

Storage is key for enhancing the security of supply. Appropriate support, including financial, should be provided to those projects that aim at increasing the storage and withdrawal capacities in order to ensure an increased level of preparedness and response to risks in the security of gas supply. **To import sufficient LNG and pipeline gas from other suppliers, investments estimated at EUR 10bn by 2030 will be required** for a sufficient level of gas infrastructure, including LNG import terminals, pipelines, to connect underutilised LNG import terminals and the EU network, and reverse flow capacities. Additional investments to connect LNG import terminals in the Iberian Peninsula and the EU network through hydrogen-ready infrastructure may further contribute to diversify gas supply in the internal market and help tap into the long-term potential for renewable hydrogen. Also, a very limited investment will be needed to ensure security of supply in Member States almost fully dependant on pipeline oil from Russia.

Dependence on Russian fossil fuels also extends to crude oil and petroleum products. While for the majority of cases the world market allows for quick effective replacement, some Member States are more reliant on Russian pipe oil. The stop of supply from the Druzhba pipeline, which delivers crude oil to Europe directly from central Russia, will increase pressure on alternative supply routes, namely ports (such as Gdansk, Rostock, Trieste or Omisalj) and alternative pipeline infrastructure, currently not prepared to handle such additional pressure, that serves the same regions.

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[28] The LNG facility in Alexandropoulis (a floating storage and regasification unit) is set to be completed in the end of 2023 and will have a capacity of 153,500 cubic metres, with a yearly potential throughput of 5.5 billion; the budget is ca EUR 364 mn with EUR 167 mn from the 2014-2020 cohesion policy.

[29] Of great importance for the security of supply in Central and Eastern Europe are two gas corridors: the Trans-Balkan Corridor (Turkey-Bulgaria-Romania) and the Vertical Corridor (Greece-Bulgaria interconnector, Romania-Bulgaria interconnector and BRUA) which will facilitate the supply of gas from third countries in the region.

[30] See indicative projects in Annex 3.

In this context, very limited and targeted investments to ensure the security of oil is needed. Projects building on and expanding the capacity of the existing infrastructure and tackling existing bottlenecks (namely in the Transalpine (TAL), Adria or SPSE oil pipelines) are key to ensure viable alternatives to the most affected Member States. The establishment of alternative supply routes must also be accompanied by targeted investments in the reconfiguration and upgrading of petroleum product refineries, as replacing Urals crude oil by alternative oil grades entails technological changes. The total investment needs **to ensure the security of oil supply is expected to amount to up to EUR 1.5 -2bn**.

An **additional EUR 29 billion of additional investments are needed in the power grid** by 2030, to make it fit for increased use and production of electricity. All relevant projects are already included in the 5th PCI list[31]. The accelerated implementation of electricity PCIs is crucial for an interconnected system with an increased share of renewable energy sources. The current high electricity prices in the Iberian Peninsula highlight the importance of improving cross-border electricity interconnections as a cost-effective way to ensure secure and affordable electricity supplies. The Commission will continue to support and encourage the Spanish and French authorities for accelerating the implementation of the three existing projects of common interest through the High Level Group South West Europe aiming at increasing the interconnection capacity between the Iberian Peninsula and France. The EU has already taken action for the synchronisation of the Baltic States' electricity networks with the continental European network. Once completed, no later than 2025, neither the electricity trade nor system operation can be used to threaten the energy security of the region.

Energy storage plays a significant role in ensuring flexibility and security of supply in the energy system by facilitating the integration of renewable generation, supporting the grid, and shifting energy to the time when it is most needed. Ultimately, energy storage reduces the use of gas power plants in the energy system.

The Commission will also encourage the swift development of crucial offshore grids and cross-border hydrogen infrastructure.

European map of infrastructure for gas – PCIs and additional projects identified through REPowerEU, including hydrogen corridors

[31] https://ec.europa.eu/energy/sites/default/files/fifth_pci_list_19_november_2021_annex.pdf

European infrastructure map for electricity

4.2 National reforms and investments

While most of the targets and objectives are European and require a strong coordination, implementation of many of the measures remain with Member States and require **targeted reforms and investments**.

The Recovery and Resilience Plans (RRPs) have proven highly suitable to implement urgent priorities in a joint EU framework, based on needs by Member States and with a strong results orientation. They are already providing a set of ambitious reforms and investments to deliver on the twin transition. Their milestones and targets are more valid than ever.

The Commission invites Member States to add to their existing RRPs a dedicated chapter with new actions to deliver on the REPowerEU objectives of diversifying energy supplies and reducing dependence on fossil fuels. Technical support to Member States is available under the Technical Support Instrument[32] for that purpose. Cross-border investments are essential to strengthen interconnection and ensure the security of energy of supply for the Single Market. When assessing the dedicated RepowerEU chapters, the Commission will take its contribution towards the security of supply for the Union as a whole into account. The 2022 **country-specific recommendations** will guide the new RRP chapters. The Commission issued together with this communication tailored recommendations for all Member States on energy policy in line with the REPowerEU objectives.

The RRPs should ensure complementarity between measures funded under the RRF and actions supported via other national or EU funds. In particular, synergies must be increased

[32] Technical Support Instrument: 2022 country factsheets | European Commission (europa.eu)

between cohesion policy, in particular the European Regional Development Fund (ERDF), the European Social Fund+ (ESF+), the second pillar of the Common Agriculture Policy (CAP), Connecting Europe Facility (CEF) and the REPowerEU chapters in the RRPs. For example for gas, mature projects for grids, storage or LNG located in one Member State but having European importance can be included in the RRF REPowerEU chapter. RRPs could also for example support energy infrastructure projects selected in TEN-E regional groups for their common interest because they link Member States' energy networks, connect regions currently isolated from European energy markets, strengthen existing cross-border interconnections, help integrate renewable energy, and respond to market integration, competitiveness and security of supply objectives. This allows freeing CEF energy funds for interconnectors in electricity, off-shore, hydrogen and other infrastructure projects of common interest that require cross-border planning and regional cooperation for their implementation as provided under the TEN-E policy.

The RRPs provide for a fast and effective way to frontload investments focused on REPowerEU needs, combined with accompanying reforms to maximise their impact. As the REPowerEU chapter and cohesion policy funds both support the green energy transition, in energy efficiency and renewable energy investments can be supported under both. In view of enhancing synergies between these policies, Member States have the possibility to plan their investments over the lifetime of the programming period in a coordinated manner, taking into account the available funding and implementation timelines.

4.3 Financing

To mobilise finance for covering the short term REPowerEU investment needs, the Commission proposes a targeted and swift amendment of the Recovery and Facility Regulation. The amendment foresees allocating additional funding from the auctioning of allowances of the Emissions Trading System (‘ETS’), in a limited amount. It also proposes that Member States benefit from a higher flexibility to transfer resources allocated to them both under the Common Provisions Regulation (EU) 2021/1060) and the Regulation on CAP strategic plans (EU) 2021/2115). These grants will complement the remaining EUR 225 billion of loans under the RRF, resulting in a total amount close to EUR 300 billion. It is proposed that if part of the remaining EUR 225 billion of loans under the RRF is not requested by the member States currently entitled to them within 30 days after the entry into force of the amended RRF Regulation, these resources will be made available to other MS.

Member States will have the possibility to transfer up to 12.5% of their allocation under the cohesion policy to the RRF by adding a 7.5% transfer possibility for REPowerEU objectives based on demonstrable needs and provided that Member States have used the already available 5% transfer possibility. This new transfer possibility will allow Member States to include in their RRPs new investments and reforms for that contribute to a rapid reduction of fossil fuel imports from Russia. Such a transfer possibility is justified by the urgent timeline and nature of some the investments needed.

In addition, Member States will have the possibility to transfer up to 12.5% of their allocation under the European Agricultural Fund for Rural Development to the Recovery and Resilience Facility. Delivering part of the Common Agricultural Policy financing under the Recovery and Resilience Facility speed up implementation of relevant projects, allowing farmers to receive

the necessary financial support to reduce the use of synthetic fertilizers and increase the production of sustainable biomethane or renewable energy.

The process for undertaking voluntary transfers by Member States of cohesion policy funds and CAP funds to the REPowerEU chapters of the recovery and resilience plans has been designed to ensure a swift adoption process, and should not delay the adoption and implementation of the strategic plans and programmes.

Above all, it is important that Member States engage in a wide consultation process during the preparation of their REPowerEU chapters, in particular with local and regional authorities, social partners as well as stakeholders from the agricultural sector, to ensure broad ownership that will be key for the successful implementation of the measures.

Cohesion policy funds with their strong record of supporting energy-related investments will continue to complement and strengthen the REPowerEU and European Green Deal objectives. Under the current MFF, cohesion policy will support decarbonisation and green transition projects with up to EUR 100 billion. To ensure swift disbursement, the Commission will put forward a flexible instrument to help member States mobilise private resources and intends to adopt by the end of 2022 a delegated act to speed up the design and reimbursements of energy efficiency projects and renewables projects through standard reimbursement schemes in cohesion policy. The Commission will also work with Member States in promoting the development of regional and local energy agencies as single entry point for energy projects.

State aid rules fully apply to the reforms and investments included into the REPowerEU chapters. It is the responsibility of each Member State to ensure that such measures comply with the EU State aid rules and follow the applicable State aid procedures. In light of the unprecedented urgency to reduce dependence on Russian fossil fuels, the Commission will look into ways to facilitate State aid control for REPowerEU measures while limiting distortions to competition. In particular, the Commission will provide guidance on how measures can be designed in line with State aid rules and fast track decisions once it has complete information. The Commission will also assist Member States in designing measures which can be exempted from notification under the General Block Exemption Regulation. Finally, it will keep the Temporary Crisis Framework for State aid under constant review to ensure that it is apt for enabling Member States to address the effects of the current geopolitical situation, including in the field of energy, and it will continue ensuring that the State aid framework is generally fit-for-purpose.

The **Connecting Europe Facility –Energy (CEF-E)** will support projects of common interest (PCIs) not implemented by the market or not implemented otherwise within the timeframe needed to deliver on the REPowerEU objectives. The Commission **launches together with this communication a new CEF Energy call for proposals for Projects of Common Interest (PCIs)** with a total estimated budget of around EUR 800 million. Successful projects will be selected in the second half of 2022 to support the most urgent infrastructure projects needed for realising the REPowerEU priorities. In early 2023, the Commission will launch another CEF Energy call for proposals for PCIs for projects to apply that may not be ready for this year's call.

Member States can consider **taxation measures to support REPowerEU objectives** so as to incentivise energy savings and reduce fossil fuels consumption. Member States are encouraged

to consider additional tax measures such as reductions and exemptions from vehicle taxation for both the purchase and use of electric and hydrogen vehicles, tax deductions linked to energy savings and the phase-out of environmentally harmful subsidies. The Commission's pending proposal for a revision of the **Energy Taxation Directive (ETD)**, contributes to the objectives of REPowerEU by setting price signals to reduce consumption of fossil fuels and save energy and the Commission calls on Member States to swiftly reach an agreement.

The InvestEU Programme will mobilize private finance to support a wide range of investments that contribute to achieving the REPowerEU's policy goals, by sharing risks with implementing partners. The Commission will work closely and in a Team Europe approach with the EIB Group, other implementing partners of the InvestEU Programme and EU Member States to accelerate lending, blending and advisory products for renewables, energy efficiency and electricity networks.

To enable the **Innovation Fund** to cover 100% of the relevant costs in the case of competitive bidding, the European Parliament and the Council should swiftly examine the proposed amendment to the ETS Directive for the Innovation Fund, after which the Commission will swiftly adopt the necessary amendment to the Delegated Act establishing the Innovation Fund.

5. Reinforcing preparedness

Europe must be ready and prepared for a severe supply disruption. While the risk for unserved gas demand for this summer will be limited, there could be a risk that, without further action in the coming months, storages will not be sufficiently filled for next winter.

Together with the swift adoption of the storage regulation in view of starting implementation of refilling storage levels this summer, the Commission calls on Member States to:

- **pre-emptively implement the EU Save Energy Communication.** The gas saved in the short term can be used notably to refill underground storage ahead of the next winter;
- **update their contingency plans,** taking into account the recommendations contained in the Commission's preparedness review. The updated contingency plans should identify the essential customers which play a key role for critical supply chains in the Union;
- ask transmission system operators to accelerate the technical measures, which can **increase the reverse flow capacities from west to east by the next winter**, including regarding the technical requirement concerning the composition of gas;
- **conclude the outstanding bilateral solidarity arrangements between neighbouring countries.**

The existing EU legal framework already foresees that in case of extreme crisis Member States can request their neighbouring Member States **solidarity measures.** Solidarity measures are meant as **last resort** in the event of an extreme gas shortage to ensure supply to **households, district heating systems and basic social facilities** in the affected country.

The Commission will issue **guidance on the prioritisation criteria of non-protected customers**, in particular of industry. The guidance will focus, on the one hand, on the identification of national and cross-border value chains of key and critical importance which, if disrupted, could negatively impact on security, food, health and safety at European and global level. It should also assess the impact on the competitiveness of the different territories. The Commission will also facilitate setting up a coordinated **EU demand reduction plan** with pre-emptive voluntary curtailment measures which should be ready for activation before an actual emergency arises. This plan would include voluntary market-based measures to reduce the consumption of undertakings and thus guarantee that supplies to protected customers are prioritised. In addition, the Commission is reviewing Member States' Risk Preparedness Plans in the electricity sector to minimize the impact of potential gas disruptions on electricity generation.

Conclusions

The time to reduce Europe's strategic energy dependence is now. REPowerEU accelerates diversification and more renewable gases, frontloads energy savings and electrification with the potential to deliver as soon as possible the equivalent of the fossil fuels Europe currently imports from Russia every year. It does this with coordinated planning, in the joint interest and with strong European solidarity.

There is a double urgency to reduce Europe's energy dependence: the climate crisis, severely compounded by Russia's aggression against Ukraine, and EU's dependence on fossil fuels, which Russia uses as an economic and political weapon.

The green transformation of Europe's energy system will strengthen economic growth, reinforce its industrial leadership, and put Europe on a path towards climate neutrality by 2050.

The European Commission calls on leaders, Member States, regional and local authorities, and indeed every citizen and business, to reduce Europe's energy dependence from Russia through the implementation of this REPowerEU plan.

EUROPEAN
COMMISSION

Brussels, 18.5.2022
COM(2022) 230 final

ANNEXES 1 to 3

ANNEXES

to the

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

REPowerEU Plan

{SWD(2022) 230 final}

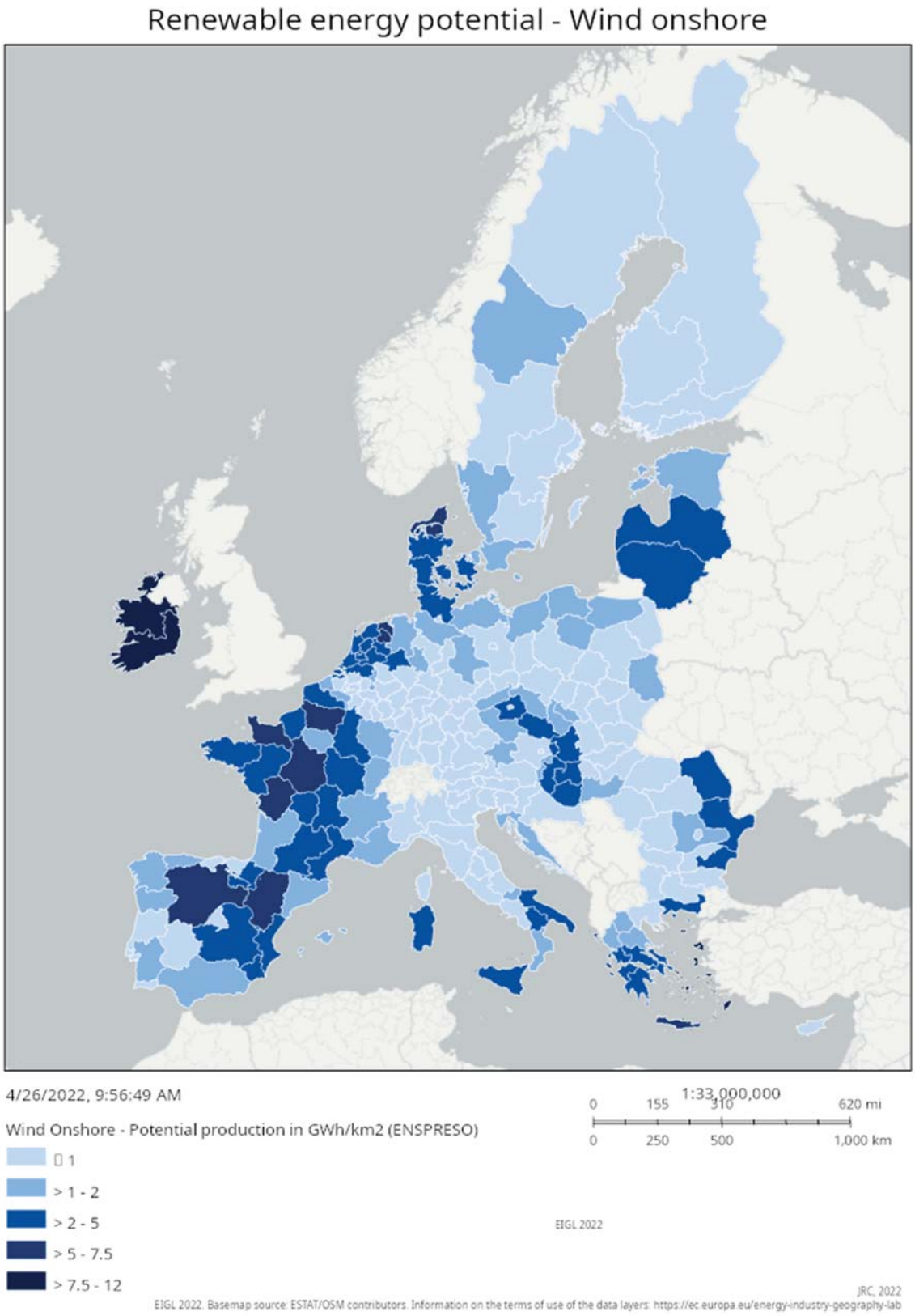
ANNEX 1

STARTING POINT: ALL FIT FOR 55 MEASURES WILL REDUCE EU GAS DEMAND BY 116 BCM, OR 30% REDUCTION			
RePOWER PLAN	**Equivalent GAS SAVED**	**JOINT EU AND MS RePOWER EU ACTIONS**	**INVESTMENT NEEDS (EUR)**
SAVINGS			
Citizens : Behavioural change	10 bcm	EU Save Energy communication Play my part campaign	-
Residential sector: energy efficiency and heat pumps	37 bcm	EU Save Energy communication Higher 13% EED target by amended EED Ecodesign and energy labelling requirements for solar PVs heat pumps Potential Important Projects of Common European Interest (IPCEI) focused on breakthrough technologies and innovation	56
Industry: energy efficiency and electrification	12 bcm	Higher 13% EED target by amended proposal Higher 45% RES target by amended proposal Innovation fund RRF chapter	41
Curtailment		EU coordinated demand reduction plan	-
FUEL DIVERSIFICATION			
LNG and pipeline gas	50 (LNG) + 10 bcm (pipeline)	Diversification obligation Joint Gas and Hydrogen Purchasing EU IT tool for demand aggregation and infrastructure transparency MoUs with partner countries Adoption of the storage proposal RRF chapter	
Biomethane	17 bcm	Biomethane action plan RRF chapter	37
Renewable Hydrogen	+ 14 Mt of additional H2/ammonia of which 8 Mt replace natural gas equivalent to = 27 bcm 10 Mt is imported and about 4 Mt of additional domestic production	RFNBO sub-targets in line with higher RED targets Hydrogen Valleys Regulatory framework: Delegated acts on definition and standards Imports: Joint Gas and Hydrogen Purchasing Vehicle and International Hydrogen Partnerships Industrial Capacity: Electrolyser Declaration Innovation fund RRF chapter	27 bn is direct investment in domestic electrolysers and distribution of hydrogen in the EU. (excludes the investment of solar and wind electricity needed to produce renewable hydrogen, and it excludes the investments for the imported hydrogen)
RENEWABLE ELECTRICITY			
Solar & Wind	21 bcm[1]	Higher 45% RES target by amended RED PPA guidance Solar strategy Solar roof top initiative by amended RED RRF chapter Solar alliance	86 bn EUR

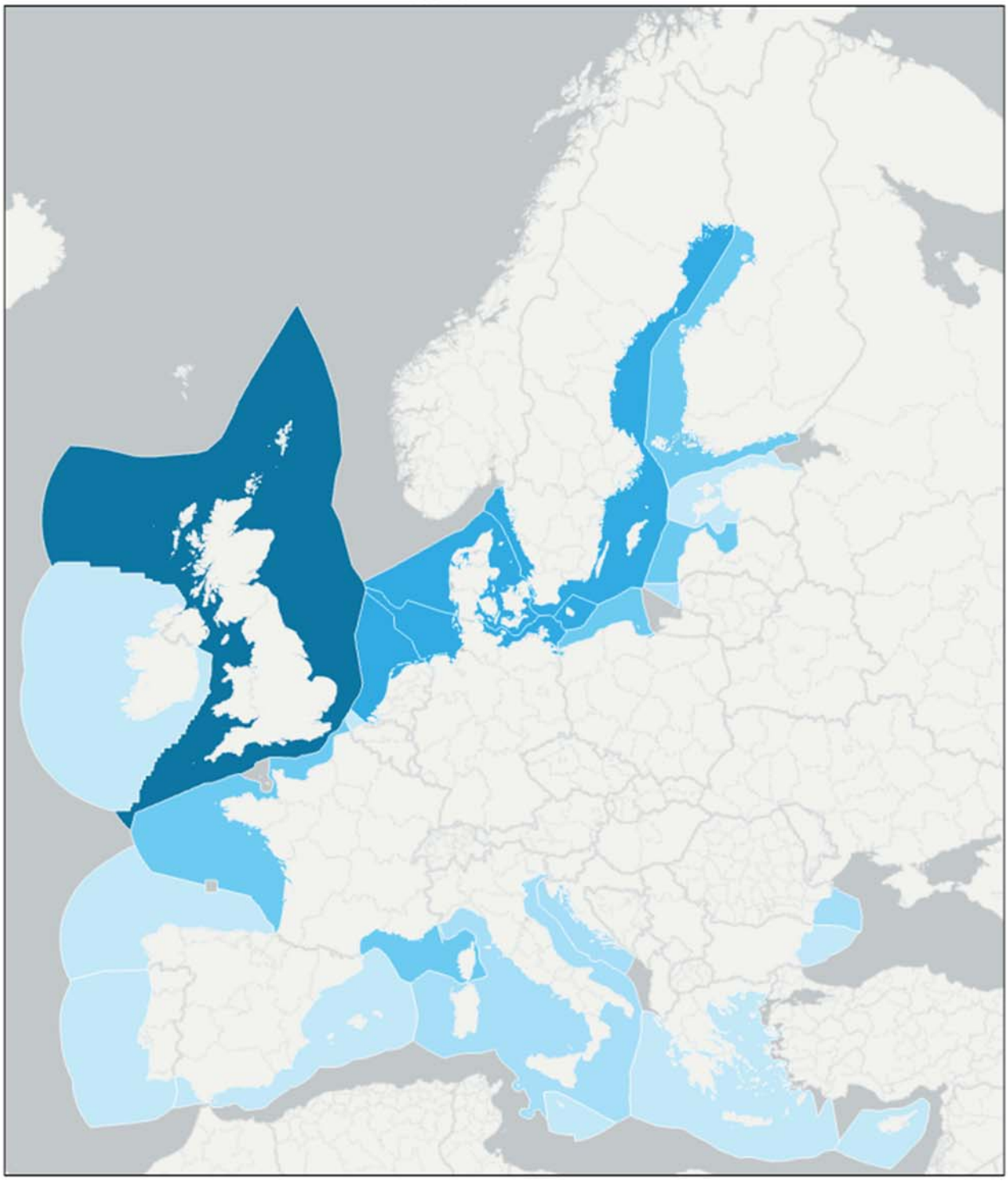
[1] In the scenario around 12 bcm is achieved through 4 Mt of additional domestic hydrogen production and 9 bcm through additional substitution of gas in the power system. These bcm savings are distributed in the table in other sectors.

		Potential Important Projects of Common European Interest (IPCEI) focused on breakthrough technologies and innovation	
Permitting		Legislative proposal on permitting amending RED EC recommendation	-
SMART INVESTMENTS AND REFORMS			
Infrastructure		Integrated EU-wide infrastructure gaps and needs assessment for gas, electricity and hydrogen	29 bn (power grids) + 10 bn (power storage) + 10 bn (gas) Oil for security of supply 1,5 bn [hydrogen infrastructure see Staff work document]
RRF		Revised RRF proposal close to EUR 300 billion (225 bn loans+ up to 72 bn grants) RRP guidance	
Innovation Fund		Revised Innovation Fund proposal rolling out carbon contracts for difference Dedicated RePowerEU call in Autumn 2023 Dedicated RepowerEU funding windows	
CEF		Dedicated RePowerEU calls, starting May 2022	
Reform		European semester Country-specific recommendations Permitting PPA guidance RRF chapters	

ANNEX 2 – maps


Renewable energy potential - Wind onshore
4/26/2022, 9:56:49 AM
1:33,000,000
0 155 310 620 mi
0 250 500 1,000 km
Wind Onshore - Potential production in GWh/km2 (ENSPRESO)
1
> 1 - 2
> 2 - 5
> 5 - 7.5
> 7.5 - 12
EIGL 2022
JRC, 2022
EIGL 2022. Basemap source: ESTAT/OSM contributors. Information on the terms of use of the data layers: https://ec.europa.eu/energy-industry-geography-lab

Renewable energy potential - Wind offshore



4/26/2022, 9:44:22 AM

1:33,000,000

0 155 310 620 mi

0 250 500 1,000 km

Wind Offshore - Potential production in TWh (ENSPRESO)

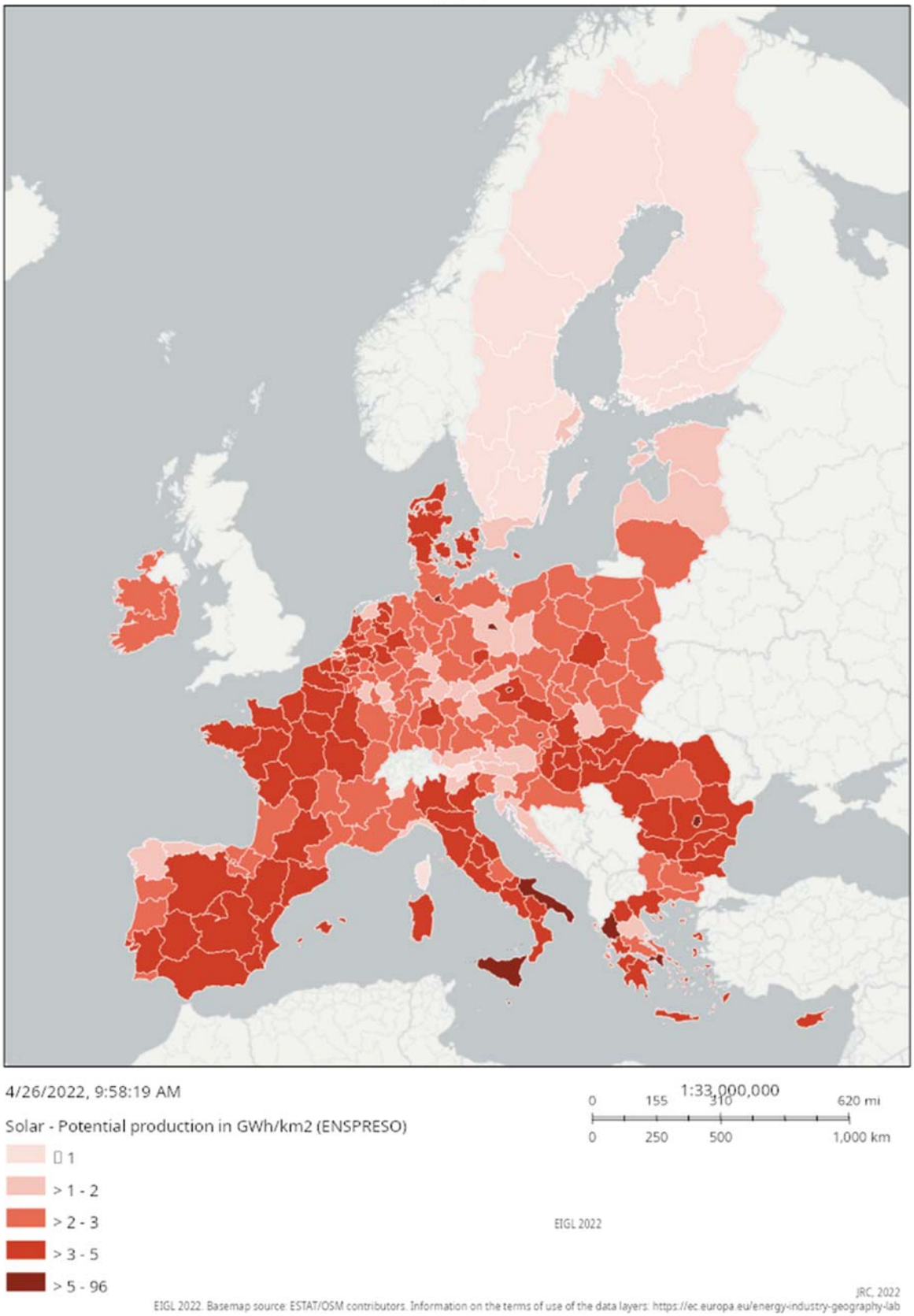
- 8
- > 8 - 28
- > 28 - 85
- > 85 - 200
- > 200 - 441.2

EIGL 2022

JRC, 2022

EIGL 2022. Basemap source: ESTAT/OSM contributors. Information on the terms of use of the data layers: https://ec.europa.eu/energy-industry-geography-lab

Renewable energy potential - Solar



ANNEX 3

Infrastructure needs for gas

Achievements of the TEN-E framework to establish resilient European electricity and gas networks

The TEN-E Regulation has established a new approach to EU-wide infrastructure planning based on regional cooperation with Member States and relevant stakeholders to identify projects of common interest (PCIs) that contribute to the development of energy infrastructure priority corridors and thematic areas. It also requires Member States to streamline permit granting procedures for PCIs and provides access to financing from the Connecting Europe Facility (CEF) to enable their timely implementation.

Since the TEN-E Regulation was established in 2013 gas PCIs have helped to establish a more resilient European gas infrastructure based on more diversified supplies. Gas PCIs have contributed to reduce bottlenecks in the European gas infrastructure, diversify supply sources as well as counterparts and routes. Once the ongoing PCI projects are implemented all Member States will have access to at least three gas sources or the global liquefied natural gas (LNG) market.

In 2022 alone, PCIs with a total additional gas transmission capacity of 20 bcm/year have been or will be commissioned, e.g. the gas interconnector between Poland and Lithuania (the GIPL pipeline), the Poland-Slovakia interconnector, the Baltic Pipe between Poland and Denmark, the Greece-Bulgaria pipeline (IGB). LNG terminals in Cyprus (2 bcm/year) and Alexandroupolis Greece (5 bcm/year) are due to be operational in 2023. Moreover, several gas PCIs are expected to be completed in the coming years which include several storage projects in South Eastern Europe (Greece, Romania, Bulgaria) as well the LNG terminal in Gdansk in Poland (at least 6 bcm/year).

It is thanks to these projects, many of which have benefitted from financial support through the Connecting Europe Facility, that Member States are able to react to recent supply cuts in a spirit of solidarity.

In addition to significant improvements in the European gas infrastructure, key electricity interconnectors have been kick started also through CEF grant for works, e.g. the Biscay Bay electricity interconnector between France and Spain to increase the interconnection capacity with the Iberian Peninsula, the Celtic interconnector between France and Ireland and the EuroAsia interconnector between Greece and Cyprus which both will end the isolation from the Union’s electricity grid of Ireland and Cyprus respectively supporting the integration of renewable energy sources and enhancing security of supply. Moreover, the synchronisation of the electricity grids of the Baltic States, the last Member States having electricity systems still dependant on third countries, is well underway for completion at the latest by 2025. Support under the TEN-E policy as well as financially, under CEF for over EUR 1.2 billion, have been essential to set the project on track.

The accelerated implementation of electricity PCIs[2] will be crucial for a better interconnected system that will enable to increase the share of renewable energy sources and reduce renewable energy curtailment significantly faster in line with the REPowerEU objectives.

ENTSOG assessment of additional gas infrastructure needs

The REPowerEU communication announced that the Commission would assess as a matter of priority whether measures and investments are needed in hydrogen-ready gas infrastructure and interconnections to overcome bottlenecks to the full use of the EU's LNG capacity. The Commission has requested ENTSOG to support this assessment with the purpose of identifying any remaining gas infrastructure gaps that require immediate alleviation under the REPowerEU plan.

The ENTSOG assessment[3] analysed to what extent infrastructure bottlenecks exist in the European gas network in case of an end to Russian gas flows to Europe using two different demand scenarios (current demand and 2030 demand assuming full implementation of fit for 55 proposals with a 27% lower gas demand compared to today which is expected to be even lower with the implementation of REPowerEU) and assuming different levels of infrastructure development[4].

The assessment shows that it will be possible to fully compensate the end to Russian gas imports by a combination of demand reductions as envisaged by the Commission's fit for 55 package[5], a ramp up of domestic production of biogas and fossil-free hydrogen in particular, and rather limited additions of gas infrastructure beyond what is already included in the current 5th PCI list. Mitigating the few remaining bottlenecks will also increase the European gas system's resilience and flexibility.

As regards the geographic distribution of needs, it is clear that the biggest challenge would be to meet demand in Central and Eastern Europe, but also in the northern part of Germany, if RU gas imports cease. The assessment, which was subsequently discussed with Member States in a regional context, has shown that different possible solutions exist to address the Russian supply dependency, mostly in geographic proximity to the needs and requiring cooperation between two or more Member States.

Additional gas infrastructure needs per region

Baltic Sea region

The three Baltic States and Finland are significantly dependent on Russian gas, whilst Poland shows a lower extent of dependence to such imports.

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2 The current 5th PCI list includes in total 67 electricity PCIs.

3 Covering all EU Member States and several third countries i.e. North Macedonia, Bosnia Herzegovina, Serbia, UK.

4 Level 0 = current infrastructure, level 1 = advanced projects (FIDs+ advanced PCIs), level 2= level 1+additional LNGs and TAP expansion.

5 Even with current demand and domestic supply levels, the projects identified would mitigate Russian dependence almost fully, with a remaining 5% dependence in CZ, SK, HU, RO and BG.

Projects such as the Balticconnector between Estonia and Finland, the enhancement of the interconnection between Latvia and Estonia, the Klaipeda LNG Terminal, and the Świnoujście LNG Terminal have already ensured market integration and decreased dependence on Russian gas in a region historically dependent on a single supplier. The situation is expected to significantly further improve with the recent launch of the interconnector between Poland and Lithuania (GIPL), and imminent completion of the expansion of the Świnoujście LNG Terminal, the Baltic Pipe, bringing for the first time gas from the Northern Seas to the region through Poland, the enhancement of the interconnection between Lithuania and Latvia and the enhancement of the Inčukalns UGS. The link between the Baltic Sea region and Central-Eastern Europe will be completed in the 2nd half of 2022 with the interconnection between Poland and Slovakia. The region has also benefited to the greatest extent from grants from the Connecting Europe Facility for Energy.

In the short term, the assessment showed that the **temporary rented floating storage regasification unit (FSRU) to be installed in either Estonia or Finland** later in 2022 can significantly reduce dependence on Russian gas. Latvia has also been invited to join the project development.

In the medium to longer term, the assessment has clearly established that the region around the Baltic Sea would benefit from the development of a **second LNG terminal in Poland, in Gdansk** (completion in 2026 which could be accelerated to 2025) which is a project on the 5th PCI list. The project could alleviate also any additional needs of the Baltic States, by freeing up capacity in the Klaipeda LNG terminal in Lithuania to serve any additional remaining needs in the Baltic States and Finland.

Western Europe

Most Western European countries show no or minimal dependence on Russian gas already today. However, Germany is strongly exposed to dependence on Russian gas, especially its northern market area where demand is concentrated. In the absence of Russian gas imports, the infrastructure bottlenecks are related to insufficient pipeline capacity from West to East as well as insufficient import capacity, including LNG infrastructure.

Unlike most European countries, Spain and France odorise gas in the transmission system. Therefore, infrastructure and regulatory limitations prevent South-Western countries from cooperating with countries in North-Western as well as Central and Eastern Europe; no significant gas capacities are available from France to Germany.

In the short term, the assessment has clearly shown that the **additional FSRU in Eemshaven (NL) and FSRU Wilhelmshaven (DE) and an additional LNG terminal in Germany (Brunsbüttel)** will alleviate infrastructure limitations in North-Western Europe. In general, it will be important to avoid overcapacity in LNG import infrastructure that could become stranded assets in the future.

In the mid-term, the assessment and the discussions have concluded that the development of a **deodorisation unit enabling gas flows from West to East between France and Germany** would remove a key bottleneck to reduce Russian gas dependence in Central Europe. In

combination with **gas infrastructure reinforcements to increase export capacity from Belgium to Germany** this would enable full utilisation of the LNG capacities in Western Europe to address dependence on Russian gas also in the Central and Eastern European regions.

An additional cross-border infrastructure project on the Iberian Peninsula should be further assessed in view of its long-term potential to tap into the important renewable hydrogen potential of the Iberian Peninsula, as well as Northern Africa, and whether it could become the first element of the hydrogen backbone considering the Hydrogen Accelerator.

Central and South – East Europe

In Central and South – East Europe, including the Energy Community, most of the countries show significant dependence on Russian gas taking into account today's gas demand.

In South – East Europe, key gas priority infrastructure projects became operational in the course of 2020-2021, including notably the Trans-Adriatic Pipeline, the 1st phase of the BRUA pipeline corridor and the Krk LNG terminal. The remaining priority infrastructure investments in the region which are set to be finalised in 2022 are the rehabilitation, modernization and expansion of the Bulgarian transmission system, the new interconnector between Greece and Bulgaria (IGB) which in its first operational phase will offer bidirectional capacity of 3 bcm/y. The interconnector Serbia - Bulgaria (IBS) which aims at creating bidirectional interconnection of 1,8 bcm/y, as well as the construction of the FSRU in Alexandroupolis, which will provide import capacity at the level of 5.5 bcm/y, are currently expected to be completed in the second half of 2023. Furthermore, the expansion of the underground gas storage facility in Chiren, Bulgaria, is planned for 2025.

The assessment has shown that, in the medium term, South East Europe would benefit to some extent from the FSRU terminal in Poland (PCI project on the 5th PCI list) while the main benefits will occur in the Baltic Sea region. Transportation of natural gas from Gdansk to the SEE region and Ukraine would require the accelerated construction of the North-South Gas Corridor in Eastern Poland. The assessment of ENTSOG has also shown that, in the medium term, an **expansion of the capacity of the LNG terminal in Krk** will further help mitigating Russian supply dependence, but to reap these benefits, it would be necessary to **enhance the Croatian transmission grid towards Slovenia and Hungary.** . Further supplies to the region could come through full scale **TAP expansion** , but upgrading TAP would require accelerated additional infrastructure investments in the Italian transmission grid (**Adriatica Line and Mattagiola – Massafra pipeline** which are PCI projects on the 5th PCI list). If the Italian transmission network is reinforced, it would enable increased flows from the South to the North of Italy which would be relevant for additional flows from TAP, EastMed, and Northern Africa. Furthermore, **expansion of Interconnector Greece - Bulgaria (IGB phase II)**, could further mitigate dependence further notably in Bulgaria and in the entire SEE region by allowing to increase flows from TAP and LNG terminals in Greece.

Furthermore, the ENTSOG assessment has shown that projects of common interest and additional projects recognised by the REPowerEU plan, if implemented, would provide

additional benefits also to the Energy Community Contracting Parties, whose needs would be fully satisfied. With the completion of Projects recognised by the flagship 5 of the Economic Investment Plan for Western Balkans (EIP projects), the Energy Community Contracting Parties will have access to various alternative sources and routes. The implementation of the EIP projects would need to be assessed on a case-by-case basis in order to avoid the risk of stranded assets.

Member States should ensure that the identified projects are implemented as quickly as possible in line with the needs and timeline of the REPowerEU Plan. In particular, identified projects, alongside PCIs, should be allocated the status of projects of highest national significance and priority ensuring rapid implementation. The Commission will be ready to facilitate this.

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COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

EU 'Save Energy'

1. INTRODUCTION

Saving energy, i.e. reducing energy consumption through price signals, energy efficiency measures or voluntary efforts can often be the cheapest, safest and cleanest way to reduce our reliance on fossil fuel imports from Russia. Moreover, using less energy supports security of supply, facilitates storage requirements and underpins the clean energy transition.

Voluntarily reducing unnecessary energy consumption and fast-tracking energy efficiency measures will reduce the volume of gas and oil shortage in case of a disruption of flows from Russia. As such it is a critical element to stabilise markets and prevent further price volatility. Over the medium to long-term, energy savings would contribute to lower the prices of energy, help responding effectively to sudden price hikes and supply shortages.

Saving energy directly reduces our energy bills and makes our economy more resilient. High prices for fossil fuel-based energy already hurt households and all industrial sectors, from services to manufacturing and from agriculture to transport. For the energy poor, vulnerable households, micro, small and medium-sized enterprises and for energy intensive industries, they force uncomfortable choices about forgoing energy use. Higher energy prices also affect the relative competitiveness of firms with possible knock-on effects on employment and incomes.

Last year, as part of the 'Fit for 55' package and delivering on the European Green Deal, the Commission proposed an increase of the energy efficiency ambition by the end of this decade. While primarily framed to support the decarbonisation of the EU economy, the proposal also implied other substantial benefits such as higher energy security and lower GHG emissions, air pollution and natural resources depletion.

Implementation of the full "Fit for 55" package would lower our gas consumption by 30% (equivalent to 100 bcm) by 2030. More than one third of this would come from meeting the EU energy efficiency target put forward in the Energy Efficiency Directive (EED) recast proposal. The target would be delivered by the implementation of the relevant energy efficiency policy proposals such as the recast EED itself, the recast of the Energy Performance of Buildings Directive (EPBD), Ecodesign and Energy Labelling legislation, as well as other policy instruments with an impact on energy consumption such as the CO_2 emission standards for new vehicles, the EU Emission Trading System (ETS) and the proposed new ETS for buildings and road transport.

Implementing these policies would deliver a structural reduction in energy use. In the wake of the Russian invasion of Ukraine, those changes should now happen even faster to increase the EU's resilience and energy independence at greater speed.

At the same time, significant energy savings driven by voluntary choices can be achieved relatively quickly. The latest IPCC report[1] highlights that changes to our lifestyles and behaviour can help significantly lower our energy consumption. Choosing to reduce heating temperatures, drive more economically and shift to more public transport and

[1] IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change

active mobility, use household appliances and air-conditioning more efficiently and switch off the lights can deliver substantial, short-term savings[2].

Therefore, this EU 'Save Energy' plan takes a two-pronged approach:

(1) Achieving immediate energy savings through voluntary choices; and

(2) Accelerating and strengthening structural, mid- to long-term energy efficiency measures.

Both approaches will need to be supported by an effective financial framework and governance structure.

2. ACHIEVING IMMEDIATE ENERGY SAVINGS THROUGH PERSONAL CHOICES

In view of the current geopolitical and market situation, we cannot afford to wait until the important structural energy efficiency measures are in place. It is vital to look for immediate opportunities to reduce energy consumption while the current crisis endures. In the shorter term, most of those opportunities would come from voluntary choices, some of which could also last into the mid-to-long term if they lead to changes in habits.

These choices should primarily focus on where the greatest savings in gas and oil consumption can be achieved. Natural gas plays the largest role in heating, accounting for around 42% of energy used for space heating in the residential and household sectors. Oil is the next most important fossil fuel for heating accounting for 14% while coal accounts for around 3%. Fossil fuels use in transport represent 288 million tonnes of oil equivalent per year, or 93% of the transport sector energy needs. Air transport and shipping are almost entirely dependent on fossil fuels, while fossil fuels provide 93% of the energy use in road transport and 23% of the energy use in rail. Around 25% of passenger car activity takes place in the urban mobility environment.

Therefore, the key sectors for significant short-term savings are heating in households and services, and transport and mobility, with some additional short-term potential in industry sectors. Actions to immediately reduce gas consumption are particularly important as any savings that can be made early will help in refilling storage and thus reduce the supply risks over the winter season. At the same time, it is also important to save electricity as gas, oil and coal are also used for power generation. The main reductions in oil use are likely to be achievable by reducing private car use and air travel, as well as more efficient driving for trucks.

These choices can reduce energy demand that can help to reduce fossil fuel imports and avoid more serious shortages and consequently the imposition of curtailment measures with all their ensuing economic and social consequences.

Change is, of course, already driven by current high market prices as households and businesses seek out ways to curb the increase in their energy bills. Such market-driven savings, however, may fall short for various reasons. Actors may not be aware of the best savings opportunities. Coordination may be necessary to achieve the best results. Fairness

[2] Analysis of behaviour change due to electricity crisis: Japanese household electricity consumer behaviour since the earthquake; Murakoshi et al, 2013. Can Rationing Affect Long Run Behavior? Evidence from Brazil; Costa, 2012. See also Policies for energy conservation and sufficiency: Review of existing policies and recommendations for new and effective policies in OECD countries: Bertoldi, 2022 (https://doi.org/10.1016/j.enbuild.2022.112075)

and solidarity are also not necessarily guaranteed: the wealthier may or may not adjust their behaviour. Others, especially the most vulnerable, may instead be forced to take painful measures. Finally, market prices will not necessarily lead to an appropriate effort from the point of point of view of the REPowerEU objectives.

The types of support actions that can be taken can therefore be divided into:

- **Information actions** – to ensure the different types of energy users understand the importance of reducing energy demand and know what they can do to contribute.

- **Incitement and supporting actions** –to help energy users in their efforts to reduce energy consumption, for example by offering rebates on the purchase of the most efficient appliances.

The key advantage of change driven by this sort of measures is that their impact on energy consumption is immediate, no (or very little) up-front investment is required, and only a small change of habit is needed, with no or a very limited impact on welfare as only those who want and can make such choices will do.

Such measures will mainly be voluntary and rely on goodwill, and on the effective communication to energy users of the most effective steps they can take. Since the main uses of gas and oil are relatively limited (primarily heating for gas and transport for oil) the messages can be relatively well targeted.

Delivering targeted information to citizens is crucial for them to make informed choices. The right messages need to be delivered at the right time. This is likely to mean a small number of broadly targeted measures underpinned by accessible information.

These actions need to be taken by trusted bodies that have a good understanding of local circumstances and are able to engage a broad section of the population in concrete action. Member States often are best placed to promote these types of energy saving actions at the appropriate time and in view of their local circumstances. Local authorities, through e.g. local, regional and national energy agencies, the Covenant of Mayors and the 100 Climate-neutral and Smart Cities Mission have a key role to play.

Information actions may also be reinforced by including energy savings related skills in school curricula and promoting skills acquisition in the sectors which are crucial for achieving the ambitious targets of the REPowerEU plan.

Quite a few Member States have already taken actions to address the potential for short term energy savings[3] but more could be done. To support these efforts, the joint Commission - IEA ***'Playing my part'*** campaign provides simple information on some key steps that individuals and companies can take voluntarily when possible to contribute to reducing our energy imports from Russia.

In addition, to support consumers in choosing more efficient appliances, the Commission is launching the consumer interface of the European Product Registration for Energy Labelling (EPREL) database[4]. The Commission is also working on an information campaign to provide awareness raising information and materials to be used for communication to individuals by other bodies. Member States should also make full use

[3] For example, the Belgian government has launched the 'J'ai un impact / ik heb impact' campaign aiming to achieve short term energy savings in view of the Ukraine crisis. Italy has announced a decision to limit heating and cooling temperatures in public buildings.

[4] For more information see: https://eprel.ec.europa.eu/screen/home

of the opportunities available to them to promote energy efficiency such as reduced VAT rates for high efficiency heating systems, ensuring energy pricing encourages switching to heat pumps and encouraging purchase of more efficient appliances. Member States will be best placed to identify the most effective and fairest ones for their own circumstances

Many specific immediate recommendations can be envisaged and an illustration of the types of measures, including indicative estimated savings potentials, is provided in the annex and the most significant ones are summarised in the table below[5].

	Oil savings (Mtoe)	Gas savings (bcm)
Gas saving measures		
Savings from turning down heating, turning off heating in unused rooms, block draughts etc.	≈1.5	≈6
Providing information about keeping condensing boiler temperatures below 60 degrees and encouraging people to check theirs.		≈3
Information about servicing boilers, simple insulation measures, draught proofing, fitting Thermostatic Radiator Valves and heating controllers and encouragement to act.	≈0.3	≈1
Consider modifying the energy pricing and introducing progressive tariff structures and other solutions to encourage energy savings and switch from gas to electricity.		≈1
Industry		
Incentivise energy audits and implementation to avoid heat losses from high temperature processes, supporting switching away from fossil energy.		≈2
Transport measures		
Recommending reducing motorway speeds.	≈8	
Encouraging walking, cycling, public transport, micro-mobility in urban areas.	≈5	
Encouraging train transport.	≈2	
Illustrative potential	***≈16***	***≈13***

The IEA estimates that these types of short-term gas-related measures could achieve **a 5% reduction in (final) gas use (around 13 bcm)** over a year. Similarly, and depending on the Member State and its overall transport demand, measures could achieve up to a **5% reduction in (final) oil use (around 16 mtoe)**, while not preventing necessary journeys.

In support of these efforts, the Commission will:

- Develop a campaign in the context of the EU response to the effects of Russia's war against Ukraine and high energy prices, intended to raise awareness and provide materials for use by other bodies.

- Disseminate information on the 'Playing my part' campaign on energy saving actions for individuals and work with stakeholder groups to increase the reach of these information measures and create the greatest impact.

[5] The indicated estimated energy savings are based on a range of sources and are dependent on a wide range of factors including the degree to which individuals respond to publicity and information campaigns and other incitements. In view of this, they should be understood as purely indicative of the possible relative magnitude of effect at EU level. In addition, the impacts of the measures can overlap.

- Launch the European Product Registration for Energy Labelling (EPREL) database consumer interface to support consumers and procurers choosing more efficient appliances.

3. ACCELERATING AND STRENGTHENING STRUCTURAL, MID- TO LONG-TERM ENERGY EFFICIENCY MEASURES

The current EU's energy efficiency targets significantly contribute to the EU's climate ambitions. The 20-20-20 targets and the 2030 climate targets set under the Climate Law are clear examples where energy efficiency measures have allowed growth and reduced energy consumption to go hand in hand and played an important role for achieving the greenhouse gas reduction target. As confirmed by research[6], energy efficiency policies also provided wider benefits in terms of that can be monetised to differing degrees. These include aspects such as reduced energy poverty, increased health and welfare, increased business competitiveness and enhanced energy security.

Member States have established the necessary frameworks and institutional arrangements to deliver on their previous and current energy efficiency targets. A governance structure is in place through the National Energy and Climate Plans (NECPs) to ensure that these ambitions are consistent with the overall EU objectives. There is now an urgency to accelerate these energy efficiency improvements to increase the EU's resilience. With higher energy prices reducing the pay-back period of energy efficiency investment, there is a need for a renewed effort to remove the liquidity and information constraints holding back such profitable investment.

Because of the work that has been done over the past decade, this ramping up of effort should not require the creation of new structures or bodies. For example, all Member States have long-term renovation strategies, large businesses are required to carry out energy audits every four years and efforts have gone into adequate training and quality assurance. Increasing the rate of energy efficiency improvements may however require existing levels of resourcing to be strengthened, for example for providing advice and information as well as mechanisms to enable more private investments.

The current EU rules on ecodesign and energy labelling have resulted in 10% lower annual energy consumption by the products in their scope, significantly reducing EU primary energy demand and saving costs to consumers. The Commission proposal for a Regulation on Ecodesign for Sustainable Products[7] extends the scope of the Ecodesign framework to cover the broadest possible range of products. As the use of materials in products has an important energy footprint, this new framework will significantly increase energy savings through boosting both energy and material efficiency.

3.1. Indication of a higher EU energy efficiency target

The Commission's EED recast proposal of July 2021 includes a higher energy efficiency target of 9% by 2030 (compared to the 2020 reference scenario).

In 2021, the Commission also undertook a study on energy savings potentials of energy efficiency measures, which showed that the economic saving potential for 2030 could be as high as 13% of FEC (752 Mtoe) if the EU intensifies funding and efforts for energy

6 See for example https://combi-project.eu/

7 COM(2022) 142 final

efficiency. According to the same study[8], the technical potential for energy savings could be as high as 19% of FEC (696 Mtoe).

Following the REPowerEU communication of 8 March, further modelling of the REPowerEU[9] scenario with structurally higher gas prices also results in a cost-effective energy efficiency target of 13% in 2030.

3.2. Possible strengthening of energy efficiency measures

In view of the need to speed up the Union's independence from fossil fuel imports, Member States should consider fast-tracking existing, and implementing additional, energy efficiency measures. Each Member State will know best where to focus its efforts and in addition there are clear areas at the EU level where a common approach can bring added value.

In the ongoing co-decision processes on different elements of the 'Fit for 55' package the co-legislators may strengthen the regulatory framework for energy efficiency in the short term and to deliver more energy savings in the mid- to long-term in the context of REPowerEU, including:

- **Increasing the ambition of national energy savings obligation.**

- Introducing **obligations to ensure that in key sectors,** energy efficiency will be increased, subsidies for fossil fuel technologies will be stopped, renewable energy technologies are consistently promoted and energy savings technologies and equipment are quickly developed.

- Strengthening the **implementation of energy audit results** to ensure that cost-effective measures are implemented and that companies (in particular SMEs) and other entities such as public bodies that are not subject to the energy audit obligation are incentivised to undertake such audits and act on its results. Data centres and the use of waste heat should also be addressed in this context.

- **Introduce additional Minimum Energy Performance Standards** for buildings to boost renovations that encompass also heating (and cooling) systems, with sufficiently ambitious timelines and **setting a pathway to upgrade worst-performing buildings** in the Energy Performance Certificate "G class" up to "D class".

- **Phase out Member States' subsidies for fossil fuel-based boilers in buildings** as of 2025 as a minimum (noting that in most situations such incentives are contrary to Article 7(2) of the Energy Labelling Regulation) and encourage redirection to incentivise support schemes for heat pumps instead.

- **Strengthen national energy (and resource efficiency) requirements of new buildings** through heating system requirements and introducing zero-emission standards before 2030 (before 2027 in the case of public buildings).

- **Tighten national heating system requirements for existing buildings** addressing major renovations and boiler replacements and connection to efficient district heating systems in densely populated areas. This would work hand in hand with the setting of

[8] https://op.europa.eu/en/publication-detail/-/publication/511bb328-f8b9-11eb-b520-01aa75ed71a1/language-en

[9] SWD(2022) 230 final

stricter ecodesign limits for heating systems at EU level, implying 2029 as an end date for 'stand-alone' fossil fuel boilers being placed on the market and parallel rescaling of energy labels (by 2025/2026) that will result in boilers and other fossil fuel-based appliances ending up in the bottom energy classes. Such EPBD and ecodesign and energy labelling measures will incentivise the roll-out of heat pumps and will contribute to the goal of doubling the rate of installation of heat pumps.

- **Introduce national bans for boilers based on fossil fuels in existing and new buildings by setting requirements for heat generators based on greenhouse gas emissions or the type of fuel used.** Whilst the EPBD recast introduces a clear legal basis for such national bans to address current legal uncertainty, it is already possible under the existing legislative framework to go ahead with such measures, which are already being introduced by several Member States.

In the mid- to long-term it will also be **important to further increase energy efficiency in transport** with a view to reduce oil consumption, encourage the switch to efficient renewable alternatives and increase transport energy efficiency, for example through:

- Aerodynamic retrofitting of heavy-duty vehicles and facilities to plug refrigerated trailers; longer trucks with eco-design such as aerodynamic devices on their trailers;

- including further eco-design requirements or higher energy efficiency targets for vehicles and trailers the upcoming revision of the CO_2 performance standards for newly sold heavy-duty vehicles, due in December 2022;

- incentivising the uptake of zero-emission heavy-duty vehicles and boosting the energy saving potential of longer and heavier trucks to drive cross-border within the European Union in the upcoming revision of the Weights and Dimensions Directive;

- boosting the use of combined transport generating energy savings in the upcoming review of the Directive on Combined Transport;

In view of this, the Commission:

- Proposes to increase to 13% the binding target in the Energy Efficiency Directive;

- Invites the Parliament and Council to consider, during the ongoing negotiations, the relevant measures outlined above to enable additional savings and energy efficiency gains in buildings through the Energy Performance of Buildings Directive and the Energy Efficiency Directive;

- Invites the Parliament and Council to uphold the ambition of the Commission proposal for a Regulation on Ecodesign for Sustainable Products[10], the rapid deployment of which will lead to further energy savings through improved energy and resource efficiency of a broad range of products;

- Will consider a legislative initiative to increase the share of zero emission vehicles in public and corporate car fleets above a certain size;

- Put forward a legislative package on greening freight transport

[10] COM(2022) 142 final.

The Commission also urges Member States to speedily adopt the reform of the Single European Sky Regulation on the modernisation of air traffic management in Europe in view of the significant gains in reduced fuel burn this would generate through higher flight efficiency.

4. FINANCING

As regards financing for energy efficiency and building renovations, the investments put forward in the national Recovery and Resilience Plans (RRPs) are a good starting point, with more than 67 billion euro having been committed to such investments under the Recovery and Resilience Facility (RRF). The major share of the funding support was dedicated to building renovations (mainly residential and public buildings), followed by the construction of energy efficient buildings, with energy efficiency in SMEs, industry and in tertiary buildings, often being less frequent. The REPowerEU discussions that are currently taking place with all Member States are a good opportunity to strengthen the RRPs in these areas.

The EU Emissions Trading System (ETS) including the Modernisation Fund and the proposed new ETS for buildings and road transport and the related Social Climate Fund are also expected to provide overall revenues of at least a similar order of magnitude, with energy efficiency investments being a key objective for revenue use. In addition, within the current Multi-Annual Financial Framework under the cohesion policy funds (ERDF, Cohesion Fund and Just Transition Fund), will provide significant support for energy efficiency and sustainable transport. In particular, the **InvestEU Programme** will mobilize private finance to support a wide range of investments in energy efficiency, by sharing risks with implementing partners, including the EIB Group. In addition, the Common Agricultural Policy, Horizon Europe and the LIFE programme all provide support for investments in energy efficiency. In total, under these instruments at EU level, financial resources allocated to climate related spending amount up to 626 billion euros for the 2021-2027 MFF and NextGenerationEU (although these resources address several policy areas beyond energy efficiency).

Measures involving State aid are subject to State aid rules. The Climate, Energy and Environmental Protection State aid Guidelines (CEEAG) provide ample opportunities for support to energy efficiency projects. Despite significant EU- and national, regional and local-level public financing going to energy efficiency, such funding alone will not be sufficient to cover energy efficiency investment needs and, therefore, scaling up private investments is essential to achieve these objectives. Further funding needs stem from necessary up- and re-skilling of workers to counter the shortage of skilled labour to implement many of the planned measures, including but not limited to the installation of energy saving tools, efficient appliances, or renewable electricity generation, as well as building and renovation measures.

This means, on one side, to make the most cost-effective use of public financial support based on financing instruments and innovative financing schemes. To achieve this, the Commission will continue to promote technical assistance for energy efficiency investments, the uptake of energy efficiency innovative financing schemes (such as on-bill and on-tax recovery, energy performance contracting and performance-based models), and financial products (such as energy efficiency mortgages and green loans and financing schemes for acquisition of transport zero-emissions fleets).

In view of the importance of developing financing schemes for energy efficiency, by combining financial instruments and grants, the Commission, with the support of the

European Investment Bank, provides a model[11] to support Member States with developing Energy Efficiency Financial Instruments and increase the uptake of these schemes under the Cohesion Policy Funds.

On the other side, it is key to strengthen the cooperation with financial institutions on energy efficiency investments and to mobilise their active commitment toward the achievement of the REPowerEU and the European Green Deal objectives. In this regard, the Commission, in cooperation with Member States, continues to strengthen the work of the successful Energy Efficiency Financial Institutions Group (EEFIG), for example with a view to transforming it into a high-level European Energy Efficiency Financing Coalition with the financial sector. Additionally, the Commission will examine additional ways to trigger further private investments, e.g. through mortgage portfolio standards or pay-for-performance schemes.

In view of the need for increased private financing for energy efficiency, the Commission will:

- launch, in cooperation with Member States, a high-level European Energy Efficiency Financing Coalition with the financial sector, based on the successful Energy Efficiency Financial Institutions Group (EEFIG);
- examine possible additional measures to trigger further private investments, e.g. through mortgage portfolio standards or pay-for-performance schemes.

5. GOVERNANCE AND PARTNERS

Member States, and their regional and local authorities and organisations, are best placed to reach out to EU citizens and business to encourage them to take energy saving measures or to invest in energy efficiency measures. The Commission will complement such efforts by identifying and sharing expertise among Member States on the most effective actions, where possible through existing structures, for example the Concerted Actions on the EED and EPBD, local initiatives, etc. Under the Technical Support Instrument, the Commission is helping Member States to identify reforms and investments to phase out fossil fuel imports from Russia, including for the acceleration and strengthening of energy efficiency measures. The Commission is keen to work with all relevant national, regional and local actors to provide the greatest support and sharing of information.

Cities and towns represent three quarters of the EU's population and have the biggest potential to support urgent energy savings actions. They also have deep knowledge about, and interface with, people facing or at risk of energy poverty. Within this context, the Covenant of Mayors and the 100 Climate-neutral and Smart Cities Mission are key partnerships for action. An important aspect to ensure that all consumers can play their role is strengthening the existing networks with local and regional governments, and networks of experts and stakeholders active at these levels. At international level the Global Covenant of Mayors provides an established channel to reach 11 000 cities, including in Ukraine that can be integrated into similar action after the conflict.

There are specific aspects to be addressed in different business sectors and the Commission intends to explore whether specific energy savings partnerships could be created with appropriate stakeholders in relevant sectors (e.g. transport, industry, agri-food, ICT including data centres, water, and energy). Other existing initiatives, for example, the

[11] https://www.fi-compass.eu/resources/factsheets-and-brochures/model-for-a-financial-instrument-with-a-grant-component

Clean Islands initiative, the initiative on Coal Regions in Transition, could be used to provide a framework to households, enterprises and services.

In times of urgency, deep local knowledge and tailor-made hands-on support is needed to advise people how to best combine renewable energy use and energy efficiency measures, or how to become members of a renewable energy community. It must be ensured that all citizens have the necessary information to take decisions. Even urgent actions must ensure inclusiveness, equality and non-discrimination.

In view of this, the Commission will:

- continue bringing together the relevant stakeholders, energy savings partnerships, consumer organisations, skills partnerships and alliances, the Committee of the Regions, local and regional networks, and Member States central authorities, to allow for the sharing of best practices on energy savings measures across the board and follow-up on the impacts of the energy saving measures toward next winter;

- continue providing dedicated technical assistance on energy efficiency, such as through the Technical Support Instrument, cohesion policy and ELENA, which will help authorities and stakeholders removing bottlenecks to the deployment of energy efficiency programmes;

- convene Member States to report by 1 July on the actions that they have taken to achieve short-term demand reduction. They will also be invited to set out what further actions they envisage and the expected impact from them, including on data centres and industrial waste heat.

6. CONCLUSION

Energy efficiency is a key element of the European Green Deal and the Union's strategy to achieve a decarbonised economy by 2050 in a cost-effective way. The currently high energy prices and the war in Ukraine have given renewed impetus to the need to save energy to ensure the European Union becomes independent from Russian fossil fuel imports as soon as possible.

As indicated in this plan, this requires both mid- to long-term, structural energy efficiency measures as well as immediate changes. It will require appropriate price signals, smart use of scarce public funding and more private investments, and further support along with accompanying policies for concrete action on the ground. It will require stronger involvement of citizens, local and regional authorities and actors to ensure strong ownership and quick deployment of the needed energy savings actions.

Implementing the recommendations and actions set out in this EU Save Energy communication will make it possible for everyone to save energy and thereby contribute to Europe's energy independence.

Non-exclusive toolbox of measures to achieve immediate energy savings

The below table introduces a non-exhaustive list of targeted measures able to generate significant energy savings in the short-term (over a one-year period). The indicated estimated energy savings are dependent on a wide range of factors including the degree to which individuals respond to publicity and information campaigns and other incitements. In view of this they should be understood as purely indicative of the possible magnitude of effect at EU level.

In addition, the impacts of the measures can overlap. For example, the same energy savings might be achieved by the information campaign measures or by the increasing the roll-out of EPCs and targeted energy checks. In view of this, it is not possible to sum the estimated impacts to arrive at an overall energy saving figure.

Possible measures	***Description of measures***	***Estimated impacts in one year (Mtoe)***
Cross-cutting energy services and financing measures		
Information campaign on multiple energy wastage in households and small businesses	Targeted information campaign, inciting citizens to turn down heating and boiler temperature, avoid consumption at peak hours, close doors, turn off heating in unused rooms, switch-off lights, block draughts, lower energy use in retail shops. This should also include advice services, such as one-stop-shops or energy efficiency kits, for citizens and SMEs.	11 Mtoe
Certification and maintenance	Free-of-charge advice, inspection, energy audits and energy performance certificates to create awareness and provide recommendation on energy savings, as well as spot checks in thermal heating systems and fast-track maintenance to reduce wastage	3.5 Mtoe
Modify energy pricing to encourage lower energy use and fuel	Remove preferential treatment of fossil fuels and flat rates for energy. Introduce progressive tariffs and other solutions to foster savings and encourage switch from gas to electricity	2.4 Mtoe
Encourage purchase of more efficient appliances	Member States to provide information and incentives. The EPREL consumer interface provides readily accessible comparable information.	
Roll-out of innovative financing practices and further support ESCOs	Fast-track innovative financing schemes and financial products can support the increased uptake of energy efficiency measures and generate energy savings in the short-term (on-tax	0.7 Mtoe

	and on-bill financing schemes, energy efficiency mortgages, ESCOs financing)	
Smarter control practices in district heating sub-stations	Introduce smart control and monitoring of centralised district heating sub-stations, which are unequipped to ensure control and eliminate supply temperature fluctuations and the increase flow of hot water to radiators	2.5 Mtoe
Buildings		
Heating and air-conditioning use in buildings	Default settings on condensing boilers can often be adjusted to increase efficiency and save up to 8% of the energy used to heat rooms and water.	2.5 Mtoe
Speedy heat pumps roll-out through dedicated financing incentives	Activate financing and fiscal incentives for fast-tracked heat pumps roll-out, for example through VAT reduction and energy efficiency obligation. Bonus grants to replace fossil-fuel based boilers to direct offset natural gas demand.	1.5 Mtoe
Building automation and energy management systems	Encourage fitting of Building automation and control systems (BACS) that monitor and automatically adjust energy use in buildings.	1.5 Mtoe
Provide information on easy to install insulation measures in buildings	Address easy to install insulation measures in attics and roofs, and through high performance windows and double-glazing	1.5 Mtoe
Industry		
Energy audits and actions to address heat loss	Incentivise heat loss audits and actions to avoid heat losses from high temperature processes. Encourage SMEs to carry out audits.	2.5 Mtoe
Accelerate and financially support the replacement of fossil fuel systems with renewables	Incentives, such as tax breaks or subsidies, to accelerate the replacement of fossil fuel systems with renewables, particularly in existing buildings with boilers more than 12 years old.	5 Mtoe

As regards transport, various 'win-win' measures could be taken at local, regional or national levels as illustrated in the table below, in line with the Sustainable and Smart Mobility Strategy and particularly the new urban mobility policy framework. These actions can be quickly put in place or accelerated by public authorities, transport operators and employers or other agents (individually as per measure) can be quickly put in place or accelerated.

Possible measure	**Potential impact** (depending on the	**Description of the measure**

	specific design)	
Reinforce the adoption of electric and more efficient cars, vans, trucks and buses	High	• Continued/extended public support for sustainable vehicle purchase • Dedicated support schemes for specialized and captive fleets (taxis, shared fleets, logistic fleets, buses) • Investment in publicly accessible recharging and refueling infrastructure (public and private market actors) • Support for the deployment of private recharging infrastructure (at home/in offices/in businesses) by means of subsidies or tax incentives • Investment in zero emissions public transport infrastructure with the aim of reducing private car usage (metro, tram, metropolitan trains, trolleybus)
Encourage reducing speed while driving	Medium to high	• Reducing motorway speeds • Recommend reduced-speed zones in urban areasDevelop car-free zones to facilitate soft mobility
Reduce the price of public transport and rail	Medium to high	• Price reduction for public and rail transport based on public support to operators
Incentivize walking, cycling and micro-mobility in cities	Medium to high	• Support for free bike sharing and other micro-mobility solutions • Incentivizing bike purchases through bike purchase subsidies or tax/VAT reductions • Incentives/rewards for employees that use public transport or active modes for commuting to work • Investing in new bike lanes in and around/towards cities • Promoting/incentivizing last-mile delivery by cargo bike or smaller delivery e-vehicles • Increasing possibilities to travel on public transport (train, metro) with a bike
Promote more efficient driving and operation of freight vehicles and delivery of goods	Medium	• Ensuring better/full loading of heavy-duty vehicles through better planning/data • Optimising multi-modal delivery solutions, including through last-mile zero-emission solutions and pick up stations • Offering eco-drive training • Accelerating rollout of ITS services
Car free days	Low to medium	Organizing car free days in cities

Adapt existing road charging schemes	Low to medium	Road charging schemes reducing congestion during peak times and/or incentivizing more sustainable vehicles

EUROPEAN
COMMISSION

HIGH REPRESENTATIVE
OF THE UNION FOR
FOREIGN AFFAIRS AND
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JOINT COMMUNICATION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

EU external energy engagement in a changing world

{SWD(2022) 152 final}

1. Introduction

The European Union and the world are facing **the existential threat of climate change and a burgeoning energy crisis**. If we do not accelerate the fight against climate change and combat biodiversity loss, the targets agreed in Paris will be out of reach and with that, the possibility to avoid a full-blown climate crisis with devastating consequences for the people and the environment across the globe.

The sixth Intergovernmental Panel on Climate Change report concludes that global greenhouse gas emissions must be reduced by 43% by 2030 to remain on track for meeting the goal of **limiting global warming to 1.5 ºC.** As the energy sector is central to delivering greenhouse gas emission reductions, it will be at the heart of this transition.

At the same time, **Russia has flouted international rules through its unprovoked and unjustified war of aggression against Ukraine**. It has upended energy and food markets, triggering heightened price volatility and energy insecurity, impacting not only its immediate neighbourhood, but the entire world. This requires a response that addresses both the short-term needs and the long-term implications of the EU and its partners. The EU stands in full solidarity with Ukraine and continues to support its energy system.

The green energy transition is the only way to simultaneously ensure sustainable, secure, and affordable energy worldwide. The EU is thus determined to stay the course and engage with partners across the globe to encourage partner countries to enhance their climate ambition and define their pathways to climate neutrality, but also to establish long-term relationships that are mutually beneficial, in particular in the area of energy.

The EU will continue and **step up its engagement around the world through dedicated partnerships**. This can be done by financial support, assistance, technology transfers, and/or enhanced trade relationships.

There is also a European need to embark on this course. Despite the diversification and internal energy security measures taken since the 2009 gas crisis, Europe is still too dependent on a supplier who is willing to use energy as a weapon. To overcome this vulnerability, the European Commission presented on **8 March 2022 a REPowerEU communication**, providing a blueprint to put an **end to the imports of fossil energy from Russia** well before 2030. This requires diversifying the EU energy supply, increasing energy savings and efficiency and accelerating the green energy transition.

All this responds to the challenges of a **fast-changing world and energy landscape**. In the coming years and decades, new opportunities for producing energy will emerge, together with new trade patterns and transport needs. While trade in conventional energy commodities will gradually decline, new commodities such as hydrogen and ammonia will begin to be traded internationally and demand for low emission technologies will grow. New standards and governance arrangements will be required to build more reliable and mutually beneficial partnerships through a rules-based approach.

The European Union must be ready to act in and shape this new, changing environment. There will be new **opportunities for Europe** to build on its green technological leadership, and to promote a more just and sustainable development across the world, but also new challenges for its energy security and the resilience of its supply chains, in particular the critical raw materials, which are key for the energy transition.

Similarly, the crisis is an opportunity for many countries to leap-frog carbon-intensive development and benefit from a greener, more equal economy that provides energy access to millions of people. **In line with SDG 7 the EU will work to ensure a just and inclusive energy transition.** The European Commission and the High Representative will partner and support those embarking on the green transition, facilitating long-term sustainable investment, including through the Global Gateway, which is the European Union's plan and value-based proposition for major investment in infrastructure development around the world.

All these aspects require the EU to update its external energy strategy, more than ten years after the adoption of the previous one, reinforcing its engagement with partners and strengthening its climate and energy diplomacy, in line with the Foreign Affairs Council Conclusions of 25 January 2021.

To achieve this, the EU external energy policy will aim to:

- **strengthen its energy security, resilience and open strategic autonomy by diversifying the EU's energy supply and boosting energy savings and efficiency;**
- **accelerate the global green and just energy transition to ensure sustainable, secure and affordable energy for the EU and the world;**
- **support Ukraine and other countries that are directly or indirectly affected by the Russian aggression;**
- **build long-lasting international partnerships and promote the EU clean energy industries across the globe.**

2. An EU external energy policy for REPowerEU

As set out in the **18 May 2022 REPowerEU plan** published in parallel with this strategy, Europe's energy system will increase its efficiency and move to green energy sources at a faster pace than expected before the start of Russia's aggression against Ukraine. While **the green energy transition is at the heart of the EU's drive for energy independence**, moving away from Russian fossil fuels will require replacing some of them with fossil fuels from other international suppliers, considering that the EU's domestic oil and gas production is much diminished: we import 90% of our gas consumption, 97% of our oil and 70% of our coal needs. As the EU's gas demand will contract at a faster pace than earlier expected and in order to minimise the risk of stranded investments and assets, the EU will favour diversification strategies that encompass both gas and green hydrogen investments.

2.1. Diversifying the EU's gas supply

Today, Russia is Europe's largest gas supplier.[1] **The REPowerEU plan aims to end our dependence on Russian gas as soon as possible.** Most of this gas demand will be substituted with renewables, low carbon energy sources, energy efficiency and savings. The remaining need for natural gas will be covered by diversifying suppliers.

To provide the gas supplies needed over the coming years, **the EU must increase its gas imports from non-Russian sources**: mostly of liquefied natural gas (LNG) (+50 billion cubic meters (bcm)), but also pipeline gas (+10 bcm or more). To this end, the EU has launched the EU Energy Platform – to pool demand, coordinate infrastructure use and negotiate with international partners to facilitate joint gas and hydrogen purchases, as laid out in the REPowerEU Chapeau Communication.

This builds on the work done by the European Commission since last autumn, **reaching out to our main LNG and pipeline gas suppliers**. These efforts have resulted in record monthly LNG deliveries of 12.5 bcm in April 2022 and 42 bcm from January to April 2022. The Platform will integrate ongoing diversification efforts by EU Member States and be open to Ukraine, Moldova and Georgia, as well as the Western Balkans.

To facilitate the diversification efforts, the **European Commission and the US have agreed**[2] to work for the delivery of additional LNG to the EU (at least 15 bcm in 2022 and approximately 50 bcm annually until at least 2030), through US exports but also in cooperation with other international partners. The Commission has also established a dedicated **working group with Canada** to look at possible LNG and hydrogen deliveries in the coming years.[3]

Before this summer, the EU aims to conclude a **trilateral agreement with Egypt and Israel** on supplying Europe with LNG. Japan and Korea have already redirected a number of LNG cargoes to Europe and work continues to use this option in the future. Qatar stands ready to facilitate swaps with Asian countries. In terms of pipeline gas, Norway has already increased its deliveries to Europe and both **Algeria and Azerbaijan** have expressed their willingness to do so as well. The EU will aim to restart the energy dialogue with Algeria and will intensify cooperation with Azerbaijan in the light of the strategic importance of the Southern Gas Corridor. Scaling up the Trans Adriatic Pipeline (TAP) capacity would increase the gas supply to the EU and the Western Balkan countries.

Countries in sub-Saharan Africa, and in particular in Western Africa such as Nigeria (already supplying 15% of EU 2021 imports), Senegal, and Angola also offer untapped LNG potential. A full and effective implementation of the Joint Comprehensive Plan of Action would facilitate a dedicated reflection on the potential for Iran to become a reliable gas supplier to Europe.

The EU will aim to ensure that additional gas supplies from existing and new gas suppliers are coupled with **targeted actions to tackle methane leaks and to address venting and flaring**,

[1] In 2021, more than 40% of the EU's overall gas consumption came from Russia: this equals around 155 billion cubic metres (bcm) of which 15 bcm is in the form of liquefied natural gas (LNG).
[2] Joint Statement between the European Commission and the United States on European Energy Security
[3] Joint Statement by President von der Leyen and Prime Minister Trudeau

creating additional liquidity on global markets, while ensuring significant climate benefits. To that end, the EU will cooperate with its fossil fuel supply partners to reduce methane emissions. At least **46 bcm of natural gas is lost[4] a year** to venting and flaring in the countries that could be supplying this to the EU. The technology exists to capture most of this methane (the main component of natural gas) in a sustainable and economical way. The EU stands ready to provide technical assistance to partners to set up such **mutually beneficial "You collect/we buy" schemes**.

The EU will also convene partners such as the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD) and the World Bank to create incentives for the rapid collection of wasted fossil gases, including methane, bundling those losses into meaningful products that can be sold to international buyers.

The EU's diversification effort takes place against the backdrop of growing global demand and high prices of LNG. These actions must take into account the interests of global partners.

Considering the medium-term evolution of the energy mix in the EU and in partner countries, the **EU will promote broader energy partnerships**, combining gas cooperation with long-term energy cooperation on hydrogen, renewable gases (including biomethane) and other green energy sources to avoid stranded assets and ensure the green transition.

EU energy policy will also aim to ensure open, flexible, liquid and well-functioning global LNG markets, engaging both with the major producer (US, Australia, Qatar, Nigeria, Egypt etc.) and consumer (China, Japan, Korea) countries. G7, G20, International Energy Agency (IEA) and other international fora provide opportunities for that.

Key actions

- **ensure the rapid operationalisation of the EU Energy Platform and its regional platforms;**
- **fully implement the Joint Statements with the US and Canada;**
- **negotiate political commitments with existing or new gas suppliers to increase gas deliveries to Europe;**
- **set up 'You collect/we buy' natural gas and methane capture and trade schemes.**

2.2. Preparing the EU for renewable hydrogen trade

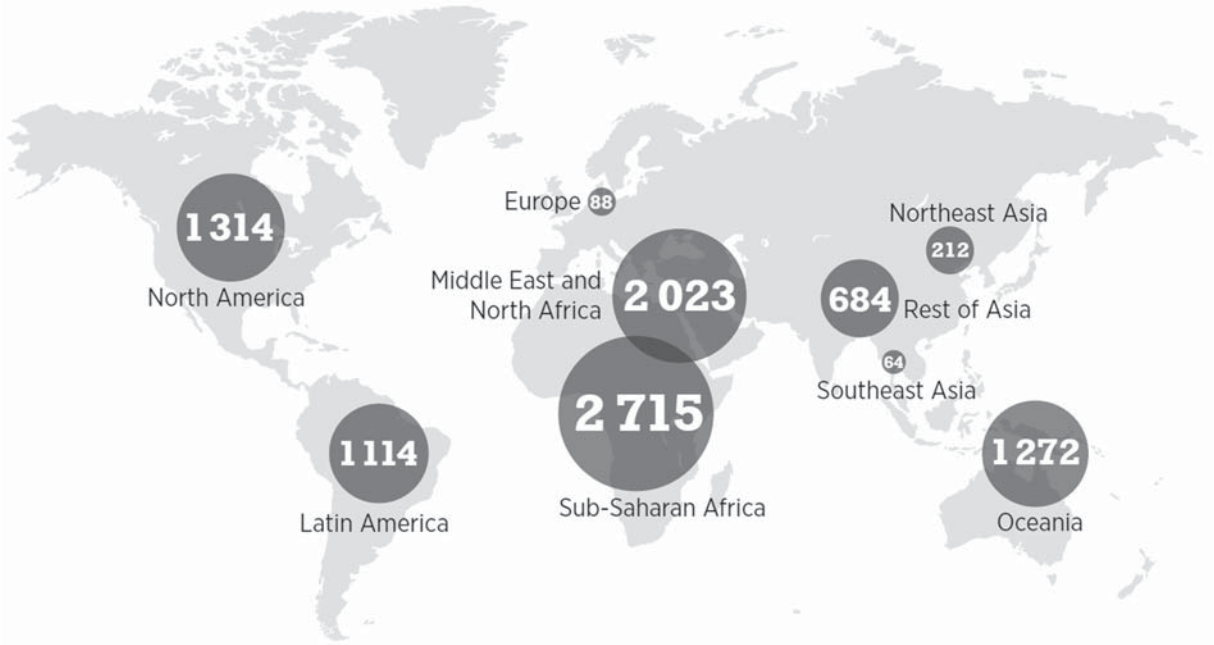
The REPowerEU plan sets out that an additional 15 million tonnes (mt) of renewable hydrogen – on top of the 5.6 mt already planned under the *Fit for 55* initiative – can replace approximately 27 bcm of imported Russian gas by 2030. This includes **10 mt of imported hydrogen**.

The capacity to produce renewable hydrogen is much more evenly distributed across the world than oil and gas reserves given global wind and solar resources. However, this market has yet

[4] 46 bcm/a is the baseline IEA estimate based on best practice assumptions.

to be developed and requires, globally, a significant expansion of renewable production and the availability of water.

In order to facilitate imports of 10 million tonnes of hydrogen into the EU, the European Commission aims to conclude hydrogen partnerships with reliable partner countries to ensure open and undistorted trade and investment relations for renewable and low carbon fuels. It envisages three major hydrogen **import corridors from the North Sea region (Norway and UK), the Southern Mediterranean and Ukraine**, as soon as conditions allow.



International Renewable Energy Agency (IRENA): Technical potential for producing green hydrogen under USD 1.5/kg by 2050, in EJ

A region with a particularly high potential to generate renewable hydrogen is the southern Mediterranean. To create win-win opportunities for both the region and the EU, the European Commission is working on a Mediterranean Green Hydrogen Partnership between the EU and countries in the southern Mediterranean. This work builds upon the existing new Agenda for the Mediterranean and its Economic and Investment Plan and will start with the EU-Egypt Hydrogen Partnership. This would be the first stepping stone for broader renewable hydrogen cooperation between Europe, Africa and the Gulf, another area of abundant resources for producing hydrogen.

When implemented with local social, economic and environmental needs in mind, cooperation in this field would promote local production and consumption of renewable electricity and renewable hydrogen and the development of green industry value chains in partner countries. The EU's regulatory framework for hydrogen should ensure a level playing field for imported and domestically produced hydrogen.

In Sub-Saharan Africa, South Africa and Namibia are already advancing in developing their renewable hydrogen sector and have attracted the interest of EU industry. Enhanced cooperation on renewable hydrogen is also part of the EU's bilateral engagement with countries

like Egypt and Morocco, where the European Commission has launched work on an EU-Morocco Green Partnership.

Work is also on-going on a **strategic partnership with Ukraine on renewable gases**, including hydrogen and biomethane, with a view to scale it up significantly once the conditions allow.

In our immediate neighbourhood, the EU stands ready to support network development through the reviewed Trans-European Networks for Energy Regulation (TEN-E)[5]. Projects with non-EU countries that contribute significantly to the TEN-E objectives can get the status of Projects of Mutual Interest, a label indicating joint projects in electricity transmission, hydrogen transport and CO2 network and storage facilities that meet exacting EU safety standards. In parallel, investments will be necessary to ensure the shipping capacity and logistics to transport this commodity.

The nascent **global hydrogen market must be based on common rules**, in particular for standards, certification and good regulatory practice, in terms of infrastructure access and trade. The EU regulatory framework for hydrogen is the most advanced worldwide. Based on this experience, the EU should lead efforts for developing a solid framework for a global rules-based and transparent hydrogen market. This process should take into account lessons learned in gas and oil markets so that these new energy goods can flow freely across borders, thereby strengthening our energy security as we transition away from fossil fuels.To kick-start the global renewable hydrogen market, the EU considers the development of a **Global European Hydrogen Facility**, as reflected in the REPowerEU Chapeau Communication.

Key actions:

- **conclude hydrogen partnerships, notably in the EU's neighbourhood and Africa, to facilitate the import of 10 million tonnes of hydrogen by 2030 and the development of local hydrogen markets;**
- **sign a Memorandum of Cooperation on Hydrogen with Japan by the end of 2022;**
- **promote a global rules-based and transparent hydrogen market based on EU's experience;**
- **initiate the first trading hubs for renewable hydrogen in Europe and establishing it as the benchmark for Euro denominated transactions in hydrogen;**
- **establisha Strategic Partnership with Ukraine on renewable gases in 2022;**
- **develop a Global European Hydrogen Facility.**

2.3. Reducing dependency on Russian energy imports other than gas

Shipping 8 million barrels daily, Russia is the world's largest oil exporter. Its invasion of Ukraine has therefore created turmoil and uncertainty on the global oil market, with prices occasionally coming close to the all-time high of USD 150 per barrel.

[5] Trans-European Networks for Energy Regulation

As a result of Russia's invasion of Ukraine, market volatility and tightness is likely to continue and impacts not only the EU, but all oil consumers across the world, especially the most vulnerable. **The EU is working with its international partners to ensure that sufficient oil supplies remain available globally and at affordable prices.** Together with the G7 group of energy ministers, the EU calls for oil-producing countries to look into increasing deliveries to the global market using to the full the available spare capacity.

In this context, the full and effective implementation of the Joint Comprehensive Plan of Action would facilitate the entry of available Iranian oil supplies into the market easing supply pressure and price volatility. The Communication on the Strategic Partnership with the Gulf, published in parallel with this strategy, lays out the EU's approach to strengthening its relationship with the Gulf Cooperation Council countries rich in oil resources.

At the same time, IEA members have unanimously agreed to draw on **emergency stocks** to release 120 million barrels, the largest stock release in IEA history. This has shown the importance of emergency stocks as a shock absorber. While the decisions on the release of stocks are a Member State competence, the experience with the IEA collective process demonstrates the usefulness of the EU taking a coordination role, should additional releases become necessary.

The EU decided to stop all imports of coal from Russia, as part of its fifth sanctions package in April 2022. To cope with the crisis in the short term, this means replacing 44 to 56 million tonnes of coal annually, largely by importing. In the longer term, coal will be phased out in the EU, in most countries by 2030. With the adoption of the **EU embargo on Russian coal**, prices in the EU increased around 15% to EUR 325 per tonne, but major difficulties with the coal supply are not expected with end of April prices returning to pre-embargo level.

Diversification of fuel supplies for nuclear power plants is an important strand of work as some EU Member States are still fully dependent on Russian nuclear fuel. The EU will assist nuclear utilities in expediting the licensing process of alternative fuel for the Russian design VVER reactors[6] and work with international nuclear organisations such as International Atomic Energy Agency (IAEA) and Nuclear Energy Agency (NEA) under the Organisation for Economic Co-operation and Development (OECD) to build up cooperation in the area of security of supply. Work with partners such as Canada is already ongoing.

Key actions:

- **work with G7, G20 and other international fora as well as bilaterally with relevant countries to ensure well supplied and well-functioning oil markets;**
- **continue the dialogue with the Organization of the Petroleum Exporting Countries (OPEC) to ensure stability and affordability on the oil market;**
- **coordinate the EU response to the pressure on oil markets, including potential oil stock releases as part of IEA joint action or EU's reaction to supply disruptions;**

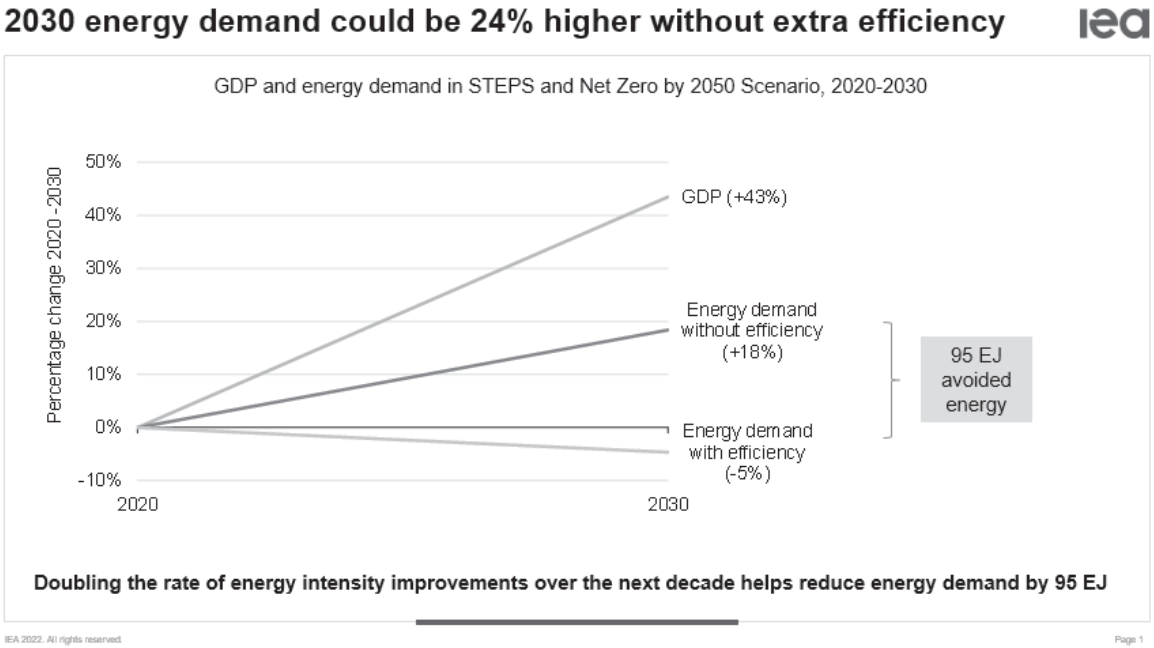
[6] The Russian abbreviation VVER stands for "water-water energetic reactor".

- **accelerate the diversification of fuel supply for nuclear power plants, including in cooperation with EURATOM[7].**

2.4. Prioritising energy savings and efficiency

As the EU moves away from Russian energy supply, it will **prioritise energy savings and efficiency**, aiming to achieve a 5% reduction in oil and gas demand in the short term. This will decrease the price and demand pressure on the global markets. The EU will also work with international partners to **make energy savings and efficiency a global priority.** Together with other developed economies, the EU will in particular focus on reducing energy consumption, among other things building on the IEA Playing My Part campaign.

Energy efficiency has numerous environmental, social and economic benefits. In the IEA's net zero scenario, the global economy grows by 40% by 2030, but uses 7% less primary energy and the solutions for that are already today technically ready, cost-efficient and available for all sectors. The highest saving potentials can be realised in the heating and cooling of public and private buildings. Additional major energy savings can be gained from more efficient processes, the circular economy transition and transport, as well as from more efficient appliances, both in homes (such as heat pumps) and industry.



IEA: Doubling the rate of energy intensity improvements over the next decade helps reduce energy demand by 95 EJ

The EU has developed **regulatory, legislative, standard-setting and labelling experience** that can be a source of inspiration for many countries. The EU will promote these standards and practices internationally, while acknowledging the specific circumstances of its partners.

[7] A new action will be included in the amendment of EURATOM work program 2021-2022 to increase the EU's security of supply through researching alternative fuel sourced from outside of Russia for Russian-designed reactors in the EU and Ukraine.

Mobilising large **capital investments** from both the public and the private sector is also crucial. The EU best practices on energy efficiency financing can be shared and scaled up, in close cooperation with the financial institutions and international partners.

The case of stopping methane leakages shows that energy saving measures can come at negative abatement costs: up to 70% of methane emissions from oil, gas and coal sectors can be stopped using today's technology, and almost half of them at a profit or at no cost[8].

The European Commission has already adopted an **EU Methane Strategy**[9] and a legislative proposal to tackle methane emissions that have a clear international dimension. Internationally, the EU established jointly with the US the **Global Methane Pledge**[10]. Participant countries commit to reducing their collective methane emissions by at least 30% from 2020 levels by 2030. Over 110 countries have already joined this pledge, representing about half of global man-made methane emissions.

- **Key actions:work with partners to make energy efficiency and savings a global priority;**
- **support the global transition to more circular economy to reduce energy consumption;**
- **facilitate the availability of and the access to finance for energy efficiency and saving investments;**
- **implement the Global Methane Pledge (GMP) and the external dimension of the EU methane strategy.**

3. Supporting partners impacted by Russia's invasion of Ukraine

The Russian military aggression in all its dimensions is producing alarming systemic, knock-on effects on the global economy which is already battered by the COVID-19 pandemic and climate change, with particularly dramatic impacts on developing countries.

Recent projections by UNCTAD[11] estimate that the global economy will be a full percentage point of GDP growth lower than expected due to Russia's invasion of Ukraine which is severely disrupting already tight food, energy and financial markets.[12] Commodity prices are reaching record highs: crude oil prices have increased by around 60%, gas and fertilizers have more than doubled, and food prices are 34% higher than this time last year.

Recent United Nations assessments indicate that one third of 1.7 billion people already living in poverty are set to be exposed to disruptions in food, energy and finance systems[13]. As a result,

[8] The IEA estimates "that it is technically possible to avoid around three quarters of today's methane emissions from global oil and gas operations. Even more significantly, around 40% of current methane emissions could be avoided at no net cost".
[9] EU strategy to reduce methane emissions, COM/2020/663
[10] Global Methane Pledge
[11] United Nations Conference on Trade and Development (2022) Trade and Development Report 2021, March update
[12] United Nations - Global impact of war in Ukraine on food, energy and finance systems, April 2022
[13] United Nations - Global Crisis Response Group

many developing countries will lose further economic ground, while their vulnerability is heightened by rising geopolitical tensions and deepening economic uncertainty.

Acknowledging this impact, **the European Union will make use of all existing instruments to continue supporting developing economies**, particularly in Africa and the EU's neighbourhood, to recover from the COVID-19 pandemic and achieve an inclusive and sustainable growth, while building economic resilience that is necessary to address these shocks and the climate change crisis. The EU's efforts to support a global just and green energy transition, outlined in chapter 4, are central to this work. The EU will monitor and address the impact of Russia's aggression on partners through bilateral and multilateral engagement and work towards a united global response.

3.1. Repowering Ukraine's energy system and cooperating with close neighbourhood

Since the start of Russia's military aggression, helping Ukraine and other nations directly affected by the war has been a central part of the EU's energy policy. The EU work has focused on ensuring uninterruped energy supplies and nuclear safety in Ukraine. The **emergency electricity grid synchronisation** with Ukraine and Moldova is a major step towards ensuring security of supply. The next political priority is to allow for electrcity trade with the EU based on gradual increases of tradable capacity.

Reverse flows already today allow to bring gas from Slovakia and Hungary to Ukraine. Opening **the EU platform for common purchases** of gas, LNG and hydrogen to Ukraine, Moldova, Georgia and the Western Balkans is as well a clear signal of support. Damaged energy equipment in Ukraine is repaired by chanelling specialised energy equipment from Member States to Ukraine via the EU Civil Protection Mechanism. Items Members States cannot deliver are procured via the Energy Support Fund for Ukraine established by the Energy Community.

To allow for future full integration of Ukraine's energy market, the EU is providing technical support to ensure market reforms. The reforms will also allow for better integration of renewable energy and aligment with the EU's climate ambition. This work is taking place in the **framework of the Association Agrement, and under the EU-Ukraine Strategic Partnership**. The Energy Community and the newly establised Ukraine Energy Task Force play an important role in this work.

Nuclear safety remains a major priority, in particular following Russia's reckless behaviour at the Ukrainian nuclear sites. The EU is fully aligned with the International Atomic Energy Agency's effort to ensure the safety of Ukrainian nuclear facilities at all times. The EU mobilises its European Instrument for International Nuclear Safety Cooperation to address urgent needs and restore nuclear safety to comply with the international legal framework and pursues the long standing support to the Ukrainian regulatory authority. It stands ready to assist in the reconstruction of the necessary nuclear safety capacity.

Looking to the future, the EU has set out its approach to longer-term reconstruction framework in the Ukraine Relief and Reconstruction Communication.[14] The EU will work with Ukraine to prepare the **REPowerUkraine initiative**, to 'rebuild better' the Ukrainian energy system, with the aim to decarbonise Ukraine's energy sector thus ensuring Ukraine's energy independence. The focus should be on energy efficiency, renewables, renewable hydrogen, biomethane and future-proof infrastructure. The EU will support this process both financially and technically.

With the **Western Balkans**, the EU will continue supporting the **region's Green Agenda and energy independence, promoting reforms** that take the region forward on their European path. The Energy Community, with the support from the European Commission, is working to determine the energy and climate targets for 2030. This will send the right investment signals and ensure political commitment to coal phase-out and energy transition in general. Implementation of the key legal acts adopted by the Energy Community in November 2021 will allow for a better integration of renewables, storage and demand side response.

The EU will propose to **fully integrate the Western Balkans into the EU internal electricity market** in order to enable the change to renewable energy production and the decarbonisation of energy supply in South-East Europe. The progressive introduction of carbon pricing could contribute to greater alignment with the EU.

Key actions:

- **support the repair and reconstruction of energy infrastructure in Ukraine;**
- **increase cross-border capacity to enable electricity trading;**
- **facilitate the reverse flow of gas to Ukraine via the Slovak Republic, Hungary and Poland and to Moldova and Ukraine via Romania (Trans Balkan pipeline);**
- **invite Ukraine, Moldova, Georgia and the Western Balkan countries to participate in the EU's voluntary gas purchasing scheme;**
- **accelerate the domestic reforms and energy flagships of the Economic and Investment Plans for the Western Balkans and Eastern Partnership, adjusted to the current situation, to speed up renewables' deployment, ensure a green energy transition and help reduce dependency on Russian gas;**
- **take advantage of the Energy Community framework to encourage ambitious energy and climate targets and market reforms, as well as to boost renewables and energy efficiency;**
- **launch the REPowerUkraine initiative to ensure energy supply and rebuilding the Ukrainian energy sector after the war.**

4. Leading and accelerating the global green and just energy transition

The green energy transition is crucial for limiting global warming to 1.5 degrees, for boosting growth, providing opportunities and improving living conditions across the globe, as well as

[14]Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: Ukraine relief and reconstruction, COM/2022/233.

mitigating price and energy security risks. Following the 1.5 degree scenario would mean **2.3% more GDP growth** until 2030 than with business-as-usual and **85 million new energy-transition related jobs[15].**

The EU is committed to **leading and speeding up the global green transition** and supporting its international partners in the process. This includes working together on renewable energy, energy efficiency and savings, on the circular economy, green growth, natural resource protection, critical raw materials, clean technologies and future-proof infrastructure.

The European Commission and the EU High Representative have launched the **Global Gateway**, a new European strategy to boost smart, clean and secure links in digital, energy and transport sectors and to strengthen health, education and research systems across the world, in line with the UN's 2030 Agenda and the Paris Agreement. The Global Gateway – including a strong push for the green energy transition – will be delivered through a **Team Europe** approach, bringing together the EU and its Member States with their financial and development institutions, including the EIB and the EBRD in order to leverage up to EUR 300 billion of investment in 2021-2027.

The EU supports the global green transition also through its climate finance. 30% of the EU's development aid envelope is channelled into tackling climate change, including in the energy sector. The EU is arguably the largest contributor to the global commitment of the most developed nations to provide annually USD 100 bln for climate finance and will continue to engage other partners to follow suit.

To succeed, the green transition must be just and socially fair. Especially in the context of slow recovery, economic turbulence and the global consequences of Russian aggression against Ukraine, the social aspects of reshaping the energy systems must be central to the transition. This is a priority for the EU and an integral part of our external energy policy. On the one hand, it means reducing the social and economic impact of phasing out fossil fuels (in particular coal) and on the other, offering new opportunities via green technologies (chapter 4.1), while tackling issues like energy access, fossil fuel subsidies, skills development and distributional effects of the transition.

While coal is not the only fossil fuel, it is the most polluting one and responsible for 40% of the world's greenhouse gas emissions. It is therefore at the heart of EU's just transition efforts that focus in particular on the biggest coal-consuming countries.

In follow-up to COP26, the EU, together with its Member States France and Germany as well as its international partners, the US and the UK, is implementing a **just transition partnership with South Africa** with a budget of USD 8.5 billion to accelerate the decarbonisation of the economy with the emphasis on the coal phase-out and minimising the country's social adaptation costs. The EU is exploring the possibility to conclude just transition partnerships with other partners like Vietnam, Indonesia and India.

[15] World Energy Transitions Outlook: 1.5°C Pathway

In line with China's stated ambitions to reduce its dependence on coal and make progress towards its goal to become carbon neutral by 2060, the EU-China Energy Cooperation Platform (ECECP) and the annual high-level EU-China Energy Dialogue focus on carbon markets, energy systems, renewable energy, energy efficiency and business cooperation. The EU has also established labour and social policy dialogues with India, China and Southern neighbourhood within the Union for Mediterranean Regional Platform on Employment and Labour. The EU also provides support for the phase out of coal in the Western Balkans and Ukraine via its 'Coal Regions in Transition' initiative.

Key actions:

- **accelerate the global green energy transition by facilitating sustainable investments and connectivity through Global Gateway;**
- **collaborate on just transition and coal phase-out with the EU partner countries, including in the EU's neighbourhood;**
- **work to ensure the global commitment of** USD **100 bln annually for climate finance and use the EU contribution to support the green, just transition;**
- **implement the joint energy transition partnership with South Africa and explore the scope to forge other global partnerships along this model;**
- **implement the 'Coal Regions in Transition' initiative in Ukraine and Western Balkans;**
- **align and implement global initiatives to end fossil fuel subsidies and engage with countries heavily reliant on coal-fired power to achieve this;**
- **work with IEA, IRENA and ILO to further a just and inclusive transition globally.**

4.1. Promoting renewable technologies and energy efficiency in partner countries

Electricity based on wind and solar is now the cheapest power option in most regions of the world. In a 1.5 degree world, renewables could represent 90% of the global energy production by 2050. Global markets will be worth an estimated EUR 24 trillion for renewable energy and EUR 33 trillion for energy efficiency up to 2050[16]. This represents a major opportunity for the world's economy.

The rise of renewable energy will change the dynamics of the global energy system. While hydrocarbon resources were concentrated in a few countries, every nation has the potential to develop renewables and participate in energy trade. Today, around 80% of the world population lives in countries that are net energy importers. This is set to change.

The EU, which represents 9% of global emissions, has a **strong interest in prompting the uptake of renewable energy and improving energy efficiency across the world**. To accelerate the roll-out of photovoltaics, the European Commission is publishing **a European Solar Strategy[17]** together with the present strategy.

[16] IRENA, Global energy transformation: a roadmap to 2050, 2019
[17] European Solar Strategy, COM/2022/221

The efficient roll-out of renewable energy sources and increasing energy efficiency requires a **wider 'system approach'** that factors in electricity production, transmission and consumption as a whole. Installing renewable energy capacity is most effective where it is integrated into open and flexible regional markets. The EU has been a first mover in creating a large integrated energy market and our experience can help international partners to accelerate their transition.

Many countries in the Western Balkans, Eastern Partnership and Southern Neighbourhood are gradually increasing the use of renewable energy in their region. Countries like India and Morocco have already set themselves ambitious targets for renewables deployment, implemented and further strengthened under the EU-India Clean Energy and Climate Partnership and the EU-Morocco-Green-Partnership. Similar work is ongoing in our partnership with China (including on Emissions Trading Systems based on the EU system).

Fair and reciprocal energy cooperation with Africa is an important priority, both to ensure energy access to 570 million people currently without electricity in sub-Saharan Africa, but also to support investments in sustainable energy systems and renewable hydrogen trade, once local needs are covered. By 2030, the **African Green Energy Initiative** aims to support the deployment of at least 50 GW of renewable electricity, providing at least **100 million people** with electricity access. In order to achieve this goal, leveraging private sector investments will be key.

Under the Global Gateway initiative, the EU will mobilise EUR 2.4 billion in grants for sub-Saharan Africa and EUR 1.08 billion for North Africa to support renewable energy, energy efficiency, the just transition and the greening of local value chains. This will also support the African Union Green Recovery Action Plan which seeks to increase the renewable energy generation capacity by at least an additional 300 GW by 2030.

The acceleration of renewables uptake worldwide also presents **an opportunity to strengthen trade relations**. To develop their home-grown renewables potential, most countries in the world require access to innovative technologies, knowledge and capital and the EU green tech industry is well positioned to be a partner in those efforts. Half of the world's wind power comes from turbines manufactured in Europe. EU companies are leaders in important segments of the photovoltaic, hydrogen and heat pump industries and are catching up with Asia on battery technologies, thanks to the European Battery Alliance.

In order to thrive and to grow further, the green tech industry needs to be able to rely on a stable **regulatory framework, fair competition, sufficient investments, and a fiscal level playing field** – this is equally important and beneficial for the EU and local actors. External energy policy must work hand in hand with the EU industrial and trade policy, ensuring market access for our industry and addressing challenges via the Free Trade Agreements and enforcement action.

Developing **business to business relations** requires constant attention: the business networking events organised under the EU and US Energy Council, most recently on offshore wind, is a

model to be replicated. Across Asia (for example in the Republic of Korea and Taiwan) have been set up to offer new business opportunities to EU green tech companies.

De-risking and credit export instruments are also key to enable entry into new markets. The EU clean tech companies increasingly compete with foreign companies that receive direct financial support from their governments. The Commission will develop **an EU strategy for export credits** benefitting green tech companies to improve the level playing field for the EU businesses in non-EU country markets. The Commission is also seeking to amend OECD rules to provide further incentive for export credit support for climate-friendly technologies.

Key actions:

- **accelerate the roll-out of renewables and energy efficiency across the world, including in Western Balkans, Africa, the Mediterranean and the Indo-Pacific;**
- **implement the mutually beneficial EU-Africa-Green Energy Initiative;**
- **support the green transition in Central Asia through a Regional Team Europe Initiative on environment/energy/water;**
- **increase the roll-out of renewable energy in cities and rural municipalities, for example through the Urban Transition mission of Mission Innovation;**
- **advance clean technologies in the context of the Trade and Technology Council (TTC) with the US;**
- **develop an EU export credit strategy.**

4.2. Cooperating on research and technology

Many of the technologies needed to achieve full decarbonisation of the global economy are not yet mature or competitive with fossil fuel based heat and power. International cooperation is essential to increase the speed of green energy innovation and roll-out, while lowering their cost, in particular for **renewable energy and hydrogen.** Other key research areas for an innovation-driven transition include the development of **smart, cyber secure and flexible power grids, long-duration energy storage, sustainable raw materials, small modular reactors and sustainable fuels for industry and transport**.

Since renewable energy and hydrogen will not be able to substitute all fossil fuels in the energy mix, carbon removals will also be needed, in particular in industrial sectors where electrification or hydrogen-based options are not cost-effective. The EU will cooperate with its neighbours and other countries to bring to global markets innovative zero-consumption energy efficiency solutions, as well as technologies such as carbon-capture utilisation and storage (CCUS) .

The EU will continue supporting international cooperation and multilateral initiatives in line with its global approach to research and innovation[18]. The Commission will provide resources for international cooperation from Horizon Europe, the EU's public financing programme for research and innovation. The EU will also reinforce engagement with major international

[18] Communication on the Global Approach to Research and Innovation, COM/2021/252 final

initiatives, like Mission Innovation and the Clean Energy Ministerial, to develop together the green energy solutions of the future.

Key actions:

- **develop CO2 sequestration and storage techniques to market maturity, including in cooperation with Norway;**
- **continue the Long-Term Joint EU-African Union Research and Innovation Partnership on Renewable Energy and extending its scope to renewable hydrogen.**

4.3. Ensuring access to critical raw materials

While the EU is determined to end its dependence on Russian energy, it is equally determined to **avoid new dependencies in the future.** As demand for fossil fuels decreases, increased demand for raw materials, including rare earths and metals could lead to new supply challenges in the course of the energy transition. According to the Critical Raw Materials in Technologies and Sectors foresight study, the demand for critical raw materials needed in the low-carbon energy sector and their costs will increase significantly by 2050. The EU depends in this sector primarily on rare earths, lithium, magnesium, niobium, germanium, borates and scandium, some of which cannot be procured domestically.[19]

To continue advancing on its energy transition, EU companies will need to source these materials in tight commodity markets or substitute them in the longer term through new industrial processes. Potential remedies to minimise the EU's future dependence in this strategic area include further diversifying global supply chains, prioritising energy efficiency measures, incentivising long-term investments in new mining and refining activities inside the EU as well as stepping up circularity efforts to ensure that materials are retained in the economy for as long as possible and that waste is recycled.

The Commission will intensify work on the supply of critical raw materials and prepare a legislative proposal. This initiative will aim to strengthen the European value chain through the identification of mineral resources and of raw materials projects in the European strategic interest, while ensuring a high level of environmental protection.[20]

The EU has already established **Sustainable Raw Material Value Chain Partnerships** with Canada and Ukraine. To diversify its supply chains further, the Commission is working towards establishing additional **mutually beneficial** raw material value chain partnerships in **Africa (e.g. Namibia), Latin America, Western Balkans** and with **Australia,** via trade agreements or Memoranda of Understanding.

At least in the medium term, access to well-diversified supplies from international markets will be key to ensure resilience. EU trade policy plays a key role in this regard, by ensuring open access to supplies and by avoiding market distortions through development and implementation

[19] Critical Raw Materials in Technologies and Sectors foresight, 2020

[20] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: REPowerEU Plan, COM/2022/230.

of trade agreements. The Energy and Raw Materials Chapters on EU Free Trade Agreements (FTAs) have a central role in this.

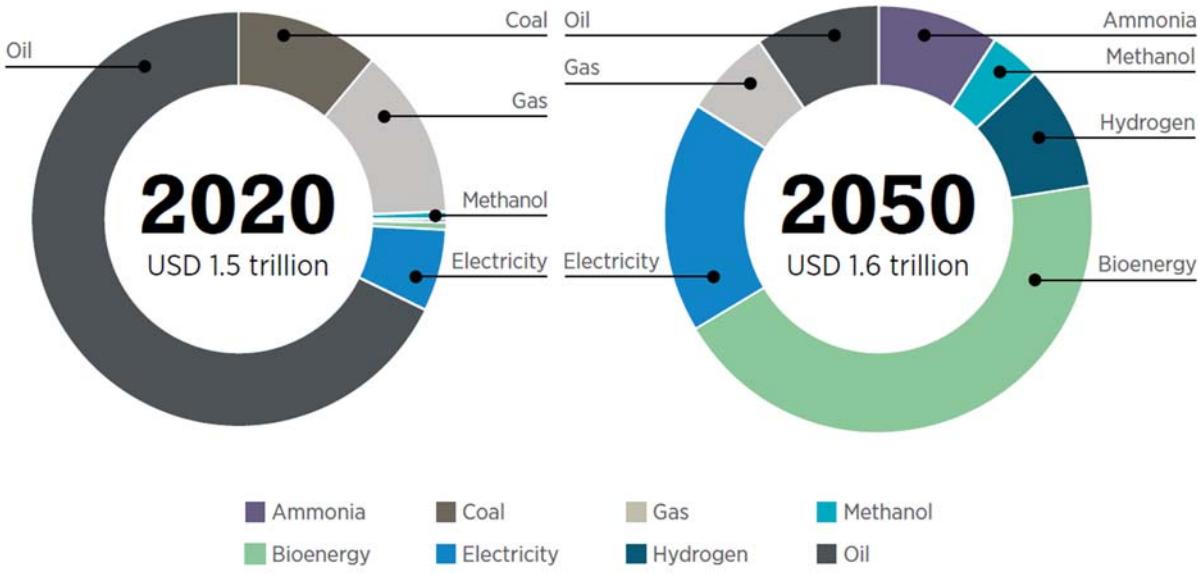
Key actions:

- **establish mutually beneficial raw material value chain partnerships, beyond Ukraine and Canada;**
- **strengthen cooperation on raw materials value chains with Norway under the EU-Norway Green Alliance;**
- **reinforce the use of EU economic and trade policy tools to ensure undistorted access to international markets;**
- **promote global resource efficiency and circularity, notably through product design measures[21];**
- **work with international organisations such as the OECD, the IEA and IRENA on supply chains for critical raw materials used in the energy transition.**

5. Laying the foundations of the new global energy system

5.1. Strengthening established alliances, building new partnerships

The new global energy system does not mean simply replacing fossil fuels with renewables, it will be fundamentally and structurally different from today's. Collaboration and partnerships will be key to how it functions. As the EU strives to make the global green transition a reality, it will reach out, listen to and work with the entire world.



IRENA: Shifts in the value of trade in energy commodities, 2020 to 2050

The **EU will continue to work in tandem with the US**, with whom the priorities are well aligned across the full energy policy spectrum. Through the EU-US Energy Council and in

[21] Overview of EU measures to make sustainable products the norm in the EU

international fora, EU will endeavour to affect positive change on the global energy landscape. The energy relationship with **Canada** has significantly accelerated, building on the existing High-Level Energy Dialogue.

Both the **Eastern and the Southern Neighbourhood** will continue to be crucial for the EU. The energy relations with Eastern Partnership countries will need to be reinforced and reviewed, while remaining focused on sustainable energy security and the green energy transition, following the commitments at the 6th Eastern Partnership Summit in December 2021. The resilience, energy security and green transition of **Ukraine, Moldova and Western Balkans** are linked to the EU's and therefore a central priority. Cooperation with **Turkey** should continue on decarbonisation, to ensure alignment of the Turkish legal framework with the EU acquis, including through the Turkish Investment Platform.

In the Southern Neighbourhood, a common Mediterranean energy policy should be developed based on the Union for the Mediterranean Ministerial Declaration adopted in June 2021. The EU will support regional cooperation in the Eastern and Southern Mediterranean region on energy transition and to unleash the renewable energy potential. The EU will continue to pursue cooperation on decarbonisation including on methane emissions with all fossil fuel suppliers in the region, such as **Egypt, Israel and Algeria**.

Africa is a key partner for the EU. In addition to the cooperation policy objectives, stronger trade and investment engagement with African countries is expected as they are increasingly becoming fast growing markets for green energy technologies. African countries can also contribute to the EU's energy security, today with oil and LNG supplies, and in future through green hydrogen and renewable fuels as well as raw materials critical to the green energy transition.

The EU will continue to work with partners like **Norway, Japan, Australia, Chile, United Kingdom** and others on energy transition and mutually relevant priorities. The EU is currently negotiating a FTA with **Australia**. As a significant future producer of green hydrogen, strengthening energy links should be a priority. Chile is also expected to become a large producer of green hydrogen in the future, as well as supplying critical raw materials such as lithium.

As part of the **EU-India Clean Energy and Climate Partnership**, the EU will intensify its energy cooperation with India in support of accelerating the local roll-out of renewables and the rapid decarbonisation of its industry. The EU will support joint activities in the areas of offshore wind and solar energy and their integration through smart grids.

The EU is continuing to further work with **China** on de-carbonisation, power market reform and to render the energy system more effective and efficient. Cooperation will focus on emission trading systems, electricity systems, grid-modelling, financing of energy efficiency and business cooperation.

As laid out in the **Joint Communication on the Gulf[22],** the EU will work closely with Gulf countries to promote the green energy transition, including investments in the Southern Neighbourhood. In order to better structure its cooperation with the Gulf, the Commission proposed to hold annual ministerial meetings on the green transition complemented by related private sector initiatives.

Central Asia is a key region rich in resources. Building upon the region's potential in solar, wind and hydroelectric energy, the EU will encourage Central Asia's reforms of the energy sector and transition to a low-carbon economy, as well as cooperation on critical raw materials with countries such as **Kazakhstan**.

5.2. Geopolitics and global energy architecture

Russia's invasion of Ukraine is a stark reminder that the world is marked by major geopolitical and economic power rivalries. If not counterbalanced, relations between major powers could become increasingly confrontational and unilateralist, leading to competing visions and agendas.

The global green energy transition can support the EU in achieving its broader geopolitical objectives to reinforce resilience and open strategic autonomy. The European Commission and the High Representative will promote EU's energy objectives by reinforcing the role of energy diplomacy in the foreign and security policy. This will require strengthening monitoring mechanisms, foresight and assessment of the strategic implications of the global energy transition on partner countries.

Effectively addressing the challenges of the global energy transition requires trust and cooperation within the international community. The EU will step up its multilateral action in support of EU objectives and global commitments based on the principles of rules-based and effective multilateralism set out in the 2021 Joint Communication on strengthening the EU's contribution to rules-based multilateralism[23]. Enhanced partnerships within the UN, G20 and G7, and closer cooperation with International Financing Institutions are necessary.

Multilateral energy organisations and forums such as the IRENA, the IEA, the Energy Community, the International Solar Alliance, the Clean Energy Ministerial and Mission Innovation, the Global Covenant of Mayors for Climate and Energy, all have a key responsibility in promoting the energy transition globally. Some organisations, such as the Energy Charter, are in urgent need of deep modernisation in order to align them with the 2050 goals, and the EU is actively addressing this. If sufficient reform of the Energy Charter Treaty cannot be achieved, the EU will consider withdrawing its membership.

The EU will continue to support a more inclusive representation of emerging and developing economies in international institutions. The EU together with its Member States as part of a

[22] Joint Communication to the European Parliament and the Council on a Strategic Partnership with the Gulf, (JOIN/13/2/2022)
[23] Joint Communication to the European Parliament and the Council on strengthening the EU's contribution to rules-based multilateralism, (JOIN/2021/3 final)

Team Europe approach will increasingly contribute to leadership and inclusive decision shaping through greater participation in governing bodies of relevant organisations. The EU should also weigh up the benefits of upgrading its collective presence to a full membership in the energy fora considered key and strategic for advancing the European Green Deal and this Strategy.

Furthermore, the EU will reinforce cooperation within multilateral and regional organisations and seek closer engagement with the Union for the Mediterranean, the African Union and its agencies, the Latin American Energy Organisation (OLADE) or the Association of South-East Asian Nations (ASEAN) to address common challenges and work together at the international level.

Key actions:

- **regularly monitor the geopolitical impact of the green transition;**
- **initiate a review of the EU's engagement in international energy fora key for the global energy transition;**
- **step up energy diplomacy in the EU and Member States' foreign policy.**

6. Conclusion

This is a critical time for the global energy policy. Climate change, geopolitical shifts, technological developments and increased global energy demand create a challenging and fast-changing environment that require our energy systems and relations to adapt.

Adding to that, **Russia's invasion of Ukraine has far-reaching consequences for the energy security** of not only the EU, but the entire world. Russia's actions have triggered unprecedented price volatility on the energy markets and underlined the need for partnerships based on trust and shared long-term goals.

The green energy transition is the only way to simultaneously ensure sustainable, secure and affordable energy worldwide. To be successful, that transition must be socially just and fair, leaving no-one behind. It means not only phasing out fossil fuels and outdated practices, but phasing in green energy, innovative technology, better markets and circular economy. It requires tackling already now the potential future risks and dependencies.

The transition is an opportunity for the EU and its partners to build together **a new energy system that is more sustainable, more equal and more collaborative**. This communication lays out the EU's strategy to reach that goal.

EUROPEAN
COMMISSION

Brussels, 18.5.2022
COM(2022) 221 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

EU Solar Energy Strategy

{SWD(2022) 148 final}

1. SOLAR ENERGY TO REPOWER EUROPE

Massive, rapid deployment of renewable energy is at the core of the REPowerEU plan - the EU initiative to put an end to its dependency from Russian fossil fuels. Solar energy will be the kingpin of this effort. Panel by panel, the infinite energy of the sun will help reduce our dependence on fossil fuels across all sectors of our economy, from residential heating to industrial processes.

As part of the REPowerEU plan, this strategy aims to bring online over 320 GW of solar photovoltaic by 2025 (more than doubling compared to 2020) and almost 600 GW by 2030[1]. These frontloaded additional capacities displace the consumption of 9 bcm of natural gas annually by 2027.

Solar energy has a number of advantages that make it particularly suitable to meet today's energy challenges.

Solar photovoltaics (PV) and solar thermal technologies can be rolled-out rapidly and reward citizens and businesses with benefits for the climate and their purses.

This is because solar energy costs have decreased spectacularly over time. The EU's renewable energy policies helped bring PV costs down by 82% over the last decade[2], turning it into one of the most competitive source of electricity in the EU. Solar energy, combined with energy efficiency, protects European citizens from the volatility of fossil fuel prices.

EU citizens appreciate this autonomy to produce their own energy, either individually or collectively. It is a huge opportunity for whole cities and regions, especially those transitioning to a new energy and economic model. The solar sector not only creates renewable electricity and heat; it also creates jobs, new business models and start-ups.

Massive deployment of solar energy is also a chance to reinforce the EU's industrial leadership. By creating the right framework conditions, the EU can expand its manufacturing base, building on its vibrant competitive and innovation-driven environment while ensuring that solar products are up to the EU consumer's high standards.

The EU Solar Energy Strategy outlines a comprehensive vision to swiftly reap the benefits of solar energy, and presents four initiatives to overcome the remaining challenges in the short-term.

First, by promoting quick and massive PV deployment via the **European Solar Rooftops Initiative**.

Second, by making **permitting procedures shorter and simpler**. The Commission will address this issue through the adoption of a legislative proposal, a recommendation and a guidance alongside this communication.

Third, by ensuring the availability of an abundant skilled workforce to face up the challenge of producing and deploying solar energy all across the EU. In line with the call for stakeholders to establish an **EU large-scale skills partnership** for onshore renewable energy under the Pact

[1] All values on electricity generation capacity refer to alternating current (AC).
[2] See IRENA Data Centre

for Skills, as part of the REPowerEU plan, this strategy will set out its relevance for the solar energy sector[3]. This partnership will bring together all relevant stakeholders to take action on upskilling and reskilling to fill the gap.

Fourth, by launching a **European Solar PV Industry Alliance** that aims to facilitate innovation-led expansion of a resilient industrial solar value chain in the EU, in particular in the PV manufacturing sector.

2. ACCELERATING SOLAR ENERGY DEPLOYMENT

Solar PV is one of the cheapest source of electricity available[4]. The cost of solar electricity was already well below wholesale electricity prices before the 2021 surge in prices. This advantage has become even more relevant now in the face of the crisis. Solar electricity and heat are key for phasing out EU's dependence on Russian natural gas. Large-scale deployment of PVs will reduce our reliance on natural gas used to produce power. Solar heat and solar power combined with heat pumps can replace natural gas boilers for heating in residential or commercial spaces. Solar energy in the form of electricity, heat or hydrogen can replace natural gas consumption in industrial processes.

By the end of 2020, the EU reached 136 GW of solar PV installed generation capacity, having added more than 18 GW that year. It delivered around 5% of total EU electricity generation[5]. To reach the 2030 target for renewables proposed by the Commission and the objectives of the REPowerEU plan, we need to radically step up a gear. **Over this decade, the EU will need to install, on average, approximately 45 GW per year**.

Solar energy systems have long been a low-cost and reliable solution for heating in many European countries[6] but overall solar heat accounts for just around 1.5% of heating needs[7]. To reach the EU 2030 targets, **energy demand covered by solar heat and geothermal should at least triple**.

Rooftops have been the place for most of the solar energy deployment so far, but huge untapped potential remains. It is a low-hanging fruit and the EU and its Member States must join forces to exploit it rapidly as much as possible, given multiple benefits for consumers.

European Solar Rooftops Initiative

[3] COM(2020) 274 final, 1 June 2020

[4] Estimated at 24-42 EUR/MWh depending on the location within the EU *in* Eero Vartiainen, Gaëtan Masson, Christian Breyer, David Moser, Eduardo Román Medina "Impact of weighted average cost of capital, capital expenditure, and other parameters on future utility-scale PV levelised cost of electricity" – Estimated at 32-74 EUR/KWh depending on the location within the EU *in* Lugo-Laguna, D.; Arcos-Vargas, A.; Nuñez-Hernandez, F. A European Assessment of the Solar Energy Cost: Key Factors and Optimal Technology. Sustainability 2021, 13, 3238. Estimated at an average of 60 USD/MWh in the EU according to IEA World Energy Outlook 2021. Estimated at 75-131 USD/MWh across Italy, Spain, France and Germany according to IRENA Technical Report "Renewable Power Generation Costs 2020".

[5] Eurostat

[6] Competitiveness of the heating and cooling industry and services - Publications Office of the EU (europa.eu)

[7] Solar heat accounted for 38 GW_{th}, primarily in the form of solar heating systems for domestic hot water in residential homes, with 1.6 GW_{th} added in 2019. Eurostat

According to some estimates, rooftop PV could provide almost 25% of the EU's electricity consumption[8] - this is more than the share of natural gas today. These installations – on residential, public, commercial and industrial roofs – can shield consumers from high energy prices, contributing to public acceptance of renewable energy. They can be deployed very rapidly, as they utilise existing structures and avoid conflicts with other public goods like the environment.

The EU-wide European Solar Rooftops Initiative, announced in the Commission's REPowerEU Communication, aims at unlocking the vast, underutilised solar generation potential of rooftops to make our energy cleaner, more secure and affordable. To achieve this swiftly, immediate action is necessary by end 2022

The EU will:

- *Increase its 2030 target for renewables share to 45%.*
- *Limit the length of permitting for rooftop solar installations, including large ones, to a maximum of 3 months.*
- *Adopt provisions to ensure that all new buildings are "solar ready".*
- *Make the installation of rooftop solar energy compulsory for:*
  - *all new public and commercial buildings with useful floor area larger than 250 m^2 by 2026;*
  - *all existing public and commercial buildings with useful floor area larger than 250 m^2 by 2027;*
  - *all new residential buildings by 2029.*
- *Ensure that its legislation is fully implemented in all Member States allowing consumers in multi-apartment buildings to effectively exercise their right to collective self-consumption, without undue costs[9].*

The EU and Member States will work together to:

- *Eliminate administrative obstacles for cost-effective extensions of already installed systems.*

[8] Bódis, K., Kougias, I., Jäger-Waldau, A., Taylor, N., Szabó, S.: A high-resolution geospatial assessment of the rooftop solar photovoltaic potential in the European Union (2019) Renewable and Sustainable Energy Reviews, 114, art. no. 109309

[9] Both the Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources and the Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity contain provisions on collective self-consumption.

- *Set up at least one renewables-based energy community in every municipality with a population higher than 10 000 by 2025.*

- *Ensure that energy poor and vulnerable consumers have access to solar energy, e.g. through social housing installations, energy communities, or financing support for individual installations.*

- *Support building-integrated PVs for both new buildings and renovations.*

- *Ensure full implementation of the current provisions in the Energy Performance of Buildings Directive (EPBD) in relation to the nearly zero-energy buildings standard for new buildings, including through dedicated guidance.*

Member States should:

- *Establish robust support frameworks for rooftop systems, including in combination with energy storage and heat-pumps, based on predictable payback times that are shorter than 10 years.*

- *As part of such a framework and where needed to unlock investments, set up a national support programme to ensure as of next year:*

  - *massive deployment of rooftop solar energy, giving priority to most suitable buildings for quick interventions (Energy Performance Certificate classes A, B, C or D),*

  - *combine solar deployment with roof renovations and energy storage; this should be implemented through a one-stop shop integrating all aspects.*

The Member States should implement the measures under this initiative as a priority, using available EU funding, in particular the new REPowerEU chapters of their Recovery and Resilience Plans. The Commission will monitor progress in the implementation of this initiative on an annual basis, through the relevant fora, with the sector's stakeholders and the Member States.

If fully implemented, this Initiative, as part of the REPowerEU plan, will accelerate rooftop installations and ***add 19 TWh of electricity after the first year of its implementation*** *(36% more than expected in the Fit for 55 projections). By 2025,* ***it will result in 58 TWh of additional electricity generated*** *(more than double the Fit for 55 projections).*

Financing solar energy deployment

Solar energy technologies have relatively high upfront costs, compared to other sources of energy, but low operational costs. Therefore, attractive financing conditions are crucial for their competitive deployment. Commission analysis indicates that additional investments in solar PVs under REPowerEU would amount to **EUR 26 billion between now and 2027**, on top of the investments needed to realise the objectives of the Fit for 55 proposals.

Most of the financing will be private, but partially triggered by public funding, including from the EU. The **Recovery and Resilience Facility** already dedicated at least EUR 19 billion to accelerate the roll-out of renewables[10]. Other instruments are contributing to this effort: the cohesion policy funds, InvestEU, the Innovation Fund, the Modernisation Fund, Horizon Europe and the LIFE programme. Connecting Europe Facility RES and the EU renewable energy financing mechanism will support cross-border cooperation on solar energy projects.

Besides dedicated energy financing programmes, **Member States should also look for synergies with** transport infrastructure or research and innovation programmes, ensuring a coordinated support framework for solar energy across relevant policy areas. In addition, they should use specific technical support provided by the Commission to reduce their dependence on Russian fossil fuels through the **Technical Support Instrument** which *inter alia* supports reforms to enhance the rollout of solar energy. The new **Guidelines on State aid for climate, environmental protection and energy** (CEEAG)[11] have introduced a set of criteria for tailored and proportionate support to renewable energy, including solar. Among other things, this includes contracts for difference, technology-specific tenders or exemptions from mandatory competitive bidding for small projects, including certain energy community projects.

2.1. Utility-scale deployment and enabling measures

Utility-scale installations

Utility-scale solar installations will be crucial to replace fossil fuels at the required speed. In recent years, competitive bidding has driven growth in this segment. By 2020, 19 Member States had carried out national-level tendering processes, also known as renewable energy auctions[12]. This mechanism has contributed to drive down costs and recent years have seen greater emphasis on auction designs which increase reliance on market-based revenues[13]. **Stable, publicly available schedules for the foreseen auctions increase visibility for project developers and drive up investment**. They should cover at least the following five years, include the frequency of competitive tendering, the related foreseen capacity, the available budget and the eligible technologies[14].

Beyond auctions, public procurement can also be leveraged to further promote solar energy deployment, while generating incentives to enhance the sustainability of the equipment. In addition, aggregation of demand for solar energy from large public buyers can reduce investment risks and facilitate innovative business models in the solar energy sector. To this end, the Commission will build on the **Big Public Buyers initiative**, proposing the creation of a community of practice dedicated to the procurement of solar energy. This community will share knowledge and develop best procurement practices for solar energy technologies.

[10] Based on the 22 Recovery and Resilience Plans (RRP) adopted by the Council of the EU and the two RRPs of Sweden and Bulgaria endorsed by the Commission on 29 March 2022 and 7 April 2022 respectively.
[11] Communication from the Commission - Guidelines on State aid for climate, environmental protection and energy 2022 (2022/C 80/01)
[12] CEER report (2020): 2nd CEER Report on Tendering Procedures for RES in Europe; AURES II project auction database.
[13] For instance, under a two-way contract-for-difference premium model, the State pays the renewable electricity producer the difference between the actual electricity price and a reference price when the former is lower; vice-versa, the producer pays to the State the difference when the electricity price is above the reference price (see http://aures2project.eu)
[14] Article 6 of Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources.

Solar project developers are increasingly relying on a combination of electricity market participation and corporate **renewable Power Purchase Agreements (PPAs)** to ensure a stable income. A swift adoption of the revision of the Renewable Energy Directive (RED), proposed in July 2021[15], and the implementation of the Commission Recommendation on PPAs adopted alongside this communication should allow Member States to boost the number and aggregated volume of the agreements.

As the share of variable renewables increases in the electricity system, **auctions should also support renewables-based technologies that can reduce the cost of ensuring network stability and system integration.** Concentrated Solar Power (CSP) with thermal storage and solar PV with batteries are examples of technologies that can provide these benefits.

The public consultation confirmed that a key barrier holding back utility-scale installations, including solar, is administrative, in particular long and complex permit-granting procedures. To overcome this obstacle, the Commission has presented a **Recommendation on fast permitting for renewable energy projects** and a **legislative proposal on permitting** alongside this communication.

Go-to areas and multiple use of space

The required expansion in utility-scale projects will increasingly face competing uses of land and public acceptance challenges. Member States should undertake a mapping exercise to identify **appropriate locations for renewable energy installations** needed to collectively achieve the revised EU 2030 renewable energy target. They should also **designate the renewable go-to areas** in which permitting will be simpler and faster than elsewhere while limiting the impact on other uses of land and preserving environmental protection. In addition, permit-granting procedures for the installation of solar energy equipment in rooftops and other structures created for purposes different than solar energy production should be limited to three months.

The repurposing of former industrial or mining land represents an opportunity for solar energy deployment. The Modernisation Fund, as well as the cohesion policy, in particular the Just Transition Fund, can support this kind of economic diversification and reconversion initiatives.

Innovative forms of deployment (1) – Multiple use of space

Multiple use of space can contribute to mitigating land constraints linked to competition for space, including for environmental protection, agriculture and food security.

In particular, under certain conditions, the agricultural use of land can be combined with solar generation in so-called ***agrivoltaics*** *(or agri-PV). The two activities can establish synergies, whereby PV systems can contribute to crop protection and yield stabilisation[16], with agriculture remaining the primary use of the land area. Member States should consider incentives for the development of agri-PV while designing their* ***National Strategic Plans for***

[15] Proposal for a Directive of the European Parliament and of the Council amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC on the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 (COM(2021) 557 final)

[16] Barron-Gafford, G.A., Pavao-Zuckerman, M.A., Minor, R.L. et al. Agrivoltaics provide mutual benefits across the food–energy–water nexus in drylands. Nature Sustainability 2, 848–855 (2019). See also research developed by Fraunhofer ISE on the topic: https://agri-pv.org/

***the Common Agricultural Policy**, as well as their support frameworks for solar energy (e.g. through the integration of agri-PV in renewable energy tenders). It is also worth noting that, in the agricultural sector, State aid rules allow investment aid to sustainable energy.*

*Furthermore, thanks to **floating PV** solutions, the surface of water can be used for solar generation. Offshore solar installations represent a great potential, integrated in the EU Offshore Renewable Energy Strategy*[17]*. Ongoing research and innovation efforts are dedicated* inter alia *to developing new mooring solutions, improving the durability of PV panels in marine environment, monitoring and assessing the impact on the environment and reducing maintenance costs. Within the energy sector, the **use of the surface of artificial lakes** created by hydroelectric dams represents a specific potential for PV deployment. Floating PV panels reduce water evaporation and, connected to the dam's electric systems, increase the total output, although the impact on aquatic biomass is still being investigated. Any intervention on water bodies must respect the conditions set out in the Water Framework Directive and the Marine Strategy Framework Directive* [18].

*Finally, **transport infrastructure**, such as highways or railway tracks, presents an unexploited potential for solar energy deployment. For instance, if the installation of solar panels on highway sound barriers in a pilot project in the Netherlands were to be replicated in the country's whole system of sound barriers, it would yield enough electricity for 250,000 households*[19].

The Commission will develop **guidance for Member States to promote the development of the innovative forms of solar energy deployment** listed in this strategy.

Rising to the skills challenge

The EU solar PV sector employed 357,000 full-time equivalent (direct and indirect) jobs in 2020 and this figure is expected to at least double by 2030. The installation sector is a particularly strong source of local jobs, representing 80% of the total, while the operation and maintenance sector accounts for 10%[20].

There is already a lack of skilled workers. This bottleneck could grow quickly if unaddressed. Vocational and Educational Training is an important instrument to address this challenge and Member States are encouraged to analyse the skills gap in the solar energy sector and develop training programmes fit for purpose, taking into account the potential to increase women's participation.

At EU level, as part of the REPowerEU plan, the Commission will bring together the relevant stakeholders in the renewable energy sector, including from the solar, wind, geothermal,

[17] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future COM(2020) 741

[18] Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy; Directive 2008/56/EC of the European Parliament and of the Council establishing a framework for community action in the field of marine environmental policy

[19] Solar Highways: solar panels as integrated constructive elements in highway noise barriers. A multifaceted research into the design, construction and yield of a bifacial solar noise barrier. A LIFE + programme project executed by Rijkswaterstaat and TNO. 'Layman's report' Author: Minne de Jong, June 2020

[20] SolarPower Europe, EU Solar Jobs Report 2021.

biomass and heat pumps industries, but also from regional and national permitting authorities, to set up **an EU large-scale skills partnership** for onshore renewable energy, including solar energy, under the Pact for Skills.

The partnership should develop a clear vision of concrete upskilling and reskilling measures for solar energy expansion. This should include training cooperation between companies along the value chain, social partners, training providers, and regional authorities. By joining forces, stakeholders can maximise the return on their investment in the partnership. Private, local and national funds can support the partnership's objectives and be complemented by EU funding, from the European Social Fund to Erasmus+ and Marie Skłodowska-Curie Actions.

The Commission will support implementation by the Member States of the Council Recommendation on ensuring a fair transition towards climate neutrality including actions to support workforce reskilling and upskilling and labour market transitions towards growing sectors such as solar energy[21].

In addition, to promote mobility, the revision of the RED proposed in July 2021 provides requirements for mutual recognition of certification schemes across the EU, based on common unified criteria. It also mandates Member States to publish the list of certified installers to provide guarantees for consumers.

2.2. Bringing solar value to citizens and communities

Deploying solar energy on rooftops provides an immediate solution to reduce reliance on natural gas for citizens, but also SMEs and industry. With every energy consumer turned producer, the acceptance and democratisation of the transition towards a clean and independent energy system is reinforced. Accelerating this transition requires lifting the range of regulatory, financial and practical barriers that still prevent most EU citizens from using the sunshine to increase their independence and reduce their energy bills.

Incentivising prosumers

Prosumers are owners of small, decentralised installations who self-consume part of the energy they produce. Support and enabling policy frameworks for prosumers take various forms: investment subsidies, feed-in tariffs, exemptions from certain taxes or the possibility to sell excess electricity to other consumers or directly in the market. Among other things, the new State aid CEEAG guidelines include exemptions from mandatory competitive bidding processes to allocate aid and determine the aid level for small projects, including those below or equal to 1 MW of installed capacity. In addition, the 2021 proposal for the revision of the Energy Taxation Directive continues to allow Member States not to tax electricity of solar origin[22].

The full potential of solar energy for the EU can only be exploited if citizens and communities are provided with the right incentives to become prosumers. The public consultation pointed to the persistence of some negative factors, such as low remuneration for the excess electricity produced or a general lack of awareness.

[21] COM(2021) 801, SWD(2021) 452 final. Annex 3 provides an overview of funding supporting the fair transition to climate neutrality and the online source "EU funding instruments for upskilling and reskilling"
[22] Proposal for a Council Directive restructuring the Union framework for the taxation of energy products and electricity (recast) COM(2021) 563 final

Better information is key to enhance clarity and predictability on the benefits of self-consumption for potential investors, citizens and SMEs. Investment costs, financial support, increase of property value, network tariffs, generation and consumption profiles and return on investment are all relevant factors impacting investments. **One-stop-shops** in Member States should share such information and give citizens **advice on both energy efficiency measures and solar energy projects** in an integrated manner, from the technical requirements to administrative steps and support measures. The best available projections on the above variables should then be used to **design support frameworks that reassure those** deciding on an investment in solar energy, energy storage or heat pumps. This should be done in particular through **a predictable payback period, shorter than 10 years**.

Direct public support, multi-stakeholder approaches and innovative financing models should **facilitate access to solar energy for the energy poor and vulnerable**. This issue deserves particular attention in the most remote regions, i.e. the EU outermost regions[23], which enjoy a large untapped solar energy potential.

Member States should support partnerships between local authorities, energy communities and social housing managers to facilitate collective and individual self-consumption schemes. Pre-financing shares in energy communities, virtual net-metering schemes (while accounting separately for calculating network charges) or renting out solar PV, energy storage and heat pumps at a fee lower than retail electricity prices, can all be used for this purpose. Member States can also[24] apply reduced VAT rates to energy efficient, low emission heating systems, including solar panels, solar water heating systems and heat pumps, as well as to social housing and residential building renovation expenditure[25].

PVGIS, a tool for citizens to evaluate their roof's PV potential

The free and open web-based PVGIS Photovoltaic Geographical Information System tool, developed and maintained by the European Commission's Joint Research Centre, provides information about solar radiation and PV system performance for any location in Europe. Citizens and installers can use it for an instantaneous assessment of the potential to generate solar energy on rooftops.[26]

A balanced allocation of costs and benefits

One of the main barriers to individual or collective self-consumption identified by stakeholders through the public consultation are charges and network tariffs.

Under the current EU legislation, national regulatory authorities (NRAs) have the mandate and exclusive competence to prescribe transparent, non-discriminatory and cost-reflective tariffs. Prosumers have the right to sell their excess production without being subject to discriminatory or disproportionate procedures and charges and should be able to participate in all electricity

[23] The EU counts nine outermost regions - French Guiana, Guadeloupe, Martinique, Mayotte, Reunion Island and Saint-Martin (France), Azores and Madeira (Portugal), and the Canary Islands (Spain). They are located in the western Atlantic Ocean, the Caribbean basin, the Amazonian forest and the Indian Ocean and are home to 4.8 million EU citizens

[24] Council Directive (EU) 2022/542 of 5 April 2022 amending Directives 2006/112/EC and (EU) 2020/285 as regards rates of value added tax

[25] See annex III of Council Directive (EU) 2022/543.

[26] https://joint-research-centre.ec.europa.eu/pvgis-photovoltaic-geographical-information-system_en

markets. **These principles are not yet widely implemented across the EU**, especially in multi-apartment buildings.

Member States should avoid discriminatory treatment as regards grid injection tariffs between producers connected at transmission level and those connected at distribution level, such as prosumers and energy communities. Authorities should enable the development of local energy markets to diversify remuneration pathways for prosumers, based on energy sharing and peer-to-peer exchange arrangements.

In the context of collective self-consumption or peer-to-peer exchanges within multi-apartment buildings, NRAs should **consider possible cost reductions stemming from the reduced use of the network**. At the same time, such cost-reflective tariffs should not lead to discrimination against those who do not have access to self-consumption. In other words, any discriminatory cost-socialisation of grid-related costs should be avoided. Looking forward, digitalisation, in particular smart meters, can greatly facilitate real-time monitoring of electricity flows and the evaluation of the impact on grid costs.

Time-differentiated distribution network tariffs, especially if flanked by dynamic pricing contracts, would contribute to aligning the choices of prosumers and energy communities with grid congestion management needs and market conditions.

Energy communities and other collective solar actions

Collective solar energy projects provide another avenue to reduce the consumption of fossil fuels and address energy poverty and vulnerability.

Current legislation already supports **renewable and citizen energy communities**, as well as collective solar initiatives to generate, store, share, exchange, and use energy. However, these communities still face **significant barriers**, including difficulties in securing financing, navigating licencing and permitting procedures or developing sustainable business models. In addition, as they are often initiated by a group of volunteers, they suffer from limited time and lack of access to technical expertise. Cross-border energy communities, which can exploit complementary renewable energy potentials in EU border regions, face additional challenges linked to legal, technical or administrative inconsistencies across borders[27].

To tap into this potential, Member States should **establish appropriate incentives and adapt administrative requirements to the characteristics of energy communities**. An integrated 3-step "learn-plan-do" programme could help energy communities build technical expertise and secure access to financing. The assessment and removal of existing barriers would level the playing field with more professionalised and established market participants.

In addition, Member States are encouraged to make use of the flexibility provided by the new State aid CEEAG guidelines, including exemptions for renewable energy community projects with installed capacity equal to or below 6 MW from mandatory competitive bidding processes, or to facilitate their participation in such processes.

Collective action can also be organised by consumer organisations, for instance by purchasing of solar energy products. Other types of collective solar energy actions, managed by

[27] Report from the Commission "EU Border Regions: Living labs of European integration", COM(2021) 393 final.

professionalised and larger actors, should also be encouraged to engage in innovative business models based on collective self-consumption and energy sharing.

Integrating solar energy through the interaction with other devices

To be seamlessly integrated in the energy system at large, the rapid growth of solar energy requires new technological, digital and operational advances.

Energy storage is an important asset to contribute to this integration, especially in the context of heating or transport shifting to electricity. Full system benefits from distributed assets, such as batteries, can only be reaped if they are properly integrated and able to participate in all electricity markets, including balancing and congestion management markets, in a non-discriminatory and homogeneous manner across the EU. At EU level the ongoing work on the **EU network code on demand side flexibility** aims at addressing remaining regulatory barriers and unlocking the potential of such distributed assets as flexibility sources. The July 2021 proposal for a revision of the RED also includes additional provisions to ensure non-discrimination in the market participation of these assets.

Electric vehicles (EVs) can also serve as energy storage devices and contribute to solar electricity self-consumption, if parked within the premises of the owner or user. Linking the EV's consumption at home while recharging away from home, for instance through the same electricity supplier, can potentially contribute to a more dynamic system integration of distributed solar energy assets. This may also allow owners and users to use the same contract and data-sharing agreement for their recharging needs.

Off-grid recharging stations equipped with PV panels and energy storage offer the possibility to increase access to EV recharging infrastructure in rural areas and, in general, in those locations with limited grid connection.

Innovative forms of deployment (2): vehicle-integrated PV

Solar energy and electric vehicles can also be integrated in technologically novel ways. ***Vehicle-integrated PV*** *presents a high potential to contribute to the reduction of emissions from the transport sector, by increasing the energy autonomy of EVs and partially replacing grid power with solar electricity produced on board[28]. More than other EVs, they can also become an additional source of electricity for the grid while parked, and an energy storage solution contributing to overall grid resilience. The opportunities provided by this technology are being analysed through a pilot project managed by the Commission[29].*

Devices such as batteries and heat pumps can only contribute to the integration of solar electricity into the energy system if they can effectively communicate with each other and with solar energy systems. This interoperability can be facilitated through measures such as standardisation, or open-source solutions for digital connectivity. One of the objectives of the

[28] Thiel, C., Gracia Amillo, A., Tansini, A., Tsakalidis, A., Fontaras, G., Dunlop, E., Taylor, N., Jäger-Waldau, A., Araki, K., Nishioka, K., Ota, Y., Yamaguchi, M.: Impact of climatic conditions on prospects for integrated photovoltaics in electric vehicles (2022). Renewable and Sustainable Energy Reviews, 158, art. no. 112109

[29] Pilot Project – Effect of Energy-efficient and Solar Power Generating Vehicles on Overall Energy Demand in the EU Transport Sector (2022/S 053-136682) – Contract notice published on 16/03/2022.

Commission's proposal for a Data Act[30] is to foster a level playing field for energy solutions and services, while putting the user in control of data collection and sharing to third-party service providers. Research and innovation projects jointly develop interoperability and data sharing solutions, while standardisation organisations are already running activities in this respect. In addition, the upcoming Digitalisation of Energy Action Plan will support interoperability for a wide range of energy consuming, producing and storage devices through a code of conduct for energy smart appliances manufacturers[31].

2.3. Solar value for buildings and industry

The contribution of solar to decarbonising our building stock

Solar energy can deliver a substantial part of a building's electricity and heat demand, either through solar heat collectors, solar PV (with heat pumps) or a combination of the two, including hybrid PV-thermal technologies. Through support policies and regulations that **provide a level playing field for all solar technologies** and do not favour one against the other, national and local authorities can promote the most efficient solution for each situation.

When combined, the installation of solar energy and renovation interventions become mutually reinforcing, optimising the building's energy performance. If national support programmes are designed accordingly, they can ensure **swift massive deployment of rooftop solar energy in buildings, giving priority to most suitable buildings for quick interventions** (Energy Performance Certificate classes A, B, C or D). Where appropriate, this effort can be combined with roof renovations and deployment of energy storage and heat pumps.

As regards new buildings, where technically feasible, the recast of the Energy Performance of Buildings Directive[32] requires that **100% of on-site energy consumption be covered by renewable energy** as of 2030. This transition towards the decarbonisation of buildings' energy consumption will be accelerated by introducing an **obligation to install solar energy equipment** on all new and existing public and commercial buildings above a certain size and on new residential buildings in a gradual fashion, between 2026 and 2029. Where the building is not adapted, renewable electricity can also be acquired through a PPA.

In addition, provisions will be adopted to ensure that **all new buildings are "solar ready"**, i.e. designed to optimise the generation potential on the basis of the site's solar irradiance, enabling the fruitful installation of solar technologies without costly structural interventions.

Greening of energy taxation and the proposed **new emissions trading system for buildings** and road transport can contribute to generating the resources required for these interventions, while setting the appropriate economic incentives. In this context, the proposed **Social Climate Fund** can support measures and investments integrating renewables in buildings, principally to the benefit of vulnerable consumers and micro-enterprises.

[30] Proposal for a regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act) COM(2022) 68 final

[31] See the work carried out by the JRC in this area: https://ses.jrc.ec.europa.eu/development-of-policy-proposals-for-energy-smart-appliances

[32] Proposal for a directive of the European Parliament and of the Council on the energy performance of buildings (recast) COM(2021) 802

Innovative forms of deployment (3): Building-integrated PV

The opportunities that buildings provide to install solar energy extend well beyond rooftops and parking spaces. ***Building-integrated PV (BIPV)*** *represents a novel form of solar deployment: they constitute a construction product, while at the same time allowing solar electricity generation from additional surfaces. Despite recent cost reductions, the potential of this sector remains to be unlocked through uptake by the construction sector and the related economies of scale. EU-wide deployment would require* ***homogeneous certification*** *for the affected products, as well as customised professional training and university programmes. National governments can also provide* ***guidance to local authorities*** *on how to deal with BIPV in their permitting decisions[33]. Some Member States have introduced* ***specific opportunities for BIPV in their renewable energy support frameworks****. Attaching such support to the construction permit stage can further facilitate the uptake of these products by actors in the construction sector.*

Solar energy for the industrial sector

To meet their electricity demand, companies are already signing direct PPAs with solar energy projects. By 2021, more than 5 GW of solar PV projects had directly signed PPAs with corporate offtakers[34]. However, corporate renewable PPAs still account for a small fraction of the sector's electricity consumption.

Solar energy can also provide industrial heat, which accounts for 70% of industrial energy demand. Based on solar collectors or concentrated solar, solar heat can deliver heat for industrial processes from 100 to over 500°C. Nevertheless, the potential of solar heat for industrial processes is still largely untapped. Two of the main obstacles it faces are administrative hurdles and the gap between the payback times of these investments and the financial requirements of most industrial actors.

Solar electricity can be used in combination with heat pumps or electric furnaces to provide heat, or it can be converted into renewable hydrogen, to be used as fuel or feedstock in industrial processes. Due to declining costs, in particular in places with high irradiation and limited land constraints, it is expected that renewable hydrogen production from solar electricity could become cost-competitive within the next decade.

The Commission is preparing an **EU-wide scheme for carbon contracts for difference** under the Innovation Fund to support innovative solutions for the decarbonisation of industrial energy demand.

2.4. Preparing the energy network for the efficient absorption of solar electricity

Infrastructure investments

[33] JRC Policy Brief (JRC120970): How Photovoltaics can ride the EU Building Renovation Wave
[34] RE-Source platform (2021)

Solar energy is abundant, but the energy infrastructure bringing it to the consumer must change to enable a more electrified system powered by wind and solar. In the public consultation, solar industry stakeholders identified grid expansion and grid connection as a key bottleneck for deployment.

The efficient integration of decentralised solar installations will primarily require significant adaptations in distribution networks. These include digitalisation investments, such as smart grids, to enable higher system performance and seize the flexibility opportunity provided by small distributed assets. The forthcoming Digitalisation of Energy Action Plan will highlight the importance of providing clear investment signals to accelerate the digitalisation of the electricity grid.

A trans-European electricity system provides intrinsic flexibility and contributes to lower prices. The updated **Trans-European Networks for Energy** (TEN-E) regulation[35] will contribute to the **expansion of cross-border electricity infrastructure and smart grids** and facilitate integrated infrastructure planning, thus enabling a more efficient transmission and integration of solar electricity produced across the EU.

Member States should use EU funds to remove the bottlenecks to solar expansion in distribution and transmission grids. This could be done through their cohesion policy funding, including INTERREG or the Recovery and Resilience Fund which already foresees EUR 9.6 billion dedicated to energy networks and infrastructure[36].

Paving the way for Direct Current solutions

The introduction of high shares of solar PV and wind has an impact on the way the electricity grid is managed. As renewable power from solar is produced in Direct Current (DC), conversion to Alternating Current (AC) to feed into the grid and then converting back to DC, e.g. to store energy, leads to energy losses. Such conversion losses are currently growing because more devices and system, such as batteries, heat-pumps, data centres, electric vehicles or appliances, operate in DC. Increasing the use of DC technologies could thus be beneficial to the electricity system.

The Commission is investigating how low-voltage DC technologies can enhance the clean energy transition. Based on the conclusions drawn from this process, it will **engage with European and international standardisation bodies** for the establishment of the necessary standards and protocols.

The updates of the **National Energy and Climate Plans** are a critical tool for the Member States to adapt and enhance the necessary policies and measures to implement the above-mentioned initiatives accelerating massive deployment of solar energy. To ensure this, the Commission will provide Member States with guidance ahead of the update of their plans in 2023.

[35] Proposal for a regulation of the European Parliament and of the Council on guidelines for trans-European energy infrastructure and repealing Regulation (EU) No 347/2013 – COM (2020) 824 final

[36] Based on the 22 Recovery and Resilience Plans (RRP) adopted by the Council of the EU and the two RRPs of Sweden and Bulgaria endorsed by the Commission on 29 March 2022 and 7 April 2022 respectively.

3. ENSURING ACCESS TO SUSTAINABLE SOLAR ENERGY

The EU currently imports most of the solar energy products it installs: EUR 8 billion of PV panels in 2020, 75% of which from a single country[37]. Meanwhile, only a small share of global production takes place in the EU. This level of supply concentration diminishes the EU's resilience in case of global or country-specific events. Expanding the EU solar value chain, in particular in the manufacturing stage, on the back of its vibrant innovation and competitive market, will strengthen the sector's resilience, while creating jobs and value added. In addition, the EU will step in to ensure that solar energy products are sustainable and up to the standards demanded by EU consumers.

3.1. More innovative, sustainable and efficient solar energy products

Supporting innovation in solar energy

The solar energy sector has become a very dynamic and competitive industry, ensuring a constant output of innovative technologies. The EU has one of the strongest innovation environments across all solar energy technologies, from PV to concentrated solar power (CSP). The challenge now is to ensure that a new generation of breakthrough technologies leads to higher conversion efficiencies (which translate into less use of resources, such as space, raw materials, water, etc), increased circularity in the use of raw materials and a more sustainable life cycle, including in manufacturing.

Through Horizon Europe, the EU will continue to support research and innovation to reduce the cost of solar energy technologies, while increasing their energy efficiency and their sustainability, including in the manufacturing stage. These new technologies include heterojunction cells, perovskites and tandem cells, all of which achieve higher efficiencies than commercial technologies. Financial support is also needed for innovation in solar thermal or CSP technologies, as well as products tailored to innovative forms of deployment. The upcoming 2023-2024 work programme will include a **flagship initiative to support solar energy research and innovation**, focused *inter alia* on novel technologies, environmental and socio-economic sustainability, and integrated design.

Also under Horizon Europe, the **European Partnership for Clean Energy Transition** will crowd in support from Member States, the energy industry and public organisations for research and innovation in solar energy over the 2021-2027 period. The collaboration with Member States can be further expanded by developing a common solar energy research and innovation agenda in the framework of the European Research Area. This initiative will build on the ongoing work of the Strategic Energy Technology Plan.

The **space sector** represents an additional innovation trigger. This strategic sector needs the development of high-performance solar cells, including multijunction cells. The Commission will continue to exploit synergies between the space and terrestrial sectors in all initiatives critical for the EU space programme, including research and development.

To bridge the gap between research results and commercial development, the **Innovation Fund** will provide around EUR 25 billion of support over 2020-2030, depending on the carbon price, for the commercial demonstration of innovative low-carbon technologies, including solar energy. One of the seven large-scale projects selected in the first batch supports innovation in

[37] Eurostat - International trade in products related to green energy.

the solar sector. Finally, the European Regional Development Fund supports research and innovation in Member States and regions in priority areas identified through the local smart specialisation strategies.

Fostering the sustainability of PV systems installed in the EU

Over 20 years of operation, today's commercial PV systems can produce almost twenty times the energy needed to manufacture them[38]. However, it is important to continue to reduce the carbon and environmental footprint associated with their manufacturing.

The European Commission plans to propose in the first half of 2023 two mandatory internal market instruments that would apply to solar PV modules, inverters and systems sold in the EU: **an Ecodesign Regulation and the Energy Labelling Regulation**. These measures would concern the efficiency, durability, reparability and recyclability of products and systems, to incentivise environmentally sustainable devices. The Commission is also assessing options covering the quality of the manufacturing process and the carbon footprint of PV modules. Apart from their sustainability impact, these measures are also expected to foster innovation and provide a common reference for potential buyers to compare different products.

The Commission also plans to propose a revision of the existing Ecodesign and Energy Labelling regulations for space and water heaters in 2023. The interaction between heaters and solar energy products is key for the integration of solar energy; these regulations would make their combined benefits more understandable and visible for consumers.

The EU will provide European consumers with guarantees that the products they buy have been made respecting human and labour rights. Since private actors play a central role in the fight against forced labour, the Commission has put forward detailed reporting requirements covering this and other labour rights aspects in its proposal for a Corporate Sustainability Reporting Directive[39].In addition, the Commission has announced a new legislative initiative to **effectively prohibit the placing on the EU market of products made by forced labour[40]**. It will build on international standards and existing EU initiatives in particular due diligence and transparency obligations, and combine a ban with a risk based enforcement.

3.2. Supply chain resilience

Raw materials reliance

The use of raw materials for manufacturing of PV panels depends on the technology used. The market is currently dominated by crystalline silicon cells, which essentially rely on silicon. Thin-film technologies, which represent less than 5% of the global supply, make a more heterogeneous use of raw materials[41]. In addition, the manufacturing and installation of all PV modules requires glass, aluminium and steel; copper is used for their connection to the grid.

[38] Photovoltaics report, Fraunhofer Institute for Solar Energy Systems, February 2022

[39] Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting COM(2021) 189 final

[40] Commission Communication on decent work worldwide for a global just transition and a sustainable recovery (COM(2022) 66 final)

[41] There are three main categories of thin film solar cells: cadmium telluride (CdTe), copper indium gallium diselenide (CIGS), and amorphous thin-film silicon (a-Si, TF-Si).

Suppliers from within the EU currently cover a small share of demand for processed materials and depends on international suppliers, often concentrated in one or a small number of countries.

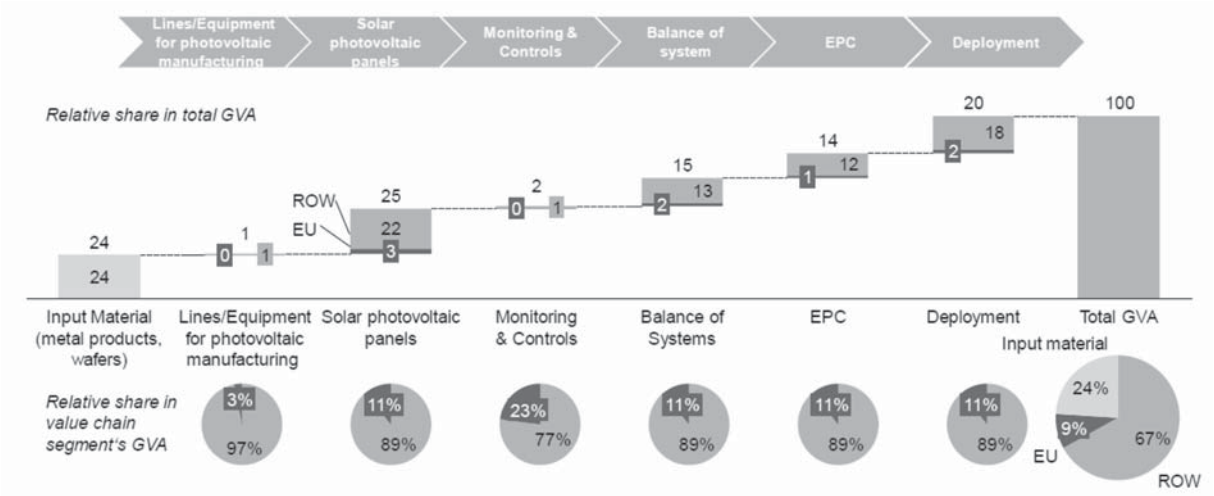
Although materials intensity is set to decrease over time thanks to technological improvements, silicon demand is expected to increase fourfold by 2030 and then stabilise[42]. EU policy aims at building resilience in relation to critical raw materials, based on access to resources, circular economy and sustainability. Achieving resource security requires action **to ensure that global markets are not distorted and to diversify supply.** Strengthening the sustainable and responsible domestic sourcing of, in particular, silicon metal and polysilicon could also be envisaged.

Improving resource efficiency and circularity is equally important to address this challenge. Since 2012 EU legislation has called for the recovery, reuse and recycling of PV modules. The recycling industry today can deliver high levels of circularity, but further innovation is still needed. Starting in 2025, the quantity of PV panels reaching their end of life will significantly increase. This will require ensuring reparability and recyclability by design for new equipment and **building up an ecosystem for the efficient recycling of used materials**. The Ecodesign measures for PV systems would include information requirements on these aspects to promote better product design leading to higher long-term energy performance and facilitating recycling and repair.

Manufacturing: a critical point for resilience

The EU industry holds strong positions in several parts of the solar PV value chain, starting with the polysilicon sector, but especially in the downstream segment, including inverter and solar trackers manufacturing or monitoring and control. European companies have also maintained a leading position in the deployment sector. As shown in the figure below, downstream segments represent half of the value chain's gross value added and the EU captures more than 10% of that value.

Figure: Breakdown of Gross Value Added throughout solar PV value chain[43]



[42] JRC, Joint Research Centre (Carrara, S., Alves Dias, P., Plazzotta, B., Pavel, C.), (2020a), Raw materials demand for wind and solar PV technologies in the transition towards a decarbonised energy system.

[43] First published in the European Commission Staff Working Document accompanying the report from the Commission to the European Parliament and the Council "Progress on competitiveness of clean energy technologies" (COM(2021) 950, COM(2021) 952)

Source: Guidehouse Insights, 2020

At the same time, the EU is today a small actor in several critical manufacturing and assembly steps in the upstream value chain, including ingots, wafers and cells[44]. If the scarcity of EU-based manufacturing is not remedied, it is poised to reduce the EU's competitiveness in research and innovation, an area in which proximity to manufacturing clusters is often necessary.

The marginal EU contribution in the manufacturing and assembly stages of the supply chain, combined with the quasi-monopolistic role of one country at the components stage at global level, diminishes the EU's resilience in case of extensive external supply disruptions[45]. This creates risks for accelerated solar energy deployment.

3.3. An EU Solar PV Industry Alliance

Increased EU demand for PVs and rising global transport costs are attracting interest in investments in PV manufacturing in the EU. At the same time, the industry is finding it difficult to translate its innovative technological advantages into large scale production and build economies of scale, notably due to high perceived financing risks.

Nevertheless, at least 14 projects have been announced, covering ingots, wafers, cells and modules, although many of them have not yet secured financing. This project pipeline would bring the industry close to achieving a manufacturing capacity equivalent to 20 GW of solar PV at each step of the value chain - an objective set for 2025 by the European Solar Initiative. It is estimated to require more than EUR 8 billion in investments.

EU Solar PV Industry Alliance

Securing a diversification of supplies through more diverse imports and scaled up solar PV manufacturing in the EU of innovative and sustainable solar PVs would contribute to mitigate supply risks for the necessary massive deployment of solar energy in the EU. This objective will be supported by an EU Solar Industry Alliance.

The alliance will bring together industrial actors, research institutes, consumer associations and other stakeholders with an interest in the solar PV sector, including the emerging circularity industry. The Alliance will work to identify and coordinate investment opportunities, project pipelines and technology portfolios and establish pathways for the solar industrial ecosystem in Europe.

It will provide a framework for coordinating actions aimed at the development and uptake of new, more efficient and sustainable technologies. It will cover innovation/technology, industrial supply chain, finance, regulation, skills and citizen engagement, and provide advice to the EU and the Member States. The alliance will map the availability of financial

[44] European Commission, Report from the Commission to the European Parliament and the Council: Progress on competitiveness of clean energy technologies (COM(2021) 950 final) – (SWD(2021) 307 final). Figures cited cover EU + Norway.

[45] European Commission, Directorate-General for Energy, Guevara Opinska, L., Gérard, F., Hoogland, O., et al., Study on the resilience of critical supply chains for energy security and clean energy transition during and after the COVID-19 crisis : final report, 2021

support, attract private investment and facilitate the dialogue and match-making between producers and offtakers.

At EU level, the following EU programmes are particularly relevant:

- *InvestEU can provide de-risked financing to private investments channelled via the European Investment Bank and other public finance institutions.*
- *The Innovation Fund can also channel funding towards innovative zero and low-carbon equipment, such as solar panels and their components.*
- *Recovery and resilience and Cohesion policy funds can support relevant projects boosting local development.*

The alliance will include a research and innovation pillar with strong links to Horizon Europe.

Circularity and sustainability will also be in its focus. It will promote coordination across the value chain to facilitate higher recycling efficiencies. It will monitor developments in this sector and anticipate possible bottlenecks, in particular with regard to access to safe and sustainable raw materials. It could discuss potential targets for material recovery rates.

Finally, the alliance will cooperate with the EU large-scale Skills Partnership for onshore renewables to promote the development of a skilled workforce for the solar manufacturing sector.

The Alliance will fully comply with EU competition rules, in particular Article 101 TFEU, in both its setting-up and its activities[46].

The Commission will work on a guidance on permitting procedures for new manufacturing plants.

The Commission will support efforts from Member States to pool their public resources via a potential Important Projects of Common European Interest (IPCEI) focused on breakthrough technologies and innovation along the solar value chain.

The innovative forms of deployment highlighted above, such as product-integrated PV or multiple use of space, also tend to require product innovation and customisation to specific needs. As PV expands beyond the current model of modular rooftop and utility-scale installations, a proactive, innovative EU industry can fill the emerging gaps on the supply side.

In the context of rapid innovation, the EU must strive to maintain its competitiveness in the value-chain segments where it is stronger, such as trackers or inverters, as well as engineering, procurement, and construction.

4. INTERNATIONAL COOPERATION IN THE FIELD OF SOLAR ENERGY

[46] Competition rules should in particular be safeguarded by reporting on meetings, discussions, information exchanged and agreements reached and making these available to the Commission on request. Furthermore, the members of the alliance will sign a code of conduct including a competition compliance programme.

Solar energy is a cornerstone of the global transition to clean energy and net zero emissions. While many of the least developed and most vulnerable countries are the most endowed in terms of potential, a range of factors have hampered the uptake and development of solar in these regions. By the end of 2021, 843 GW were installed worldwide, more than double the capacity installed just four years earlier[47]. And yet, further acceleration in solar energy deployment and integration is still required to achieve the objectives enshrined in the Paris Agreement.

The EU has developed an energy model that creates the incentives to attract investments in renewable energy and integrate them into the grid. Many partner countries in the EU's neighbourhood, such as those belonging to the Energy Community, are interested in replicating this model, backed by regional electricity markets and cross-border cooperation and infrastructure. The EU, via its diplomatic efforts and strategic engagement with third countries will be working on expanding solar energy and other renewables to reduce exposure to fossil fuel volatility and geopolitical risks.

Beyond Europe and its neighbourhood, many countries are firmly committed to solar energy deployment. India is an example and the EU is offering its support through technical cooperation and business-to-business interactions, under the **EU-India Clean Energy and Climate Partnership.** The exponential growth of PV markets also demonstrates the versatility of solar technologies in countries such as Vietnam or Japan.

While solar power is the cheapest source of electricity in most countries today, it is still prevented from competing on equal terms by market distortions, subsidies or advantages to incumbent energy producers. The EU is actively supporting the phasing out of fossil fuel subsidies worldwide and the promotion of open, transparent and competitive investment conditions. The EU will also work with its partners to remove trade and investment barriers such as local content requirements and to promote transparent and competitive procurement procedures. Promoting a more favourable business environment will also be an objective of future trade agreement negotiations. In the context of the **EU-US Trade and Technology Council**, both sides are discussing supply chain resilience in the solar value chain with regard to transparency and sustainability.

The EU stands ready to support its partners around the world in making use of this technology to accelerate their transition towards universal access to affordable, reliable, and modern energy services, as enshrined in the 7th UN Sustainable Development Goal for 2030. Solar energy's accessibility, modularity and flexibility makes it suitable both for centralised and decentralised grid systems.

Africa, which has the richest solar resources on the planet, installed only 5 GWs of solar PV in 2019. At the same time, in sub-Saharan Africa, 570 million people do not have access to electricity. Last February, during the 6th EU–African Union Summit, the Commission presented the **Africa-EU Green Energy Initiative** to support Africa's green transition in the energy sector by increasing renewable energy capacity and the number of people gaining access to affordable and reliable energy. The EU can assist Africa's efforts to adopt innovative technologies maximising solar energy resources, that is through agri-PV or floating solar on artificial lakes[48]. As part of the **Global Gateway EU-Africa investment package**, the EU will

[47] IRENA statistics

[48] Gonzalez Sanchez, R., Kougias, I., Moner-Girona, M., Fahl, F., Jäger-Waldau, A.: Assessment of floating solar photovoltaics potential in existing hydropower reservoirs in Africa (2021). Renewable Energy, 169, pp. 687-699

support the development of regional electricity markets across the five continental African power pools through technical assistance and funding for electricity interconnections and transmission lines. To diversify its suppliers, promote sustainable development and local value in partner countries, the EU is also exploring opportunities to engage with selected countries in sustainable raw material value chains partnerships to support alternative sources of materials needed for the solar industry.

In cooperation with the **International Renewable Energy Agency**, the EU is also preparing Regional Energy Transition Outlooks for Africa, Latin America and the Caribbean and Europe, providing a thorough analysis of the regions' potential and options in terms of renewable energy, energy efficiency, infrastructure, energy access and cross-border cooperation. The EU is also cooperating with the **International Solar Alliance** to disseminate its experience in solar energy technologies, policies and practices. With the **International Energy Agency**, the EU will also prepare zero-emission energy roadmaps for just and socially fair transitions in countries dependent on coal.

5. CONCLUSIONS

EU solar energy has a significant potential to rapidly become a mainstream part of our power and heat systems and a main lever to achieve the European Green Deal objectives while phasing out our dependence on Russian fossil fuels. This strategy proposes to seize the plentiful opportunities offered by energy technologies that run on sunshine. It sets out a roadmap to achieve this while allowing citizens to directly reap the benefits of solar energy technologies and the EU industry to capture this growth opportunity, creating jobs and added value for the EU.

With the **European Solar Rooftops Initiative**, the EU will make use of this simple and abundant resource to power our houses, offices, shops, and factories, by decisively lifting the barriers that are still preventing that momentous shift from taking place.

The **EU large-scale skills partnership** for onshore renewables, including solar energy, will turn the growing bottleneck in the skilled workforce needed to manufacture, deploy and maintain solar energy into an opportunity for new green jobs at the service of the clean energy transition.

On the supply side the proposed **EU Solar PV Industry Alliance** should help diversify our supply chains, retain more value in the EU and deliver efficient and sustainable products based on next-generation technologies.

Amid the energy crisis and geopolitical tensions, the implementation of the Strategy and these key solar initiatives proposed for the EU and its Member States is of utmost urgency. The Commission invites the European Council, the Council and the European Parliament to endorse this Strategy, including its key initiatives.

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COM(2022) 221 final

ANNEX

ANNEX

to the

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

EU Solar Energy Strategy

{SWD(2022) 148 final}

Annex: Key actions to implement the EU Solar Energy Strategy

Flagship initiatives:

- EU Solar Rooftops Initiative
- Commission's permitting package – legislative proposal, Recommendation and guidance
- EU large-scale skills partnership for onshore renewable energy, including solar energy
- EU Solar PV Industry Alliance

Other actions:

The Commission will:

- develop a guidance for Member States to promote innovative forms of solar energy deployment;
- propose the creation of a community of practice dedicated to the procurement of solar energy in the framework of the Big Public Buyers initiative;
- promote the uptake of Direct Current (DC) technologies and engage with European and international standardisation organisations on the areas of DC application;
- propose the application of the Ecodesign Directive and Energy Labelling Regulation to PV systems;
- propose a legislative initiative banning products made by forced labour from the Single Market;
- set up an Energy Communities Facility to provide cascade funding to energy community projects in the EU, under the LIFE programme;
- develop a joint strategic research and innovation solar energy agenda with Member States;
- launch a research and innovation flagship on solar energy under Horizon Europe.

Member States should:

- integrate incentives for agri-PV, as appropriate, when designing their CAP National Strategic Plans;

- incentivise installation of energy storage devices to complement distributed renewable energy systems;

- ensure that incentives to renewable heat provide a level playing field for the different technologies;

- in order to support energy communities:

    - put in place programmes to provide integrated energy efficiency and solar installation advice and guidance to energy communities;

    - assess and remove unjustified barriers to the development of renewable and citizen energy communities;

- prioritise investments in both transmission and distribution infrastructure, cross-border and national, necessary for large-scale deployment of solar and other renewable energy, including smart electricity grid projects, noting EU funding possibilities;

- National Regulatory Agencies should evaluate electricity tariffs in light of:

    - actual costs incurred taking into account the use of the network in case of self-consumption, and peer-to-peer energy transactions at building or local level;

    - ensuring non-discrimination between production connected at the distribution level and production connected at the transmission level for injection charges as well as non-discrimination of energy storage or aggregation;

    - the benefit of time-differentiated distribution network tariffs to manage peak loads and grid congestion.

<u>The Commission and Member States will collaborate to:</u>

- facilitate electric vehicle recharging through a single supplier of choice across different recharging infrastructure;

- develop a network code on demand side flexibility.

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