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CORRIGENDUM

This document corrects document COM(2024) 404 final of 11.09.2024

Concerns all language versions.

Modification of footnote 54.

The text shall read as follows:

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

State of the Energy Union Report 2024

(pursuant to Regulation (EU)2018/1999 on the Governance of the Energy Union and Climate Action)

1. INTRODUCTION

Energy policy is critical for European competitiveness, security and decarbonisation towards climate neutrality by 2050, as well as for the achievement of zero pollution, biodiversity protection and circular economy objectives. Under the European Green Deal, the EU has put in place a stable and ambitious energy policy framework, reflecting the fact that energy accounts for around 75 % of greenhouse gas (GHG) emissions.

In 2023 and 2024, the Commission consolidated the policy framework needed to reach our international commitments, and the Union´s energy and climate targets. By reaching political agreements on all key legislative files in the **Fit for 55 Package**[1], the European Union has paved a clear pathway to its 2030 targets.

Russia's war of aggression against Ukraine and its weaponisation of energy, have threatened Europe's energy security and, in turn, its economic security. In response, the EU launched the **REPowerEU plan** to phase out dependence on Russian fossil fuels and took the emergency actions needed to achieve energy security and stabilise markets.

Over the past few years, the pace of renewable power installation has been at a record high. The EU has also reduced its dependence on Russian fossil gas, and energy saving has limited consumption. However, EU energy security still faces challenges ranging from import dependency and security risks to growing threats posed by climate change and environmental degradation. The European industry faces a significant challenge to its competitiveness due to rising competition from China, high energy prices differentials compared to other industrial competitors like the US, and potential strategic dependencies on clean energy technologies. Likewise, citizens face high energy bills, which, combined with the rising cost of living, further reduces their purchasing power.

Moreover, the pace towards the EU energy efficiency and renewable targets must be further increased to ensure their achievement.

The clean energy transition is key to secure, sustainable, competitive and affordable energy for businesses and citizens to keep industry (hard-to-abate industrial and transport sectors and clean tech sectors in particular) and quality jobs in the EU, and for Europe's economic security. The overall geo-economic context requires the Commission and the EU to deliver concrete results.

To reach climate neutrality by 2050, the EU has set an intermediate 2030 target of at least 55% reduction of net GHGs compared to 1990[2] with a full "Fit-for-55" energy and climate policy framework, and the European Commission has recommended an intermediate 2040 climate target of 90%[3]. As part of our commitment to be the first climate neutral continent by 2050, **the European Union and its Member States are working to deliver on the 2030 climate and energy objectives, with visible positive results for citizens and business**.

The annual **State of the Energy Union report measures the EU's progress towards the objectives of the Energy Union, the REPowerEU Plan** and the **clean energy transition** in line with the energy and climate targets.

Following last year State of the Energy Union report[4] dealing with the challenges and achievements in 2020-2023, this year's report updates on **how the EU successfully acted on unprecedented developments and challenges** in the last year of this Commission's mandate. The report is structured in two parts. The first part shows how the high energy and climate ambition under the European Green Deal and the REPowerEU Plan provided the basis for the EU's crisis response strategy. It also outlines steps to enhance the competitiveness of European industry. The second part analyses the state of play in the implementation of the Energy Union in all its five dimensions: decarbonisation; energy efficiency; energy security; internal energy market; research innovation and competitiveness.

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1 The Revision of the Energy Taxation Directive is being discussed at the Council.
2 Regulation (EU) 2021/1119, Article 4
3 COM(2024) 63 final
4 COM(2023) 650 final

State of the Energy Union – key achievements

- ***The EU has adopted all key energy and climate files under the Fit-for-55 package, including*** *amendments stemming from the REPowerEU plan to rapidly phase out our dependencies, and the revision of the EU ETS, that now applies to maritime transport emissions, amends rules on free allocation to incentivise industrial decarbonisation, and mandates Member States to spend all revenues for climate and energy purposes.*
- *The* ***EU's greenhouse gas emissions have already fallen by 32.5[5]% compared with 1990****, while the EU economy has grown by around 67% in the same period, decoupling growth from emissions.*
- *For emissions covered by the ETS, the data reported by EU Member States by 2 April 2024 show a 15.5% decrease in emissions in 2023, compared to 2022 levels. With this development, ETS emissions are now around 47% below 2005 levels and well on track to achieve the 2030 target of -62%.*
- *Measures at EU and national level have paid off* ***and electricity and gas prices fell drastically*** *compared to the peaks in 2022, both in wholesale and retail markets. However, they have remained high.*
- ***The EU achieved 18% of gas demand reduction between August 2022 and May 2024. This resulted in about 138 billion cubic metres (bcm) of gas saved****. With EU sanctions banning seaborne imports of* ***Russian crude oil*** *and* ***refined petroleum products*** *as well as* ***Russian coal****,* ***imports of Russian gas (pipeline & LNG) dropped from a 45% share of overall EU gas imports in 2021, to only 18%*** *up to August 2024.*
- *To quickly* ***replace Russian gas supply and ensure Europe's energy security in the short-medium term, the EU reached out to other international suppliers****.* ***Norway*** *and the* ***U.S.*** *have become the* ***EU's largest gas suppliers*** *- for pipeline and LNG gas respectively- providing 34% and 18% of EU gas imports in the first half of 2024.*
- *A record of* ***twelve new LNG terminals and six expansion projects of existing terminals*** *have been commissioned between 2022 and 2024. Overall, these are expected to increase the EU's LNG import capacity by 70 bcm to 284 bcm by 2024.*
- ***The EU Energy Platform*** *contributed to EU diversification goals. It attracted more than 180 companies to bid and matched European buyers with external suppliers for more than 75 bcm of natural gas between 2023 and 2024.*
- ***EU gas storage levels*** *were at 59% capacity on 1 April 2024,* ***reaching*** *a new high record for the close of the winter season; on 19 August 2024, the EU has achieved the 90% gas storage capacity target, over two months ahead of the 1 November deadline.*
- ***The first Union list of Projects of Common Interest (PCIs) and of Projects of Mutual Interest (PMIs)***[6] *was adopted by the Commission in November 2023 to help build an infrastructure network across Europe that is fit for our ambitious diversification and decarbonisation objectives.*
- *The* ***Grids Action Plan*** *has been tabled and will address key challenges in expanding, digitalising and better using EU electricity transmission and distribution grids.*
- *The* ***Net-Zero Industry Act*** *and the Critical Raw Materials Act, which entered into force in 2024, will help* ***strengthen supply chain resilience*** *through diversified sourcing* ***and build a strong domestic manufacturing base for net-zero technologies****. The new harmonised* ***EU rules for ecodesign*** *will also contribute to reducing energy costs for European businesses and citizens.*
- *Wind surpassed gas generation to become the EU's second largest source of electricity behind nuclear. With 56 GW of new solar energy capacity installed in 2023, the* ***EU has set yet another record*** *from the additional 40 GW installed in 2022.* ***Onshore and offshore wind energy*** *in the EU had a* ***total cumulative installed capacity of 221 GW*** *(201 GW onshore; 19 GW offshore), with 16 GW installed in 2023.*[7]

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5 Excluding international aviation and maritime emissions

6 https://energy.ec.europa.eu/topics/infrastructure/projects-common-interest-and-projects-mutual-interest/key-cross-border-infrastructure-projects_en

7 Early indications (Ember) show that in the first half of 2024 around 50% electricity generation came from renewables. In addition, wind and solar generated more electricity than all fossil fuels combined.

- *The **European Hydrogen Bank**, financed from the EU ETS Innovation Fund, has been established and conducted a first successful round of EU auctions awarding nearly €720 million to seven renewable hydrogen projects in Europe.*
- *In early February, the Commission launched the **European Industrial Alliance on Small Modular Reactors** (SMRs) which will accelerate the development, demonstration and deployment of the first SMR projects in the EU by early 2030.*
- *The Commission published in October 2023 a Communication on the revision of the **Strategic Energy Technology (SET) Plan**, the main instrument to implement the research, innovation and competitiveness pillar of the Energy Union.*
- *Regarding **the implementation of the national Recovery and Resilience Plans (RRPs),** by mid-June 2024, the EU has disbursed more than EUR 240 bn to Member States to implement the measures in their plans. Over EUR 184 bn have been allocated by Member States to support energy related reforms and investments since the launch of the Recovery and Resilience Facility.*
- *2021-2027 **Cohesion Policy** programmes have continued to provide key support for investments in the energy sector, with a total EUR 83 billion (including national co-financing) allocated to Energy Union priorities. Clean technologies can be further supported by cohesion funds with the Strategic Technologies for Europe Platform.*
- *Support measures introduced with the aim of providing relief for households and businesses against high energy prices, helped ease the impacts of the energy crisis on living costs.*
- *While the assessment of the **draft updated national energy and climate plans (NECPs)** in December 2023 has shown Member States' determination to step up action at national and regional level to meet the Fit for 55 and REPowerEU goals, there are ambition gaps, including bottlenecks and missing links for integrated infrastructures towards the Union's 2030 targets and to enhance resilience to climate impacts. The Commission made recommendations and has been working closely with Member States to support the timely delivery of the Union's 2030 targets in the final updated NECPs.*
- ***Supporting Ukraine, including its energy sector,** has continued to be a top priority for the Commission and all 27 Member States. The Union Civil Protection Mechanism (UCPM) has provided an estimated EUR 900 million in support to Ukraine. The **Ukraine Energy Support Fund** (UESF) has established itself as a key support tool to procure energy equipment, such as the delivery of thousands of generators and power transformers, and has mobilised more than EUR 500 million by August 2024. The EU's EUR 50 billion **Ukraine Facility**, underpinned by the Ukraine Plan, will provide consistent funding to aid Ukraine's recovery and bolster sustainable economic growth until 2027 and separately funding of EUR 96 million to the UESF with additional funds for 2024 winter, to provide support for Ukraine's energy system.*
- *The EU has continued **international energy and climate diplomacy efforts** to diversify energy imports and strengthen relations with international partners and to support its partners in their transition and access to energy. At COP 28 the EU announced the global pledge on tripling renewable energy capacity and doubling the rate of energy efficiency improvements by 2030, which has been endorsed by 132 countries, and its objectives have been recognised by the decision on the first Global Stocktake. Furthermore, at COP 28 the EU has committed to phase out inefficient fossil fuels subsidies, and announced a Team Europe pledge of more than EUR 20 billion for the Africa-EU Green Energy Initiative (AEGEI)[8] as part of Global Gateway Africa-Europe Investment Package. At the same time, 25 countries, including 12 Member States, also committed to triple nuclear energy capacity by 2050.*
- *The EU leads global efforts to **reduce methane emissions** from the energy sector through the Global Methane Pledge. Its spin-off, the **Lowering Organic Methane (LOW-Methane)** initiative, addressing methane emissions from the waste sector, was launched at COP29. Moreover, the EU has continued to*

[8] AEGEI is a Team Europe Initiative led by the European Commission, which has committed €3.4 billion in grants between 2021 and 2027, and supported by 12 Member States (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Portugal, Spain and Sweden), as well as the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD). This Team Europe Initiative aims to support the deployment of at least 50 GW of renewable electricity in Africa and to provide at least 100 million people with electricity access by 2030.

*play a key role in **Mission Innovation**, its key global forum to stimulate action and investment in research, development and demonstration to make clean energy affordable, attractive and accessible for all.*

- *Similarly, the role of the EU was key to adopt the **Kunming-Montreal Global Biodiversity Framework**, to address biodiversity loss, which is essential for climate mitigation and adaptation.*

2. ENSURING A SECURE AND COMPETITIVE ENERGY AND CLIMATE TRANSITION THROUGH THE EUROPEAN GREEN DEAL AND REPOWEREU PLAN

In May 2022, the Commission responded to the European Council's demand to phase out Europe's dependency on Russian energy imports as soon as possible by adopting the **REPowerEU Plan**. The objective was to rapidly reduce the EU's dependence on Russian fossil fuels not only by saving energy and diversifying our supplies, but especially working towards the long-term objective to fast-forward the clean transition via the acceleration of renewables deployment and energy efficiency measures, joining forces to achieve a more resilient energy system and a true Energy Union. The same demand had come from the citizens in the context of the Conference on the Future of Europe[9].

In parallel, the EU adopted most of the Fit-for-55 and REPowerEU climate and energy files, enabling the achievement of the 2030 climate and energy targets as strengthened by REPowerEU. This is crucial to keep Europe on track towards climate neutrality, make progress in adapting to climate change in line with the European Climate Law, and to improve the resilience, competitiveness, and strategic autonomy of the EU economy in the face of a global clean technologies race. Moreover, through the Technical Support Instrument, the Commission has assisted[10] 17 Member States in implementing REPowerEU through identifying reforms and investments to phase out fossil fuel imports from Russia.

Thanks to the actions already taken and the unity and determination showed in handling the crisis, the EU has so far collectively **overachieved on most of the short-term REPowerEU targets, such as drastically reducing Russian imports,** and has taken timely measures laying down a solid ground for the achievement of the European Green Deal medium to longer-term **objectives**. However, despite increased ambitions, efforts are still needed according to the Commission's assessment of the draft updated NECPs submitted in 2023, identifying an ambition gap in meeting climate, renewables and energy efficiency 2030 targets[11]. Furthermore, only 10 Member States have submitted their final plans to date, which is of a high concern.

2.1. Saving Energy and Reducing Russian fossil fuels imports

Immediate actions focused on saving energy and enhancing energy efficiency as the cleanest and cheapest way to address the energy crisis. Actions undertaken under REPowerEU allowed one of the steepest gas demand decline in history.

In parallel to EU sanctions banning seaborne imports of Russian crude oil and refined petroleum products[12] as well as Russian coal, imports of **Russian gas (pipeline & LNG) dropped from a 45% share of overall EU gas imports in 2021 to only 18% in the first half of 2024** (from 150.2 to 25.4

[9] Notably proposal 18: "Reducing dependency of EU from foreign actors in energy".
[10] Supporting REPowerEU: affordable, secure and sustainable energy for Europe - European Commission (europa.eu)
[11] Assessment might evolve following final updated NECPs to be submitted by Member States by 30 June 2024.
[12] As a result, only 3 % of all EU crude oil imports in February 2024 came from the Russian Federation versus 27,2 % in Q2 2022. The outlook for the oil security of supply and oil prices is stable, as market tightness was partially balanced by the production increase from non-OPEC+ countries, mainly the US. However, the geopolitical tensions in Middle East and in Ukraine highlights the vulnerability of global oil markets. Recently, the EU adopted the 14th sanction package to target tankers that are part of Russia's dark fleet.

bcm)., **and the yearly amount imported in 2023 declined by 72% from 2021**. These are significant achievements, setting the EU on track to phase out imports of Russian fossil fuels as soon as possible. This also had large repercussions on Russia, whose revenues from selling both pipeline gas and LNG to the EU dropped by more than 70% since the peak of the crisis in 2022. Recently, action has been taken to target Russia's LNG revenues more specifically. Following the **14th package of sanctions** adopted on 24 June 2024, **the EU will ban reloading services of Russian LNG in EU territory** for the purpose of transshipment operations to third countries, and **will prohibit new investments,** as well as the provision of goods, technologies, and services **for the completion of Russian LNG projects under construction**, such as Arctic LNG 2 and Murmansk LNG.

The EU has exceeded its voluntary target of reducing gas demand by 15% as established by the emergency **Regulation on EU Coordinated Gas Demand Reduction Measures**[13]. Overall, the EU has reduced its gas demand by 18% from August 2022 to May 2024 with 138 billion cubic meters (bcm) of gas saved[14]. These savings are the combined results of the efforts of Member States, businesses and citizens, that helped to avoid supply shortages and ensure security of supply. Gas demand reduction efforts were prolonged through a Council Recommendation[15].

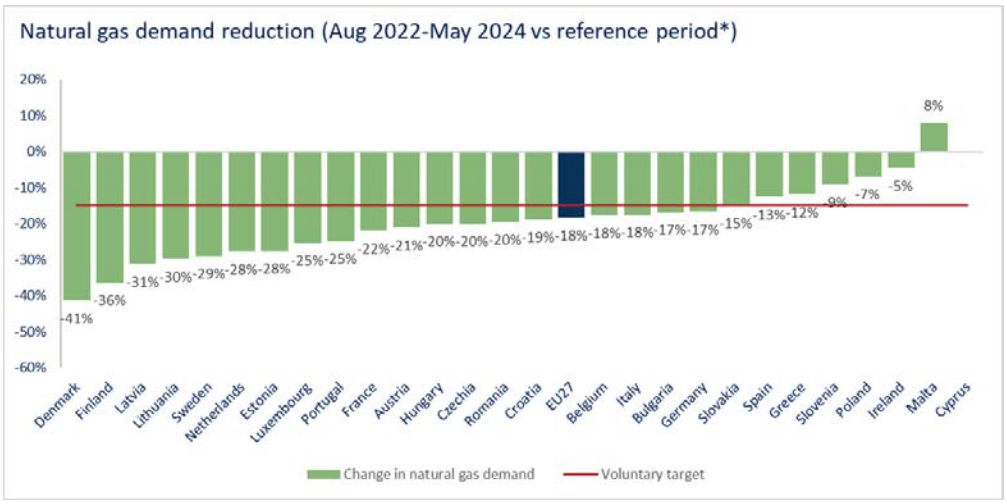

Figure 1. Natural Gas Demand Reduction[16]

Source: European Commission based on Eurostat

Moreover, the EU rapidly adopted **obligatory gas storage filling targets** to stay prepared for the winter seasons of 2023 and 2024, providing a strong reassurance both for security of supply and for the market. The Gas Storage Regulation[17], required Member States' underground gas storage facilities to be filled to at least 80% of their capacity by 1 November 2022, rising to 90% from 2023 onwards. On 1 April 2024, gas storage levels were at 59% capacity, a record for the close of the winter season, and on 19 august the EU has achieved the 90% storage capacity target over two months ahead of the 1 November deadline.

[13] COM(2022) 361 - Council Regulation (EU) 2022/1369.
[14] Source: Eurostat.
[15] C/2024/2476.
[16] The reference period is defined as the average of the previous 5 years for the period August 2022 to May 2023 (as laid out in the demand reduction regulation). Therefore, for August-December it refers to 2017-2021, but for January-May to 2018-2022.
[17] COM(2022) 135 - Regulation (EU) 2017/1938

Over the years, the Commission together with Member States have also carried out collaborative work and a strong coordination, notably via the Gas Coordination Group and the Electricity Coordination Group, to **ensure EU's winter preparedness** in a spirit of unity and solidarity.

Both measures, together with the **Fit for 55** and **emergency legislative initiatives**[18], have contributed to stabilising energy prices. While retail gas and electricity prices are still above pre-crisis levels, they have declined substantially compared to peaks in 2022.

These emergency measures were coupled with significant progress towards the EU's longer-term objectives, aligning key Fit for 55 legislation with the increased ambition of the REPowerEU Plan.

Following the adoption of the recast **Energy Efficiency Directive** in September 2023, the Commission adopted a series of **recommendations** to ensure implementation and help Member States in the transposition process. The Commission is also rapidly engaging in the implementation of the **Energy Performance of Buildings Directive** adopted in April 2024, which will rapidly enable to decarbonise our building stock, still responsible for about 40% of the EU's total energy consumption, and ultimately increase our energy security and reduce our dependence on imported fossil fuels. The **European Mission on climate neutral and smart cities** has continued to contribute significantly to the energy savings targets of the REPowerEU Plan. Thirty-three cities have now received a Mission Label, which recognizes their climate measures and investments plan to reach climate-neutrality by 2030.

2.2. Fast-forwarding the clean energy transition

During 2023 and 2024, the EU has progressed significantly in fostering the clean energy transition with the adoption by co-legislators of key legislation within the **Fit for 55 package**[19] and the setting of important milestones towards the achievement of the **REPowerEU objectives**.

In particular, the **scale up of renewable energy production** was at the centre of the REPowerEU Plan's objective to build a secure and decarbonised energy system in the EU. The latest data show excellent results with the increase of installed **wind and solar capacity** by 36% between 2021 and 2023[20], saving approximately 35 billion cubic meters (bcm) of gas over 2 years. With **56 GW of new solar energy capacity** installed in 2023[21], **the EU has set yet another record** surpassing the additional 40 GW installed in 2022. These figures represent important steps in the right direction, but further acceleration is needed to meet the REPowerEU targets under the **EU Solar Energy Strategy**[22] and reach a total of at least 700 GW capacity by 2030, up from the estimated 263 GW installed at the end of 2023. Over the last years, the EU has taken several initiatives to strengthen the support to the European photovoltaic manufacturing sector by launching the **European Solar PV Industry Alliance**[23]**, adopting a Solar**

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18 COM(2022) 473 - Council Regulation (EU) 2022/1854, COM(2022) 549 - Council Regulation (EU) 2022/2576, COM(2022) 668 - Council Regulation (EU) 2022/2758

19 Directive (EU)2024/1275 of the European Parliament and of the Council on the energy performance of buildings (recast); Directive of the European Parliament and of the Council on common rules for the internal markets for renewable gas, natural gas and hydrogen, amending Directive (EU) 2023/1791 and repealing Directive 2009/73/EC (recast); Regulation of the European Parliament and of the Council on the internal markets for renewable gas, natural gas and hydrogen, amending Regulations (EU) No 1227/2011, (EU) 2017/1938, (EU) 2019/942 and (EU) 2022/869 and Decision (EU) 2017/684 and repealing Regulation (EC) No 715/2009 (recast). Regulation (EU) 2023/2405 of the European Parliament and of the Council of 18 October 2023 on ensuring a level playing field for sustainable air transport (ReFuelEU Aviation); Regulation (EU) 2023/1805 of the European Parliament and of the Council of 13 September 2023 on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC.

20 Industry estimates.

21 Solar Power Europe.

22 EUR-Lex - 52022DC0221 - EN - EUR-Lex (europa.eu)

23 Home - European Solar PV Industry Alliance (solaralliance.eu)

Charter, and setting up a public-private co-programmed partnership to support its coordinated R&I efforts. As for **wind power**, 16 GW of new capacity was installed in the EU in 2023, reaching a total 221 GW,[24]. While this shows good progress, the power sector needs to increase the pace of installation to meet the EU's ambitious renewable energy targets, a challenge to which the Commission has responded with the adoption of the **Wind Power Package**[25], while striving for a balanced deployment in collaboration with local citizens to avoid that the energy transition is challenged because of concerns over landscapes, biodiversity, cultural heritage and lifestyles, especially in rural areas.

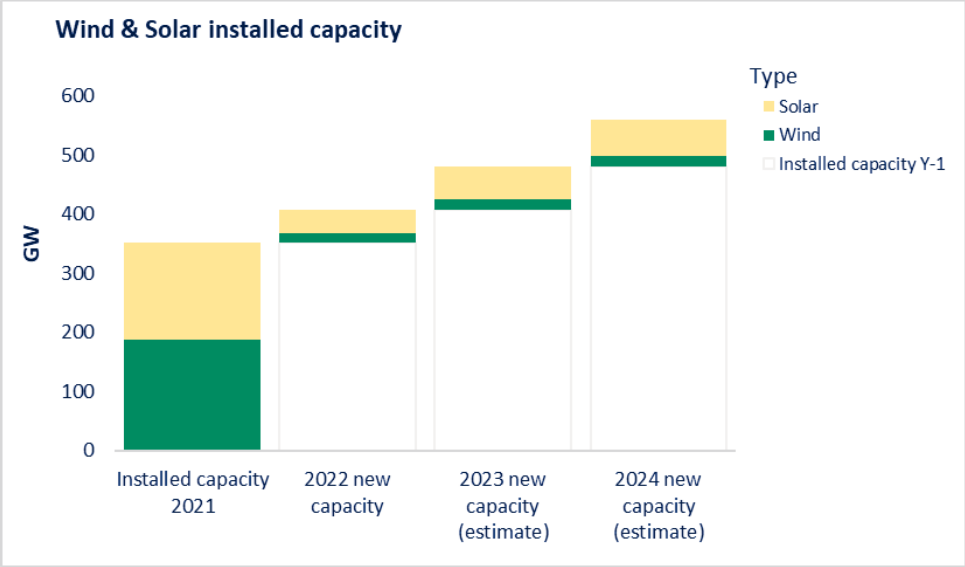

Figure 2. Wind and Solar installed capacity

Source: European Commission based on Eurostat, WindEurope, Solar Power Europe

Based on the ambitions and projections set out in EU Member States' draft updated National Energy and Climate Plans submitted in 2023/24, biogas and biomethane production could reach a range of 30-32 bcm by 2030. While this outlines a positive trend, further efforts are needed to reach the REPowerEU target of producing 35 billion cubic meters (bcm) per year by 2030.. Based on the available data from industry for 2022, the combined biogas and biomethane production is reported to be 21 bcm out of which about 4.2 bcm of biomethane, that has reached 5.2 bcm in 2024[26].

The **heat pump market** has been growing in the last 10 years with an acceleration in 2021 and 2022 related to the gas prices and the Ukraine war: sales increased from about 700,000 units in 2015 up to 1.5 million in 2020 and accelerated to 2.75 million in 2022[27]. In 2023, sales maintained to similar values (2.77 million units)[28], hit by the decreasing gas prices and a depressed building sector. Despite this steady growth, fossil fuel boiler sales still dominate the market for heating equipment.

As for hydrogen, which is crucial for hard-to-abate industrial and transport sectors, Europe has the largest pipeline of announced hydrogen projects in the world. recently updated under the European Clean Hydrogen Alliance. By the end of 2024, the EU could reach 0.8 GW of new electrolyser capacity.

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[24] WindEurope.

[25] European Wind Power Action Plan, COM/2023/669 final, and Communication on achieving the EU's offshore wind ambitions, COM(2023) 668 final.

[26] Last Biomethane Map published by the European Biogas Association www.europeanbiogas.eu/european-biomethane-map-2024/

[27] REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL Progress on competitiveness of clean energy technologies, COM/2023/652.

[28] European Heat Pump Association (EHPA), Market Report 2024, limited to AT, BE, CZ, DE, DK, EE, ES, FI, FR, HU, IE, IT, LT, NL, PL, PT, SE, SK. Including mainly space heating and sanitary hot water heat pumps.

Furthermore, European industrial consumers have launched procurement tenders for around 1 million tonnes of renewable and low-carbon hydrogen since September 2023[29]. Despite a recent increase in finalised projects and final investment decisions taken, still too few projects move past final investment decision on the supply side, notably due to lower than anticipated demand for green hydrogen The approval of the four waves of Important Projects of Common European Interest (i.e. Hy2Tech, Hy2Use, Hy2Infra and Hy2Move) corresponding to a public investment of 18,9bn will support the deployment of large-scale projects. To stimulate both demand and supply, the European Hydrogen Bank has conducted the first EU wide renewable hydrogen auction through the Innovation Fund, financed from EU ETS revenues, with a budget of EUR 800 million. The auction attracted 132 bids totalling 8.8 million tonnes of renewable hydrogen production capacity and their intended off-takers to be operational by 2029 the latest. The seven awarded projects are expected to produce 1.6 million tonnes of renewable hydrogen in the first 10 years of operation. The Commission plans to organise a second auction before the end of the year with an increased budget of EUR 1.2bn to support the European hydrogen industrial ecosystem. European electrolyser manufacturing capacity has raised from 4.2 GW in 2022 to 6.8 GW in 2023, and is expected to reach 12.4 GW by the end of 2024[30]**.** In addition, the Commission is working on a pilot mechanism to support the development of the **European hydrogen market** and create market transparency. The mechanism will be in place for five years and will be part of the **European Hydrogen Bank**. In addition, strategic priorities and actions being implemented to have at least 50 Hydrogen Valleys[31] under construction or operational by 2030 within the EU round up the EU's efforts to create a hydrogen market[32]. While progress towards a hydrogen market at European scale has been recognised by the European Court of Auditors (ECA), a recently published report points out issues along the whole value chain, such as the need of completing the regulatory framework with the adoption of the Delegated Act on low-carbon hydrogen [33].

On top of these sector-specific actions, the Council agreed in December 2023 to **prolong certain emergency measures on permitting**, aimed at shortening and accelerating the permit-granting procedures for renewable energy projects. In May 2024, a new 'package' was adopted, including three targeted measures to further accelerate the deployment of renewables in the EU: a Commission Recommendation and guidance on the design of **renewable energy auctions**; an updated Recommendation and guidance on speeding up **permit-granting procedures** for renewable energy projects; and a guidance on designating **renewables acceleration areas.** The Commission launched at the end of 2023 an initiative to support timely transposition of the revised Renewable Energy Directive in the Member States (Accele-RES)[34], including bilateral meetings with Member States to discuss transposition progress and to identify challenging areas where Commission can offer support. Under the Single Market Enforcement Taskforce, the Commission and Member States have addressed around 60% of the process-related barriers identified in national permit-granting procedures. However, these measures do not solve all problems. The insufficient staff or capacities of public administrations to deliver permits remains a key issue. The Commission constantly invites Member States to reinforce such capacities.

[29] IEA (2024) Global Hydrogen Review.
[30] Data from BloombergNEF's Electrolyser Manufacturing 2024 report as of March 26, 2024.
[31] Hydrogen Valleys are hydrogen ecosystems that cover a specific geography ranging from local or regional focus (eg industrial cluster, ports, airports, etc.).
[32] COMMISSION STAFF WORKING DOCUMENT Towards a roadmap for accelerating the deployment of Hydrogen Valleys across Europe: challenges and opportunities
[33] https://www.eca.europa.eu/en/publications/SR-2024-11
[34] European Wind Power Action Plan, COM/2023/669 final.

To enhance visibility and predictability for the whole value chain, an **EU-wide renewables auctions platform** was launched as part of the package, with the aim of consolidating information on planned renewable energy auctions in all EU Countries.

In addition, to address the main challenges in expanding, digitalising and better using EU electricity transmission and distribution grids, including cross-border interconnections, - an indispensable condition to the completion of the Energy Union - the Commission published in November an **Action Plan for Grids**[35]**,** that the Council, in its conclusions of May 2024, called on Member States to swiftly implement.

The Plan identifies concrete and tailor-made actions to tackle the crucial issue of improving access to finance for grids projects, by increasing visibility on opportunities for EU funding programmes. Grid operators, both at transmission and distribution levels, are faced with an unprecedented increase in investment needs, also necessary to achieve the 15% interconnection target by 2030, and therefore with their volume of capital expenditure,. For electricity EUR 584 billion in the overall investments by 2030, out of which 375-425 billion of investment in distribution grids. The expected steep increase of investment in grid might put the current model of refinancing these investments through consumer tariffs under strain.

The **revised Emissions Trading System (ETS) Directive** reinforced financial support to lower-income Member States to modernise their energy systems and improve energy efficiency through the Modernisation Fund. Total support from this Fund was raised to 750 million allowances, an increase of 110 million allowances (representing around EUR 60 billion). Moreover, three more Member States became eligible to the Fund, bringing the total number of beneficiaries to 13. The total disbursements from the Modernisation Fund since it was established amount to around €12.7 billion.

2.3. Diversifying our energy supplies through strengthened partnerships

The EU has diversified its energy imports by replacing Russian gas supply with imports from other international suppliers, benefitting from the existence of several newly built floating storage regasification units (FSRUs) terminals and enhancement of the trans-European gas networks.

A record of **twelve new LNG terminals and six expansion projects** have been commissioned between 2022 and 2024. Overall, these are expected to increase the EU's LNG import capacity by 70 bcm by 2024. **Norway and the U.S. have become the EU's largest gas suppliers** - for pipeline and LNG respectively- providing 34% and 18% of EU gas imports in 2024 up to June[36].

Demand aggregation and joint purchasing of natural gas continued in 2024 under **AggregateEU**. The mechanism has been successful overall, attracting more than 180 companies and matching European buyers with external suppliers for more than 75 bcm of natural gas between 2023 and 2024. Building on this success, demand aggregation and joint purchasing has been incorporated as a permanent voluntary tool under the **hydrogen and decarbonised gas market package**. In June 2024, the Commission launched the procurement for the IT provider for a permanent **European Multiproduct Platform** for the joint purchase of strategic commodities that will include the future voluntary mechanism for natural gas, the separate pilot for **hydrogen** and a new mechanism for **Strategic Raw Materials**.

The Commission has also worked on strengthening relations with **international partners** to address the needs resulting from the decline of imports of Russian gas. The EU signed 14 Memoranda of

[35] An EU Action Plan for Grids, COM/2023/757 final.
[36] COM/2024/63 final, Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society.

Understanding (MoU) with countries in its direct neighbourhood (Morocco, Egypt, Norway, Ukraine) and beyond (Azerbaijan, Kazakhstan, Namibia, Japan, Argentina and Uruguay). A **Strategic Partnership with Ukraine** on renewable gases was also established and the MoU on EU – Ukraine Strategic Partnership on Biomethane, Hydrogen and other Synthetic Gases was signed on 2 February 2023.

The Commission and the Euratom Supply Agency (ESA) have continued pursuing the objective of supply diversification as regards nuclear fuel, related nuclear fuel cycle services and spare parts.In 2023 and 2024, two new EPR nuclear reactors have come on stream in the EU, which will be able to generate carbon-free electricity to cover the consumption of 6 million homes. In addition, in February this year, the Commission launched the **European Industrial Alliance on Small Modular Reactors (SMRs)**, gathering about 300 members that aim to facilitate the deployment of the first SMR projects in Europe by early 2030s.. Moreover, the **Euratom Research and Training Programme** supports two projects that contribute to a swift and secure development and deployment of a European fuel solution for the so-called water-water energetic reactor (VVER) to facilitate diversification away from Russian fuels and promote security of nuclear fuel supply.

Since the beginning of Russia's full-scale invasion, supporting Ukraine has been a top priority for the European Union, and the Commission has continued its unwavering support to Ukraine's energy sector to ensure its operation despite the continuous attacks on infrastructure. By 31 July 2024, over 40% of all Member States donations were dedicated to the energy sector. Over 8 189 power generators and 3 348 transformers, along with millions of pieces of energy equipment, have been sent, with the **Union Civil Protection Mechanism**'s total contribution estimated at over EUR 900 million.

The **Ukraine Energy Support Fund** (UESF), which was set up under Commission's auspices and is managed by the Energy Community Secretariat, has established itself as a key support tool to procure energy equipment and has mobilised more than EUR 500 million by August 2024. The EU's EUR 50 billion Ukraine Facility, underpinned by the Ukraine Plan, will provide consistent funding to aid Ukraine's recovery and bolster sustainable economic growth until 2027. In 2022, the synchronisation of the Ukrainian and Moldovan grids with the Continental European Network stabilised Ukraine's electricity system during the early months of the war. Today this facilitates close collaboration with ENTSO-E to secure and increase capacity for electricity exchanges, today set at 1.7 GW for commercial trade. It has also allowed Ukraine to use emergency imports, particularly following recent attacks on its energy infrastructure. Overall, close coordination is being made on electricity exports and on restoration with partners (notably US) to provide enough generation for the next winter. With an EU grant of EUR 96 million and contributions of Member States and private donors through the Union Civic Protection Mechanism it is expected to restore capacity for 2.7GW.The Ukrainian National Energy and Climate Plan will be a key strategic document for transforming Ukraine's energy and economic sectors, aligning it with EU standards and supporting EU accession.

The EU has also provided an EUR 1 billion energy support package to the Western Balkans in 2023 to help the region face the energy crisis.

2.4. Competitiveness and the clean energy sector

The clean energy transition is key to secure, sustainable, competitive, and affordable energy for businesses and citizens, to keep industry and jobs in Europe and for Europe's economic security. While policy action has significantly reduced energy prices from peak levels in 2022, EU electricity industrial retail prices are still 2 to 3 times higher than in the U.S. (2021 to 2023) while historically they were 1.5 - 2 times higher than the US prices. Gas prices are 3 to 6 times higher than those in the U.S., while historically they were 2-3 times higher.

The high spread of EU industrial power prices vis-a-vis countries like the US and China challenges Europe's competitiveness, especially for energy intensive industries, and risks increasing critical dependencies. **To provide our citizens and business with affordable energy it is paramount to accelerate the roll-out of competitive clean energy**. The EU has acted to lower energy prices structurally, through inter alia better market integration, investment in cross border interconnections and the recent Electricity Market Design (EMD) reform which represents a fundamental step to accelerate the deployment and integration of more renewable energy in the energy system, promote the stability, predictability and affordability of energy prices and thereby contributing to the competitiveness of EU industry.

Competitiveness will continue to be a key objective in the years to come, with the European Council having called for a new **European Competitiveness Deal**. In her political guidelines, Commission President von der Leyen set out a new **Clean Industrial Deal** to combine decarbonisation and competitiveness. Its full focus will be on supporting and creating the right conditions for companies to thrive in Europe, including by simplifying the regulatory environment, reducing energy costs, investing in clean technologies, and ensuring access to cheap, sustainable, and secure energy supplies and raw materials.. The **Report** from **Mario Draghi** on competitiveness and the **Report** from **Enrico Letta** on "*Empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens*" also emphasised, *inter alia*, the need to strengthen the Single Market dimension for energy and the importance to **invest in Europe's infrastructure networks**, strengthening cross-border interconnections, upgrading the electricity transmission and distribution grids and expanding energy supply choices for industry.

Based on screening of planning, reporting, and monitoring obligations under EU energy and climate law, the Commission identified several key actions in the rationalisation plans to identify new measures to reduce reporting burdens, including repealing reporting obligations on oil stocks[37], reviewing the security of gas supply legislation[38], and tertiary legislation under the gas and electricity internal market legislation and the Regulation on Wholesale Energy Market Integrity and Transparency[39]. This is complemented by several support measures to ease compliance. The rationalisation plans also noted the possible revision of the Governance Regulation as a means to further improve efficiency.

The current geopolitical context has increased the importance of resilience and security **in the net-zero industry,** the economic relevance of which is also increasing sharply with global market for key, mass-manufactured, net-zero technologies set to triple by 2030 with an annual worth of around EUR 600 billion. European manufacturers are facing intensive competition on these growing global markets.Energy technologies are one of the ten critical technology areas for the EU's economic security[40].

With the **Net-Zero Industry Act (NZIA)** and the **Critical Raw Materials Act**, the EU took action to strengthen the competitiveness and the supply chains resilience of its clean energy technologies manufacturers. The resilience of future energy systems will be measured by a secure access to the

[37] Under Article 6(2) and 9(4) of Council Directive 2009/119/EC (Directive - 2009/119 - EN - EUR-Lex (europa.eu)) & Article 26(1)a) of Regulation (EU) 2018/1999 (Regulation - 2018/1999 - EN - EUR-Lex (europa.eu)

[38] Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010 (Regulation - 2017/1938 - EN - EUR-Lex (europa.eu)).

[39] Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency Text with EEA relevance (http://data.europa.eu/eli/reg/2011/1227/oj).

[40] As identified in the Annex to the Commission Recommendation of 3 October 2023 on critical technology areas for the EU's economic security

technologies that will power those systems - wind turbines, electrolysers, batteries, solar PV, heat pumps, grid technologies and others. The NZIA will help the EU diversify its sources of supply for clean technologies and build strong domestic manufacturing capacity of clean technologies, enhancing competitiveness as we seek to reach climate neutrality by 2050. Since 2022, the Innovation Fund has been supporting the roll-out of clean-tech manufacturing with a dedicated budget envelope in its annual calls. Clean energy technologies already supported by the Innovation Fund are set to deliver a substantial capacity increase in solar and battery production as well as electrolysers. The **Strategic Technologies for Europe Platform** (STEP) is contributing to the development and manufacturing of advanced clean technologies in the EU, reducing strategic dependencies and bolstering European innovation in such critical technologies.

As the EU advances towards a net-zero future, it will be important to address **emerging dependencies on critical materials** and nuclear fuels to enable the energy transition and ensure EU's economic security.

The **Strategic Partnerships on sustainable raw materials value chains** that the EU is concluding with third countries are an integral part of the external dimension of the Critical Raw Materials Act to secure and diversify the EU's supply on critical raw materials while ensuring local value addition in partner countries. To date, the EU has signed 14 Strategic Partnerships[41]. Over the past year, the diversification of global supply chains for critical raw materials has advanced further through seven newly established, mutually beneficial partnerships including with vital energy partner countries such as Norway, Australia or Serbia[42].The **UN-convened Panel on critical energy transition minerals**, launched in April 2024 and co-chaired by the Commission services, will bring together governments and other stakeholders active in the extractive industries to address issues relating to human rights, equity, transparency, investment, and sustainability and human rights in critical minerals supply chains, to ensure that the increasing demand for critical minerals will not exacerbate geopolitical tensions but instead foster a just and balanced energy transition.

In the transition towards a greener economy, **skills are an important enabler for Europe's competitiveness** and innovation as the shift towards clean energy technologies requires a workforce with additional skills compared to traditional energy sectors . Under the Net-Zero Industry Act, **European net-zero industry Academies[43]** are either already launched or in the process of being established to address the issue by developing learning content in the Member States in sectors such as solar power, hydrogen, and batteries, with further academies in raw materials and wind power to follow in the future. The Academies build upon initiatives such as the Blueprints for Sectoral Cooperation on Skills[44] and the EU Pact for Skills[45], with its 3 Large-scale Skills Partnerships in the renewable energy ecosystem. Ensuring that workers acquire the skills in need would allow reaping the full employment potential of the REPowerEU targets which are estimated to create over 3.5 million jobs by 2030[46].

[41] Strategic Partnerships have been signed to date with Canada, Ukraine, Namibia, Kazakhstan, Argentina, Chile, Democratic Republic of Congo, Zambia, Greenland, Rwanda, Norway, Uzbekistan, Australia, Serbia.
[42] In 2024, diversifying global supply chains of critical raw materials has further advanced in line with the EU's External Energy Strategy through five newly established, mutually beneficial partnerships with countries such as Australia, Norway, and Serbia. These partnerships are also strategically important for phasing out other EU energy dependencies.
[43] Net-Zero Industry Act
[44] Blueprint for sectoral cooperation on skills - Employment, Social Affairs & Inclusion - European Commission (europa.eu)
[45] Pact for Skills - Employment, Social Affairs & Inclusion - European Commission (europa.eu)
[46] For more information: Pact for Skills, Launch of large-scale renewable energy skills partnership (europa.eu)

3. TAKING STOCK ON PROGRESS TOWARDS THE 2030 ENERGY AND CLIMATE POLICY GOALS AND AMBITION

3.1. Decarbonisation

In 2022[47], **net domestic GHG emissions,** including land use, land-use change, and forestry (LULUCF) and excluding international transport emissions, **decreased by 2.5% compared to 2021.**[48] This translates into a reduction in GHG net emissions of 32.5% compared with the 1990 base year. Over the same period, there was a minor decrease in reported GHG net removals from LULUCF of 4 million tonnes of CO2 equivalent compared to 2021.

For emissions covered by the ETS, the data reported by EU Member States by 2 April 2024 show a 15.5% decrease in emissions in 2023, compared to 2022 levels. With this development, ETS emissions are now around 47% below 2005 levels and well on track to achieve the 2030 target of -62%.

However, economy wide GHG emission projections, recently submitted by Member States, are expected to show **some gap with the EU climate ambition**. To stay on track with the EU 2030 reduction target and climate neutrality by 2050, the EU needs to pick up the pace of change and increase the focus on areas where the required emission reductions are significant (e.g. buildings and transport) and to reverse the declining trend of the LULUCF net sink. The **Nature Restoration Law** and its implementation are critical to ensure the achievement of LULUCF targets, which are essential to remove the unavoidable emissions from hard-to-abate sectors, and to enhance adaptation.

The assessment of the draft updated NECPs in December 2023 shows that Member States have taken a step in the right direction, but this is not yet sufficient to reduce net greenhouse gas emissions by at least 55% by 2030. The draft updated NECPs lead to GHG emission reductions of -51%, a gap of 4 percentage points. This is also reflected in gaps towards the Effort Sharing and Land Use Land Use Change and Forestry 2030 targets, demonstrating the need for more robust measures and implementation in the final NECPs to stay on track towards 2030. Furthermore, only a few Member States have included in their draft updated NECPs detailed plans to consider adaptation to climate change in the context of the resilience of their energy systems.

In 2022[49], the EU reached a share of **23.0 % of renewable energy** in gross final energy consumption, an increase of 1.1 percentage points **compared to 2021** (21.9%).[50] In the context of the pathway towards 2030, the 2022 share is slightly above the binding interim trajectory share of 22.2% for 2022 based on the previous 2030 target of 32%[51].

On average, the overall renewable energy share has been increasing by 0.7 percentage points annually over the last 10 years. Progress has been strong in the **electricity sector**, with an increase in the renewables share from 25.1% in 2012 to 41.2% in 2022. The progress in **heating and cooling** (from

[47] Provisional data for 2023 will be presented in the 2024 Climate Action Progress Report.

[48] GHG emissions and removals for 1990-2022 are based on 2024 GHG inventory as submitted by EU Member States to the Commission by 15 March 2024. In 2024, however, the inventory reporting timeline is exceptionally extended until the second half of the year due to the delivery of the UNFCCC Enhanced Transparency Framework (ETS) reporting tool. Member Staes will be able to submit an updated final GHG inventories to EEA by 15 September. Therefore, figures may change following possible resubmissions resulting from later reviews. Together with the aggregated EU-level emission data, the GHG inventory will be submitted to the UNFCCC under Regulation (EU) No 525/2013 by the 15 December 2024.

[49] Latest available data from Eurostat are from 2022.

[50] As reported by Member States in line with Eurostat SHARES.

[51] Reference point as set in Article 4 of the Governance Regulation based on the previously EU-level target before the entry into force of the revised Renewable Energy Directive.

18.6% to 24.9%) **and transport** (from 5.8% to 9.6%) was more modest. The new 2030 EU target of 42.5% (and even more so the aspirational target of 45%) will require a much faster growth in the coming years. The Commission assessment of the draft updated NECPs identified an ambition gap in renewables consumption by 2030, with contributions 3-4 percentage points lower than the revised EU binding target of 42.5%[52].

The renewable energy shares in 2022 continue to vary widely across Member States, reflecting the different starting positions and national targets set for each Member State in the original Renewable Energy Directive and the national contributions set in the national energy and climate plans. Sweden achieved the highest renewable energy share in 2022 (66%), followed by Finland (47.9%), Latvia (43.3%) and Denmark (41.6%). With shares of less than 14%, Belgium, Ireland, Luxembourg, and Malta had the lowest shares.

Considering both national consumption and currently notified statistical transfers, three **Member States had a 2022 share still below their 2020 binding renewable energy target under the original Renewable Energy Directive: France (2.7 percentage points lower than the 2020 target), Ireland (2 pp) and Austria (0.2 pp).** Consequently, these Member States will have to take, within one year, additional measures to cover the gap within the next year[53]. Moreover, several Member States **did not meet their reference point for the year 2022[54]**. Those Member States are expected to explain in their next integrated progress report how they intent to close the gap.

The Commission currently organises the second call for proposals under the **EU renewable energy financing mechanism**. Luxembourg will again participate as the contributing country reinvesting the non-disbursed EUR 12.5 million of its previous commitment and adding another EUR 40 million into the mechanism. The host countries are Finland which will host solar PV projects, and Estonia which will host onshore wind energy projects.

Since 2021, the **CEF for Energy** has a dedicated **window for cross-border renewable energy projects** (CB-RES). In 2023, the Commission has organised two calls for proposals to update the CB RES list and to co-finance works and studies. The evaluation of these calls for proposals is still ongoing, but the increasing number of applications indicates an increasing uptake of the programme.

In the transport sector, ReFuelEU Aviation and FuelEU Maritime Regulations were adopted in late 2023, which will replace fossil fuels with renewable and low carbon fuels and will decarbonise those two hard-to-abate transport sectors. The Commission also launched in 2022 the Renewable and Low-Carbon Fuels Value Chain Industrial Alliance, which is a novel initiative dedicated to advancing the production and supply of those fuels for which the markets are at an early stage of maturity and require substantive investment to reach the targets from 2030 onwards.

The agreed revision of **Urban Wastewater Treatment Directive (UWWTD)** includes a legally binding objective to reach energy neutrality[55] for the sector by 2045 with interim targets.

In May 2024, the new **Methane Regulation** was adopted, introducing new requirements on measuring, reporting and verifying methane emissions in the energy sector.

[52] Assessment might evolve following final updated NECPs to be submitted by Member States by 30 June 2024.
[53] In accordance with Article 32(4) of the Governance Regulation.
[54] Ireland (falling short by 6.2 pp), France (4.5 pp), Austria (2.4 pp), Spain (1.8 pp), the Netherlands (1.4 pp), Romania (1.1 pp), Slovenia (0.4 pp), Italy (0.2 pp) and Belgium (0.1 pp). Reference point as set in Article 4 of the Governance Regulation based on the previously EU-level target before the entry into force of the revised Renewable Energy Directive.
[55] Energy generated from renewable sources equals energy used at urban wastewater treatment plants.

Energy efficiency

The EU met the 2020 **energy efficiency** targets, both in terms of primary energy consumption and final energy consumption. **After a considerable rebound in 2021 as the European economy was coming out of lockdown, in 2022 the EU managed to showcase a systemic decrease in its energy consumption** consistent with the downward trend of the last 15 years, also reflecting the EU's collective effort to reduce energy demand following Russia's war of aggression against Ukraine.

In 2022, primary energy consumption in the EU reached 1 257 million tonnes of oil equivalent (Mtoe), a 4.1% decrease compared with 2021, **moving closer to the new 2030 target of 992.5 Mtoe with the gap narrowing to 26.7% from the 2030 target.**

Final energy consumption reached 940 Mtoe in 2022, a 2.8% decrease compared with 2021. In 2022, final energy consumption was 23.3% away from the new 2030 target (763 Mtoe). Energy efficiency efforts will need a further step up to achieve the 11.7% final energy consumption reduction target by 2030, as the Commission 2023 EU-wide assessment of the draft updated NECPs identified a reduction of only 5.8% compared to the 2030 projections.[56] In 2022, final energy consumption decreased by 19.6 Mtoe (-7.5%) in the EU residential building sector and by 8.7 Mtoe (-6.7%) in the service sector compared to the levels of 2021. However, the decrease is largely caused by a milder winter and a reduction in consumption, rather than by an improvement of the building performance itself, indicating there is room for improvements in the implementation of the national Long Term Renovation strategies. In practice, **renovation rates and electrification of heating equipment across the board remain too low and national measures are insufficient to reach a decarbonised building stock by 2050**, for which a swift implementation of the revised directive for the energy performance of building will be absolutely key.

Regarding energy savings achieved in 2021 by implementing **energy efficiency obligation schemes**, alternative policy measures, or both, various Member States reported savings being less than 60% of the needed savings, which will need to be compensated in the remaining years to 2030.

Ecodesign and energy labelling are additional key policy instruments driving energy efficiency in the EU. About 50 regulations covering 30 product groups are estimated to save annually 1,418 TWh primary energy and 139 $MtCO_2eq$ in 2030, as well as 157 billion € for customers[57]. This roughly corresponds to the energy consumption of Spain in 2022. The new Ecodesign for Sustainable Product Regulation (Regulation (EU) 2024/1781) is expanding the possible scope beyond energy-related products and allows introducing new requirements focusing on resource efficiency, circularity, and sustainability.

However, concerns about the compliance of energy-related products with the requirements have emerged. In order to secure the energy, environmental and financial benefits of the policy, ensure the level playing field among economic operators, and protect consumers, it will be critical to **pursue and intensify the efforts towards better compliance**, both for EU-manufactured energy-related products as well as for imports, in collaboration with the Member States, and in line with the Letta report' call to strengthen enforcement to uphold the Single Market integrity[58].

The agreed revision of the EU **Industrial Emissions Directive** better supports EU industrial installations to become, amongst others, more energy efficient, thus contributing to tackle the triple planetary crisis.

[56] Assessment might evolve following final updated NECPs to be submitted by Member States by 30 June 2024.
[57] Ecodesign Impact Accounting Overview Report 2023. https://europa.eu/!3cfvJd
[58] Enrico Letta - Much more than a market (April 2024) (europa.eu), in particular p. 128-129.

Energy security

After two very challenging years in 2022 and 2023, 2024 has so far been a year of stabilisation for the EU energy system. **Security of supply in the gas sector has substantially increased** and the market fundamentals are now much more stable. This is notably thanks to demand reduction and the further implementation of the REPowerEU Plan, which allowed the EU to reduce its dependency on Russian fossil fuels. The EU went through the last winter with no major supply disruption, despite the outage of the Baltic connector between Finland and Estonia and the geopolitical turmoil in the Middle East.

The improvement in EU security of gas supply is also reflected in **the decision of several Member States (Estonia, Finland, Sweden, and Denmark) to decrease their crisis levels**. Currently, there are still eight Member States in early warning, and one in alert level.[59] Building on lessons learnt and a reinforced security of supply framework, the EU is well prepared for the next winter and the end of the gas transit agreement between Russia and Ukraine.

The Commission works closely on gas international security of supply with its strategic partners, notably IEA members. A pilot project for enhancing communication on gas security matters within the group has started in Autumn 2023 with the objective of building a shared understanding of problems and their effects on partners. The Commission actively monitors and discusses market behaviours of various actors on the EU and global LNG markets.

The March 2024 Commission Communication on managing climate risks highlights the increased risks for energy security, in particular electricity disruption due to heat, wildfires, droughts, and floods affecting peak demand, all of which impact production, storage, transport, and distribution[60]. Climate risk planning needs to be strengthened within the energy sector.

Even though some local events, owing to extreme weather conditions (e.g. winter storms) or failure in some infrastructure elements resulted in disturbances in some regions, **over the last year, no major electricity incidents or adequacy issues threatening the security of electricity supply were observed at EU level.** Owing to good cooperation and coordination between all stakeholders across the EU, these local events did not spill over. Increasing renewable capacities help in ensuring local power generation and security of supply by reducing imports of fossil fuels in the EU. At the same time, availability of nuclear generation has been good thus far, and the same can be said on hydropower. The winter period risk assessment is being carried out.

In the energy sector, **the volume of cybersecurity incidents remained stable with no noteworthy events or incidents of significant impact reported during the last year.** On infrastructure, the Estlink 2 electricity transmission cable link between Finland and Estonia was disconnected from the grid on 26 January due to a malfunction. The cable is expected to be repaired by mid-September. The recently adopted NIS 2 Directive and Critical Entities Resilience Directive will contribute to increasing the resilience of energy infrastructure. Additionally, the Commission has analysed the reports of the stress tests in the energy sector carried out by Member States and has proposed follow-up actions to Member States, who will decide on the way forward.

To strengthen the resilience and protection of critical maritime infrastructure, including inter alia undersea pipelines, against hybrid and cyber threats, the Commission has revised the EU Maritime Security Strategy and its Action Plan in October 2023.

[59] The gas SoS Regulation allows member states to activate three different crisis levels: “early warning” (an event is likely to happen), “alert” (disruption has occurred but the market can cope) and “emergency” (gas supply is insufficient and non-market-based measures are needed).
[60] COM(2024)91 final.

Given the significant societal and economic importance of energy security, energy is explicitly prioritised also in the context of the Joint Commission / High Representative European Economic Security Strategy. Since June 2023, both resilience of supply chains and the physical and cyber security of critical infrastructure have been prioritised in such a Strategy.

3.4. Energy markets, including energy poverty

Over the past few years, the Commission has led significant and far-reaching reforms to the European energy market organisation in the form of the recent Electricity Market Design (EMD) reform, the Hydrogen and Gas Markets Decarbonisation Package and the reform of the Wholesale Energy Market Integrity and Transparency (REMIT) Regulation. **The recent legislative packages will all require extensive revisions of tertiary legislation to trigger the necessary changes on the ground.** For gas, this concerns the areas of capacity allocation, congestion management and tariffication. For electricity, new tertiary legislation is being developed concerning demand response in wholesale electricity markets and the use of flexibility solutions by grid operators. To further enhance the development of flexibility in the power system and the electricity markets, the Commission has closely engaged with Member States to follow-up on the implementation of the Electricity Directive, particularly the provisions related to demand side flexibility.

Several key policies have been put into place with the purpose of identifying and speeding up cross-border and national infrastructure development. The European Network of Network operators of Hydrogen was created to develop non-biased and targeted EU hydrogen ten-year network development plans. The EU grid action plan and the first list of Projects of Common and Mutual Interest were adopted and accelerated permitting provisions were put in place through Emergency Regulations, the revised REDIII and TEN-E requirements.

Regarding energy poverty, in 2023, 10.6% of the EU population declared that they were not able to keep their home adequately warm. Compared with 2022, this share increased by 1.3 percentage points[61], in a context of energy crisis and inflation. The situation varied across the EU countries promoting measures to protect households.[62] The new energy market legislation will better safeguard vulnerable households and those affected by energy poverty from disconnection. In case of a natural gas price crisis, EU-level emergency measures can help to protect consumers through interventions on retail price caps. Member States can also act to ensure access to essential services and shield vulnerable consumers from excessive costs, addressing energy poverty directly.

The Social Climate Fund, which entered into application in 2024, will mobilise at least euro 86.7 bn of EU ETS revenues for the period 2026-2032, including 25% Member State co-funding, to contribute to a socially fair transition towards climate neutrality. The Fund will finance measures and investments which the Member States will compile in their Social Climate Plans by June 2025 and should help compensate the expected increase in energy bills due to the introduction of carbon pricing for heating and transport. The Commission has established an expert group, where the Commission and the Member States share good practices and exchange views on the preparation of the Fund. Since June 2024, the Commission provides support to 10 Member States for the preparation of their Social Climate Plans through the Technical Support Instrument.

Research, innovation, and competitiveness

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61 Source EU SILC survey.

62 The highest shares of people unable to keep their home adequately warm were reported in Spain (20.8%), Portugal (20.8%), Bulgaria (20.7%) and Lithuania (20.0%). In contrast, Luxembourg (2.1%), Finland (2.6%), Slovenia (3.6%) and Austria (3.9%) reported the lowest shares.

EU manufacturers face growing competition in net-zero technologies on global and domestic markets. Compared to 2022, EU production value of Li-ion batteries and heat pumps increased the most in 2023 (around 30%), followed by fuel cells (18%), ocean energy technologies, biofuels (ethanol) and CCUS (nearly 10%)[63]. While Li-ion batteries have the highest production value in the EU in 2023 (EUR 21 billion), the EU also had its largest trade deficit in this technology (nearly EUR 19 billion). Solar PV showed a similar deficit, yet at a much smaller EU production value (EUR 2.1 billion). In the case of batteries, the trade deficit increased by 21% compared to 2022, while for solar PV it declined by 13%. From the net-zero technologies with a trade surplus in 2023, the most prominent was wind (EUR 1.7 billion), where imports fell by 65% and exports increased by 50% compared to the previous year. Heating and cooling networks had the second largest surplus (EUR 1.3 billion) followed by hydropower (EUR 0.2 billion). During 2021-2023, EU exports of wind rotors held the largest share in global exports of the technology (67%), followed by solar thermal and hydropower technologies with around 40%.

The Commission revised the SET Plan in 2023 and included it in the Net-Zero Industry Act, strengthening its role in implementing the research, innovation and competitiveness pillar of the Energy Union and recognizing its contribution to the EU's manufacturing capacity of strategic net-zero technologies.

Research & innovation (R&I) remains key to ensure the future competitiveness of EU companies in cutting-edge net-zero industry technologies. In this context, the continued implementation of the 2022 EU Action Plan on the Digitalisation of the energy system[64] contributed to foster digital innovation in the EU, for example by developing a digital twin of the EU's electricity grid and by defining smart grid indicators to promote a faster uptake of smart and innovative grid technologies.

To bridge the **gap between research & innovation (R&I) and market uptake** in new or early-stage clean tech sectors, the Commission will continue to support **R&I** in close partnership with Member States through the Strategic Energy Technology (SET) Plan and its Implementation Working Groups to define joint research and innovation agendas in strategic sectors as the recently published one on solar technologies[65]. It is also critical to foster partnerships with industry and transport sectors to accelerate the development of net-zero technologies, accelerate market-uptake of R&I results and strengthen the EU's manufacturing base, for instance by developing strong links between the European Technology and Innovation Platforms and industrial alliances (the European Battery Alliance, the European Clean Hydrogen Alliance and the Solar PV Industry Alliance), to promote the development of viable investment projects and manufacturing capacity in clean energy technologies in the EU, and to address market, regulatory, infrastructure and technological barriers to their large-scale deployment. The Innovation Fund, with its estimated budget of around EUR 40 billion until 2030 from the sale of EU ETS allowances, plays a crucial role in this regard. The clean transition dialogues[2] with industry and social partners helped to strengthen and support the implementation of the European Green Deal, contributing to a reinforced industrial approach.

Co-benefits of the energy transition

Beyond decarbonisation, increasing energy efficiency and the use of non-combustible renewable sources of energy helps to reduce pollution in line with the goals set out in the Zero Pollution Action

[63] Calculations for the forthcoming 2024 reports of the Clean Energy Technology Observatory (CETO). For more information: Clean Energy Technology Observatory.
[64] COM(2022) 552 final.
[65] COMMISSION STAFF WORKING DOCUMENT Solar energy joint research and innovation agenda with Member States in the context of the European Research Area (ERA).

Plan[66], e.g. by tackling **air pollution** and reducing the associated premature deaths and ecosystem impacts. Ambitious measures will thus help Member States to deliver on targets linked to clean air, including the more ambitious air quality standards of the revised Ambient Air Quality Directive. The (ongoing) evaluations of the Governance Regulation and of the National Emissions reduction Commitments Directive 2016/2284 are an opportunity to streamline the links between energy and climate and clean air policy further.[67]

4. CONCLUSIONS

During the past years, the EU has proven to live up to its commitments, by taking firm actions to ensure its security, progress in the clean energy transition and unwavering solidarity to Ukraine. It has acted in unity to achieve the objectives of the REPowerEU Plan, with a view to building a more secure and decarbonised energy system for all Europeans.

Such an objective is far from easy, especially in view of the rapidly evolving geo-political context and unprecedented crises faced by the EU. Nevertheless, as shown by the data presented in this report, the timely, concerted action at Member State, EU and citizen levels, has avoided the worst effects of the energy crisis by saving energy, diversifying our supplies and taking action to address the drivers of EU structural weaknesses by strengthening measures towards climate neutrality, and a genuine energy union, centred on the ramp-up of clean energy.

In an increasingly geopolitically divided world, the importance of security of supply, energy security, sustainability and resilience issues combined with increasing impacts of climate change on preparedness within the energy sector, have come to the fore, such as the challenge to the competitiveness of the EU's industry, transport and supply of critical raw materials. Here the EU has swiftly acted by strengthening its international partnerships and by adopting of the NZIA and the Critical Raw Materials Act, but also by inviting strategic reflections of Mario Draghi and Enrico Letta

With a solid foundation forged by relentless cooperation and solidarity, the EU is better prepared to navigate the profound changes and challenges that are ahead,

Yet, new and emerging challenges such as the ambition gap in renewables and energy efficiency targets, the increase of energy poverty, the energy price differential compared to other global competitors and the risk of new strategic critical dependencies require in the next years a decisive policy response and a step change in efforts both at EU and Member-State level, through more coordination, market integration and joint action..

The Member States submission of their final updated National Energy and Climate Plans (NECPs) present a crucial milestone in this regard as they will both need to live up to the ambition of the 2030 EU targets and further accelerate the implementation towards these targets and are thus at the centre of the EU and Member State delivery strategy towards the Energy Union's objectives. In the context of increasing focus on implementation of EU climate and energy legislation, all Member States must step up efforts to ensure a sufficient level ambition and ensure that the European Union is on track towards its collective energy and climate targets for 2030. The Commission urges the remaining Member States to submit their plans without delay to enable a swift and comprehensive assessment at EU level, while proving a solid springboard to address bottlenecks, discuss best practices, and improve regional coordination and enable a rapid and agile delivery of our 2030 objectives.

[66] COM(2021) 400

[67] More evidence will be published in the next Zero Pollution Monitoring and Outlook scheduled for end 2024.