

SUPEERA

Policy Brief



REPowerEU

CHALLENGES AND
OPPORTUNITIES AHEAD



Setting the scene

Two years after the launch of the European Green Deal, the European Union has made substantial steps forward in its efforts to promote the green transition. The publishing of the Fit for 55 package in 2021 is the most telling example of this endeavour and the finalisation and roll out of the legislative proposals therein contained in the next years will be crucial to attain the 2030 and 2050 EU climate goals.

The year 2022 also marks a crucial moment for European research, and the EU in general. It will not only signal the halfway of the current European Commission and European Parliament terms, but it will also see the Horizon Europe Missions – new instruments designed to reduce the distance between citizens, researchers, policymakers and local government - at work, after being launched in 2021,

These efforts will be invalidated without the active participation and support of the research community as only by combining state of the art research with careful policymaking the EU will be able to reach its ambitious goal of becoming climate neutral by 2050. The research community has a pivotal role to play in this process, supporting identified political priorities with empirical findings and developments. It can also advise policymakers on the way forward through fundamental research, particularly focused on low TRLs, to advance breakthrough technologies, materials, and systemic approaches. Crucial in this effort will be the participation of the industrial sector, without which developments will be unattainable. In particular with the new objectives posed by REPowerEU, a close interaction between research, industry and Member States will be more fundamental than ever.

In the context of the SUPEERA project, a series of policy briefs are currently being developed to identify concrete R&I challenges in EU policies relevant to the energy research community. The final goal is to support the achievement of the Clean Energy Transition (CET). This Policy Brief will focus on the REPowerEU Communication, published by the European Commission as a reaction to the Russian aggression of Ukraine and the consequences the conflict will have on the EU energy system. The document is also intended to provide further responses to enduring high energy prices and the need to proceed to a swifter emancipation from fossil fuels in line with the goals of the European Green Deal.



The EC Communication for a Joint European action for more affordable, secure and sustainable energy

The European Commission has published in March 2022 the Communication “**REPowerEU: Joint European Action for more affordable, secure and sustainable energy**”¹. The document lays down indications to attain a twofold objective: diversifying gas supplies, via higher Liquefied Natural Gas (LNG) and pipeline imports from non-Russian suppliers, and larger volumes of biomethane and renewable hydrogen production and imports; and, reducing faster the use of fossil fuels in houses, buildings, industry, and power system, by boosting energy efficiency, increasing renewables and electrification, and addressing infrastructure bottlenecks.

The table below summarises the main actions and features of each objective, divided following the structure of the document. The measures are categorised by short (ST), medium (MT), and long term (LT).

Key priorities	Identified R&I challenges
Mitigating retail prices and supporting heavily exposed companies	<ol style="list-style-type: none"> The combination of higher energy, transport and higher food prices is likely to increase poverty and affect business competitiveness. Therefore, the Commission will investigate all possible options to address the emergency. Price regulation and transfer mechanisms are available to help protect consumers and the economy. Examples of such mechanisms include: <ul style="list-style-type: none"> Member States setting retail prices for households and micro-enterprises; [MT] Commission’s incentives for energy efficiency and savings; [MT] Member States offering temporary relief for companies facing liquidity needs, based on the guidelines on rescue and restructuring; [ST] Member states supporting the companies and sectors mostly impacted by the energy crisis being facilitated by the full flexibility of the Commission’s State aid toolbox. [ST] The Commission will shortly be consulting Member States on the needs for and scope of a new, self-standing Temporary Crisis Framework. [ST] Member States will be able to keep on taking exceptional measures with the support of the Stability and Growth Pact (SGP) all throughout 2022. [ST]
Preparing for next winter by ensuring sufficient gas storage	<ol style="list-style-type: none"> Gas supplies are sufficient until the end of this winter even in case of full disruption of supplies from Russia. Nonetheless, to be prepared for the next winter, filling of gas storage across the EU should start now. [S/MT] A legal proposal will help ensuring the fairness and smart use of the existing infrastructure, as not all Member States have underground storage facilities in their territories. The aim is to ensure the uninterrupted energy flow within the whole EU. [LT] <ol style="list-style-type: none"> Such legal proposal will identify gas storage as a critical infrastructure and introduce provisions to tackle ownership risks for gas infrastructure. Solidarity arrangements are expected to be concluded in between the Member States. The Commission will be in charge of coordinating the refilling operations through various joint actions, while Member States can incentivize such operations by providing aid to suppliers, for example in the form of guarantees. [S/MT] The Commission is currently investigating all allegations of potential anti-competitive commercial conduct by Gazprom. [MT] The EU stands ready to support Ukraine, Moldova and Georgia to ensure reliable and sustainable energy as necessary. [MT]
Eliminating EU dependence on Russian fossil fuels	<ol style="list-style-type: none"> Phasing out our dependence on fossil fuels from Russia can be done well before 2030. To do so, the Commission proposes a REPowerEU plan based on two pillars: diversifying gas supplies and reducing faster EU dependence on fossil fuels. [M/LT]

¹ [Official Communication Text](#)



	<ol style="list-style-type: none"> 2. The energy efficiency first principle is more relevant than ever and should be applied across all sectors and policies. [ST] 3. Projects completing internal market in energy and those with a strong cross-border dimension should be privileged. Such projects will improve the interconnection of the European gas and electricity networks and other infrastructure and fully synchronise our power grids. [M/LT] 4. Financing needs will be assessed based on a comprehensive mapping of the needs of Member States as well as of cross-border investment needs. [LT]
Diversify gas supplies	<ol style="list-style-type: none"> 1. The Commission will continue discussing within G7 and with major global purchasers of gas (Japan, South Korea, China, India) medium-term market developments to diversify LNG and pipe imports and to foster international partnerships. [MT] 2. The Commission aims at increasing the EU production of biomethane, doubling the objective of Fit for 55. [M/LT] 3. The Commission will further develop the regulatory framework to promote a European market for hydrogen and support the development of an integrated gas and hydrogen infrastructure, hydrogen storage facilities and port infrastructure. [LT]
Reducing faster our dependence on fossil fuels	<ol style="list-style-type: none"> 1. Rolling out solar, wind and heat pumps <ul style="list-style-type: none"> • The Commission will present in June a communication with the aim of helping unlock solar energy's potential as a major renewable energy source in the EU [ST] • The Commission will help further develop the value chain for solar and wind energy and for heat pumps, also boosting the EU's competitiveness and tackle strategic dependencies [LT] 2. The REPowerEU aims at decarbonising industry through the deployment of innovative hydrogen-based solutions and cost-competitive renewable electricity. [LT] 3. The necessary condition to realize all REPowerEU acceleration goals is to simplify and shorten permitting. The Commission calls on Member States to ensure that the planning, construction and operation of plants for the production of energy from renewable sources as being in the overriding public interest, and thus qualify for the most favourable procedure available. [LT]

REPowerEU brings promises to change the EU energy system, opening the door to innovation

The REPowerEU communication bears a **unique chance** to reformulate energy policies in a way which is conducive to emancipate the EU from Russian fossil fuels, tackle high prices and reach 2030 and 2050 climate goals. To attain these objectives, it is important for further legislative steps stemming from it to have at the core the vision for a **sustainable, fair and just transition to the benefit of all EU citizens and businesses** and embed at the same time the **principles of EU security of supply and Strategic Autonomy**. On a global scale, it will be critical to promote **EU leadership in climate diplomacy** and **technology transfer, integrate climate adaptation considerations** (e.g., IPCC AR6 WG2²) and actively support the achievement of the **United Nations Sustainable Development Goals**³. Now more than ever, the transition needs in fact to be addressed from a **holistic** and **systemic** perspective, and driven by **societal objectives**. In this respect, the REPowerEU Communication represents a golden opportunity to translate these aspirations into concrete proposals which will be able to deliver impact within a short time frame while at the same time laying the foundations for the future EU energy system.

Against this backdrop and diving into the specificities of the document, a first historical measure contained in the Communication foresees a mechanisms for **common purchase of gas**

² <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>

³ <https://sdgs.un.org/goals>



for all EU Member States, to be coordinated at EU level by the European Commission. This represents a change from common practice, but it is not the only remarkable point therein contained. Here below follows an analysis of the research and innovation challenges deriving from a number of measures identified in the REPowerEU proposal with the view of harnessing its potential and drive significant impact both in the short and medium to long term.

Eliminating EU dependence on Russian fossil fuels

Although the Communication is divided into two parts, the most relevant section for the energy R&I community is the one dedicated to cutting ties with Russia on fossil fuel imports. Phasing out this dependence will be difficult, as Russia exports to the EU 155 bcm (billion cubic metres) of gas alone every year. The EU has decided to tackle this issue with a three-folded strategy: **Gas Diversification, Electrify Europe, and Transform Industry**.

Each of these “chapters” aims at reducing the current dependence on Russian fossil fuels, ranging from LNG diversification, to heat pumps installations, to the deployment of additional wind and solar capacity. The “Gas Diversification” chapter gives high importance to **hydrogen**, but this opens up a series of potential issues. First, **the current technology does not allow for fast production and transmission of green hydrogen**, diminishing its role in the short run. Secondly, the Communication expects additional renewable hydrogen production to substitute 25 to 50 bcm of Russian gas by 2030. The EU is aiming high with this objective, as green hydrogen production still has a long way to go in the energy mix. The current EU hydrogen strategy foresees the production of 10 million tonnes of green hydrogen per year in 2030. Not only the feasibility of full domestic production is challenged, but the objective in general will require **massive investments in renewable electricity**.

Electrification is one of the main focus of the REPowerEU discussion, as it holds the potential of greening up a large part of the energy sector. However, there are many directions that electrification can go to deliver on its objective. The document dedicates great attention to **wind and solar energy**. To capitalise on this important role, there are some key steps that the EU will need to take.

In regards to solar energy, for the EU to become energy-independent it would need to **bring back the production value chain to Europe**. Relying on PV panels produced elsewhere in the world is no option as proven by the events of 2021, where PV factories in China were unable to produce for some time and, as a result, there was a shortage of PV panels in Europe and very long waiting times. In this field, initiatives like the **Important Projects of Common European Interest (IPCEI)⁴ on PV** should be supported immediately by substantial investments from the EU and the Member States. In this way, research and industry would be able to collaborate to swiftly bring back the complete value chain to Europe.

Furthermore, because of space constraints the EU should capitalise on its technological leadership in the field of “**integrated photovoltaics**” and boost funding to research and development in this technology. PV is particularly suited for integration in a broad variety of environments because of the absence of rotating parts resulting in the absence of noise and a limited need for maintenance. Integrated PV refers to the integration of solar cell technology in the

⁴ https://ec.europa.eu/competition-policy/state-aid/legislation/modernisation/ipcei_en



built environment, infrastructure, agricultural environments, on water and on vehicles. This requires a close and strong interaction between producer, designer, installer and customer and represents an opportunity for the development of a local industrial eco-system that is distinct from and not in competition with the giants that now dominate the PV market for standardized PV systems.

As far as **wind energy** is concerned, the research community can first and foremost play a vital role in **developing a revised assessment of resources onland and offshore**. This assessment should be carried out according to the latest technology developments and the latest existing wind conditions data (wind resources and site suitability data). Subsequently, another important step consists in providing innovations to accelerate the **implementation of larger wind energy projects**. In terms of technological barriers to overcome, **system integration innovations can be implemented relatively fast**, while **impact on ecology and society should be minimised**. Innovations and guidelines for this process should be addressed by different partners in the various countries to account for existing heterogeneous geographical conditions. **Administrative barriers**, for example those related to **permitting procedures**, should also be tackled.

Two will be the main realms of interest for wind energy research: **system integration** and **floating wind**. In both cases, the experience learnt from EU projects will prove to be crucial when executed, as the insights can quickly be implemented in offshore wind developments and system integration. The potential held by floating wind technology opens up completely new areas of research, while system integration is essential to absorb the large amount of energy injected in the energy system. Both areas of study can provide short and long term results, advancing wind energy fast enough to achieve the goals set for 2030.

Making the transition as technology-inclusive as possible

While certainly fundamental in the short term due to the nature of their technological advancement and deployment, wind and solar energy are part of a more complex system of energy sources.

Nuclear energy, although still a controversial point in EU policy also in relation to the debate over the EU taxonomy, can be a part of the solution as it currently represents a large section of the EU's generated electricity. Delaying the planned shutdowns of nuclear power plants could be a short term answer, but in the long run the support to small and medium sized nuclear reactors can prove to be effective, in pair with licensing and construction of next generation reactors focused on fuel recycling rather than new materials sourcing.

Other technologies can prove powerful tools to transition away from Russian fossil fuels, tackle high energy prices and attain climate objectives. **Concentrating Solar Thermal technologies** can play a decisive role in delivering electricity overnight, thus complementing PV plants and partially replacing currents combined cycle and coal-fired power plants. To capitalise on the technology's potential, there is a need among other actions to promote **solar hybrid projects** combining concentrated solar power and PV panels, to couple existing coal and gas plants to CSP plants with Thermal Storage, and to apply high TRL technology solutions to integrate solar energy in upgrading fuels and biomass.



Similarly, **geothermal energy** will be crucial to substitute gas in district heating systems, with and without the contribution of ground-based heat pumps. Researchers can provide regional concepts to combine seasonal heat storage for cooling and heating, based on the different geological conditions and demand structure. This would help balance the fluctuating supply from other renewables, as is the case of the power-to-heat application which exploits the vast amount of excess power provided by PV, mainly in the summer period.

Energy efficiency and sufficiency, then, will need to span through and go beyond all the mentioned technologies for their high potential to attain large volumes of energy savings, tackle energy poverty and foster a culture of energy sobriety and moderation. One of the most recent initiatives in this regard is the collaboration between the EU Commission and the International Energy Agency on a set of actions⁵ aimed at reducing energy use among EU citizens. Crucial in this field will be nonetheless the achievement of energy consumption reductions at industrial and company levels, where larger volumes of energy savings can be reached.

Energy system modelling will also eventually have an important impact on the EU energy systems. As there is no common EU model, analyses would need to be performed by running the models of a number of institutions that evaluate the results jointly. **Modelling can support policymaking in many aspects**, including deciding how to best use existing resources, showing the consequences of gas imports, presenting an EU-wide outlook and planning further steps such as transmission capacity increase. Nonetheless, a common energy modelling strategy does not exist at European level, leaving the EU trailing behind in policy planning.

Potential R&I challenges connected to REPowerEU include:

- Develop further integrated photovoltaics and bring back to the EU the solar supply chain
- Explore systems integration for larger wind projects, including floating wind
- Continue developing next generation nuclear reactors focused on fuel recycling
- Explore energy system modelling for measures such as transmission capacity increasing
- Promote solar hybrid projects combining concentrated solar power and PV panels
- Empower geothermal energy research to further develop ground-based heat pumps

⁵ https://ec.europa.eu/info/news/european-commission-and-iea-outline-key-energy-saving-actions-2022-apr-21_en



Conclusions

The REPowerEU Communication is a bold reply to the consequences that the Russian invasion of Ukraine has on the EU energy system, the enduring high energy prices and the need to pursue the EU climate goals for 2030 and 2050. Squaring the circle proves to be a complex task, as many short term goals risk being conflicting with medium to long term priorities.

In this context, it will be of the utmost importance to base any legislative action stemming from the REPowerEU Communication on the vision for a **sustainable, fair and just transition to the benefit of all EU citizens and businesses**, the principles of **EU security of supply and Strategic Autonomy** as well as on the promotion of **EU leadership in climate diplomacy and technology transfer**. The integration of **climate adaptation** considerations and the active support the achievement of the **United Nations Sustainable Development Goals** will be equally crucial to the success of the initiative.

Hydrogen was recently defined by EU climate chief Frans Timmermans as the **'pivotal element'** in Europe's future economy, stating he strongly believes green hydrogen will be the driving force of energy systems of the future.

On a more concrete level, several are the low-hanging fruits to which REPower can look at to unlock suitable solutions to the challenges it aims to tackle. Among these, the **accelerated permitting procedure for renewable energy projects** will be key for all Member States and will be a transversal boost for many different energy applications. In addition, the **focus on hydrogen** will be beneficial to all EU member states in driving the clean energy transition, by eliminating the necessity for dependence on foreign gas and helping national economies by creating jobs and fostering innovation.

The measures proposed will also importantly have an underpinning goal: **increasing the energy efficiency of all processes**, mainly in industry and buildings. This goal, in line with EU legislation, will have the effect of making the EU more independent and cleaner in the long run, reaching both EU objectives and obtaining a transition that is clean, fair and future proof for all citizens. This is a goal in line with SUPEERA and EERA's mission and objectives, and through the research on clean energy technologies the EERA community will be a fundamental actor in all developments to come.





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