

THE EUROPEAN CLIMATE LAW

CHALLENGES AND
OPPORTUNITIES AHEAD



Setting the scene

The European Green Deal celebrates its first year in 2021, testifying the renovated push from the European institutions to focus the attention of policymaking on the threats posed by climate change. To reach climate neutrality by 2050, the EU will need to incorporate several initiatives in energy and climate to develop a stable and coherent framework for concerted action. Within this framework, the recently published “Fit-for-55” package, a set of 13 legislative proposals aiming at making the EU’s climate, energy, land use, transport, and taxation policies fit for reducing greenhouse gas emissions by at least 55% by 2030, represents a key milestone for the EU’s ambitions and provides the roadmap to translate EU climate goals into concrete actions. The 13 proposals put forward within the package are strictly interconnected between each other, as well as with the targets agreed in the European Climate Law, the centrepiece of the EU Green Deal.

The recently approved EU budget and the creation of Next Generation EU, a plan to boost the post-pandemic recovery of Europe, ensure substantial backing to many projects and initiatives supporting the reduction of emissions and promoting the EU’s digital ecosystem and its competitiveness. Green investments and collaboration on transnational projects are now crucial to ensure that the efforts of the Member States, industry, and research organisations will not fall short of the set objectives.

To complement the efforts made by policymakers, it is vital to ensure that R&I challenges are addressed in parallel, increasing the collaboration between research and industry to achieve the goals towards a climate-neutral energy system in the EU. The research community has undoubtedly a pivotal role 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, for the advancement of breakthrough technologies, materials, and systemic approaches.

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). The analysis of the policies identified has the two-fold objective of supporting recommendations towards the EERA membership and the SET-Plan ecosystem at large, also identifying potential focus areas in energy R&I for EU policymakers. Specifically, this paper focuses on the European Climate Law, as outlined in the [Communication](#) published on 4 March 2021 and updated on 17 September of the same year by the European Commission, which enshrines into law the goal set out in the EU Green Deal – for Europe’s economy and society to become climate-neutral by 2050.



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The [European Commission’s Communication on the European Climate Law](#) enshrines into law the EU’s climate-neutrality objective, ensuring that all EU actions and policies contribute to it in a socially-fair and cost-efficient manner, with all sectors of the economy and society playing their part.

The Communication revolves around four strategic priorities that will guide the EU actions in the months and years to come. The table below provides an overview of these priorities and the related areas for development defined by the European Commission. They are reported as identified R&I challenges as our analysis focuses solely on the areas with the highest potential for further improvement through European R&I actions.

Key priorities	Identified R&I challenges
Achieving climate neutrality	<ul style="list-style-type: none"> a) Take the necessary measures at Union and national level to enable the collective achievement of the climate-neutrality objective. b) The trajectory to reach climate-neutrality developed by the EU Commission should take into account the following: <ul style="list-style-type: none"> i. Cost-effectiveness and economic efficiency; ii. Competitiveness of the Union’s economy; iii. Best available technology; iv. Energy efficiency, energy affordability, and security of supply; v. Fairness and solidarity between and within Member States; vi. The need to ensure environmental effectiveness and progression over time; vii. Investment needs and opportunities; viii. The need to ensure a just and socially fair transition; ix. International developments and efforts undertaken to achieve the long-term objectives of the Paris Agreement and the ultimate objective of the United Nations Framework Convention on Climate Change¹; x. The best available and most recent scientific evidence, including the latest report of the IPCC².
Enhance adaptation to climate change	<ul style="list-style-type: none"> a) Ensure continuous progress in enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change. b) Develop and implement adaptation strategies and plans that include comprehensive risk management

¹ For more information on the United Nations Framework Convention on Climate Change (UNFCCC) visit the following page: <https://unfccc.int/>.

² https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf



	<p>frameworks, based on robust climate and vulnerability baselines and progress assessments.</p>
<p>Assessment of national and Union progress and measures</p>	<ul style="list-style-type: none"> a) Regularly assess the following: <ul style="list-style-type: none"> i. The collective progress made by all Member States towards the achievement of the climate-neutrality objective; ii. The collective progress made by all Member States on adaptation. b) Once the assessment has been conducted, the EU Commission should submit its conclusions, together with the State of the Energy Union Report prepared in the respective calendar year. Both documents must be submitted to the EU Parliament and Council. c) By the end of September 2023, and every 5 years thereafter, the EU Commission should review the following: <ul style="list-style-type: none"> i. The consistency of EU measures with the climate-neutrality objective; ii. The adequacy of EU measures to ensure progress on adaptation. d) In the case it is found that EU measures are inconsistent or inadequate, the necessary measures should be taken, in accordance with relevant EU Treaties. e) Assess draft measures and legislative proposals in light of the climate-neutrality objective. Such analysis should be included in any impact assessment accompanying these measures or proposals. Furthermore, the result of the assessment must be public at the time of the adoption.
<p>Enhance public participation in climate activity</p>	<ul style="list-style-type: none"> a) Engage with all parts of society to enable and empower them to take action towards a climate-neutral and climate-resilient society. b) Facilitate the building of an inclusive and accessible process at all levels <ul style="list-style-type: none"> i. Promoting multilevel governance and policy design practices open to the involvement of stakeholders ii. Promoting participatory process aimed at involving the wide public into the policy design and implementation process (e.g. public consultation, deliberative arena...)



Ensuring the successful transition towards climate-neutrality will heavily rely on research

Also referred to as the “law of laws” due to its key importance for achieving the EU Green Deal’s objectives, the European Climate Law provides the conditions to set out a trajectory leading the EU to climate-neutrality. At the same time, it enhances certainty and confidence in the EU’s commitment for businesses, workers, investors and consumers, as well as transparency and accountability, thus promoting prosperity and green job creation.

More specifically, the path towards climate-neutrality set out within the Communication addresses the necessary steps to be taken at national and European level. First of all, based on a comprehensive impact assessment presented in September 2020, the EU Commission has proposed to raise the greenhouse gas (GHG) emissions reduction target to at least 55% compared to 1990 levels. Additionally, and if deemed appropriate, an **intermediate target for 2040** will be proposed, an important initiative ensuring the alignment of national efforts. Such target will be informed by the **Union’s GHG budget for 2030-2050**, which outlines the maximum level of emissions that can be released in the atmosphere without undermining the EU pledges under the Paris Agreement. Incentivising early action and leading the way towards carbon-neutrality, the latter represents a necessary tool providing a clear and transparent budget that can help assess national and European progress.

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« In order to reach the climate-neutrality objective set out in Article 2(1), the binding Union 2030 climate target shall be a domestic reduction of net greenhouse gas emissions (emissions after deduction of removals) by at least 55 % compared to 1990 levels by 2030. »

These measures open a large window of opportunity for clean energy research, as the foreseen greenhouse gas emissions cuts will require an **immediate boost to R&I investment to step up the identification and conception of new technologies and the development of those that are not yet on the market.**

Coupled with regular reporting by Member States and their National Energy and Climate Plans (NECPs), and additional mechanisms ensuring the efficient evaluation of Union-wide progress, the 2030-2050 emissions budget will also serve as a basis to **issue recommendations and re-direct national climate policies where necessary** – e.g. in the case inconsistencies are found between national measures and EU climate objectives or measures are regarded as inadequate. Otherwise, without an overarching coordination effort, researchers will have less opportunities to collaborate across borders and produce results that can fit different environments.



Alongside regular evaluation processes, several additional factors need to be taken into account when designing the EU's trajectory towards climate-neutrality. First of all, as mentioned within the Communication, Member States need to **make use of the best available technology** in order to achieve a timely energy transition. In this respect, research and innovation will be crucial for expanding the range of options, improving performance and reducing costs in key technological areas. Structural changes in the energy system are needed if we are to achieve a rapid decline in emissions and innovation will play an increasingly important role. In particular, the European Commission underlines that **solar photovoltaics (PV), electric mobility and energy storage** will be among the most important innovations on the current horizon. However, efforts will need to be increased in many other key sectors, considered the large scope of the energy research field and its potential applications in real life situations. **Carbon capture and storage (CCS) and carbon removal mechanisms**, for instance, will be necessary to ensure the compensation of GHG emissions from sectors where decarbonization is challenging. Key technologies in these areas should, therefore, be made cost-effective and deployed at large-scale. Other crucial fields of research include the **digitalisation** of the energy sector, the **circular economy**, and the **integration of energy systems** for a more cross-cutting approach to the clean energy transition process.

The **European High Performance Computing Joint Undertaking** could be an important instrument to make climate research one of the key purposes of the use of supercomputer, helping in terms of modelling and predicting climate events.

The digital and the ICT sectors will also play a crucial role in the transition to a greener energy system. Based on new IT technologies such as **high performance computing (HPC), modelling, robotics and artificial intelligence**, platform concepts for accelerated material development and device design will speed up the development and innovation chain for new energy system components by at least a factor of 10. This will make a difference, empowering more innovative and energy-efficient processes in possibly all energy sectors and reducing the long times associated with

developments in key technology areas.

International collaboration and a stronger knowledge-exchange among researchers in different geographical areas will also be key to succeed. In this respect, support for public and private initiatives pooling knowledge and resources together will need to be increased and communication channels between researchers improved.

Social considerations should also be taken into account. **Strengthening the social dimension of the energy transition** is an important precondition to ensure its success both in terms of addressing current and potential social impacts (e.g. energy poverty, inclusion of vulnerable groups in the transition pathways) and in terms of exploiting the



potential of social dynamics to foster the transition process (e.g. networks, culture and values, community identity, embedded knowledge). More specifically, what is needed is the development of a **detailed and inclusive narrative of the energy transition** envisioning how climate action can improve the quality of life of citizens and contribute to social cohesion, avoiding the exacerbation of social inequalities brought by climate change and related extreme weather events³.

Managing the social impact of the transition through the implementation of financial mechanisms such as the **Just Transition Fund (JTF)** and the **new Social Climate Fund** proposed within the framework of the recently published “Fit for 55” legislative package, will also be of pivotal importance. Through well-defined transition strategies, such mechanisms should guarantee enough support is given to fossil-fuel dependent regions and vulnerable households in order to efficiently transition to cleaner energy alternatives.

All of these innovations, nonetheless, will only be obtained if researchers increase their level of cooperation and communication. Still today, most sectors are crippled by the lack of **effective framework mechanisms** for researchers to work with and receive feedback from peers. In this sense, it is fundamental to **foster networks between researchers** and participation in activities that strengthen knowledge creation and knowledge sharing.

The crucial missing link is the communication and dissemination of research results. **Most of today’s advancements in research activities are not properly shared by the research communities**, and the low performance in communication activities by project consortia and research organisations weakens the capability of researchers to have a solid impact on society. Increased attention should be therefore paid to such critical aspect to, among others, generate better engagement with stakeholders, raise awareness on the benefits of research, maximise results’ impact and inform regulatory decisions.

³ EERA White Paper “Clean Energy Transition”: https://www.eera-set.eu/index.php?option=com_attachments&task=download&id=675:Digital-final_EERA_White_Paper_Clean_Energy_Transition



Conclusions

The European Climate Law represents the most ambitious legislative attempt to make the clean energy transition a reality. The provisions included in it set the goals for the next decades and will help the EU reach the transition in an inclusive, sustainable, and just way. To achieve these objectives, the support of research activities will be crucial, and **it should become a focus of the EU institutions to plan extensive support to the research activities conducted in energy matters.**

The importance of early-stage research is undisputed, and financial efforts from the EU institutions should be directed to increase the attractiveness of the sector. **Support to low TRL research will unlock new ideas and help scaling up projects in high-potential, high-risk sectors.** At the same time, **research needs a boost to reach the market stage.** In this case, high TRL research calls for market-supporting mechanisms to protect investments and enterprises from the risks inherent to investing in new technologies.

The research community is called to increase its efforts to collaborate and present a united front when consulted on priorities for investments and planning. **The main challenge in the coming years will be the de-siloing of many areas of energy research.** Attention should be dedicated to **research in the field of energy systems integration**, which can lead to better planning for the exploitation of energy sources in a way that is beneficial for different technologies and sectors. It will be important to **study methods to support new industrial sectors and instruments, in order to enable a cross-cutting transition. Stronger consideration to the social aspects of the Clean Energy Transition and the development of a holistic perspective** that promotes equity and solidarity will be equally crucial to achieve the desired results.

The main challenge in the coming years will be the **de-siloing of many areas of energy research.** In, this respect, attention should be dedicated to research in the field of **energy systems integration.**

Ultimately, it will be of utmost importance that **the research community and the European institutions keep an open dialogue about how each can best support the other.** Without clear objectives and a common vision on how to bring the 2030 and 2040 goals to reality, the process of urgently moving towards a climate neutral and sustainable EU will not be reached in due time.





SUPEERA

