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Achieving the EU's Energy Ambitions:

Expanding the EU's Low Carbon Energy Systems

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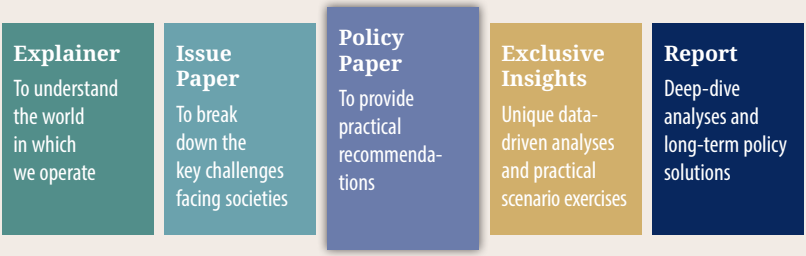

Summary

This is the second in a series of three policy papers titled **"Achieving the EU's Energy Ambitions"**. *The first paper, published in November 2024, is dedicated to the challenges of reforming the European Union's energy and climate governance. It identifies several political, legal, and institutional bottlenecks that must be anticipated, and suggests various ways to overcome them.*

Achieving carbon neutrality – as the EU committed itself to doing in the 2021 European Climate Law, stemming from its climate commitments under the Paris Agreement – will require a profound transformation of Europe's energy infrastructure. Achieving carbon neutrality is also a lever for competitiveness and to strengthen Europe's strategic autonomy, when its fossil fuel resources are declining and limited. Fit for 55 has begun to make decarbonization a decisive paradigm for our competitiveness, a development which the Clean Industry Deal should complement.

Infrastructure dedicated to the processing, transportation, and distribution of fossil fuels will need to be phased out or adapted, accompanied by a **massive, rapid, and coordinated** deployment of infrastructure dedicated to low-carbon energy. It should be stressed that all three terms are important here. As fossil fuels still account for some 70 percent of Europe's energy consumption, the deployment needed to replace them must be achieved on a massive scale. If we are to achieve carbon neutrality by around 2050, it must be rapid. Finally, to avoid creating bottlenecks that would not only slow down the whole transition but also generate imbalances within the internal market, this deployment must also be coordinated. As the gas crisis of 2021–22 demonstrated, the security of the continent's energy supply is at stake.

The evolution of capacities for energy transformation, transportation, distribution, and storage lies at the heart of the efforts that European

institutions, national authorities, and businesses need to make to move away from fossil fuels. **To accelerate this process, the EU should adopt a new regulation on European energy security** that could provide the backbone for the development of Europe's energy capacities in Europe. This would be in line with measures that other world economic powers, such as China and the United States, have already introduced or are in the process of introducing.[1]

First, it should be noted that European regulations – and particularly over regulation and gold-plating practices in the transposition of EU regulations into national law – have generated significant red tape that slows down all decarbonization projects. In France, for example, an offshore wind farm project has taken three years to build so far – but more than a decade of administrative procedures needed to be completed before building could even start. Unless this **red tape can be cut** – one of the key aspects in the Draghi report[2] – it is unrealistic to contemplate making the major changes to Europe's energy infrastructure necessary to move away from fossil fuels. The EU began to address this issue in an emergency regulation adopted with temporary effect in 2022, with some (but not all) of the measures subsequently enshrined in the Renewable Energy Directive (RED). However, the scale of the effort required calls for actions that are far more extensive and cover a wider spectrum of infrastructure. The Commission is well aware of this, as President Ursula von der Leyen has stressed simplification as one of its priorities.

Second, new energy conversion and storage capacities will need to be **financed**. This implies extending the tools already employed by the

[1] *Article 5 of the Executive Order of January 20, 2025 "Unleashing American Energy" signed by President Trump thus directs federal executive agencies to implement all measures deemed necessary to accelerate permitting procedures for energy projects. Since the US States have extensive powers in this area, over which the federal executive has no control, a simplification policy at the European level could have a greater impact than such a policy at federal level in the United States.*

[2] *Mario Draghi, The Future of European Competitiveness – Part B, September 2024., https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en, accessed 14 Février 2025.*

EU (such as contracts for difference)[3] to all infrastructure required for the transition while standardizing it on a European scale. These tools must be designed so that they do not support system-damaging or value-destroying behaviour. In the case of electricity, for example, this means discouraging production during periods of negative prices. The stability of the European power grid and the economic equilibrium of all its components are at stake.

In addition to support mechanisms, the need for liquidity to finance the transition argues for a greater role for the European Investment Bank (EIB). The EIB should make its support available for projects involving all types of low-carbon energy on an equal basis. This is in line with the principle that each Member State has the freedom to determine its own energy mix, but mainly the fact that, on a Union-wide scale, all types of low-carbon energy are going to be needed. Furthermore, Important Projects of Common European Interest (IPCEI) in the energy field should, as a matter of principle, be recognized as satisfying the EIB's lending guidelines.

Networks are an essential element of decarbonization. Without adapting them to the challenges of electrification and reducing the use of fossil fuels, the EU will be faced with bottlenecks that will slow down the energy transition and result in onerous additional costs for consumers and industry. Whether we are talking about developing electricity and hydrogen networks or adapting gas networks to reduce consumption, the problem is the same: achieving temporal equalization between current consumption (which largely determines current revenues) and future consumption. Meeting this challenge is far from straightforward, especially given the complexities of national network operator models,

[3] *The "complément de rémunération" (contract for difference) is a mechanism designed to guarantee remuneration to an energy producer. The producer sells its output on the market, and if the average selling price is lower than a predefined reference price, the public counterparty (mainly the government) will compensate the producer for the difference. The remuneration supplement is said to be "bidirectional" when the producer must pay the difference to the public counterparty if the sale price is higher than the reference price.*

the rules imposed on their capital structures, and so on. This is why we propose the creation – for example under the direct management of the EIB – of amortization accounts that would help network operators address the challenge of temporal equalization.

As the energy system serves the whole of the European economy, transfers between sectors and intertemporal transfers – through debt – appear natural as long as they are embedded in a consistent logic of pursuing the economic and industrial competitiveness of the EU. Investments in the transformation of the energy system cannot be financed by mandatory levies on energy consumption and certainly not by levies or tariffs on consumption subject to international competition. Generally speaking, the EU must ensure that energy taxation does not undermine the energy and climate objectives it has set itself, as is currently the case in some Member States. A key resource for the energy transition is to avoid squandering states' limited resources on subsidies for fossil fuels, particularly subsidies based on final consumption.

This policy paper will be followed by a third section dedicated to energy markets, covering, in particular, the challenges of making Europe's electricity system more flexible in order to adapt it to the massive deployment of renewable energy, dependent on external conditions, to replace fossil fuel power plants.

Summary of proposals

Proposal 1

Introduce a **European Energy Security Act (EESA)**. In order to simplify and accelerate the permitting process for low-carbon energy projects, this would establish a single integrated procedure with clear maximum deadlines (six months for simple projects, one year for others) and provide for automatic recognition of low-carbon energy zones to facilitate the siting of projects without needing to go through different procedures in the various Member States.

For networks and interconnections, energy production, import/export terminals, and storage projects, a technology-neutral list of Projects of Common Interest (PCIs) would be drawn up, for which the EESA would provide accelerated direct authorization at the European level and extensive recourse to dedicated financing, extending what is already in place for networks.

Proposal 2

Coordinate – at the level of a technical group of the Council of the EU with the help of a dedicated Commission (inter-DG) task force – an approach to simplify and harmonize the transposition of European directives into national law, particularly those impacting project authorization procedures. This would involve empowering European

authorities to oversee over-regulation and gold plating and ensure as uniform an implementation as possible. This measure would aim to limit the gold plating of European law, which makes procedures more cumbersome and creates imbalances between Member States – often wrongly perceived as being attributable to the EU when in fact they stem primarily from the choices of the Member States themselves.

Proposal 3

Include in the **European Energy Security Act** a prohibition on any direct price support system for sales during periods of negative market prices, unless the system includes a clause encouraging or obliging the producer to reduce or even cease production during these periods.

Proposal 4

In the **European Energy Security Act**, prohibit feed-in tariff schemes, including for small-scale facilities, as these do not take grid balancing issues into account. For small-scale facilities, participation in calls for tenders could be intermediated by national aggregators so as not to increase the administrative burden on project developers.

Proposal 5

In the **European Energy Security Act**, harmonize support frameworks for new installations contributing to supply security, following the harmonization of support for low-carbon energy included in the *Electricity Market Design Regulation*. This harmonization should include the following elements:

- A uniform definition of a plant's available capacity, understood as its market presence and actual capacity to produce or reduce consumption during certain hours, designated *ex ante* by the transmission system operators, along the lines of the capacity definition in the French or Polish mechanisms.
- Ensuring that support for flexibility can only be granted on the basis of a fixed or variable premium proportional to this availability, the amount of which is defined as part of a transparent, nondiscriminatory, and competitive procedure based on objective criteria.
- Ensuring that support for flexibility services may only be granted to low-carbon installations, i.e., those meeting a maximum carbon intensity threshold (gCO_2/kWh) over their life cycle, with the possibility of separate allotments for diffuse load shedding, other forms of load shedding, stationary storage, and flexible generation, if it can be demonstrated that this allotment does not affect the competitive nature of the procedure for each of the lots.

Proposal 6

In the **European Energy Security Act**, harmonize support for load shedding and storage in the EU by making bidirectional remuneration supplements based on the generation capacity available on demand or making load shedding more widespread.

Proposal 7

Within the framework of the **European Energy Security Act**, include a provision to harmonize support frameworks for nonelectric low-carbon energy carriers (gaseous and liquid). This should clarify that such support is generally based on the exchange of certificates of incorporation, reserve direct price support measures for small installations, and provide for the free circulation and mutual recognition of certificates of incorporation throughout the European market.

These certificates should adhere to design criteria such as being awarded through competitive, transparent, nondiscriminatory procedures based on objective criteria and include incentives for supported facilities to participate effectively in the markets, echoing the general design criteria already established for electricity.

Proposal 8

Undertake a comprehensive review of the architecture of the General Block Exemption Regulation (GBER), with a view to achieving technological neutrality during the current mandate. This revision would make it possible to eliminate redundancies with other European sectoral legislation, automate exemption notifications for national aid schemes that mirror those implemented by the Commission (in line with Proposal 7 of the first note) without any amount threshold, and re-evaluate upward the amount thresholds enabling the beneficiary to benefit from the exemption regime in other cases.

Proposal 9

Align the EIB's actual lending policy with the lending policy guidelines it drew up in 2019 to fully open up the eligibility of projects related to nuclear energy. More generally, rebuild the EIB's lending policy framework around the concept of technological neutrality with the goal of decarbonization.

This shift would involve indiscriminate support for low-carbon energy conversion, with nuclear projects falling within this new framework and no longer within the framework devolved to other thermal power plant projects. The new framework could also consider IPCEIs in the energy sector to be aligned in principle with the EIB's lending policy so as to secure loans for these Projects of Common Interest.

Proposal 10

Modeled on the InvestEU fund, create a **European Energy Security Fund** within the framework of the **European Energy Security Act (EESA)**, consisting of a permanent EU guarantee line (unlike the recovery and temporary resilience scheme under NextGenerationEU), coupled with an EIB equity intervention pocket. Both would be dedicated to key investments in the energy system transition (decarbonization and supply security), particularly *Projects of Common Interest* (PCIs).

Proposal 11

Extend the European Interconnection Mechanism to low-carbon production facilities in the form of a European Energy Security Mechanism. This mechanism constitutes the subsidized part of the **European Energy Security Act (EESA)**. It would be based on the pan-European tendering scheme proposed in Recommendations 6 and 7 of the first note (reform and extension of the platform for renewables), supplemented by the possibility of granting direct investment aid to IPCEIs in the energy field.

Proposal 12

In the **European Energy Security Act**, introduce the principle of a European amortization account for each of the electricity, gas, and hydrogen networks to solve the

problem of intertemporal equalization arising from the nonconcurrent evolution of the costs borne by operators and the volumetric demand for the associated vectors. The account could be managed by the EIB, which would finance it through a loan secured by an ultimate guarantee from the EU against certain predetermined risks.

Proposal 13

Within the European Energy Security Fund, set up a compartment dedicated to strengthening the equity capital of network operators, either through a direct stake in their capital or through funds of funds.

Proposal 14

The European Energy Security Mechanism, which would double as the financial component of the EESA, could integrate the current European Interconnection Mechanism, extending it to cover all energy production, transmission, distribution, and storage facilities in a technologically and vectorially neutral way. Given the extended scope of this new mechanism, the resources allocated to it in the multiannual financial framework should be increased accordingly.

Proposal 15

The EU's transition to a low-carbon, non-fossil-fuel energy system does not, as a matter of principle, need to be entirely or mainly supported by levies on energy consumption. Quite apart from the stakes in terms of Europe's competitiveness, opting for this approach would probably lead to deadlock due to the unanimity required to legislate on taxation at the European level.

Proposal 16

In general, the structuring of energy consumption prices can contribute to the transition to a low-carbon, non-fossil-fuel system without necessarily increasing average levies for consumers, provided that the following is true:

- The full costs of the lowest-emission energy types should be made as stable as possible.
- The full costs of the highest-emission energy types should not be secured.

If the EU makes the political choice to base the capture of resources needed for the energy transition on energy consumption, these resources should come primarily from the highest-emitting energy sources and should not affect the competitiveness of low-carbon energies.

Proposal 17

Prohibit, within the **European Energy Security Act**, any measure instituted by Member States involving payments

to consumers, market operators, or any intermediary in the value chain based on the volumes of fossil energy placed on the market or having equivalent economic effects.
This is to ensure that resources are not squandered in a direction directly opposed to the energy transition, such as indiscriminate support measures for fossil fuel consumption, even in times of crisis (such as discounts at the pump). If intervention is necessary, it must be socially targeted and designed so as not to diminish incentives to reduce fossil fuel consumption (e.g., by increasing certain social benefits).

Proposal 18

As part of the Energy Taxation Directive, introduce a clause requiring Member States to prioritize the taxation of different energy carriers according to their life cycle carbon intensity.

Proposal 19

Allocate a share of the cost of extending the Emissions Trading System to the transport and building sectors (ETS 2) to finance the tools proposed in this paper (the European Energy Security Mechanism, the European Energy Security Fund and EU guarantee, pan-European platform tenders, etc.). This extension could be achieved by raising the ETS 2 price ceiling, as the sectors concerned are not subject to much risk of carbon leakage.

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Introduction

This policy paper is the second part of a triptych on energy and climate issues and challenges for the European Commission's new term of office. The first part, while recalling the division of competencies in these fields between the European Union and its Member States, was based on the observation that achieving the 2030 and 2040 climate objectives will require a thorough overhaul of the EU's energy and climate governance model to overcome certain institutional and political blockages that can already be anticipated. This policy paper aims to provide recommendations as the new European Commission takes office, in a rapidly evolving geopolitical context and an aggressive and unrestrained international competition.

The in-depth decarbonization of Europe's energy system will require an all-encompassing vision of energy systems, one that goes beyond the most consensual levers and incorporates all the tools each Member State may need to wean itself off fossil fuels. For this reason, the principle of technological neutrality should be central to the design of European energy and climate laws in order to leave each Member State as much freedom as possible to decarbonize its territory, taking into consideration its own constraints (demand, climate, access to the sea, population density, etc.).

Beyond the challenges of reforming European energy and climate governance, achieving carbon neutrality by 2050 will require a rapid and profound transformation of the energy system. This implies a massive and rapid deployment of the facilities and equipment needed for decarbonization (transformation, transport, distribution, and storage of low-carbon energy) while integrating them into European energy markets that meet consumers' needs competitively and efficiently.

If we are to achieve carbon neutrality by 2050, deploying the energy system as a real asset is an even more important building block than defining common objectives or improving the integration of energy markets. Of course, this objective requires clear, coordinated trajectories between Member States, but achieving it depends above all on the implementation of an appropriate regulatory, financial, economic, and fiscal framework that sends the right signals to project developers and reduces the risks and obstacles to the implementation of projects. This issue is fully in line with the simplification efforts undertaken by the Commission in response to the recommendations of the Draghi report.

However, in recent decades, the practical aspects of transforming energy systems have often been relegated to the background in the Union's energy policies. These aspects are only partially addressed in the main texts of the Third (2009) and Fourth (2018–2019) Packages or in the Clean Energy Package.

This situation is partly explained by the fact that the transformation of the energy system falls mainly within the remit of the Member States or stems from collateral effects of various European policies (Energy efficiency directive, renewable energy directive, etc.). Moreover, during a period of relative stability in the energy system, decision-makers have sometimes prioritized setting objectives over defining the means to achieve them.

The profound transformation of our energy systems, which began with the 2030 targets,[4] is now testing the technical, physical, and economic capacities of key players in the sector. The latter have already been weakened by the double energy shock of 2022–2023 caused by the reduction in gas supplies from Russia and the difficulties of the French nuclear power sector. These challenges have repercussions at every

[4] *Inscribed in the Second Renewable Directive in 2018 (2018/2001/EU), this transformation has been confirmed by the revision of these targets as part of the Third Directive (2023/2413/EU) and Fit for 55.*

stage in the development of energy projects: financing, economic prospects for operation, obtaining permits within the required timeframes, connecting up projects, supplying equipment, maintaining supply security, etc. The coming transformation raises the question of how to adapt resources to these new needs.

Can we continue to authorize, finance, connect, build, and supply new plants at the unprecedented pace wished for by Member States in their energy and climate plans, following the approaches of the past decade? This second action note proposes a number of ways of removing certain constraints and facilitating the transformation of our energy system at the pace desired by legislators. The proposals could feed into the reflections on the drafting of the Clean Industrial Deal currently being prepared by the Commission. A second concern is maintaining a diversified supply base, interconnected networks, and controllable facilities to guarantee supply security throughout the energy transition. This concern, expressed by several Member States, is illustrated by French calls for a Nuclear Act and German efforts to secure electricity installations via a *Kraftwerkstrategie*. These initiatives underline the importance of taking this issue into account more systematically.

Accompanying the transformation of the physical production, transmission, and distribution system could involve sector-specific legislation such as a Low-Carbon Production Act or two pieces of legislation, one dedicated to the development of renewable projects and the other to nuclear projects. However, this approach carries the risk of a lack of coordination and tensions between different energy sectors. The experience of the Electricity Market Design Regulation, which favored technological neutrality, could serve as a model for avoiding these pitfalls and ensuring the coherence of European energy policies.

Toward a European Energy Security Act

A political priority for the next European term of office could therefore be the implementation of a European Energy Security Act, which would aim to do the following for all energy vectors of the energy transition (low-carbon electricity, low-carbon liquid and gaseous fuels, low-carbon heat):

- Facilitate the authorization and development of production facilities.
- Secure their financing and business model.
- Guarantee diversified and secure supplies of raw materials and strategic components.
- Meet the challenge of deploying energy networks.
- Complete the integration of security of supply issues into the operation of the European energy market.

This policy paper will focus on detailing the organizational and financial aspects of such a text **dedicated to transforming our energy system during the energy transition**.

The third and final note will focus more **directly on measures to adapt and extend the current market framework**. The aim is to ensure the full integration of supply security considerations into its efficient operation. The economic challenges of developing new flexibility mechanisms for the power system will also be covered in this final section.

Toward European Legislation on Energy Security

1 Supporting the Deployment of the EU's Future Low-Carbon Energy System

The proposed European Energy Security Act aims to facilitate the deployment of low-carbon energy conversion facilities and networks across the EU, covering all stages of a project, from preliminary studies to implementation, commissioning and operation. This would include issuing administrative authorizations, securing access to land, stabilizing the plant's business model, as well as access to essential equipment for construction and maintenance, and access to the necessary low-carbon fuels for operation. To make the transition as cost-effective as possible, one needs to guarantee maximum security for project developers.

This security is based on three pillars:

- **Legal certainty:** Projects must evolve within a stable, clear, and predictable legal and administrative framework.
- **Economic and financial security:** Cash flows, particularly those dependent on public support, must be protected against political reversals.
- **Industrial security:** Access to essential materials, goods, and equipment, as well as to the necessary low-carbon fuels, must be guaranteed. These aspects have been partially addressed by the Net Zero Industry Act (NZIA) and the Critical Raw Materials Act (CRM Act). They should be extended and deepened in the Union's future industrial policy, which is beyond the scope of this policy paper.

The measures presented in this section apply in a technology-neutral way to both energy networks and energy transformation facilities (generating capacity, biomethanizers, electrolyzers, geothermal heat production units, etc.).

1.1. ENSURING THE PHYSICAL DEPLOYMENT OF FACILITIES: PUBLIC PARTICIPATION, ENVIRONMENTAL PROCEDURES, AND ADMINISTRATIVE SIMPLIFICATION

Energy production facilities and network infrastructure are subject to a European legal framework that imposes various environmental regulatory requirements (see Appendix 1). These obligations mainly concern the environmental assessment of projects, the protection of habitats and species, risk prevention, the protection of water resources and aquatic environments, and the preservation of natural forest areas.

This complex European legal framework has imposed a substantial administrative burden on the development of energy production and network projects. This burden varies considerably between Member States, both in terms of the conditions for triggering the applicable procedures and in the level of detail of preliminary studies, the conduct of procedures, the arrangements for public participation, or the conditions for granting authorizations.

Until now, the issue of administrative simplification – as regards authorization procedures for projects – has remained confined to national public debates in each Member State, with variable results depending on the perceptions of the economic players involved and the ability of public authorities to simplify their transposition of European legislation without adding new constraints. However, in 2022, this simplification issue for European legislation on energy and environment for project developers was recognized for the first time in a European text.

Negotiated in the Council in the second half of 2022 on the legal basis of Article 122(1) of the Treaty concerning emergency measures *"appropriate to the economic situation, in particular if serious difficulties arise in the supply of certain products, notably in the field of energy,"* Regulation 2022/2577 of December 22, 2022 marks the first official recognition of the importance of simplifying environmental authorization procedures to *"respond to the short-term energy emergency"* in the context of the first winter following the invasion of Ukraine. Although its scope does not cover the entire energy system, it does include facilities producing energy from renewable sources, such as heat pumps, co-located energy storage facilities, and the infrastructure required to connect them to the grid, thus adopting a "systemic" approach integrating production, storage, and the grid.

The emergency regulation introduces several important simplifications. Among other things, it establishes for the first time a uniform, all-encompassing definition of the permitting procedure, imposes maximum durations for procedures in the Member States, and provides for the *repowering* of existing renewable power plants to receive permits in less than three months if the increase in capacity does not exceed 15 percent of the initial capacity (see Appendix 2 for details of the areas of simplification introduced by this text).

This text, adopted as an emergency measure, initially had a limited duration of eighteen months. However, a reassessment at the end of 2023 in light of continuing energy supply difficulties in the Union led to its extension until 2025. Against a backdrop of uncertainty as to the possibility of extending these measures beyond that date, and in the absence of a political consensus within the European Parliament to continue legislating through Article 122 of the Treaty, which limits its legislative role, part of the main provisions were incorporated at the end of 2023 into the Renewables Directive 2018/2001, amended by Directive 2023/2413.

The provisions of this regulation could form the basis of a framework for simplifying environmental procedures for energy generation, transmission, and distribution projects as part of a European Energy Security Act (EESA). This framework would go beyond the measures consolidated in the Renewables Directive 2018/2001, amended by Directive 2023/2413. As a perennial framework, it should address administrative simplification for all projects linked to the Union's energy future, including not only renewable projects but also all forms of low-carbon energy production, as well as low-carbon energy storage and transport/distribution projects on all vectors (electricity, gas, and low-carbon liquids), based on a logic of technological neutrality.

These provisions should be based on a clear recognition, enshrined in a recital and in the first article, that the simplifications granted to energy projects stem from the imperative to transform the European energy system to meet climate change risks in line with Europe's international commitments. This approach balances the existential risk to the environment in the event of the failure of the Union's energy and climate policy against local issues of nature protection at project sites.

Such clarification would reinforce the political legitimacy of these simplifications by showing that this is not a step backward in environmental protection but a necessary acceleration of the climate transition. It would also provide legal certainty for the acts adopted to implement them.

a. For a European Regulation on Energy Security

Proposal 1

Introduce a **European Energy Security Act (EESA)**. In order to simplify and accelerate the permitting process for low-carbon energy projects, this would establish a single integrated procedure with clear maximum deadlines (six months for simple projects, one year for others) and provide for automatic recognition of low-carbon energy zones to facilitate the siting of projects without needing to go through different procedures in the various Member States.

For networks and interconnections, energy production, import/export terminals, and storage projects, a technology-neutral list of **Projects of Common Interest (PCIs)** would be drawn up, for which the EESA would provide accelerated direct authorization at the European level and extensive recourse to dedicated financing, extending what is already in place for networks.

In a nutshell, these provisions could include the following elements:

- **A clear definition of permitting procedures**, based on Regulation 2022/2577, could include *"all relevant administrative permits issued for the construction, refitting, and operation of such installations, integrating all administrative steps from the acknowledgment of receipt of the complete application by the competent authority to the notification of the final decision by that authority."* **This definition would be supplemented by a description of procedures prior**

to the granting of permits to take account of the specific nature of certain Member States, such as France, which have put in place a framework for prior public participation that is applicable even before a permit application is submitted, potentially lasting up to a year in the case of a full public debate. This second definition could cover *"all prior administrative procedures involving the public authorities, in particular for public participation or debate, the conclusion of which conditions the launch of any administrative stage in the permit procedure, from the first application by the petitioner to the notification of the conclusion of these procedures by the competent authority."*

- **The introduction of a maximum duration for the permitting process** could be set, for example, at six months for projects with the least impact (photovoltaics, stationary electricity storage, substantial modifications for the *repowering* of existing low-carbon non-fossil plants not exceeding 100 percent of the installed capacity, projects for the decarbonization of heat in buildings) and at one year for all other low-carbon energy production, storage, or transport/distribution projects. In addition, a maximum duration of three months could be set for procedures prior to the granting of permits. For these time constraints to be effectively applied by Member States, the following additional measures would be required:
  1. **Silence means agreement:** As in the emergency regulation, a system of silence meaning agreement within one month could be applied to projects with the least impact, subject to the six-month time limit.
  2. **Single integrated procedure:** Member States would be required to offer all low-carbon energy production, storage, or transport/distribution projects a single integrated procedure, including a unified application file to be submitted to a one-stop shop, a single point of contact within public administrations, a single procedure for public participation or debate lasting no more than three months, and the issuance of a single administrative act. This

would ensure the widespread adoption of a single authorization in domains and Member States where it is not yet in place, thus ensuring the relative harmonization of permits across Europe.

3. **Annual reporting:** Member States should publish annual statistics on authorization times for each category of project covered by the text, including overall procedure durations, timelines for preliminary procedures, and timeframes for each stage (administrative admissibility, public participation, and the competent authority's opinion on environmental impacts in accordance with Directive 2011/92/EU). The Commission could then present an annual summary of the comparative performance of Member States and issue public recommendations based on European best practices.
4. **Right of appeal to the European level:** In a more innovative way, project developers could be granted the right to request, on expiration of the maximum deadline, the direct issue of the permit by a European-level authority within a maximum period of six months. An *ad hoc* authority could be created within the European Environment Agency to manage these authorizations, which would be enforceable only before the European courts (the General Court and the Court of Justice) and would prevail over national decisions. This approach, which would recast the relationship between national and European competences in the field of environmental authorization, could be justified by the profoundly European and integrated nature of energy systems and climate action. It would be preferable to a "silence means agreement" system for large-scale projects, which could encourage national authorities to reject projects by default rather than granting implicit authorization.

- **An automatic exemption from systematic or case-by-case environmental assessment** for certain categories of project. This would include, in particular, electricity connection projects, photovoltaic projects (whatever they may be, it is understood that if they lead

to land clearing, it is under this category that an environmental assessment would take place), and even biomethane production, electrolysis, or stationary electricity storage projects below a certain footprint.[5]

- **Sustainable implementation of low-carbon energy zones** (previously known as renewable energy zones, but this recommendation applies the principle of technological neutrality advocated in the first note in the series).[6] This would be based on the following elements:
  1. **Automatic qualification:** Any perimeter already hosting renewable or low-carbon production projects would automatically qualify as a renewable or low-carbon energy zone. This would make it possible to immediately integrate large areas into this status, facilitating repowering as well as the implementation of new solar or co-located storage projects on already-equipped sites, such as wind farms, and thus improving grid integration. A "tolerance band" of 100 to 200 meters around existing projects could be considered to allow marginal expansion of these zones without difficulty. In addition, the nodes of electricity and gas transmission networks (substations and compression facilities) could be included as renewable or low-carbon energy zones, facilitating connections at the most opportune points.
  2. **Recognition of impact assessments:** These existing zones would be deemed to have undergone an impact assessment as part of the program plans, since their environmental issues would already have been analyzed[7] during the authorization of the existing projects.

[5] *In the French case, this would make it possible to force the annex to R.122-2 to be de-transposed, bypassing the alleged issue of compatibility with the principle of non-regression enshrined in French law alone in article L. 110-1 C. Env. 9.*

[6] *Maxence Cordiez, Pierre Jérémie, and Lola Carbonell, "L'Europe de l'énergie à l'heure du pragmatisme – Quel nouveau cadre pour atteindre la neutralité carbone?" [Europe's energy in the age of pragmatism – what new framework to achieve carbon neutrality?], Institut Montaigne, November 2024, https://www.institutmontaigne.org/publications/leurope-de-lenergie-lheure-du-pragmatisme, accessed February 14, 2025.*

[7] *Under the projects directive 2011/92/EU.*

3. **Reporting and a European geoportal:** Member States would be required to report the areas thus qualified on a common European geoportal, with quantitative data indicating the total deposits available. This would facilitate prospecting for project developers and make it possible to monitor Member States' contributions to opening up space for energy production. In the case of France, this work could capitalize on the high-quality work carried out by the services of the Ministry of Industry and Energy with a view to deploying a dedicated geoportal map.
4. **Exemption from environmental assessment:** A systematic or case-by-case exemption from environmental assessment would be granted for low-carbon energy production or transmission/distribution projects carried out in these zones, provided that an environmental assessment had been carried out when the zone was identified, in accordance with Directive 2001/42/EC. A six-month time limit would apply in these zones to obtain permits.[8]

- **Developers of generation projects could apply to the Commission to have their projects included on a list of Projects of Common Interest, following the example of the regime applicable to network infrastructure**.[9] This would be done according to objective, transparent, nondiscriminatory, and technologically neutral criteria, based strictly on the size of the projects and their contribution to reducing emissions in a Member State or to maintaining a low-carbon system that guarantees security of supply. This would recognize that the success of these projects is of major European interest for the energy transition.

[8] *It is understood that the case of nuclear facilities will continue to be covered by the Euratom framework and the decree authorizing their creation, leaving full latitude for review and public participation, considering the risks inherent in this type of activity.*
[9] *Within the framework of Projects of Common Interest (PCIs) defined by regulation 2022/869 on trans-European energy infrastructure (TEN-E regulation).*

- **Projects on this list would benefit from the right to have their authorization procedures reviewed within one year**, with a maximum of three months' due diligence in the general case, as well as the right to apply for authorization at the European level from the outset.

These projects would also be eligible for European funding based on the existing structure for financing networks of common interest under the Connecting Europe Facility. The specific financing options that could be granted to these projects to secure their completion will be developed below, given their importance to the energy transition on a Union-wide scale, above and beyond national issues.

b. Reducing the Over-Transposition of European Directives at the National Level

Proposal 2

Coordinate – at the level of a technical group of the Council of the EU with the help of a dedicated Commission (inter-DG) task force – an approach to simplify and harmonize the transposition of European directives into national law, particularly those impacting project authorization procedures. This would involve empowering European authorities to oversee gold plating and ensure as uniform an implementation as possible. This measure would aim to limit the over transposition of European law, which makes procedures more cumbersome and creates imbalances between Member States – often wrongly perceived as being attributable to the EU when in fact they stem primarily from the choices of the Member States themselves.

It would be possible to go further than the first measures of an energy security regulation mentioned above. In the vast majority of cases, administrative complexity is the result of over-transposition by Member States and the gradual addition of regulatory and administrative layers, without ever rebuilding an integrated authorization framework based on European law.

France is a good illustration of this phenomenon: despite the simplification efforts made by the 2015 Macron law for growth, activity, and equal economic opportunity[10] and the ordinance on single environmental authorization,[11] successive texts such as the PACTE law on business growth and transformation,[12] the Green Industry law, and the ASAP act to accelerate and simplify public action[13] have mainly enabled incremental adjustments, sometimes by over-transposing,[14] without ever rebuilding the environmental and town planning authorization, public participation, and environmental assessment regimes on the basis of European texts. **Such an overhaul would have enabled us to meet the requirements of our European commitments and our constitutional framework in a more pragmatic and readable way for project developers**.[15]

A critical retrospective examination of French transposition choices for the main texts (environmental assessment, species protection, etc.) compared with those of other Member States and the actual requirements of EU law would reveal, beyond the need for further integration and unification of procedures, that the main obstacles and differences between French practices and those of other Member States stem from

[10] *Loi n° 2015-990 du 6 août 2015 pour la croissance, l'activité et l'égalité des chances économiques.*
[11] *Ordonnance n. 2017-80 du 26 janvier 2017 relative à l'autorisation environnementale.*
[12] *Loi portant plan d'action pour la croissance et la transformation des entreprises.*
[13] *Loi d'accélération et de simplification de l'action publique.*
[14] *For example, the environmental authority's opinion should be issued at the same time as the public inquiry.*
[15] *If, as Lawrence Lessig has written, the paradigms for writing effective computer code apply just as much to the production of effective law, this may imply, rather than proceeding by successive patches, sometimes rewriting the entire existing code base in a functional approach.*

regulatory divergences. These divergences particularly concern the thresholds and criteria for subjecting projects to the different administrative regimes applicable to them, as illustrated by the variations in environmental assessment thresholds and criteria.

The European proposals set out in this section are intended to provide the impetus for an overhaul of procedures in the various Member States, focusing on projects to transform the Union's energy system. There is nothing to prevent this movement from being extended to all economic projects or to an exhaustive analysis of the over-transposition of environmental and town planning laws being conducted in order to reconstruct these regimes from their European foundations, rather than through corrective additions.

It is important to emphasize that even if administrative complexity is mainly the result of gold plating choices and the accumulation of legislative and regulatory layers at the national level, the EU is often wrongly perceived as being responsible for the creation of standards that are disconnected from reality. To counter this perception, the Union could position itself as a coordinator of simplification initiatives, harmonizing and simplifying national transpositions to make them more effective. The Union could encourage the comparison of best practices between Member States and the promotion of uniform and straightforward frameworks, a role that seems particularly relevant in the energy field, in line with the logic of an *ever-closer Union*. The precedent set by Regulation 2022/2577 and the importance of deploying a carbon-neutral energy system reinforce the profoundly European nature of this issue.

1.2. STABILIZE, HARMONIZE, AND STANDARDIZE SUPPORT SCHEMES FOR THE TRANSFORMATION OF ENERGY SYSTEMS

The second challenge for projects to transform energy systems concerns access to public support and financing. A stable and uniform framework across the Union, enabling easy comparison of support schemes, is essential to facilitate the massive investment needed to make the transition to carbon neutrality.

The economic model of energy networks and its evolution during the energy transition (low-carbon electricity, hydrogen and gas, low-carbon liquids) presents specific challenges linked to the intertemporal variation in delivery volumes throughout the transition process and to the regulatory framework for these infrastructures arising from sectoral law. These aspects will be dealt with in the last section of this note, allowing us to focus **on investment decisions in energy transformation projects within the Union**.

In theory, the scope of state aid is distinct and independent from that of sectoral law. The field of state aid falls under the exclusive and autonomous competence of the European Union, with the Commission setting its own criteria for assessing the compatibility of aid schemes with the Treaty through guidelines that it determines on its own authority.

In practice, sectoral law tends to codify into positive provisions elements derived from the Commission's decision-making practice, sometimes reinforced by case law. This, in turn, enables the Commission to use them as an immediate criterion for analyzing aid schemes, using the principle that aid that is incompatible with sectoral law could not be compatible with the Treaty. We shall see that provisions along these lines have already been incorporated for renewable energies in the Renewable Energies Directive 2018/2001/EU and, very recently, in a more general framework in the Electricity Market Design Regulation 2024/1747.

The support system for energy transformation facilities within the European Union is based mainly on two types of aid: investment aid, which is linked to the investment and whose disbursement is independent of the facility's operating characteristics, and operating aid, which is linked to production and market conditions.[16] Member States use various mechanisms, such as feed-in tariffs and remuneration supplements, to integrate production capacity into the market while taking into account public and environmental concerns. These mechanisms require prior approval from the European Commission to ensure their conformity with the internal market (see Appendix 3).

Member States have implemented a wide variety of national support mechanisms, which they have gradually adapted to better integrate generation capacity into the market and include various public policy issues in calls for tender. These schemes have contributed to the successful deployment of renewable energies and, in some countries such as France, to the launch of load shedding and storage capacities.[17] In the European context, where there is a concern for respecting the principle of technological neutrality, the scaling-up required to achieve carbon neutrality will confront energy production projects with a triple challenge in terms of access to public support, calling for specific measures in an EESA.

a. First Challenge: Stability of National Frameworks

The first challenge is to provide project developers with a clearer picture of the tendering schemes available by requiring Member States to

[16] *As a matter of fact, European aid schemes consistently operate on the principle of strict proportionality and necessity of the aid, unlike the approach of American schemes (IRA tax credits, for example), which are not bound by a general principle of controlling overpayments.*
[17] *If we take into account the long-term call for tenders for the capacity mechanism.*

include an exhaustive list of support measures and other public incentive mechanisms in their NECPs (National Energy and Climate Plans). A second challenge lies in stabilizing support schemes, which must not be open to question by Member States once the final investment decision has been made (see Appendix 4).

This echoes three proposals in our first note on reforming European energy and climate governance:

- **Proposal 9**, providing for the comprehensive presentation of notified aid schemes and of all types of incentive schemes in the NECPs.
- **Proposal 10**, introducing an irreversibility clause for an incentive framework once the final investment decision has been made.
- **Proposal 11**, transforming the NECP submission process into a continuous cycle of future energy planning, NECP preparation, and the implementation of a socioeconomic transition plan.

b. Second Challenge: Harmonizing Support Systems

The operating principles of the various support schemes still vary significantly from one Member State to another, a legitimate consequence not only of the exclusive competence of Member States to develop the various technological sectors in their energy mix and of their budgetary autonomy but also of the sedimentation of historical choices in the organization of support schemes (see Appendix 5).

Faced with this situation, the European Commission has endeavored to ensure greater coordination and standardization of national support schemes, on the one hand through its own competencies in terms of state aid, and on the other through sectoral legislation: in the Renewable Energies Directive (2018/2001) and in the Electricity Market Design Regulation (2024/1747). However, this harmonization effort still

needs to be pursued, particularly in the face of flexibility issues, which remain largely unexplored.

1.3. FIRST HARMONIZATION: PUBLIC SUPPORT, PERIODS OF NEGATIVE ELECTRICITY PRICES, AND MARKET PARTICIPATION

The provision in the Renewable Energy Directive (2018/2001/EU) to the effect that *"renewable electricity producers shall respond to market price signals and maximize the revenue they derive from the market"* tends to be interpreted as restricting the granting of support in the form of premiums additional to the market price during periods of negative market prices, although it does not formally prohibit it. Moreover, this restriction has gradually been incorporated into numerous support schemes approved by the Commission and has emerged in its decision-making practice in recent years in Member States with particularly marked negative price episodes (see, for example, the SA.102084 scheme for renewable energies in Germany).

It is not in itself dysfunctional for the electricity market to have negative prices; in an energy mix with a substantial proportion of zero-marginal-cost installations, such as photovoltaic or wind power plants, these are the natural result of pricing at marginal cost and the nonzero price elasticity of consumption over the hours when renewable production exceeds total consumption. In such a system, the significant price variability between these hours of very low or negative prices and the hours of high demand and low renewable production leading to very high prices creates an economic model for storage and load shedding and helps to remunerate the most flexible consumers.

On the other hand, it is incoherent to grant public support for production taking place during these hours; this amounts to subsidizing production that has no outlets and destroys value on the scale of the whole

system (as reflected in the negative nature of the price expressed). Prohibiting the payment of additional remuneration or feed-in tariffs, and in any case direct price support schemes in the event of negative market prices, has the advantage of avoiding incentives for renewable producers to continue producing during hours of low demand beyond the satisfaction of consumer needs. This situation leads to value-destroying negative price episodes for conventional producers whose operation is necessary for supply security. It is also a source of difficulty for the smooth operation of the grid, as conventional generation units have limits in terms of the amplitude and gradient of the power ramps they can absorb.

In light of experience gained over the last few years, it now seems useful and necessary to include in the EESA **a prohibition on all direct price support payments during periods of negative market prices**.

However, such a ban could slow down the development of low-carbon energies by introducing difficult-to-quantify economic risk for project developers. This risk stems from the growing number of hours with zero or even negative prices, which affect projects' economic equation. In the absence of remuneration for negative price hours, this risk should naturally be reflected in auction prices, driving them up. However, risk-price fungibility is not perfect, and it is to be feared that this increase in risk will in fact dissuade certain project developers and raise their cost of access to capital, thereby increasing the cost of developing the low-carbon energies concerned.

One solution to this problem could be to apply additional remuneration, not to production but to production potential. A low-carbon capacity operator with such a contract would see their economic equilibrium guaranteed, with visibility on their revenues, while still being exposed to market prices. In particular, their exposure to negative prices would encourage them not to produce during these periods without being negatively impacted by this lack of production (conversely, producing

during these periods would entail a loss of revenue). It should be noted that during periods of negative prices, the market price used to calculate the remuneration supplement could not be negative (floor at €0/MWh), so as to limit the cost to the public counterparty.

During times of high prices (i.e., above the strike price), the producer would, in parallel, be more incentivized to maximize their production than would be the case with a conventional contract for difference (CfD) contract, as their subsequent payment to the state would not depend on their actual production but on their potential production.

While such a mechanism would help stabilize the power system by responding to the problem of overproduction at certain times, it does have shortcomings that should not be underestimated: it transfers market risk to the community, resulting in an increasing cost per MWh actually produced for the states,[18] and it encourages the continued deployment – through state aid – of generating capacity whose contribution to the power system will diminish as peak load periods increase.

This ultimately raises the question of the effectiveness of public investment in decarbonization, as well as the added value of increasing the flexibility of the power system to optimize the use of low-carbon electricity when it is available.

[18] *This rising cost would be due not to an increase in the strike price of remuneration supplement contracts (which could even decrease as the project risk is reduced) but to the reduction in effective production of the capacities concerned at times when the price is negative.*

Proposal 3

Include in the **European Energy Security Act** a prohibition on any direct price support system for sales during periods of negative market prices, unless the system includes a clause encouraging or obliging the producer to reduce or even cease production during these periods.

This general provision would apply, throughout the EU, to contracts covered by Article 19 *quinquies* on contracts for difference for new plants (i.e., all contracts concluded after July 17, 2027, for large plants), and then, possibly with a second application date to take account of plant commissioning lead times, to all contracts, including purchase obligation contracts for new plants. As mentioned above, however, the legal stability of existing contracts must be preserved, which is why we are not seeking retroactive amendments to these contracts.[19]

As a second step, **we could consider a general ban on feed-in tariffs, including those for small plants (possibly leaving them open for demonstration purposes)**, to ensure that all production capacity is fully involved in the market and is thus exposed to the price signals it generates. Of course, it is hard to imagine small facilities participating directly in calls for tender, given the administrative burden this can represent, as well as the cost of accessing these procedures, particularly in terms of guarantees.

We could, however, consider this participation being intermediated by aggregators who develop small-scale projects on a diffuse basis, particularly photovoltaic projects, and who present

[19] *In any case, the current decade will see the end of the largest share of photovoltaic contracts from the 2006–2015 period.*

aggregates of projects of sufficient size to be economically viable in a dedicated call for tenders or a dedicated lot of photovoltaic calls for tenders. Such a dedicated lot could usefully include criteria favoring applicants with co-located storage facilities to further improve the integration of these installations into the grid balance and their participation in system services. The removal of the exemption for small installations and the ability to organize such tenders for aggregate participation and include criteria favoring co-located storage could thus be incorporated into the provisions of Regulation 2019/943/EU as amended by the Electricity Market Design Regulation and into Directive 2018/2001/EU on renewable energies.

Proposal 4

In the **European Energy Security Act**, prohibit feed-in tariff schemes, including for small-scale facilities, as these do not take grid balancing issues into account. For small-scale facilities, participation in calls for tenders could be intermediated by national aggregators so as not to increase the administrative burden on project developers.

1.4. SECOND HARMONIZATION: MOVE TOWARD A CLEAR FRAMEWORK FOR SUPPORTING NEW FACILITIES THAT CONTRIBUTE TO SECURITY OF SUPPLY

In our first note on the revision of the governance framework, we proposed that the assessment of flexibility needs and the determination of indicative national targets for non-fossil-fuel flexibility – which are currently provided for in an autonomous framework[20] – along with

[20] *Articles 19e and septies of Regulation 2019/943, as amended by Regulation 2024/1747 Electricity Market Design.*

the support schemes contributing to these targets, be included in the general framework of the NECPs. To a greater extent than has been the case to date, the latter will have to fully integrate the issue of security of energy supply in general, and electricity supply in particular. As far as electricity is concerned, supply security depends, in particular, on the appropriate sizing of flexible installation fleets on a national scale. This information should therefore be included in NECPs.

As mentioned above, while Regulation 2019/943, since amended by Regulation 2024/1747 Electricity Market Design, contains some general design principles for supporting this type of facility, the main guidelines are to be found mainly in the Commission's decision-making practice and in the schemes implemented by several Member States. France, in particular, has pioneering experience in supporting load shedding and storage.

Developing support for facilities whose main role is to bring flexibility to the system calls for special design rules: indeed, the logic commonly employed for support schemes for intermittent renewable facilities (wind, photovoltaic, etc.), which consists in securing the electricity sale price in a way that is relatively independent of the supply–demand balance, makes no sense when it comes to facilities whose main value to the system lies in their ability to choose their production profile and to be available at times of greatest system stress.

Conversely, claiming to support renewable installations with subsidies based solely on installed capacity – irrespective of the production profile – leaving the sale of electricity entirely exposed to the market, as suggested in recent publications by the German authorities,[21] would weaken the incentive to reduce production at times when prices are negative compared with a CfD scheme that either excludes support at

[21] *Bundesministerium für Wirtschaft und Klimaschutz (Germany), "Optionen für das zukünftige Strommarktdesign" [Options for the Future Electricity Market Design], August 2, 2024, https://www.bmwk.de/Redaktion/DE/Meldung/2024/20240802-strommarktdesign.html, accessed February 14, 2025.*

such times or is linked to actual production. This approach would also increase the overall cost of the transition by placing more risk on the projects (both price risk and full-volume risk). By eliminating the link between the full costs of supported installations and the costs to the consumer that derive from the Electricity Market Design framework, this approach also risks absolving Member States of responsibility for the competitiveness of their energy mix choices. Additionally, it could lead to intra-European market distortions, as some Member States might use such public support schemes to overdevelop non-dispatchable renewable assets, thereby driving energy prices in their zones toward negative or zero values during most hours. This would primarily benefit industrial consumers, who can limit their consumption outside these hours, while leaving neighboring Member States to bear ultimate responsibility for system balance through their dispatchable installations throughout the year.

This observation has led several Member States to set up specific schemes for the deployment of installations that contribute to the flexibility of the power system:

- France, via the long-term call for tenders for the capacity mechanism and via the call for tenders for load shedding, which has been regularly expanded since its creation in 2019.
- Poland, through one of the compartments of its capacity mechanism.
- Germany, as part of its *Kraftwerkstrategie*, has announced its intention to provide capacity support for the deployment of dispatchable thermal power plants that are expected to use decarbonized fuels in the long run.

Whatever one thinks of the sincerity of the announcements concerning the deployment of fossil-fuel-powered, dispatchable thermal installations, which are supposed to be converted to non-fossil fuels in the more or less distant future, the fact remains that these

different regimes have common features, which suggests that it may be possible to go beyond the harmonization enshrined in Electricity Market Design (Article 19 *nonies* of 2019/943/EU). Thus, it would be possible to harmonize support frameworks for new installations that contribute to power system flexibility within the EESA framework.

Proposal 5

In the **European Energy Security Act**, harmonize support frameworks for new installations contributing to supply security, following the harmonization of support for low-carbon energy included in the Electricity Market Design Regulation. This harmonization should include the following elements:

- A uniform definition of a plant's available capacity, understood as its market presence and actual capacity to produce or reduce consumption during certain hours, designated *ex ante* by the transmission system operators, along the lines of the capacity definition in the French or Polish mechanisms.
- Ensuring that support for flexibility can only be granted on the basis of a fixed or variable premium proportional to this availability, the amount of which is defined as part of a transparent, nondiscriminatory, and competitive procedure based on objective criteria.
- Ensuring that support for flexibility services may only be granted to low-carbon installations, i.e., those meeting a maximum carbon intensity threshold (gCO2/kWh) over their life cycle, with the possibility of separate allotments for diffuse load shedding, other forms of load shedding, stationary storage, and flexible generation, if it can be demonstrated that this allotment does not affect the competitive nature of the procedure for each of the lots.

We will see in the third policy paper dedicated to market issues that this uniform definition of the concept of "available capacity" is also necessary if we wish to complete the integration of European markets in an appropriate and efficient manner, by ensuring adequate financing of facilities in a suitable stock that the energy market alone cannot provide.

This is based on the establishment of coupled national capacity markets, the design of which presupposes a harmonized definition of the notion of capacity. Where appropriate, these markets can then be used to support the harmonization of support schemes for devices and installations that can contribute to power system flexibility.

The harmonization of capacity markets could go as far as replicating the framework established by the Electricity Market Design Regulation by generalizing the use of two-way contracts for difference based not on the price of energy but on the price of production or demand response capacity. In this way, consumers would benefit from a capacity price that would also be stabilized by the effect of support mechanisms.

Proposal 6

In the **European Energy Security Act**, harmonize support for load shedding and storage in the EU by making bidirectional remuneration supplements based on the generation capacity available on demand or making load shedding more widespread.

1.5. THIRD HARMONIZATION: ALIGNING OTHER ENERGY VECTORS – RENEWABLE AND LOW-CARBON GASES AND LIQUIDS TO CREATE A LIQUID EUROPEAN MARKET FOR INCORPORATION CERTIFICATES

Although efforts to harmonize public support for production in the EU are already well-advanced for electricity, nothing comparable yet exists for renewable and low-carbon gases or renewable and low-carbon liquids. This is all the more problematic given that these vectors will play a crucial role in the success of the transition, particularly for sectors that are difficult to decarbonize (heavy mobility, industry, etc.) and marginally for the maintenance of flexible low-carbon electricity production.

For nonelectric low-carbon energy carriers, there is a greater variety of support schemes, but a two-tiered trend is emerging from recent developments. Some Member States maintain support in the form of feed-in tariffs or additional remuneration for biomethane, particularly for smaller installations that contribute to the rural economy. At the same time, in each Member State, systems of compulsory certificates of incorporation are being structured through a mechanism that is already well harmonized at the European level (see Appendix 6 on how certificates of incorporation work).

Proposal 7

Within the framework of the **European Energy Security Act**, include a provision to harmonize support frameworks for nonelectric low-carbon energy carriers (gaseous and liquid). This should clarify that such support is generally based on the exchange of certificates of incorporation, reserve direct price support measures for small installations, and provide for the free circulation and mutual recognition of certificates of incorporation throughout the European market.

These certificates should adhere to design criteria such as being awarded through competitive, transparent, nondiscriminatory procedures based on objective criteria and include incentives for supported facilities to participate effectively in the markets, echoing the general design criteria already established for electricity.

It is legitimate, and in line with the principle of Member States' competence to define their energy mixes and supply structure, that they should have the freedom to define the structure of the incorporation mandate, i.e., the number and type of certificates required from the marketers of a given energy product, as well as the procedures for accounting for certificates (multiplying coefficients, ceilings, etc.).

However, a number of aspects could be harmonized, including:

- **The general rules for accepting certificates** (in particular, clarifying whether certificates generated by incorporation in a non-EU Member State are mutually recognized for incorporation mandates from another Member State, and providing rules to prevent double-counting for Third Renewable Directive targets where appropriate).[22]

- **Rules for defining the scope of the incorporation obligation** (in order to limit distortions of competition linked to the exemption of certain energy products from the incorporation obligation to only the most sensitive sectors exposed to carbon leakage, such as agriculture or fishing).
- **Penalty amounts for noncompliance with the obligation** (which in practice implies a ceiling price for incorporation certificates).

While these points may seem arcane or trivial at first glance, in practice, the financial flows involved in these mechanisms are already on the order of several billion euros a year in the main Member States. Furthermore, they will increase as mandates become more pronounced over the coming decade. This will make any distortions increasingly problematic. For example, biofuel flows were subject to distortions during the energy crisis linked to differences in penalty amounts under various schemes in Western Europe.

Conversely, harmonizing these regimes will eventually enable the emergence of a single market for different classes of certificates of incorporation on a European scale (by type of low-carbon energy product that can be incorporated into each of the liquid or gaseous energy carriers, and subject to compliance with sustainability criteria). This will be an essential means of facilitating the long-term financing of production assets for these products, which are essential for sectors that are difficult to decarbonize through electrification.

[22] *From a strictly legal point of view, the Alands Vindkrafts ruling tends to suggest that it is possible to restrict eligibility to certificates generated on the soil of the same country. However, this does not go in the direction of integrating the common market for goods whose free movement throughout the Union is well established, and moreover, could be analyzed differently in a reading derived from the Services Directive 2006/123/EC. Insofar as there is a legal debate and the issue is clearly politically sensitive, it seems legitimate for this debate to be settled at a political level, on the understanding that economic logic would lead us to accept a book and claim of certified incorporations in non-EU member states.*

Unlike explicit electricity support schemes, most of these "certificate" instruments are extra-budgetary. To date, they have not been considered state aid under EU law (as they do not involve public resources). Consequently, the harmonization of these schemes cannot stem from the gradual development of the Commission's decision-making practice under its state aid remit. This makes harmonization all the more crucial.

In the third paper, we will see that this exercise in the European integration of national markets for certificates of incorporation of renewable energy, for vectors other than electricity, is consistent with the correction of certain fundamental flaws in the market for guarantees of origin for electricity in order to transform it into a genuine tool for traceability and support for the emergence of a stable low-carbon electricity system.

a. Third Challenge: Standardizing Support Systems and Integrating Them across Europe

A final point concerns the supervision of support schemes that fall into the category of state aid, as defined in Articles 107 and 108 of the Treaty on the Functioning of the European Union. These are subject to an often lengthy and delicate procedure of prior notification and prior approval by the Commission – a procedure that conditions their implementation by Member States.

Only aid schemes meeting the criteria of the General Block Exemption Regulation (GBER) n° 651/2014 are exempt from this requirement. For energy production facilities, the latter only allows operating aid for the promotion of electricity produced from renewable sources to be exempted up to a limit of €30 million per company and per project and €300 million per year over all the schemes concerned in a given Member State, and €30 million per company and per investment

project for investment aid (art. 3). In addition to these thresholds, the aids concerned must be considered transparent (art. 5) and provide an incentive (art. 6) and are subject to an obligation to publish information (art. 9) as well as specific design rules (arts. 36 and 41 for investment aid, and arts. 42 and 43 for operating aid). These specific rules closely mirror the design criteria set out in the Renewables Directive 2018/2001/EU and the Electricity Market Design Regulation, which we mentioned earlier (granting based on a competitive procedure, participation in markets, and selection criteria with at least 70 percent based on a price criterion). **Finally, in a discriminatory manner, this regulation excludes state aid measures for nuclear power generation from any exemption for environmental protection aid (art. 1(6))**.

Proposal 8

Undertake a comprehensive review of the architecture of the General Block Exemption Regulation (GBER), with a view to achieving technological neutrality during the current mandate. This revision would make it possible to eliminate redundancies with other European sectoral legislation, automate exemption notifications for national aid schemes that mirror those implemented by the Commission (in line with Proposal 7 of the first note) without any amount threshold, and re-evaluate upward the amount thresholds enabling the beneficiary to benefit from the exemption regime in other cases.

Ten years after it was first published, the architecture of the GBER needs a thorough overhaul to take full advantage of the technology-neutral approach adopted in the Electricity Market Design Regulation for the design criteria of price-based support schemes. **In this context, it is legitimate to advocate for full equality of treatment in the regulation**

of all sustainable technologies within the meaning of the European taxonomy, particularly between nuclear power generation and all other forms of low-carbon energy, especially renewables.

In the same vein, we proposed in the first note in this series that in the event of a significant gap between the aggregate contributions of Member States and the common EU targets set out in the Renewables Directive, the Commission could directly launch calls for tender at its own level and from the common budget, extending the platform already set out in the current governance framework.

We have also seen that the design rules for low-carbon energy production support schemes have been largely harmonized in sectoral law and have proposed that a step further be taken in the direction of harmonizing national support schemes to improve the clarity of support frameworks for energy production projects within the Union. The specific design rules (arts. 36 and 41 for investment aid, and arts. 42 and 43 for operating aid) set out in the GBER are currently redundant with principles already codified in sectoral law.

In the spirit of simplifying and accelerating procedures, consideration could be given to **automating the exemption from notification for any national scheme that mirrors exactly the low-carbon bidding schemes implemented at the European level by the Commission** (if the Commission has deemed it non-distorting and has implemented it, it cannot be distorting when implemented by a Member State) **without any threshold amount**.

In addition, the amount thresholds in Chapter I, which reflect the sizing of renewable energy support schemes more than ten years ago, should be raised substantially (e.g., a single threshold of €1 billion per scheme per year for operating aid), taking into account feedback from the scaling-up of low-carbon energy production projects in Europe over the past decade.

1.6. FACILITATING ACCESS TO FINANCING FOR ENERGY PRODUCTION PROJECTS THAT CONTRIBUTE TO DECARBONIZING THE UNION

Today, almost thirty years after the first Electricity Package (1996) opened up the liberalization of energy systems, Europe has a mature framework for financing energy transition projects and, more generally, for sustainable finance. This framework has been fleshed out by several major standardization texts over the past mandate: European Corporate Sustainability Reporting Directive (CSRD) 2022/2464, Taxonomy Regulation 2020/852 and its delegated acts.

These now provide investors with a uniform framework for identifying and certifying the "sustainable" nature of financial products and for qualifying investment projects in physical assets. This framework, the fruit of lengthy debate, is in keeping with the logic of technological neutrality (if not its implementation), which is the guiding principle of this report, largely thanks to the efforts of the French authorities.

a. Technological Neutrality and Public Funding

Within the framework of sustainable finance built up over the last few decades by the European Union, energy transition investment projects can access financing under conditions governed by monetary policy choices. This is particularly true of energy conversion projects.

At a time when rising interest rates substantially increase the cost of risk-free financing, thereby restricting access conditions, **a legitimate debate arises regarding the suitability of the common monetary policy to the climate challenge**.

On the one hand, it seems increasingly necessary for the European Central Bank's policy of quantitative easing and direct intervention in the markets to take into account the "sustainable" nature of assets. On the other hand, the effects of climate policies need to be better taken into account in the interest rate policy itself. This subject is beyond the scope of this report.

As far as public-sector financiers are concerned, the EIB currently plays an important role in certain areas. In line with its historical mission of deploying infrastructure to facilitate the integration of the European single market (Article 309 of the Treaty, Article 18 of Protocol No. 5 annexed to the Treaty) and its pioneering efforts in the development of sustainable finance, the EIB is active in the following areas:

- Addressing the persistent investment deficits that remain despite existing policies.
- Targeting infrastructure that will be needed in the long term, taking into account the important dimension of innovation and the rise of low-carbon technologies.
- Supporting new market-led investment in the energy sector, particularly for relatively new types of infrastructure (auctions, active demand-side participation, storage).

The EIB's action in support of decarbonization could be further stepped up in the run-up to the new European mandate, particularly with the next version of this lending policy.

Proposal 9

Align the EIB's actual lending policy with the lending policy guidelines it drew up in 2019 to fully open up the eligibility of projects related to nuclear energy. More generally, rebuild the EIB's lending policy framework around the concept of technological neutrality with the goal of decarbonization.

This shift would involve indiscriminate support for low-carbon energy conversion, with nuclear projects falling within this new framework and no longer within the framework devolved to other thermal power plant projects. The new framework could also consider IPCEIs in the energy sector to be aligned in principle with the EIB's lending policy so as to secure loans for these Projects of Common Interest.

The question of the eligibility of nuclear projects has been a constant battleground for certain Member States wishing to use this energy source – notably France – during the last mandate.

New nuclear generation projects are challenging for private financiers to undertake. This is due to the capital intensity involved, the associated execution risks, and, until Electricity Market Design, the uncertainties over the final format of any support frameworks. This is a difference of degree, not kind, from other large-scale decarbonized generation projects (offshore wind, etc.). The latter can also present execution risks and be highly capital-intensive, provided that the safety and risk management framework, as well as post-operation considerations, offer European financiers a priori security regarding these aspects specific to nuclear generation.

It should be recalled that there are currently no legal barriers to the EIB granting loans to nuclear energy projects. Paragraph 25 of the 2019 lending policy states that *"the Bank's policy on support for projects relating to nuclear power generation and the nuclear fuel life cycle remains fully applicable and unchanged from the previous version of the policy approved by the Board of Directors in 2013."* This text clearly affirms a principle of technological neutrality, recalling that *"the Bank shall adopt a technology-neutral approach in line with the EU's decarbonization objective and the objectives of ensuring security of energy supply and competitiveness, in an environmentally sustainable, cost-effective, efficient, safe, and socially acceptable manner, allowing for diversified technological solutions, taking into account the national energy mix, preferences, potential, and characteristics of each Member State"* (paragraph 138, paragraph 34).

The EIB's 2019 lending policy provides for the eligibility of nuclear projects in principle, referring to *"the same appraisal criteria as those normally applied to large-scale thermal power plants [...] [supplemented] with additional guidelines, relating to the appraisal of nuclear projects, so as to take account of certain specific aspects of nuclear activities"* (paragraph 142, section 35). The same guidelines also point out that, over the 2007–2012 period, the Bank granted around €1 billion to three projects involving uranium enrichment facilities, setting a clear precedent. However, in addition to technical and legal criteria, eligibility remains subject to *"a favorable opinion from the Commission, in accordance with Articles 41 to 43 of the Euratom Treaty."*

The EIB's *de facto* refusal to finance nuclear energy projects over the past ten years is thus primarily political in nature. Therefore, it is up to the political level to pursue efforts aimed at ensuring the technological neutrality of the EIB's lending policy.

The EIB's new technology-neutral lending policy framework should be built around the following points to serve the Union's climate objectives:

- **Treat all low-carbon electricity generation, whether renewable or nuclear, in the same way within a single chapter dedicated to decarbonized electricity generation** – which in recent years has become the only form of electricity generation supported by the EIB. Indeed, there is no longer any reason to treat nuclear facilities by reference to the framework for other thermal power plants, since these are no longer eligible for EIB loans. Issues specific to the nuclear sector (risk management, management of post-operational issues) would in any case be addressed by the requirement to obtain the necessary authorizations from the environmental and safety authorities – a condition that would apply in a similar way to all projects – and issues relating to environmental impact would be assessed as part of the environmental impact assessment, again within a unified framework under European law. The economic analysis of projects would take their direct and indirect costs explicitly into account, as well as their contribution to climate change mitigation and to the economic and industrial development of the Union (access to competitive low-carbon electricity, etc.).

- **Delete all references to Articles 41 and 43 of the Euratom Treaty**, since there would no longer be any need for special treatment of nuclear projects under the lending policy, and since nothing in the Euratom Treaty makes the granting of loans by the EIB conditional on an opinion from the Commission in these articles, nor does it require the Commission to give a positive or negative opinion on investment projects to the project promoter, as these articles are concerned with purely indicative reporting of investments in the civil nuclear field and a process of "discussion" with the Member States hosting these projects. **This will free lending decisions – which are the technical decisions of a bank and are normally without any political significance – from a political constraint that should never have intervened**. The EIB's pioneering role – compared with other multilateral financial institutions – in

supporting decarbonization will be affirmed, just as it was when the EIB was the first to pull out of fossil fuel investments.

- **Grant to Projects of Common Interest (IPCEI) a priori recognition by EIB services of a high degree of alignment with EIB lending policy in the energy sector, thus securing their potential eligibility for loans, as is already the case for network infrastructure**.[23] This proposal is in line with Proposal 1 of this note, which is to enable projects for decarbonized energy production facilities to apply to the European Commission for IPCEI qualification in a completely technology- and vector-neutral way.

b. Creating a European Energy Security Fund

Proposal 10

Modeled on the InvestEU fund, create a **European Energy Security Fund** within the framework of the **European Energy Security Act (EESA)**, consisting of a permanent EU guarantee line (unlike the recovery and temporary resilience scheme under NextGenerationEU), coupled with an EIB equity intervention pocket. Both would be dedicated to key investments in the energy system transition (decarbonization and supply security), particularly Projects of Common Interest (PCIs). In addition to its lending policy, the EIB plays a key role in implementing the InvestEU program, which extends and expands the European Fund for Strategic Investments (EFSi).[24]

[23] *EIB Lending Policy, 2019, Annex IV, 2.*
[24] *Resulting from Regulation 2015/1017/EU.*

The InvestEU Fund

The InvestEU fund supports private and public investment in four areas:

- Sustainable infrastructure (including energy infrastructure)
- Research, innovation, and digitization
- SMEs
- Social investment and skills.

This support is provided via a €26.2 billion EU budget guarantee line (including €9.9 billion for sustainable infrastructure). In practice, InvestEU is coordinated with the Recovery and Resilience Facility (RRF), which provides loans and grants to support reforms and investments undertaken by Member States as part of the post-COVID recovery. Member States have the option of investing part of their RRF funds through a "Member States" sub-fund within InvestEU for specific financial products offered by one or more InvestEU partners (including the EIB).

Given the massive need for investment in the EU's energy transition, it is worth asking whether the resources specifically earmarked for this in InvestEU are commensurate with the challenges of the coming decades.

Over and above the recovery and resilience framework, the creation of a permanent EU guarantee line and an EIB equity intervention pocket dedicated to key investments in the transition of the energy system could be one of the financial levers of an EESA. This financial tool should be coordinated with the Union's energy and climate policy.

The practical implementation of this European Energy Security Fund would rely on specific rules for granting the Union's guarantee, as

outlined in a dedicated article of the EESA. Contrary to the provisions of Article 9(2)(b) of the EFSI Regulation,[25] which deals separately with renewable energies, the rules of this fund would be based on a grid of strict technological neutrality and contributions to reducing the Union's emissions or maintaining decarbonized systems that contribute to collective security of supply.

Finally, it would be legitimate to make Projects of Common Interest approved under the EESA eligible for this guarantee.

c. Direct EU Support: Extend the European Interconnection Facility to Decarbonized Generation Facilities in the Form of a European Energy Security Facility

Proposal 11

Extend the European Interconnection Mechanism to low-carbon production facilities in the form of a European Energy Security Mechanism. This mechanism constitutes the subsidized part of the **European Energy Security Act (EESA)**. It would be based on the pan-European tendering scheme proposed in Recommendations 6 and 7 of the first note (reform and extension of the platform for renewables), supplemented by the possibility of granting direct investment aid to IPCEIs in the energy field.

In the field of energy networks, the financing offered by the EIB is currently coordinated with grants awarded under the Connecting Europe Facility (CEF). The CEF is an instrument for financing energy transmission

[25] *Regulation 2015/1017/UE.*

networks under the TEN-E and TEN-T regulations. Today, this mechanism is used exclusively to provide direct European subsidies, using funds from the 2021–2027 Multiannual Financial Framework (MFF), for transport and energy network infrastructure projects.

However, the CEF does not contribute to the deployment of Europe's low-carbon, non-fossil-fuel energy production tool, which is left exclusively to national support. In revisions of the TEN-E regulation, the EU seems to have gradually recognized that including only networks and no production activities was limiting. This has led to the inclusion in the latest revisions of financing possibilities for renewable energy projects. **The possibility of financing is then indexed to the condition that these projects are "cross-border." In this way, they contribute to a better interconnection of national systems, which remains a limited and "related" case to the development of European networks**.

The pan-European tendering scheme, which we suggested in Proposals 6 and 7 of our first note,[26] could form the first pillar of a European Energy Security Facility to be funded under the next MFF. This would be complemented by a **second pillar consisting of the possibility of granting direct investment aid in the form of subsidies for energy production projects qualifying as Projects of Common Interest in the process described above, along the same lines as under the current CEF**.

The creation of a European Energy Security Mechanism would constitute the subsidized part of the financial component of the EESA. It would provide a single line of pan-European funding for generation, transmission, distribution, and storage. This funding line would be designed to be technology-neutral as well as neutral with respect to energy vectors, making the Union's direct contribution to the deployment of strategic infrastructure for its energy security visible and quantifiable.

[26] *Cordiez, Jérémie, and Carbonell, "L'Europe de l'énergie à l'heure du pragmatism" [Europe's energy in the age of pragmatism].*

2 An Economic Model for Networks and Infrastructures: Stranded Assets and Assets under Development

2.1. INTRODUCTION: PRINCIPLES OF NETWORK FINANCING AND REGULATION

A successful energy transition requires unprecedented effort to transform Europe's energy networks. In this section, we present the major financial and operational challenges they will face in the coming years. We will see that the current framework for financing and pricing electricity and gas networks, as well as the hydrogen network for which a framework has recently been established in European law as part of the Gas Package, will not enable them to easily meet these challenges without adaptation or the implementation of complementary mechanisms.

Transmission and distribution network infrastructures play a key role in the success of the transition: **sizing them appropriately is a key condition for integrating new low-carbon, non-fossil-fuel generation capacity. Appropriately sizing them is also essential** in view of the way consumption is likely to evolve over the course of the transition in terms of both quantity and spatial and seasonal distribution. Ensuring adequate infrastructure interconnection is a prerequisite for the efficient operation of European energy markets and the security of supply. Deploying such infrastructure at the best possible cost to the community presupposes several conditions:

- Centralized planning of the infrastructure's target route and deployment schedule, which is naturally the responsibility of public authorities in conjunction with infrastructure managers.
- The establishment of a regulatory framework giving users maximum visibility on future network usage charges and security with regard to the infrastructure deployment schedule.

- The integration of economic performance incentives for the infrastructure manager (cost and time control) into this regulatory framework.
- Given the capital-intensive nature of these projects, access to capital should be as open as possible for the actual deployment of the infrastructure, minimizing recourse to public finance and enabling a competitive cost of capital to be achieved by taking advantage of the regulated nature of infrastructure revenues.

For each of these conditions, a point of balance must be found both in relation to the other conditions and in relation to the objectives of other public policies.

First, centralized planning of the target route must assume a degree of flexibility based on periodic reassessment of the appropriate sizing and correspondence between the mapping of needs and the route. This reassessment should be based on broad consultation with network stakeholders (users, financiers, and local stakeholders) and a transparent economic methodology.

Second, implementing a regulatory system that ensures coverage of infrastructure costs (based on a regulated asset base and coverage of operating costs incurred) means striking a balance in the distribution of costs between present and future consumers. It is also important to maintain incentives for performance in terms of both capital costs and the operator's operating costs.

Third, **the quest for access to capital that is as open and competitive as possible** and for regulation that provides security of return on capital invested in infrastructure **must be balanced with the preservation of elements of sovereignty** over the actual operation of the network and its day-to-day management, as well as with the maintenance of performance incentives for the network.

European choices for network infrastructure regulation are part of a compromise with other issues specific to the EU. These include the balance between the Union's competencies and those of the Member States. Another challenge is ensuring complete competitive neutrality of the infrastructure, both for future users and for the various parties likely to contribute to its deployment (in particular, operators of other types of regulated energy infrastructure – such as electricity and gas networks). This stems from the importance attached to competition aspects in the Treaty on the Functioning of the European Union (TFEU), as the Commission's own competency, and from the concern of certain Member States about the market power that certain integrated energy companies in other Member States may have.

The European framework is thus based on a strict parallel between electricity and gas transmission infrastructure, according to a logic of vertical unbundling enshrined in successive electricity and gas packages (1996, 2003, 2009, 2019–2024), which have organized the opening up to competition and the formation of an increasingly integrated European electricity and gas market based on a layered model. Strict rules on the independence and neutrality of the transmission and distribution segments were laid down, given their status as competitive bottlenecks, as follows:[27]

- A power generation or natural gas production and importation sector open to competition.
- Transmission and distribution infrastructures with a monopoly (legal or *de facto*) over their service areas (often national), compensated by a tariff set by an independent administrative authority to ensure strict coverage of costs incurred under reasonable assumptions of economic efficiency (remuneration of the regulated asset base and coverage of operating expenses), applied neutrally in a competitive manner and geographically averaged across all users (producers or consumers) within the service area.

[27] *We prefer this notion of bottleneck, documented in competition case law, to the rather French notion of natural monopoly.*

- A supply sector, in the sense of service delivery to end customers, also open to competition.

In the case of electricity and natural gas, this design choice is explained by the previous existence of vertically integrated national or regional monopolies. Unless they ensured such separation, vertically integrated players would have retained the ability to exclude upstream or downstream competitors through their network access arrangements. This would constitute a competitive bottleneck in access to essential infrastructure, given that its duplication is neither feasible for competitors (barrier to entry) nor desirable for the community (natural monopoly, and gains from centralized, coordinated network deployment to limit redundancies and optimize sizing). Establishing neutral and transparent rules for third-party access was therefore necessary to ensure the opening up to competition, which it was assumed would lead to efficiency gains in both the production and supply sectors.

For electricity and gas, the "reference" approach in the texts is thus that of ownership unbundling (OU), in which the network operator is independent in terms of both capital and governance of any production or supply activity. Given the severe constraints this would have placed on existing players, two other regimes were included: the Independent Transmission Operator (ITO) model, in which the network operator can remain capitalized by a vertically integrated company but is then subject to very strong guarantees of independence, under close control by the regulator (accounting separation, separate governance, restriction of HR mobility), and the Independent System Operator (ISO) model, a variant of the ITO model, in which the network itself (the real asset) is owned by a third party and its operational management is the responsibility of an entity offering the same guarantees of independence from the vertically integrated company as in the ITO model.

Thus neutralized from a competitive standpoint by a separation (unbundling) regime, the network is then economically regulated by

a cost-based tariff: regularly, the independent regulator identifies the costs that the network operator will incur for the coming period, both in terms of operating expenses (Opex) and capital costs (Capex), including new fixed assets in the regulated asset base. On this asset base, depreciation allowances and a return on net book value are determined.

Costs are then shared between all network users according to objective, transparent, and nondiscriminatory rules, which aim to ensure that each user bears a share of costs representative of the costs incurred in supplying them. This pricing system respects the postage-stamp principle in the sense that it is independent of the distance covered by the electricity between the producer and the end consumer to supply a site and, in most cases, is equalized in the sense that it applies a uniform tariff throughout the network operator's service area.

In most cases, the tariff is distributed according to the subscribed power and the volumes drawn off by users, taking into account a seasonal pattern: at the first level, the tariff borne by consumers in their bills evolves as the quotient between the costs incurred by the network operator for the year and the volumes transported or distributed by the network for the same year. At the end of the period, the regulator notes any legitimate deviations from the investment program and cost assessment adopted at the start of the period and may make adjustments accordingly for the following period, with the aim of ensuring cost coverage and financial security for the network operator, who, due to unbundling, can have no resources other than the tariff, while maintaining an incentive for operational performance.

The mechanics provided by this framework work very well in a quasi-static regime, where network evolutions in terms of geography, asset base size, and traffic volume are incremental, and where no external rigidity applies to its access to financing. However, it is more difficult to withstand shocks, whether it involves the rapid deployment of an electricity network, massively strengthening it, supporting the spatial

and quantitative evolution of gas network uses or liquid hydrocarbon networks while maintaining a service consistent with the needs of the European energy system and its long-term security of supply, or deploying new network infrastructure from scratch, particularly for dihydrogen.

2.2. THE CHALLENGE OF TRANSFORMING POWER GRIDS AND FINANCING THEM

a. Strengthening Power Grids: An Essential Prerequisite for Decarbonization

The International Energy Agency (IEA) report published in 2023[28] highlighted the crucial challenge of transforming electricity grids. On a global scale, investment in grids, which has remained broadly stable at around $300 billion a year, has not kept pace with the rapid growth in investment in decarbonized generation.

This state of affairs entails a significant risk that grids will become the "weak link" in the energy transition and the limiting factor in our ability to achieve carbon neutrality by weaning ourselves off fossil fuels. This leads the IEA to conclude that annual investment in networks needs to double to $600 billion worldwide by 2030. European networks are no exception.

This observation has also been widely documented at the European level in the wake of the preparation of the NECPs, which provided sets of trajectories and consolidated hypotheses on which to base network development. As early as November 2023, the Commission provided initial elements of analysis in its communication *The missing link in networks – An EU action plan for networks* (COM(2023) 757), underlining that *"The Ten-Year Network Development Plan (TYNDP) of the European*

[28] *IEA, Electricity Grids and Secure Energy Transitions (IEA, 2023), https://www.iea.org/reports/electricity-grids-and-secure-energy-transitions, accessed February 14, 2025.*

Network of Transmission System Operators for Electricity (ENTSO-E) shows that over the next seven years, cross-border transmission infrastructure is set to double, with an additional capacity of 23 GW by 2025 and 64 GW by 2030," bringing *"the investment required for electricity networks over this decade to 584 billion euros."*

The Commission's responses in this communication provide some initial elements. These are developed in an incremental approach relative to current mechanisms, focusing on coordinated planning by the European Network of Transmission System Operators for Electricity (ENTSO-E) for the authorization of anticipatory investments, better mobilization of existing financial tools in the TEN-E regulation, in particular for the designation of Projects of Common Interest and mobilization of the European Interconnection Facility, as well as at the level of the EIB, and facilitating the granting of permits.

b. Reinforcing Power Grids Poses Intertemporal Equalization Problems

The Commission's responses to date do not appear, at this stage, to have fully extinguished the difficulties encountered by network operators in coping with the scale of investments required throughout Europe. This observation applies even in Member States such as France, which is fortunate enough to have nationwide network operators and a network that is now adequately sized and maintained.

Over and above the issues of European public financing via the instruments of the TEN-E regulation and the questions related to the granting of permits, on which cross-cutting proposals for the transformation of the entire energy system can be made (as we saw above), **the question of anticipatory investments poses a new problem for electricity networks and the economic design of their programming and regulatory framework**.

The provisions applicable to the construction of network tariffs[29] do not prohibit the inclusion of anticipatory investments, provided they support the operator's strategic objectives and correspond to those of an efficient operator, which is ultimately a matter for the regulator to assess. **To do so, however, these investments must correspond to clearly identified projects and network elements, with a timetable for completion and an estimated budget that can be approved by the regulator**.

In the current situation, network operators must anticipate substantial future investments in the medium and long term, potentially ahead of the preparation of a work program and a granular cost assessment. In the present and future regulatory – and pricing – periods, they will have to make very substantial capital investments, far in excess of the previous pace of incremental development and very gradual renewal of the oldest network elements. These capital expenditures would then be borne in the network tariff by a user base that would not have grown in consumption volume to the same extent, since network development is a prerequisite for the development of electrical uses, leading to a temporarily high tariff increase at a higher rate than inflation.

We thus find ourselves in a "chicken-and-egg" situation, where grid development is essential to pursue the development of electricity systems and the electrification needed to achieve carbon neutrality, but where this development would, under the current tariff framework, lead to a substantial rise in electricity bills. This increase

[29] *Article 18(1) of Regulation 2019/943/EU lays down the principle that "Network access charges applied by network operators, including network connection charges, network usage charges and, where appropriate, charges for related network reinforcements, shall be cost-reflective, transparent, take into account the need to ensure network security and flexibility and reflect the costs actually incurred insofar as they correspond to those of an efficient and structurally comparable network operator, and shall be applied in a non-discriminatory manner. These charges do not include unrelated costs supporting other strategic objectives." Point 4(b) of the same article explicitly allows account to be taken, when setting the tariff, of "payments actually made and received, as well as expected payments for future periods, estimated on the basis of previous periods."*

would slow down the expected growth in usage (due to the elasticity of consumption). The prospect of significant increases in network tariffs – and the adverse signals for decarbonization they could imply if they are not smoothed out to a greater extent than the current tariff framework allows – is an emerging topic in the public debate in some Member States, particularly those pursuing very rapid trajectories for the integration of renewable energies and the electrification of uses.[30]

This effect is further strengthened by the network operators' own financial constraints. While their balance sheets in France are healthy and backed by responsible public shareholders, this situation is not universal across the Union. The scale of future investments means that network operators will either have to increase their capital or take on debt. In many Member States, the capital structure of network operators is constrained by legal requirements. This is the case in France, where Article L. 111–42 of the Energy Code prescribes wholly public capital for RTE. Article L. 111–56, on the other hand, subjects Enedis to the governance regime for companies with public shareholding, through requirements of a political nature, due to the legitimate sensitivity conferred on the ownership of companies that are essential to the continued operation of states and their sovereignty.

In cases where the Member States concerned or other competent public bodies are already under severe budgetary constraints, this may limit the range of possible participants in a capital increase, especially if this capital is subject to low return expectations. At the same time, in the absence of increased equity capital, network operators' debt is constrained by balance sheet ratios and cannot grow indefinitely. These financing constraints are all the more marked in a period of higher risk-free rates, such as the one that began in early 2021.

[30] *Aurora Energy Research, "Grid Overload: The Impact of the Electricity Grid on the Dutch Energy Transition," March 7, 2024, https://auroraer.com/insight/grid-overload-dutch-energy-transition, accessed February 14, 2025.*

For example, KfW acquired a 20 percent stake in 50 Hertz in 2018, and the federal government is working on a plan to acquire a stake in TenneT's German assets,[31] with the unofficial aim of consolidating the four national transmission system operators into a single entity.[32] In parallel with these delicate operations, BNetzA has undertaken to make capital contributions to network operators more attractive, raising in June 2023 the weighted average cost of capital in new investments – distinct from the regulated return for the existing asset base – to 7.09 percent after tax, an increase of 40 percent on its previous value. This approach ensures the attractiveness of network financing, particularly for new investments, while limiting the impact on all users, and closely follows the approaches also envisaged in France by the CRE for both TURPE 6 and ATRD, distinguishing between old and new assets. However, it departs from the historical – and more economically coherent – approach that treated the entire asset base as a single block, exposed to a single regulated return. In this respect, it should be seen as a presentation device that, in reality, amounts to recording a trajectory of a gradual increase in this yield, converging toward the value retained for new investments.

Thus, it appears that European power grids are currently faced with the problem of their ability to ensure **intertemporal equalization** between today's costs and users, on the one hand, and future grid users, on the other, in order to ensure a form of equity. This capacity raises the question of how this intertemporal equalization is to be financed.

[31] *Handelsblatt/CEW, "Investment of 111 Billion Euros Required for Expansion of Electricity Grid Operator," March 14, 2023, https://www.cleanenergywire.org/news/investment-111-billion-euros-required-expansion-electricity-grid-operator-media, accessed February 14, 2025.*

[32] *Michael Nienaber and Petra Sorge, "Berlin will mit Fusion von Strom-Highways Ausbau forcieren" [Berlin aims to accelerate expansion with the merger of electricity highways], February 28, 2023, https://www.bloomberg.com/news/articles/2023-02-28/berlin-will-die-vier-top-strom-highways-fusionieren-kreise, accessed February 14, 2025.*

c. Local Challenges of Updating Price Formation Zones in the Face of Congestion

Over and above the question of intertemporal equalization in network financing and the capital-intensive challenges faced by operators, the subject of integrating a greater proportion of local signals in the construction of network tariffs, and even in the construction of electricity market signals themselves, is beginning to emerge in Europe. This proposal is regularly put forward by German stakeholders and appears in the latest BMWK publications on the evolution of the national market framework.[33] The temptation to partially de-deregulate electricity grid tariffs can be explained by the singular situation of the German grid. It expresses a single market price for electricity (there is only one German bidding zone for the formation of the spot price), despite the existence of significant congestion on the German grid between the north, a region of high renewable production, and the south of the country, a region of higher consumption.

In purely theoretical terms, bidding zones are defined as the largest areas in which there is no significant network congestion. Price differentials between two bidding zones then express the cost of congestion and enable interconnections between them to be remunerated. In Germany, a two-zone segmentation of the national bidding zone is deemed politically unfeasible, not least because it would lead to substantially higher electricity prices in the south of the country and lower ones in the north, to the detriment of competitiveness for the country's industrial base, which tends to be located in the southern half. This issue is made all the more sensitive by the structural energy competitiveness difficulties facing German and European industry from 2022 onwards, against a backdrop of heightened industrial and trade tensions between the US and China.

[33] *BMWK, "Optionen für das zukünftige Strommarktdesign" [Options for the Future Electricity Market Design].*

At the same time, the massive network reinforcement that would be required to eliminate congestion is proving tricky to achieve, not least because of local acceptability constraints. This has led network operators to pass on very significant congestion and capacity reallocation charges in network tariffs: in 2023, these costs amounted to €2.35 billion in Germany, representing almost 60 percent of all congestion costs on an EU scale. The effects of this singular situation extend beyond national borders, notably due to the existence of loop flows, i.e., flows of electricity produced in northern Germany that transit through the systems of neighboring Member States (first and foremost Benelux, Poland, and the Czech Republic) before returning to southern Germany, increasing the network costs of neighboring states. This state of affairs led to intense negotiations as part of the Clean Energy Package, which resulted in the introduction, in Article 14 of Regulation 2019/943, of a procedurally cumbersome framework for revising bidding zones. This laborious framework, which in practice avoids the need to redefine zones by means of action plans (Article 15), has not to date reduced the fundamental problem, namely, the existence of internal congestion in the German system.

In this context, de-equating the network tariff by introducing local tariff signals into its construction presents certain risks. In particular, if de-equalization is introduced only for the injection tariff, i.e., only to make it more expensive to set up in areas of high production but not for the extraction tariff, so as not to penalize consumption in areas of high consumption, there would be a risk of indirect transfer via renewable support schemes from the state budget to renewable project developers setting up in high-production areas and then via a reduction in congestion and redispatching charges (partly borne by this de-equitization) to industrial consumers.

From a French point of view, the introduction of local signals runs counter to the electricity tariff structure implemented in the late 1970s. The latter was based on the principle of full national equalization,

aimed at promoting national cohesion and regional development, rooted in a logic of solidarity that has constitutional foundations. **With this in mind, it will be up to the Commission to keep a watchful eye on the impact on intra-European competition of any tariff de-equalization mechanism or the introduction of local signals in tariff construction. The market framework built in Europe provides a simple answer to the simple problem of congestion: that of redefining bidding zones, which must remain the reference solution under the authority of ACER and the national regulatory authorities within the framework of Article 14 of Regulation 2019/943/EU, possibly revised to make it more immediately applicable**.

2.3. REGULATION OF GAS NETWORKS IN THE ERA OF DECARBONIZATION

Over the past three years, Europe's gas infrastructure has been at the heart of the EU's energy crisis following the invasion of Ukraine. With pipeline supplies from Russia drying up, flows within the European market were reorganized in a west–east direction from French and Spanish LNG terminals. At the same time, major efforts were made to connect new floating terminals (in France and Germany) to the European system as a matter of urgency, relieve congestion at key points in the network, open new interconnections, and ensure maximum availability and high levels of geological storage. These efforts were successfully completed, testifying to the resilience of the European gas system and its ability to maintain security of supply in terms of volume (maintaining security of supply in terms of price was more questionable at the end of summer 2022).

From an economic point of view, in the medium to long term, gas infrastructure will undergo major changes, possibly calling into question once again the pricing model based on covering costs incurred over the same period, as is currently the case. Gas consumption

volumes are likely to shrink in absolute terms, notably as a result of the decarbonization of certain uses (residential, tertiary, industry, etc.) through electrification or switching to heating networks. Their spatial distribution is also likely to evolve, with future gas consumption likely to be concentrated on a reduced number of delivery points for uses that are not highly substitutable and highly efficient in terms of renewable and low-carbon gases (industrial uses, collective heating, etc.).

The three production/consumption scenarios studied by the French regulator (Commission de régulation de l'énergie, CRE) in its study on French gas networks for the 2030 and 2050 horizons,[34] delivered in April 2024, are based on existing documented scenarios (by Ademe – the Agence de la transition écologique – and the network operators), each representing different evolutions, but which are all in line with the objective of carbon neutrality. These scenarios project a gas consumption volume of between 165 and 320 TWh in 2050, compared with a consumption of 474 TWh in 2021, representing a reduction of between 30 percent and 65 percent.

a. Runaway Prices, or the Self-Perpetuation of Declining Gas Consumption

At the same time, it is not a priori certain that the costs borne by the network tariff can be reduced in the same proportion: While the number of delivery points should gradually decline, there is no guarantee that this trajectory will follow the same trend as that of volumes delivered, and there is no guarantee that the network cost structure will follow that of the number of delivery points or volumes delivered. Indeed, the latter is highly dependent on the geometry of the network to be

[34] *Commission de Régulation de l'Énergie (CRE), "Avenir des infrastructures gazières aux horizons 2030 et 2050, dans un contexte d'atteinte de la neutralité carbone" [Future of gas infrastructure by 2030 and 2050, in the context of achieving carbon neutrality], April 4, 2023, https://www.cre.fr/documents/rapports-et-etudes/avenir-des-infrastructures-gazieres-aux-horizons-2030-et-2050-dans-un-contexte-d-atteinte-de-la-neutralite-carbone.html, accessed February 14, 2025.*

maintained and in which the necessary renewal investments are to be made.

Insofar as new low-carbon renewable and non-fossil gas production (biomethane) will be partly located in rural areas and will tend to be far from transmission network nodes, and insofar as isolated gas users in the distribution network who choose to exit gas late in the period will continue to need to be supplied from almost all network elements, in the absence of a coordinated policy for dismantling the most costly network elements, it seems likely that the network's cost structure will decline much more slowly than the consumption base. CRE thus concluded that, even in the event of a sharp drop in consumption, the current gas transmission network will still be needed to a very large extent by 2050 to compensate for geographical and temporal discrepancies between consumption and production and to continue to ensure transit between France's neighboring Member States.

Added to this is the cost of the new investments required to accommodate low-carbon renewable and non-fossil gas production: In the case of France, CRE estimates them at between €6 billion and €9.7 billion by 2050, depending on the scenario, i.e., an investment effort of between €200 million and €300 million per year, which remains reasonable in relation to current investment costs (€1.3 billion per year).

In most Member States, this means that natural gas network tariffs are on an upward trajectory at a faster rate than inflation. In some regions, this can lead to natural gas supply costs rising faster than electricity supply costs, and thus to the reference electricity solution becoming more competitive than the reference gas solution for the same use (e.g., domestic heat). In the absence of other rigidities and assuming perfect information and rationality on the part of agents, consumers should decide to switch to electricity when the discounted future bill differential exceeds the investment cost of switching to a reference electric solution (a heat pump, in this case).

In certain circumstances, the fall in gas consumption can become self-sustaining through its inflationary effect on gas tariff levels. This makes it difficult to control the trajectory of gas consumption and tariffs, and can lead to economic difficulties for some operators and even consumers.

Parallels with the Transformation of the French Rail Network between the Wars

The phenomenon currently facing the gas distribution network is not entirely without precedent for other kinds of network infrastructure. The French rail network is a case in point. At its peak before the First World War, it boasted a dense national network of almost 70,000 kilometers of lines, which continued to expand until 1928, when the local network reached 20,291 kilometers. After the First World War, the significant drop in passenger traffic and the development of increasingly competitive road freight jeopardized rail operators' economic equilibrium. As early as June 1921, a new railway agreement was signed, providing for centralized coordination of the network by a *Conseil Supérieur des Chemins de Fer* and the implementation of a common equalization fund between surplus and deficit lines, ensuring balance through a dedicated tariff term. This attempt at equalization did not perfectly resolve the additional difficulties caused by the economic crisis of 1929, which was felt in France from 1931 onwards. This led in 1933 to the introduction of stricter controls over line management and investment programs, alongside initial efforts at regulated coordination via the decree law of April 19, 1934, which attempted to regulate road freight in order to limit competition with rail freight.

From 1937 onwards, a stable framework was established to accompany this inevitable transformation of the network based on the nationalization of the main companies in the sector and their consolidation within the SNCF, which initiated the first major wave of closures of loss-making lines (9,546 kilometers between 1937 and 1939). Together with the French government, the SNCF (national railway service) developed a framework for technical and economic analysis of the relevance of maintaining lines, making it possible to objectivize decisions to maintain or close services. At the same time, lines of local interest, most often outside the nationalized perimeter, were left to be gradually reabsorbed according to economic effects (cost trajectories and competition with road transport) in a movement to close their operators line by line. This gradual, controlled evolution not only enabled the rail network to be progressively de-densified, but also enabled its infrastructural reorganization in the second half of the twentieth century to introduce new services to meet the new needs of French society (RER, TGV, etc.).

b. Managing the Risk of Gas Network Price Spikes

At the level of large gas operators, CRE's work suggests that the risk of price runaway is under control, although the sharper-than-expected fall in consumption and its persistence beyond the price shock of 2022 will lead to steeper trajectories than those envisaged before the Ukrainian crisis. However, this risk can be substantial on the scale of local, more fragmented network operators, as is the case outside France.

This raises the question of how to coordinate the development of the network grid so as to steer the trajectory of costs, particularly fixed costs,

in line with traffic volumes. The most strictly economic approach would involve deregulating the gas tariff to express to consumers connected to the network elements that are most costly to maintain the value to the community of withdrawing gas from these sectors. This approach is both very complex to implement, since it presupposes finding an objective rule for determining this value and socially perilous and potentially conducive to distortions of competition between professional customers connected to distinct sectors or between Member States, depending on the methodology chosen. Finally, it would represent a profound break with the French rationale of territorial cohesion and national solidarity, which has historically underpinned tariff construction.

The only other option is to equip ourselves with instruments to steer the network's cost trajectory by having the means to organize the gradual dismantling of the most costly network elements without abandoning comprehensive equalization. This leads CRE to recommend that *"a local coordination exercise be carried out as of now, with priority given to areas where heating network development projects are underway."* In the longer term, and depending on the actual drop in consumption, it considers that *"it would seem more appropriate, in the strict logic of optimizing the network to be maintained locally, to move toward a phase-out of gas use at local level, rather than prohibiting specific uses at the national level."*

In other words, rather than assigning a given date for the abandonment of domestic gas heating (or, more generally, end dates for certain uses) in the energy and climate program, it would be preferable to establish, in conjunction with the territories and populations concerned, a methodology for periodic identification and a gradual timetable for dismantling access to gas in territories where the socioeconomic balance is the most unfavorable to maintaining it. This timetable could be included in periodic network planning, with tools to support the social and economic effects of these network withdrawals, a governance framework between the network operator and the regulatory authority to monitor

this exercise, and instruments to reflect the effects of these policies in the tariff.

In short, once again, the issue is one of intertemporal equalization between current and future network users in the face of an evolving cost trajectory decoupled from the trajectory of usage during the energy transition.

However, this evolution is in the opposite direction to that of the electricity network, since it involves dealing with the case in point of a faster reduction in usage than in costs rather than a growth in costs in anticipation of an increase in usage. In both cases, the issue is how to finance this intertemporal equalization and how to support the spatial equalization of network costs through the evolution of its geography.

2.4. NEW LINEAR INFRASTRUCTURES: DEPLOYMENT AND PROJECT RISK MANAGEMENT

For hydrogen, a specific framework has just been included in the Gas Package. The same strict rules of separation between production, transport, and supply of hydrogen are laid down, with the same three possibilities (OU, ITO, ISO) and the designation by Member States of Hydrogen Network Operators (HNO), equivalent to monopoly electricity or gas network operators in their service area, with validation by the independent regulatory authority of network deployment plans based on supply and demand projections.

a. The Difficulty of Financing the Creation of a Network from Scratch

Hydrogen does not present the same difficulty as electricity and gas due to vertically integrated players that existed prior to regulation. The

choice of regulation adopted at the European level also overlooks the great difficulty, for an HNO starting its activity from scratch, of identifying the best route segments on the basis of consumption and production that do not yet exist. These provisions for independence and neutral third-party access to infrastructure will apply virtually without exception from 2032 onwards. For the earlier period – during which European infrastructure will, in any case, be at a very early stage of development – a slight degree of flexibility will continue to be allowed, leaving open the possibility of third-party access on terms negotiated in an objective, transparent, and nondiscriminatory manner.

In addition to these vertical unbundling rules, there are also horizontal unbundling rules that are specific to hydrogen. The texts of the Gas Package recognize that the joint operation of gas or electricity networks, on the one hand, and hydrogen, on the other, can create synergies and must be authorized. However, they also impose a legal separation of the entities operating the hydrogen network from other electricity or gas network activities and an accounting separation so that separate tariffs can be established without cross-subsidies between the different types of infrastructure.

In such a framework, with no transfer between mature networks and the hydrogen network and no possibility of integration with production or supply activities, tariff construction poses a major problem when deploying hydrogen applications. In fact, to date, there is no comparable case in the energy sector where infrastructure serving new uses has been deployed in a perfectly dissociated way from day one. Both the electricity and gas grids worldwide, as well as liquid hydrocarbon networks, have always been initially developed in a vertically integrated logic, often co-developed with downstream industrial energy use projects integrated into the overall energy system planning exercise.

The regulated model adopted by the Gas Package for hydrogen transport infrastructure creates a "tariff wall" problem in the first few years. The tariff levels resulting from the mechanism for setting regulated tariffs will be very high in the first few years and will not allow the first users to pay for the amortization and remuneration of network investments in the early years, even if they have made every effort to minimize infrastructure development costs. This effect stems from the choice of an accounting separation between hydrogen and gas (hydrogen pays for the hydrogen network) and from the fact that the high investment costs generated by investments sized according to a "no-regrets" logic are covered in the first few years by subscriptions that are still very limited in relation to the optimal sizing of the infrastructure (based on long-term load forecasts consistent with the 2050 outlook for the French and European energy system).

This problem is analogous to the one described above for the electricity grid – but more acute since the hydrogen grid starts from an initial state in which it has no users. It is also analogous to the potential problem described above for the gas grid under certain conditions: as natural gas consumers become more decarbonized and electrified (e.g., installing heat pumps for domestic heating), the consumption base supporting the grid tariff shrinks, while fixed grid costs do not decrease as fast. This leads to an ever-greater increase in the network tariff, which increasingly drives natural gas consumers away from electricity.

b. Solutions to the Tariff Wall for the Initial Development of a Hydrogen Network

Two main approaches are envisaged in the Gas Package to solve the tariff wall problem. The first is based on an intertemporal deferral mechanism, which may involve an amortization account, as in the German regulatory model. The second involves direct financing through the creation of work-in-progress by governments, as is the case in Spain.

The German approach approved by the Commission on June 21, 2024 (SA.113565), which derives from paragraphs 28q and 28r of the *Energiewirtschafsgesetz* (EnWG) and implements this intertemporal flexibility scheme, is based on the creation of a legal entity bearing a depreciation account *(Amortisationskonto)*, in which the transmission system operators supporting the development of the main hydrogen network *(Kernnetz)* are shareholders, and the capping of the network tariff charged to users by the network operators over the first years of operation. For the first few years of operation of the hydrogen network, this amortization account provides network operators with a payment to compensate for the difference between capped tariff revenues and regulated network costs. In return, a future tariff increment will be paid over the medium term once the network has reached maturity. Finally, the amortization account is financed by a loan from KfW, with a partial guarantee of the difference at the end of the period if the network never reaches maturity and therefore never manages to cover the investments initially committed. This approach enables network operators to make infrastructure deployment risk "transparent," generating cost-covering cash flows from the very first years at the level of the ceiling tariff. It allows the "tariff wall" of the first few years to be overcome by capping, at a limited cost to the public authorities.[35] By way of derogation from this intertemporal equalization approach, the texts of the Gas Package also envisage the possibility of transferring part of the costs of developing the hydrogen network to the gas tariff in a regulated manner.

c. The Risks of Deploying the Network from Scratch for Generation and Consumption Project Developers

A second difficulty, not identified in the Gas Package, concerns the risk of construction delays. To make investment decisions, future users of the hydrogen network, both producers and consumers, need relative

[35] *The cost of public guarantee is estimated at €3 billion by the Commission, for a network of 9,700 km with an estimated total cost of €19.7 billion.*

certainty that they will be connected within the planned timeframe and will then be able to exchange hydrogen via the network with their counterparts. Indeed, the financial risks in the event of non-availability of the network when their production or consumption facilities are commissioned are considerable, both because of the risk of losing or having to repay the state aid they have been granted and because of the contractual penalties they may incur with their customers or hydrogen suppliers. In the current framework, while some Member States have been able to find solutions to the tariff wall to unblock an investment decision by HNOs (Germany, Spain, see above), these solutions have all consisted in relieving the grid operator of the risk of ramping up over the first few years but have ignored the problem posed to grid users. In an "unbundled" framework, the only solutions to this problem are:

- Either to place the responsibility for compensating affected customers in the event of delays in commissioning on the hydrogen network operator – this is often not feasible in practice, given the small size of their balance sheets over the first few years, and in most cases requires the state to secure the HNOs or deferring the cost of these compensations into the network tariff, with the possibility of intertemporal carryover

- Or to provide a direct public guarantee by national authorities (or similar bodies) or at the European level to hydrogen network users over the first few years, as this risk is extremely difficult for private insurers to cover. This public guarantee could be included in the more general guarantee to address the deployment challenge via an intertemporal equalization fund.

d. The Nature of Hydrogen Network Operators Is also a Source of Uncertainty

Finally, within the European framework, the approach adopted for the appointment of HNOs in most Member States will lead to this role being entrusted to dedicated subsidiaries of the previous gas network operators, enabling maximum use to be made of the latter's own technical expertise and skills in the development and operation of these networks.

However, in many cases, the capital structure of these operators will remain constrained, either for reasons of political acceptability or because of legal constraints on the ownership of energy infrastructure networks (majority public capital, etc.). In the OU or ITO models, this is likely to make it more difficult for them to access equity capital on competitive terms. This would make the deployment of hydrogen infrastructure more costly or mobilize public budget resources that are already heavily strained by other public policies.

The German depreciation account approach to dealing with deployment risk has the advantage, in the German context, of deconsolidating the associated liability into a joint entity of all HNOs. However, this approach cannot be replicated trivially on a Member State by Member State basis, particularly in contexts where the HNOs will be one or two, or in contexts where the public authorities will not have the resources to deal with the problem through a subsidy or repayable advance not treated as a loan for accounting purposes.

Once again, the issue at stake is one of **intertemporal equalization** between current and future network users in the face of an evolving cost trajectory decoupled from the trajectory of usage during the energy transition. This network deployment risk is compounded by a second risk, specific to hydrogen as infrastructure emerging from scratch. This is linked to the uncertainty, for users, of the timing of future connections

and of the bearing by as-yet unidentified HNOs, for which network codes and connection agreements have not yet been stabilized, of compensation to users adversely affected by delays in connection.

2.5. FACING THE CHALLENGES: EUROPEAN FUNDING, TARIFF FRAMEWORK, AND UNBUNDLING

As with generation facilities, the deployment of energy networks in line with Europe's climate ambitions will need to be supported by a financing framework that is consistent across Europe and that best mobilizes those players who have already demonstrated their ability to contribute to the deployment of major infrastructure of European interest. At a time when certain Member States (Germany in particular) have taken the lead by deploying new networks on a purely national scale using their own resources, the deployment of tariff regulation and financing tools coordinated on a European scale seems essential to provide a coordinated response to the common challenge of financing the future of existing networks and the deployment of new infrastructure. These answers can be found in the structure of network tariffs, network operator equity financing, debt financing, and joint guarantee instruments.

When it comes to network tariffs, the challenge for each of the energy networks is, in fact, a common one: that of maintaining the match between the actual trajectory of traffic on the network and the trajectory of costs borne by network users at a given point in time, whereas the costs borne by the network operator may follow a different time trajectory. In each case, as we have seen, it is a question of intertemporal equalization to re-establish this match between traffic and costs and ensure a smooth transition between the current network usage regime and the one that will prevail once carbon neutrality is achieved in twenty-five years' time.

Proposal 12

In the **European Energy Security Act**, introduce the principle of a European amortization account for each of the electricity, gas, and hydrogen networks to solve the problem of intertemporal equalization arising from the non-concurrent evolution of the costs borne by operators and the volumetric demand for the associated vectors. The account could be managed by the EIB, which would finance it through a loan secured by an ultimate guarantee from the EU against certain predetermined risks.

The approach suggested by the Gas Package for hydrogen and deployed for the German Kernnetz offers a framework that can be deployed on a European scale and elegantly generalized to all energy infrastructure networks facing the challenges of transition.

The EESA could thus include the principle of a European amortization account for each of the three energy carriers (electricity, gas, and hydrogen) in the form of a legal entity to which the network operators concerned could voluntarily subscribe and which could be managed, for example, by the EIB, in parallel with the role played by the KfW in the German case.

The member suppliers could then use their membership to exchange cash flows that they commit to transferring to the amortization account over a given period (the contribution period) for secure cash flows benefiting them over another period (the security period). During this second period, the amortization account would cover the gap between the guaranteed cash flows and those obtained through regulated tariffs. The level of cash flows paid into the amortization account by member operators over the contribution period and the parameterization of cash flows over the security period

would be subject to certification at the time of subscription by ACER, on the basis of a reasoned opinion from the national regulatory authorities and, if necessary, the European Commission, confirming that the trajectories incorporated into the modeling are consistent with a validated NECP, and therefore with the European trajectory of transition toward carbon neutrality.

The financing of each of these amortization accounts would be ensured by a loan from the EIB, with an ultimate guarantee from the Union to the latter on the related risks within a predetermined limit (e.g., 75 percent of the financing gap at the end of the period), making it possible to mitigate the financing cost as much as possible, based on the German model: this ultimate Union guarantee would be entered, along with the guarantees proposed in the section dedicated to production facilities, by amending art. 9 of Regulation 2015/1017/EC.

This approach allows for pooling risks at the European level, thereby reducing the overall level of risk across the system. If it is possible that some Member States or network operators miss the expected trajectories, the risk borne at the scale of a European amortization account becomes that of a collective failure of the transition, it being understood that as the transition progresses, it seems reasonable to hope that both Member States and the Union will take action to prevent such a collective failure. This allows the system to offer a degree of flexibility, with the capacity to integrate national network operators following slightly different trajectories, notably in terms of defining contribution and security periods and payment profiles.

At the same time, ensuring the participation of a large number of network operators also makes it possible to deconsolidate the depreciation account and thus avoid balance sheet effects on network operators, and doing so at the European level rather than through national aid schemes (which may exist elsewhere, in complementarity) ensures

that there is no distortion of competition or effect on the internal market. Finally, securing the cash flow of network operators during periods when the transition is most important, in exchange for "premium rates" in less risky periods, enables them to finance themselves under more favorable conditions and ultimately benefits consumers by ensuring more moderate rates.

In very practical terms, this framework would thus allow, as a simple option that the players would be free to use or not, as follows:

- **An electricity network operator could subscribe to the European amortization account for electricity networks and, with the prior approval of the national regulator and the agreement of ACER, obtain over the next decade** (the security period). During this period, which concentrates the heaviest investment in network reinforcement – particularly to support the connection of new low-carbon generation and growth in consumption – the operator would receive **a guaranteed cash flow in the form of a revenue increment above tariff revenues based on actual traffic** (tariff level smoothed accordingly), **thus securing the financing of these investments. In exchange, in the period beyond the decade 2025–2035, the grid operator would contribute to the amortization account through a tariff increment based on the volumes of electricity that would then become more significant on the grid** (making it absorbable by individual users).

- **A gas network operator could subscribe to the European amortization account for gas networks in order to obtain, with the prior approval of the national regulator and the agreement of ACER, a cash flow guarantee enabling it, at the end of the amortization period (post-2035, for example), to cover the end of amortization of its existing assets, irrespective of the volumes of traffic on the gas network and therefore of the actual tariff revenues during this final phase**. In return, it would contribute to

the amortization account at the beginning of the period via a tariff increment based on the relatively certain volumes expected in the early years. **This approach could be further refined, for example, to cover the gap between the amortization trajectory currently included in the tariff and the financing of network elements presenting a higher risk on their user volume trajectories, on the one hand, and an accelerated amortization trajectory for these network elements, including accompanying investments in decarbonization of connected users, on the other**. This would make the amortization account a tool for financing disconnection measures in the most costly areas of the network and those most at risk, along the lines envisaged by the CRE. In both cases, it would enable gas network operators to hedge their bets against the risk of a decarbonization trajectory for the Union that would ultimately see traffic on the gas network decline faster than anticipated while containing the risk of tariff runaway and stranded assets at the end of the period.

- A hydrogen network operator, wherever it may be in the Union, could secure funding for the main network contributing to the European backbone in its service area through a mechanism harmonized across the Union. This would prevent the network from developing at an uneven pace across different regions, ensuring that progress does not occur faster in some areas than in others. The primary value of the backbone lies precisely in its ability to stretch across the whole continent, from areas of industrial consumption to areas with the most competitive supply conditions for low-carbon, non-fossil-fuel electricity, and in its ability to pool hydrogen production and extraction on a large scale, facilitating the flexibility of electrolyzers and thus their contribution to the smooth running of the[36] power system.

[36] *Bilan Prévisionnel 2023, RTE, 2023.*

Proposal 13

Within the European Energy Security Fund, set up a compartment dedicated to strengthening the equity capital of network operators, either through a direct stake in their capital or through funds of funds.

In the section on financing the transformation of the Union's decarbonized production base, we proposed that, over and above the recovery and resilience framework, the Union should benefit from a permanent EU guarantee line and a capital investment window from the EIB as part of a **European Energy Security Fund**. This fund would be dedicated to key investments in the energy transition, and, in particular, to decarbonized production projects qualifying as Projects of Common Interest, coordinated with the Union's energy and climate policy. The implementation of such a financial tool would form an integral part of the EESA described in this chapter.

While investment in networks, and in particular in transition-enabling infrastructure, has long been an important focus of the EIB's activities, until now it has tended to concentrate on specific projects (interconnections, etc.) rather than on network operators themselves at the parent company level.

With regard to energy networks, the European Energy Security Fund could be expanded to include a compartment dedicated to strengthening the equity capital of network operators either by direct intervention in their capital or through funds of funds. In theory, the latter should be able to attract capital on the market without difficulty, provided that the returns on regulated asset bases provided for by the regulatory authorities in the tariffs are sufficiently attractive. In practice, however, we have seen that rigidities (legal or political) can exist, and that the security and sovereignty at stake in the ownership

of strategic assets such as energy infrastructure networks justifies the existence of restrictions on entry into the capital of network operators. In this context, allowing a European public player to act as an investor in network operators would provide an additional option and alleviate the cost of these constraints for end-users. Ultimately, this will also enable the European level to confront more directly all the constraints specific to the governance of network operators, to contribute to this through cross-fertilization of experience from a shareholder point of view, complementary to that already existing at the operational level in the ENTSOs, and even to develop a common policy for the integration or consolidation of network operators in certain territories of the Union that present particular challenges.

Proposal 14

The European Energy Security Mechanism, which would double as the financial component of the EESA, could integrate the current European Interconnection Mechanism, extending it to cover all energy production, transmission, distribution, and storage facilities in a technologically and vectorially neutral way. Given the extended scope of this new mechanism, the resources allocated to it in the multiannual financial framework should be increased accordingly.

Finally, as far as EU-wide subsidies are concerned, the European Interconnection Mechanism provided for in the TEN-E regulation already provides a framework for direct aid to interconnection or grid reinforcement projects designated as Projects of Common Interest. In the section dedicated to generation facilities, we proposed the creation of

a European Energy Security Mechanism, which would constitute the subsidized part of the financial component of the EESA described here. It would provide a single pan-European financing line for generation and transmission, distribution, and storage facilities designed to be technology-neutral and neutral between energy vectors, making the Union's direct contribution to the deployment of strategic infrastructures for its energy security visible and quantifiable.

Within this framework of common interest, other facilities and projects in the Union's energy system could then be added, along with contributions from both public and private financiers. This would take over the European Interconnection Mechanism, which already exists for networks, and extend it to all generation, transmission, distribution, and storage tools in a technologically neutral way that is neutral between energy vectors. This means that the resources available for the European Energy Security Mechanism will be considerably greater than for the current European Interconnection Mechanism within the MFF.

3 Finding the Means to Achieve Shared Ambitions

3.1. FINANCIAL RESOURCES AND PRINCIPLES FOR FINANCING THE TRANSITION

All the actions and public investments set out in this and the previous note have a cost, whether it involves financing a system of European calls for tenders to ensure that the Union's energy-climate objectives are met in the event of a shortfall on the part of Member States, pledging a **European Energy Security Fund**, providing a guarantee fund for amortization accounts, financing the extension of the European Interconnection Mechanism to production and storage facilities in a Mechanism for Europe's Energy Security, and more generally providing it with resources commensurate with the financing needs of the transition.

All of this will require very significant resources, going beyond the contributory capacities of Member States and the Union's budget in its current format. Implementing the transition on the basis of competitive processes is the most cost-effective approach to achieving carbon neutrality.

These considerations militate in favor of considering public financing only when it can be established that a market failure exists and it can be demonstrated that public intervention is necessary to achieve the objectives pursued. The more direct the intervention, the higher the burden of proof as to the existence of market failure and the strict necessity of public intervention. It is in this spirit that the measures set out in this note should be approached.

First and foremost, we need to simplify administrative procedures, which is a no-regrets effort. Then, where state aid is justified,[37] it should be as standardized, efficient, and market-compatible as possible. To this end, public funding must be technologically neutral. Second, access to private financing must be facilitated. As a last resort, the EU must be given the means to intervene directly with European public funds, in the form of guarantees (for networks), or even in the form of equity capital or direct subsidies for projects of common European interest (Project of Common Interest scheme). The proposals in this chapter should be read in the context of such a concentric circles approach.

a. The Source of Funds for the Carbon-Neutral Energy Objective

Proposal 15

The EU's transition to a low-carbon, non-fossil-fuel energy system does not, as a matter of principle, need to be entirely or mainly supported by levies on energy consumption. Quite apart from the stakes in terms of Europe's competitiveness, opting for this approach would probably lead to deadlock due to the unanimity required to legislate on taxation at the European level.

Such an approach aims to minimize public intervention by targeting only the most critical points necessary to remove key constraints on the transition. It will, however, require very significant financial volumes, going beyond the resources currently dedicated (via the green infrastructure part of InvestEU, the European Interconnection Facility,

[37] *In particular, to develop production resources that cannot be developed by market forces alone, given the risks involved or the gap between costs and market prices.*

or the platform of the Governance Regulation). The availability of such European public resources does not, in principle, have to be supported by levies on energy consumption. There are many other approaches to the design of European-level resources that, in economic terms, could be more relevant or less distorting.

This debate goes well beyond the scope of the present study, but let us simply point out that any common European fiscal approach to underpinning these various measures would require unanimity in the Council, which, as we explained in the first note, would be difficult, not to say unrealistic, to achieve.

b. Structuring Energy Prices to Support the Transition

Proposal 16

In general, the structuring of energy consumption prices can contribute to the transition to a low-carbon, non-fossil-fuel system without necessarily increasing average levies for consumers, provided that the following is true:

- The full costs of the lowest-emission energy types should be made as stable as possible.
- The full costs of the highest-emission energy types should not be secured.

If the EU makes the political choice to base the capture of resources needed for the energy transition on energy consumption, these resources should come primarily from the highest-emitting energy sources and should not affect the competitiveness of low-carbon energies.

If new actions have been backed by the European resources based on energy consumptions, they will have to comply with certain design principles to make a positive contribution to the transition.

To facilitate the transition from the consumer's point of view, we need to ensure that the full cost of supplying the lowest-emission energy sources, including network tariffs where applicable, and all the fiscal or contributory components based on consumption, is as stable and predictable as possible. At the same time, the full cost of the highest-emission energy sources should not be secured. It would therefore be potentially volatile. The difference between the two would have to be sufficiently large and certain for its discounted amount to cover the investment costs of switching to low-emission energies. Put another way: to convince consumers to switch from a combustion vehicle to an electric vehicle, before considering the question of purchase subsidies, it is necessary to ensure that the electricity bill is as stable and predictable as possible, that the price of fossil fuel does not benefit from any measures to attenuate its volatility, that they are perceived as being on a sustainable upward trajectory, and that the discounted difference between the electricity bill and the cost of fossil fuel covers, over the vehicle's lifetime, the difference in net purchase cost between an electric vehicle and a combustion vehicle. With this in mind, subsidies for vehicle purchases should be sufficient to ensure that the discounted difference between the two running costs is greater than the net switchover cost. From an economic point of view, we can advocate for different amounts of aid for different social categories (income deciles, for example) to reflect the different levels of risk – and, therefore, discount rates – of more or less precarious categories of the population.

Therefore, to provide the Union with resources that facilitate the transition, if the political choice is made to base them on energy consumption, they will have to be, as a matter of priority, based on the highest-emitting energy sources and in no way undermine

the competitiveness for consumers of a transition to low-carbon non-fossil energies. Nor should they be designed in such a way as to mitigate the effects of price volatility on consumers' total fossil fuel supply costs.

Proposal 17

Prohibit, within the **European Energy Security Act**, any measure instituted by Member States involving payments to consumers, market operators, or any intermediary in the value chain based on the volumes of fossil energy placed on the market or having equivalent economic effects.
This is to ensure that resources are not squandered in a direction directly opposed to the energy transition, such as indiscriminate support measures for fossil fuel consumption, even in times of crisis (such as discounts at the pump). If intervention is necessary, it must be socially targeted and designed so as not to diminish incentives to reduce fossil fuel consumption (e.g., by increasing certain social benefits).

According to these principles, before considering the design of such a common resource, the priority must be to avoid squandering national resources in a direction opposed to the energy transition.

The energy crisis of 2022–2023 severely tested the mettle of European households, which are facing significant inflation, driven in no small measure by the energy component of the consumer price index. In response to citizens' deep concern about their purchasing power, Member States have deployed a range of assistance solutions. Some Member States, including France, have introduced direct subsidies for the consumption of fossil fuels in the form of a rebate on the unit price

charged to consumers (reduction in the price of a liter of fuel at the pump), offset by the national budget to marketers. In terms of communication, these subsidies were widely presented as resulting from a desire to "guarantee" households a price for fossil fuels that did not exceed certain "psychological" thresholds (notably the threshold of two euros per liter of fuel).[38]

This is precisely what should never be done if we are to have any chance of achieving carbon neutrality. Indeed, this type of measure creates downward expectations among consumers about fuel prices and expectations about the future implementation of public policies by reducing volatility. As a result, the decision to invest in a low-carbon consumption mode is made more difficult over the long term, fossil fuel dependency is maintained for longer, which is highly detrimental to the Union's energy security, and budgetary expenditure is directly transferred to a product that is almost exclusively imported. Liquid fuels are probably the worst Keynesian multiplier.[39] Many other solutions could have been envisaged, whether in the form of lump-sum subsidies targeted at fuel or energy expenses, non-targeted subsidies, or increases in existing social benefits if the aim was to focus aid on groups who were particularly vulnerable to the inflationary shock.

Before focusing on what could be done, we can therefore conclude on what should never be possible again.

In an EESA, for example, we could envisage a permanent ban in European law on any measure instituted by Member States and consisting of a payment to consumers, marketers, or any intermediary in the value chain, based on the volumes of fossil fuels

[38] *Recall that less than three years earlier, many commentators expressed the crossing of another "psychological" threshold at 1.5 euros per liter as one of the determining factors in the Gilets Jaunes crisis, this threshold being deemed unsustainable at the time.*

[39] *It can be argued that the pump price reduction measure was partly equivalent to a direct payment from the budget of the Member States that implemented it to the budget of the oil-producing states.*

marketed, or having equivalent economic effects. Naturally, certain exemptions could be made for sectors exposed to carbon leakage through international competition (agriculture, fishing), but generally speaking, it is by refraining in the future from duplicating expenditure as pointless as this that we can begin to give ourselves more means of action.

Proposal 18

As part of the Energy Taxation Directive, introduce a clause requiring Member States to prioritize the taxation of different energy carriers according to their life cycle carbon intensity.

Without necessarily seeking to increase energy taxation in general, it could be structured more efficiently to serve decarbonization by ensuring that the taxation directive establishes a hierarchy according to the carbon intensity of the various energy vectors.

France is a case in point. The excise duty on gas – which emits greenhouse gases, is fossil fuel-based, and needs to be imported – is lower than the excise duty on electricity. This imbalance is detrimental to electrification and favors fossil gas consumption, even though French electricity is low in carbon and France is Europe's leading electricity exporter. The result is negative in terms of climate objectives, trade balance, and energy security. Yet recent debates on the Finance Bill for 2025 show that these arguments, however elementary, struggle to find resonance with the political figures in charge of drawing up the budget, who are in fact little attuned to the issues at stake in sectoral policies.

A European principle, applicable in every Member State, of prioritizing energy taxation according to the carbon intensity of energy

sources would, therefore, make it possible to avoid this kind of aberrant situation while preserving the fiscal freedom of Member States in energy matters. They could choose to tax energy more or less depending on the role of industry in their economy, but they would have to ensure that the hierarchy of taxes was consistent with their climate commitments.

c. SEQE 2's Potential Role in Financing the Transition

Proposal 19

Allocate a share of the cost of extending the Emissions Trading System to the transport and building sectors (ETS 2) to finance the tools proposed in this paper (the European Energy Security Mechanism, the European Energy Security Fund and EU guarantee, pan-European platform tenders, etc.). This extension could be achieved by raising the ETS 2 price ceiling, as the sectors concerned are not subject to much risk of carbon leakage.

If new means are to be found for the Union in line with the design principles outlined in the previous proposals, then one avenue could be to use the extension of the Emissions Trading Scheme (ETS) to the building and transport sectors (ETS 2). This extension was included in the 2023 revision of the ETS Directive (2023/958/EU, 2023/959/EU) as part of Fit for 55 for implementation from 2026. In practice, it makes the marketing of energy products for these sectors subject to the presentation at the end of each period of emission allowances in a number corresponding to the emissions induced by

the use of the energy products sold. These allowances are then auctioned according to a total volume representing the maximum volume of emissions desired from these sectors for the period in question and decreasing progressively. In this way, we ensure compliance with emission targets in the building and transport sectors, which are not very exposed to international competition, and express the cost of achieving this target through the price of the allowance. To take into account the social impact of this measure, in addition to a social support scheme for European consumers (Social Climate Fund), the price of the SEQE 2 allowance is capped at 45 euros per ton emitted (art. 30 *nonies* of the amended Directive 2003/87/EC). When the price exceeds this threshold on a long-term basis, additional allowances are released from a reserve, reducing the decarbonization effort required to keep the price around this level.

Today, the revenues from this mechanism are essentially allocated to social support for European consumers, which seems legitimate when it comes to a measure as politically sensitive as the introduction of a carbon price, including for households across the continent.

If additional revenue were to be found to finance investments in the Union's energy security, a share of the quota revenues from the ETS for the building and transport sectors could be earmarked for this purpose. On the one hand, the cost borne by consumers sends useful signals by increasing the price of fossil fuels in line with their emissive power without affecting price volatility. On the other hand, the investments thus made make low-carbon supplies more stable and competitive. In the long term, the rents generated by these investments would remain available to pursue the Union's action and the deployment of ever more integrated infrastructures. The simplest approach would be to raise the price ceiling of 45 euros set out in Article *30h*, and to amend Article *30d* of the same Directive 2003/87/EC to allocate a share corresponding to the price increment to the purposes set out

here (European Energy Security Mechanism, European Energy Security Fund and Union guarantee, pan-European platform tenders, etc.). With emissions from the building and transport sectors representing around 1.1 billion tons per year at the EU level in 2021, raising the price cap by one euro per ton would allocate around one billion euros to these needs over the first few years if the price of allowances were limited by the cap.

In addition, this revenue has the double advantage of being adopted by qualified majority (and not unanimously), as it is not fiscal in nature; of being temporary, as it is proportional to the Union's emissions and will therefore converge toward zero when carbon neutrality is achieved; and, finally, of encouraging Member States to move as quickly as possible in the energy transition to reduce their contributions to the common effort and maximize the benefits they derive from it.

[40] *In particular, Directive 2009/147/EC on the conservation of wild birds.*

1 European Legal Framework for Environmental Assessment

ENVIRONMENTAL ASSESSMENT OF PROJECTS

Directive 2011/92/EU as amended by 2014/52/EU, which follows on from the previous framework set out in 85/337/EEC, stipulates that certain categories of projects likely to have a significant impact on the environment must be subject to an authorization procedure and an environmental impact assessment (Article 2). A project's dependence on an authorization procedure may be either automatic in view of its specific characteristics (for the largest installations) or determined on a case-by-case basis (for smaller installations exceeding other thresholds, taking into account their specific nature and location). Authorization applications are examined on the basis of an environmental impact assessment report, commonly known as an impact study (Article 5), which is the responsibility of the project owner. The directive stipulates that the quality of this study must be assessed by a competent authority independent of the project owner appointed for this purpose by the Member States. Finally, the framework (Article 6) requires that authorities likely to be affected by the project, by virtue of their specific environmental responsibilities or local and regional competencies, have the opportunity to give their opinions on the information provided by the developer and on the application for authorization. It also provides that, at an early stage in the authorization procedure, the main information relating to the project should be communicated to the public to ensure its effective participation in decision-making procedures. In practice, this authorization framework is the one used for environmental authorizations for energy production or transmission/distribution facilities.

Virtually all significant projects involving the energy system are subject to this framework. This is systematically the case for crude oil refineries, thermal power plants, and other combustion facilities exceeding 300 MW, nuclear power plants and fuel production facilities, facilities for the storage, reprocessing, or treatment/disposal of irradiated fuel and radioactive waste, dams exceeding 10 cubic hectometers, overhead power lines with a voltage of 220 kV or more and a length of more than 15 kilometers, pipelines with a diameter of more than 800 millimeters and a length of more than 40 kilometers for the transport of gas, oil, chemicals, or carbon dioxide for geological storage, and carbon dioxide capture or storage sites. It is interesting to note that the European framework provides only for wind farms (onshore or offshore) to be subject to these procedures on a case-by-case basis and does not provide for photovoltaic or methanization projects to be subject to them, either generally or on a case-by-case basis.

In most Member States, including France, this process has led to the implementation of an integrated environmental authorization. In this case, the general architecture of the environmental authorization process set out in the directive is used to coordinate the issuance of other authorizations and administrative procedures prior to the implementation of a given project. In France, this is the case for the majority of projects likely to have an impact on the environment, under the environmental authorization provided for in Articles L. 181–1 et seq. of the Environmental Code. However, the conditions under which these procedures are triggered remain extremely variable and vary widely from one Member State to another: the framework provided by Directive 2011/92/EU as amended allows any Member State that deems it appropriate to subject installations to a full environmental assessment, including an impact study, according to lower thresholds or project categories defined by the national authorities. In most cases, this full environmental assessment requires an in-depth analysis of the environment over a 12-month period, assessment by a competent authority, public participation – in the form of a public inquiry, for example – and then the issuance of a permit setting out the operating conditions.

In the case of France, these procedures were historically transposed when Directive 85/337/EC came into force by successive adaptation of the previous framework for classified installations derived from the 1976 law. This is a particularly striking example of over-transposition in the sense of subjecting to environmental assessment procedures projects for which there is no requirement to do so under European law: **France is thus the only Member State to subject photovoltaic projects to environmental authorization on a case-by-case basis** and one of the few to systematically require environmental assessments for wind power projects from the first turbine. Conversely, in Spain, photovoltaic projects are not subject to environmental authorization, and wind power projects are only systematically subject to authorization once they reach fifty turbines or 30 MW of installed capacity. In fifteen years, this does not seem to have led to any significant difference in the level of environmental protection between these two Member States.

PROTECTING SPECIES HABITATS

This framework is based on Directive 92/43/EEC and provides (Articles 12 to 15) for the establishment by Member States of a system of strict protection for the animal and plant species listed in Annex IV (a) and (b), which as a general rule prohibits the disturbance of habitats or species in their natural ranges. By way of exception, Member States may authorize the implementation of projects or activities that disturb them under three cumulative conditions (Article 16):

- *"That there is no other satisfactory solution."*
- *"That the derogation does not adversely affect the maintenance, at a favorable conservation status, of the populations of the species concerned within their natural range."*
- For a legitimate reason, particularly *"in the interests of public health and safety, or for other imperative reasons of overriding public interest,*

including those of a social or economic nature, and for reasons that would entail beneficial consequences of primary importance for the environment."

This procedure is likely to apply to any project relating to the energy system, provided that its location coincides with habitats or areas where protected species are present: *de facto*, it has become virtually systematic for most projects of a certain scale, particularly for energy networks or renewable production facilities. This framework has also been supplemented by species-specific texts,[40] adopted at a later date, but based on the general structure of the Habitats Directive, i.e., a general prohibition on damaging species, which may be derogated from on certain grounds if no alternative is established.

The implementation of this framework has led to relative variability in the scope of application, first and foremost between Member States: France has thus chosen to define its own lists of protected species for the application of this procedure, according to its own grid of national and regional lists, over and above the list included in the European framework. France has also chosen to add "sites of geological interest" to this protection scheme, which under European law only covers flora and fauna. Most Member States, including France, have opted to integrate the issuance of such permits, where applicable, into the more general procedural framework for the issue of environmental authorizations for the purposes of Directive 2011/92/EU on the environmental assessment of projects, it being understood that an ad hoc procedure, codified in Articles L. 411–1 et seq. of the Environmental Code, also exists for projects, works, or activities that would not be covered by a full environmental authorization.

This variability is also reflected in the methods used to assess compliance with the three above-mentioned criteria, which, given the way they are drafted, continue to be open to interpretation by the courts, despite the intense development of case law, which is difficult for petitioners to

anticipate. In particular, the assessment of the existence of an *imperative reason of overriding public interest* has led to significant legal uncertainty for petitioners, which has led some Member States, including France, to enshrine in their national law a default recognition of such a reason for certain projects meeting specific characteristics. Although this introduces useful certainty for project sponsors, it also introduces a new set of criteria and thresholds within an already complex administrative system that already includes criteria for environmental authorization, among other requirements.[41] In fact, the maintenance of specific thresholds and criteria was still necessary to provide legal certainty for the decree granting this recognition by default, in terms of its compatibility with the directive, and to grant this a priori recognition only to facilities of sufficient scale and contributing to the achievement of public policy objectives such as those of the NECP. Further simplification must therefore be achieved at the European level.

RISK PREVENTION

With regard to accidental risks, this framework is based on Directive 2012/18/EC (known as Seveso 3) for the general case. It requires operators of facilities handling hazardous substances above the thresholds defined in the directive to define a major accident prevention policy, detailing the operator's overall objectives and principles of action, the role and responsibility of management, and a commitment to continuously improve the control of major accident hazards and ensure a high level of protection. On the basis of this policy, operators are required to draw up a safety report demonstrating that the hazards presented by the facility have been identified, that measures have been taken to prevent them and limit their consequences, that the design, operation, and maintenance of the facility enable the risks to be controlled, and to

[41] *Decree n. 2023-1366 of December 28, 2023, implementing, in mainland France, article L. 211-2-1 of the Energy Code and article 12 of law n. 2023-491 of June 22, 2023.*

present internal emergency plans. This document, updated every five years, is brought to the attention of the competent authorities of the Member State. Finally, the directive stipulates that the public must be informed of the main safety-related aspects of these installations and must be able to participate in decisions concerning the creation of new installations or substantial modifications to them. Specific provisions also apply to the control of urban development around these sites. It should be noted that the Seveso 3 framework does not formally subject the operation of installations falling within its scope to an authorization regime but does provide for the possibility of prohibiting the operation or putting into operation of an establishment, installation, or storage area, or any part thereof, if the measures taken by the operator for the prevention and mitigation of the consequences of major accidents are clearly inadequate, or if prior notifications, safety reports, or other required information are not transmitted in good time. In the context of the energy system, this framework is particularly likely to apply to major thermal power plants and sites producing, refining, or storing fossil fuels as well as renewable or decarbonized fuels.

In the case of nuclear installations,[42] a specific framework applies, set out in Directive 2009/71/Euratom as amended by 2014/87/Euratom. This framework gives considerable latitude to Member States and their independent safety authorities to establish their own safety requirements for nuclear installations, in line with the fundamental principle of Member States' national responsibility, on the basis of which nuclear safety rules have been developed at the international level, as endorsed by the Convention on Nuclear Safety. However, it does lay down common organizational rules: operation subject to the issue of an authorization including a demonstration of safety, a process of periodic verification of the installation's good level of safety and corresponding management systems, and involving the preparation of on-site

[42] *Defined as a nuclear power plant, an enrichment plant, a nuclear fuel fabrication plant, a processing facility, a research reactor, a spent fuel storage facility, or radioactive waste storage facilities that are on the same site and are directly linked to the nuclear facilities listed above.*

emergency plans, provision of the necessary information relating to the nuclear safety of nuclear installations and related regulations for the public and workers, periodic safety reviews, and inspections. Setting the safety framework, issuing authorizations, and carrying out inspections and controls during the operating cycle is entrusted to a safety authority whose effective independence Member States are required to guarantee.

Although these two frameworks have parallels in their objectives and structural approaches, they are implemented according to distinct principles. While the European nuclear safety frameworks show a high degree of harmonization, the result of years of cooperation between independent safety authorities, they follow a deterministic approach. This means that the design provisions adopted by the operator are justified, in particular, by the study of a limited number of design basis accidents and by the application of rules and criteria that include margins and conservatisms. These are complemented by probabilistic safety assessments. In contrast, the Seveso framework offers a greater variety of implementation, both in the level of detail of the analyses to be carried out by the operator and in the balance struck between deterministic and probabilistic interpretations. Some Member States rely mainly on deterministic approaches (implementation of equipment and isolation distances) that are simple for operators to implement but can lead to more costly measures. Others, including France, rely on probabilistic studies that are more complex to carry out and appraise but offer a "tailor-made" analysis of risks and safety measures.

In terms of chronic risk prevention, the European framework derives from the Industrial Emissions Directive (IED Directive, 2010/75/EU), which brings together in a single text the seven previous texts on industrial emissions and the IPPC Directive that preceded it. The guiding principles of the IED framework are as follows:

The use of Best Available Techniques (BAT) in the operation of the activities concerned. BAT must be the basis for defining emission limit values (ELVs) and other permit conditions.

PERIODIC REVIEW OF AUTHORIZATION CONDITIONS

Return the site to a condition at least equivalent to that described in a "baseline report," which describes the state of the soil and groundwater prior to commissioning.

The IED framework provides for an authorization procedure, at the very least for combustion or incineration plants (art. 4). It sets out the minimum content of the permit application file (art. 12), as well as the conditions under which a permit may be granted (art. 14ff). It also coordinates the framework for granting IED authorizations with the more general framework for environmental assessment (see above) (art. 5(3)) and establishes specific arrangements for public participation in the authorization procedure (art. 24). Authorized facilities are subject to a periodic inspection plan (art. 23).

Some Member States, including France, also have a generic framework for the prevention of risks and nuisances associated with the operation of facilities with environmental or accidental impacts. In general, the French system applicable is that of classified installations (L. 511–1 C. Env.), whose authorization system is now integrated into the environmental authorization process resulting from Directive 2011/92/EU. This means that projects are subject to an authorization procedure well below the thresholds for environmental assessment set out in the directive or in the Seveso framework, but allows petitioners to include their projects in a single environmental authorization procedure covering all the issues at stake in terms of environmental impact, risk management, impact on species habitats, and, as we shall see, on water bodies.

Under this single procedure, a single file is submitted to a single administrative office, leading to discussions with a single official within the administration, a single public participation procedure, and, ultimately, the issuing of a single administrative authorization. In the case of basic nuclear installations, given the specificities of the framework for granting a decree authorizing the creation of a basic nuclear installation – which on the one hand is at decree level, and on the other is subject to appraisal by the ASN – this streamlining process, which was completed by law n.2023–491 of June 22, 2023 on the acceleration of procedures relating to the construction of new nuclear facilities near existing nuclear sites and to the operation of existing facilities, has led to the unification of all procedures into two distinct procedures: an environmental authorization procedure on the one hand and the decree authorizing the creation of the facility on the other. It should be noted, however, that in the case of pipelines for the transport of hazardous materials (and energy products in particular), there is generally no harmonized European framework for their authorization in terms of risks, or for the regulation and control of their operating conditions in terms of accidental or chronic risks. Some Member States, including France, have chosen to set up their own national framework in parallel with the environmental authorization of these installations and equipment (L. 555–1 C. Env.).

PROTECTING WATER RESOURCES AND AQUATIC ENVIRONMENTS

The Water Framework Directive (2000/60/EC) does not itself provide for an authorization system but does allow Member States, under the programs of measures they must introduce in each of their river basins in order to achieve good status for water bodies, to subject certain operations impacting on the quality of water bodies to prior authorization regimes, in particular discharges into the environment. Some Member States, including France, have implemented such a system of

prior administrative authorization for installations, works, and developments impacting water bodies. The corresponding regime in France (IOTA regime, art. L. 214–1 C. Env.) governs any *installation, work, or activity carried out for non-domestic purposes by any natural or legal person, public or private, and resulting in the withdrawal of water from surface or groundwater, whether or not it is returned, or a change in the level or flow of water, the destruction of spawning grounds, nursery, or feeding areas for fish, or direct or indirect, chronic, or episodic discharges, run-off, discharges or deposits, even if non-polluting*, thus going well beyond the pure scope of the Framework Directive.

In practice, almost all energy system projects are subject to this regime, at least in terms of excavations, earthworks, and any lifting work required during construction. In France, this system is integrated into the environmental authorization procedure laid down in Directive 2011/92/EU.

PROTECTING NATURAL AREAS AND FORESTS

European law does not in itself provide for a clearing authorization scheme, which in practice refers to the general environmental assessment framework – to which clearing or deforestation operations exceeding a certain size are subject. However, some Member States have their own national frameworks for the protection of their forest areas on an autonomous legal basis, distinct from purely environmental objectives in the sense of those pursued by Directive 2011/92/EU. This is the case in France, which requires prior authorization for any voluntary operation having the effect of destroying the wooded state of a plot of land and putting an end to its forestry use (art. L. 341–1 C. For.).

Since Law 2023–175 of March 10, 2023, on the acceleration of renewable energy production, this system has been supplemented by a second system set out in Articles L. 111–29 et seq. of the French Urban Planning

Code, designed to protect agricultural land. This system, which can be likened to a prior authorization system, is specific to ground-mounted photovoltaic installations – that is, those that are the most competitive and the most likely to be built on the scale required to meet the needs expressed in the NECP trajectories. This system requires the approval of the departmental commission for the preservation of natural, agricultural, and forestry areas unless the project is located in a predetermined zone and complies with technical conditions set out in a departmental framework document drawn up by the departmental chambers of agriculture.

In practice, these national provisions apply to a wide range of energy production projects, primarily photovoltaic (via the dedicated regime for siting on agricultural land) but also to any other project requiring some form of land clearance.

2 Simplifications Introduced by the Emergency Regulation

The scope of the simplifications introduced by Emergency Regulation 2022/2577 of December 22, 2022 is multi-faceted.

First, it introduces for the first time **a homogeneous and all-encompassing definition of the permitting procedure**, understood as covering all relevant administrative permits issued for the construction, re-equipment, and operation of the installations concerned, and integrating all administrative stages from the acknowledgment of receipt of the complete permit application by the competent authority to the notification of the final decision on the outcome of the procedure by the competent authority. For the purposes of the Habitats, Birds, and

Water Framework Directives, it grants **recognition of overriding public interest and interest [relating to] public health and safety to the projects concerned** (art. 3). This is of particular importance, as it gives legal certainty to the validity of this legal criterion for the granting of the derogations provided for by these directives and, in particular, the protected species derogation. The petitioner must always demonstrate the absence of alternatives and the absence of harm to the conservation status of the species in their natural areas, but at least by default they benefit from this recognition, which therefore cannot be called into question before the courts. The framework does, however, allow Member States to restrict the benefit of this a priori recognition according to technical characteristics; we have seen that this is what France has implemented.

Second, the text imposes **maximum timescales** on Member States **for granting permits, including a derogation from Directive 2011/92/EU which allows certain projects to be exempted from environmental assessment, and a one-month "silence means agreement" regime for permits for smaller installations where grid connection capacity allows**. These provisions apply in particular to the installation of solar energy equipment and co-located energy storage facilities, including building-integrated solar installations and rooftop solar energy equipment (art. 4), as well as to the installation of heat pumps (exempt from environmental assessment, art. 7). These provisions have not been fully transposed in France, where there is currently no guarantee that a maximum period of three months will be respected, nor is there any provision to the effect that silence is tantamount to agreement, as provided for in this text.

Third, the text generally provides for the **repowering of existing renewable power plants** to be authorized in less than three months if it does not exceed 15 percent of the initial capacity. Photovoltaic solar power can also be exempted from environmental assessment on a case-by-case basis if it does not require any new land consumption. In this

case, the environmental assessment only covers the environmental impact of the incremental installed capacity, and not the project as a whole, as would be required under the general framework of Directive 2011/92/EU.

Fourth, the text provides for a general exemption from environmental impact assessment for the purposes of the Environmental Assessment Directive (2011/92/EU) or species protection assessments under the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC), for projects located in renewable energy zones designated by Member States and that these zones have been subject to an environmental assessment themselves under program plans. This last provision is extremely important: it enables Member States to identify acceleration zones for which environmental due diligence is carried out in advance, in line with the envelope permit approach. Once these zones have been studied, project developers can very quickly deploy installations there, as they are exempted from carrying out impact studies, which generally take at least a year, and benefit from a greatly reduced legal risk, since classic contentious grounds, such as the inadequacy of the impact study, or the reasons for the opinion of the environmental authority, would cease to apply. In absolute terms, exemption from environmental assessment also implies exemption from public participation, which, in practice, would make the authorization process in these areas purely declaratory – even if, in practice, considerations of local acceptability generally make such consultations useful and necessary.

France's law n.2023–175 of March 10, 2023, on the acceleration of renewable energy production, provides a particularly sophisticated framework for the identification of renewable energy acceleration zones, introduced in Article L. 141–5-3 of the Energy Code.[43]

[43] *Christine Le Bihan-Graf and Pierre Jérémie, "Les principales mesures de la loi relative à l'accélération de la production d'énergies renouvelables" [The main provisions of the law on accelerating the production of renewable energy], Énergie,-Environment-Infrastructures (LexisNexis review), 5, May 2023.*

The process for drawing up these zones, which stems from Parliament's express desire to build on the decentralized organization of French institutions, proceeds from the bottom up, leaving the initiative for proposing them to the communes, and providing for a process of integration into higher-level land-use planning documents: SCoT, PLU(i) at the level of the competent public inter-municipal cooperation establishments, then articulation with the regional level (SRADDET, and examination of the zone aggregation by the regional energy committee). In this exercise, we deliberately chose not to link the definition of these zones to the achievement of the renewable energy development targets set out in the NECP. On the one hand, this is because there is nothing a priori to enable a public authority to judge the *fair* contribution of a given territory to these objectives, which is the subject of market signals and free determination by developers on the basis of the physical characteristics, development costs, and relevance of a given territory. On the other hand, if it were legally stipulated that the aggregation of zones would be sufficient to achieve the EPP objectives, this would make the rest of the territory *de facto* off-limits to renewable projects, since it would then no longer be possible to demonstrate the absence of alternatives and the necessary nature of projects to achieve objectives of major public interest, and therefore to grant them protected species exemption.

The experience of the next few years will show whether this organizational choice, which leaves the initiative to local authorities, will have borne fruit beyond the relative initial enthusiasm of Parliament and local authority associations in terms of the volume of identified zones and renewable deposits placed under this regime. The fact remains, however, that the French legal framework does not go all the way in terms of the facilitations provided for in Emergency Regulation 2022/2577. In particular, the exemption from environmental assessment and flora and fauna studies for projects located in these zones has not been introduced in French law, despite the fact that it is at the heart of the simplifications made possible by this innovative scheme, and that its

implementation in French law theoretically requires only regulatory-level acts. Today, the main impact of the definition of these zones is to guide the actual deployment of projects in them, insofar as it is planned to grant a bonus in the selection criteria for calls for tenders for public support to projects located there, and to grant certain marginal procedural simplifications, notably regarding public participation.

3 How Does the Support Scheme for Energy Production Facilities Work within the EU?

When it comes to support for energy production facilities within the Union, there are generally two types of aid:

1. **Investment aid:** This aid is granted at the time of the final decision to invest in a given activity or project. It can take the form of tax exemptions or reductions, or direct subsidies granted at the time of the investment decision and subject to conditions linked to commissioning.
2. **Operating aid:** This aid is determined by the performance of a given activity and its main economic parameters. It is subdivided into direct and indirect operating aid.

Indirect support schemes are often based on certificate obligation mechanisms imposed on certain market players (consumers or suppliers). These players are obliged to acquire certificates, which are granted to the operators of the activity targeted for support, in proportion to their production in this area (as in green certificate schemes).[44]

[44] One example of this type of mechanism is the French biomethane production certificate scheme.

Historically, the most traditional mechanism for direct aid was feed-in tariffs. Under these schemes, subsidized producers benefit from a contract with an obliged buyer who is required to purchase their production at a price set by the authorities. The purchaser is then compensated by the public authorities for the costs incurred as a result of this purchasing obligation.

This mechanism has been widely used to support the production of renewable electricity, but it is now mainly reserved for small-scale facilities due to its simplicity for project developers.

The advantage of this approach lies in the fact that it maintains a risk linked to production volume, encouraging projects to locate in areas offering the best potential while at the same time offering a high degree of visibility on the plant's cash flows, which facilitates investment decisions and project bankability. **However, it does have a number of drawbacks: it does not expose project owners to price signals from the spot electricity market, which can lead them to produce at times when their output has a negative value for the community. Furthermore, as the tariff is set administratively on the basis of a target rate of return for a facility deemed "typical," it can lead to over-remuneration of the most efficient projects compared to facilities modeled by the public authorities**.

This approach has gradually been supplemented by *"complément de rémunération"* approaches, whereby the project developer holds a CfD with a public third party. The strike price is determined through competitive auctions, which select the facilities capable of producing a given volume of renewable energy at the lowest cost. The project owner then sells all its production on the market at the market price, and the public counterparty compensates for the difference between the strike price and the realized selling price through a financial payment proportional to the volumes sold. The realized selling price is determined on the basis of a normative basket of market products defined *ex ante*.

This approach is now deployed for almost all major renewable electricity projects (onshore wind, offshore wind, photovoltaic, small hydro, etc.). It allows the project owner to carry a volume risk, encouraging them to position themselves on the best sites in terms of deliverability while making them aware of market prices. This encourages them to find the best sites in terms of production profile (those that enable them to beat the "price achieved by selling electricity on the market"), thus ensuring full participation in the market for all volumes of electricity produced.

Beyond this simple description, it is important to point out that these mechanisms are extremely varied, reflecting the specific public policy choices made by Member States. This diversity can be seen both in the selection conditions in the call for tenders, which may include their own eligibility or rating criteria (non-price rating criteria designed to take account of environmental issues, local acceptability, industrial policy, etc.), and in the exact format of the remuneration top-up, which may be symmetrical (e.g., the price of the feed-in remuneration may be set at a certain level), as well as the exact format of the remuneration supplement, which can be symmetrical (the renewable facility returns the value created above the strike price when market prices are higher) or asymmetrical (it keeps it, but will in theory offer its electricity on average for a lower strike price in the tender), include various caps or trimming clauses on the amounts paid, etc. This wide variation can be observed both between Member States, and between support mechanisms for different sectors within the same Member State.

These two classes of mechanism constitute direct price support schemes. To these should be added capacity payment schemes, i.e., payments conditional on maintaining the availability (and a minimum level of participation in the energy market) of facilities, particularly those contributing to maintaining supply security. These schemes also make the same distinction between schemes providing for the payment of a fixed capacity premium, and schemes providing for capacity payments

"for difference," with a valuation – where such a market exists – of availability on a "capacity market," and payment of a remuneration supplement, constructed as the difference between the market price and the exercise price of the support scheme, most often determined in a competitive procedure. This latter approach is notably the one that has prevailed in France for aid to load shedding under the system of calls for tenders for load shedding (SA.48490).

These different economic definitions are linked to the legal definition of state aid, which is based on four cumulative criteria: state aid (i.e., involving state resources), conferring a selective advantage on certain companies or products, affecting competition, and affecting intra-European trade. Schemes falling into this category – as is the case a priori for any direct aid mechanism – are then subject to prior approval by the European Commission under its powers enshrined in Articles 107 and 108 of the Treaty.

4 Stabilizing Support Contracts for Low-Carbon Energies

It is essential to protect project developers against the temptation of Member States to use legislation to modify the terms of current support schemes, which could upset the economic equilibrium of plants that have already been built or have already made their final investment decision.

Such retroactive changes are particularly value-destroying and seriously undermine the cost-effective deployment of the transition. Not only do they have immediate economic impacts on committed projects, but they also increase the perceived risk for all future investments in the

Member States concerned. This increased risk translates into a "risk premium" in the weighted average cost of capital (WACC) of future projects, thus increasing the overall cost of financing the energy transition. **An economy's ability to develop and attract investment is measured prima facie by the guarantees it provides of strict respect for property rights and the full application of contracts: support contracts concluded in the context of aid for the transformation of our energy systems are no exception**.

Over the course of the 2010 decade, Spain, Italy, and the Czech Republic called into question their photovoltaic support frameworks, initially based on laws guaranteeing "reasonable profitability rates" (Spain), "fair returns" (Italy), or payback periods (Czech Republic), and regulatory texts setting feed-in tariffs accordingly. Italy and the Czech Republic reduced their feed-in tariffs retroactively, while Spain proceeded in two stages, with more cautious revisions for the oldest aids, prior to 2013. These revisions gave rise to a very dense arbitration dispute under the Energy Charter Treaty.[45] In 2013, 2016, and 2019, Spain was the most litigated country in the world before the International Centre for Settlement of Investment Disputes. In practice, the effects of the planned measures have largely been nullified by these appeals, as well as by those before national and European courts.

The French authorities have also tried their hand at retroactively modifying feed-in tariff contracts, with a retroactive revision of the 2006 and 2010 photovoltaic feed-in tariffs (commonly known as "S06-S10") provided for in Article 181 of the 2021 Finance Bill. After a contentious battle, which, as in previous cases, turned out to be more beneficial for specialist lawyers than for public finances, the French government took note of the Conseil d'État's decision on January 26, 2023, and decided,

[45] *Maximilian Schmidl, "The Renewable Energy Saga from Charanne v. Spain to The PV Investors v. Spain: Trying to See the Wood for the Trees," Kluwers Arbitration Blog, February 1, 2021, https://arbitrationblog.kluwerarbitration.com/2021/02/01/the-renewable-energy-saga-from-charanne-v-spain-to-the-pv-investors-v-spain-trying-to-see-the-wood-for-the-trees/, accessed February 14, 2025.*

in mid-2023, to abandon the revision of photovoltaic contracts affected by the 2006 and 2010 tariff decrees (S06-S10).

These precedents suggest that support contracts for renewable projects are sufficiently protected, either by national law or by the application of the Energy Charter Treaty. However, it may be objected that the failure of the first attempts has not discouraged Member States from repeating the experiment and, more fundamentally, that the coordinated exit of EU Member States from the Energy Charter Treaty mitigates this protection.[46] The Renewable Energy Directive (2018/2001/EU) includes a provision in Article 6 that attempts a point of balance, bearing the principle that *"Member States shall ensure that revision of the level and conditions of support granted to renewable energy projects does not adversely affect the rights conferred or compromise the economic viability of projects already receiving support,"* while recognizing that *"Member States may adapt the level of aid in accordance with objective criteria, provided that these criteria were foreseen at the level of the original design of the aid scheme."*

It would seem appropriate to provide a much stricter framework for the application of public law contracts awarded as part of the support measures included in the NECP, particularly to prevent any unjustified retroactive modification. In this respect, and in line with Proposal 10 of the first note on the reform of European energy and climate governance, the provisions of Article 6 of Directive 2018/2001 would be repealed and substituted within the EESA proposed here, in accordance with the following provisions.

In practice, it should only be possible to retroactively amend public law contracts entered into under support measures included in the NECP in a way that reduces the level of aid, in accordance with objective criteria laid down in the original design of the aid scheme, following a public

[46] *There is a legal debate about the continued applicability of the Energy Charter Treaty to projects decided in a State Party before it withdrew from the Treaty.*

consultation procedure enabling all parties to express their positions, and with the prior reasoned agreement of the European Commission, assessing, in particular, the long-term impacts on the cost of financing the energy transition.

More radically, it could be envisaged that in the event of a Member State's failure to honor its commitments under the NECPs approved by the Commission, these contracts would benefit from a guarantee provided by the European budget, which would then have the option of turning to the Member State in default to recover the sums due. Member States would thus be deprived of a "right to remorse," enabling them to reconsider ex post aid that has already been granted if it proves to be ill-calibrated. This would imply greater responsibility on their part in the granting and sizing of support, insofar as either the aid could reasonably have been determined to be disproportionate at the time of its creation, in which case responsibility lies with the Member State and not the beneficiary, or its disproportionate nature is the result of a favorable evolution in market circumstances to the benefit of the aid recipients, which is the normal remuneration for the risk taken (in compensation for cases where adverse circumstances would have degraded their return on investment), which it is profoundly illegitimate to seek to take away from them.

This development is the tenth proposal of the first note in our series on energy priorities for the new European term.[47]

[47] *Cordiez, Jérémie, and Carbonell, "L'Europe de l'énergie à l'heure du pragmatism" [Europe's energy in the age of pragmatism].*

5 Harmonizing Support Mechanisms for Low-Carbon Energies in Europe

The operating principles of the various support schemes for low-carbon energy production in the European Union still vary significantly from one Member State to another. This is legitimately the result not only of Member States' own competencies in terms of developing the various sectors in their energy mix and their budgetary autonomy but also of the sedimentation of historical choices in organizing support schemes or heterogeneous approaches that often predate the latest rounds of European harmonization under the Third Package (2009) and then the Clean Energy Package (2018–2019).

Faced with this situation, the European Commission has endeavored to ensure greater coordination and standardization of national support schemes, on the one hand through its own competencies in the field of state aid, and on the other through sectoral legislation.

With regard to state aid, the guidelines on state aid for climate, environmental protection, and energy for 2022[48] set out, in line with the 2014 guidelines, general principles that have been extended beyond the renewable energies framework to *"projects to reduce and eliminate greenhouse gas emissions, including through support for renewable energies and energy efficiency,"* in particular the granting of aid through a competitive procedure open to all eligible beneficiaries (par. 103–104) above certain thresholds (par. 107), with limited allotment possibilities derogating from the principle of neutrality between all eligible beneficiaries (par. 104), and based on objective, transparent, and nondiscriminatory selection criteria, within which non-price criteria may not exceed 30 percent. Similarly, the guidelines give preference to investment aid,

[48] *Communication 2022/C 80/01.*

reserving operating aid for cases where the Member State demonstrates *"that this will result in more environmentally friendly operating decisions."* Finally, the guidelines allow considerable latitude in the form of aid, *"in particular immediate grants and contracts for current aid payments, such as compensatory deviation contracts (CfD)"* (par. 121).

Over and above these general principles, the Commission has established consistent principles in its decision-making practice with regard to both renewable schemes (e.g., in decisions SA.50272, SA.45274, SA.45275, SA.45276, SA.47246, SA.47247 and SA.48007 for France, which established a stable framework for assessing aid to renewable energies, essentially foreshadowing the additions introduced by the 2022 guidelines), as well as support schemes for new nuclear power projects, for which the *Hinkley Point C* (SA.34947) and *Dukovany II* (SA.58207) decisions were taken. Certain common principles emerge from these decisions: the Court of Justice's ruling of Sept. 22, 2020 on the *Hinkley Point C* case indisputably confirmed the full compatibility with European law of support for the development of nuclear power on the grounds of its contribution to combating climate change.[49]

In terms of sectoral legislation, the main provisions already in place for low-carbon energy production schemes are those set out in the Renewable Energies Directive (2018/2001) and those recently added in the Electricity Market Design Regulation (2024/1747).

The framework of the Renewable Energy Directive stipulates that *"Support schemes for electricity from renewable sources shall be designed to ensure the optimal integration of such electricity into the electricity market and to ensure that renewable electricity producers respond to market price signals and maximize their revenues from the market"* (art. 4(3)), and generally provides that *"aid shall be granted for electricity produced from renewable sources in an open, transparent, competitive, nondiscriminatory,*

[49] *See paragraphs 30 to 33, Hinkley Point C, Sept. 22, 2020, C-594/18 P.*

and cost-effective manner" (art.4(4)). Certain exemptions are provided for, particularly to ensure geographical diversification and for small-scale installations. Finally, since the amendment of Directive 2018/2001/EU by Directive 2024/1711/EU, it has been stipulated that in the case of *"direct price support schemes, the aid [shall] be granted in the form of a market premium which may be, inter alia, variable or fixed."* This enshrines the general principle of remuneration supplement contracts, in addition to the participation of supported producers in the electricity market, and not of purchase obligation schemes, which see their production purchased in toto by a centralized buyer.

The Electricity Market Design Regulation (2024/1747/EU), for its part, introduced more precisely by creating a new Article 19d in Regulation 2019/943/EU, the obligation that *"Direct price support schemes for investments in new electricity generation installations to produce electricity from the sources listed in paragraph 4* [i.e., all low-carbon technologies][50] *shall take the form of two-way contracts for difference or equivalent mechanisms with the same effects."* This obligation applies in general to all contracts under direct price support schemes for investments in new electricity generation concluded on July 17, 2027: only small plants and demonstrators are allowed to derogate from it.

What the bidirectional nature of these contracts for difference implies is that the resulting financial flows are linked to consumers: When market prices exceed the strike price, the revenues must be redistributed to all consumers, and when they are lower, it is the consumers who compensate the producers for the shortfall. The solution proposed by the Commission thus enables[51] support for new plants to be used as a stabilizer for

[50] *Excluding dam lake hydropower, which has specific economic characteristics that justify different treatment.*

[51] *Pierre Jérémie, Laure Rosenblieh, and Léa Boudinet, "L'article 19b du règlement Electricity Market Design au cœur de la réforme du marché intérieur de l'électricité" [Article 19b of the Electricity Market Design regulation is at the heart of the reform of the internal electricity market.], Énergie,-Environment-Infrastructures (Lexis-Nexis review), 3, February 2023, https://www.de-pardieu.com/larticle-19b-du-reglement-electricity-market-design-au-coeur-de-la-reforme-du-marche-interieur-de-lelectricite/, accessed February 14, 2025.*

consumers' bills, ensuring that the share of their supply provided by new plants under remuneration supplement is fixed-price in practice, through the effect of these two-way flows, while ensuring that all volumes participate in the smooth running of the spot market. It ensures that Member States are encouraged to seek out the most competitive mix of new installations under this type of contract, since national consumers will be directly exposed to the strike price basket of contracts existing in their local market for a share of their supply. This calls for great responsibility in the technological choices for the energy transition.

In addition to this obligation, Recital 35 also provides the clear possibility of using this class of support for existing plants, again with complete technological neutrality: *"Where Member States decide to support publicly funded investments in new low-carbon non-fossil fuel power generation facilities with direct price support schemes in order to meet the Union's decarbonization objectives, these schemes should be structured as two-way contracts for difference or equivalent mechanisms with the same effects so as to include, in addition to a revenue guarantee, an upward limitation on the revenues they derive from the market through the generation assets concerned."* Member States thus have the option of ensuring the same link, through two-way contracts, between existing assets and consumers, when they decide to support investments in the latter.

Of course, neither this recital nor Article *19d* of the Regulation at any point prohibits Member States from supporting these facilities by any means other than direct price support schemes. If they freely choose not to use a price support approach but rather investment aid or any other aid organization scheme, this remains entirely possible as long as the scheme falls within the Commission's analysis criteria for state aid.

Finally, the Electricity Market Design Regulation (2024/1747/EU) includes the first additions to the framework for flexibility support (art. 19 *nonies* of Regulation 2019/943/EU): these provisions are very general in nature, and do not prescribe a specific approach to the economic organization

of such support. However, these provisions include the obligation to use "an open, transparent, competitive, voluntary, nondiscriminatory, and cost-effective procedure" to set "a minimum level of participation in the electricity markets for activated energy, which takes into account the technical particularities of the asset offering flexibility" and to limit *"new investment in non-fossil fuel flexibility resources such as active demand response and energy storage"* to *"what is necessary to achieve the national indicative target"* for flexibility in *a cost-effective manner*.

6 How Certificates for the Incorporation of Renewable or Low-Carbon Energy Sources Work

Certificates of incorporation are issued by a regulatory authority to players who can demonstrate that they have incorporated energy products into the energy put into circulation that meet certain characteristics, either due to their nature (biomethane under the French CPB scheme), or their properties (their renewable nature, compliance with a certain carbon intensity, biomass sustainability criteria, etc.). Member States may require suppliers in different sectors[52] to present a certain quantity of certificates for each period in proportion to the volumes of energy put up for sale over that period.

Certificates of incorporation can be traded between players who have incorporated more or less energy into their mix and who must meet targets set by the public authorities. Exchanging certificates on a market gives them a price, which represents the cost to the community of

[52] *Gas for buildings in the case of CPB in France, energy for transport in the case of the French TIRUERT, or the SICBIOS mechanisms in Spain and BioKraftQuG as well as the carbon content obligation system in Germany.*

complying with mandates to incorporate a share of energy meeting certain criteria in a given sector or for a given energy carrier. In order to prevent certain specific issues – such as competition with food or industrial uses of biomass – the eligibility of certain certificates is then capped. This limits the energy incorporation of dual-use products (animal or vegetable fats, first-generation bioethanol, etc.), while to promote certain uses or certain sectors, the value of certain certificates can be multiplied by coefficients.

The various certificate schemes have a number of common features. First and foremost, they share the same legal objective: to meet the sector-specific targets for reducing the carbon intensity of energy or the renewable share set out in the Third Renewables Directive (2023/2413/EU), i.e., the objectives set out in Articles 22a and 22b for energy for industrial use, Article 23 for energy for heating and cooling in buildings, and Article 25 for the transport sector. **They are also based on the same economic rationale:** through each of these mechanisms, the Member States create a market-based instrument that ensures compliance with the relatively sophisticated mandates resulting from the negotiation of these texts at the lowest cost to the community, taking into account their own national preferences for the various sectors they wish to promote. The rules for accounting for the contributions of different products to the targets set out in the directive are precisely defined in the directive (Article 27 for transport), and the rules for product certification are also precisely defined at the European level (Article 29, delegated acts under Article 26), with a very high level of harmonization. **Finally, these certification mechanisms apply to highly standardized energy products**, both in terms of the characteristics of the energy carriers marketed (specifications for fuels, networked gas, etc.), and of the products incorporated. All these products circulate freely within the European internal market, are transportable via dedicated logistics widely deployed throughout the Union and even benefit from finely harmonized tax rules through the general excise duty regime (2008/118/EC).

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Energy is at the heart of the new European Commission's mandate. The previous term was marked by a succession of crises but it also managed to define a common ambition of achieving net zero by 2050: a 55 percent reduction in greenhouse gas emissions by 2030 compared to 1990 levels and new sector-specific policies, "Fit for 55" legislative package, to achieve them.

The first paper in our series highlighted the need for a new energy-climate governance to achieve carbon neutrality by 2050. However, **replacing 70% of energy produced by fossil fuels is a massive task and will require a rapid and coordinated deployment of infrastructures dedicated to low-carbon energies** (transformation, transport, distribution and storage). **Networks are an essential element of our decarbonization efforts**. If they are not adapted, the EU will be faced with bottlenecks slowing down the transition and leading to additional costs that will be harmful to consumers and industry.

This second paper puts forward solutions to achieve this in the form of a new European Energy Security Act (EESA). It would harmonize and unify administrative processes and support mechanisms in a bid to **simplify existing regulation and processes**, within a homogeneous framework with clear time limits. It would also give the Commission a role of 'mediator' to ensure that there is no over-transposition. It would also encompass all energy carriers of the transition (electricity, liquid and gaseous fuels, low-carbon heat) to secure their **financing and economic model** – through a standardisation and systematisation of existing support mechanisms; by giving the European Investment Bank (EIB) a greater role in financing low-carbon energy; and, building on the success of InvestEU, by mobilising the European guarantee to free up private investment. Lastly, the EESA would create a new European financing instrument for networks, to meet the challenge posed by their considerable needs.

Against this backdrop, Institut Montaigne is putting forward three action papers to contribute to the ongoing debate on Europe's decarbonization efforts. This second note focuses on the acceleration of low-carbon energy infrastructure. It will be followed by a third paper devoted to energy markets and making the European electricity system fit to deploy renewable energies.

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