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The European Union's electricity transition: progress and challenges

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The transition of the European power system is a key element in achieving carbon neutrality and supporting the Union's competitiveness. Despite a significant acceleration of the transition following the energy crisis and implementation of the RepowerEU Plan, 2030 targets remain highly ambitious. A number of challenges must be addressed in order to succeed, including the timely deployment and integration of renewable electricity production, the alignment with the green reindustrialization agenda, and the political and public appropriation of this transition, which has been put under pressure during the recent energy crisis.

KEY MESSAGES

By 2023, low-carbon energies (renewable and nuclear) accounted for two-thirds of the European electricity mix, leading to a 20% reduction in CO_2 emissions due to the decline of coal power. At the same time, consumption has fallen markedly as a combined result of sufficiency and efficiency policies, along with the phenomenon of demand destruction in the energy sector.

The EU is aiming to reduce the share of fossil fuels power generation to less than 20% by 2030, while achieving 70% renewable electricity. This will require a doubling of the rate of wind power installation and the perpetuation of the record expansion of solar capacity achieved in 2023.

In a context of intense international competition, it is essential to clarify the position of renewable energy in Europe's industrial strategy: while solar energy is currently benefiting from increasing political support, robust measures are required to protect the European wind industry, without neglecting to consider the challenges associated with the massive deployment of network infrastructure.

The transition also necessitates the continuation of electricity market design reforms, with a delicate balance to be struck between the need to meet the challenges of integrating renewable energies through increased flexibility, and the ability to ensure competitive and accessible prices for the range of different consumers (particularly industry and households).

At the political level, the energy crisis has reinforced the need for a strong strategic vision and narrative on the role of the power system transition as a key factor for European competitiveness and resilience, while also paying attention to the need for strengthened local ownership and acceptance of projects.

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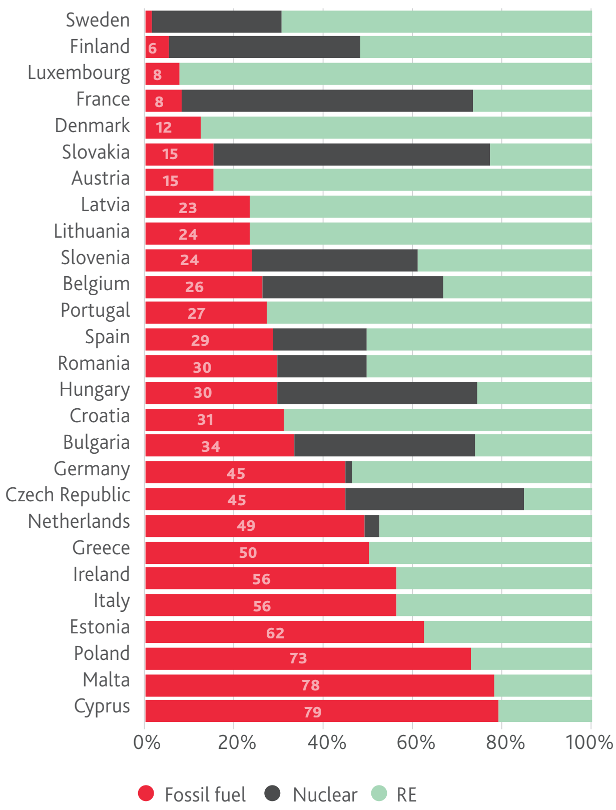
1. RECORD EMISSIONS REDUCTIONS IN THE EUROPEAN ELECTRICITY SECTOR IN 2023

Greenhouse gas (GHG) emissions from Europe's electricity sector fell by 20% in 2023, due to a considerable reduction in fossil fuel generation. For the first time, low-carbon energies accounted for two-thirds of European electricity production, while the share of fossil fuels fell to only a third. As shown in **Figure 2**, fossil fuels now account for less than a third of the electricity mix in 16 Member States.

The rapid shift towards decarbonization is due to a combination of factors (**Figure 3**), including the decline in fossil fuel generation (down by 209 TWh)–which is particularly striking for coal, with a fall of 26%. This has primarily been offset by the rapid development of renewable energies (RE): solar and wind generation has increased by 90 TWh in 2023 (81 TWh in 2022), equivalent to the electricity consumption of Belgium.

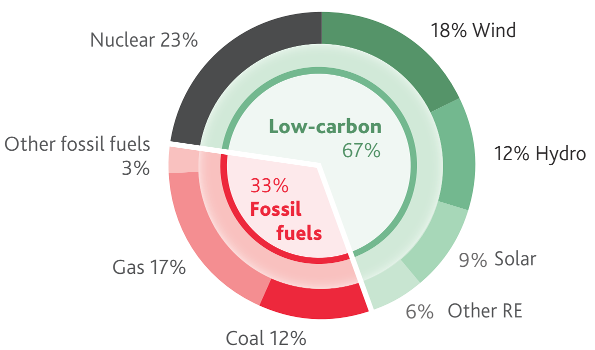
Another factor is the very sharp decrease in consumption: an 82 TWh reduction compared to 2022, and as much as 186 TWh compared to 2021. This trend can be explained largely by improvements in energy efficiency and sufficiency. However, a significant proportion (40%) also reflects the more concerning phenomenon of demand destruction in the industrial sector, linked to the steep hikes in market prices during the energy crisis, which goes against the electrification pathway that the EU is pursuing.

FIGURE 2. Electricity mix by source in 2023 in the EU Member States



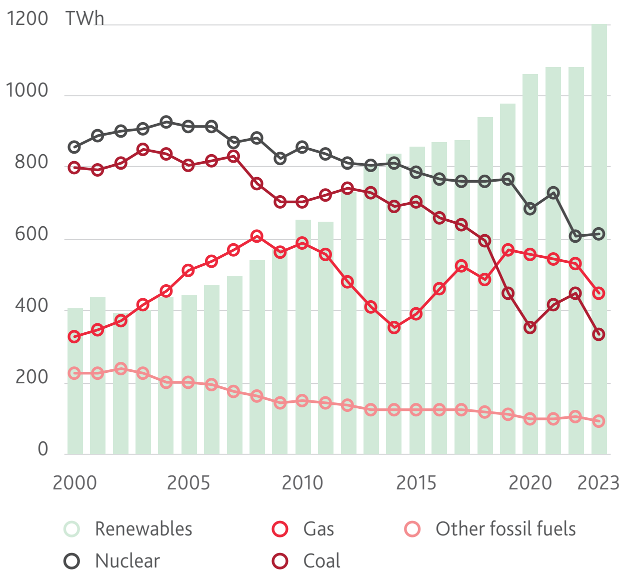
Source: IDDRI, data Citepa 2021.

FIGURE 1. Electricity generation in the European Union in 2023 by source



Source: IDDRI, data (Ember, 2024b).

FIGURE 3. Annual electricity generation in the European Union by energy source



Source: IDDRI, data (Ember, 2024b).

2. HIGHLY AMBITIOUS TARGETS FOR 2030

Following the energy crisis and the RepowerEU plan, low-carbon electricity generation and electrification were acknowledged as key levers for resilience and the drive to reduce dependence on imported fossil fuels. The latest revisions of the National Energy and Climate Plans (NECPs) have therefore resulted in a ramping up of ambition, with targets increasing by 45% for wind power and 70% for solar power on average compared to 2019 (Ember, 2024a).

At the European level, the RePowerEU plan calls for the share of renewable energies to reach 70% of the European electricity mix by 2030, up from 45% in 2023 (European Commission, 2022, p. 23). At the Member State level, 14 countries are aiming to achieve a renewable share of between 70% and 100% of their electricity mix by 2030,[1] while 25 are expected to attain over 70% low-carbon electricity (Ember, 2024c).

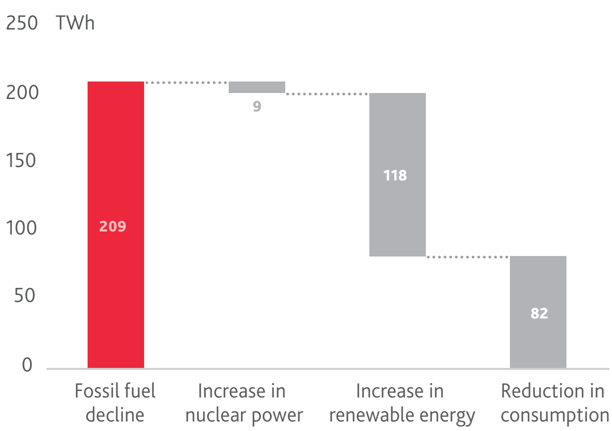
Achieving these targets will require the deployment of solar and wind power capacity in Europe on an unprecedented scale (**Figure 4**):

— for photovoltaic solar energy, the record rate of development achieved in 2023, i.e. 56 GW, must be the average rate that is maintained for the next 7 years;[2]

— for wind power, the objective is to double 2023's growth rate, i.e. to move from 16 GW to 33 GW annually, with an increasing share for offshore wind power.

Taking other renewable sources and nuclear power into account, this deployment should ensure an 80% or more decarbonization of the electricity mix by 2030, while meeting the electrification requirements (EEA/ACER, 2023, p. 12). In a similar way to the projections for France, the scenarios of the European Network of Transmission System Operators for Gas and for Electricity forecast an increase in electricity demand of 10 to 25% between now and 2030 (ENTSO-E/ENTSOG, 2024a).[3]

FIGURE 4. EU electricity mix changes between 2023 and 2022



Source: IDDRI, data (Ember, 2024b).

3. ENSURING A SUCCESSFUL ELECTRICITY TRANSITION: SIX CHALLENGES FOR EUROPE

3.1. Clearly define the integration of renewable energies into European industrial strategy

The power system transition is a central challenge for Europe's green and net-zero industry strategy, both to ensure its sovereignty over key technologies and sectors, and to facilitate the electrification of industry in the decades ahead.

Regarding industrial sovereignty, many unanswered questions remain, despite the guidance provided by the regulations in the Net-Zero Industry Act, adopted on 27 May 2024 (European Commission, 2024). The cross-cutting objective of manufacturing "at least 40% of the annual needs" for the deployment of so-called "strategic" technologies in Europe is an important marker, but it must be adapted according to the challenges and market realities of the various sectors and technologies, based on three complementary approaches:

— the first relates to geopolitical risks, inducing the need to reduce the risks associated with an overdependence on certain countries or regions, by diversifying (for raw materials) and developing domestic industrial capacity to meet at least a limited proportion of domestic demand, while ensuring that domestic production can be rapidly ramped up in the event of a geopolitical crisis;

— the second approach concerns the political ambition embodied in the idea of "industrial sovereignty", aimed at securing a large market share for European manufacturers "at any cost". Indeed, faced with a price differential that is sometimes significant, the ambition of industrial sovereignty can require strong subsidies for both the upstream (development of industrial capacities) and downstream (support for electricity generation) segments of the sector, at the risk of rapidly depleting public finances (particularly in a period of budgetary austerity), eventually jeopardizing the achievement of deployment targets;

1 Lithuania, Estonia, Denmark, Austria, Portugal, Greece, Sweden, Ireland, Croatia, Spain, Latvia, the Netherlands, Germany and Italy. These countries account for 60% of European electricity consumption.

2 As an illustration, 650 GW of photovoltaic power corresponds to an average of around 1.4 kWp (or 8 m² of panels) installed per European Union inhabitant.

3 It should be noted that the EU Action Plan for Grids, published at the end of 2023, refers several times to an increase of "60% by 2030". This is an error: this is the trend indicated by ENTSO-E for 2050 (European Commission, 2023).

— finally, the third pertains to the strategic positioning of European industry in increasingly competitive global markets: should the EU be present across the entire value chain for every technology that is regarded as "strategic"? Or should resources be concentrated on establishing leadership in certain cutting-edge, high added-value segments, such as technologies for integrating renewable energies into the electricity system or offshore wind energy?

As for photovoltaics, Europe seems to oscillate between these positions. On the one hand, the European Solar Photovoltaic Industry Alliance, launched by the EU Commission in 2022, aims to increase the market share of European manufacturers to over 50% as early as 2025 (compared with 3% today), driven by strong European-wide political support for "gigafactories";[4] on the other hand, the competitiveness of European manufacturers is currently being undermined by Chinese overcapacities, which have led to a 50% drop in module prices over the last 12 months (PVXchange, 2024). Moreover, the level of ambition remains an order of magnitude below that of China: the Chinese manufacturer JinkoSolar plans to build a 56 GW factory for 2025, whereas the largest European factories are aiming for individual capacity of around 5 GW (pv-magazine, 2024).

The situation is reversed for wind power: until recently, the European industry was the global leader, but its market share is now shifting towards China.[5] This also applies to the domestic market: European manufacturers have clearly dominated the market so far (85%), but competition from China has increased sufficiently to trigger a strong political reaction.[6]

Furthermore, a growing gap seems to appear between the political ambition of the transition (requiring a doubling of the wind power deployment rate) and the strategy of European manufacturers, which seems more focused on consolidating their business models given the current economic difficulties.[7] A recent report on Europe's wind industry concludes that European demand could exceed domestic manufacturing capacity as early as 2026, with imports reaching 50% by 2030 (WindEurope & Rystad Energy, 2023). In other words: preserving the European wind energy market requires both strong political support for wind energy and a clear commitment by the industry to expand supply.

[4] The European Solar PV Industry Alliance's action plan calls for up to 30 GW of module production to be achieved by 2025, while deployment targets are in the region of 55 to 60 GW annually. The alliance currently has around ten projects in Europe.

[5] According to Enerdata, the market share of Chinese turbine manufacturers has risen from 46% in 2021 to 66% in 2022; China now accounts for two-thirds of capacity additions worldwide (77 GW of wind power installed in 2023, compared with 17 GW in the EU [Enerdata, 2024]).

[6] Chinese manufacturers are offering tariffs advertised at -20%, which has led the European executive to launch an investigation into Chinese manufacturers and potential anti-competitive practices (EnergyWatch, 2024).

[7] European turbine manufacturers have endured several difficult years, due to rising raw material costs and reduced financial margins, as well as bottlenecks caused by delays in awarding tenders and implementing projects (WindEurope & Rystad Energy, 2023).

Conversely, the success of Europe's power system transition will largely be measured by its ability to meet the massive electrification needs of industry, while providing competitive prices, with a need to clarify the strategic approach adopted.

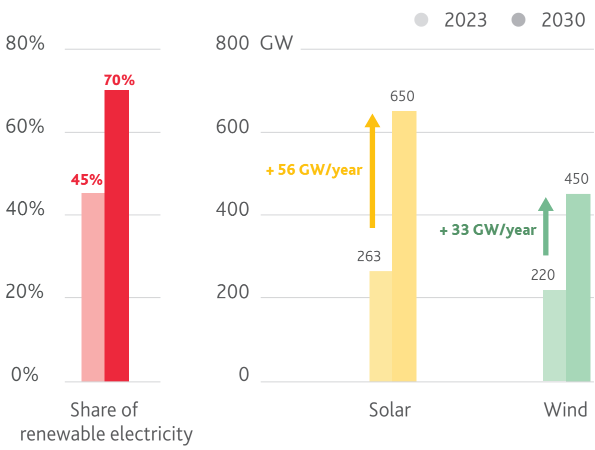
Indeed, the energy crisis has led to a fragmented landscape of national approaches aimed at reducing electricity costs for industry, generating a need for European harmonization to avoid the effects of increased competition among Member States, rather than in relation to external competitors (Jäger, 2023). A roadmap for industrial electrification should also enable the identification of measures that can promote synergies between European industry needs and the power system transition, such as the development of low-carbon electricity portfolios that could provide stable and competitive prices for industrial actors (DIW, 2024). Finally, in connection with future electricity market reforms (see section 3.4), this strategic reflection should also address distributional aspects, particularly in view of the parallel desire to promote industrial competitiveness and protect residential consumers (Bruegel, 2024).

3.2. Doubling flexibility requirements: the new cornerstone of the European power system

The accelerating development of variable renewable energy (VRE) will profoundly change the way the European electricity sector operates. Wind and solar power could account for up to 55% of Europe's electricity mix by 2030, with a total installed capacity (1,100 GW) equivalent to twice Europe's peak electricity demand. According to a report by the European Environment Agency (EEA) and the Agency for the Cooperation of Energy Regulators (ACER), the need for flexibility could double over the decade, with a particularly pronounced need for intra-day flexibility, in line with the boom in photovoltaic energy, as shown in **Figure 5** (EEA/ACER, 2023).

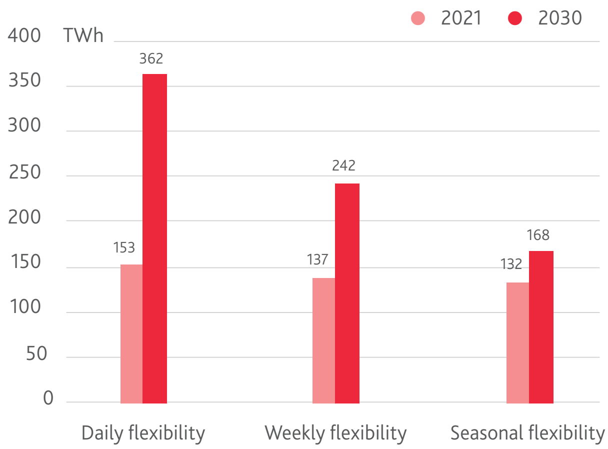
The need for greater flexibility across seasons remains lower due to the overlapping effects of production from photovoltaics

FIGURE 5. 2023 status and 2030 targets (in % and GW) for renewable electricity in the EU



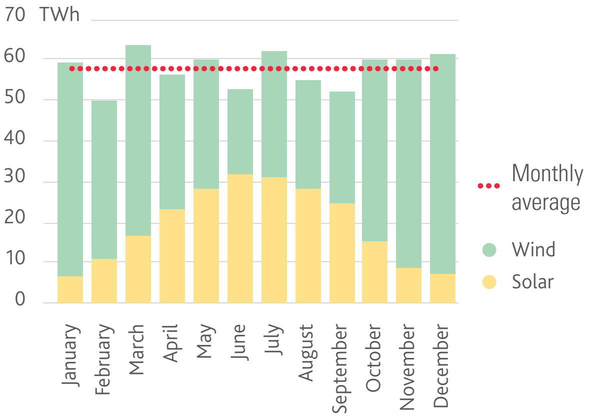
Source: IDDRIO, data CE, (Ember, 2024b).

FIGURE 6. Flexibility requirements of the European electricity system in 2021 and 2030



Source: IDDRI, data (EEA/ACER, 2023).

FIGURE 7. Monthly European wind and solar generation at the European level in 2023



Source: IDDRI, data (Ember, 2024b).

(higher in summer) and wind power (higher in winter) on a European scale. As shown in **Figure 6,** in 2023, the variation of the combined monthly production of wind and solar did not deviate by more than 13% below or 10% above the annual average.

In anticipation of this critical issue, Article 19 of the regulation on the European electricity market adopted in May 2024 includes a new obligation for Member States to draw up ten-year strategies for the deployment of low-carbon flexibilities, including an analysis of needs, potential, challenges and possible support mechanisms, as well as the definition of indicative national targets. Considering the integrated nature of the EU power system as well as the benefits arising from mutualization of flexibility resources, the harmonization of both assessments and deployment strategies among neighbouring countries will hence become a key issue.[8]

Batteries (household and grid-scale) currently represent a very dynamic market in countries that are the furthest ahead in solar energy development (Germany and Italy in particular). In 2023, 80% of new residential photovoltaic installations in Germany were linked with batteries, with a total installed capacity of 7 GW. By 2035, ENTSO-E estimates that stationary batteries in Europe could reach 143 GW, compared with 16 GW at the end of 2023, making them the leading flexibility solution, ahead of hydroelectric pumped-energy transfer stations (STEPs) (ENTSO-E/ENTSOG, 2024b).[9]

However, beyond battery storage, the diversity of flexibility levers that can (and must) be developed should not be overlooked, starting with demand response.[10] For France alone, RTE's 2023-2035 forecast indicates an economic gain of "between a few hundred million and around one billion euros annually on the scale of the power system", while stressing the importance of drawing up a strategic roadmap for its deployment, based on three approaches: an industrial programme for the deployment of necessary infrastructure (smart meters and control systems for buildings, electric charging stations, etc.); a strengthening of economic incentives for increased flexibility (see section 3.4); and coordinated management of all flexibility levers to guarantee their effectiveness and availability during periods of peak demand) (RTE, 2023).

3.3. Grid infrastructures, the backbone of the energy transition

To cope with both renewable capacity deployment and the electrification of demand, a major roll-out of network infrastructure is essential. However, networks also have a key role in managing flexibility: cross-border interconnections could satisfy between 15% and 33% of Europe's daily and weekly flexibility needs by 2030, by enabling the aggregation and smoothing of supply and demand-side fluctuations over greater geographical areas, as well as the mutualization of existing flexibility tools (JRC, 2023a, p. 14).

The European Commission's recent action plan for grids refers to investment needs of 584 billion euros by 2030 (around 75 billion euros per year), most of which should be directed towards

8 To avoid the risk of duplication, we can add the challenge of linking this new strategy to existing assessment processes, particularly those relating to security of supply (at national and European levels).

9 According to the scenarios in ENTSO-E's Ten-Year Network Development Plans (2024), the capacity of stationary batteries would be much greater than that of pumped hydro storage (PHS) in 2035 (143 GW compared with 57 GW), while the volume of energy stored could be similar (119 TWh for batteries, 107 TWh for PHS), while meeting potentially different flexibility needs (intra-day and weekly for batteries, more seasonal for PHS).

10 Areas with the greatest potential for "controllable" consumption include load shedding by electro-intensive industries, domestic hot water tanks, other white goods (washing machines, dishwashers), electric vehicle chargers and electric heating (with convectors or heat pumps) in well insulated homes.

distribution networks (European Commission, 2023).[11] Over and above funding requirements, such deployment also raises a major industrial challenge, as the annual demand for power cables could be quadrupled, along with a doubling of demand for electrical facilities, in France alone (*Ouest France*, 2024).

Grid connection delays are an increasing bottleneck for renewable energy projects in Europe, with up to 150 GW of wind and solar projects having stalled in Italy and Spain respectively (Reuters, 2023).

In addition to the quantitative expansion of network infrastructure, qualitative developments can also help speed up the connection of projects to the network, while limiting the need for reinforcement, such as: generalizing remote control of renewable installations by grid operators, dynamic curtailment of power generation,[12] hybrid installations combining wind and solar power stations at the same connection point[13] or power stations with local storage.

In this respect, it is regrettable, as expressed by the *Commission de régulation de l'énergie* (French Energy Regulatory Commission), that these "good practices" are currently reserved for local pilot projects within "regulatory sandboxes", when there is an urgent need to generalize those that have already proved beneficial (in France and particularly in its European neighbours) in terms of meeting the challenges of the low-carbon transition (CRE, 2024).

3.4. Anticipating the next step: adapting the electricity market design to an increasingly flexible system

It may seem contradictory to mention the need for new reforms of electricity market design (EMD) when the European Council has recently adopted, in May 2024, the reform project initiated during the energy crisis. While the previous reform dealt primarily with the direct effects of the crisis,[14] the current aim is to ensure that the market is able to cope with much more volatile functioning, based on an electricity mix that is overwhelmingly low-carbon and renewable (Rüdinger & Berghmans, 2024).

And time is running out if the objective is to anticipate the situation by 2030: experience has shown that there can be a delay of five to six years between the initiation of political processes and the implementation of new market rules by operators and regulators.

One of the difficulties of a future reform of EMD stems from the extremely delicate equilibrium between the need to provide solutions to technical challenges, linked mainly to the integration of renewable electricity, the need to account for socio-economic issues, and the need for political legitimacy. In reality there is a growing divergence between two spheres of debate, which could jeopardize future reforms:

— on the one hand, the community of "experts" discusses the best solutions for successfully integrating variable production and flexibility resources into the market, by encouraging increasingly dynamic wholesale market prices and tariffs for end-users, strengthening physical interconnections and harmonizing market operations, and trading with increasingly shorter lead times;
— on the other hand, in some Member States, the energy crisis and the price hikes on wholesale markets have led to a structural questioning of the legitimacy of the integrated European electricity market at a political level. France remains emblematic in this respect, with several political parties over the past two years (both left and right) calling for a "Frexit" from the electricity market (Godelier, 2024).

The accusations against the European electricity market for being the main "culprit" for price rises have proved unfounded (ACER, 2022). However, it is true that the mechanisms used to construct wholesale market prices have amplified the effects of rising fossil fuel costs for consumers (Calatayud & Météreau, 2023; Goldberg & Guillou, 2023).

Limiting the issue of EMD reforms to a debate among experts on technical aspects such as the "division of price zones", "nodal pricing", "real-time clearing" or the "integration of demand-side management into capacity mechanisms" without recognizing the issue of political legitimacy and the management of socio-economic impacts could be counterproductive, especially in a context where anti-European forces are gaining ground.

A future reform project should therefore initially set about establishing a strategic vision of the role of the integrated market as a tool (and not as an end in itself) for managing the transition to a low-carbon economy while ensuring competitive and accessible electricity prices for industrial and residential consumers. This also implies identifying points of tension and the need for political mediation around key issues:

— How can we reconcile the need for stable prices to protect consumers and encourage electrification with the transition to increasingly dynamic market price signals, necessary to identify flexibility needs and guide the balancing of supply and demand in real time?[15]

[11] These orders of magnitude appear to be consistent with those quoted by the French network operators RTE and Enedis, which estimate a total of €200 billion between now and 2040 (i.e. around €11 billion a year).

[12] In Germany, for example, remote control is compulsory for all renewable energy installations over 25 kW. The distribution network operator must be able to instantaneously monitor the feeding in of power at any time and be able to modulate it remotely. In France, this type of rule currently only exists as part of local experiments. In Germany, the dynamic peak shaving approach has enabled certain network operators to double the connection capacity of the existing network (particularly for solar energy), provided that the installation operator agrees to remote peak shaving during voltage peaks on the network.

[13] At an event organized by the Franco-German Office for Energy Transition (OFATE) on 15 May 2024, the operator Galileo noted that, according to a study, a connection point planned for a 20 MW onshore wind farm could also accommodate 36 to 47 MW of photovoltaics (depending on the geographical location and the wind and solar resources), effectively doubling the use of the grid connection, with peak shaving corresponding to only 6% to 8% of the total annual production.

[14] The central idea is to improve consumer protection, strengthen the role of long-term contracts to promote price stability, and implement mechanisms to manage future crises.

[15] For example, in Denmark, 70% of consumers have dynamic tariffs on an hourly basis, combined with dynamic network usage tariffs (with differentiation between peak and off-peak hours and between seasons). In France, RTE's

— Should guidelines on state aids for energy be revised to meet the challenges of industrial competitiveness in an increasingly competitive international environment? If so, how can the risks of policy fragmentation and dumping within the European Union be avoided?
— In the French context, is it still possible (and desirable) to retain the principle of tariff equalization at national level, when it is necessary to ensure that network constraints are better taken into account in the price signal (implying differentiated tariffs by zone for the "energy" part and the use of networks, or even the transition to a system of nodal prices)?[16]
— Should there be a reliance on centralized approaches to manage low-carbon production through "pooling" to maximize the effects of aggregation and reduce the costs of integrating variable production (Neuhoff *et al.*, 2023)? Or should greater decentralization be ensured by encouraging individual power purchase agreements and self-consumption?

A constructive approach to these issues necessitates an understanding of the complementary nature of technical and political approaches to the debate on the evolution of market architecture, by building bridges between these two communities of actors through dedicated discussion platforms. This also implies implementing more detailed impact assessments and studies, to gain a better understanding of the issues involved in the development of the European electricity system after 2030 and the potential consequences of various reforms.

3.5. Financing the low-carbon transition against a backdrop of austerity and high interest rates

The financing challenge, far from being restricted to the electricity sector, affects all sectors of the ecological transition. According to I4CE figures, investment in the low-carbon transition needs to double at the European level, from 400 to 800 billion euros annually (I4CE, 2024). Additional requirements are divided equally between three main pillars: the power system transition,[17] energy efficiency of buildings, and low-carbon mobility.

forecast assumes that the number of consumers switching to TEMPO-type "semi-dynamic" tariffs should increase from 270,000 to up to 700,000 by 2030. Similarly, RTE predicts that up to 7 million electric vehicles will benefit from "controlled" recharging in 2030, which implies a sufficiently dynamic (and incentive) pricing system. In constructing the tariff grids, we might also question the relevance of the decision to pass on the cost of the capacity mechanism on to the entirety of the annual consumption, when it should in fact be linked to the kWh consumed during periods of high stress for the system.

16 Nodal pricing enables the direct inclusion of the constraints linked to the use of networks in the market price of electricity, which in theory makes it possible to avoid congestion phenomena and associated costs. Nodal pricing is generally considered to be the "ideal" solution, but is difficult to implement because of path dependence effects (JRC, 2023b; Neuhoff *et al.*, 2023).

17 More precisely, the study identifies additional investment needs of 74 billion euros for wind power, 8 billion euros for solar power and €42 billion for grids (i.e. €124 billion in total).

All these investments share the same financial characteristics, i.e. a very high capital intensity (ratio between initial investment and operating costs), combined with a long lifetime. As a result of these two factors, financing costs have a major impact on the economic viability of projects.

For example, the recent increase in interest rates (from 0 to 4.5% within a year and a half) observed since the energy crisis has directly affected the cost of debt and hence generation costs for renewable energy projects.[18] According to a Wood Mackenzie study, a rise in interest rates of just 2% can increase the cost of electricity production by between 16% (offshore wind) and more than 20% (ground-mounted photovoltaics) (Wood Mackenzie, 2024).

In this context, the issue of developing new, innovative financing mechanisms to facilitate access to capital while reducing project financing costs has become even more urgent. Several possibilities are currently under discussion, with the outcome to be decided during Europe's next term of office (Berghmans, 2024):
— Firstly, there is a call to strengthen the capital markets union to facilitate private and public investment, a proposal that features prominently in the single market report (Letta, 2024);
— Another possibility could be the creation of a new European investment plan dedicated to the ecological transition, financed by the European budget or on the basis of joint debt (with reference to the precedent of financing post-COVID recovery plans);
— Increasing the flexibility of the European Stability and Growth Pact to establish preferential accounting rules for green investments by Member States has also been debated, even though the adoption of the Stability Pact reform in 2024 seems to have closed this door for the near future;
— Applying differentiated rates for the European Central Bank (ECB) to refinance ecological transition projects is another option raised in the public debate, notably by French President Emmanuel Macron (*Le Monde*, 2024). However, it would require a change in the ECB's mandate, which would also entail uncertainty.

3.6. Promoting local ownership and sharing the benefits of projects

Given the scale of the deployment of renewable energy sources required over the next decade, encouraging local ownership and fair sharing of the value of projects is becoming particularly critical.

18 Some articles have even used the term "fossilflation" to highlight the impact that the rise in fossil fuel prices has had on the inflation rate and the rise in key interest rates, effects which paradoxically make it more difficult to implement transition policies aimed precisely at limiting this dependence (Schnabel, 2022).

Following a phase of increasing popularity between 2015 and 2018 with the call for a "Energy Union with citizens at its core, where citizens take ownership of the energy transition" (European Commission, 2015), and the introduction of Renewable Energy Communities (RECs) by the 2018 Renewable Energy Directive (Rüdinger, 2019), political support for the issue of local ownership has tended to wane in recent years, in favour of simplifying permitting and grid connection procedures.[19]

For example, as of May 2024, only 6 out of 27 Member States had correctly transposed the definition of "renewable energy communities", and only 3 had implemented regulations and support mechanisms favourable to their development at the appropriate level, according to the monitoring tool published by Rescoop, the European federation of citizen energy cooperatives.[20]

In 2023, in order to foster the acceptance of projects, there was renewed interest in improving the way in which their benefits are shared. This is particularly the case in Germany, where Article 6 of the Renewable Energy Act, revised in 2023, provides for the establishment (on a non-mandatory basis) of a fee of €2/MWh for the benefit of neighbouring communities located within a radius of 2.5 kilometres of the project.[21] Similarly, a growing number of German regions are developing or have already adopted laws on sharing the value of renewable projects, laws that are often more ambitious than national regulations (BWE, 2024).

In France, a similar approach (although at a much lower level)[22] was introduced with article 93 of the law of March 2023 on accelerating the production of renewable energies. The draft decree, which awaits finalization, refers to the principle of a compulsory contribution of €17,500/MW installed from projects that win national tenders, which would be earmarked for local projects to promote the ecological transition and protect biodiversity, or which could give a local authority a stake in a project's capital.

These initiatives focused on the sharing of financial benefits must be welcomed. But they are no substitute for a broader reflection on the instruments needed to ensure actual local ownership of projects, notably through the direct participation of citizens and municipalities in the decision-making and governance structures of RES projects on their territories.

4. CONCLUSION: COORDINATED EUROPEAN ACTION REMAINS ESSENTIAL

The power system transition is a key challenge for the implementation of the Green Deal and the achievement of carbon neutrality in Europe. Also, it is probably the sector that has seen the most rapid change in recent years, in terms of both the perception of the impact of the energy crisis and the resulting acceleration in the pace of transition.

However, this issue of time frames is also currently exacerbating the magnitude of the challenges that stand in the way of making a success of the next phase of the energy transition. Whether on the scale of implementing renewable energy projects, the evolution of political regulations or the functioning of markets: 2030 is not far away.

Given the scale of the challenges, this also means that European partners must at all costs avoid wasting time on futile debates, as happened during the previous electricity market reform. This is particularly relevant for Franco-German cooperation (Rüdinger, 2024): following years of mutual misunderstandings, a return to a functional partnership now seems essential if coordinated and effective progress is to be achieved in the coming European term. The Franco-German declaration on the new agenda to boost competitiveness and growth in the European Union, adopted at the end of May 2024, is an important step in this direction, as is the joint action plan to promote electrical flexibility (BMWK, 2024).

Clearly, this means moving beyond unproductive discussions about nuclear versus renewable energy, by recognizing both the freedom of Member States to choose their energy mix and the need to adopt a common approach to resolving the challenges facing the European electricity system in terms of decarbonization, governance, infrastructure development and competitiveness. Such ambitions would make an outstanding programme for the coming term of office.

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[19] For France, an action plan backed by a national objective to develop "1,000 locally-governed renewable energy projects by 2028" was published by Minister Barbara Pompili in 2021 and has since been forgotten (MTE, 2021; Rüdinger, 2022). Similarly, the participatory bonus mechanism, considered since 2016 to be the main tool for encouraging participatory financing and locally-governed projects in calls for tender in France, is no longer used at all by project developers, because the criteria are considered too complex.

[20] The transposition tracker is available here: https: //www.rescoop.eu/policy/transposition-tracker/enabling-frameworks-support-schemes. In France, the decree adopting the RECs, ratified on 26 December 2023, took five years to be published and the concept of RECs is still not used operationally.

[21] For a 10 MW wind farm, this amounts to around €50,000 a year.

[22] The German mechanism provides for a contribution of €2/MWh, to be paid every year for 20 years, whereas the French proposal would be equivalent to a one-off payment (at the start of the project) of around €1.2/MWh for a photovoltaic project, and 0.6 euros per MWh for a wind power project, according to the draft decree, reduced to €0.5/MWh in the proposal made by the CRE (CRE, 2024). It should be noted, however, that France already has a tax lever similar to the German model in the form of the flat-rate tax for network companies (*imposition forfaitaire des entreprises de reseaux*, IFER), which provides for a contribution of around 3 to 3.5 euros/MWh payable each year for wind and photovoltaic projects.

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The European Union's electricity transition: progress and challenges

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