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**ELECTRICITY AND GAS MARKETS
ENERGY INFRASTRUCTURE
REGULATORY & INSTITUTIONAL
DEVELOPMENTS**



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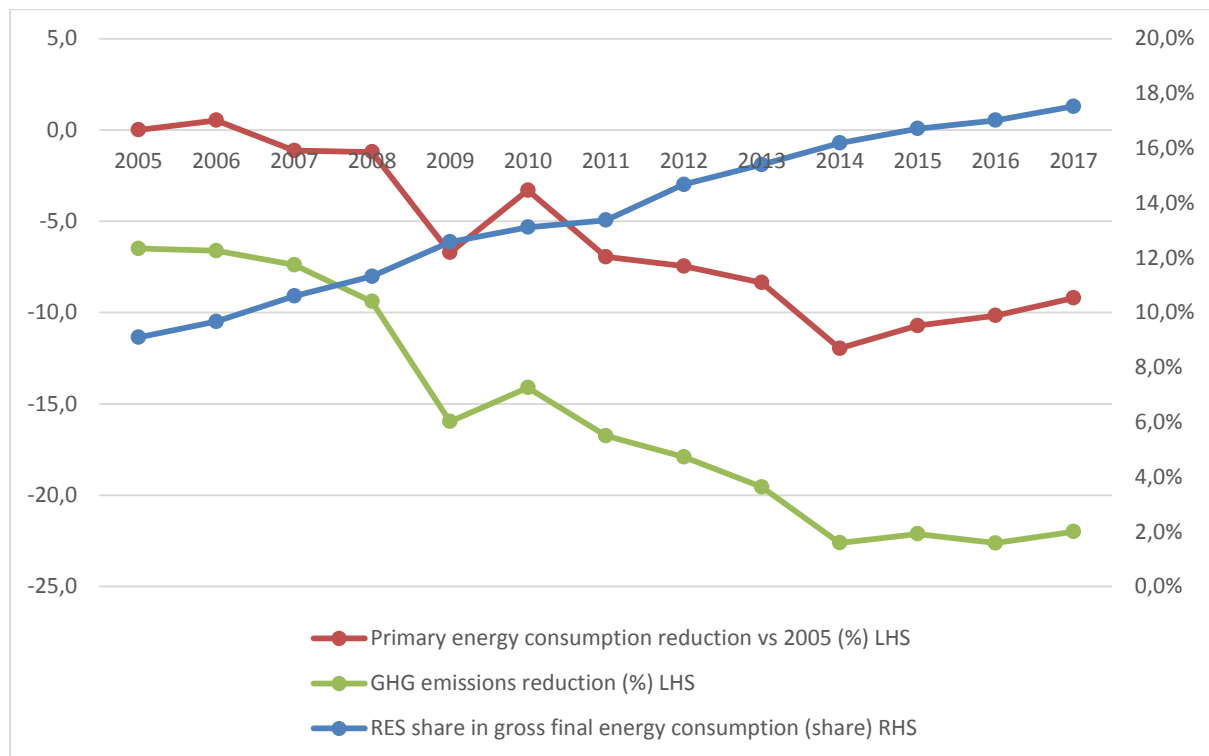
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INTRODUCTION

In the last five years, EU energy and climate policy has been largely on track to meet its ambitious 20-20-20 energy and climate goals. There has also been considerable progress towards completing the internal markets in electricity and gas.

As Figure 1 shows, as a bloc the EU has met its 2020 target for CO₂ reduction (a reduction of 20% on 1990 levels) and is on track to meet its 2020 Renewable Energy Sources (RES) target of 20%. At a European level, the energy efficiency target is also likely to be met. There is, however, a small but significant probability that it will be missed, as it requires a 13% reduction in primary consumption on 2005 levels by 2020.

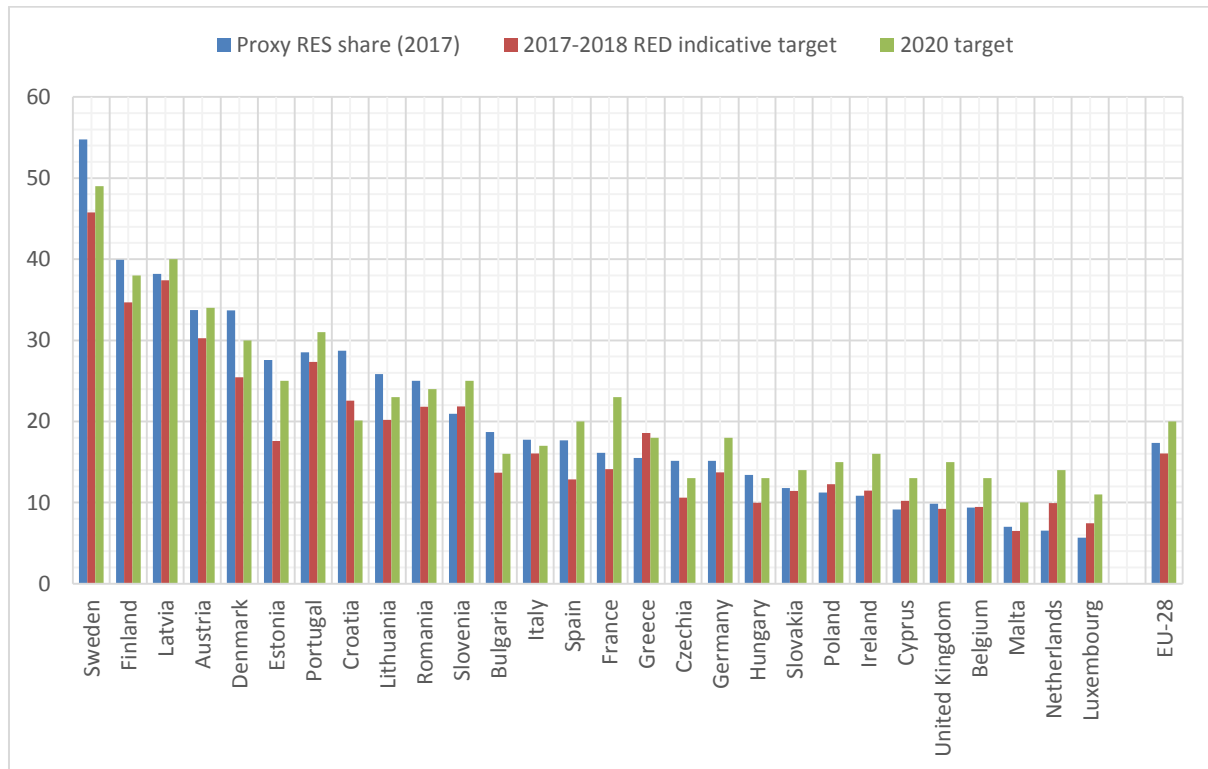
Figure 1: Progress towards EU Energy and Climate Targets



Source: European Environment Agency and Eurostat

Moreover, the progress made by individual Member States towards the 2020 goals has a much more mixed picture. The contribution varies from country to country with leaders and laggards (see Figure 2). Twelve countries met their 2020 target by 2017, while eight were not on track to meet their 2020 target. This national disparity may persist - to a lesser extent - during the coming decade (2020-2030), in part due to the implementation of Integrated National Energy and Climate Plans (NECPs), in line with the Governance of the Energy Union and Climate Action Regulation.

Figure 2: Progress of individual countries on Renewable Energy Targets



Source: European Environment Agency (https://www.eea.europa.eu/data-and-maps/daviz/countries-breakdown-actual-res-progress-5#tab-googlechartid_chart_11)

EU industrial policy on energy – coordinated via national RES targets – is showing signs of paying off via both onshore and offshore wind as well as solar (largely justifying earlier subsidies, at least in the aggregate).¹ Fossil fuel prices have remained weak, partly in response to the realisation that backstop technology prices are falling and that extraction rates need to rise for fossil fuel producers.² The result has been a reduction in Europe's overall direct exposure to the international geopolitics of energy.³

Since 2008, demand for electricity in the EU-28 has fallen by 3.5% and by 10.5% for gas⁴ since 2010, due to moderate GDP growth and the impact of energy efficiency measures and rising product standards, particularly in lighting and gas boilers. Exchanges on the European Network of Transmission System Operators for Electricity (ENTSO-E) system peaked in 2015.⁵ The growth in distributed generation has reduced demand on the electricity transmission system.

The ongoing improvements in battery storage capacities and the progress in electric vehicles at scale will accelerate the electrification of transport modes and a renewables-based electricity generation system.

¹ Newbery, D. (2017), *How to judge whether supporting solar PV is justified*, EPRG Working Paper, No.1706.

² Oil price (Brent) was \$103 on 2 April 2014, and was \$70 on 3 April 2019.

³ Measures of the diversity of the EU's energy supplies have substantially improved since 1990. Chalvatzis, K.J. and Ioannidis, A. (2017), *Energy Supply Security in the EU: Benchmarking Diversity and Dependence of Primary Energy*, Working paper Energy supply security in the EU: Benchmarking diversity and dependence of primary energy," *Applied Energy*, Elsevier, vol. 207(C), pages 465-476

⁴ Figures from Eurostat.

⁵ Latest figures 2017. Source: ENTSO-E Factsheets.



The current Commission can take credit for continuing innovation in RES, which has delivered significant reductions in costs, advances in energy efficiency, a substantial tightening of the EU ETS and improved security of supply in terms of diversity of energy sources and less supply interruptions.⁶ In addition, the Commission has been attentive to unfair import competition and thus protective of EU interests. It has been notably active in supporting European industrial interests in the energy sector against anti-dumping and anti-subsidy measures, including adopting trade defence measures on solar panel imports from China.

There has also been genuine progress towards creating single markets in electricity and gas, with increased cross-border trading in electricity and increasingly coupled regional and pan-European wholesale markets.⁷ The Agency for the Cooperation of Energy Regulators (ACER) has substantially increased its role in monitoring cross-border trade and has overseen the massive process of network code review that will allow standardised network connection arrangements across Europe. Regional security coordinators (RSOs) have been introduced and have aided coordination between national electricity system operators.

The Clean Energy Package of November 2016 was a significant achievement with eight new directives and regulations in the process of entering into force. Notable developments are the increase in the renewable energy target for 2030 to 32%, a reduction in energy consumption by 32.5% (against baseline), creation of a new European body for DSOs and an emphasis on promoting active consumers and citizen energy communities. This is in addition to the earlier agreement to extend the EU ETS to 2030 and reduce GHG emissions in the EU ETS by 43% compared to 1990 levels (40% for overall emissions).

However substantial issues remain to be addressed. Market integration is still a work in progress, with the single markets in both electricity and gas in particular not yet fully completed. While the optimal use of interconnectors for day-ahead trading of electricity has improved, real-time and continuous trading, as well as the reserve and ancillary services markets, retain room for improvement.

The proliferation of national arrangements, notably in capacity mechanisms, has favoured national generation and has constrained European energy security efforts. The impression remains that national TSOs and NRAs are resisting European integration in order to make their national systems easier to manage and that the available cross-border transmission capacity is not being optimally released to the market.

Moving from 30% to 50% of renewable electricity - as mentioned in the 4th Energy Package - will demand even greater flexibility from the power system, since intermittent renewables will largely contribute to the increase in generation capacity. Network integration, reserve capacity and storage can provide flexibility, as can market participation by active consumers and demand aggregators. The EU single market solutions can enhance this flexibility at a much lower cost than individual Member State markets, but this will require significant co-ordination between Member State ancillary services markets. This places pressure on network companies, which will need to re-think their economic models. It also calls for broader discussions on the network tariff structures that the Commission placed on the agenda in the revised Electricity Directives and Regulations.

There have been significant rulings in the area of State Aid, partly in response to Member State actions focussed on national energy security concerns, for example on support schemes, power purchase arrangements (PPAs), market opening and capacity markets, which seem to have created

⁶ On customer minutes lost, see CEER (2018), *CEER benchmarking report 6.1 on the continuity of electricity and gas supply data update 2015/16*. Brussels: CEER.

⁷ Pollitt, M. (2019), 'The Single Market in Electricity: An Economic Assessment', *Review of Industrial Organization*. DOI: <https://doi.org/10.1007/s11151-019-09682-w>



regulatory uncertainty at EU level.⁸ These rulings will need to be integrated into the forthcoming review of State Aid guidelines. The recent ruling against the UK, retrospectively cancelling all capacity market contracts five years after the initial capacity market auction, is particularly worrying to investors. This also calls for a review of the procedure concerning the Commission's assessment of notified measures. Energy remains one of the sectors setting the agenda on state aid reform.

Distributional issues around energy remain a significant concern, with the continuation - and in some cases re-introduction - of retail energy price controls in a number of Member States. Climate policy is proving expensive for the EU electricity customer and thus raises energy poverty and energy justice issues. Member States can and do have individual preferences on energy taxes and subsidies and on the extent of consumer protection afforded to residential energy consumers.

The emphasis on facilitating a smart energy transformation based on smart meters and consumer participation in the market is laudable as an industrial/innovation policy; however, it should not be confused with measures to address distributional concerns. Most domestic energy consumers seem unwilling or unable to engage with smart energy, with only better-off consumers benefiting from smart meters and associated prosumage.

There is still much to be done to implement network codes and the appropriate allocation of risk between investors and the government on large-scale energy projects such as nuclear, interconnection, off-shore windfarms and LNG facilities.

There is also the issue of whether carbon taxes require coordination across Member States, where these exist in addition to the EU ETS. The introduction of additional carbon taxes on sectors covered by the EU ETS can be thought of as a reverse state aid issue, where some Member States are deliberately exporting polluting industries to counterparts while still benefiting from the output of those industries via the single market. Carbon taxation may also negatively affect the stability of the EU ETS system and could lead to inefficient abatement efforts at an EU level. This makes action to coordinate carbon reduction ambition upwards important for the new Commission.

Many National Regulatory Agencies (NRAs) remain ineffective and subject to government interference. The Commission still has a role to play in promoting best practice among NRAs and specifying guidelines to ensure sufficient independence from government, although this remains difficult given the levels of subsidies required to deliver climate and energy targets. In addition, ACER remains relatively feeble.

In the coming five years, we can expect further falls in the cost of wind and solar power, energy storage and electric vehicles. This will have significant implications for the energy transition, but the prospects for global fossil fuel prices (and carbon prices), nuclear, hydrogen and CCS remain unclear. We can expect digitisation to increase (as in all sectors). However, the extent of the impact of new actors and new business models in the next five years is difficult to predict and subject to regulatory uncertainty, with some capacity for negative disruption, particularly if new technology brings unwelcome arbitrage of existing energy taxation and network fixed cost recovery mechanisms.

On energy, many open questions remain, particularly over the continued use of gas within the EU. While the European Commission's long-term scenarios predict a decrease in demand for gas, what role will it play in the next five years? Will it continue to decline, and will there be significant moves

⁸ See notably: Case T-356/15, *Austria v Commission* (Hinkley Point C nuclear power station), ECLI:EU:T:2018:439; Case T-793/14 *Tempus Energy Ltd and Tempus Energy Technology Ltd v Commission* (UK capacity market), ECLI:EU:T:2018:790; T-251/11 *Republic of Austria v European Commission* (Austrian Green Electricity Act) ECLI:EU:T:2014:1060; Judgment in Case C-405/16 P, *Germany v Commission* (amended German law concerning renewable energy sources (EEG 2012), ECLI:EU:C:2019:268.



towards the electrification of heating - as has already been the case in the Netherlands, UK and Austria. Will gas be able to transition to become an increasingly green energy source? Will the value of the gas network, as a provider of energy security in terms of back-up gas generation, increase as volumes decline? Is there further work to be done in coupling gas and electricity networks?

Within the electricity sector, questions remain over the appropriate regulation of energy storage, how to promote the required energy infrastructure investments and how to co-ordinate DSOs and TSOs.

Finally, it is important to emphasise that although the EU may have met its 2020 targets, it is not currently on track to meet its 2030 targets on carbon reduction, RES shares or energy efficiency.⁹

In the light of this, we will explore three areas where we think the European Commission and Parliament can make a significant impact in the next five years; markets, infrastructure and regulatory and institutional developments. For each area, we will introduce the main ambitions (priorities) that future policymakers and leaders should consider for their programmes for the next five years.

⁹ Source: European Environment Agency (2018), *Trends and Projections in Europe 2018: Tracking Progress Towards Europe's Energy and Climate Targets*, p.9.

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ELECTRICITY AND GAS MARKETS AMBITIONS

- 1** Expand the scope of the ETS to include more sectors and countries
- 2** Strengthen demand-side policies to improve the flexibility of the electricity system
- 3** Build a coherent and long-term EU regulatory framework for green gases and hydrogen
- 4** Strengthen the consumer agenda and clarify the role of new actors



Ambition #1: Expand the scope of the current ETS to include more sectors and countries

The EU ETS remains the flagship of EU's energy and climate policy. It is an institutional arrangement with significant capability for driving decarbonisation in the energy sector and in the wider economy. The ETS has proved a robust and resilient mechanism, in part because it has the important effect of ensuring that prices fall during recessions and rise during booms, thus dampening the impact on the business cycle.

Policymakers should prioritise improving the ETS and learn from other schemes around the world. We suggest extending the EU ETS to further sectors, with at least 85% coverage (as in Quebec-California). We would also welcome linkage with similar schemes (e.g. the new ETS in China), where this does not dilute the ambition of the scheme and continues to promote global decarbonisation. The 100% auctioning of permits and a move to border tax adjustment for included sectors, subject to international competition, would be desirable.¹⁰ Wider coverage could see sectors such as agriculture and air and freight transport included.

A key challenge for the Commission is to promote a market design across Europe that leads to an efficient trading arrangement.¹¹ Any such market design should include an appropriate short-run reserve market, auctions for RES (where learning benefits remain that are in need of support), an appropriate carbon price and ancillary services markets. Getting the short-term signals for capacity correct is an essential element behind building longer-term reserve markets that are fit for purpose, e.g. capacity markets.

As we know, it is challenging to create market solutions that work for the entire EU. For example, the Commission would need to define the extent to which electricity market arrangements can differ between Member States, given the different electrical demands of the system, for example, there will be significant differences between, say, Ireland, the Iberian peninsula or Germany. Another example is to decide, alongside national arrangements, the further development of mutually-beneficial cross-border markets and the extent to which markets should be integrated across Member States.

Ambition #2: Strengthen demand-side policies to improve the flexibility of the electricity system

The European Commission needs to pay significant attention to EU policy on markets for flexibility in electricity supply. This includes promoting demand-side inclusion in ancillary services markets, setting rules for capacity markets and promoting digitisation. Including the demand side requires using market mechanisms for ancillary services procurement that also include the demand side.

This is in line with extending the single market in electricity to intra-day trading, particularly by encouraging the improved use of interconnectors to provide short-term balancing and other ancillary services. This is a critical area where the single market in electricity should be extended and further potential gains seem to exist.¹²

¹⁰ Pollitt, M. (2019), 'A Global Carbon Market?', *Frontiers of Engineering Management*, 6(1): 5-18.

¹¹ Pollitt, M. and Chyong, K. (2018), *Europe's Electricity Market Design: 2030 and Beyond*, Brussels: CERRE.

¹² See Newbery, D., Strbac, G., & Viehoff, I. (2016), 'The Benefits of integrating European electricity markets', *Energy Policy*, 94, 253-263.

Ambition #3: Build a coherent and long-term EU-wide regulatory framework for green gases and hydrogen

The recent - and significant - stress placed on the natural gas sector by relatively low coal prices and the workings of the ETS may now be relieved by a policy-driven phase-out of coal and (partially) nuclear in Europe. However, important new challenges for the years to come have emerged for both the sector and the policy-makers.

First, electrification of important sectors in the economy, such as construction, implies a direct decline in the demand for gas. However, the large-scale electrification of buildings, transport and industrial processes will not be possible without a substantial increase in power generation capacity. Where and when renewable power becomes insufficient, gas-fired power plants will be needed to keep electricity systems flexible and reliable.¹³ Thus it seems likely that, in the medium term, the demand for gas will remain robust, but will decline and become increasingly volatile. Regulators should be open to reviewing infrastructure remuneration mechanisms to account for these developments.

Second, although the narrative that natural gas is the most cost-efficient and clean option for the transition towards a low-carbon economy has been valid up to 2020, it does not easily extend beyond 2030. This is because the ambition is now notably different, namely, a fully-decarbonised economy by 2050. It is therefore essential that the sector and policy-makers work together to develop a feasible strategy that allows the gas sector to realise its potential within these new, significantly more ambitious, aspirations. A crucial step for the industry is to demonstrate the feasibility of gas sector decarbonisation, mainly via increasing production and integration of renewable gases such as biomethane from anaerobic digestion and gasification and synthetic biomethane from green hydrogen produced by water electrolysis using decarbonised electricity.

Another technique that needs to be given an opportunity is carbon capture and storage and/or use, which could be fundamental in upscaling production of 'blue' hydrogen. A critical role for the Commission will be to ensure that these techniques have the opportunity to compete on a level playing field with decarbonised electricity and are subject to contestability. This requires identifying barriers to development that impede their ability to scale up. Such commitments will reassure investors that the industry is here for the long term, unless clearly proven unsuccessful. This will lower investment risks, stimulate R&D and realise the gains of 'learning by doing' and 'learning by using'.

Following the adoption of the Clean Energy Package, which concentrated mainly on electricity markets, the so-called 'Gas Package' thus becomes a crucial next step for the new Commission. The Commission should assess the scope of the package, taking stock of the lessons learnt from the Clean Energy Package and defining a clear and predictable regulatory framework for the entire gas industry. The 'Gas Package' may therefore become a 'System Package', where renewable biomethane and hydrogen are also part of the Regulation. It should also define the basis for future sector coupling and introduce a realistic framework for gas and hydrogen infrastructure.

¹³ Moraga, Le Coq, Mulder and Schwenen (2018): 'Gas and the electrification of heating & transport: scenarios for 2050,' Centre on Regulation in Europe, May 24, 2018.



Ambition #4: Strengthen the consumer agenda and clarify the role of new actors such as energy communities

The European Commission needs to balance the needs of consumer groups with the constraints on producers' technology. Active demand response can only become possible by providing consumers with access to real-time prices to allow them to make informed consumption decisions. In particular, in order to promote local demand response, one would need to facilitate - or even support - technologies that allow devices in households and in small businesses to respond to changing prices. Prices should reflect local conditions, either directly or indirectly,¹⁴ and therefore an average price (or zonal price) is unlikely to allow for smart consumption decision marketing at a retail level.

Promoting smart energy *is* a producer-led agenda, even if it is not what citizens actually want. The interests of consumers lie in cheap, reliable and clean energy. This should lead the Commission to focus on market integration of wholesale energy and ancillary services and level playing fields within national retail energy markets, rather than being overly-concerned by the nature of retail energy offerings.

There is a need to refine the regulatory framework for market participation, particularly as the industry continues to transform and new players emerge on the consumer side. For example, the development of energy communities raises some issues. By definition, an energy community is a non-profit partnership where self-sufficiency in energy needs is the primary objective, but where the excess energy production will be sold outside the community. There are different benefits associated with this 'common-pool resources', such as sharing investment costs and increasing energy efficiency. However, the concept of an 'energy community' needs to be clarified, in particular on how to maintain non-discriminatory network access and preservation of consumer rights.

Here, the European Commission proposed to introduce two new market players: Citizens Energy Communities and aggregators. Whether those new entities will fundamentally change retail energy markets and develop profitable business models remains largely untested. Independent aggregators may prove better-placed to invest in distributed energy resources, as they are not vertically integrated with centralised generation. A regulatory framework that delineates the responsibilities of retailers and independent aggregators does not yet exist.

Member States may allow Citizens Energy Communities to act as both local retailer and network operator, irrespective of the role communities play as actors in the power system. They might prove a useful organisational entity to facilitate the local integration of different energy sources (heat, electricity, gas), technologies (storage, production, transformation) and market players (industry, residential customers, government etc.).

However, Citizens Energy Communities should face the same duties and responsibilities as traditional entities that perform that function, in particular with respect to balancing responsibility and to obligations related to quality of service as Distribution System Operators (DSOs).

Moreover, regulatory impact assessments should take account of the non-monetary costs for consumers: search costs, additional risk (whether perceived correctly or not) and behavioural adjustment costs.

¹⁴ Locational marginal prices (LMPs) are a direct method. Incentives to reduce local congestion are an indirect method.



Consumers should have right to opt out of dynamic pricing models, but they should not be completely shielded from competition. Creating activated consumers has the potential to create both losers and winners, thus specific public services regulation might be needed to protect vulnerable consumers. Such measures should be at the discretion of Member States, but should be proportional to the objectives and not distort competition.

Information provision and increasing trust in the energy retail market is a public good, vital for the long-term success of the European energy market and for reaching climate goals. Member States and the Commission have an important role to play here.

Issues for policymakers

- *Provided that the current EU ETS scope is extended, how and when ETS Phase IV framework should be reviewed?*
- *How to avoid and manage contradictory or overlapping national policies aimed to strengthen the carbon price either through "carbon floor" mechanisms or via new carbon taxes imposed to non-eligible ETS sectors?*
- *Will renewable gases and hydrogen require a specific regulatory framework or a broader decarbonisation package in line with GHG targets by 2030 and 2050?*
- *Does Europe need a new energy consumer agenda that defines regulatory gaps and priorities by 2030?*

ENERGY INFRASTRUCTURE AMBITIONS

- 1 Foster optimal use of monopoly energy networks**
- 2 Encourage transmission owners to take greater risks**
- 3 Implement fixed cost recovery that is fair to existing network users and encourages the efficient use of the network**
- 4 Stimulate joint charging for electricity and gas networks**
- 5 Encourage greater energy network interconnection**
- 6 Boost coordination between transmission and distribution system operators**



Ambitions #1 & #2:

Encourage optimal use of monopoly energy networks in light of falling/flat overall energy demand

Encourage transmission owners to take greater risks in new projects in light of uncertainty over future demand for energy networks

The Commission must pay particular attention to rising network costs due to a number of factors, including, falling energy demand; network replacement; and growing connection of RES with the associated increased requirements for storage and interconnection at low capacity utilisation.¹⁵ The current regulatory approach is coherent with that required for an established technology and gradual change. It focuses on minimising costs and avoiding unnecessary investments. Network deployment follows demand rather than preceding it.

However, it normally offers little incentive to innovate or to even adopt a proactive stance to modernise assets, to extend the grid to facilitate RES deployment and to contract services instead of investing. Incentive-based regulation approaches must be adopted to:

- Foster deployment of smart grid technologies and digitalisation;
- Extend the network proactively and efficiently to facilitate integration of new RESs and new loads (EV, etc.); and
- Facilitate local flexibility by shifting from remuneration-based approaches based on a separate control of capital investment (CAPEX) and operating expenses (OPEX) to those focusing on a combination of both (the so-called TOTEX).

The latter would allow network operators greater flexibility in organising their business. Remuneration should be based on performance, and not only on physical investment. This change implies that CAPEX will form a larger share of total network expenditures and that regulation needs to focus on providing incentives to lower costs overall, i.e. TOTEX. The Commission could also look into alternative funding opportunities which might lower capital costs.

The following proposals should be considered at a European level:

- Harmonising accounting rules for CAPEX. This will make cross-border benchmarking and comparisons easier.
- Providing regulatory certainty on how new investment projects will be treated. Regulators should be able to commit for variable periods of time. To encourage investment in new networks, regulators could promise higher returns for network firms that commit to invest early and are able to lower network congestion.
- Allowing transmission operators to share risk with market participants. This could be done by introducing long-term financial transmission rights.

Merchant investors should be allowed to build high-voltage transmission capacity, and to bid those transmission rights into the market (and possibly withhold capacity). This would treat merchant investors as generators or storage operators who bid into the wholesale market. Allowing them to make more capacity available over time gives them an incentive to build larger transmission lines. Competition authorities should check whether they obtain market power. This is important because the EU's current rules do not allow for enough risk to be taken by shareholders in conditions where individual interconnectors are marginal and hence interconnector revenue is highly uncertain.

¹⁵ See European Commission (2017), *European Energy Industry Investments*, Report for ITRE Committee, p.31ff.

Ambition #3: Allow network owners to wholly or partially own storage facilities, provided that: a market tender test results in no viable offer from third parties, the owners are required to resell unused capacity to market participants, and all the above operations are conducted under the control of the relevant regulatory authority

The network operators should not be subject to strict prohibition nor offered specific advantages for owning storage capacity. There may be sections of the network where third parties are unwilling to build welfare-enhancing storage facilities. Thus, where a market tender test results in no viable offer, network companies could be investors of last resort for storage. If such an asset is network-operator owned, the operator should be required to resell unused capacity to market participants. This should be done under the control of the relevant regulatory authority, by specifically permitting the incumbent transmission and distribution operators to set up and sell shares in Special Purpose Vehicles (SPVs) aimed at financing assets that save core network costs and provide market-based services (e.g. grid scale batteries). Such SPVs would need to be subject to competition tests as to the network operator's involvement and competitive tendering for the shared ownership and operation.

Regulating the decline of the gas network is likely to be a critical issue, with the recovery of network fixed costs being particularly problematic (particularly where these arise from network charges for entering and exiting the high-pressure grid). The Commission may wish to consider rules on accelerated depreciation of the gas transmission system and who pays for repurposing the network to transport hydrogen or captured CO₂.

Declining average demand, along with potentially increased seasonal and cross-border flows, mean that attention must be paid to the optimal use of existing network capacity and storage. It will be important to address how any large, fixed and increasingly risky (given volatile demand) cost additions might be financed through appropriate risk-sharing between investors and consumers.

The Commission should pay particular attention to infrastructure that falls within the Projects of Common Interest (PCI) list and whether these genuinely increase European welfare and are worthy of funding.

The incentive structures of the System Operators (SOs) should be adjusted to minimise overall system costs, not simply the costs of a particular Member State or region.

Improving cross-border capacity is not the only method for increasing international trade. Often, investments within a Member State can be more effective. Longer-term cost-sharing rules need to be agreed, based on a thorough cost / benefit study.



Ambition #4: Encourage fixed cost recovery that is fair to existing network users and encourages the efficient use of the network

The issue of how to recover existing network costs in the face of increasingly flexible consumers is an important concern, particularly for electricity. The problem of net metering and a lack of local connection signals must be addressed. The appropriate combination of fixed, per unit, capacity and peak charging is not intuitive; it depends on the particular mix of storage, EVs and distributed generation on TSO and DSO systems and a balance between efficiency and distributional arguments. However, it is important that all Member States are aware of arbitrage opportunities for investment, simply based on the existing mix of network charges. The Commission has argued for greater harmonisation between Member States in tariff methodologies in order to mitigate the risk of market fragmentation; the planned ACER best practice report will be the main tool for advancing any concrete proposals within the Commission.

In this context, policymakers should investigate the following issues:

- Is there any scope for extending the use of congestion charges? Some form of congestion pricing might need to be introduced at the distribution level. These could lead to more efficient use of networks, where accurate price signals are sent and where responding to such signals is feasible.
- Net metering is not cost-reflective, is unfair from a distribution perspective and is a form of state aid. It favours better-off customers who can afford their own generation capacity, while simultaneously raising total system costs. Net metering also distorts incentives on the location of distributed energy resources, which can be better-accommodated at grid scale on the medium voltage network.
- Capacity charges are useful in certain circumstances, for example recovering fixed costs, - and do not distort operational decisions. Reducing - or even abolishing - the energy component, except for the congestion charge, might be a way forward in many markets, particularly if implemented soon, before any significant uptake of PV, EVs or battery storage.
- The 'tariff base' is currently shrinking; is there a way to increase this and create a more stable base by bundling sectors? For example, a tariff for electricity, gas and heat networks could be socially acceptable in some countries. This tariff could then be allocated across the three elements in different ways.
- Both natural gas and electricity (for example, via heat pumps) could be used for heating. It would not be appropriate for network tariffs and energy taxes to influence network users into choosing one technology or the other; a combined tariff might be better. The rollout of heat networks and the decommissioning of gas networks is likely to be gradual and coordinated by national governments. During this transition, some form of cross-subsidisation between networks services might be necessary.
- Sector coupling in the energy sector has many similarities with the transport sector. Different transport modes act as substitutes and complements, externalities between modes exist and infrastructure investment needs to be coordinated. When designing tariff structures for one transportation mode, the externalities in the other modes also need to be considered. Funding infrastructure projects could be based on local taxes (such as a local VAT surcharge, as in the United States), usage fees or levies on other modes. In London, as well as other cities around Europe, congestion charges help fund public transportation. Detailed regulatory impact analysis is required to develop the optimal tariff structures.



Ambition #5: Extend the scope of NRAs to include heat networks

The Commission should consider the regulation of heating and how this can be covered by existing electricity and gas NRAs. Heating will increasingly become an issue, given the potential for many gas customers to switch from short-term (competitive) gas markets to long-term (and potentially non-competitive) heating contracts. There could be scope for coordinating investment between electricity, gas and district heating.

There are a number of good reasons for having the NRAs regulate local district heating networks. First, heat regulation is based upon the opportunity costs of a competitive gas contract. Second, effective benchmarking of multiple local district heating networks is best done by an NRA, rather than a local authority. Third, coordinating investments in gas and district heating networks might be required. Fourth, there are competition externalities from the heating market to the energy and gas markets; these can be affected by cross-subsidies from the heating company to electricity company and the bundling of heating and electricity contracts.

However, existing regulatory framework for electricity and gas networks cannot be transferred easily to heating networks. For example, it is not clear that there can be third party access (TPA) to heat networks or whether heat storage is part of the network monopoly or potentially competitive.

In the same way that district heating could be regulated by integrated electricity, gas and heating NRAs, there is a question as to whether electricity and heat network companies should be integrated. District heating and electricity could be organised by the same local energy community.

Ambition #6: Encourage greater energy network interconnection between European countries

EU-wide regulation of cross-border investments in transmission needs to be improved. The European Commission should promote merchant interconnection, rather than force cap and floor arrangements that socialise investments. Interconnectors need to be included within national transmission pricing regimes and not exempted from national zonal charging arrangements, such that there are correct locational price signals for siting new transmission links.

Specific attention needs to be paid to how risk is allocated between transmission operators and network users, depending on the location of the transmission links. In addition, the Commission should assess the potential of smaller market zones, as they could prove more appropriate in the future.



Ambition #7: Encourage greater coordination between transmission and distribution system operators

The allocation of network assets and associated management responsibilities is divided between TSOs and DSOs. The current allocation is a historical artefact, and it is not clear whether the division of responsibilities is close to optimal given the increasing presence of distributed generation, storage and gas production. The Commission should take a view on an effective TSO-DSO interface as well as voltage and nodal levels of responsibility. This is important in helping create a level playing field for market participation in network services and may improve coordination in procuring ancillary services at low- and high-voltage levels. In addition, there is the ability to fully separate the real-time system operation from the asset ownership and cost recovery mechanisms.

The Commission should encourage each NRA to fully evaluate whether there is scope for reallocations (via mergers or asset swaps) of assets between transmission and distribution in order to make better use of existing infrastructure. There should also be strong incentives for co-ordinating investments and for facilitating joint working between TSOs and DSOs. It should be possible to establish, and earn revenue from, joint SPVs to finance assets. NRAs should also be encouraged to examine whether joint TSO-DSO tariffs currently provide optimal pricing signals.

Issues for policymakers

- *Is the Clean Energy Package and the wide range of EU funding sufficient to foster TSOs and DSOs investments and, therefore achieve a smooth decarbonisation transition by 2050?*
- *How to secure greater energy network interconnection between EU national markets?*
- *What are the main drivers to better structure and reinforce TSOs and DSOs cooperation in the short run?*
- *How to better regulate and optimise heating in the next five years?*

REGULATORY & INSTITUTIONAL DEVELOPMENTS

AMBITIONS

- 1** Review energy governance structures & responsibilities to secure the implementation of the Clean Energy Package
- 2** Systematically monitor the distributional effects of energy transition policies by creating the European Energy Transition Observatory
- 3** Set a framework for energy data governance that promotes energy policy goals through data transparency
- 4** Promote sharing of good practice in regulation and innovation by NRAs in energy
- 5** Promote innovation by NRAs to stimulate regulatory innovation and align better with citizen preferences



Ambition #1: Review the current EU energy governance structures and responsibilities in order to secure a smooth implementation of the Clean Energy Package

Much has changed within the governance structure of the European energy sector in recent years, with the creation of a European regulator (ACER) and European cooperative institutions such as CEER, ENTSO-E, ENTSO-G and - in the near future (2021) – a new EU DSO entity. However, much remains to be done to be able to effectively govern a truly integrated European energy industry and to ensure delivery of EU policy goals. The responsibilities of the various institutions should be developed, drawing on best practices at Member State level. Creating independent system operators at the Member State level should be supported; these could potentially develop into regional level ISOs and, in time, perhaps even at European level. This is because ISOs can be tasked with undertaking real-time, whole system operation in a way that SOs linked to TOs cannot.¹⁶ To ensure that consumer interests – including distributional concerns – are properly taken into account, there needs to be better representation for consumer interests at both Member State and European levels.

The division of responsibilities between the Commission and Member State bodies is complicated for many reasons, including subsidiarity concerns. In many areas, there is little reason to harmonise regulation between Member States (although the Commission has, nevertheless, done so on occasion). In fact, in order to encourage development of the regulatory tools needed to meet future challenges, it may be beneficial to test different models. However, some areas – notably the integration of physical infrastructure and markets – cannot be left to Member States alone; these will require appropriate regulatory powers at a European level. This could be achieved by strengthening the various European institutions – including ACER – and by continuing those developments that started with the creation of electricity regions.¹⁷

Ambition #2: Systematically monitor the distributional effects of energy transition policies by creating the European Energy Transition Observatory

The 'Yellow Vests' movement has triggered new debates on the impacts and social acceptance of energy and climate change policies, not only in France but also in other EU countries. Meanwhile, the 'Extinction Rebellion' movement in the UK is seeking to accelerate the low-carbon transition in the face of increasingly disconcerting scientific evidence on the impact of global warming. This clearly illustrates the 'popular' tension between the need to accelerate decarbonisation of the economy and the fact that some sectors will be severely adversely impacted while the less well-off energy consumers will pay disproportionately higher bills.

The concept of a 'fair transition to low-carbon energy' for citizens has been ever-present in the climate debate at the annual COP summits and in the EU's 2050 low carbon strategy. However, the issue of how best to spread the cost burden of this transition among end-consumers remains unclear. Clear guidelines on designing energy transition policies that avoid adverse effects on low-income households are still needed.

¹⁶ Recently Ofgem moved to force the creation of National Grid Electricity System Operator as the (I)SO for the whole of GB, a wholly independently business of National Grid. This was to address the perceived conflict of interest between National Grid's roles as both a transmission operator and a system operator. (See Ofgem (2017), Future Arrangements for the Electricity System Operator: Response to Consultation on SO Separation, London: Ofgem)

¹⁷ Von der Fehr, N-H. (2017), 'Regions – the future for the European Internal Electricity Market?', Brussels: CERRE.



In order to understand and address this particular challenge, the European Commission should create a European Observatory for Energy Transition and Distributional Effects. This new body would focus its efforts in assessing European initiatives, national trends and collecting evidence (i.e. data and research) capable of guiding decision-making in the EU institutions and national governments. This Observatory would make annual recommendations to the European Commission, the European Parliament and the Council.

Another recommendation is to add new criteria for European Commission impact assessments. In addition to proportionality and subsidiarity, the short- and long-term “social fairness” of measures should also be considered.

Ambition #3: Develop a framework for energy data governance that promotes broader energy policy goals through data transparency

The European Commission needs to work on data governance in energy, as it has in other network sectors. Currently, there is considerable diversity in data ownership approaches between TSOs, DSOs, retailers and third parties. Who should own and operate data hubs in the energy sector – what third party access rights should be standard? This would include the potential governance of blockchain data and digital platforms.

The Commission should encourage exploitation of energy data and competition in processing this data. The presumption in national regulation should be that monopoly network data will be made available publicly and that data provision costs are included in the monopoly network cost. Retail smart meter data should be presumed to be owned by customers and should be made available for research. Presumptions on product standards on electrical device controllability, and hence on data flow and device identifiability, also need to be considered. For example, there should be a general presumption that EVs will be subject to controlled charging by the electricity grid, as this will minimise any grid integration costs associated with EV roll-out. This would reflect a general presumption for integrating data across energy platforms to benefit the system as a whole.

Data does need to be subject to well-defined property rights and energy data protection should be consistent with GDPR, but there should be a presumption that raw energy data – suitably anonymised - exists for the public benefit, having been created across public networks. There should be well-defined property rights for processed data, allowing it to be traded. Data needs to be capable of being integrated between network operation, trading markets and certification processes.

Ambition #4: Promote sharing of good practice in regulation and innovation by NRAs in energy

Building the necessary regulatory capacity in Member States to allow them to handle new developments such as green gases, EVs and the internet of energy is a matter of urgency. Capacity building can be accelerated by cooperation and learning between regulators. The Commission, particularly via ACER, will play an important role here, facilitating cooperation and promoting best practices in innovation and smart regulation. It is important that the Commission monitors the quality and performance of NRAs, the role of national courts and the actions of national ministries of energy (e.g. in setting clear and consistent energy policies). The objective should be to provide practical help and support to Member States in learning from, and engaging with, the latest



regulatory developments that might be relevant to them. However, it is also important to encourage regulatory competition and that ACER leaves headroom for innovation by individual NRAs.

The Commission might wish to consider the role of NRAs and energy ministries in supporting innovation with respect to the low-carbon transition. Innovation funding initiatives have already been successfully trialled in some countries (e.g. the UK). Over the next five years, we could foresee a potential need for significant innovation to prepare for decarbonising the heating sector; this raises substantial issues for current energy market and regulatory arrangements.

In addition, achieving the necessary flexibility on the demand side of the market requires the participation of new agents and the introduction of new business models, including service providers, intermediaries and aggregators. The regulatory framework should encourage such innovation and market entry, particularly the interactions between new agents and TSOs / DSOs. While it is possible to envisage considerable variations between Member States, creating a level playing field for pan-European businesses may spur innovation and support overall flexibility in the single energy market.

Ambition #5: Promote innovation by NRAs within national energy policy in order to stimulate regulatory innovation and align better with citizen preferences

There are considerable variations across Europe in how energy market outcomes are perceived, particularly in terms of final consumer prices. These variations not only need to be taken seriously, but may well need to be accommodated within a well-functioning single electricity market. In determining its approach, the Commission needs to develop a regulatory framework that accommodates national preferences on consumer prices while simultaneously ensuring competitive and efficient wholesale energy markets.

Issues for policymakers

- *Is the EU Energy Union Governance an adequate and viable framework to promote convergence of national policies and targets?*
- *Will distributional effects of energy and climate policies and regulation create unintended societal resistance and social polarisation? How should policy makers manage upcoming distributional effects? Is it national or European responsibility to deal with them?*
- *How to boost regulatory innovation by National Regulators in line with climate targets?*
- *Does Europe have an appropriate energy and data strategy to deal with the challenges ahead?*

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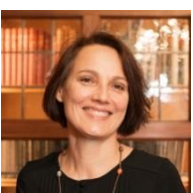
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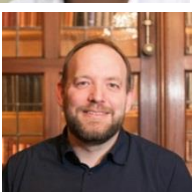
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ABOUT CERRE

The Centre on Regulation in Europe (CERRE) is an independent Brussels-based think tank. We promote ever-better regulation of network and digital industries in Europe and beyond.

We support rules that guarantee access to quality services at reasonable prices for all citizens, consumers and users today, while stimulating investments and innovation for tomorrow. These rules should safeguard citizens' rights and ensure strong consumer protection as well as appropriate competition between industry players.

The growing convergence and interactions between the energy, water, mobility, media, telecom and online economy sectors, create new opportunities and challenges for regulation. CERRE's approach allows stakeholders, including policymakers and regulators, to actively adapt to fast changing technology, business models and markets.

The CERRE community supports applied research that guides political, regulatory and business leaders to take better decisions for all. To do so, CERRE develops and disseminates policy-oriented independent research undertaken by experienced economists, lawyers, engineers, political scientists and other acknowledged academics based all over Europe.



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