
Memo to the commissioner responsible for energy

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The great momentum in Europe's energy transition must continue during your mandate. Electrification is the primary tool for reaching climate targets. Fortunately, you take office against a backdrop of huge global innovation and cost reduction in clean technologies. Your first challenge will be to ensure security of energy supply as electrification raises questions about infrastructure and cyber-security risks. You will also need to deploy efficient frameworks, including a European fund, to ensure the necessary green investments are made, particularly in European electricity grids.

You should work with national capitals to eliminate remaining energy imports from Russia. You should lead negotiations on the 2040 climate targets, which would see EU emissions falling by 90 percent compared to 1990. Finally, you should propose a European Energy Agency to deliver the better data policymakers and investors need to better understand Europe's energy transition.

Resolve electrification infrastructure issues

Promote investment, especially in grids

Exit the energy trade with Russia

State of affairs

Contrary to what in 2019 was expected to be an unexciting implementation mandate, your predecessor had to manage the most turbulent period ever for the European energy portfolio. First, the pandemic slashed energy demand and derailed investment plans. Then Russia invaded Ukraine. Europe had to replace Russia as its dominant energy supplier – no small feat considering that in 2021 Russia provided about 40 percent of the natural gas, half of the coal and a quarter of the oil imported into the EU. Simultaneously there were large nuclear power shortfalls and a once-in-a-century-drought.

The embargo on imports of coal, oil and oil products from Russia will remain in place for the foreseeable future, and gas imports from Russia via pipeline will remain drastically limited. The emergency reconfiguration of Europe's energy imports is thus set to solidify. Given the geopolitical context, remaining direct and indirect imports of Russian fossil fuels – in particular liquified natural gas (LNG) – and nuclear fuels could end at any time.

Skyrocketing gas prices propelled inflation and led to a fall in gas demand of 19 percent between 2019 and 2023, while electricity demand fell by 7 percent. Thanks to broadly coordinated national policies and the power of the internal market, the acute energy crisis came to an end. Gas storages are filled well, electricity and gas wholesale prices have returned to 2021 levels and electricity demand has stopped declining. But several remaining challenges and emerging cracks still need to be addressed.

The transformation of Europe's energy sector – which is expected to decarbonise fully by 2040 – is far from guaranteed. Meeting the next milestone – the 2030 targets – is only six years away. It requires almost doubling the share of renewable energy in final consumption (in 2022 it was 22.5 percent, while it needs to reach 42.5 percent in 2030). This is a very tall order: some EU countries do not want to commit to the national efforts that will be needed.

Meanwhile, energy efficiency targets will require a reduction of more than a fifth in primary energy compared to 2022. This is not going to be easy either, but high energy prices and electrification of transport and heating can help. However, this electrification will

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bring with it a need for huge investments in electricity generation and grids. Obligations such as the phase-out of new internal combustion engine cars by 2035, and targets such as increasing hydrogen consumption to 20 million tonnes by 2030, will also require substantial investment. Overall, Europe is on the brink of a massive green-energy investment wave. The EU will have to spend about 3 percent of annual GDP on energy-related investments (excluding transport), versus 1.7 percent in the 2011-2020 period.

Electrification will be at the centre of Europe's energy transition. The European Commission (2024) expects electricity to account for more than 62 percent of final energy consumption by 2050, up from a projected 33 percent in 2030. Hence, investment in the electricity system will be a core driver of energy costs. Fine-tuned rules are needed to enable markets to develop and run a continental electricity system efficiently – such coordination is currently not in place. Cross-border networks are too limited, some power plant dispatch is still inefficient and, most importantly, there is little-to-no regional coordination of national power system development. Coordination means investment in clean-energy generation and storage as well as the use of demand side flexibility. Europe's Energy Union must increasingly become an Electricity Union (Zachmann *et al*, 2024).

Cross-border networks are too limited, some power plant dispatch is still inefficient and there is little-to-no regional coordination

The energy transition will reduce energy costs in regions with abundant access to cheap clean electricity – known as the renewables-pull effect (Samadi *et al*, 2023). Previously favourable factors for energy-intensive industry location decisions, such as access to coal and gas, will quickly lose their relevance. The threats (or opportunities) arising from relocation of sectors within countries, within Europe and globally, creates dangerous political incentives to use energy-policy tools to shape energy prices for industrial users.

While the European energy system demonstrated its resilience to price shocks, costly national support schemes were required to partially buffer consumers from the most negative consequences. Structurally increasing the share of energy costs in household expenditures (currently between 11 percent in 2020 and 13 percent in 2022) remains politically very difficult.

Internationally, decoupling from Russia is likely to prove

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permanent. Over the course of the next two decades, EU energy imports are expected to decrease substantially (from 800 Mt of oil and gas in 2021 to 300 Mt in 2050). In the meantime, the United States is set to assume a very important role in LNG exports to the EU. The EU will need to also prepare the energy dimension of enlargement – especially to Ukraine.

The good news is that the global roll-out of clean technologies and continued investment into research and development gift the EU with continuing cost reductions (Claeys *et al*, 2024). Solar PV deployment has continued to accelerate, with global capacity additions in 2024 expected to be nearly triple their 2019 levels, while onshore and offshore wind capacity is still growing rapidly. Since 2019, the cost of batteries for use in stationary storage and electric vehicles has dropped drastically. Continued technical improvements in efficiency and capabilities thanks to deployment of these clean technologies are an enormous and transformative help. Some highly acclaimed technologies such as small modular reactors and hydrogen electrolysis, have not yet seen their commercial breakthroughs, while geothermal and district heating are coming back into fashion. Your mandate will likely feature many fascinating and some unexpected technological developments, including occasional disappointments. Most of those will, however, be more relevant for the 2050 planning horizon than the deployment plans during your mandate.

Challenges

Ensuring energy security will remain a crucial challenge during your mandate – but in a very different way from that of your predecessor. While LNG supply still needs to be closely monitored, and energy imports from Russian will remain an issue for you, both issues are likely becoming less systemic, and more regionalised, risks. This should give time to work on strategic solutions that ensure gas import resilience (including hydrogen) and a framework for dealing with Russian imports.

An energy system that involves more interconnections and more digitalisation is potentially more vulnerable to systemic physical

and cyber risks. Adequately tackling this will require cross-border coordination of defence and interior security. It will also require coordination on the energy side to ensure resilience of highly meshed systems.

To ensure a managed, cost-efficient transition, Europe must synchronise electricity supply and demand growth

Deploying efficient frameworks to ensure the delivery of the required clean-energy investment volumes will be the key indicator of your success. Thereby, public budgets can at best play a catalytic role – the bulk of the investments will have to come from private sources. Meeting this investment challenge will be made more difficult by higher interest rates. Moreover, skill shortages and some value-chain issues increase the cost of the hardware. To ensure a managed, cost-efficient transition, Europe must synchronise electricity supply and demand growth. If heat pumps and electric vehicles are deployed too slowly, Europeans will have to pay for underutilised renewables. If too little is invested in electricity generation and storage, European consumers might run into very expensive scarcity. If grid capacity is too low, even perfect synchronisation of demand and generation will not help. Getting to a coordination framework between actors and between countries, each with strong interests and preferences, is going to be a daunting task.

Similarly, it will be important to promote the best feasible pathway to achieve decarbonisation targets. A balance needs to be struck between reducing final energy demand and promoting electrification. Relying solely on the efficiency gains from electrification – notably through heat-pumps for heating and EVs for transport – risks putting an extraordinary burden on the electricity grid in periods of low renewable-energy generation. On the other hand, it will not be easy to ensure that efficiency is properly accounted for in all investments, while not discouraging electrification.

A related challenge is to find a suitable way of sharing the cost of the energy system. Increasingly, the electricity system will be central in the energy system. The shift of tariffs and taxes from oil, gas and coal toward one major energy carrier – electricity – leads to new distributional challenges. Should the costs of electricity transmission be borne by taxpayers, should current renewable investments be paid for by future consumers, how much profit and risk should be left for private investors, and should households

subsidise the bills for industry? In the transition, the current settings of market design, network tariffication, taxation, levies and subsidies, and an extended carbon price that directly affects household budgets, will lead to very different distributional results, both within and between countries. Finding new guidelines that provide good incentives for efficient operation and investment – but that are also fair – is going to be a crucial challenge.

Investors will only invest in the ‘right’ technology mix if the expected returns correspond to the desirability of these investments. Expected market prices would be an efficient driver, but future prices depend on current and future policy choices. And those policy choices will depend on current and future technology preferences. If uncertainties are high, the EU runs the risk of under-investment in sustainable solutions and over-investment in technologies with high degrees of optionality/self-hedging (eg fossil-fuel plants). To address this, public institutions need to provide credible guidance on which investments they will value at which point in time. Such guidance would imply which investments should not be devalued by future policy choices. The challenge will be to balance flexibility with credibility.

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A crucial challenge for you will be to define the policy architecture to meet Europe’s climate targets after 2030. You will have to propose successors to the 2030 renewables (42.5 percent), energy efficiency (-40 percent) and interconnection (10 percent) targets, and whether/how those will be allocated to member states. You will thus have to decide: 1) how targets are defined, eg should energy efficiency targets be measured in terms of primary energy or should they rather be set on final energy, or useful energy? 2) which targets are set, eg is an energy efficiency target still needed when renewable electricity is regularly abundant, or should there be an electrification target? 3) what level of renewables to target; 4) how will those targets be differentiated across member states; and 5) how national targets can be enforced. An overly restrictive setting will not be credible, while a too-loose setting will not provide guidance. Issues like the treatment of nuclear power, which is seen as a silver bullet by some countries and a dead-end by others, will create an additional complication.

Energy-policy choices will become increasingly political over

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the next few years. It will be of paramount importance to anchor policy in reliable and transparent data. Without good data, Europe's green transition will be harder to achieve. Good data and publicly available information are needed to assess the impact of planned policies, to evaluate current frameworks and to plan infrastructure, to assess national and regional plans and to identify priorities. In the absence of good public data, special interests find it much easier to lobby for suboptimal approaches. The EU has a substantial problem in this respect, as energy data is not available currently in a timely way or at the level of granularity, reliability and consistency needed for informed policymaking. To inform and guide the EU energy transition in a transparent, consistent and authoritative way, you will have to respond to this challenge.

Recommendations

Prepare to become 'Fit for 90'

Efficient European coordination of investments and policies also requires well-defined and accepted targets for 2040, by when net emissions should be 90 percent below 1990 levels. The 2020 and 2030 targets on energy efficiency and renewables provided guidance, but ensuring that all member states contribute their fair share has proved an impossible exercise. Applying the same approach to the 2040 climate targets would imply highly intrusive energy-efficiency and renewables targets. One way out could be to have targets that are more in line with expected decarbonisation pathways – in effect using 'clean electrification targets.' A more radical shift would be to replace gross targets by requiring National Energy and Climate Plans to show planned investments to achieve domestic mitigation in line with the climate ambition.

Coordinate member-state investments in clean electrification

Implementing incentives for efficient investment in the large-scale electrification of Europe by 2040 is your most important task. This will require a broadly consistent vision of the future electricity

system that no member state fundamentally disagrees with. The task is to synchronise the increase in clean-electricity generation with the investments in the enabling infrastructure (including storage, networks, and back-up), and the switch from fossil fuels to electricity in major demand sectors. Such coordination across borders requires transparent and inclusive planning, and efficient markets and conducive pricing (with the right taxation and subsidies). European and national investment incentives can then be evaluated against their contribution to this effort.

For example, national and European network development plans should be scrutinised by the corresponding regulators to assess whether they constrain the desired transition. For investments in renewables and flexibilities/back-up you should encourage member states to engage in joint mechanisms for supporting investments. If this is not possible, you will have to, at least, put effective guardrails on national investment incentives. Otherwise, disproportionate investment incentives for one technology in one country can trigger a subsidy race in all neighbouring countries – to the detriment of consumers and taxpayers. For the demand-side, you will need to promote both efficiency investments – aimed at reducing final energy demand – and technologies creating flexibility in the power system for short-term (via heat-pumps and electric vehicles) and seasonal variations (via industry). New instruments can be designed to reward energy efficiency gains, while cross-country public transport should be made more cost competitive against flying and private mobility. You will also need to ensure that all consumers are incentivised to dynamically respond to system conditions to reduce the overall system costs.

Launch an EU Grids Fund

You should work with other relevant commissioners on a European fund to invest in electricity grids. This would have two main merits: first, it would enable faster deployment of much-needed grid infrastructure, the systemic benefits of which largely exceed the willingness-to-pay of those consumers that normally have to pay for it. Second, it would put some of the grid cost on future taxpayers and thereby allow faster electrification today and hence

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greater benefits also for those future consumers. As a matter not only of affordability and social fairness, but also to encourage fast electrification and decarbonisation, you need to ensure that, on aggregate, electricity is a cheaper form of energy than fossil fuels. Energy taxation and the carbon trading are important levers, but the sharing of network costs between current and future ratepayers and taxpayers will also be essential. At the same time, containing cost will require maintaining good incentives for investments and reducing electricity consumption, especially in times of scarcity.

Europe must not become dependent again on Russian energy

Go the last mile on Russian energy

Europe must not become dependent again on Russian energy. In the near term, sectoral (eg nuclear) and regional vulnerabilities will be exploited by Russia to pursue tactics that ultimately aim at undermining the European project. The risk that individual member states are tempted by 'energy gifts' from Russia is undermining solidarity and investments in alternative supplies. Moreover, any imports from Russia help Russia finance its war on Ukraine. You should develop an EU strategy to jointly manage remaining energy trade with Russia. Any decision to reopen energy trade with Russia should be an EU decision. With the transit contract between Naftogaz and Gazprom in Ukraine to expire at the end of 2024, and the upcoming wave of new LNG liquefaction capacity from the US and Qatar, the favourable moment to renegotiate the contractual terms of energy trade with Russia is now. A European buyers cartel would strengthen political leverage in any negotiations with Russia. At the same time, you should prepare a tightening of energy sanctions. Europe still buys gas via ship and pipeline, nuclear fuel and pipeline oil worth €30 billion per year from Russia, and does not enforce rules that would constrain Russian oil and oil product exports. The missiles and shells Russia can buy with these revenues drastically increase the cost of European battlefield support for Ukraine.

Strike a grand bargain on EU security of supply

To overcome the stalemate between individual member states' interests – Czechia and others in buying Russian pipeline oil; Spain, France and Belgium in LNG; Slovakia, Austria and Hungary in

pipeline gas; France and others in nuclear fuel – a grand bargain is needed that fairly shares the cost across all member states. For this, you need to engineer tangible solidarity solutions for the vulnerable countries. In the short-term one area sticks out. To give Ukraine a free hand in negotiations over a new gas transit contract with Russia (the current one expires at the end of 2024), you should moderate a discussion on the use of intra-European gas-transit infrastructure to properly supply Austria, Hungary, Slovakia and Ukraine from the west, in case no settlement with Russia is reached. In these negotiations, you should push for the transit agreement not to be renewed.

Create a European Energy Agency

Such an agency would make your work easier by providing timely data and modelling to everyone and thus improving the quality of the European energy policy debate (Tagliapietra *et al*, 2023). Obtaining early warnings of demand-supply gaps will help underpin policy initiatives and improve guidance for investments. The loss of political control over results from the currently used proprietary black-box models will be outweighed by the gains in credibility of an open approach, easing negotiations with co-legislators, and ensuring a more transparent policy-making process.

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