



TEN/717
EU Strategy for Energy System Integration

OPINION

European Economic and Social Committee

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Powering a climate-neutral economy: An EU Strategy for Energy System Integration

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1. **Conclusions and recommendations**

- 1.1 The European Economic and social Committee (EESC) supports the Commission's intention as set out in its Communication: integration of the electricity system with the heat and transport system is vital to reach the goals of climate neutrality, security of energy supply, including reduction of energy imports, and the goal of affordable prices for Europe's consumers and the European economy.
- 1.2 That said, the EESC is bound to note that the Commission leaves some points of great importance for the success of the European energy transition unanswered in its communication.
- 1.3 The Commission does not answer the question of how it intends to achieve security of supply using low-carbon or carbon-free energy sources. It states that 84% of the electricity demand is to be met from renewable sources, but fails to detail the sources from which the rest of the electricity is to be produced. Given the crucial importance of security of supply for the European economy and consumers, this is unacceptable, especially as electrification of the heat supply and the transport sector is expected to boost electricity demand despite progress on efficiency.
- 1.4 The EESC agrees with the Commission that a lack or inadequacy of CO₂ emissions pricing in the heating and transport sector is a serious problem for system integration. But just describing the problem is not enough. Concrete proposals for solutions are needed. The Commission is far too hesitant and vague on this point.
- 1.5 Energy system integration requires modernisation and upgrading in certain areas and in some cases the construction of new energy infrastructure. This necessitates massive investments, which could potentially be facilitated by a dedicated European financial framework accessible to businesses in all Member States. These investments could provide important economic stimulus to master the recession triggered by the COVID-19 pandemic and should create good and fair jobs. However, it is important here that investment decisions are taken in such a way as to support energy and climate policy aims. Given the huge capital requirements, it is also essential to make the best use of existing infrastructure. This requires prioritising the technological options available for rapid and efficient system integration. Energy efficiency, in particular in industrial processes, must be given priority over all other approaches. Moreover, this prioritisation must show which technology is best suited to which application that achieves system integration. The right infrastructure investment can then be planned accordingly. The Commission's Communication is far too sketchy on this point.
- 1.6 The Communication focuses in particular on hydrogen and offshore wind energy. These are important technologies, but their use should only be complementary – where onshore wind energy and solar energy, as well as short-term storage such as batteries, are insufficient. This is because, for the foreseeable future, onshore wind energy and solar are not just the cheapest forms of energy production, but also the best options for attaining an important strategic goal of the Energy Union: decentralisation as a way of creating secure and good jobs and generally making the most of the sociopolitical and regional economic benefits of the energy transition, empowering consumers also as prosumers and putting them at the heart of the energy system, combating energy poverty, increasing security of supply while promoting regional development and fostering buy-in for the

transition. In particular, onshore wind energy and photovoltaics enable direct system integration: for example, the use of solar energy on the spot to charge electric cars, or the use of wind energy for power-to-heat applications. The Commission ignores this great potential of onshore wind energy and photovoltaics in its Communication, which the EESC considers to be a huge mistake.

- 1.7 System integration has the potential to boost innovation in the European economy and so increase its international competitiveness. This will only be successful, however, if the potential of digitalisation for system integration in particular is unlocked: artificial intelligence and machine learning can be a game-changer in demand-led supply of energy for the electricity, heat and transport sectors. However, the deployment of such technology must be carefully weighed against its usefulness and potential ethical problems, particularly with regard to data sovereignty, and should be preceded by an initiative to train suitable specialists. It defies comprehension that the Commission does not acknowledge this in the Communication.
- 1.8 Finally, system integration requires completely reconfigured energy markets, to be designed in such a way as to promote community energy and empower consumers. Only then can the relevant objectives of Directive (EU) 2019/944 on the internal market for electricity and Directive (EU) 2018/2001 on renewable energy be met. System integration will be much faster if consumers can exercise their rights, including as prosumers, self-producers and members of renewable energy communities. At the same time, attention should be paid to the public sector's role in security of supply. These aspects are entirely absent from the Communication.
- 1.9 The EESC supports the Commission's idea of organising a major event on energy system integration and is ready to play an active role in this. In this regard, the Committee wishes to address the issues raised in this opinion that are not sufficiently covered in the Commission's Communication. In particular, it must be emphasised how important the active involvement of citizens is for energy system integration. On this point specifically, the Commission's Communication is disappointing as it only sees citizens as consumers who merely lack sufficient information.

2. **General comments on the Commission document**

- 2.1 The Commission's Communication relates to the European Council's commitment to achieving climate neutrality by 2050. Given that the energy system is responsible for 75% of greenhouse gas emissions, the most crucial step towards this goal is the creation of a largely zero-emission and carbon-neutral energy system.
- 2.2 The integration, or coupling, of the various hitherto only very loosely connected energy sectors – electricity, transport and heating (including cooling and process heat) – plays a crucial role in this, an aspect dealt with only very sketchily in the Clean Energy Package, despite the fact that there are applications that have been putting system integration into practice for a very long time, such as combined heat and power (CHP) generation.
- 2.3 In its description of the situation at present, the Commission highlights the fact that the energy system has so far been characterised by various parallel vertical value chains.

2.4 The notion of energy system integration is now being put forward as an alternative. By this the Commission understands the coordinated planning and operation of the energy system "as a whole", the aim being to better knit together energy sources, infrastructure and consumption sectors. The Communication sets out the various benefits of such system integration: the contribution to meeting climate goals, more efficient use of energy resources, greater flexibility in the energy system itself and, finally, more empowerment of consumers, improved resilience, and greater security of supply, though it remains unclear whether security of supply is at EU or Member State level. And yet this is an important matter, since Member States sometimes have very different strategies on this and the conditions with regard to generally available energy sources are sometimes very different in the various Member States.

2.5 To achieve this, the Communication sets out a plan resting on six pillars:

1. a "circular energy system" with a clear focus on energy efficiency (actions include: making the "efficiency first" principle operational; reviewing the Primary Energy Factor; and promotion of waste-to-energy approaches);
2. greater electrification of end-use sectors (actions include: expansion of offshore wind energy; mandatory consideration of renewable energy in public procurement; promoting electrification of heating for buildings; expansion of charging points for electric vehicles; revision of the Renewable Energy Directive; new CO₂ emission standards for cars and vans, and reworking of the Alternative Fuels Infrastructure Directive);
3. use of biofuels in certain areas (actions include: a European certification scheme for renewable, low-carbon and sustainable fuels; possibly additional measures such as minimum shares or quotas in specific end-use sectors; scaling up the capture of carbon for its use in the production of synthetic fuels);
4. making energy markets fit for decarbonisation and distributed resources (actions include: ensuring non-energy price components are consistent across energy carriers; harmonising energy taxes; possible expansion of the Emissions Trading System; phasing out of direct fossil fuel subsidies; adaptation of the gas regulatory framework; an information campaign on consumer rights; and improved consumer information);
5. an integrated energy infrastructure (actions include: new regulation for the trans-European networks and ramped-up investment in smart district heating and cooling networks);
6. a digitalised energy system and a supportive innovation framework (actions include: a Network Code on cybersecurity; implementing acts on interoperability requirements).

3. **The EESC's general comments**

3.1 The analysis of the current problematic situation is very accurate and the Commission's basic approach is certainly to be welcomed: there is an urgent need to push forward with integrating the energy system – especially given the need to speed up decarbonisation in the transport and heating/cooling sectors in Europe. System integration is important not only for achieving climate

neutrality, but also for stable security of supply and affordable prices for private consumers and the economy. The EESC therefore strongly supports the Commission's plan to advance the integration of the electricity, heating and transport sectors. However, the plan must not be used as a reason to further liberalise services of general interest before the effects of the previous liberalisation initiative have been assessed. However, the EESC also warns that the Commission should encourage the European Union's neighbours, and primarily the Eastern Partnership countries, to follow this plan and make it their own policy. The question of whether a CO₂ border tax could be helpful here should be explored.

- 3.2 The six concepts referred to in point 2.5 constitute correct and effective approaches. The majority of the measures themselves are persuasive, despite the occasional lack of clarity as to how much they really contribute to energy system integration.
- 3.3 The criticism that can be levelled, however, is that the strategy's political aims, its consistency and logical structure fall short. In addition, the role that citizens/consumers play – or would be expected to play – is more or less completely neglected. This is all the more frustrating because the Commission was still promising in the Clean Energy Package to put citizens at the centre of the energy transition.
- 3.4 The Commission fails to define clear, ambitious and specific sub-targets derived from the overarching objective of climate neutrality. This is particularly true for the expansion of renewable energy, which is lagging behind the targets in many Member States.
 - 3.4.1 The Commission is, admittedly, very (self-)critical when it comes to the chances of this becoming reality. It writes, for example, that: "Without robust policy action, the energy system of 2030 will be more akin to that of 2020 than a reflection of what is needed to achieve climate neutrality by 2050. [...] The steps taken in the next five-to-ten years will be crucial for building an energy system that drives Europe towards climate neutrality in 2050."
 - 3.4.2 But the Commission itself lacks political courage, as the Communication proves. Because the statement that – with the share of electricity in final energy consumption expected to rise sharply – a share of 55-60% of renewable energy in the electricity mix by 2030 and of 84% by 2050 will be enough leaves a lot of questions unanswered. The most important of these is: how is stable security of supply supposed to be achieved? Biogas, biofuels, including synthetic biofuels such as hydrogen, and, under certain circumstances, hydropower can be used to offset the fluctuations of wind and solar energy. There are also two technology options that could make up the 16% shortfall and be considered carbon-free or low-carbon: nuclear and gas or coal power plants with carbon dioxide capture and storage (CCS). These, however, involve major economic, environmental and social challenges. Even though it is for the Member States to determine their exact energy generation mix, it is incomprehensible that the Commission does not explain how it intends to achieve carbon-free security of supply.
- 3.5 The timidity is also seen elsewhere. As the Commission rightly suggests, one of the main reasons why energy system integration is progressing so slowly is the lack of carbon pricing of fossil fuels used in transport and, above all, in heating. Add to that the fact that many Member States tax electricity heavily, even if it comes from renewable sources. Excessive network charges are also

a problem in a number of Member States. This market distortion means, for example, that in many configurations the use of surplus electricity for the production of heat (power-to-heat) – in other words, the simplest form of system integration – is not economically feasible.

- 3.6 Only if the problem of market distortion is solved will energy system integration really make headway. The announcement of "further work towards the phasing out of direct fossil fuel subsidies" and a "possible proposal for the extension of the ETS to new sectors" rings hollow and falls short. Society has been hearing these platitudes from the Commission for years, without anything of substance changing. The technological support that the Commission describes primarily in the first three pillars of its strategy (see points 3.1 to 3.3 above) will be markedly less effective if the Commission does not act robustly to remove the market distortions described above.
- 3.7 It is welcome that the Commission proposes a sequence for technological tasks. However, it should have made it clear on this point that, in terms of efficiency, the combustion of fuels can never compete with the direct use of photovoltaic or wind power, except in the case of combined heat and power plants where the heat is used directly in the immediate locality. This aspect is particularly important for transport decarbonisation, which in certain areas cannot be achieved through electrification. The Commission covers the issue cursorily with examples at certain points in the Communication. However, it does not take efficiency as the key criterion for assessing different technology options, which would be essential for integration of the energy system from the energy technology and energy economy perspectives.
- 3.8 The Commission also fails to recognise the fundamental importance of infrastructure. An economically efficient design of system integration can only be achieved if the existing energy infrastructure is taken into account as an important basis for planning and implementing system integration, or if the infrastructure implications of different technology options are recognised. If this were done, what we would see is the following:
- a) For charging electric vehicles: photovoltaics (including roof solar panels in particular) are particularly suitable, as photovoltaic systems usually feed electricity at a low-voltage level and electric vehicles are charged at that level.
 - b) Power-to-heat applications, for example via heat pumps or a heat storage device: wind turbines or larger solar farms can be suitable if the heat is to be delivered via a remote or local heating network. This is because more electricity is needed to operate the pumps or the heat storage device.
 - c) Long-term storage of surplus electricity as hydrogen: gas storage facilities are particularly suitable.
- 3.9 None of these power-to-X technologies necessarily requires entirely new infrastructure. It is more a question of using the existing technologies wisely and modernising and upgrading them where

necessary¹. In many Member States, infrastructure has suffered from a policy of austerity. Cost-efficiency is an important aspect of the modernisation and development of infrastructure, but it also has to be about creating good jobs. With this in mind, the Commission should consider making the promotion of power-to-X applications conditional on the use of an existing infrastructure, at least in the short to medium term, so as to first unlock potential that requires least effort. In this light, the Communication's one-sided focus on offshore is open to question.

- 3.10 While the Communication mentions digitalisation, it fails to grasp its real potential. Smart grids, which give specific signals to market players and thus also make markets smart, are essential for efficient and secure energy supply. Assuming that the right information is made available to market participants through digital applications, electric cars (especially as vehicles-to-grid), heat pumps or hydrogen storage devices can provide important ancillary services and take pressure off the grid. Artificial intelligence, machine learning and the automation of energy consumption processes, whether at household or industrial level, will help take load shifting to a new level and incorporate it into virtual power plants.
- 3.11 Finally, the Communication ignores many points that the Commission has deemed important in previous Communications – e.g. on the Energy Union framework strategy – or that are already EU law as part of the Clean Energy Package, which is about the "active consumer" as characterised in Directive (EU) 2019/944 on the internal market for electricity, and who was supposed to have access to all relevant electricity markets. That idea does not feature at all in the Communication – and nor do the activities of self-consumers or renewable energy communities which were codified in Directive (EU) 2018/2001 on renewable energy. The Communication states: "Citizens have a central role in system integration. This means that they should contribute to shape the implementation of this Strategy" This rings very hollow when the only concrete measure is an information campaign.
- 3.12 The EESC has repeatedly pointed out that in many Member States there are significant hurdles that effectively prevent citizens from helping to shape the strategy. This makes it all the more incomprehensible that the Communication ignores the problem. Other goals highlighted in similar places and ignored in the Communication are: reducing dependence on energy imports, strengthening regional economic cycles, and creating fair and good jobs. These are criteria that need to be taken on board when designing energy integration and which make certain technology options more advantageous than others. The Commission should also encourage third countries to take these aspects on board in their energy policy. Here, too, border taxation could be a strategic option.
- 3.13 There would be a lot of opportunities to make citizens players in sector coupling who can take action and benefit themselves. Just one example: the latest wind farms provide enough electricity under average conditions to meet the demand of around 7 000 electric cars. With investment costs of less than EUR 10 million, it makes a lot of sense to promote community wind farms to power local charging stations. However, such approaches, which would enormously boost acceptance –

¹ Just one example: even though fossil gas will play an increasingly limited role, existing gas networks could instead or also be used for "green gas" or hydrogen.

not least because they would drastically cut costs for citizens and have a positive economic impact regionally – are not even touched on in the present Communication.

- 3.14 Consumer rights need to be strengthened if people are to benefit from system integration. And they must apply to prosumption as well as the traditional consumer role. The Communication regards citizens as merely customers or consumers, who should only be given tailored information. This is more than disappointing for the EESC, not least given the promises of the European Energy Union.
- 3.15 While the Commission does recognise in abstract terms the need for action on the rights of consumers in the gas and district heating sector, only the empowerment of gas customers is announced as a key measure under a new legal framework for the gas sector for 2021. There are no specific measures for local and district heating, although this is precisely where consumer rights are much worse than in the electricity and gas sectors. However, to preserve existing system integration, no further liberalisation measures must be taken in the heating sector.
- 3.16 In this connection, the EESC reaffirms its position that a second-class energy society is to be avoided at all cost². We cannot have a situation in which only affluent and technologically well-equipped households benefit from the energy transition and all the rest have to bear the costs. Quite the contrary: tangible measures are needed to tackle energy poverty both nationally and at European level. These include better accessibility of support for thermal renovation or replacement of heating systems for energy-poor households, mandatory basic supply models and general safeguards for consumers in the energy sector, including against excessive electricity network charges and abuse of monopolies.

4. **Specific comments**

The circular energy system

- 4.1 The EESC has already presented the concept of a circular energy system in its own-initiative opinion TEN/660, and welcomes the Commission taking up the idea.
- 4.2 However, the term should not refer, as in the Communication, only to energy saving and energy efficiency, but to energy flows in general. This is particularly important for rapid integration of the energy system locally, i.e. at the place of final consumption.
- 4.3 The EESC welcomes the Commission's announcement that it will review the level of the Primary Energy Factor. It is clear even now that current practice in many Member States is less favourable for power-to-heat applications and biofuels. Consideration should also be given to clearly aligning the Primary Energy Factor with CO₂ emissions.
- 4.4 Implementation of the "energy efficiency first" principle, which is mentioned as a key measure in section 3.1 of the Communication, could encourage the setting of higher energy prices. However,

² See [OJ C 429, 11.12.2020, p. 85](#).

attention should be paid here to vulnerable energy consumers and an increase in energy poverty avoided. The Committee has repeatedly called for strategies to this end and has also made tangible proposals (see, for example, opinion SC/53). This aspect is particularly – though not uniquely – important for a large number of citizens in Eastern Europe and for the regions in transition. Regionally differentiated approaches are therefore necessary to achieve the high efficiency goals.

Accelerating the electrification of energy demand

- 4.5 The Commission's approach is right: electrification of the heat and transport sector is the best way to tackle system integration. For this to be in line with the goal of climate neutrality, a rapid expansion of renewable energy is required, but one based and focused on need.
- 4.6 It would have been desirable for the Commission to make clearer the exact implications of this for the revision mentioned of Directive (EU) 2018/2001 on renewable energy. The EESC believes that the expansion objectives set out are much too limited.
- 4.7 Section 3.2 of the Communication clearly focuses on offshore wind. Photovoltaics and onshore wind get no mention at all. This is incomprehensible, because in their case, as explained in point 3.7 above, potential for system integration can be tapped quickly and efficiently, whereas offshore wind for hydrogen production requires huge investment in energy infrastructure. The Commission would therefore be advised to follow the "first things first" rule in sequencing its actions.

The role of hydrogen

- 4.8 There is no doubt that hydrogen will be an indispensable part of a climate-neutral energy mix. Hydrogen will be essential for three areas in particular when direct electrification reaches its limits:
- for long-term electricity storage to overcome "Dunkelflaute" events, i.e. moments of insufficient solar radiation and wind supply;
 - as fuel for aviation, waterborne transport and, in a few specific cases, heavy goods road transport, as well as in a few specific sections of public transport;
 - for certain industrial processes.
- 4.9 However, hydrogen production is costly and entails large energy loss. The Communication should therefore make it clear that hydrogen can only be an option if direct heating or electrification are not technically feasible (or possible only at significantly higher costs).

Market design and openness

- 4.10 The rigid concentration on a central wholesale market to be found in a lot of Member States prevents the integration of the energy system in many instances. It might, for example, make much more sense technically (in terms of relieving the electricity grid) and economically (in terms

of cost-efficiency) to use local surplus electricity for mobility or power-to-heat applications that also trigger local electricity demand. Such direct integration of different energy sectors in the same place, ideally by involving established public and municipal utilities with their sustainable networks, is often made impossible by central wholesale markets.

- 4.11 The Commission's failure to recognise that the rigid focus on a few central wholesale electricity markets prevents system integration is all the more surprising given that other forms of trading are already mentioned and acknowledged in existing legislation: for example, the Directive (EU) 2019/944 on the internal market for electricity explicitly grants active consumers the right to peer-to-peer trading and energy-sharing within energy communities. Both are forms of trading that make it possible for not just citizens, but also SMEs and municipalities, to drive system integration forward very effectively on the ground. The Commission Communication is therefore disappointing on this front. At no point is it spelt out how the market should be organised so that consumers can play that role.

The integrated energy infrastructure

- 4.12 The commitment to wrap-around infrastructure planning is welcome, as there is expected to be considerable demand for investment, which could be addressed where appropriate by a pan-European financing framework. However, it is important here to include the existing infrastructure and its optimisation and expansion in terms of energy production options and consumption patterns, including making consumption more flexible, and to factor in the interaction between market or trading systems and infrastructure. This is a challenge the Commission has yet to live up to.
- 4.13 It fails to recognise that the infrastructure determines which technologies are to be preferred, namely those which, all other things being equal (*ceteris paribus*), best use the existing infrastructure.

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