EREF Input to European Commission Consultation on Smart Sector Integration

1. **What would be the main features of a truly integrated energy system to enable a climate neutral future? Where do you see benefits or synergies? Where do you see the biggest energy efficiency and cost-efficiency potential through system integration?**

No-regrets measures in the energy transition process towards 2030, of which sector coupling/smart sector integration (SSI) is an important element, will necessarily have to address and support the following key features of this transition process, namely:

i) The massive growth and integration of renewables, particularly variable RES (wind, solar), into Europe's electricity system, at an unprecedented scale and rate, in order to meet the EU 2030 targets, which will be increased in the context of the European Green Deal and facilitate reaching net zero by 2050; To this end, effective decarbonisation will require to significantly increase the use of renewable electricity across sectors, particularly in the heating and cooling and transport sectors that still rely to a large extent on fossil fuels and which need to be electrified much further.

ii) The urgent need for a substantial efficiency increase in the functioning/utilisation of both the internal electricity market and the associated electricity infrastructure, in order to smoothly and effectively integrate, transport and use the huge amounts of generated RES electricity.

iii) The necessary phase out of fossils in power and energy production needs to be driven by a very substantial and fast decrease in the share of coal-fired power capacity and, also of the phase out of fossil gas-fired power capacity, a direction which is required to reach stringent 2030 and 2050 decarbonisation targets. This, in turn, necessitates the corresponding growth of green storage capacity, especially large-scale projects for long-term, seasonal storage, but also projects in demand side flexibility and other storage options.

iv) In addition to green storage capacity, in times of low demand and high generation through wind and the sun, integrating the gas and electricity sector can turn the temporarily abundant renewable electricity into green hydrogen– that can be easily stored and reconverted back into electricity, in times of high demand. Investing in Power-to-Gas tech technologies could, in the medium and long-term, contribute to increasing the RES share in the EU's energy mix and help decarbonise the gas sector.

Each of the above key features of the 2030 energy transition process can be accommodated by a set of no-regrets measures that can effectively support the said process, generally at low cost and quick turn-around times, as well as with multiple benefits.

2. **What are the main barriers to energy system integration that would require to be addressed in your view?**

From EREF's perspective, the following main barriers need to be addressed:

- **Persisting RES growth/integration problems** related to space planning, tortuous administrative/licensing procedures, new technological and regulatory challenges associated with the development of RES projects in progressively more difficult and testing environments, etc. The Recast RES Directive 2018/2001 (RED II) is certainly a very substantial step forward in this direction, but more specific and targeted EU legislation and actions are needed to overcome the above mentioned problems.

- **Minimising the overcapacity**. The variability of energy output from variable renewables requires a flexible power system with flexible back-up power sources, a smart grid and adequate storage capacity for short medium and seasonal variations to compensate for the variability of renewable energy supply and energy demand. Yet, overcapacity, particularly inflexible overcapacity, has negative impacts on all of the three basic objectives/pillars of EU energy policy: affordability, security of supply and sustainability. First, overcapacity is clearly an economic problem, in terms of the efficiency of the resource allocations and competitiveness. Second, it may affect the security of supply, since flexible capacity which is needed to back up variable renewables may lose the incentive to supply electricity when needed. Third, overcapacity represents a barrier to an energy transition based on renewables deployment.

- **Improve market integration and harmonise the Member States' capacity adequacy to ensure proper incentives for new green investment**. In the energy only markets, low marginal cost and variable nature of RES generation lead to revenue reductions and, therefore, disincentivises investment. The fundamental problem is not mainly the low cost levels and the variability of renewables. Most market imperfections and failures existed prior to significant renewables integration, but their effects were amplified, at the physical level, by the introduction of variable RES generation in a system based on inflexible baseload power plants, and at the institutional level by poor market integration and individual country definitions of capacity adequacy.

- **Lack of storage/flexibility options for accommodating the increase of RES in Europe's energy systems**. We note that the growth of variable renewable energy resources, i.e. wind and solar power, has added a third stochastic process, in addition to load and failures of components, to power systems, with much more dynamics than the two other processes. In addition, long-term storage is also needed to ensure security of supply and reduce the cost of overcapacity associated with renewable sources. Most of the short- and long-term benefits of storage are not sufficiently (if

at all) remunerated in today's market environment. Moreover, they are not even appropriately quantified.

- **Co-ordinated infrastructure planning across networks** is particularly important to optimise flexible power demand and generation, as well as its transmission and distribution to consumers. For instance, in certain EU countries, wind and solar power are curtailed due to real or alleged grid constraints or lack of implementation of priority grid access for RE. Electricity distribution networks, via local flexibility markets, or gas networks, via production and injection of green gases like green hydrogen, biomethane, biogas or synthetic fuels could significantly help reduce these constraints and/or be used to soak up the temporarily abundant wind or solar power. Hence a holistic system approach to local and national infrastructure planning needs to be undertaken, as efficiency and decarbonisation will also depend on it. In order to maximise benefits at national, regional and local level, the implications of coordinated infrastructure planning need to be considered across the system and first and foremost address the need reduce inflexible fossil and nuclear capacity to facilitate significantly higher deployment and system integration and resulting system change with variable RE at the centre of Europe's energy mix and energy networks.

3. **More specifically:**

- **How could electricity drive increased decarbonisation in other sectors? In which other sectors do you see a key role for electricity use? What role should electrification play in the integrated energy system?**

  The integrated energy system in Europe and elsewhere will be much more electrified than today's energy system. Major parts of heating and cooling demand will be met by a mix of significantly increased building efficiency and electric heat pumps driven by renewable power. Individual and public transport will largely be based on – increasingly green – electricity. Some industrial processes and relevant parts of air and maritime transport can probably not directly be based on electricity, but will need to be operated through indirect electrification, e.g. by green hydrogen, synthetic fuels and biogas/-methane produced with renewable energy. Estimates about direct and indirect electrification shares in the future energy system reach up to 70 and 80 per cent. And nearly all agree that electricity will play a significantly bigger role than it does today. Furthermore, the ongoing digitalisation, which will be needed for smart sector integration will be a strong driver for higher electricity shares in the energy mix and for higher electricity demand, not all of which can be compensated through innovative efficiency solutions.

- **What role should renewable gases play in the integrated energy system?**

All gases used in the future energy system should be renewable gases: green hydrogen, sustainable biofuels and synthetic fuels. They should be used, where direct electrification is not (yet) possible or available. Conversion losses in both directions of (green) gas production and use should be thoroughly considered and calculated.

- **What measures should be taken to promote decarbonised gases?**

  Provide incentives for green gases (and green only). Decarbonised gases from fossil fuels using CCS, CCU etc. can only be accepted – but should not be supported financially – for processes where direct electrification or green gases are not (yet) available.

- **What role should hydrogen play and how its development and deployment could be supported by the EU?**

  GREEN hydrogen should be used for processes which cannot be directly electrified and as a storage option for various end-use, from electricity via heating and cooling and for some transport applications.

- **How can energy markets contribute to a more integrated energy system?**

  Market design must favour flexibility and clean (renewable) energy, and/or disadvantage emitting and inflexible energy sources. This can be achieved by meaningful carbon pricing and by incentivising combined renewable energy power/energy production – through virtual powers plants for example. The accompanying higher degree of electrification can be addressed by shifting power markets closer to intraday and (close to) real time trading, which again requires a high level of digitalisation and smart systems, which again will need to result in a more distributed and decentralised energy system.

- **How can cost-efficient use and development of energy infrastructure and digitalisation enable an integration of the energy system?**

  Penalise inflexibility and reward flexible supply and demand. Move to real time markets and facilitate decentralised energy production and consumption (prosumers). This will reduce necessary grid capacity due to behind-the-meter supply and demand, and it will leave capacity for integrating larger scale storage and cross-regional and cross-border energy flows.

4. **What policy actions and legislative measures could the Commission take to foster an integration of the energy system?**

<u>EREF recommends pursuing the following objectives and measures, such as:</u>

- **Stop designing and favoring neo-liberal and narrow evaluation criteria for renewable energy support mechanisms.** Technology neutral auctioning for renewable electricity projects is a barrier to a holistic citizen and industry engaged transformation of the whole energy sector and violates the rights and duties of the Member States to be responsible for their integrated and sustainable energy mix and system transformation.

- **Facilitate and accelerate the deployment of renewable energy in all end-use sectors** is key to Europe's smart energy future. This applies to the increasing electricity demand due to digitalization and higher degrees of electrification of all end-uses, but increasingly includes direct renewable energy applications for heating and cooling and for industrial processes and for various transport options. Therefore, market design needs to incentivize sector coupling and sector integration and respective coordination on EU, national and sub-national levels, for power and gas grids and their system operators. Virtual power plants as well as integrated renewable energy systems for power, heat and transport would be helpful to facilitate this process. Customer tariffs for households and industrial customers need to foster flexibility and demand response as well as energy savings. Power and heat storage capacities at all levels – from small to large, from minute reserves to seasonal storage need to be promoted and their system services need to be rewarded in contrast to inflexible load and production. Grid fees and prices need to be adjusted accordingly.

- **Efficient functioning of the European energy markets should be improved.** European markets require clear, non-discriminatory rules and a stable regulatory framework that will give consistent signals both to investors of energy assets (generation facilities, grids), as well as to their users. In that respect, the effective and rapid implementation of the network codes and guidelines adopted in the Third Energy Package as well as in the Clean Energy Package is considered a top priority.

- **The existing interconnectors should be used efficiently.** The efficiency of the use of interconnectors, as expressed by the ratio of net transfer capacity to nominal capacity, should be raised significantly. This means that congestion management should be non-discriminatory and should maximise the European socio-economic welfare. The introduction of an operational target aiming at maximising the efficiency of the existing infrastructure, whilst keeping network security limits under control, is a potential measure in the right direction.

- **Actively pursue political coordination at local, national, regional and European level**. Support and coordination between different political levels are crucial to sending the message on the added value of key RES projects for ensuring a long-term social and economic welfare of European citizens. Stronger presence and

involvement of representatives of the EU institutions could build bridges between Member States' various decision-making levels.

As for promoting the deployment of storage/flexibility options that will support the RES growth, EREF suggests to:

- **Develop EU Guidelines for establishing a proper, dedicated and effective operational and tariffication framework** for electricity and gas as well as heat and cold storage in Europe and the Member States that will allow storage to be viable and competitive, on the road Europe's Clean Energy Transition**.** This framework should postulate that storage should not only be allowed to participate fully in the energy market, on equal footing with the other service providers, but also **to be fairly and equitably rewarded** for the multiplicity of crucial services it can offer to the energy system (flexibility, balancing, congestion management, voltage and frequency stabilisation, increased renewables integration, security of energy supply, decarbonisation of other economic sectors, such as transport and chemical industry etc.).

- **Actively promote the prompt and effective application/specialisation of the above Guidelines to each Member State or Regional Market, in order to develop their own optimised regulatory/legislative/tarification framework for storage.** Since the design and operation of storage systems is strongly dependent on (and adapted to) the particularities of each Member State's energy system, it is obvious that there is no single, "one size fits all", framework that can promote the optimal use of such systems and maximise their benefits for the national and regional energy systems

- **Design and execute a Storage Pilot Program**. Undertake a program of pilot projects, including projects in electricity, gas and liquid applications in different constellations, including projects encompassing more than one end-use and/or offering integrated energy supply, to identify technologies and Member States suited to develop storage systems that are appropriate to offer storage capacity to a wide range of EU markets. The project selection criteria should include, in addition to cost, the commitments and capacity to offer long-term and short-term storage to other EU markets, and the availability of infrastructures for so doing.

- **Perform a detailed analysis, both at the EU and the Member State levels, to quantify directly or indirectly all the above benefits**. The objective will be to determine a total value of the benefits that storage units offer to the European and national energy systems and compare it with their investment costs. A favourable comparison will provide a compelling evidence that these assets should be remunerated properly and the investments should proceed for the benefit of the said energy systems.