EASE Reply to European Investment Bank's Public Consultation on the EIB Energy Lending Policy[1]

March 2019

[1] To facilitate reading, the text of the EIB document will be in *italics* while the EASE replies will be in a box with a green border.

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Trends in the energy transformation

15. Without further action, the rise in temperature will change the climate and have major impacts on our societies and ecosystems. The 2018 IPCC (Intergovernmental Panel on Climate Change) report concludes that limiting global warming to 1.5 degrees Celsius compared to 2 degrees could ensure a more sustainable society. Energy production and use account for two-thirds of the world's GHG emissions, meaning that the energy sector has a key role to play to reach the goals of the Paris Agreement.

16. Nevertheless, energy demand from the energy sector continues to grow globally, increasing CO_2 *emissions. Fossil fuels represent 80% of energy consumption globally and fast-growing countries such as China and India are relying on fossil fuels to meet the growth in energy demand. At the same time, 600 million people in Africa still do not have access to modern energy.*

17. Reaching the goals of the Paris Agreement requires the EU to eliminate nearly all greenhouse gas emissions by 2050. It follows that by the middle of the century, if not earlier, fossil fuels such as coal, crude oil and even natural gas will no longer be used to any significant extent, at least in the absence of carbon capture and storage, to generate electricity, supply heat or fuel transport. This implies a radical transformation of energy systems.

18. Energy consumers and citizens will be at the centre of the energy transformation. The significant investments required, the evolution of energy prices, the type and location of activities needed will have long-term economic and social impacts. The transition will spur innovation, create growth and jobs in new sectors. In order to be socially acceptable, these impacts will need to remain fair across regions, across society.

19. This transformation can follow different pathways, reflecting the pervasive uncertainty that surrounds the cost and performance of key technologies, social acceptability and policy choices. Government policy can define specific targets and provide the policy stability and incentive mechanisms to be used to reach those targets; but markets dynamics have an important role to determine the least-cost pathway to reach those goals.

20. Certain key trends are likely to dominate this transformation process. Firstly, substantial investment in energy efficiency is required to reduce the volume of energy required to meet consumers' rising energy needs (heating, lighting, power, transport). Within the EU, a particular challenge is to improve the energy performance of the existing building stock.

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21. Secondly, the market share of variable renewable sources (i.e. solar and wind) will increase over time. The cost of these renewables technologies has decreased dramatically. They can now be deployed competitively and will become the largest sources of power generation. Integrating variable generation has a number of profound implications on electricity systems and requires greater flexibility over the short term from either conventional sources, exports/imports through electricity interconnections or new technologies to match supply and demand (demand response, digitalisation, batteries).

22. Thirdly, and relatedly, an increasing share of the new investment in power generation will be decentralised, i.e. power will be injected directly into the distribution network. The traditional model of central power generation flowing through a transmission system into a (passive) distribution system is quickly breaking down. As more capacity is connected to the distribution level, the Distribution System Operators (DSOs) have to actively manage power flows, with implications on investment plans, the interface with Transmission System Operators (TSOs), network tariffs and final energy prices paid by consumers.

23. Fourthly, as with the economy at large, energy systems are increasingly digitalised. Digitalisation technologies (smart meters, ICT, electronics, etc.) and services contribute to cost reductions and system integration of decentralised resources, and more direct consumer participation in energy markets, notably the capacity to manage demand in response to price signals.

24. Fifthly, it is expected that the heat, industry and transport sectors will become increasingly electrified. Low-carbon electricity will have to play an increasingly important role in providing energy for heat (i.e. replacing natural gas and heating oil) and transport (replacing mineral oil). This will lead to increased interaction between sectors, or sector coupling. Electricity can also be transformed into other energy carriers, often captured under the term "power-to-x" (i.e. hydrogen, synthetic methane etc.), facilitating seasonal storage and use of existing conventional infrastructures.

25. Sixth, these trends raise new challenges for energy security. Renewables can reduce dependence on imported fuel but integrating high shares of wind and solar power raises energy security issues. In particular, given seasonal weather patterns across Europe, the electricity system will also need to be able to cope potentially with weeks or months of lower production from wind and solar and meeting peak demand will also remain a challenge, exacerbated by the increasing electrification of heat. This will require continued investments to ensure an adequate infrastructure. In addition, digitalisation requires a high level of reliability of energy systems but also exposes it to cyber-security risks. Modern economies rely on an uninterrupted and abundant energy

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and ensuring a high level of security of supply is a necessary condition for the success of the energy transformation.

26. Meeting the long-term decarbonisation targets at least cost will rely on a portfolio of low-carbon technologies. Most of the technological options discussed in the European Commission (EC) strategic long term vision will have an important role to play to meet the 2050 net-zero emission targets. As identified under the EU Strategic Energy Technologies Plan (SET Plan), there are potential cost reductions for a wide range of power generation technologies.

27. Europe alone can only be a part of the combined effort to transform the energy sector. In Asia, the Middle East and Africa, energy demand continues to grow rapidly, outpacing Europe. Many countries are likely to continue relying largely on fossil fuels for now, with, as shown in Box 2, gas demand continuing to increase even in decarbonisation scenarios. Meeting the objectives of the Paris Agreement will not be possible without significant efforts outside Europe and the EU intends to be exemplary in order to play a leading role in climate mitigation.

Q1: Do paragraphs 15-27 above provide a reasonable characterisation of the long-term energy transformation? Are there additional dimensions that the Bank should consider when reviewing its Energy Lending Policy?

Energy storage is recognised in the 'Clean Energy for All Europeans' package as one of the key building blocks of the energy transition. Storage is essential to integrate rapidly increasing shares of variable renewable energy sources (RES) along the entire value chain - from generation to consumption - while ensuring system stability, efficiency, and the active participation of consumers. Moreover, energy storage can support the decarbonisation of the mobility, gas, heating, and cooling sectors by enabling sector coupling. The importance of energy storage and other flexibility technologies should be further emphasised in the above text.

Paragraph 19 rightly recognises that there are many different pathways to achieving the EU's decarbonisation targets, and that there is considerable uncertainty about the technology developments that will occur in the coming decades. This is why EASE supports a technology neutral approach, wherever possible, with regards to energy storage technologies. This should be considered in the EIB's energy lending policy, instead of only focusing on batteries.

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Paragraph 21 correctly notes the need for greater flexibility in the energy system to integrate rapidly rising shares of RES while ensuring system stability. However, EASE emphasises that batteries are not the only promising technology capable of providing system flexibility: other storage technologies - chemical, thermal, mechanical, electrical - can provide the needed flexibilities at different locations and timescales. Further investment and commercialisation of these technologies can lead to significant cost decreases and efficiency improvements.

As the document explains, storage infrastructure will be necessary and it should not be forgotten that in the short term, pumped hydro storage plants are the most cost-effective storage technology available to integrate massive amounts of vRES while maintaining energy security at appropriate levels and avoiding curtailment.

Paragraph 24 reads: "This will lead to increased interaction between sectors, or sector coupling. Electricity can also be transformed into other energy carriers, often captured under the term "power-to-x" (i.e. hydrogen, synthetic methane, etc.), facilitating seasonal storage and use of existing conventional infrastructures."

EASE highlights that, in addition to seasonal storage and utilisation of existing infrastructure, sector coupling through "power-to-x" (e.g power-to-gas, power-to-heat) can contribute to higher levels of system efficiency and flexibility as far as no fossil energy is involved in the processes. As discussed in the European Parliament Study "Sector coupling: how can it be enhanced in the EU to foster grid stability and decarbonise?"[2], sector coupling "…can improve the efficiency and flexibility of the energy system as well as its reliability and adequacy. Additionally, sector coupling can reduce the costs of decarbonisation."

Paragraph 25 highlights the need of continued investments to ensure an adequate infrastructure. EASE would like to stress that energy storage technologies can have a role to play in increasing the resilience of existing networks while deferring transmission and distribution investments, which - as broadly mentioned in paragraph 19 - are target of volatile patterns in social acceptability.

Distribution companies will require carrying out huge investments to adapt the grids to a completely new landscape of multilateral transactions, involving powerful data analytics to optimise grid management and address cyber security issues. Medium scale energy storage can provide valuable services to DSOs as additional network components, providing different support services and replacing/delaying reinforcement investments.

[2] http://www.europarl.europa.eu/RegData/etudes/STUD/2018/626091/IPOL_STU(2018)626091_EN.pdf

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EASE believes that a range of diverse energy storage technologies is an essential part of the 'portfolio of low-carbon technologies' referenced in paragraph 26. The diversity of energy storage technologies, and the wide variety of applications they can provide at all levels of the energy system, are not fully recognised throughout the consultation document.

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Box 1: Is EIB energy lending in line with long-term climate targets?

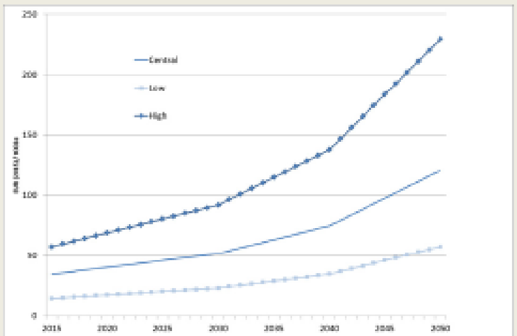
In the period 2013-2017, around 70% of EIB energy lending was in support of energy efficiency and renewable energy, including connection to power grids. This is recorded by the Bank as contributing directly to the Bank's corporate target for climate action.

The question of alignment with long-term climate targets applies to the remaining 30% of Bank lending associated with wider energy objectives: gas infrastructure, gas-fired power generation etc. This Box highlights two safeguards used by the Bank to ensure alignment with climate targets.

Firstly, all investment projects undergo an economic test that routinely accounts for the external cost of pollutants, including carbon emissions and local air pollutants. More details can be found in the Bank's Guide to Economic Appraisal. A key point is that these costs are assumed to rise in real terms over time, particularly for carbon.

Secondly, in 2013, the Bank introduced a second safeguard for the power generation sector – an Emissions Performance Standard (EPS) defined in terms of GHG emissions (g CO_{2e}) per unit of power generated (kWh_e). This is designed to ensure that any power generation project helps to reduce average emissions in the sector. As with carbon pricing, this has a dynamic component, reflecting the forecast reduction in GHG emissions embedded within the EU Emissions Trading Scheme (ETS).

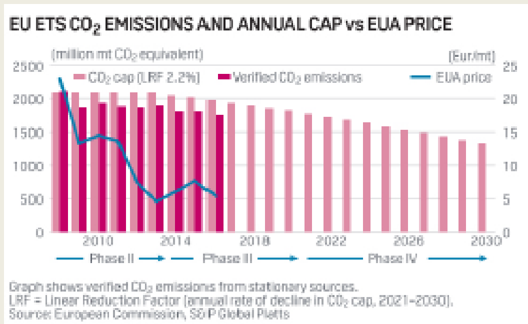
(a) External costs: carbon and local air pollutants



The Bank started integrating a price of carbon into its analysis in the mid-1990s. The figure above shows the latest values used by the Bank, formally adopted by the Bank as part of the 2015 Climate Action Strategy. Most recently, the report of the High-Level Commission on Carbon Prices provided recommended values consistent with the Paris Agreement, which are very close to the Bank's central to high values.

It is important to stress that the Bank also values local air pollutants. Since 2015 the Bank has adopted standard unit values for emissions of air pollutants, including particulate matter, ammonia, nitrogen oxides, sulphur dioxide, non-methane volatile organic compounds and certain heavy metals.

(b) EPS



In 2013, the Bank introduced an Emissions Performance Standard at 550g CO_2/kWh_e. This threshold is calculated according to a methodology consistent with emissions reduction under the ETS Directive and demand growth under the 2050 Roadmap.

The EPS was calculated as an average for the power sector over the lifetime of the asset. As illustrated in the figure above, the ETS cap reduces over time. In recognition of this dynamic element, in 2013 the Bank limited the validity of the threshold to five years. In 2018, the Bank informed the Board that it would review the threshold in the context of its new Energy Lending Policy – i.e. with full agreement over the Clean Energy for All Europeans package and the amendment to the ETS Directive.

Q2: As set out in Box 1, the Bank believes it has a robust framework to ensure that energy projects being financed are compatible with long-term climate targets. Do you agree? Are there areas where the Bank can improve?

Given the importance of the investment required to successfully complete the energy transition, we propose to increase the percentage for energy efficiency and renewable energy from 70% (in the period 2013-2017) to 80%.

Moreover, the EIB energy lending policy should support new technologies on the basis of rigorous/clear criteria regarding:

1. Technology maturity;
2. Cost-effectiveness
3. Efficient contribution to GHG emissions abatement

Q3: Within the broad areas of renewables, energy efficiency and energy grids, are there particular areas where you feel the Bank could have higher impact?

Keeping deployment of renewables at the same pace will require large and complex national and international grid expansion and in this aspect the EIB already finances Projects of Common Interest (PCIs) that help with interconnectors.

It is important to recognise the importance of all types of energy storage. Storage is part of a portfolio of solutions that can reduce the costs to end consumers and significantly facilitate the integration of renewable energy. There is a need to finance innovative business cases and storage technologies and the EIB should devote attention to this key sector by including it as a priority in their energy lending policy.

Last but not least, it is crucial to finance R&D of new technologies in order to ensure the affordability of the energy transition while strengthening the EU economy. Due to high initial/up-front costs, new energy technologies have higher investment costs (CAPEX) and low operating costs (OPEX). Thus, facilitating this initial investment could be of crucial importance, both for companies and for domestic consumers (heat pumps, electric vehicles, etc.)

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Theme 3: New energy technologies and business models

1. In the 21st century, the pace of technological change in energy has accelerated, resulting in a rapid transformation of Europe's resource mix and opening new investment opportunities across all segments of the energy system. The rapid growth of digitalisation and the deployment of storage and electric vehicles is expected to increase system flexibility, facilitate system integration of renewables and empower consumers.

2. Most of these technologies can be deployed either at utility scale or be decentralised. According to some sources, one third of new investments will be connected to the medium and low voltage networks by 2030. In some countries, the fraction of capacity that will be installed at the edge of the grid, i.e. behind the meter, is estimated to exceed 20% by 2030. Distributed resources are changing the operation and investments in energy systems.

3. These technologies will also facilitate the electrification and integration of energy consuming sectors (building, heating and cooling, transport, industry) with the power sector – also referred to as sector coupling.

4. This annex introduces briefly the potential of new energy technologies before turning to research development and innovation.

Deploying new technologies and business models

Demand response

5. Demand response is important to increase the flexibility of power systems and in particular reduce consumption during tight system conditions. While energy-intensive users have long been active participants in power markets, digital technologies and automation are increasingly allowing new customers to participate in energy markets.

6. Aggregators of demand response are developing new business models which consists in developing software and installing equipment to remotely control the load of electric appliances (heating, vehicles, batteries, etc.) installed by consumers. Customer acquisition costs are high and the revenues of demand response aggregators are usually highly sensitive to price volatility and the evolution of market design.

Decentralised energy

7. Solar PV and several new energy technologies of small size can now be deployed rapidly and at scale. In the EU, the share of new generating capacity connected to the distribution networks is growing. As discussed in Annex III, this growth will increase

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the operational complexity for distribution companies, and make the interface between DSOs (Distribution System Operators) and TSOs (Transmission System Operators) more dynamic.

8. New investors are able to enter this market, including non-energy companies, energy communities or customers self-generating their electricity. The financial viability of decentralised energy critically depends on the regulatory framework, in particular in terms of network and electricity tariffs and their evolution.

Battery storage

9. At the moment, the cost of battery storage remains high, but it is declining rapidly. The current capacity – 1.3GW, or 2.6GWh remains very limited, and remains small compared to pumped hydro power stations – but this is expected to rise reflecting the growth of variable renewables, new usages and further cost reductions.

10. Battery storage systems are still predominantly used for the provision of system services to TSOs. Battery storage can provide mainly short-term flexibility to the power system and can increasingly participate in the wholesale, intra-day, balancing and ancillary services markets. The business models of battery storage projects often rely on several revenue streams and they can be developed either by independent merchant companies or regulated ones.

Electric mobility

11. Electrification of light duty vehicles (passenger cars and vans) and public transport (buses) is important to reduce emissions, including CO2 and local air pollution, and to reduce oil dependence. The electric vehicle (EV) fleet size is forecasted to reach up to 120 million globally by 2030. The investments in the associated charging infrastructure may require additional reinforcement of the distribution network. The impact of EV charging stations on the power system depends significantly on the timing of customer activities. If charging occurs at peak periods, this will exacerbate system strain. If charging occurs in periods of low demand, or high renewable generation, EV charging could help to reduce system strain.

12. In terms of business models, several new companies are developing EV charging services and networks of recharging stations, using different billing strategies. Both energy companies and EV manufacturers are currently active in this field. Investments are driven by the expected market growth and first mover strategies to secure market share.

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EU policy

13. The Clean Energy for All Europeans package adopted by the EU aims at creating the conditions for the development of energy communities and new flexibility resources, in particular storage and demand response; enabling energy communities and distributed resources to participate in energy markets; and promoting electromobility.

14. The new Electricity Directive promotes market-based investments in distributed resources. New market participants are expected to develop innovative business models, relying increasingly on software, smart technologies or energy services. Compared to traditional infrastructure investments, these new activities tend to be less capital intensive.

15. Enabling the deployment of battery storage is a key priority of the EU considering the strategic importance of this technology. The clean energy package aims at creating a level playing field to ensure the efficient development of this technology, and new storage projects are expected to be mostly market-based investments, although they may also continue to be procured by system operators for specific system services.

16. In addition, this increasing diversity of new resources will contribute to the capacity adequacy of power systems, thus ensuring security of supply in cost-effective ways. As discussed in the next annexes, additional conventional generation and grid investments are no longer the only options to meet system needs. The new electricity regulation and electricity directive are creating a framework to enable demand response and storage to participate in the market at a much larger scale than before, including where there are implemented capacity remuneration mechanisms.

Investment barriers

17. Many of the investments discussed above are relatively small-scale. As with energy efficiency, high transaction costs can deter projects. In addition, in many countries the regulatory framework has to be adapted to enable efficient investment in decentralised energy resources, to increase their participation in wholesale markets, and to modernise the structure of electricity tariffs. Despite the potential economies of scale within the larger EU market, in practice markets at distribution level, which would allow trading of electricity at local level, are still missing and remain fragmented.

18. Despite reductions in recent years, the costs of some new technologies remain high compared to conventional generation and traditional grid investments. Accelerating the deployment of these technologies can help generate positive externalities, kickstarting the roll-out of new technologies and services to capture network effects, often in a context where the market design for new services is not well established.

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19. This type of investment in digitalised technologies is new to the energy sector. The aggregation of small-scale demand response, for instance, consists principally in developing software and growing a critical mass of customers. Similarly, deployment of EV charging infrastructure seeks to create a network effect to attract an increasing number of consumers in the longer run.

20. The viability of new business models relying on innovative services and technologies remains uncertain. Besides the rapid cost reduction of some technologies, the demand for these services and their revenues depend on long-run market fundamentals and market price volatility in the short run. The details of market designs differ across Member States, despite efforts by the Clean Energy for All Europeans package to increase the degree of harmonisation. Lastly, there is fierce competition between technologies and business models.

Role of the EIB

21. The Bank has financed investment in new technologies by European energy companies. For instance, the roll-out of smart meters in France, Italy, UK Spain and other countries, enabling tens of millions of consumers to better manage their electricity consumption. These clients are also investing in battery storage projects and EV charging stations.

22. To support smaller projects, the Bank typically uses intermediated loans. Between 2013 and 2017, the EIB financed around EUR 4bn in the form of framework loans in the energy sector, with a large portion directed to distributed projects. It also invested EUR 625m in funds that take small equity participations in the energy sector, mainly in renewable energy and energy efficiency.

23. To date, the Bank has largely financed battery manufacturing rather than storage projects – see Box (Northvolt). The EIB is actively financing electromobility investments across the entire value chain, from R&D of the car industry, to battery manufacturing and, as described in Box III.1, the deployment of a dense network of charging stations that will facilitate the adoption of electromobility.

Future focus of Bank activity

24. The EIB recognises the policy priority to develop innovative solutions to enable a cost-effective and rapid decarbonisation of energy production and use. It will seek to continue supporting new technologies and business models, including for batteries, decentralised generation, and EV charging stations.

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25. These projects will be required to meet an economic test. The Bank intends to define an appropriate approach in order to capture the different economic dimensions associated with the deployment of new technologies and business models.

26. Nevertheless, novel business models can involve a high degree of risk associated with market demand, regulation and prices. This naturally constrains the capacity of the EIB, as well as that of its intermediaries, to finance such projects in practice, particularly by means of debt financing. Guarantees such as EFSI increase the EIB's overall risk bearing capacity and the Bank will look at ways to reinforce this capacity.

Q10: Are there ways in which the Bank could provide more targeted support to distributed resources (demand response, small-scale generation and storage projects)? Are new business models or technologies emerging in this context, with specific financing needs? Is the Bank's portfolio of financial products and instruments adequate to support this technological transition?

First, EASE underlines that the energy storage sector is much broader than battery storage alone. Given the diversity of energy storage technologies – and the clear added value for system operators, market participants, and consumers in having access to a wide range of different storage technologies – the EIB's energy lending policy should be open to different energy storage technologies rather than referring only to batteries.

Regarding e-mobility, the role of energy storage in supporting faster and more cost-efficient roll-out of EV solutions by coupling the energy and transport sectors should be explicitly recognised.

EASE underlines that the integration of the energy consuming sectors with the power producing sector (e.g power-to-gas, power-to-heat) if not involved with fossil energies can improve the efficiency and flexibility of the energy system as well as reduce the costs of decarbonisation.

There is a great deal of diversity regarding energy storage technologies, applications, and services:

- Technologies are at varying TRLs, from early R&D to full commercial deployment
- Energy storage technologies can be deployed at grid scale (front-of-the-meter), commercial & industrial scale, or behind-the-meter, and the scale of the storage projects can differ substantially.

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- Energy storage can be deployed as stand-alone storage devices or co-located with generation: large-scale solar or wind, thermal generation, or small-scale behind-the-meter solar. Hybrid storage systems (combination of two or more storage technologies into one facility) are also being deployed for various applications
- The revenue streams available to storage differ substantially by Member State and location, as do the grid fees and tariffs applied to storage

This means that is no one-size-fits-all solution to suit the financing needs of different energy storage projects. Different finance instruments and advisory services must be available to allow support for all different types of storage projects.

Q11: The Bank has developed a number of products – both financial and advisory – targeted to supporting innovative energy projects. Do you have a view on these instruments? Can the Bank improve or better target the financing needs of the energy demonstration sector?

EASE supports the approach outlined in paragraph 25. As stated in the consultation, to date support for energy storage has been primarily in the form of investments in manufacturing facilities but not in supporting deployment of real projects. EASE believes that there is a need to focus on energy projects to help de-risk technologies and business models. This is essential in order to have the level of storage deployment required to meet the EU's decarbonisation objectives.

Therefore, the EIB could work more closely with EASE to define targeted support for energy storage projects (both financial and advisory). Cooperation between the storage industry and the EIB would help the EIB gain a better view of the energy storage business cases and financing challenges, while the storage community would better understand the offerings of the EIB.

Q12: Some renewable technologies or applications remain relatively expensive. Should the Bank continue to finance such projects, even in the absence of an innovative component?

Most of the funding should be directed towards projects of sufficient maturity. Innovative technologies with promising results should be supported by a framework that ensures that the market encourages their development. There is apparently no reason to support non-innovative, unprofitable actions.

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Theme 4: Securing the infrastructure needed during the transformation

1. Adequate energy infrastructure, including energy networks, fuel supply sources, power generation capacity, and flexibility resources remain essential to complete the European energy market and to reliably meet the needs of energy consumers. This infrastructure must increasingly adapt and underpin the ongoing energy transformation by integrating renewables and other new resources in an efficient and secure manner.

2. Energy networks remain the backbone of energy systems and enable the connection of new power generation capacity. This includes increasingly decentralised resources, storage, and active consumers. While their importance will decline in a progressively decarbonised economy, gas infrastructure as well as fossil fuel extraction and petroleum refining will also continue to play a role during the energy transformation.

Electricity networks

3. In the EU, the transformation of energy systems involves the connection of hundreds of gigawatts of wind and solar PV capacity, which is geographically dispersed and often located far from major consumption centres. This integration requires sustained long-term investment in interconnections, transmission and distribution networks.

4. The role of transmission networks is changing. Whilst less new centralised capacity is connected and less energy is transmitted, the transmission network is increasingly used to provide flexibility and balance supply and demand across large geographic areas, depending on wind and solar generation. Congestion on the transmission network will become more frequent, within each country and at the borders, as illustrated in Western Europe already, but the construction of new lines is remaining a very long process.

5. Distribution networks are rapidly moving to the centre stage of the energy transformation. They are connecting an ever increasing amount of distributed resources and becoming a platform to ensure efficient competition. Along with new technologies (Box IV.2), distribution network reinforcement is determining the hosting capacity of solar PV, wind and other generation sources for decades to come and will participate in the efficient integration of renewables in the grid in the long term.

EU policy

6. The EU has adopted a new interconnection target of 15% by 2030 for each Member State. As this target is a percentage of the installed capacity, which is growing rapidly due to the addition of wind and solar PV, this headline target is complemented by additional criteria (such as the price difference between bidding zones and the level of

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renewable capacity) designed to identify the most urgent needs for investments in new cross-border capacity. The European Commission also regularly updates its list of Projects of Common Interest, which become eligible for grants under the CEF (Connecting Europe Facility).

7. Distribution companies are increasingly becoming local system operators. In the new electricity directive, the EU creates a common framework for DSOs at EU level, contributing to the creation of a Europe-wide market for the development of distributed resources.

Investment barriers

8. Investment needs in electricity networks will remain at a sustained level during the energy transformation, estimated at around EUR 60-100 bn per year in the coming decades in the EU alone according to the EC long-term scenarios. It is important to reduce the cost of capital to ensure the affordability of this investment. However, a number of potential barriers may push up the cost of capital in delivering this investment, or even deter efficient investment altogether.

9. For cross-border interconnections (including PCIs), new projects may continue to suffer from coordination failures between Member States, especially where there is an asymmetric split between costs and benefits.

10. Capacity connected to the distribution network or on customers' installations can create coordination issues at the interface with TSOs. Their participation in the larger European internal energy market still requires the development of local market standards and platforms at distribution level, which do not exist across Europe at the moment.

11. Additionally, despite being regulated entities, the rate of remuneration of the regulated asset base may be considered too low in some cases. Some distribution companies, often smaller or in cohesion regions, may suffer with structural weaknesses on their balance sheet. This can affect their ability to raise debt at attractive rates, at least until structural reforms have taken effect.

Role of the EIB

12. As shown in Box IV.1, the Bank has been a core partner in financing the European electricity grid. The current volume of EIB support – EUR 4bn per year – equates to less than 10% of future investment needs.

13. Interconnection, and Projects of Common Interest (PCIs) in particular, are a high priority for the EIB (Box IV.1), whether they are regulated or developed on a merchant basis by independent companies.

14. The EIB is also financing distribution network investments, including regular investment programmes in lines and sub-stations of DSOs and large smart meters roll-out programmes in several countries.

15. Investments in distribution grids are expected to be increasingly motivated by a growing share of distribution-connected renewables, as well as the growing participation of distributed resources in power markets.

16. The EIB's participation can help reduce regulated entities' cost of capital. EIB participation usually provides longer tenors than those available in the market, facilitating the decision to undertake investments. Depending on the national regulatory approach, the financial advantage provided by EIB loans can be passed through in the form of lower network tariffs providing a direct benefit to final consumers.

Future focus of the Bank

17. The Bank intends to continue its support towards electricity grids. It will continue to work with its clients to finance their investment needs.

18. PCIs will remain a high priority for the EIB. The EIB will continue to work in close cooperation with the European Commission and ENTSO-E to ensure a robust economic assessment of the projects it supports.

19. In addition, the Bank is considering paying particular attention to network projects which use or enable new technologies and facilitate the decarbonisation of energy production and usage.

Q13: In light of the long-term nature of the network development plans, which type of projects should the Bank focus upon? In addition to PCIs, should the Bank prioritise newer investment types, for instance in digital technologies?

Energy storage projects are a complement to smart grid infrastructures, and should be assessed on an equal footing compared to the other flexibility technologies.

EASE would like to stress that energy storage technologies can have a role to play in increasing the resilience of existing networks while deferring or avoiding transmission and distribution grid investments, which – as mentioned in paragraph 19 – may face challenges due to social acceptability. EASE has worked with ENTSO-E since 2013 to improve the cost-benefit methodology for storage projects in the Ten-Year Network Development Plan and Projects of Common Interest. A proper CBA for storage projects is essential to ensure that the unique attributes and value of energy storage projects are taken into account. Through this process, EASE has identified critical barriers to quantify the real value of storage, in particular to tackle issues related to the loss of

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system inertia and other challenges stemming from higher shares of renewables in the system, and is working with ENTSO-E to solve this. However, this process is likely to be a lengthy one.

Gas infrastructure

20. European demand for natural gas is expected to decline gradually over the coming decades (Box IV.3), with all substantial usage in power generation, mobility or heating dwindling by 2050. This trend is more differentiated outside the EU, in particular where natural gas may play a significant role in substituting for coal over the medium term.

21. As discussed in section II, the variability of renewable power can be complemented by increasing the flexibility of the energy system. Gas-fired power generation is important for modern power systems and for ensuring capacity adequacy. This is likely to generate peaks in gas demand in periods of low wind and sun. Equally, in domestic heating, switching from fuel oil to gas can provide significant energy savings. This requires a robust and well connected European gas transmission and distribution network.

22. The case for investment in gas infrastructure today remains highly differentiated across Europe. In some regions, for differing reasons, the current rate of usage of gas infrastructure is low, translating into a high level of system adequacy. However this is not uniformly the case, and there are a number of gas projects currently classified as EU PCIs designed to improve regional security of supply and market integration. On the other hand, there may be a risk of stranded assets in some regions where the gas infrastructure is already well developed, as a result of the EU's decarbonisation goals.

23. In addition, in the context of 2050 targets, as natural gas usage declines, gas infrastructure may continue to be used by alternative energy carriers: biogas, hydrogen or synthetic methane. The development of these technologies may enable the continued use of the existing gas infrastructure.

EU policy

24. Gas security remains an important priority for the Energy Union. Compared to 2013, gas security improved significantly in Europe due to investment in reverse flow infrastructure and LNG regasification import terminals.

25. Gas interconnections provide important benefits with respect to the completion of the Internal Energy Market (IEM), achieving the 2020 and 2030 European climate targets in some countries, as well as securing a high level of security of supply through

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diversification of import sources. Unlike electricity, there are no quantitative interconnection targets. The third PCI list identifies 53 gas projects.

26. In addition, the EU is currently investigating new ways to use the existing gas infrastructure, including potentially by biogas or power-to-gas solutions in order to improve the coupling of the power and gas sector. This potentially adds an 'option value' to maintaining existing gas infrastructure.

Investment barriers

27. As with the discussion on electricity networks, gas infrastructure is largely a regulated business model in which access to long-term debt is a critical factor in reducing the cost of capital.

28. Similar to electricity grids, the development of cross-border gas grids may face coordination failures. New infrastructure can continue to improve market integration and security of supply, which benefits the EU as a whole. In addition, the economic lifetime of fossil infrastructure is uncertain and this could reduce incentives to invest to maintain a high level of safety for the installations or reduce fugitive GHG emissions.

29. Today, there are no significant barriers for cross-border trades in most countries. Liquidity at EU hubs has increased, hub spreads/differentials are at minimum levels since 2005, meaning EU gas price convergence has significantly increased. The gas grid has become more resilient and nearly all Member States comply with the N-1 criterion and already have access to two sources of gas.

30. As with the discussion on power grids, some gas distribution companies, often smaller or in cohesion regions, may have difficulties in accessing long-term finance, given structural weaknesses on their balance sheet. Whilst reforms may have already been initiated, these can typically take several years to achieve full effect.

Role of the EIB

31. As shown in Box IV.1, the Bank has played a prominent role in supporting the gas CI network. Over the five year period 2013-2017, the Bank signed loans in support of gas networks totalling EUR 8.8bn, equivalent to around 13% of overall energy lending.

32. The EC and the EIB are working closely with Member States and promoters at regional level (Baltic Energy Market Interconnection Plan – BEMIP, Central and South-Eastern European Gas Connectivity Group – CESEC, South-West Europe and the Northern Seas) to facilitate the development of key infrastructure. The priorities are now to end energy isolation and improve security of supply where these are still an issue.

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33. The EIB undertakes a careful assessment of the economic case for gas infrastructure. Environmental externalities are always taken into account, both in terms of GHGs and other pollutants. The Bank periodically reviews the key element of its approach, including economic life, the assessment of renewables as alternatives to natural gas and methodologies for the valuation of benefits in terms of supply costs and security of supply.

Future focus of the Bank

34. The Bank is aware that some stakeholders question whether EIB should continue to support a 'transition' fuel such as natural gas. Nevertheless, the EIB remains committed to supporting the Energy Union in this area, and acknowledges the economic case for investment in gas infrastructure during the energy transformation.

35. At the same time, the EIB recognises the changing case for investment in gas. In the light of the EU 2030 climate and energy targets, there may be a risk that some new investments to expand gas network capacity may become stranded assets before the end of their typical economic and technical lifetime.

36. Consequently, the Bank is currently considering how to ensure that any gas infrastructure that it finances remains compatible with long-term decarbonisation targets. The new integrated national energy and climate plans will provide a useful reference framework. However, at the individual project level, the economic assessment methodology needs to be appropriate in the context of the long-term energy transformation. The Bank is currently considering whether and how it may need to adjust its present approach – see paragraph 22 above and Box 1.

Q14: What is your view on the investment needed in gas infrastructure to meet Europe's long-term climate and energy policy goals, while completing the internal energy market and ensuring security of supply? What approach could strike the right balance to prevent the economic risk of stranded assets?

Developing power-to-gas technologies will be essential to integrate increasing shares of vRES, providing longer-duration storage than batteries or other energy storage technologies on the market today.

The EIB's lending policy should verify whether investments for gas infrastructure contribute to decarbonised energy and whether they are financially supported to the extent that their maturity justifies it. Any major/large infrastructure should be based on a rigorous cost-benefit analysis. In the case of gas interconnections and regasification, this analysis should be validated through open seasons as market tests.

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About EASE

The European Association for Storage of Energy (EASE) is the voice of the energy storage community, actively promoting the use of energy storage in Europe and worldwide. It supports the deployment of energy storage as an indispensable instrument within the framework of the European energy and climate policy to deliver services to, and improve the flexibility of, the European energy system. EASE seeks to build a European platform for sharing and disseminating energy storage-related information and supports the transition towards a sustainable, flexible and stable energy system in Europe.

For more information please visit www.ease-storage.eu

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Disclaimer

This response was elaborated by EASE and reflects a consolidated view of its members from an energy storage point of view. Individual EASE members may adopt different positions on certain topics from their corporate standpoint.

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