

Towards a Green Transformation of Europe's Energy Infrastructure

26 Enablers for the EU Green Deal and NextGenerationEU

T&D Europe, the voice of Europe's grid technology providers, welcomes the agreement on the European Commission's proposals for Next Generation EU and the reinforced long-term budget for the EU. Rather than seeing the impact of the COVID-19 pandemic as a challenge for recovery, the EU should seize the current situation as an opportunity to drive the green and digital transitions. Europe's grid technology providers support the EU Green Deal as the appropriate growth strategy.

Now that there is agreement on the funding, it is time to adopt and implement specific investment decisions. T&D Europe has identified a series of measures that will boost jobs and economic growth in Europe's clean energy ecosystem, enable the green transformation of the economy and help Europe to become climate-neutral by 2050. The good news is that many technologies are already available today and allow for immediate large-scale deployment. If implemented, together they will produce an electricity network that continues to be robust, reliable and resilient, while enabling Europe to meet the twin challenges of climate change and digitalisation.

Drivers and barriers

Europe's electricity network is a regulated market. It comes therefore not as a surprise that research has found that "investments in grid assets are mainly driven by regulation that guarantees investors a reasonable return on equity."¹ This presents an opportunity for policy-makers and regulators to use their mandate and provide investors the necessary clarity. To further drive investments, policy and regulation need to provide the financial conditions for DSOs to invest in future-proofing the network. One important measure to do this is to review the investment framework for network operators by removing the current regulatory CAPEX bias and transition to a TOTEX approach, to incentivize the uptake of green technologies and solutions, which contributes to a cost-efficient operation of the network. Secondly, system operators need to have the regulatory certainty that they can recover investments via the network tariff and that the remuneration will remain at a predictable and market-based level.

Research has also identified that for transmission and distribution the policy framework is the strongest driver. Support schemes for renewables, research, development and innovation as well as specific targets (e.g. for smart meters, energy efficiency, interconnections) are considered as being important drivers.² Applying that finding, the EU and its member states

¹ European Parliament (2017), *European Energy Industry Investments*, p.37
https://www.eesc.europa.eu/sites/default/files/files/energy_investment.pdf

² Ibid. p.38

should prioritise infrastructure investment in modernizing and future-proofing Europe's electricity networks, inter alia, through the inclusion in the National Recovery and Resilience Plans and in the National Energy and Climate Plans of clear investment and development plans for the electricity network. The Commission has an important role in making sure that the funding for these plans is used in the right way. Being responsible for the evaluation of the national recovery and resilience plans, the Commission will be able to track investments in transmission and distribution networks and it could report on it as part of the annual State of the Energy Union.

Major barriers are the lack of public acceptance of large infrastructure projects, the complex and protracted permitting procedures as well as the cost of capital and access to funding. It should be noted that investments in the electrical grid do not necessarily mean the construction of new lines. A major challenge for the grids is the digitalisation of the network, which can be done without major visible public works. Also, the grid operators have been working with environmental organisations “to ensure that the goals of grid modernisation and environmental protection can be achieved side by side.”³ These efforts will help in building public acceptance on a case by case basis.

While policy, regulation and finance all require further action, technology has not been identified as a major barrier to investments. T&D Europe believes that technologies and solutions are available to meet the challenges and needs for the the energy system of the future. The further development of a climate-neutral energy system, integrating power generation, consumption and the power grid, requires ongoing and continued research and innovation activities. To help overcome current barriers and strengthen the drivers, we have identified 26 enablers for a green transformation.

26 specific enablers and 4 clusters for a green transformation

The 26 measures can be divided into those that require funding (a bit more than a half of them) and those that do not, but instead rely on political, policy and regulatory actions. The measures can be grouped into 4 clusters that sometimes necessarily overlap yet will guide the stakeholder into its relevant interest:

- Infrastructure - including all technical, flexibility, architecture aspects,
- Decision-making tools,
- Market Mechanisms and Financial Frameworks, and
- Political leadership.

³ <https://renewables-grid.eu/publications/european-grid-declaration.html?L=0>

A table summarizing those measures vs. clusters & funding needs is attached in Annex.

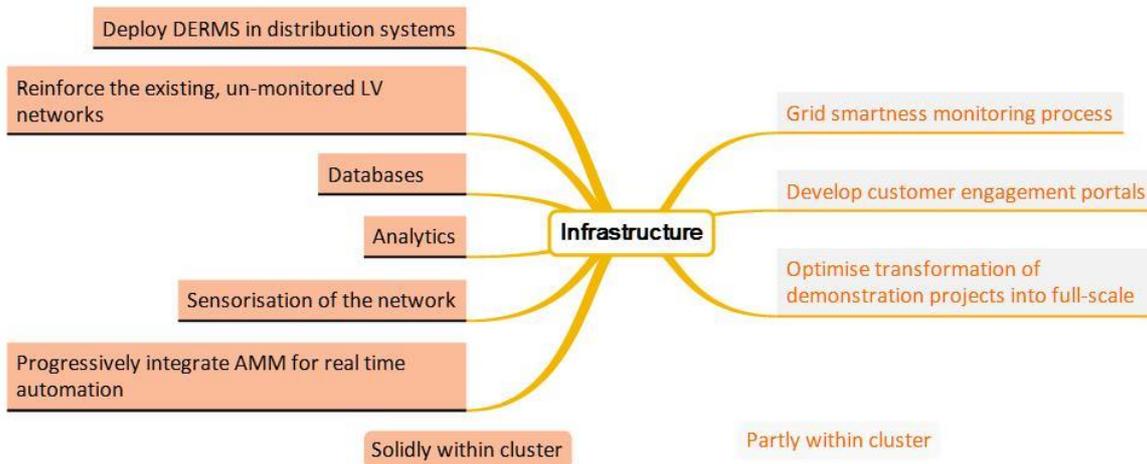
Implementing those measures requires investors who are willing to drive the green and digital transition of the clean energy eco-system. Moreover, investing in a de-carbonised and digital energy system needs policy-makers and regulators to adapt the financial and regulatory frameworks to allow for a reasonable return on investment and limited financial risk. Only a joint effort of political leaders, policy-makers, regulators, transmission and distribution system operators, technology providers and users of the networks can afford investors to start making the recovery green. The good news is that Europe has a world leading clean energy eco-system. It is now time to come together and act.

1. Infrastructure

Europe's electrical grid has proven its resilience since the outbreak of the COVID-19 pandemic. While the confinement measures across Europe led to a significant drop in electricity demand, which puts stress on the system, Europe's network operators have proven their ability to manage this extremely well. This excellent result does, however, not provide guarantees for the future. In fact, Europe's electricity system is going through a rapid transition from a centralised system based on large fossil fuel and nuclear power generation to one that is characterised by decentralised renewable energy production. This transition together with the empowerment of consumers places different demands and expectations on the grid.

This includes for example increasing the use of monitoring and control technologies for MV and LV electricity networks. Grid automation, digital grid asset monitoring, digital twins in combination with Internet-of-Things (IoT) cloud computing offer a tangible positive impact on quality of service and improved financial efficiency as a result of improved transparency of power flows, grid loading and physical grid equipment status in real-time. Custom-tailored software and application program interfaces enable the electrical power grid to become the cross-sector energy system manager for achieving carbon neutrality. Also the deployment of multi-terminal, multi-vendor HVDC technology will help Europe to be equipped for developing the energy highways of the future. And even more, HVDC- electrical power transmission technology has the potential to become the key enabler for green fuel applications and sector coupling especially for long distance interconnection to Europe. The EU Commission, network operators and regulators are in the front line to make this transformation happen.

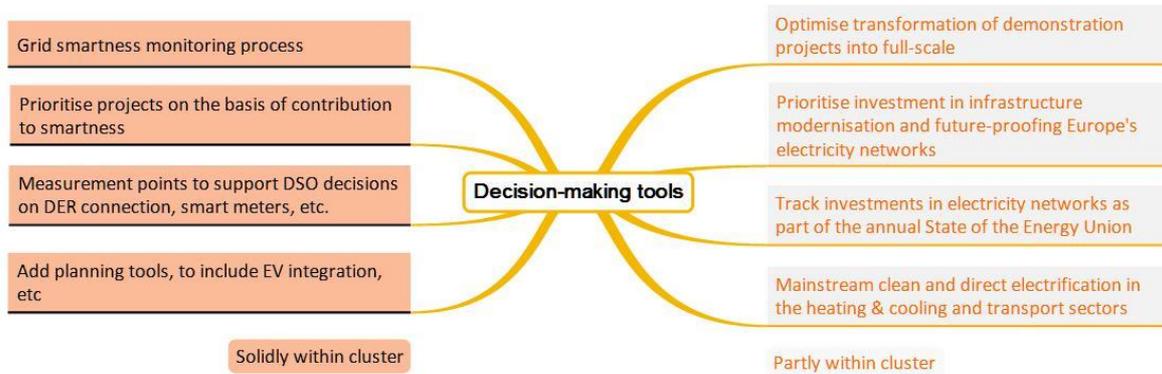
Here is a graphical view of the enablers tied to the infrastructure cluster:



2. Decision-making tools

Future-proofing Europe’s interconnected electricity network is an important, but by no means easy task. Policy-makers, regulators and operators need appropriate decision-making tools to ensure proper coordination of network developments. Here Europe’s Clean Energy Package has already introduced an important task for national regulatory authorities to establish a limited set of indicators that help to monitor the progress towards smart grids in transmission and distribution. Continued attention of policy-makers on the implementation in practice of this provision will be key if Europe is to maintain a grid that is fit for all the current and future purposes. Also, the introduction of measurement points in the networks will support DSOs in their decision-making about distributed energy resources (DER) connection, smart meter, MV/LV substations and BTM devices.

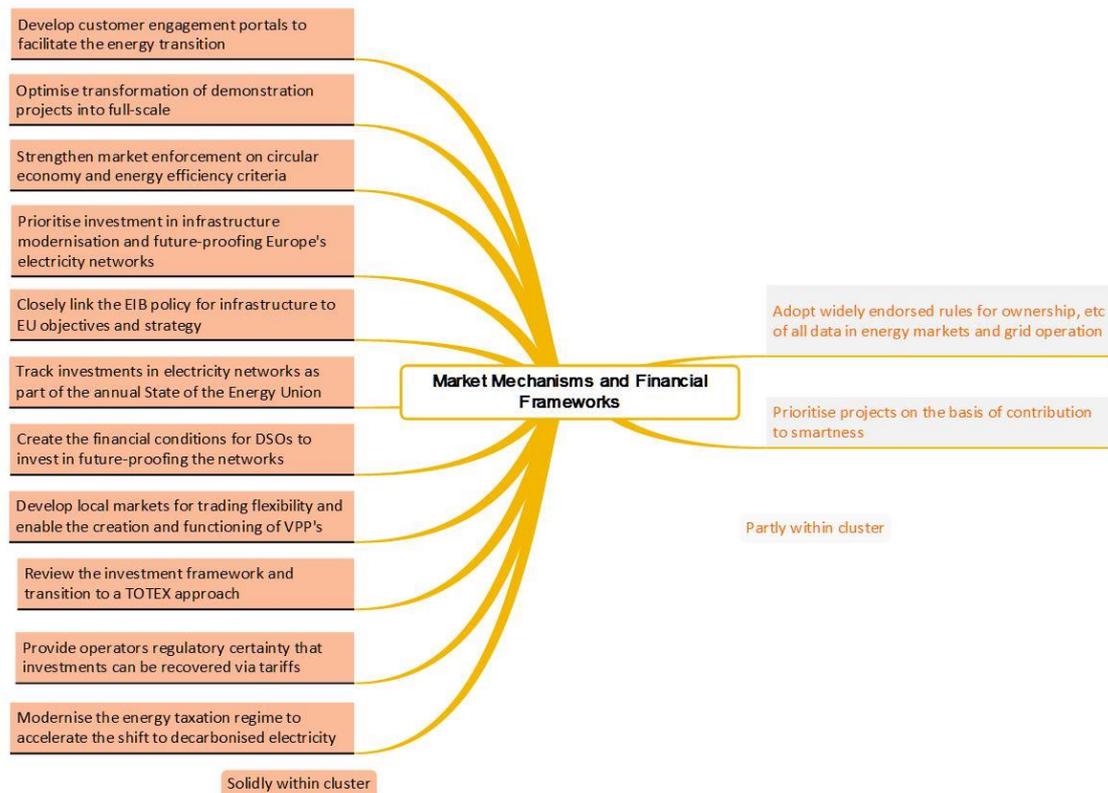
Here is a graphical view of the enablers tied to the decision-making tools cluster:



3. Market Mechanisms and Financial Frameworks

The European Commission recognised the importance of unlocking the necessary investments when it presented the Clean Energy Package. Market mechanisms and financial frameworks are preconditions for network investments. Network operators need regulatory certainty that investments can be recovered via the network tariff and that the remuneration will remain at a predictable and market-based level. Policy-makers and regulators need to review the investment framework for network operators by removing the current regulatory CAPEX bias and transition to a TOTEX approach, to incentivize the uptake of green technologies and solutions, which contributes to a cost-efficient operation of the network. Policy-makers and regulators can also improve market conditions by modernising the energy taxation regime to accelerate the shift towards decarbonizing electricity consumption and the increased uptake of clean electricity in end-use sectors, inter alia, in heating, electric vehicles and shore-side electrification.

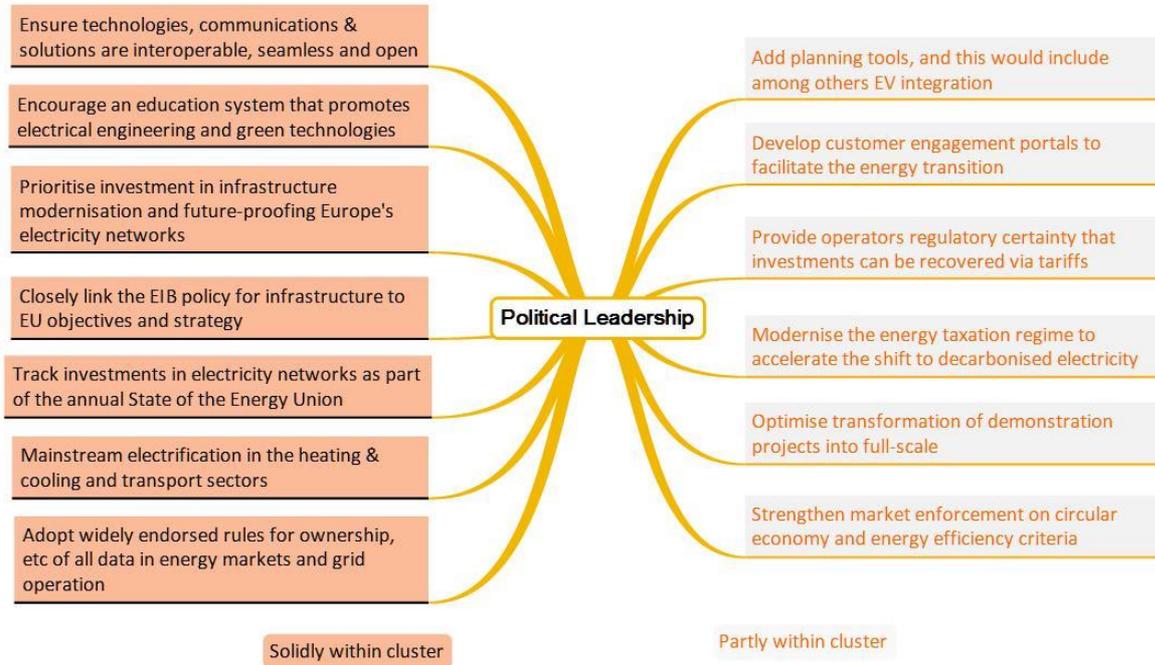
Here is a graphical view of the enablers tied to the Market Mechanisms and Financial Frameworks cluster:



4. Political leadership

As a critical and strategically important infrastructure the development electricity networks is to a large extent shaped by political, policy and regulatory decisions. Therefore future-proofing Europe's electricity network is highly political. Europe's decision-makers in Parliament, Council and Commission have the opportunity to shape an electricity system that is the backbone of a climate-neutral Europe. In the implementation of the decisions on Next GenerationEU, the EU Green Deal and the multi-annual financial framework, Members of the European Parliament, Ministers and Commissioners need to prioritise infrastructure investment in modernizing and future-proofing Europe's electricity networks.

Here is a graphical view of the enablers tied to the political leadership cluster:



Confidence

Europe can approach the current challenges with confidence. Europe has probably the best and at the same time most intricate electricity system in the world. At the same time Europe is also home to a strong clean energy eco-system that is capable to deliver on Europe's needs. For transmission and distribution of electricity, Europe is home to a world-leading grid technology sector, providing conventional, digital and innovative solutions for a future-proof electricity network that is more and more decentralised and more and more digital. The strength of the sector lies in the combination of large, multinational corporations and a large variety of specialised SMEs. Together they form a strong industrial base in Europe.

By 2050 the EU's electricity network will support and connect sustainable cities and communities, where prosumers can manage their energy production and consumption with microgrids, where transportation can be powered by electricity and where an increasing share of decentralised renewable energy production can be easily integrated. This requires a future-proof, smart, digital network with easy and cybersecure data interoperability and with the necessary interconnections to manage the seasonal fluctuations in renewable generation.

Brussels, February 2021

Annex

The 26 measures identified by T&D Europe as key Enablers for the EU Green Deal and NextGenerationEU were each assessed to identify the main area(s) of activity that it addressed. These areas of activity are described here as Clusters. The table below shows the extent to which each measure addresses each cluster, using the following system: 1 - the measure falls solidly within the cluster; 0.5 - the measure falls partly within the cluster; blank - low or no contribution to the cluster. The € indicates that the enabler requires financing. This assessment then forms the basis of the graphics used in this paper.

	Cluster (relative weighting)			
	Infrastructure	Decision-making tools	Market mechanisms & Financial Frameworks	Political leadership
Enabler				
1. Grid smartness monitoring process	0.5	1		
2. Sensorisation of the network	€ 1			
3. Analytics	€ 1			
4. Databases	€ 1			
5. Reinforce the existing, un-monitored LV networks as a basis for better constraint management	€ 1			
6. Prioritise projects on the basis of their contribution to improving the smartness of the network		1	0.5	
7. Create the financial conditions for DSOs to invest in future-proofing the network	€		1	
8. Introduce measurement points to support DSOs in their decision-making about DER connection, smart meter, MV/LV substations and BTM devices.	€	1		
9. Financial conditions for DSOs to invest in future-proofing the network			1	
10. Deploy DERMS in distribution systems to manage the DER flows and electrotechnical constraints (voltage, congestion)	€ 1			
11. Progressively integrate AMM for real time automation further pushing the limit of their integration	€ 1			
12. Add planning tools, and this would include among others the EV integration	€	1		0.5
13. Develop local markets for trading flexibility and enable the creation and functioning of Virtual Power Plants (VPP)			1	
14. Develop customer engagement portals to facilitate the energy	€ 0.5		1	0.5

transition and create standardised processes and offerings					
15. Ensure that technologies, solutions and communications are interoperable, seamless and open					1
16. Review the investment framework for network operators by removing the current regulatory CAPEX bias and transition to a TOTEX approach, to incentivize the uptake of green technologies and solutions, which contributes to a cost-efficient operation of the network				1	
17. Provide system operators regulatory certainty that investments can be recovered via the network tariff and that the remuneration will remain at a predictable and market-based level				1	0.5
18. Modernise the energy taxation regime to accelerate the shift towards decarbonizing electricity consumption and the increased uptake of clean electricity in end-use sectors, inter alia, in heating, electric vehicles and shore-side electrification	€			1	0.5
19. Analyse and implement the best way to transform demonstration projects in large-scale industrial investment and deployment, thereby enabling Europe to turn innovation into employment and leadership	€	0.5	0.5	1	0.5
20. Strengthen market surveillance enforcement to ensure that all grid technology on the EU market complies with the mandatory circular economy and energy efficiency criteria				1	0.5
21. Encouraging an education environment that promotes the training of high-skilled workforce in the field of electrical engineering and green technologies related sectors	€				1
22. Prioritise infrastructure investment in modernizing and future-proofing Europe's electricity networks, inter alia, through the inclusion in the National Energy and Climate Plan of clear investment and development plans for the electricity network;	€		0.5	1	1
23. Closely link the European Investment Bank lending policy for infrastructure to the Clean energy package objectives and the EU long-term decarbonisation strategy				1	1
24. Track investments in transmission and distribution networks as part of the annual State of the Energy Union			0.5	1	1

25. Mainstream clean and direct electrification in the heating & cooling and transport sectors, as the most cost-effective and energy efficient strategy to address climate change and enhance the quality of life of all Europeans. Deploy without delay the technologies that are already available to decarbonise industrial processes, transport and the heating & cooling sector	€		0.5		1
26. Adopting EU or international rules for ownership, protection, liability and transfer of all data types (not just smart meter) in energy markets and grid operation				0.5	1