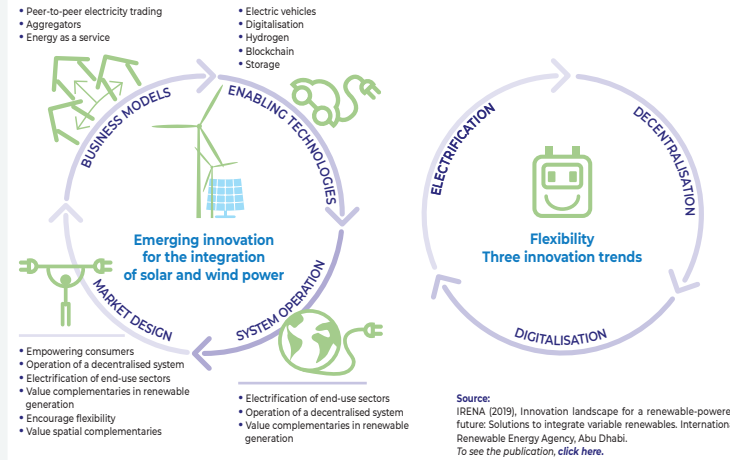
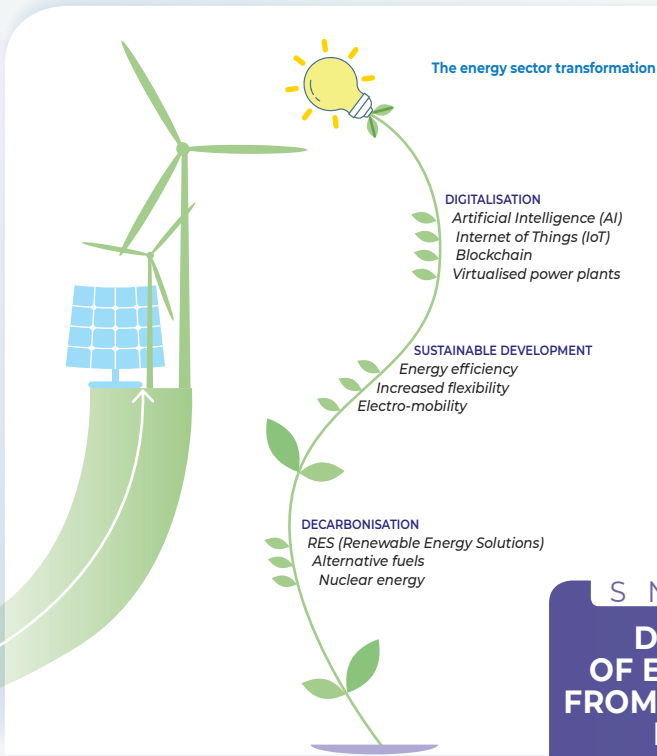
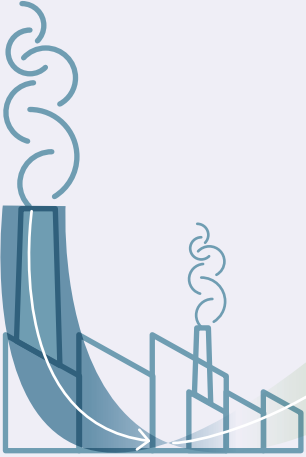
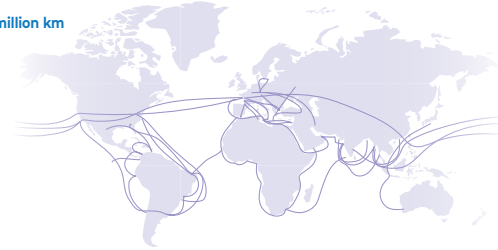


DIGITALISATION IS AN ENABLING FACTOR TO

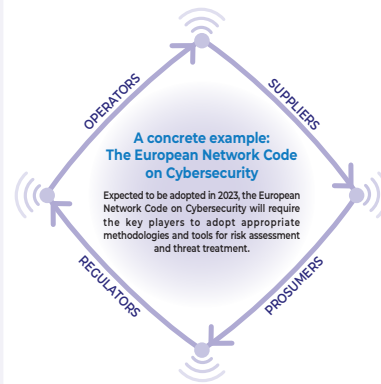
- Foster **decarbonisation** and incorporate **renewable energy** into the energy systems
- Satisfy **energy demand** and maintain reasonable costs through the aggregation of different kinds of services



Submarine Optical Cables > 1.3 million km



SNAPSHOT DIGITALISATION OF ENERGY MARKETS FROM THE REGULATORS' PERSPECTIVE



- **OPERATORS** will have to apply organisational standards, process certification, certified products, interoperability tests, security assessment and threat treatment.
- **PROSUMERS** will have to be provided with awareness programmes and best practices.
- **REGULATORS** will have to use appropriate methodologies and tools for risk assessment, impact analysis, cost/benefit evaluations of cybersecurity expenditures, effectiveness indicators and flexible regulatory schemes.
- **SUPPLIERS** will have to implement technical standards, conformance tests and process and product certification.

BENEFITS

- Provision of data to distribution system operators (DSOs), enabling them to process data in real time in order to manage the network codes and the system.
- Reduction of power system costs by improving safety and productivity
- Increase of energy savings in buildings, transport, and industry sectors
- Support to the increasing demands of prosumers
- Management of congestions, regulation of voltage levels and support to operators in case of faults, by means of flexible distribution networks.

CHALLENGES TO THE REGULATORS

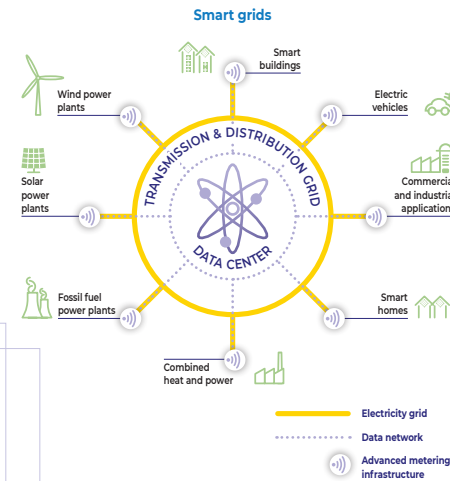
- **Cybersecurity and privacy risks:** there are no frontiers for cyberattacks, and the arrival of new components to the network and new uses are bringing **new threats ranging from grid instability to risks to integrity of components**. These risks must be assessed and managed.
- **Enhancement of grid infrastructure** to avoid dire consequences for DSOs, calling for **reactive and proactive legislation and regulation to be introduced**.

POSSIBLE SOLUTIONS

- To tackle **cybersecurity threats**, energy regulators must ensure that the **investments are reasonable** and heading in the right direction.
- **Uncertainty mechanisms must be included in the regulation** to deal with the ever-evolving cybersecurity issues.

CYBERSECURITY REGULATORY FRAMEWORKS

- In **performance-based regulation**, the regulator may provide operators with economic signals to enhance the quality of service. Under this scheme, the firm decides the cybersecurity strategy, identifies countermeasures, and benchmarks costs adhering to the objectives stated in the regulation.
- In **"cost plus" regulation**, it is the regulator who identifies the relevant countermeasures, while the firm complies to the national cybersecurity strategy and submits an investment plan to the regulator.
- In order for the regulation to work well, a **set of steps should be meticulously followed**.
- **There is no single best practice** for all countries as it depends on the characteristics, values, and laws of the country.



This snapshot is based on the presentations given during MEDREG Training on "Regulatory Implications of the Digitalisation of Energy Markets and the New Role of Consumers" held in October 2021. The contributions come from representatives of Energy Regulatory Authorities, ELDER, Enel, EU Agency for Cybersecurity, Research Institute on Sustainable Economic Growth CNR-Ircres, IRENA, Ricerca Sistema Energetico and Sparkle.

Source: IRENA (2019), Innovation landscape for a renewable-powered future: Solutions to integrate variable renewables. International Renewable Energy Agency, Abu Dhabi. To see the publication, [click here](#).

DIGITALISATION COMES WITH

- **Infrastructure**
Submarine optical cable systems are key enablers and critical infrastructure for ensuring digital transformation at global level.
→ International bandwidth demand is doubling every two years. Submarine Cables handle 97% of global digital traffic.
→ Wide opportunities are available to **create a synergy between the telecom backbone and the energy infrastructure** projects. Telecommunication and Internet companies are indeed heavily investing in **new submarine and terrestrial backbones**.
→ The Mediterranean basin can be the **ideal playground** to test this enhanced cooperation.
- **Innovation, smart grids and meters, and flexible services**
Innovations are currently emerging for the integration of renewable energy sources (RES). Digital technologies can support the integration of RES through faster response, better management of assets and by using connecting devices and collecting and sharing data.
- **Blockchain**
It is enabling a new world of decentralised communication and co-ordination by building the infrastructure to allow peers to safely, cheaply and quickly connect with each other without a centralised intermediary.
- **Internet of things (IoT)**
IoT is allowing faster data management by physically embedding sensors, processing ability, software, and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks.
- **Artificial Intelligence (AI)**
AI is enhancing the decision making process by developing computer systems that can make instantaneous decisions based on knowledge and previous experiences, reducing the amount of time needed to attack problems that energy systems might face.

TRANSFORMATION OF CONSUMERS INTO 'PROSUMERS'

- The electric system is changing from the traditional power systems, characterised by well-defined tools handling stages ranging from generation to consumption, to a more **distributed model**, involving different emerging stakeholders, in particular prosumers.
- With the deployment of **smart meters**, customers will be more aware about their energy consumption and how to participate in the overall energy system.
- **Demand-side flexibility** is key for a renewable-powered future, as it can help match energy demands to times where renewable energy sources are available.
- **Regulatory experiments** are important to put in practice the new technologies.