



AND MAKE THE MOST OF THE RENEWABLES REVOLUTION

New digital technologies are breaking down the traditional boundaries within the energy sector, opening the door to a new era of flexibility. Smart demand response, sector coupling and energy systems 4.0 – the opportunities are countless to make the most of the energy transition. Above all, the digitalisation of the power system has proved to be extremely efficient for network operation and integration of renewables, reducing the need for curtailment and other measures such as capacity markets.

Building on the International Energy Agency's successful report on "[Digitalisation & Energy](#)" published in November 2017, SolarPower Europe highlights the many reasons why European policymakers should embrace this revolution and "go digital" when thinking about future electricity market design.

1. DIGITALISATION WILL MAKE THE ENERGY TRANSITION CHEAPER

According to the IEA report, the digitalisation of the power sector could help save up to \$80 billion a year. This huge potential will alleviate public finances, but first and foremost the consumer bill.

- **Digitalisation makes better use of the existing grids**

According to the IEA report, the uptake of smart demand response could save \$270 billion of investments in energy infrastructure by 2040.

Analysis has shown that a combination of solar and digitalised 'grid supporting' storage which controls the maximum grid feed-in can double the low-voltage grid capacity to absorb feed-in of variable renewables (up to 60%) without any other additional infrastructure.

System operators can also maximise the use of interconnector capacity, thereby bringing an additional source of flexibility to the system without additional investments. Variable RES input can be managed and stored most cost efficiently when connected and handled at medium voltage level.

- **Digitalisation reduces the need for back-up capacity**

European Commission modelling^[1] has shown that further digitalisation will trigger a peak decrease of 36GW in 2030, leading to €1,383 million per year in benefits for the distribution and transmission grid and €3,772 million per year in reduced back-up capacity.



2. DIGITALISATION WILL FOSTER THE INTEGRATION OF RENEWABLE CAPACITIES IN THE MARKET

- **Digitalisation optimises electricity flows and market exchanges closer to real time**

Real-time load balancing and up-to-the-minute pricing signals and tariffs will allow customers to better respond to price signals: network operation will be increasingly conducted on a market basis, allowing small installations to properly participate and provide grid services.

- **Digitalisation reduces renewable curtailment**

According to the IEA report, smart grids with digitally-enabled demand response and storage could reduce curtailment of PV and wind across the EU from 7% to 1.6% by 2040 and avoid a massive 30 Mt of CO₂ emissions per year.

- **Digitalisation increases renewable energies' contribution to grid stability**

Digitalisation will make variable generation more controllable and able to provide grid services. For example, the new generation of PV inverters are highly controllable devices, which can be used to modulate the energy fed into the grid, and provide ancillary services to network operators with more accuracy than conventional generators.

3. DIGITALISATION WILL DRIVE SECTOR COUPLING... AND SYSTEM FLEXIBILITY

Digitalisation will break the boundaries between sectors. Together, renewables, electric vehicles, smart buildings and smart heating and cooling will shape a cleaner and more efficient economy.

- **Electric vehicles and smart charging**

Smart charging points, will increase EVs' contribution to system flexibility by adapting the vehicle's consumption to low demand periods, while releasing electricity to the grid at peak times. This will be particularly relevant coupled with on-site building mounted PV installations, which generate mostly during the day when the electric vehicle fleet is charging.

- **Energy-positive smart buildings and intelligent home systems**

Smart buildings and energy management home systems can provide energy efficiency and demand response, building automation and maximise the potential from smart appliances. Smart energy management will foster the uptake of energy-positive buildings. Such optimisation could unlock the full potential of the huge surface (4000 km²) of European buildings' façades and roofs: innovative (and EU made) technologies such as building-integrated photovoltaic products could potentially cover up to 40% of EU electricity demand.

- **Unlocking smart demand response**

The internet of things will contribute to unlocking smart demand response. According to the IEA report, 185 GW of system flexibility could be reached worldwide, with further digitalisation of the energy system. The European Commission has estimated that the technical potential of the volume of controllable smart appliances in the EU by 2025 will be at least 60 GW: shifting this load from peak times to other periods can reduce peak-generation needs in the EU by about 10%^[2].

^[2] European Commission SWD, Best Practices on renewable Energy Self-Consumption COM(2015) 339 final



4. DIGITALISATION WILL BOOST EU'S INDUSTRIAL LEADERSHIP IN RENEWABLES

- Industry 4.0 key part of maximising solar industrial value for Europe

Digitalisation is a key part of a future European solar industrial strategy, acknowledging the tremendous value to be gained from offering high-end, quality and niche products in a commoditised market. SolarPower Europe analysis has shown that value is moving to the downstream and specialist parts of the sector.

- Investing digital R&D in segments of PV market where Europe has an advantage

To stay ahead of global competitors, EU policymakers must target digital R&D investment into highly digitalised segments of the solar PV sector such as the manufacturing equipment for PV wafers, modules and cells, operations, maintenance and asset management of large-scale plants and building integrated PV.



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