

# Smart Energy Systems

## 21 September 2020 – Copenhagen

# smartEn Introduction

smartEn is the association of market players driving digital and decentralised energy solutions.

Our mission is to:

- **Promote system efficiency** through the advanced management and integration of electricity demand and supply in homes and buildings, transportation, businesses and decentralised energy projects.
- **Empower energy users** by enabling them to participate in the energy market through flexible demand, storage, self-generation and the participation in community projects, and giving them control of their energy data.
- **Encourage innovation and diversity** by enabling new market players and energy service offers that provide attractive choices for consumers and allow for healthy competition.
- **Drive the decarbonisation of the energy sector** through the cost-effective integration of renewable sources and smart electrification of heating, cooling and transport.

To do so, we:

- create a **cross-sectoral single voice** for innovative market players driving digital, decentralised and decarbonised energy solutions,
- **advocate smart energy solutions** with policymakers to realise supportive regulatory conditions,
- **communicate the benefits** and potential of smart energy solutions to all relevant stakeholders,
- produce **crucial expertise** that supports the business of our members and promotes our objectives to policy makers,
- act as the **central network** for smart energy solutions for our members and other constituents.



# Who is smartEn?

## Executive Members



## Regular Members



## Associate Members



# Smart Energy Systems – The Prosumers

## Four different types of prosumers that conform the Smart Energy Systems from the demand side

- Different objectives:
  - Self-consumption
  - Reduction of tariffs
  - Stable energy prices
  - Autonomy and resiliency
  - Community engagement
  - Social aspects, e.g. contributing to decarbonisation
- Financial drivers to facilitate those objectives:
  - Feed-in tariffs
  - Regime of taxes and network charges (linked to the needs of the grid)
  - Access to markets for aggregated and flexible loads
- Benefits for society and energy system:
  - Decarbonisation
  - Reducing overall system costs (less infrastructure needed)
  - Increasing energy security and resiliency
  - Raising awareness (e.g. your neighbours solar panels or Tesla)



# Smart Energy Systems - Network Tariffs and Taxes

- Market barrier: They make or break most business cases for prosumers. One of the main barriers for flexibility services.
- Prices do not reflect needs of the grid, congestion etc., not allowing customers to properly valorise their flexibility.
- Time-of-use tariffs are a key enabler. But with a very limited impact if only applied to the energy component, and if not linked to the physical needs of the grid.
- Time-of-use pricing if only applied to the energy component and not the network tariff, can provide contradictory signals, raising the actual cost.
- Taxes play a similar blunting role: They are high and they are constant, not linked to energy usage and to the energy source (CO2 taxing).



Source: The smartEn Map Network Tariffs and Taxes 2019

# Smart Energy Systems – Access to the Markets

- Have a real market: both for DSO and TSO products
- Cohesive and interconnected markets to not waste flexibility
- Low market entry barriers (e.g. lower requirements for independent aggregators)
- “Real” Technology neutral (including the technical prequalification in different products)
- Value-reflecting monetisation of Demand Response: Include in the remuneration the avoided costs and the source.



Source: The smartEn Map European Balancing Markets Edition 2018

# Value from system flexibility in 2030 (GB)

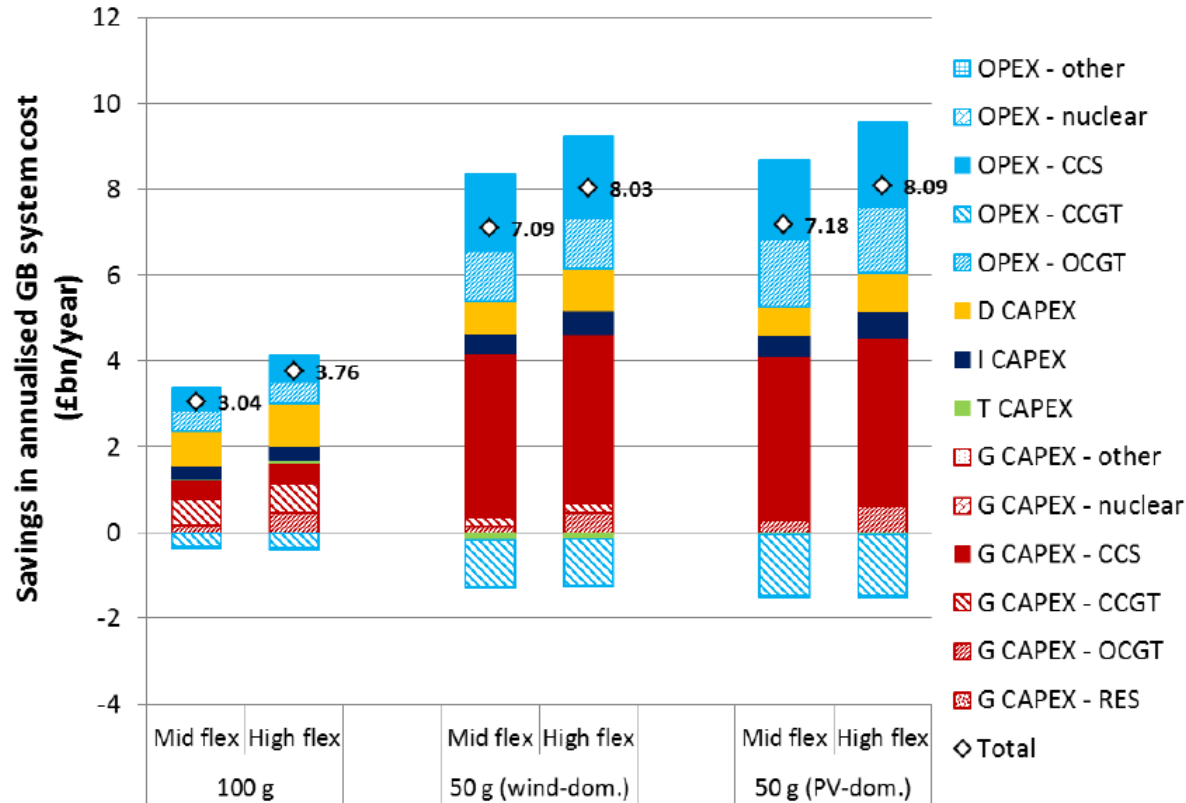


Figure 3.3. Impact of increasing system flexibility on system costs in three core scenarios in 2030

Source: Imperial College for Committee on Climate Change 2015



# System value from smart charging in 2040 (GB, FR, ES, IT)

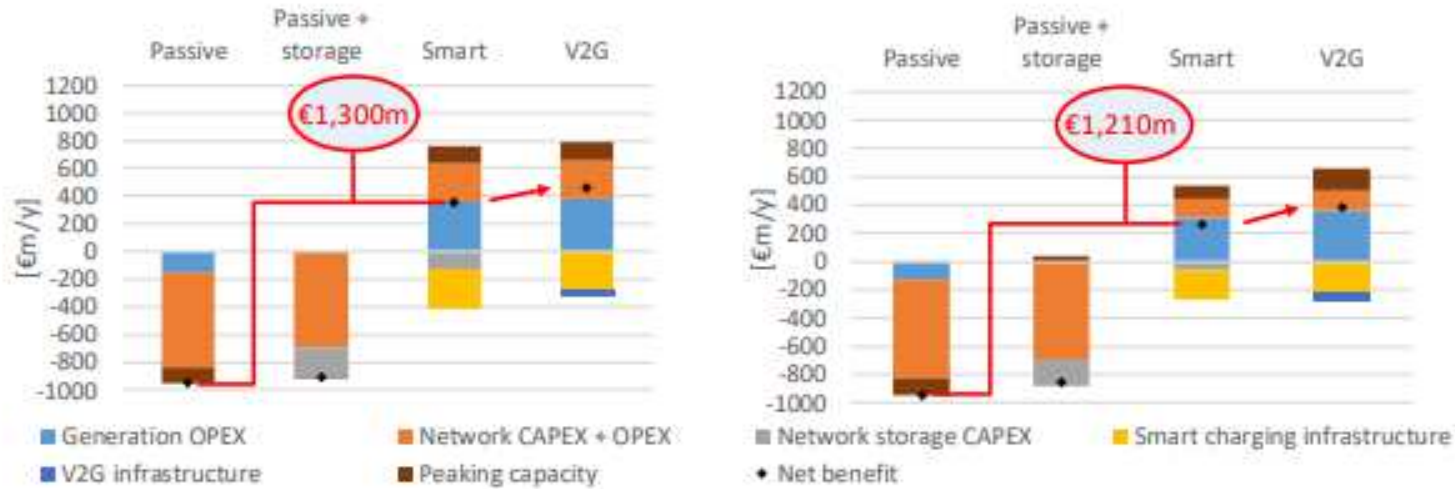


Figure 13: Whole system cost and benefits 2040: GB (left); FR (right)

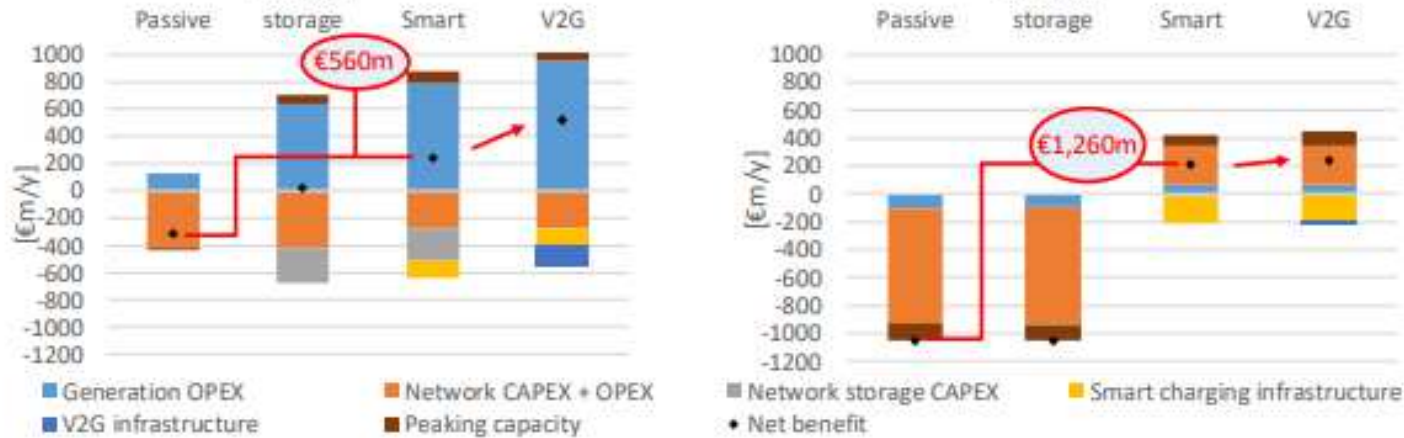


Figure 14: Whole system cost and benefits 2040: ES (left); IT (right)

Source: Batteries on wheels: the role of battery electric cars in the EU power system and beyond, Element Energy, 2019

# Way forward

- Reworking of Network Tariffs and Taxes: Link them to the problem they we are trying to solve
  - Dynamic taxing (not only time-of-use, which can create congestion problems)
  - Link to the physical condition of the network and the energy source (dynamic CO2 taxing)
- Time-of-use contracts are important, but it has to be applied both to the energy component as well as to the tariff (especially when linked to the kWh consumed)
- Market prices should reflect the real value of electricity, scarcity prices must be possible, and the full value of flexibility should be reflected in electricity prices.
- Create local flexibility markets: Take advantage of the Distributed Energy Resources where congestions can happen (e.g. EVs).
- TOTEX Based incentives for regulated actors (DSOs): Procure flexibility as an alternative to network reinforcements. Switch from exclusive CAPEX remuneration.

# Smart Energy Systems – Going forward: Sustainable Prosumer Models 11

Identify the value prosumers bring to society:

- Decarbonisation
- Lowering system costs
- Energy security and resiliency
- Increased competition
- Awareness and engagement
- Innovation
- Inclusiveness

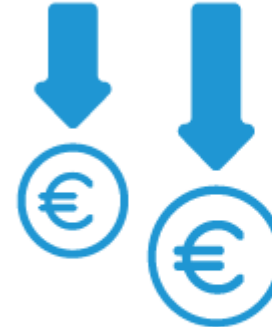


**VALUE**

Do potential prosumers have access to all the relevant information?  
e.g. Price certainty and transparency



**INFORMATION**



**MONETISATION**

How can prosumers monetise the value they bring to the energy system

How can a smart tariff and taxes system support our goals?



**COMMUNICATION**

How do prosumers interact with the grid, their supplier or ESCO?

Provide certainty about the source of their electricity

# Denmark's strengths

- Electricity prices provide big incentives for prosumers
- No governmental support mechanisms needed (feed-in tariffs or net-metering)
- Distributed Energy Resources expected to grow even without those support mechanisms (Solar rooftop PV projected to grow by 100% in the next three years, Source: SolarPower Europe GMO 2020)
- Already experienced with dynamic tariffs
- Innovative players already operating in the country (e.g. Nuvve)
- First class knowledge and research teams on Smart Energy Systems at the Technical University of Denmark (DTU)



**smartEn**

Smart Energy Europe

Thank you for listening!

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[www.smarten.eu/mapping-the-markets/](http://www.smarten.eu/mapping-the-markets/)