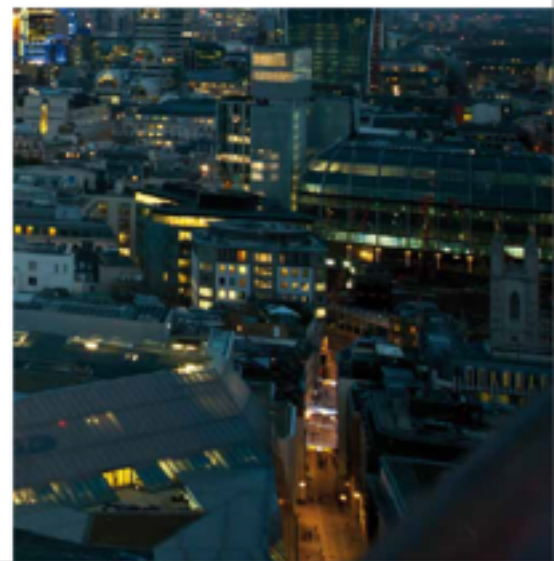
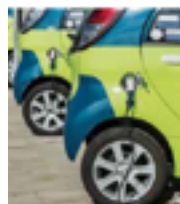


The (r)evolutionary role of the DSO

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Conference
Challenges and Opportunities
The emerging EU market
for electricity



The customer: *"I have a dream"*

- ✓ I woke up at seven with intelligent and increasing lighting in my room, the system that replaced the alarm clock a few years back, thanks to special lamps, is now controlled by "The Box" connected to my smart meter
- ✓ Hot water at 52°C has been prepared and kept at temperature using the electric power I stored yesterday integrated with energy bought at the lowest market price over the night. Kids are away, so last night I punched in we'd have been just two to take a shower this morning: no wastes
- ✓ The same applies to my washing machine and dishwasher, honest night shift workers, very reliable, very much independent
- ✓ The fridge is still silent, working on the deep cold stored yesterday. In fact yesterday was an extra-sunny day...
- ✓ Today it will be equally sunny. I shall produce full "X" kilowatt over 6 hours and will presumably need just the half... I will present the extra production to my mother: she leaves 600 kms away but my "BlitzGeschenk" application will notify Mom's retailer they are offered "X-Y" kilowatt over the grid and ask them to account it in Mom's bill for a small fee...
- ✓

- ✓ Yesterday I bought at the supermarket a test 500 kWh voucher from a new retailer at an interesting price: just stick the card into the smart meter and here you go! (or – just text the retailer to activate it: within the hour your metering company and previous retailer will be alerted...)
- ✓ I'll be on holiday three weeks in July: my self-produced electricity will be sold almost in full to the grid: my broker will take care of it..
- ✓ I'll be on holiday three weeks in July: my self produced electricity will be sold to my neighborhood self balancing microgrid at a price we agreed beforehand or I shall be credited the same amount of energy for my later use...
- ✓ My EV is fully charged in empty hours but I'll be away a few days: I'll sell "X" kilowatts to "BlitzParking" and will retrieve the same amount for free over the next month when I park at their installations and recharge...
- ✓ I've just bought an "EnergyRoamingPass" to carry my own energy around when on holiday in my mountain house, boat , camper...
- ✓ ...

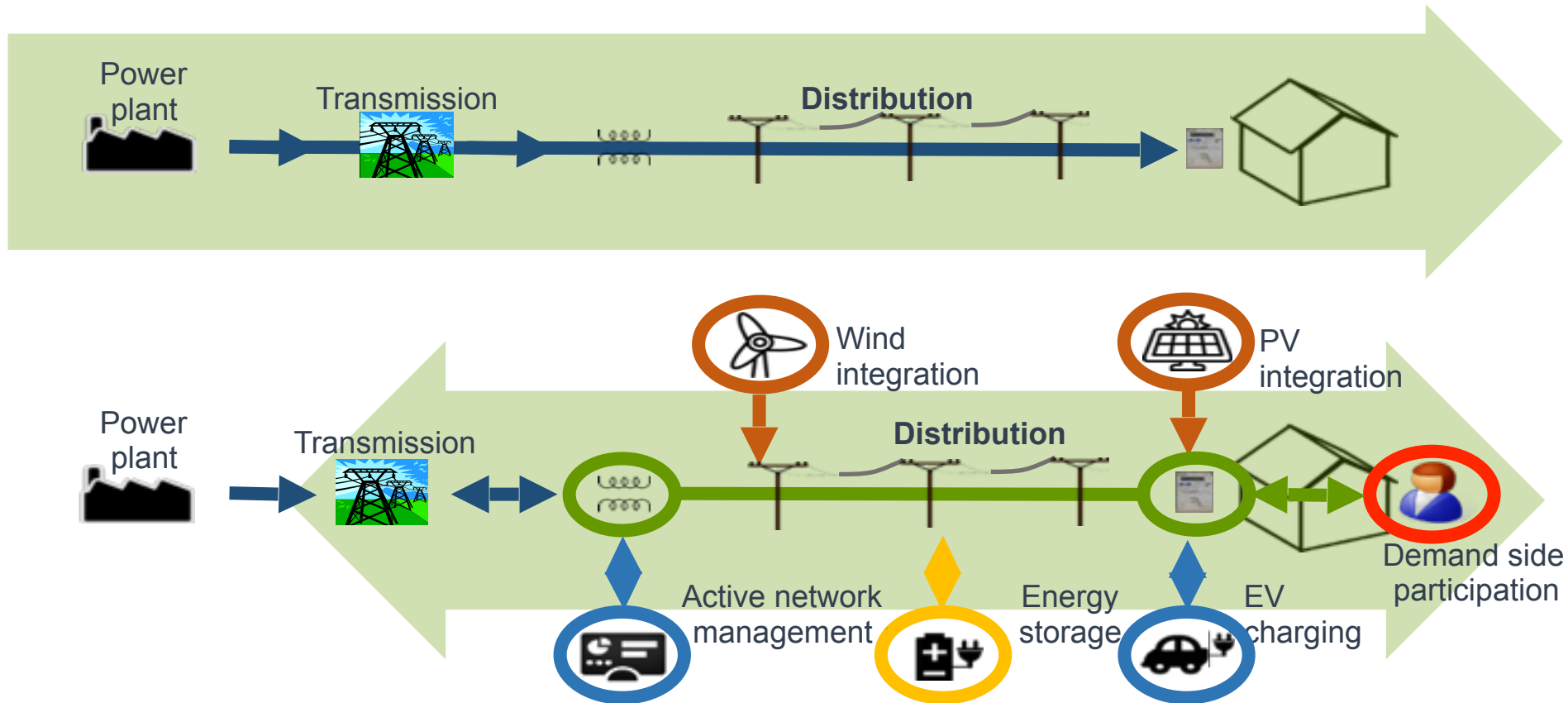
The DSO: “☹ had a nightmare...”



By the way, this one is a telephone pole, they really are going to totally disappear...

- ✓ Off-grid installations
- ✓ Microgrids, Nanogrids
- ✓ Organised prosumers
- ✓ Real estate developers
- ✓ Residential and industrial facility managers
- ✓ PV producers/retailers, aggregators joint ESCOs
- ✓ EV Charging operators
- ✓ Platforms and apps developers
- ✓ [Dirk Vansintjean, RESCoop.be](#), and his European virtual power plant
- ✓ ...

Give-up the “New Paradigm”?



Disruption factors

- ✓ Distributed generation and “grid defection”
- ✓ Customers expectation
- ✓ New customer-centric entrants competitors
- ✓ Demand uncertainty
- ✓ Technology
- ✓ Changes in policy and regulations
- ✓ Fuel security
- ✓ Decarbonisation



- ✓ According to a recent PWC study and presentation, disruption will drive business model and technology transformation along the whole value chain...
- ✓ We are already witnessing a business model change and imperious technology changes.
- ✓ Business models will be impacted by new markets, new products and services, new competitors new partnerships and even new customers.
- ✓ Technology changes do produce the digitalisation of customers, of assets and operations; distributed energy resources and micro-grids, energy efficiency, demand response based application that will generate business and beyond-the-meter automation – and further services alike.

THE EVOLVING SCENARIO

New breed of consumers, highly digitalised and eager for slick and efficient service, wanting high quality and reliable supply

Innovative and efficiently operated microgrids, fully efficient off-grid communities demonstrations and operations widely using distributed generation

Quick and up-to-date offer from smart home appliances and apps providers, energy service companies offering more than basics, reliable and trustworthy data and information providers, almost automated/default price-cost comparison and choice

New forms of possible unbundling, structured capacity markets and revised approach to CAPEX and OPEX in distribution

Lower cost photo-voltaic and storage, lower cost communications and sensors, digitisation of traditional grid equipment, digitisation of customers

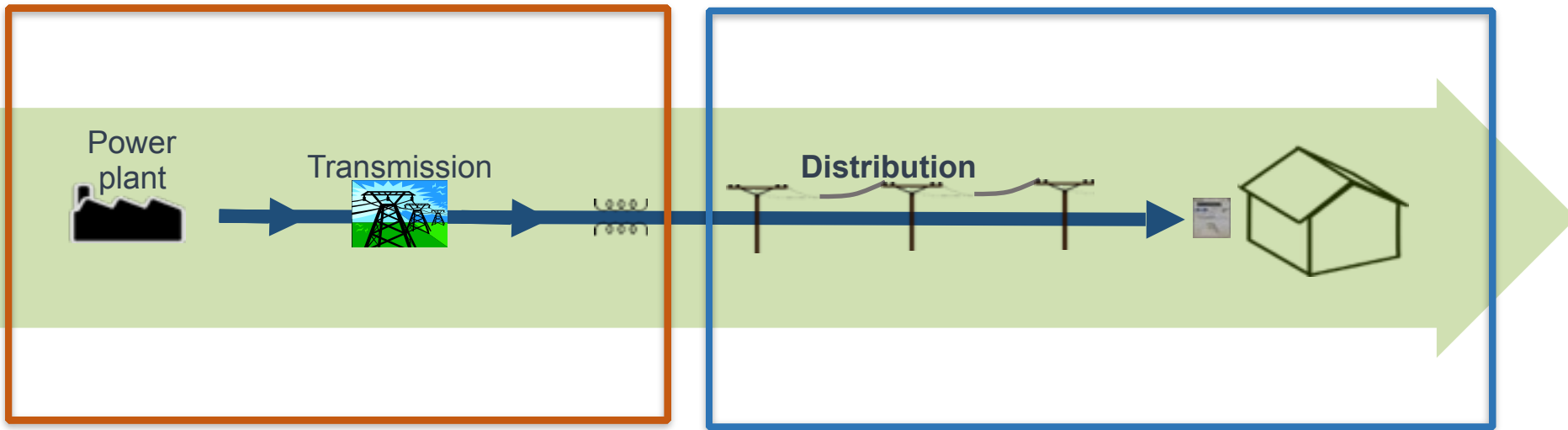
New uses of electricity (district heating, heat pumps etc.), Increased demand response, Increased electrification and economic growth in developing countries

Geo-political risk, Competition for scarce resources, Growing global demand for energy

Operational change

ACTIVE MANAGEMENT

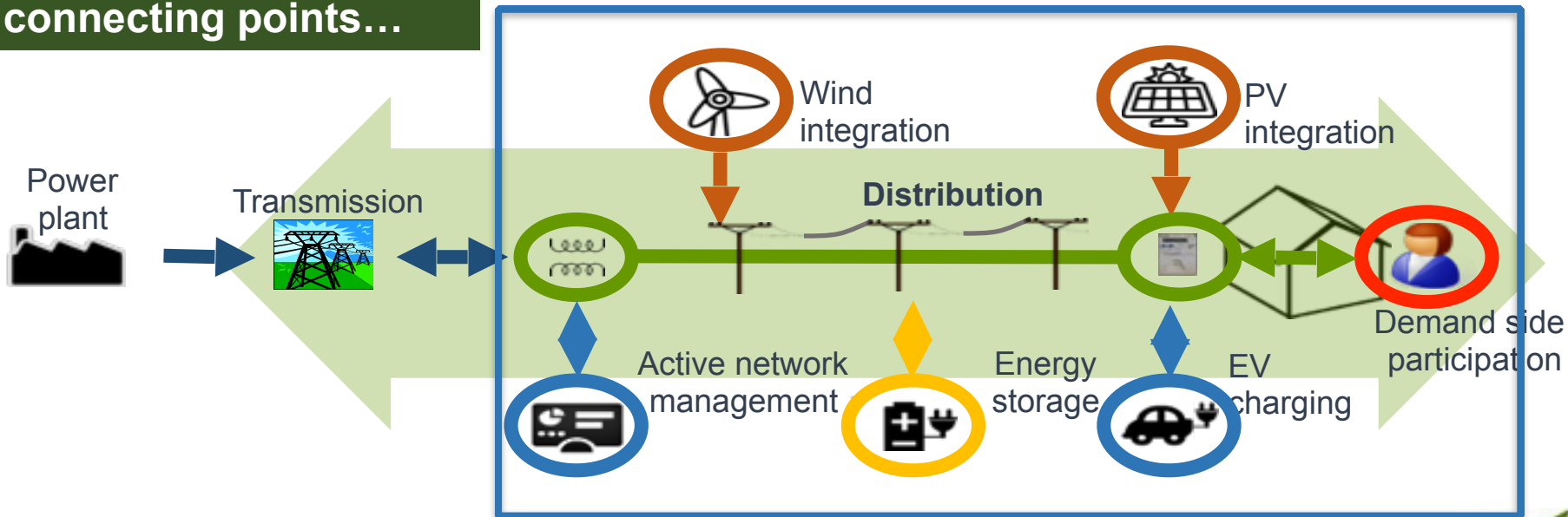
PASSIVE MANAGEMENT



Enhanced interaction and monitoring of transmission grid dynamics, bulk generation inflow, renewable feed-ins, own distribution grid, connecting points...

ACTIVE MANAGEMENT OF OWN, THIRD PARTIES AND CUSTOMER ASSETS

Smart buildings production/consumption, individual and collective local storage, unpredictable self generation/usage ratio, EV domestic charging/storage...



Multiple approaches possible

**Interconnections
at continental
level cater for
extra distance
transmission of
electric power**

**Classic 20th
Century grid
based on
thermal
generation with
hydro controlled
feed with no or
limited wind,**

**Interacting local
grids with no or
very limited
need of classic
distribution grid;
massive TSO
ops not
necessary.**

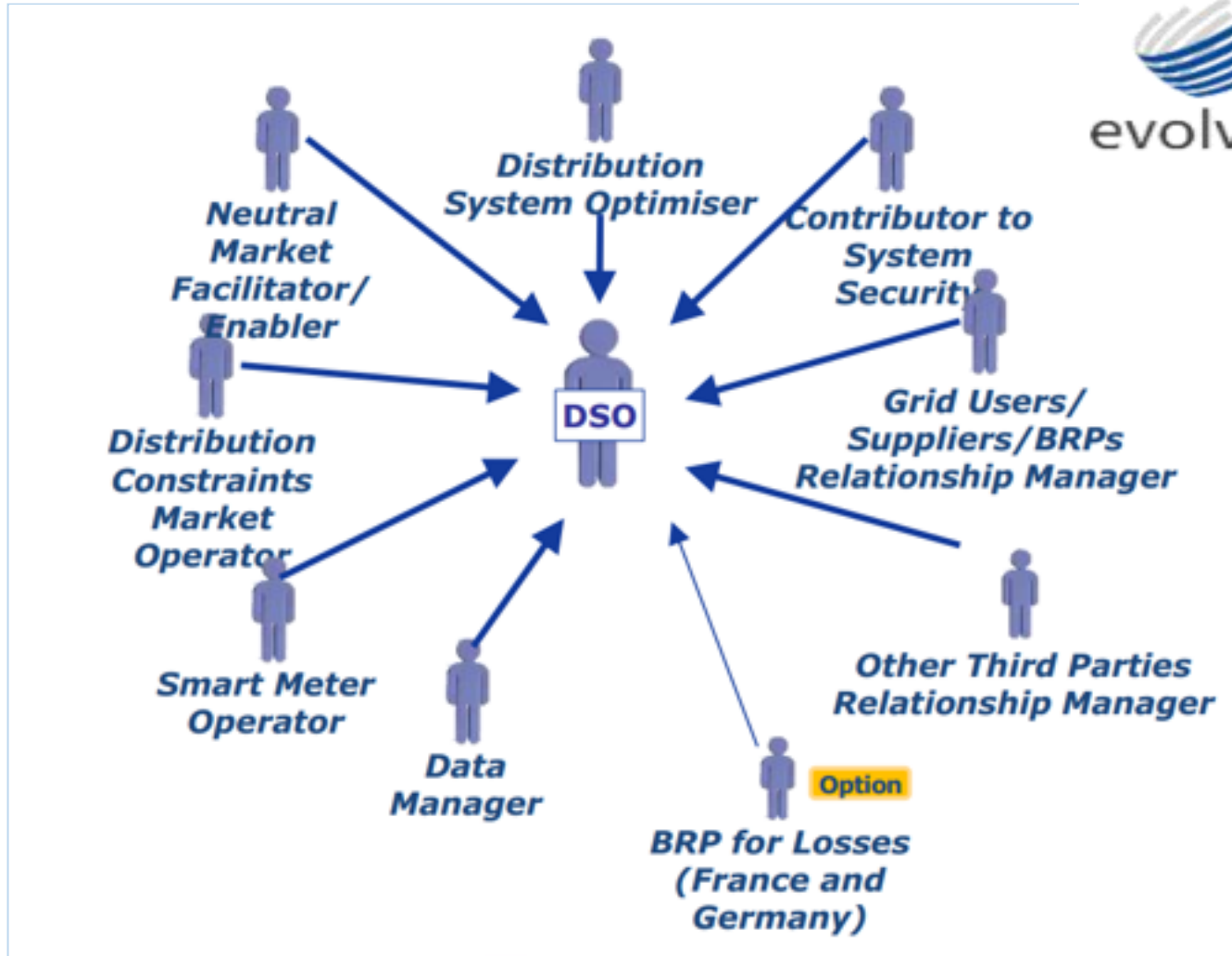
**Comfort model
connecting RES
to TSO grids
balanced
through storage
and demand
side
management**

**Generation and
storage
connected to the
distribution grid.
TSO
marginalised**

In this scenario we need

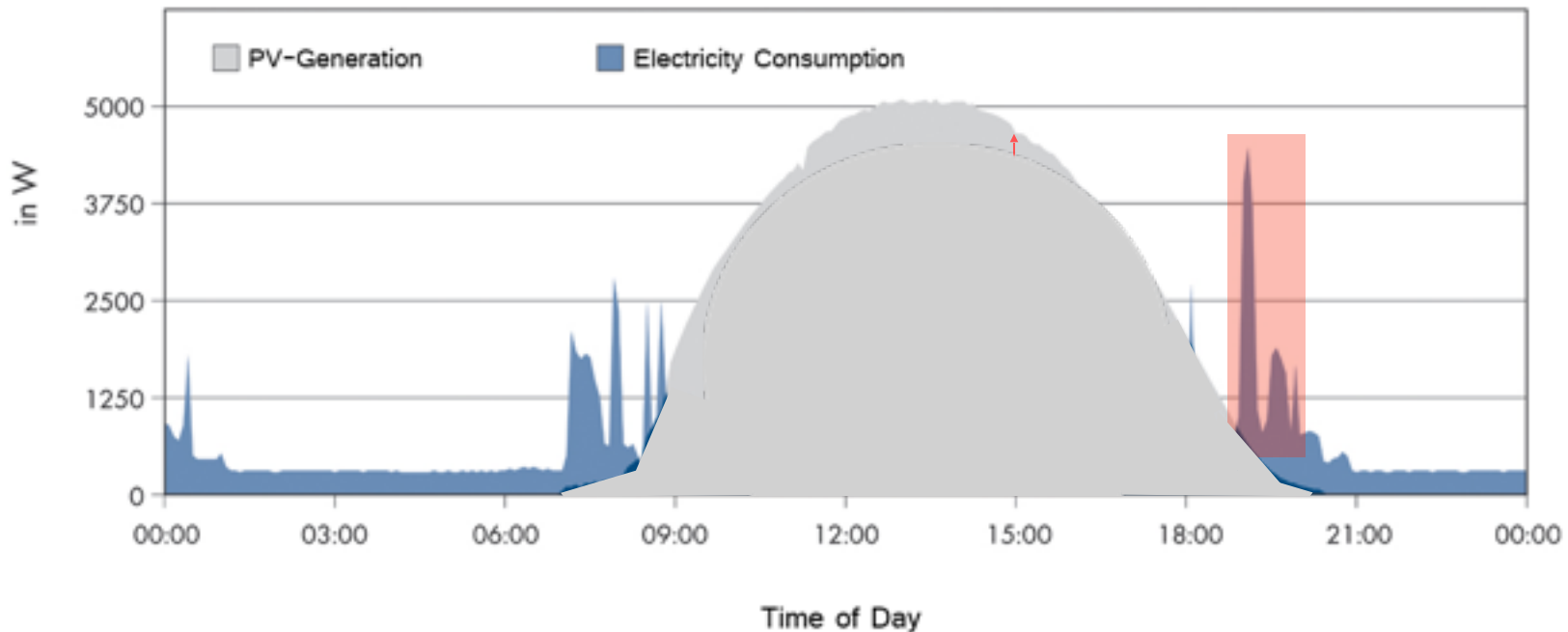
- ✓ Forward looking regulation to handle the technological progress and the multiple choices that will flood the market at the customer level.
- ✓ A policy-engineering effort capable to accommodate rapid evolution without disrupting the evolving role of DSOs and their commitment to guaranty an equanimous access to electric power, which requires further investments.
- ✓ A framework that contemplate shared language relations between TSOs, DSOs, aggregators retailers and all other actors on the market.
- ✓ Consideration of the evolutionary/revolutionary role of DSOs that are bound to become actual facilitators with wider responsibilities in terms of security and quality of supply.
- ✓ Clear, long term signals necessary to approach the investments required to support the evolution of the market and of the use of electric power.
- ✓ Complexes and prejudice free further discussion on the evolving DSOs business model and how to combine this with value disruption and stranding investments avoidance.

Evolving the DSOs role



- ✓ In principle, self-consumption is not an issue: prosumers should be able to use their own generation as they please.
- ✓ However, in most European countries distribution network tariffs are not yet adapted to self-consumption.
- ✓ The network tariff paid by consumers is based on their energy use, while the cost incurred by the DSO depends on the network capacity used by consumers.
- ✓ Self producing and consuming households consume less energy, but do not lower the need for grid capacity.

Let's have look at a regular household

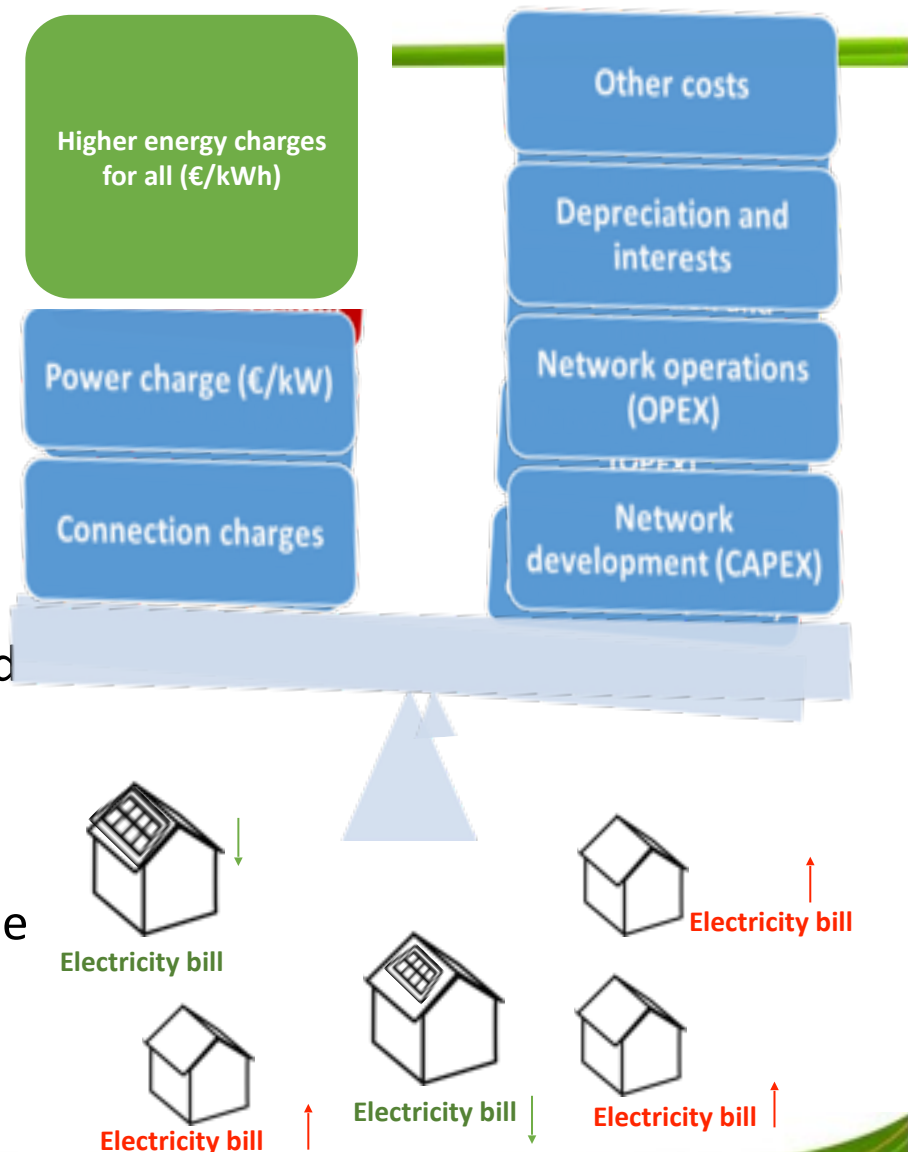


Generation, consumption and self-consumption on a clear summer day (four-person household and solar power plant with 5 kW peak power).
Source: SMA

- ✓ When consumption is low, energy is fed back to the grid. This is a grid use.
- ✓ When the sun does not shine, the grid is used to cover the energy need of this household.
- ✓ **If the distribution tariff is energy-based**, the DSO is only paid for the blue hours, while investment and maintenance (depending on maximum grid capacity used) are not reduced.

Why is this an issue?

- ✓ An imbalance appears between the DSC costs and the DSO revenues.
- ✓ This adds uncertainty for the DSO: revenues will vary depending on DER generation. This can be significant with a high PV penetration.
- ✓ Today, to cover this risk, the DSO (backed by the regulator), has to increase the network charges (€/kWh) for all consumers.
- ✓ **BUT, this is not a long term solution.** The uncertainty issue is not solved, and consumers without generation are penalised.



Tariffs should be more capacity-based rather than volume-based.

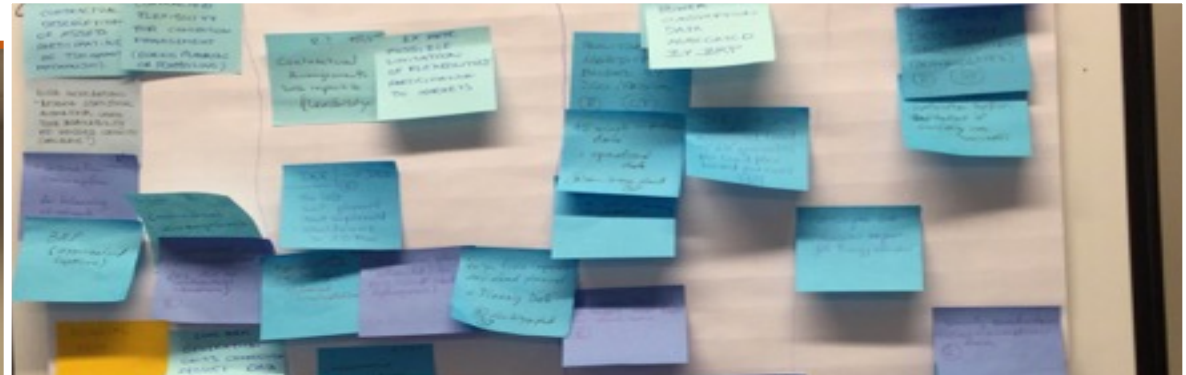
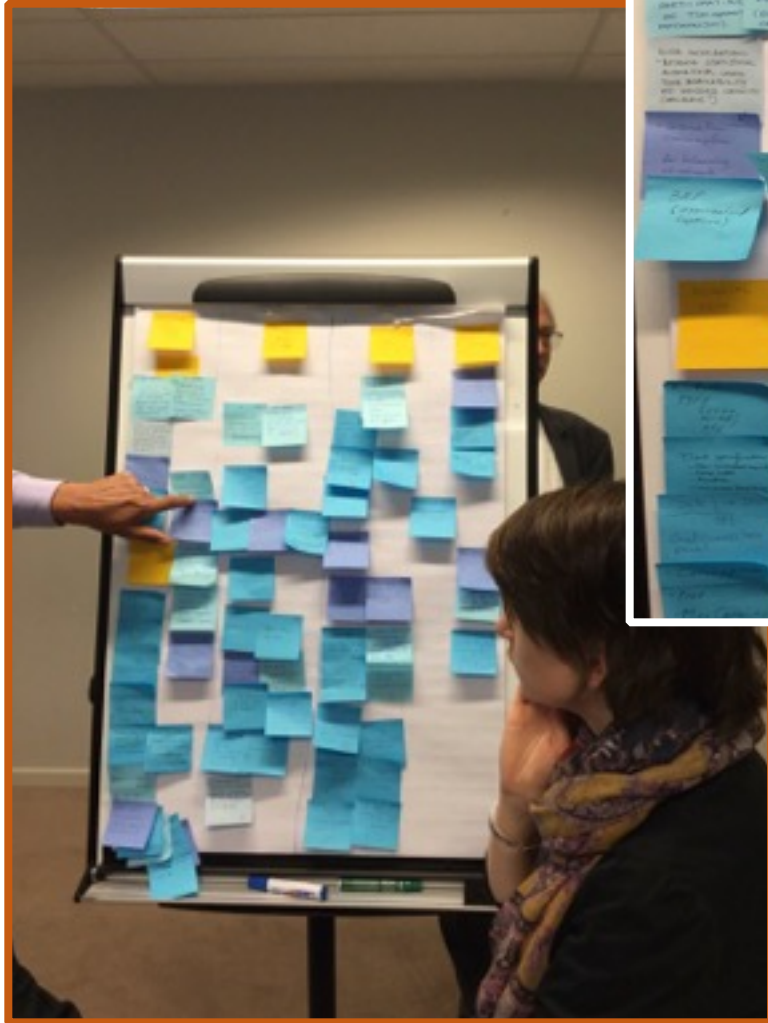
Other options to be investigated, complementary to the volume-based tariffs:

- ✓ Special tariffs for prosumers?
- ✓ Time of use tariffs ?
- ✓ Direct incentives (smart contracts) for the users having a larger impact on the grid?
- ✓ Dynamic tariffs?

Preliminary ideas submitted to the EU Commission - DG Energy

- ✓ Support to innovation
- ✓ Cost reflectiveness
- ✓ Sufficiency: network tariffs should ensure full recovery of all allowed network cost and reasonable return on capital
- ✓ Market openness: network tariffs should not hamper innovative pricing for demand response and energy efficiency
- ✓ Transparency: determination of tariffs should be transparent, auditable, consistent and easily understandable.
- ✓ Non-discrimination: there should be no discrimination between customers of the same customer group

DSO/TSO: working on the data we both need



What we recently asked the EU Commission

- ✓ A new market design where actual flexibility is possible
- ✓ Data management left in the hands of DSOs: these are neutral market facilitators, already regulated, efficient and cheaper than any project to set up new entities to deal with data
- ✓ Acknowledgement for DSOs in providing services necessary to operate the network in security (e.g.: in many Member States existing regulation hinders DSOs to use flexibility measures)
- ✓ Clear role to align the system to those policies that have so far encouraged the development of decentralized electricity generation, electric vehicles, energy storage, flexible demand and the push towards the energy transition.

What do we stand for...

- ✓ An **equal footing** in discussions and regulation with TSOs.
- ✓ A **balanced split of roles** and responsibilities with TSOs – where DSOs are considered full-fledged network operators actively managing their networks

DSOs to:

- ✓ **maintain control over their networks,**
- ✓ run the direct interaction with distributed generators – and
- ✓ be responsible of the consumer related data management either commercial or technological

What do we stand for...

- ✓ **Neutrality of the DSOs** as a strong position to oppose proprietary unbundling
- ✓ Innovative regulatory frameworks better reflecting the **shift from capacity to operational costs**
- ✓ Demand-side response (DSR) framework representing **a high potential for network management**, although a market set-up is not the only option.

What do we stand for...

- ✓ An increased network **reward system** to provide adequate return on investment needed to develop wide scale smart technologies
- ✓ DSOs to use **flexibility services from generators and consumers**, suitable to take stock from “prosumers” production and their evolution

What do we stand for...

- ✓ “Smart contracts” between DSOs and grid users should also be considered as an alternative. If a market model prevails, **assurances that market signals will not contradict each other** to the detriment of grid stability should be in place, as should the possibility for DSOs to override market signals in cases of emergency.
- ✓ More cooperation between TSOs and DSOs when **preparing and executing defense and resilience plans**

Thanks for listening

