Self-Consumption Trends in PV

Self-Consumption Workshop – Brussels 23 Oct 2018

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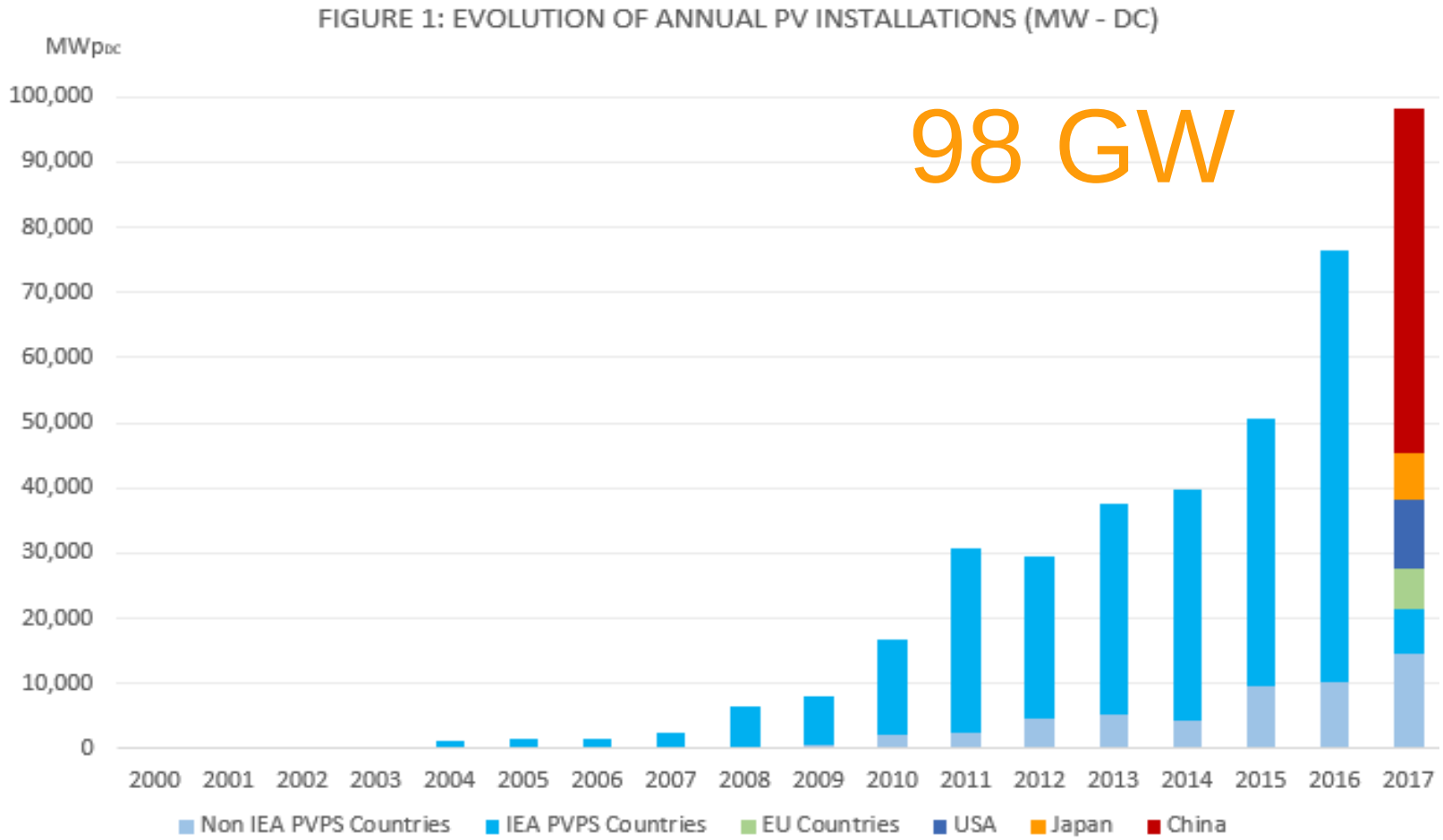
BECQUEREL INSTITUTE - BRUSSELS

- Research oriented Institute and consulting company for Solar Technologies.
- Global PV Market Analysis including competitiveness and economics.
- Industry analysis together with quality & reliability.
- Support for PV development
- Integration into electricity systems (grids and markets).

- In-house experts / Global network of experts and stakeholders
- PV Market Alliance partner

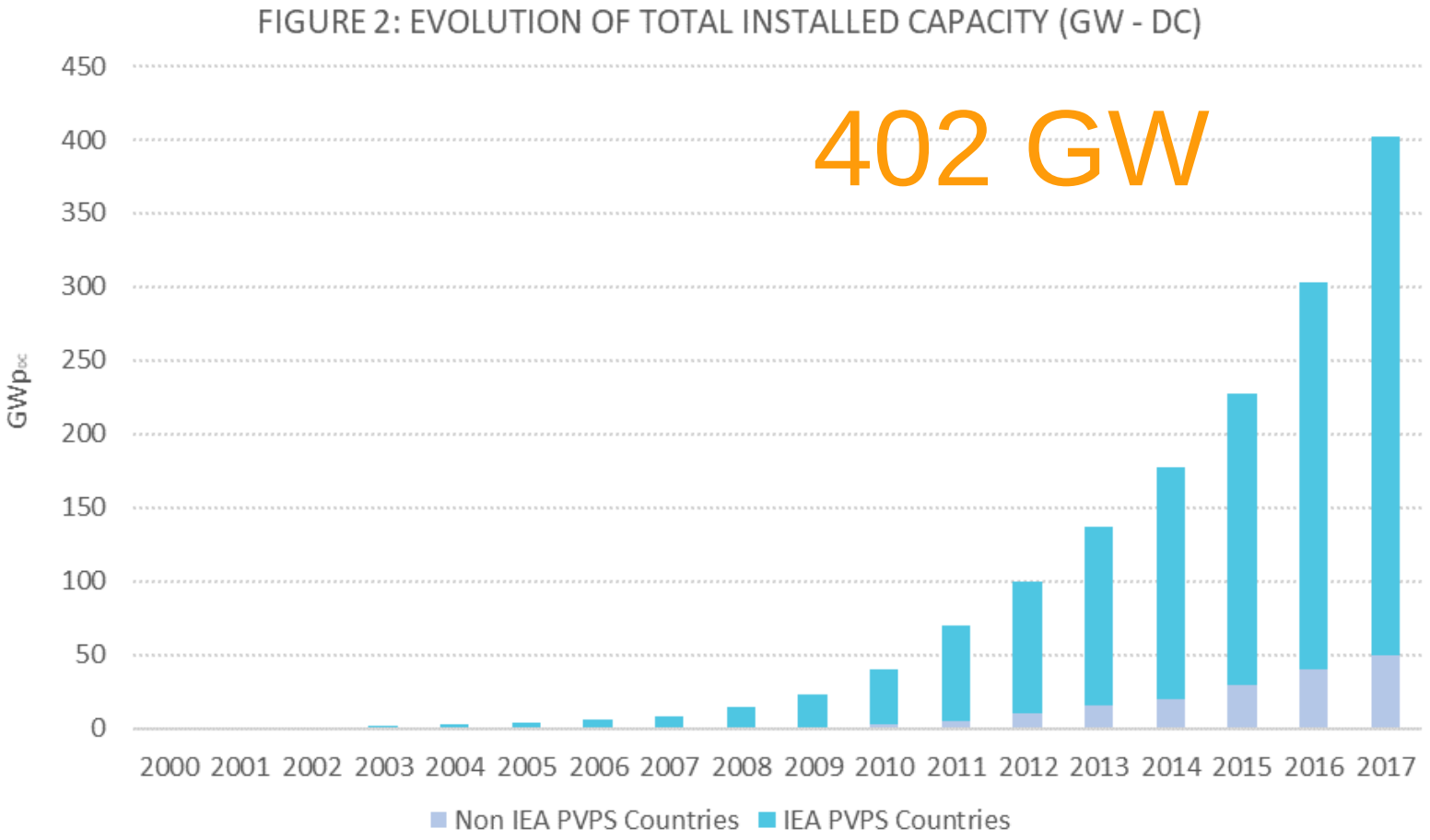
THIS GOES FAST FAST FAST…



98 GW

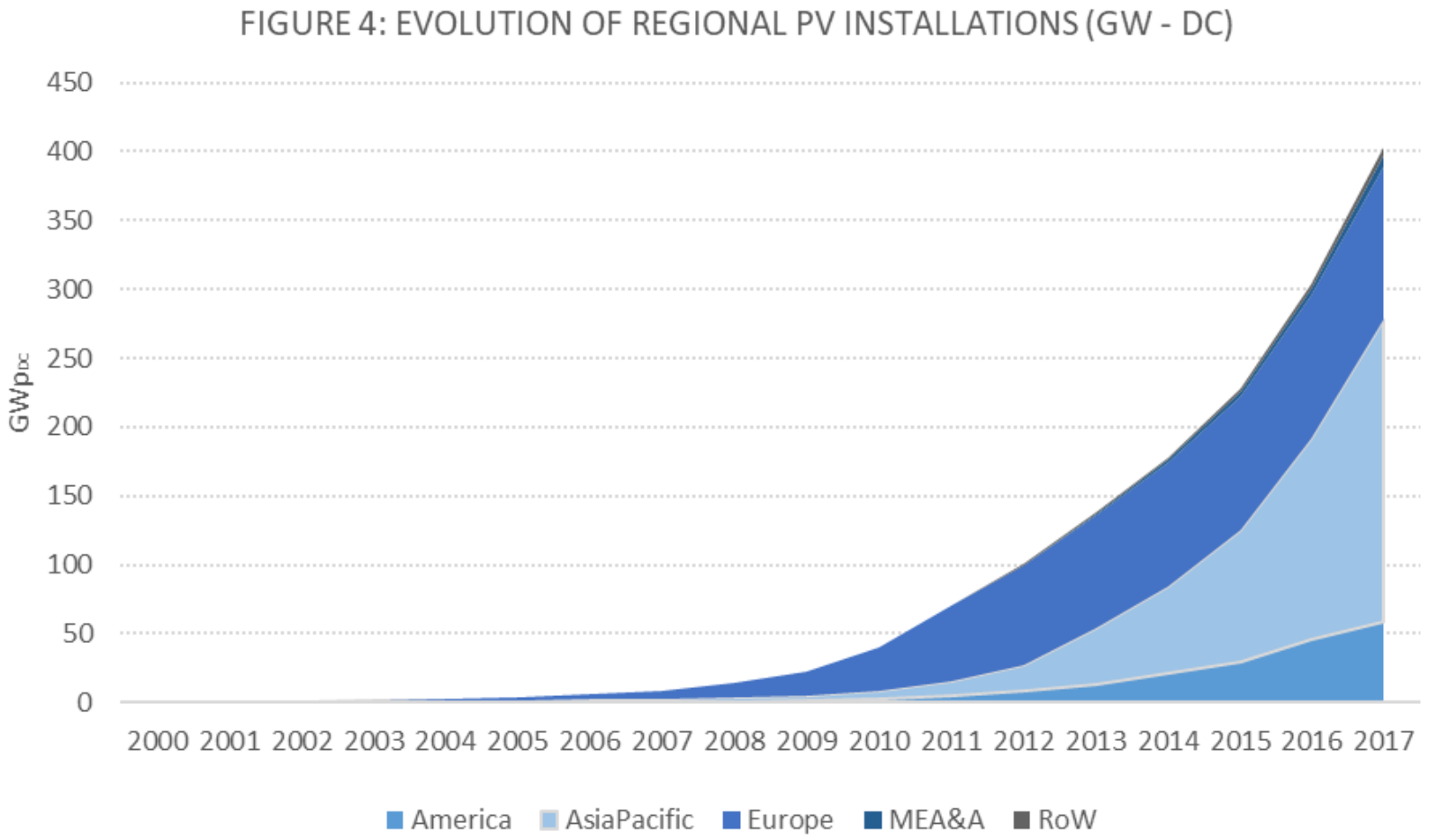
Source: IEA-PVPS Snapshot 2018

APPROACHING THE HALF TW !

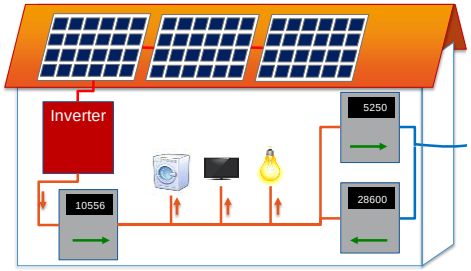


Source: IEA-PVPS Snapshot 2018

ASIA IS LEADING



A TALE OF 2 MARKETS



Distributed PV

Producers

Grid injection, PPA, competition with utilities generation business, includes floating, agri, …

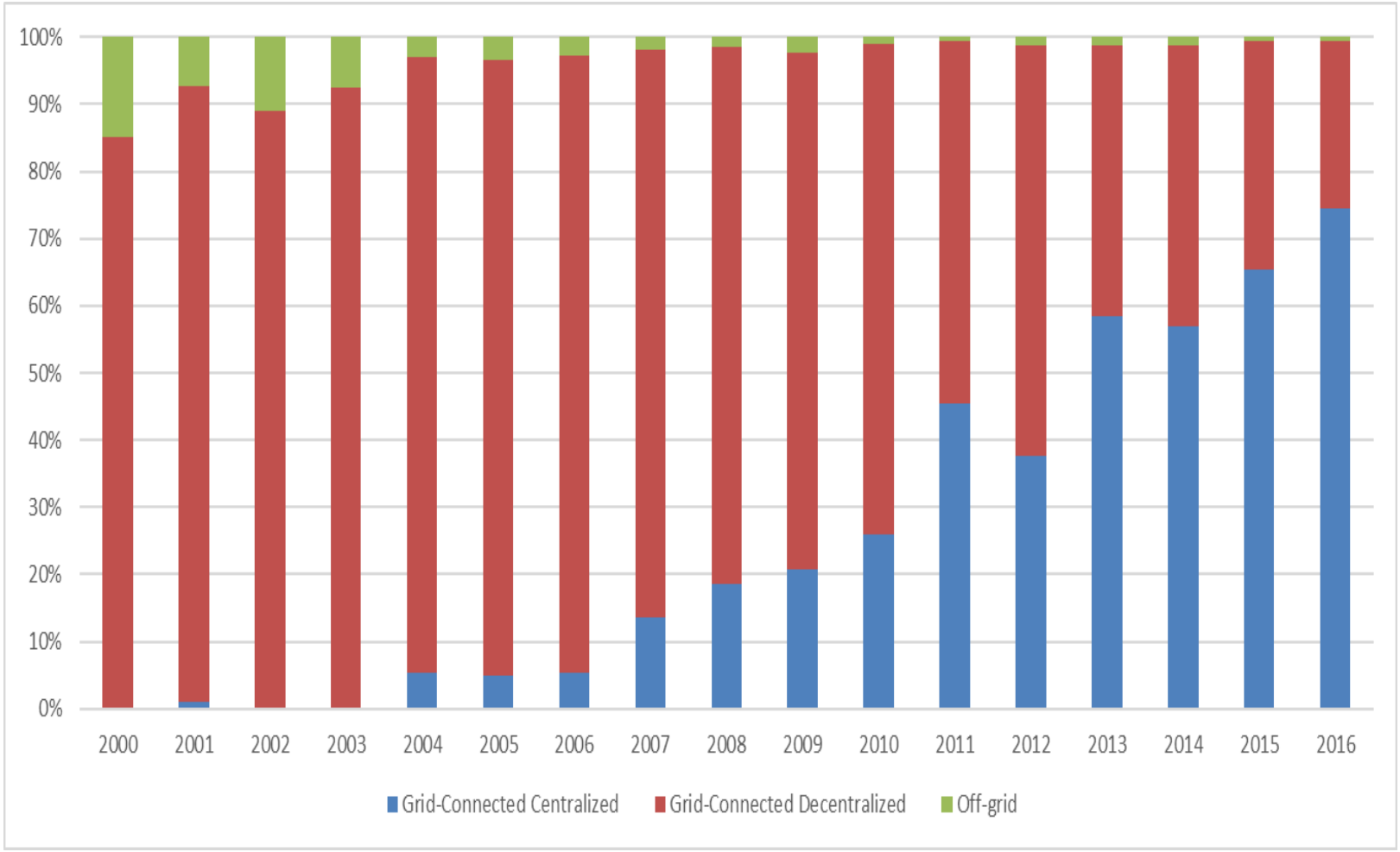
One technology

Self-consumption, energy effiency, grid parity, competition with utilities distribution business, includes BIPV, VIPV, PV roads, guerilla PV…

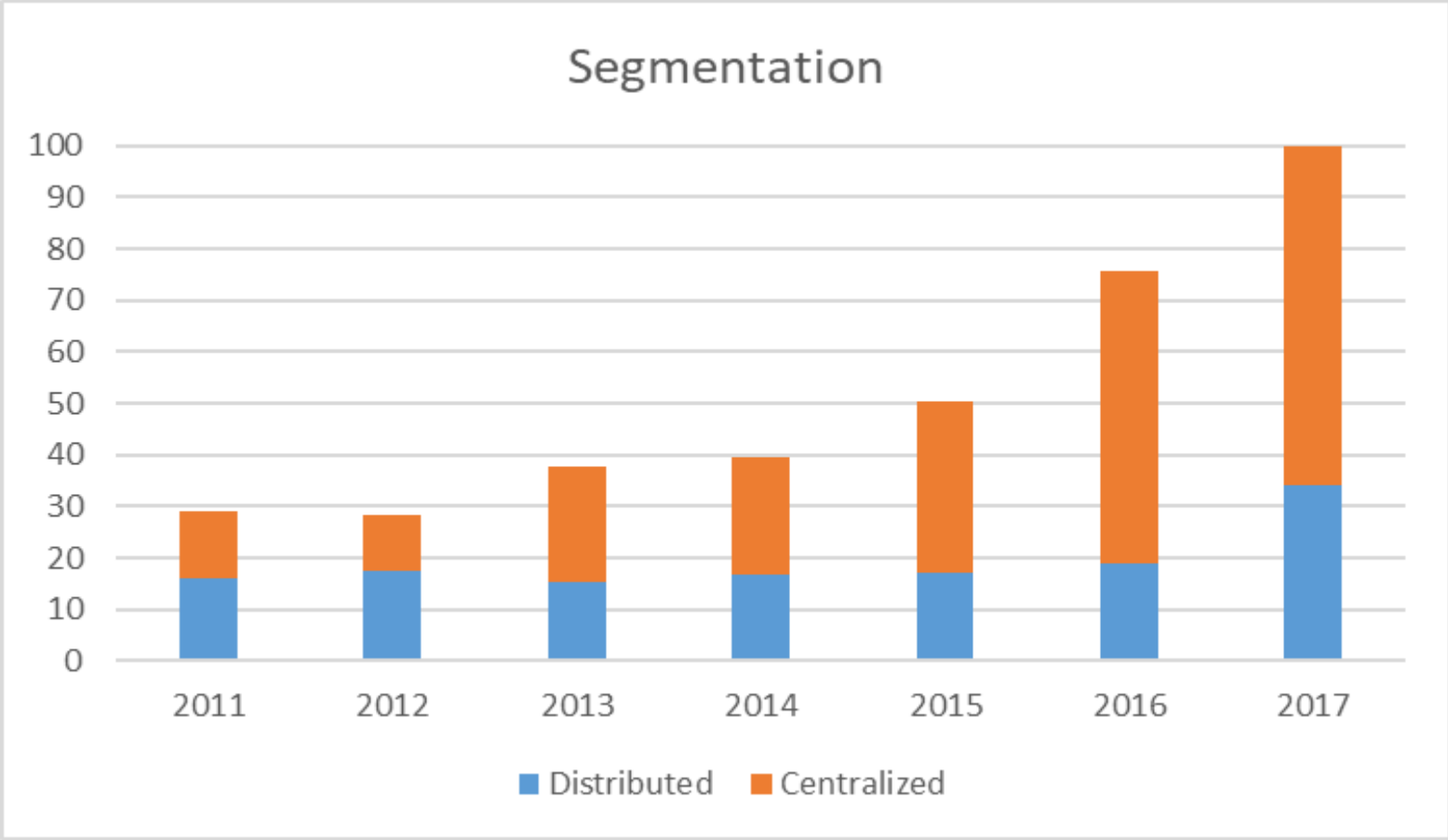
Prosumers

Centralized PV

UTILITY-SCALE DOMINATES

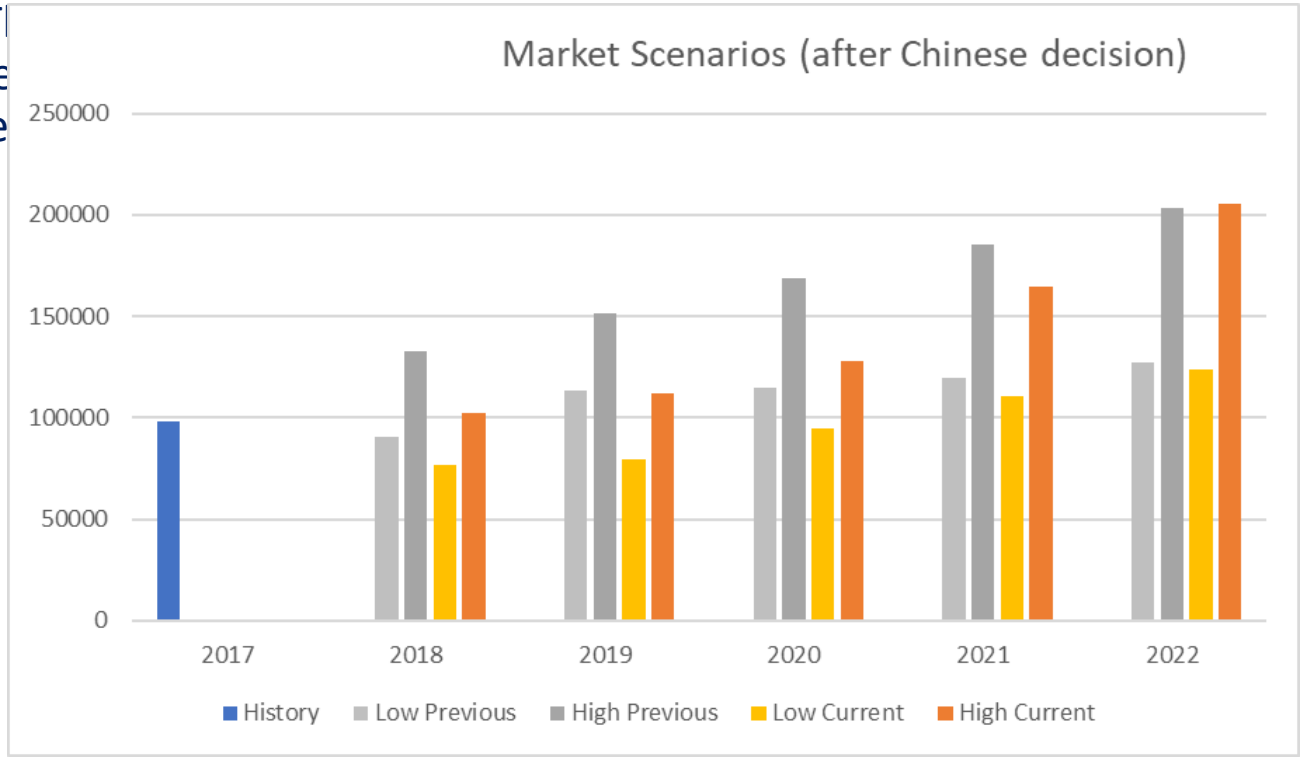


SEGMENTATION CHANGE?



PV MARKET FORECASTS UNTIL 2022

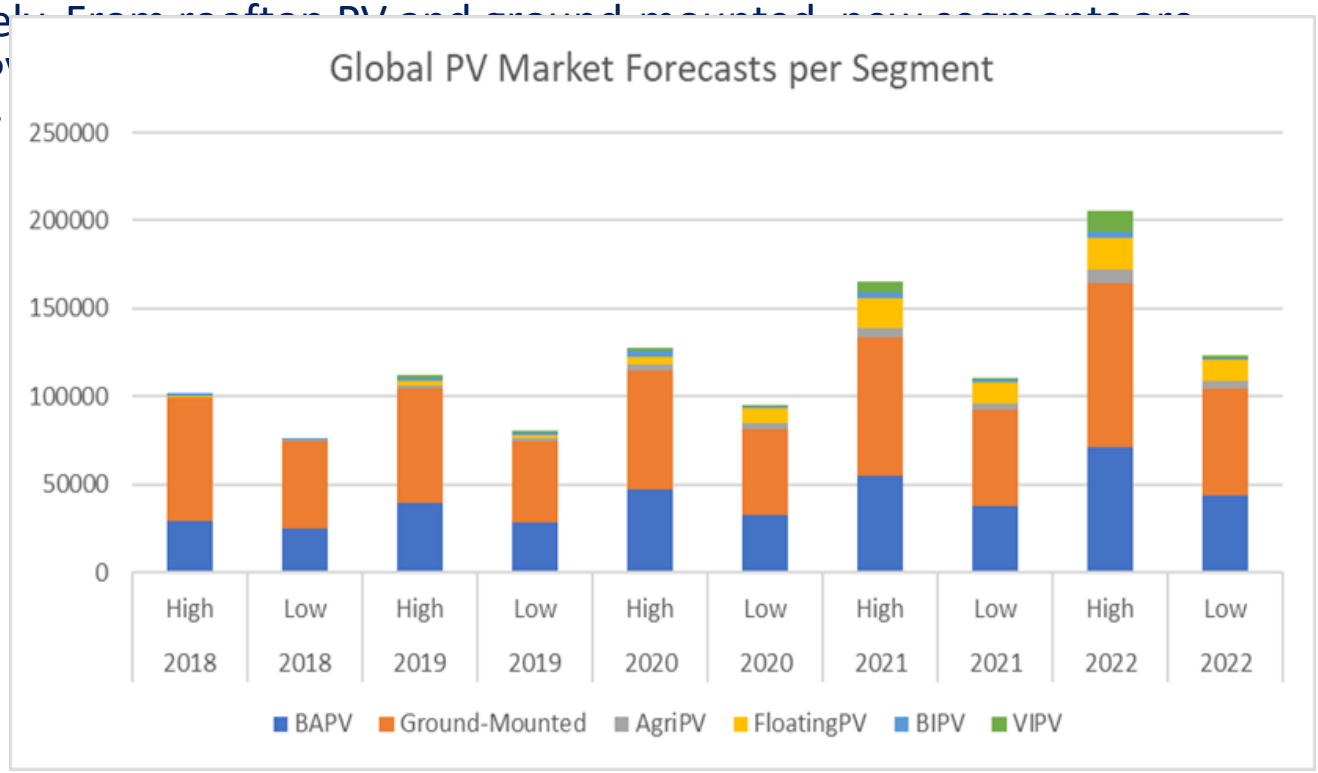
The prospects are high to see the PV market doubling by 2022, from 98 GW (2017) to around 200 GW. T
the growth in Europe
scenario than for the



Source: PV Market Alliance, not yet published numbers. 2018

WHICH SEGMENTATION ?

The diversification of the market is happening now, but the effects won't be significant immediate[illegible]. From rooftop PV and ground-mounted, new segments are developing: BIPV, VIPV[illegible] are rather limited for



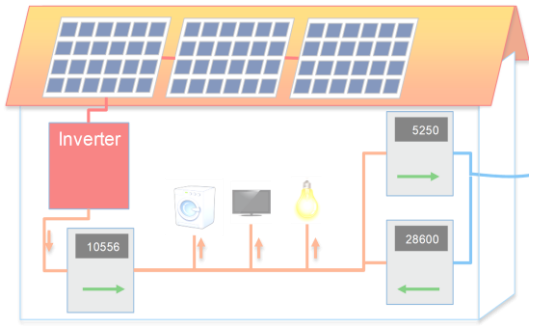
Source: PV Market Alliance, not yet published numbers. 2018

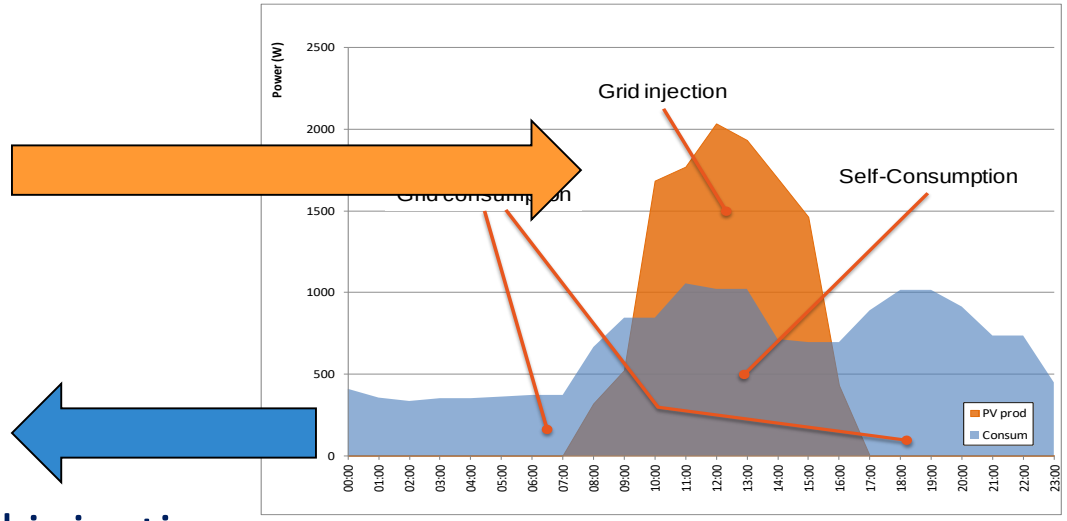
SELF-CONSUMPTION POLICIES

THE SELF-CONSUMPTION

Self-consumption of PV installations

20 to 100%



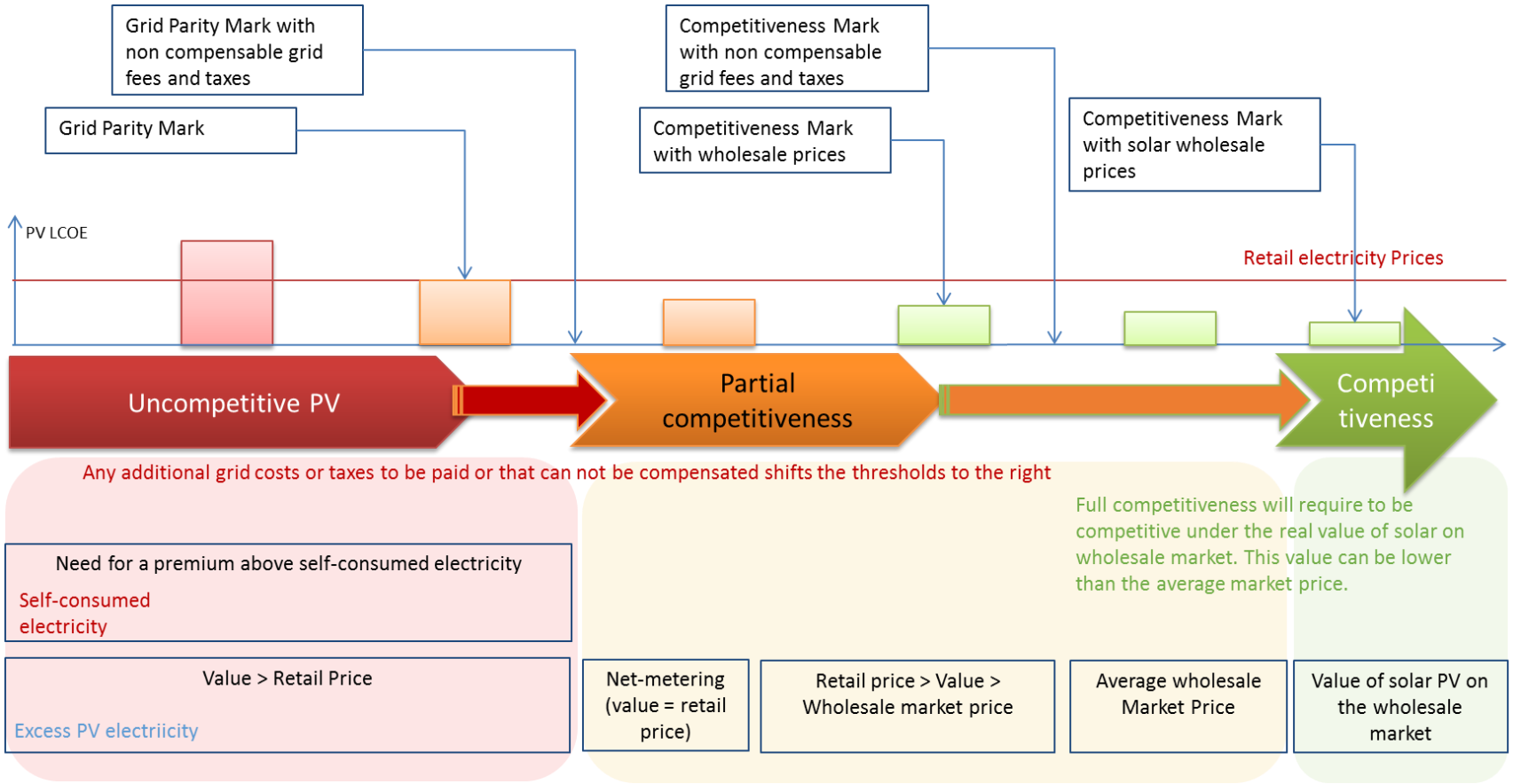


Challenge: minimizing grid injection

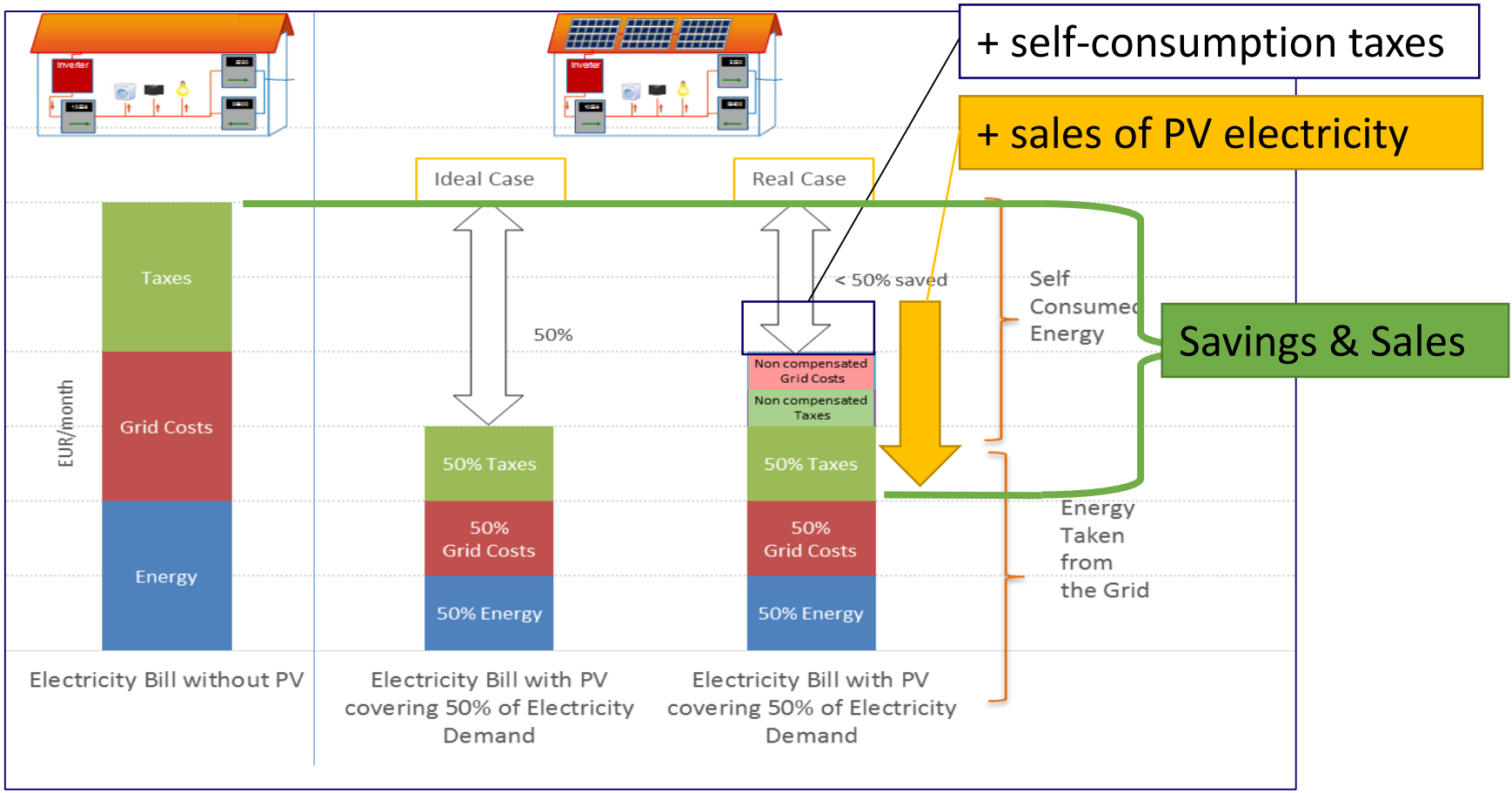
Solutions: decrease PV system size, DSM, Storage

THE DEBATE ON SELF-CONSUMPTION

Self-consumption will be constrained due to limited savings on the electricity bill



ECONOMICS OF SELF-CONSUMPTION



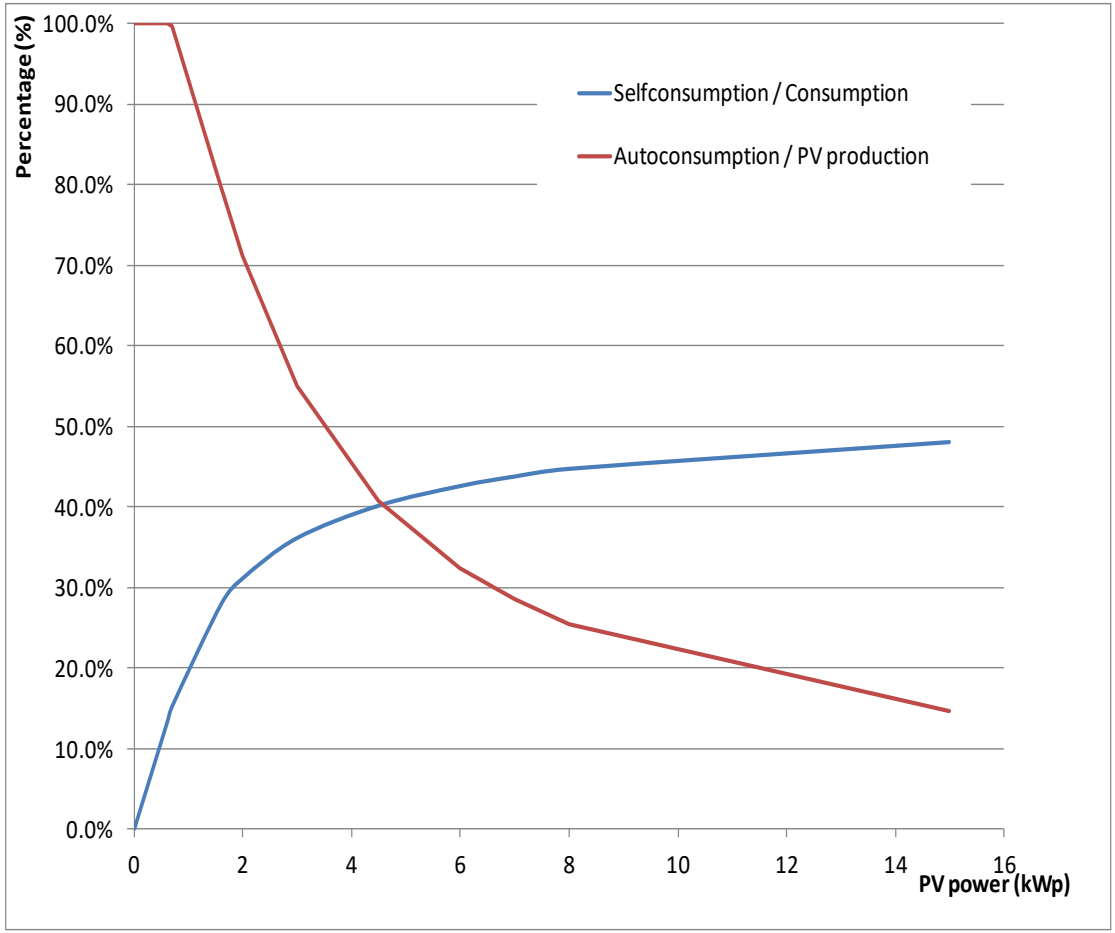
IMPACT OF SC RATIOS

Ratios are smaller in the residential sector (20-30%).

DSM, system size, storage can increased them.

Commercial and industrial applications can reach higher ratios.

But is local optimization of SC optimum from a system point of view ?

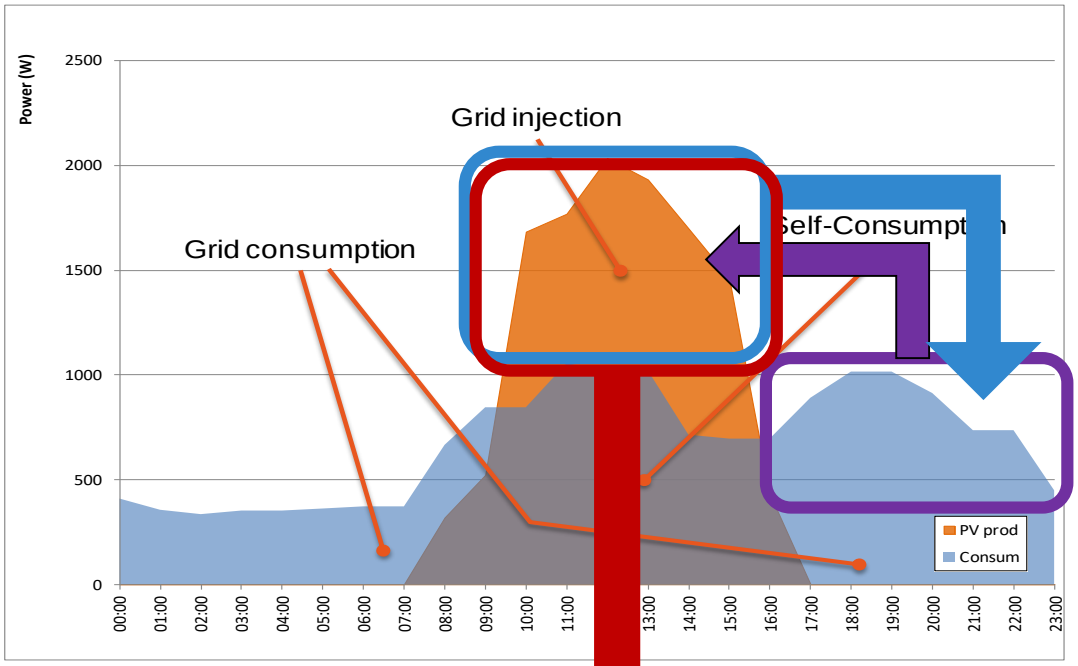


DSM & STORAGE SOLUTIONS

DSM

Electricity Storage

Other uses(out of the load)



H&C, Transport

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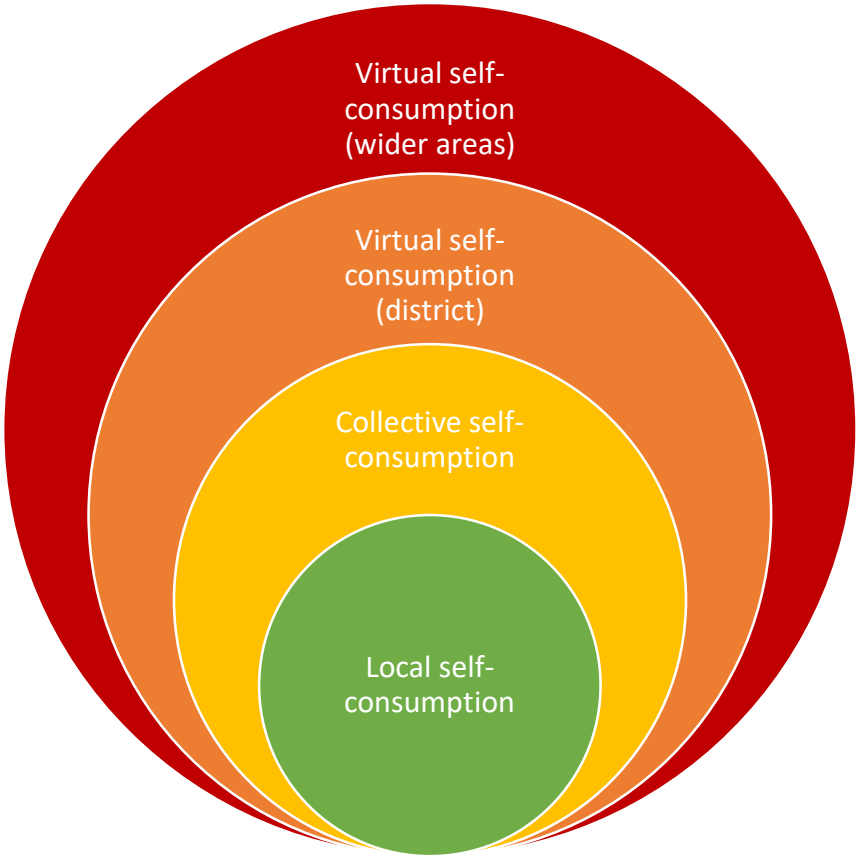
EXPANDED SELF-CONSUMPTION

Remuneration of the transmission grid necessary

Remuneration of the distribution grid necessary

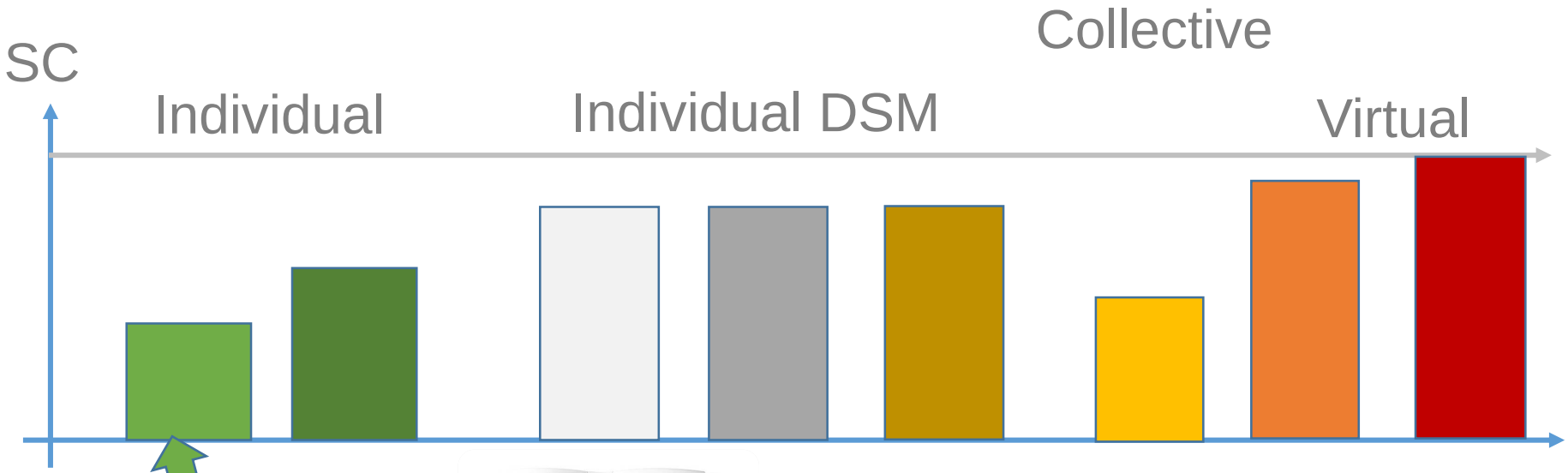
How to share energy? Grid costs management similar.

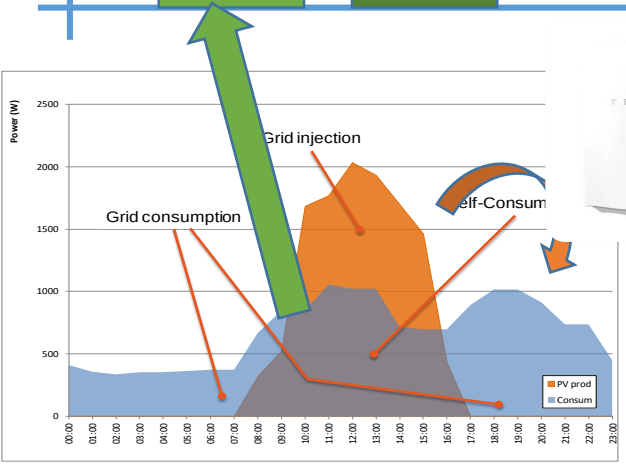
Grid costs paid for consumed electricity and mutualized for self-consumption



Becquerel Institute and TUW-EEG

INCREASING SC RATIOS





CHALLENGES

- SC requires optimisation to increase competitiveness
- Local optimisation shows limitations
  - DSM, batteries, EV charging etc.
- Thinking out of the… box !
  - Collective
  - Virtual SC… could be everywhere
  - Peer-to-peer
- Some key questions
  - Grid costs
  - Taxes
  - System stability

GRID FINANCING?

- Grids are mostly financed on an energy basis, but their deployment is capacity based.
- Average Energy/capacity tariffs in Europe depends on country and segment. From 10/90% to…
- One reason: max capacity is not simulnaeous.
- How to adapt to PV development ?

GRID FINANCING

- Grid tariffs depend on policy choices
- Most countries so far:
  - Grid costs to be paid on the really consumed electricity
- Belgium: prosumer's tariff =~ grid costs for prosumers round 80-100 EUR/kWp (but net-metering)
- Spain: Sun tax – same idea, different application (dead!)
- Italy: scambio sul posto – but favourable to PV
- Many discussions about net-metering in the USA

A SIMPLE PROPOSAL

- **10% PV penetration** (5% utility 5% distributed)
- Average self-consumption all segments: 50%
- Lost of financing for grid operators: 2.5%
- Increase of the electricity bill if mutualized: **~1%**

- **Medium term grid financing is NOT a major issue**

→
Mutualize lost grid costs polluter-payer principle

NEW BUSINESS MODELS

- Utility-scale plant to power public buildings in cities
- Virtual compensation between buildings in the same city
- Charging EVs in the office with PV electricity produced at home (or the opposite)
- Storage, EV, PV, H&C in buildings, connected and exchanging electricity.

CONCLUSIONS

The revolution has just started…

From simple modules to BIPV, roads, floatting PV, urban furniture, cars, trains, planes…

PV will be the CHEAPEST source of energy in this century.

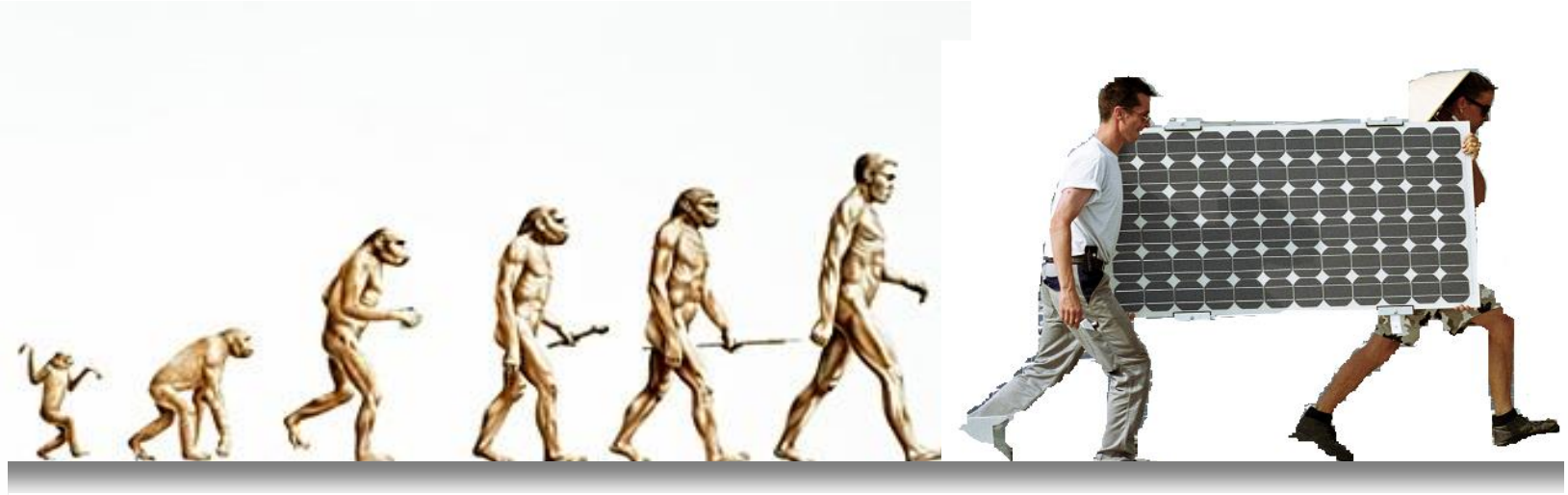
The grid must adapt to my uses and is not a definitive given.

QUOTE

« PV is not the source of electricity of the future…

… it is already a reality today »

NEXT STEP IN EVOLUTION



Thanks for your attention

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