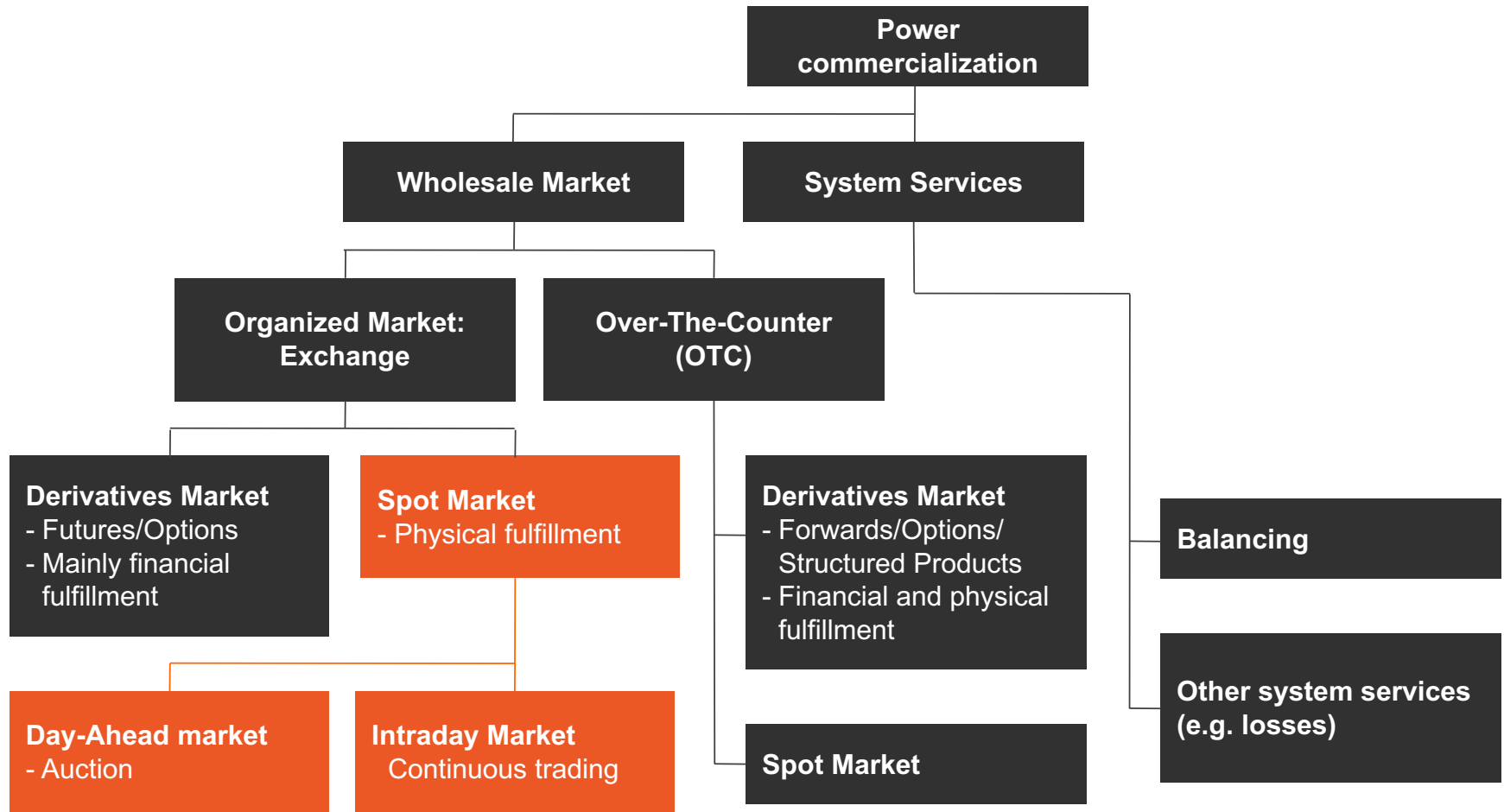


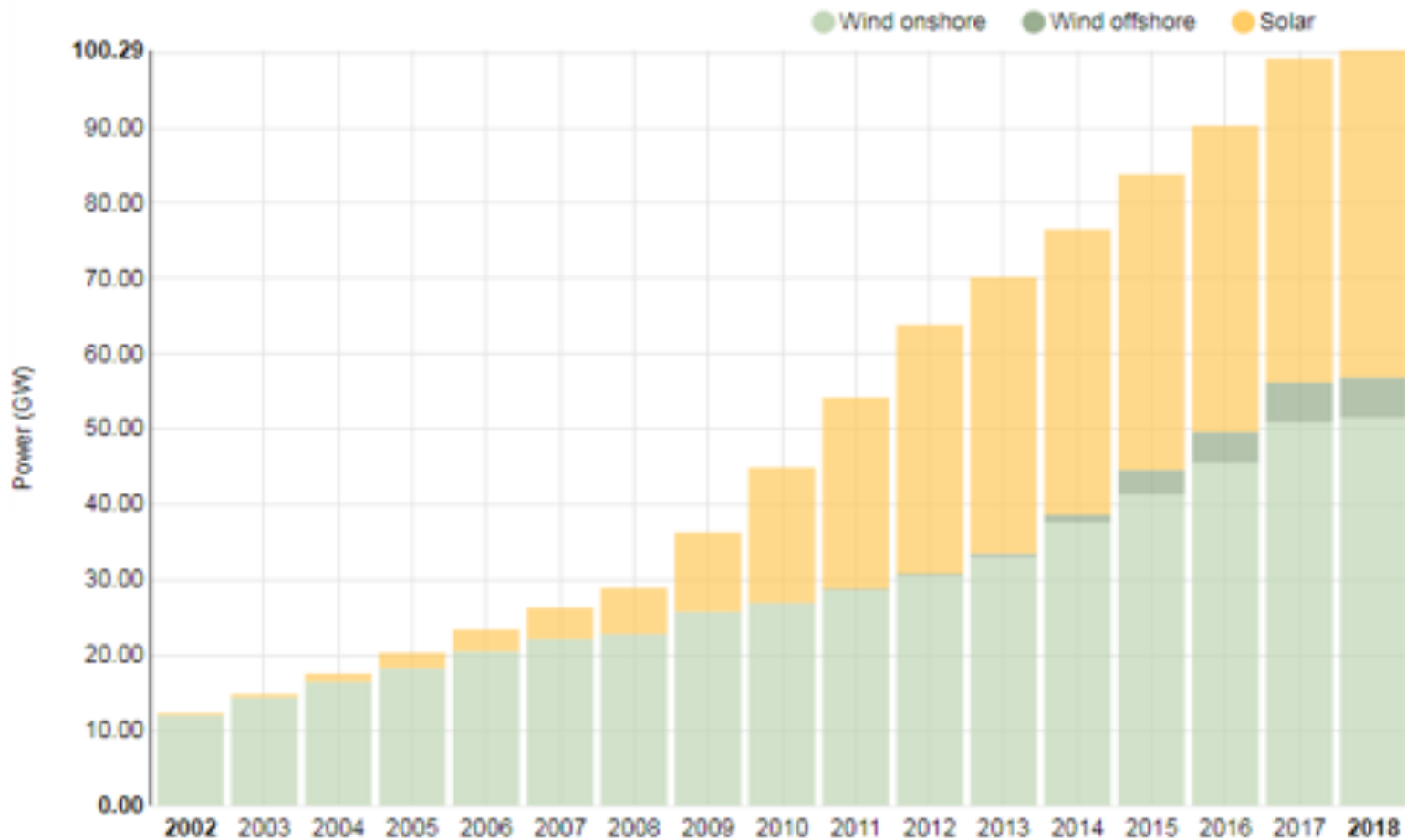
Decentralization and Digitalization in the Energy sector

Conférence CAESARS
EDF Saclay, 06/09/2018

Ways of commercializing power

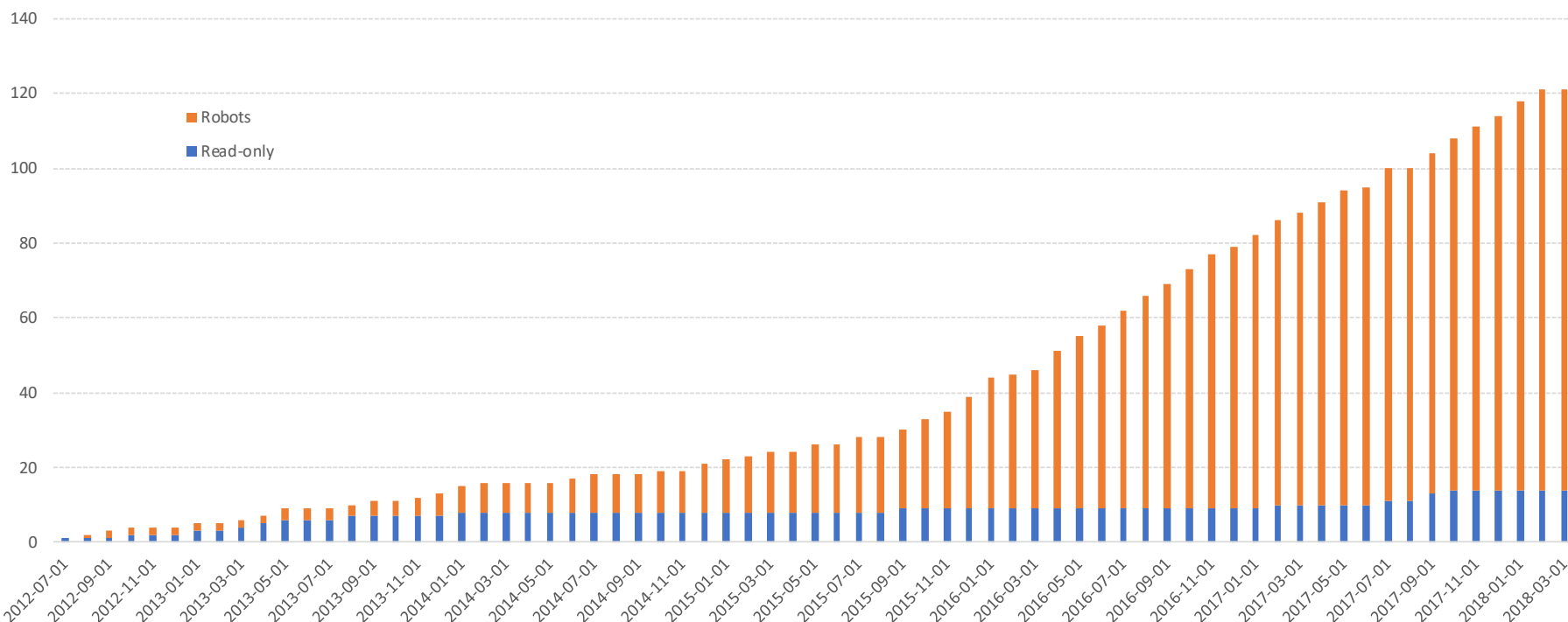


A massive deployment of intermittent RES



Robots/API developments

Number of API connected to EPEX markets



Source: M7 API_Invoicing_ID_Waitinglist Overview: API in production (Feb 18 update)

In 2018, 38% of APIs in production are developed by members themselves and 62% are provided by ISVs

Locational OBKs

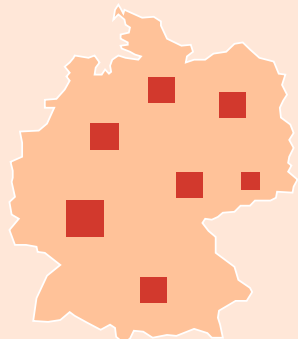
A global market...

EU XBID EPEX		Bid		Ask	
Product	Qty	Price	Price	Price	Qty
DE 03:00	10	32	33	33	25
DE 03:00	3	31	34	34	5
DE 03:00	8	30	35	35	1
DE 03:00	7	29	38	38	4



In parallel with...

Local Market 4		Bid		Ask	
Product	Qty	Price	Price	Price	Qty
DE 03:00 Local 4	10	32	34	34	25
DE 03:00 Local 3	3	31	36	36	5
DE 03:00 Local 2	8	30	37	37	1
DE 03:00 Local 1	7	29	39	39	4



“On-demand” local markets

Main principle:

- ➔ Opening of “on-demand” locational order books on the Intraday continuous market to solve local congestion issues
- ➔ A same volume can be placed on both the global market AND a locational order book

Need to proceed with caution:

- ✓ Local trading certifications delivered by System Operators to market participants
- ✓ “2 C’s rule” ➔ need of Congestion AND Competition to open a locational order book
- ✓ Strict compliance rules for local trading
- ✓ Cooperation between transmission and distribution over locational trading

Open questions:

- Same power volume ⇔ Same price on the 2 markets?
- Possibility to re-sell local volumes?

Presentation of the enera project

The challenge



The enera Project

- The increasing share of installed renewable capacity is creating new challenges for system operators to manage the grid efficiently and economically

- The German ministry of Economic Affairs and Energy is funding the enera project to explore new smart market mechanism to allow for more renewable energies in the future
- The 3 pillars of the project are: Network, Market and Data

A project to experiment a new kind of market to solve growing grid congestions, as an alternative to grid reinforcements (software vs hardware)

Flexibility supply

Flexibility providers:

- Power plants
- Aggregators
- VPPs
- Storage
- Renewables



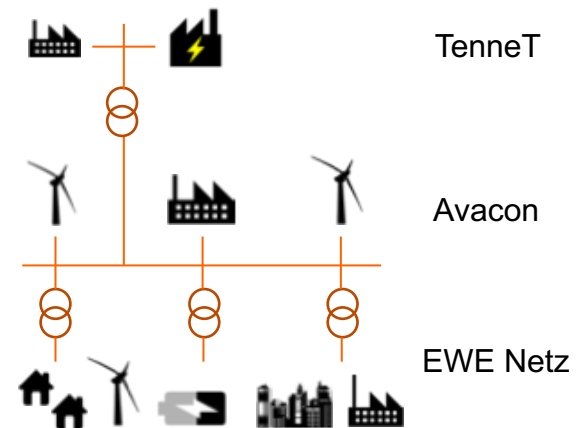
Flexibility market platform



Market-based congestion management

- Trading systems
- Standards
- Transparency
- Coordination
- Neutrality

Flexibility demand from system operators



Connecting the local with the wholesale market

- Connect microgrids with the wholesale market

EPEX and LO3 signed a Memorandum of understanding on 12/12/2017

- The LO3 Exergy platform creates transactions at a local level (registered in a blockchain) and the microgrid trades "the net" with the wholesale market via the trading system API: value surpluses

- This will open up local players in the microgrid to market opportunities (more liquidity and reaction to price signals) and will allow optimization of social welfare to local / global levels

Microgrid pilot projects in Europe (e.g. Landau in Germany).

Step 2: Connect microgrids with local markets (eg, the ENERA project) from 2019

