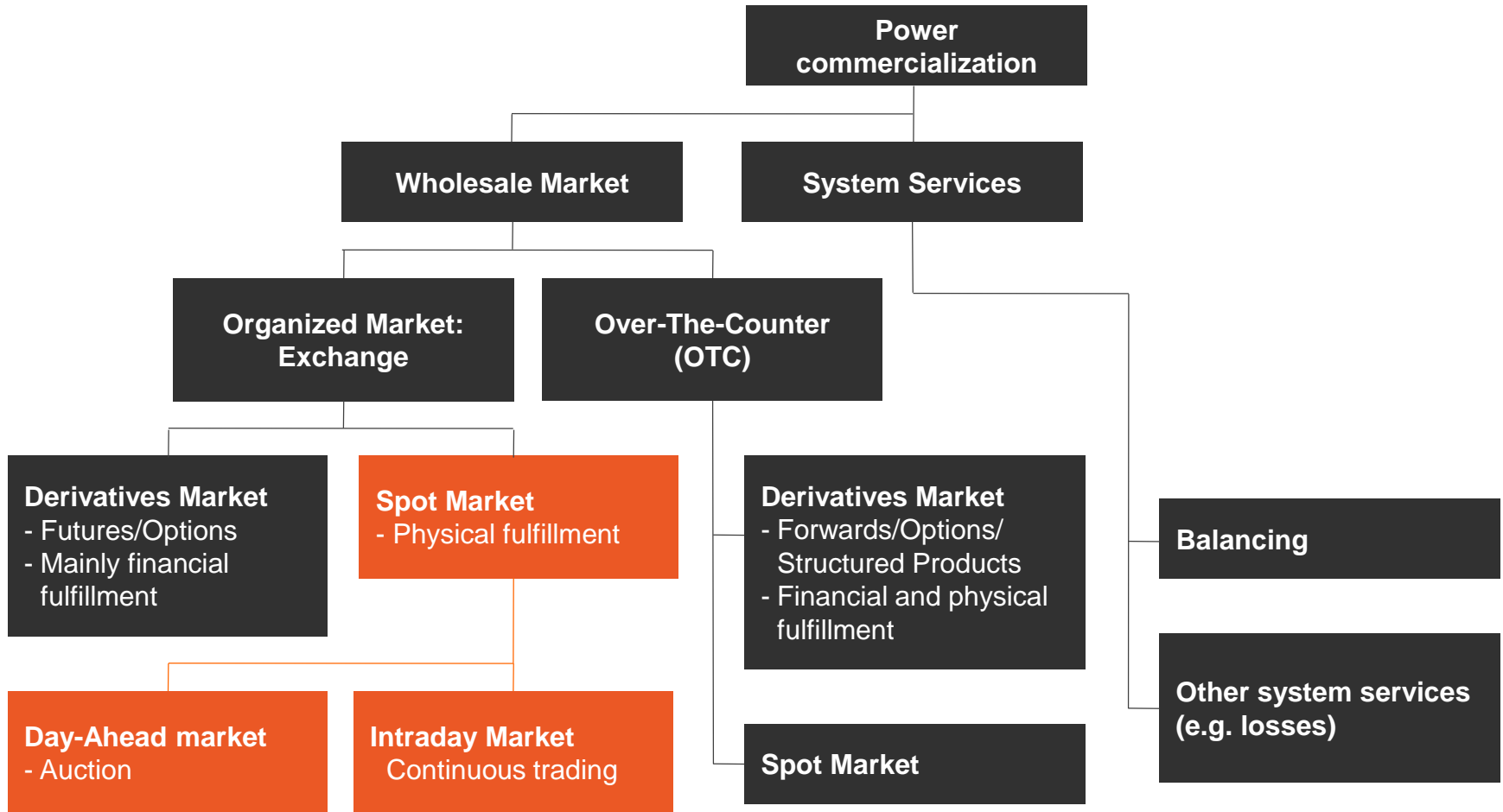


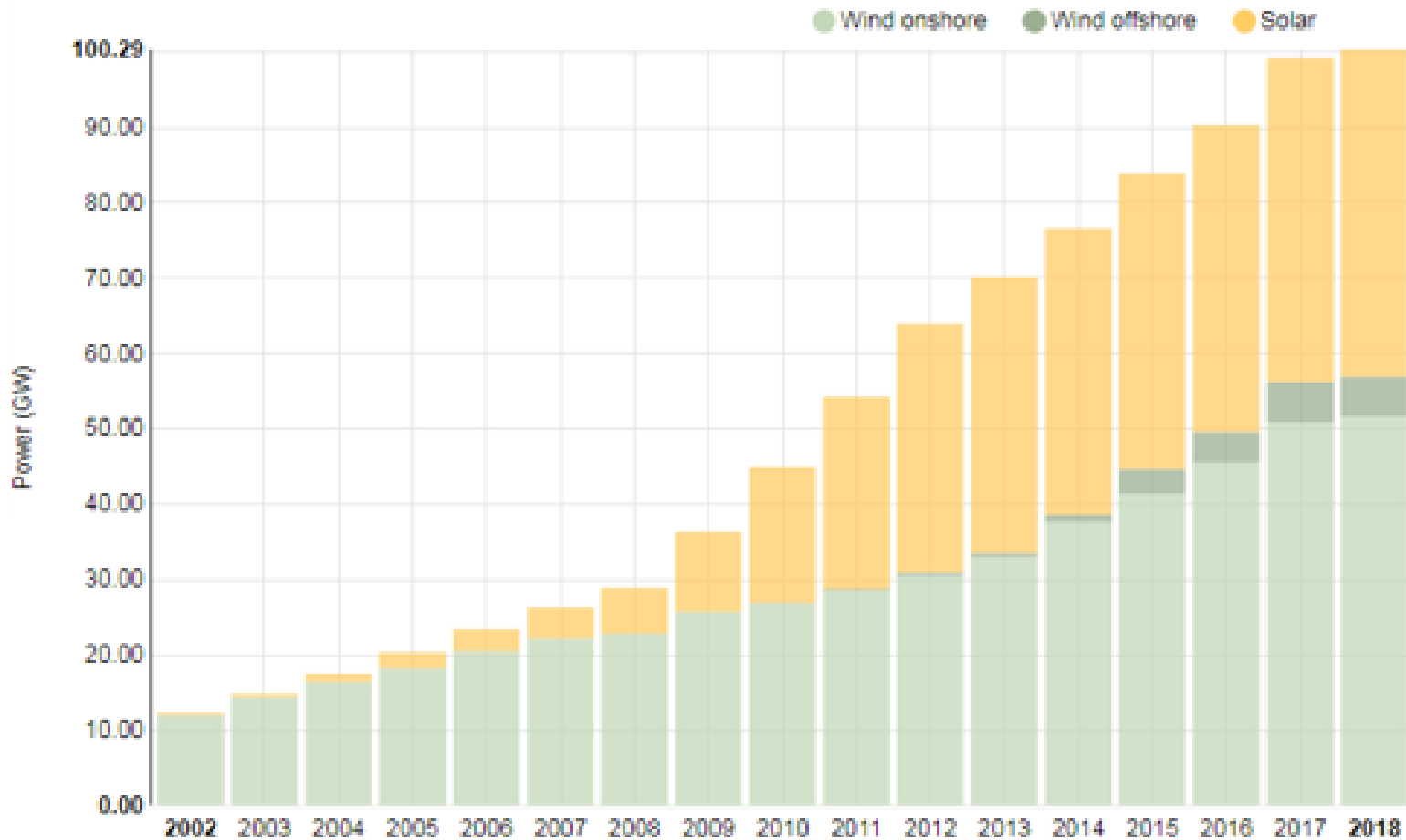
Local flexibility Markets

Conférence OFATE
Dauphine, 27/09/2018

Ways of commercializing power



A massive deployment of intermittent RES



The main objectives

The concept in a few words:

Implementation of a market-based congestion management platform efficiently centralizing local flexibility offers to allow System Operators to reliably and economically relieve physical congestions and bottlenecks from the grid.

A clear and transparent market mechanism

- **Clear and transparent market rules** for actors participating in the market-based congestion management
 - Asset Certification by the SOs, Verification of the physical impact, Strict Compliance
- Definition as an addition to all existing wholesale markets to solve specific local issues.

Development of distributed flexibility

- **Unveil the potential of distributed flexibility**
 - Provide transparent locational flexibility prices and foster the development of distributed flexibility (demand-side management, renewables, aggregators, batteries...).
- The platform can become **the short-term activation mechanism of long-term local flexibility contracts** if there are any, but also **be open to any other flexibility provider**.

Coordination between System Operators

- **Clear guidelines and communication protocols to increase and develop the cooperation between TSOs and DSOs**. It is a key element to reach optimality in the congestion management solution and avoid inefficiencies.
- **EPEX SPOT is a neutral and objective third party** that will be able to efficiently run the platform, adapt to current System Operator processes and Grid management rules, and ensure compatibility with the current European zonal markets

High-level perspective

The current power system is expected to be **facing significant challenges in the future**, regarding the integration of much more decentralized intermittent energy resources.

- How to make the power system more efficient and able to deal with foreseen challenges?

Current wholesale market

- Considering very large price zones
- Intra-zonal grid topology not considered at the moment (study on zone splitting carried out by Entso-e)

Future challenges

- Adapt the power system to the integration of much more decentralized intermittent energy (wind and solar power)
 - Find a way to handle congestions

New technologies

- The development of new technologies (Internet of Energy, smart grids, demand response, blockchain, smart metering, etc.) has the potential to meet our future challenges.

New paradigm for the future power system

- Design a new way of functioning for the power system that will overcome the foreseen challenges
- The use of new technologies will need to be integrated and organized such that the whole system remains efficient

Key design elements

The experience from many workshops and discussions around the topic of Local Flexibility markets helped us to understand the following key aspects:

- **Clear definition of roles and responsibilities:** TSOs – DSOs – Market Operator – Flexibility Providers
- **2 C's rule - Congestion & Competition:** there is a need to have a problem to solve (Congestion) and sufficient amount of Competition for a market-based solution to be efficient.
- **Certification:** the assets that can bid in the locational order books are assets that have been certified by a System Operator.
- **Physical impact need and verification:** when a flexibility is activated in the Local Flex Market, it must deliver **a physical impact at a given point of the grid**. This impact can be verified by a System Operator ex-post.
- **Who can trade?**
 - Step 1: Trades possible only between System operators and Flexibility Providers
 - Step 2 (to be assessed): Secondary market with trades possible between Flex Providers
- **How to maintain global control area balance?**
 - Option A: the flexibility provider to rebalance its perimeter on its own
 - Option B: the System Operator needs to balance the second leg
 - Option C: quote spread products directly between different locations in the grid

Locational OBKs

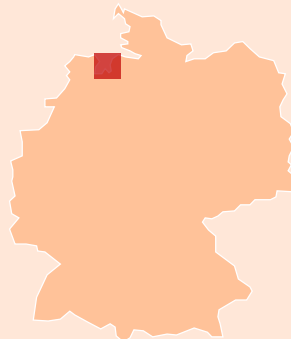
A global market...

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



In parallel with...

| Local Market 4 | Bid | | Ask | |
|------------------|-----|-------|-------|-----|
| Product | Qty | Price | Price | Qty |
| DE 03:00 Local 4 | 10 | 32 | 33 | 25 |
| DE 03:00 Local 3 | 3 | 31 | 34 | 5 |
| DE 03:00 Local 2 | 8 | 30 | 35 | 1 |
| DE 03:00 Local 1 | 7 | 29 | 38 | 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



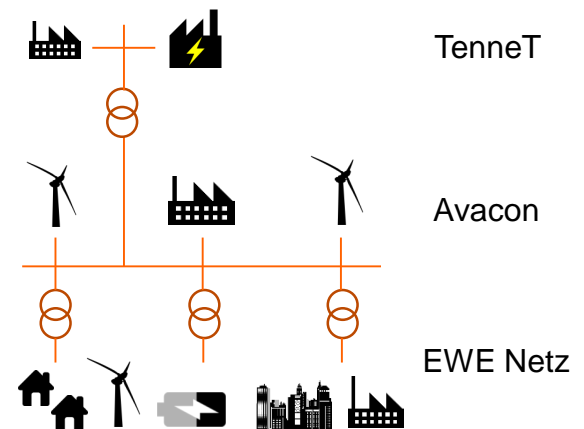
Flexibility market platform



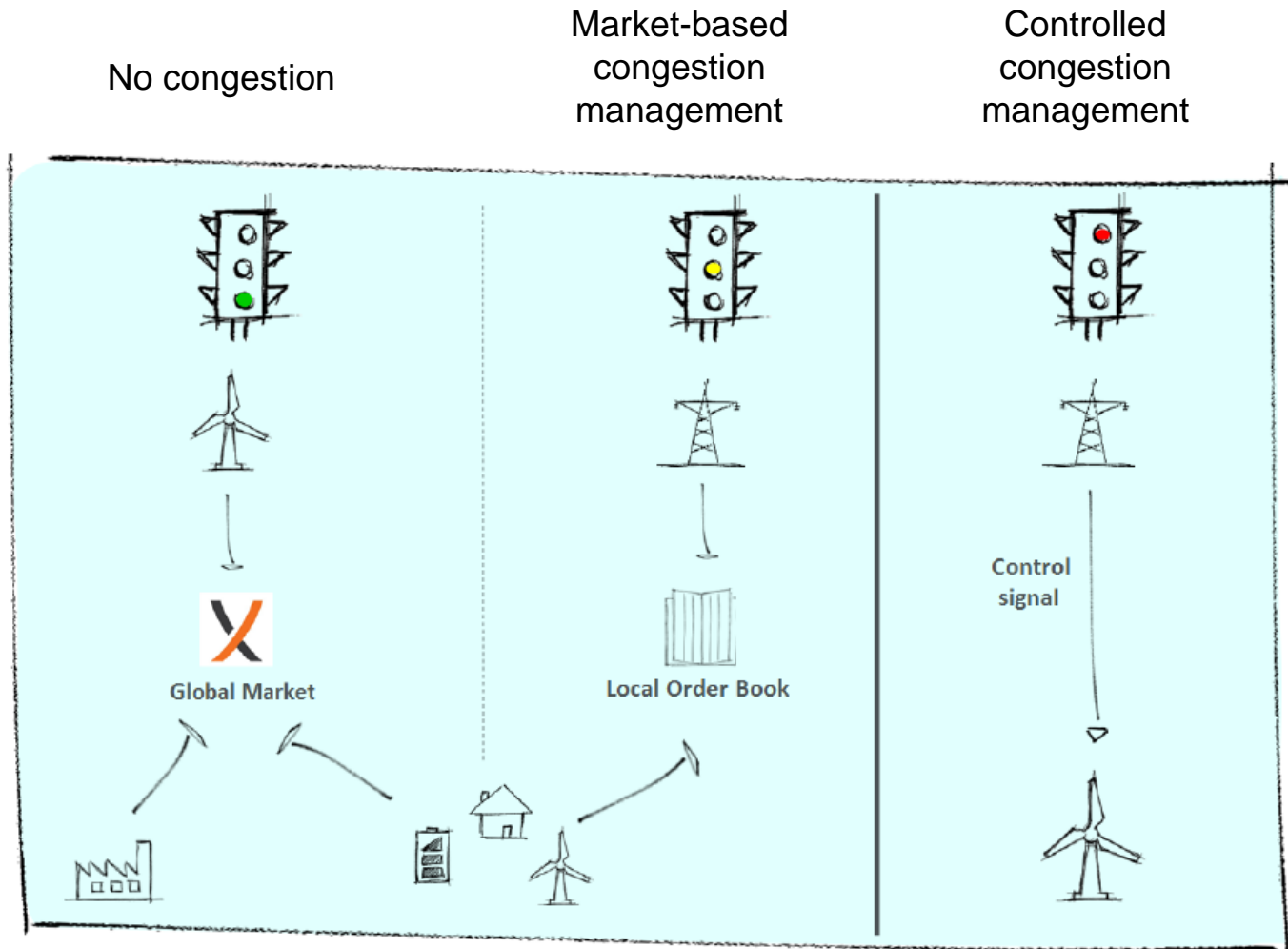
Market-based congestion management

- Trading systems
- Standards
- Transparency
- Coordination
- Neutrality

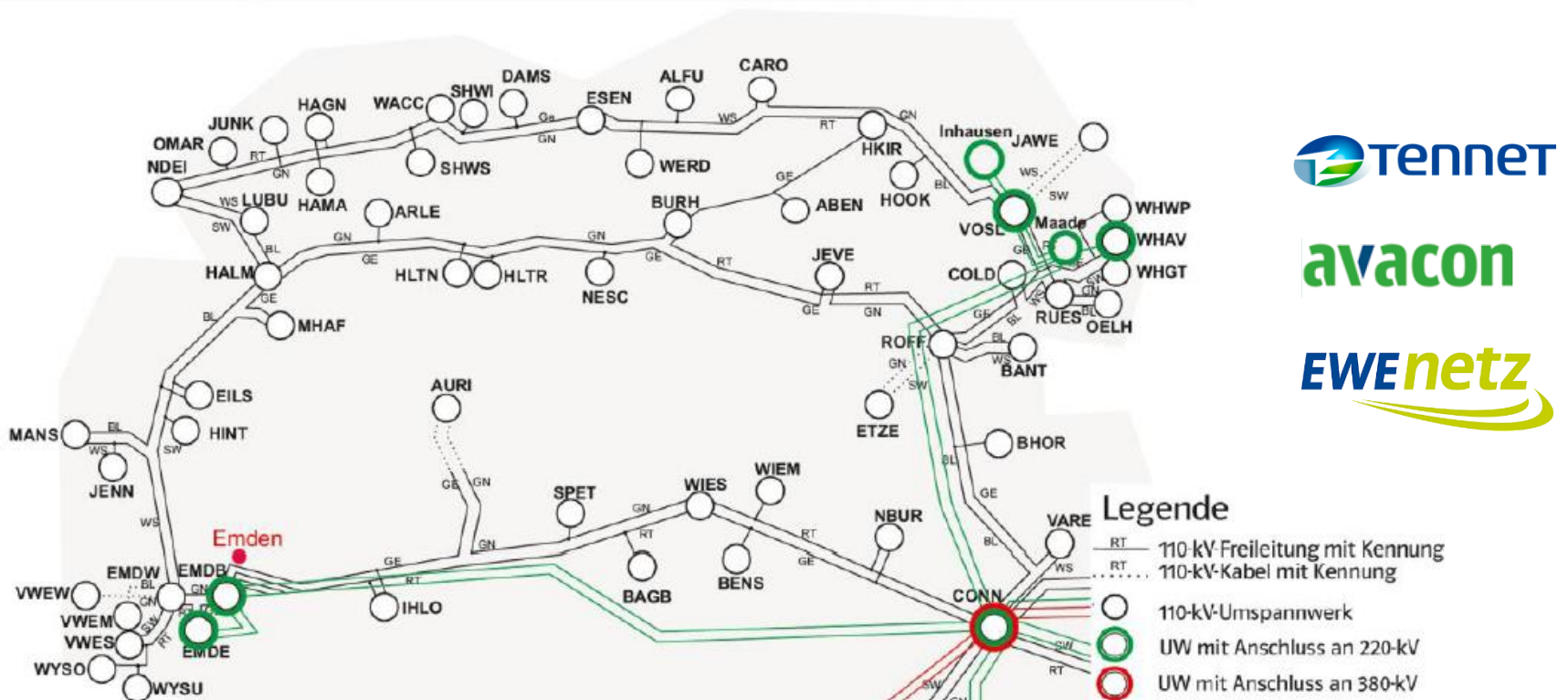
Flexibility demand from system operators



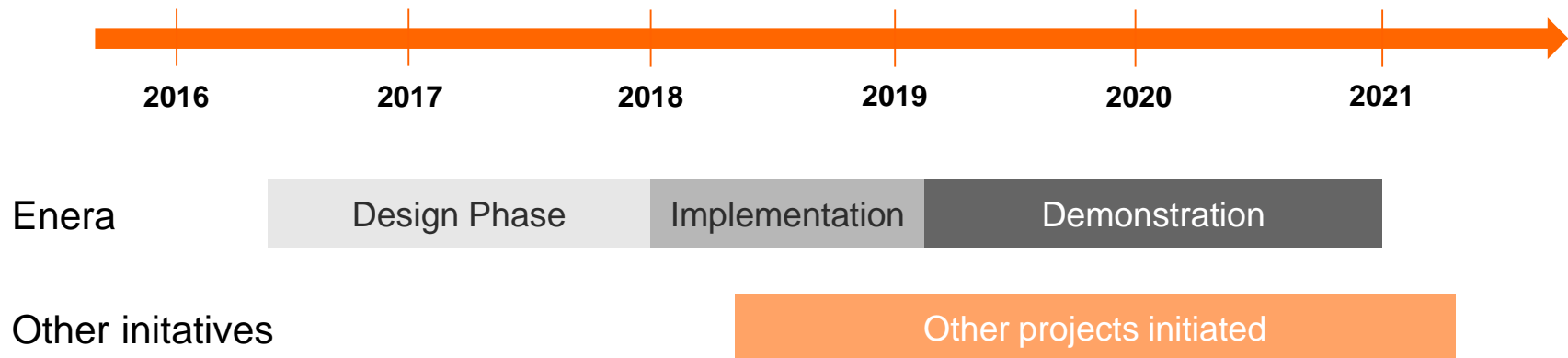
The process



Physical grid bottlenecks appear in the region on three SO grids



EPEX Spot in Project Mode



EPEX SPOT is designing the solutions to **address power system challenges** by:

- congestion management;
- enhancing the current design of liquid and large bidding zones.

This will create **new opportunities** for:

- the members to value their flexibility;
- for system operators to avoid too costly grid expansion.

➔ The design can serve as a **blueprint for a much larger implementation.**