Flexibility market development in Baltic States

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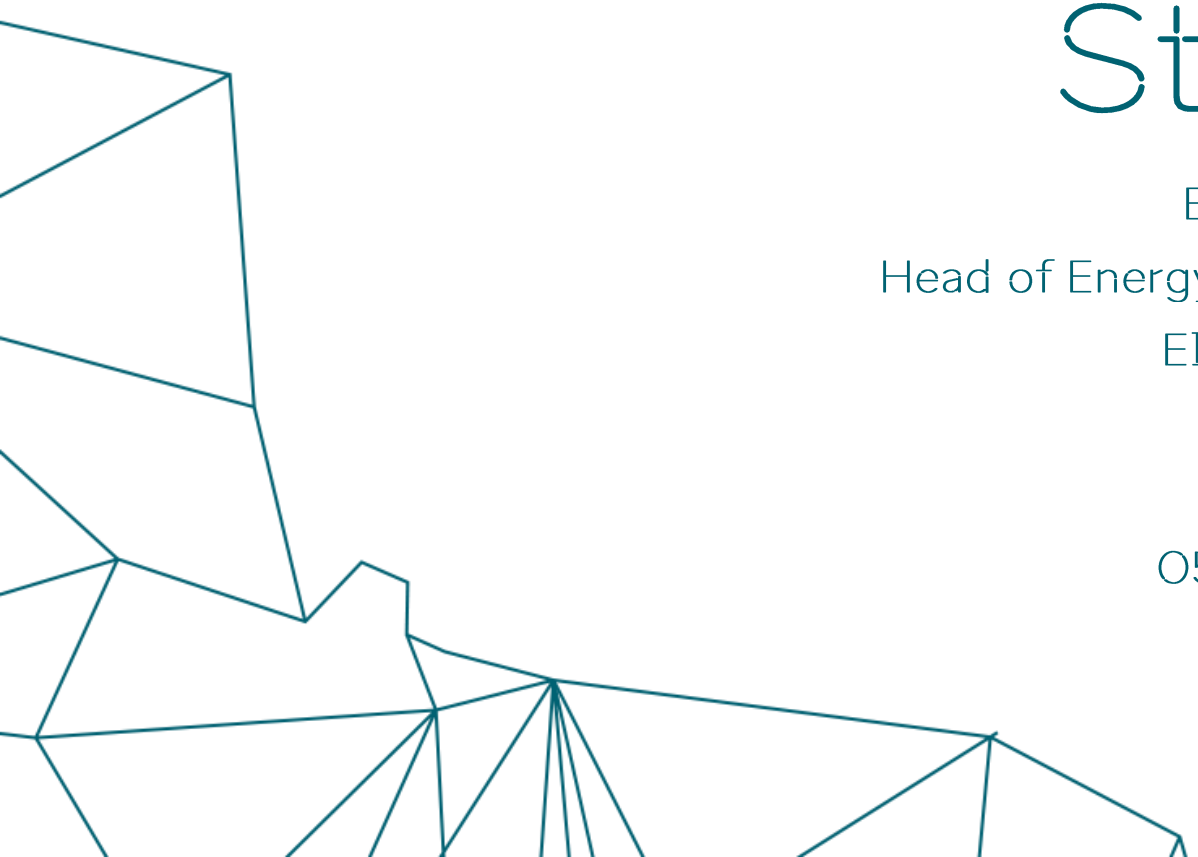


Elering in Brief

Elering is managing Estonian electricity and gas transmission systems with purpose to ensure high-quality energy supply to Estonian consumers at every moment.

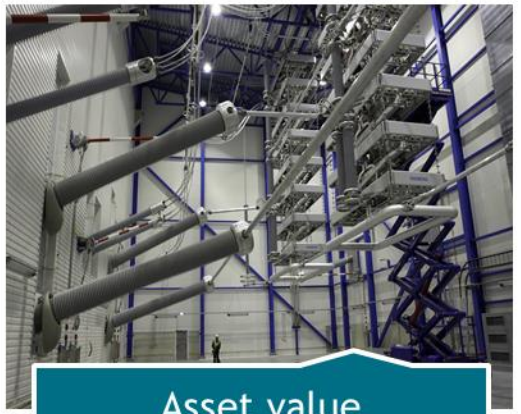
110-330 kV lines, connections with Finland, Latvia and Russia

Natural gas transmission network

Emergency reserve power plants and ca 150 substations

Eurobond listed on London Stock Exchange, Moody's A2/stable

230 employees

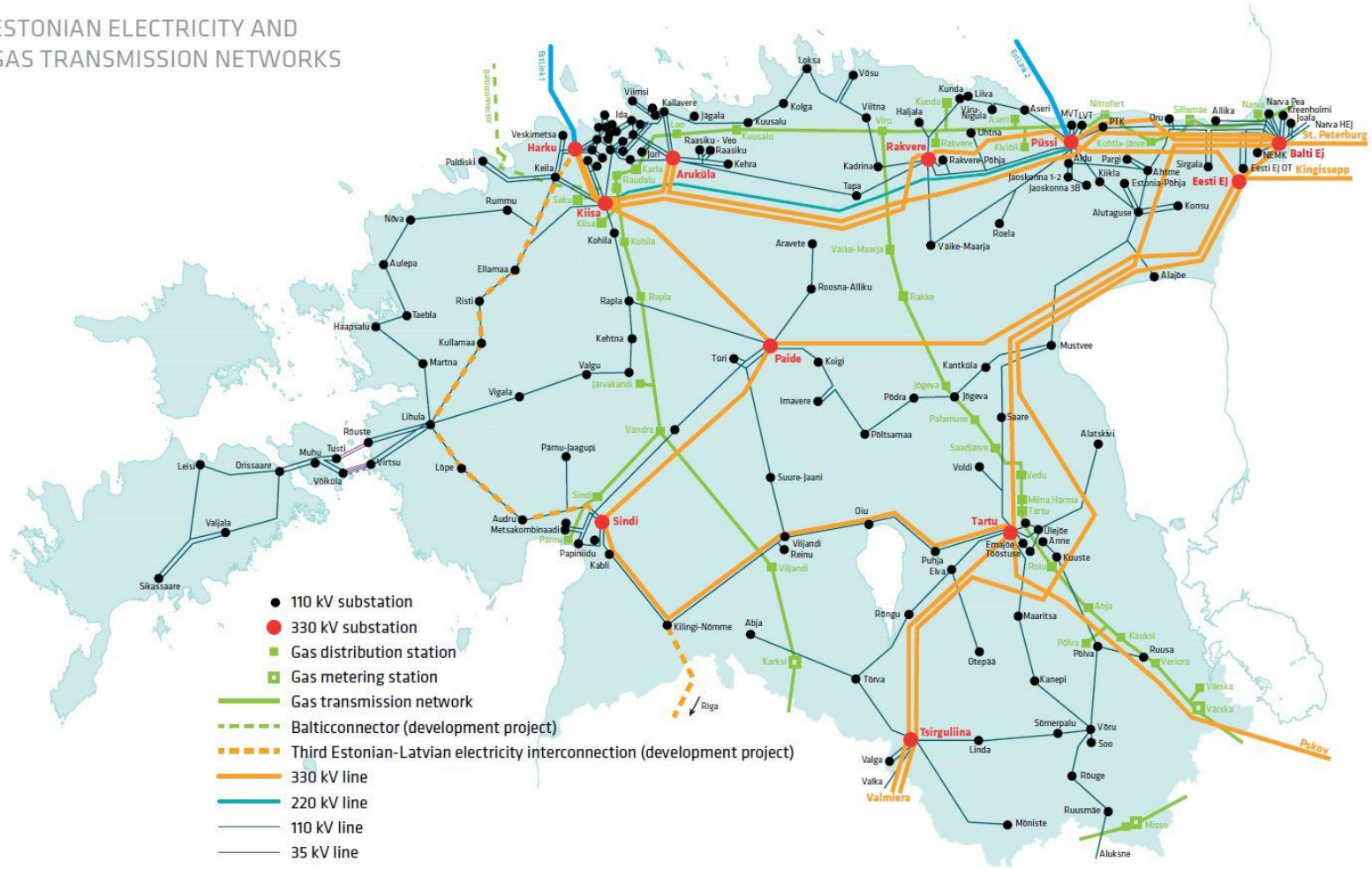


Asset value ca MEUR 900

Transmission Networks

Electricity transmission network consists of over 5500 km lines and near 150 substations. Natural gas transmission network consists of ca 900 km gas pipelines and 39 gas metering and distribution stations.

ESTONIAN ELECTRICITY AND
GAS TRANSMISSION NETWORKS



Interconnections in Baltic region

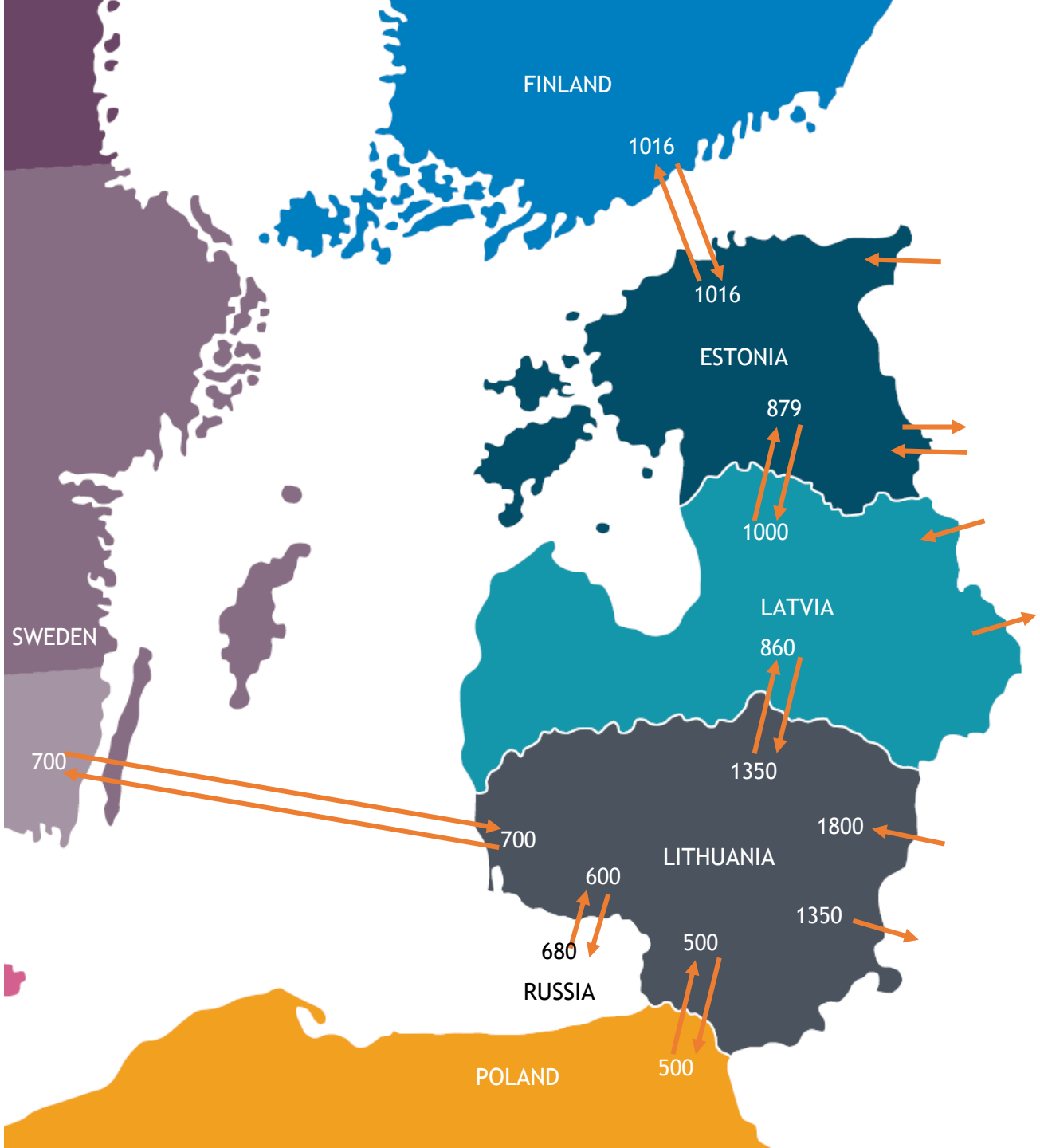
Connection to Nordics and Europe:

2006 Estlink 1 (EE-FI) – 358 MW

2014 Estlink 2 (EE-FI) – 658 MW

2016 NordBalt (LT-SE4) – 700 MW

2016 LitPol (LT-PN) – 500 MW



Energy transition

Active customers

Decentralized renewables*

Storage

Demand response

Aggregators

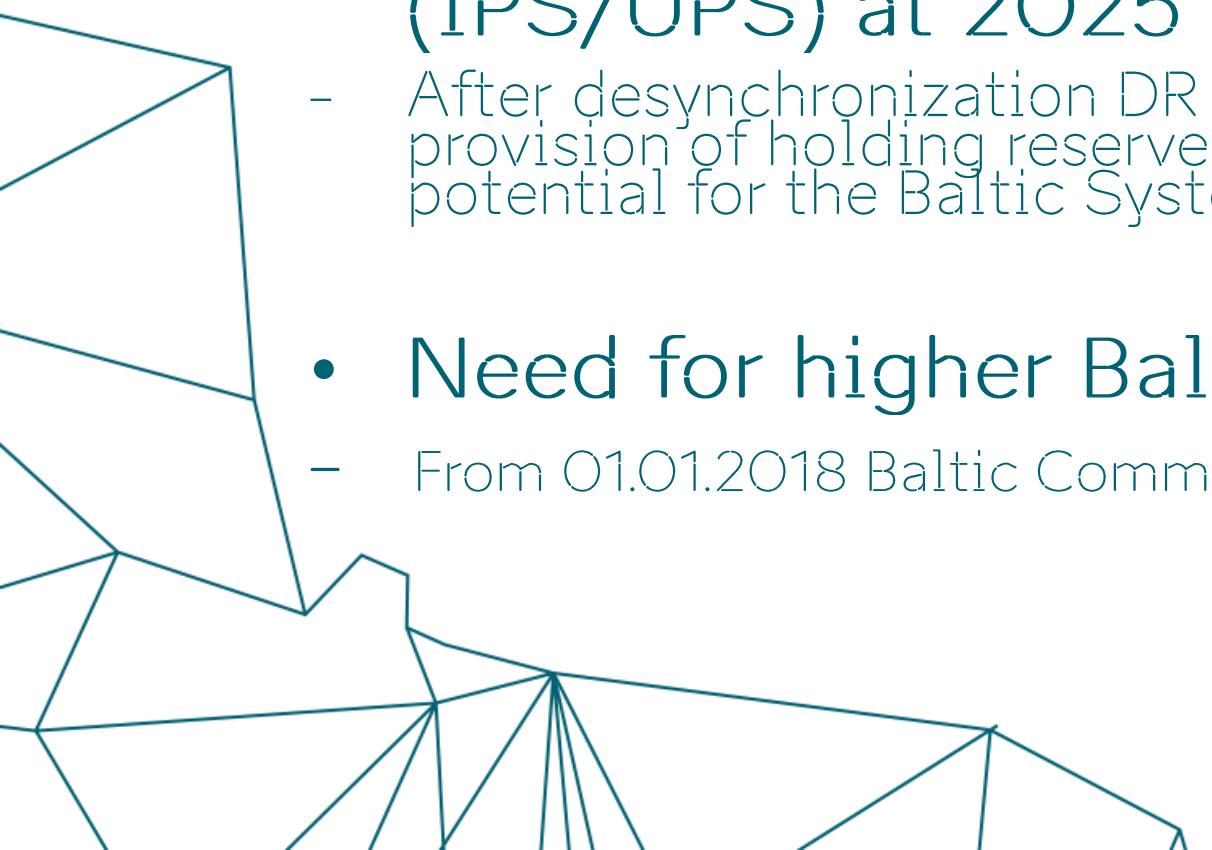
Distributed flexibility

*Installed capacity of wind & solar is almost 1000 MW in Baltics

Baltic specific needs

- **Desynchornization of Baltic electricity grids from the integrated Unified Power System (IPS/UPS) at 2025**
  - After desynchronization DR could play an important role in the provision of holding reserve and deliver significant cost saving potential for the Baltic System

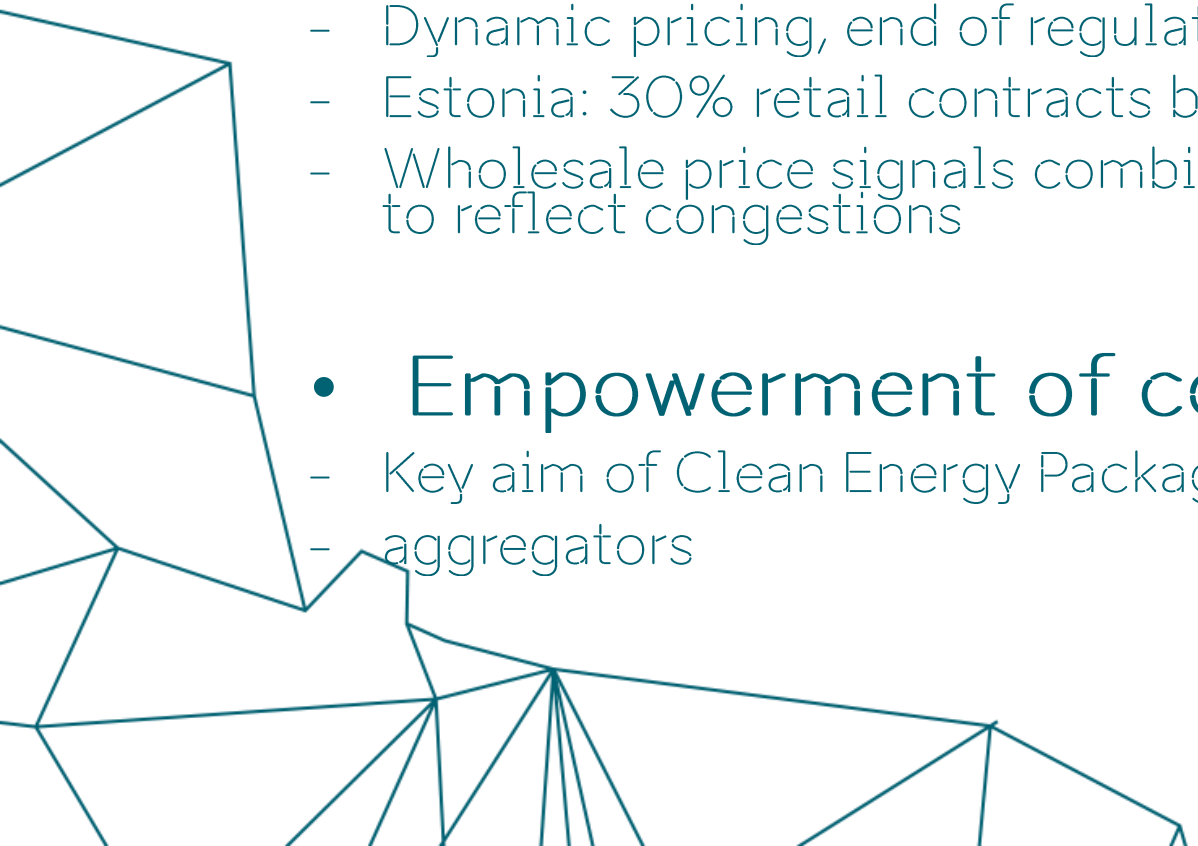
- **Need for higher Balancing market liquidity**
  - From 01.01.2018 Baltic Common Balancing market is active



Open regulatory questions of IEM

- **Coordination of wholesale and retail markets**
  - All timeframes: day ahead, intraday, balancing, ancillary services markets
  - Dynamic pricing, end of regulated prices
  - Estonia: 30% retail contracts based on exchange price
  - Wholesale price signals combined with dynamic pricing signals from DSOs to reflect congestions

- **Empowerment of consumers of all sized**
  - Key aim of Clean Energy Package (CEP)
  - aggregators



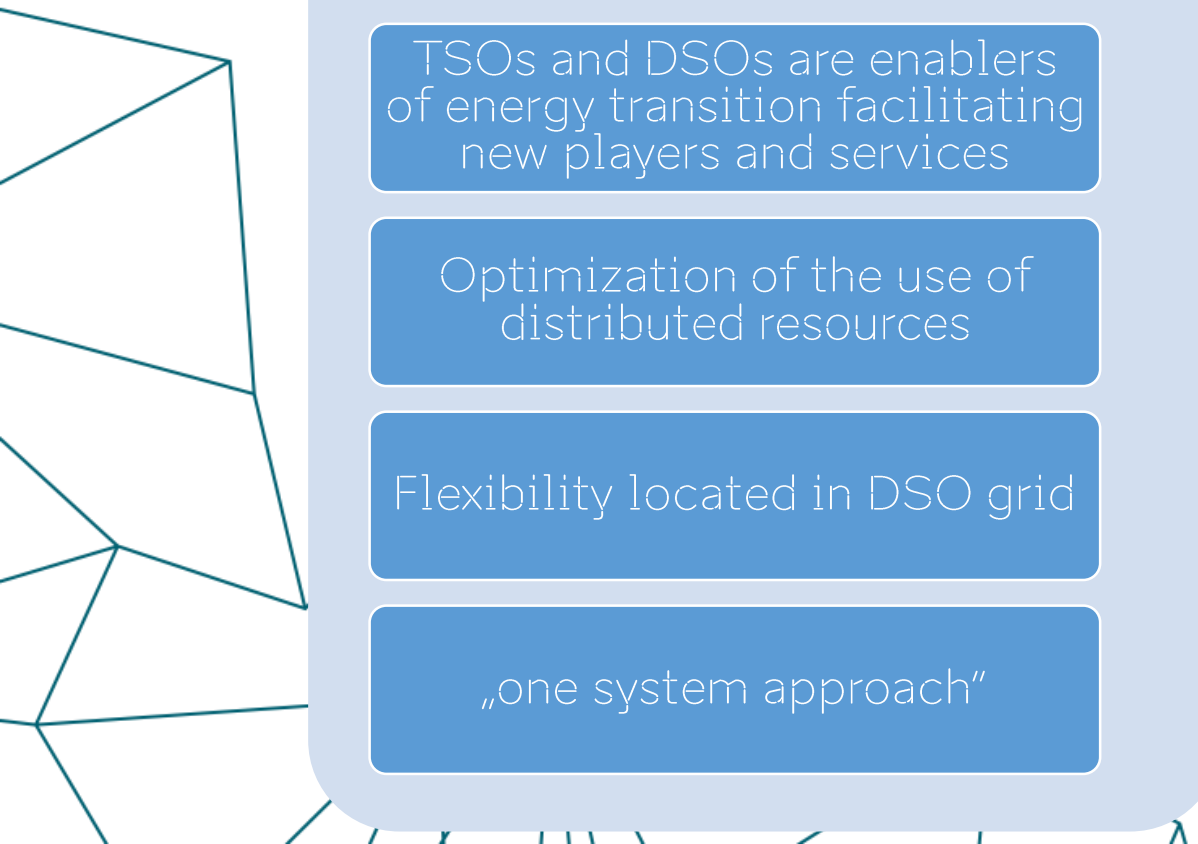
Key drivers for active system management

TSO-DSO cooperation

- TSOs and DSOs are enablers of energy transition facilitating new players and services
- Optimization of the use of distributed resources
- Flexibility located in DSO grid
- „one system approach"

Digitalization

- Free cross border data movement
- Empowering end-users to become active
- TSO as provider of the data grid
- Estonia: 100% smart meters from 2017



Vision on TSO-DSO cooperation

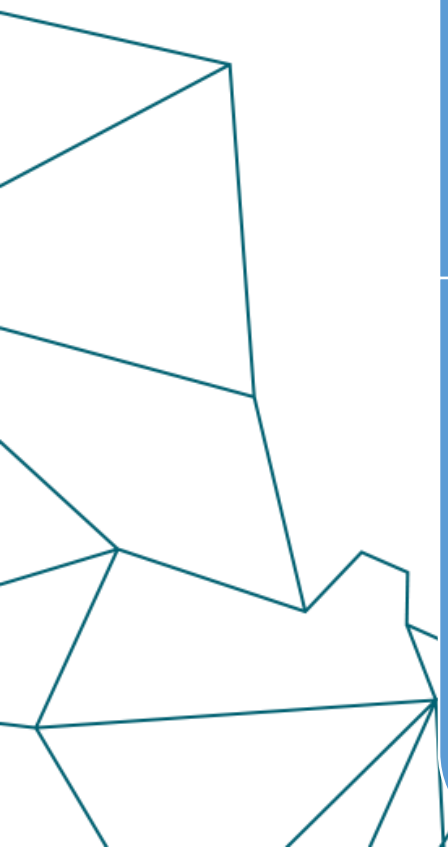
Creating a channel between distributed energy, TSO/DSO grids and wholesale markets

Coordinated usage of flexibility by TSOs, DSOs at critical times, which lowers the cost of secure grid operations

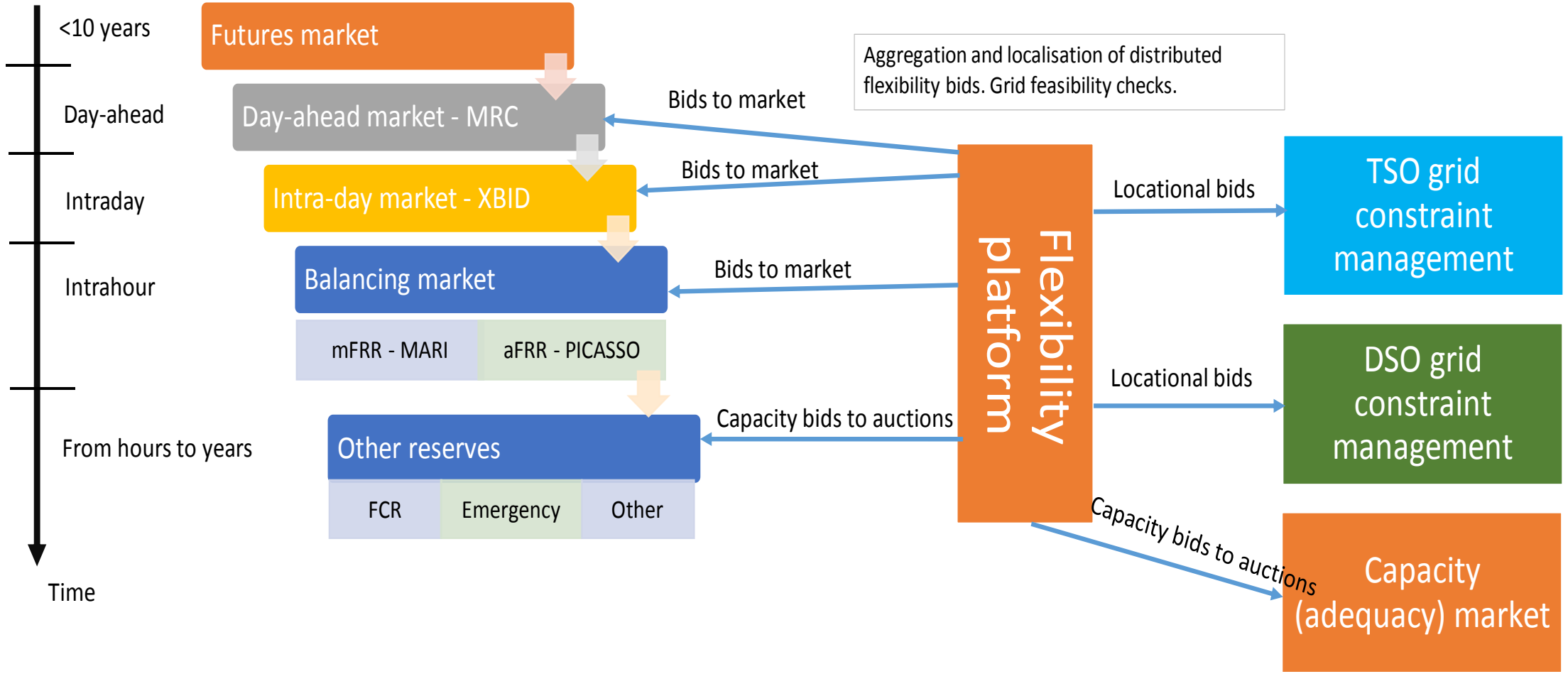
Regional single flexibility platform

The most optimal usage of flexibility, locational awareness and price signals

Enabling consumer demand to participate in wholesale markets, increased liquidity in balancing market



A channel between distributed energy, TSO/DSO grids and wholesale markets



Coordinated usage of flexibility by TSOs, DSOs at critical times, which lowers the cost of secure grid operations

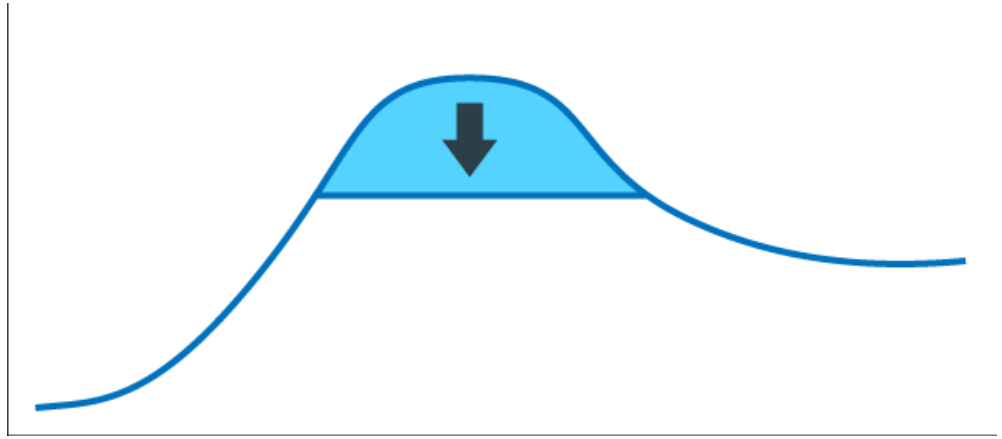
- Not new for TSOs as SO GL foresees for SO-s the rights to put restrictions on Balancing bids, in order to avoid security issues on their grid
- Similarly the platform design should allow to set limitations or activate flexibility for congestions if needed
- The solution is to add locational information to bids
- Activation of bid in one process shouldn't impact negatively the other process
- No double activation of bids

The most optimal usage of flexibility, locational awareness and price signals

- Activation of resources regardless of grid connection level
- Valuation of resources according to stakeholder's needs to achieve optimum resource usage – market based incentives with clear procedures for pricing
- Bid prices to reflect true marginal flexibility value

Enabling consumer demand to participate in wholesale markets, increased liquidity in balancing market

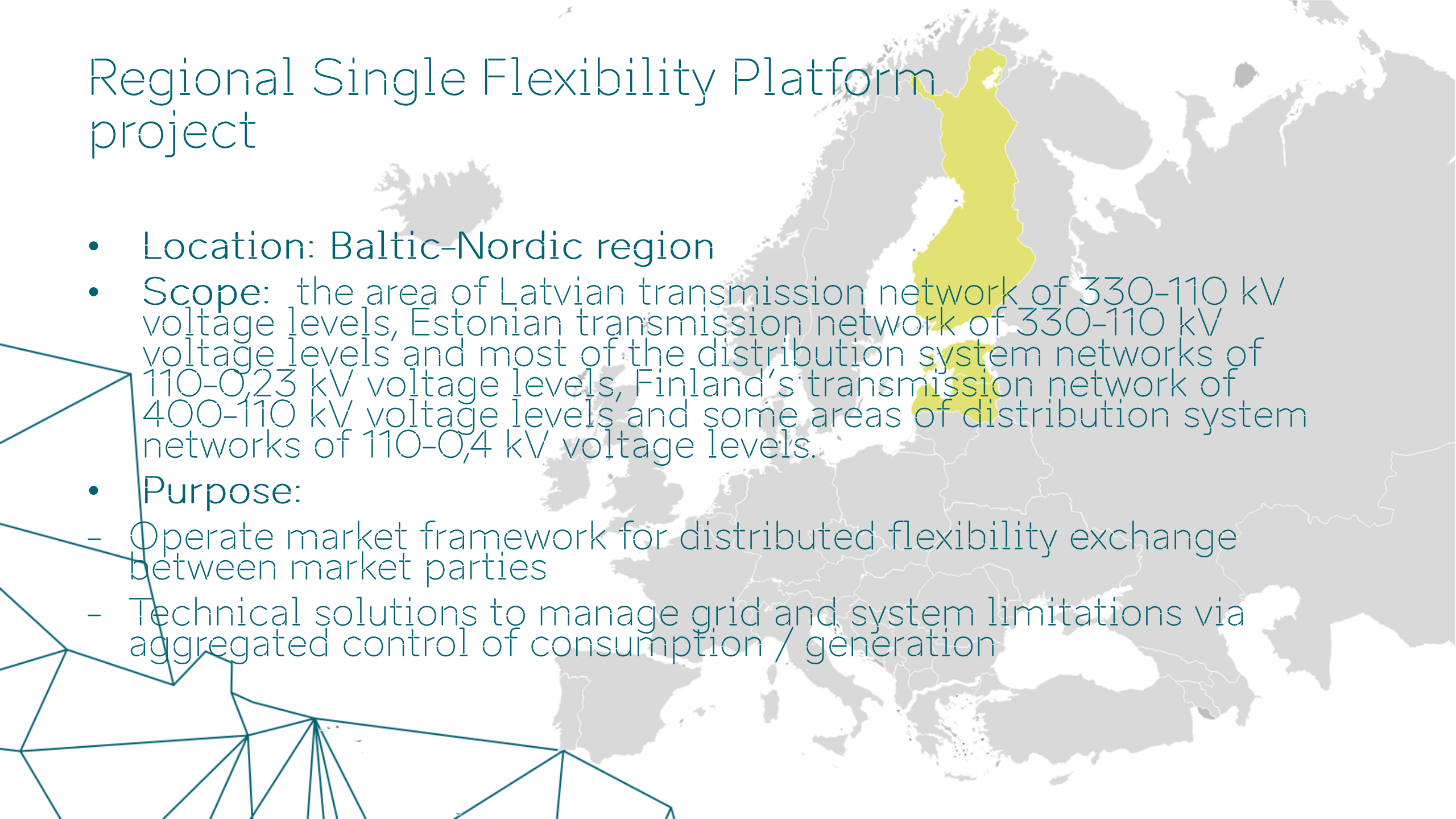
- Liquidity is key success factor
- Common bid submission process should fulfill both TSO and DSO network needs
- Participation in all markets
- Aggregation functionalities
- Level playing field for different service providers



Opportunities and challenges

- Clear trend towards a need for such coordination of usage of flexibility
- Support by EU and other related parties to use the distributed flexiblity
- Smart grid developments
- At the same time the change in electricity system is slow paced
- Data security and access need to be managed

Regional Single Flexibility Platform project



- Location: Baltic-Nordic region
- Scope: the area of Latvian transmission network of 330-110 kV voltage levels, Estonian transmission network of 330-110 kV voltage levels and most of the distribution system networks of 110-0,23 kV voltage levels, Finland's transmission network of 400-110 kV voltage levels and some areas of distribution system networks of 110-0,4 kV voltage levels.
- Purpose:

- Operate market framework for distributed flexibility exchange between market parties
- Technical solutions to manage grid and system limitations via aggregated control of consumption / generation

Use cases

Congestion management

- Distributed resources increase both the congestion and remedies
- TSOs and DSOs responsibility
- Necessary data to manage bid activations in respect of congestions

Frequency / balance management

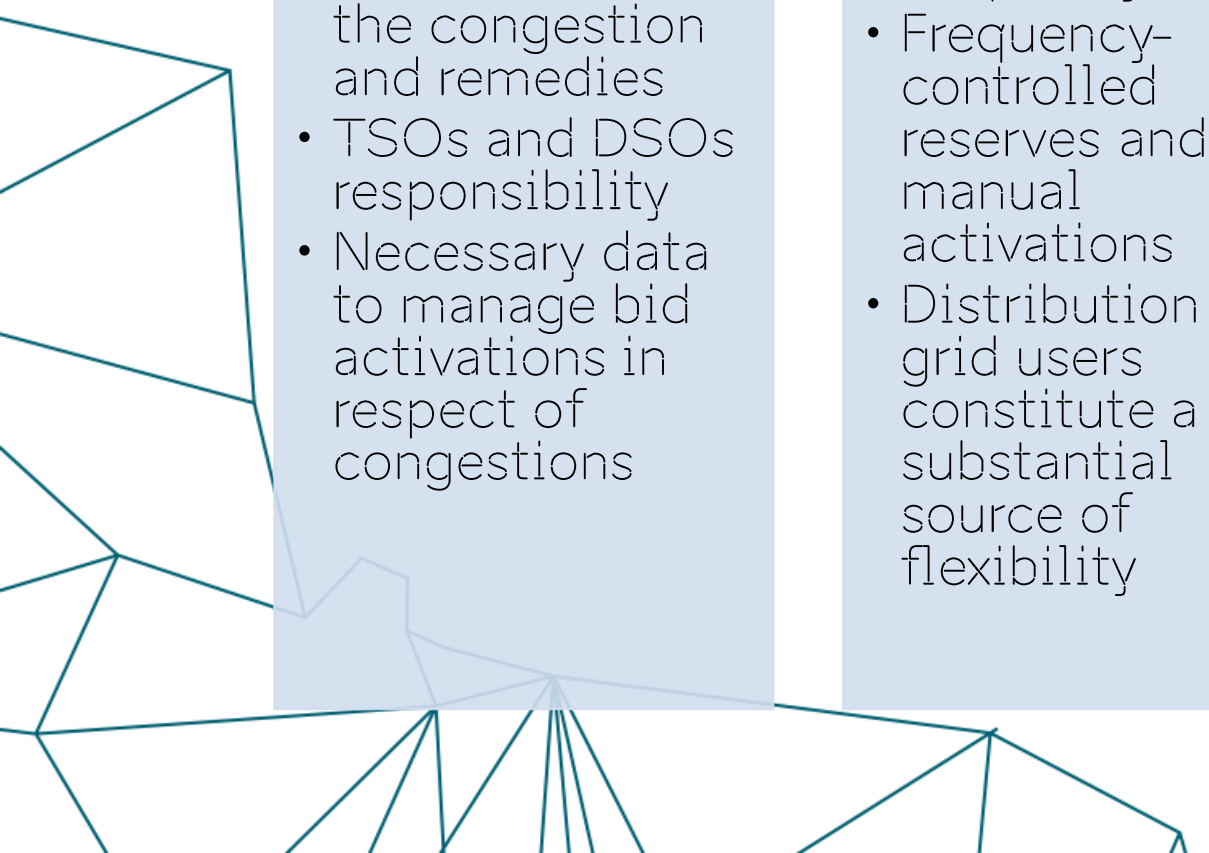
- TSOs maintain power system frequency
- Frequency-controlled reserves and manual activations
- Distribution grid users constitute a substantial source of flexibility

Flexible grid connections

- Peak might only happen in few hours per year
- New connection is checked against peak for planning grid reinforcements
- Network users financial contribution needed or…
- …prosumer agrees to be flexible

Trading between interested market players

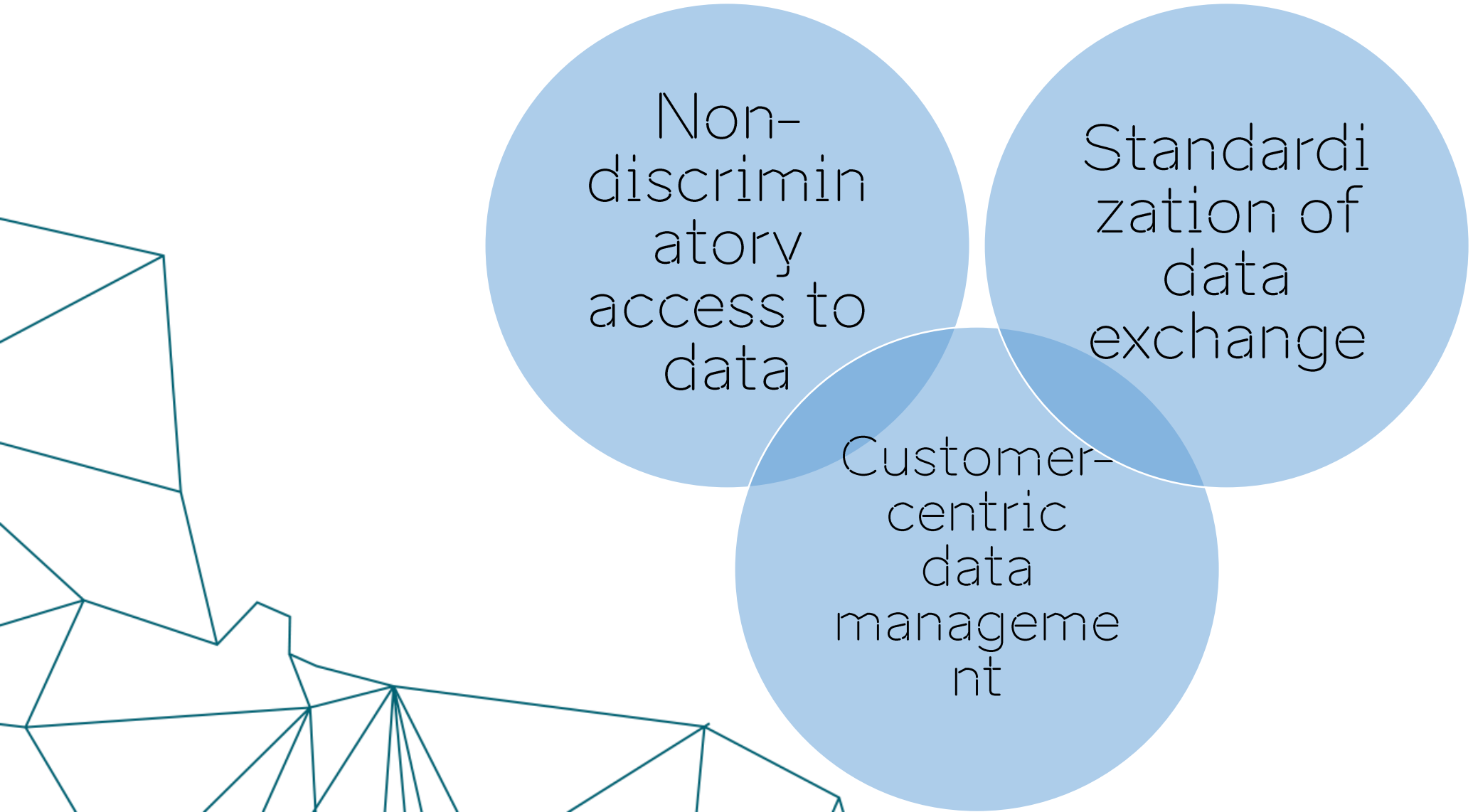
- Flexibility can be traded between market participants



Project risks

- Not enough flexibility offers
- No practical experience with this concept and
- Challenging ITC requirements
- …

Approach on digitalization to support TSO-DSO cooperation



Thank You!

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