The Electric Power System

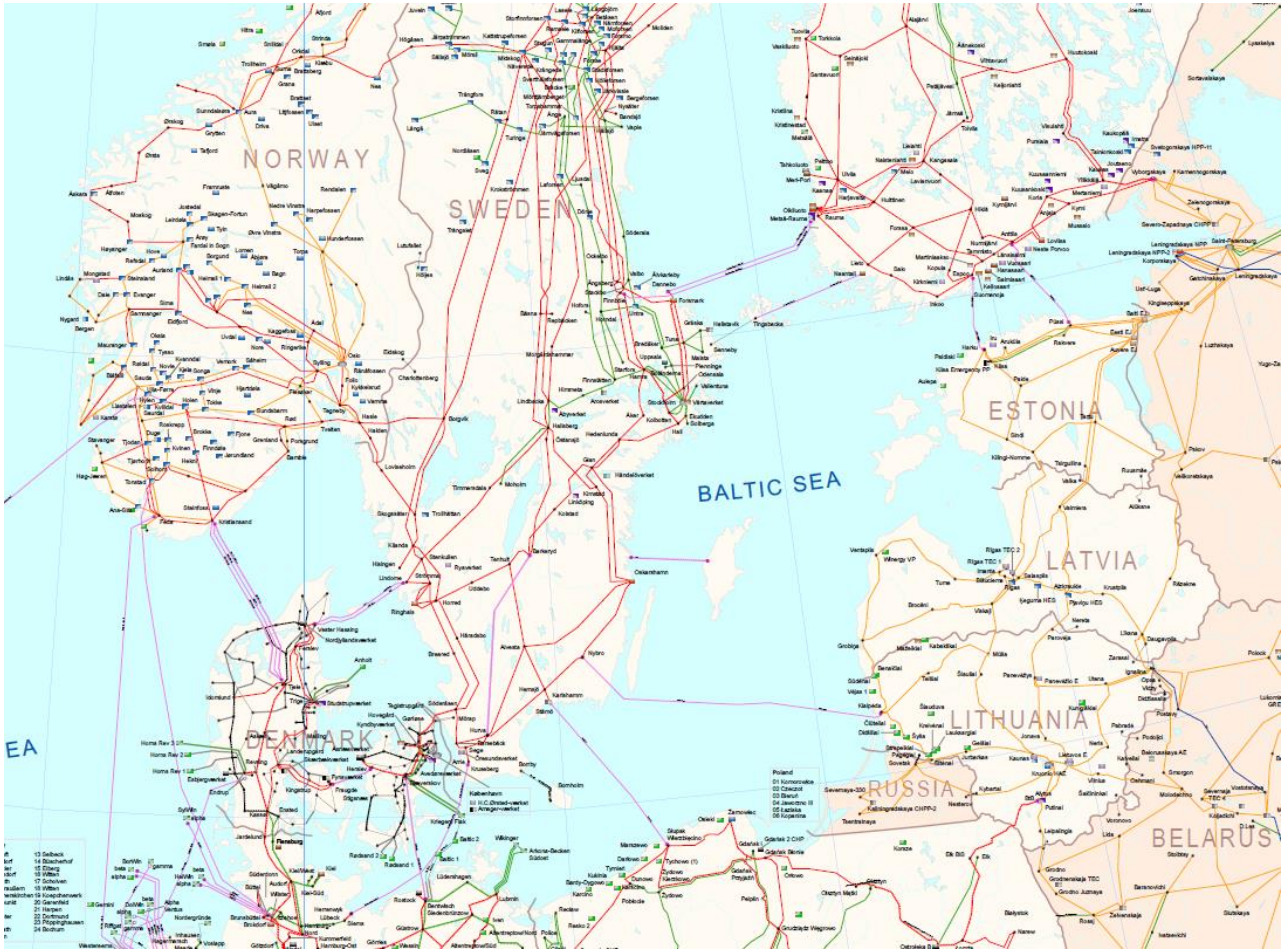
- Estonia -

Basic facts

- Area: 45 339 km^2
- Population: 1 319 133 as of January 2018 (source: Statistikaamet)
- Number of electricity consumers: 563 000 as of June 2014 (source: Elering AS)
- Number of TSOs: 1
- Number of DSOs: 27
- Peak load: 1 587 MW (source: Elering AS)
- Average interruption of electricity: 105 min (SAIDI in biggest DSO's network in 2017; source: Elektrilevi OÜ)

Global map of the grid and of its interconnections

- Interconnectors with:
  - Finland (HVDC)
  - Russia
  - Latvia



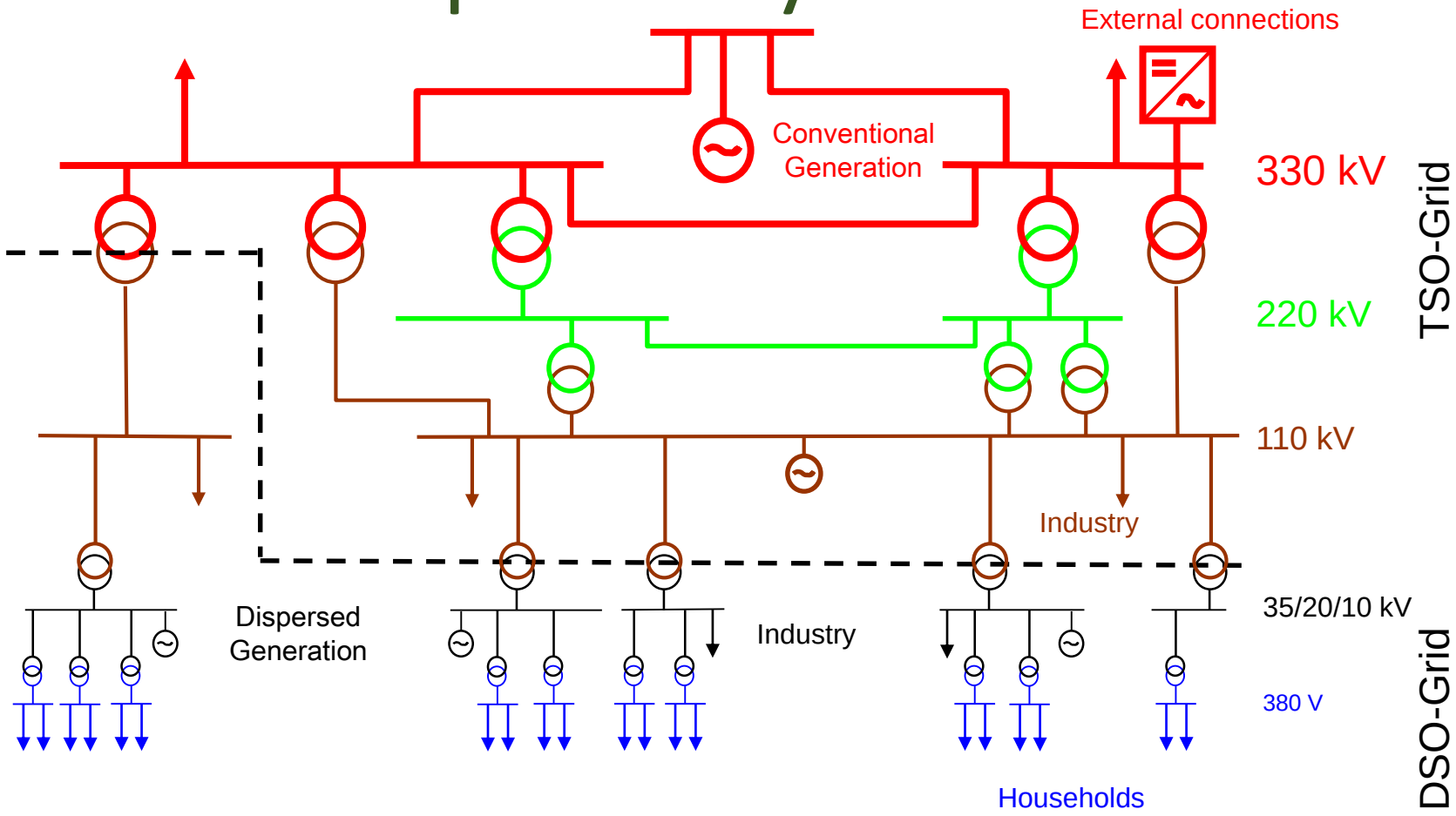
Source: www.entsoe.eu

Grid facts and characteristics

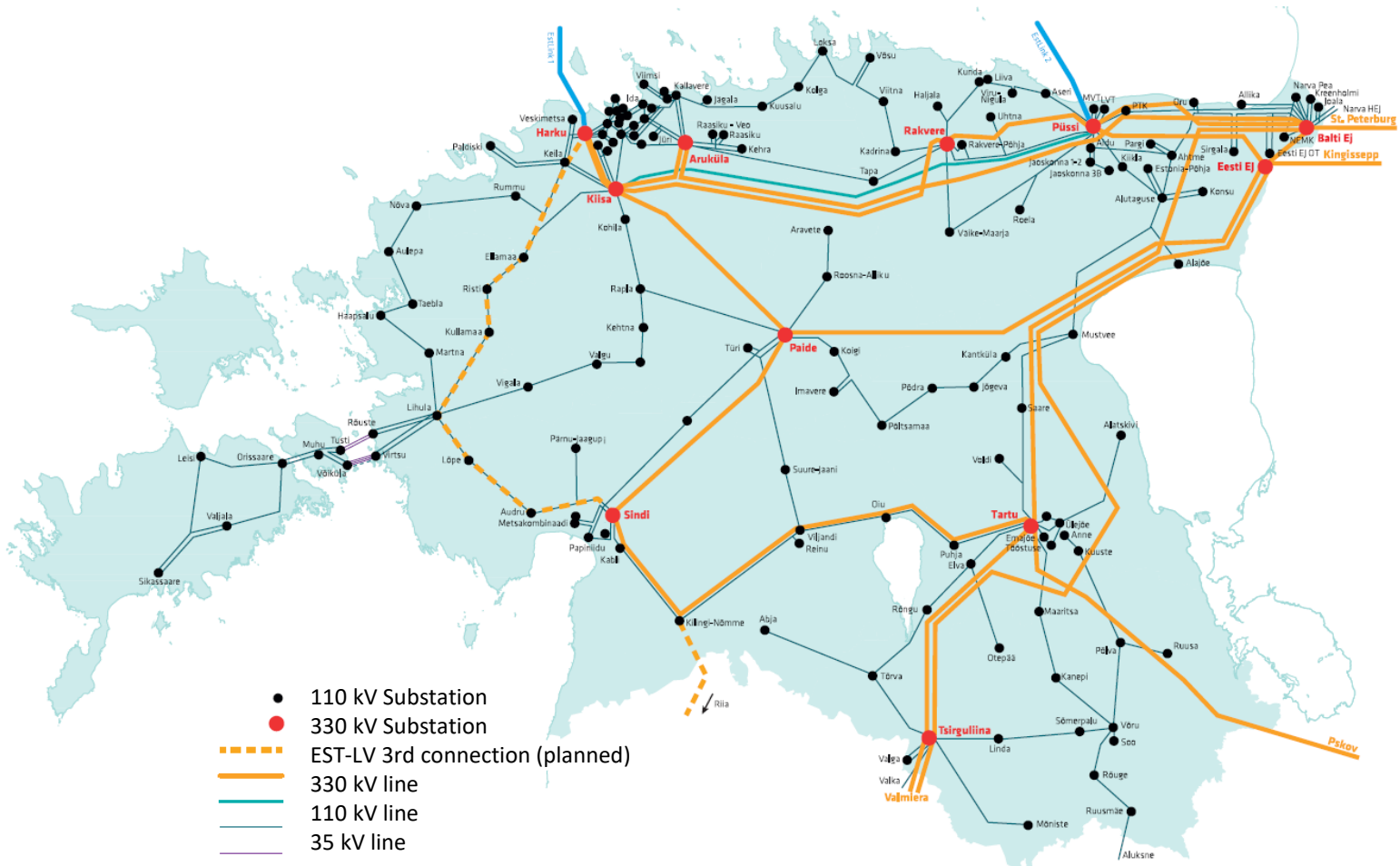
- The electricity grid in Estonia is generally divided into transmission grid (110 kV-330 kV) and distribution grid (0,4 kV-35 kV)

	Voltage level	Total length	Responsibility
Transmission grid	330 kV	1 697 km	TSO
Transmission grid	220 kV	158 km	TSO
Transmission grid	110 kV	3 493 km	TSO
Distribution grid	0,4-35 kV	65 000 km	DSO

Structure of electrical power system



Map of the high voltage grid



Source: Elering AS

Information on TSO

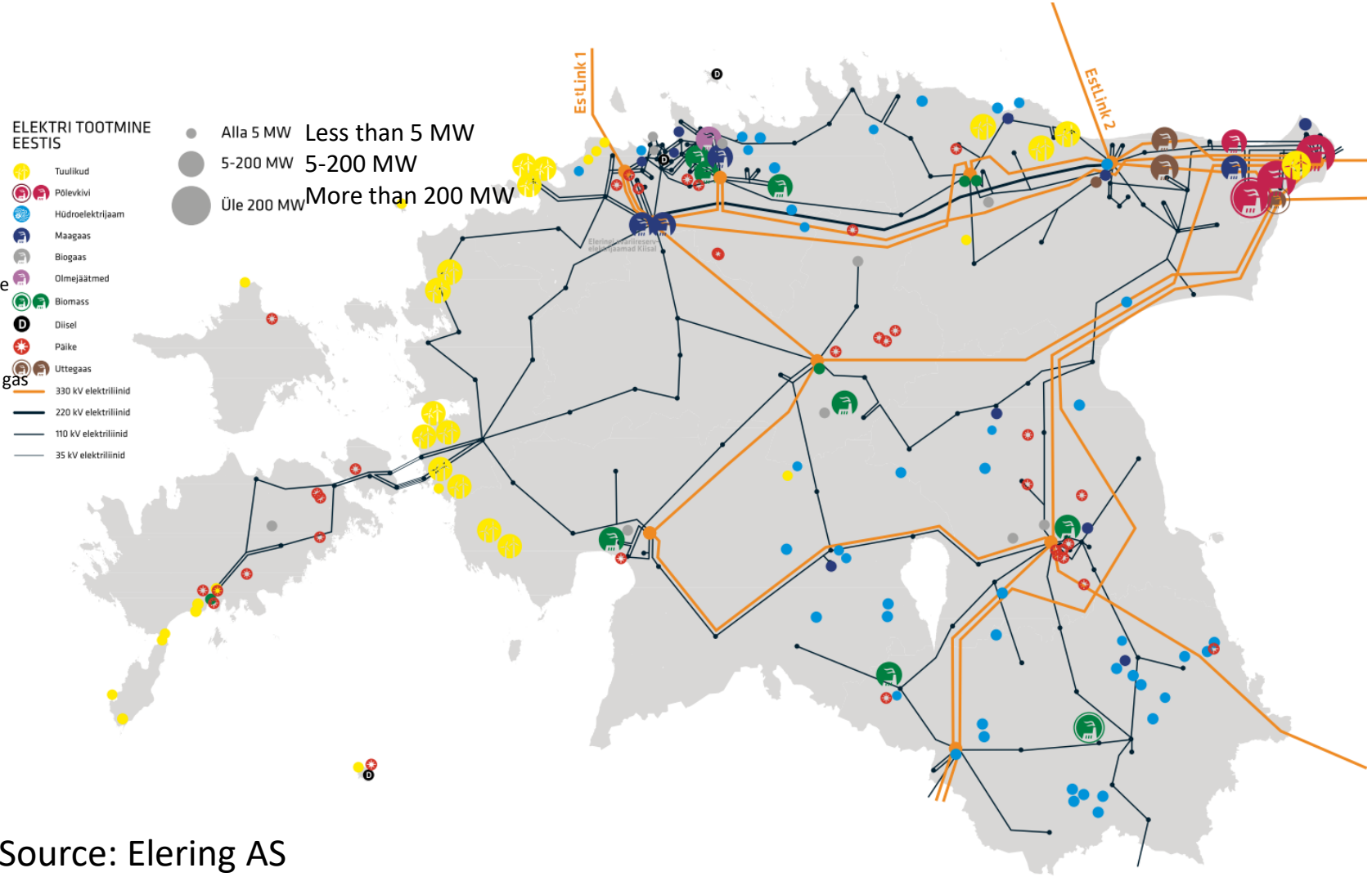
- Name: Elering AS
- Network length: 5 406 km
- Served area: 45 339 km²
- Annual transmitted energy: ca. 14 TWh
- website: http://www.elering.ee

Responsibilities of TSO & DSOs

- TSO responsibility:
  - Ensures security of supply and system balance at all times
  - Composes yearly action plan for ensuring security of supply
  - Cooperates with system operators of neighboring power systems
  - Prepares and monitors the fulfilling of action plans for system restoration, coordinates the system restoration in case of blackout
  - Coordinates balance responsibilities in system
  - Composes long-term plans for system development
- DSO responsibility
  - Provides information on consumption for balance settlement purposes
  - Provides information on expected future consumption and load in its network

Power structure of the country

Wind turbiines
Oil-Shale
Hydropower
Natural gas
Biogas
Municipal waste
Biomass
Disel
PV
Oil shale retort gas



Source: Elering AS

Installed capacity with reference to primary resources

- Installed capacities[1] (MW), as of April 2018
  - Oil shale 1977 MW
  - Natural gas 200 MW
  - Wind power 481 MW
  - Biomass 130 MW
  - Hydro power 8 MW
  - Solar 1,4 MW
  - Others 30 MW

Source: Elering AS

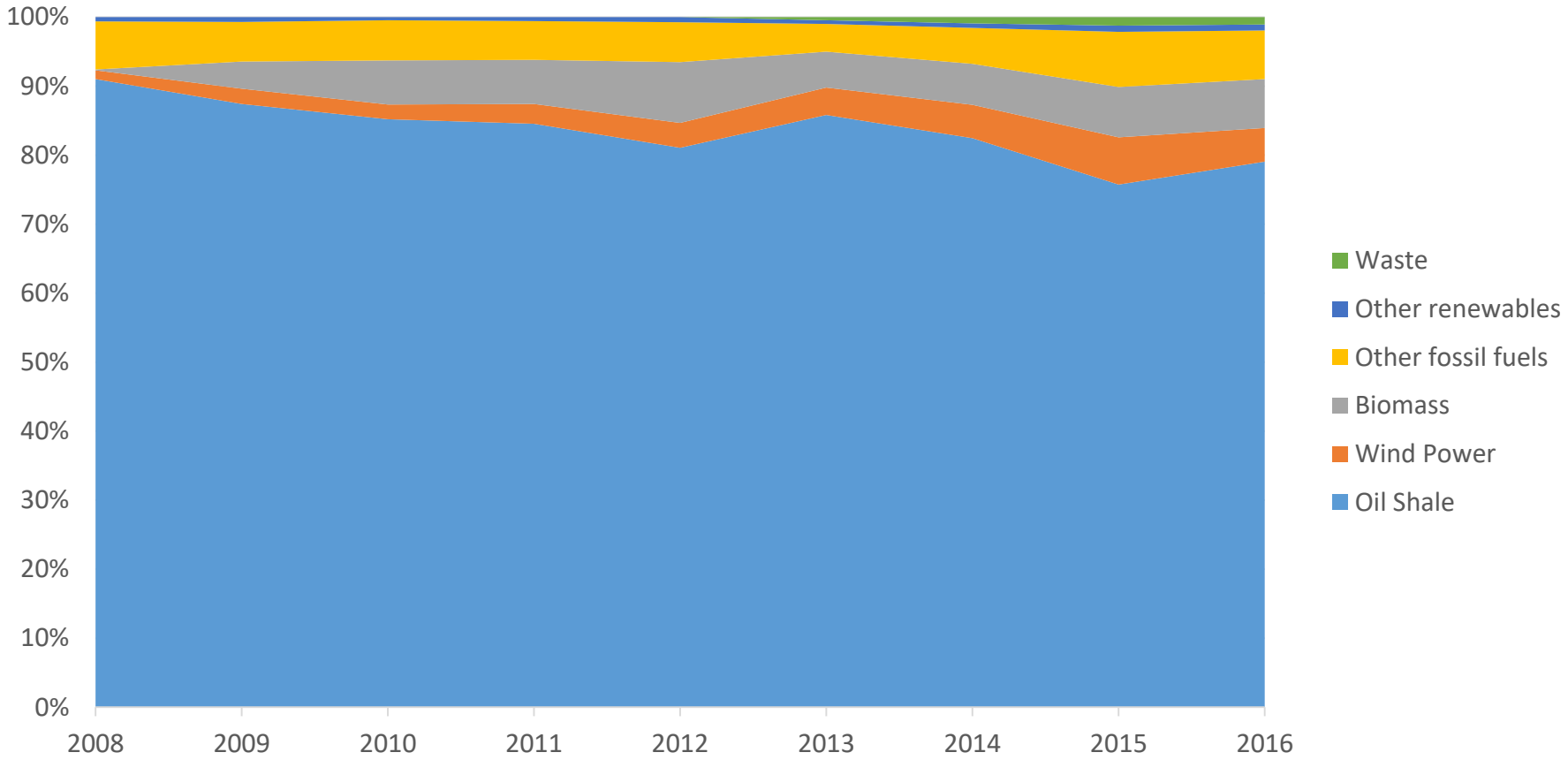
[1] Capacity connected to transmission grid

Energy production with reference to primary ressources

- Electricity generated (TWh), 2016
  - Oil shale 9,62 TWh
  - Biomass 0,87 TWh
  - Wind power 0,59 TWh
  - Natural gas 0,07 TWh
  - Oil 0,03 TWh
  - Hydro power 0,03 TWh
  - Others 0,97 TWh

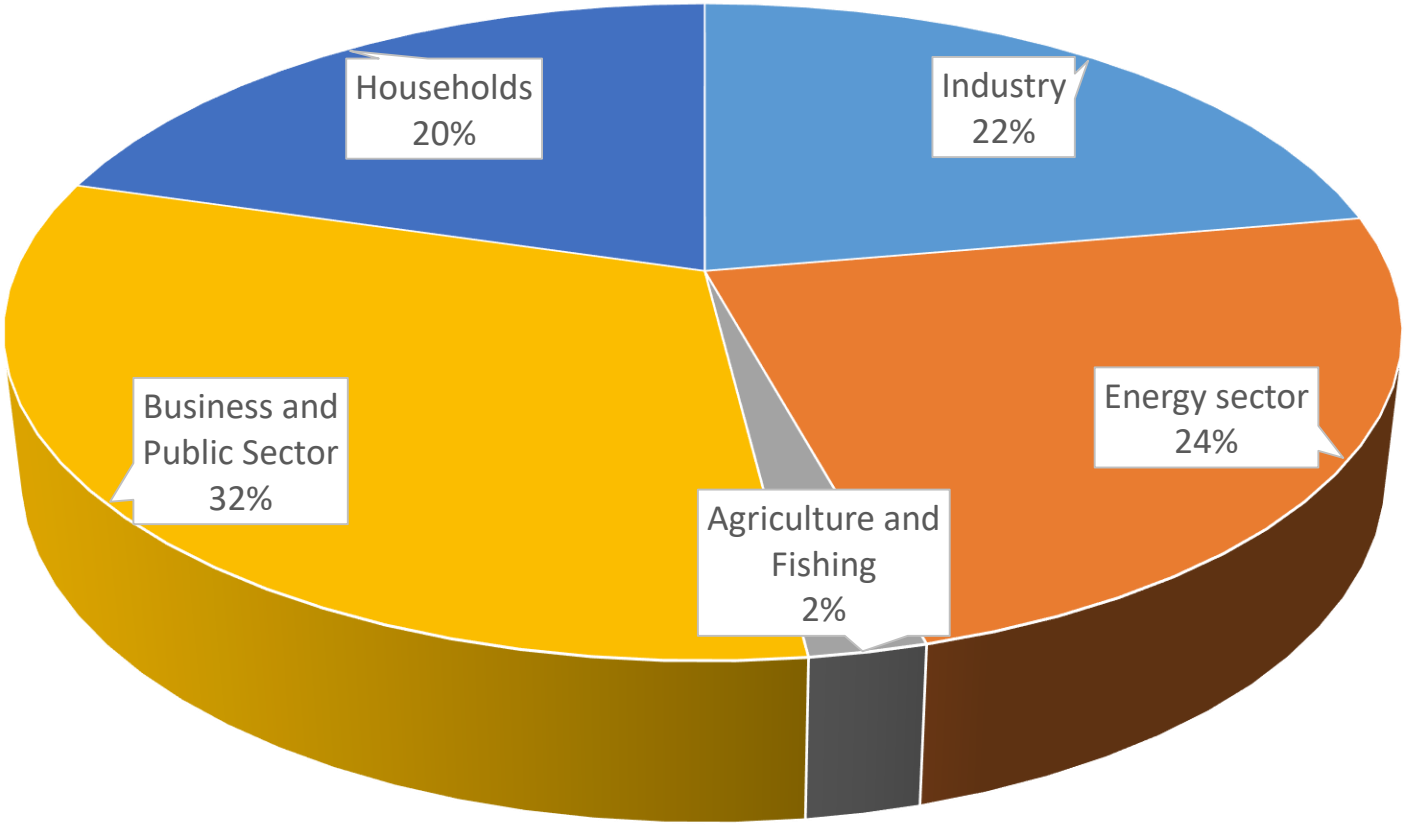
Source: Statistikaamet

Development of generation since 2008



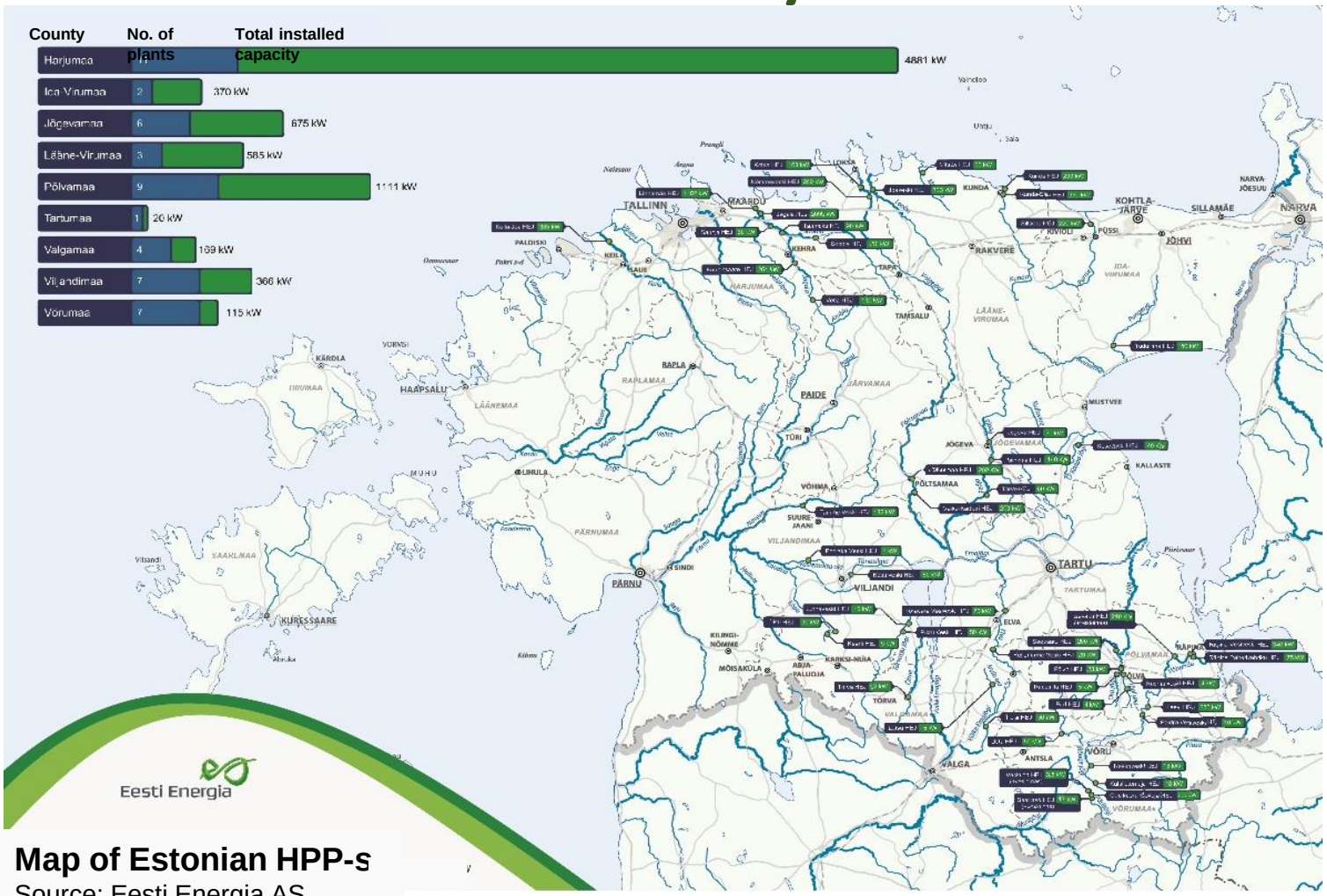
Source: Statistikaamet

Consuption per customer groups



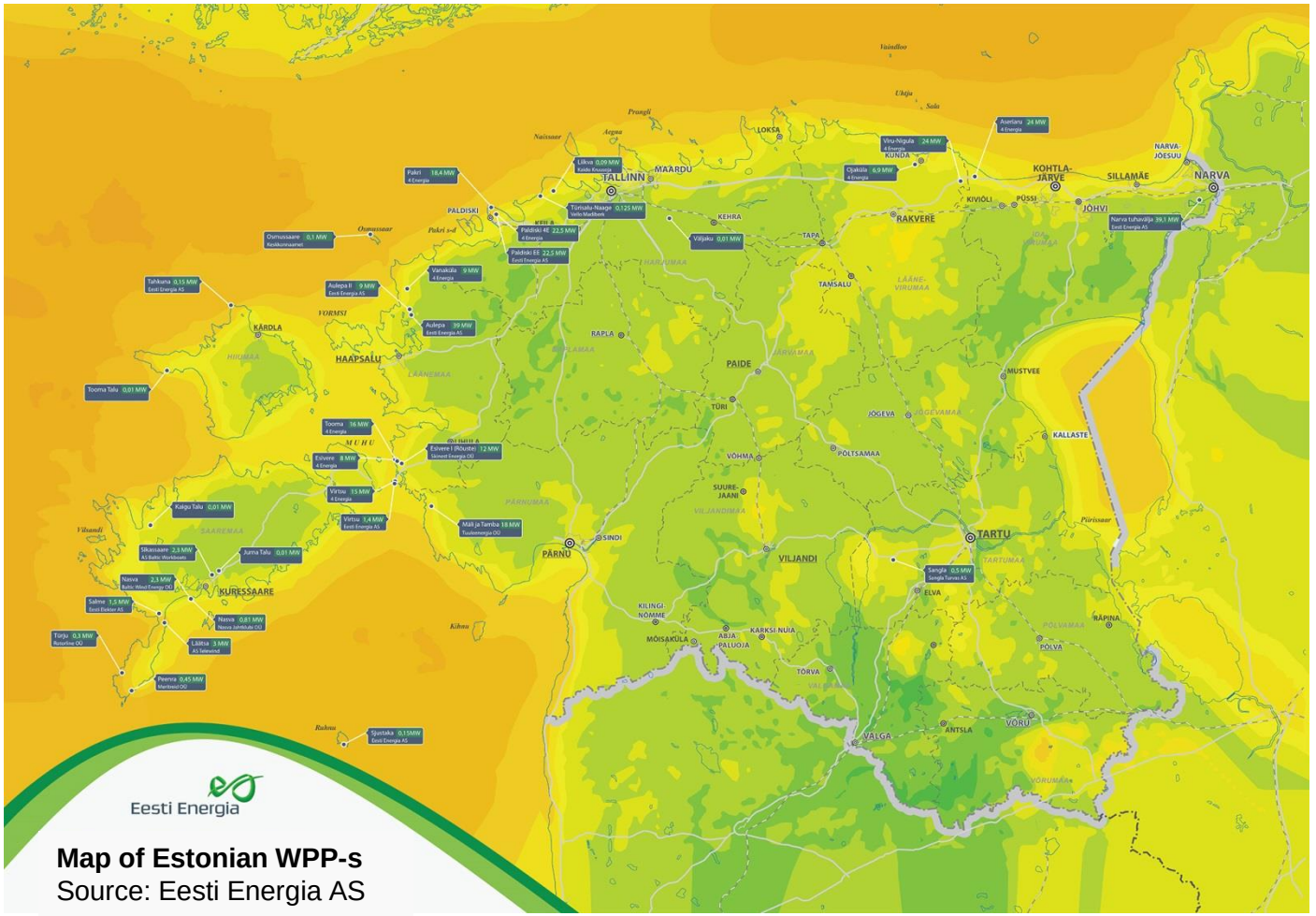
Source: Statistikaamet

Location of Hydro PP's

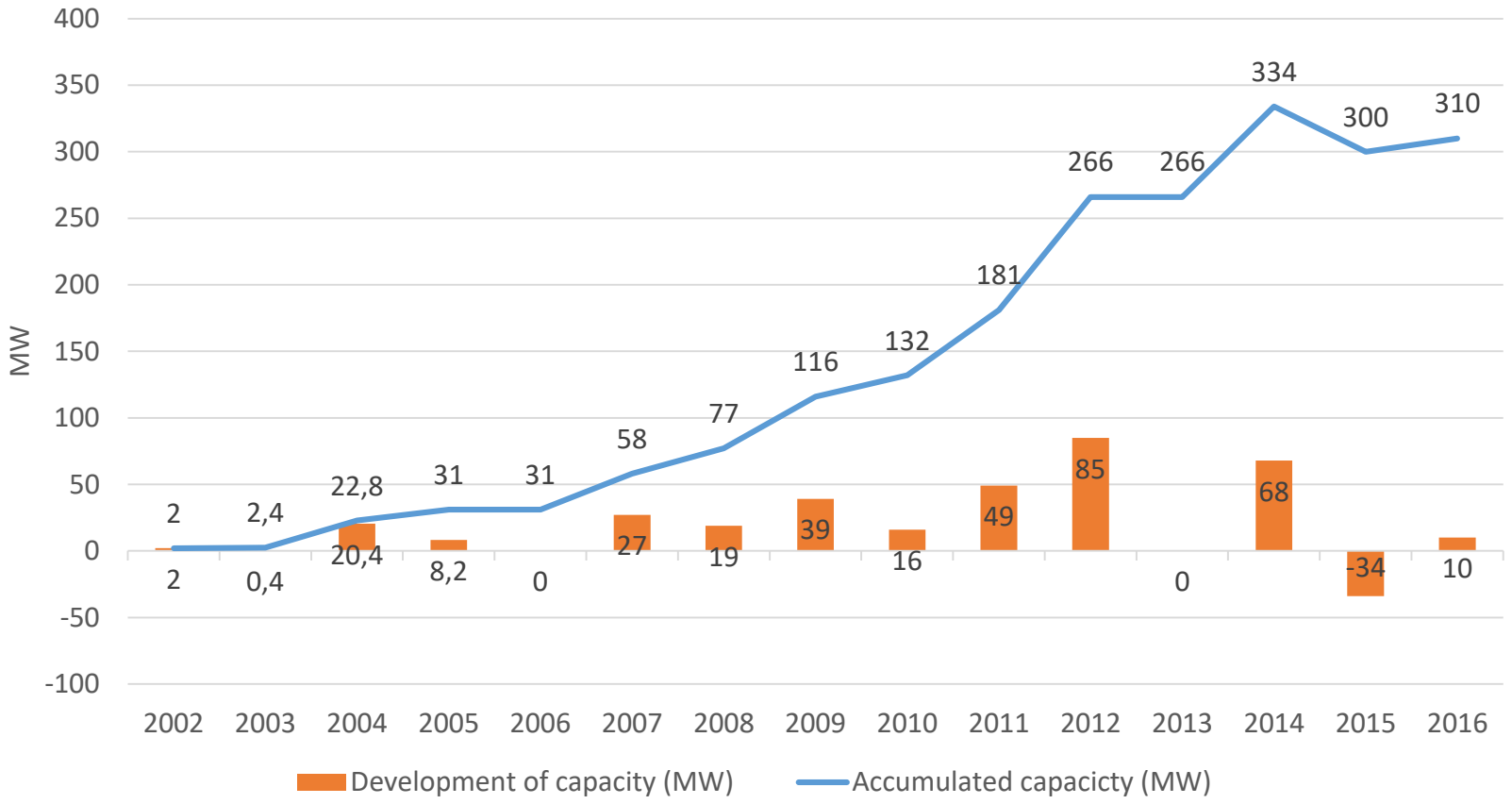


Map of Estonian HPP-s
Source: Eesti Energia AS

Location of Wind PP's

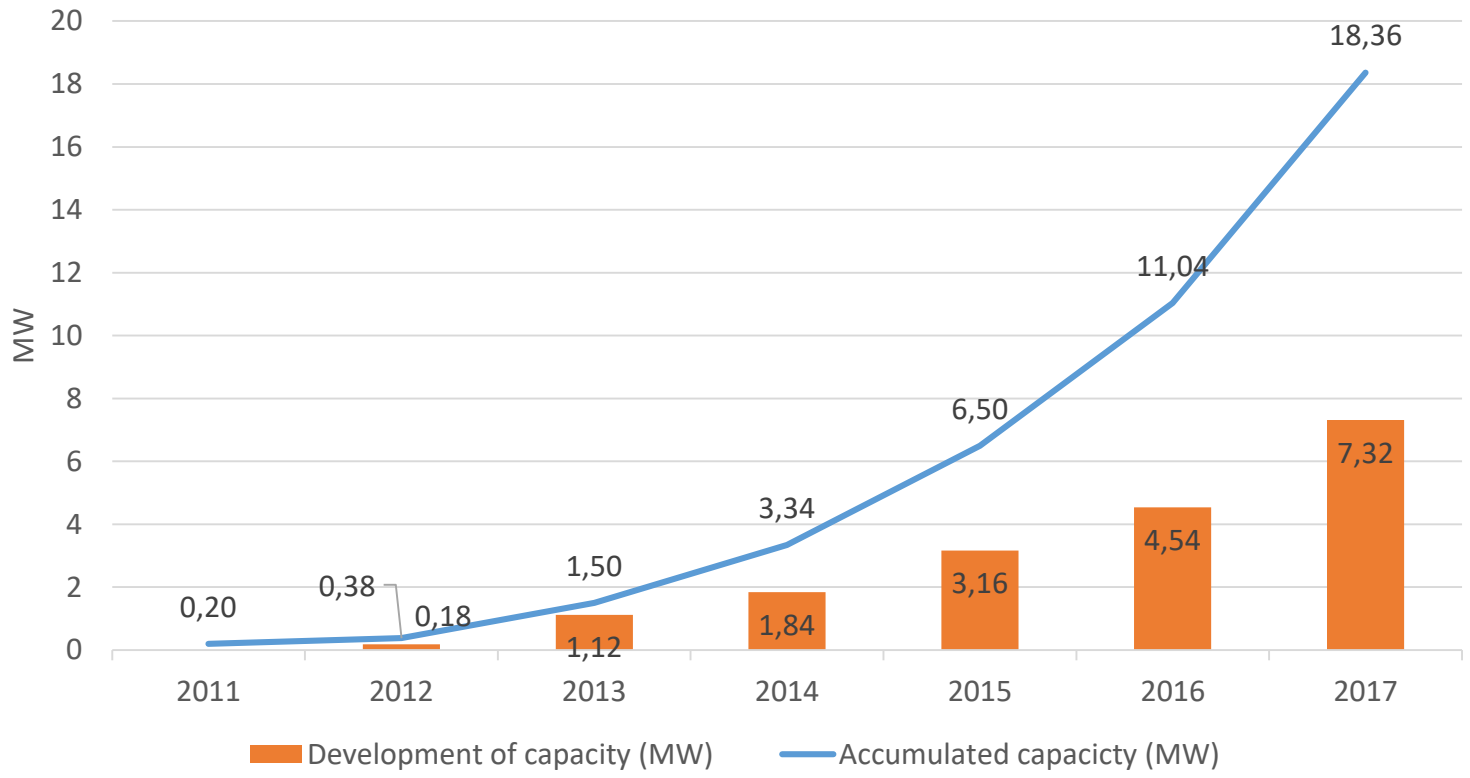


Development of wind power



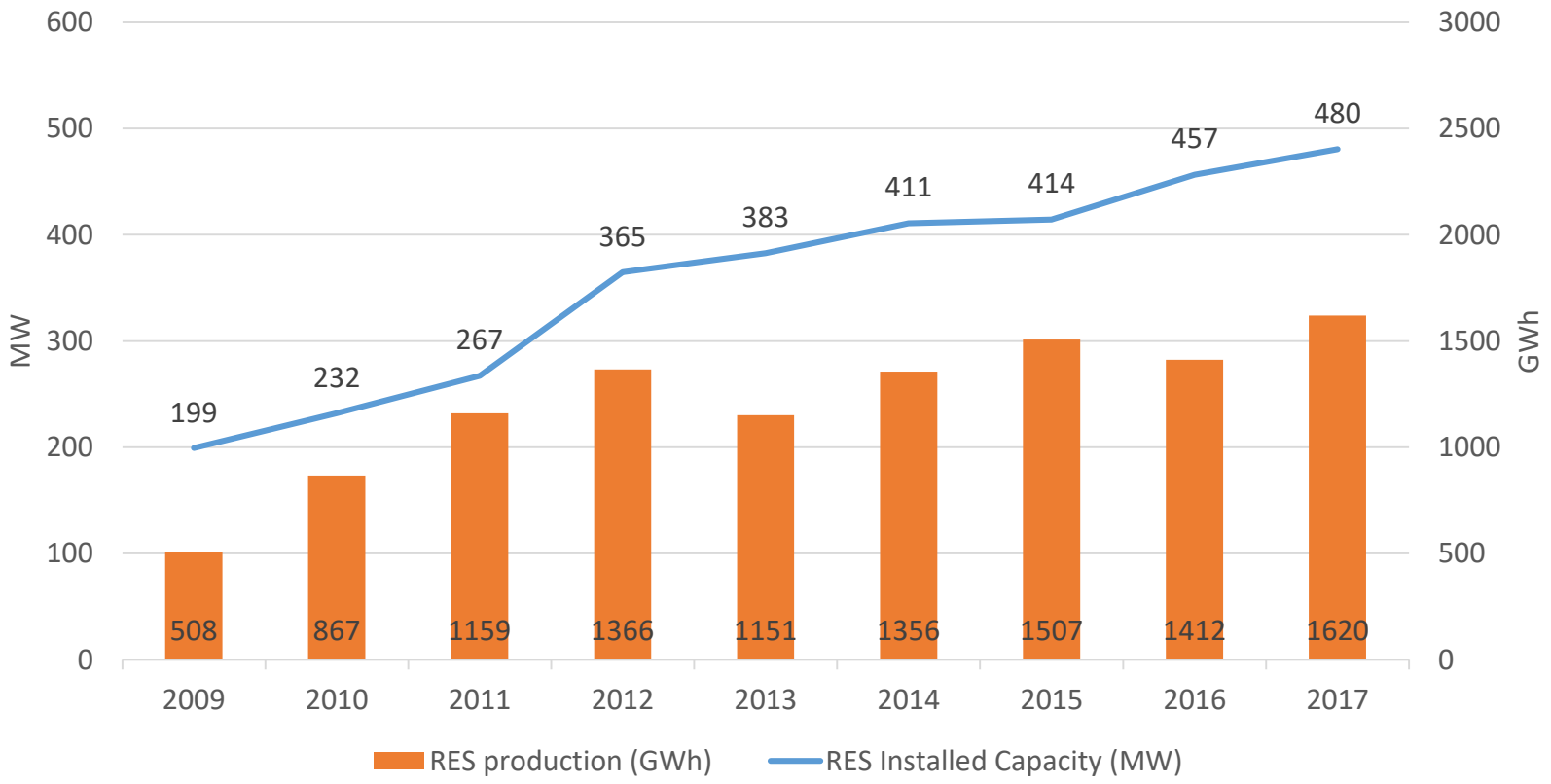
Source: Statistikaamet

Development of photovoltaic power



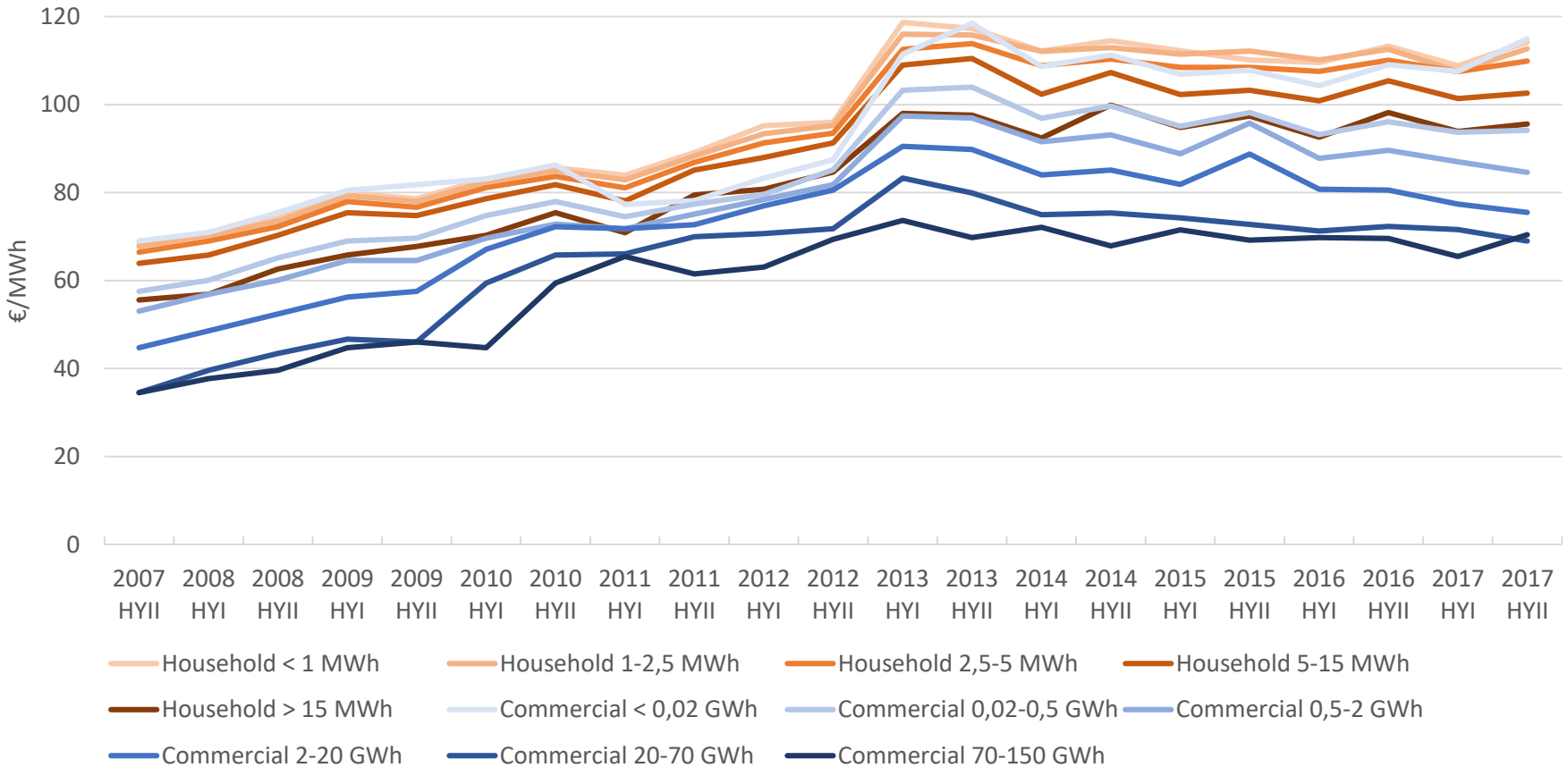
Source: Eesti Taastuvenergia Koda

RES installed capacity and production since 2008



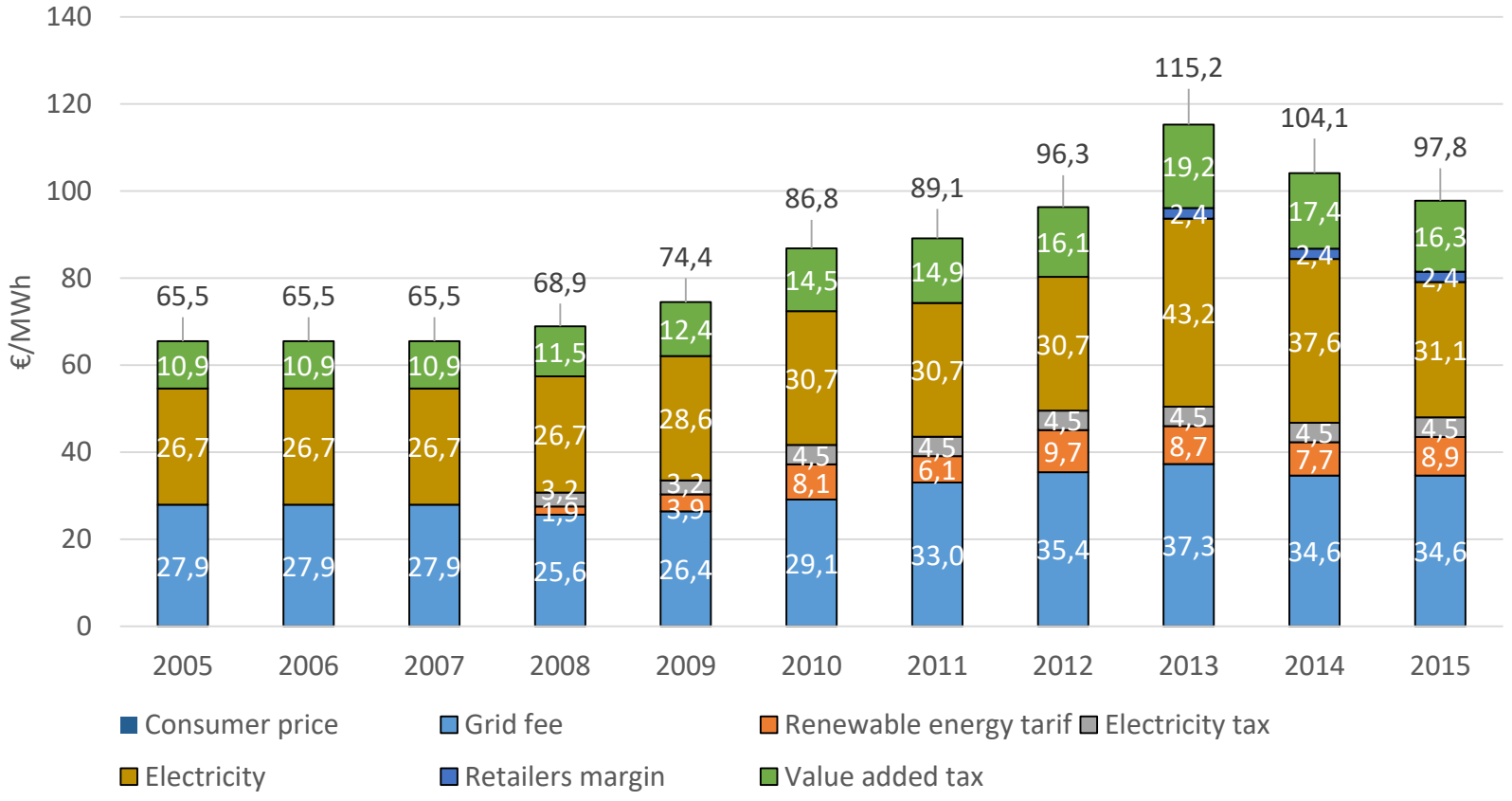
Source: Eesti Taastuveneriga Koda

Price development for industry consumers and households



Source: Statistikaamet

Price development for households (price split for typical consumer)



Source: www.energiatalgud.ee

Electricity market organisation

Source: Elering AS

Power balance in 2016

- Net Generation 10,4 TWh
- Consumption 7,7 TWh
- Imports 3,6 TWh
- Exports 5,6 TWh
- Losses 0,7 TWh

Source: Statistikaamet

Energy exchanges in 2016

- In TWh

	Commercial flows			
	Import	Export	Import	Export
Russia	0,0	0,0		
Latvia	0,3	4,7		
Finland	3,2	0,9		

Specific aspects of the electricity market

- Capacity allocation
  - Estonia-Finland
    - Capacity is allocated via implicit auctions by NPS
  - Estonia-Latvia
    - Allocated by Limited Physical Transmission Rights auctions (yearly, quarterly, monthly)
  - Estonia-Russia
    - No capacity is allocated to market participants
- Electricity market
  - Day-ahead trades done in Nord Pool Spot

Thank you!