The Electric Power System

- Republic of Macedonia -

Basic facts

- Area: 25.713 km^2
- Population: ~ 2.069.172
- Number of electricity consumers: 695.279 (DSO)
- Number of TSOs: 1
  - MEPSO http://mepso.com.mk/
- Number of DSOs: 2
  - EVN Macedonia http://evn.mk/
  - ELEM distribution http://elem.com.mk/
- Peak load: 1507 MW (2014)

Global map of the grid and of its interconnections

- Interconnectors with:
  - Serbia
  - Kosovo
  - Greece (2 interconnections)
  - Bulgaria

Source: ENTSO-E

Grid facts and characteristics

- Transmission system (TS) comprises of 400 kV and 110 kV transmission overhead lines and cables.
- Five 400/110 kV/kV substations connect the 400 kV and 110 kV networks
- TS is connected with the neighboring systems via 400 kV interconnections
- Total installed generation capacity in 2014 is 1857 MW (connected to the transmission grid), mainly shared among 580 MW of HPP-s (31%) and 1240 MW of TPP-s (67%).

Structure of electrical power system

- The 400 kV transmission lines are the backbone of the transmission grid in the Republic of Macedonia. They form a 400 kV ring comprised of three transmission lines connecting the largest consumption located in the northern part of the country with the largest production facilities located in the south-western part. Also, the 400 kV transmission lines are used for interconnection to the neighboring power systems.
- The 110 kV transmission grid connects the large hydro power plants, all of the larger cities, as well as the industrial centers. The 400 kV and 110 kV transmission grids are coupled through five substations. A Project for reconfiguration of the 110 kV grid in the south-western part of the country is currently underway.

Map of the high voltage grid

Source: mepso.com.mk

Information on TSO(s)

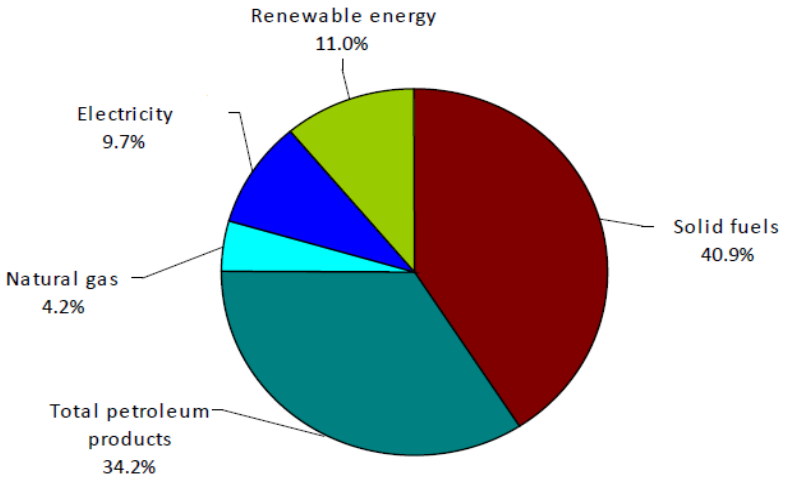
- Name: MEPSO
- Network length (km): 529 (400kV) & 1587 (110kV)
- Served area (km²): 25.713
- Annual transmitted energy (TWh) ~ 7,403 (2015)

Responsibilities of TSO & DSOs

- MEPSO owns, maintains and expands the transmission network, operates the electricity power system of the country and secures interconnections with the neighboring transmission systems. MEPSO also acts as Market Operator.
- DSO owns, maintains and expands the distribution network

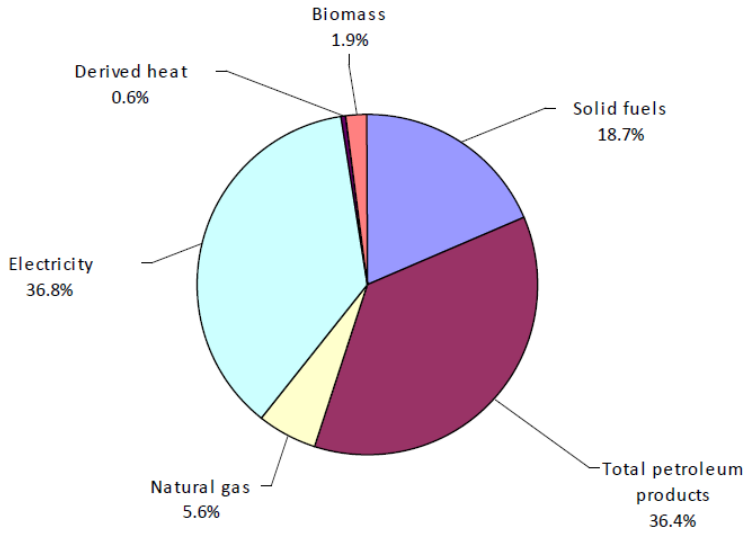
Power structure of the country

Gross inland consumption by types of energy commodities, 2014

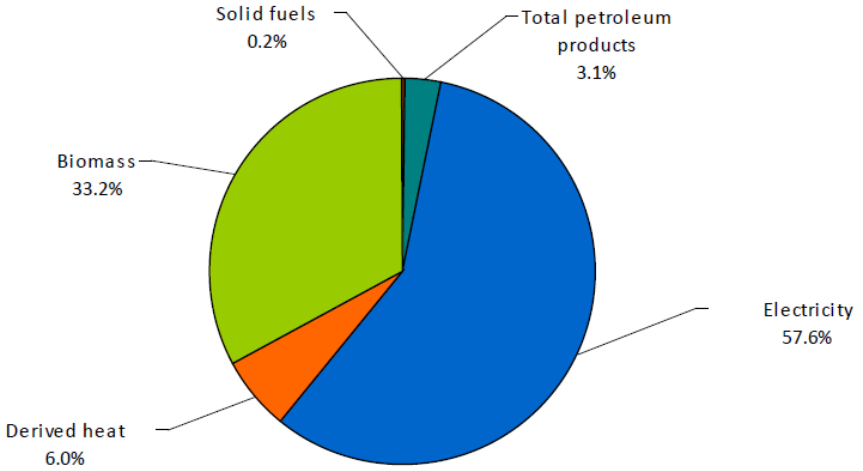


Source: stat.gov.mk

Final energy consumption in industry by types of energy commodities, 2014

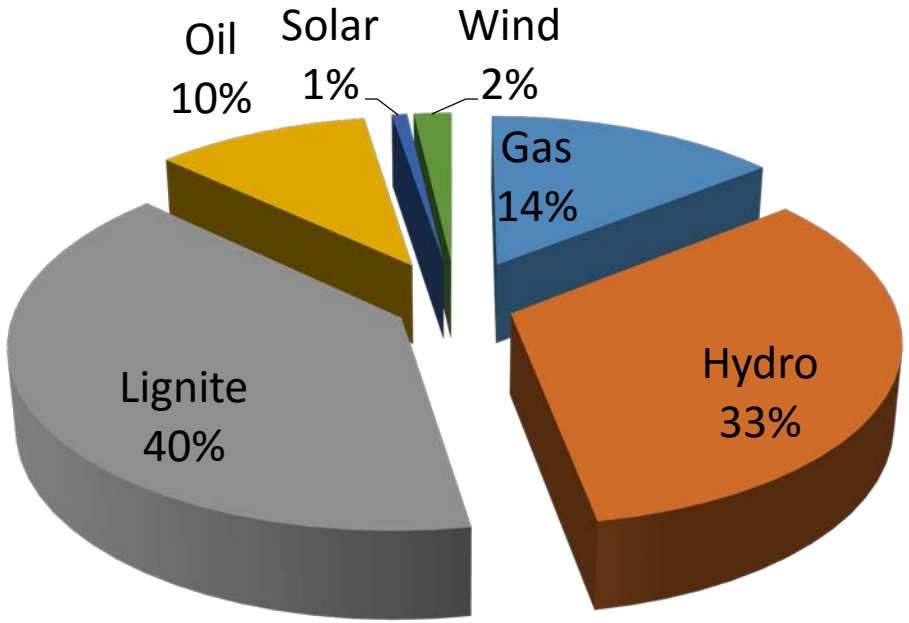


Final energy consumption in households by types of energy commodities, 2014



Installed capacity with reference to primary resources

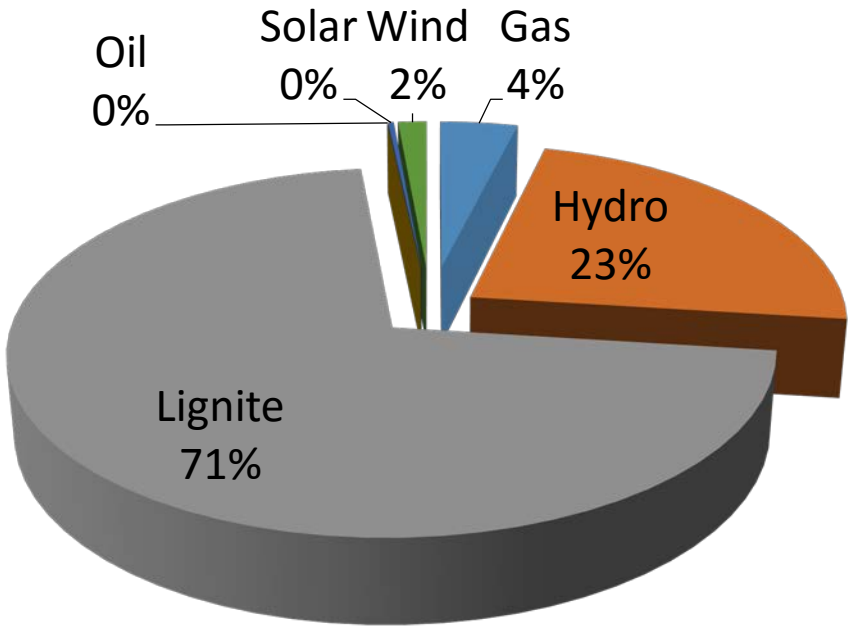
- Installed capacities (MW), year 2014
  - Gas **287**
  - Hydro power **603**
  - Lignite **800**
  - Oil **210**
  - Solar power **15**
  - Wind power **37**



Source: erc.com.mk

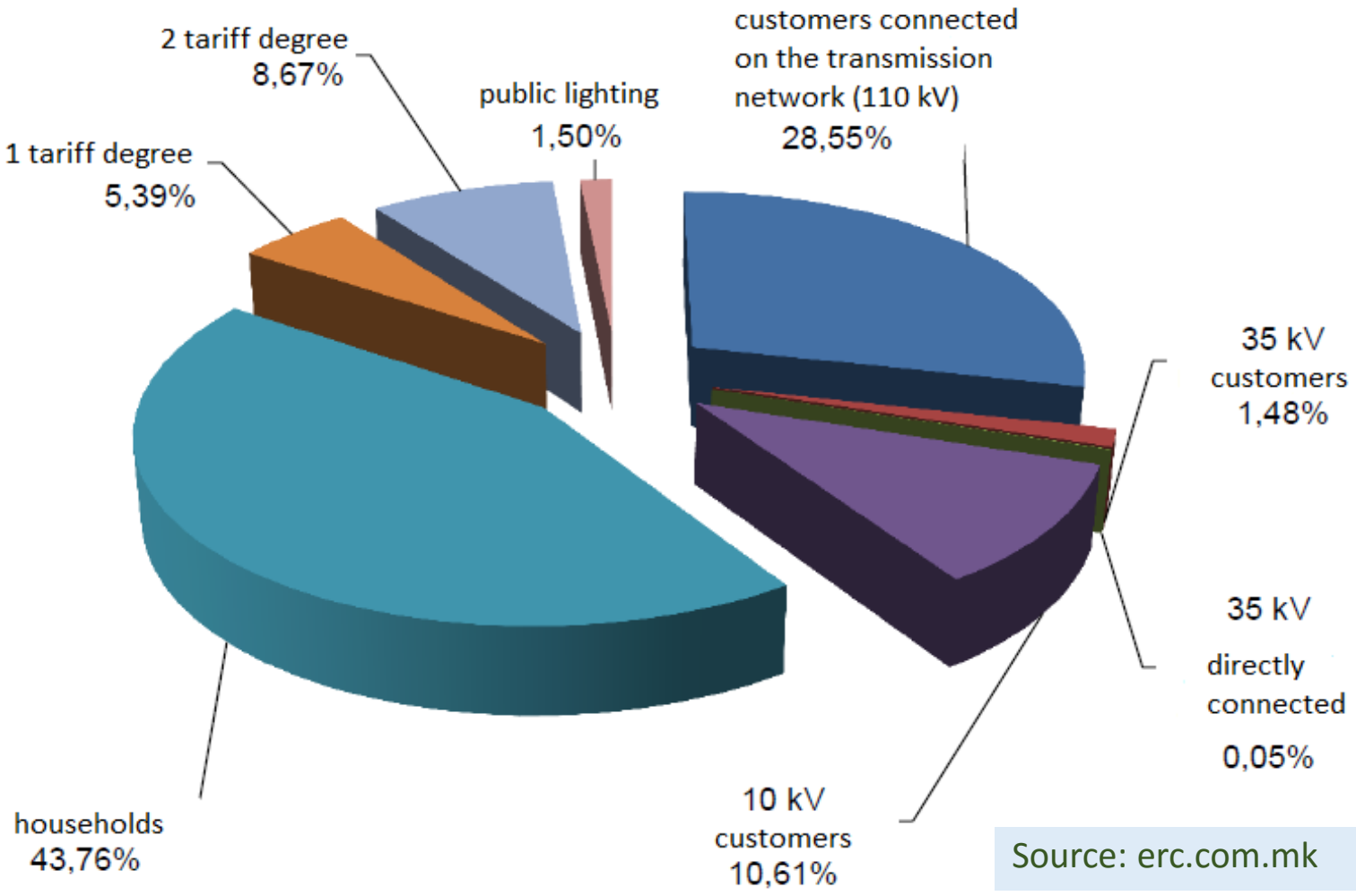
Energy production with reference to primary resources

- Electricity generated (GWh), year 2014
  - Gas **190**
  - Hydro power **1136**
  - Lignite **3506**
  - Oil **0**
  - Solar power **14**
  - Wind power **70**



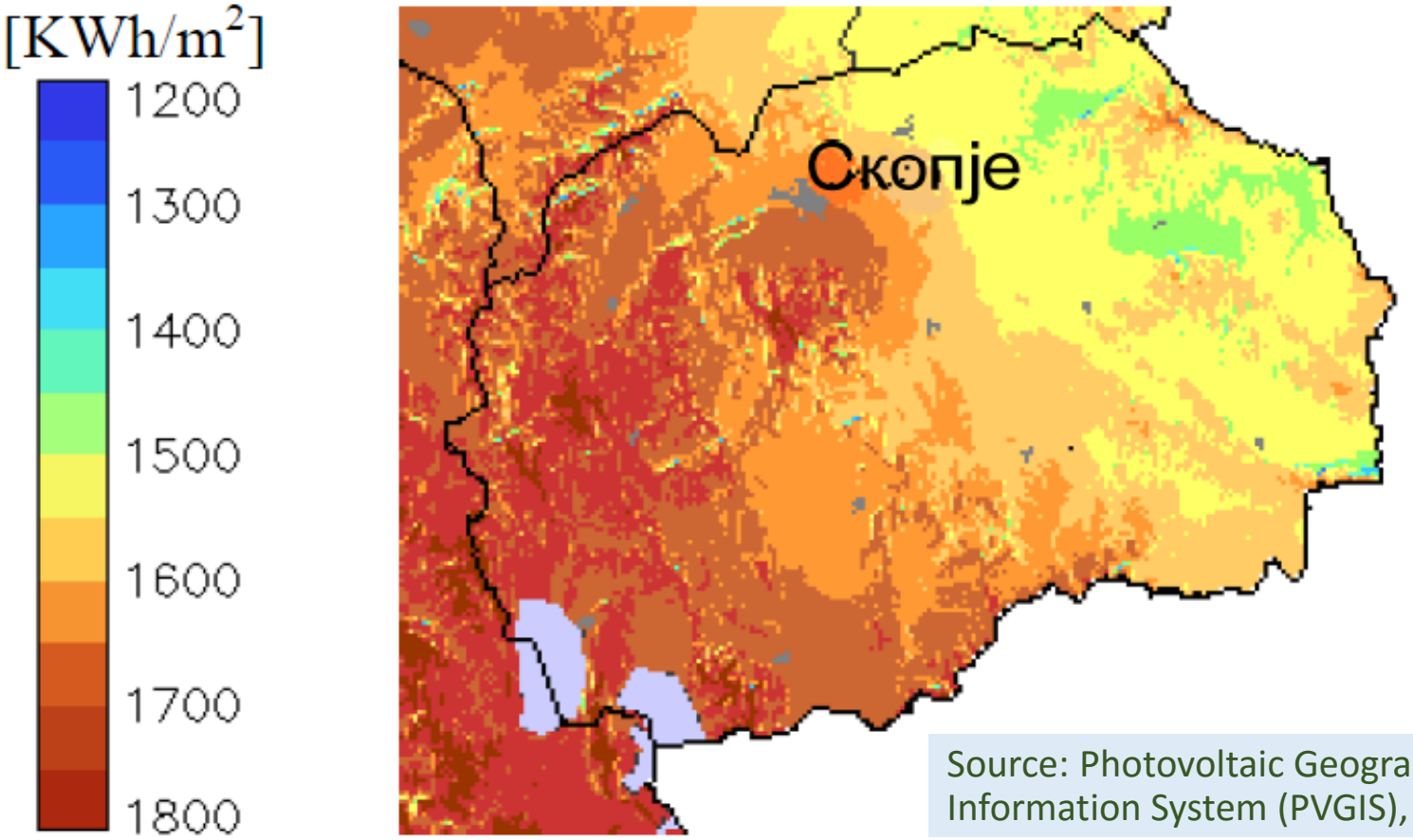
Source: erc.com.mk

Consumption per customer groups



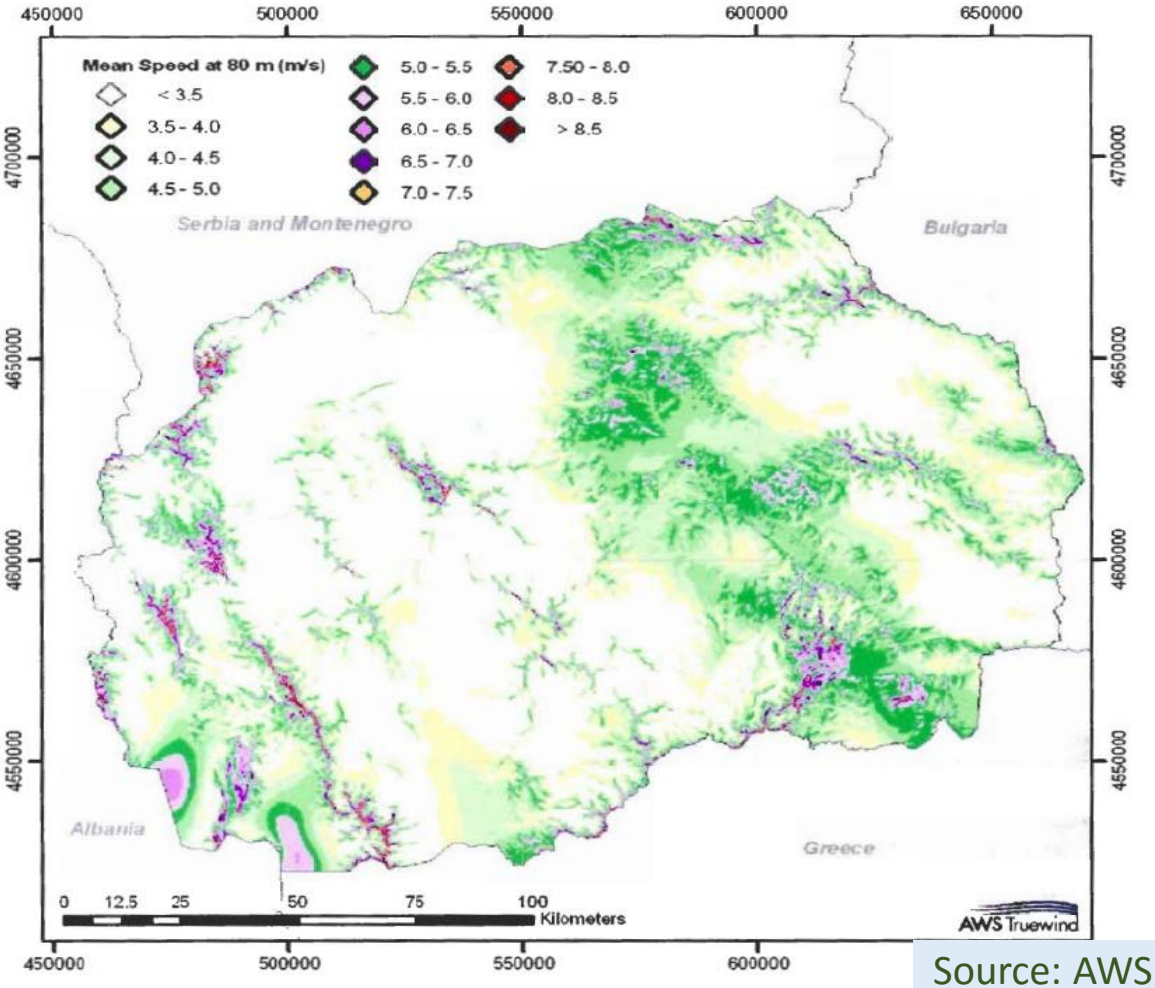
Source: erc.com.mk

Location of renewable energy sources - solar



Source: Photovoltaic Geographical Information System (PVGIS),

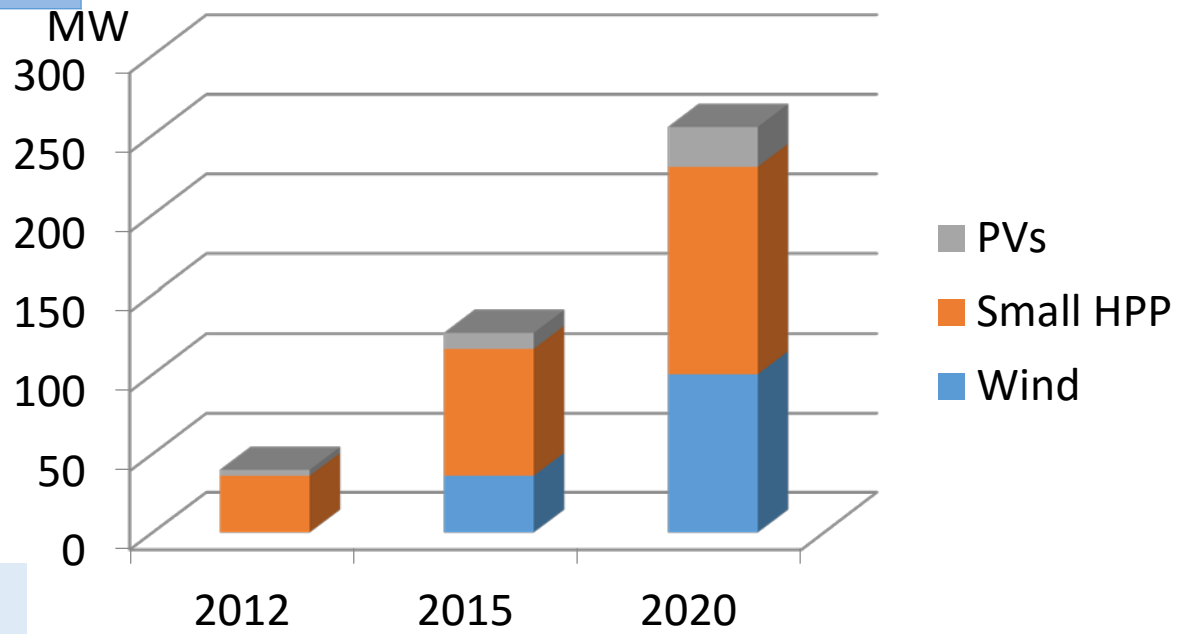
Location of renewable energy sources - wind



Source: AWS Truewind

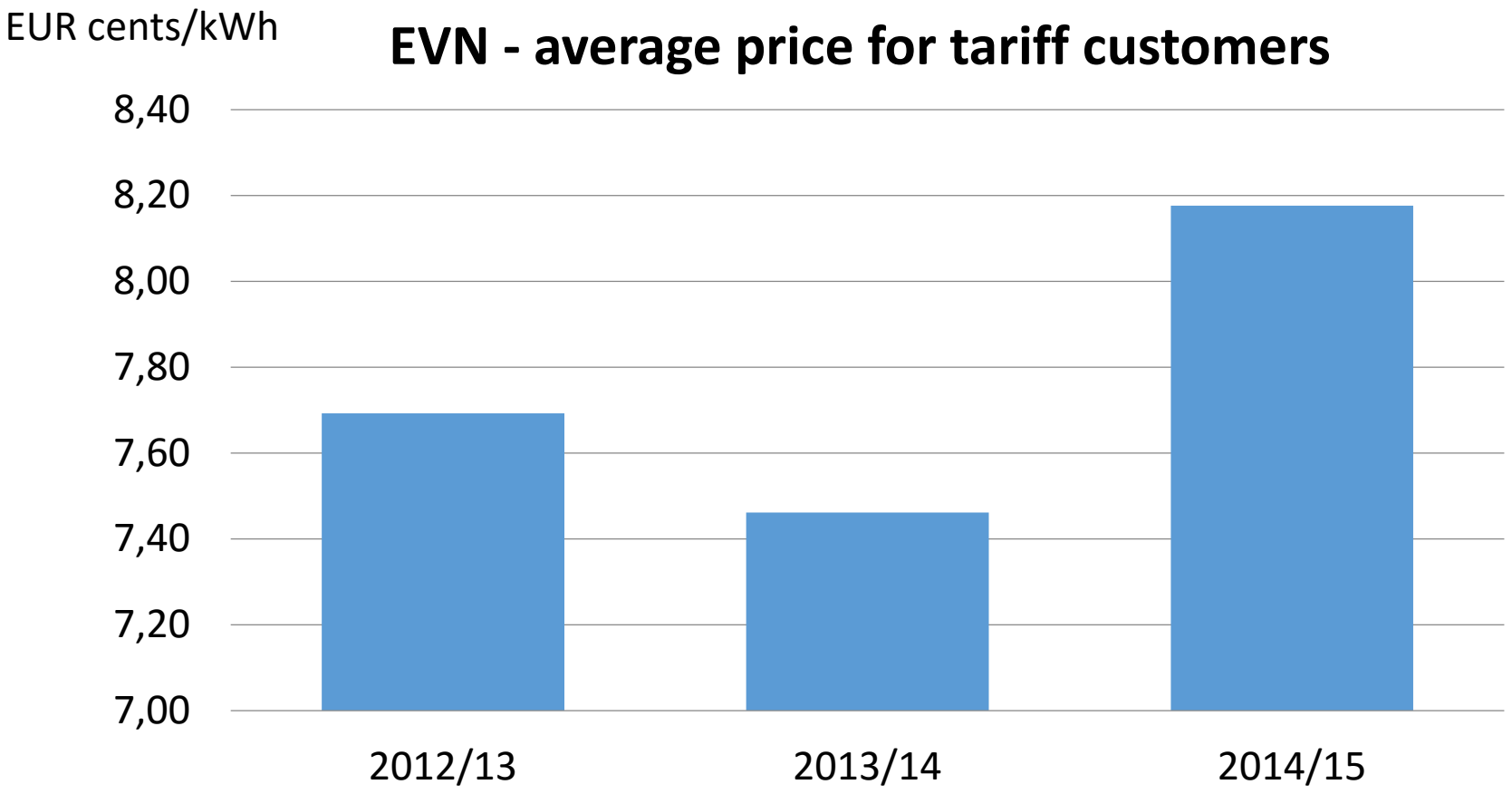
RES installed capacity since 2012

(MW)	2012	2015	2020
Wind	0	36	100
Small HPP	36	80	130
PVs	3.8	10	25



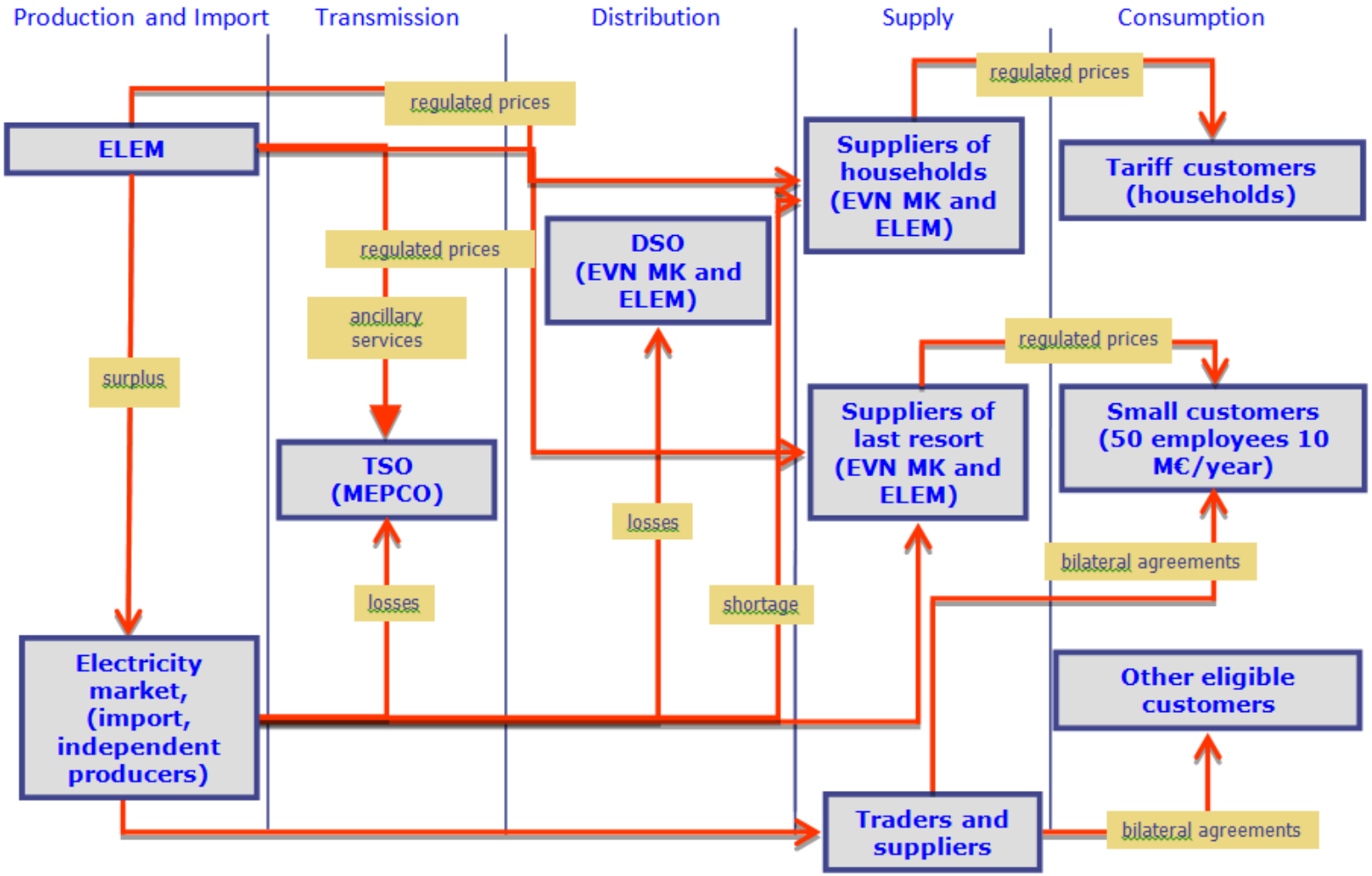
Source: http://iceor.manu.edu.mk/

Price development for tariff customers



Source: erc.com.mk

Electricity market organisation



Power balance in 2014

- Generation 4982 GWh
- Consumption 7850 GWh
- Imports (physical) 5598 GWh
- Exports (physical) 2529 GWh
- Losses 201 GWh

Source: erc.com.mk