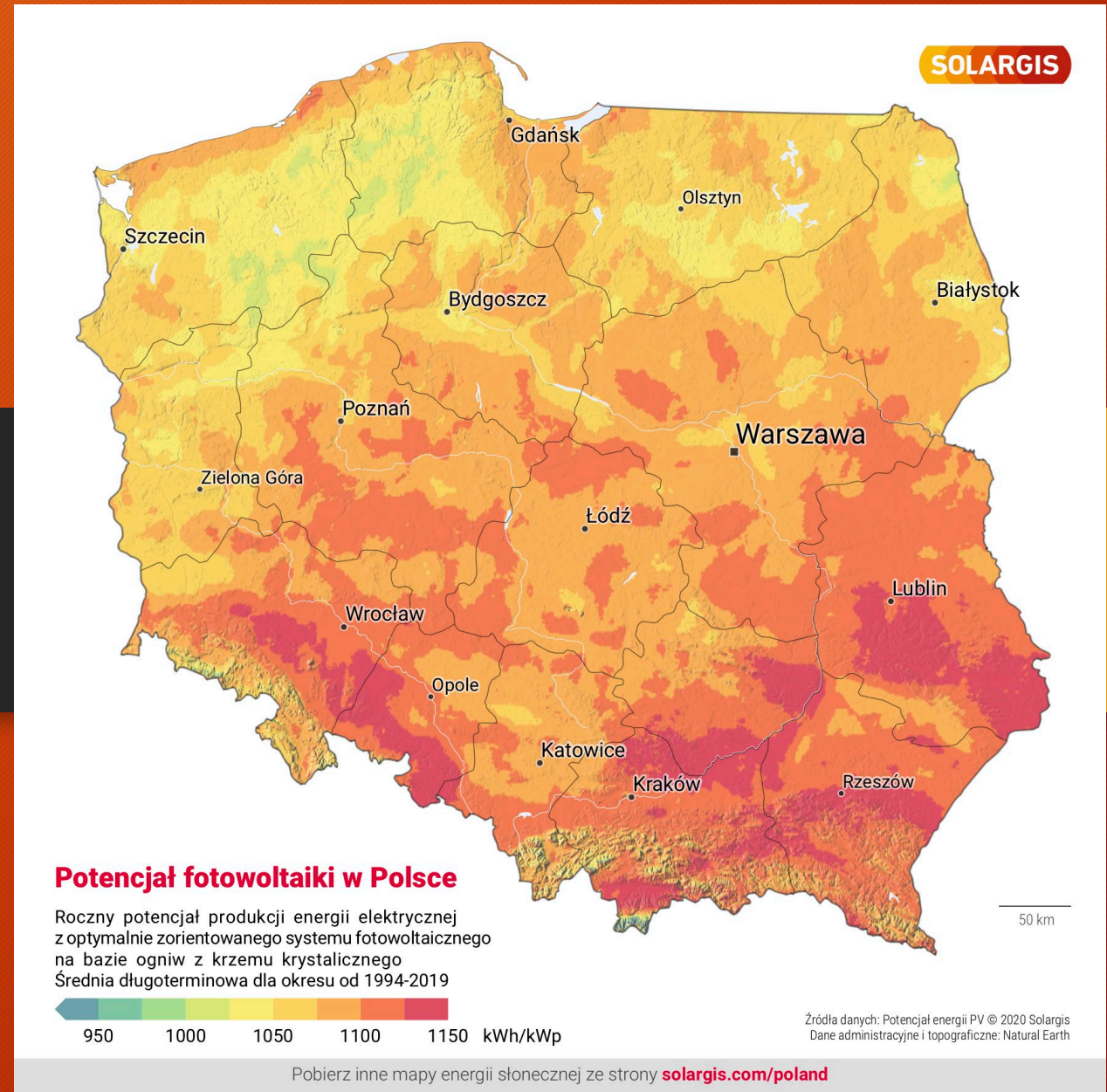


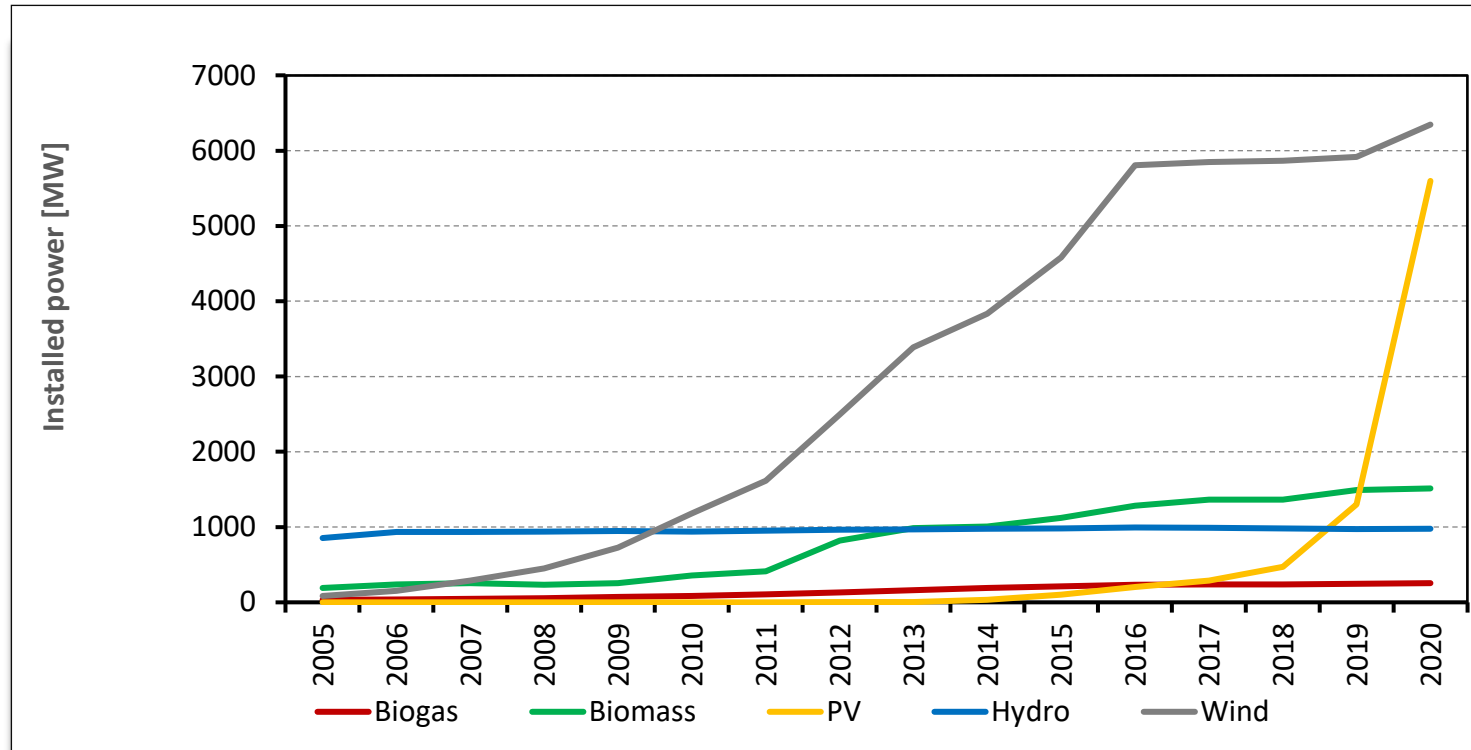
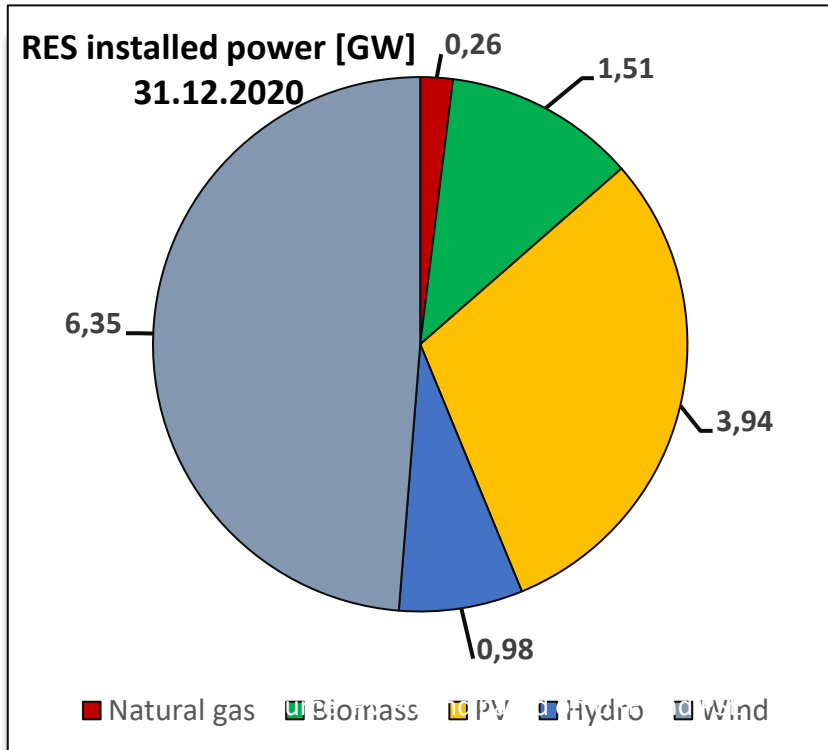
# Photovoltaics in Poland

Stanislaw M. Pietruszko

PV POLAND Polskie Towarzystwo Fotowoltaiki

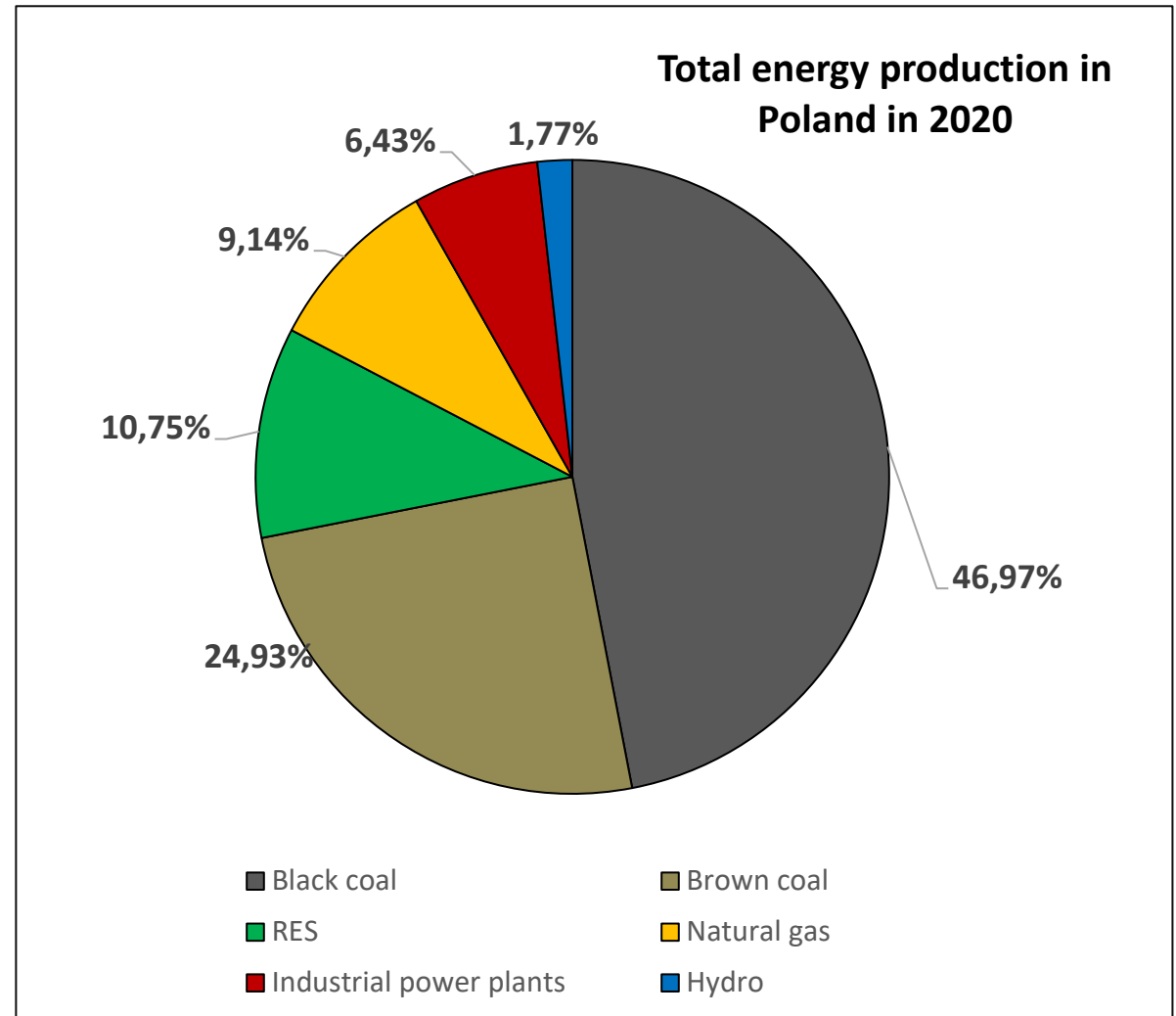
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# RES Installed Power

# Electricity production in 2020



## Microinstallations up to 50 kW

- Owner: private individual or entrepreneur
- Maximum simplification of building and distribution grid connection procedures (no building-permit required, grid connection usually by notification only) Entrepreneur has a freedom of choice: net-metering or excess energy sales (but these can not be the main source of income)

## Small installations from 50 kW up to no more than 500 kW (foreseen change up to 1000 kW)

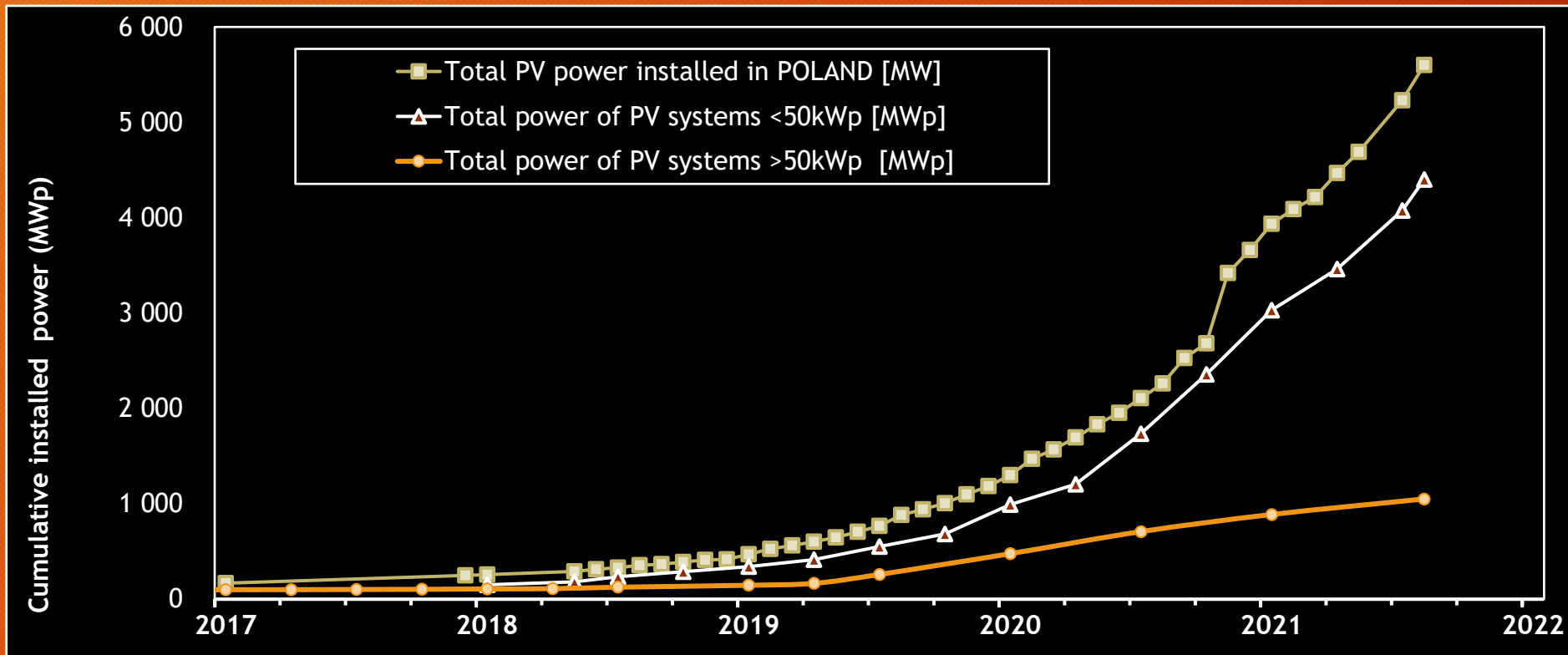
- Regulated economic activity (entry in the Small RES Installation Energy Producer Registry)
- Building permit (with project)
- New distribution grid connection agreement
- When wishing to use state energy sales subsidy systems, requirement of selling entire produced electrical energy
- Guaranteed energy purchase price at wholesale prices from last quarter

## Large installations from 500 kW (foreseen change from 1000 kW) (formally the term „large” is not present in the RES Act)

- Licensed economic activity
- Requirement to find a buyer of produced energy
- Requirement to include expenses of trade balancing when selling energy

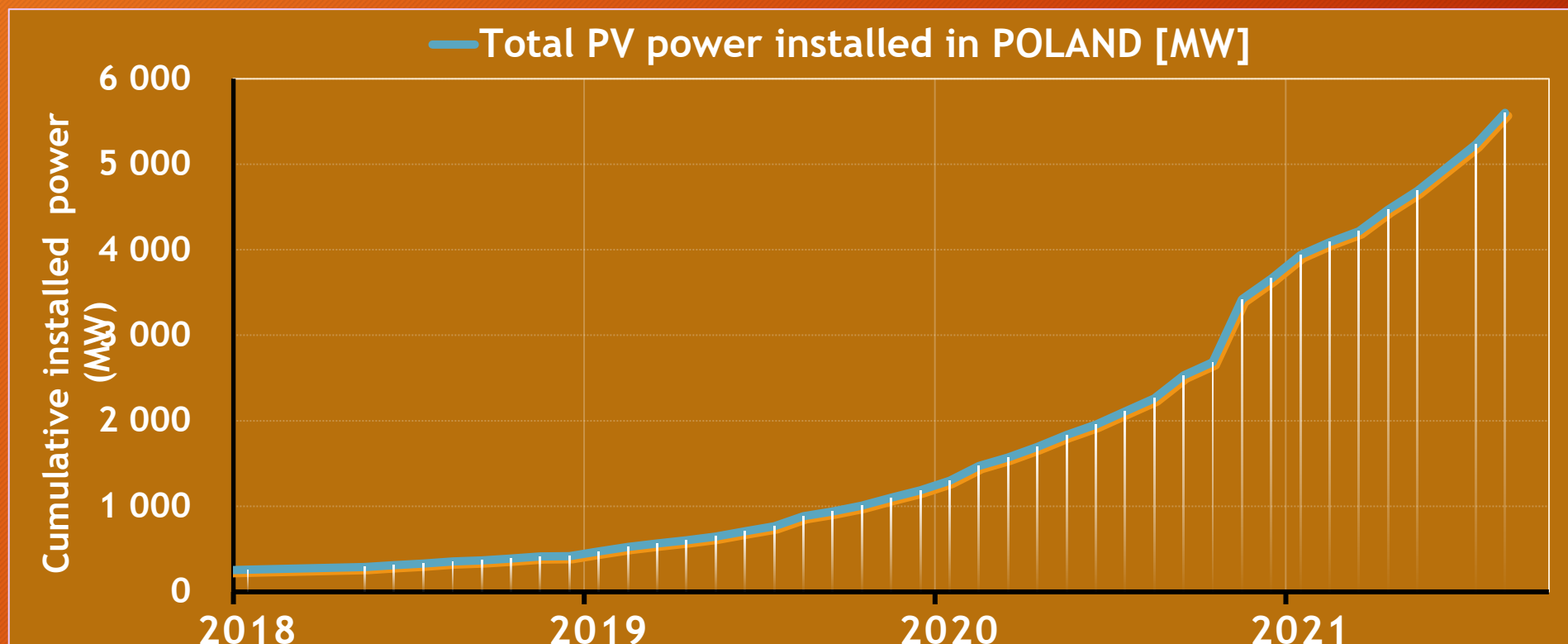
# PV systems by power segments

# PV market by power segments

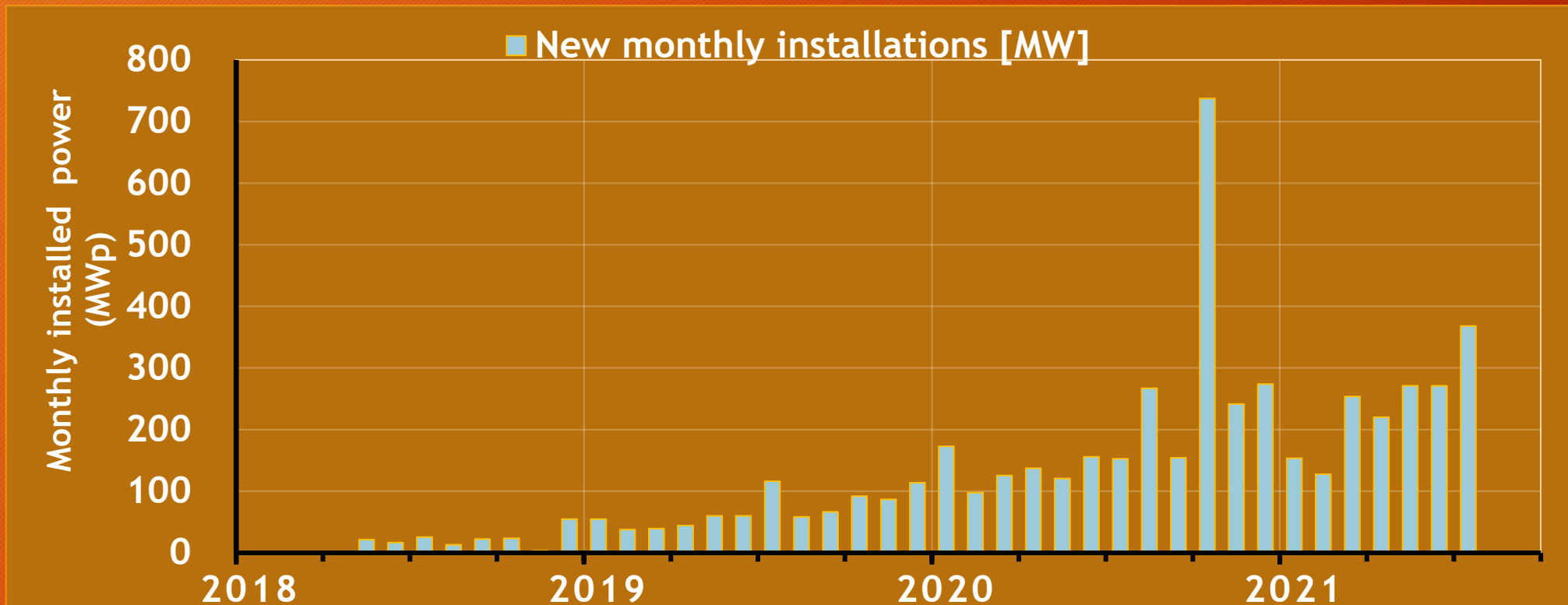


# Total PV power installed in POLAND [MW]

6



# New monthly installations [MW]



# PV market development in Poland

In the case of prosumer micro-installations, a combination of several factors (virtual energy storage - simplicity of the system, affordability, bank acceptance for investment, fear of a rapid increase in grid energy prices, good atmosphere created by state institutions, administrative facilitation, various subsidies) has resulted in a very intensive development of this market segment in the last two years.

In the case of the industrial scale RES installations, the primary incentive for investors are RES energy auctions. In the auction, photovoltaics competes with wind energy, as winning solution in <1MW bids and introducing in >1MW bids. Nowadays also CPPA market is increasing, but needs further legislative support.



# Polish PV market

- The market value in 2020 was approx. € 2.2 billion
- Employment at the end of 2020 is approx. 8000 people (mainly in installation, and sales)
- Production lines with a capacity of 50 - 120 MW / year (SWTC - smart wire, classic and full black modules, BIPV, halfcut, glass-glass)
- Unit power of PV modules from Polish producers is up to 400 Wp
- Manufacturers focus on innovation: quantum dot modules (patent 2018, commercial production will start in mid-2021), printing modules from organic compounds (third generation cells), perovskites, semielastic modules
- The main directions of import of PV modules are: Germany 50%, China 15%, Italy 15%
- A shift from multicrystalline to monocrystalline technology is observed

The first attempts at legal regulations were made about 15 years ago (industrial scale installations). The Act on Renewable Energy Sources was passed only at the beginning of 2015, after a legislative process lasting over 5 years. In the last 5 years, this act has been amended many times and it seems that it will be amended again in the near future. Some of the amendments are revolutionary, e.g. the one from mid-2016 replacing the feed-in tariff system (FIT) with a discount system. So far, the provisions of the EU directive on renewable energy sources (RED II) of 2018 have not been implemented in Polish law. It is therefore in vain to look for solutions dedicated to a group (collective) energy prosumer, energy communities, CPPA development support.

# Polish RES regulations

# PV components and installer companies

**PV module production - 500 MW / year potential (utilisation 50-60%, planned growth)**

Bruk-bet Solar, ML-System S.A. (BIPV, quantum dot glass), Corab, Hanplast (bifacial), Selfa PV GE, X-disc, JBGPV, Saule Technologies

**Support structures**

Corab, Energy 5, Baks, Remor, Megawaty

**Cable, connector and tool manufacturers**

Technokabel, Elektrim, Tele-Fonika Kable, Emiter, Erko

**Energy storage**

BMZ

**Inverters**

Spirvent

**Installation**

Hymon, Columbus, Foton Technik / Innogy, Alseva

# Near future of domestic PV industry

The COVID-19 pandemic in the first half of 2020 sharply disrupted supply chains in the PV industry. The implementation of ambitious ecological plans (Winter Package, New Green Deal) forced EU decision-makers to take a new look at the European PV industry and attempt to recreate it after the collapse caused by losing the price war with products from China. One of the ideas for protecting European PV production is to introduce a "carbon border tax". Taking advantage of the opportunity to obtain funds from the EU, the government of the Republic of Poland in consultation with the Polish PV industry, took decisive measures to develop the photovoltaic industry in the form of public-private partnership. It is also planned to apply innovative technologies and significantly strengthen domestic producers of other components of PV systems.

# PV support schemes

## Subsidy programmes (NFOŚiGW, WFOŚiGW, Ministry of Development)

- „Mój Prąd”, „Agroenergia”, „STOP-SMOG”, „Czyste Powietrze”, Regional Operational Programs, Operational Program „Infrastructure and Environment”

## Tax incentives

- Thermo-modernization relief, thermo-modernization bonus

## Preferential loans and bank guarantees

## Discounts - net-metering for prosumers

## RES Energy auctions

The discount system is dedicated to prosumers generating energy from renewable sources in micro-installations. Thanks to the adopted method of billing the energy introduced and taken from the grid by the prosumer. The prosumer may at any time feed the surplus of energy produced to the grid, and then collect **80%** (for installations up to 10 kW) or **70%** (for installations with a capacity of 10-50 kW) of the previously fed amount of energy for free (no distribution fees). The collection does not have to be immediate - the prosumer has 12 months to do so. If during this time he does not use his energy consumption limit, this energy is lost. The discount system works for 15 years from the first generation of energy in the micro-installation.

## Discounts - net metering

# Main challenges

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- Network capacity for RES
- Energy balancing
- Access to the prosumer system for more citizens
- Integration to the grid
- Energy management system
- Energy storage
- Smart consumption

# More changes coming....

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- Winter package implementation
  - Energy and RES communities
  - Equal distribution fees
- Grid integration - local energy management
- Wider access to the system
  - Virtual prosumer
  - Collective prosumer
- Increased self-consumption
  - Individual energy storage
  - Change of support schema for newcomers