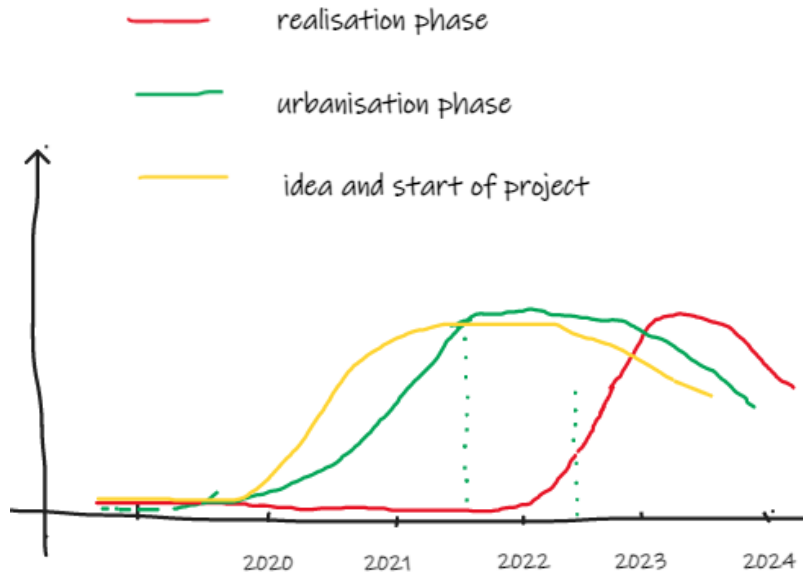


# Producers on the Distribution Grid in MK

May, 2023

# Deployment of RES in the distribution grid in MK (1/2)

## Process phases



→ Rapidly increasing interest since 2020

- Constant “capacity load” since 2021
- Preparatory and urbanization phases about to finish → moving towards realization
- Focus on realization phase in 2023

# Deployment of RES in the distribution grid in MK (2/2)



## Key deployment drivers

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### → Key drivers until 2015

- Feed-in subsidization scheme

### → Installed capacity until 2015

- Photovoltaics → 17 MW
- Small Hydro PP → 96 MW
- Biogas/Biomass → 6 MW

### → Key drivers 2016 onwards

- Premium photovoltaic tariffs
- Feed-in tariffs for other RES
- High market prices in recent years

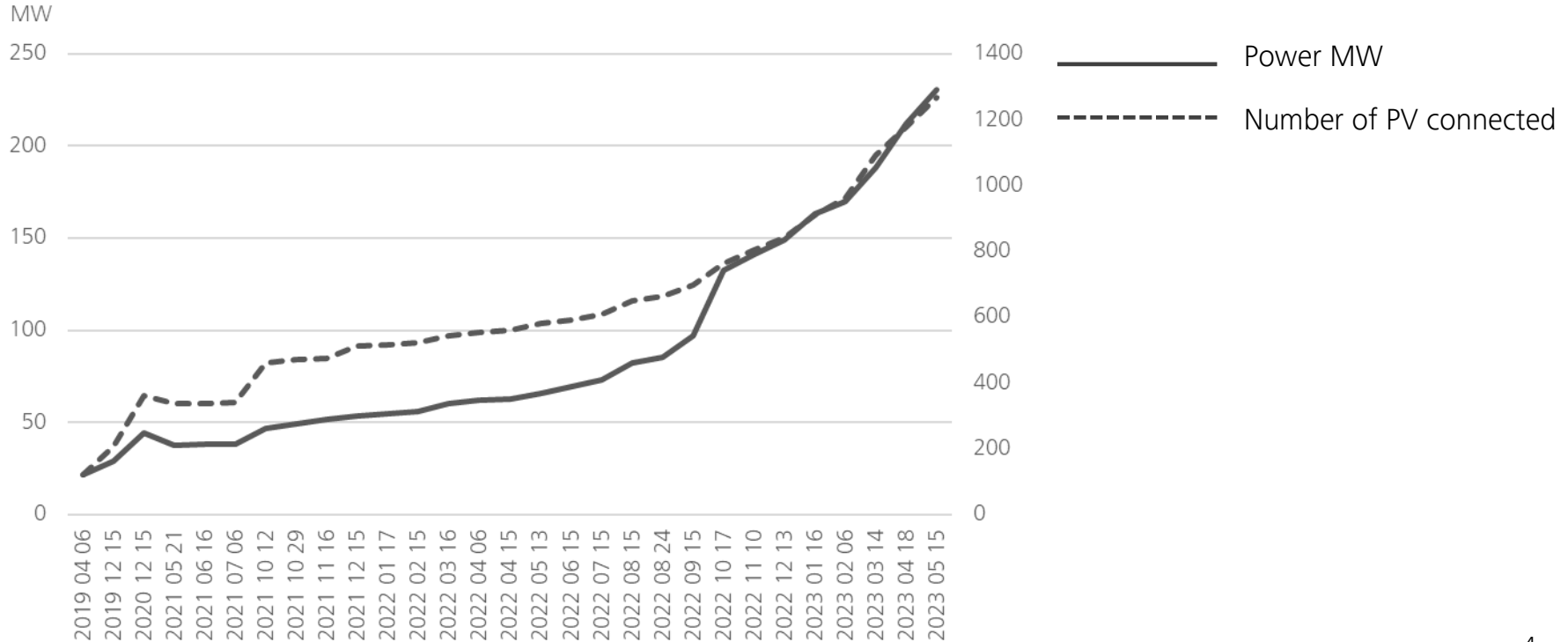
### → New installed capacity since 2016

- Photovoltaics → 235 MW
- Small Hydro PP → 134 MW
- Biogas/Biomass → 11 MW

DSO is facing challenging pressure of new RES producers in recent years!

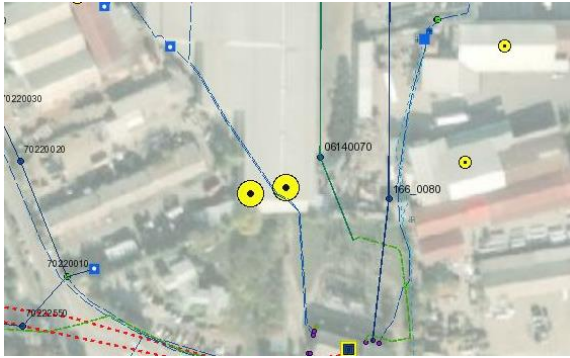
# Scope of Producers on Distribution Grid

## Growth of Connected PV in MK



# Tracking Producers on the Distribution Grid (1/3)

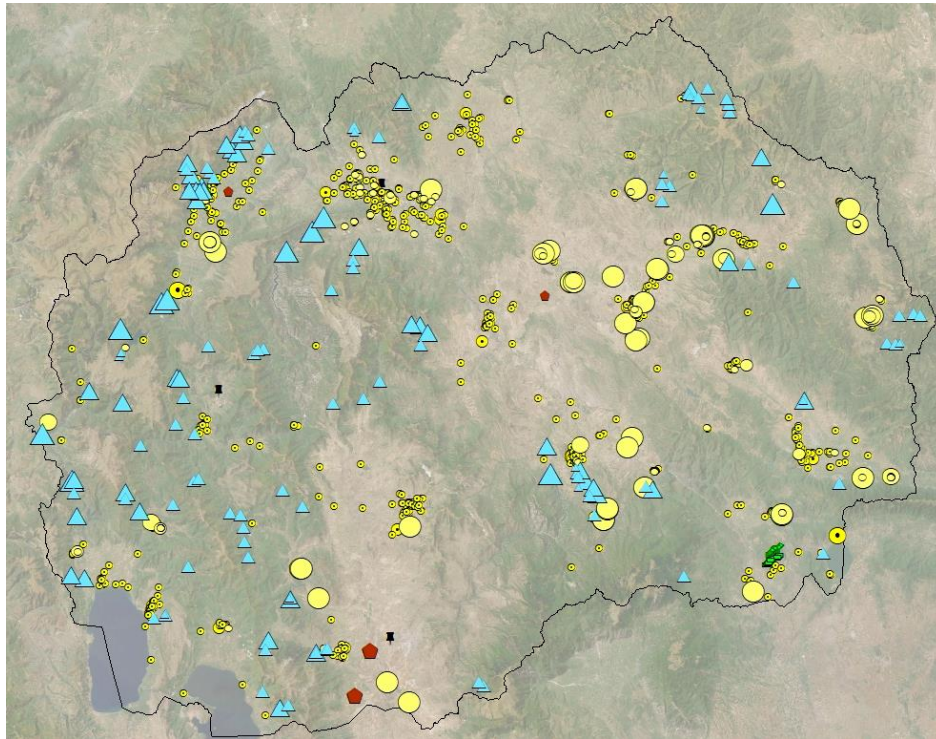
## ED Data Management



- Recording of the data in technical systems
  - GIS (Geographic Information System)
  - ADMS (Advanced Distribution Management System)
- Internal procedure for managing the data related to planned and connected producers
- Spatial, electrical visualization and technical analyzes for connection
- Range from several kW till several MW

# Tracking Producers on the Distribution Grid (2/3)

## Connected Producers

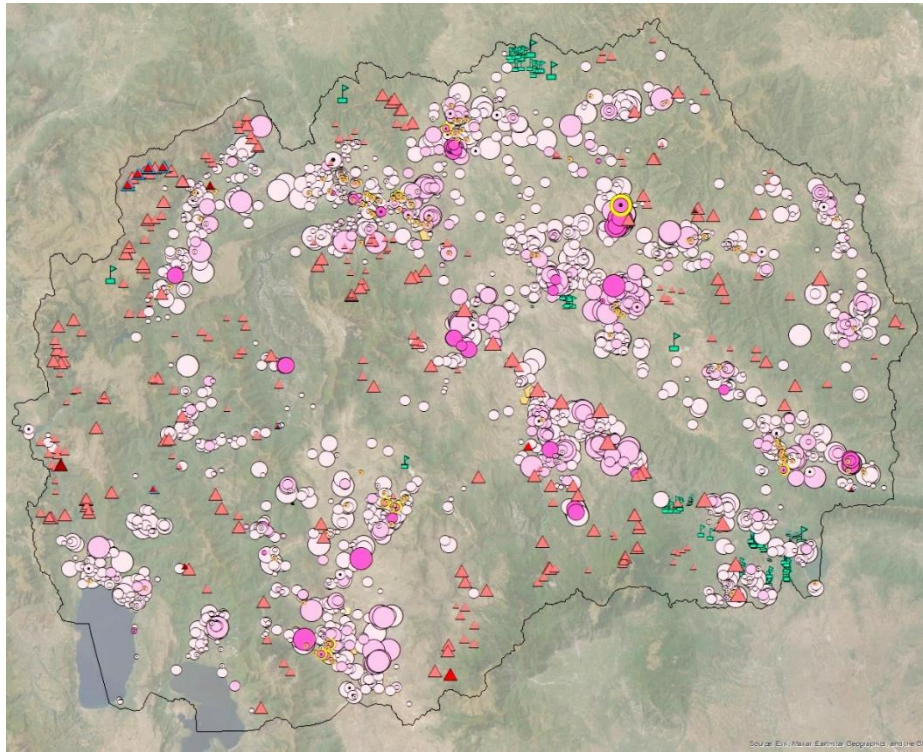


- ▲ Hydroelectric power plant
- Photovoltaic power plant
- Photovoltaic power plant\_Prosumer
- ⬠ Biomass power plant
- 🌳 Wind power plant
- Coal-fired power plant

\* Size of the symbols is corresponding to the installed power

# Tracking Producers on the Distribution Grid (3/3)

## Planned Producers

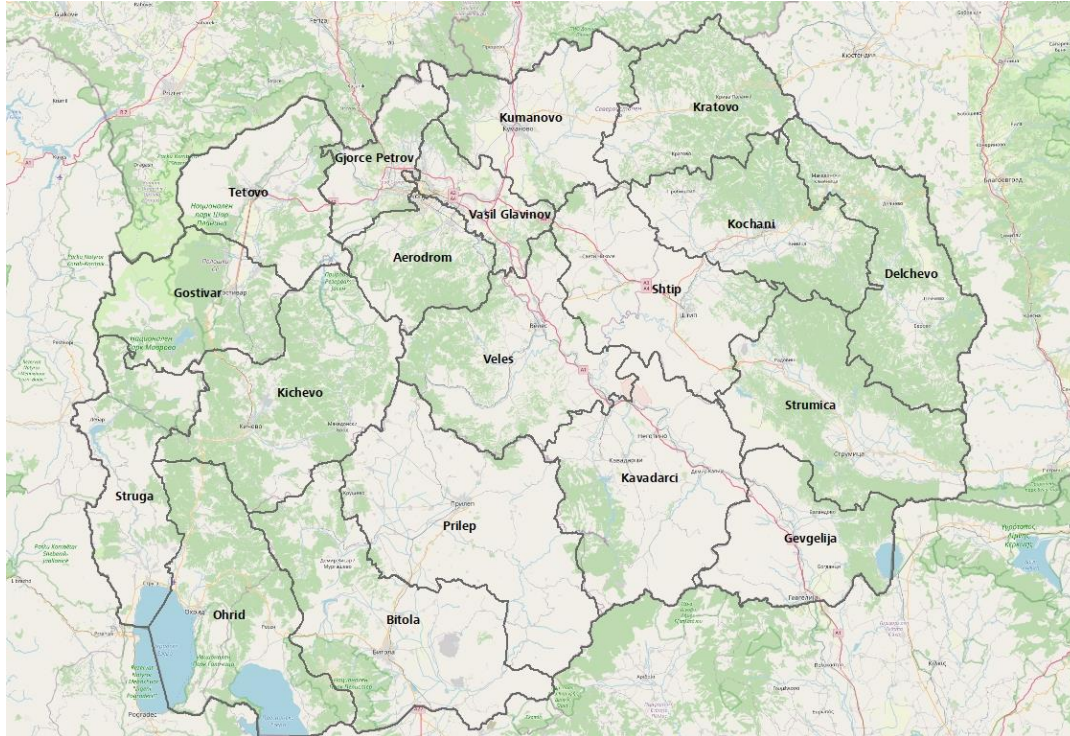


- ▲ HPP\_w/\_Building\_permit
- ▲ HPP\_High\_probability
- ▲ HPP\_Medium\_probability
- ▲ HPP\_Low\_probability
- PVPP\_Prosumer\_w/\_Building\_permit
- PVPP\_Prosumer\_High\_probability
- PVPP\_Prosumer\_Medium\_probability
- PVPP\_Prosumer\_Low\_probability
- PVPP\_w/\_Building\_permit
- PVPP\_High\_probability
- PVPP\_Medium\_probability
- PVPP\_Low\_probability
- ◆ BPP\_w/\_Building\_permit
- ◆ BPP\_High\_probability
- ◆ BPP\_Medium\_probability
- ◆ BPP\_Low\_probability
- 📍 WPP

\* Size of the symbols is corresponding to the planned power

# Customer Electricity Centers (KEC)

## Territorial organization of DSO





# Connected and Planned Producers

## Distribution per KEC in MW

KEC	Connected PV	Connected PV_Prosumer	Connected Biomass/ Biogass	Connected SHPP	Total	Planned			
						Submitted BSP	High	Medium	Low
10 AERODROM	1,7	4,5		2,7	9,0	2,7	5,6	19,9	588,0
11 TETOVO	4,1	4,8	1,0	26,6	36,6	46,1	46,8	43,2	170,7
12 OHRID	1,4	8,0		10,2	19,6	21,8	22,4	108,7	138,3
13 BITOLA	3,9	7,5	6,0	10,9	28,3	26,5	27,8	267,9	370,8
14 PRILEP	4,3	9,2		0,8	14,3	29,7	39,9	74,8	265,3
15 VELES	5,5	5,8	1,0	8,4	20,7	16,0	22,6	68,9	265,0
16 KUMANOVO		4,6		2,7	7,4	2,4	32,2	38,5	264,7
17 SHTIP	35,0	10,4	2,0		47,3	111,0	111,0	334,3	1051,6
18 STRUMICA	6,0	11,1		2,6	19,7	47,2	53,5	87,8	1039,1
19 GOSTIVAR	0,1	3,7		0,7	4,4	0,1	2,6	1,5	97,4
21 KICHEVO		0,8		9,0	9,8	11,6	10,6	44,4	106,7
22 STRUGA	1,1	2,4		10,8	14,2	7,1	8,3	17,8	104,7
25 KAVADARCI	12,1	15,1		21,2	48,4	49,0	70,0	288,9	391,3
28 GEVGELIJA	2,0	6,3		1,3	9,6	12,2	11,8	5,3	282,6
30 KOCHANI	10,9	11,3		4,6	26,8	47,7	110,9	48,2	490,4
32 DELCHEVO	9,8	2,8		17,4	30,0	25,1	36,0	18,7	293,6
35 KRATOVO		0,2		4,9	5,2	17,5	16,9	12,0	347,2
38 V.GLAVINOV	4,6	12,5	0,6	0,2	17,9	34,2	33,8	59,3	118,2
39 G.PETROV	0,4	4,3		10,0	14,7	5,6	5,6	2,0	114,8
TOTAL	102,7	125,4	10,6	141,6	380,3	513,5	668,4	1657,2	7042,1

→ Probability that planned producers will be realized

- High – procedure for e-approval for building or Request for consent for connection has been initiated
- Medium – initiated procedure for urbanization (e-urbanism)
- Low – informational indication or submitted request for opinion for connection possibilities

# Efforts for structural deployment of PVs (1/2)

## Consent for construction of PV plants

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- Pursuant to Amendments on Energy Law from November 2022, Consent for the construction of a photovoltaic power plant shall be issued
  - Mandatory document that needs to be obtained prior to the construction process – each competent institution should consider it within each phase of the investment project
  - Consents are issued according previously adopted Indicative Plan
    - For capacities with  $P_{max} < 10$  MW by Ministry of Economy,
    - For capacities with  $P_{max} > 10$  MW by Government upon recommendation from Ministry of Economy
  
- Existing ongoing PV projects are exempt from the obligation to obtain Consent for construction

# Efforts for structural deployment of PVs (2/2)

## Indicative plan for deployment of RES



- Indicative Plan for deployment of RES is adopted every year by the Government on proposal of the Ministry of Economy, consisting
  - Electricity production technologies for which the construction procedure may be initiated in the respective period
  - Total installed capacity per regions which could be connected to the transmission and the distribution systems
  - Report on realization of the Indicative Plan from previous year
- The Indicative plan shall be prepared on basis of
  - Development Plans for TSO and DSO and
  - Other relevant information from competent institutions