IrREA

Iran Renewable Energy Association

Renewable energy investment in Iran









Renewable energy and energy efficiency organization of Iran (SATBA)

SATBA vision 2031

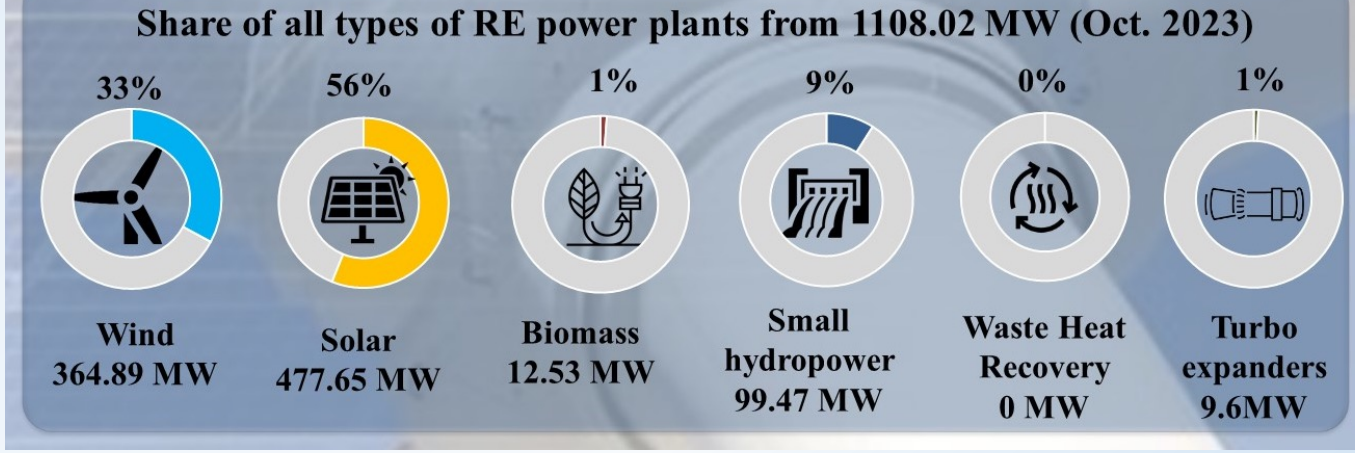
Promotion of the share of renewable energy to a minimum of 15% of the installed power capacity of the country (equivalent to 18,000 megawatts) and establishment of the central authority responsible for energy efficiency and reduction of electrical energy losses throughout the production-to-consumption chain, equivalent to 25,000 megawatts (equivalent to 80 billion kilowatt-hours annually) by the year 2030.

Mission Statement of SATBA

Enhancing the production and utilization of renewable and clean energies in the electricity sector, and improving electrical energy efficiency at the national level through *policy-making*, *regulation*, *facilitation*, *and the management of relevant projects*

Renewable Energy statistics in Iran

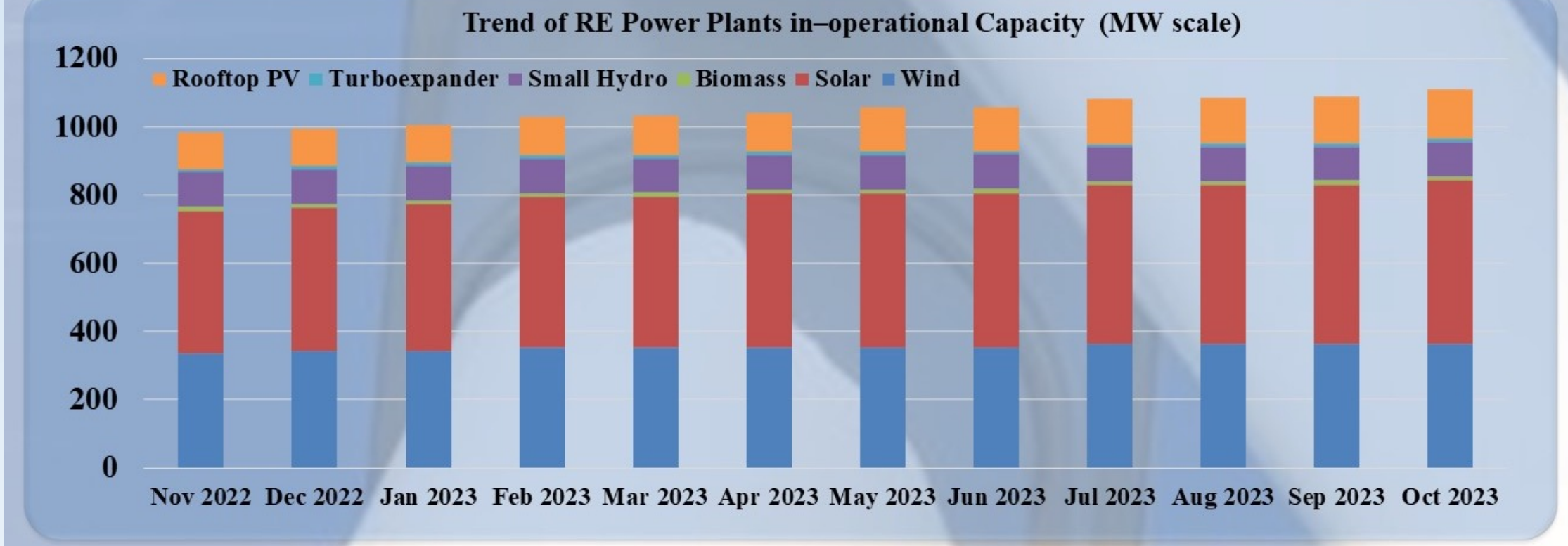
Cumulative (Till October 2023)		October 2023
10802	Generated Electricity from RE (million KWh)	182
3023	Fossil Fuel Conservation (Million cubic meter natural gas)	49
2376	Water conservation (million liter)	40
6857	Prevention of CO_2 (Thousand ton)	102
45.7	Prevention of air pollutants(SPM, NOx,SOx,…) (thousand ton)	0.8



Renewable energy statistics in Iran

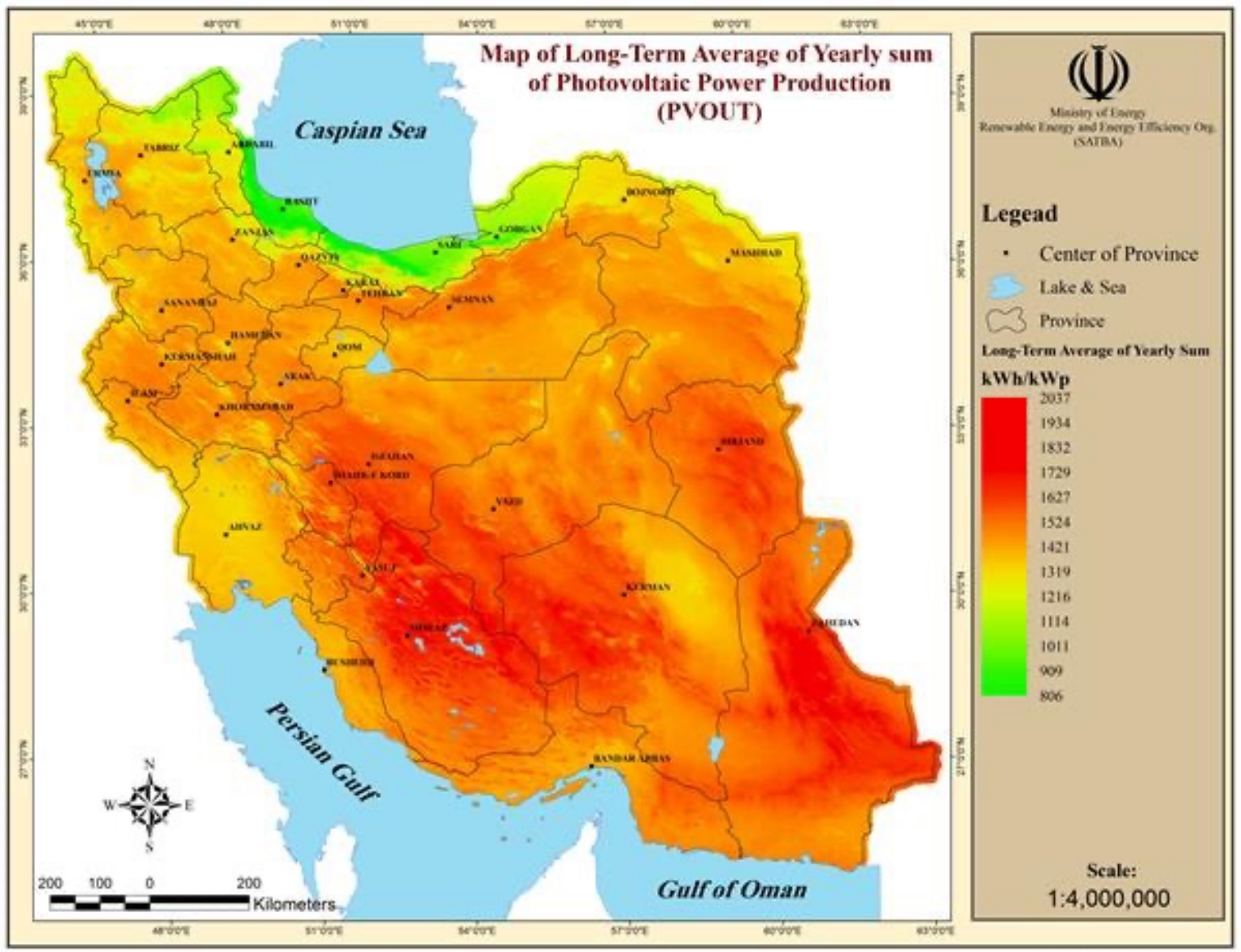
Number of rooftop PVs **12717 Units**

Cumulative Capacity of rooftop PVs **135802 kW**



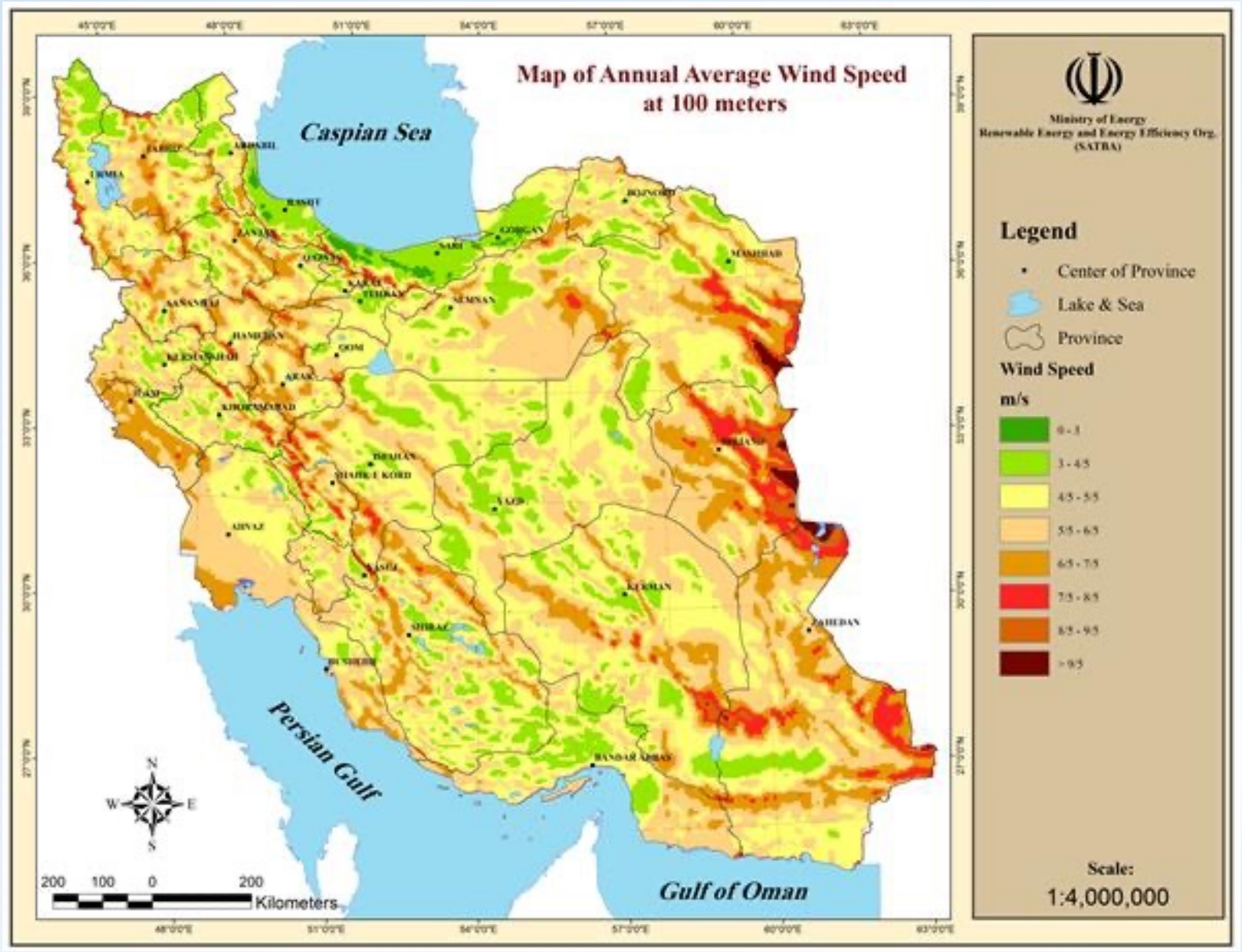
The share of RE power plants in total annual electricity generation is **0.6 %**

Resource Assessment of Solar energy in Iran



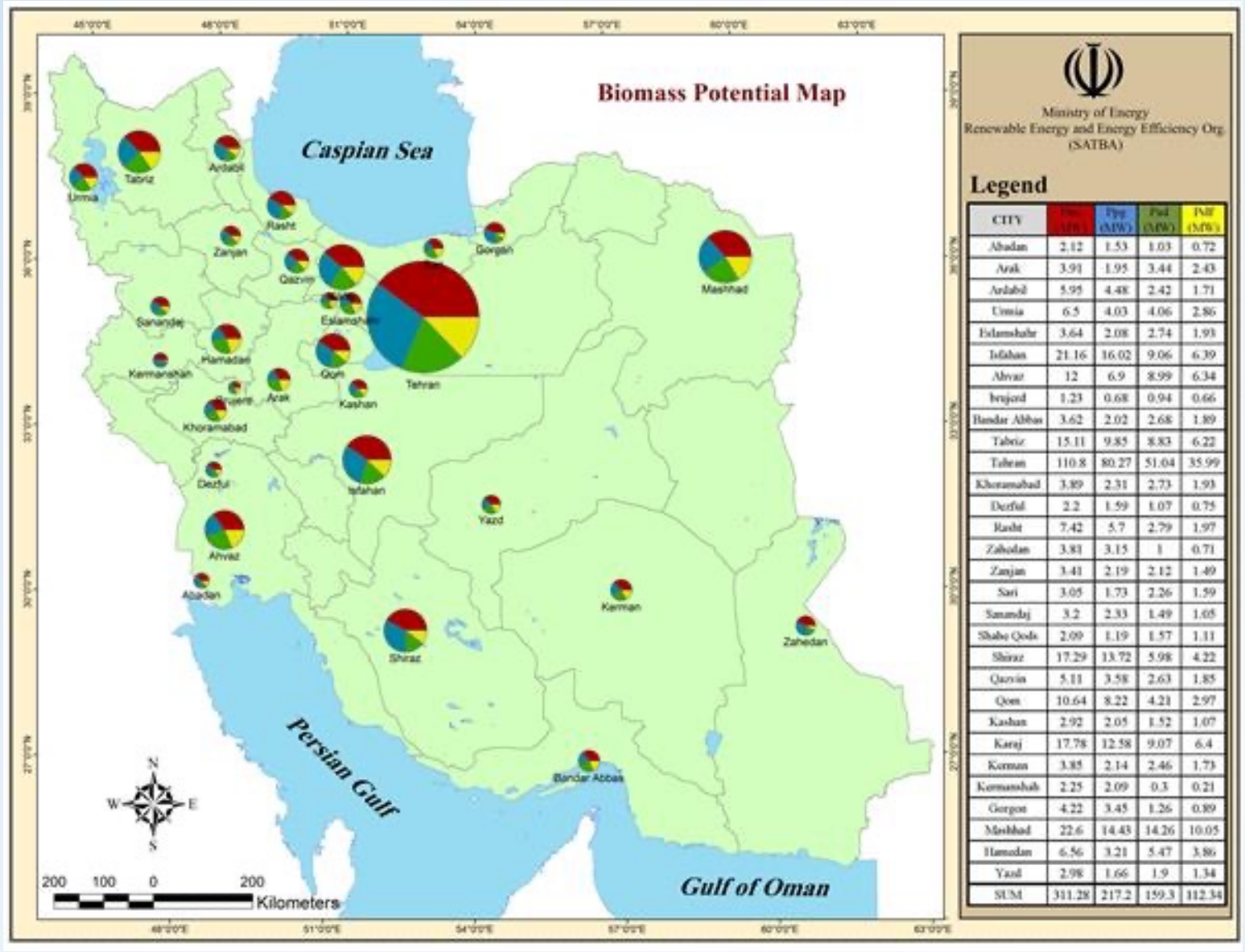
Iran with 300 sunny days in a year, is a paradise for construction of PV power plants and generating solar electricity

Resource Assessment of Wind Energy in Iran



According to the Resource Assessment studies, the ability of producing more than <u>40,000 megawatts</u> wind energy is in Iran

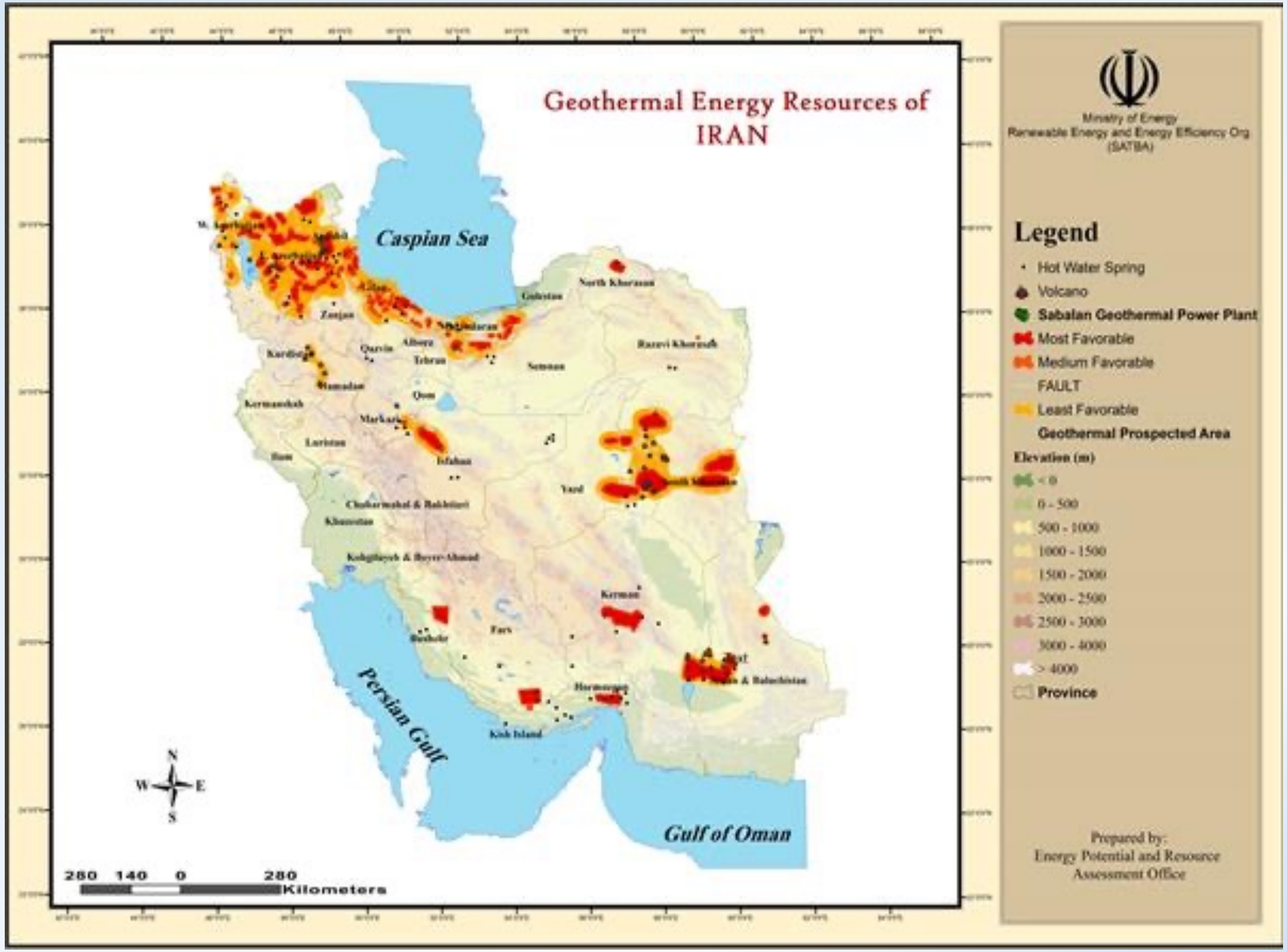
Resource Assessment of Biomass energy in Iran



CITY	[illegible] (MW)	Ppg (MW)	Pad (MW)	Pdf (MW)
Abadan	2.12	1.53	1.03	0.72
Arak	3.91	1.95	3.44	2.43
Ardabil	5.95	4.48	2.42	1.71
Urmia	6.5	4.03	4.06	2.86
Eslamshahr	3.64	2.08	2.74	1.93
Isfahan	21.16	16.02	9.06	6.39
Ahvaz	12	6.9	8.99	6.34
brujerd	1.23	0.68	0.94	0.66
Bandar Abbas	3.62	2.02	2.68	1.89
Tabriz	15.11	9.85	8.83	6.22
Tehran	110.8	80.27	51.04	35.99
Khoramabad	3.89	2.31	2.73	1.93
Dezful	2.2	1.59	1.07	0.75
Rasht	7.42	5.7	2.79	1.97
Zahedan	3.81	3.15	1	0.71
Zanjan	3.41	2.19	2.12	1.49
Sari	3.05	1.73	2.26	1.59
Sanandaj	3.2	2.33	1.49	1.05
Shahe Qods	2.09	1.19	1.57	1.11
Shiraz	17.29	13.72	5.98	4.22
Qazvin	5.11	3.58	2.63	1.85
Qom	10.64	8.22	4.21	2.97
Kashan	2.92	2.05	1.52	1.07
Karaj	17.78	12.58	9.07	6.4
Kerman	3.85	2.14	2.46	1.73
Kermanshah	2.25	2.09	0.3	0.21
Gorgon	4.22	3.45	1.26	0.89
Mashhad	22.6	14.43	14.26	10.05
Hamedan	6.56	3.21	5.47	3.86
Yazd	2.98	1.66	1.9	1.34
SUM	311.28	217.2	159.3	112.34

According to the Resource Assessment studies, the ability of producing more than 800 MW Biomass energy is in Iran

Resource Assessment of Geothermal energy in Iran



Investment method and driving Force in Renewable Energy field

Construction of Renewable Power plants using Buy Back model

Article 16 of the Law on Increasing Knowledge-Based Productions



Electricity supply for cryptocurrency mining centers

Article 12 of the Law on Removing Barriers to Competitive Production



Construction of a solar power plant in industrial Parks

Guaranteed power purchase agreements

Development of specialized solar Parks

Green trading board of the energy exchange market

Export of renewable electricity

Development of Rooftop solar power plant

Guaranteed purchase of renewable electricity

- The capacity of power plant can be up to up to 1 MW and twice the maximum electricity demand contract
- The contract period is 20 years
- The base tariff annually adjusted from the starting date of operation based on the fluctuation of Euro exchange rate and internal inflation

Guaranteed basic purchase price (Rials)	Power plant capacity	Type of technology	Row
25000	20 kW and less	Solar Power Plant	1
22000	Between 20 kW and 1 MW		2
22500	250 kW and less	Wind Power Plant	3
17000	Between 250 kW and 1 MW		4

Maximum allowed construction period(months)	Base rate	Type of power plant (biomass)		Row
24	13500	Landfill	Biomass	۱
24	21800	Biological processes (biochemical)		۲
30	30000	Thermal processes (thermochemical)		۳

Maximum allowed construction period (months)	Guaranteed basic purchase price (Rials)	Type of power plant (hydroelectric)		Row
12	15000	run of the river	Small hydropower (10MW and less)	1
18	19000	in water transmission pipe		2

Construction of Renewable Power plants through auction mechanism

- The maximum power purchase price for electricity is 6.9 cents per kilowatt-hour
- Repayment of the principal amount and investment profits over a period of 6 years (with the flexibility to reduce to 4 years)
- The duration of the contract is 20 years
- Taking advantage of the benefits of the generated electricity through diverse methods in the following years

	Cumulative Capacity (MW)	The number of solar sites
Tender winner through auction mechanism	3035.2	**89**
Contracts concluded using the auction mechanism	1478.7	**34**

Construction of Renewable Power plants through auction mechanism (special rapid construction process)

- 4500 megawatts of solar power plant trough auction mechanism
- The maximum power purchase price for electricity is 7.3 cents per kilowatt-hour
- Repayment period is 5 years
- The duration of the contract is 25 years



Construction of a wind power plant through auction mechanism

- 3000 megawatts of wind power plant trough auction mechanism
- The maximum power purchase price per kilowatt-hour of electricity in the tender is based on the weighted average value of the saved fuel, a maximum of 9.5 cents. also, during the repayment period of the government's obligations, the investor can sell the electricity produced by the power plant in the green electricity board of the Energy Exchange.
- The repayment period is 4.5 years
- The duration of the contract is 20 years



Construction of Renewable Power plants using Buyback model

- Industries can receiving smooth electricity without interruption at the point of consumption
- No power outage during grid restrictions
- No additional fee for electricity transit



Cumulative Capacity(MW)	The number of power plants	Number of applicants
2988	**44**	**43**

Iran's green trading board of the energy exchange market

- Provide the electricity produced by the power plant in physical form or renewable electricity production certificate (REC) in the green board of the Energy Exchange.
- Lack of appropriate power cuts during network restrictions
- No additional fee for electricity transit



A brief review of renewable energy investment models in Iran

- **Construction of renewable power plants by industries through the Buyback model**
- **Construction of renewable power plants in industrial parks and private lands through Guaranteed power purchase agreements**
- **Construction of renewable power plants through Auction mechanism**
- **Construction of renewable power plants through supplying electricity in the Iran's Green trading board of the energy exchange market**
- **Construction of renewable power plants in specialized solar parks through Guaranteed power purchase agreements**
- **Construction of renewable power plants through Supplying electricity for cryptocurrency mining centers**
- **Construction of renewable power plants for Electricity export**
- **Construction of renewable power plants through Guaranteed power purchase agreements (Small Hydro, Biomass, Turboexpander, Rooftop solar power plants.)**



3×7, 8.9, 8.7 MW (total 38.5 MW) capacity grid-connected PV power plant (Hamadan Province, Iran)



55 MW Wind farm
(Takestan, Qazvin Province, Iran)

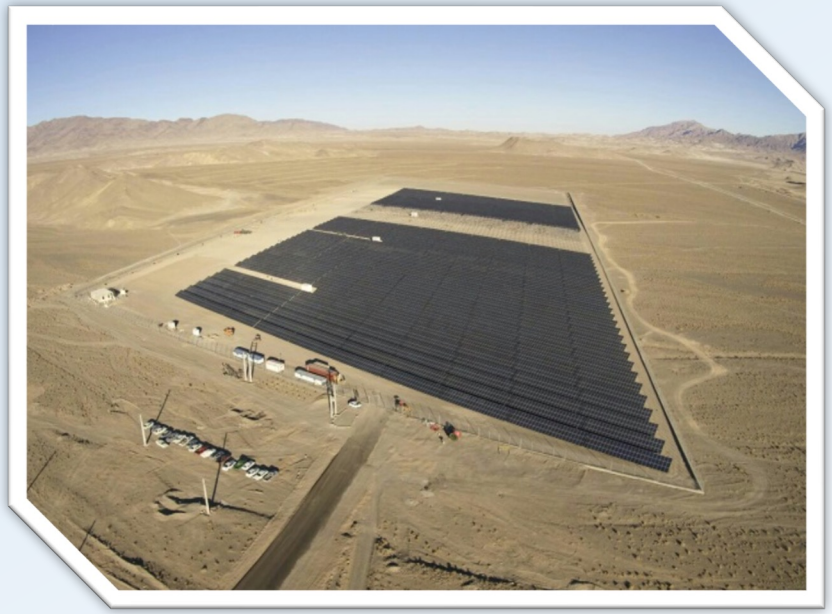


10 MW capacity grid-connected
PV Power Plant (Fars Province, Iran)



10 MW PV power plant
(Qom Province, Iran





2×10 MW capacity PV power plant (Zahedan & Yazd Provinces, Iran)



10 MW capacity PV power plant
(Yazd Province, Iran)



10 MW capacity PV power plant
(Kerman Province, Iran)



9.6 MW capacity Waste Heat Recovery
(Khozestan Province, Iran)



10 MW capacity grid-connected
PV power plant (Isfahan Province, Iran)



10 MW capacity grid-connected
PV power plant (Qeshm Island, Iran)



1 MW capacity grid-connected
PV power plant (Razavi Khorasan, Iran)



10 MW capacity grid-connected
PV power plant (Fars, Iran)

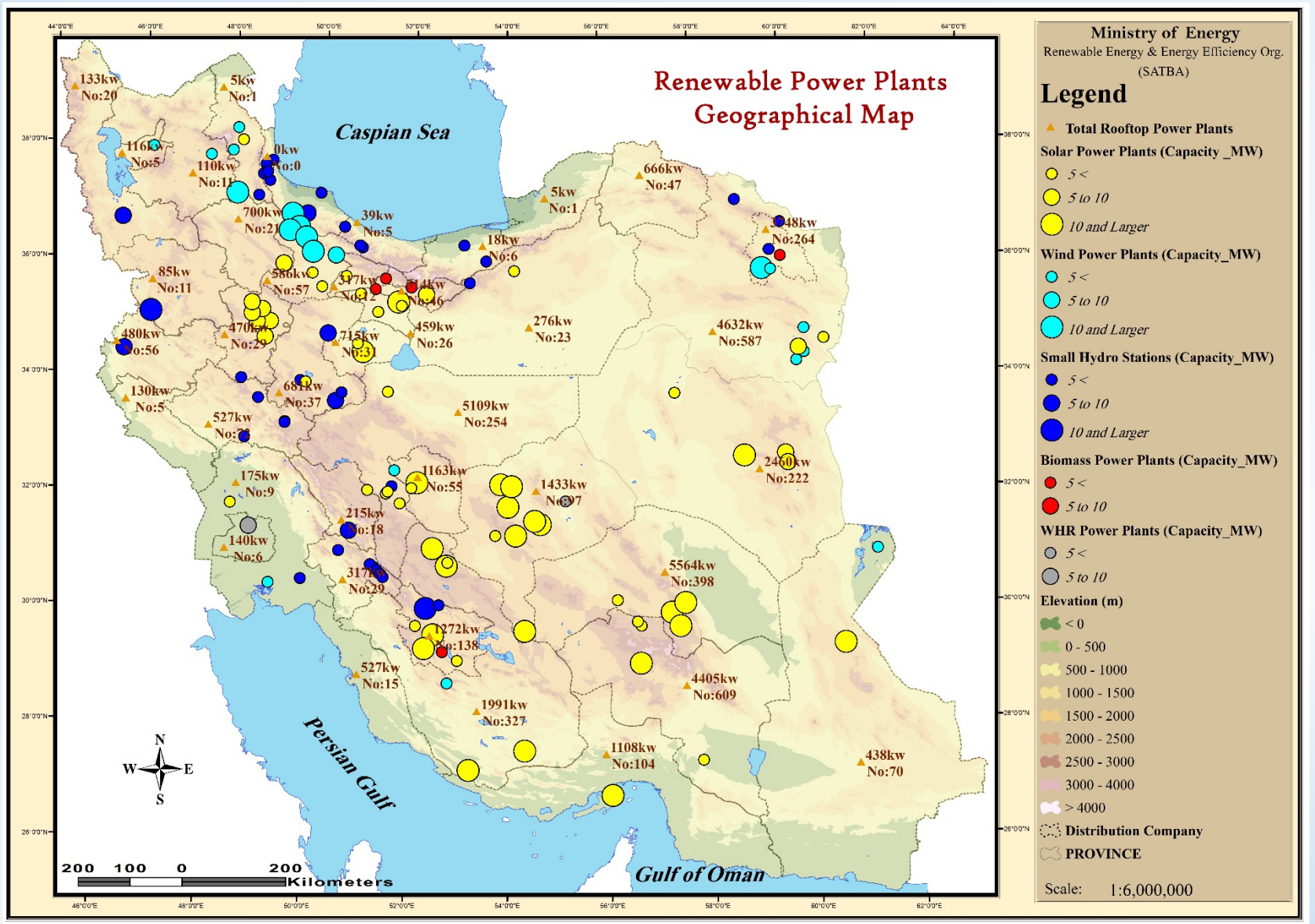


61.2 MW Wind farm
(Qazvin Province, Iran)



3 MW capacity Small Hydropower
(Semnan Province, Iran)

Distribution of Renewable Power Plants in Iran



National Wind Turbine Technology Roadmap

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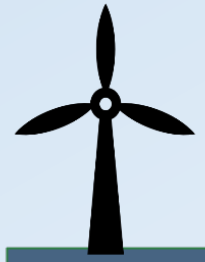
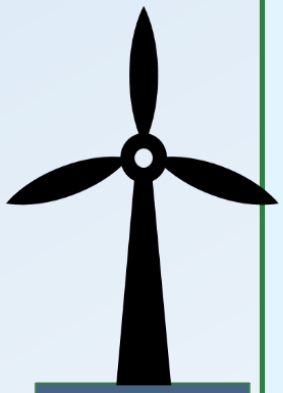
2022	2023	2024	2025	2026	2027



2.5 MW Wind Trbine

Current technological capability

125 MW



MW 4.3 Wind Trbine

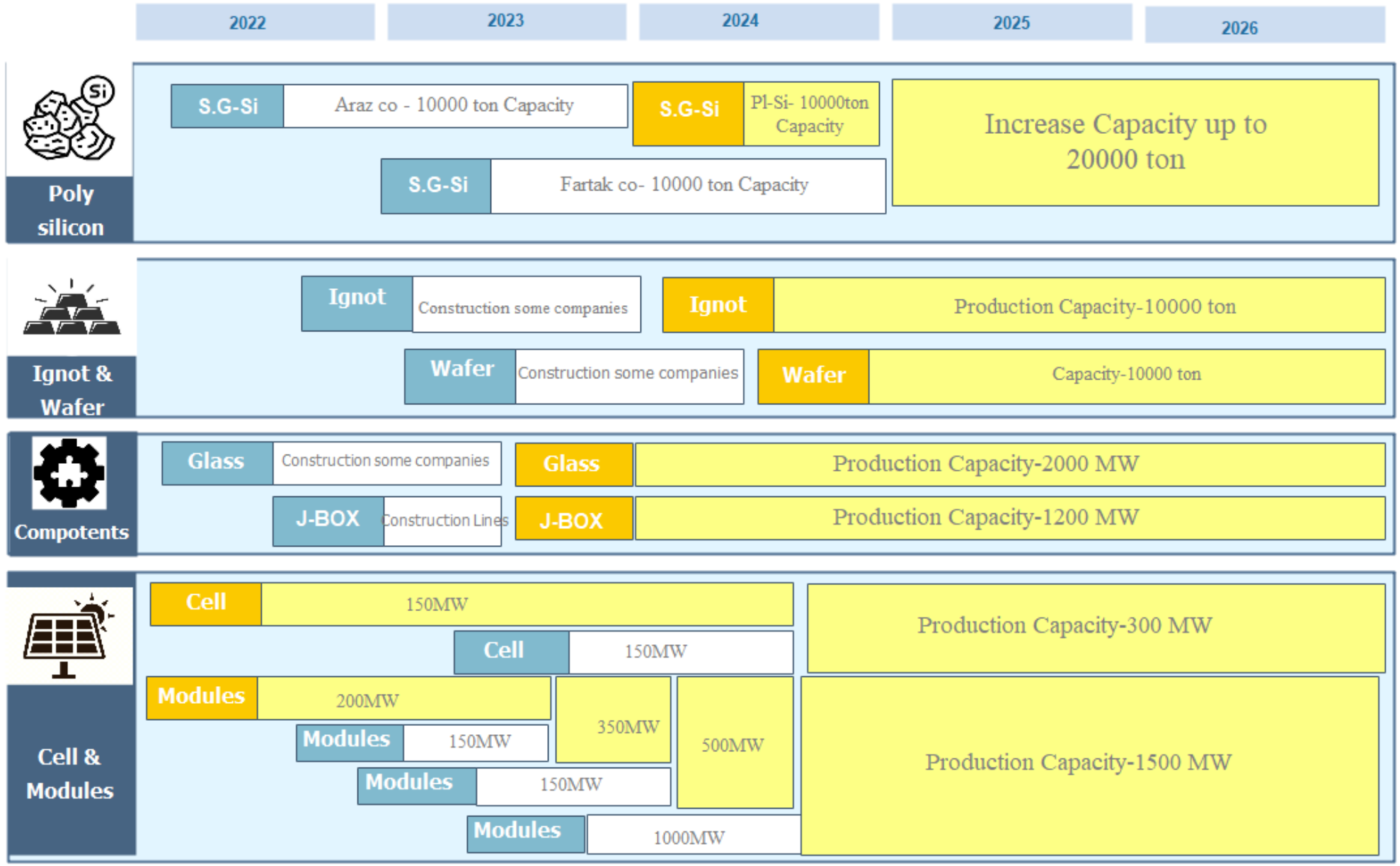
Upgrade

Annual capacity -100MW

Upgrade

Annual capacity -500MW

National Solar Industry technology Roadmap



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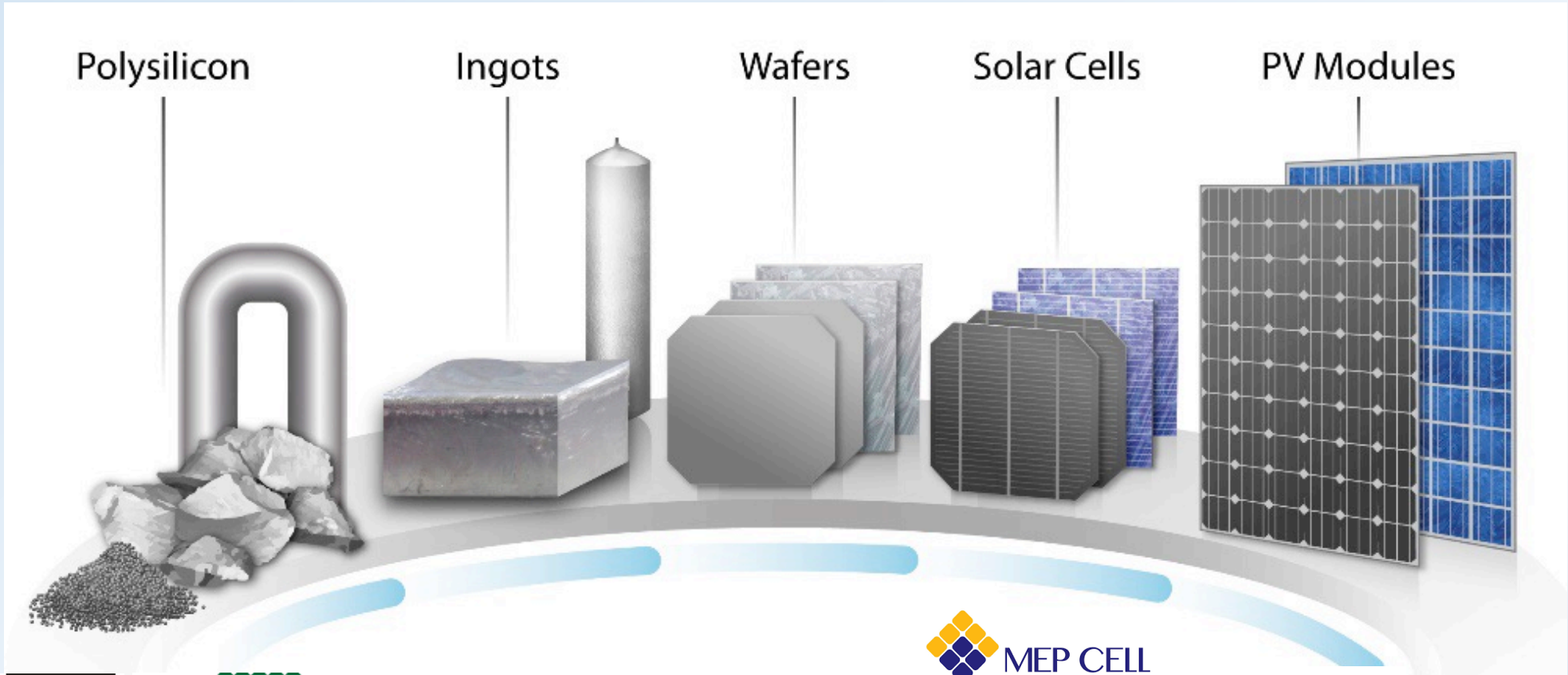
Technological Capability in Solar Value Chain



ARAZ SILICON

FARTAK

تابان
تامین انرژی برق ایرانیان

MEP CELL

صنایع تولیدانرژی پاک آتیه

SSF
Solar Sanat Firoozeh

NOORAN ENERGY

Technological Capability in wind Turbine





Wind Turbine 2.5 MW

Wind Turbine 4.3 MW

Wind Turbine 660 KW

Capability of Iranian EPC companies in Renewable Energy









- Design, engineering, implementation and installation of wind power plants
- Operation and maintenance of wind power plants
- Design and installation of small scale and large scale solar power plants

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Thank you for your kind attention



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