ASIA CLEAN ENERGY FORUM 2022

Enkhsaikhan. T

Clean Energy LLC

Innovating for success Newcom Group

14-17 JUNE 2022

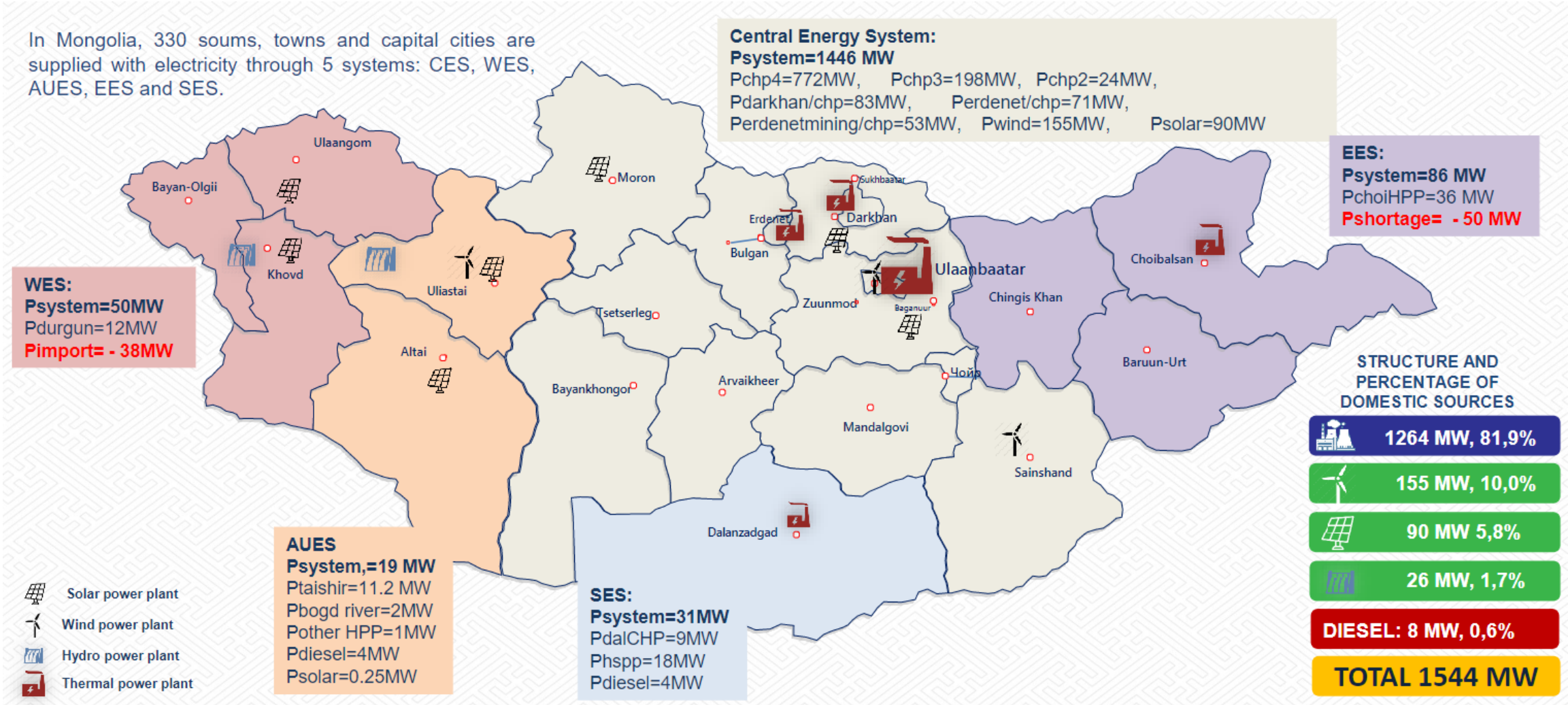
Clean Energy

Content of speech

Overview

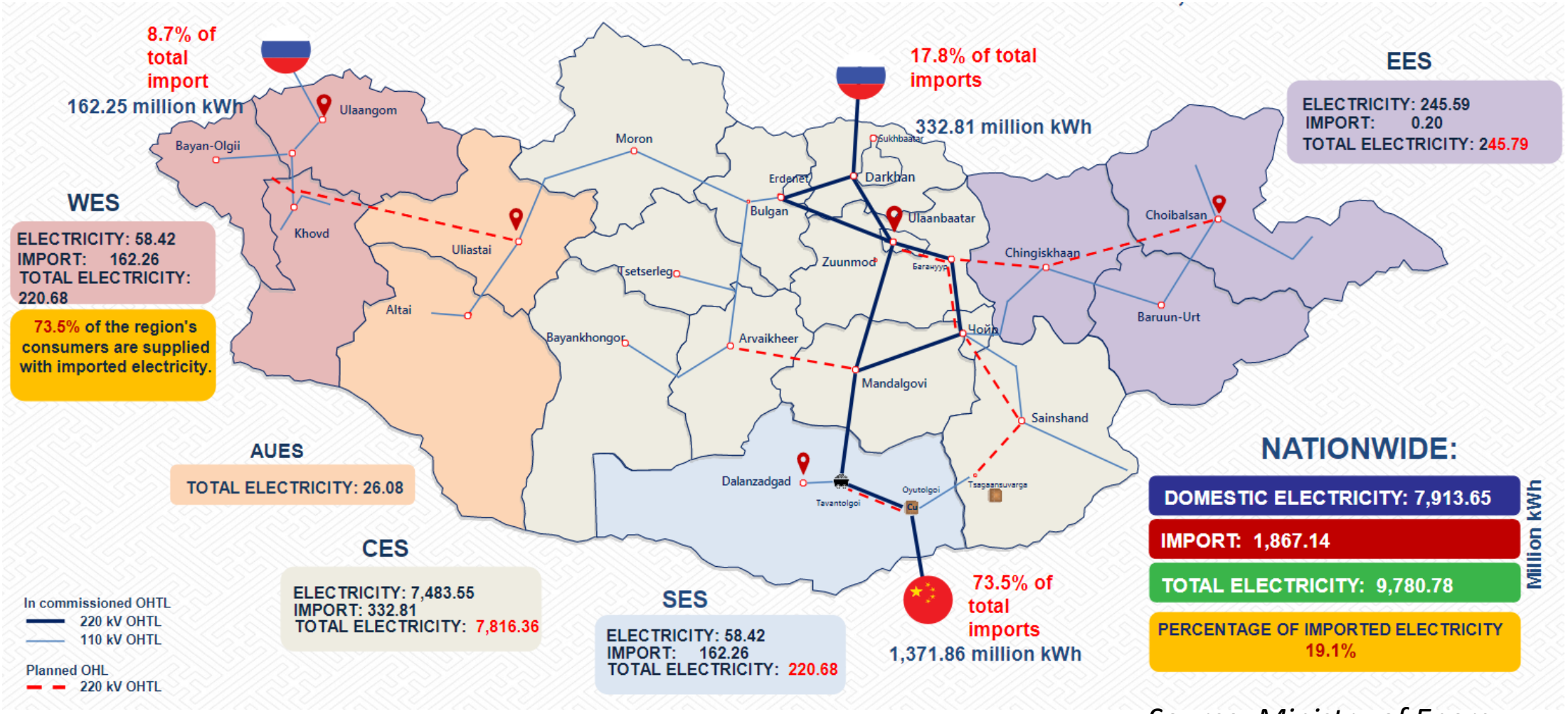
- Renewable energy source
- Operating renewable energy projects
- Planned renewable energy projects
- Sector coupling projects in Mongolia

THE ENEGRY SYSTEM IN MONGOLIA



Source: Ministry of Energy

THE ENEGRY CONSUMPTION IN 2021

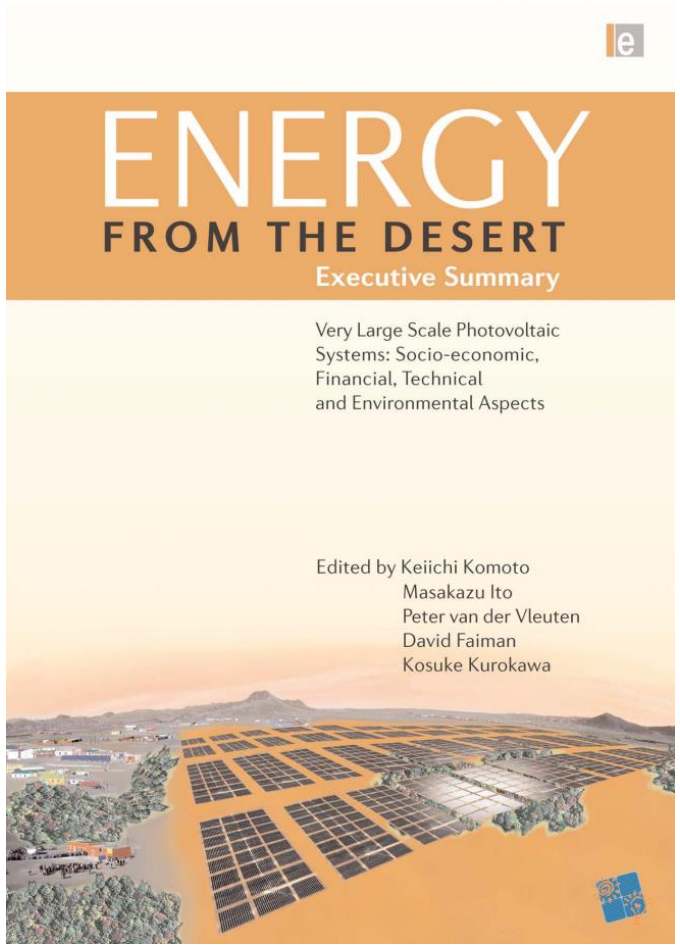


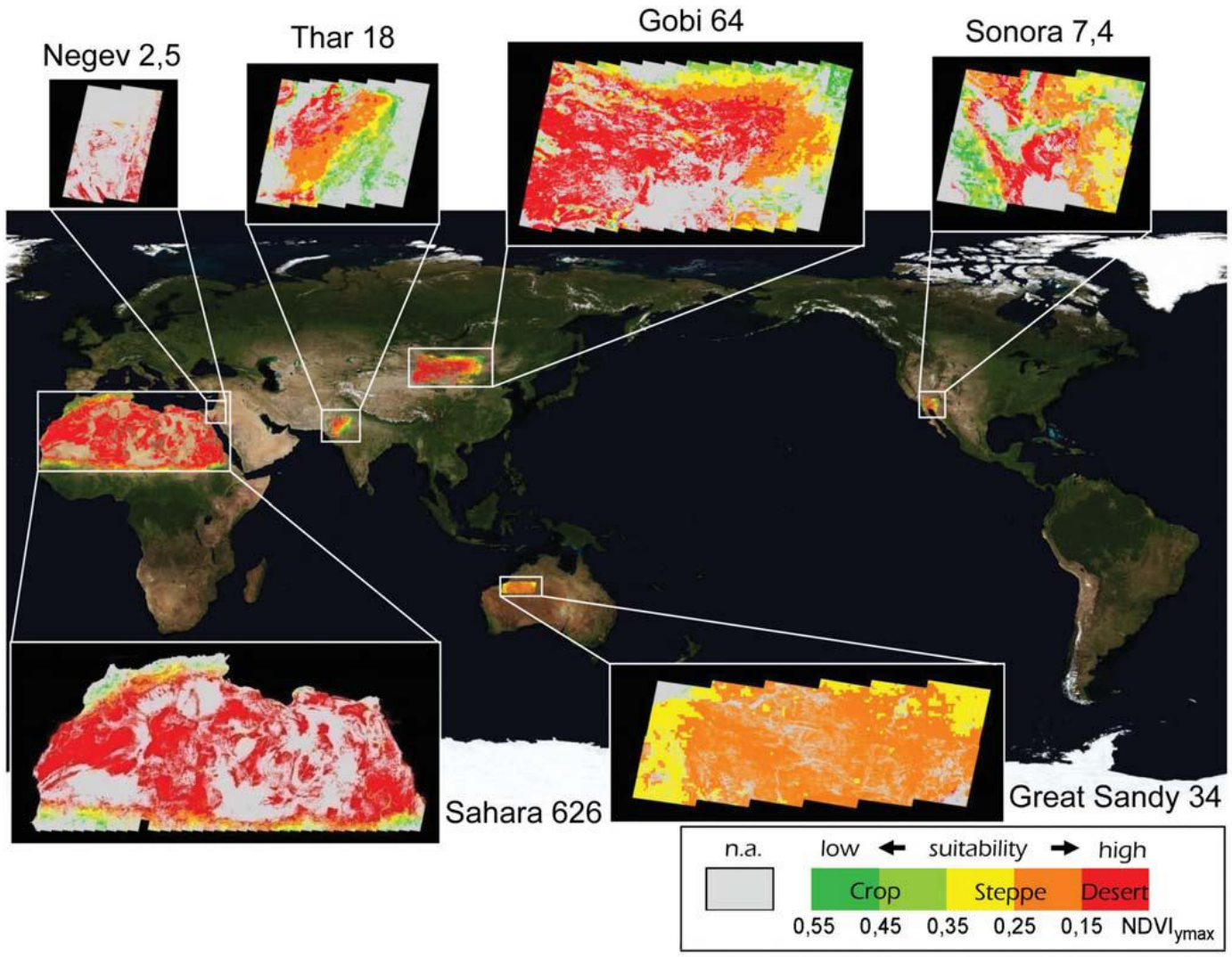
Source: Ministry of Energy

RENEWABLE ENERGY POTENTIAL IN MONGOLIA

ENERGY FROM DESERT

In Gobi desert 270-300 sunny days in a year, 4.3-4.7 kWh/meter or higher per day





Based by Professor K. Kurokawa, led the work of IEA PVPS Task 8, 2009

ENERGY FROM WIND

Mongolia Total - 1 100 000 MW = 1 100 GW

Wind Energy Potential
Megawatts

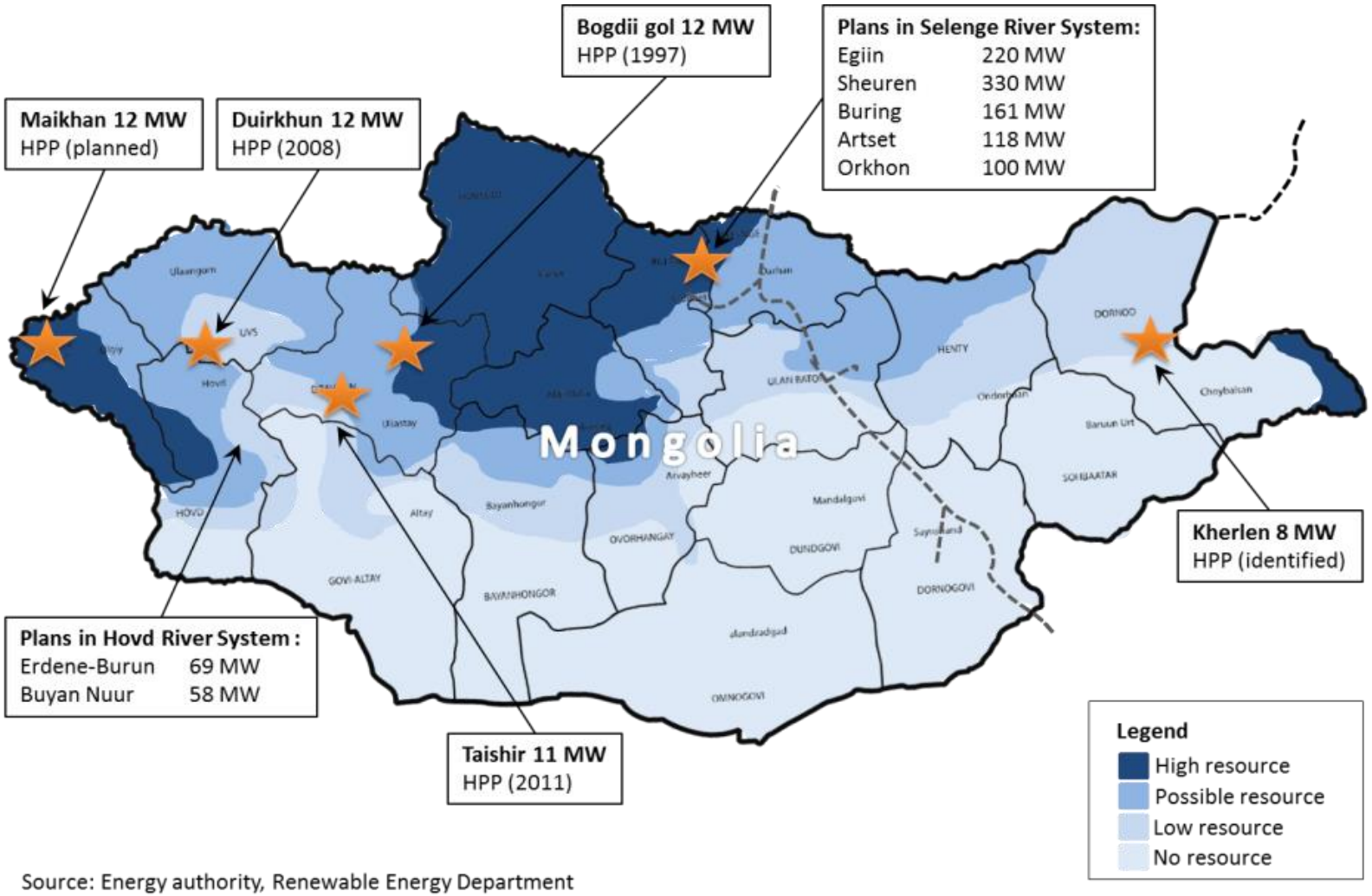
- 5 000 - 10 000
- 10 000 - 25 000
- 25 000 - 50 000
- 50 000 - 75 000
- 75 000 - 100 000
- 100 000 - 310 000

The following assumptions were used in calculating the total potential wind electric capacity installed

Minimum wind power - 300W/m²
Turbine size - 500 kW
Hub height - 40 m
Rotor diameter - 38 m
5D side-to-side spacing - 190 m
10D front-to-back spacing - 380 m
Swept area - 1 134 m²
Turbines/km² -13.9
Capacity/km² - 6.9 MW

Source: IRENA_RPA_Mongolia_2016

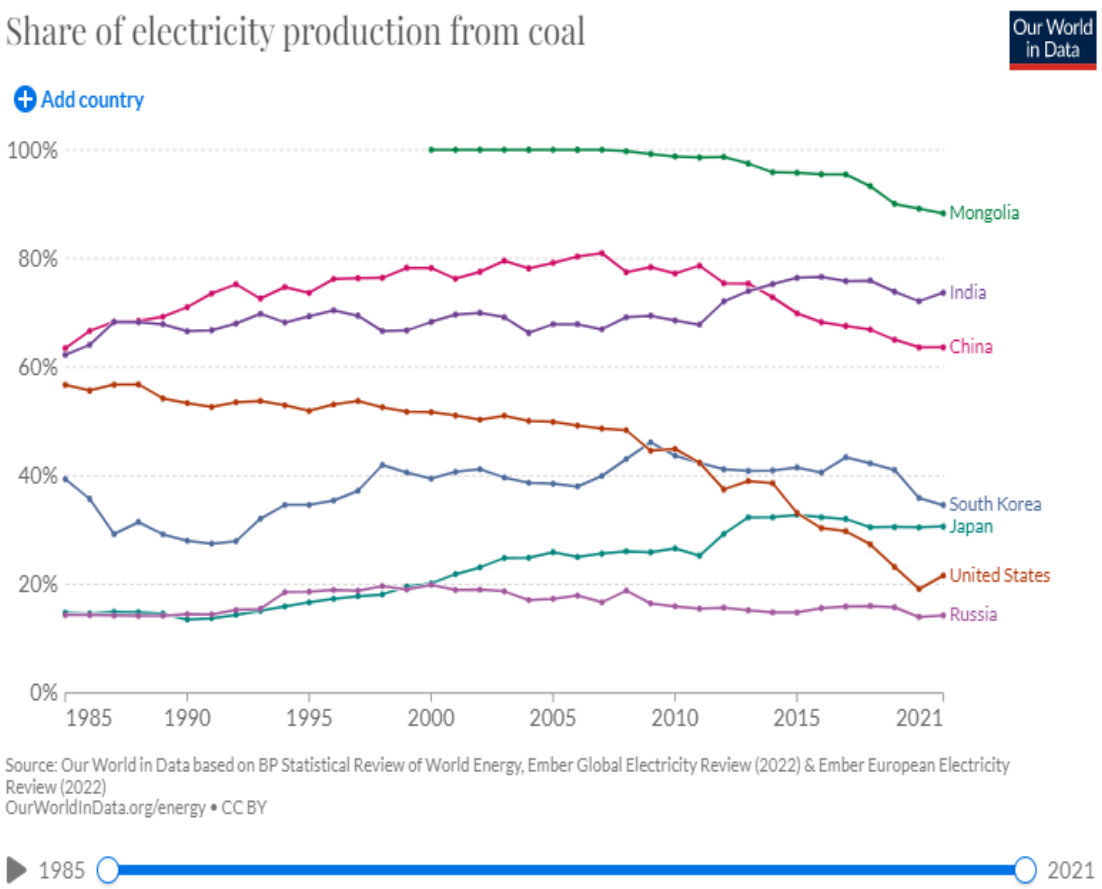
ENERGY FROM HYDRO

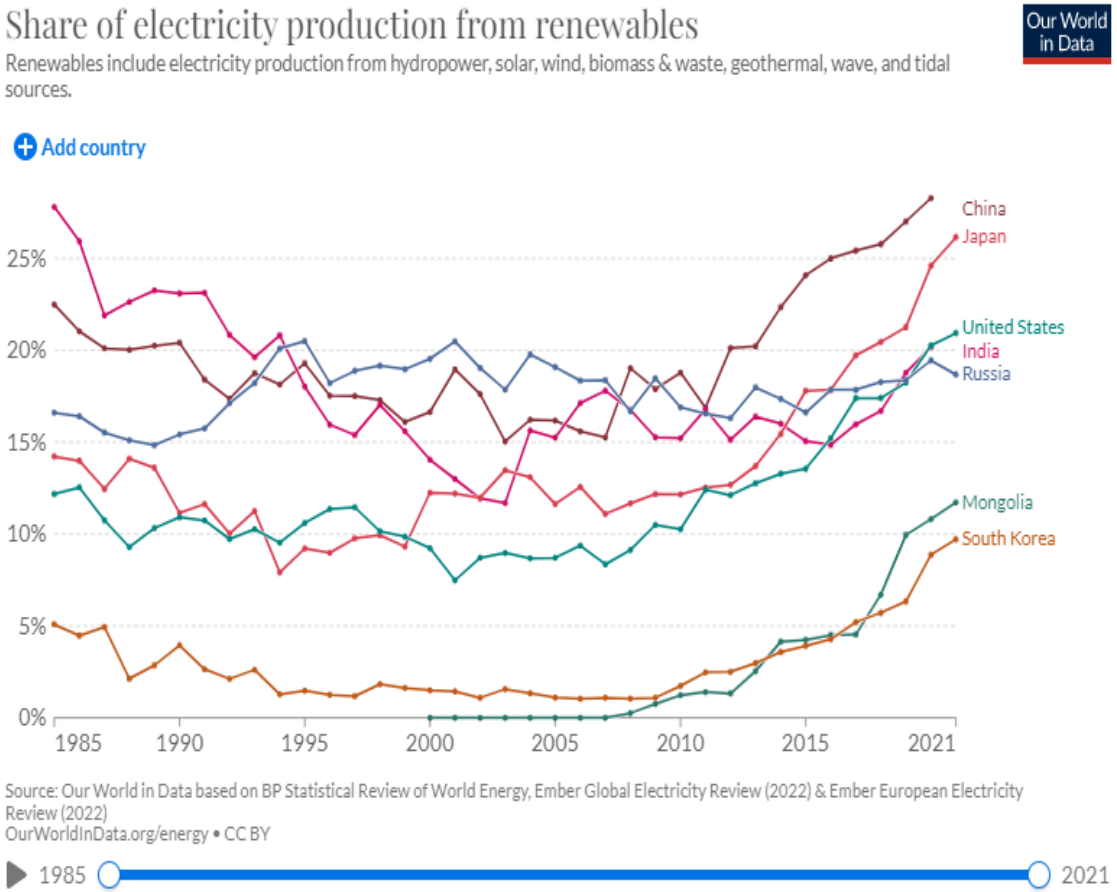


Source: Energy authority, Renewable Energy Department

Current operating renewable projects

ELECTRCITY FROM COAL AND RENEWABLES

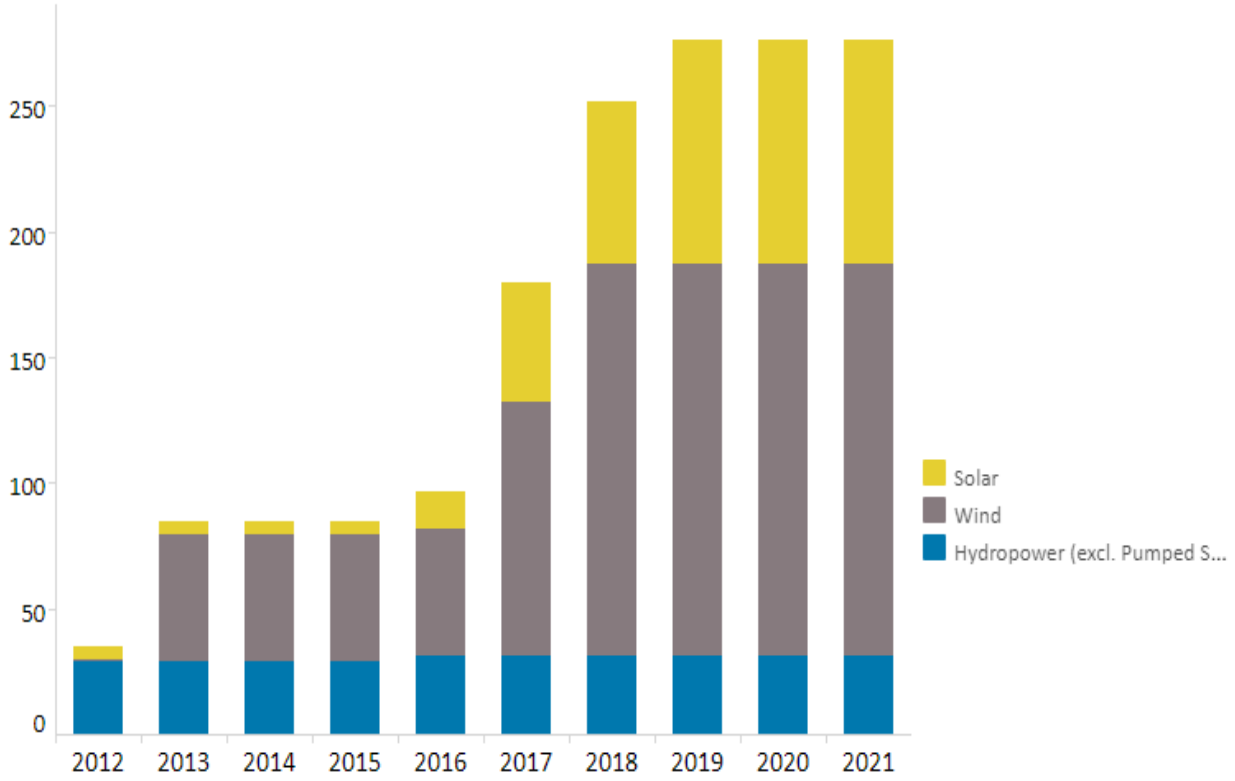




Source: https://ourworldindata.org/electricity-mix

RENEWABLE ENERGY PROJECTS

Grid connected small and medium Hydro, Wind and solar system



"100 000 Solar Ger" project has been completed

Off-grid and grid-connected Mini solar PV systems

Solar PV system	Location	Scale (kW)	Comments
Off-grid			
Noyon Solar System	Noyon soum, Umnugovi province	200	When Noyon soum was connected to the grid, the solar PV system was moved to the centre of Khatanbulag soum in Domogovi province.
Tsetseg Solar System	Tsetseg soum, Khovd province	100	When Tsetseg soum was connected to the grid, the solar PV system was moved to the centre of Altai soum in Govi-Altai province
Bugat Solar System	Bugat soum, Govi-Altai province	140	in operation
Altai Solar System	Altai soum, Govi-Altai province	200	in operation
Bayantooroi Solar PV System	Bayantooroi bagh, Tsogt soum, Govi-Altai province	100	in operation
Durvuljin Solar PV System	Durvuljin soum, Zavkhan province	150	in operation
Urgamai Solar PV System	Urgamai soum, Zavkhan province	150	in operation
Sub-total		1 040	
Grid-connected			
Chinggis Khan Air-port Solar PV System	Chinggis Khan Airport, Ulaanbaatar	443	In operation
Jargalant Solar PV System	Jargalant soum, Khovd province	50	In operation
Sub-total		493	
Total	1 533 kW		

Source: IRENA_RPA_Mongolia_2016

Planned renewable projects

RENEWABLE ENERGY POLICY

National energy sector development policy:

- 20% share of Renewable energy in 2020
- 30% share of Renewable energy in 2030

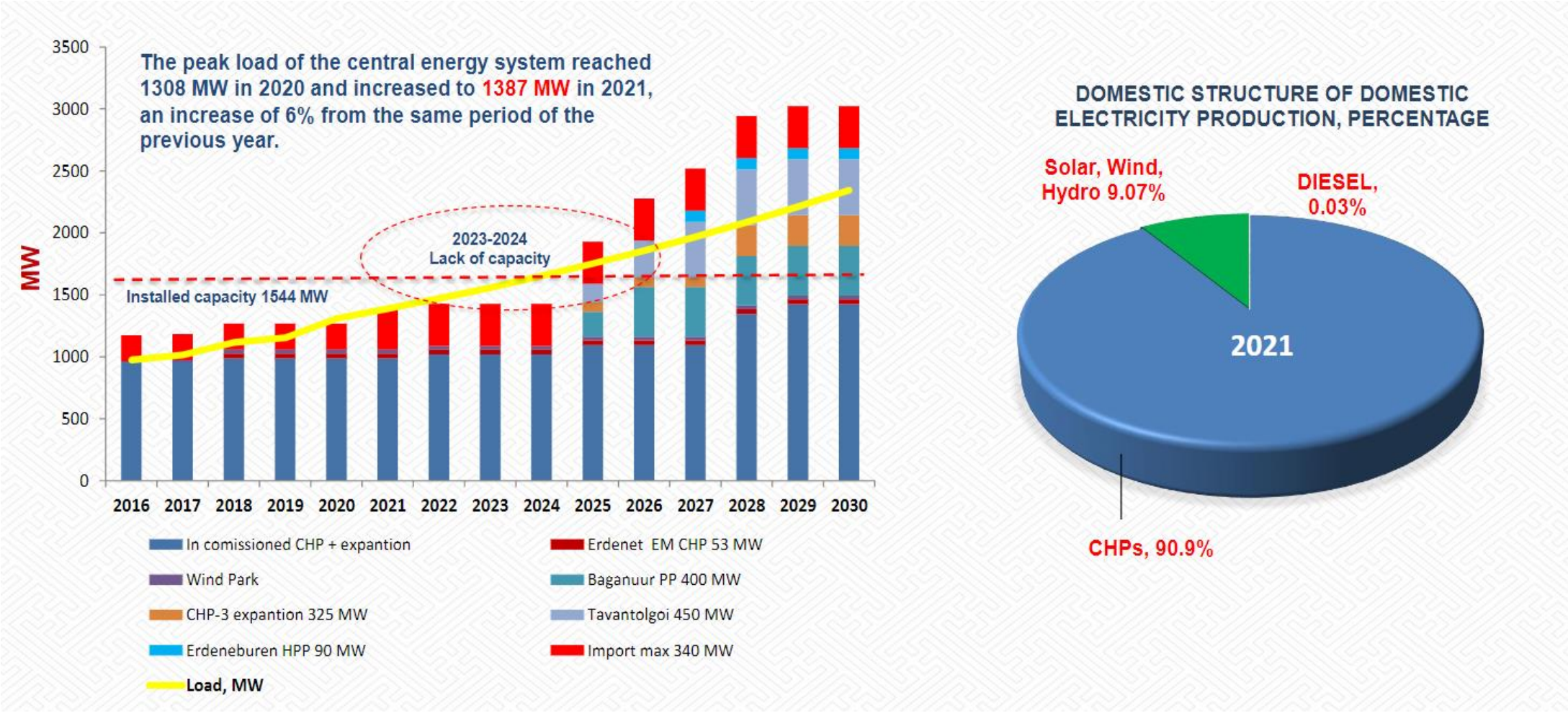
Paris agreement:

- Reducing CO2 with 22.7 % by 2030 compared to 2014

Glasgow COP26:

- There is opportunity to reducing CO2 with 27.2 % by 2030 compared to 2014

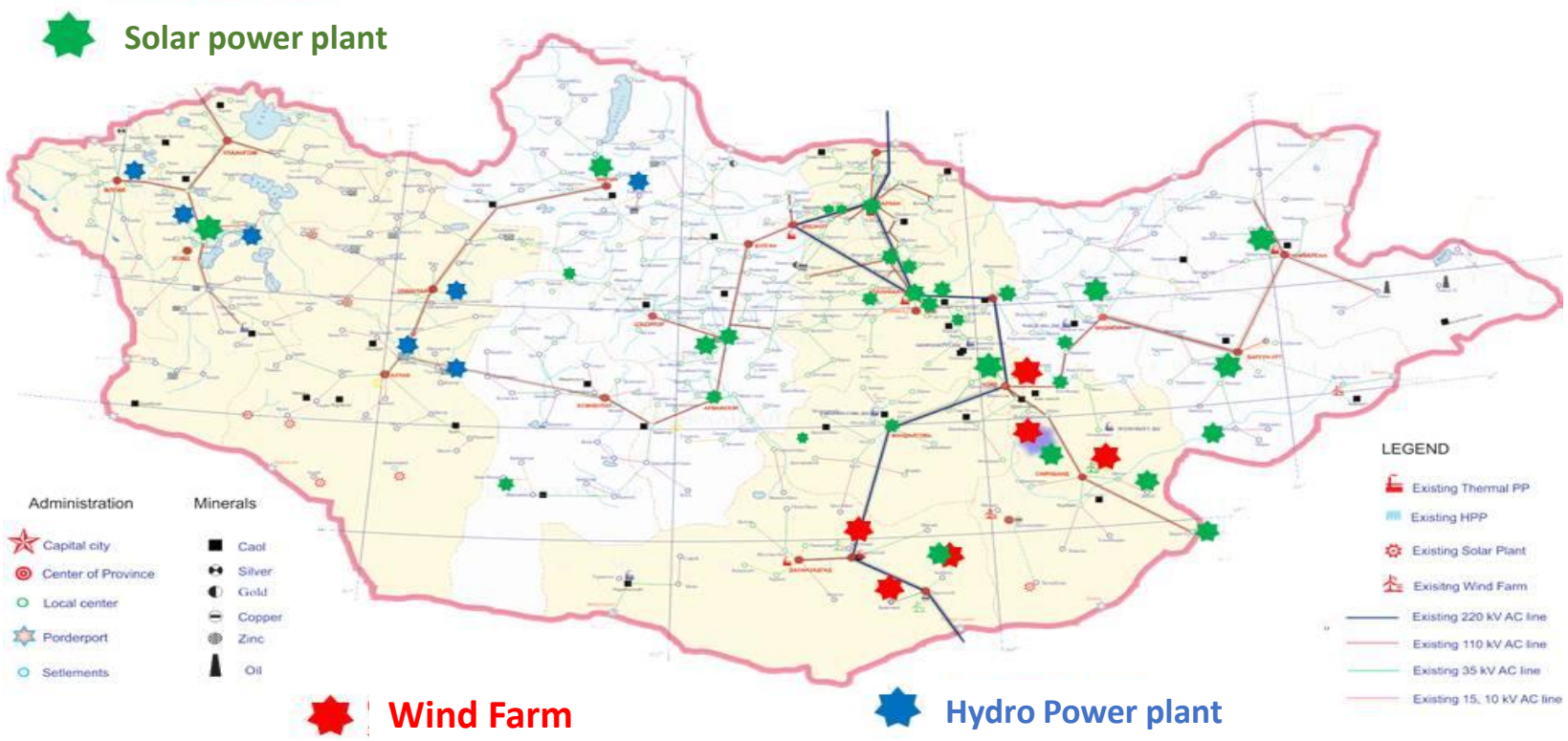
SYSTEM ELECTRICITY BALANCE UP TO 2030



Source: Ministry of Energy

FUTURE RENEWABLE ENERGY PROJECTS

Locations of the projects



RENEWABLE ENERGY PROJECTS

Enhancement project in Western Region

- **Khovd Myangad 10 MW Solar Power Plant,**
  /agreement signed, construction is at 98 percent. World Bank/
- **Uvs Umnugobi 10 MW Wind farm,**
  /wind farm technical studies/
- **Gobi-Altai, Yesun-Bulag 10 MW Solar Power Plant ,**
  /at the stage of re-tendering/
- **Gobi-Altai, Altai300 kW Solar Power Plant,**
  /Construction is at 60 percent./
- **Zavkhan, Uliastai 5 MW Solar Power Plant,**
  / agreement signed, construction is at 77 percent /
- **Zavkhan, Telmen 5 MW Wind farm,**
  /complete a detailed feasibility study/

Note to: Altai 300kW Solar Power Plant, Uliastai 5MW Solar Power Plant and Khovd 10MW Solar Power Plant are in operation

By project:

Reduce transmission and distribution network losses.
Imported electricity will be reduced by 40 MW.
It will be supplied with green energy without carbon emissions.
With the commissioning of Erdeneburen HPP in 2027, it will be possible to fully supply renewable energy to the electricity consumption of 5 Western aimags.

Source: Ministry of Energy

Sector coupling projects

SECTOR COUPLING

Electric vehicle

- By 2021, in Mongolia 492 electric vehicles and established 8 stations for EVs. These electric cars spend USD 2 for 100km.
- If charge EV during nighttime (low demand), cost can be decreased.

Electric bus

- By 2021, in Mongolia 35 electric buses and established 2 stations for EBs. These electric buses saves USD 100 a per day.

Heating greenhouse

- Every day farm is utilizing solar energy for heating greenhouse during winter.

SECTOR COUPLING

West energy system of Mongolia

- Mongolian government and ADB are building Solar power plant with 3.6MWh battery energy storage at Ulaistai city of Zavkhan province.

Central energy system of Mongolia

- Mongolian government and ADB are planning to establish 80MW/200MWh battery energy storage on Songino substation of Ulaanbaatar city. After this project, central grid will use energy from BESS during peak load and will charge during low load.

H_2 HYDROGEN

GREEN-HYDROGEN ENERGY PROJECT

- Make a basic research on the development of hydrogen production and the use of hydrogen in energy supply
- Protect the tax and legal environment for international investors
- Create a legal environment for use in energy and other sectors of the economy
- Step-by-step training of national personnel for the construction and operation of hydrogen plants and energy source

Sources

1. Mongolian renewable energy sector development status, 2020, Bavuudorj Ovgor, Ministry of Energy, Mongolia
2. Energy from the Desert, 2004, Keichi Komoto, IEA
3. NEDO International Projects, 2010, Japan
4. Developing in the Northeast Asia Regional Energy Market, 2018, Sujata Gupta, Teruhisa Oi, East Asia Energy Department ADB
5. Storage system study for grid stability, 2017, Tovuudorj, Ministry of Energy, Mongolia
6. Mongolian wind energy development update, October 2018, J.Osgonbaatar, MREA, Mongolia
7. Renewable Energy Status, 2020, E. Myagmardorj, Mongolian Renewables Industries Association
8. Northeast Asia Energy Interconnection Research, October 2019
   Global Energy Interconnection Development and Cooperation Organization
9. The new recovery policy and energy development projects, Ministry of Energy, Mongolia, March 2022

Thank you for your attention

Email: contact@cleanenergy.mn