GOVERNMENT OF MONGOLIA

MINISTRY OF ENERGY

THE NEW RECOVERY POLICY AND ENERGY DEVELOPMENT PROJECTS

"MONGOLIA ECONOMIC FORUM-2022"

"ENERGY RECOVERY" PRELIMINARY DISCUSSION

21 MARCH 2022

THE PURPOSE OF NEW RECOVERY POLICY

Reduce the negative impact of the coronavirus infection pandemic on the economy

Promptly address development barriers and expanding economic foundation

Effectively implementing the “Vision-2050” long-term development policy of Mongolia

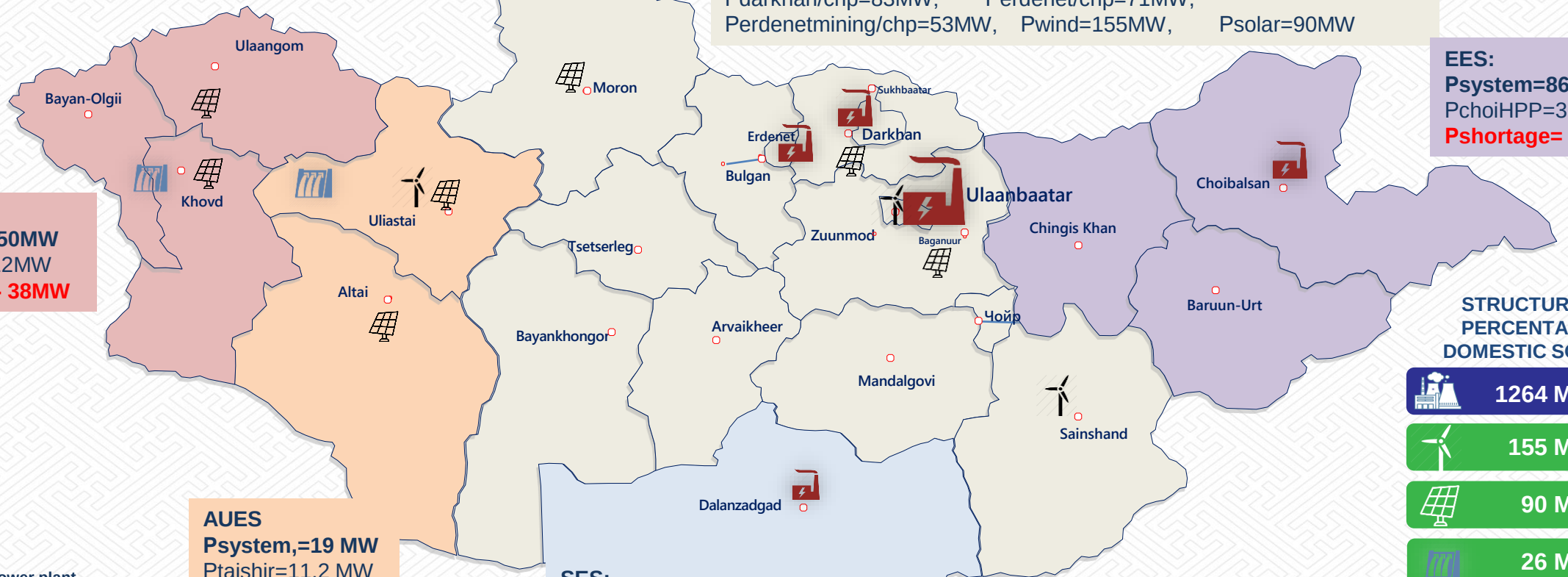
- RECOVERY OF BORDER PORT
- ENERGY RECOVERY
- INDUSTRIAL RECOVERY
- URBAN AND RURAL RECOVERY
- RECOVERY THROUGH GREEN DEVELOPMEN
- RECOVERY OF THE PUBLIC PRODUCTIVITY

RESOLUTION OF PARLIAMENT OF MONGOLIA No 106 of 2021

5 ENERGY SYSTEMS IN MONGOLIA

In Mongolia, 330 soums, towns and capital cities are supplied with electricity through 5 systems: CES, WES, AUES, EES and SES.

Central Energy System:
Psystem=1446 MW
Pchp4=772MW, Pchp3=198MW, Pchp2=24MW,
Pdarkhan/chp=83MW, Perdenet/chp=71MW,
Perdenetmining/chp=53MW, Pwind=155MW, Psolar=90MW



WES:
Psystem=50MW
Pdurgun=12MW
Pimport= - 38MW

EES:
Psystem=86 MW
PchoiHPP=36 MW
Pshortage= - 50 MW

AUES
Psystem,=19 MW
Ptaishir=11.2 MW
Pbogd river=2MW
Pother HPP=1MW
Pdiesel=4MW
Psolar=0.25MW

SES:
Psystem=31MW
PdalCHP=9MW
Phspp=18MW
Pdiesel=4MW

- Solar power plant
- Wind power plant
- Hydro power plant
- Thermal power plant

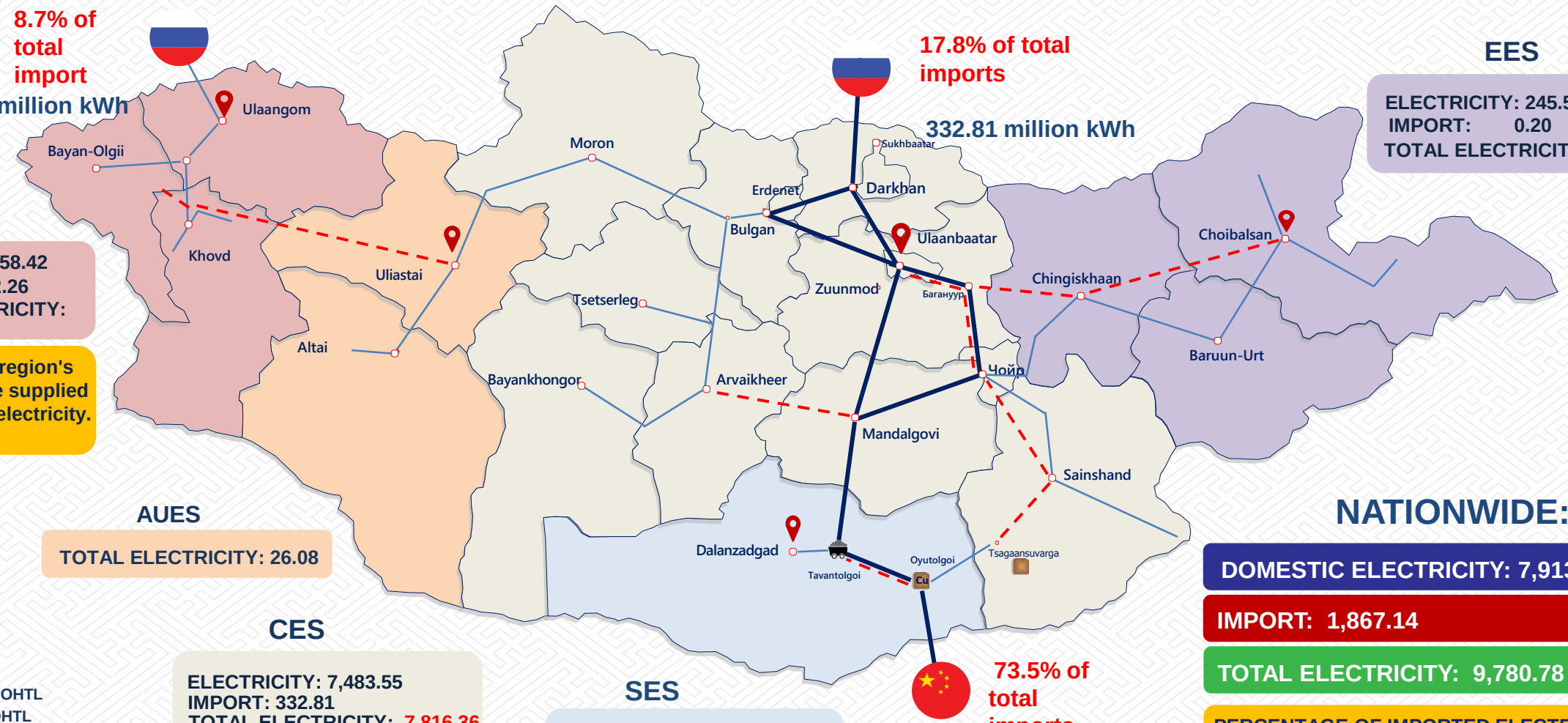
STRUCTURE AND PERCENTAGE OF DOMESTIC SOURCES

- 1264 MW, 81,9%
- 155 MW, 10,0%
- 90 MW 5,8%
- 26 MW, 1,7%
- DIESEL: 8 MW, 0,6%
- **TOTAL 1544 MW**

Ministry of Energy

CURRENT SITUATION OF THE MONGOLIAN ENERGY SECTOR

NATIONAL ENERGY PRODUCTION AND IMPORT IN 2021, / million kWh /



8.7% of total import
162.25 million kWh

17.8% of total imports
332.81 million kWh

73.5% of total imports
1,371.86 million kWh

WES

ELECTRICITY: 58.42
IMPORT: 162.26
TOTAL ELECTRICITY: 220.68

73.5% of the region's consumers are supplied with imported electricity.

EES

ELECTRICITY: 245.59
IMPORT: 0.20
TOTAL ELECTRICITY: 245.79

AUES

TOTAL ELECTRICITY: 26.08

CES

ELECTRICITY: 7,483.55
IMPORT: 332.81
TOTAL ELECTRICITY: 7,816.36

SES

ELECTRICITY: 58.42
IMPORT: 162.26
TOTAL ELECTRICITY: 220.68

NATIONWIDE:

DOMESTIC ELECTRICITY: 7,913.65
IMPORT: 1,867.14
TOTAL ELECTRICITY: 9,780.78
PERCENTAGE OF IMPORTED ELECTRICITY 19.1%

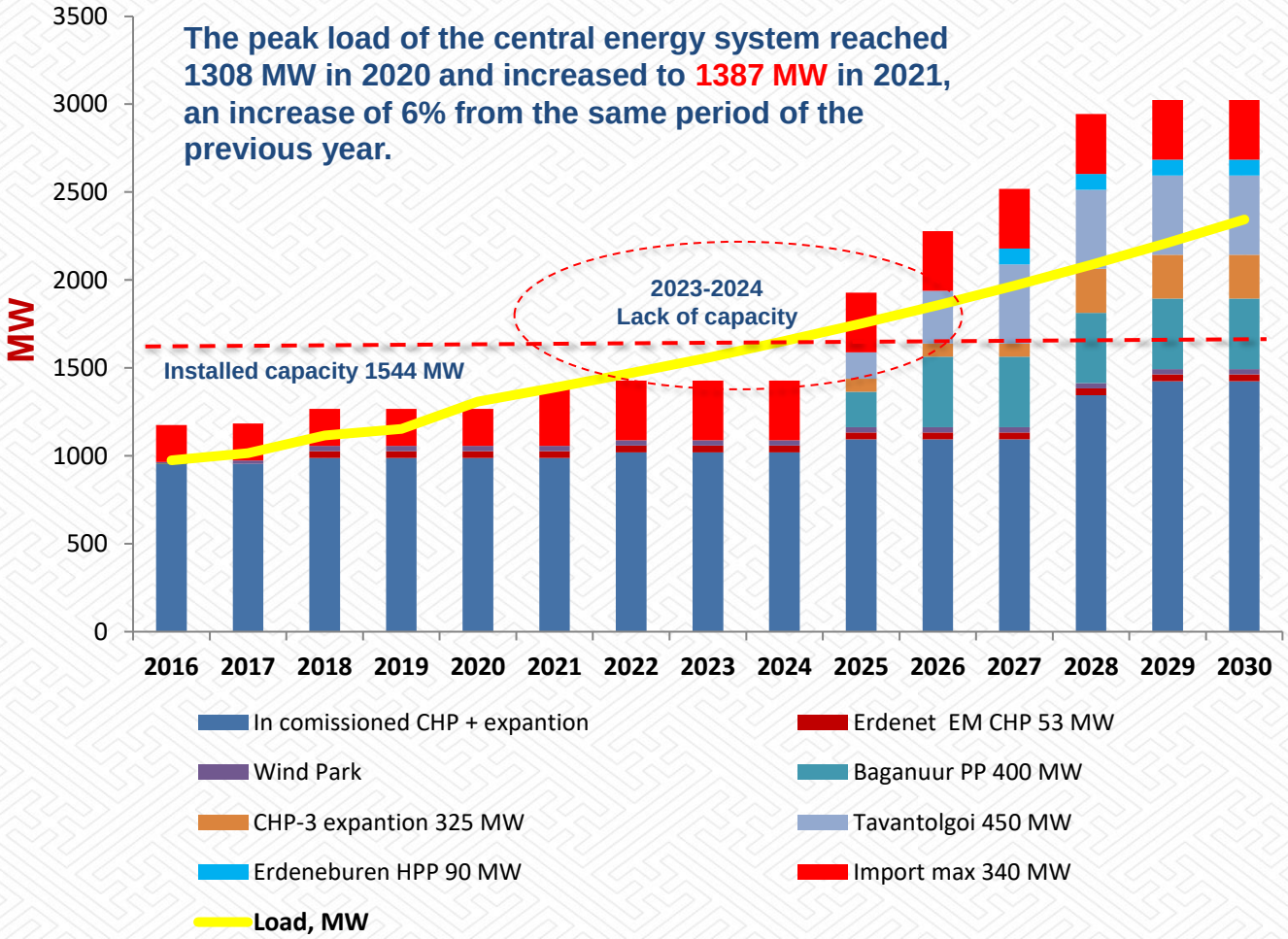
Million kWh

In commissioned OHTL
220 kV OHTL
110 kV OHTL

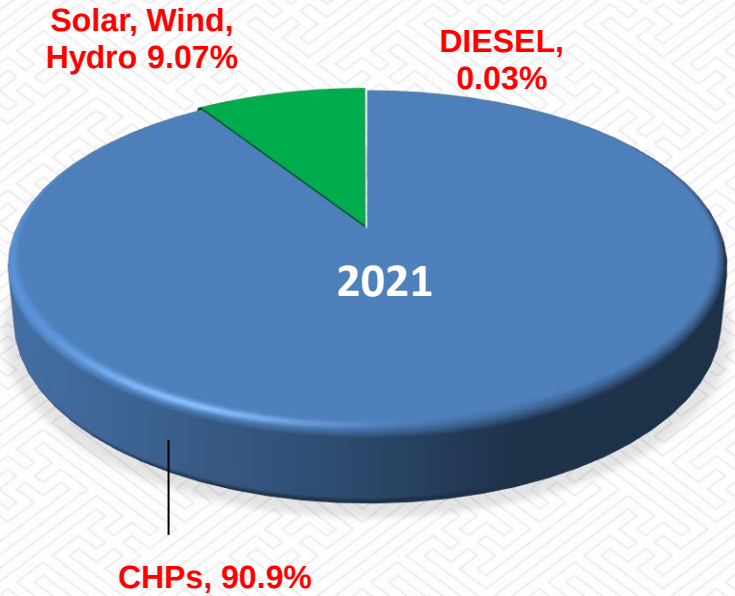
Planned OHL
220 kV OHTL

CURRENT SITUATION OF THE MONGOLIAN ENERGY SECTOR

SYSTEM ELECTRICITY BALANCE, until 2030



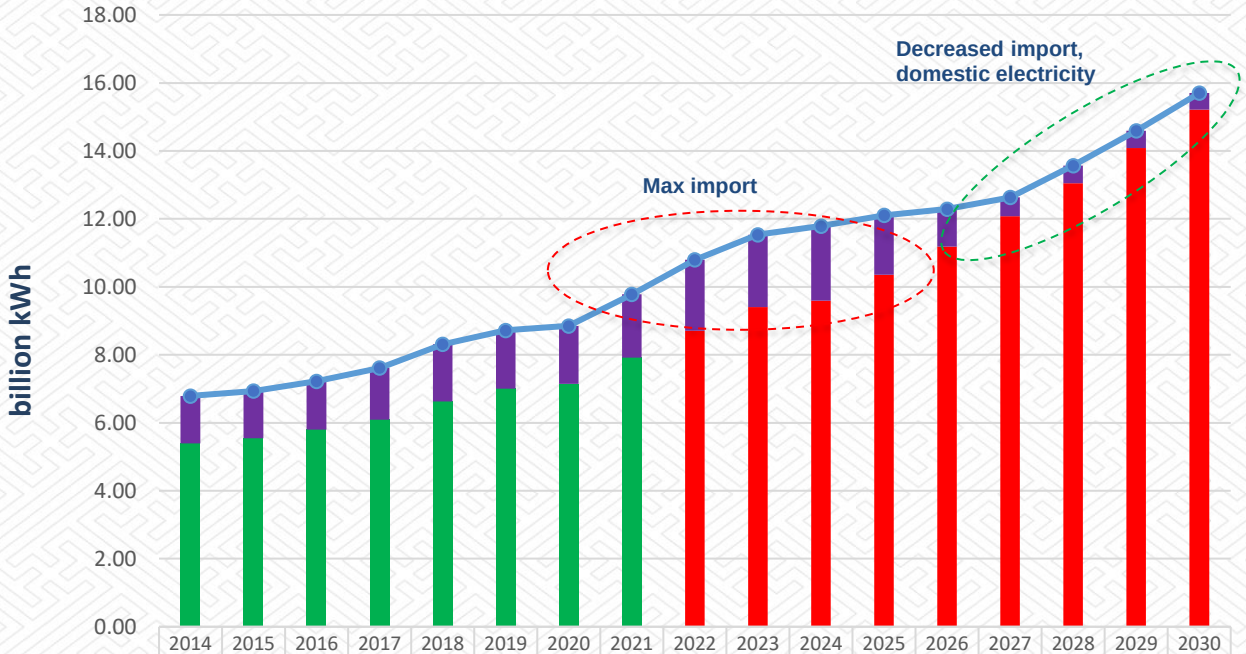
DOMESTIC STRUCTURE OF DOMESTIC ELECTRICITY PRODUCTION, PERCENTAGE



CURRENT SITUATION OF THE MONGOLIAN ENERGY SECTOR

ELECTRICITY PRODUCTION, IMPORT AND CONSUMPTION / until 2030 /

Total electricity consumption, billion kWh

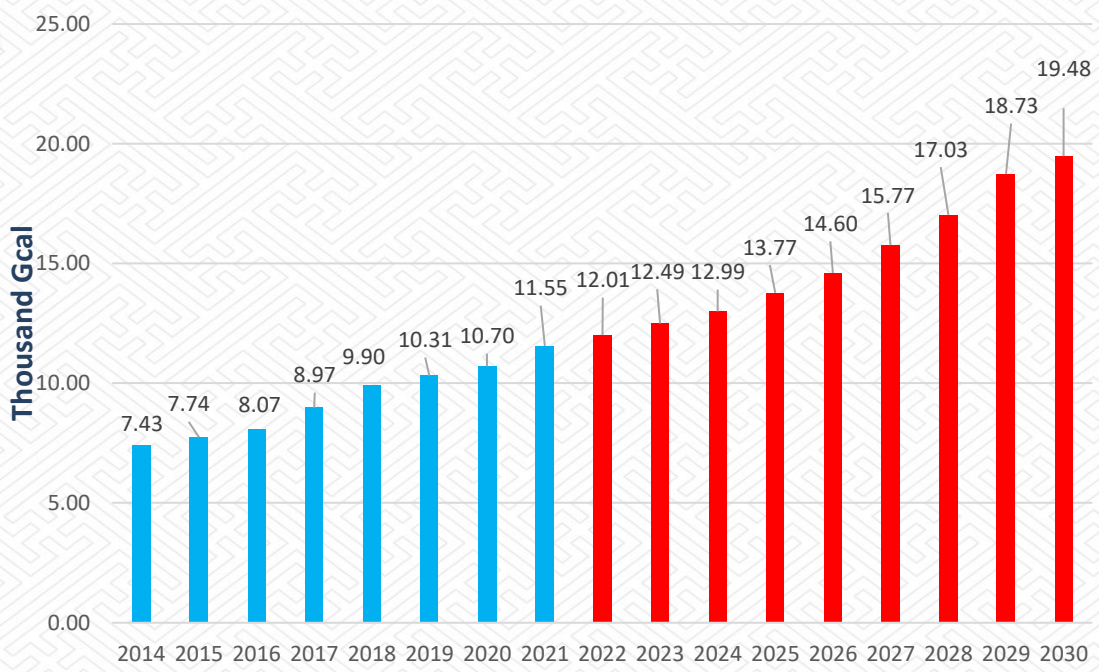


	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Import	1.40	1.39	1.42	1.52	1.68	1.72	1.71	1.87	2.09	2.13	2.20	1.75	1.10	0.55	0.52	0.50	0.49
Total production	5.39	5.54	5.80	6.09	6.62	7.00	7.15	7.91	8.71	9.40	9.59	10.36	11.19	12.08	13.05	14.09	15.22
Total consumption	6.79	6.94	7.22	7.61	8.31	8.72	8.85	9.78	10.80	11.53	11.79	12.11	12.29	12.63	13.57	14.59	15.71

In 2021, electricity will increase by 11% from the previous year

HEAT ENERGY PRODUCTION AND CONSUMPTION, / until 2030 /

Total heat consumption, thousand GCal



Thermal energy increased by 7-8%

Ministry of Energy

ULAANBAATAR DISTRICT HEATING

HEAT SUPPLY

2318 Gcal /h
Capacity of sources

3166 Gcal /h
Connected use

473 Gcal /h
Expected use with specificatior

-1321 Gcal /h
Lack of capacity

CHP-2 /1961, 61 years/
Capacity: 60 Gcal /h
Connected use: 97.6 Gcal /h
Expected use with specifications : 5.5 Gcal /h
Lack of capacity: -43.1 Gcal /h

Bichil district

1st district

Botanik

Bayangol am

5 shar

CHP-2

CHP-4

CHP-3

Amgalan TP /2015, 7 year/
Capacity: 300 Gcal /h
Connected use: 458.5 Gcal /h
Expected use with specifications: 76.66 Gcal /h
Lack of capacity: **-235.2** Gcal /h

CHP-4 /1983, 39 years/
Capacity : 1373 Gcal /h
Connected use : 1614.6 Gcal /h
Expected use with specifications: 279.05 Gcal /h
Lack of capacity: **-520.7** Gcal /h

CHP-3 /1968, 54 years/
Capacity : 585 Gcal /h
Connected use: 995.5 Gcal /h
Expected use with specifications:112.21 Gcal /h
Lack of capacity: **-522.7** Gcal /h

CURRENT SITUATION OF THE MONGOLIAN ENERGY SECTOR

- The energy sector made full use of the total installed capacity of the system during the heavy winter load of 2021-2022, and operated in emergency mode without backup equipment.
- The successful implementation of the CHP-4 turbogenerator modernization project and the expansion of the Darkhan CHP and the expansion of Erdenet CHPs by 35 MW played an important role in overcoming the heavy winter load of 2021-2022.

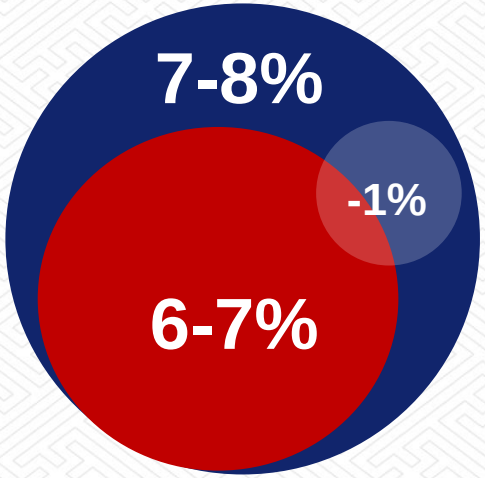
Age of Thermal Plants **35-60 years**

Age of power transmission and distribution grids **32-62 years**

CURRENT SITUATION OF THE MONGOLIAN ENERGY SECTOR

Increase in electricity (on average per year)

- GROWTH OF ELECTRICITY CONSUMPTION, 7-8%
- GROWTH OF DOMESTIC ELECTRICITY GENERATION, 6-7%



Difference -1%

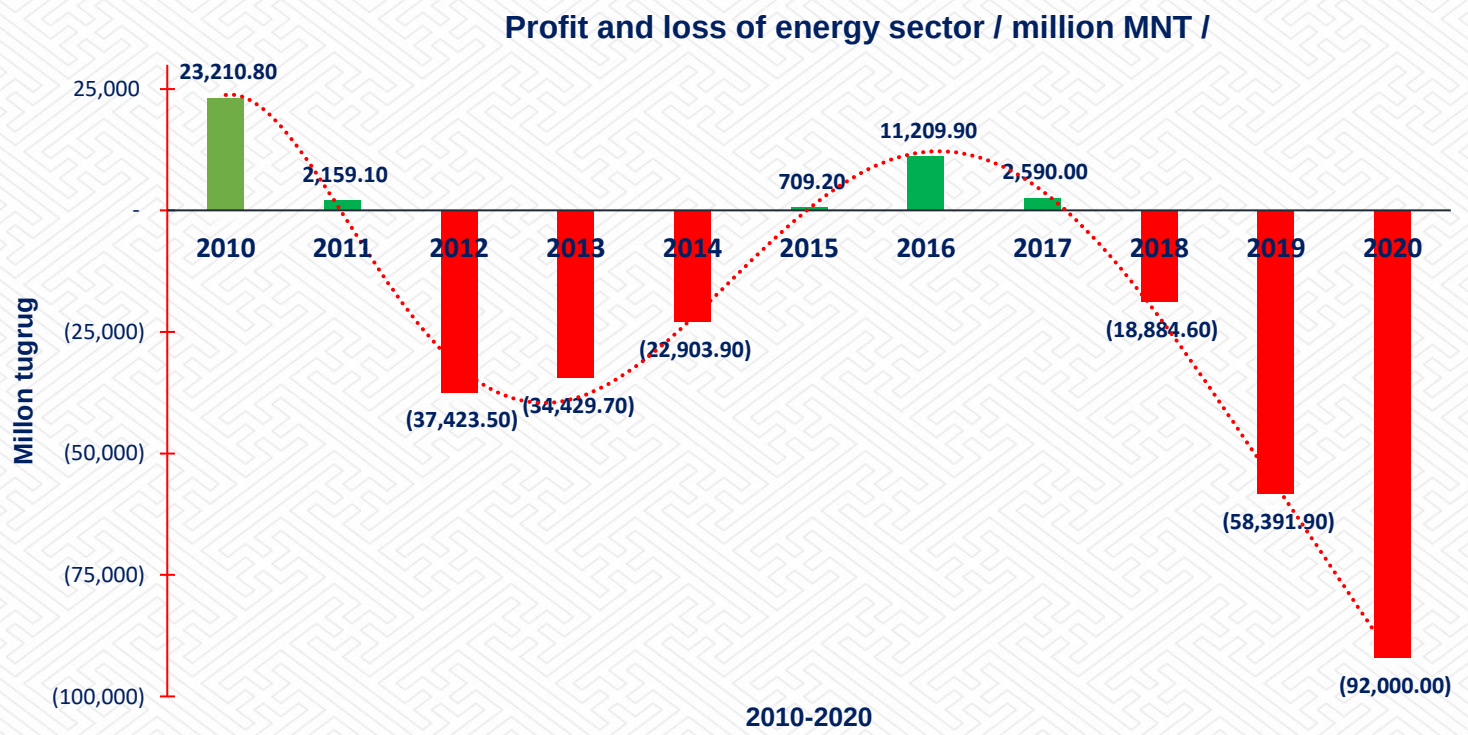
Electricity price (tugrug/ kWh)

Average consumer price

Production unit cost

Difference -49.11 tugrug

By the end of 2020, the energy sector will have an operating loss of 92.0 billion MNT and its debt will continue to increase.



ENERGY RECOVERY

THE PURPOSE OF ENERGY RECOVERY

- New energy sources and transmission and distribution networks shall be established and their existing capacity shall be enhanced, and the reliability of energy production and supply shall be improved.
- Renewable energy facilities shall be developed in an appropriate ratio where the water facilities and stored resource stations shall be built for ensuring the reliability and stability of the integrated energy system.
- In certain phases, the energy sector shall be transferred into an independent financial and economic system.
- Actions shall be taken to ensure the preparation of the high voltage aerial transmission lines and substations for connecting to the renewable energy source and network within the Northeast Asian integrated energy grid.
- The construction of a natural gas pipeline from the Russian Federation to the People's Republic of China through the territory of Mongolia shall be boosted.

Ministry of Energy

ENERGY DEVELOPMENT PROJECTS

FOR 22 DEVELOPMENT PROJECTS, TOTAL REQUIREMENT INVESTMENT **14.9 TRILLION MNT**.

6 CAPACITY EXPANSION PROJECTS OF CHPS

CHP-3 325 MW
CHP-2 100 MW
CHOIBALSAN CHP 50 MW
AMGALAN TP 116 MW (100 Gcal/h)
CHP-4 boiler 500 ton/h
GAS SOURCES 219 MW (185 Gcal/h)

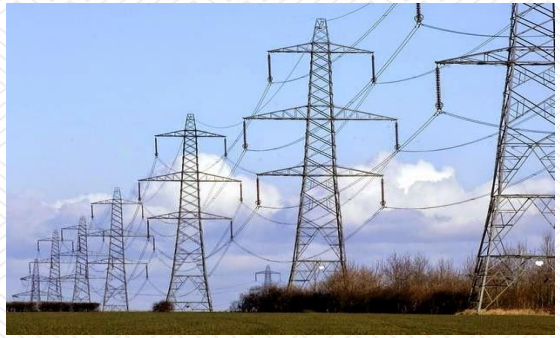
TOTAL: 4,233.0 BILLION

5 PROJECTS TO BUILD NEW ENERGY SOURCES

Tavantolgoi CHP 450 MW
ERDENEBUREN HPP 90 MW
EG RIVER HPP 315 MW /Research/
BAGAKHANGAI PP 300 MW
BAGANUUR CHP 400 МВт

TOTAL: 9,128.8 BILLION

7 POWER SUBSTATION, DISTRIBUTION AND TRANSMISSION GRIDS PROJECTS



ERDENEBUREN-MYANGAD-ULIASTAI 468 km
TAVANTOLGOI CHP-OYUTOLGOI 167 km
SAINSHAND-TSAGAANSUVARGA 204 km
BAGANUUR-CHINGIS-CHOIBALSAN 518 km
BAGANUUR-CHOIR 188 km
MANDALGOBI-ARVAIKHEER 287 km
BAGANUUR-NALAIKH-ULAANBAATAR 130 km

TOTAL: 1,280.7 BILLION

4 ENVIRONMENTALLY FRIENDLY POWER PROJECTS BASED ON SCIENCE AND ADVANCED TECHNOLOGIES

NUCLEAR ENERGY
HYDROGEN
LNG
RENEWABLE ENERGY,
solar 35 MW, Wind 15 MW

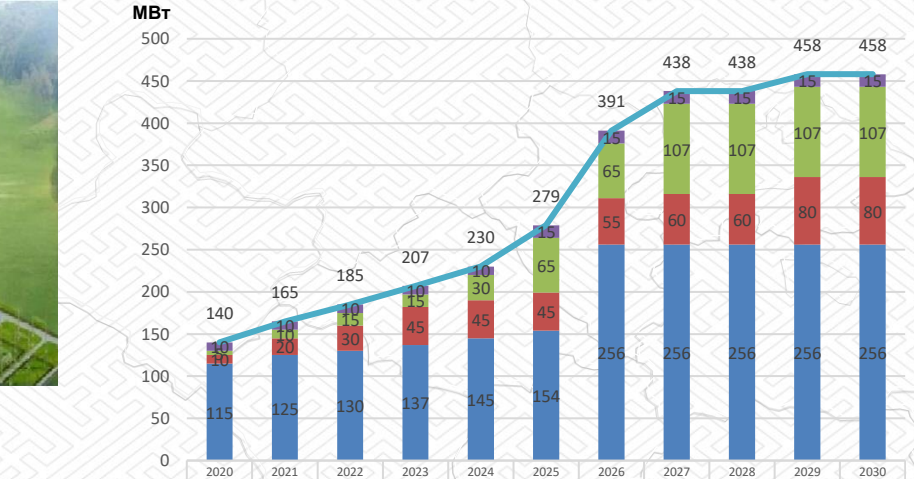
TOTAL: 329.1 BILLION

Ministry of Energy

TAVANTOLGOI CHP 450 MW, 220 KV OHTL PROJECT

5 **Tavantolgoi CHP 450 MW , 220 KV OHTL 134 km and substation construction project /2296.9 billion/**

Consumption of large power plants in the South Gobi / until 2030 / /



	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Other	10	10	10	10	10	15	15	15	15	15	15
Tsagaansuvarga	5	10	15	15	30	65	65	107	107	107	107
Tavantolgoi mining	10	20	30	45	45	45	55	60	60	80	80
OyuTolgoi mining	115	125	130	137	145	154	256	256	256	256	256
Total	140	165	185	207	230	279	391	438	438	458	458

Southern Electricity Distribution Network

ELECTRICITY:100.01

IMPORT: 1,371.86

TOTAL: 1,471.86

Million.kWh

OYUTOLGOI LLC accounts for 73.5% of Mongolia's total electricity imports.

Project information

Ministry in charge	Ministry of Energy
Implementation period	2020-2026
Project capacity	450 MW, 220 kV OHL 134 km , 220 kV substation, water supply
Location	Umnugobi province8 Tsogttsetsii soum
Total investment	**2296.9 billion MNT** /808.2 million USD/
Source of funding	Erdenes Tavan Tolgoi 30%, Development Bank of Mongolia 70%
Is it included in the public investment program?	2.1 76 provisions
Is it included in the government's action plan?	3.5.1.3. Construction of Tavan Tolgoi 450 MW power plant and related infrastructure will begin.

After the project:

It will produce 3150.0 million kWh of electricity per year.

Putting strategic deposits in the region into economic circulation.

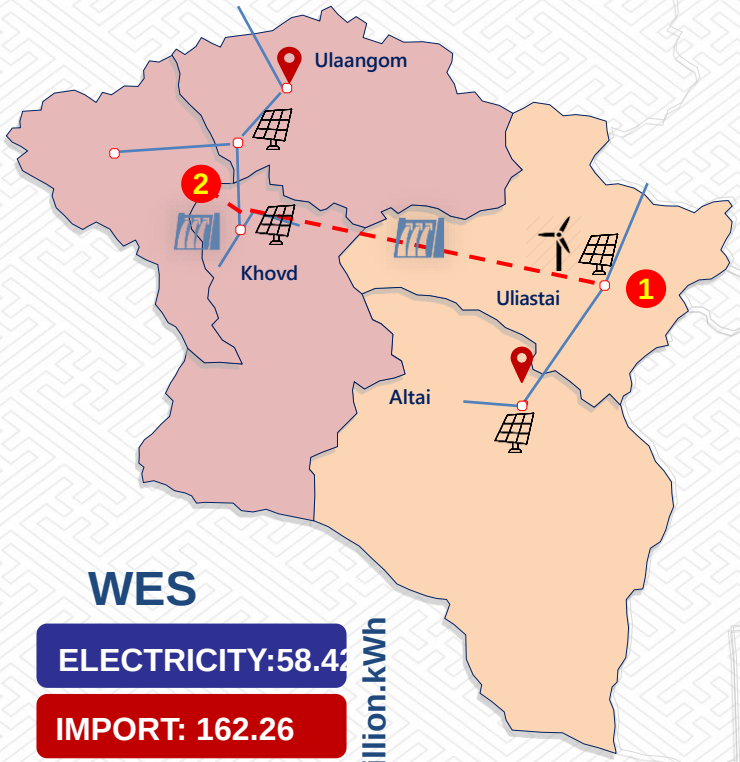
The $ 110-120 million that Oyu Tolgoi LLC pays to its import power plants will remain domestic.

200 MW of electricity will be supplied to the central region's integrated system.

Ministry of Energy

ERDENEBUREN 90 MW HYDRO POWER PLANT, 220 KV OHTL PROJECT

ERDENEBUREN-MYANGAD-ULIASTAIN 220 KV OHTL AND SUBSTATION PROJECT



WES

ELECTRICITY:58.42 Million.kWh

IMPORT: 162.26

TE: 220.68

73.5% of imports are provided to regional consumers.

AUES

TE: 26.08

Hydro power plant project information

Ministry in charge	Ministry of Energy
Implementation period	2021-2027
Project capacity	It will generate 90 MW of electricity and 366 million kWh of electricity per year.
Location	Khovd aimag, Erdeneburen sum, Khovd river
Total funding	**773.36 billion MNT**
Source of funding	Concessional loan from the Government of the People's Republic of China 95%, Mongolian budget 5%
Whether it is reflected in the GAP	3.5.1.7. Start the construction of Erdeneburen 90 MW HPP and build 220 kV Erdeneburen-Myangad-Uliastai overhead transmission line and substation.

OHTL project information

OHTL, Substation	Construction of Erdeneburen-Myangad-Uliastai 220 kV two-circuit 468.3 km long OHTL, new 220/110/35 kV “Myangad” and “Uliastai” substations, annual transmission of electricity 297.08 million kW. time and throughput 125-301 MVA
Total funding	354.1 billion MNT / 124 million USD /
Feasibility study, design and ESIA completed	• Feasibility study and design completed. • Preliminary environmental studies and bird surveys have begun.

2 **ERDENEBUREN 90 MW HYDRO POWER PLANT /773.36 Billion/**

1 **ERDENEBUREN-MYANGAD-ULIASTAIN 220 KV OHTL AND SUBSTATION PROJECT /354.1 billion/**

Ministry of Energy

CHOIBALSAN 50 MW CHP, BAGANUUR-CHINGIS-CHOIBALSAN OHTL PROJECTS

3 INSTALLED CAPACITY INCREASE BY 50 MW PROJECT FOR CHOIBALSAN CHP

4 BAGANUUR-CHINGIS-CHOIBALSAN 220 kV 2 CIRCUIT 518 KM POWER LINE, SUBSTATION PROJECT

TPP project information

Ministry in charge	Ministry of Energy
Implementation period	2020-2023
Project capacity	50 MW of electricity, 100 Gcal/h with heat
Location	Dornod aimag, Kherlen sum
Total funding	**226.6 billion MNT**
Source of funding	Development Bank loan 75%, State budget 25%
Project performance	Construction Performance 48%, Funding 11.5%
Project process	Construction began in August 2020. It will be commissioned in June 2023.

OHTL project information

Ministry in charge	Ministry of Energy
Implementation period	construction work 2 years
Project capacity	220 kV OHTL with a length of 518 km, 220 kV substation, annual power transmission 0.87-1.31 billion kWh, transmission capacity 100-150 MW
Location	Baganuur, Khentii and Dornod aimags
Total funding	468.50 billion MNT / 156 million USD /
Source of funding	Foreign loans and aid
	“Vision 2050” long-term development policy
	Action Plan of the Government of Mongolia for 2020-2024

construction process

DES

CAPACITY 36 MW

PE: 245.79 MILLION KWH

IMPORT: 0.20 MILLION KWH

99.9% of regional consumers are supplied domestically

After the project:

Capacity: 86 MW.

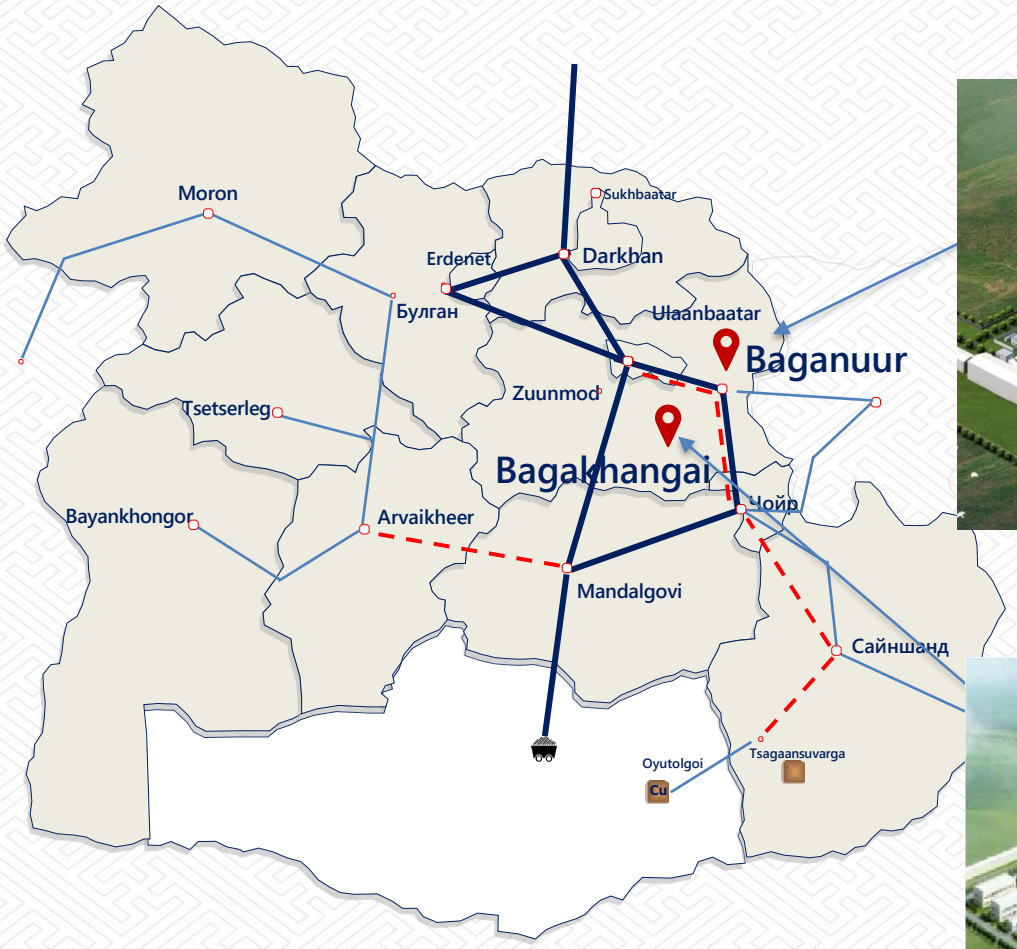
300 million kWh per year increases.

The CES transmission network will extend horizontally to the east and connect to the EES.

A system that has been in operation for 50 years will be integrated into the CES.

Ministry of Energy

BAGANUUR CHP 400 MW AND BAGAKHANGAI PP 300 MW PROJECTS



BAGANUUR 400 MW POWER PLANT PROJECT, 1,808.0 billion

Project information	
Ministry in charge	Ministry of Energy
Implementation period	2020-2025
Project capacity	400 MW of electricity
Location	Ulaanbaatar, Baganuur district
Total funding	1,808.0 billion MNT
Source of funding	Private section

BAGAKHANGAI 300 MW POWER PLANT PROJECT, 1,596.0 billion

Project information	
Ministry in charge	Ministry of Energy
Implementation period	2020-202
Project capacity	300 MW of electricity
Location	Ulaanbaatar, Bagakhangai district
Total funding	1,596.0 billion MNT
Source of funding	Private section

Ministry of Energy

EXPANSION PROJECTS TO BE IMPLEMENTED IN ULAANBAATAR

A project to build a 100 MW gas power plant based on the infrastructure of the second thermal power plant
/284.60 billion MNT /
/ 2021-2028

A renovation project to increase the capacity of the fourth thermal power plant by 350 MW (500 t/h)
/205.20 billion MNT /
/ 2022-2025 /

Project to increase the capacity of Amgalan thermal power plant by 116 MW
/66.65 billion MNT /
/2022-2024/

Construction project for heat source (4 gases) operating at peak load mode of Ulaanbaatar central heating system
/ 95.90 billion MNT /
/2021-2025/

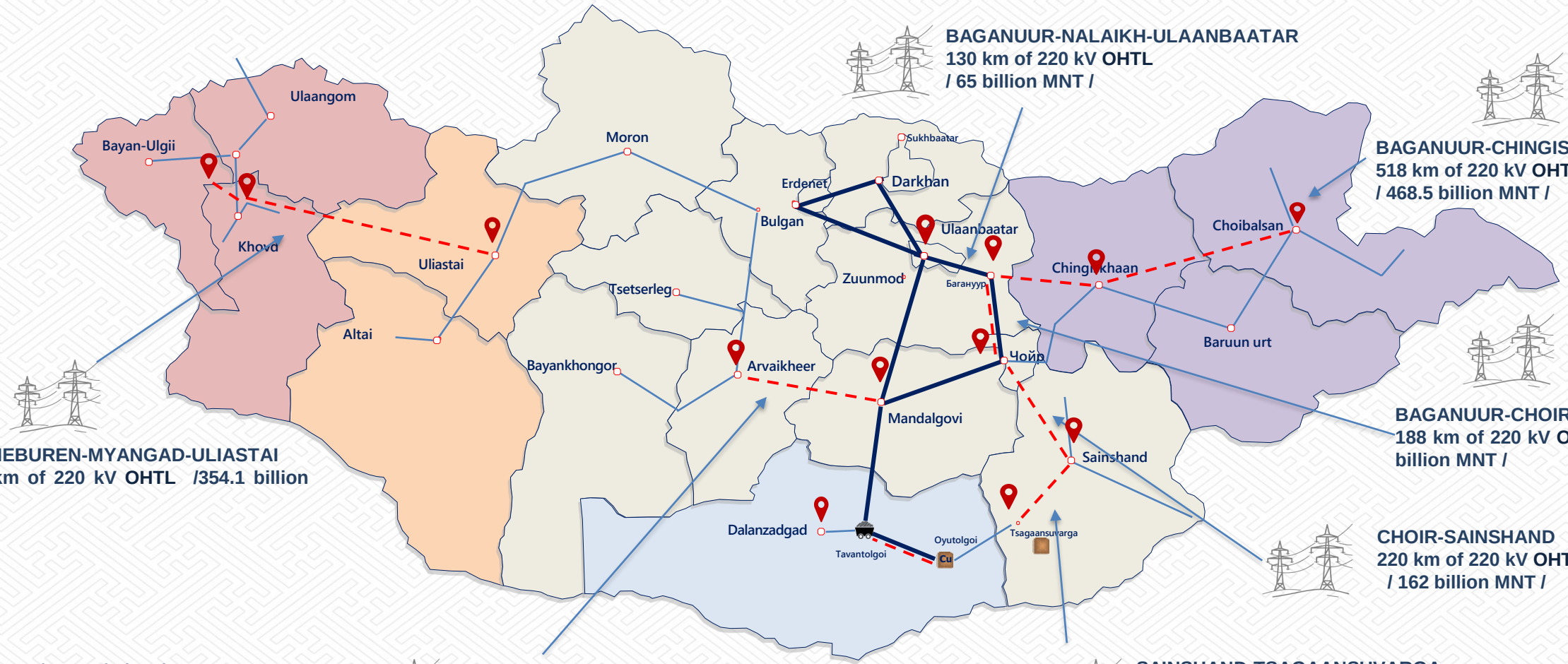
Project to expand the capacity of the third thermal power plant by 400 MW
/ 1467.0 billion MNT/
/ 2021-2027 /

Bayankhoshuu
21st district
Bichil district
Dari Ekh
1st district
Bayangol Am
5 Shar
Botanik
Dunjingarav
Khuush Am
Zaisan
Baga Tenger
Ikh Tenger
Nisekh
Nukht
Artsad am

CHP-2
CHP-4
CHP-3
46 MW
Amgalan
81 MW
70 MW
22 MW

Ministry of Energy

PROJECT OF OVER HEAD TRANSMISSION LINES



BAGANUUR-NALAIKH-ULAANBAATAR
130 km of 220 kV OHTL
/ 65 billion MNT /

BAGANUUR-CHINGIS-CHOIBALSAN
518 km of 220 kV OHTL
/ 468.5 billion MNT /

ERDENEBUREN-MYANGAD-ULIASTAI
468.3 km of 220 kV OHTL /354.1 billion MNT /

BAGANUUR-CHOIR
188 km of 220 kV OHTL / 90 billion MNT /

CHOIR-SAINSHAND
220 km of 220 kV OHTL / 162 billion MNT /

MANDALGOVI-ARVAIKHER 220 kV 287 km OHTL / 177.8 billion MNT /

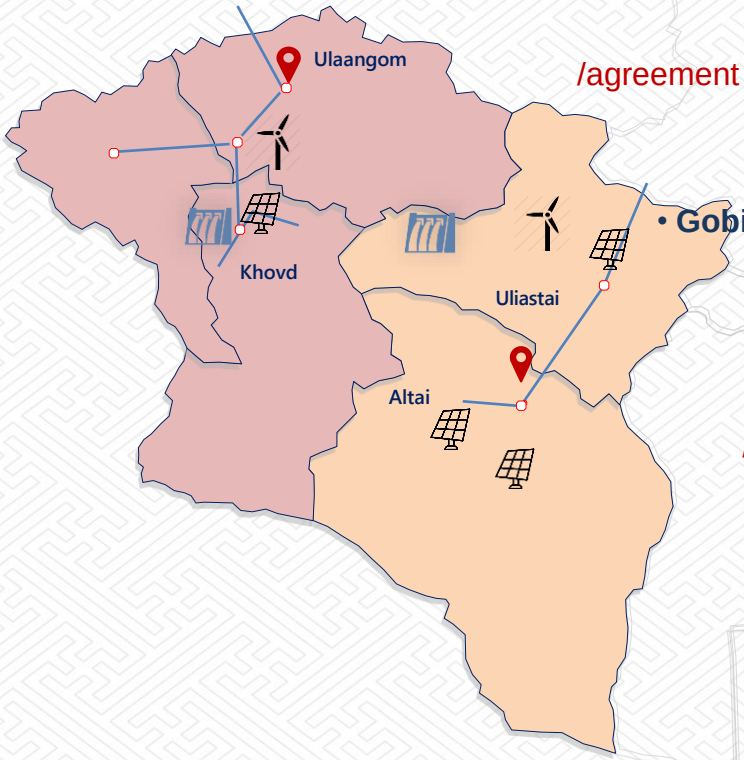
SAINSHAND-TSAGAANSUVARGA
204.6 km of 220 kV OHTL / 98.3 billion MNT /

Used Over Head Transmission Lines
- 220 kV OHTL
- 110 kV OHTL

Planned OHTL
- 220 kV OHTL

RENEWABLE ENERGY ENHANCEMENT PROJECT IN THE WESTERN REGION

Renewable Energy Enhancement Project in the Western Region /Solar 35MW, Wind 15MW/



- **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/

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.

Ministry of Energy

ENVIRONMENTALLY FRIENDLY DEVELOPMENT PROJECTS BASED ON SCIENCE AND ADVANCED TECHNOLOGIES

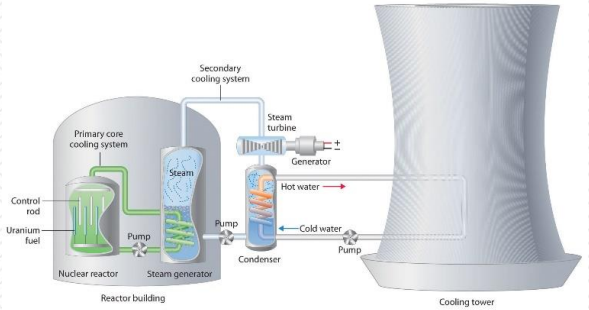
HYDROGEN

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 sources

NUCLEAR

NUCLEAR ENERGY PROJECT

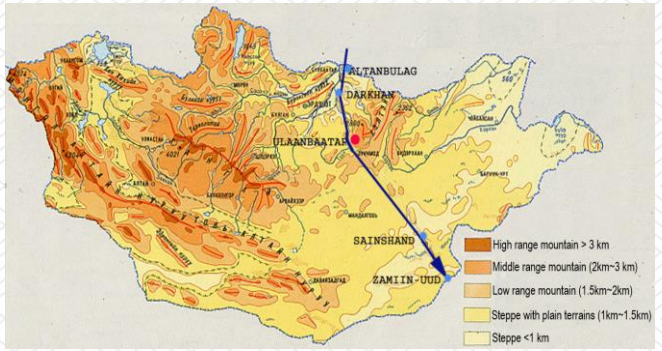


The project will conduct a baseline study on the construction and operation of small-scale nuclear sources with technology above the III + nuclear reactor.

- Complete the feasibility study;
- Promoting international cooperation;
- Create a legal environment;
- Construction and operation of a nuclear reactor.;

Natural Gas

RUSSIA-MONGOLIA-CHINA NATURAL GAS PIPELINE



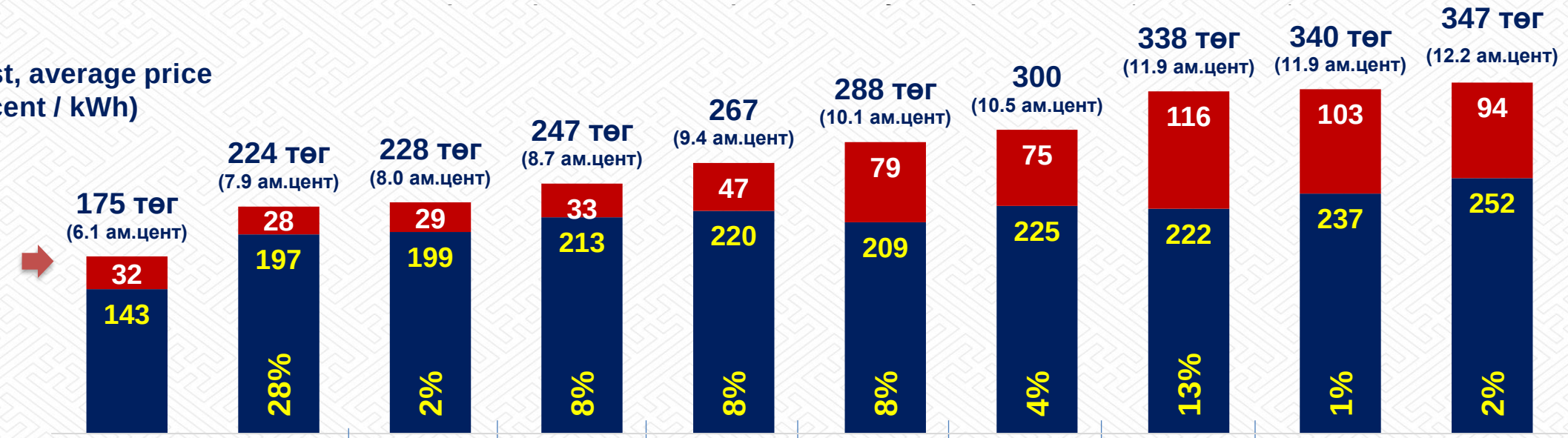
Mongolia's energy consumption will be calculated and the capacity, location, infrastructure and logistics terminals of the facilities will be surveyed.

The natural gas pipeline will pass through 6 aimags and 22 sums of Mongolia

CURRENT SITUATION IN THE ENERGY SECTOR

Electricity unit cost, average price MNT / kWh (cent / kWh)

Impact of loan and Investment



INCREASE THE CAPACITY OF CHPS

With a project loan with a term of 10 years and an interest rate of 7%

- 2024 он: CHP-3 The first stage is 50 MW Choibalsan TPP 50 MW
- 2025 он: Amgalan Thermal Plant 100 Gcal/h
- 2026 он: CHP-4 500t/h Boiler x
- 2028 он: CHP-3 250 MW CHP-2 100 MW

NEW ENERGY SOURCES

The starting price of the electricity sale and purchase agreement is 6.3-7.0 USD/kWh.

- 2024 он: Tavan Tolgoi CHP (block 1) 150 MW
- 2025 он: Tavan Tolgoi CHP (block 2) 150 MW Baganuur CHP 400 MW
- 2026 он: Tavan Tolgoi CHP (block 3) 150 MW
- 2028 он: Buuruljuut CHP 300 MW

OVER HEAD TRANSMISSION LINES

DISCOUNTED LOAN with a term of 30 years and an interest rate of up to 3 percent

- 2023 он: Battery Storage 160 MWh
- 2024 он: Tavan Tolgoi-Oyu Tolgoi 167 km Choir-Sainshand 220 km
- 2027 он: Erdene-Buren-Myangad-Uliastai 468 km
- 2028 он: Sainshand-Tsagaansuvarga 204 km; Baganuur-Chinggis-Choibalsan 518 km; Baganuur-Choir 200 km; Mandalgobi-Arvaikheer 287 km; Baganuur-Nalaikh-Ulaanbaatar 140 km

NEW RECOVERY POLICY

DISCUSSION GOAL

The following results will be achieved through the implementation of the Energy Recovery goals and measures set forth in the New Recovery Policy.

The total installed capacity of Mongolia's power system will increase by **1,765 MW**. These include:

- Total capacity of TPP expansion projects is 475 MW
- The total capacity of new source projects is 1290 MW

Distributed gas power plants will be built in Ulaanbaatar for the winter.

In Mongolian energy system, there will build total of **1962 km** 220kV OHTL.

The implementation of the above 22 projects and activities in the energy sector will fully meet the goals and objectives of the first phase of the **"Vision-2050"** long-term development policy of Mongolia at the 2030 level.

After the project:

Installed capacity:
- Electricity: 1765 MW
- By heat: 1185 Gcal/h

2 TIMES

OHTL project:

220 kV
1962 km
OHTL:

2 times

EARLY DEVELOPMENT OF THE ENERGY SECTOR WILL SUSTAIN THE COUNTRY'S ECONOMIC GROWTH IN THE LONG RUN.

THANKS FOR YOUR ATTENTION.