



The JICA Knowledge Co-Creation
(Program Group & Region Focus)



COUNTRY REPORT

ENERGY POLICY AND LEGAL CONDITION IN MONGOLIAN ENERGY SECTOR

Khiimorisain Purevdorj

Specialist,
Energy Regulatory Commission

Japan Tokyo, 2020



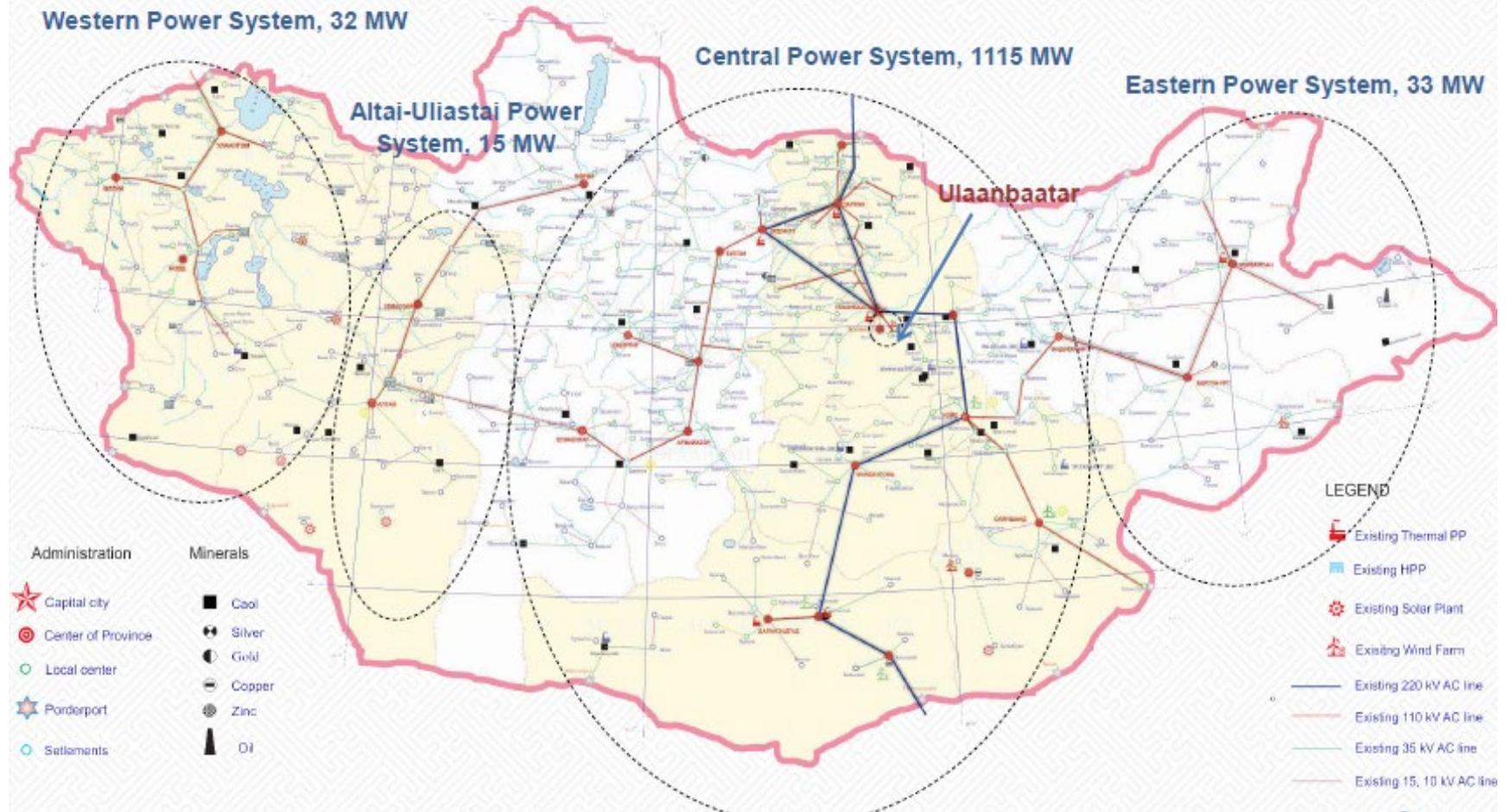
MONGOLIA COUNTRY PROFILE



- Territory: 1.564 million km²
- Population: 3.0 million
- Capital city: Ulaanbaatar (~1.0 million-35.6%)
- Highest point: Khuiten mountain peak (4374 a.s.l.m)
- Lowest point: Khukh nuur depressions (518 a.s.l.m)
- Min. temp: -33°C (-50°C)
- Max. temp: +23°C (+35.8°C)
- Official language: Mongolian
- Main religion: Tibetan Buddhism
- GDP per capita: 3973.44 \$

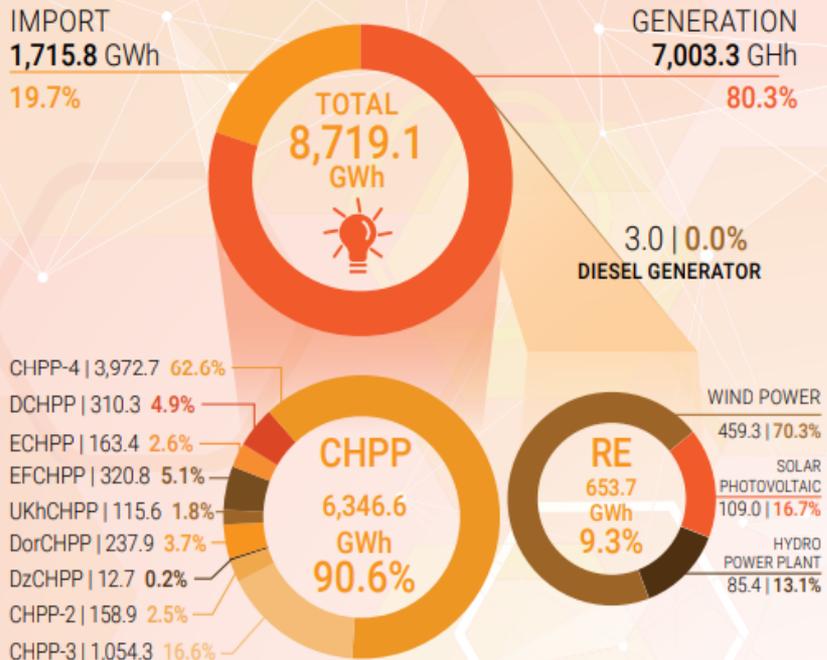
Source: World Bank

MONGOLIAN INTEGRATED POWER SYSTEM



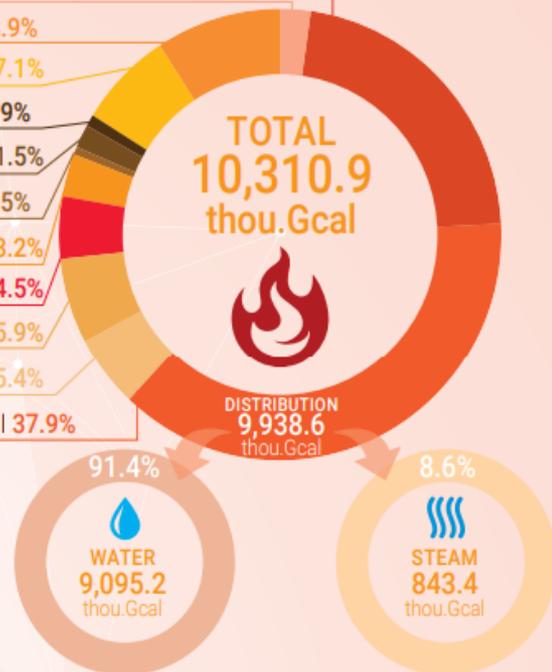
POWER SECTOR CURRENT STATE -2019

GENERATION STRUCTURE AND IMPORTS

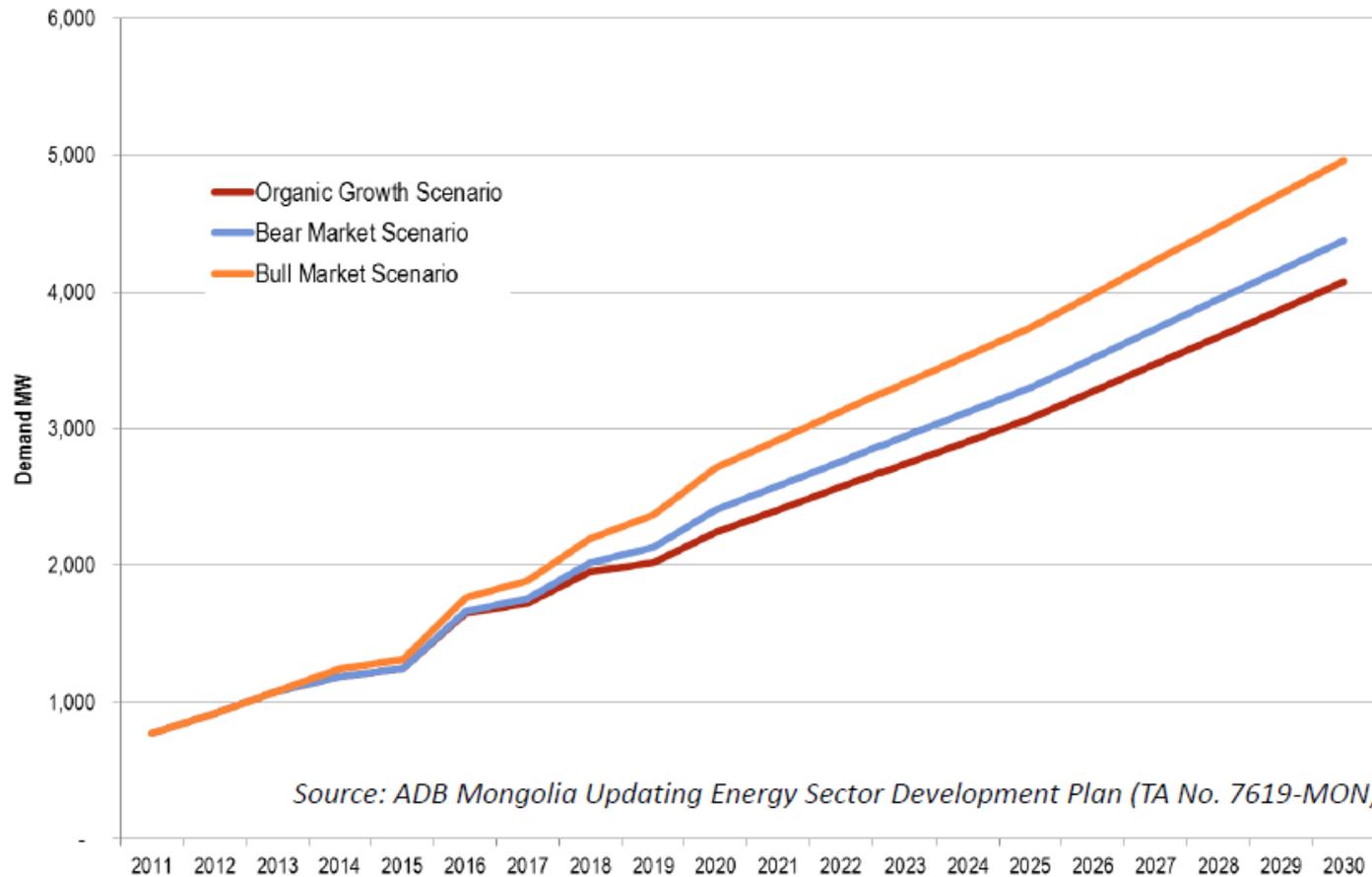


HEAT GENERATION BY PLANTS

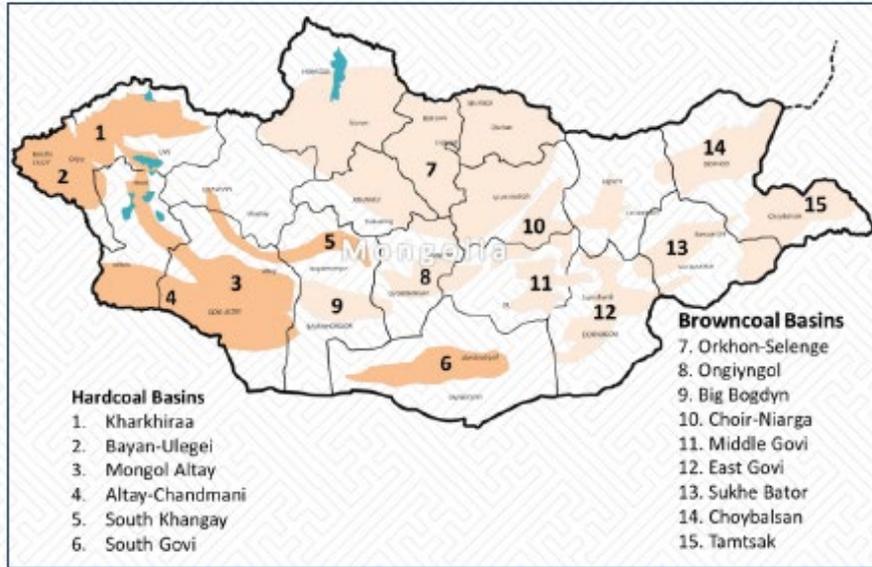
CHPP-3	2,252.3	thou.Gcal	21.8%
CHPP-2	243.4	thou.Gcal	2.4%
LH-RA	922.0	thou.Gcal	8.9%
ATP	729.4	thou.Gcal	7.1%
TPND	96.3	thou.Gcal	0.9%
BNTP	154.8	thou.Gcal	1.5%
DzCHPP	50.9	thou.Gcal	0.5%
DorCHPP	332.8	thou.Gcal	3.2%
EFCHPP	461.6	thou.Gcal	4.5%
ECHPP	604.4	thou.Gcal	5.9%
DCHPP	557.2	thou.Gcal	5.4%
CHPP-4	3,905.8	thou.Gcal	37.9%



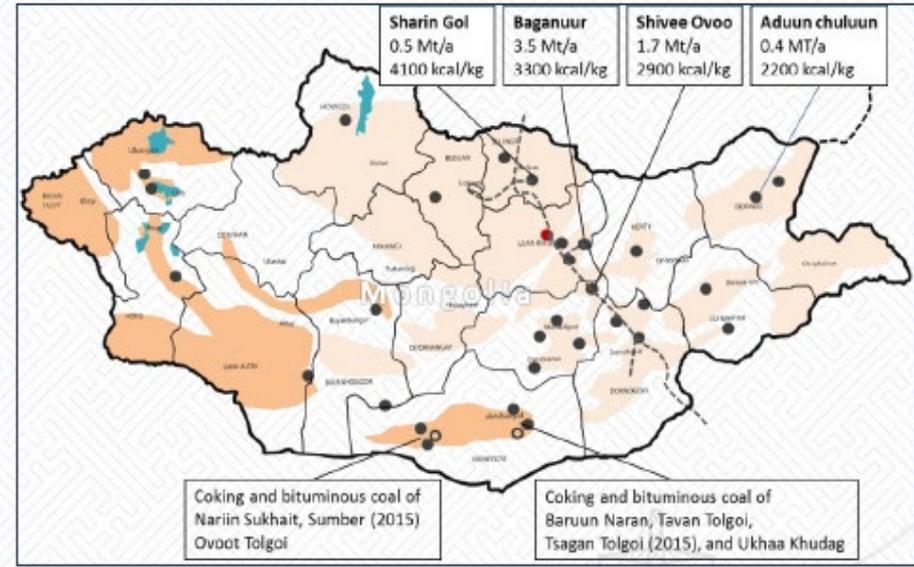
POWER DEMAND OUTLOOK



RESERVES OF COAL RESOURCES



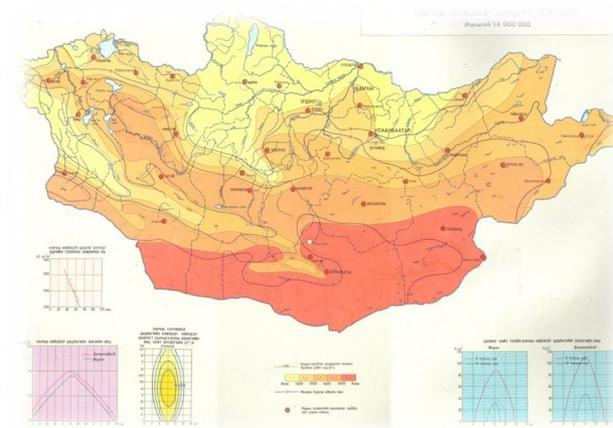
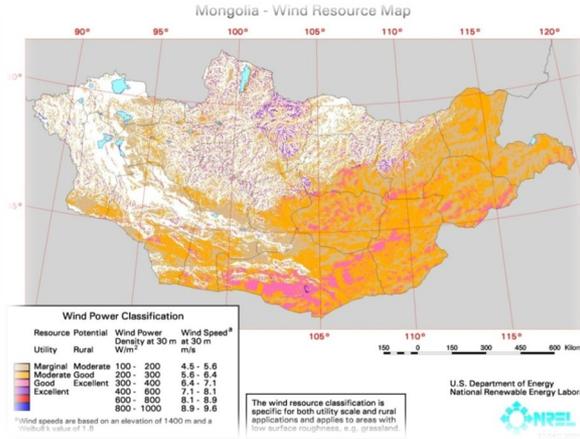
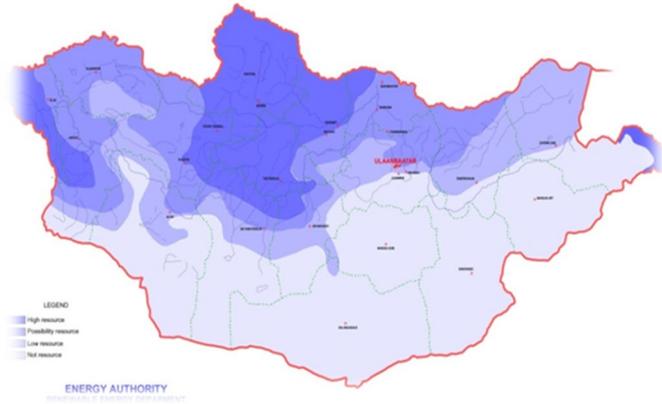
- Estimated total sources around 1730 billion ton in 15 coal basins
- Over 370 identified occurrences in 85 deposits
- Proven reserves 12 billion ton, which of 2 billion ton is coking coal



- Mines in Gobi region are for exporting -34.5 million ton in 2019
- Mines in Southern region and other regions are for power production and household heating –

RENEWABLE ENERGY RESOURCES

HYDRO ENERGY RESOURCE OF MONGOLIA



3800 small and big streams and rivers in Mongolia. Hydro power potential about **6417.7 MW**. It would produce **56.2 billion kWh** of electric energy in a year.

Wind resources assessment made by NREL (USA). Good-to-excellent wind resources equivalent to **1,100 GW** of wind electric potential. Potentially deliver over **2.5 trillion kWh** per year.

Annual average amount of solar energy is **1,400 kWh/m²/y** with solar intensity of **4.3-4.7 kWh/m²** per day. Total annual radiation intensity equals to **2.2*10⁶ TW**.

LEGAL & REGULATORY FRAMEWORK IN ENERGY SECTOR

- **Legal framework for energy regulation**

- ✓ Law on Energy
- ✓ Law on Renewable Energy
- ✓ Law on Licenses for business activities
- ✓ Law on Concession
- ✓ Law on Energy conservation

- **The resolution of the grand state assembly of Mongolia**

- ✓ The State Policy for Energy Sector in Mongolia (2015-2030)
- ✓ National Renewable Energy Programme (2005-2020)
- ✓ National Energy Conservation Action Plan (NEEAP 2017-2022)

- **The order of Minister for Energy**

- ✓ Grid code of National Electricity Transmission Network

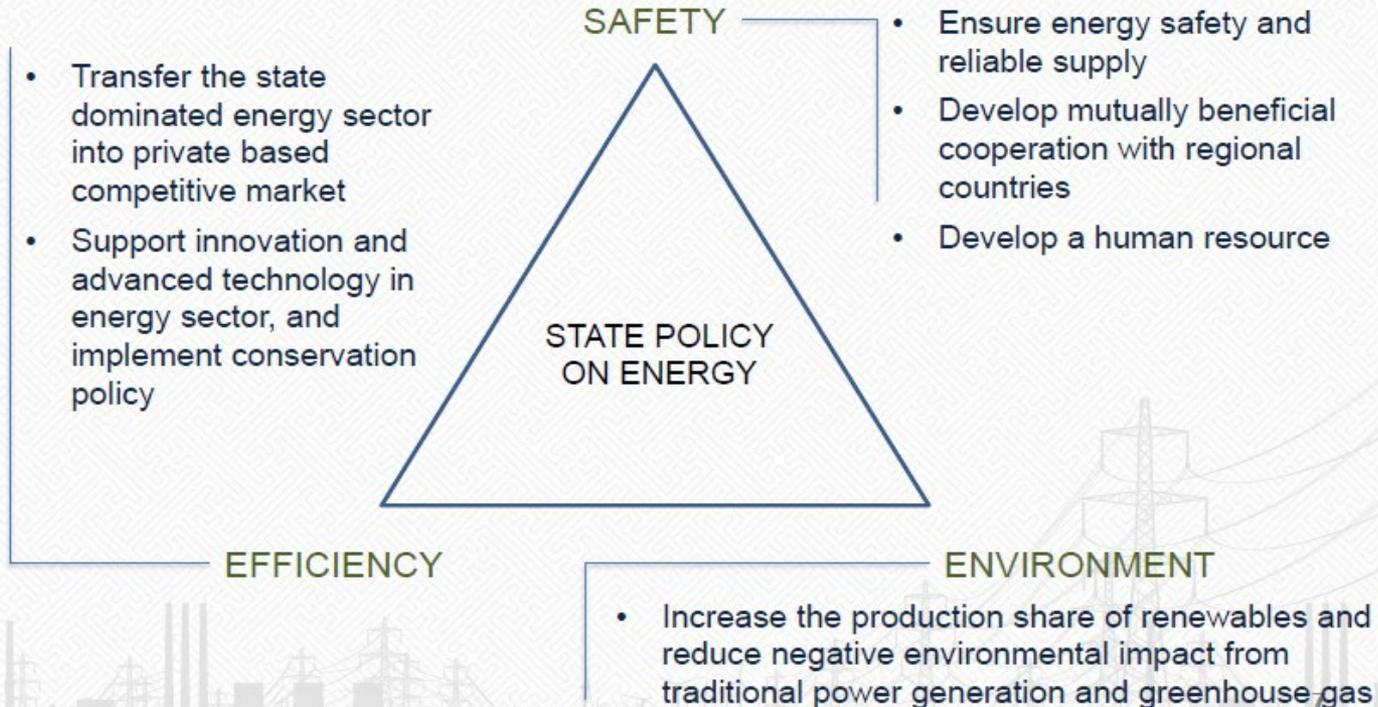
- **The resolutions of ERC on:**

- ✓ Licensing policies and directives
- ✓ The rule to regulate relation to licensing matters
- ✓ The rule to set the terms and conditions of license, and to evaluate and review compliance

LEGAL & REGULATORY FRAMEWORK IN ENERGY SECTOR

“State Policy on Energy” 2015-2030

PRIORITY AREAS AND STRATEGIC GOALS



LEGAL & REGULATORY FRAMEWORK IN ENERGY SECTOR

“State Policy on Energy” 2015-2030

Expected Results - Criteria

Indicators	2014 on /Base year/	1 st stage /by 2023 /	2 nd stage /by 2030/
Reserve Capacity for Electricity Generation	-10%	10 % ≤	20% ≤
Reserve Capacity for Heat Generation in Cities	3%	10 %≤	15 % ≤
Profit Share on Tariff Structure in Central Region	-16.22 %	0%	5%
Own Use of CHP's	14.4 %	11.2%	9.14 %
Transmission & Distribution Loss /excluding Oyutolgoi/	13.7%	10.8%	7.8%
Share of Renewables on total Installed Capacity for Domestic Supply	7.62%	20%	30%
Greenhouse Gas Emission per 1 Gcal Power Generation	0.52 ton CO ₂ equivalent	0.49 ton CO ₂ equivalent	0.47 ton CO ₂ equivalent
Reduction of Building Heat Loss	0%	20%	40%
Technological Achievements that have to be utilized in Energy Sector	CFB	Sub Critical Coal Bed Methane, Battery Energy Storage, Pumped Storage	Super Critical, Ultra S/Critical, Hydrogen, Concentrated Solar Plant

FULL POWER OF THE ENERGY CONSERVATION LAW

- ✓ Organize countrywide implementation of state energy conservation policies and provisions of law;
- ✓ Coordinate the activities to develop a National Energy Conservation Action Plan (NEEAP);
- ✓ Obtain annual performance reports of designated consumers on energy conservation activities;
- ✓ Register of designated consumers;
- ✓ Issue and revoke accreditations for energy auditing entities and ESCO's
- ✓ Issue certificates for energy auditors and energy managers;
- ✓ Establish a database system for energy conservation and for efficient use of energy and manage public awareness campaigns;
- ✓ Manage and ensure basic and advanced trainings for energy auditors and energy managers;

INSTITUTIONAL STRUCTURE FOR ENERGY SECTOR

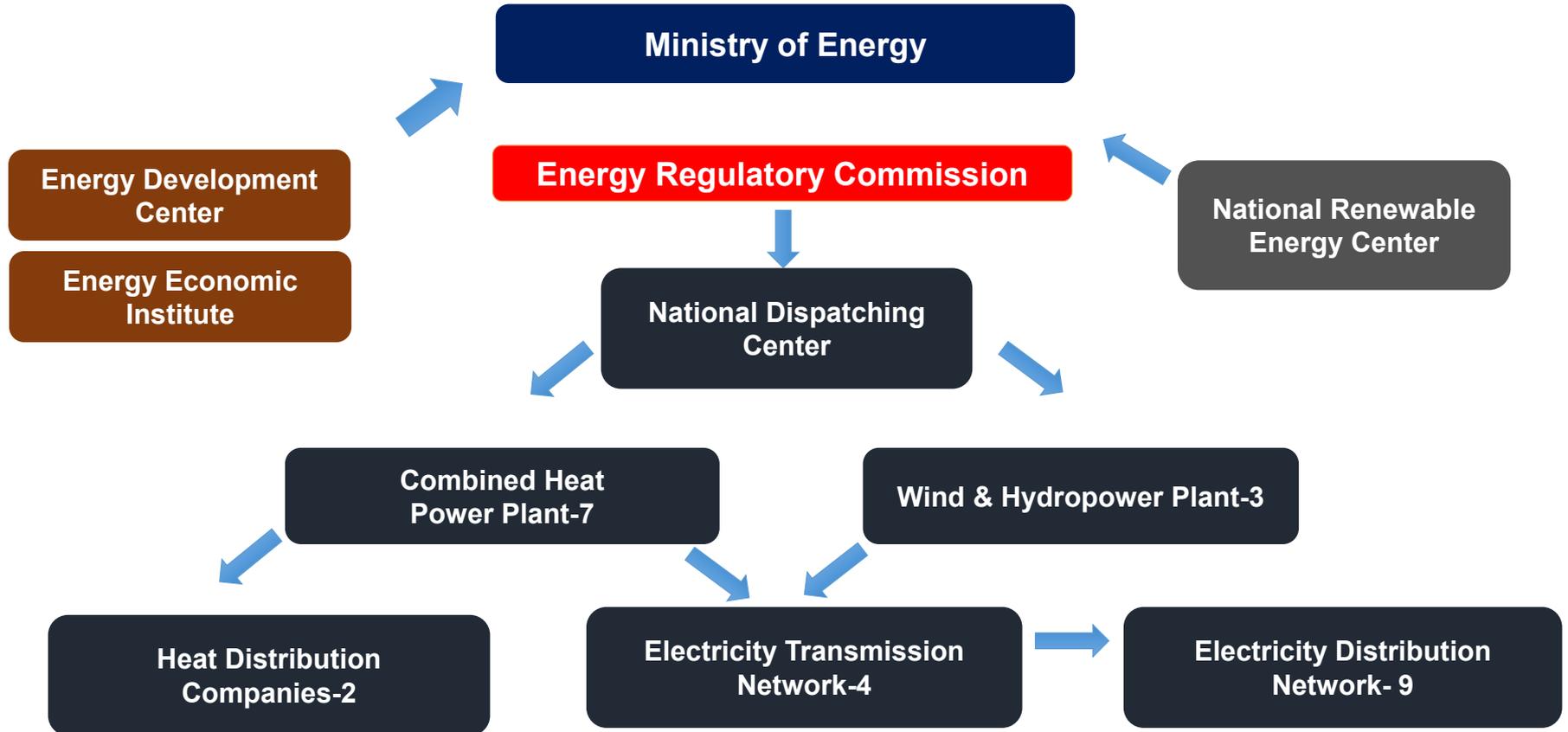
MINISTRY OF ENERGY

- ❖ Policy making
- ❖ Long term power development
- ❖ Policy implementation
- ❖ Promotion of rural electrification
- ❖ Technical standards

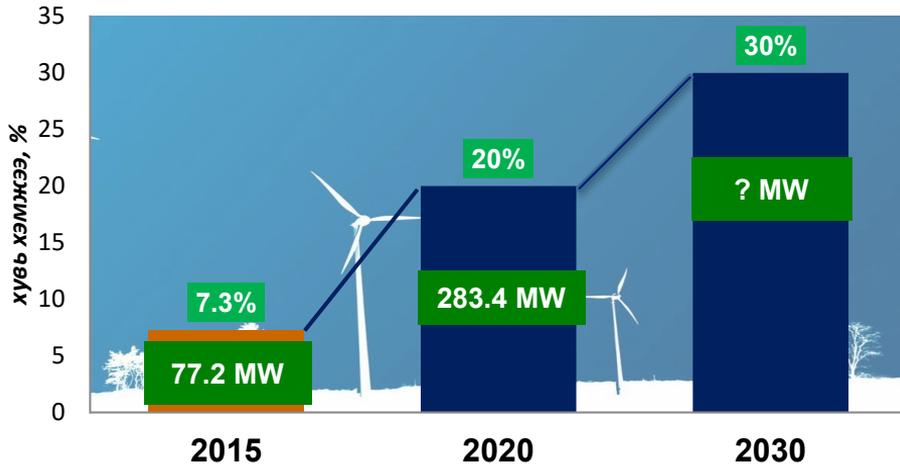
ENERGY REGULATORY COMMISSION

- ❖ Tariff setting regulations
- ❖ Issuing license more than 5 MW
- ❖ Competition and Market
- ❖ Monitoring of performance
- ❖ Energy conservation and efficiency

INSTITUTIONAL STRUCTURE FOR RENEWABLE ENERGY

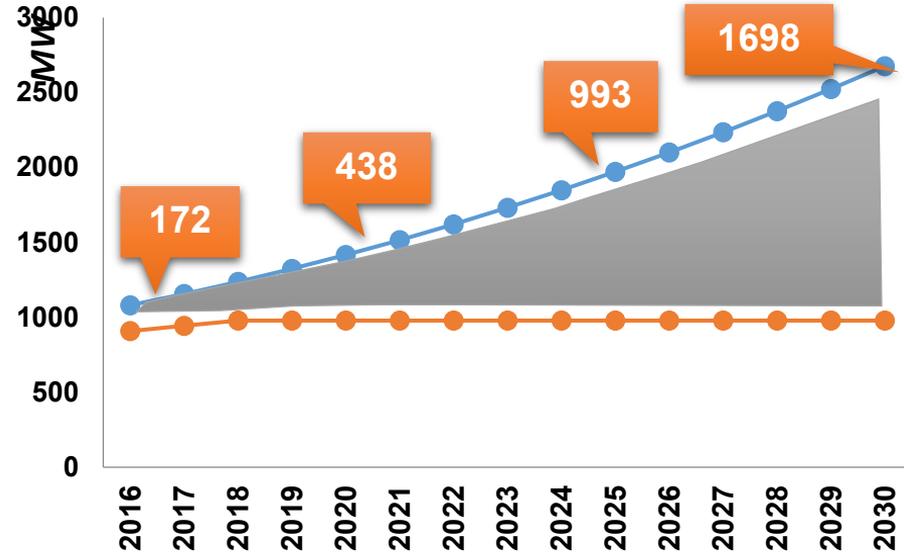


RENEWABLE ENERGY TARGET & ITS CURRENT IMPLEMENTATION



In the State policy on energy, the share of renewables will be reached at 20% by 2020, 30% by 2030 in total installed capacity.

- The targets are reachable with implementing **300-800 MW** of Renewable energy systems.



- ❖ If it is assumed that the current increase in energy demand is constant, there will be demand for **438 MW** of electricity by 2020, **1698 MW** by 2030.
- ❖ The required renewable energy capacities to reach the national renewable energy goals will be **283.4 MW** in 2020 and **803.1 MW** in 2030.

GHG EMISSION LEVELS AND THEIR VALIDATION

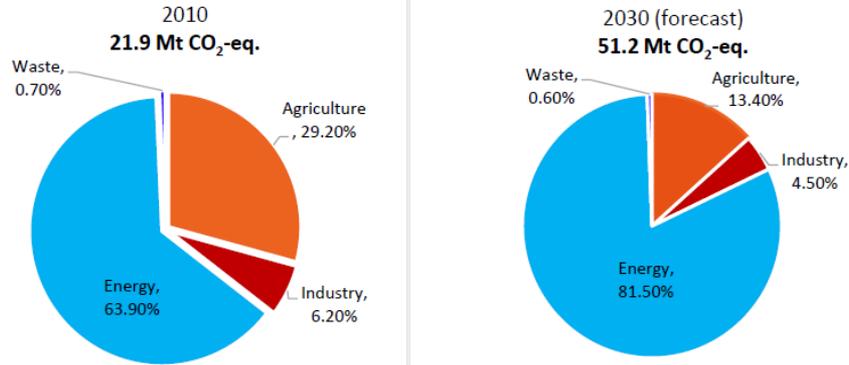


Figure 1. GHG emissions share by sector in 2010 and 2030 [forecast, excluding LULUCF].¹

Mongolia ratified the Paris Agreement in 2016, confirming its intended Nationally Determined Contribution (NDC) of 2015 to reduce greenhouse gas emissions by 14% below the business as-usual scenario in the year 2030, equivalent to an annual reduction of approximately 7.3 MtCO₂e of economy-wide emissions in 2030.

to a business-as-usual (BAU) scenario, excluding LULUCF.

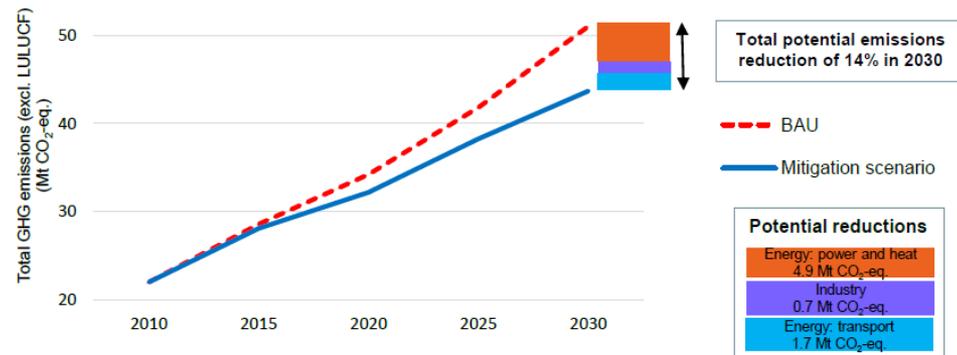
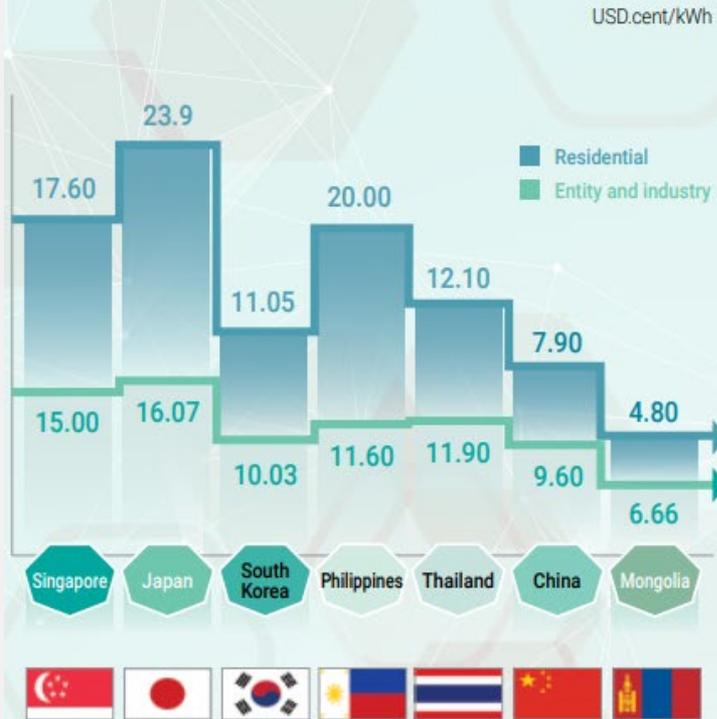


Figure 2. Indicative potential emission reductions of the measures compared to BAU emissions

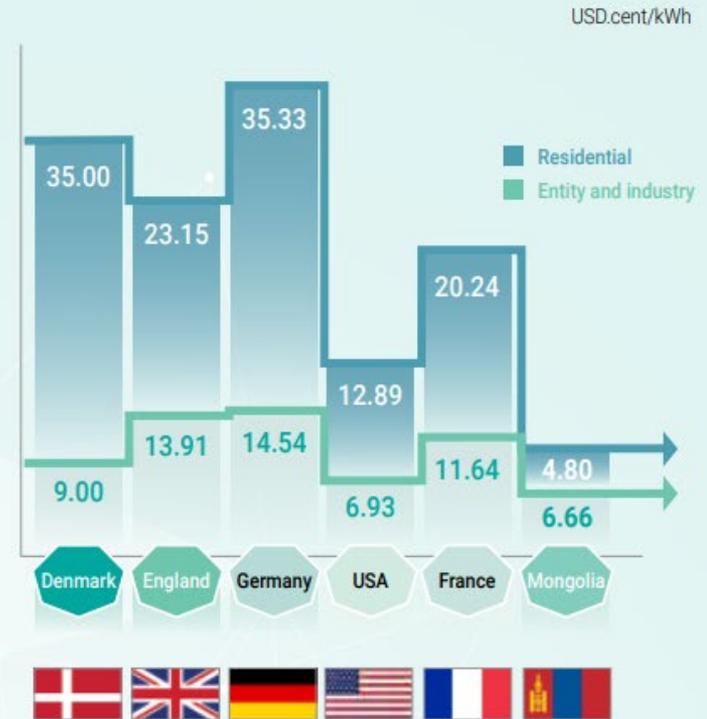
ENERGY TARIFFS

COMPARISON OF END USER ELECTRICITY TARIFFS WITH SOME ASIAN COUNTRIES



Note: Exchange rate USD to MNT 1:2,734.33

COMPARISON OF END USER ELECTRICITY TARIFFS WITH DEVELOPED COUNTRIES



Note: Exchange rate USD to MNT 1:2,734.33

MEDIUM-TERM ENERGY PROGRAM 2018–2023

Main scope	Action to be implemented
<p>To ensure domestic electricity and heat demand (extend existing installed capacity and construct new thermal plants)</p>	<ul style="list-style-type: none"> -To expand the Darkhan CHPP capacity by 35 MW - To renovate turbine generators №1–4 of CHPP-4 of UB city - To expand the Erdenet CHPP capacity by 35 MW - To expand the Choibalsan CHPP capacity by 50 MW - To expand the capacity of high-pressure section of CHPP-3 of UB city by 75 MW - To expand the Amgalan thermal power plant of UB city, making it a 50 MW combined heating and electricity producing station; - Expansion and renovation adding 250 MW to CHPP-3 of UB city - To commence expansion work (with 1 block having gas generator operating in regulating mode.) to augment the capacity of CHPP-2 in UB by 300 MW - To construct TTPP (300 MW)—domestically supply the energy demand of the Oyu Tolgoi copper mining and processing plant by relying upon the Tavan Tolgoi coal deposit - To develop and implement technical and technological solutions for thermal power plants projects such as the 700 MW Baganuur plant and the 300 MW capacity Booroljuut plant; - To commence construction of generation sources with capacity not lower than 100 MW for the Altai-Uliastai energy system - To commence construction of thermal power plants relying on coal deposits to supply 5 aimags in the Western region
<p>Construction of renewable energy sources</p>	<p>To commence construction of the 315 MW capacity Egiin Gol hydro power plant</p> <ul style="list-style-type: none"> - Erdenburen Hydro PP - Storage system with large capacity (100 MW) - Upscaling renewable energy program (30 MW) - New Solar PP-60 MW - New Wind PP-100 MW

CURRENT RENEWABLE ENERGY PROJECTS

Mandakh -200 kW



Bugat -140 kW



Sainshand 55 MW



Salkhit -50 MW



CURRENT RENEWABLE ENERGY PROJECTS

Taishir -11 MW



Durgun -12 MW



Tsetsen-Uul -150 kW



Zavkhanmandal -110 kW



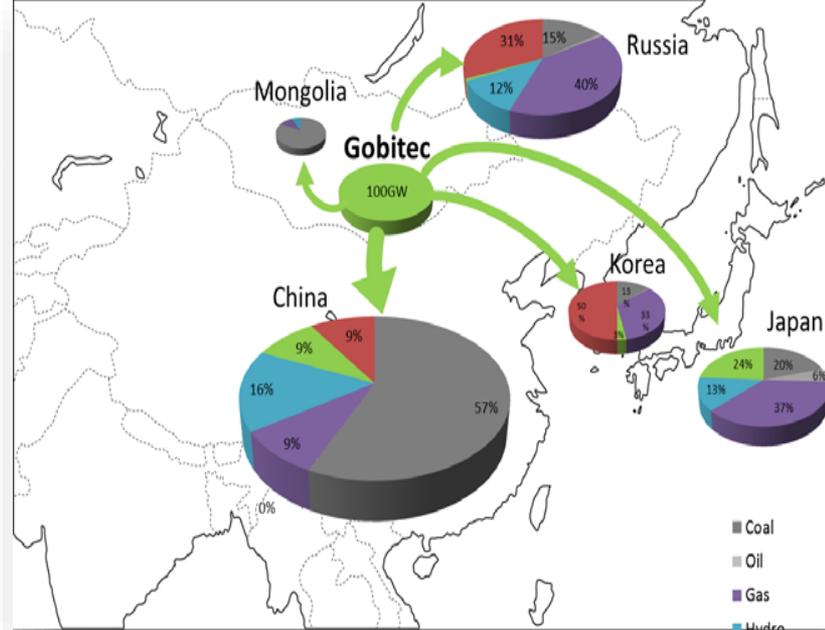
INTERNATIONAL COOPERATION IN RENEWABLE ENERGY

GOBITECH + ASIAN SUPER GRID

100 GW RE capacity



- Hydro
- Wind
- Solar-PV
- Solar-CSP



*Generation mix is based on 2030 BAU forecast.

*Japan: Scenario of phasing-out nuclear by 2030

- Coal
- Oil
- Gas
- Hydro
- NRE
- Nuclear

The Gobitec concept represents the idea of producing clean energy from renewable energy sources in the Gobi Desert and to deliver the produced energy to regions with a high demand of electric energy.

Source: "Gobitec and ASG for Renewable energies in Northeast Asia" report, 2014.

Import: maximum 10% of electricity demand

ISSUES AND CHALLENGES FACING ENERGY SECTOR IN MONGOLIA

Safety

- Aging power infrastructure, insufficient technology
- Digitalization, energy system flexibility and cyber security
- Stable and sustainable energy supply and decrease its dependence for refined fuel and electricity
- Operation & Maintenance system for long-term Policy need it

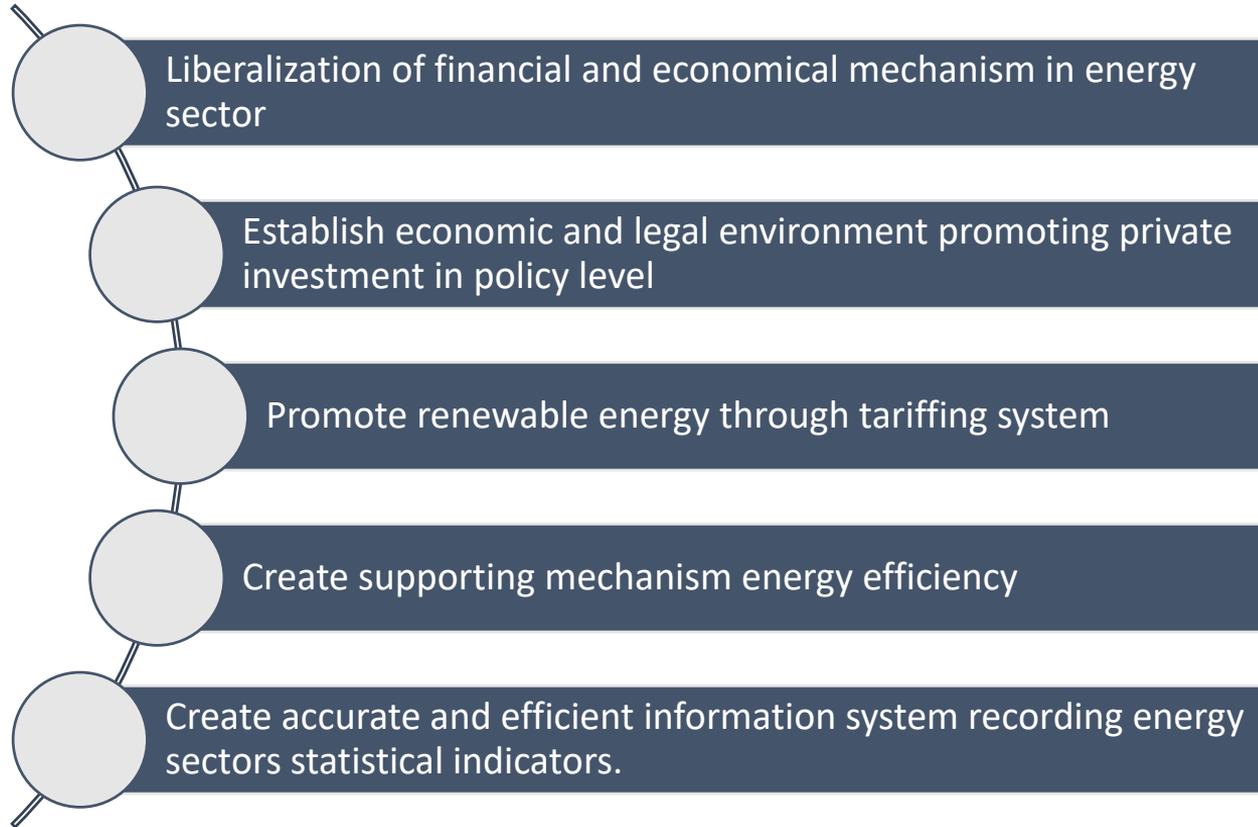
Environment

- Develop new Business model which promoted use of distributed small renewable energy system such as solar, wind
- Market-based support system for renewable electricity production, supplier compete their energy price
- Develop hybrid renewable energy systems with energy storage
- Contribute to Mongolia's National Determined Contribution (NDC) for climate change mitigation.
- Improve and strengthen advantages of the existing energy market

Efficiency

- Promote to use energy efficiently and cost reduction for every sector
- Enhance to ESCO business model
- Introducing international standards
- Bringing international financial model which implement energy conservation measures

SUBJECTS OF PARTICULAR INTEREST WITH REFERENCE TO THE CONTENTS



THANK YOU

ありがとうございました