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Overview of Energy/Electricity demand and Renewable energy potential in Mongolia

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- ❖ Concluding remarks

POLICY FRAMEWORK

Key policies and and Legislations In place

- State policy on Energy - National Energy Policy (June 15, 2015)
- National Renewable Energy Program (2006-2020)
- Law on Energy of Mongolia
- Law on Renewable Energy (FiT, Supporting Tariff, Long term PPA)
- Law on Energy Efficiency of Mongolia
- Master Plan for Energy Sector development (Roadmap)
- Tax exemption for Renewable energy equipment and products (2016)
- Land Agreement – long term lease

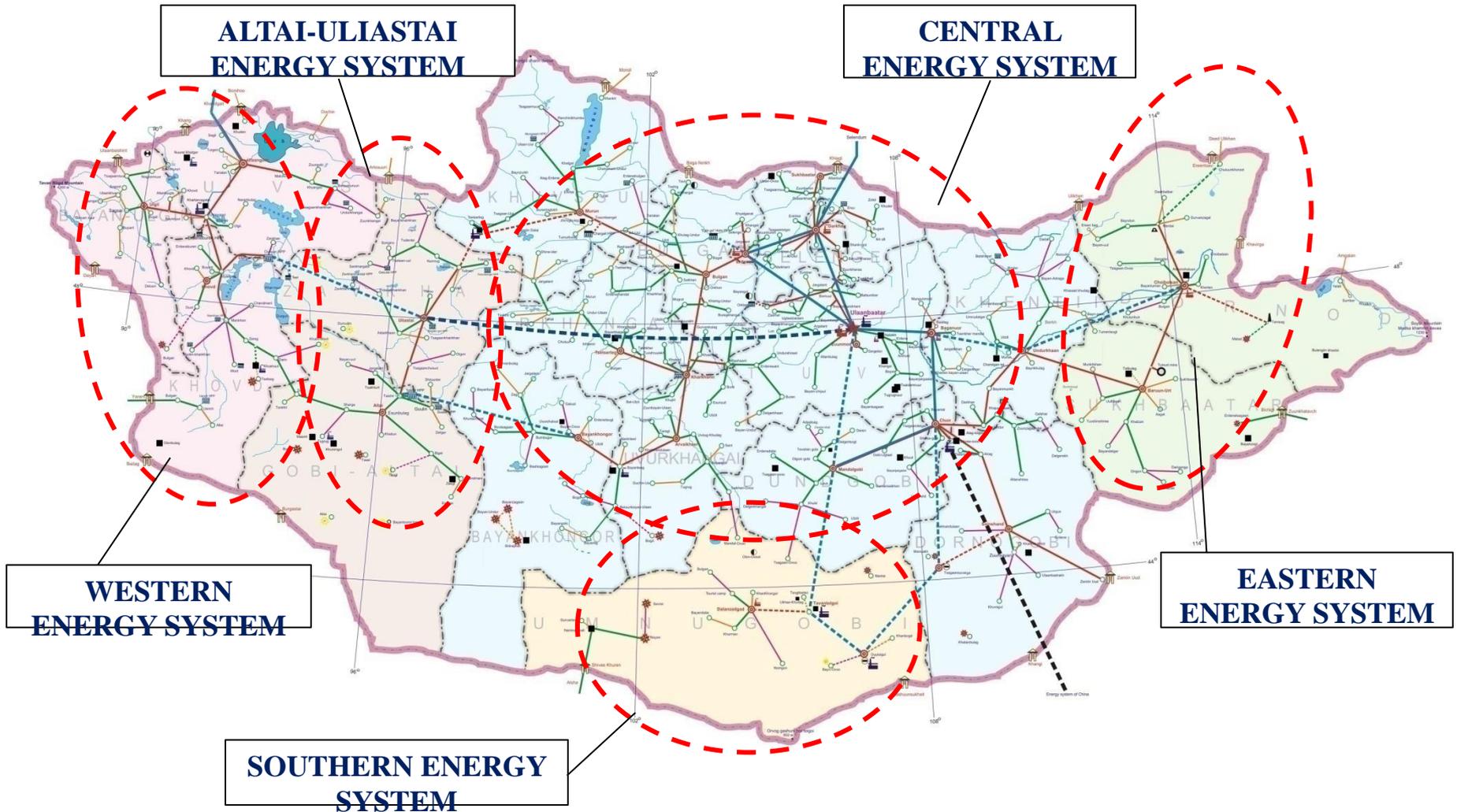
Key organizations invelved in Energy Sector development

- Ministry of Energy (EDC, EEI, NREC)
- Energy Regulatory Commission
- National Dispatching Centre
- National Transmission Network Company
- Distribution Companies
- Private Energy companies (Newcom, MSC, Xasuu Megawatt and etc)

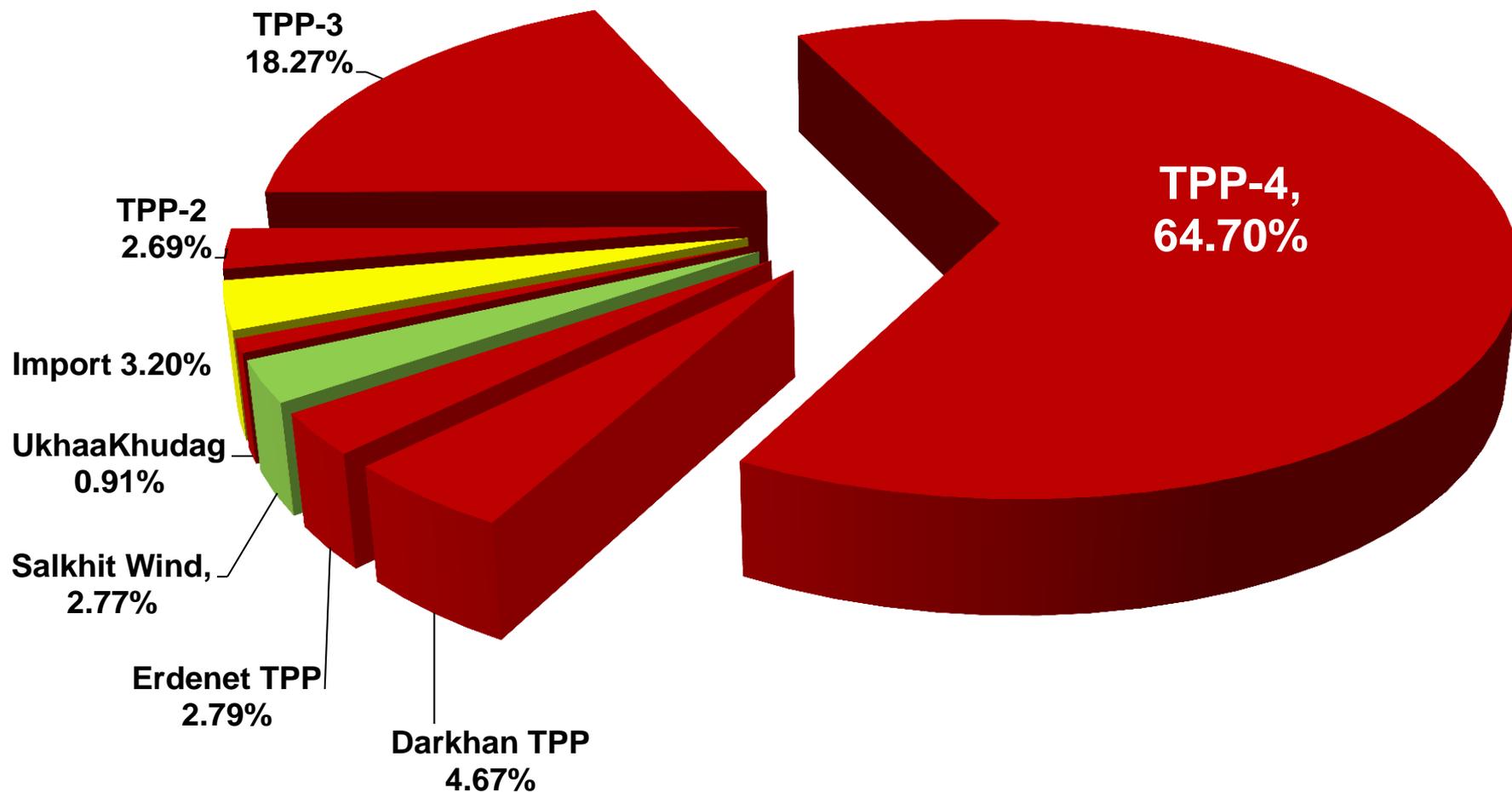
THE CURRENT SITUATION OF POWER SUPPLY AND DEMAND IN MONGOLIA

- ❖ Due to harsh winter and one of the world's most sparsely distributed populations, Mongolia faces considerable challenges to provide sufficient heat and electricity for its people, especially in rural areas.
- ❖ Currently, the largest power suppliers in the country are aging coal-fired plants providing electricity and, in most cases, district heat in combined heat and power (CHP) mode via central networks.
- ❖ Most of the electricity and heat consumption in Mongolia occurs in the Central Energy System (CES), which is supported by the Russian grid in frequency and load. Maximum import is limited to 100 MW, although night peak during winter can be increased to 180 MW. No interconnection for inter-country operational power export appears to exist between Mongolia and China
- ❖ It is expected that mining developments will see major power demand growth in Mongolia, especially in the South Gobi region where the majority of existing and future mines are likely to be located. New power generation to supply such load is required to maintain future industrial zones, which could potentially include further wind and solar projects.

MONGOLIAN INTEGRATED POWER SYSTEM

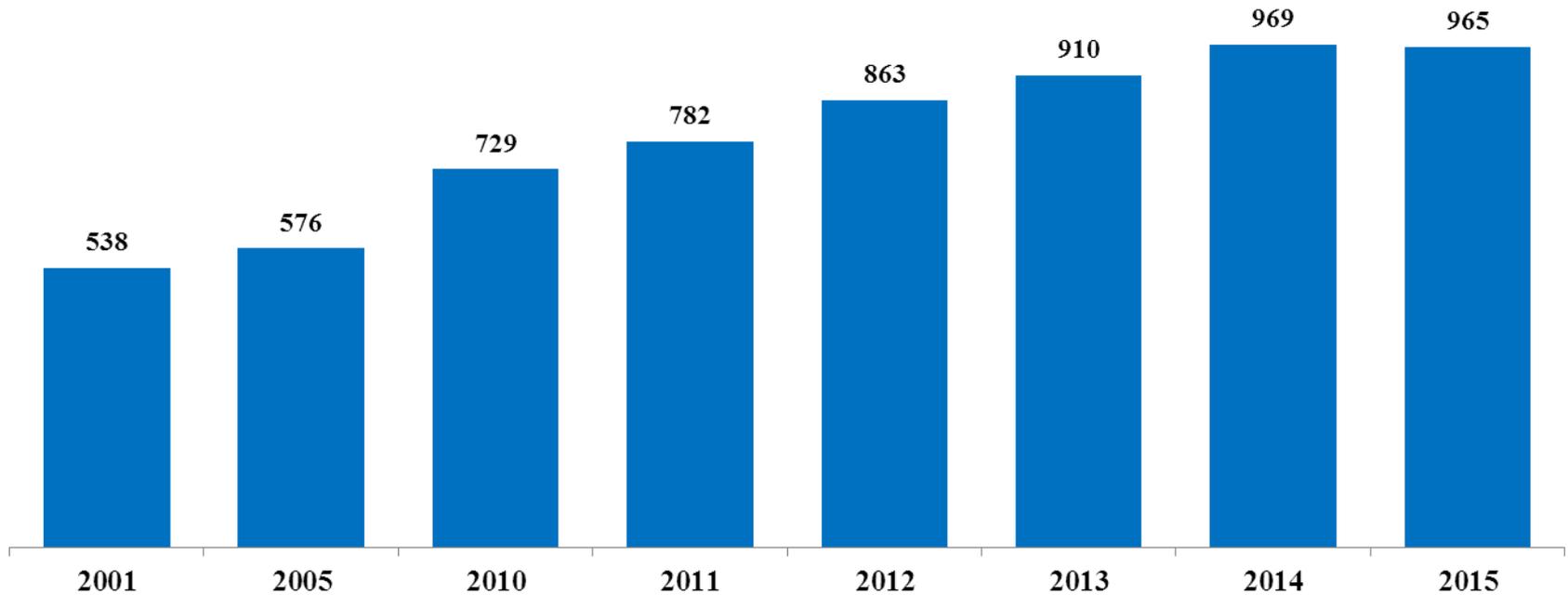


MIX OF POWER SOURCES IN CENTRAL ENERGY SYSTEM OF MONGOLIA (2015)

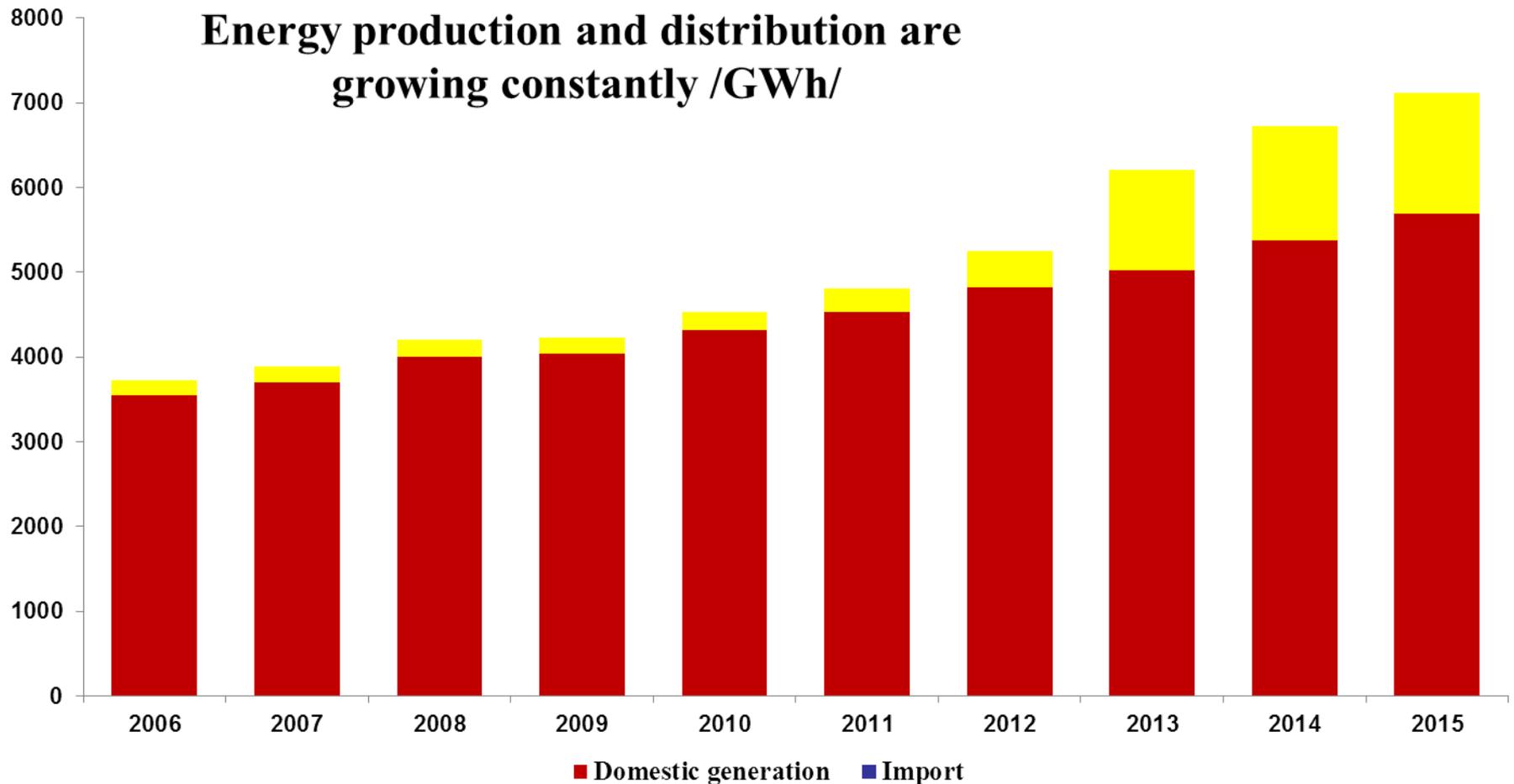


PEAK DEMAND GROWTH OF CENTRAL ENERGY SYSTEM OF MONGOLIA (MW)

Energy production and distribution are growing constantly /million.kW/hour/

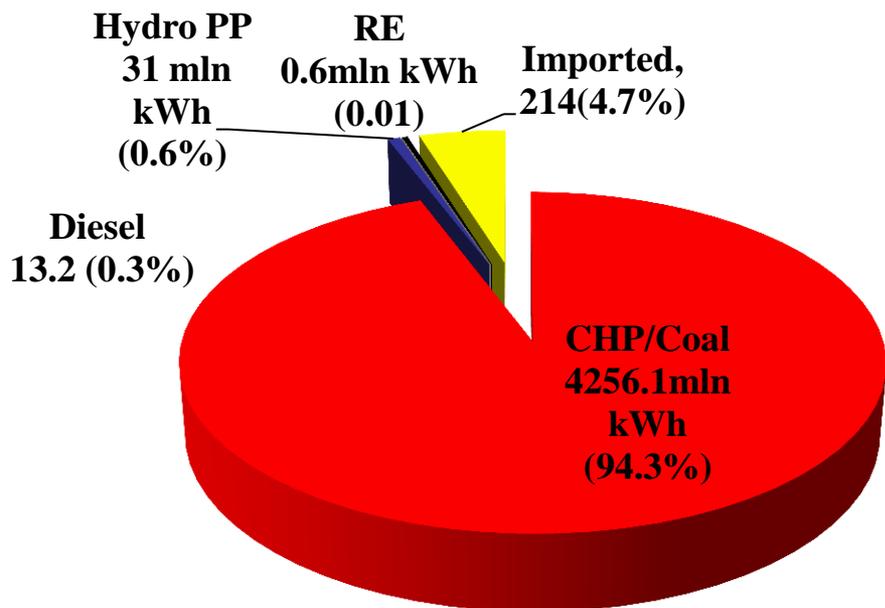


ELECTRICITY SUPPLY OF MONGOLIA (GWh)

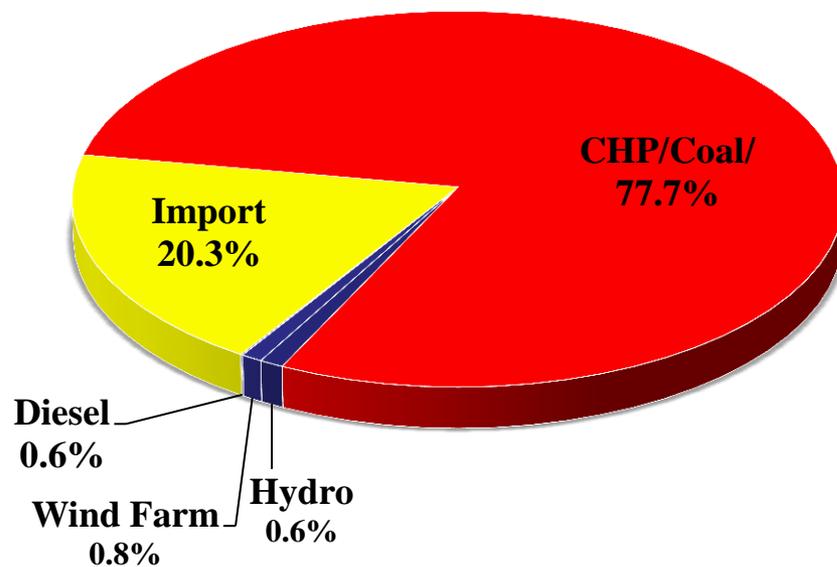


STRUCTURE OF ELECTRICITY PRODUCTION (GWh)

Electricity production + Import, 2010
by type of sources (**Total 4,3 billion.kWh**)

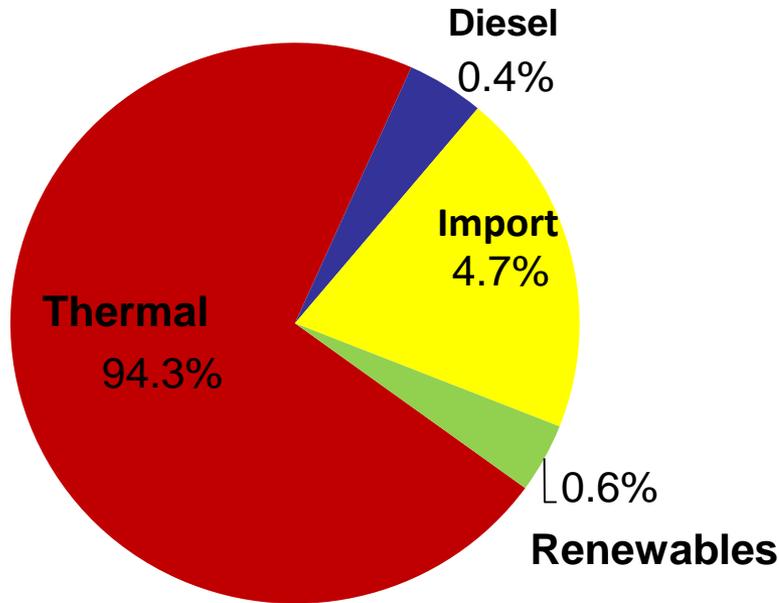


Electricity production + Import, 2015
by type of sources (**Total 7.1 billion.kWh**)

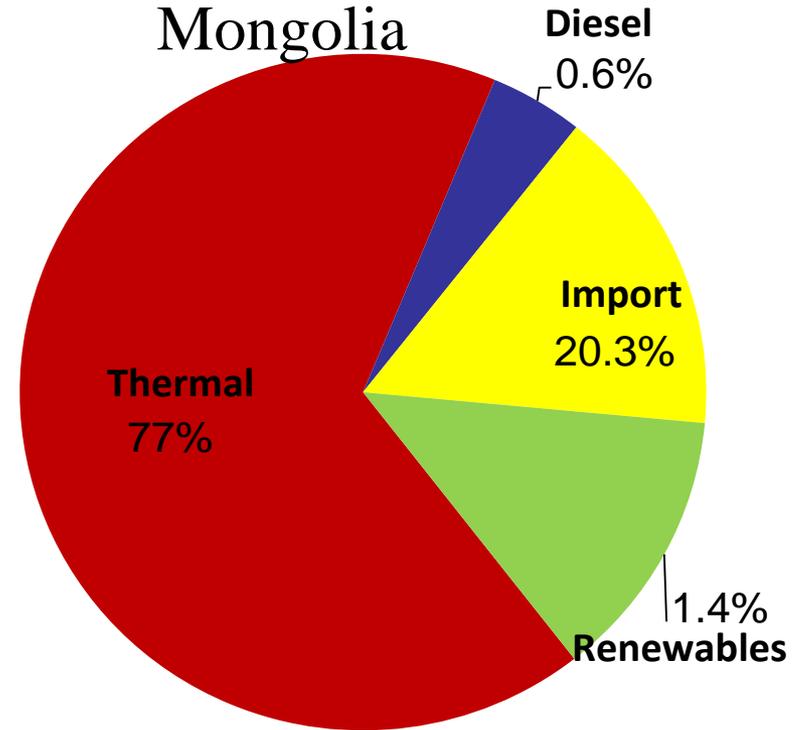


CHALLENGES

2010 Electricity mix
Mongolia



2015 Electricity mix
Mongolia



Total Renewables: 0.6%

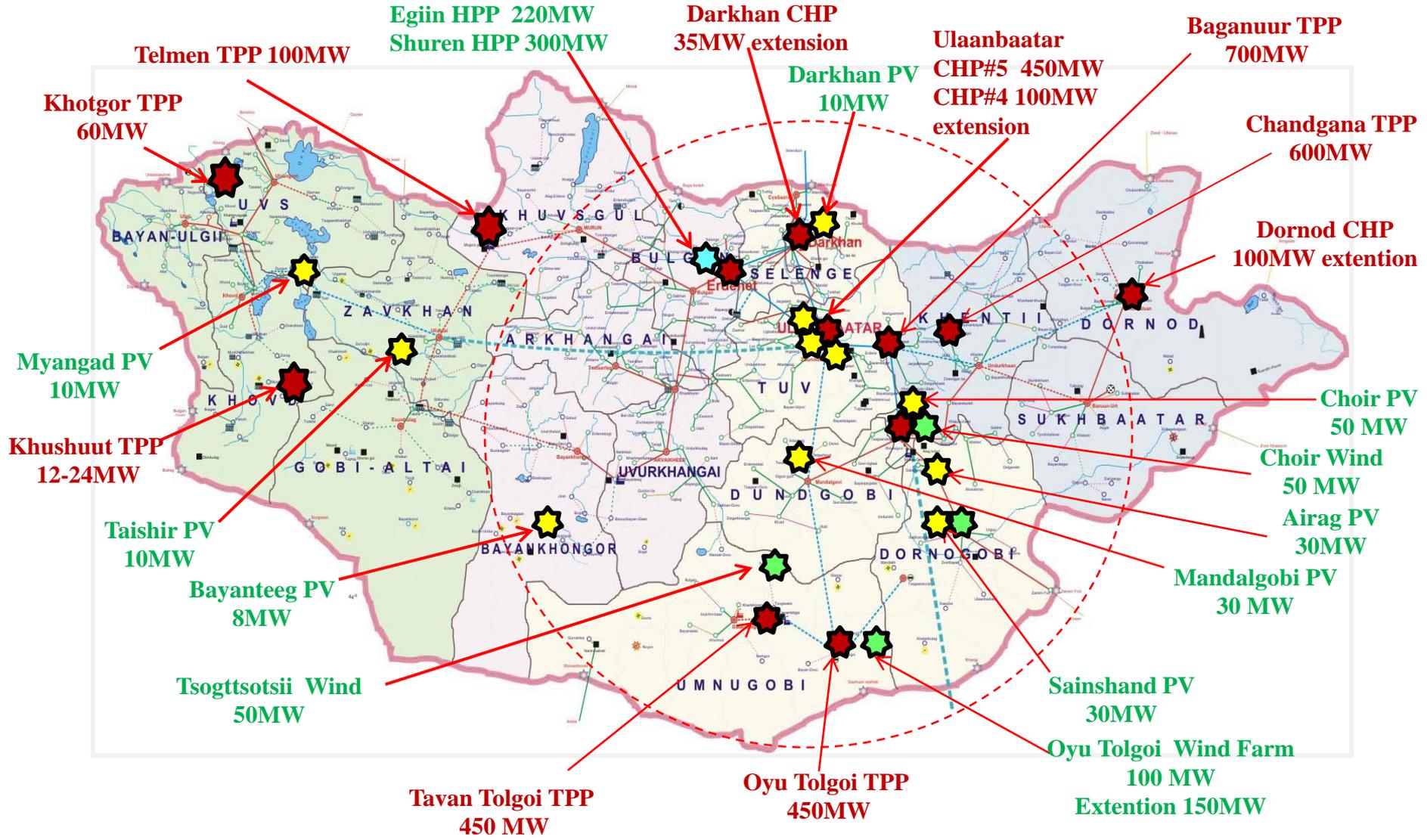


Total Renewables: 1.4%

Renewable energy too slow to meet the increasing demand

Needs more integration to promote RE deployment

PROPOSED PROJECTS UNDER PIPELINE



A number of private developers are currently working on several coal-fired power plants and a number of Wind and Solar power which are mostly in the feasibility stage

KEY CHALLENGES

- ❖ Due to harsh winter and one of the world's most sparsely distributed populations
 - **due to extreme cold in winter, the value of heat from CHP stations is much higher than in other options which presenting challenges for RE developers (electricity-only)**
 - **High losses in transmission and distribution networks due to long lines to low demand centers with low density populations and limited grid interconnection among the four grids and other neighboring countries)**
- ❖ Currently, the energy system in the country are composed mainly coal-fired plants (**which are inflexible to absorb high penetration of intermittent solar and wind energy supply and low efficiency, aging of existing coal-fired plants, that need investment and rehabilitation**) + (There are No large hydropower plants, No interconnection for inter-country operational power export appears to exist between Mongolia and China)
- ❖ Given the relatively low current power demand (~1GW) and poor in-country grid interconnection, insufficient load demand and/or base-load supply (**It may limit the amount of wind and solar power that can be connected to the grid**)
- ❖ The relatively small size and experience of the construction industry, the limited experience in developing, constructing and operating power projects, including renewable energy projects (**except 1st 50MW Wind farm**)
- ❖ Regulatory, economic, managerial and financial barriers also exist.

OPPORTUNITIES

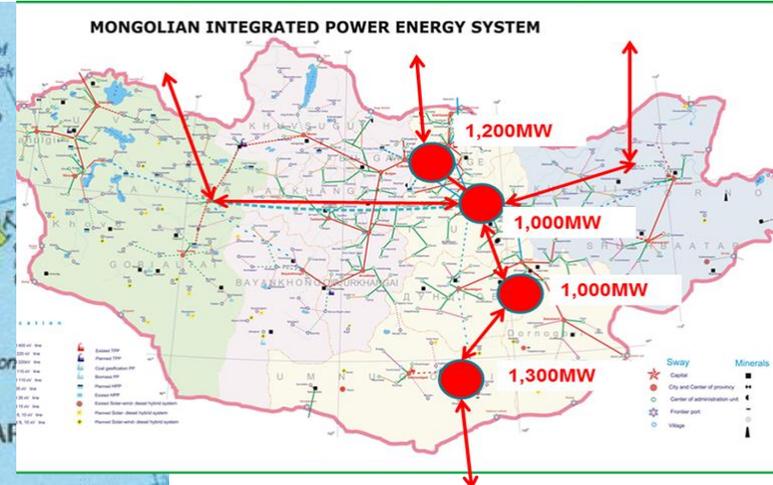
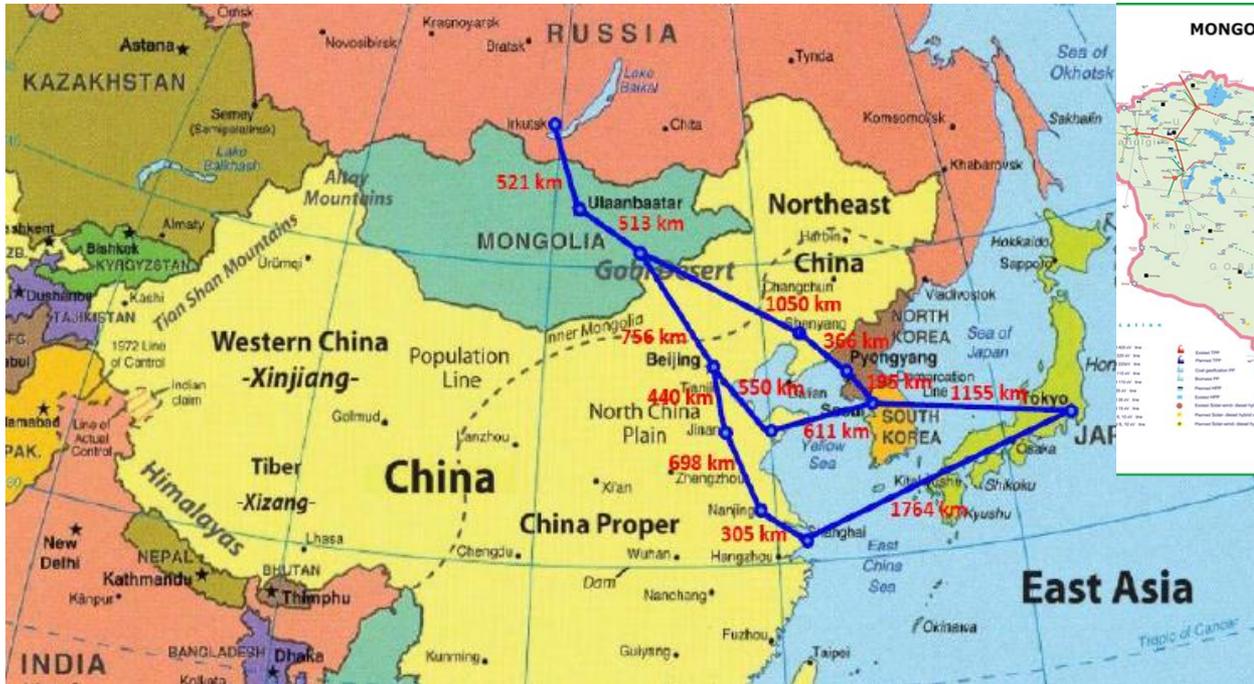
- ❖ There are under development 3-4 Hydro power plants in the northern and western part of Mongolia (Egiin HPP, Shuren HPP and Erdenburen HPP). Introduction of those hydropower plants may encourage further development more capacity of Solar and Wind farms, which are under pipeline
- ❖ There are also under pipeline to develop several Large scale coal power plants in cooperation with Chinese companies. Introduction of those CHP plants in the Central and South Gobi region, is also can encourage further development more capacity of Solar and Wind farms, which are under pipeline
- ❖ It is expected that mining developments will see major power demand growth in Mongolia, especially in the South Gobi region where the majority of existing and future mines are likely to be located. New power generation to supply such load is required to supply energy for future industrial zones, which could potentially include further wind and solar projects
- ❖ In the future, implementation of regional grid inter-connection plans with Russia and China can provide further grid flexibility

FURTHER DEVELOPMENT POLICIES TO ENCOURAGE RE DEVELOPMENT

Government of Mongolia has ambitious target to increase share of renewable energy by 20% by 2013 and 30% by 2030. Starting from targets, the following five components of renewable energy policy lay out the course of action to reach the targets:

- ❖ **Incentives** (It covers supply-side and demand-side incentives. Supply-side incentives are targeted at producers of renewable energy, while demand-side incentives are targeted at the primary buyer)
- ❖ **Licensing and permitting guidelines** (all regulations related to approval and permitting of renewable energy projects (issue licenses, approval FiT, and Model PPA)
- ❖ **Renewable energy resource exploitation policy** (It covers the approach to exploiting the full potential of renewable energy. This includes policies like renewable energy corridors or preferential zones)
- ❖ **Grid integration policy** (It covers policies related to interconnecting wind power plants to the grid. It includes policies related to grid code for interconnection, system operations, and enhancing flexibility of grid)
- ❖ **Public awareness and human resource development policy** (It covers policies related to increasing public awareness of advantages of solar and wind energy and developing human capacity and talented engineers in the area of renewable energy)

Gobitec - Asian Super Grid initiative



MY REMARKS

There are in Mongolia an abundant Renewable Energy Potential to Make the full Transition from Coal-Fired Generation to RENEWABLE ENERGY not only in Mongolia, but also in Northeast Asia!

We need active REGIONAL ENERGY INTEGRATION TO REALIZE ASG

CONCLUSION

RUSSIA

ASG

MONGOLIA

ASG

CHINA

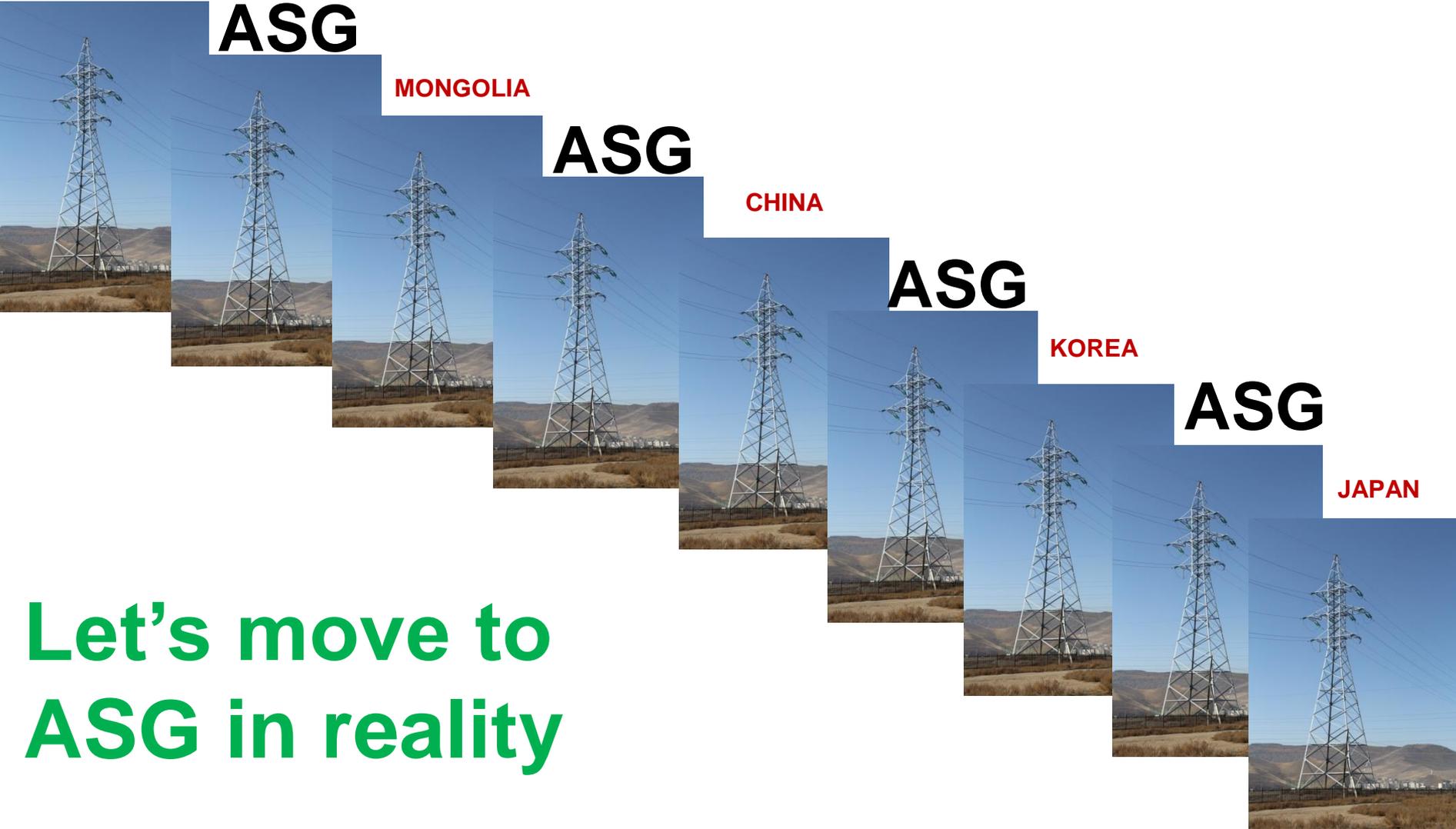
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**Let's move to
ASG in reality**



An aerial photograph of a vast solar farm in a desert. The solar panels are arranged in a precise grid pattern across the arid, brownish-yellow landscape. The sun is bright and high in the sky, creating a lens flare effect. The horizon shows distant, low mountains under a clear blue sky.

Thank you for your attention!