MONGOLIA'S ENERGY CHALLENGES DURING CRISES

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Contents

Objectives and methodology

Objectives:

To undertake rapid analysis of energy sector and energy security of Mongolia and affordability of clean energy technologies by households during crisis and formulate recommendations and measures that will be integrated into Government policies and actions.

Methodology:

- Desk review: conducted between 7-14 November, to review and analyze global energy market and situation of Mongolia energy sector during crises through literature review
- Interviews: conducted between 14-18 November, to understand challenges and cross-check preliminary findings from the desk review
- Focus group discussions: conducted on 11 November with participants from 14 SMEs to examine social, economic, and environmental impacts of energy sector situation
- Surveys: conducted between 10-15 November, 20 households shared their perception via questionaries

Global energy market

The effects of the global COVID 19 pandemic and the Ukraine –Russia conflicts have had a different, opposite effects on the energy market worldwide.

COVID 19 pandemic:

- Global and local lockdown is causing energy prices to plummet leading to an economic slowdown.
- Both events have had the same impact of supply chain and manufacturing disruptions, closed ports, misplaced shipping containers and record freight rates that have continued with China's ‘zero Covid’ policy.
- The PRC’s ‘zero Covid’ policy brings additional uncertainty and pressures and as a third negative event affects the economic recovery of their trading partners, especially in Europe and also in the neighboring countries, such as Mongolia, triggering a long-term L-shaped recession.

Russia-Ukraine conflicts:

- Immediately leads to an increase in energy prices, shortages, neglect of post-pandemic recovery, resulting in a two-floor W-shaped recession.
- It can cause a massive negative impact on the world economy with significant risks of destabilization in many regions and countries.
- Russia continues using energy as an economic and political weapon. The Russian government is developing a plan for pipeline and LNG transport infrastructure to China and is enforcing political influence mechanisms against interest groups and states.

Global energy market

Developed countries with solid financial reserve and social protection systems can adapt to ‘new normal’ of expensive, but freedom‘s energy.

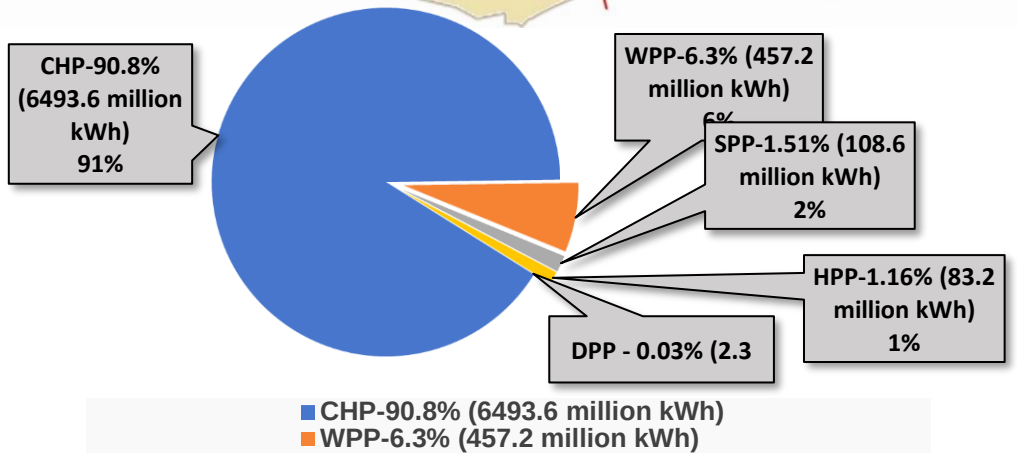
- Divergence between advanced and emerging market and developing economies is expected in medium term. Developed countries with solid financial reserve and social protection systems can adapt to ‘new normal’ of expensive, but freedom‘s energy. The massive financial support and energy saving measures already underway in many European countries could mitigate the impact of the crisis and stabilize the situation.
- In many developing countries, due to inflation, national currencies are depreciated and this leads to an increase in import prices for energy resources and spare parts for generating capacities. This could exacerbate the energy crisis and stagflation already underway in a number of countries.
- The current energy crisis obviously describes the vulnerability of the energy market, the supply chain and the infrastructure: the dominance of unpredictable, authoritarian suppliers, irrational energy demand, inefficient and underdeveloped domestic, energy production, transportation route bottlenecks, pipeline-based infrastructure, undeveloped network and grid.

Global energy market

Current situation will accelerate the energy transition as a medium and long-term solution.

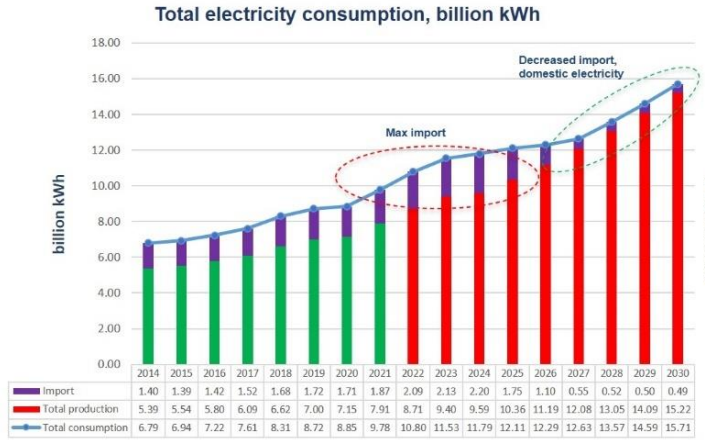
- With the energy transition, the importance of power generation and the supply grid is increasing. Electricity has traditionally been underestimated as a topic of geopolitics. They establish new channels of influence and geopolitical pressure, which was evidently shown by last attacks by Russia on the Ukrainian electricity infrastructure, by eliminating Finland from Russian electricity supply. This means that once peripheral areas such as the post Soviet area, Central Asia and perhaps Mongolia may come into conflict.
- A multiplicative effect of a range of crises, inflation and upcoming stagflation has raised concerns that the climate change agenda will fall on governments' priority lists. But current situation will accelerate the energy transition as a medium and long-term solution. A viable answer for developing countries could be decentralized, self-sufficient, off-grid and sustainable renewable energy generation.

Energy sector of Mongolia during crises



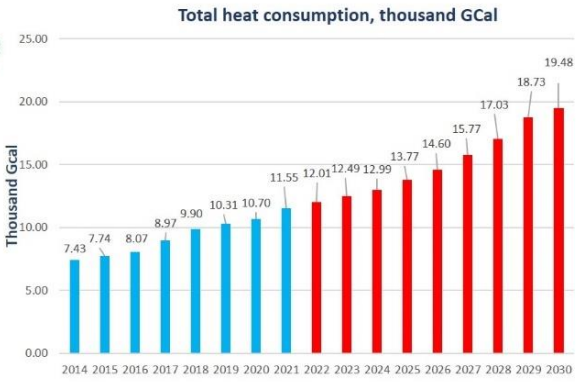
Energy Production	Unit	2019	2020	2021
Electricity generation	GWh	7,003.3	7,145.6	7,900
Peak load	MW	1,153	1,303	1,378
Increase	Percent	5.7	2.0	10.7
Import	Percent	19.6	19.3	19.0
Heat distribution	thousand Gcal	9,938.6	10,353.6	10,756.6
Increase	Percent	4.3	4.8	3.6

ELECTRICITY PRODUCTION, IMPORT AND CONSUMPTION / until 2030 /



	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

HEAT ENERGY PRODUCTION AND CONSUMPTION, / until 2030 /



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 MBт

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

Energy sector of Mongolia during crises

- On December 15, 2020, the peak load of the Central energy system increased to **1308 MW** due to the approval of Government Resolution No. 211 dated December 13, 2020, to exempt households and some enterprises from electricity, heat, water and waste fees for seven months as part of COVID-19 aid. The surge in electricity consumption was offset by imports from Russia, and power capacity of the transmission line was increased from 245 MW to 350 MW in July 2022.
- Due to the large number of highly skilled engineers who were infected with Covid-19, the continuous and normal operation of the energy system was disrupted. In addition, engineers and technicians of TPPs, transmission and distribution companies failed to carry out regular technical inspections of their equipment and facilities since lockdown began.
- Due to the difficulty of transportation, the equipment needed for maintenance was stuck at the border for **3-6 months**. Many suppliers have requested to extend their supply contracts.

Energy sector challenges during COVID-19 pandemic

40% increase in electricity consumption in ger districts and areas that use electric heater and low-and-medium power distribution network equipment is damaged

Delay in the regular technical inspections and planned maintenance work causes a significant increase in technical failures recently.

The companies did not participate in bidding for the purchase of metal structures, boiler overhaul and fuel oil for the thermal station.

Energy sector of Mongolia during crises

- Since Russia/Ukraine conflict began, energy sector has lost about **30 billion MNT** on payments for imported electricity due to exchange rate differences.
- Large power pumps and high pressure valves were supplied from Russia and Ukraine, have been cut-off now due to Russia/Ukraine conflict. Materials and spare parts of main and auxiliary equipment of thermal power plants are highly dependent on Russia and Ukraine.
- It has been **2 years** since the Russian and Ukrainian companies did not carry out technical inspection and adjustment of the power transmission substations.
- At the beginning of the war in Ukraine, the equipment that was transported to Russia through the territory of Belarus was returned to the port of Brest, and the transportation was waited for 2-3 months.

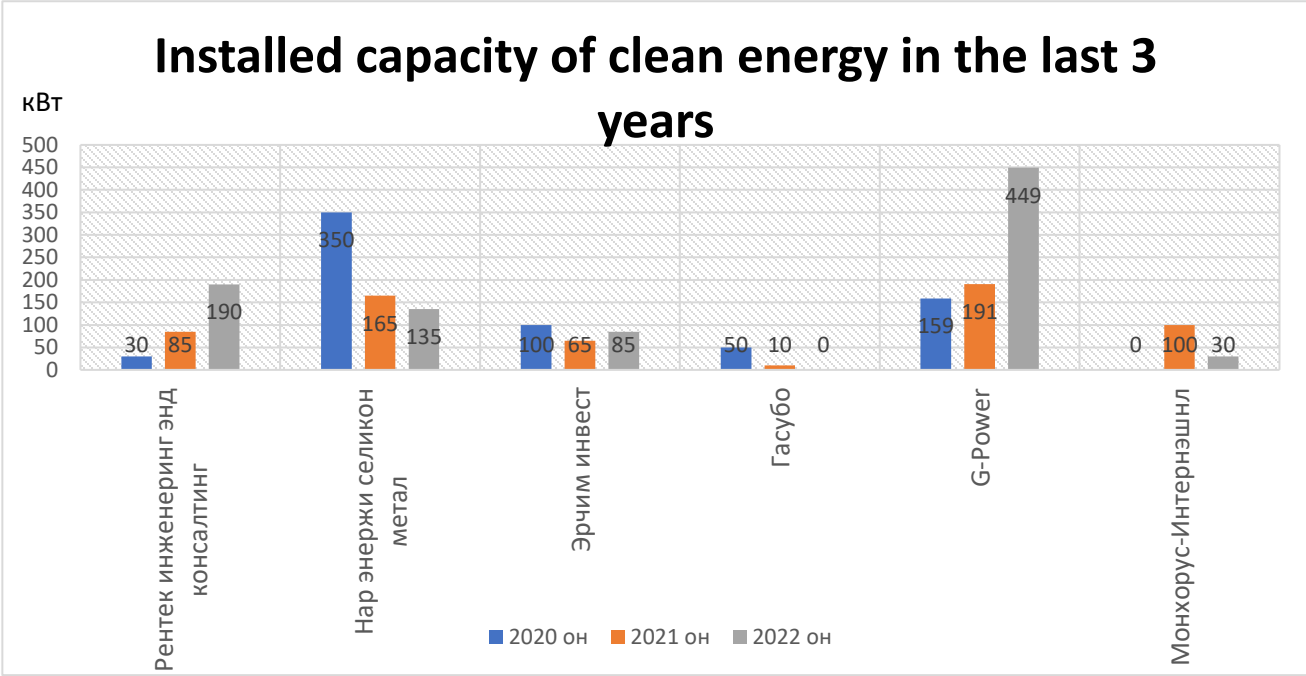
Energy sector challenges since Russia/Ukraine conflict

Russia's removal from SWIFT - energy sector is affected indirectly. Due to difficulties in the procurement process, contract cancellations and renewals by contractors have increased.

10% of electric motors and 50% of spare parts for turbines ordered by TPP-4 from Russia have arrived. Electrical equipment has not been received.

Affordability of clean energy technologies during crises – households and SMEs

- 37 percent of the enterprises participating in the survey are engaged in the installation of solar energy, which indicates which clean energy technologies are being installed by consumers. 50 percent of all participants have been operating in the field for 1-5 years, indicating that clean energy is an emerging energy sector with potential for further development.
- Whereas 73 percent of the households that participated in the survey were interested in also installing solar PV. 21 percent of the respondents chose based on economic benefits, while 23 percent chose based on energy reliability.



- The installed capacity of clean energy in 2021 was 616 kW, which decreased from 2020 (689 kW), but increased in 2022 (889) due to the implementation of the regulation to supply of electricity from the consumer's renewable energy sources to the distribution network.

Affordability of clean energy technologies during crises – households and SMEs

COVID 19 pandemic:

- The project implementation period was delayed by an **average of 6 months** due to restricted movement in and out of the city, border closure, and lockdown.
- In 2021 and 2022, transport prices increased by **2-3 times** compared to 2020. Business turnover decreased by **4-5 times** due to longer transportation time and slower turnover of goods.
- The cost of imported materials increased by **10-15%,** the exchange rate of MNT against foreign currency fell by **15-30%,** and the price of raw materials purchased domestically increased, making contracts made in MNT unprofitable.

Russia-Ukraine conflicts:

- Due to the increase in the commodity price supplies of PVs and spare parts have slowed and prices have risen. In particular, shipments from Europe have stopped. There is a lot of delay in getting supplies from or through Russia.
- The shortage of dollars in Mongolia directly affected the price of PVs.

Preliminary findings

Results of desk review

- To improve governance of the energy sector. Develop a plan of action to be taken in the event of a recurrence of events similar to price increases and transportation difficulties that occurred during the crisis.
- After the government's decision to exempt electricity and heat fees, electricity consumption in residential areas and areas that use electric heater increased by 40%, and the equipment of the electricity distribution and transmission network was damaged, therefore should create backup equipment.
- To prevent the risk of damage or interruption of imported power lines of the Russian Federation, the power system of the Central region should have a backup import outlet.
- Develop a carbon market in coordination with the tax system and create a carbon credit exchange and trading platform. For distributed generators connected to the distribution network, create and implement a system for calculating the energy produced using traditional tariffs and calculating the differential support based on the RPS or credit purchase principle.

Preliminary findings

Results of interviews

- To develop the options for replacing equipment manufactured in Russia and Ukraine of large power thermal power plants with equipment from other countries that meet international standards. Immediate transition to international standards in the energy sector (IEC, ISO, ASTM, etc.).
- Power transmission and distribution companies should switch to smart controlling systems (during the Covid-19 lockdown, there was an opportunity to use drones for inspection and diagnosis).
- In order to prevent cyber security when introducing e-transition policy in the energy sector, do not give dominant rights to goods, materials and equipment of 1 manufacturer.
- To redesign the budgeting methods for private companies in energy maintenance aligned with price growth and inflation.
- To initiate new resource projects in the energy sector to accelerate the energy transition.

Preliminary findings

Results of FGD and surveys

- The crises has a clear impact on the operations of cleantech suppliers, with negative consequences such as reduced business profitability and reduced supply due to price increases. While, there is a need for the government to support citizens and businesses that have introduced clean technology through policies.
- In Mongolia, in 2023-2026, there will be a shortage of energy capacity and difficulties in providing consumers with electricity and thermal energy continuously and reliably, which may negatively affect the access to energy of households as well as the problems of the SMEs.
- A certain increase in the use of clean energy technologies in 2022 is due to the income and purchasing power of some consumers, and the increase in green credit opportunities, as well as the formation of a regulatory environment for the supply of RE from the consumer's generator to the distribution network.
- Although there is a certain interest in introducing and using clean technology, the possibility of introducing and using clean technology is limited due to the limited technical capabilities, as well as the low household income and weak purchasing power of citizens.

Thank You

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