



Mongolia's Future Energy and Economic Development: Today's Complex Choices Will Have Long-term Ramifications



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by David Von Hippel, Chogdon Oyunchimeg, Jargal Dorjpurev, and Tsegmid Sukhbaatar

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I. Introduction

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"It will be up to Mongolian leaders, however, to make the difficult choice of a future direction for the Mongolian energy sector, a choice unique to Mongolia in the potential diversity of directions that are plausible for this sparsely-populated nation with a growing economy and many resources, but not, in general, dissimilar to the choices that many nations now face as they seek more climate-friendly energy paths."

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David von Hippel is a Nautilus Institute Senior Associate working on energy and environmental issues in Asia, as well as on analysis of the DPRK energy sector.

Jargal Dorjpurev is the Director and Senior Consultant at EEC Co. Ltd, in Ulaanbaatar, Mongolia. He has worked extensively in the climate change mitigation, environmental, energy sector development, and renewable energy fields as a consultant to the Mongolian government, international organizations, and other groups.

Chogdon Oyuncyimeg is a power systems engineer and independent consultant in the energy field, also based in Mongolia. She has held project engineer, program manager, and related positions consulting for private firms and international organizations, as well as positions in the Mongolian power sector and other organizations in the energy field.

Tsegmid Sukhbaatar serves as CEO of Clean Energy LLC. He is an expert in the development of Mongolian energy and infrastructure, and has held various positions in the energy sector as a policymaker, planner and developer in the Mongolian Government, as head of the Mongolian Energy Association, and as a private sector consultant providing advice on energy policy in Mongolia for more than 30 years.

The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Nautilus Institute. Readers should note that Nautilus seeks a diversity of views and opinions on contentious topics in order to identify common ground.

II. Report by David Von Hippel, Chogdon Oyunchimeg, Jargal Dorjpurev, and Tsegmid Sukhbaatar

Mongolia's Future Energy and Economic Development: Today's Complex Choices Will Have Long-term Ramifications

Although the nations of the Earth together and separately face (or, in many cases, choose not to face) stark and complex decisions about their energy futures in a world of changing climate, perhaps no nation has at the same time both more diverse options for its energy and economic future and the potential to make those options reality than Mongolia. Landlocked in the middle of Northeast Asia between its superpower neighbors Russia and China, Mongolia is a study in contrasts. In centuries past Mongolia's armies and iconic leaders conquered and ruled most of Eurasia, but the nation was largely a client state of the Soviet Union for much of the 20th century, effectively reclaiming its independence after the fall of the Berlin Wall (about 1990). A vast country—one of the twenty largest in the world by land area—it is so sparsely populated, at about 3 million people, that its population density is the lowest of any large nation; in fact it leads only a handful of island territories (two of them in the arctic) on the international list. Mongolia has a rich agrarian heritage of livestock herding, but well over half of its population now lives in urban areas, most in the capital region of Ulaanbaatar (UB), and the fraction of the population in cities has been increasing rapidly. In a nation of breathtaking open vistas and natural beauty, UB, the coldest capital city in the world, and other Mongolian cities suffer from severe air pollution problems that stem from the use of mostly aging, Soviet-era coal-fired central heating and power generation stations, as well as the combustion of coal and other fuels, including waste fuels, for heating in individual homes, particularly in per-urban “ger” districts.^[1] Mongolia's economy has expanded rapidly in recent years, largely as a result of a boom in mining, but also through an increase in tourism and other industries. This economic expansion has brought traffic jams to once-sleepy UB, and economic advancement to some citizens, but social dislocation for others. As a result, Mongolia's leaders have, for the past several years, been grappling with a choice of how to achieve economic development while retaining the cultural and environmental values that have been a hallmark of Mongolian life

for a millennium or more. Mongolia's choice as to how to move forward with its energy and economic future in a climate-constrained future is both fascinating and illustrative.

The land area of Mongolia is richly endowed with natural resources. Historically, these have included the grasslands that have nurtured the nation's traditional livestock economy. In more recent years, discoveries of vast coal (estimated at up to 160 billion tonnes) and mineral deposits (tens of millions of tonnes of copper, for example) have made Mongolia a mecca for the international mining industry. As noted on the website for the March 23-25 2015 "Expo Mongolia: Building Mongolia's Future",[\[2\]](#)

"As a fast growing country with an enormous deposit of coal, gold, copper, uranium, rare earth elements and oil, Mongolia has a great chance to become the 'Pearl of the East'. The country is listed among the world's Top Ten in terms of natural resources!"

Mongolia already annually exports on the order of 20 millions of tonnes of coal, mostly to China, and those exports are expected to climb to 50 million tonnes/yr or more within a decade. Copper concentrate is Mongolia's largest export in terms of total value, and new copper mines have recently begun operation.[\[3\]](#) Mongolia also has considerable wind and solar energy,[\[4\]](#) some of them located in areas, such as the Gobi desert region, where fossil fuel and mineral resources are also found. Mongolia's first major wind energy installation, the 50 megawatt (MW) Salkhit development, went on line in 2013. As noted in an earlier *Monitor* article,[\[5\]](#) the prospects of developing Mongolia's renewable energy resources for export (for example, via power lines to China, Japan, and Korea) are a continuing topic of discussion in Mongolia and other Asian nations; UB hosted the Energy Charter Forum "Developing Renewable Energy through Gobitec and the Asian Supergrid in Northeast Asia" in June of 2014.[\[6\]](#) Exporting renewable electricity, however, is in many ways not as straightforward as exporting coal or minerals—in addition to financing and building the generating capacity required to feed exports, agreements need to be reached on who will build and operate the transmission lines through which power will be exported, and, for power destined for consumers other than those in China or Russia, Mongolia and its electricity buyers must reach an agreement with one of its superpower neighbors on power lines transiting Chinese or Russian territory on their way to, for example, Korea or Japan. Understanding its geographic predicament when it comes to international trade, Mongolia has been an active supporter of regional efforts for coordinated economic development, such as the Greater Tumen Initiative (GTI), a regional effort focused originally on the area around the Tumen River, which borders, North Korea, China, and Russia, but more recently broadened to include areas of Northeast China, the Russian Far East's Primorsky Territory, Eastern Mongolia, and ports in the Republic of Korea (ROK).[\[7\]](#)

The question now before Mongolia's decision makers can be thought of as whether Mongolia will choose to continue on the path to being, essentially, a regional Saudi Arabia of coal and minerals exports, move to a path on which it might aim to be a regional Saudi Arabia of renewable energy,[\[8\]](#) or choose some middle path. Given the environmental challenges associated with both fossil fuel and minerals exports and with providing its own citizens with power and heating, as well as the complex cultural, social, and economic implications of the different paths, as well as the powerful international business entities involved, it is commendable that Mongolian policymakers are examining development options carefully, and have made environmental and "green growth" issues a central focus through the efforts of the Ministry of Environment, Green Development and Tourism (MEGDT), and through a number of recent laws. These laws include the Law on Air,[\[9\]](#) the Law on Air Pollution Payment,[\[10\]](#) the Renewable Energy Law[\[11\]](#), the National Renewable Energy Program[\[12\]](#) and the Green Development Policy[\[13\]](#)

Mongolia's per-capita greenhouse gas (GHG) emissions are relatively high, due to its cold climate and dependence on coal, but its overall national emissions from fuels consumed domestically are not

significant internationally due to its small population. Its coal exports, however, if they rise to 50 or 100 million tonnes annually (which Mongolian resources could easily support), make a much larger contribution to international GHG emissions. If Mongolia builds its economy to be dependent on international markets for fossil fuel and mineral commodities, it will be (and already has been) susceptible to swings in income caused by fluctuation in commodity prices, as well as, potentially, vulnerable to the impacts on the global coal market on a future international climate agreement. In that respect, emphasizing exports of renewable (wind and solar) electricity may offer less risk, as renewable electricity is likely to have a strong and growing market in the major economies of the region, provided that Mongolia can effectively export its renewable power.

An exploration of different energy futures for Mongolia was undertaken in 2013-2014 with support from the ROK-based Global Green Growth Institute (GGGI) by a group of Mongolian officials and researchers led by the Ministry of Energy with contributions from MEGDT and other organizations. The group was supported by a team of consultants, including the authors. The resulting report, *Strategies for Development of Green Energy Systems in Mongolia: Final Report*, includes a description of the quantitative exploration of several scenarios for future energy sector development in Mongolia.^[14] These scenarios included a “reference” case in which most energy needs continue to be met by coal, a “recent plans” case including a start toward broader use of renewable energy and more efficient end-use equipment, a “expanded green energy scenario” with a stronger transition to renewable energy use and a more aggressive effort and efficiency improvement, and an “shifts in energy export” case that postulates the reduction in coal exports, with the lost income offset by export of renewable electricity. The domestic-focused “expanded green energy” scenario stabilizes Mongolia’s GHG emissions by 2020, and increases the renewable fraction of electricity generation to nearly 50% by 2035. The “shifts in energy exports” scenario includes sustained and rapid growth in solar and wind generation to a total of about 13 gigawatts (GW), by 2035, most of which would be exported.

Overall, the scenarios explored in the GGGI report offer a revealing, if illustrative, set of options for Mongolia to consider as it looks to its future energy and economic development. The report includes suggestions for green energy policies that could be pursued to move toward an “expanded green energy” track ranging from improved building energy efficiency to additional capacity-building in planning and environmental enforcement to exploration of ways to span the current technical mismatch between renewable electricity options and the need for space heating in Mongolian households. It will be up to Mongolian leaders, however, to make the difficult choice of a future direction for the Mongolian energy sector, a choice unique to Mongolia in the potential diversity of directions that are plausible for this sparsely-populated nation with a growing economy and many resources, but not, in general, dissimilar to the choices that many nations now face as they seek more climate-friendly energy paths.

III. References

^[1] “Gers”, sometimes referred to as “yurts”, are traditional portable dwellings traditionally used by semi-nomadic herders and others in Mongolia, typically heated by a central stove fueled with wood or animal dung, or with coal. Ger districts, which have grown up around many Mongolian cities, especially UB, include both gers and other types of homes, including those built with masonry products and other materials.

^[2] See “Welcome to Expo Mongolia”, website of Expo Mongolia: Building Mongolia’s Future”, March 23-25, 2015, available as <http://www.expomongolia.com/>.

- [3] See, for example, *The UB Post* (2014), “D.Galsandorj: Although copper export revenue doubled, coal export revenue dropped considerably”, dated August 1st, 2014, and available as <http://ubpost.mongolnews.mn/?p=10979>.
- [4] One estimate, by the International Energy Agency, placed Mongolian renewable electricity (wind and solar) potential at 2600 GW.
- [5] David von Hippel (2015), “What Could an ‘Asian Super-grid’ Mean for Northeast Asia?”, *Global Energy Monitor*, Vol. 3, No. 1 (January 2015), available from http://www.egskorea.org/eng/sub/sub2_1.asp.
- [6] See Energy Charter (2014), “Ulaanbaatar Energy Charter Forum: Developing Renewable Energy through Gobitec and the Asian Supergrid in Northeast Asia”, 26 June 2014. Conference materials available at <http://www.encharter.org/index.php?id=661&L=0>.
- [7] See, for example, Wang Weina (2014), “Regional Economic Cooperation under the Framework of the Greater Tumen Initiative”, prepared for the High-Level International Workshop on “WTO Agreement on Trade Facilitation: Implications for LLDCs”, Ulaanbaatar, Mongolia, 2-3 June 2014, and available as <http://www.lldc2conference.org/custom-content/uploads/2014/06/2-bWang-Weina-GTI..pdf>.
- [8] 15 years ago, one of the authors of this article (D. von Hippel), in a conversation with a Saudi official who wondered aloud what his country would do when the oil ran out, suggested that Saudi Arabia use a portion of its current oil revenues to build infrastructure for solar energy exports. It is unclear, however, whether this advice has been acted upon by the Saudis in a meaningful way so far.
- [9] Most recently revised in May, 2012; see, for example <http://tseveragaar.mn/en/?p=263>.
- [10] Originally approved in 2010, and revised in 2012.
- [11] This law was approved by Parliament in 2007, and is available at <http://en.energy.gov.mn/laws/show/id/2>
- [12] This program was approved by Parliament in 2005, and is available at <http://www.nrec.mn/en/index.php?pid=49&nid=19>
- [13] This policy was approved by Parliament in 2014, and is available at: <http://covermongolia.blogspot.com/2014/06/green-development-policy-of-mongolia.html>.
- [14] Global Green Growth Institute, dated March, 2014, and available as <http://www.sei-international.org/mediamanager/documents/Publications/Climate/GGGI-SEI-2014-Mongolia-green-energy-systems.pdf>.

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608 San Miguel Ave., Berkeley, CA 94707-1535 | Phone: (510) 423-0372 | Email:
nautilus@nautilus.org