

Brown to Green Energy Systems in Mongolia





- **Electricity generation infrastructure consists primarily of coal-fired sources (96.2% in 2014).**
- **The average energy required for industrial output is 7 times greater than the world average (2014).**
- **An estimated 40% of heat supplied to buildings in Ulaanbaatar is lost (2010).**
- **Brown energy and energy inefficiency threaten Mongolia's economic security.**



- **By 2030, Mongolia has committed to raising its share of renewable electricity in total installed capacity of energy production to 30% and reducing building heat loss by 40% compared to 2014 levels.**
 - **Satisfying growing energy demand will require both new capacity and rehabilitation of existing facilities.**
 - **Well-designed energy efficiency measures have the potential to drive growth in the market for green technologies and materials.**
 - **Recent energy sector reforms, such as the 2015 Energy Conservation Law, aim to support the shift to green energy.**
 - **Shifts in energy export from coal to renewables could catalyze low-carbon growth.**



- **Mongolia transitions from brown to green energy and improves efficiency**
 - **Strategies for Development of Green Energy Systems in Mongolia (2013-2035)**
 - **Green Energy Action Plan developed through the National Green Development Policy implementation plan.**
 - **Alternative heating systems analysis, investment prioritization and capacity building carried out.**
 - **Prefeasibility study on waste-to-energy conducted.**

- **On-going projects:**
 - **Mongolia Transition to Green Development**
 - **Project Design and Preparation**
 - **In-country Support: Energy Planning and Modeling**



Strategies for Development of Green Energy Systems in Mongolia (2013-2035)

Global Green Growth Institute (GGGI)
Stockholm Environment Institute-US (SEI-US)



- **Energy and environmental challenges:**
 - Providing sufficient heat and electricity for citizens and for a growing, increasingly urban economy, while;
 - Reducing the environmental burden of heat and power production in older coal-fired infrastructure

- **Develop strategies for promoting the implementation of green (low-carbon, low-pollution) energy systems in Mongolia which would**
 - Reduce GHG emissions within key sectors
 - Improve air quality
 - Facilitate other socio-economic benefits



- **Assist in providing tools, training, and ideas to help Mongolia to grow its economy with substantially less growth in emissions of GHGs and other pollutants**
 - An initial comparative analysis of green growth and alternative development strategies
 - Tools to move forward with more detailed analysis, planning, implementation of green growth strategies
 - Training in use of Long-range Energy Alternatives Planning (LEAP) for energy supply-demand modeling and scenario evaluation



- **Sectoral background, scenarios, their development and conclusions**
 - *Power and Heat Supply*
 - *Buildings Sector*
 - *Transport Sector*
 - *Industrial Sector: Mining and Manufacturing*
 - *Agricultural Sector*



- **Four broad scenarios of how energy supply and demand could evolve in Mongolia through the year 2035**
 - ***Reference:*** Continuation of largely coal-based energy supply for a rapidly expanding economy driven by mining exports, particularly coal and copper. Gradual improvement in energy intensity of demand
 - ***Recent Plans:*** Same economic and demographic forecast, but with accelerated introduction of priority technologies reflecting recent developments and priorities. These include large hydro and wind plants, advanced coal combustion technology, and efficient lighting and apartment building insulation improvements



- **Four broad scenarios of how energy supply and demand could evolve in Mongolia through the year 2035**
 - ***Expanded Green Energy:*** Same economic and demographic drivers, however with more rapid buildup of all proposed renewable energy projects accompanied by extensive implementation of energy efficiency measures economy-wide
 - ***Shifts in Energy Exports:*** Same as *expanded green energy* scenario but with an additional shift in the types of fuel and energy exported from coal to renewable electricity (wind and solar)



- ***Reference scenario: continued reliance on coal-based power and heat supply, in an economy based largely on copper and coal exports***
 - Primary energy demand in Mongolia is more than three times higher in 2035 than in 2010
- ***Recent Plans scenario: implementation of current MOE/MEGD priorities***
 - Deployment of hydropower and wind power, increased efficiency at existing coal-fired power plants, building and lighting efficiency improvements



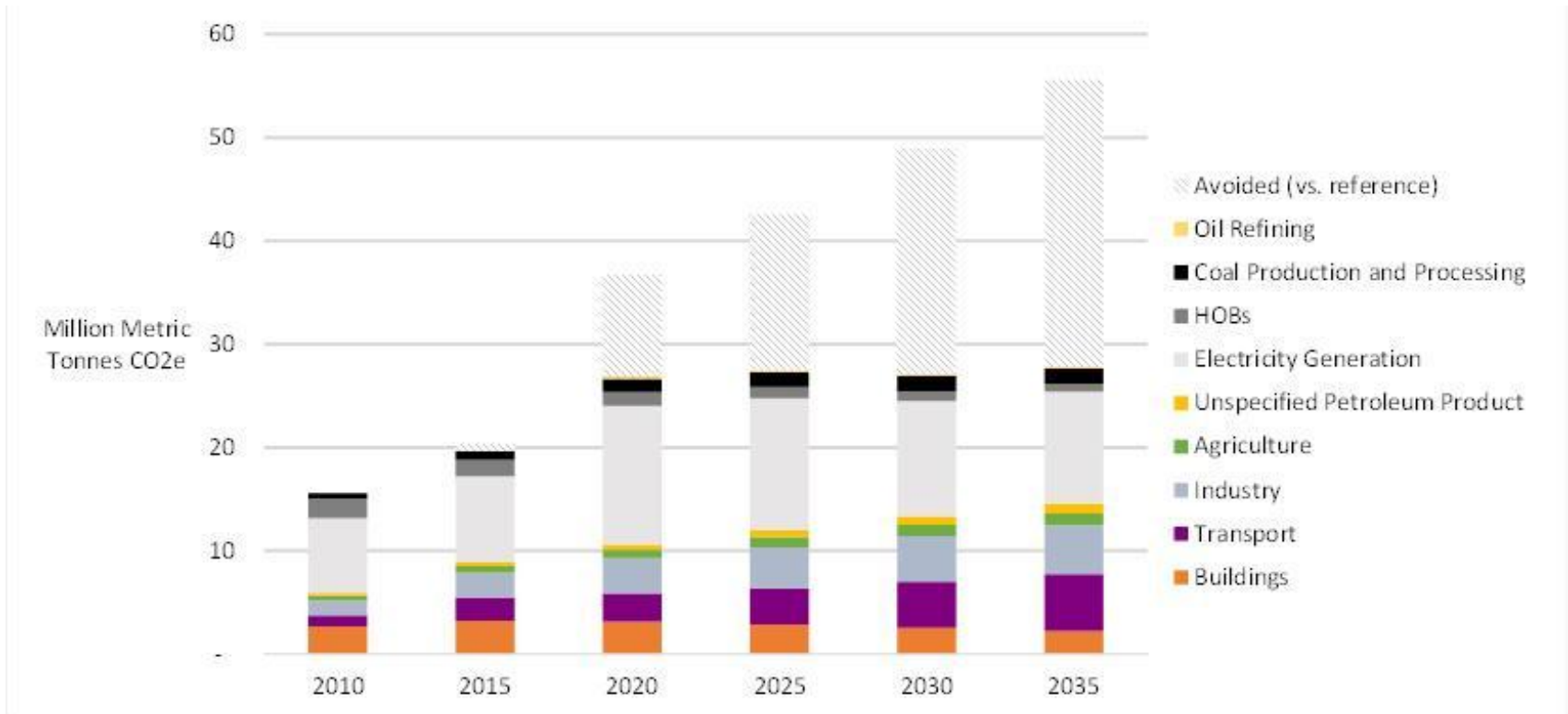
- **Begin transition away from coal power *Expanded Green Energy* scenario results:**
 - Energy efficiency initiatives slow growth in Mongolia's energy demand to 10% below reference levels in 2020 and by more than 30% below reference levels in 2035
 - Halve GHG emissions by 2035, from 56 million tonnes CO₂e in the reference case to 28 million tonnes CO₂e

- ***Shifts in Energy Exports* scenario benefits:**
 - Potential “green growth” economic benefits, and global benefits for greenhouse gas emissions and climate
 - Contributes even more strongly to global climate change mitigation by exporting renewable electricity
 - Reduced exposure to climate and other policies that reduce global, in addition to Chinese, coal demand

Key Scenario Results



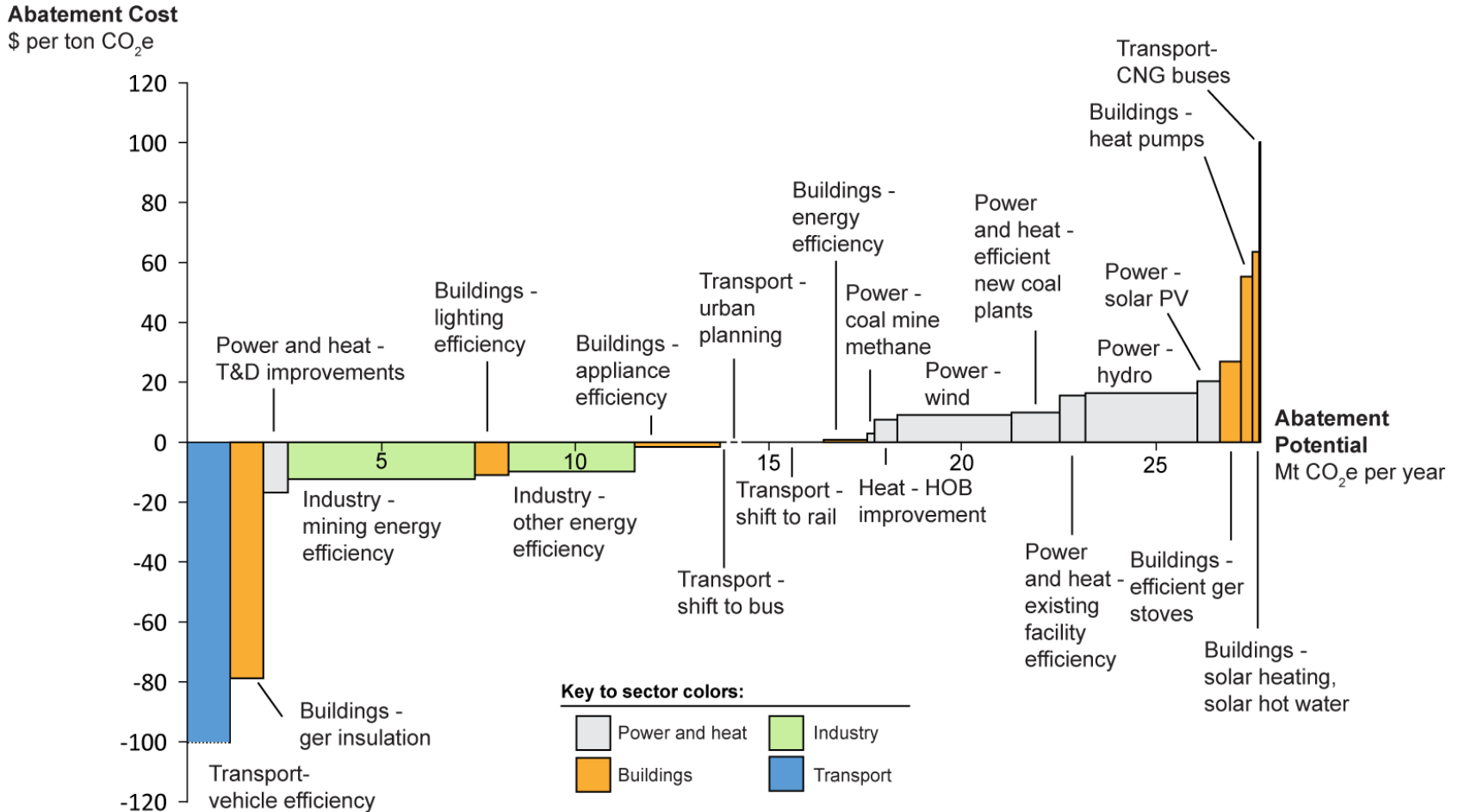
- **The combination of demand and supply-side options included in the expanded green energy scenario reduce GHG emissions in 2035 by half relative to the reference case**



Key Scenario Results



➤ Many of the options included in the expanded green energy scenario are available at a net overall cost savings





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Thank you

Photo by P. Erickson