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World Bank and ESMAP: Long-Term Strategic Partners in China's Energy Transition

China has emerged as a global clean energy leader. In 2016, the country's coal consumption fell for the third consecutive year. Its wind capacity doubled every year since 2005 to reach 149 GW and photovoltaic capacity reached 77 GW. In the process, China strengthened its institutions and put in place effective energy efficiency measures, making the country account for more than half the world's entire energy savings in the past 20 years.

China's rapid economic rise over the past two decades did not come without a price: heavily dependent on coal to fuel its economy, China became the planet's largest emitter, accounting for almost 30 percent of global carbon emissions in 2014.

But China is emerging as a leader in sustainable energy. As the world races to mitigate the effects of climate change, China has committed US$360 billion to clean energy through its 13th Five-Year Plan on Energy Development (2016-20). The plan envisions that installed renewable power capacity—including wind, hydro, solar, and nuclear power—will contribute to half of new electricity generation by 2020.

The World Bank and the Energy Sector Management Assistance Program (ESMAP) have been important partners in China's energy transition. Through lending and policy advice, the World Bank—with ESMAP's support—has become a long-term, trusted partner, helping the country tackle multi-dimensional challenges associated with scaling up cleaner and more efficient sources of energy, and lowering the carbon footprint of its cities.

KEY ACHIEVEMENTS

With World Bank and ESMAP support, China has nearly 6,000 ESCOs—one of the largest energy efficiency industries in the world.

ESMAP support helped shape China's renewable energy industry into the largest in the world with over US$100 billion in renewable energy investments.

As a part of a larger World Bank project, ESMAP funding mobilized US$80 million to replace approx. 800,000 traditional stoves, making it the largest clean stoves program globally.

Since 2006, ESMAP has helped leverage US$440 million in World Bank investments in the district heating sector in cities across China.

A Multifaceted Approach to Energy Efficiency

The government of China has made energy efficiency one of its top priorities and embarked on an intense energy conservation campaign. As a result, from 1980 to 2010, while China's economy increased 18-fold, energy consumption increased only 5-fold. Energy intensity per unit of GDP declined by about 70 percent during the same period. China accounted for more than half the world's entire energy savings in the past 20 years.

The World Bank helped this shift by introducing energy efficiency financing mechanisms and market-based approaches, such as the energy service companies (ESCO) concept, through the Energy Conservation Project. As the ESCO industry grew, the second phase of the project strengthened the industry, established the ESCO Association, and provided partial risk guarantees. ESMAP funding subsequently supported the sharing of energy efficiency lessons across provinces and evaluated the energy efficiency potential in the water sector. Led by active government programs and incentives, China's energy efficiency industry has become one the largest in the world with nearly 6,000 ESCOs.

To help China successfully implement its energy efficiency reforms, ESMAP supported the production of a key policy note that proposed updates to the institutional and regulatory frameworks. It formed the basis for the establishment of a National Energy Conservation Center and provided the underpinnings for the US$400 million World Bank China Energy Efficiency Financing Project. The project led to significant energy savings—4.4 million tons of coal equivalent and a reduction of 10.7 million tons of emissions, equivalent to avoiding 3 GW of new coal power plants per year—and leveraged US$3 billion in energy efficiency and renewable energy investments from local banks and enterprises. As a result, participating banks have significantly increased their interests, capacity, and confidence in energy efficiency financing and mainstreamed such financing in their businesses.

Scaling Up Clean and Renewable Energy

Concerned with the adverse health and environmental costs associated with inefficient coal use, the government of China focused on increasing the share of renewables in its energy mix. Partnering with the World Bank on the 15-year China Renewable Energy Scale-Up Program (CRESP), China aims to enable commercial renewable electricity suppliers to provide energy efficiently, cost-effectively, and on a large scale.

ESMAP has been instrumental throughout CRESP's implementation.

During the first phase, ESMAP worked with decision makers to develop the crucial Renewable Energy Law, one of the first in emerging market economies, which became the cornerstone of renewable energy policy in China. ESMAP also introduced international best practices in establishing renewable energy targets and incentive mechanisms in the wind industry. Together with CRESP, ESMAP support helped shape China's renewable energy industry into the largest in the world with over US$100 billion in renewable energy investments.

ESMAP worked with decision makers to develop China's crucial Renewable Energy Law—one of the first in the developing world.

Despite remarkable efforts, large amounts of electricity generated by wind and solar never entered into the country's power grid. This curtailment is mainly due to generation overcapacity and a preference by grid operators for electricity generated from coal. Major power sector reforms were needed to influence a shift in the market.

ESMAP stepped in with a series of policy recommendations on power sector reform to gradually phase out the coal generation quota system and move toward a competitive and greener power market. Shared with key policy makers, the notes influenced key decisions—such as priority setting for renewables in the 13th Five-Year Plan—which were folded into the second phase of CRESP to support the smooth integration of renewable energy into the country's grid.

> **"A relatively small amount of ESMAP funding—US$5.7 million since 2010—has helped expand China's clean and renewable energy, dramatically reduce its energy intensity at a time of unprecedented economic growth, and remove policy and institutional barriers."**
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> *Todd M. Johnson*
> *World Bank Energy Sector Coordinator, China*

ESMAP also tackled the issue from a complementary angle—promoting efficient and clean cooking to reduce air pollution and promote better health. ESMAP funding helped design a clean and efficient cook stove component that was included in the US$500 million Hebei Air Pollution Prevention and Control Project. Under this project, an US$80 million clean stove program was mobilized to replace approximately 800,000 traditional stoves will be replaced with clean models, making the program the largest clean stoves program globally and directly contributing to reducing air pollution and the associated socioeconomic damages in Hebei.

Low Carbon Cities

Achieving a low carbon, sustainable energy future in China is not possible without addressing the energy footprint of the country's massive urban areas, which contribute more than 70 percent of energy-related carbon emissions.

ESMAP support came at a crucial time, when the World Bank increased its investment in a diverse urban portfolio in China to respond to high demand.

Through technical assistance to projects in Beijing, Ningbo, and Tianjin, ESMAP helped to build local capacity to design and establish municipal guidelines and regulations for low carbon development, including green building standards and certification, and energy performance benchmarking and disclosure systems for buildings. Lessons from these cities were used to develop the Urban-Scale Building Energy Efficiency and Renewable Energy Project Global Environment Facility (GEF) grant to support scaling up energy efficiency and renewable energy through better policies.

In Shanghai, ESMAP's upstream support helped to identify cost-effective low carbon measures through the use of an abatement cost-curve methodology. This led to the design of a US$100 million World Bank loan to support energy efficiency and low carbon energy sources. The success of Shanghai was replicated in Shenzhen where ESMAP supported the local government in establishing an emission peaking timeline and strategy.

Reforming the inefficient and outdated urban heating market presented another key challenge for China. Over the past 15 years, ESMAP informed policy dialogue and investment that connected millions of people to improved district heating services.

The underpinnings of significant policy reforms came in 2003, when ESMAP helped the government to develop a national heat pricing and billing policy that recommended a consumption-based billing (meter-based billing), two-part heat tariff regime. This formed the basis for revising the National Heat Pricing Management Method, which has been mainstreamed as the tariff policy for district heating throughout China.

MISSION

The Energy Sector Management Assistance Program (ESMAP) is a global knowledge and technical assistance program administered by the World Bank. It provides analytical and advisory services to low- and middle-income countries to increase their know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Denmark, the European Commission, Finland, France, Germany, Iceland, Japan, Lithuania, Luxembourg, the Netherlands, Norway, the Rockefeller Foundation, Sweden, Switzerland, and the United Kingdom, as well as the World Bank.

ESMAP technical assistance in district heating and energy efficient buildings in cold regions of China catalyzed a series of World Bank investments over more than a decade.

The GEF US$18 million Heat Reform and Building Energy Efficiency Project transformed ESMAP's recommendations into national guidelines on two-part heat tariffs and supported consumption-based billing pilots in four cities. This led to the adoption of stricter energy efficiency building codes and avoided emissions of about 440 million tons of CO_2.

Targeted Interventions for a Cleaner Future

Through targeted interventions that shaped policy and mobilized large investments, ESMAP helped China to successfully decouple energy from growth. The importance of expanding China's clean and renewable energy industry, while dramatically reducing the rapidly growing country's energy intensity, has significant impact on the future of the entire planet.

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