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A research program of  
China National  
Renewable Energy  
Centre



In cooperation with  
US NREL and the  
Danish Energy Agency

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Boosting Renewable Energy  
as part of China's energy system revolution





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# China's energy revolution

The Chinese government has started an Energy Revolution what will transform the Chinese energy system from its current unsustainable development path into an energy system suited to China's future aspirations.

The vision is a sustainable energy system with high energy security and low environmental impact, supporting sustained economic growth.

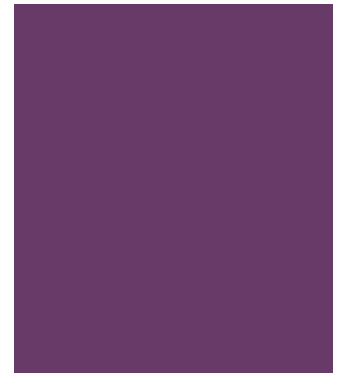
The current heavy reliance on burning coal would be supplanted by a more diversified system, where non-fossil fuels, efficient use of energy and smart coupling between demand and supply are the backbone of the system.

As with every revolution, this Energy Revolution is not a simple transformation or evolution. Fundamental changes are necessary in order to achieve the goals, based on thorough research and investigation of the most efficient means to promote the changes and to ensure an effective implementation strategy.

Clarifying the potential for renewable energy as a viable, economically attractive energy supply source is critically important in the current start-up process, in light of the continued development of fossil power generation and its growing placement in western China.



# A new program for “Boosting Renewable Energy as part of China’s energy system revolution”



CNREC, together with the US National Renewable Energy Laboratory and the Danish Energy Agency, has defined a five-year program to assist in implementation of the Energy Revolution.

The program “Boosting Renewable Energy as part of China’s energy system revolution” aims to maximise renewable energy as a vital part of the future Chinese energy system, enabling China to implement international best-practice solutions for the transformation of the energy system. The program is funded by the London based charity, the Children’s Investment Fund Foundation as part of its climate mitigation activities.

The program will give support to the Chinese National Energy Administration regarding the decisions on the future targets for renewable energy and for coal reduction. It will address the most critical obstacles for the future development of renewable energy and develop a comprehensive look at the whole energy system-- from demand to production in order to find the optimal ways to develop a sustainable energy system that can be a model for the world.

In cooperation with international front-runners, CNREC will bring international experiences and success stories to a Chinese audience with the aim of finding the best solutions for a Chinese energy transformation.

The project is guided by a Policy Committee, anchored in the Chinese energy administration; a Steering Committee led by NEA; and an Advisory Committee with key national and international experts. CNREC is responsible for project management, and a project team with participants from CNREC, NREL and DEA will implement the project with support from external experts.



## **China National Renewable Energy Centre (CNREC)**

is a research centre and think tank for policy research on renewable energy. CNREC is part of the Energy Research Institute under the National Development and Reform Commission and it provides the National Energy Administration with research results for energy planning and energy administration.

## **National Renewable Energy Laboratory (NREL)**

is the U.S. Department of Energy's primary national laboratory for renewable energy and energy efficiency research and development. NREL is the operating agent of the U.S.-China Renewable Energy Partnership (USCREP), a bilateral effort for which CNREC is the Chinese partner.

## **Danish Energy Agency (DEA)**

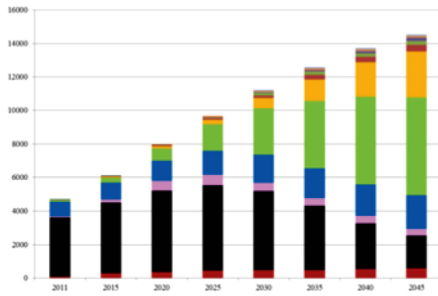
provides national policy makers the basis for implementing the ambitious Danish energy strategy for a society without fossil fuels in 2050. DEA has been collaborating with CNREC since 2012 through the Sino-Danish RED Program.





# Main activities 2015 - 2017

The program focuses on four main research areas and also includes the development and publication of a China Renewable Energy Outlook with comprehensive analyses of the future Chinese energy system with high shares of renewable energy.



## Scenarios for a Beautiful China

The scenario analyses will look at the development of the Chinese energy system from 2015 to 2050, analysing the impact of high shares of RE in the system from technical, economic and institutional points of view. The main results of the analyses will be published in the China RE Outlook, beginning in 2016. In 2015 and 2017, reports will be developed for 5 and 10 year outlooks, supporting the consideration of RE in the 13th Five-year Plan. The scenario analyses are important to demonstrate for Chinese decision makers the viability of low-carbon strategies.



## RE-Friendly Grid Development Strategy

Different grid development and grid operation strategies will be examined for optimal use of the transmission grid, taking into account RE penetration, carbon emission, and air pollution. The analyses will, among other things, address the impact associated with establishing long-distance transmission lines for coal power export from north and west China, and analyse options for how the transmission grid development and use of the transmission grid can support the integration of RE as a low-carbon energy path for China.



## Power System Flexibility

The research activity on power system flexibility will evaluate a broad range of measures for making the operation of the power system more flexible. Technical measures as well as economic incentives for power producers, dispatch centres, grid companies and power consumers will be analysed based on international experiences from countries with high shares of renewable generation in their power systems. The research will provide concrete inputs to support reforms that enhance power system flexibility. The results will be reported each year in topical thematic reports.



## Boosting Distributed Generation

The research on distributed generation will address technical, economic and institutional barriers to widespread deployment of RE in distributed architectures. The initial focus is solar PV (roof-top and building integrated) and the supporting network elements, such as smart inverters, that can enable high penetrations of DG PV. The research will produce specific recommendations to support power system policies and regulations that facilitate DG PV deployment, and will be reported each year in topical thematic reports.

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