中德能源与能效合作
Energiepartnerschaft
DEUTSCHLAND - CHINA

国家能源局
National Energy Administration

Supported by:
Federal Ministry
for Economic Affairs
and Energy

on the basis of a decision
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Sino-German Energy Transition Project

Towards a more effective, low-carbon energy system in China

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Imprint

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Sino-German Energy Transition Project (as part of the Sino-German Energy Partnership on behalf of the Federal Ministry for Economic Affairs and Energy (BMWi))

Tayuan Diplomatic Office Building 1-15,
14 Liangmahe South Street, Chaoyang District
100600 Beijing, P. R. China

c/o
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Torsten Fritsche
Köthener Str. 2
10963 Berlin

Project Director
Anders Hove (GIZ)

Editors
Ander Hove, Weng Fangping, Philip Geres, Qian Wenyun (GIZ)

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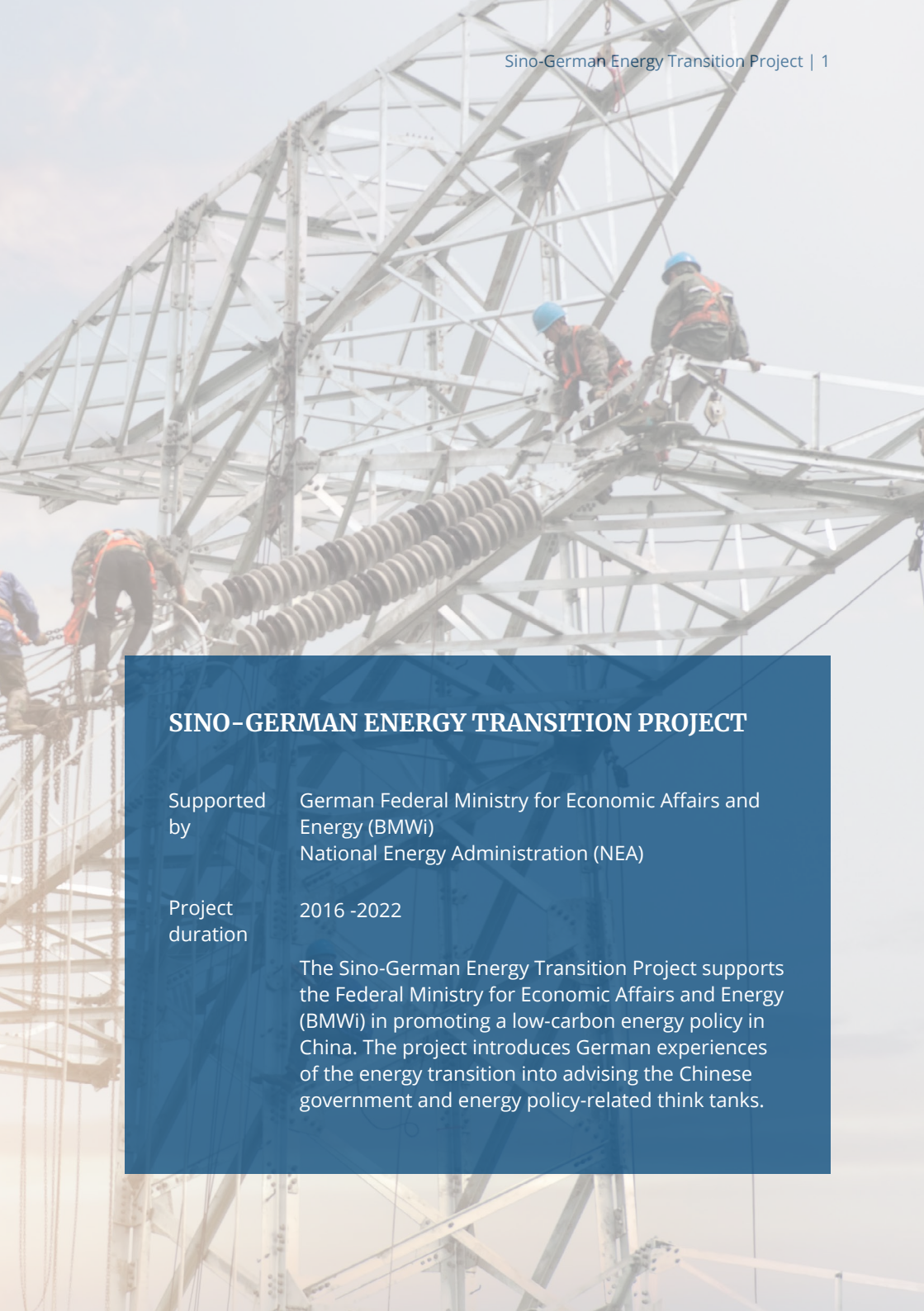

SINO-GERMAN ENERGY TRANSITION PROJECT

Supported by	German Federal Ministry for Economic Affairs and Energy (BMWi) National Energy Administration (NEA)
Project duration	2016 -2022

The Sino-German Energy Transition Project supports the Federal Ministry for Economic Affairs and Energy (BMWi) in promoting a low-carbon energy policy in China. The project introduces German experiences of the energy transition into advising the Chinese government and energy policy-related think tanks.

Background

China is the world's largest coal consumer and the country with the highest greenhouse gas emissions. To meet its climate goal, in particular, the latest commitment to peak the country's carbon emissions before 2030 and to become carbon neutral by 2060, China needs to dramatically transform its energy system away from fossil fuels towards a renewable-energy based system.

To further this objective, China has launched a series of energy transition policies. During the period of the 13th Five-Year Plan (2016-2020) in the field of energy policy China became the world's largest producer of renewable energy. Despite the rapid growth in installed renewable energy capacity, coal remains the main source of energy for electricity as well as industrial and residential heating energy. A major challenge is the design of effective energy policy measures to steer the energy transition towards a faster decline of fossil fuel generation in favor of a renewable-based energy system.

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In the light of the upcoming release of the 14th Five-Year Plan (2021-2025), this is an opportune time frame to translate these challenges into new actions. Government think tanks play a crucial role in drafting the Five-Year Plan – and the sectoral Five-Year Plans based thereupon – as ministries rely on their expertise to develop new policies. Therefore, cooperating with these think tanks and strengthening them with international energy transition experience is a promising way to promote the transition to a low-carbon energy system in China and effectively anchor it in medium and long-term energy policy planning.

Germany is a pioneer in the energy transition and has gathered valuable experiences and best practices. German research institutes and think tanks are in an excellent position to share this knowledge with their Chinese counterparts. At the same time, there are challenges which Germany and China are facing simultaneously or where China has experiences that can inform Germany's energy transition, such as the emergence of electromobility and its meaning for the energy system.

Against this background, the Sino-German Energy Transition Project supports the exchange between Chinese government think tanks and German research institutions to strengthen the Sino-German scientific exchange on the energy transition and share German energy transition experiences with a Chinese audience.

Implemented by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

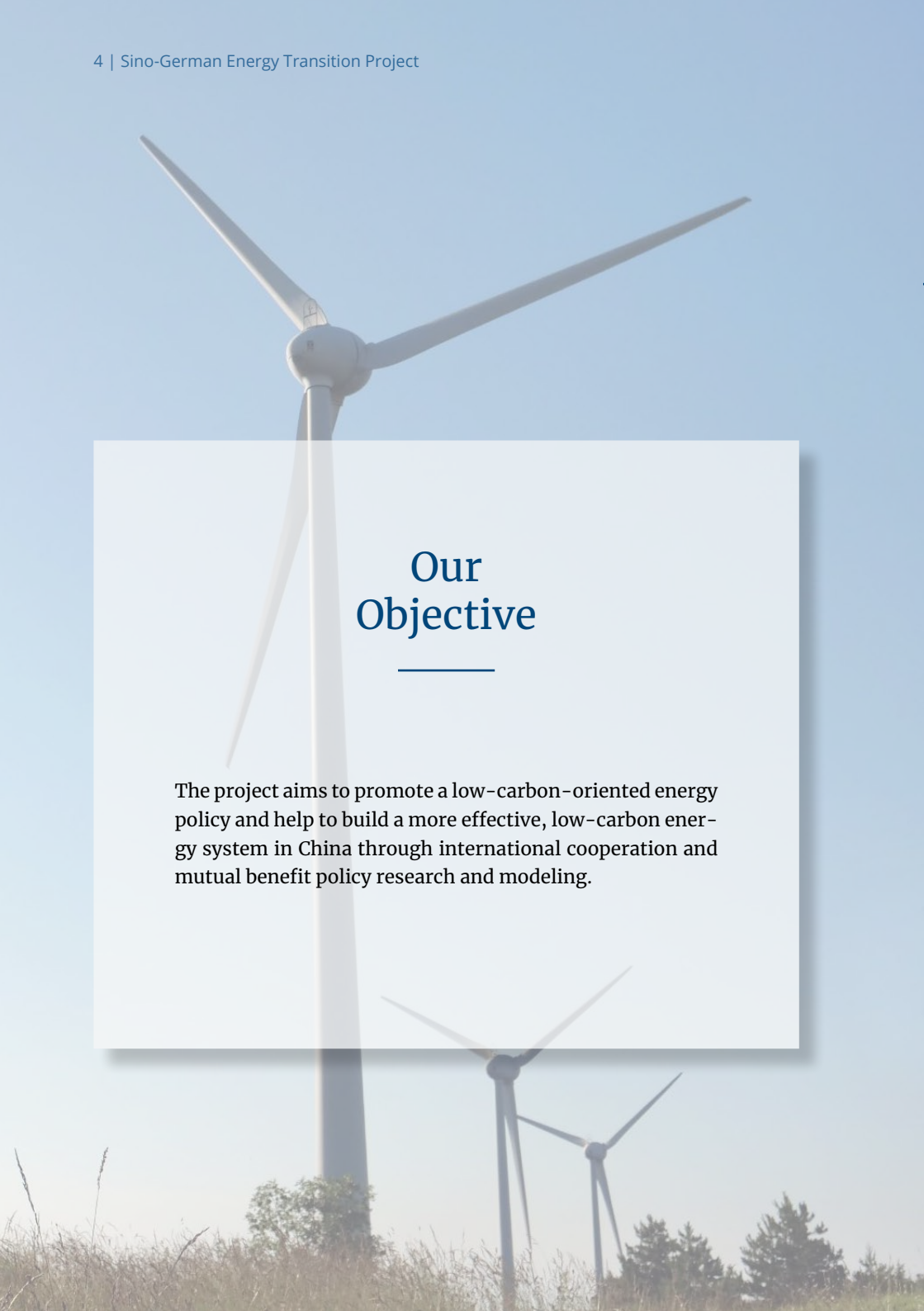
dena German Energy Agency

Agora Energiewende

电力规划设计总院 China Electric Power Planning & Engineering Institute

IAE

中国南方电网 CHINA SOUTHERN POWER GRID 南方电网能源发展研究院



Our Objective

The project aims to promote a low-carbon-oriented energy policy and help to build a more effective, low-carbon energy system in China through international cooperation and mutual benefit policy research and modeling.

Our Approaches

To achieve the overall objective, the Sino-German Energy Transition Project introduces German experiences of the energy transition into advising the Chinese government and energy policy-related think tanks.

The project implements this program under **4** work streams:

Providing technical advice to Chinese policymakers on the low-carbon transformation of the Chinese energy system

Sharing German energy transition experiences and expertise as inputs for the modeling of energy scenarios and corresponding research by Chinese state think tanks

Coordinating the contributions of German partner institutions to promoting the low-carbon orientation of China's energy policy

Increasing visibility of the German energy transition and Sino-German cooperation in the energy sector

Focal Topics & Expected Results

The Chinese and German partners will collaborate in research on nine topics, which have been jointly selected by the Chinese and German partners. The project has a diverse range of intended outputs, including bilateral workshops, modeling workshops, policy reports and technical publications

Distributed Energy

Rural Energy Transition

Power Market Reform

Provincial Energy Transition

Electric Vehicle

Heating and Cooling

Hydrogen

Energy Efficiency

Grid Planning
(incl. flexibility and demanside response)

Rural Energy Transition

Objective

With a growing share of decentral renewable energy sources and electric vehicles, both power supply and loads will become more variable. Therefore, charging vehicles when supply is high and using their battery charges to stabilize the grid in low supply periods (vehicle-to-grid, V2G) is can help improve power system flexibility, especially in rural areas with high vehicle ownership and dependence.

A study on the economics of microgrids and V2G for integrating large amounts of renewable energy, electronic loads, and electric vehicles in cooperation with Wuppertal Institute and CAS Institute of Applied Ecology (IAE). The study reseach will include surveys in one Chinese village and one German village.

Expected Results

Impact

For the first time, the project will concretely model the potential of V2G on the level of a rural community, using data from real measurements in the German village. This work can inform grid planning and system integration of renewables in rural areas, both in Germany and in China.

Flexibility

Objective

A study on the potential of data center demand response to contribute to power system flexibility, as well as their potentials for energy efficiency measures and sector coupling, for example by using waste heat.

With digitization advancing at breathtaking speed, the need for computing power in data centers is rising dramatically. As estimated, global data center electricity demand in 2018 reached 198 TWh, almost 1% of global final electricity demand. With growth expected, their efficient integration into the energy system has therefore a major impact on power sector operations and emissions.

Expected

With China expecting high growth in data center capacity and energy consumption, this study looks at international best practices and generates valuable insights into how flexibility measures can be implemented in the prevailing conditions.

High Power EV Charging

China is the world's largest EV market and has more EV trucks and buses on the roads than any other country. As a result, China has significant expertise with handling the electricity loads from charging such vehicles, as well as with optimizing charging and grid investments. As some German cities contemplate following a similar path and German research institutes are performing case studies, there is the expectation to exchange experiences and draft a path into the electrified future in urban areas.

Results

The study identifies and analyses Best Practices from Germany and China on efficient EV high power charging and EV infrastructure investment practices. It also identifies the potential of new technologies and businesses to facilitate the integration of EVs and required infrastructure in urban areas. Furthermore, it assists Chinese and German cities to optimize grid and charging investments.

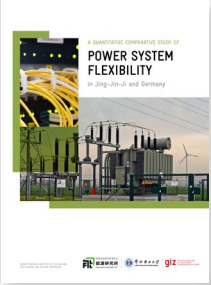
The study focuses on the potential for High Power Charging (HPC) infrastructure in cities for the private and public sector. The Reiner Lemoine Institute will perform the study in Berlin, while at the same time a Chinese consultancy will prepare a mirror study on a city in China.

Impact

Highlights

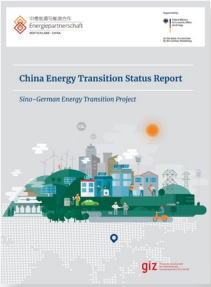
from Phase I

Together with the Chinese and German partners, the project carried out several researches to accelerate the energy trnasition in China during the implementation of phase 1 (2016-2019).



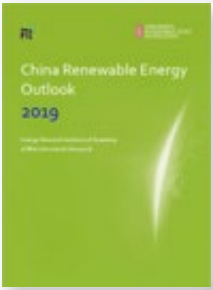
A Quantitative Comparative Study of Power System Flexibility

Researchers used five metrics to quantify flexibility in Germany versus China's Jing-Jin-Ji region, for better integration of renewables.



China Energy Transition Status 2020

The report takes stock of China's energy transition, analyzes how far China has come and what hot topics need to be addressed in the next phase.



China Renewable Energy Outlook (CREO 2019)

CREO analyses the possible role for renewable energy in the Chinese energy system and the scenarios provide a consistent vision as a foundation for policy development.

Sino-German Energy Partnership

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The Sino-German Energy Partnership is the central platform for energy policy dialogue between Germany and China on national level. It aims at accelerating the energy transition in the two countries by continuous political, economic, regulatory and technological exchange with focuses on energy efficiency and renewable energies. Furthermore, the Energy Partnership provides a platform for fostering private sector cooperation. As part of the Energy Partnership, the Sino-German Energy Transition project focuses on supporting research cooperation between German and Chinese think tanks on all aspects of the low-carbon energy transition. On behalf of the Federal Ministry for Economic Affairs and Energy (BMWi), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH implements the Sino-German Energy Partnership (EP) and has established offices in Beijing and Berlin serving as an information platform and point of contact for all involved and interested parties. On the Chinese side, the Energy Partnership is chaired by the National Development and Reform Commission (NDRC) and the National Energy Administration (NEA).

Contact us

Anders Hove

Project Director
Sino-German Energy Transition Project

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Tayuan Diplomatic Office Building
1-15-1, 14 Liangmahe South Rd, Chaoyang District,
100600 Beijing, PR China

+86 10 8532 6646 ext. 20

energy-china@giz.de

www.energypartnership.cn

Follow us on:

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