



Federal Ministry
for Economic Affairs
and Climate Action



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

Recommendations for the development of Energy Efficiency Networks in China

The Sino-German Energy Partnership



Imprint

The report “Recommendations for the development of Energy Efficiency Networks in China” provides a general summary of the activities related to EENs in China up today, a general analysis of barriers and chances of EEN in China and finally, general recommendations for the development of EENs in China. The report is published in the framework of the Sino-German Cooperation Field on Energy Efficiency Networks. The Cooperation Field, as part of the Sino-German Energy Partnership between the German Federal Ministry for Economic Affairs and Climate Action (BMWK) and the National Development and Reform Commission of the People’s Republic of China (NDRC), is jointly implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the China International Engineering Consulting Cooperation (CIECC). The Cooperation Field supports the formation and operation of the Sino-German Energy Efficiency and Climate Networks in Taicang that shall serve as a showcase for the establishment of further Energy Efficiency Networks across China. As a German federal enterprise, GIZ supports the German government in the achievement of its goals in international cooperation for sustainable development.

Published by

Sino-German Energy Partnership
commissioned by the German Federal Ministry for
Economic Affairs and Climate Action (BMWK)
Tayuan Diplomatic Office Building 1-15, 14 Liangmahe
South Street, Chaoyang District
100600 Beijing, P. R. China

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Acronyms

BMWK	German Federal Ministry of Economic Affairs and Climate Action
CADZ	China Association of Development Zones
CIECC	China International Engineering and Consulting Company
dena	German Energy Agency
EEN	Energy Efficiency Network
EMS	Energy Management System
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation
IEEN	Initiative Energy Efficiency Networks
LEEN	Learning Energy Efficiency Network
NAPE	German National Action Plan on Energy Efficiency
NDRC	National Development and Reform Commission
SGCC	State Grid Corporation of China
SME	Small and Medium Size Enterprises

Executive Summary

Recommendations for the development of Energy Efficiency Networks in China

Today, Energy Efficiency Networks (EENs) are an effective way to improve energy efficiency in companies and municipalities in Germany. The first pilot EEN in Germany was funded in 2002 and since the end of 2014, the “German Initiative for Energy Efficiency Networks” has been supporting the creation of EENs of companies and has become one of the most successful instruments of the German National Action Plan on Energy Efficiency (NAPE).

EEN - Definition and Structure:

An EEN is a voluntary, methodical, goal-oriented and non-bureaucratic exchange of experiences and ideas between its participants (companies, municipalities, etc.). An EEN has in average 10 participants.

For a successful exchange and to obtain best results, the network activities are followed and supported by experts (operators, moderators and consultants) during the entire running time of usually 2 to 3 years. About one year after the beginning of the network, the participants define a common energy-saving goal. EENs can define a GHG-emissions saving goal as well. The common goals are the addition of the single saving goals of each participant, which are in turn based on the results of energy audits or similar procedures performed by each participant.

To date, there are different models of EENs in Germany. One of them is the so called “Learning Energy Efficiency Network (LEEN)”. All these models meet minimum quality criteria as defined by the German networks’ initiative.

Over 340 EENs have been started in Germany since the beginning of the initiative. The benefits of participating at EENs goes further than just saving energy, emissions and costs, it helps companies to make their commitment on energy efficiency and environmental protection visible, increase the knowledge and expertise of employees, improve energy management and much more.

This document provides a general summary of the activities related to EENs in China up today, a general analysis of barriers and chances of EEN in China and finally, general recommendations for the development of EENs in China. The development and the results of EENs in Germany have been previously

summarized by the authors in another document. Both, this and the previous document, were elaborated on behalf of the Sino-German Energy Partnership which is commissioned by Federal Ministry of Economic Affairs and Climate Action (BMWK) and implemented by German Agency for international Cooperation (GIZ).

In China, the first pilot EEN was created in 2005 followed by several other pilot EENs. An analysis of these experiences made by the authors shows that there are different barriers that should be addressed to facilitate the development of EENs in the country such as a lack of expertise on energy efficiency within companies, the need for a central entity for EENs, cultural barriers etc. At the same time, EENs represent opportunities. For example, in China, like in Germany, EENs can become an effective instrument to motivate companies to implement energy efficiency measures and thus to reach national efficiency and environmental targets. EENs can also be a mean to increase knowledge and expertise in companies and more.

The recommendations of this document are the result of a general analysis and not of a detailed on-site study. Nevertheless, they have a solid base since the authors, experts from the German Energy Agency (dena), have been working on the topic of EENs in Germany and in other countries for several years and have been following the last activities related to EENs in China including those of a pilot EEN in Taicang. The recommendations are:

- **Official recognition of the EENs** (e. g. in official actions plans, regulations, public announcements etc.).
- **Develop incentives for EEN-participation** (e. g. tax-reductions, exemptions from legal obligations, official certificates, loan programs, etc.).
- **Develop an EEN-model for China** better adapted to local conditions.
- **Create a central entity for EENs** like the one existing in Germany.
- **Develop training programs.**
- **Development and dissemination of EEN-Best-practice.**
- **Create company-internal EENs.**
- **Support international exchange on EENs.**

1. EEN Activities in China

To better understand the context in China around Energy Efficiency Networks (EENs) as well as the proposals presented in the last chapter, this chapter presents a brief summary of past and current activities related to EENs in China including the current pilot EEN in Taicang.

Activities between 2005 and 2020

The first four Energy Efficiency Networks (EENs) in China were operated between 2005 and 2010 by the German consulting firm Arqum. The first network was founded in Shanghai and the others in industrial parks in the Jiangsu province. The networks focused on energy efficiency and environmental protection.

After the first experiences, the German Agency for International Cooperation (GIZ) and the State Grid Corporation of China (SGCC) decided to launch scaling up activities on EENs between 2010 and 2013. This action was in part motivated by a new directive issued by the Chinese government, in which SGCC was obliged to save 0.3 % of its total electricity consumption. The activities included the training of 50 moderators and 50 energy consultants to support EENs in China. The training was based on the German EEN-model known as LEEN.

With the support of GIZ, SGCC launched 576 networks with over 6,000 industrial companies. A total of 4,378 network meetings and numerous energy efficiency audits were carried out. These activities led to a total energy-saving of 960 GWh as well as reductions in peak loads of up to 689 MW could. The total energy-saving divided by the number of networks results in an average energy-saving of 1.6 GWh per network. This number seems very low compared to the average of the EENs in Germany of about 30 GWh. The explanation to this important difference is that only about 30 % of the networks started by SGCC were regularly active and following the German LEEN-model. The rest of the networks were meeting irregularly or were inactive.

Later, two further EENs of industrial parks were founded in Chengdu and in Kunshan with the support of the China Association of Development Zones (CADZ), which is an association of industrial parks in China. In both cases, the role of the network operator was taken by the respective administration of the industrial park. The assessed energy-cost savings of the pilot EENs were about 41 respectively 15 million RMB/year.

In 2016, the EENs were included in the 13th “5-year action plan” of the Chinese government as an instrument for energy efficiency and emissions

reduction. This plan is similar to the National Action Plans on Energy Efficiency of Germany.

GIZ has been supporting the development of EENs in

China for several years within the frame of the Chinese-German Energy Partnership. This included among other things the organization of exchanges among key actors as well as the development and promotion of information like a guideline for EENs in China in 2017.

Finally, in China there are several so called “thematic round tables”, which are groups of companies that meet regularly and exchange on different topics. Unfortunately they don’t define saving goals like the EENs. The round tables are usually supported by business associations.

The current pilot Network in Taicang

A further pilot EEN was founded in 2021 in an industrial park in the region of Taicang following a recommendation of the German-Chinese working group on energy efficiency from the Sino-German Energy Partnership, which is a cooperation platform between the German Federal Ministry of Economic Affairs and Climate Action (BMWK) and the National Development and Reform Commission (NDRC). The German consulting firm Arqum has been assigned for the realization of this network. The operation of the network was also supported by the China International Engineering and Consulting Company (CIECC). Moreover, the German Energy Agency (dena) has been following the activities of the network as an advisor since summer 2021. The network has a total of 10 participants. Most of them are production sites of German companies present in China.

Unfortunately, the corona pandemic has been severely affecting and delaying the work of the network. Nevertheless, some progress have been achieved. To date (November 2022), the companies are completing their potential analysis in form of energy audits and are defining measures to reduce energy consumption and greenhouse gas emissions. Some companies have already started with the implementation of the measures and one of them with the development of an Energy Management System (EMS) according to ISO 50001. In Germany, EEN-participation has been helping many companies to implement such systems.

2. Barriers and Chances of EENs

As for the first chapter, to better understand both, the context in China around EENs and the proposals presented in the last chapter, this chapter summarizes an analysis of barriers and chances around EENs in China.

As previously mentioned, there have been EEN activities in China since 2005. Some results of these activities are summarized in reports that the authors of this document have analyzed to identify barriers and chances of EENs in China. The authors also considered the experiences of EENs in Germany and other countries, their own experience in previous projects in China, and the results of exchanges with some Chinese experts. The main conclusions of the analysis are:

Barriers.

Barriers at company level:

- Many companies in China have a high potential regarding energy efficiency. This potential remains however unused due to a lack of expertise within their employees.
- Moreover, many companies don't consider investments in energy efficiency as profitable. This is not only due to the above mentioned lack of expertise. It is also due to a lack of sustainable culture in the companies. Many companies consider only short-term factors while estimating the profitability of measures and don't consider long term benefits.

Barriers related to frame conditions:

- Companies find some times official statements and strategies not clear enough and prefer to stay inactive in order to avoid potential sanctions. Therefore there is a need of a clear official strategy for EENs.
- Despite the training activities for moderators and energy consultants in 2013, there is still a lack of qualified professionals for EENs. Most of the trained persons are not active anymore, as they were company employees that moved over time on to higher positions and got new tasks.
- There is no central entity for EEN in China like in the central office of the networks' initiative in Germany. Until now, many EEN-activities have been focusing rather on the realization of pilot EENs than on implementing a comprehensive framework for EENs with complementary activities like information campaigns, exchange activities for key actors, a database, etc.

- To effectively scale up EENs in China, it is necessary to get the support of more partners like business associations, research institutes, local governments, etc.
- The experiences in China show that German EEN-models like LEEN might be too complex for Chinese companies (too high requirements).

Cultural Barriers:

- One of the essential characteristics of EENs is the relatively open exchange between their participants. Unfortunately, in China, it is sometimes difficult to get into open discussions.
- To successfully run an EEN, it is necessary to follow a defined working plan (e.g. identify energy-saving potentials, define savings-goals, implement measures, monitor the progress etc.). The experiences in China show that EEN participants and operators have difficulties to respect such plans.

Chances.

- Energy efficiency and climate protection are two important topics in China and all around the world. EENs are an effective instrument to bring companies to implement measures in these areas and can thus help to reach national efficiency and environmental targets.
- In addition, EENs help also to increase knowledge and expertise in companies making easier for them to understand and implement more and more complex but sustainable technologies, processes, methods etc.
- EENs can remain a topic for the German and Chinese cooperation and, why not, a cooperation with other countries as well, that have also been working on EENs like Mexico, Brazil, Chile, Denmark, Switzerland and more.

3. Recommendations

This chapter presents the recommendations for further actions and activities to promote the development of EENs in China.

Recommendations.

The authors of this document have developed recommendations for further actions and activities in China to promote the development of EENs. The recommendations are based on the analysis of the information available in reports and other documents, on exchanges with some Chinese experts, and on the experience of the authors on projects related to EENs in Germany and in other countries (see previous chapters). The recommendations are:

- **Official recognition of the EENs:** Companies in China will feel more secure in participating at EENs if such networks are suggested and recognized by official authorities e. g. in official regulations, official actions plans etc. The companies will then be sure that they are not doing something wrong or against official regulations.

The EENs were included in 2016 in the 13th “5-year action plan” of the Chinese government as an instrument for energy efficiency but without a concrete plan for their implementation. Unfortunately, they were not included in the current 5-year action plan at all.

Nevertheless, official entities, like NDRC, can still take some actions to give EENs an official recognition, based on the experience of the pilot EEN in Taicang. For example, recommend the participation at EENs in articles, public announcements, etc.

- **Develop incentives for EEN-participation:** In addition to the previously mentioned official recognition of the EENs, concrete state incentives can motivate companies to become part of them. The incentives can be for example:
 - tax-reductions,
 - exemptions from legal obligations,
 - official certificates from authorities recognizing the efforts of the companies,
 - loan programs, etc.

The incentives can be developed at national and/or regional level with the support of local and national authorities and other partners like business associations etc.

- **Develop an EEN-Modell for China:** Previous experiences show that companies in China have difficulties to follow EEN-models like the ones existing in Germany. Therefore, it might be helpful to develop an alternative model adapted to local conditions and considering local cultural aspects.

To develop such a concept, it would be necessary to first carry out a detailed evaluation of the EEN-activities and existing similar instruments or models e.g. the thematic round tables initiated by industry associations (see Chapter 1) in China up to now. A stakeholder analysis should be part of the evaluation as well in order to get a clear picture of the potential roles and contribution of different actors around EENs. The evaluation should consider both, quantitative and qualitative aspects. Methods like surveys and interviews can be applied. To ensure neutrality, the evaluation must be carried out by an independent organization that has not been directly involved in the development of EENs in China yet. Beside the results of the evaluation, experiences with EENs in other countries should be considered as well.

To make EENs more attractive for companies, their scope can be extended to other topics like decarbonization or resources efficiency. The new model can be tested in a few new pilot-EENs.

- **Create a central entity for EENs:** The central office of the German networks’ initiative (hosted by dena) acts as a national and neutral entity for EENs in Germany. Some of its tasks are:
 - be the central contact point for questions regarding EENs,
 - coordinate and support communication activities around EENs (website, newsletter, print materials, press, etc.),
 - the registration of EENs,
 - coordinate processes of stakeholders and partners of the initiative (working groups etc.),
 - represent the initiative at events (fairs, conferences etc.) and organize own events (yearly conferences etc.),
 - and more.

The creation of a similar entity in China would be very helpful to better coordinate and develop EENs activities in the country. This central entity should also cooperate with existing initiatives and structures like the round-tables mentioned in chapter 1.

- **Develop training programs:** As previously mentioned, in China there is still a need for consultants and moderators capable of supporting EENs properly. A training program can be developed to address this issue. The program would consist of two main activities. The first one would be to train local consultants and moderators, that will, in turn, later be responsible for the training of other local consultants and moderators (training of trainers). The second activity would be then the training of local consultants and moderators by the new local trainers.

To avoid the problems of past training activities focused targeting company-employees (see chapter 2), the new trainings should address other target groups like external independent energy consultants and moderators that, in the best case, will make EEN-services a part of their business-model. This would help to develop a market around EENs. New future EENs would then have a choice of well-trained consultants and moderators that would help them to carry out the network activities in a proper way and thus obtain better results.

- **Development and Dissemination of EEN-Best-Practice:** Since the EEN-approach is still unknown by most companies in China, the development and dissemination of best-practice examples would certainly help these companies to better understand the approach and its benefits. In this case, the best-practice examples will be used to motivate companies for EEN-participation. The examples can also serve as a reference during the realization of a network to control if things are being done properly or not.

The best-practice examples should be primarily based on experiences in China. However, since today there are more and more EENs in different countries, international examples can be also interesting for the Chinese audience.

The first steps would consist in collecting and preparing examples and in developing an information campaign. The dissemination of the examples will be more effective, if the campaign is supported by local and national authorities as well as other partners like business associations, chambers etc.

- **Create company-internal EENs:** Until now, most EENs in China have been "regional EENs" (networks of "neighbor" companies geographically close to each other). In many cases, these EENs were within industry parks. For a comprehensive development of EENs in China, it would be very helpful to get more experience with other kind of EENs namely:
 - "sector-internal EENs" (with the participation of companies from the same economic/industry sector),
 - "company-internal EENs" (with the participation of different facilities/production sites of the same company),
 - "EENs of SMEs" (with the participation of SMEs),
 - or "international EENs" (with the participation of facilities/production sites in different countries including China e. g. "a German-Chinese EEN" with Chinese and German companies).

Moreover, German companies, that have already participated at EENs in Germany and are also present in China, can try to convince their facilities/production sites in China to participate at EENs. They can also organize an exchange between their facilities/production sites in both countries to share experiences.

- **International exchange on EENs:** China can certainly benefit from an exchange of experiences with other countries that are also implementing EENs (see chapter 2). This exchange can, for example, take place in within the frame of the Energy Efficiency Hub.

Next steps.

The authors of this document suggest the following next steps for the development and realization of the proposed recommendations:

- The first step would be a prioritization of recommendations. To do so, evaluation criteria need to be defined first.
- After the pre-selection, detailed concepts can be developed for each selected recommendation including a realistic assessment of costs. If possible, potential project partners should be involved in the development of the concepts.
- The next step would be the final choice of recommendations based on the detailed concepts and the preliminary agreements with potential partners like MOUs.

Finally, the projects can start after closing agreements with partners, contractors etc.

Biography

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Website



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