IMPACT SHEET • SWITCH-ASIA PROJECT

CHINA HIGHER EFFICIENCY POWER AND DISTRIBUTION TRANSFORMERS PROMOTION

PAVING THE WAY TO SMART AND GREEN GRIDS WITH MORE EFFICIENT TRANSFORMERS

THE CHINA HIGHER EFFICIENCY TRANSFORMERS PROJECT HELPS REDUCE MORE THAN 846,000 TONS CO_2 EMISSIONS A YEAR BY DEVELOPING ENERGY EFFICIENCY STANDARDS AND POLICIES

switchasia NETWORK FACILITY

THE CHALLENGE

The annual loss of electricity in China is more than 20 billion kWh. About 30-40 % of this loss derives from power transmission and distribution. Large energy intensive industries use a lot of transformers and upgrading the inefficient ones is not economical – the energy savings generated are not enough to compensate for the investment cost. Local manufacturers lack capacity and awareness to produce higher efficiency transformers. End-users do not see the advantages of using them.

OBJECTIVE

The SWITCH-Asia *China Higher Efficiency Power and Distribution Transformers Promotion* project seeks to reduce electricity loss by increasing the market penetration of higher efficiency transformers (S11 and above), and by enlarging their market share in China. The specific objectives include:

- To draft new minimum energy performance standards for distribution transformers;
- To develop a total-cost-owning standard and tool based on life cycle costing to enable users of transformers to make transparent purchase decisions with energy-saving considerations;
- To develop an eco-design standard for power and distribution transformers to influence all parts of the supply chain in sustainable production;
- To increase the awareness of end-users about sustainable energy consumption;
- To reduce electric loss in power transmission and distribution, as well as to save tremendous amounts of electricity that generated by the fossil fuels.

ACTIVITIES / STRATEGY

The SWITCH-Asia *China Higher Efficiency Power and Distribution Transformers Promotion* project seeks to increase the market penetration of higher efficiency transformers and uses various strategies to reach its goals. **Developing energy efficiency standards** for transformers is one part. Project experts have worked on standards for minimum energy performance s, on eco-design and on a total-cost-owning guideline. With this set of mandatory and voluntary standards the project envisions more favourable market conditions for higher efficiency transformers.

A second part is **raising awareness** among end-users such as power distribution utilities and energy-intensive industries. Such end-users are the leading energy consumers in China who need to reduce their electricity costs. Energy savings in the use-phase of transformers are often not considered in the investment decision simply because more efficient transformers are more expensive. The project therefore helps energy managers and procurement officers to build up their capacity for undertaking life-cycle cost analyses. The total-cost-owning tool can then support energy managers in their procurement. Energy conservation and supervision centres in local government offices are in a strategic position to participate with the project efforts to create awareness and improve the compliance of energy saving standard & policies.

A third part is **capacity building** with local SMEs to enable them to design and manufacture higher efficiency transformers. Only when manufacturer have the capacity, will they progressively expand their product portfolio of transformers and contribute to the transformation of the market.

TARGET GROUPS

- Energy consumption policy-makers of the National Development and Reform Commission (NDRC) and the Standardization Administration of China (SAC) as well as standard making committees in the China National Institute of Standardization (CNIS), China Electricity Council (CEC), and China Electrical Equipment Industry Association (CEEIA)
- Power transmission and distribution utilities and energy-intensive industries (end-users)
- Small and medium-sized transformer manufacturers
- Energy conservation and supervision centers (ECSCs) in key energy using provinces

SCALING-UP STRATEGY

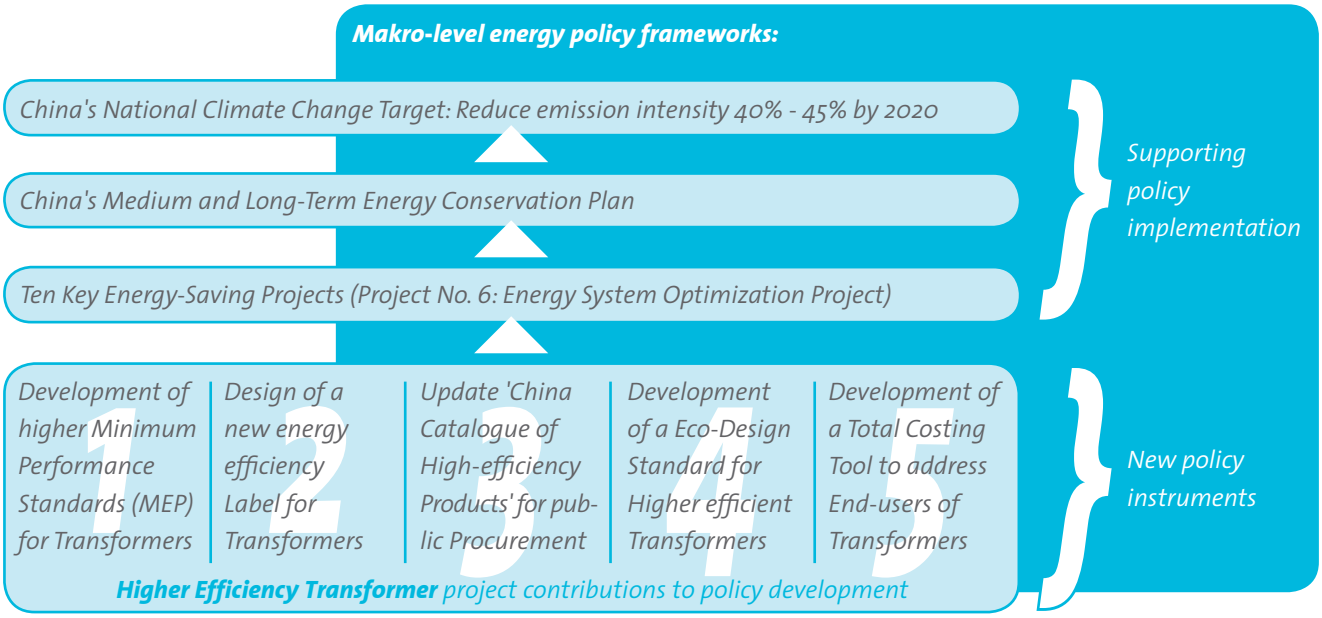
REPLICATION AIDED BY NEW POLICIES

The project contributes to the implementation of China's macro-level energy and energy conservation policy framework. Efficient transformers as part of an optimised energy system contribute to Medium and Long-term Energy Conservation Plan as laid out in China's 12th Five Year Plan. The project addresses policy-makers including those at the Standardization Administration of China (SAC) and the National Development and Reform Council (NDRC) who are responsible for undertaking management, supervision and coordination of and saving energy saving through more efficient equipment and technologies. The China National Institute of Standardization (CNIS) which is in charge of setting standards and reporting to SAC and NDRC, leads the work on minimum energy performance standards (MEPS) in the project. The project supports the introduction of new national standards for efficient transformers. This will increase the mandatory minimum energy efficiency requirements, and effectively push inefficient products off the market. The project also contributes to the redesign of a mandatory energy efficiency label and a higher efficiency certificate for top performing transformers. These initiatives will pave the way for efficient transformers to be included in the China Catalogue of High-Efficiency Products. This is used in public procurement and products included can bring tax advantages for the production companies.

SCALING-UP BY ALL ACTORS IN THE SUPPLY CHAIN

The project consortium includes all actors in the supply chain. Suppliers of raw materials, manufacturers, users and policy-makers are represented by manufacturer and end-user associations and energy management and supervision organisations. As a result of this close relationship, the project directly reflects the needs and constraints of those who are affected by the standards it is developing. Because of the constellation in the project consortium, not only minimum mandatory efficiency standards are being set but so are eco-design standards for manufacturers and a total costing owing guideline & tool for users. With the various tools the project can have an impact at all stages of the supply chain. All project partners directly promote the new standards with their own members. By transforming the market in this way, with various standards and tools, all manufacturers and end-users in China can be reached.

Policy impact framework of the China Higher Efficiency Transformer Project



RESULTS



The *China Higher Efficiency Transformers* project established close partnerships among the policy-makers, institutes, manufacturers, end-users and energy management and supervision organisations. In various workshops, the project developed three national standards for transformers: the minimum energy performance standards (MEPS), the eco-design guidelines for manufacturers, and a total-cost-owning guideline (TCO) and tool to support procurement decisions. The MEPS standard was submitted and will be issued officially by the government in 2013. The Eco-design standard and TOC guideline were all issued and effective at 2012 officially.

STANDARDS DEVELOPED

The MEPS increase the minimum efficiency of transformers. This minimum efficiency is mandatory and thus all newly installed transformers must to comply once approved. On the other hand, government encourages the multi-stakeholder approach to combine with individual assessments to procurement higher efficient transformers that boost energy saving based on the rules of the MEPS, labelling program and supported by the subsidy program.

INSTRUMENTS AVAILABLE

The project transforms the market by providing specific instruments for different target groups. It addresses manufacturers with an eco-design standard in voluntary. The project partner China Electrical Equipment Industrial Association (CEEIA) was closely involved to ensure that Chinese manufacturers accept the standard and highlight for the total supply chain.

UNDERSTANDING OF USE-PHASE COSTS INCREASED

Efficient transformers will only penetrate the market when end-users can assess the earnings from more efficient products. To enable end-users to take an informed decision, the project developed a total cost owning tool (TCO) and products' database. With them, end-users consider economic and technical data from the whole life-span of a transformer before purchase.

Sometimes, power utilities don't know how much the products should be, but the total-cost-owning (TOC) guidelines lead us end-users to pay more at procurement. We benefit in the end from energy resource savings over the life cycle. In the past, many chose the cheapest transformer, but now based on TOC evaluation we consider costs for long term.

Mr. Hanshaigen, power utility

Mr. Jinyaming, SME, Transformer Manufacturer

It is difficult to compete if we offer products at a higher price, but TOC guidelines and the minimum rules for energy efficiency can eliminate illegal products. The tools can help end-users to fully evaluate the environment and energy saving.

IMPACT IN NUMBERS

ECONOMIC IMPACT

- Depending on need of distribution network, saving 10-35 % when replacing older technology with a higher efficiency transformer

ENVIRONMENTAL IMPACT

Environmental effect:

- 887 million kWh saved and 846,300 tons CO_2 emission cut/year in the 5 targeted provinces (at a replacement level of 20% of S7 distribution and power transformers (lowest efficiency) with S11 transformers (medium-level efficiency)
- With a replacement level of 20% of S7 distribution and power transformers (lowest efficiency) with S11 transformers (medium-level efficiency) environmental savings correspond to avoided combustion of 332 000 tons of coal, which will reduce emissions of 846 300 tCO_2 and 47 200 tons of sulphur dioxide

ENGAGEMENT OF TARGET GROUP

- 15 seminars with 3 000 participants from power utilities and industrial end-users with MEPS, TOC and energy policies training courses
- 4 seminars with 400 SMEs with eco-design, MEPS and energy policies training courses
- 1 workshop for 20 provincial energy conservation and supervision centres and energy service centres with energy policies, labelling programmes and market supervision training
- 1 international forum on higher efficiency transformer systems in China to promote the achievements and enhance the communication between China and the rest of the world

POLICY LINKAGES

Recorded interaction with policy-makers of

- Power transformer technical standardization committee of CEC
- National electric and electrical eco standardization committee
- China National Institute of Standardization
- Contacts to NDRC and SAC

This project established a positive assessment for electric energy saving and greenhouse gases emission reduction by using of higher efficient transformers based on the life cycling, and change customers' procurement behaviours through the mandatory policy (MEPS) and voluntary guidance supported by finance incentive policies, training materials, project website, database and evaluation tools.

Philip Zhang, International Copper Association

Legend

- *Eligible countries where SWITCH-Asia projects are implemented*
- *Eligible Asian countries for the SWITCH-Asia programme*
- *Non-eligible Asian countries for the SWITCH-Asia Programme*

Project implementation area

- *City*
- *Region*
- *Country*

The boundaries shown on this map do not imply on the part of the European Union any judgment on the legal status of any territory or the endorsement or acceptance of such boundaries.

OBJECTIVE

The SWITCH-Asia *China Higher Efficiency Power and Distribution Transformers Promotion* project seeks to reduce energy loss by increasing the market penetration of higher efficiency transformers (S11 and above) and to enlarge their market share in China.

DURATION

PROJECT TOTAL BUDGET:

EUR 781,832.95 (EU contribution: 80%)

PROJECT CONTACT

欧盟Switch Asia–中国节能变压器促进项目
EU SWITCH ASIA - CHINA HIGHER EFFICIENCY POWER AND DISTRIBUTION TRANSFORMERS PROMOTION PROJECT

Coordinator Philip Zhang
International Copper Association Ltd., China
Rm. 2605-2608, Tower A Building 1, Tianzuo International Center, No. 12, Zhongguancun South Avenue, Haidian District, Beijing, 100081

Telephone: +86-10-68042450, ext. 203
Email: philipzhang@copper.org.cn
www.efficienttransformer.org

PROJECT CONSORTIUM

International Copper Association China (ICA)

China National Institute of Standardization (CNIS)

China Electrical Equipment Industrial Association(CEEIA)

China Electricity Council(CEC)

Action Sustainable Development (ASD-France)