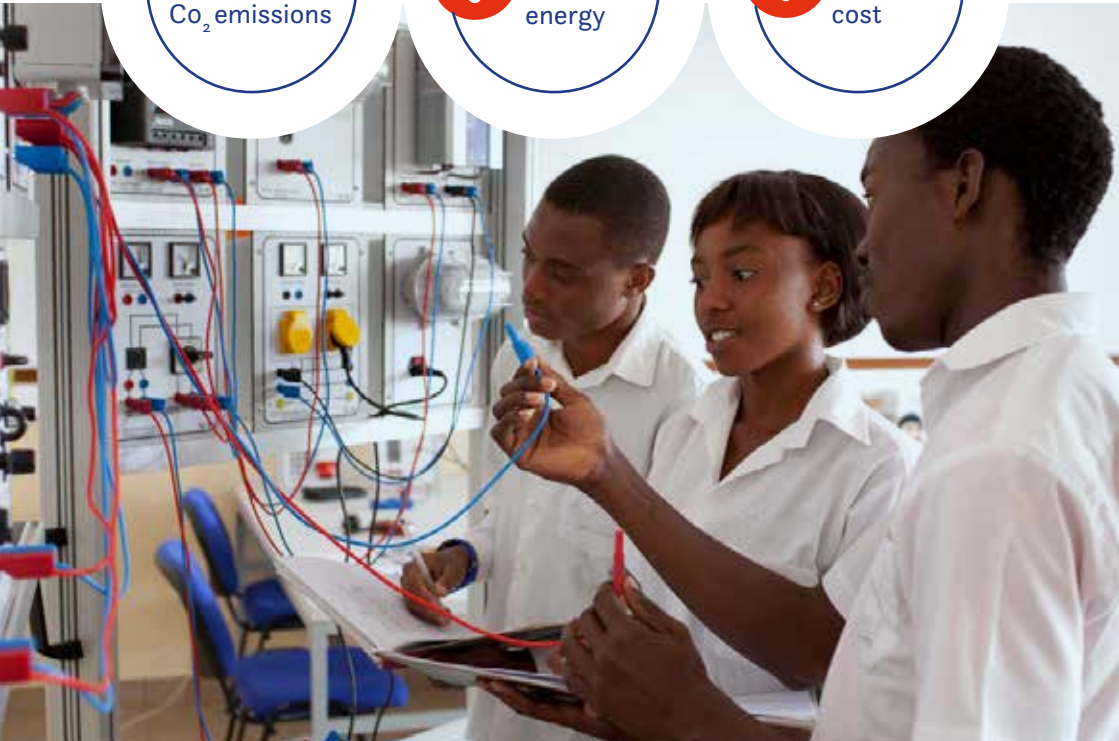
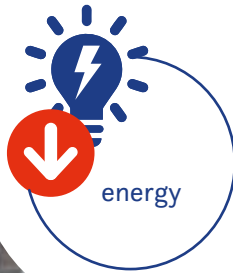
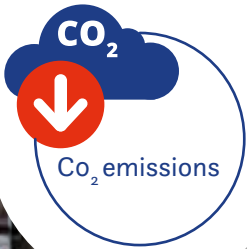


Share knowledge on Energy Efficiency



Learn about Energy Efficiency Networks

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Contact:

Nigerian Energy Support Programme (NESP)
No 2 Dr. Clement Isong Street, Asokoro
Abuja/Nigeria
Contact: nesp@giz.de



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Authors:

Bedakaino Usoko Ngubane, Joshua Yari Garba, Nico van der Woude (GFA Consulting Group GmbH)

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Nigerian Energy Support Programme:

The Nigerian Energy Support Programme (NESP) is a technical assistance programme, co-funded by the European Union and the German Federal Ministry for Economic Cooperation and Development (BMZ). It is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in collaboration with the Federal Ministry of Power. The programme aims to enable and foster investments in the Nigerian domestic market for renewable energy, energy efficiency and rural electrification.



Introduction

The industrial sector is known to be one of the highest consumers of energy, which in turn translates to a high cost of production. Industries are therefore constantly seeking ways to not only reduce cost of production, but also maintain maximum production and stay competitive in their various sectors through energy efficient practices. It is this need that led to the establishment of the first Energy Efficiency Network (EEN) in the 1980's. Since then, the concept of EEN has been adopted in many other industrialised and emerging economies - often through close partnership between industry and government.

During the last 20 years, the concept was adopted and enhanced in Europe, especially in Germany, where about 250 networks were operational as at the end of 2019. Based on the experiences of these established networks, *abundant energy saving opportunities* exist for participating industries which mostly offer an average payback period of about two to three years for investments that will be operated for more than 10 years. For some investments, the payback time can also be measured in weeks.

This brochure provides detailed information to companies on the concept, structure, and benefits of Energy Efficiency Networks. It also provides information on the *Nigerian Energy Support Programme's (NESP)* intervention which supports the establishment and operationalisation of EENs in Nigeria.

The EEN concept

Identifying the best and most profitable energy efficiency measures is challenging for companies. The EEN serves as a means to address this challenge, as it presents companies with opportunities to discover best solutions to address existing challenges through knowledge exchange and shared experiences.

As part of an EEN, network meetings are held, during which, participants discuss and *exchange knowledge and experience* under expert guidance. The joint efforts make it easier to identify possible efficiency measures by conducting energy audits, evaluate the profitability of the identified measures and implement these measures effectively.

However, to ensure the success of an EEN, participating companies must show commitment to exchange knowledge and information amongst themselves. It is therefore necessary for participants to develop a certain level of mutual trust (this could be facilitated through team building activities) in order to build a *strong network*. In general, participating companies are represented in the network meetings by the manager responsible for energy management.

‘Collaborating increases motivation towards implementation of energy and cost saving measures.’

Functions of an EEN

- ✓ Exploration of energy efficiency improvements
- ✓ Exchange of practical energy efficiency experiences in moderated meetings
- ✓ Presentation of implementation concepts for efficiency measures
- ✓ Consultation with energy efficiency experts

Types of EEN

The concept of Energy Efficiency Networks is categorised into two main types:

First is the *regional network*, where companies come from different sub-sectors but from the same region. Here, companies are often limited in their cooperation to cross cutting technologies, as process technologies differ among participants.

Second is the *sub-sectoral network*, where companies all come from the same sub-sector. Consequently, cooperation is not limited to cross cutting technologies as participants also share similar process technologies. In such cases, it is imperative for companies to focus less on competition in order to optimise the benefits of cooperation in the network.

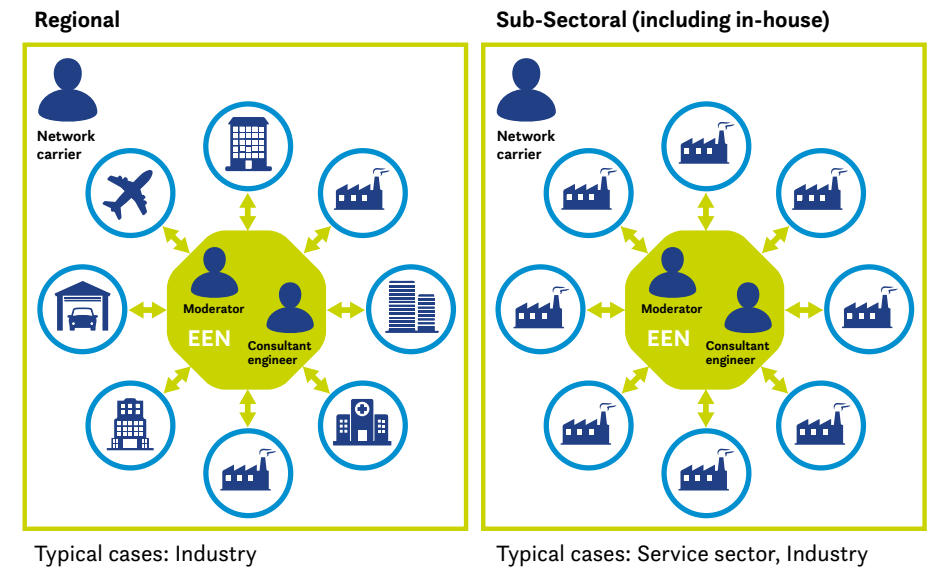


Figure 1. Types of Energy Efficiency Networks: Regional and Sub-Sectoral Energy Efficiency Networks

Composition and Duration of an EEN

An EEN has by preference, a minimum of 10 participating companies and is supported by a network team, consisting of a **network carrier**, a **consultant engineer**, and a **moderator**.

Network Carrier

The network carrier organises the network (contracts) and offers organisational support to the moderator and the consultant engineer. The role of a network carrier can be taken up by different actors e.g. it could be a company, a chamber of commerce or a donor organisation. In Nigeria, the Nigerian Energy Support Programme (NESP) has taken up the role of network carrier. However, options are being explored to identify an alternative organisation to assume the role of network carrier in order to ensure the sustainability of existing networks.

Consultant Engineer

The consultant engineer conducts the energy audits (in accordance with ISO 50002 requirement), monitors and documents the impacts of implemented measures and in addition, provides further technical support as may be required. In Nigeria, NESP has identified trained Professional Energy Auditors to participate in the EEN as consultant engineers.



Moderator

The moderator prepares and conducts the network meetings, leads the team building process and supports the network carrier with public relations. In Nigeria, NESP has trained representatives from the Manufacturers Association of Nigeria (MAN), Nigerian Association of Chamber of Commerce Industry Mines and Agriculture (NACCIMA), and Lagos Chamber of Commerce and Industry (LCCI) to serve as moderators of the EENs.

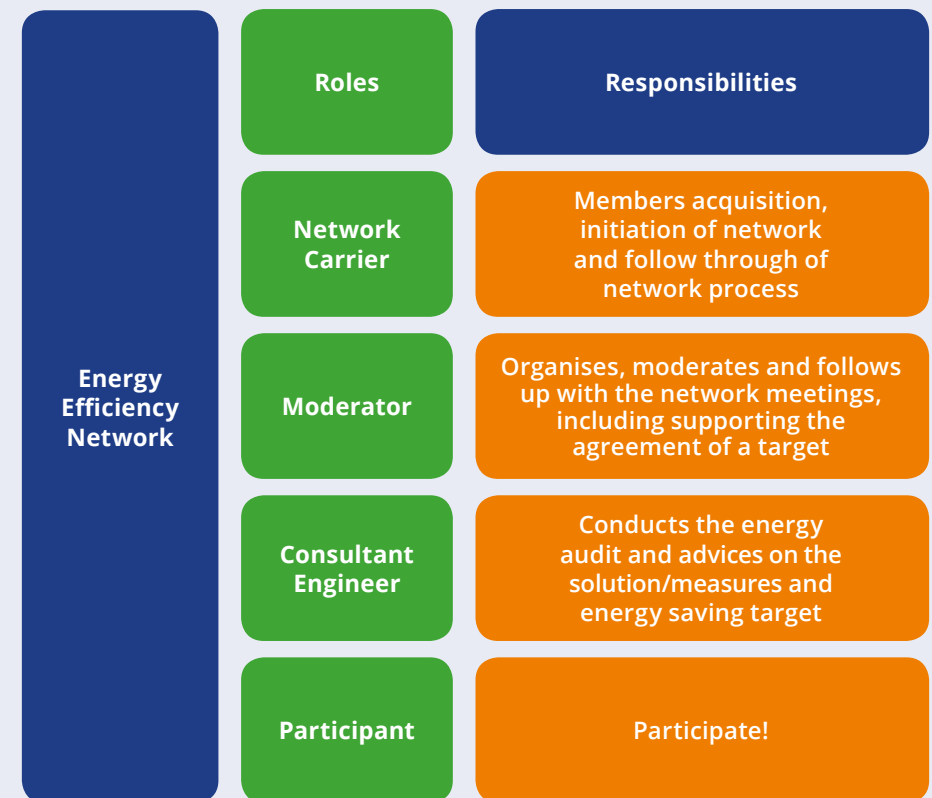


Figure 2. Roles of actors in an EEN

A typical network has a minimum running time of 3 years, usually with 4 network meetings held annually. The network meetings are planned to take place at the production sites of the participating companies.

The Network Process

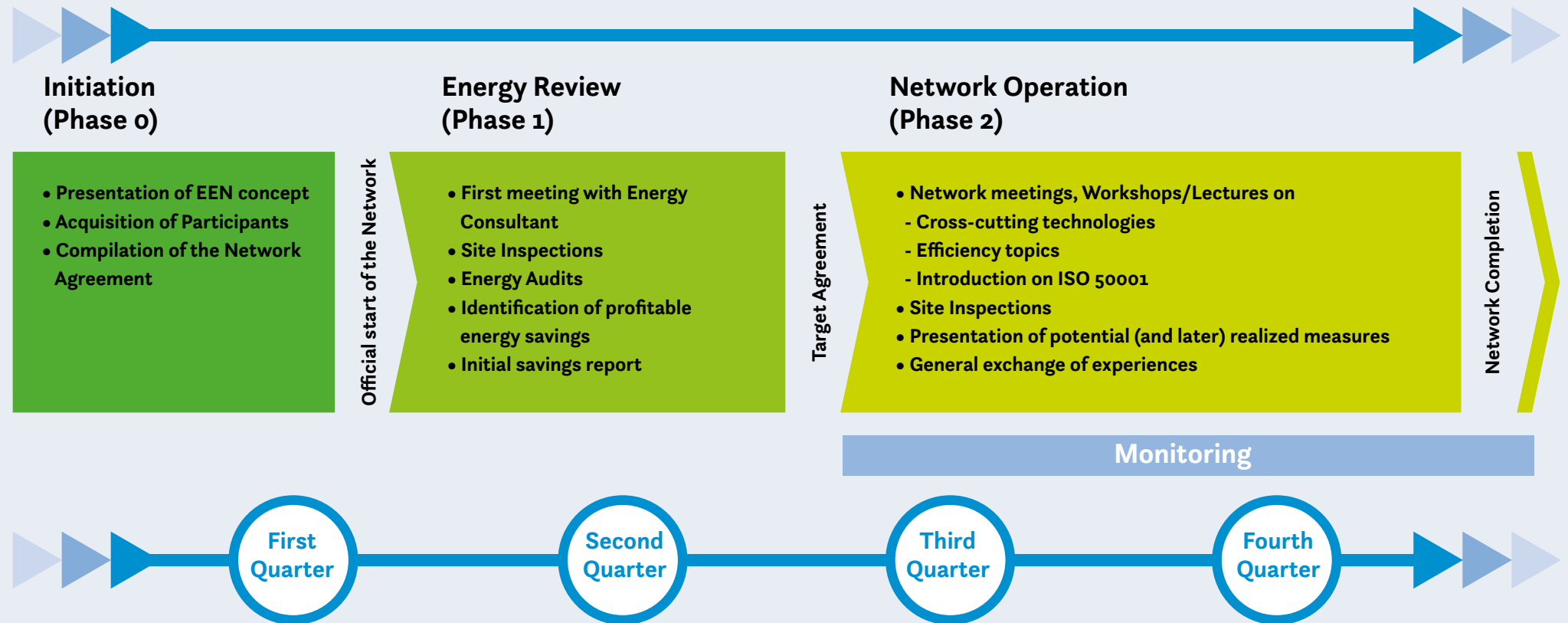


Figure 3. The Network Process

The EEN has several stages, beginning with the acquisition of potential companies that have shown commitment to participate in a network. This process then forms the basis for the establishment of the EEN.

Phase 1: in this phase, an energy review (comprising of facility inspection and energy audit) is carried out by the consultant engineer. Based on the review, profitable energy saving measures will be identified and reported in a preliminary report. Participants are then expected to set company specific

efficiency targets (confidential), commit themselves to setting energy saving targets for the network and regularly exchange experiences.

Phase 2: in this phase, several meetings and workshops are held, during which participants are trained on clean energy topics and cross-cutting technologies, potential energy efficiency measures are presented, site inspections carried out, and experiences exchanged.

Building on benefits of an EEN



Figure 4. Building on benefits of an EEN

EEN as a means for addressing barriers to energy saving

An EEN can be considered as a peer-to-peer, business-to-business network. For the participants, EEN creates an environment in which barriers to implement energy efficiency can be broken down. Such barriers are for example:

- Lack of information and specific knowledge about existing saving potentials.**
 In the EEN, this information and knowledge can be found during meetings, providing lectures by experts on energy efficiency topics.
- Lack of communication and exchange of experience.**
 During the EEN meetings, participants share information about problems, hurdles, successes, and experiences with respect to exploring energy saving potential and implementation of measures.
- Uncertain economic and legal frameworks and uncertainty in planning.**
 During the network meetings these uncertainties will be addressed, this will increase confidence amongst participants to take steps towards implementation of concrete energy efficiency measures.
- Lack of sufficient capital to invest in energy efficiency and unwillingness to use borrowed capital.**
 EEN is not a financial instrument, but it offers forms of technical assistance. However, EEN can help to explore financing options and financing opportunities and lower barriers to use borrowed capital.



Case studies: International Perspective

Case study 1: Results of the EEN of the City of Karlsruhe, Germany

The Network of the city of Karlsruhe consisted of 10 companies, all located in Karlsruhe (regional network). The participants were mainly industrial companies from different branches. The network started mid-2009 and lasted until mid-2013. During these 4 years, 16 network meetings took place.

The companies implemented more than 100 measures, saving about 10,500 MWh/a as well as reducing emissions of about 2,700 t of CO₂/a. These investments into energy efficiency were profitable as the average internal rate of return was calculated at 30% (see table 1).

Category (Average value per measure)	Value
No. of implemented measures	107
Average investment per measure	20.700 €
Average Energy cost savings per measure	6.750 €/a
Average internal rate of return per measure (IRR)	33,00%
Average static payback per measure	3 a
Average Energy saving per measure	98,5 MWh/a
Average CO ₂ reduction per measure	25,6 t/a

Table 1. Overview of results of the EEN of the City of Karlsruhe, Germany.

Related to the energy consumption, the companies saved about 7% and related to CO₂ emissions, the companies saved about 12%. The large difference between relative energy savings and CO₂ reductions is due to the fact that one company switched its electricity supply to renewable electricity (see figure 5).

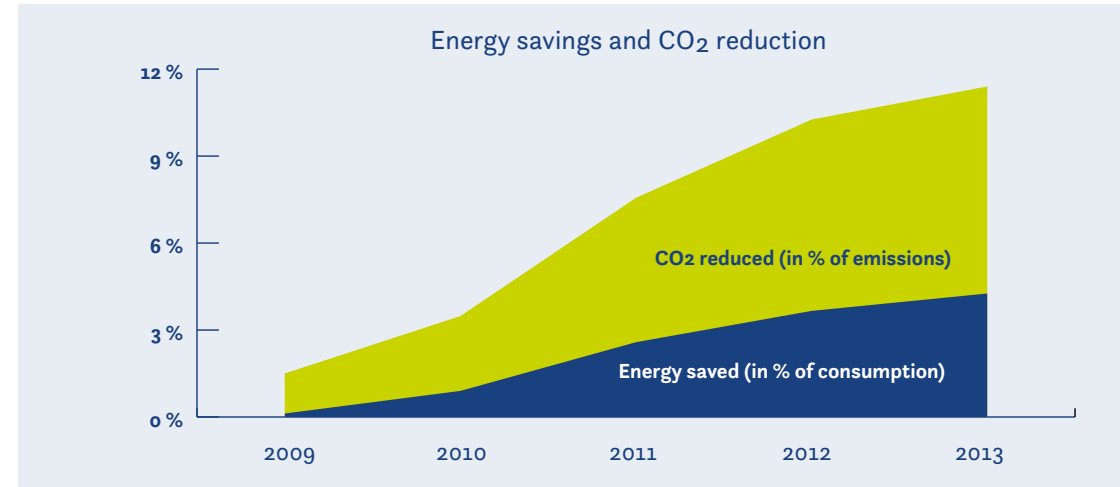


Figure 5. Energy savings and CO₂ reduction of the EEN in Karlsruhe Germany

‘Exchanging knowledge to promote carbon footprint reduction.’

Case study 2: Results of a tyre manufacturer in Germany participating in EEN (2009-2013)

A tyre manufacturer participating in EEN (2009-2013) achieved the following results.

Audit results

- ✓ 20 measures identified and evaluated
- ✓ 15 measures defined as profitable
- ✓ Total saving potential: 4,000 MWh/a

Achievements during participation in EEN

- ✓ Implemented measures: 37
- ✓ Total savings: 7,000 MWh/a
- ✓ Profitability (internal rate of return): 52%.

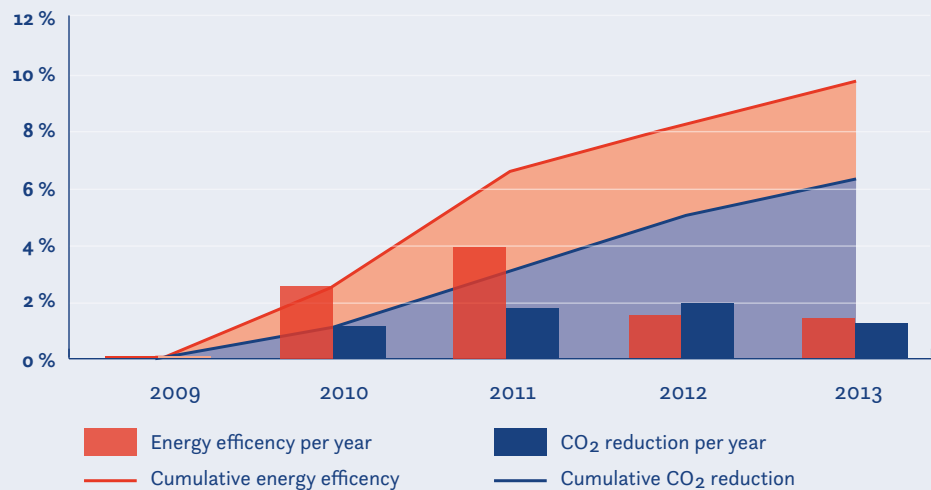


Figure 6. Energy Efficiency improvement and CO₂ reduction during participation in EEN

Energy Efficiency Networks in Nigeria

In 2016, during its first phase, the Nigerian Energy Support Programme in collaboration with the Federal Ministry of Industry, Trade and Investment (FMITI), Manufacturers Association of Nigeria (MAN) and Nigerian Association of Chamber of Commerce Industry Mines and Agriculture (NACCIMA) supported the establishment of the first Energy Efficiency Network in Nigeria, which comprised of *five participating companies* (Nigerian Bottling Company, Vitafoam Plc. Cormart Nigeria Limited, GB Foods and Bel Papyrus). The companies jointly realised annual energy savings of around 280 million Naira.

Total investment in Energy Efficiency Measures:	330 million Naira
Annual energy savings:	280 million Naira
Payback time:	1.2 years

Table 2. Results of the 1st Energy Efficiency Network in Nigeria

By early 2020, several companies had shown interest to participate in an EEN. Based on this, additional EENs have been established to address the energy challenges being faced by manufacturing industries in Nigeria.

Participating companies will be supported with:

- Implementation of energy audit
- Training on clean energy topics and cross-cutting technologies
- Site visits to facilities of manufacturing companies in the same network
- Workshops to facilitate exchange of information and experiences among companies
- Monitoring and reporting of energy savings and emissions reduction targets.

In order to maximise the benefits of participating in an EEN, companies are expected to dedicate adequate time, nominate two energy engineers to actively participate in meetings, exhibit willingness to exchange information, periodically avail meeting rooms for workshops, grant access to their facility for site visits and be committed to investing in profitable energy efficiency.



For more information on participating in the EEN, kindly contact:

The Federal Ministry of Power

Power House

Plot 14, Zambezi Crescent, Maitama

Abuja/Nigeria

Contact: Director, Renewable Energy and Rural Power Access

Federal Ministry of Industry, Trade and Investment

Old Federal Secretariat Complex, Area 1

Abuja/Nigeria

Contact: Director, Industrial Development

Nigerian Energy Support Programme (NESP)

No 2 Dr. Clement Isong Street, Asokoro

Abuja/Nigeria

Contact: nesp@giz.de