



## **CASE STUDIES**



## LARGE PENSION FUND

### Sustainability strategy for pension fund's building portfolio

DEM is assisting one of Denmark's largest pension funds with a sustainable turnaround for their real estate portfolio\*. The aim is to create an attractive building portfolio with a reduced environmental footprint and a socially responsible profile with a stable, long-term return.

Through a holistic approach, DEM and the pension fund's real estate division have developed a sustainability strategy that encompasses the above triple bottom line. The point of departure was the existing strategy and SDG work, DGNB, UN Global Compact, and the EU Taxonomy classifying sustainable economic activities.

During the process, we zoomed in on the SDGs on the previous page as these are essential to create the desired future in a building context. For each theme, specific goals are defined, putting the SDGs into a Danish context as well as pension fund's brand, existing conditions, and future ambitions.

From the outset, operationalization and practical implementation have been key. All the strategic goals have specific measures to track progress over time. A

recurring challenge when renovating existing buildings is that the investment cost is born by the owner while the savings (e.g. energy savings due to energy efficiency measures) are obtained by the tenants. Part of the strategic advice has been to develop a financial model where the pension fund and the tenants align their interest by sharing costs and subsequent savings.

Collaboration across the value chain and ongoing sustainability management are both key to reducing the pension fund's total environmental impact while enhancing social goals such as indoor climate, communality, physical and mental health. Currently, the strategy is in a pilot implementation phase, resulting in a wealth of learnings and adaptations to the original approach.

A major insight is that ambitious and holistic sustainability goals require new ways of thinking and new ways of working for all participants in the value chain: owner, administrator, consultants, asset managers, customers (tenants), contractors, suppliers etc. This takes time but is necessary to see lasting results, and to later increase and speed up collaboration and implementation across the entire building portfolio.



**Client:** A large pension fund

**Product delivered:** Sustainability strategy

**Timeframe:** March 2021-October 2021

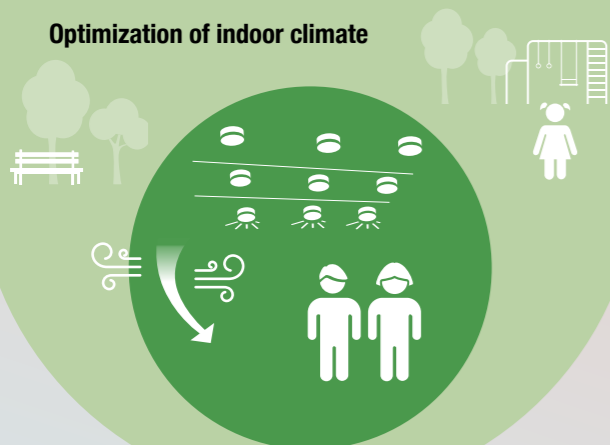
3  3.9

## REDUCE ILLNESSES AND DEATH FROM HAZARDOUS CHEMICALS AND POLLUTION

### Services provided

Sustainability targets to create the best conditions for learning and well-being by optimization of daylight, artificial light, acoustics, and ventilation while at the same time taking into consideration the total energy consumption and ensuring direct access to nature.

### Optimization of indoor climate



4  4.7

## EDUCATION FOR SUSTAINABLE DEVELOPMENT AND GLOBAL CITIZENSHIP

### Services provided

User involvement during the construction period ensures that sufficient attention is paid to the size and equipment of the teaching rooms and common areas that meet children's different needs and learning styles and that these are multi-functional and open to the public.

### User involvement



Supports children's different needs and learning styles

### Open to the public



### Rainwater collection



### Services provided

Rainwater is collected and used for irrigation.

## INCREASE WATER USE EFFICIENCY AND ENSURE FRESHWATER SUPPLIES

6  6.4



### Light wooden constructions and prefabricated wooden elements

### Services provided

Recycling of materials, focus on the consumption of resources at the construction site (water, energy, etc.). The new building will be made of light wooden constructions and prefabricated wooden elements.

## RESPONSIBLE MANAGEMENT OF CHEMICALS AND WASTE

12  12.4

# EGEDAL KOMMUNE

## Strategic partnership in Egedal Municipality

Egedal  
Kommune

In 2018, Egedal City Council adopted a 10-year investment plan, in which funds were set aside for creating innovative learning environments for children and young people. One of these initiatives is the establishment of the strategic construction partnership L:Eg (Learning Partnership Egedal), with a view to creating learning environments that are both motivating, aesthetic, and at the same time comfortable.

DEM is a partner in the Egedal Municipality Partnership and our work includes, among other things, the renovation of four elementary schools and a new daycare center (in total 43,000 m<sup>2</sup>) with a total investment of 400 million DKK.

The vision for this partnership is to agree on a mutual understanding of the form of cooperation, objectives and processes supporting a culture which keeps a constant focus on the project. This is ensured by a continued, ongoing planning of the construction process as the buildings are in operation during the renovation process.

In this project, we are working strategically with sustainability within the following four main areas: indoor climate, energy optimization, circular economy, and social sustainability. Furthermore, sustainability management is highly prioritized in this project, and key aspects are being analyzed in terms of their impact on the total economy, environmental and social parameters.

One of the selected schools in the municipality is "Balsmoseskolen", where DEM is in charge of the operational management, technical project planning,

commissioning, plumbing, ventilation, electricity, CTS and technical construction management in line with our four core areas within the SDGs: 7, 11, 13 and 17. In addition, DEM is responsible for the sustainability management during the entire project period – another good example of how DEM continuously integrates several SDGs when advising our customers.


After the renovation, each room has been equipped with CO<sub>2</sub> and temperature sensors in the ventilation system, thermostat control of the heating system, and daylight and PIR-based occupancy sensor control of the artificial light. In addition, the Trias Energetica principle has been applied based on the below design priorities:


1. Minimization of energy requirements (building envelope, windows, cold bridges, and density)
2. Maximum use of renewable energy (use of daylight, passive and active solar energy, etc.)
3. Energy efficient installations (demand-controlled ventilation with heat recovery, low temperature heating systems, water-saving fittings etc.)


Construction is based on the BR18 Low Energy Class with an expected rate of energy efficiency of 20 %, and solar cells on the roof with a yearly capacity of 12,000 kWh, corresponding to a reduction of 1.6 tonnes of CO<sub>2</sub>.



Visualization: Rubow Architects

 **Client:** Egedal Municipality, Denmark

 **Product delivered:** Consulting services including technical installations, indoor climate and energy.

 **Timeframe:** November 2021–October 2024

3  3.9

## REDUCE ILLNESSES AND DEATH FROM HAZARDOUS CHEMICALS AND POLLUTION

### Services provided

Ventilation projects have been implemented in approximately 10 housing associations i.e. 300 apartments.

### Ventilation implemented



4  4.7

## EDUCATION FOR SUSTAINABLE DEVELOPMENT AND GLOBAL CITIZENSHIP

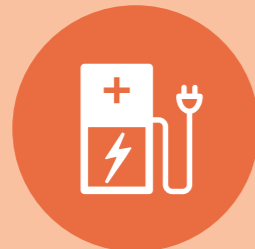
### Services provided

A series of four topic seminars on central HAPPI themes was held for residents and housing staff.



### Four topic seminars:

- Solar cells
- Electric cars
- Waste
- Climate-conscious behaviour



### Electric vehicle charging points



### Services provided

Electric vehicle charging points. Three housing associations have already established electrical vehicle charging points.

## DEVELOP SUSTAINABLE, RESILIENT AND INCLUSIVE INFRASTRUCTURES

9  9.1



### Biodiversity



### Services provided

Biodiversity was included in the strategies with an implementation period of four years.

## PROTECT BIODIVERSITY AND NATURAL HABITATS

15  15.5

# HAPPI

## Innovation Partnerships Facilitate Energy Renovation



The EU-funded project HAPPI "Social Housing Association's Energy Efficiency Process Planning and Investments" was implemented from 2018 to 2022. It has increased the energy renovation rate within the social housing sector via an exemplary action bringing together six housing associations (6,200 residents) to tackle the complex interplay of non-technological barriers (organisational, legal, financial) through process organisation and capacity building, leading ultimately to an aggregated 16.3 million Euro investment program for sustainable energy measures in their existing building stock.

With more than 160 feasibility studies/projects, the main activities have evolved around energy efficiency, renewable energy and energy management prioritizing energy saving measures, investment needs and savings in terms of energy and costs for the projects including tools for planning and executing energy optimization, sources of financial support, and training and workshops.

To ensure the sustainability and visibility of energy performance in the housing association buildings, procedures for determining baselines, monitoring procedures and performance indicators for the buildings' energy consumption were developed, and automatic data monitoring established. A major part of the project has furthermore been to build efficient partnerships between the housing associations through e.g. bundling of projects and joint tendering processes.

For the HAPPI project specifically, each housing association has developed an energy and sustainability strategy with goals that contribute to the Sonderborg

Municipality vision on CO<sub>2</sub> neutrality by 2029. Together with the energy renovations, this strategy has resulted in increased focus from residents' side, and the entire effort has contributed to making the Sonderborg region greener.

The HAPPI consortium consists of 9 innovative partners – six housing associations in Sonderborg Municipality, the educational institution EUC Syd, Sonderborg's Project Zero and DEM. DEM has been awarded the role of energy efficiency and energy management expert and has been in charge of the project management. During the process, DEM has furthermore included sustainability management which makes the HAPPI project a good example of how DEM includes several SDGs in client solutions.

Within the core of the four SDGs (7, 11, 13 and 17), the projects have installed RE equipment like solar cells, batteries and heat pumps and obtained sizeable energy savings. For EE, the annual savings are 8.9 GWh heating and 2.0 GWh electricity corresponding to a yearly CO<sub>2</sub> reduction of 1,858 tonnes. 8,070 m<sup>2</sup> of solar panels with a capacity of 1.5 MW and with 1 MWh battery capacity have been installed resulting in yearly savings of up to 1.4 GWh, and a yearly CO<sub>2</sub> reduction of 69 tonnes. Heat pumps reduce the yearly gas consumption by 437 MWh corresponding to a CO<sub>2</sub> reduction of 65 tonnes.



Photo: ProjectZero



**Client:** EU Horizon 2020:  
HAPPI project with housing associations, DK



**Product delivered:** Among other things: feasibility studies/projects, energy and sustainability strategies and innovative business models.



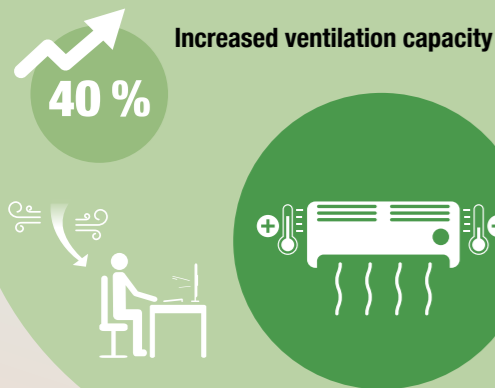
**Timeframe:** 2018-2022

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## REDUCE ILLNESSES AND DEATH FROM HAZARDOUS CHEMICALS AND POLLUTION

### Services provided

The ventilation capacity is increased by approximately 40 % corresponding to a standard reference of an office building.

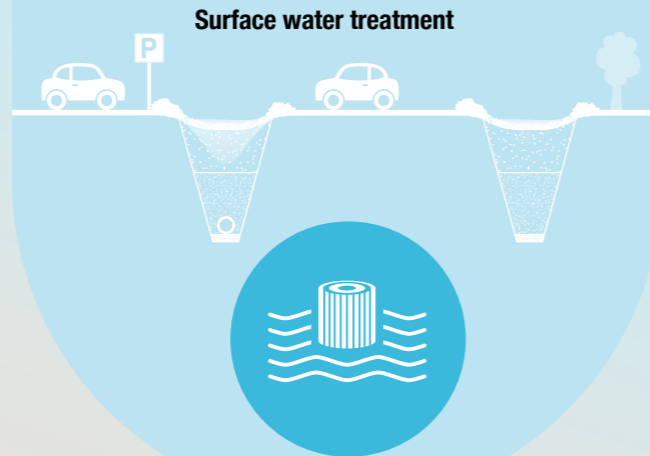


6  6.4

## INCREASE WATER USE EFFICIENCY AND ENSURE FRESHWATER SUPPLIES

### Services provided

Treatment of all the surface water takes place via a drainage system with open channels and two open basins. One of these basins functions as a cleaning basin, filtering larger impurities, if any, from the water coming from the parking areas.



# GRIBSKOV MUNICIPALITY

## Administration and Healthcare Center



In 2021, Gribskov Municipality began the construction of a new 7,700 m<sup>2</sup> administration and health care center. The focal point for the construction was to create a welcoming environment, where the municipality's work and functions are visible and where the acoustic and atmospheric indoor climate is a high priority in all aspects of the project. The administration has the necessary office space for 220 employees and common areas (functions) for citizens and staff. The healthcare center includes dental care, healthcare, rehabilitation center and is the center for home and nursing care in the municipality. The vision is a modern, innovative, and sustainable center, that embraces the citizens in the municipality and creates a safe and future-proof environment.

The project is implemented as a turnkey contract between Hoffmann, Vilhelm Lauritzen Architects, AB Clausen, and STED, and is expected to be finalized by 2023.

DEM executes all design work in relation to the technical installations and optimization of the energy consumption and indoor climate. As the construction is getting closer to completion, DEM will also be responsible for the commissioning. The technical installations pay attention to both aesthetics and functionality. The technical design includes large air exchanges via diffused ceilings, while heat pumps supplied via electricity from the solar cells contribute to low, efficient energy consumption. To ensure a fully functional and optimized building from day one after handing-over the project, a value-based commissioning process is

carried out for thorough testing of the functionality and the interaction between the technical installations.


Within DEM's core areas of sustainability i.e. SDGs 7, 11, 13 and 17, this project has specifically generated the following noticeable results:


- installation of solar cells for the supply of sustainable power to achieve a self-sufficient building
- planning with a view to obtaining DGNB gold-certification
- inclusion of a large area for local drainage of rainwater from the building.

**In relation to the reduction of CO<sub>2</sub> emissions from space heating, the measures implemented to ensure a high energy efficiency are of utmost importance to this project as the emission, according to the latest environmental declaration from Helsingør District Heating Company, is 175.5 g of CO<sub>2</sub> equivalents/kWh. This is five times higher than for instance the CO<sub>2</sub> emission measured in Copenhagen when HOFOR supplies the space heating.**

**The solar cells can produce up to 35,000 kWh/year, and with a CO<sub>2</sub> emission factor of 143 g/kWh, this will result in a reduction of 5 tonnes/year.**

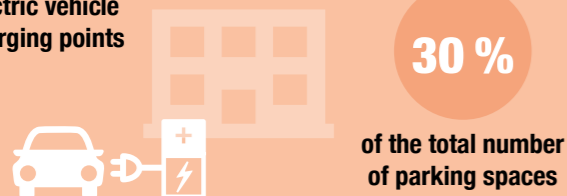


 **Client:** Gribskov Municipality, Denmark

 **Product delivered:** Consulting services including technical installations, indoor climate and energy

 **Timeframe:** 2021-2023

## Electric vehicle charging points



### Services provided

Preparation of electric vehicle charging points for approximately 30 % of the total number of parking spaces (i.e. approximately 80 parking spaces will be available for electric vehicle charging).

## DEVELOP SUSTAINABLE, RESILIENT AND INCLUSIVE INFRASTRUCTURES

9  9.1

## Waste sorting on the construction site



### Services provided

Chemicals and waste will be sorted and handled on the construction site according to a strategy agreed upon.

## RESPONSIBLE MANAGEMENT OF CHEMICALS AND WASTE

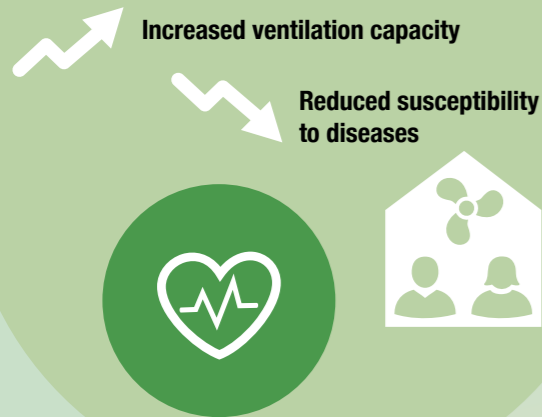
12  12.4

3  3.9

### REDUCE ILLNESSES AND DEATH FROM HAZARDOUS CHEMICALS AND POLLUTION

#### Services provided

Requirements for indoor climate may reduce diseases.

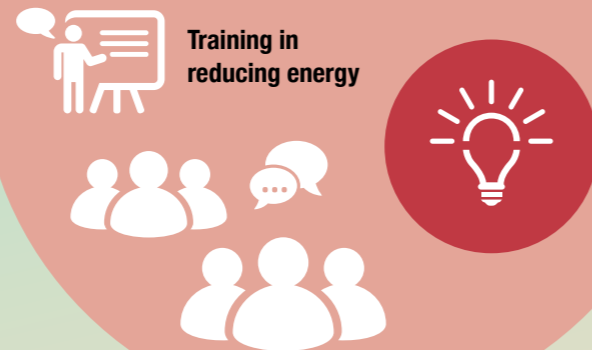


4  4.7

### EDUCATION FOR SUSTAINABLE DEVELOPMENT AND GLOBAL CITIZENSHIP

#### Services provided

Training, that potentially can contribute to a sustainable development in terms of reduced energy consumption, and consequently also reduced CO<sub>2</sub> emissions.



## NIGERIA – BUILDING ENERGY EFFICIENCY CODES (BEEC)

### Contributions to state adoption and implementation of the BEEC



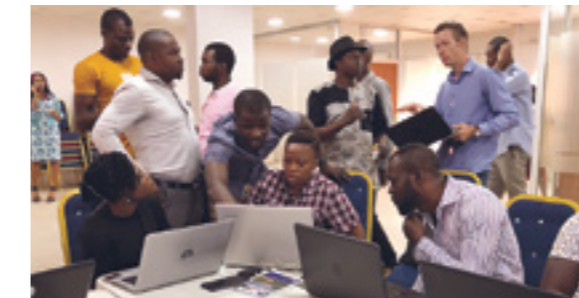
The objective of the assignment was to support the Nigerian Ministry of Power, Works and Housing (Housing Sector) in developing Building Energy Efficiency Codes (BEEC) for three selected states in Nigeria and assisting these states with the formulation of implementation strategies. The project was implemented over a period of three years and was completed in October 2021. The project was part of a National Energy Support Program (NESP) supported by GIZ – Deutsche Gesellschaft für Internationale Zusammenarbeit – and with DEM leading a consortium with Canadian Econoler as partner.


DEM was responsible for the development of a draft Building Energy Efficiency Code at state level, which included technical analysis of common building design and practices as well as for the development of an adoption process, capacity building on the practical implementation of BEEC as well as comprehensive training in performing building energy audits. Over 35 trainees were eventually certified as Professional Energy Auditors (PEAs). DEM conducted several energy audits in public buildings at federal and state level and provided support to 10 private housing developers through reviews of initial building designs to take into consideration the BEEC requirements. All these activities were to be disseminated through a communication strategy for which DEM was also responsible.


Within the four DEM core SDGs (7, 11, 13 and 17), the project has potentially resulted in an increased share of renewable energy and increased energy


efficiency by up to 30 % as a direct impact of the new Building Energy Efficiency Code. Within Sustainable Cities and Communities (SDG 11), the code should also ensure access to affordable housing and reduce CO<sub>2</sub> emission. Finally, the new code will result in future buildings being more sustainable and robust which can be seen as support to political decisions that are aligned within Climate Actions (SDG 13). The implementation of the project has been carried out in collaboration with several stakeholders and these have also engaged with each other to achieve the project objectives and thereby supporting Partnerships for the Goals (SDG 17).

Further to these impacts, the project has strived to support other SDGs such as Good Health and Well-being (SDG 3) potentially by improving the indoor climate in new buildings and thereby also reducing sickness among the households. Under Quality Education (SDG 4), the project has provided training for national practitioners that in turn will contribute to a sustainable development in terms of a reduction in energy consumption and consequently reduce CO<sub>2</sub> emissions. The training provided has also increased job opportunities and income thereby supporting Decent Work and Economic Growth (SDG 8). Finally, through this project, awareness has been increased in relation to production and demand for sustainable products thereby leading to Responsible Consumption and Production (SDG 12).



 **Client:** Deutsches Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

 **Service delivered:** Building design recommendation, capacity development, draft building codes and awareness promotion

 **Timeframe:** November 2018-September 2021

5  5.B

### PROMOTE EMPOWERMENT OF WOMEN THROUGH TECHNOLOGY

#### Services provided

In connection with the selection of candidates for the training program, priority was given to a fair gender distribution.



8  8.5

### FULL EMPLOYMENT AND DECENT WORK WITH EQUAL PAY

#### Services provided

One of the main purposes of the implemented training was to increase the employment through capacity building.



12  12.2

### RESPONSIBLE MANAGEMENT OF CHEMICALS AND WASTE

#### Services provided

A new code will ensure an increase in production and demand for sustainable products.

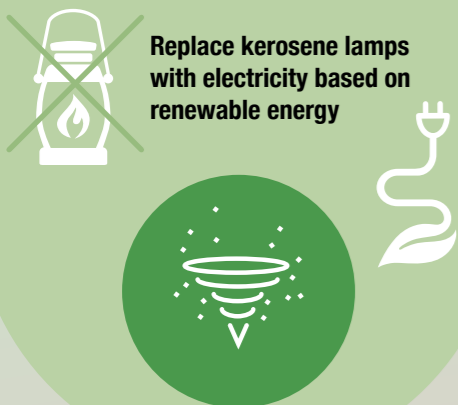


3 3.9

## REDUCE ILLNESSES AND DEATH FROM HAZARDOUS CHEMICALS AND POLLUTION

### Services provided

*Kerosene lamps, creating a poor indoor climate, are often the only light source in the villages.*



**Replace kerosene lamps with electricity based on renewable energy**

5 5.B

## PROMOTE EMPOWERMENT OF WOMEN THROUGH TECHNOLOGY

### Services provided

*The project enhances the possibilities for women to create local production.*



**Local production by women**



# INDONESIA

## Exit study of renewable energy project in Indonesia

The multi-donor program, Energising Development (EnDev\*), has supported the Indonesian Government in creating access to electricity for communities using hydro-powered and solar-powered mini-grids. The project was implemented by the German International Cooperation Agency (GIZ) in partnership with the Government of Indonesia. EnDev's activities included:

- Technical assistance and policy advice
- Capacity building through training, mentoring, and workshops
- Encouraging entrepreneurial skills for rural business owners and mini-grid managers
- Promoting a sustainable monitoring approach

DEM conducted an independent exit study two years after finalization of the project and presented two main conclusions:

- 1) EnDev left a distinct mark on the sector, and the approaches promoted in EnDev are currently used in other international programs and by EnDev's direct beneficiaries.

- 2) EnDev's support has been a relevant supplement to the sector and there are many qualitative indications of EnDev's positive impacts on the sector. Successful engagement of local communities and engagement of central and provincial governments have been key factors.

The project contributes to a range of SDGs, most notably SDG 7 about affordable and clean energy. Indonesia's geography with many small islands makes hydro-powered and solar-powered mini-grids a relevant contribution to the national policy of access to electricity to all primarily based on renewable energy.

In addition to electricity access, mini-grids also improve conditions for local production and the local economy in general, and this has also been the case in Indonesia. The main challenge for the vast majority of renewable (RE) mini-grids in Indonesia is, however, to generate enough revenue to cover long-term operation and maintenance costs, and it will require public support to ensure their long-term sustainability. These two findings are in line with DEM findings in previous mini-grid studies in developing countries, and we will build on the Indonesian findings in our future work.



Photo: EnDev / GIZ

**Client:** RVO – Netherland's Enterprise Agency

**Product delivered:** Study report and executive summary

**Timeframe:** March 2021-August 2021

8 8.2

## DIVERSIFY, INNOVATE AND UPGRADE FOR ECONOMIC PRODUCTIVITY

### Services provided

*Rural electrification is not only improving everyday life, but also paving the way for local production where electricity is required.*



**Local production potentials**

8 8.5

## FULL EMPLOYMENT AND DECENT WORK WITH EQUAL PAY

### Services provided

*Training of mini-grid managers and technical operators in managing and operating mini-grids and end user training in using electricity to increase revenues.*



**Workshops  
Mentoring  
Training**

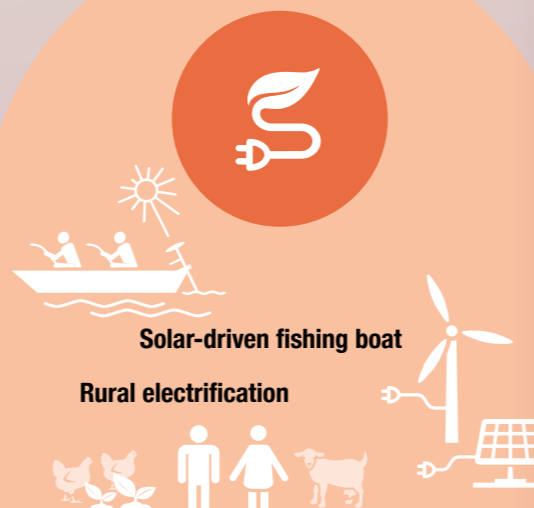
**Capacity  
building**

9 9.B

## SUPPORT DOMESTIC TECHNOLOGY DEVELOPMENT AND INDUSTRIAL DIVERSIFICATION

### Services provided

*Supported different demand-based technology development.*



**Solar-driven fishing boat**

**Rural electrification**

\* EnDev is a strategic partnership of like-minded donors and partners to support access to modern energy. Access to modern energy is a prerequisite for social and economic development. EnDev works in more than 20 countries around the globe.