

# Deep Energy Retrofit is a true catalyst for addressing the SDGs

 Aarhus, Denmark



# Kirsten Mariager - My Background

## Academic and Business Background



- BSc Civil Engineering
- Head of Sustainability Management




## DEM SDG Clients and Partners

- SDG Materiality and Cases



- SDG Management Strategy



- SDG Alignment for International Monitoring & Evaluation



# Connecting New Yorkers to a global conversation through the shared language of the SDGs



**LEARN MORE**

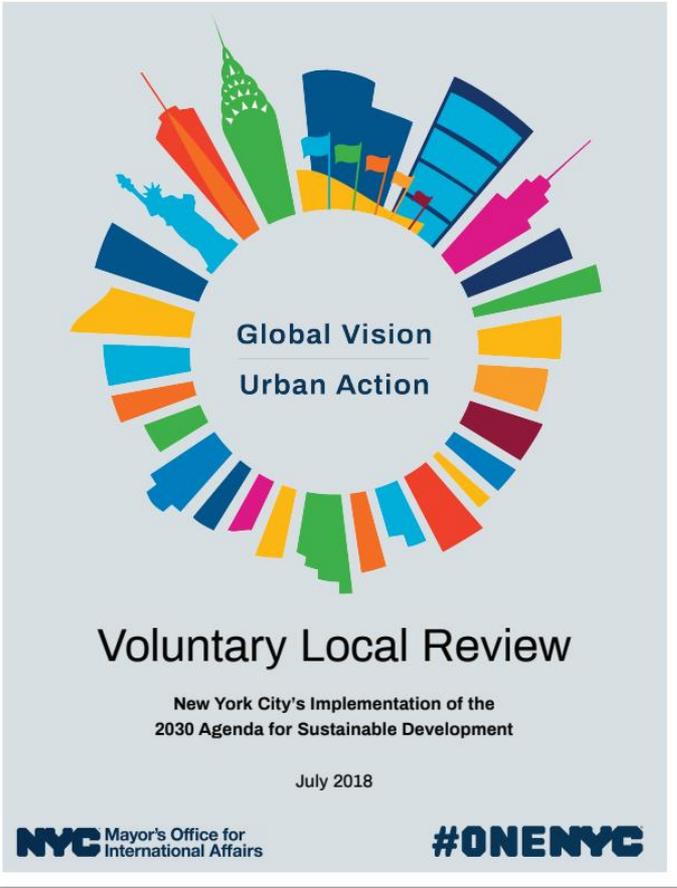
In July 2018, during the annual High-Level Political Forum at the United Nations, New York City became the first city in the world to submit a Voluntary Local Review (VLR). Part of its Global Vision | Urban Action program, the VLR is a review of New York City's local progress toward the global Sustainable Development Goals.

**NYC is First City in the World to Report to UN on Local Steps Toward Global Goals** ▶

Source: NYC Mayors Office of International Affairs



# The voluntary review describes the city's progress toward the five SDGs the UN prioritized this year:



**SDG 6:**  
**Ensure availability and sustainable management of water and sanitation for all**



**SDG 7:**  
**Ensure access to affordable, reliable, sustainable, and modern energy for all**



**SDG 11:**  
**Make cities and human settlements inclusive, safe, resilient and sustainable**



**SDG 12:**  
**Ensure sustainable consumption and production patterns**



**SDG 15:**  
**Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**



# For each SDG, the NYC Mayor’s Office for Operations has included top-line OneNYC indicators



Each goal provides a sampling of *specific indicators, a description, and the source to demonstrate* how the City monitors both operational performance and progress toward its goals.



**SDG 7:**  
**Ensure access to affordable, reliable, sustainable, and modern energy for all**

**Top-line OneNYC indicators:**

- Greenhouse gas emissions reductions relative to 2005
- Vision 4 indicators, which are related to resiliency

<b>Example:</b>	<b>Indicator name:</b>	<b>Annual energy retrofit/conservation projects completed</b>
	<b>Description:</b>	The annual number of energy retrofit, solar thermal and co-generation projects installed and operational within or on City structures in a given fiscal year.
	<b>Source:</b>	<i>DCAS Energy Management.</i>



# DEM has a strategic focus on Sustainability

## OUR VISION

Based on a passion for energy, we strive to build a future where energy is applied efficiently and sustainably in an affordable way.

## OUR VALUES

Our values are most directly linked to four of the 17 UN Sustainable Development Goals, namely 7 – Clean Energy, 11 – Sustainable Cities, 13 – Climate Action and 17 – Partnerships:



Our motivation to provide **sustainable energy** services when and where they are needed, increasing energy efficiency and the share of renewable energy in the global energy mix.



Our commitment to strengthening peoples living conditions and contributing to the creation of **sustainable cities** and communities.



Our ability to be creative and adaptable, combating **climate** change and meeting customer needs with innovative solutions.



Our willingness and desire to foster cooperation and mutual trust within all of our **partnerships**, maintaining a high standard of social responsibility and business ethics in a transparent manner.



# The SDGs have provided the foundation for business model innovation and new services on the market

- We have chosen to work actively with the 17 Goals in the **revision of our strategy plan** and have considered what incorporating these goals mean for our business.
- Today, the SDGs are used in our business to:
  - ✓ stimulate product and service innovation
  - ✓ identify and develop new market segments
  - ✓ strengthen foresight management / compliance
  - ✓ increase sales
  - ✓ strengthen our brand
  - ✓ improve operational efficiency
  - ✓ establish a common framework for our daily work



# DEMs SDG service model on the market



Our model offers a way to implement, measure, and report on progress being made towards sustainable development as an integrated part of your business strategy.

- SDG Business Strategy
- SDG Materiality Screening/Assessment
- SDG SMART Indicator (KPI) Identification
- SDG Impact Tracking Cases/ Reports
- SDG Measurement System
- SDG Training & Education Workshops



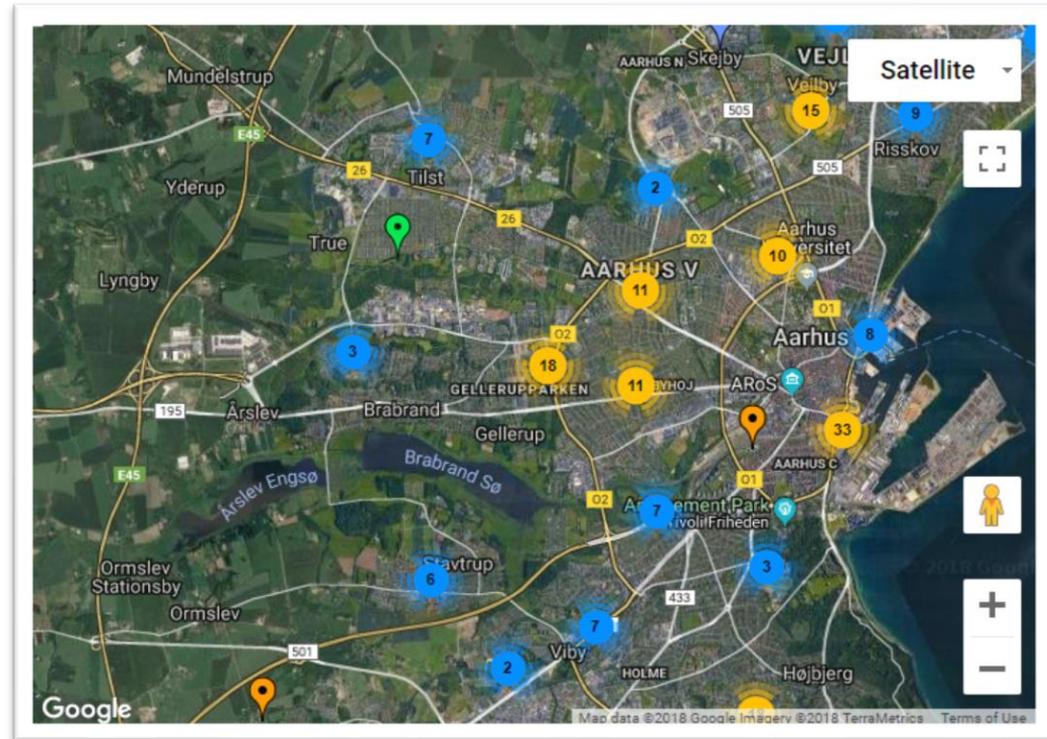
# CASE: Deep Energy Retrofit project in the City of Aarhus, Denmark

*“Our vision is a CO<sub>2</sub>-neutral city by 2030, as a step along the way towards the fossil-free society”*



# CASE: Deep Energy Retrofit project City of Aarhus, Denmark

The City of Aarhus invests USD 69 mio. in Deep Energy Retrofit to achieve 30% CO<sub>2</sub> reduction in 15 mio. ft<sup>2</sup> of buildings (650 buildings).



Pre-analysis

City council

Planning

Analysis and implementation of EE & PV

Energy management

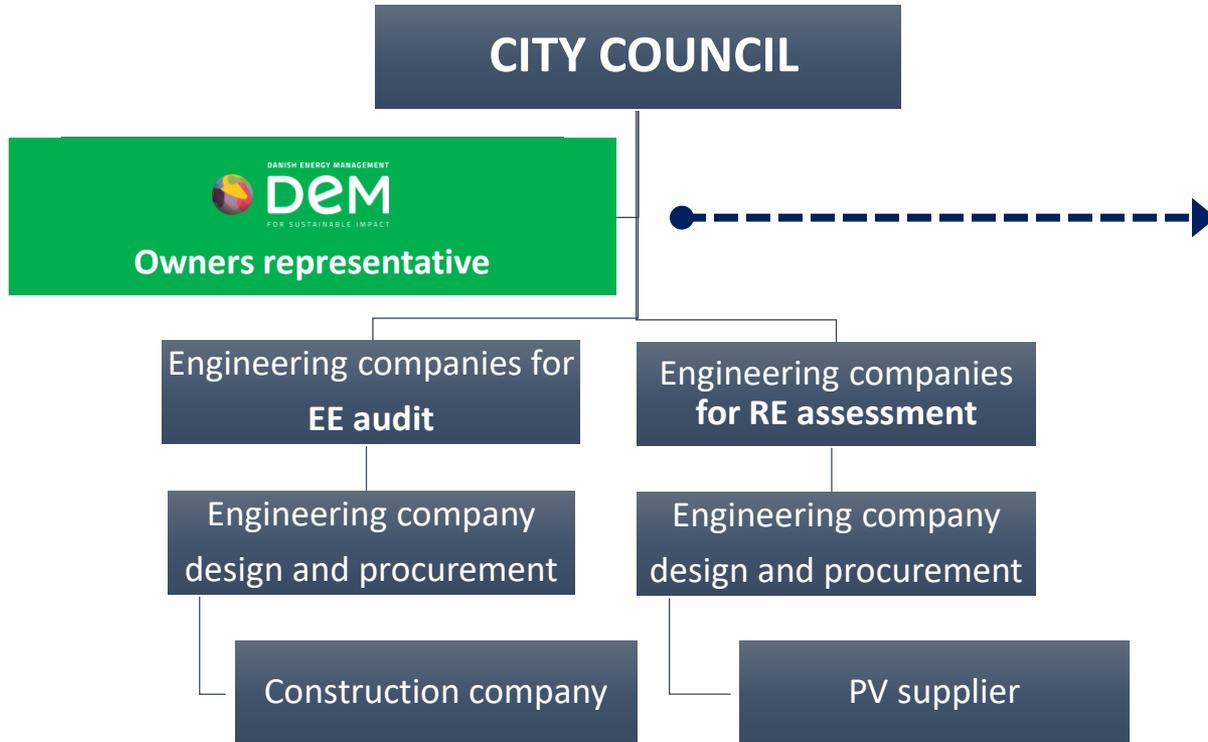
2011-2013

2013

2014-2018

2019-2034

# DEMs role as the Aa+ Owners Representative



1. Process planning
2. Project Management
3. Tendering
4. Implementation
5. Solar PV
6. Commissioning
7. Capacity development
8. Communications
9. Energy management



# Measuring sustainable impact of: The Design and installation of Solar PV plants

- 22 buildings/PV plants (schools)
- Total installed capacity 1406 kWp
- Mono crystalline PV cells



# DEMs Online SDG Measurement System - track and report on progress towards the SDGs following UN standards.



Danish Energy Management & Esbensen

### Projects

Upload Projects

Show user projects Show all projects

Macrosynergy Project Number	Items	Start date	End date	Last editor	Reporting	Total Contract Fee (DKK)	Project Manager
124	PCI contract	05/01/2015	31/12/2017	21490217	Red	0	JNY
1114	Boligfællesskab B&2	05/03/2013	30/06/2016	10490217	OK	1.132.225	TE
13010	Screening Søstøjer F&E	01/01/2013	33/04/2016	20082017	OK	606.206	PLT

Danish Energy Management & Esbensen

### Edit Project Details

Macrosynergy Project Number: 13020

Name: Depragøst Museum

Start date: 28-05-2015

End date: 30-11-2016

Budget hours: 0,00

Budget cost price hours - DEM: 176,300

Total Contract Fee - DKK: 352,200

Country of association:

Check if the numbers are correct. If not: Correct them in Macrosynergy and contact Mikkel Lomholt for further help.

All DEM ESG use information between necessity (planned) and implementation (actually built) projects.

- Feasibility (planned) projects include: initial audits, feasibility studies, general analysis, initial estimates, etc. For infrastructure projects this includes energy audits, energy studies, etc.
- Implementation (actually built) projects include: producing heat projects with renewable energy or energy efficiency projects, where it is known with relative certainty that they will be realized. This includes aware energy saving projects.

Danish Energy Management & Esbensen

### Project Indicators

Project: Hadsjergvej - Totarrådgivning (Etbæk A&M)

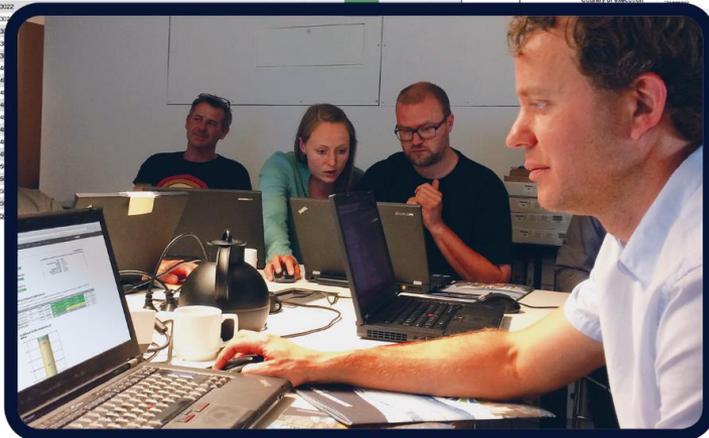
Back to project front page

Save

These are the DEM-ESB indicators that have been selected for this type of project.

#### Affordable and Clean Energy

Goal	Indicator number	Indicator description	Examples and dev
Target: 7.2 Increase share of renewable energy globally			
7	7.2.a	Increase in kWh renewable energy production, thermal and electricity (Enx)	Projects contain only efficiency, e.g. solar. The indicator 7.2.a, if the project contain must be selected an
7	7.2.b	Number of renewable energy plants included in the project (Enx)	Projects contain ren



Danish Energy Management Project list Hello, KMA Log off English

## Sustainable Development at Danish Energy Management

To see the list of your projects press the Projects button

Projects



# Selection of relevant project SDG indicators for SDG 7

## Project Indicators

Project: Solcelleprojekt 2014+2015 - Hovedsag

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[Save](#)

These are the DEM-ESB indicators that have been selected for this type of project.



### Affordable and Clean Energy

Goal	Indicator number	Indicator description	Examples and clarification	Check if relevant
▼ Target: 7.2 Increase share of renewable energy globally				
	7.2.a	Increase in kWh renewable energy production, thermal and electricity (Env.)	Projects contain only renewable energy production and not improved energy efficiency, e.g. solar PV or heat pumps.  <u>The indicators 7.2.a and 7.3.a cannot be selected at the same time.</u>  If the project contains both energy efficiency and renewable energy indicator 7.3.a must be selected and renewable energy production is then considered as a saving.	<input checked="" type="checkbox"/>
	7.2.b	Number of renewable energy plants included in the project (Env.)	Projects contain renewable energy production, e.g. solar PV or heat pumps.	<input checked="" type="checkbox"/>
▼ Target: 7.3 Double the rate of improvement in energy efficiency				
	7.3.a	Number of kWh saved through improved energy efficiency, thermal and electricity (Env.)	Projects typically contain city master plans, renovation or new build.  Project ex: FredericiaC and Regional Hospital Horsens.  <u>The indicators 7.2.a and 7.3.a cannot be selected at the same time.</u>  If the project contains both energy efficiency and renewable energy indicator 7.3.a	<input type="checkbox"/>



# Selection of relevant project SDG indicators for SDG 13



## Climate Action

Goal	Indicator number	Indicator description	Examples and clarification	Check if relevant
▼ Target: 13.1 Strengthen resilience and adaptive capacity to climate-related hazards				
	13.1.a	CO2 savings as a result of renewable energy production (Env.)	<p>Projects contain only renewable energy, and not improved energy efficiency, e.g. solar PV or heat pump projects.</p> <p>Renewable energy projects with separate project number.</p> <p><u>The indicators 13.1.a and 13.1.b cannot be selected at the same time.</u></p>	<input checked="" type="checkbox"/>
	13.1.b	CO2 savings as a result of improved Energy Efficiency (Env) in energy renovation- or new build projects	<p>Projects contain renovation or new build.</p> <p>Renewable energy production is considered as an energy saving.</p> <p>Project ex: Sydenergi and Regional Hospital Horsens.</p> <p><u>The indicators 13.1.a and 13.1.b cannot be selected at the same time.</u></p>	<input type="checkbox"/>



# Project values inserted for the relevant project SDG indicators

Project Report

Reporting Period 1/05/2015 - 30/04/2016  
Approved True

[Back to project front page](#)

[Export report to Word](#)

## Indicator values which has reached project completion

Enter the project's total contribution (best guess) and optional comment to the entered number in the period.

Some of the figures may not be relevant and thus no number or comment should be entered.



7.2.a Increase in kWh renewable energy production, thermal and electricity (Env.)

Description	Guidelines	Number	Comment
Number of implementation projects	In Denmark number of projects = 1. For international projects e.g. M&E can evaluate multiple projects.	1	<a href="#">Enter comment</a>
Number of kWh renewable energy, electricity or heat, produced during the plants lifetime	Calculated over lifetime (e.g. DK Solar PV = 25 yrs., DK heat pump = 20 yrs.). For danish projects the value is imported from the calculation module. For international projects state the used lifetime in the comment box.	35315625	<a href="#">Enter comment</a>



# Project values inserted for the relevant project SDG indicators and CO<sub>2</sub> savings are calculated



## 7.2.b Number of renewable energy plants included in the project (Env.)

Description	Guidelines	Number	Comment
Number of solar PV plants		22	Enter comment
Number of solar thermal plants		0	Enter comment
Number of Wind plants	There can be several wind mills ind one wind plant.	0	Enter comment
Number of Biomass plants		Enter number	Enter comment
Number of Hydro plants		Enter number	Enter comment
Number of other plants	Please include description of plant type in comment box.	Enter number	Enter comment



## 13.1.a CO<sub>2</sub> savings as a result of renewable energy production (Env.)

Description	Guidelines	Number	Comment
Number of ton CO <sub>2</sub> saved	<p>Calculated over lifetime ( eg. DK Solar PV = 25 yrs, heat pump = 20 yrs.)</p> <p>For danish projects the value is imported from the calculation module.</p> <p>For international projects state the used CO<sub>2</sub> emission and the source in the comment box</p>	6004	Enter comment

# Summary of project data

## Project data

### Project

[Back to project front page](#)

E-13 Projektleidelse - ATR 1.0 Aa+ Energireno. Aarhus

Kommune

Project Total Hours 264

Period 2015/2016

Period Hours 264

Actual installed effect of the plant [kWp] 1406  
Electricity production during lifetime [kWh] 35315625

### Calculated results - Annual Employee Contribution

CO2 Reduction [tCO2] 6,004  
Production 35,315,625

### Calculated results - Project Lifetime Total

CO2 Reduction [tCO2/lifetime] 6,004  
Production [kWh/lifetime] 35,315,625



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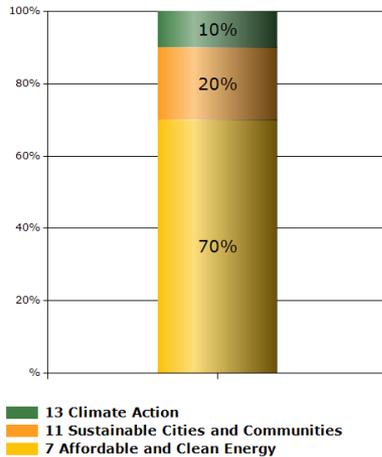


# Results are exported to MS word and can be copied into reports and presentations

The result is a **graphic representation** of project contribution to selected SDGs, Targets and SMART Indicators.

This is a powerful tool for **reaching a wide range of stakeholders** with specific key figures.

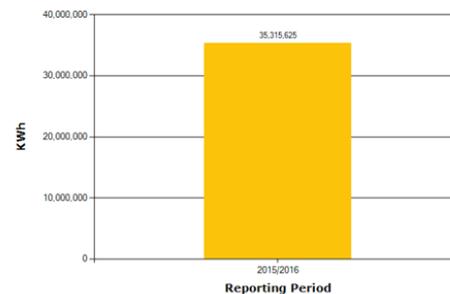
**Distribution of 264 worked hours in SDG's**



1 implementation project with renewable energy is planned.

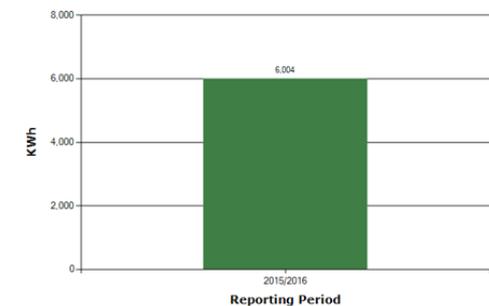
35,315,625 kWh renewable energy production is planned.

**Annual contribution to renewable energy production**



CO2 saving of 6,004 ton is planned.

**Annual contribution to CO2 saving**



# Visual communication – Project SDG cases

## Aa+: BUILDING ENERGY RENOVATION

### Sustainability Measurement

#### Renewable Energy

21 = 35

Increased heat & electricity from renewable energy

#### Energy Efficiency

124 = 3,168

Equivalent to 3,168 households' energy

#### Renovated Buildings

Based on sustainable energy design

235

#### Climate Resilience

6,004 tons CO<sub>2</sub> savings, Renewable Energy\*

45,702 tons CO<sub>2</sub> reduction, Energy Efficiency\*

\*Calculated over a 25 year lifetime

Services provided

- 360° process planning
- Holistic assessment of energy efficiency and renewable energy investment potential

Services provided

- Advising on energy efficiency procurement
- Performing energy audits and feasibility studies
- Providing energy management

Services provided

- Development of information and communication strategies
- Training and capacity building

Services provided

- Implementation of renewable energy and energy efficiency solutions as an integral part of the project

Properties: 650  
(kindergartens, schools, administrative building, etc.)

Time frame: 2013-2019

Client: Aarhus Municipality  
(2nd largest city in Denmark)

M<sup>2</sup>: 1,400,000

## Sustainability Management

Aarhus Municipality is investing 450 million Danish kroner to achieve a CO<sub>2</sub> reduction of 40 percent in municipal buildings. This will be accomplished by conducting energy renovation for a building area of 1.4 million square meters. With such a large amount of energy savings, the payback time for this large investment cost will be 15 years.

Danish Energy Management & Esbensen is providing a wide range of services that take user's experiences and needs into consideration while conducting e.g. energy audits and feasibility studies. Because there are rarely two buildings that function in exactly the same way, energy renovation is tailored to the needs of the users, incorporating their experiences, and providing plans which provide better indoor climate and better overall building condition. Incorporating energy management strategies into energy renovation projects like Aa+ helps to ensure return on investment, and helps to create a more conscientious and sustainable society at large. Another major aspect of this project that provides both sustainability and return on investment is the building-integrated design and installation of solar panels, which contribute with buildings' own energy production.



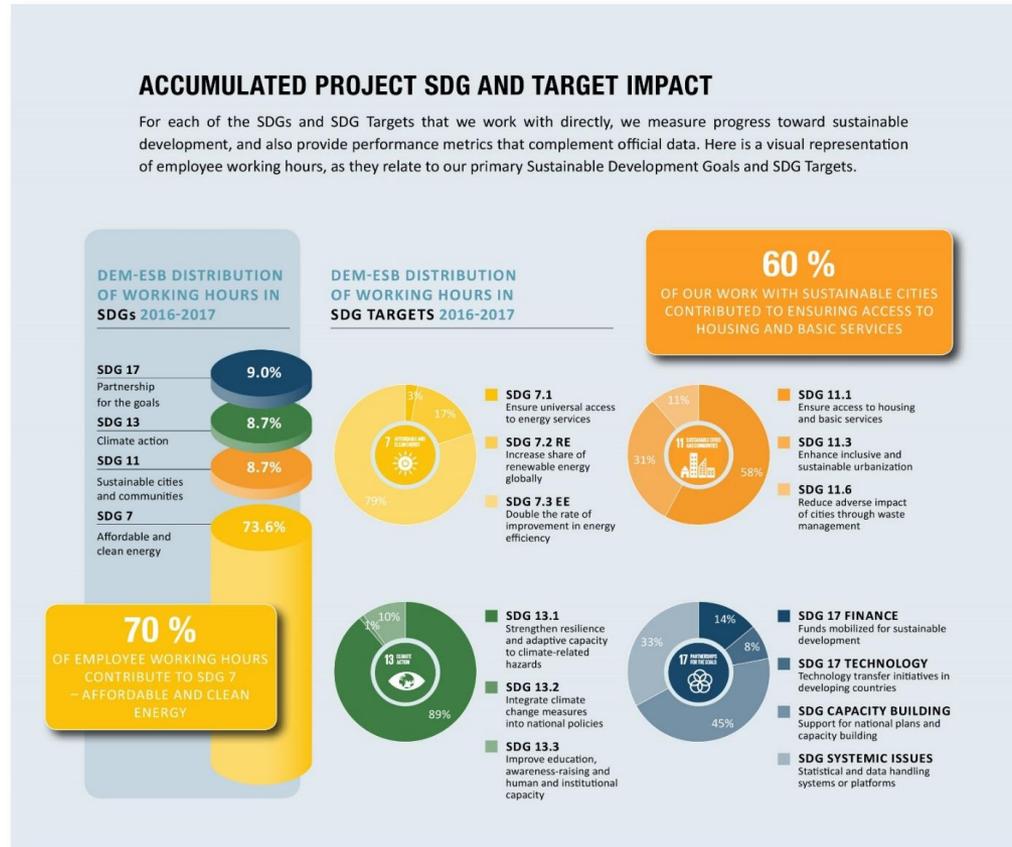




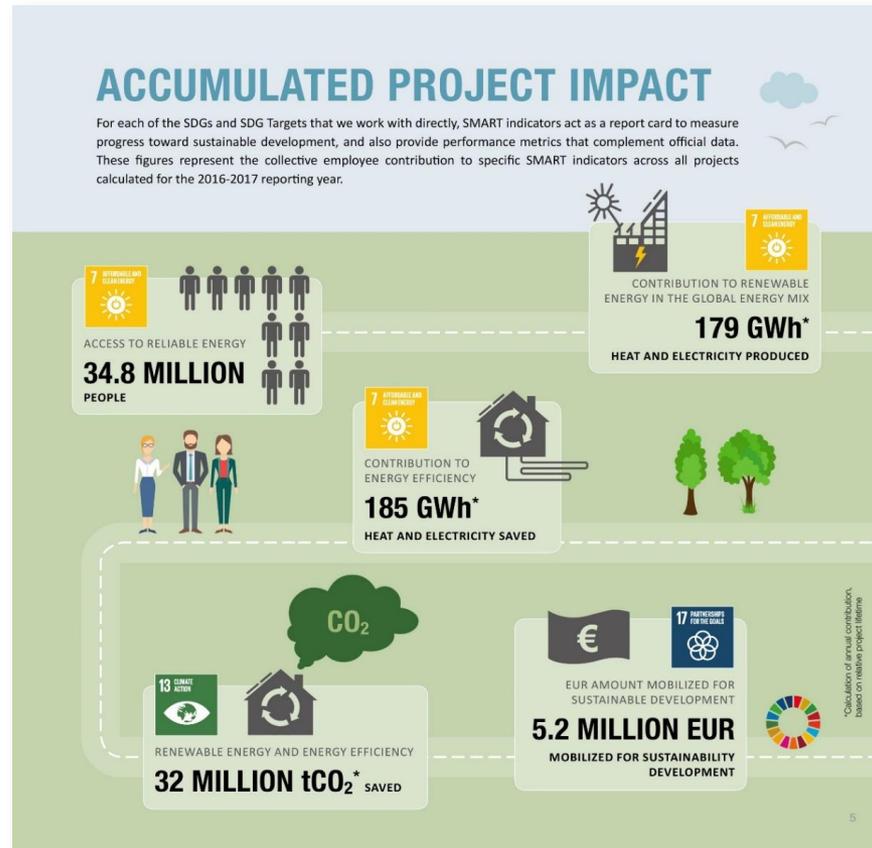
"Energy renovation is tailored to user needs and experiences, ensuring plans that provide better overall building condition."



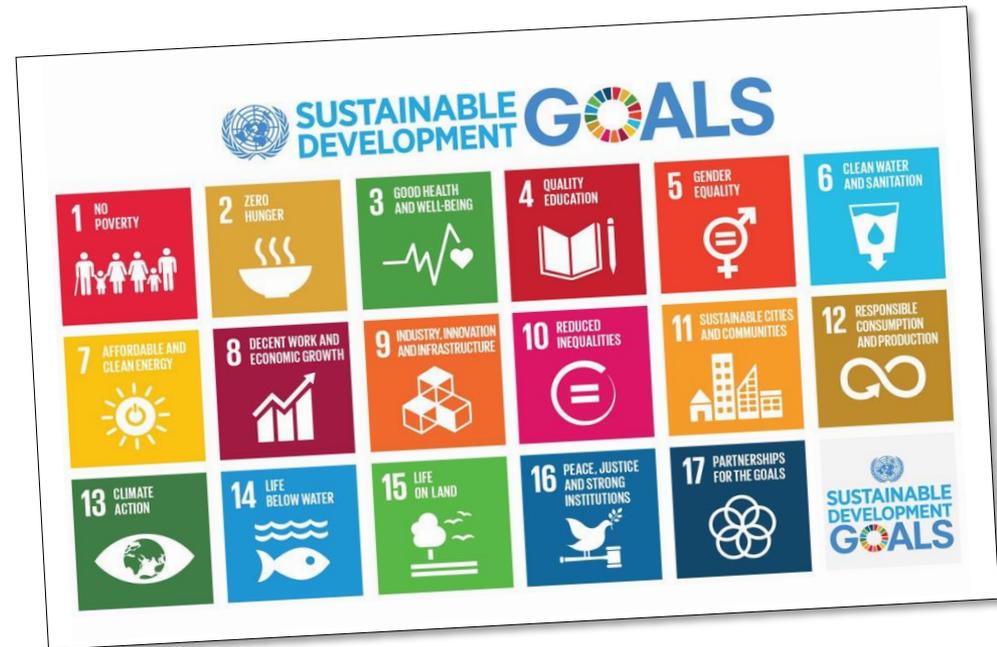
# Progress towards sustainable development is measured



# Annual sustainability impact reports



Thank you!



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