

# Energy Efficiency e-training for

# East-African Municipalities

16th March 2021

Gabriela Prata Dias



# UNEP DTU Partnership and the Copenhagen Center on Energy Efficiency



Support developing countries in their efforts  
to progress towards climate resilient low carbon societies

## UN Environment Programme of Work



### CLIMATE PLANNING AND POLICY

Better  
National Planning



### CLIMATE TRANSPARENCY AND ACCOUNTABILITY

Higher  
Accountability



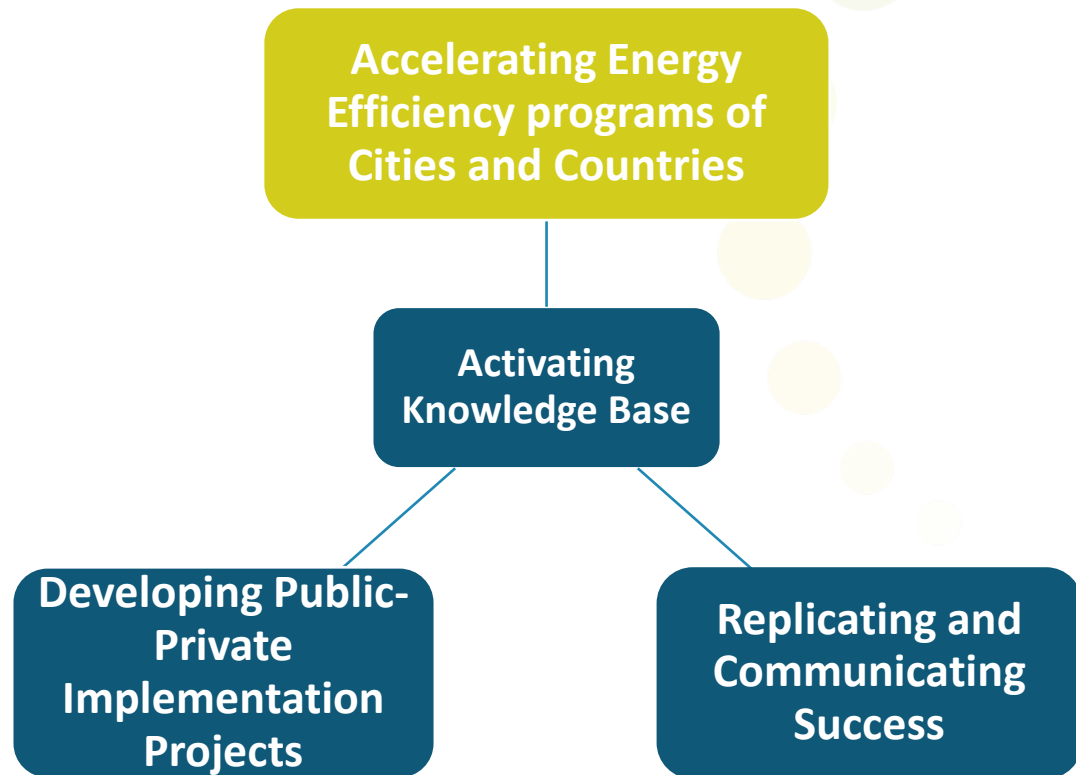
### BUSINESS MODELS AND MARKETS

Stronger Market Models

Capacity Building

Research and Analysis

# The Copenhagen Center on Energy Efficiency



# Sustainable Development Goals



# Targets and metrics to 2030

TARGET 7-1



UNIVERSAL ACCESS TO  
MODERN ENERGY

TARGET 7-2



INCREASE GLOBAL  
PERCENTAGE OF  
RENEWABLE ENERGY

TARGET 7-3



DOUBLE THE  
IMPROVEMENT IN  
ENERGY EFFICIENCY

TARGET 7-A



PROMOTE ACCESS TO  
RESEARCH,  
TECHNOLOGY AND  
INVESTMENTS IN  
CLEAN ENERGY

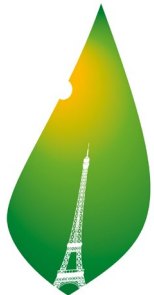
TARGET 7-B



EXPAND AND UPGRADE  
ENERGY SERVICES FOR  
DEVELOPING  
COUNTRIES



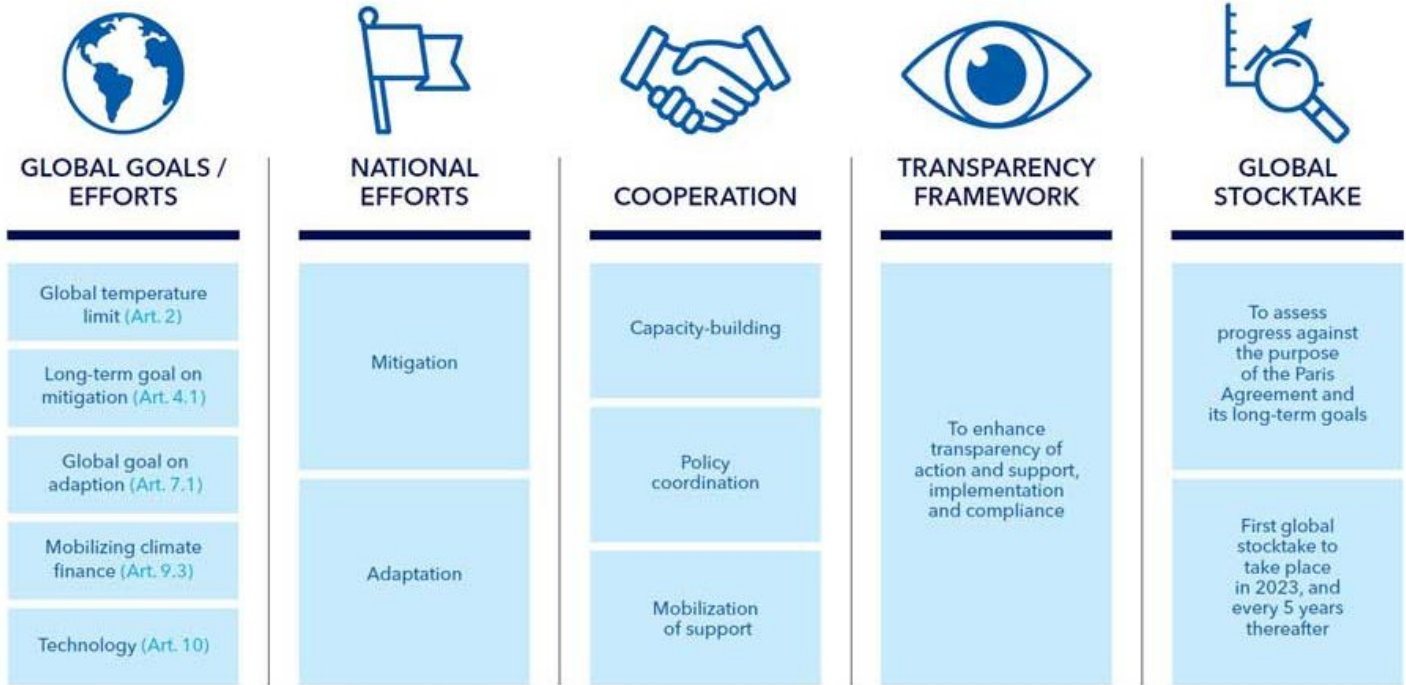
# The Paris Climate Agreement



COP21 • CMP11

**PARIS 2015**

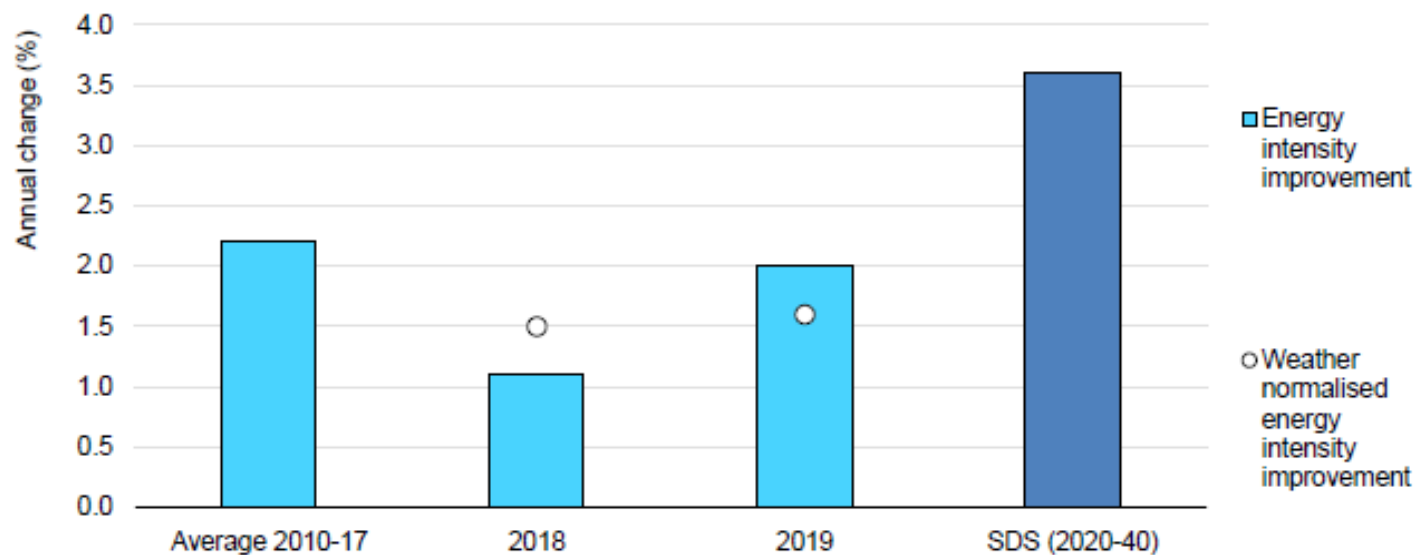
UN CLIMATE CHANGE CONFERENCE



Redrawn by DNV GL from: Lemmen, D. (2016) UNFCCC Adaptation Committee: 3rd Adaptation Forum, Adaptation Futures 2016.



**Figure 1.1** Average annual change in primary energy intensity improvement, historically and in the IEA Sustainable Development Scenario

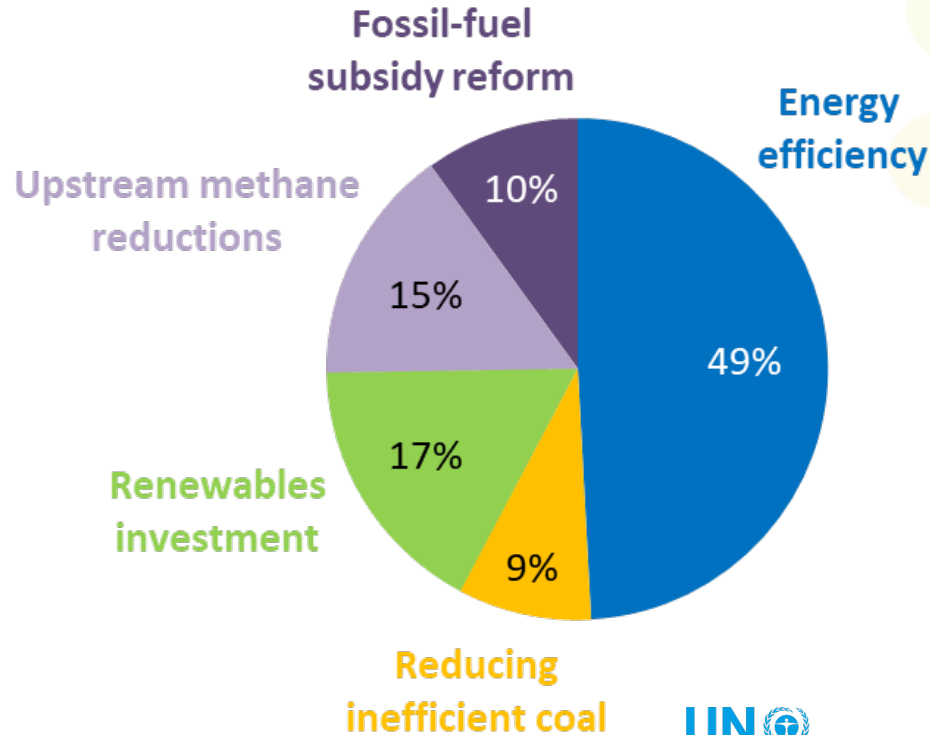


IEA 2020. All rights reserved.

Note: SDS = IEA Sustainable Development Scenario.

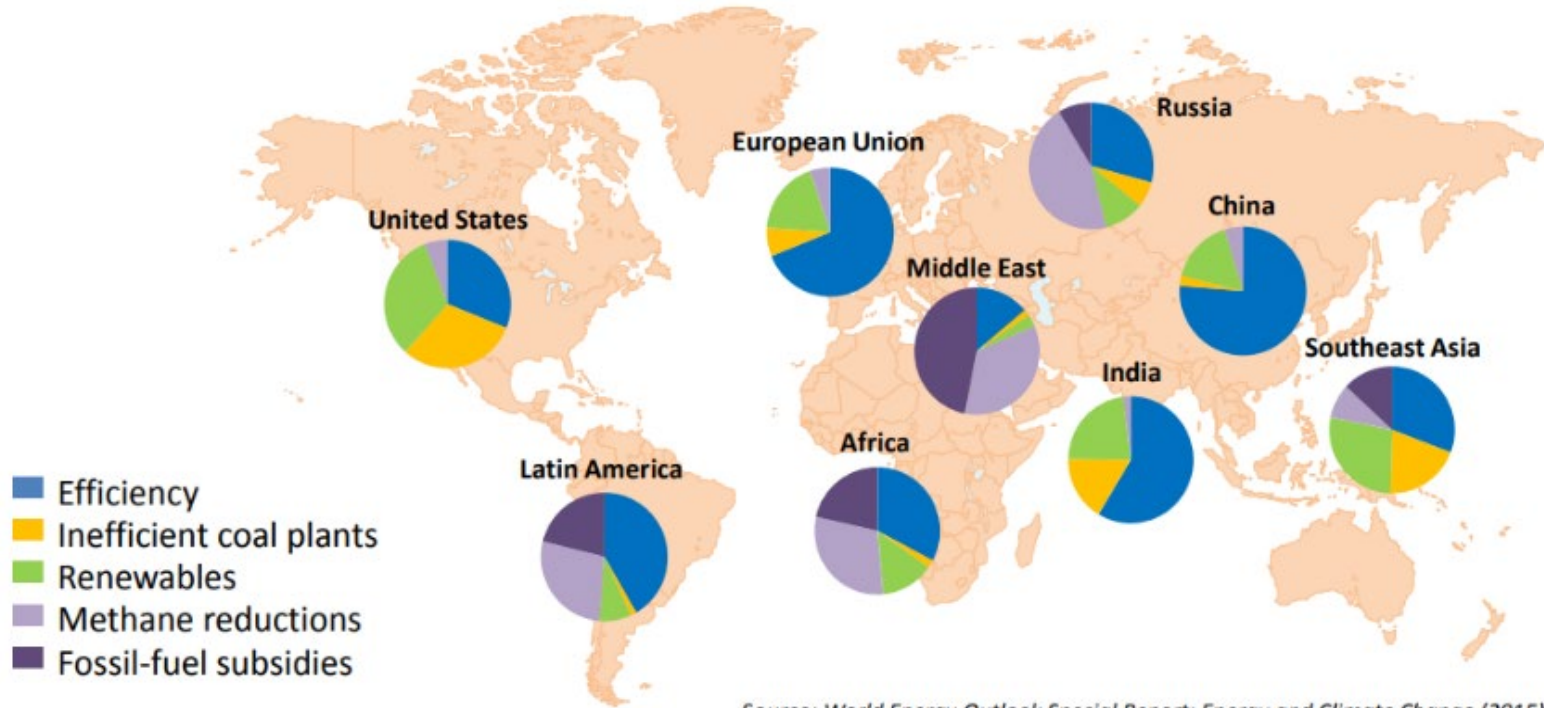
Source: IEA, [Global Energy Review 2019](#).

# Emissions savings by 2030





# Emissions savings by measure by region, 2030



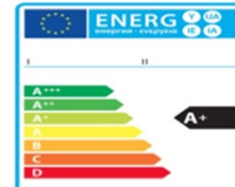
Source: World Energy Outlook Special Report: Energy and Climate Change (2015).

# Primary Energy Sources

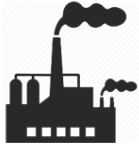
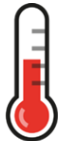
Conventional

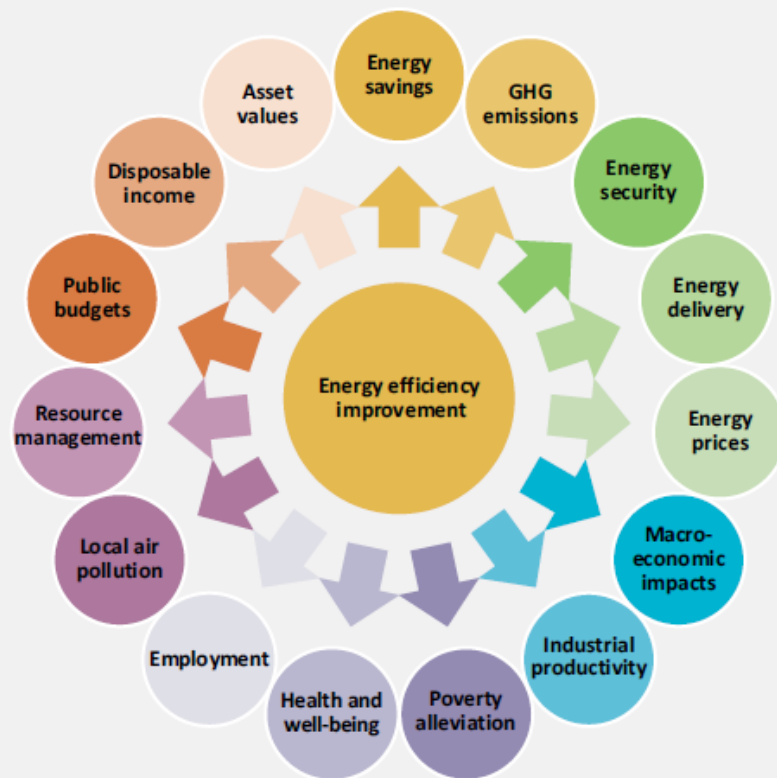


Non-conventional



# Final Energy





Note: This list is not exhaustive, but represents some of the most prominent benefits of energy efficiency identified to date.  
Source: Unless otherwise noted, all material in figures and tables in this chapter derives from IEA data and analysis.

# Motivations for Energy Efficiency

Pollution and  
Health



Refrigerants  
and Global  
Warming



GHG  
Reduction  
Objectives



Efficiency  
and  
innovation



Reduction of  
stress on  
electricity  
Grids



Reduce  
dependence  
on fossil  
fuels



# Opportunities EE offer in the Pandemic context



Improve health condition



Job creation



Economic Development



Labour intensive



Quick projects



Local supply chains & Competitiveness



Affordable energy



Reduce emissions

# How to implement Energy Efficiency

Information and capacity

Enabling Frameworks (ESCOs)

Financial and Fiscal Incentives

Specific Energy Efficiency Regulation

Cost Reflexive Prices of Energy

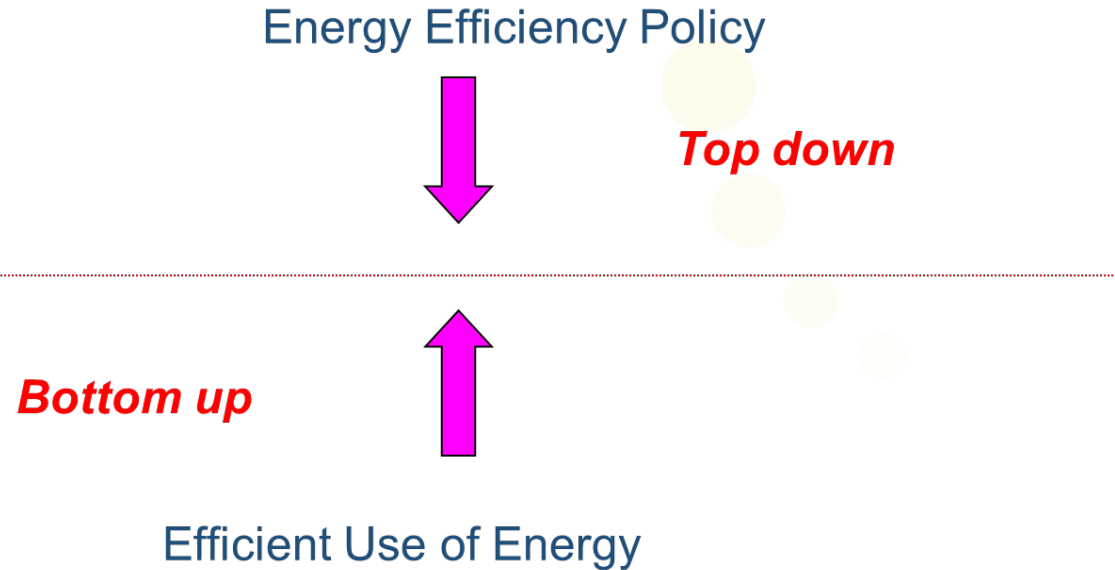
Energy Sector Reform

Institutional Configuration

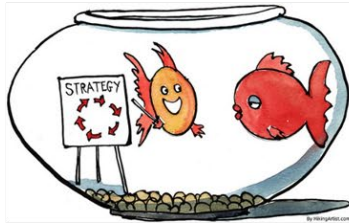
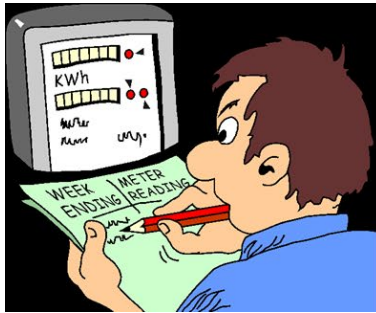
Energy Efficiency Policy and Legislation



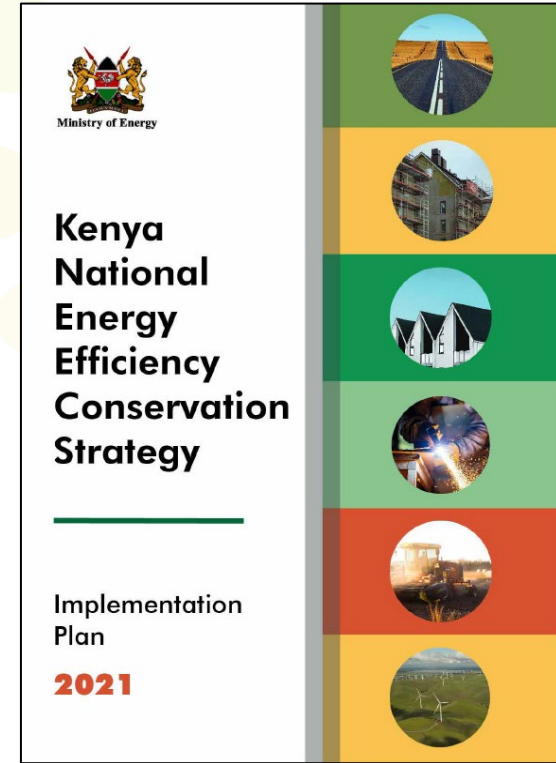
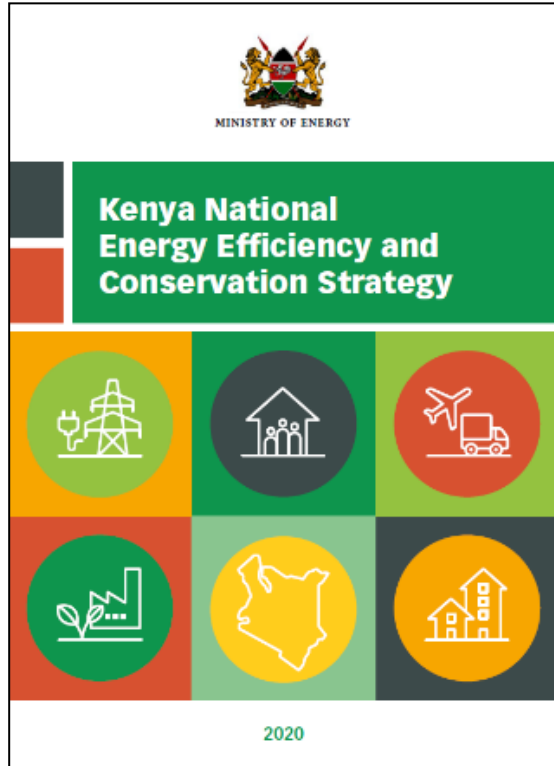
# How to implement energy efficiency



# How to prepare energy efficiency interventions



# Example of Top-down approach



# Which are the gaps at local level?



Lack of local capacity



Lack of data



Design bankable projects



Bridging the gap between the regulatory level and ground level



Long-term support to local authorities



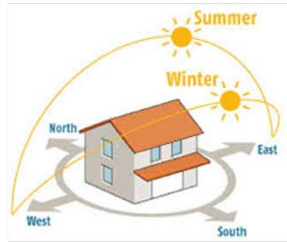
Communication and awareness raising



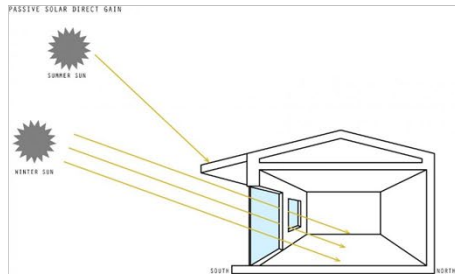
Standardisation and transferability

# Energy efficiency in buildings

## Design, position and orientation



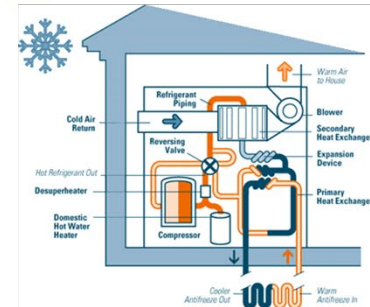
## Passive solar systems and solar protection



## Thermal characteristics of the building

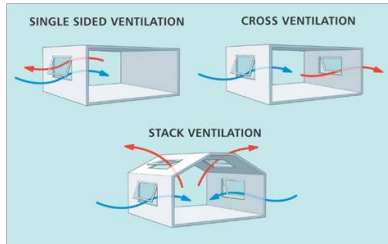


## Heating, cooling and domestic hot water

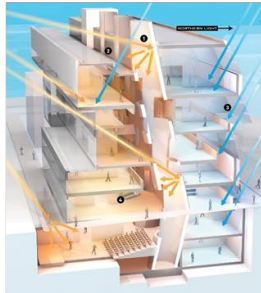


# Energy efficiency in buildings

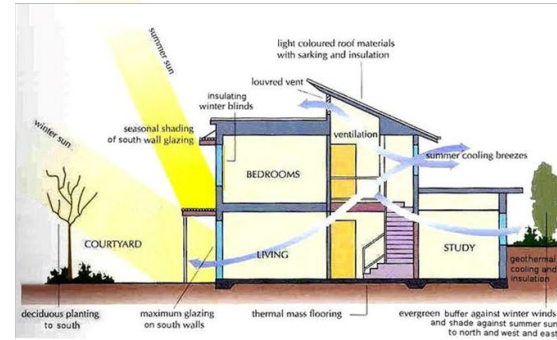
## Natural ventilation Strategies



## Maximizing natural light



## Internal climatic conditions



## Mechanical installations





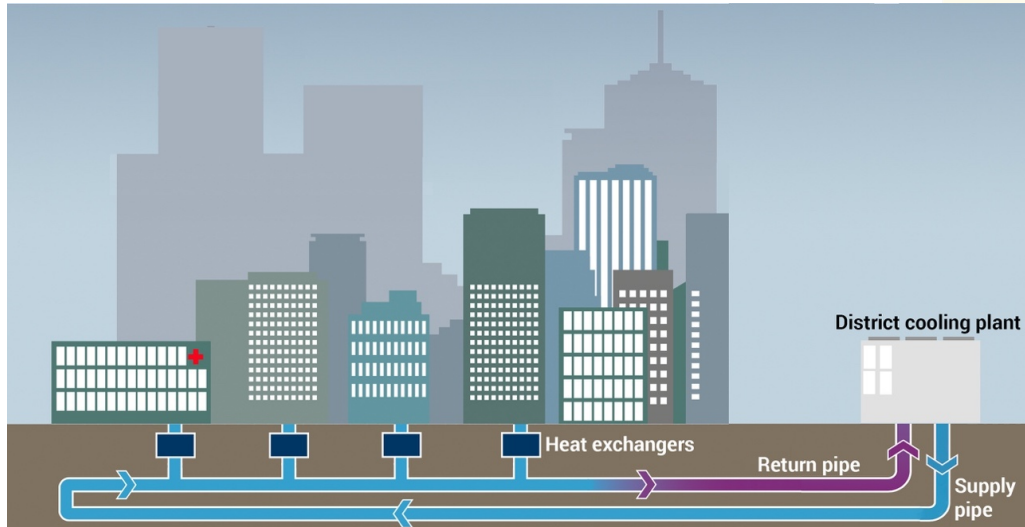
# The increased pressure on cooling





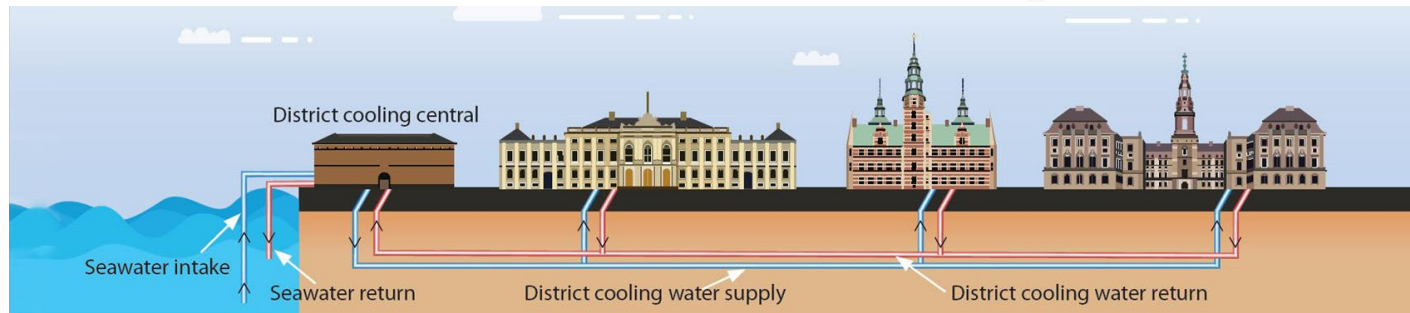
# District cooling

Cities represent more than 70% of the global energy demand and are on average 5 to 9 °C hotter than the rural areas



- Reduces the need of electricity for cooling
- Help shift demand to valley hours
- Reduces refrigerant emissions (HFC, CFC) up to 100%
- Reduces CO<sub>2</sub> emissions
- Reduces the cooling cost for final consumer
- Reduces the heat island effect in cities
- Low consumption of drinking water for cooling purposes

# Sustainable district cooling



# Integration of renewables



# Opportunities in street lighting

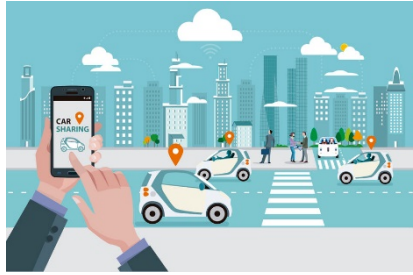




# Addressing transport and mobility



# Addressing Transport and mobility



# Water-energy-food nexus





# Our tools...



Street lighting rapid assessment online tool + Financial Tool



Water supply systems rapid assessment online tool



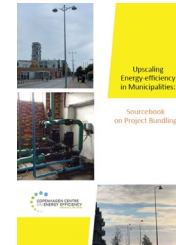
District Cooling rapid assessment online tool



Buildings database set & rapid assessment online tool




City Guides for EE implementation at local level



# Street lighting tools

Street Lighting Energy Efficiency

c2e2.unepdtu.org/kms\_object/street-lighting-energy-efficiency-calculator



## STREET LIGHTING

Energy efficiency calculator

COPENHAGEN CENTRE ON ENERGY EFFICIENCY  
U4E UNITED FOR EFFICIENCY

English

**BASIC INFORMATION**

First name

Surname

Job title

E-mail

Municipality

Country

Street Lighting Financing Tool (SLFT)

One of the main barriers to the implementation of energy efficiency projects is finding a suitable business model to finance them. The C2E2 has developed a Street Lighting Financing Tool (SLFT) so that municipalities can find out the most suitable financing scheme for their Street Lighting project.

The tool consists of a set of "Yes" or "No" qualitative questions which guides the user to the best solution for their case, providing all the information needed to respond and offering a description of the recommended model.

[Download Street Lighting Financing Tool \(SLFT\)](#)

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Sector: Lighting

Country / Region: Global

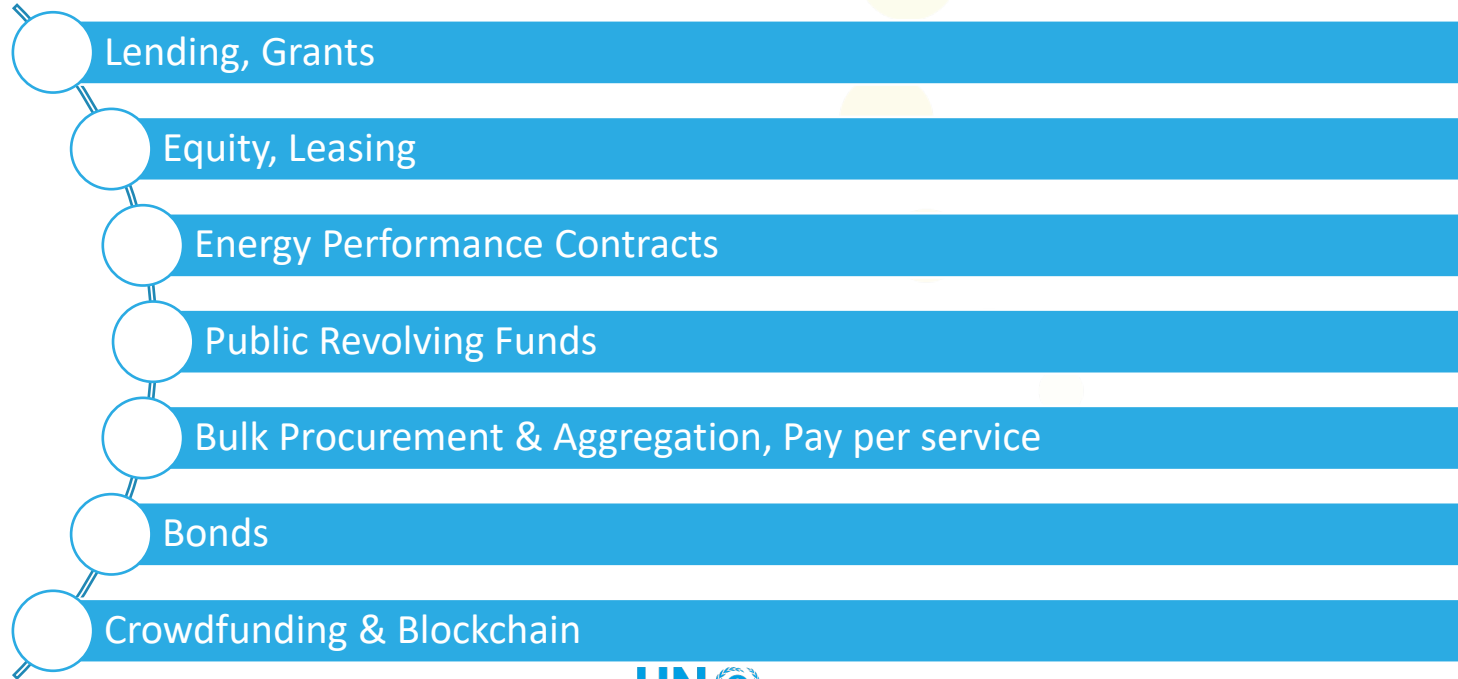
Tags: [energy efficiency](#), [financing](#), [street lighting](#)

In 1 user collection: [Public lighting toolbox for municipal](#)

# Source book on EE in Municipalities



# Business Models for Energy Efficiency



# Thank you.

[gdias@dtu.dk](mailto:gdias@dtu.dk)

**Please visit our knowledge Management System at:**

**<https://c2e2.unepdtu.org/>**

