The European Commission’s science and knowledge service

Joint Research Centre

Global Covenant of Mayors
Access to energy

Valentina Palermo

Milan, 18/11/2019

Global Covenant of Mayors - Three Pillars

MITIGATION

Accelerating the decarbonisation of their territories

ADAPTATION

Strengthening their capacity to adapt to unavoidable climate change impact

ACCESS TO ENERGY

Allowing citizens to access secure, sustainable and affordable energy.

Decarbonisation

Resilience

Secure, sustainable and affordable energy

Energy access pillar

The International Energy Agency (IEA) defines **energy access** as "*a household having reliable and affordable access to both clean cooking facilities and to electricity, which is enough to supply a basic bundle of energy services initially, and then an increasing level of electricity over time to reach the regional average*".

Sustainable Development Goal 7 (SDG7)

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all. The targets are:

7.1 By 2030, ensure universal access to affordable, reliable, and modern energy services.

7.2 Increase substantially the share of renewable energy in the global energy mix by 2030.

7.3 double the global rate of improvement in energy efficiency by 2030.

Global Covenant of Mayors - TWGs

4 TECHNICAL WORKING GROUPS (TWGs)

1. **Data Technical Working Group (D-TW)**

   - Climate Action & Energy Access
   - Emission inventory & Targets
   - Risk & Vulnerabilities

2. **Global Regional Coherence Technical Working Group**

3. **Finance Technical Working Group**

   Enhance and accelerate cities and local governments' access to domestic and international financial resources for the investment in projects critical to the realization of their GCoM Commitments

4. **Communication**

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3. **Communication**

JRC participation in GCoM TWGs

Energy access pillar

Climate Action / Energy Access (CA/EA) Subcommittee

A new concept note has been distributed among the members to elaborate the **Access to Energy / Energy Poverty pillar of GCoM.**

The CA-EA subcommittee recommends a **regional specific development** of the pillar to address country specific needs and framework.

LATIN AMERICA & CARIBBEAN	Expert consultation ongoing
EUROPE	Energy Poverty. CoM + EPOV
SUB-SAHARAN AFRICA	Pillar developed/ Access to Energy Assessment (AEA)
ASIA	Well on track to reach universal access, including India and Indonesia

Energy poverty in EU

A definition

[…] the inability to realise essential capabilities as a direct or indirect result of insufficient access to affordable, reliable and safe energy services, and taking into account available reasonable alternative means of realising these capabilities.

Key figures

57 million people in Europe cannot keep their homes warm[2]

104 million people in Europe cannot keep their homes comfortable during summer[2]

52 million people in Europe face delays in paying their energy bills[2]

10 million people need to walk more than 30 minutes to access public transport facilities[3]

Energy poor households experience inadequate levels of some essential energy services due to a combination of high energy expenditures, low incomes, inefficient buildings and appliances, specific household energy needs, exposure to climate extremes.

Energy poverty can have severe implications on the health, wellbeing, social inclusion and quality of life of citizens.

Energy poverty in EU

The **Covenant of Mayors (CoM)** and **Observatory (EPOV)** teamed up to address energy poverty. Local and regional authorities across Europe are supported in alleviating energy poverty by sharing knowledge and resources to build local capacities.

Covenant of Mayors for Climate & Energy EUROPE

EU ENERGY POVERTY Observatory

European Commission

27th of November 2019 - Energy poverty workshop | Brussels

A number of experts will discuss:

1. How to assess the inability to afford basic energy services
2. How to assess the availability of adequate energy services

Energy access in SSA

Electricity

43.3% of population in SSA in 2017 has access to electricity
(IEA website)

Clean cooking

16% of population in SSA in 2017 with primary reliance on clean cooking facilities
(IEA website)

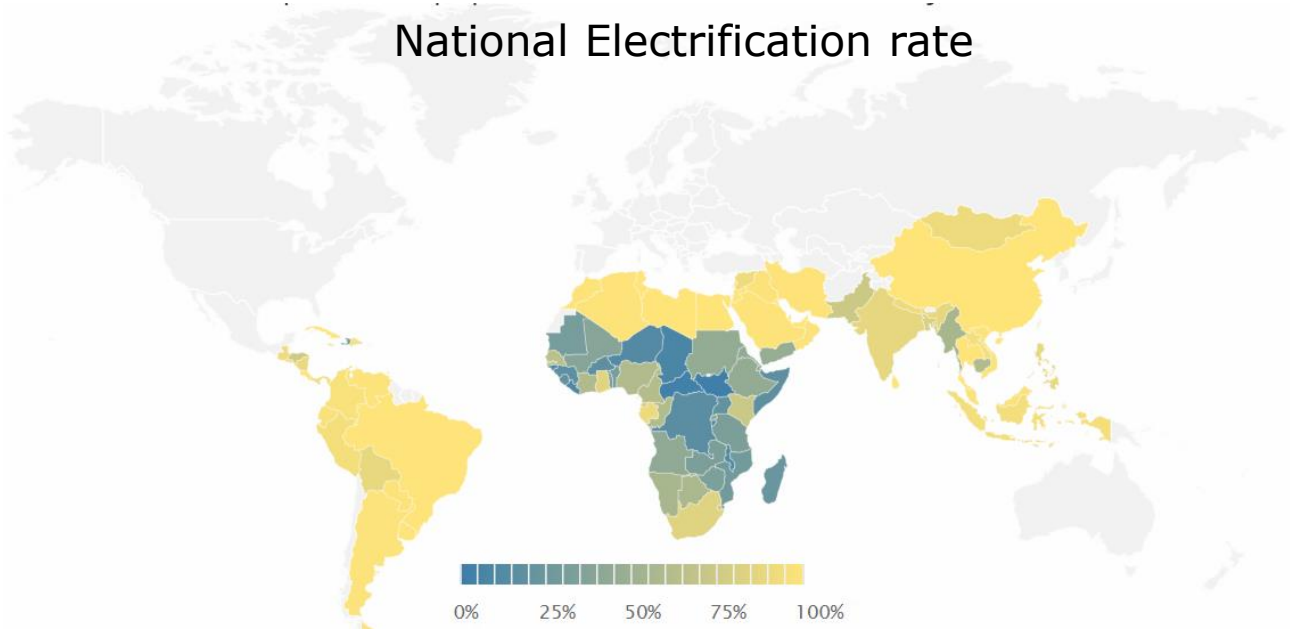
**Clean cooking as defined by IEA: access to and primary use of modern fuels (natural gas, LPG, electricity, biogas) and technologies (as improved cook stoves)*

Energy access in SSA

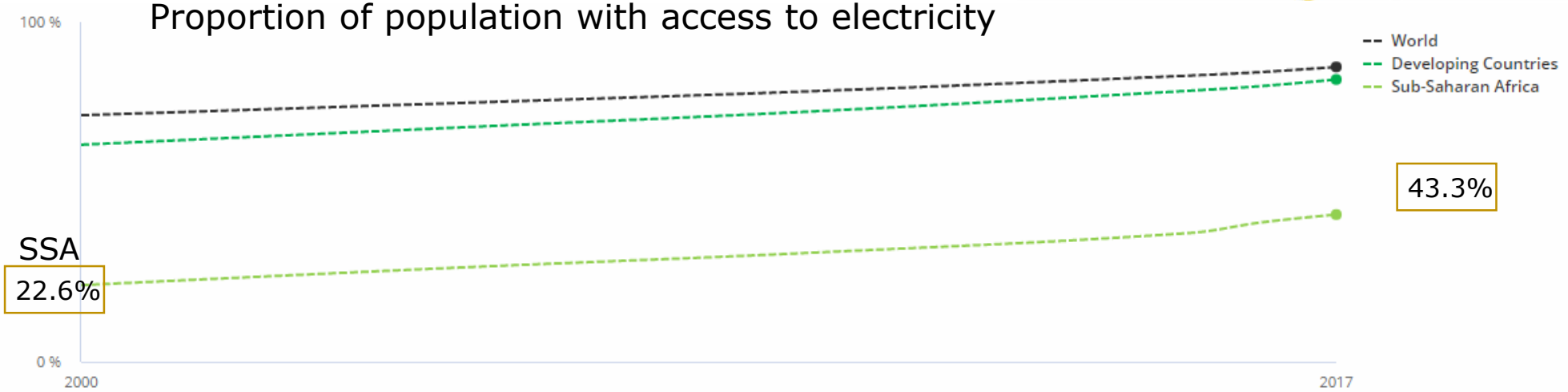
Electricity

Sub-Saharan Africa is indeed short of electricity. The region's grid has a power generation capacity of just 122 gigawatts (GW) and half of it is located in one country, South Africa.
Italy, with a population of 60 million – 15 times less than sub-Saharan Africa, has a similar installed generation capacity.

National Electrification rate



Proportion of population with access to electricity



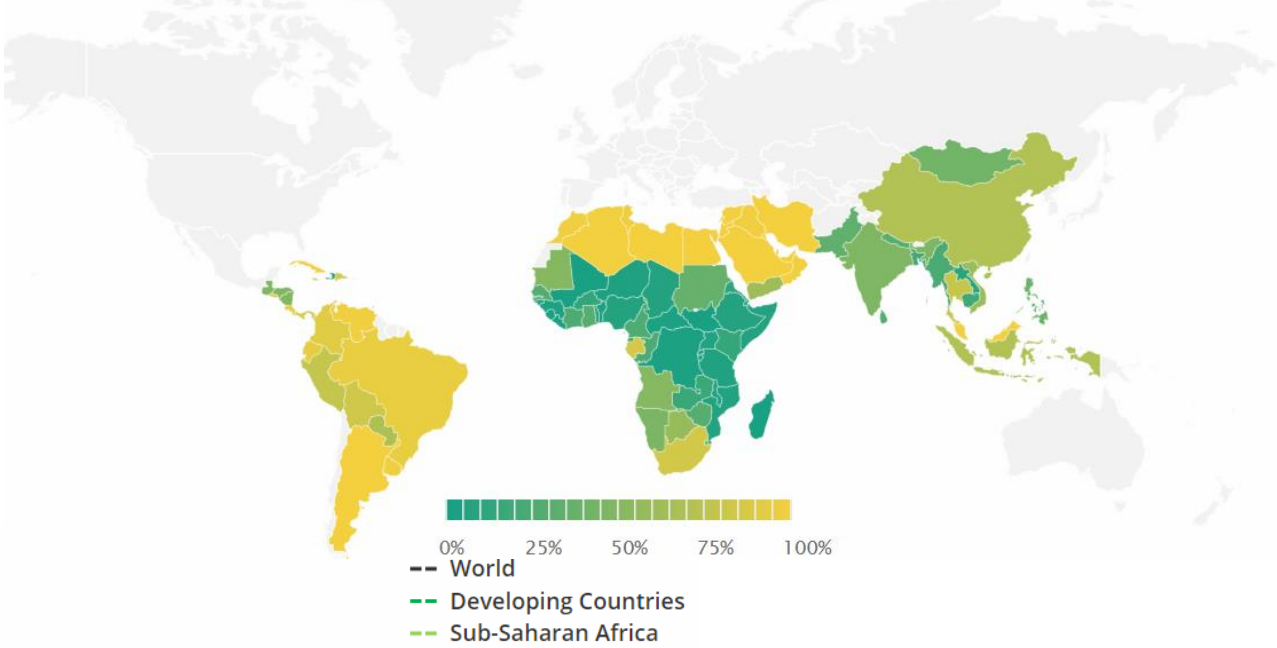
IEA, 2017
https://www.iea.org/sdg

Energy access in SSA

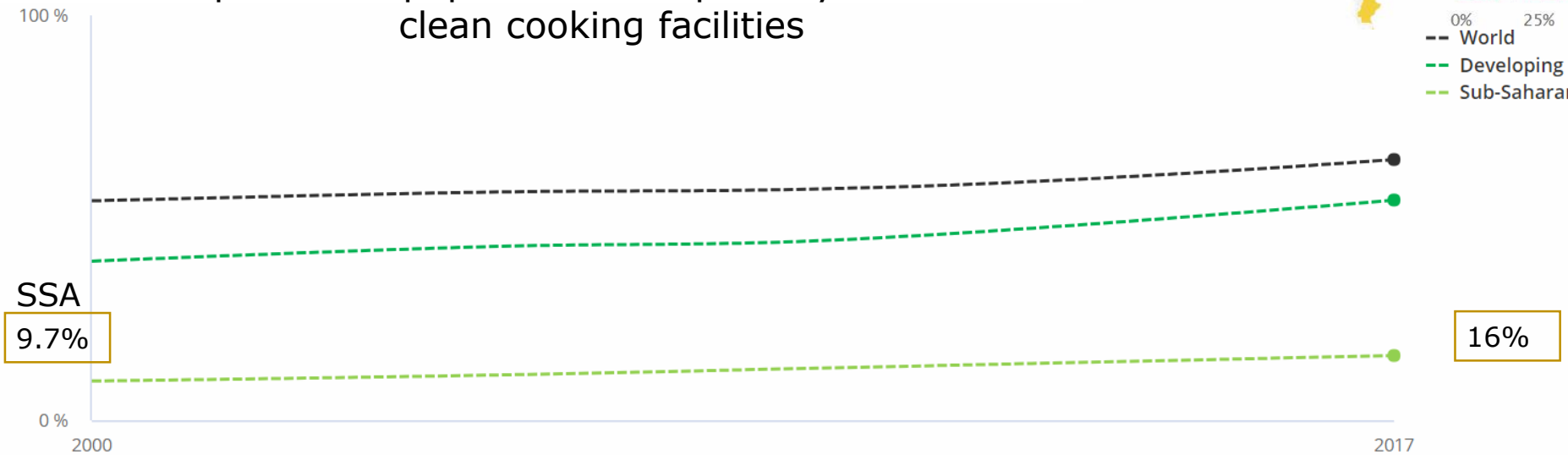
Clean cooking

Four in five people in Sub-Saharan Africa (785 million) rely for cooking on solid biomass, mainly fuel wood and charcoal. Clean, non-polluting cooking facilities are vital to reduce number of death from household air pollution in Africa, and yet access to these is even more restricted than access to electricity.

Share of population with access



Proportion of population with primary reliance on clean cooking facilities



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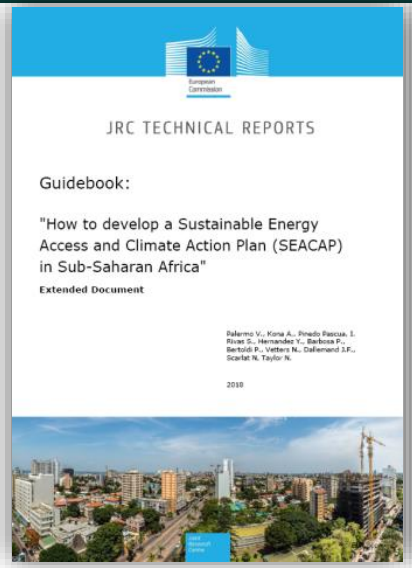
Energy access in SSA

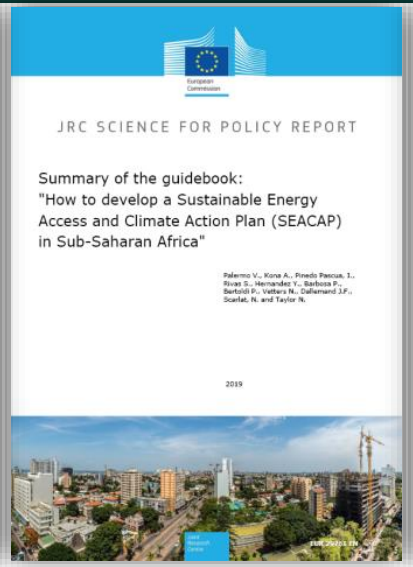

JRC TECHNICAL REPORTS

Guidebook:

"How to develop a Sustainable Energy Access and Climate Action Plan (SEACAP) in Sub-Saharan Africa"

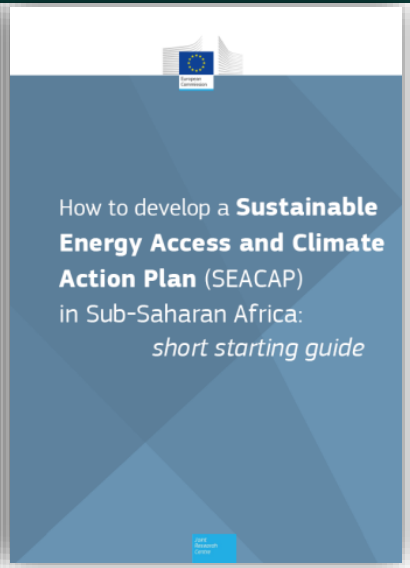
Extended Document

2019


JRC SCIENCE FOR POLICY REPORT

Summary of the guidebook: "How to develop a Sustainable Energy Access and Climate Action Plan (SEACAP) in Sub-Saharan Africa"

2019


How to develop a **Sustainable Energy Access and Climate Action Plan** (SEACAP) in Sub-Saharan Africa:

short starting guide

- ✓ First aligned with the GCoM CRF
- ✓ Pillar of energy access
- ✓ Three versions in three languages (EN/PT/FR)
- ✓ Offline reporting tool
- ✓ Revision from partners & practitioners

Access to Energy Assessment (AEA)

The AEA helps to build an overview of the current condition of Local Authorities with regard to Energy Access. A clear and detailed assessment of the status can support decision making processes.

1) Data collection process

Please report any supporting documents or data you want to share to clarify data reported in the following tables

Title	Source	Year	Method
		[Drop-Down]	
		[Drop-Down]	

2) Access to Energy - Electricity key indicators particularly relevant for your local authority or region

Fill in the overall indicator and at least one of the others per attribute

You can specify or report additional comments in the last column

INDICATORS	Value, [grid]	Value, [off-grid]	Unit	Year	Target	Target year	Deatiled information/ comments (if available)
OVERALL							
Share of population or households with access to electricity (grid/off-grid) [%]			[Drop-Down]	[Drop-Down]		[Drop-Down]	

Security (SC)		Value, [grid]	Value, [off grid]	Unit	Year	Target	Target year	Deatiled information/ comments (if available)
SC2	Number of hours per day of available electricity [h/day]			[Drop-Down]	[Drop-Down]		[Drop-Down]	
	If available please indicate the frequency of voltage fluctuations below the standard level of your municipality			[Drop-Down]	[Drop-Down]		[Drop-Down]	
SC3	Average number of electricity interruptions (unscheduled outages) per day [n°/day-n°/week]			[Drop-Down]	[Drop-Down]		[Drop-Down]	
	If available, please include the duration of interruptions (unscheduled outages) per week			[Drop-Down]	[Drop-Down]		[Drop-Down]	
SC4	Number of days without electricity per year [n°/year]			[Drop-Down]	[Drop-Down]		[Drop-Down]	

ACCESS TO SUSTAINABLE ENERGY

physical availability of sustainable, clean and reliable energy services to meet basic human needs at affordable costs

Access to Energy Assessment (AEA)

The Access to Energy Assessment (AEA) is developed as a **dashboard** of multiple indicators that help to understand the situation within the boundaries of the community.

Step 1: City exploratory analysis

- Stakeholder engagement
- Building of the team in charge of the assessment: skills topic & territory

Step 2: Data collection and processing

- Identify data availability and quality
- Data preparation **to develop indicators**

Step 3: Assessment of Energy Access

- Assess the Energy access for electricity
- Assess the Energy access for clean cooking

Energy Access in SSA – Key indicators

Electricity

INDICATORS: Access to electricity

1. Percentage of population or households having access to electricity (grid/off-grid) [%]

Secure

2. Number of hours per day of available electricity [*h/day*]
3. Average number of electricity interruptions per day [*n°/day*]
4. Number of days without electricity per year [*n°/year*]

Sustainable

5. Percentage of electricity from RES [%]
6. Number of minigrids and stand-alone systems [*n°*]
7. Laws and regulations in place for mini-grids/stand-alone systems [+/-]

Affordable

8. Percentage of population able to pay for electricity [%]
9. Percentage of expenditure of Public Buildings for electricity [%]
10. Financial and regulatory incentives for renewable energy in place [+/-]

SECURE

Adequate and reliable access to energy

SUSTAINABLE

Provision of energy while minimizing the impact on the environment

AFFORDABLE

Accessible for all
Universal access

Energy Access in SSA – Key indicators

Clean cooking

INDICATORS: Access to clean cooking

1. Percentage of population /households with clean cooking access [%]

Secure

2. Percentage of pop./households relying on traditional biomass [%]
3. Percentage of pop./households relying on LPG or other sources [%]
4. Time and distance to gather fuelwood [*h and km*]

Sustainable

5. Number of improved cook stoves [*n°*]
6. Charcoal produced in sustainable way[*Y/N*]
7. Awareness / Education programmes in place [*Y/N*]

Affordable

8. Financial and regulatory incentives in place [+/-]
9. Percentage of pop. able to pay for the transition to clean cooking [%]

SECURE

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**Clean cooking as defined by IEA: access to and primary use of modern fuels (natural gas, LPG, electricity, biogas) and technologies (as improved cook stoves)*

Any questions?

You can find us at valentina.palermo@ec.europa.eu

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Global Covenant of Mayors Climate Change Mitigation

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Resilience

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Cities commitments

Signatories pledge to:

- ✓ **Mitigation:**
  Reduce CO_2 (or non-emission) according to Nationally Determined Contribution
- ✓ **Adaptation:**
  Increase their resilience by adapting to the impacts of climate change according to Nationally Determined Contribution
- ✓ **Energy Access:**
  Adopt ambitious goals and actions to increase the access to secure, affordable and sustainable energy

→

Sustainable Energy and Climate Action Plan – SECAP

Climate Action Plan - CAP.

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- ✓ **Energy Access:**
  Adopt ambitious goals and actions to increase the access to secure, affordable and sustainable energy

SECAP
Sustainable Energy Climate Action Plan

The SECAP key aspects

Key aspects

- ✓ The development of the SECAP primarily draws on the findings from the assessments, **Baseline Emission Inventory (BEI)**, the Climate Change Risk and Vulnerability Assessment (RVA) and the Access to Energy Assessment (AEA).
- ✓ The SEACAP defines concrete measures for climate mitigation, adaptation, and access to energy with timeframes and assigned responsibilities, translating the long-term strategy into action.
- ✓ Signatories commit themselves to submitting their SEACAPs within three years following adhesion.

GCoM Reporting Timelines

Reporting Elements	Year 1	Year 2	Year 3	Year 4	Year 5
1. Measuring GHG emissions – GHG emissions inventory	within 2 years				
2. Assessing risks and vulnerability	within 2 years				
3. Setting targets for reducing emissions and goals for increased resilience	within 2 years				
4. Climate action planning, including mitigation and adaptation	within 3 years				
5. Energy access planning	to be defined				
6. Reporting progress (incl. GHG emissions inventory)				every 2 years after submitting the climate action plan	

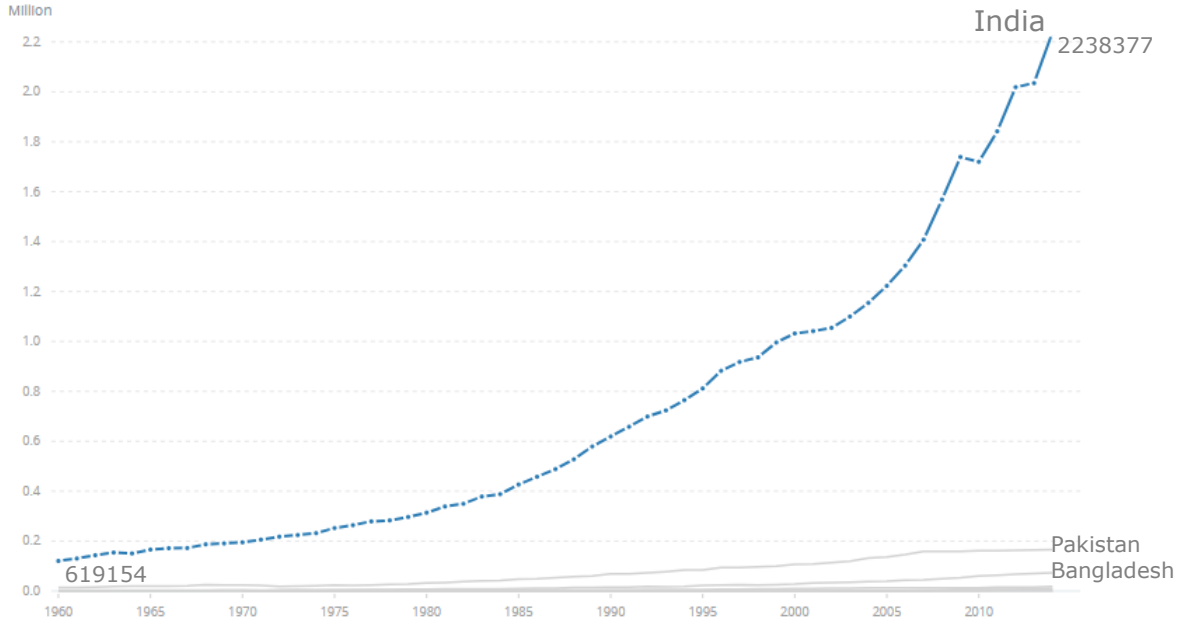
Mitigation Pillar

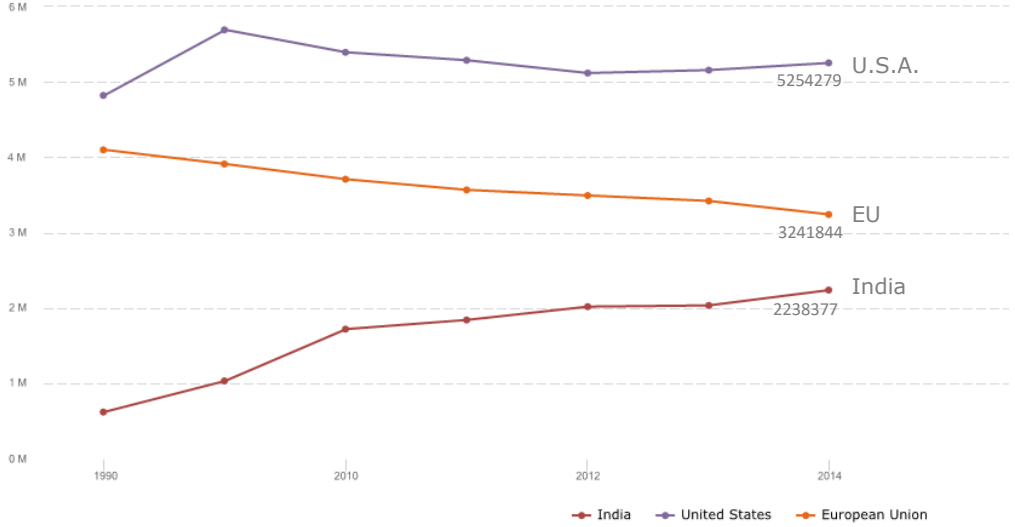
India

Most Recent Year 2014

Most Recent Value 2,238,377 $CO_{2\ kt}$

Country Name	1990 [YR1990]	2000 [YR2000]	2010 [YR2010]	2011 [YR2011]	2012 [YR2012]	2013 [YR2013]	2014 [YR2014]
India	619154.615	1031853.463	1719690.988	1841776.419	2018503.817	2034752.294	2238377.137
United States	4823403.118	5693684.894	5395532.125	5289680.503	5119436.361	5159160.972	5254279.285
European Union	4100786.671	3911984.936	3709775.555	3568090.009	3494155.955	3421472.348	3241844.353





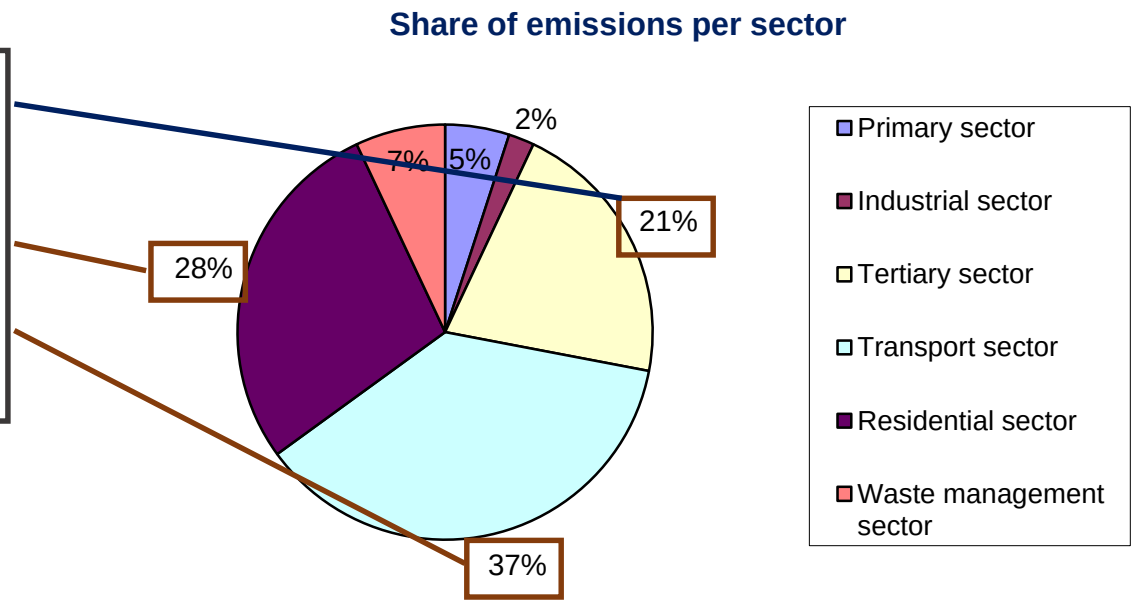
Series : CO2 emissions (kt)
Source: World Development Indicators
Created on: 11/15/2019

Baseline Emission Inventory (BEI)

What is a Baseline Emission Inventory?

BEI quantifies the amount of CO_2 emitted due to final energy consumption in given activity sectors on the municipality's territory within a calendar year and it helps to select the appropriate actions.

Three sectors represent 86% of the emissions of the city



Baseline Emission Inventory (BEI)

What are the key principles?

- ✓ **Bottom-up approach** in activity data collection;
- ✓ **Simplicity and flexibility**: the approach can be adapted to the specific situation of local authorities (city size, level of expertise, political mandate, etc.);
- ✓ Main focus on CO_2 emissions associated with **local energy consumption**;
- ✓ **key sectors** to be accounted for in the BEI and targeted by SEACAP measures (only those sectors which are most emitting and which could be influenced by the local authority's actions);
- ✓ Relevant to the **local and regional situation**, reflecting the specific activities and contexts of the local authority.

Baseline Emission Inventory (BEI)

What are the types of emissions to be included?

- ✓ **Direct emissions due to final energy consumption**

  The quantification of GHG emissions (mainly CO_2) due to energy consumption in both stationary and mobile sources.

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  The quantification of GHG emissions (mainly CO_2) due to energy consumption in both stationary and mobile sources.

- ✓ **Indirect emissions related to consumption of grid-supplied energy** (electricity and heat/cold) within the local territory boundary.

  The emissions from energy generation activities within the local territory boundaries are accounted for through the local emission factor for electricity and for heat/cold.

Baseline Emission Inventory (BEI)

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- ✓ **Direct emissions due to final energy consumption**

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- ✓ **Indirect emissions related to consumption of grid-supplied energy** (electricity and heat/cold) within the local territory boundary.

  The emissions from energy generation activities within the local territory boundaries are accounted for through the local emission factor for electricity and for heat/cold.
- ✓ **Non-energy related emissions that occur in the local territory**.

  Waste and other non-energy related greenhouse gas (CO_2, CH_4 and N_2O) emissions.

Baseline Emission Inventory (BEI)

Where are the emissions produced?

Local Government boundary (direct emissions and indirect emissions)

It is set by the administrative boundaries of the local authority signatory of the Covenant.

It coincides with the territory where the final energy is consumed and the one tackled by the SEACAP measures.

Baseline Emission Inventory (BEI)

Which are the source of emissions to be included?

<u>Buildings / Stationary Energy</u>

- Residential/ commercial / institutional buildings and facilities
- Industry, including emissions from non-ETS and ETS
- Agriculture, forestry, fisheries
- Fugitive emission from fossil fuels required

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Transport

- on-road and rail
- waterborne navigation
- aviation
- off-road

European Commission

Baseline Emission Inventory (BEI)

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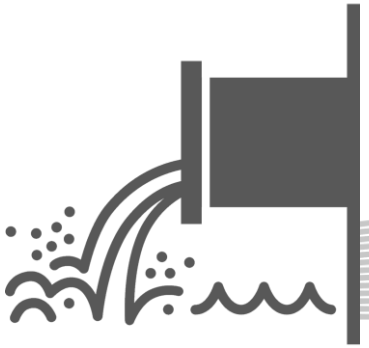
Transport

- on-road and rail
- waterborne navigation
- aviation
- off-road

Waste

- Disposal of solid waste
- Biological treatment
- Incineration and burned waste
- Wastewater



European Commission

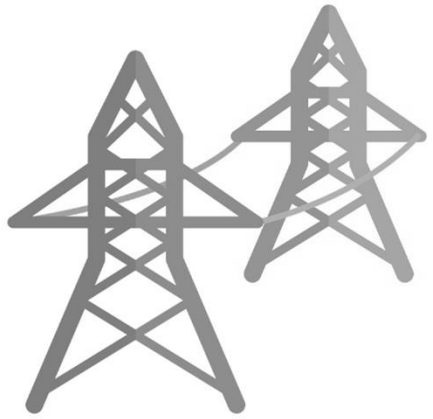
Baseline Emission Inventory (BEI)

Which are the source of emissions to be included?

Energy generation

All GHG emissions from generation of grid-supplied energy within the city boundary and all GHG emissions from generation of grid-supplied energy by facilities owned (full or partial) by the local government outside the city boundary.

- Electricity-only
- combined heat and power (CHP)
- heat/cold production plants



As the energy generated is supplied to the grid, the resulting emissions will have already been captured as indirect emissions from consumption of grid-supplied energy. Therefore, emissions will not be included in the total.

European Commission

Baseline Emission Inventory (BEI)

Sub-sectors

STATIONARY ENERGY

- **Residential buildings *(D/I)***
- **Commercial building and facilities *(D/I)***
- **Institutional buildings and facilities *(D/I)***
- **Industrial buildings and facilities *(D/I)***
- **Agriculture *(D/I)***
- **Fugitive emissions *(D/I)***

TRANSPORT

- **On-road *(D/I)***
- **Rail *(D/I)***
- **Waterborne navigation *(D/I)***
- **Aviation *(D/I)***
- **Off-road *(D/I)***

WASTE

- **Solid waste disposal *(D)***
- **Biological treatment *(D)***
- **Incineration and open burning *(D)***
- **Wastewater treatment and discharge *(D)***
- **Solid waste disposal *(D)***

ENERGY GENERATION

- **Electricity – only generation**
- **CHP generation**
- **Heat/cold generation**
- **Local renewable generation**

Baseline Emission Inventory (BEI)

Which GHG to be chosen?

Local authorities shall account for emissions of the following gases: carbon dioxide **(CO_2), methane (CH_4), and nitrous oxide (N_2O),** but reported in **tCO_2** or **tCO_2eq**.

The amount of CH_4 or N_2O into TCO_2 equivalents are converted by multiplying by Global Warming Potential coefficients (IPCC).

Baseline Emission Inventory (BEI)

Notation keys

- ✓ **Not occurring ("NO")**
An activity or process does not occur or exist within the city. This notation key may also be used for insignificant sources.

- ✓ **Included elsewhere ("IE")**
GHG emissions for this activity are estimated and presented in another category in the same inventory, stating where it is added.

- ✓ **Not estimated ("NE")**
GHG emissions occur but have not been estimated or reported.

- ✓ **Confidential ("C")**
GHG emissions which could lead to the disclosure of confidential information, and as such are not reported publicly.

Baseline Emission Inventory (BEI)

Summary

- ✓ ***type of gasses****: CO2, CH4 and N2O*
- ✓ ***boundary:*** *Local Government boundary (direct emissions and indirect emissions)*
- ✓ ***emission sources****: activity data (AD) and GHG emissions*
  - ✓ **Mandatory in the emission accounting:** AD and GHG on three main sectors:

    I) stationary energy/buildings II) transportation III) waste /waste water

  - ✓ **Mandatory, not included in the emission accounting:** AD and GHG from **energy generation** (accounted as indirect emissions);
  - ✓ **Optional in the emission accounting:** AD and GHG from Industrial Process and Product Use (**IPPU**) and Agriculture, Forestry and Other Land Use (**AFOLU**)
- ✓ ***Notation keys:*** *NO (Not Occurring); IE (Included elsewhere); NE (Not estimated); (C) Confidential*

Baseline Emission Inventory (BEI)

How to calculate emissions

Activity Data	x	Emission factors	=	GHG Emissions
Activity data (AD) quantifies the human activity occurring in the territory of the local authority		Emission factors (EF) quantifies the emissions of CO_2 emitted per unit of activity (IPCC, LCA, national/regional)		total amount of GHG emitted [tCO_2]
Examples of AD are : - Charcoal for cooking; - Electricity consumed; - Diesel used in transportation; - amount of waste sent to landfill, Examples in GB pg 46/50/56.. It is strongly recommended to used **data relevant to the local territory**		Examples of EF are : - CO_2 emitted per unit of charcoal; - CO_2 emitted per unit of electricity; - CO_2 emitted per unit of diesel; - amount of CH_4 emitted per tonne of waste sent to landfill, **converted into *CO_2 equivalents by multiplying GWP***		Total amount of GHG emissions: - GHG emissions due to charcoal; - GHG emissions due to electricity; - GHG emissions due to diesel; - GHG emissions due to waste production

BEI – Activity data

1. **Real activity data disaggregated by sub-sector.** For example, amount of energy consumption monitored at the point of use or sale, or amount of waste at the point of disposal or treatment. This should ideally be obtained from utility or fuel providers.

2. **A representative sample set of real activity data from surveys.** For example, surveying buildings for fuel consumption.

3. **Modelled data.** For example, determine energy intensity, by building and/or facility type, expressed as energy used per square meter (e.g., GJ/m2/year) or per unit of output, in order to calculate energy consumption of the relevant sub-sector.

4. **Incomplete or aggregate real activity data:** For example, if fuel consumption data by sub-sector are unavailable, but data are available for total emissions from stationary sources within the city, apportion by total built space for each sub-sector or building type. If data are only available for a few of the total number of fuel suppliers, determine the population (or other indicators such as industrial output, floor space, etc.) served by real data to scale-up the partial data for total city-wide energy consumption.

5. **Regional or national fuel consumption data scaled down using population or other**

$$Activity\ data\ = \frac{City\ population}{National\ population} * Activity\ data\ at\ national\ level$$

Setting emission targets

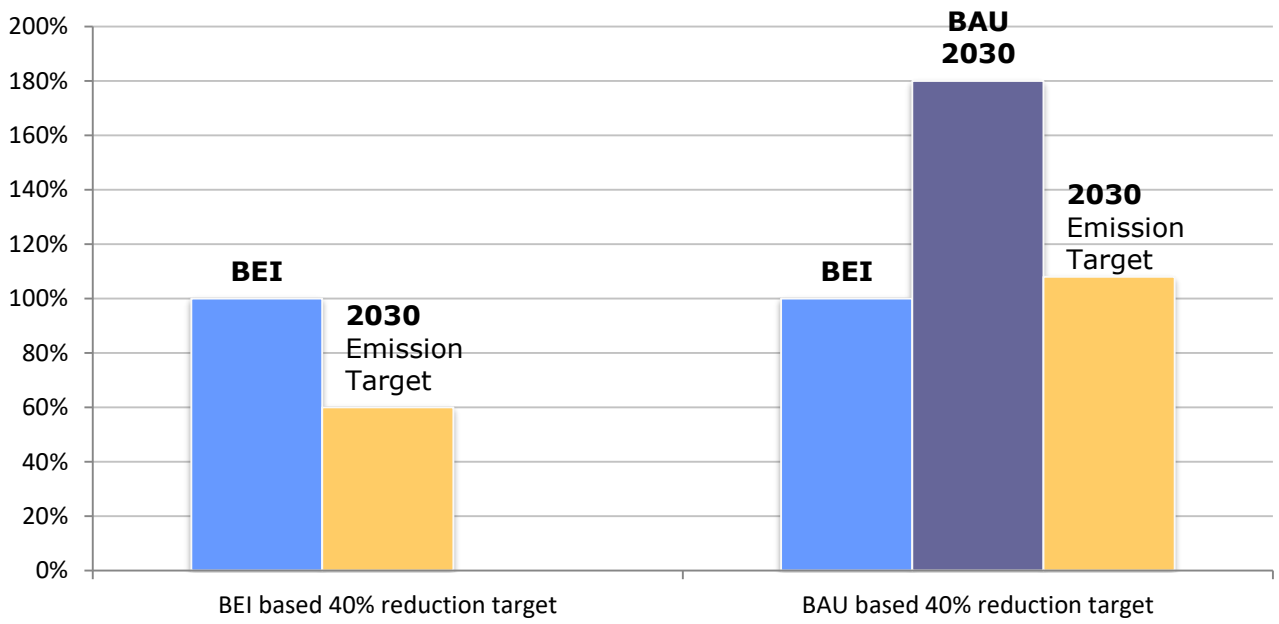
key principles of the target

Boundary:	consistent with GHG inventory boundary
4 Types:	base year; base year intensity; baseline scenario; fixed-level
Target year:	the same, or later, as NDC or as set by regional/national chapter (for target years beyond 2030, an interim target between now and 2030 shall be included; if NDC target is before 2030, additional 2030 target should be set)
Ambition:	at least as ambitious as unconditional components of NDC (mandatory), higher ambition recommended. If NDC increases, adjustment required within 5 years
Units:	percentage reduction from the base year or scenario year (except for fixed level targets)

Setting emission targets

	EU-28	GCoM
Target	40% by 2030	Beyond the NDCs
Reduction target as compared to BEI	Absolute terms [tCO_2]	Absolute terms [tCO_2]
	Relative terms [tCO_2/capita]	Relative terms [tCO_2/capita]
as compared to BAU	Not allowed	Absolute terms [tCO_2]
Base year	1990 recommended	Base year for NDC
Key sectors	CoM EU key sectors	As CoM EU + waste

BAU versus BEI
40% reduction target



When using a BAU-based approach, the 2030 targeted emissions may be higher than the BEI emissions

European Commission

Setting emission targets

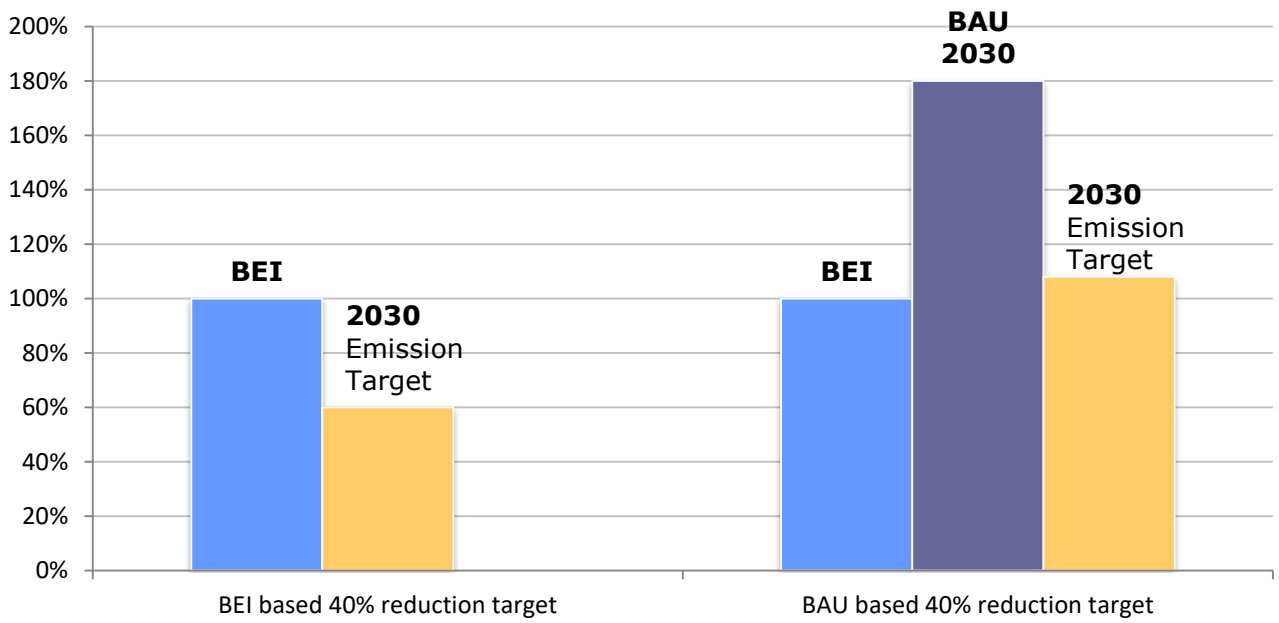
$$\text{Emission}^{2030}CO_2 = \text{Emission}^{baseline}CO_2 \times K$$

Where:
K is the national BAU coefficient for 2030 selected according to the baseline year

$\text{Emission}^{2030}CO_2$ are the estimated emissions in 2030 for the BAU scenario

$\text{Emission}^{baseline}CO_2$ are the emissions as calculated in the emission inventory

BAU versus BEI 40% reduction target



When using a BAU-based approach, the 2030 targeted emissions may be higher than the BEI emissions

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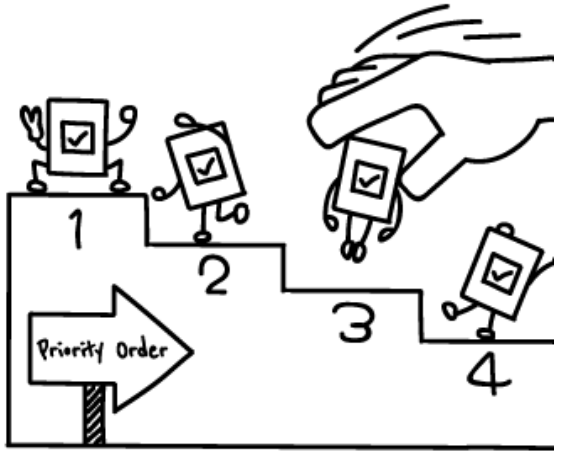
SECAP - Mitigation

key elements for planning for mitigation

- Prioritization of actions and the policy instrument(s) to implement the actions
- Financial strategy for implementing the action
- Implementation status and timeframe; Stakeholders involved in planning and implementation of the action
- Assessment of energy saving, renewable energy production, and GHG emissions reduction (by action or sector)



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SECAP – Mitigation

key requirements for actions

For each action, include:

- the department and persons in charge of implementation and monitoring,
- a timeline (start, end, and major milestones),
- a cost estimate and potential financing source(s),
- the estimated energy saving/increased renewable energy production, and the associated estimated GHG reduction

SECAP – Mitigation strategies

Modes of urban governance

Municipal self-governing: Strategies for municipality-owned assets to reduce final energy consumption and to inspire community engagement	Energy management of local authority estate Demonstration projects in public facilities Green Public procurement
Regulation and planning: Requirements and guidance in support of energy efficiency in buildings	Mandatory standards and codes Regulation, controls and sanctions
Governing through enabling: Facilitating co-operation among stakeholders and awareness raising	Labels and certificates Public-private Partnerships Capacity building, education and awareness raising
Governing through provision: Providing services and financial resources for buildings energy efficiency projects	Public sector financial management and procurement policies Financial facilitation

SECAP – Mitigation strategies

Energy Efficient Buildings

Local Authorities shall lead by example by increasing the efficiency of its own buildings and assets.

Integration of renewable energies into the design of any new buildings or renovation.

Work on informal settlements

Adopt high environmental performance and quality standards for all new buildings and refurbishment.

Towards sustainable mobility

Local authorities have a key role in planning local transport system.

Integrated, Multi-modal transport system: (Bus Rapid Transit, Light Rail, Park and Ride services).

Improvements of the public transport system as reliable and affordable alternative to the car

Efficiency of the vehicle fleet: (fuel switching and use of renewables energies)

Embedding Climate Change in land use planning

There are many site-specific strategies with high climate change mitigation potentials.

Interaction of land-use and transport planning: increasing density, mixed use developments, transportation modes diversification, TODs.

Green spaces and urban greening:

reduce the cooling demand, encourage active travel, sequestrate carbon, increase resilience of the area

SECAP – Mitigation strategies

Building sector

Amount of construction underway in India. The housing gap amounts to about 19 million units in urban areas.

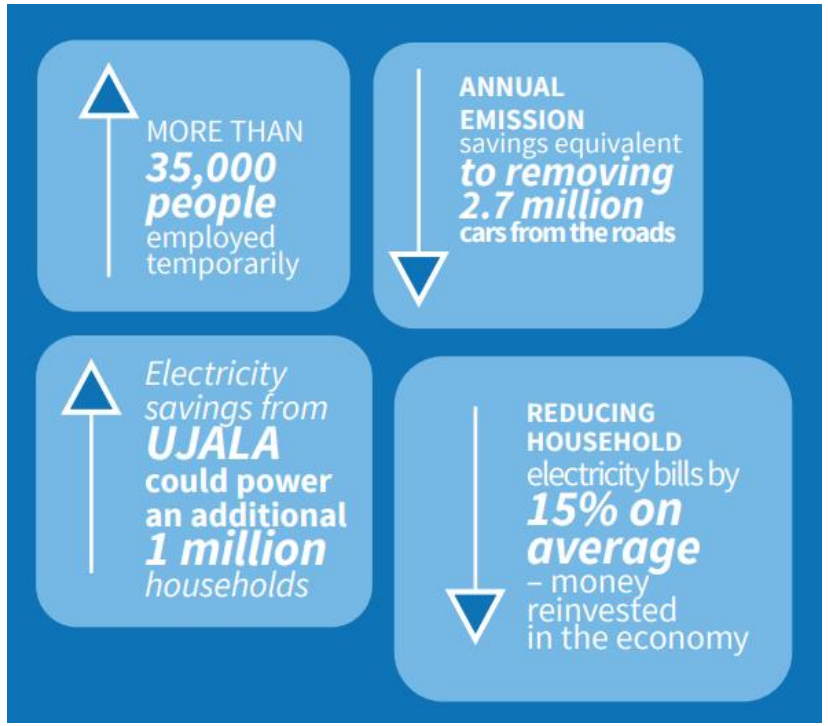
The choice of technology, design and materials, and the complementary skilled expertise for implementing energy-saving options can have significant impact on the cost and CO2 emissions of the impending building stock.

Decisions about techniques and materials may take into considerations synergies between cost and energy use/carbon emissions.

SECAP – Mitigation strategies

Building sector - UJALA

by Energy Efficiency Services Limited (EESL) and the International Energy Agency (IEA)



UJALA is a market driven initiative, with strong policy support from the government. It is an example of a self-sustaining government initiative that has several benefits, like energy savings and reduced carbon emissions, and has also triggered large scale investment in the manufacturing of LED bulbs, generated employment and other macro benefits.

UJALA has successfully distributed more than 100 million LED lamps across 120 cities in India resulting in a wide range of multiple benefits, such as:

IMPROVING PEOPLE'S QUALITY OF LIFE

HIGH QUALITY MANUFACTURING

CONTRIBUTING TO CLIMATE TARGETS

Switching from inefficient incandescent bulbs to LEDs is helping families reduce their electricity bills and enabling them to spend more time studying, reading and even working at night. The money saved adds to household's disposable income improving their quality of life, in expanding energy access to all.

SEACAP – Mitigation strategies

Urban mobility - BUS RAPID TRANSIT SOLUTIONS

Bus Rapid Transit System (BRTS)

❖ BRTS Projects for 465 Kms 14 cities at a total cost of US $ 1100 million (@US $ 2.4 million per km).

▪ **Delhi**	**5 /500kms)**
▪ **Pune**	**5/101.77 km**
▪ Pimpri Chinchwad	42.22 km
▪ Bhopal	21.71 km
▪ **Jaipur**	**6/39.45 km**
▪ Vijaywada	15.50 km
▪ Vizag	42.80 km
▪ Rajkot	29.00 km
▪ Kolkota	15.5 Km
▪ **Ahmedabad**	**40/88.50 km**
▪ Surat	29.90 Km
▪ Hubli-Dharwad	22.00Km
▪ Indore	11.45 km

Ahmedabad is the 1st city in India to have successfully launched a Full BRT system.

NMV, Pedestrianistaion are part and parcel of development policy

"The journey so far and way forward".....

Ahmedabad - BUS RAPID TRANSIT SYSTEM

Ahmedabad's economic strength was based on its manufacturing industry making it as the fourth most polluted city in India in 2001. The city faced various transportation challenges due to increased vehicle ownership, population growth, and longer traveling distances. To tackle this growing issue, in 2007 the Ahmedabad Municipal Corporation proposed India's first citywide BRT system.

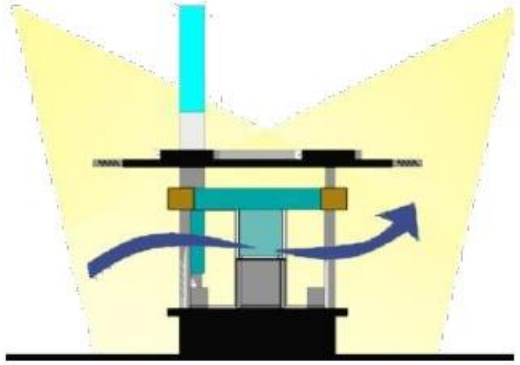
A substantial portion of the funding for design, engineering, and construction was provided by the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), a flexible program initiative administered under Ministry of Urban Development.

SEACAP – Mitigation strategies

Urban mobility - BUS RAPID TRANSIT SOLUTIONS

Bus Station Design

- Bus stations are accessed through ZEBRA crossings
  - Signalised &Synchronized with junction signal cycle (ATC)
- Closed Bus Stations & Off board ticketing
  - Provide safe and secure environment
  - Both side ticket windows
  - Access control through turnstiles/flap barriers
  - Off board ticketing to reduce dwell time, plug revenue leakage



Ahmedabad - BUS RAPID TRANSIT SYSTEM

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SECAP – Mitigation strategies

Waste and waste water

Waste management	Separate waste collection to increase the recycling of municipal solid waste and the use of organic waste for biogas production
	Use of green waste for the production of compost and pellets (Lakatamia, CY)
	Utilization of organic waste for composting rather than waste-to-energy incineration
Wastewater treatment plants	Self-sufficient wastewater facility based on methane driven combined heat and power plant (Neumarkt in der Oberpfalz, DE)
Water management	Integration of renewable sources for supplying power to pumping tapwater
	Reduction in electricity usage for pumping based on reductions in water losses in the drinking-water distribution network Seixal, PT; Bilbao, PT
	Information system for energy and water use in the public sector (Voznesensk, UA)

SECAP – Mitigation strategies

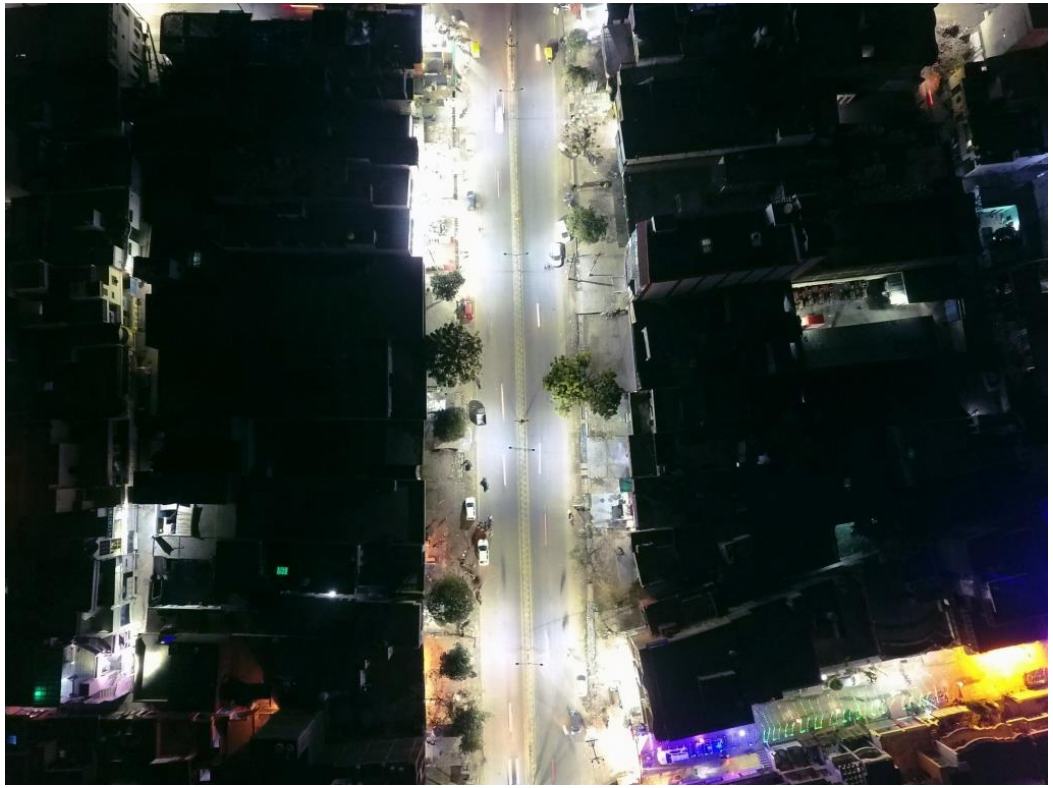
Waste and waste water – the approach of Surat city

Objectives for an innovative & modern Solid Waste Management

•To devise a system of storage of waste and segregation of recyclable waste at source.
•To improve system of primary collection of waste.
•To devise more efficient system of day to day cleaning, conventionally and mechanically.
•To devise system to eliminate practices of throwing garbage on the road causing nuisance & health threat.
•To modernize the system of community waste storage & synchronize the system of primary collection as well as transportation of waste.
•To eliminate manual handling of waste and open transportation vehicles.
•To improve the system of transportation of waste by ensuring "handling waste only once".
•To construct four more semi close body transfer station to strengthen the existing primary collection-transportation and secondary transportation system.
•To reduce quantity of waste going to landfill site by adopting suitable technology.
•Land to be acquired for other landfill disposal site.
•To derive income from the processing of waste.
•To ensure safe disposal of waste including bio-medical waste, C & D Waste, E-Waste and other Special category waste
•To have public participation in order to have proper segregation and efficient collection system.

SEACAP – Mitigation strategies

Public lighting - EESL's Street Light National Programme (SNLP)



The Ministry of State for Power, New and Renewable Energy has announced the installation of 1 million smart LED streetlights as part of the country's energy efficiency and smart city initiatives. The project is being implemented by the Energy Efficiency Services Limited, a Central government enterprise.
The municipal corporations did not have to make an upfront payment for the lights. The amount will be repaid to the company over a period of 7 years from the municipal energy savings (Pay-As-You-Save model).

Allahabad, Aligarh, Meerut, Firozabad, Mathura-Vrindavan, Gorakhpur, Jhansi, Agra …

270,000km of roads –
6.71 billion KWh saved

Actions reduction potential

Quantification of actions

- The actions must take into account the technical and economic capacity of the municipality to carry them out

- There are two basic types of quantification:

- **Direct**

when the total emission reduction is derived from a direct measure (example 1-change of street lighting)

- **Estimation**

when the total reduction is estimated or deducted through models (example 2, transport modeling)

Actions reduction potential

Quantification of actions - direct

Lamps in public buildings

Example for direct calculation

Reduced amount of electricity by replacing incandescent lamps with LED

	Incandescent lamps	Incandescent Halogen lamp	CFL	LED
Luminous efficiency	15	22,5	47,5	67,5
Luminous flux (lm)	900	900	900	900
Power (W) = Energy consumption per hour (kWh)	60	43	16	10
Energy saved (%)	-	-28,3%	-73,3	-83,3%

Source: https://ledpro.it/tabella-comparazione-led/.

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Actions reduction potential

Quantification of actions - direct

Improvement of residential buildings
The city of Hannover conducted a renovation project for 52 buildings.

The key measures were:
increase the wall insulation by 14 cm and increase the ceilings and floors insulation by 20 cm.

The expected reduction was 40.
After the implementation, data showed savings from 50 to 65%:
consumption of from 250 KWh / m^2 to 80 KWh / m^2

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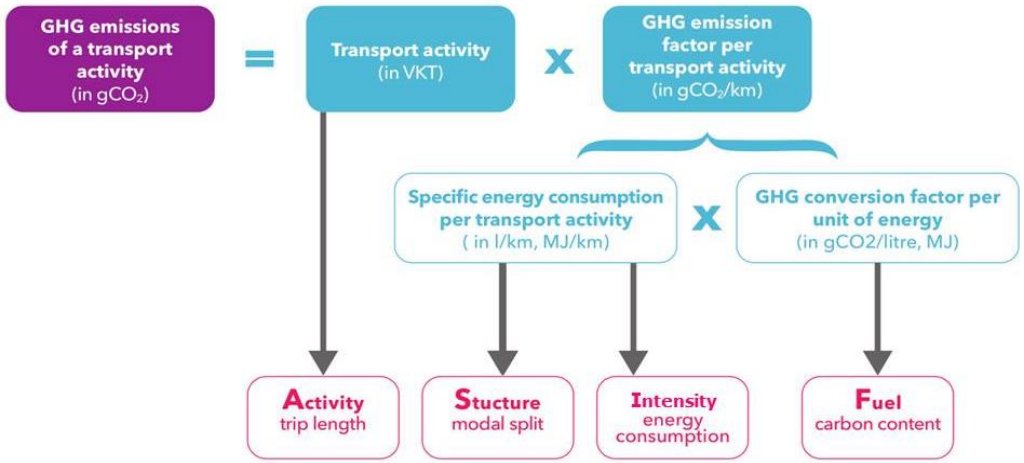
Actions reduction potential

Quantification of actions - indirect

Transport

In this sector it is more difficult to have real data,
there is the need of using indirect data (estimation) such as:

- the Vehicle-Kilometres Travelled (VKT) as a measure of traffic flow;
- the modal split and distribution of trips to different types of vehicles (fleet distribution): passenger cars; light duty vehicles; busses; two wheelers;
- Intensity and carbon content



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Any questions?

You can find us at valentina.palermo@ec.europa.eu

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Sustainable Energy and Climate Action Plan (SECAP) Principles and Guidelines

The European Commission's science and knowledge service

Joint Research Centre

European Commission

The European Commission's science and knowledge service

Joint Research Centre

The 10 key principles of a Sustainable Energy and Climate Action Plan

Milan 18 November 2019

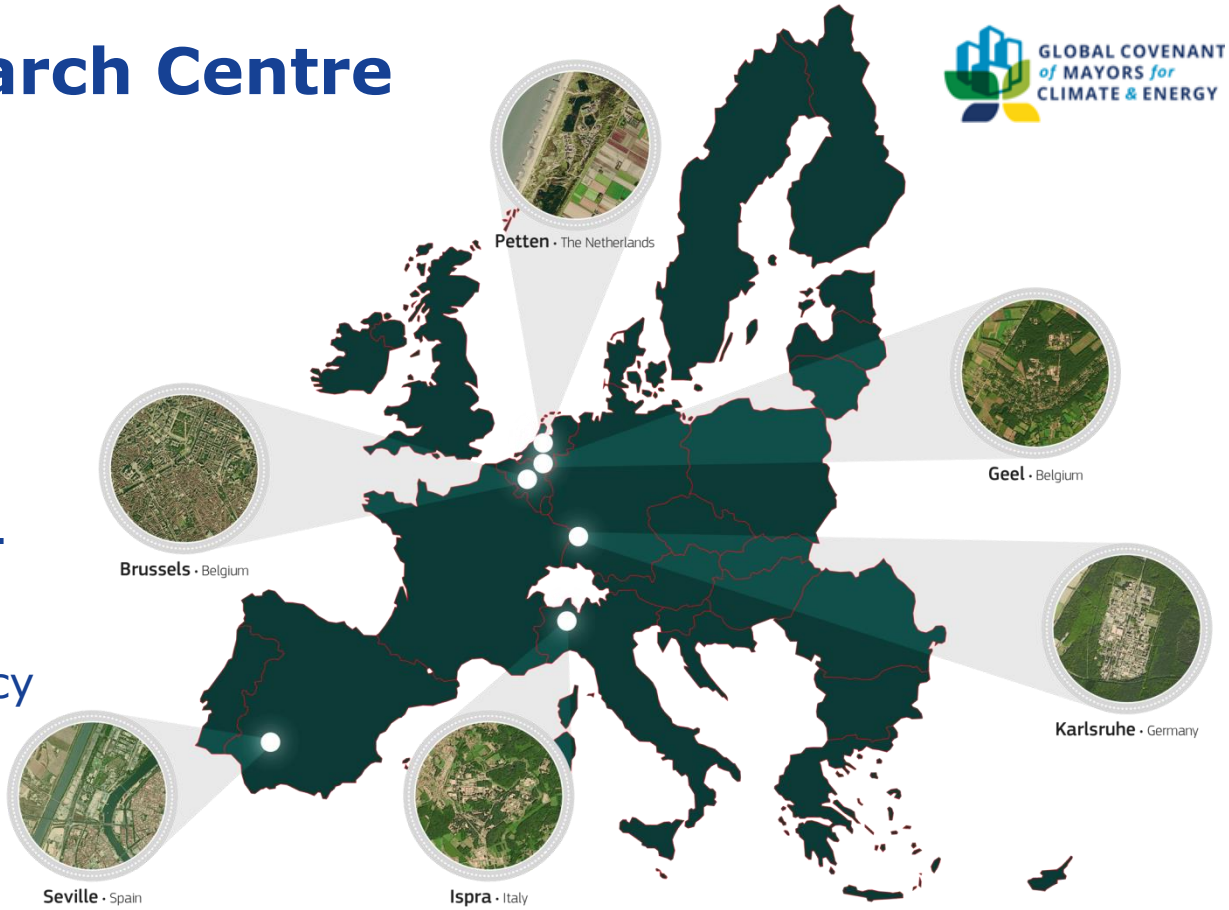
European Commission

The Joint Research Centre at a glance

3000 staff
Almost 75% are scientists and researchers.
Headquarters in Brussels and research facilities located in 5 Member States.

Main activity:
Scintific support to EU policy making.

Our team is in the Energy, Climate and Trasport Directorate



GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

European Commission

Role of the JRC since 2008

- Research on existing methodologies and tools for the development of the Covenat of Mayors
- Development of the guidebook "How to develop a (SEAP)"
- Continuous improvement of data collection process
- Evaluation of submitted SECAPs, with feedback to Covenant cities
- Development of a specific monitoring template & instructions for signatories
- Overall assessment of the initiative and publication of reports
- Capacity building (technical trainings for cities and regions)

European Commission

JRC SCIENCE FOR POLICY REPORT

Guidebook 'How to develop a Sustainable Energy and Climate Action Plan (SECAP)'

Part 1 - The SECAP process, step-by-step towards low carbon and climate resilient cities by 2030

Bertoldi, P. (editor)

Full list of authors in the acknowledgements

2018

Covenant of Mayors for Climate & Energy EUROPE

European Commission

Role of the JRC in GCoM

- Help Regional secretariat with technical support
- Workshops and training sessions
- Help for two cities per region in developing the Climate Action Plan, starting from data gathering
- Evaluation of submitted CAPs, if needed, with feedback to Covenant cities
- Development of a specific monitoring template & instructions for signatories
- Preparation of Regional Guidebook.
- Capacity building (technical trainings for cities and regions)

- **Covenant of Mayors is a platform for inter-institutional co-operation, built on the principles of subsidiarity**

- **Common objectives and support is fixed at International and National level, but ACTION takes place on the local level, with several local benefits**

"... By connecting with our European partners and reinforcing our commitment to such valuable initiatives as the Covenant of Mayors, we can work together in strengthening Europe's green economy..." *Emer Costello, Lord Mayor of Dublin (IR)*

"...It is important for me to be encouraged by others and maybe encourage people by our experience..."
Bo Frank, Mayor, Växjö (SE)

The GCoM Pillars

- **Mitigation,** more details to follow
- **Adapation**
- **Access to Sustainable Energy**

The 10 key principles

The principles are linked to the commitments taken by Covenant signatories and constitute key ingredients of success. They are described in the Guidebook "How to develop a SEAP", Part I, which is currently being updated.




I. Approval by the municipal council (or equivalent decision-making body)

Strong political support is essential to ensure the success of the process, from SE(C)AP design to implementation and monitoring

II. Commitment for a reduction of CO_2 emissions by at least 20% by 2020 and/or 40% by 2030

The SE(C)AP must specify the CO2 reduction objective of the local authority.

Ideally also:

- *A longer-term target (e.g. to 2050)*
- *Targets on energy savings or on local energy production from renewables should be specified*
- *Sector-specific targets*

Example of CoM Cities' objectives

Riga:
44% emission reduction by 2020

Ghent:
20% emission reduction by 2020
Carbon neutral by 2050

Amsterdam:
climate-neutral municipal organisation in 2015
40% emission reduction by 2020

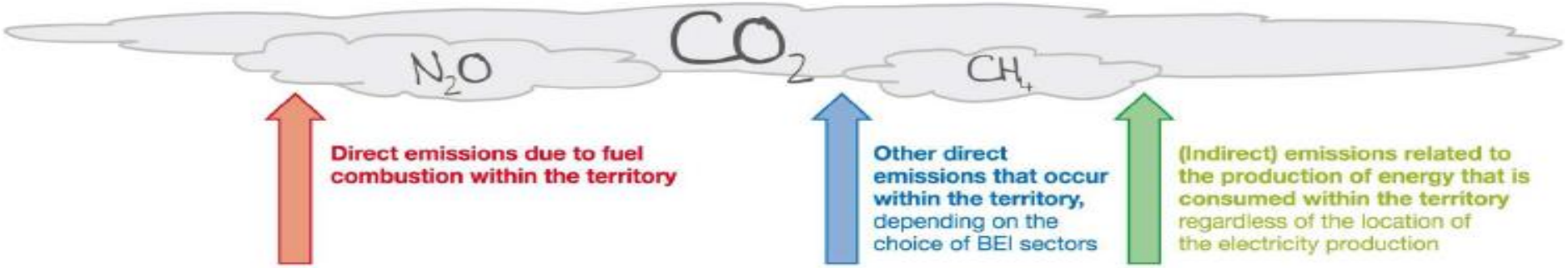
Gothenburg:
21% emission reduction by 2020
<2 tons/capita by 2050

III. CO_2 baseline emission inventory (BEI), risks and vulnerabilities assessment (RVA)

A sound knowledge of the local situation is necessary → carry out an assessment of the current framework which includes:

- *CO_2 baseline emission inventory (BEI)*
- *Risks and vulnerabilities assessment (RVA)*

- *The data collection process should be well documented*



IV. Comprehensive measures that cover the key sectors of activity

The SEAP has to contain a coherent set of measures covering the key sectors of activity

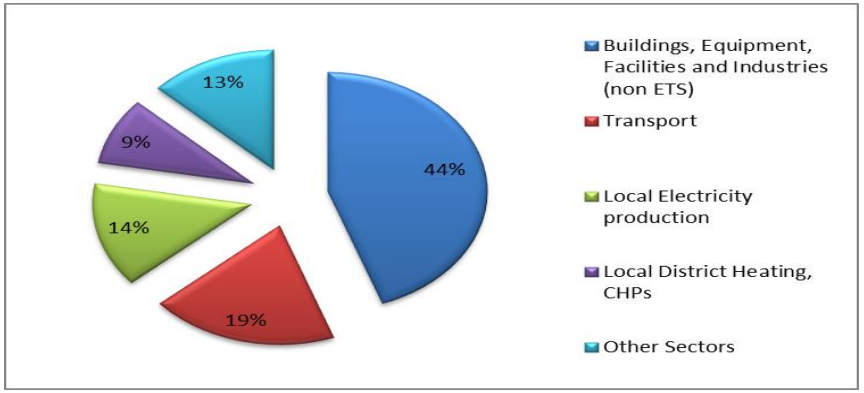
Before starting the elaboration of actions and measures, the establishment of a long-term vision with clear objectives is highly recommended.

Priority areas for action GCoM:

The choice of sectors to tackle and of specific measures to implement is entirely left to the responsibility of the Signatory, depending on:

- **political mandate** of the Mayor
- **national framework** (regulations, grants, incentives, etc.)
- **size of the local authority** (availability of human & financial resources, expertise, etc.)

Breakdown of expected GHG emissions reduction by field of action in 2020



But also…

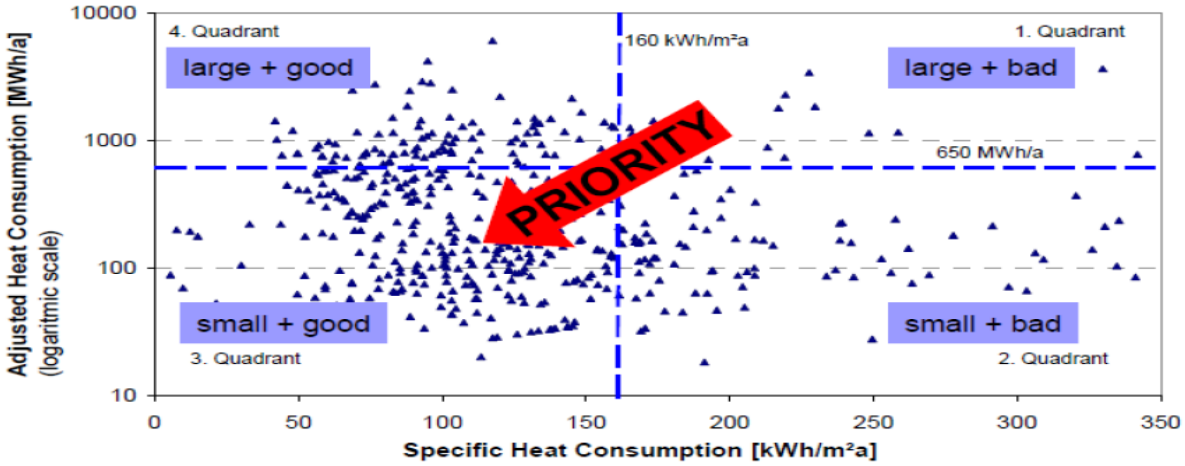
- Strategic urban planning:
  - The SE(C)AP can be an instrument to prevent rapid and uncontrolled city growth, by promoting mixed land use and encouraging sustainable mobility.

    Ex. Stockholm: efficient social planning, anticipating the increased demand for housing and transportation

- Working with citizens and stakeholders:
  - The SE(C)AP development and implementation requires coordination with citizens and other actors, consensus-building approaches, reduced duplication of efforts.

Example
Munich (1,4 million inh.): Energy saving concept

50 % of the city's municipal buildings stock examined to identify potential for energy savings



Highest priority given to the renovation of properties in quadrant 1: high relative saving potential, but also a high absolute saving potential.

V. Strategies and actions until 2020 and 2030 (and possibly beyond)

The plan must contain a clear outline of the strategic actions that the local authority intends to take in order to reach its commitments in 2020 or 2030. It has to contain:

Long-term strategy and goals

Detailed measures for the next 3-5 years which translate the long-term strategy and goals into actions, with assigned responsibilities, cost estimations, impact estimations

Example

Stockholm (830000 inh.):

- *90 % of buses will be powered by renewable fuels before the end of 2020*
- *100% of newly registered private cars should be independent of fossil fuels by 2020*
- *The bus fleet will be fossil fuel-free by 2025*

VI. Mobilization of all municipal departments involved

The SE(C)AP should outline which structures are in place or will be organised in order to implement the actions and follow the results.

It should also specify what are the human resources made available.

Example

4) Staff capacity allocated

SEAP preparation*:

	Full-time equivalent job(s)
☑ Local authority	8
☐ Local/regional energy agency	
☑ External consultant	5
☑ Covenant Territorial Coordinator	1
☐ Other	

In each municipality/city, different civil servants are involved in CoM. In total 1 FTE is reached by each participating municipality/city with less than 15.000 inhabitants for SEAP preparation and implementation. Municipalities and cities with more than 15.000 inhabitants reach 2 FTE.

Example

The city management office is responsible for the administration of the SEAP and the Environment and health administration is responsible for developing and following up the SEAP.

Consultants aid in conducting background research and communication with some stakeholders.

A steering committee for development of the SEAP consists of representatives from the city management office, city development administration, traffic and waste administration, city planning administration and real estate administration.

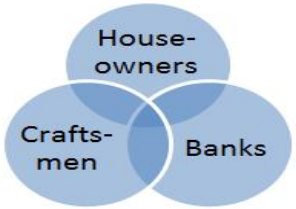
VII. Engagement of all relevant stakeholders and empowerment of citizens

The plan has to describe how the civil society has been involved in its elaboration, and how they will be involved in implementation and follow up.

Build support from
STAKEHOLDERS:
if they support the SEAP nothing should stop it!

Sonderborg (75000 inh.): Project ZERO

Shift in focus in the elaboration and implementation of their plan:



From: the municipality initiating and proposing actions consulting the stakeholders

To: the municipality takes the role of a partner together with all interested parties in developing a vision for the local community

Public-private partnership called ProjectZERO:

ZEROcarbon community by 2029:

CO_2-neutral growth and sustainable urban development

VIII. Financing

*A plan cannot be implemented without **financial resources**. The plan should identify the key financing resources that will be used to finance the actions*

Example

7) Foreseen financing sources for the implementation of your SEAP

Please specify the %

- [x] **public**
  - [x] Local Authority's own resources: 54
  - [x] National Funds and Programmes: 36
  - [x] EU Funds and Programmes: 0
- [x] **private**
  - [x] Private: 10

100

IX. Monitoring and reporting

The SE(C)AP should contain a brief outline on how the local authority intends to ensure the follow-up of the actions and monitor the results

For each action, progress based indicators should be defined

Regular adjustments of the actions based on new opportunities/findings

X. SE(C)AP submission and filling the template

Covenant signatories commit to:

submitting their SEAPs within 1-year following adhesion

submitting their SECAPs within 2-year following adhesion

The SE(C)AP must be uploaded in national language via the Covenant of Mayor's website + online SEAP template in English.

The template has to be filled carefully with sufficient level of detail, and should reflect the content of the SE(C)AP.

An adaptation of the 10 key principles might be needed in order to better suit the different reality of local authorities in **other regions of the world**, compared to EU signatory cities.

Which key principles are already applicable?

Which ones need to be reconsidered?

Conclusions

- Good quality and **reliable data** is essential for **Mitigation and Adaptation Action**.
- The **availability** and **sources** of energy data are country/region dependent
- **Difficult** to assess the consumption of energy vectors that are **not distributed via a grid** (heating oil, biomass …). Surveys are often required to complement this data.
- Importance of **utilities** /**energy suppliers** / **grid operators**: **they own** the **primary data** !!!
- **Territorial coordinators** (e.g. supporting structures) and other National/ regional authorities can play a **key role** in collecting data and making it available to local authorities
- **Aggregated data** is not enough: need data for each energy vector, for community, for **each category of customer** (households, public sector, industry, services)
- Data related to **transport** and mobility: **difficult** to be estimated
- **Adaptation and Access to Energy also important components**

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