



MRV Tools for Building Energy Policy Action Plans

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Agenda

Why use a common carbon metric?

- Purpose of MRV Energy & GHG calculations – relevance to NAMA development & policy action plans

What is the Common Carbon Metric (CCM2.0)?

- History & Development of the tool

How does the CCM2.0 work?

- Introduction to the main features of the CCM2.0

Introduction to the training exercise

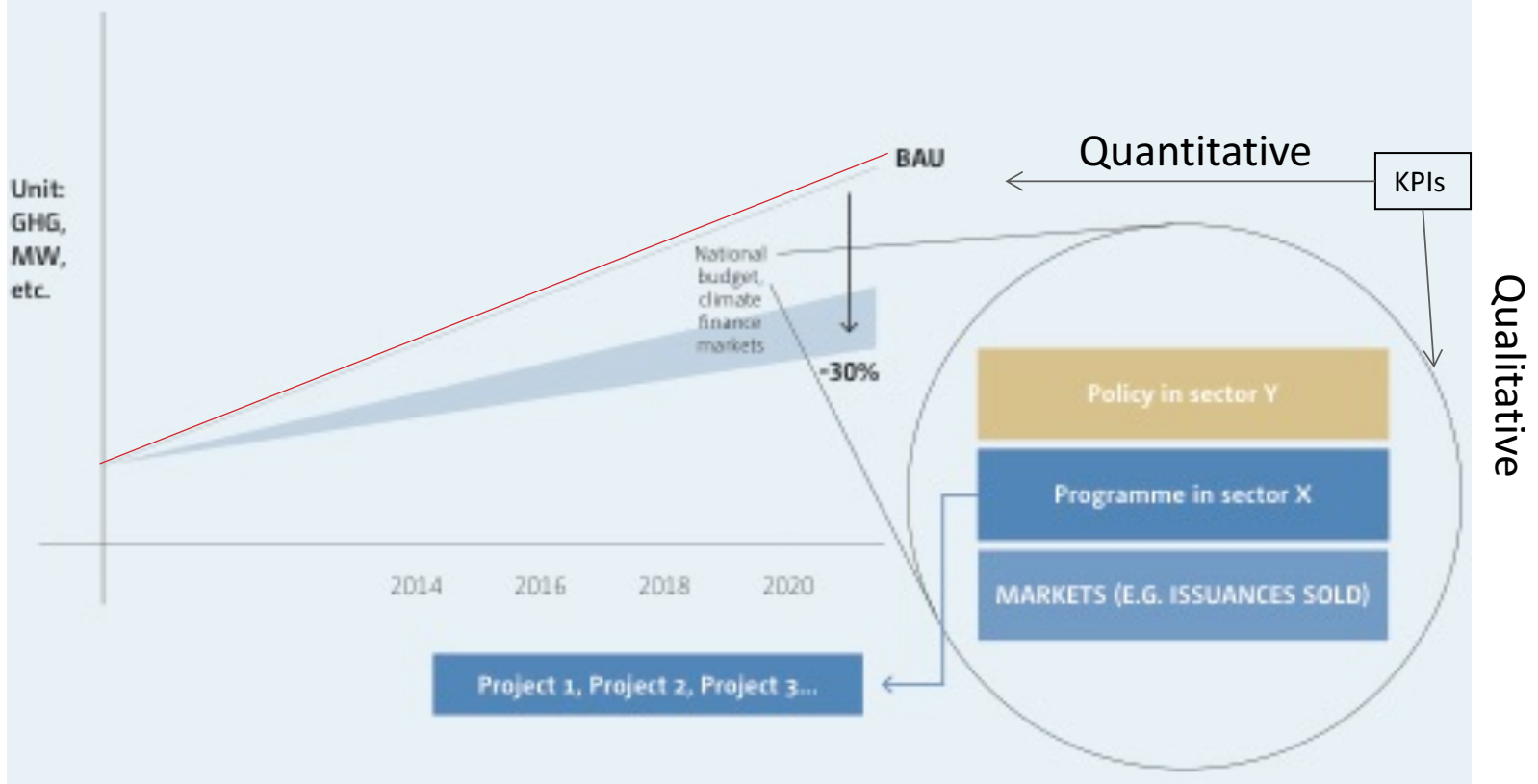


Why use a common carbon metric?

- Understand the lock-in risk of BAU
- Understand the GHGe and Energy Savings Potential of building stock
- Support applications for climate finance requiring MRV data
- Designing building sector mitigation actions including policy actions & NAMAs

Accessing Climate Financing – Providing MRV Baselines

Mitigation measures: from reduction below BAU to concrete projects



Source: UNFCCC MRV Guidelines 2013s

Developing Policy Action Plans & NAMAs

1. Stock Taking

- Existing policies and policy context;
- Transformational, Tools, Technologies & Designs
- Work force skills & capabilities;
- Information, Knowledge and Awareness

2. Scenario analysis & Goal setting

- **MRV Base-line & Mitigation Scenarios**
- Market Data and Assumptions
- Best-Practice Scenarios
- Co-Benefits Analysis

3. Implementation Road-Maps

- Key Milestones & strategic targets

- Monitoring, Evaluation & Reporting

4. Financing

- **MRV Requirements**
- NAMA, World Bank, Dev. Banks, GEF
- Bi-lateral and Multi-lateral funds



What is the Common Carbon Metric 2.0?

A tool for measuring building energy related greenhouse gas (GHG) emissions and energy savings potential of the stock of new and existing buildings in an investment portfolio, municipality, region or country.

Developed by:

Supported by:



Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety



UNEP
United Nations Environment Programme



SEMANTIC WEB COMPANY
linking data to knowledge

CCM 2.0 Development

New features:

- Options for building policy scenarios
- Simpler methodology to 3CSEP-HEB
- Applicability to any country or city
- Modeling tool + data storage + LOD → growing coverage
- Data on existing policies
- Online vs offline mode

*Floor Area Model
Building types, vintages
Performance-based approach
Room for scenario analysis
Default data & assumptions*

*Similar input data needs
Simplicity of the methodology
Emission factors
Different levels of analysis*

CCM 2.0

3CSEP-HEB Model

Common Carbon Metric

Main Features



- Generates an energy demand and GHG emissions base-line
- Enables the development of energy saving and GHG mitigation scenarios
- Supports applications for climate finance under UNFCCC mechanisms such as the Nationally Appropriate Mitigation Actions (NAMA) and the Green Climate Fund (GCF)
- Based on a calculation methodology that conforms to 'measurable, reportable and verifiable (MRV) data standards
- Has informed the development of an ISO standard on carbon metric of buildings (ISO/TC59/SC17)

DOWNLOAD THE TOOL

Start here to download the CCM2.0 tool for use off-line. You must have completed training in the use of the CCM2.0 tool in order to access the off-line version.



DOWNLOAD

How does the CCM2.0 work?

Introduction to the main features of the CCM2.0

The CCM2.0 uses a three step approach to establishing building energy use and associated GHG emissions base-lines and mitigation scenarios.

Step 1: Establish baselines

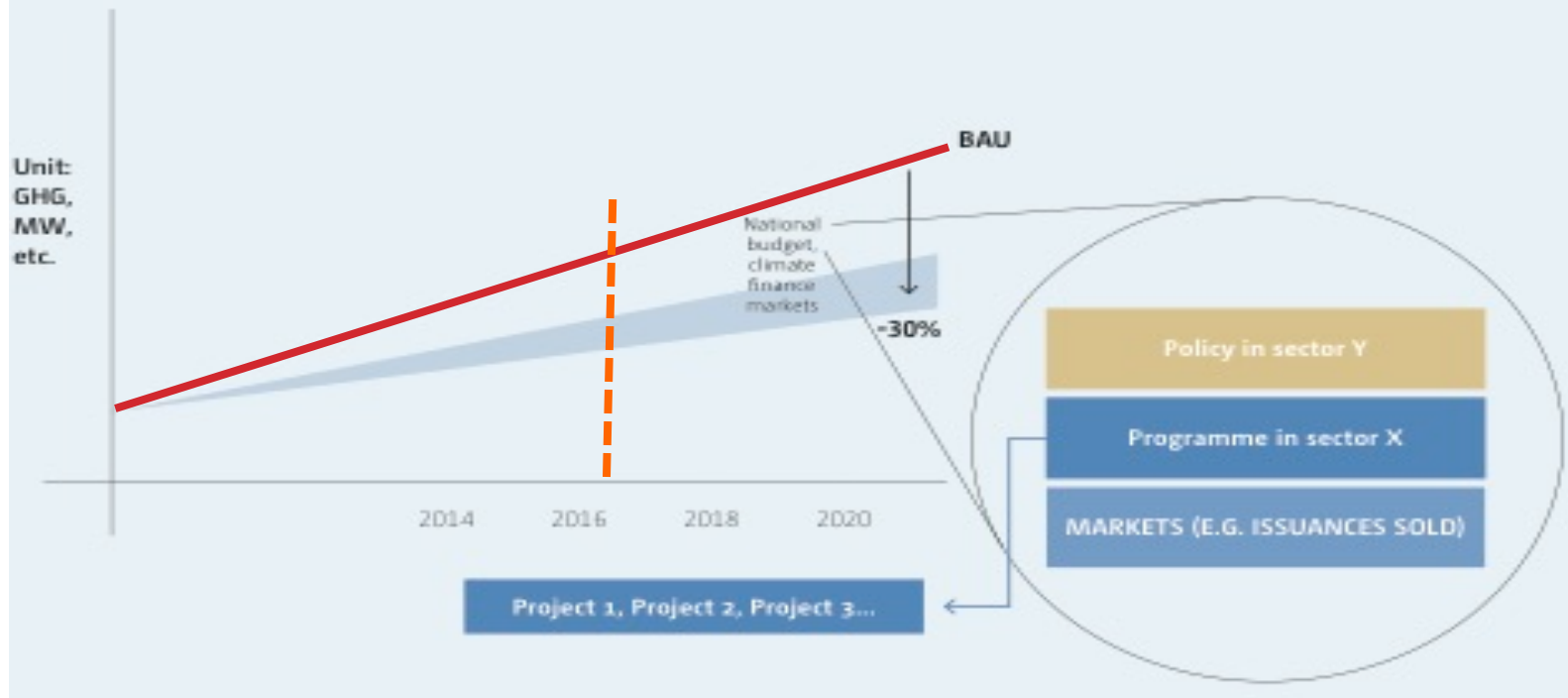
Step 2: Develop future line scenarios

Step 3: Analyze and compare results

Assuming you have all required data assembled, an assessment using the CCM2.0 should take no longer than one hour to complete. Where no measured data exists, please provide an estimate for all required data fields, noting these data as estimates in the Data Source column.

Please do not leave fields blank or enter zero (0) in any required fields.

Mitigation measures: from reduction below BAU to concrete projects



1. Establish Base-Lines



Baseline is a projection of current energy and/or emissions over time, which is used for measurement or comparison.

Baseline development

Top-down

- total building stock
- large scale
- lower level of detail

Useful if you only have access to aggregated building energy use data such as national, regional or municipal statistics on residential and/or non-residential energy-use.

Bottom-up

- individual buildings
- small scale
- high level of detail

Useful if you have more detailed measured energy use data from a representative sample of buildings in your building stock

Hybrid

- exemplary/typical buildings
- different possible scales
- variable level of detail

Used on a smaller scale, when it is important to analyse different influences on energy use and GHG emissions, or in cases where there is a lack of data.

Data: Top-down approach



- **Floor Area** of the Whole (stock) (m²).
- **Total occupancy** of the whole (number of occupants, or number of residents where information on occupancy is limited).
- Information on the **%** of the Whole's **occupants** and **building area** attributable to different categories of building stocks (%).
- At a minimum for : residential and non-residential buildings. Information on the **total amount of electricity** consumed by the Whole and on the amounts of **different types of fuels** used
- Information on the **%** of the **Whole's electricity and fuel use** that is **attributable to different categories of building stocks** (%).
- **Custom emission factors** may optionally be provided in place of the **default emission factors for electricity and fuel use**.

Data: Bottom Up approach



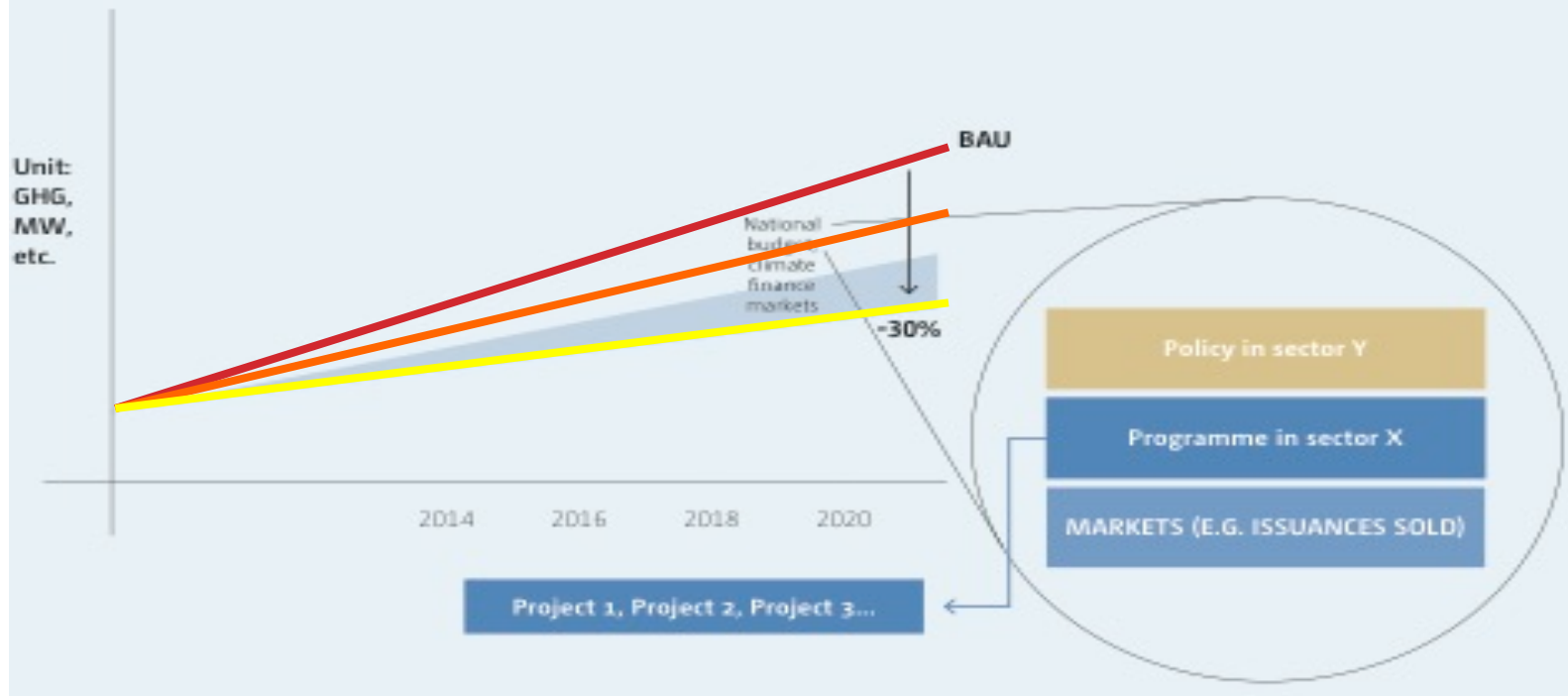
- **Descriptive information**, including **building name**, **building category**, year of construction and year of last major retrofit, and address.
- **Occupancy** (number of occupants) and **area** (m²).
- Data on the **total amount** of purchased and **metered electricity** (in kWh).
- Data on the **total amount of different fuels** consumed (various measurement units).
- Custom emission factors may optionally be provided in place of the default emission factors for electricity and fuel use.
- Users may optionally report the **amount of purchased green power** or the **amount of renewable energy that has been generated on-site and returned to the grid**



Data: Hybrid approach

- Specific energy consumption in **kWh/m²**
- Total energy use for different end-uses, building types, climate zones, etc
- Level of Region, Country or City
- Smaller scale, to analyze **different influences on energy use** and GHG emissions for **different building types or climate zones**
- Can be used when there is a lack of data, but a need for detailed assessment on larger scale (country, region, etc)

Mitigation measures: from reduction below BAU to concrete projects



2. Establish Future-Lines



‘Futurelines’ illustrate energy and/or emissions scenarios under certain (defined) conditions and assumptions. While the baseline aims at presenting the current state, the futureline aims at depicting possible futures.

Data: Future-Lines

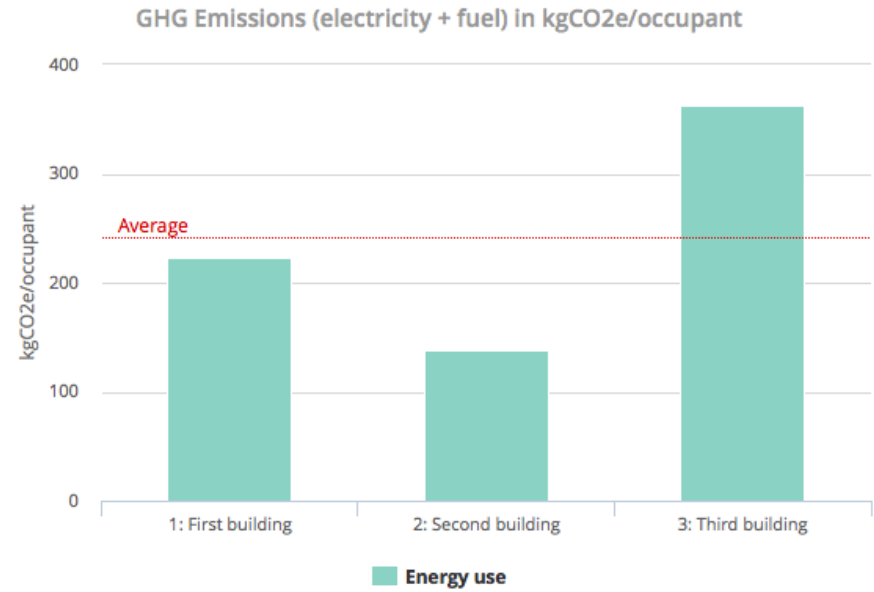
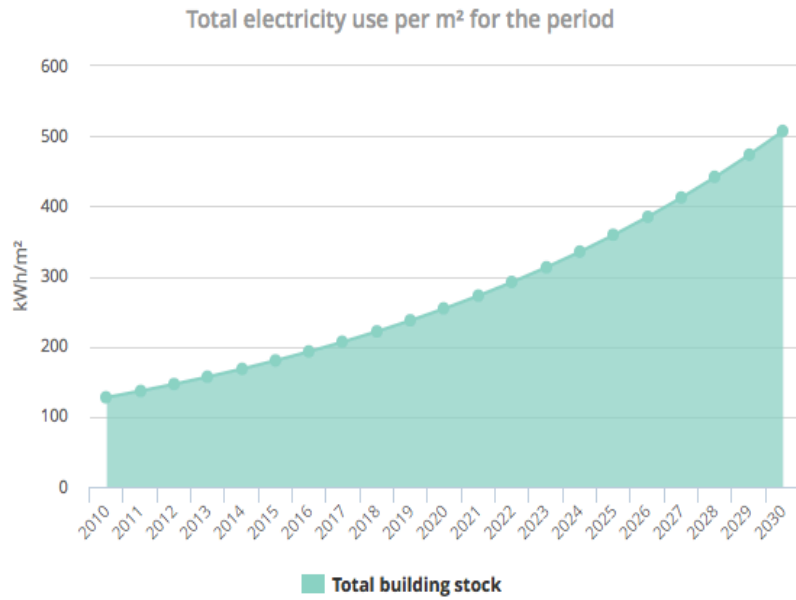


Upload a saved top-down baseline assessment

Data:

<i>Period of Analysis:</i>	Base year – 2050
<i>Renovation Rate:</i>	Fixed or Variable at X%/yr
<i>Demolition Rate:</i>	Fixed or Variable at X%/yr
<i>Construction Rate:</i>	Fixed or Variable at X%/yr
<i>Occupancy Rate:</i>	Fixed or Variable at X%/yr
<i>Electricity Use Change Rate:</i>	Fixed or Variable at X%/yr
<i>Oil Use Change Rate:</i>	Fixed or Variable at X%/yr
<i>Natural Gas Change Rate:</i>	Fixed or Variable at X%/yr

Note: Select variable for any of the above criteria to model changes in specific years or periods.



3. Analyze & Compare

Once you have established a baseline, you can generate comparisons of base-line and futureline scenarios and generate results in graphic or table formats. These outputs can be used to support policy recommendations, roadmaps and applications for climate finance.

THE CCM2.0 ONLINE TOOL

Start here to use the CCM2.0 on-line tool and data-base. This is the best place to begin if you have not received specific training in the CCM2.0 tool.



START USING THE TOOL

Introduction to the training exercise

DOWNLOAD THE TOOL

Start here to download the CCM2.0 tool for use off-line. You must have completed training in the use of the CCM2.0 tool in order to access the off-line version.



DOWNLOAD

Home / Assessments Directory

Assessments Directory

Here you can browse through all published assessments. The Assessment Directory is only available for authenticated users. Please login or register.

LOGIN

REGISTER

1a. Register & Log-in

User: Prof_Peter Password: Peter123

1b. Review the Assessment Directory

Open 'Baseline Top-Down' – This is an example of a completed 'top-down' baseline assessment
Explore the results in table and visual view. Note the data required and the units/metrics of outputs.

Open 'Baseline Bottom-Up' – This is an example of a completed 'bottom-up' baseline assessment
Explore the results in table and visual view. Note the data required and the units/metrics of outputs.

Definition of Building Type

Existing:

Buildings in current use

New:

Buildings in operation for less than 1 year

Retrofitted:

Buildings that have been recently retrofitted



Test v1 | Top-down | Baseline | 2014 | Portfolio of individual buildings

1.1

Baseinfo questions

Would you like to conduct baseline or future-lines assessment?

- Baseline
- Futureline

Name of your Assessment

Test v1

Description

Testing Tool on Commercial Buildings in Malaysia

Please, select the approach you would like to use for your assessment

- Top-down
- Bottom-up
- Hybrid

Specify the year of your baseline

2014

Please, indicate the level you would like to make the assessment for

- Region
- Country
- City
- District
- Portfolio of individual buildings

Please, select the building types you have data for

- Total for residential
 - Single-family
 - Multifamily
 - Other residential
- Total for non-residential
 - Offices
 - Hotels
 - Mercantile & services
 - Food service
 - Education
 - Public assembly
 - Health care
 - Institutional lodging
 - Other non-residential

NEXT QUESTION

SAVE COMPLETED ASSESSMENT

QUICKSAVE ASSESSMENT

Link to IEA Unit converter: <https://www.iea.org/statistics/resources/unitconverter>



Test v1 Top-down Baseline 2014 Portfolio of individual buildings

- 2.1
- 2.2
- 2.3
- 2.4
- 2.5
- 2.6
- 2.7
- 2.8

Please, provide the data for total floor area in the portfolio of your interest in m2 and indicate whether it is measured or estimated

Warning, editing an already finished question may result in data loss in follow-up questions.

Floor area	Unit	Data type ⁱ	Total value	Source of data
Total building stock	m ²	Based on ▾	245528784	NAPIC

PREVIOUS QUESTION NEXT QUESTION

SAVE COMPLETED ASSESSMENT

QUICKSAVE ASSESSMENT

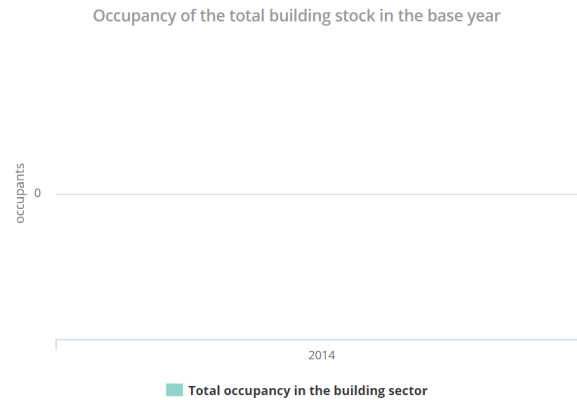
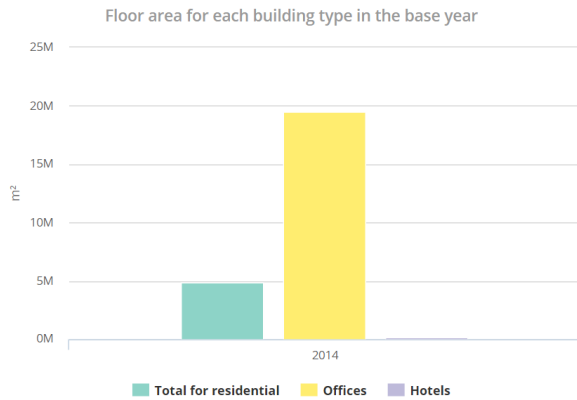
Link to IEA Unit converter: <https://www.iea.org/statistics/resources/unitconverter>

RESULTS

Test v1 Top-down Baseline 2014 Portfolio of individual buildings

table view visual view

^ Floor area & Occupancy



- Electricity use
- Fuel use
- GHG emissions

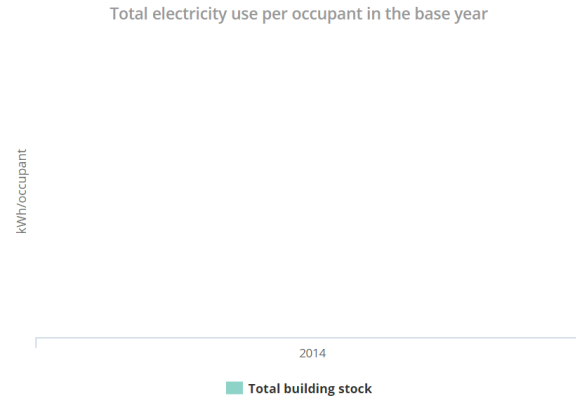
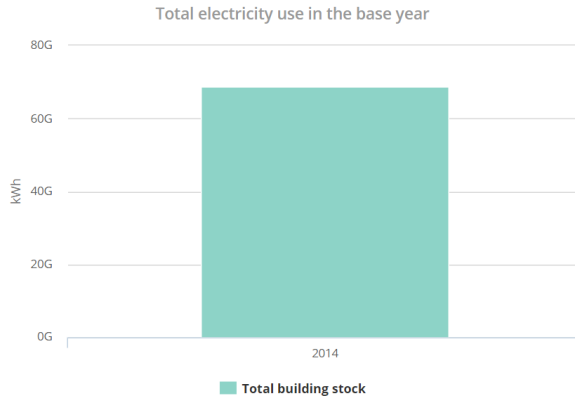
+ CREATE A NEW ASSESSMENT

EDIT ASSESSMENT

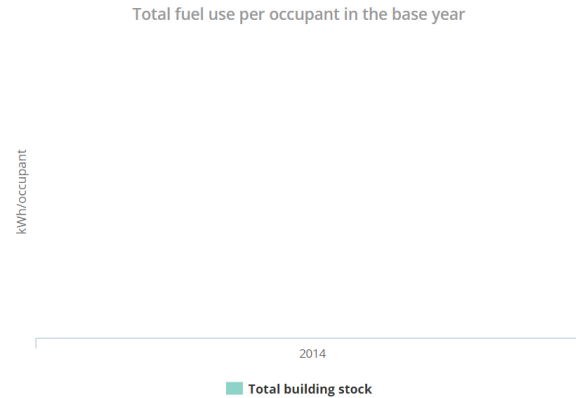
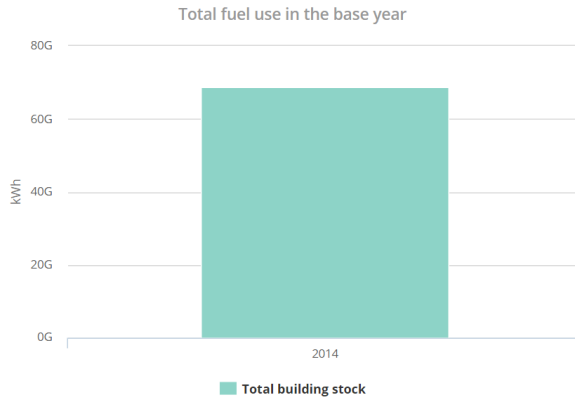
DOWNLOAD CSV



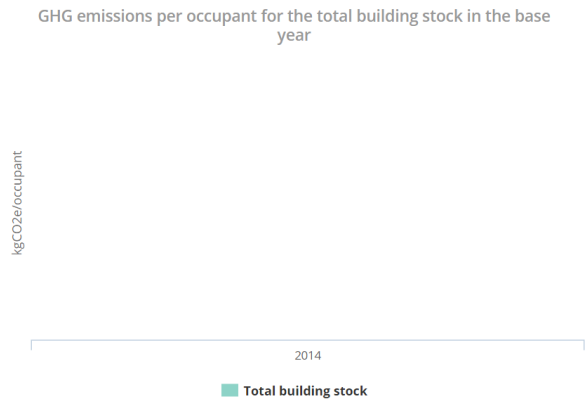
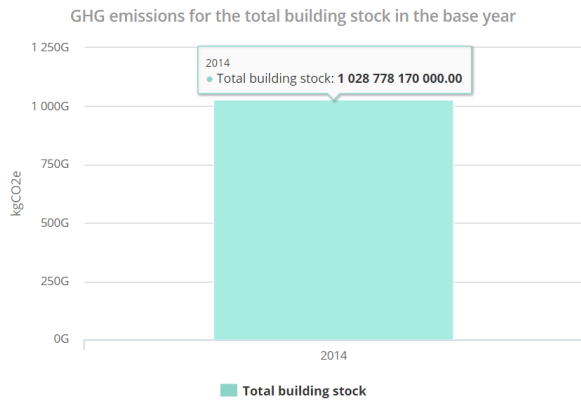
^ Electricity use



^ Fuel use



GHG emissions



[+ CREATE A NEW ASSESSMENT](#) [✎ EDIT ASSESSMENT](#) [📄 DOWNLOAD CSV](#)

RESULTS

Test v1
↓ Top-down
Baseline
2014
Portfolio of individual buildings

table view

visual view

^ Floor area & Occupancy

Floor area for each building type in the base year (m²)

Building types	2014
Total for residential	4831791
Offices	19491359
Hotels	205634

Occupancy of the total building stock in the base year (occupants)

Building types	2014
Total occupancy in the building sector	0

^ Electricity use

Total electricity use in the base year (kWh)

Building types	2014
Total building stock	68756560000

Total electricity use per occupant in the base year (kWh/occupant)

Building types	2014
Total building stock	Infinity



^ Fuel use

Total fuel use in the base year (kWh)

Building types	2014
Total building stock	68756560000

Total fuel use per occupant in the base year (kWh/occupant)

Building types	2014
Total building stock	Infinity

^ GHG emissions

GHG emissions for the total building stock in the base year (kgCO2e)

Building types	2014
Total building stock	1028778170000

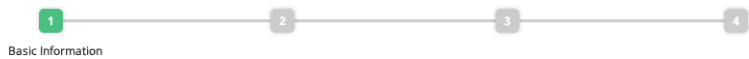
GHG emissions per occupant for the total building stock in the base year (kgCO2e/occupant)

Building types	2014
Total building stock	Infinity

[+ CREATE A NEW ASSESSMENT](#)

[EDIT ASSESSMENT](#)

[DOWNLOAD CSV](#)



1. Basic Information

1.1

Name of your Assessment ⁱ

Please, select the approach you would like to use for your assessment ⁱ

- Top-down
- Bottom-up
- Hybrid

Would you like to conduct baseline or future-lines assessment? ⁱ

- Baseline
- Futureline(s)

Select a baseline

baseline one CREATE A NEW BASELINE

Specify the start and end year of your futureline

2014 to 2020

Type the name of your futureline

futureline 1

Please, indicate the level you would like to make the assessment for ⁱ

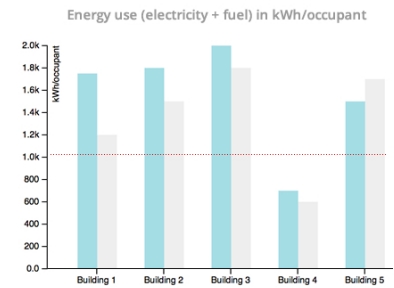
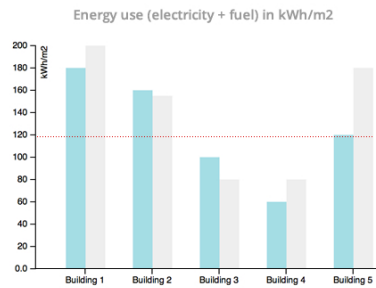
- Region
- Country
- City
- District
- Portfolio of individual buildings

SAVE & NEXT

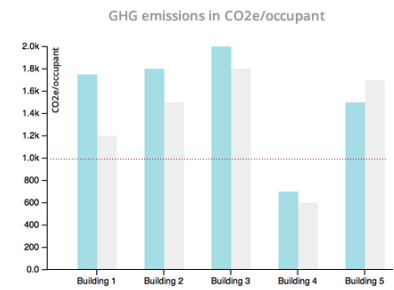
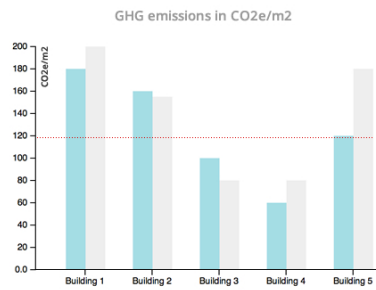
RESULT

table view visual view

Energy use Average for Building type Average



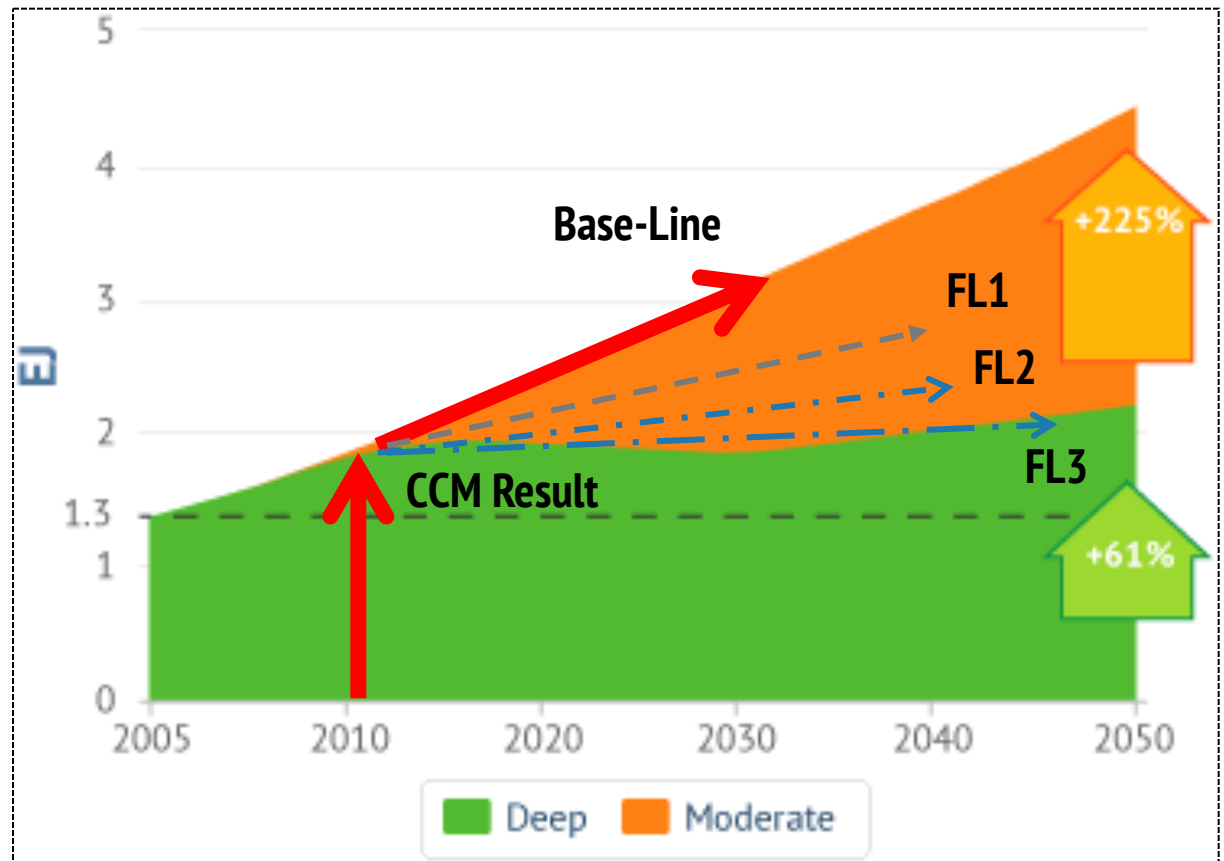
GHG emissions Average for Building type Average



CCM 2.0 baseline & Scenario (futureline)

Baseline Development that is expected without initiating any additional action to reduce emissions. The baseline is also referred to as 'business as usual',

Futureline While the baseline aims to present the current state, the futureline aims to predict the future scenarios

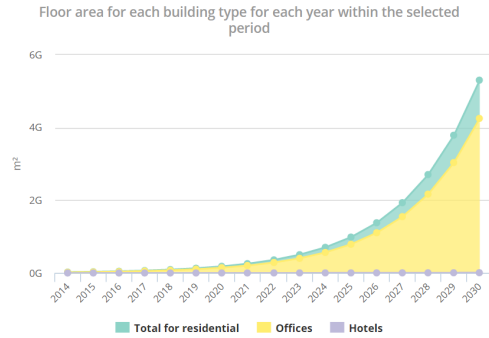


RESULTS

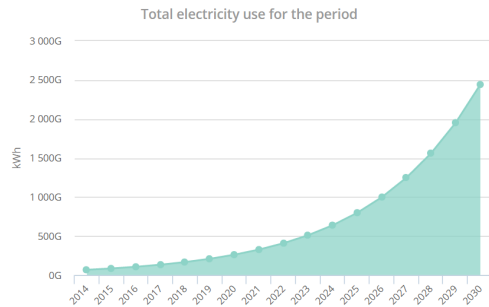
Test v4 | Top-down | Futureline | 2014 - 2030 | Portfolio of individual buildings

table view visual view

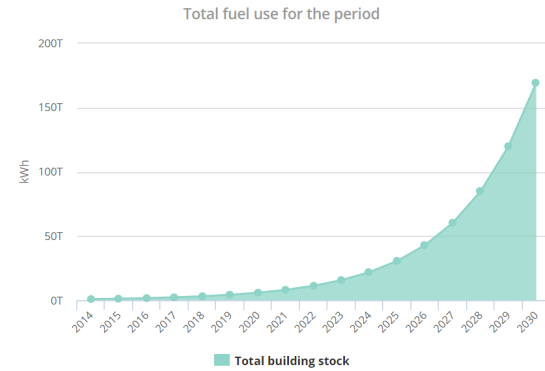
^ Floor area



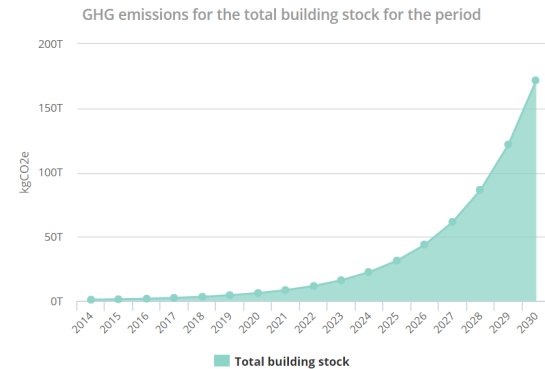
^ Electricity use



^ Fuel use



^ GHG emissions



Further application of CCM

- CCM has helped to establish a system of **MRV** indicators for the follow-up of policy implementation and reporting on building-related GHG emissions,
- **Nationally Appropriate Mitigation Actions (NAMAs)** To facilitate NAMAs, a globally consistent MRV methodology is essential to measure and track energy use and energy reductions from buildings.
- **CCM is able to support the establishment of baselines from the sector or sub-sector** (residential, commercial, etc.), thus allowing measurement over time of increased efficiency and GHG reductions from a particular building stock. (UNEP DTIE project -NAMAs for the Building Sector in Asia)
- **ISO standard** CCM has informed the development of an ISO standard on carbon metric of buildings (ISO/TC59/SC17).

Thank you!

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