D4.3 –REFEREE Documentation and tutorial

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000136.

www.refereetool.eu

REFEREE: Real Value of Energy Efficiency
Results from the scoping analysis

Project Acronym	REFEREE
Project Title	Real Value of Energy Efficiency
Grant Agreement No	101000136
Project Start Date	1 October 2020
Project End Date	30 June 2024
Call Identifier	LC-SC3-EC-4-2020
Funding Scheme	Research and Innovation Action (RIA)
Project Website	http://refereetool.eu/

Deliverable Information

Deliverable No	D 4.3
Deliverable Title	REFEREE Documentation and tutorial
Work Package No	4
Work Package Lead	MCRIT
Contributing Partners	CE, BAUM, ISINNOVA, JDI, CSD, EEB
Deliverable Type	Report
Dissemination Level	Public
Author(s)	MCRIT: Isaac Farradellas, Oriol Biosca, Efrain Larrea, Harold Del Castillo, Rafa Rodrigo, Andreu Ulied, Marta Carbonés, Camila Álvarez CE: Iakov Frizis, Ornella Dellaccio; Jon Stenning BAUM: Dario Pagnia, Joshua Dietz, Patrick Ansbacher, Rita Dornmair ISINNOVA: Stefano Faberi, Giorgia Galvini JDI: Klervi Kerneïs, Alicia Barbas CSD: Martin Vladimirov, Kalina Tcolova EEB: Davide Sabbadin, Luke Haywood, Alberto Vela
Contributors	-
Contractual Deadline	30th November 2023 (Amendment: 31st February 2024)
Delivery Date	February 2024

Version Management

Version	Date	Authors	Description of Change
1.0	08/02/2024	MCRIT: Isaac Farradellas, Oriol Biosca, Efrain Larrea, Harold Del Castillo, Rafa Rodrigo, Andreu Ulied, Marta Carbonés, Camila Álvarez CE: Iakov Frizis, Ornella Dellaccio; Jon Stenning BAUM: Dario Pagnia, Joshua Dietz, Patrick Ansbacher, Rita Dornmair ISINNOVA: Stefano Faberi, Giorgia Galvini JDI: Klervi Kerneïs, Alicia Barbas CSD: Martin Vladimirov, Kalina Tcolova EEB: Davide Sabbadin, Luke Haywood, Alberto Vela	Draft Final

Partners

Partner	Short name	Principal Investigator
MCRIT	MCRIT	Mr Oriol Biosca

Table of Contents

1 Objectives and activities carried out

This report contains the REFEREE user Manuals and Guidance. It documents the tools and provides tutorials for users.

Complementing this report, Guidance is also available online via the tool platform. All its components are available on the REFEREE Website: https://refereetool.eu/presentation-referee-tool/

This report is structured in three chapters:

a) Documentation and Guidance for the European tool

b) Documentation and Guidance for the Localities tool

c) User tutorials for both models, for tool usability step by step

For more information about the offline and online tools, additional information is available in Deliverables D4.1 and D4.2 of the REFEREE project.

2 Documentation and Guidance for the European tool

The documentation of the European Tool is structured in the following chapters:

A) **Main page.** Once the dashboard is opened, the main page will be displayed to the user. It will show a brief description of the dashboard and the navigation panel with the different sections offered.

B) **Contextual information.** Historical overview of key indicators spanning from 1990 to 2020 for your selected European. These trends provide a valuable context to complement the results from the REFEREE Tool.

C) **Benchmark options.** Information on the different reference scenarios that are offered as benchmark options through the REFEREE Tool interface for EU and country level policy assessment. At the bottom of the page, a set of key variables are displayed to provide a quantitative overview of the modelling differences associated with using each reference scenario.

D) **Policy options.** Which are offered through the REFEREE interface. Users should have this page open when designing a policy package. The information provided in this page will be valuable to users who need to better understand how the different policy options are introduced to the modelling framework, and what the policy scaling factor "intensity" means for each policy choice.

- **Policy type.** The REFEREE interface allows users to design a policy package by defining a certain set of policies. The first selection that users are requested to make for each policy is the policy type. For a given policy type, the intensity selection is associated to an appropriate unit. The page offers information on the definition of the selected policy type, an example, and the way the intensity input is interpreted by the EU and country level policy assessment tool.

- **Policy focus.** For each policy type selected, users are requested to select a valid model and subdivision option. The Model selection refers to the Future Technology Transformation model that will need to be called to assess technology deployment in response to the policy intervention. Some of the Technology Transformation models require users to select a subdivision, which determines the

technology target. The page offers information on the definition of the selected model or subdivision.

E) **FAQ.** This section presents key information relating to the simulation capabilities of the country policy assessment tool.

Guidance of the European model can also be consulted through an online **interactive dashboard** available at:

https://refereetool.eu/landing-page-referee-tool-national/

Interactive guide for the EU & country policy assessment tool

This dashboard offers supporting information for users of the EU and country policy assessment tool. Tool users are encouraged to consult this dashboard during the design of policy packages for simulation through the tool. Below you will find a navigation panel that will allow you to access the various pages of the dashboard.

Dashboard data 

Contextual Information | Reference Scenarios | Policy options | Indicators | FAQ

Contextual information

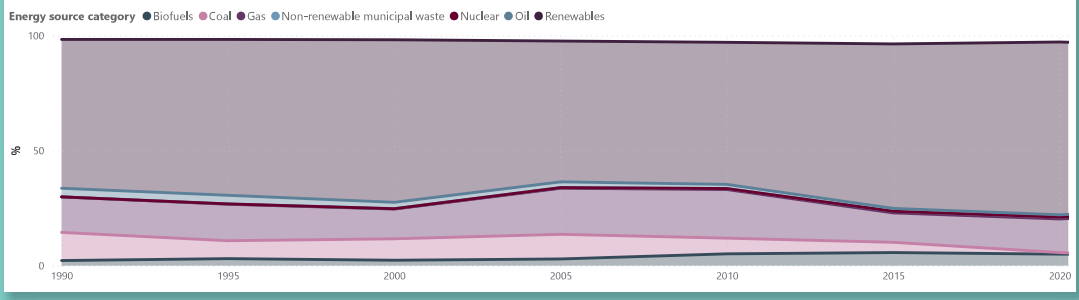
This page offers a historical overview of key indicators spanning from 1990 to 2020 for your selected Member State. These trends provide a valuable context to complement the results from the REFEREE Tool. Please make your country selection from the menu below and then scroll down to explore the charts.

Austria	Cyprus	Finland	Hungary	Lithuania	Poland	Slovenia
Belgium	Czech Republic	France	Ireland	Luxembourg	Portugal	Spain
Bulgaria	Denmark	Germany	Italy	Malta	Romania	Sweden
Croatia	Estonia	Greece	Latvia	Netherlands	Slovakia	

Electricity generation mix (%)

Share of energy source in the electricity generation mix

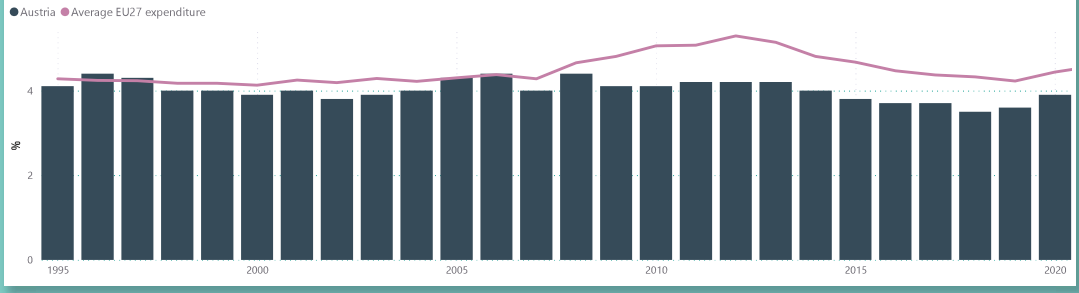
Source: EuroStat (Accessed 07/03/23)
Online data code: nrg_bal_peh



Consumer energy expenditure (% of total)

Total consumer expenditure of all energy products as a share of total consumer expenditure

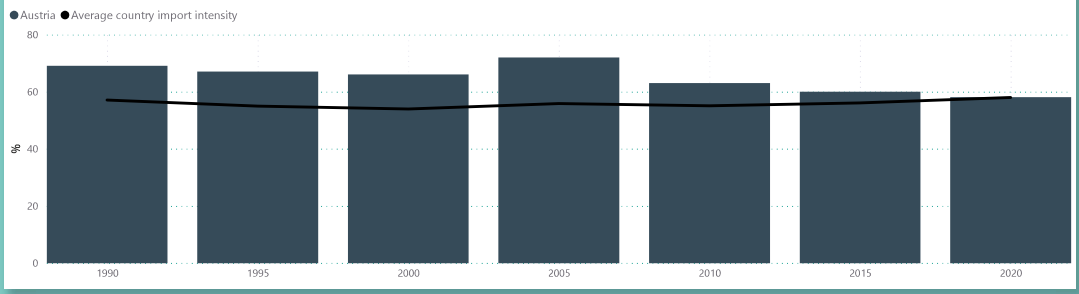
Source: EuroStat (Accessed 06/03/23)
Online data code: nama_10_co3_p3



Fossil fuel import intensity (%)

Share of total fossil fuel supply

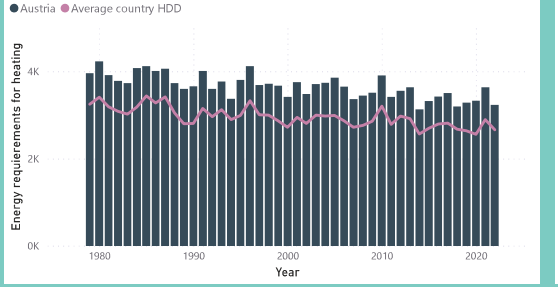
Source: EuroStat (Accessed 06/03/23)
Online data code: nama_10_co3_p3



Heating Degree Days (HDD)

Weather-based index values describing the energy requirements for heating in buildings

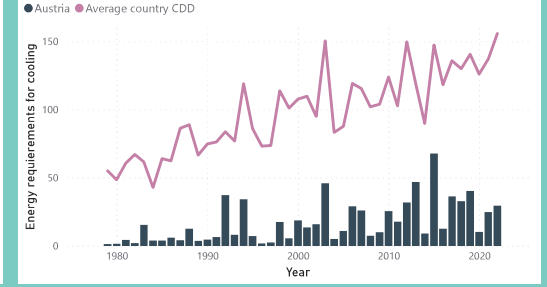
Source: EuroStat (Accessed 06/03/2023)
Online data code: nrg_chdd_a



Cooling Degree Days (CDD)

Weather-based index values describing the energy requirements for cooling in buildings

Source: EuroStat (Accessed 06/03/2023)
Online data code: nrg_chdd_a



Contextual Information | Reference Scenarios | Policy options | Indicators | FAQ

Benchmark options

This page offers information on the different reference scenarios that are offered as benchmark options through the REFEREE Tool interface for EU and country level policy assessment. At the bottom of the page, a set of key variables are displayed to provide a quantitative overview of the modelling differences associated with using each reference scenario.

EU27	Croatia	Estonia	Greece	Latvia	Netherlands	Slovakia
Austria	Cyprus	Finland	Hungary	Lithuania	Poland	Slovenia
Belgium	Czech Republic	France	Ireland	Luxembourg	Portugal	Spain
Bulgaria	Denmark	Germany	Italy	Malta	Romania	Sweden

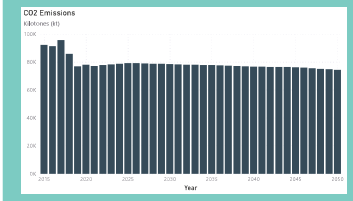
List of indicators
- CO2 Emissions
- Coal fuel consumption
- Oil consumption
- Gas fuel consumption
- Coal prices
- Gas prices
- Oil prices
- Petrol prices
- Electricity prices

2015 2060

For the models employed in developing the time series data for the 4 reference scenarios, 2020 is taken as the first year of projection. The years before 2020 are hence not part of the simulation but rather actual observations.

Reference 1

The Reference 1 scenario is aligned with the EU Reference Scenario 2020 (Primes Reference Scenario 2020).



Scenario description

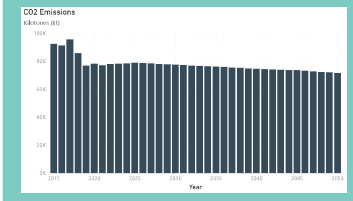
The EU 2020 Reference Scenario is a comprehensive assessment of the future of the European Union's (EU) energy system, transport sector, and greenhouse gas (GHG) emissions. It projects the impact of various macroeconomic, fuel price, technology trends, and policies on the evolution of these sectors. The scenario covers the 27 EU Member States collectively and individually.

Key features of the EU 2020 Reference Scenario include:

- **Energy consumption:** Total energy consumption in the EU is projected to increase by around 10% between 2020 and 2030, primarily driven by the growth in the transport sector. However, energy intensity (energy consumption per unit of GDP) is expected to decrease by about 30%, reflecting

Reference 2

The Reference 2 scenario builds on Reference 1 by adding a set of measures that are identified as relevant and key in driving energy sector developments in Europe. These policies have been identified following a detailed review of the EPBD, Fit for 55 and RePowerEU. The Reference 2 calibration is limited by knowledge availability (Sept 2023) and the type of measures that can be simulated through the REFEREE Tool.



Scenario description

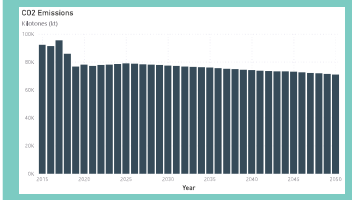
Energy Performance of Buildings Directive (EPBD):
The Energy Performance of Buildings Directive (EPBD) is a key piece of EU legislation that sets minimum energy performance requirements for new and existing buildings. The revised EPBD, which entered into force in 2020, aims to achieve nearly zero-

Reference 2 policies

Sector	Policy Instrument	Energy Carrier	Start year	End year
Road transport	Fuel tax	Gas	2023	2050
Road transport	Fuel tax	Oil	2023	2050
Road transport	Technology phase out	ICE + hybrid Vehicles	2035	2050
Power	Fuel subsidy	Offshore Wind	2023	2050
Power	Fuel subsidy	Onshore Wind	2023	2050
Power	Fuel tax	Coal	2023	2050
Power	Fuel tax	Gas	2023	2050
Power	Fuel tax	Oil	2023	2050

Reference 3

The Reference 3 scenario builds on Reference 2 by adding the expected ETS2 cost. The ETS2 cost is introduced to transport and household heating and is set at approximately 45 EUR/ton CO2 (in 2022 prices).



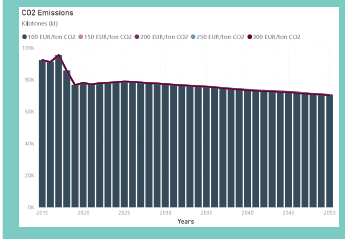
Scenario description

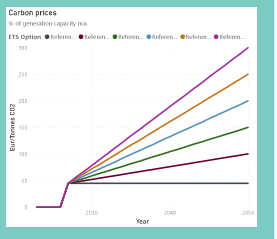
The Emissions Trading System (ETS) is a cap-and-trade system established in 2005 to reduce greenhouse gas (GHG) emissions in the European Union (EU). It is a cornerstone of the EU's climate policy and is the world's first and largest emissions trading system.

The ETS works by setting an overall limit on the total amount of GHG emissions allowed from participating installations and then allowing companies to trade emission allowances. Each installation is allocated a certain number of allowances, which represent the right to emit a certain amount of GHG. Companies that can reduce their emissions below their allowance can sell their surplus allowances on the ETS market. Conversely, companies that exceed their allowances must purchase additional allowances to cover their overage.

Reference 4

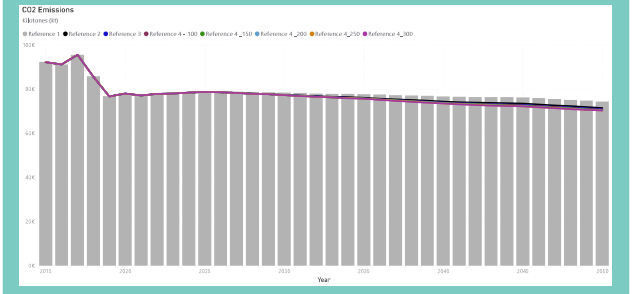
The Reference 4 set of scenario build on Reference 3 by allowing the user to select one out of five possible fossil fuel price trends. All scenarios have the same starting point, 45 EUR/ton CO2 (in 2022 prices), but different end point. The following alternatives are presented: 100, 150, 200, 250, and 300 EUR/ton CO2 (in 2022 prices).





Reference scenario comparison

This graph represents in comparative terms the first three reference scenarios presented in this page.



Contextual Information | Reference Scenarios | Policy options | Indicators | FAQ

Policy options

This page offers information relating to the policy options offered through the REFEREE interface. We recommend that users have this page open when designing a policy package. The information provided in this page will be valuable to users who need to better understand how the different policy options are introduced to the modelling framework, and what the policy scaling factor "intensity" means for each policy choice.

Policy type

The REFEREE interface allows users to design a policy measure by defining a set of parameters. The first selection that users are requested to make for each policy is the policy type (left hand side Policy selection box). For a given policy type, the intensity selection (right hand side slider) is associated to an appropriate unit. By clicking on one of the six tiles below, you can access information on the definition of the selected policy type, an example, and the way the intensity input is interpreted by the EU and country level policy assessment tool.

Energy efficiency improvement in domestic buildings	Tax
Mandated change in generation capacity mix	Subsidy
Technology phase out	

Definition	Definition of Intensity
Energy efficiency improvements in domestic buildings are treated as changes in the renovation rate. Domestic building renovations refer to a wide range of activities aimed at improving, updating, or altering the fabric infrastructure of the dwelling stock, hence speeding up its energy efficiency.	% change in the renovation rate of the whole dwelling stock

Example

A 50% intensity value with end date at 2040 and starting date at 2030 indicates a 50% increase in the renovation rate of the domestic dwelling stock betwene the start and the end date. If the baseline renovation rate for the given country is 5% in 2029, then a 50% intensity value would lead to a 7.5% renovation rate that would remain fixed between 2030 and 2040. In 2041 the renovation rate would return to its 2041 baseline value for the given country.

Policy focus

For each policy type selected, users are requested to select a valid model and subdivision option. The Model selection refers to the Future Technology Transformation model that will need to be called to assess technology deployment in response to the policy intervention. Some of the Technology Transformation models require users to select a subdivision, which determines the technology target. By clicking on the relevant tiles below users will access information on the definition of the selected model or subdivision.

Model
Subdivision

Building Stock	Passenger road transport
Domestic heating	Power sector
Industrial heating processes	Road freight transport

Explanation

A stock model that assesses the economic impacts of different net-zero transitions of the EU building stock. Uses an iterative process based on renovation rate targeted to demolition of old buildings, construction of new buildings, and renovations (of varying depth), until convergence to the target weighted renovation rate.

Developing a policy package

The REFEREE interface allows users to decide whether they would like to investigate the impacts of a single policy measure or a set of policy measures, introduced in the form of a policy package. The interface allows this by simply adding new policy inputs. The tool has only two limitations with respect to policy package design:

1. The tool does not permits stacking of policy measures.
2. All measures need to target the same geographic area.

No stacking has the following practical implications:

- If a policy measure is introduced twice, the second entry will cancel the first.
- If two policy measures with the same type and focus have overlapping dates, the second entry will cancel the first as soon as they overlap. To preserve the principle of no stacking, the change will be calculated with respect to the baseline value rather than the value assigned by the first policy measure.

Multiple benefits of energy efficiency

This page offers information on the different impact indicators reported by the REFEREE tool as the multiple benefits of energy efficiency. The information provided in this page will be valuable to users who are not familiar with the definitions of the indicators employed or users who would like to obtain a better understanding of the mechanism that describes the relationship between energy efficiency and impact indicators.

A positive value indicates that higher energy efficiency may result in a higher value of the impact indicator. A negative value indicates that higher energy efficiency may result in a lower value of the impact indicators. An uncertain value indicates that higher energy efficiency may result to a lower or higher value, subject to country socioeconomic characteristics, the effective policy mix and the policy scope/design.

Air pollution & Emissions	**Employment**	**Energy Intensity**	**Gross Value Added (GVA)**	**Manufacturing industries: heating demand by fuel**	**Public budget as share of GDP**
Air pollution Damage Costs	**Energy Cost Impact**	**Fossil Fuel Consumption**	**Household heating: heat demand by fuel and technology**	**Material Use**	**Road freight transport: fleet share by technolo...**
Demand for skills	**Energy demand by dwelling archetype**	**Fuel imports**	**International competitiveness**	**Passenger road transport: fleet share by technolo...**	**Water used in electricity generation**
Electricity generation	**Energy expenditure as a percentage of total expenditure ...**	**Gross Domestic Product (GDP)**	**Labour Productivity**	**Power generation capacity by source**	

Definition

Air pollution & Emissions is defined as the volume CO2 emissions and air-born pollutants.
This indicator is typically expressed as million gallons, but in this report assessment Air Pollution & Emissions is presented as % difference from the chosen reference scenario.

Relationship between energy efficiency and impact indicator

Negative

Mechanism through which the selected impact indicator is affected

Energy demand reductions, including a shift away from fossil fuel-reliant generation, will reduce the creation and release of air pollutants and GHG emissions through requiring less fossil fuel to be burnt.

FAQ

This page presents key information relating to the simulation capabilities of the country policy assessment tool.

What are the effects captured by the model?

The modeling framework presents a lite version of the Cambridge Econometrics modelling suite. Due to processing constraints of an online, automated interface some compromises had to be made with respect to the simulation framework.

- The simulation toolkit reports the impact of up to second degree effects.
- The simulation does not account for cross-country spillovers.

What are the user input guidelines?

- **Mandated change in generation capacity mix:** Please ensure that the total intensity of all mandated changes in generation capacity mix in your policy package do not exceed 100%. Additionally, please be aware that high intensities may cause instability in the results.
- **Mandated change in generation capacity mix:** Please be aware that if a technology already has a high share of the power generation mix, then adding a policy to boost it to an even high percentage may not have dramatic results, as the trajectory of that technology was already trending upwards.
- **Technology phase out:** Please be aware that if a technology is already on a downwards trajectory, then targeting it with a phase out may not have a dramatic effect in the results, as the technology was already being reduced.
- **Technology phase out:** Please be aware that phase outs only prevent new items from being built/produced. Dramatic reduction in the item may not be seen in the results until the lifespan of the product has ended.

Why is the policy showing reduced effects?

Some or all elements which make up the subdivisions below have zero market share in their respective countries and models. That means that policies applied to them may have reduced effects.

Zero market share list

Countries	Model	Categories
Austria	Industrial heating processes	Biofuel, Electricity , Gas, Heat, Oil, Coal, Heat Pumps, Electricity
Austria	Passenger road transport	Oil, Gas, ICE Vehicles
Austria	Power	Solar, Gas, Nuclear, Offshore Wind, Hydro
Austria	Road freight transport	Oil, Hybrid Vehicles, Gas, Electricity, ICE Vehicles, Biofuel, Biofuel Vehicles, Electric Vehicles
Belgium	Industrial heating processes	Biofuel, Electricity , Gas, Heat, Coal, Heat Pumps, Electricity
Belgium	Passenger road transport	Oil, Hybrid Vehicles, Gas, Electricity, ICE Vehicles
Belgium	Power	Hydro, Geothermal, Gas, Solar
Belgium	Road freight transport	Oil, Hybrid Vehicles, Gas, Electricity, ICE Vehicles, Biofuel, Biofuel Vehicles, Electric Vehicles
Bulgaria	Domestic heating	Electricity, Heat Pumps
Bulgaria	Industrial heating processes	Biofuel, Electricity , Heat, Oil, Coal, Heat Pumps, Electricity
Bulgaria	Passenger road transport	Oil, Hybrid Vehicles, Gas, Electricity, ICE Vehicles, Electric Vehicles
Bulgaria	Power	Solar, Geothermal, Gas, Offshore Wind, Hydro
Bulgaria	Road freight transport	Oil, Hybrid Vehicles, Electricity, ICE Vehicles, Biofuel, Biofuel Vehicles
Croatia	Domestic heating	Electricity, Heat Pumps
Croatia	Industrial heating processes	Biofuel, Electricity , Gas, Heat, Coal, Coal, Heat Pumps

Why are the results showing no effects?

The following energy carriers have no recorded fuel price for their respective model and country. As such, taxes and subsidies placed on them may show no effect.

- Bulgaria – Industrial Heating Processes – Biofuel
- All countries – Power – All renewables (Gas, Hydro, Offshore Wind, Onshore Wind, Solar, Geothermal)

Other questions

For any other questions, please refer to the online documentation on the Building Stock, FTT, and E3ME models available through the Cambridge Econometrics website.

3 Documentation and Guidance for the Localities tool

The documentation of the Localities Tool is structured in the following chapters:

A) **Overview of the Tool.** This section provides relevant information about the tool. In concrete, it has three chapters:

1. **Purpose of the tool.** It explains the main objectives and gives a quick overview of the tool, providing more information to the user on why it is relevant and how REFEREE can be useful to municipalities and their local governments.

2. **Defining inputs and outputs.** It contains information on how the tool is organized and how the tool is fed relative to E3ME model inputs and user inputs. It furthermore explains the different outputs obtainable with the Localities Tool.

B) **Tool Guidance.** Provides relevant information about the inputs that the user is going to be asked and how to obtain the results. This section is recommended to be consulted during the design of policy packages which will be simulated with the tool.

1. **Introduction.** Introduces the user to the online interface that runs the Policy Support System, including all tabs (parameters, model, results). It also explains what the model requires to the user and provides detailed explanation with examples of the different inputs to provide.

2. **Step-by-step guide.** Practical tutorial about how to provide the inputs and all the steps that user should follow. It also has a Frequent Errors page to make sure that the user is able to solve any problems it might face during the design process.

C) **How to implement policies? The European context.** Relevant information about European regulation and targets, which localities might be interested to be in touch with. It's a good idea to use the tool to simulate policies to comply with both aspects.

1. **European regulation.** It provides an overview of historical and current EU energy frameworks with relevant information to be considered during the local policy-making process.

2. **European targets.** Localities might be willing to comply with energy-related targets (i.e. GHG reductions). Further information for policy-makers related to European targets are provided in a separate document synthesizing quantitative targets currently in force in the EU. This PDF file can also be downloaded from the guidance.

Guidance of the Localities model can also be consulted through an online **interactive dashboard** available at:

https://refereetool.eu/landing-page-referee-tool-local/

referee
real value of energy efficiency

TOOL GUIDANCE - LOCALITIES

Press any chapter to navigate directly to it

REFEREE Tool

- R1. Purpose of the Tool
- R2. Defining Inputs and Outputs

Guidance

- G1. Introduction
- G2. Step-by-step guide

European context

- E1. European regulation
- E2. European targets

R1

Purpose of the Tool

Back to main

Overarching objectives

REFEREE strongly advocates the principle that energy efficiency measures will be key for delivering the European Green Deal.

The project aims to **make energy efficiency more appealing** to policy makers at all levels of governance by:

(1) **Delivering insightful** and **reliable** information on the **multiple benefits** that energy efficiency measures can provide.

(2) **Offering user-friendly tool** to make this information immediately operational for decision makers.

Back to main

Overview on the Policy Assessment tool

- The REFEREE tool simulates policies both at the level of Member states and at the level of localities (municipalities, counties, small regions…).

- **This guidance document will help you navigate the tool dedicated to the localities.** *(To know more about the Member State tool, consult the* ***REFEREE national tool Dashboard)***

- REFEREE quantifies **the multiple benefits of energy efficiency policies**, including direct impacts (energy savings) and indirect impacts (benefits on the environment, citizens' health, public finances, etc.)

Back to main

REFEREE Local Model GUIDANCE

- **REFEREE Website (tool access):** https://refereetool.eu/presentation-referee-tool/

Back to main

How can REFEREE be useful to localities?

- **A fast-changing policy area:** Local administrators often have limited tools and resources to adapt to a rapidly evolving energy landscape.
- **Easy-to-use:** The tool is aimed to assist local policy-makers in making energy efficiency decision by providing them with detailed information in an easy-to-use interface.
- **Beyond energy impacts.** In addition to assessing energy efficiency impacts such as consumption, emissions, and cost savings, the tool will offer innovative insights into non-energy impacts, like effects on public budgets or citizen income.
- **SECAP plans.** The tool is intended to help design local SECAP plans (Sustainable Energy and Climate Action Plans). It assists localities estimate energy consumption data and identify areas where impacts are expected to yield significant returns. The model provides estimations of data that may be hard to obtain in small localities, allowing an easier execution of such plans.
- **Sensitivity analysis.** The tool enables sensitivity analysis of key policies, allowing for comparison of results under different scenarios with varying policy intensities.

Back to main

R2

Defining Inputs and Outputs

Back to main

How is the tool organised?

Users input

Basic data about the locality

- *Population & expected annual growth*
- *Income per capita*
- *Public budget*
- *Country & climatic area*
- *Initial energy consumption by sector*

Local policies definition

- *Sectors: housing, tertiary, mobility*
- *Policy instrument*
- *Share of the stock that will be affected*
- *Policy intensity*

Energy consumption assessment

Historical record of energy consumption per capita

(from Covenant of Mayors SECAPs)

Energy distribution by sector

(from EU benchmark of energy consumption by sector per country)

The REFEREE local policy assessment tool

Calibrated with CE E3ME

Electricity mix is provided by E3ME country data, acquiring more robust data. Also provide maximum energy efficiency gains, as observed from national-level energy efficiency policies modelled by E3ME.

Simulation engine

Online visualisation module

Local Policy Assessment Report

Policy and reference scenario

Locality profile; Reference energy consumption; Policy intensity by sector and subsector)

Thematic graphs & tables

- *Energy impacts: energy consumption, energy mix, energy cost and cost savings*
- *Non energy impacts: productivity gains, public budget, gross locality income, green house gas emissions by origin*

Exogenous input data

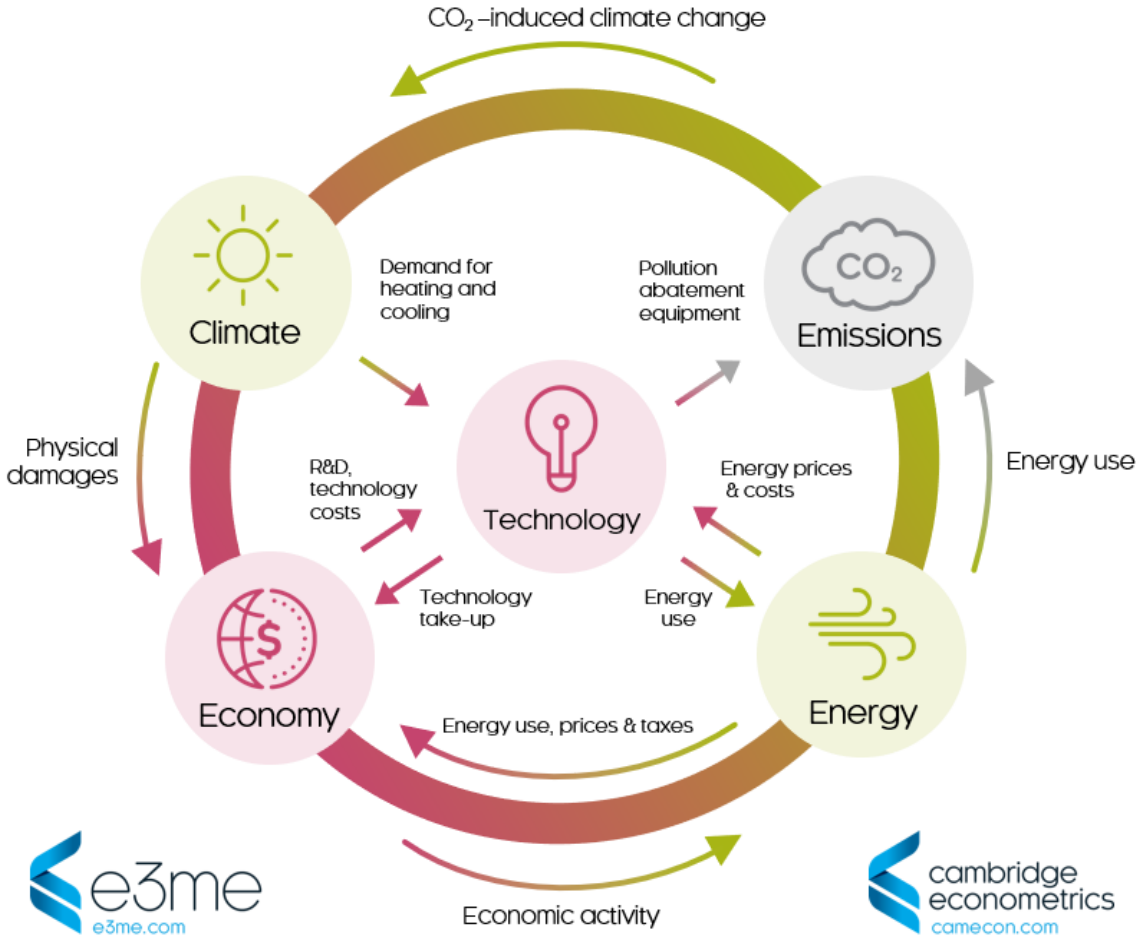
Data processing

Endogenous input/output data

Output data

Back to main

E3ME Engine



The Localities Tool is powered by E3ME Lite model

E3ME

- A global, non-equilibrium macro-econometric model designed to address **major economic and economy-environment policy challenges**.
- Econometric specification provides a strong empirical basis for analysis, allowing to fully assess **short and long-term impacts**.
- Endogenously captures linkages and feedbacks between the world's economies, energy systems, emissions.

E3ME Lite

- **Online version of the E3ME model**, based on parameters for each direct impact from the FTT models that feed into E3ME.
- Parameters are assessed for each model feedback channel and country in EU27 & UK, leading to more than 3k runs.
- Captures **net economic impacts from changes in the energy system** based on estimated parameters from E3ME.

Back to main

Inputs for the local policy tool

Inputs in the REFEREE Local Policy tool required inputs in relation to the profile of locality to be assessed, and on the energy efficiency policies to be tested.

Socioeconomic Profile of locality

- Income per capita
- Population and population growth
- Locality public budget

Policies for Energy Efficiency

- Housing, tertiary and mobility sectors are considered, as well as subsectors such as climatization, water heating, public transport or private transport.
- Policy intensities and targeted stock can be adjusted.

Energy Profile of locality

- Total energy consumption (tool provides for climatic area proxies based on Covenant of Mayors benchmark)

- Local energy consumption abatement by sectors (tool provides for country-based proxies based on Member States reporting to Eurostat)

Internal assumptions (E3ME parameters)

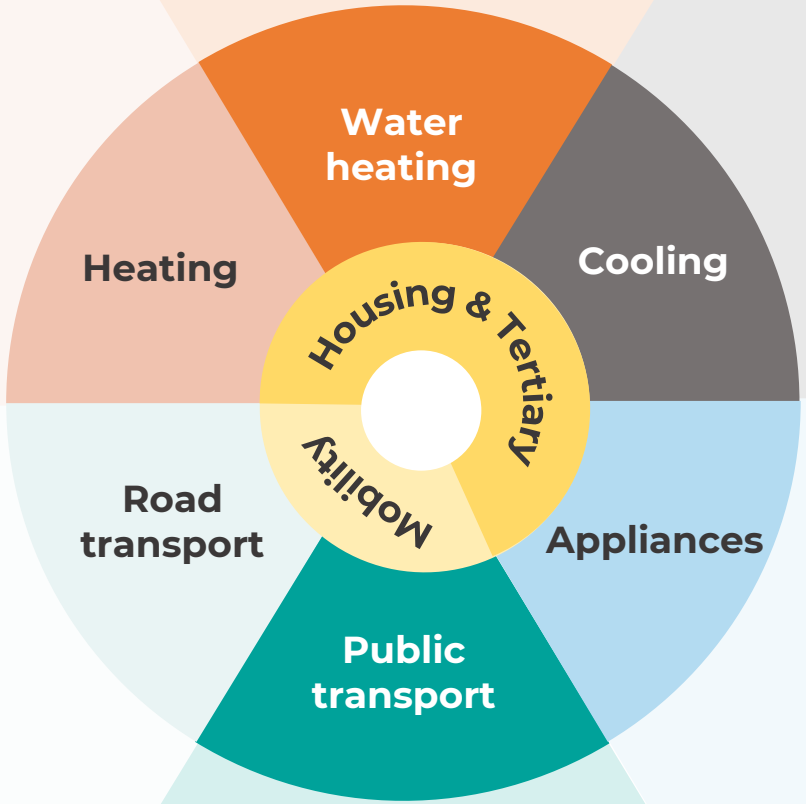
- Historical electricity mix and 2035 projection
- Historical energy costs and 2035 projection
- Housing energy profile by sources
- Tertiary energy profile by sources
- Mobility energy profile by sources

Back to main

Local policy measures to be simulated

- Water saving equipment
- Consideration of user behaviour
- Thermal water collectors

- Smart heating energy management
- Consideration of user behavior
- More efficient heating technologies
- Energy renovation of buildings



- Smart cooling energy management
- Consideration of user behavior
- More efficient cooling technologies
- Nature-based cooling strategies

- Increase mean vehicle occupation
- Reduce travel rate
- Transfer road users to public transport
- Increased vehicle efficiency

- Support for household appliance renovation
- Renewal of building lighting
- Awareness-raising for the rational use of appliances

- Fleet renovation
- Better fleet management

Back to main

Outputs

Impact areas	Results
Expected energy consumption and energy savings	Energy consumption and energy savings (total & by sector) • Housing: heating, cooling, water heating, appliances • Tertiary: heating, cooling, water heating, appliances • Mobility: public transport, road transport
Cost savings (pre-tax)	Costs and cost savings (total & by sector) • Housing: heating, cooling, water heating, appliances • Tertiary: heating, cooling, water heating, appliances • Mobility: public transport, road transport
	Magnitude of savings contrasted to locality aggregated income (Proxy to locality GDP)
Climate Change	CO2 emission savings (total & by sector) • Housing: heating, cooling, water heating, appliances • Tertiary: heating, cooling, water heating, appliances • Mobility: public transport, road transport
	Contrast with existing policy targets for greenhouse gas emission reduction
Socioeconomic impacts	Increase of available income per capita
	Increase of available local aggregated income
	Locality public budget impacts
Governance (transformation capacity of public policies)	Impact of public policies derived from citizen behaviour
	Impact of public policies derived from cleaner technology (cleaner energy mix)
	Exogenous gains not deriving from local policies (derived from cleaner electricity mix)

Back to main

Outputs. Energy Efficiency Impacts

Total Energy Savings (in MWh)
MWh of the Expected energy consumption and energy savings for different sectors and subsectors.

- Housing: heating, cooling, water heating, appliances
- Tertiary: heating, cooling, water heating, appliances
- Mobility: public transport, road transport

Cost savings (Million euros)
This is, euros saved by changes in energy consumption, in euros (countries with other currencies, will need to make their own transformations if needed). Two main drivers: (1) Total energy consumption (less energy mean less costs); (2) Energy mix (different energy carriers have different costs). Sectors considered, again **Housing, Tertiary and Mobility.**

Climate Change Impacts (in tCO2)
This is CO2 emissions tons reduced because of less energy consumed (MWh), and because of cleaner energy mixes. Sectors considered, again **Housing, Tertiary and Mobility.**

Contrast with existing policy targets. In addition, REFEREE provides guidance for reducing greenhouse gas emissions and increasing energy efficiency allowing to compare simulation results with the EU objectives
in force (for example, 55% reduction in CO2 by 55% to 2030 compared to the reference year). *(To know more about this, check **Chapter 3 European targets more in deep**.)*

Back to main

Outputs. Non-energy impacts

Increase of available local aggregated income (in %)

- The Model estimates the increase in aggregate income available to citizens of a given locality based on the savings obtainable in the energy bill. This result is intended as a proxy to the locality productivity indicator (municipal GDP) estimating a potential increase of the local economy resulting from lower energy costs. This result is presented as the % of the € variation from the initial year (which will be 100%) to the final (100%+X).

Increase of available income per capita (in %)

- The Model estimates the impact of economic savings on individual households by evaluating, for the duration of the simulation, the energy savings per capita in relation to the income per capita of the locality. The model only considers energy costs pre-tax, so there will be an additional income available to families also arising from the taxes saved. This additional savings will depend on the tax levels of each country and/or the locality', which can be of important additional magnitude (up to 100% increase). This result is presented as a % of the € variation from the initial year (which will be 100%) to the final (100%+X).

Locality public budget impacts (in %)

- The model assumes that with the increase in disposable income for citizens and businesses in a locality (and the increase in population), public budgets will also have a positive impact. This indicator is calculated basing upon the initial public budget declared in the parameters section, population growth, available income per capita as well as available local aggregated income variations. This result shows a % of the € variation from the initial year (which will be 100%) to the final (100%+X).

G1

Introduction

Back to main

Introduction

This guide shows the necessary input data for the tool, explains how to input this data using dialog masks, and describes the corresponding types of results generated.
The tool is structured into three sections:

1. **Parameters** → Enter details about the locality.
2. **Model** → Add policies by combining pre-defined policy measures.
3. **Results** → View the effects of the policies in the model output.

Note: Users can freely navigate through the sections and revise any data in the Parameter or Model sections as needed.

Back to main

Parameters: Locality Data

The model requires some basic parameters to establish the **baseline for modelling** the subsequent **policy effects**. All required information about the locality is inserted in the first section (more detailed guidance in chapter 8, our “step-by-step guide”).

Besides basic information such as **population**, **public budget** and **income per capita**, the user is asked to select the country of the locality. Once all the information is filled in, the tool proposes **realistic but imperfect values** for the **energy consumption** of the **locality** in **each sector**.

If **more accurate data** on energy consumption are available for each sector, these **should be used.** Otherwise, users can copy and paste the proposed values from the tool.

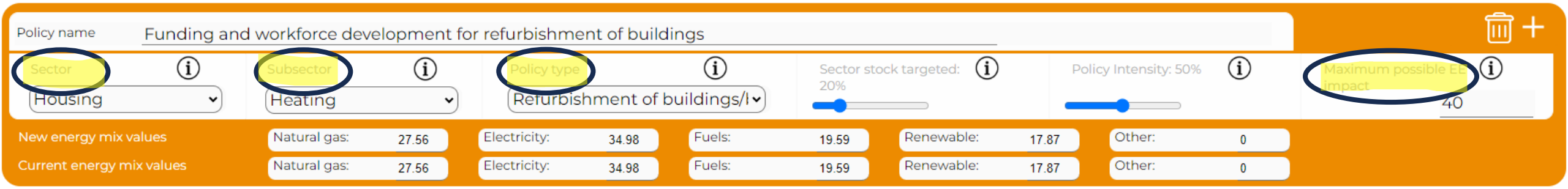
If data on the energy consumption are only available from **historical sources** but not for the initial year of simulation, users can copy only the tool’s proposals for the **initial year of simulation** (when policies are implemented; most likely the **present year**).

Back to main

Model: Sectors & Policy Types

Once the model has all the necessary data from the locality, the user can move to the second section, designed for **inserting policies**. Main **sectors** (Housing, Tertiary and Mobility) are divided into several **subsectors**. Within each subsector, various policy types are available for selection. Policies of the same type need to be **combined** and inserted only once. For instance, both a **funding scheme** to support homeowners in improving energy efficiency and a **communication strategy** aimed at ensuring the effective use of these funds by homeowners should be inserted as a **combined policy package** belonging to the same policy type (e.g. refurbishment).

Each **policy type** produces a **maximum possible energy efficiency impact** for the share of sector stock that is targeted. The value for this impact is **predefined** based on the best available benchmarks for each policy type, located in the upper right corner of each policy bar. The efficiency impacts of the locality's policy package for any policy type should only be edited if more accurate data are available than the benchmark provided by the tool. Examples for better understanding are provided in the following slides.



Back to main

Model: Sector Stock Targets

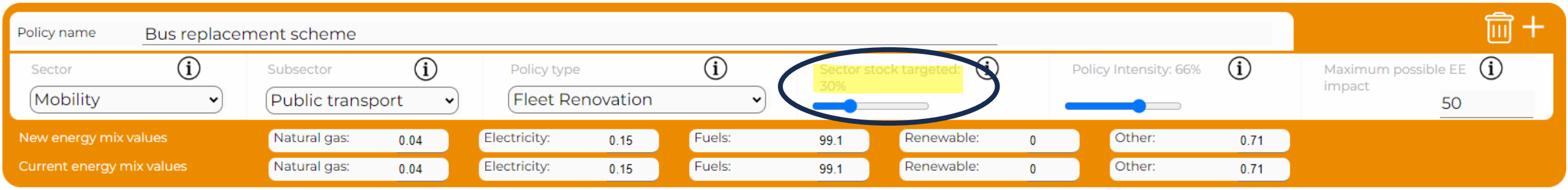
The input factor "sector stock targeted" determines the **% of the total stock** that should be more energy efficient by the **end of the policy simulation**. Here, "stock" always refers to the total of each subsector.

Example I → Mobility sector

Let's consider a municipality planning to **replace its current buses** with more efficient ones. This change is projected to yield a maximum energy efficiency (EE) improvement of 50%. While this figure is based on internal calculations, users can edit the percentage if they possess more concrete data, although this is not typically recommended due to its complexity to obtain. In this case, the sector stock pertains to the **entire public transport fleet**.

Suppose the municipality operates **200 buses** and plans to replace 60 of them; thus, **30% of the sector stock** is targeted. Consequently, the tool assumes that efficiency gains apply to 30% of the sector stock, namely the public transport fleet.

If data related to the **mileage** of each bus exists, then sector stock should refer to mileage. A replacement of 30% of buses could lead to the policy affecting 45% of the mileage, if new buses run 50% more frequently (30 * 1,5 = 45; where we add to the 30% the 50% of increased mileage multiplying it by 1,5).



Back to main

Model: Sector Stock Targets

Example II → Housing sector

A municipality plans to increase efforts to **refurbish buildings** for better insulation and **more efficient heating**. This will likely yield a maximum EE improvement of 40%. Here, the sector stock refers to **all buildings within the municipality**.

If there are **4000 buildings** in the municipality and it plans to refurbish 800 of those, **20%** of the **sector stock** is **targeted**. If data related to the **floor space** of each building is available, then sector stock should refer to the floor space that is refurbished. Floor space is a **more accurate value** for calculating the efficiency gains in heating than buildings, as the **size of buildings vary significantly**. A refurbishment of 20% of all buildings could lead to the policy affecting 40% of the sector, if those 20% renovated make up 40% of the floor space.

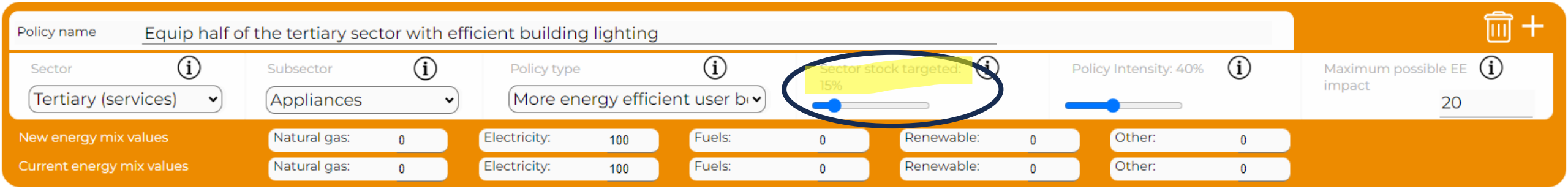
Back to main

Model: Sector Stock Targets

Example III → Tertiary sector

A municipality plans to **equip half of the tertiary sector** with **efficient building lighting**. This will likely yield a maximum EE improvement of 20%. Here, the total **sector stock refers to all appliances** connected to the electricity network.

When estimating the sector stock target, it is important to consider that besides lights there are many more appliances in the tertiary sector. If **30%** of the electricity consumed by all appliances is **used by lighting systems** and **50%** of lights should be **replaced** with more energy efficient ones, the **sector stock target** will be **15%** (30%*50% = 0,3*0,5 = 0,15 = 15%).

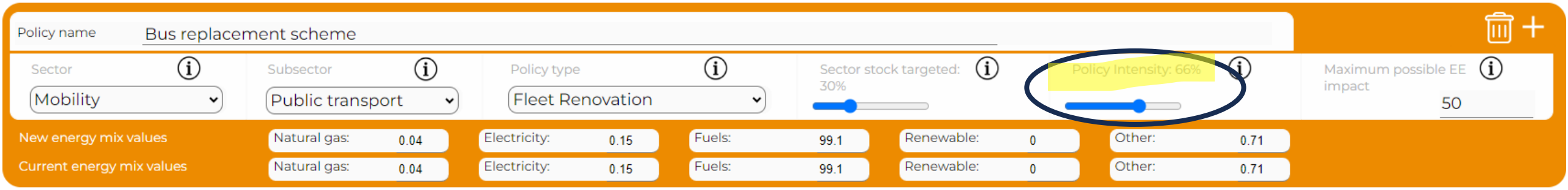


Back to main

Model: Policy Intensity

The input value for **policy intensity** provides a useful way to include an estimation of the **success of the policy** in the calculation of the model. Success primarily hinges on **available resources** for this policy as well as some external factors. These resources may include the amount of public funding, administrative personnel overseeing policy implementation and monitoring its success, workforce and skills required to achieve the goals within the desired timeframe, and communication campaigns to engage non-municipal actors.

Policy intensity should only approach 100% if the policy is guaranteed to succeed in both targeting the desired sector stock and achieving the maximum possible EE impact. For instance, if 30% of the public transport fleet is slated for replacement, but the policy package cannot ensure that each new bus will be 50% more efficient, both factors —along with the resources allocated to achieve the goals— must be considered when estimating the policy intensity.



G2

Step-by-step guide

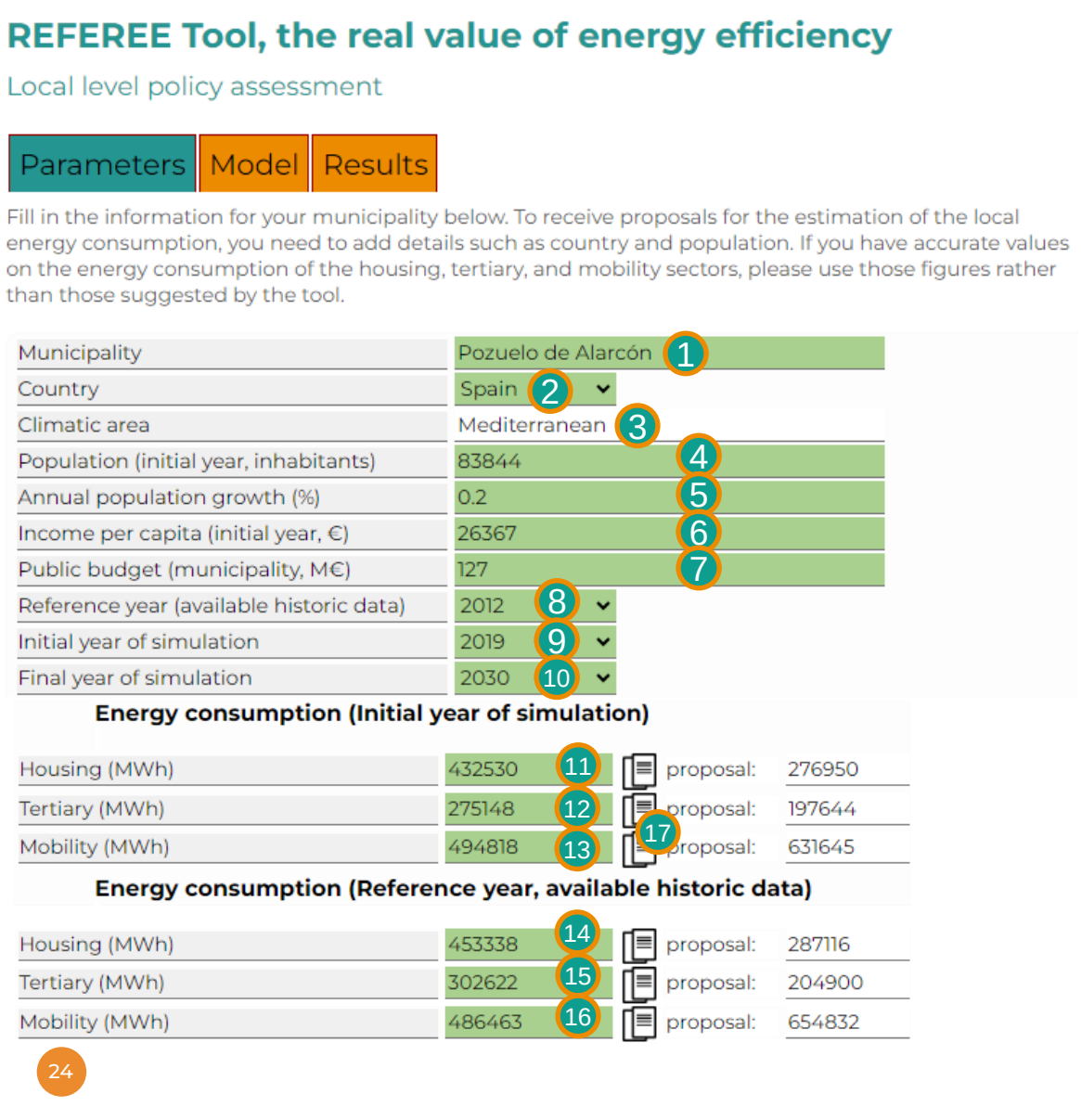
Parameters

Model

Results

Back to main

Parameters section

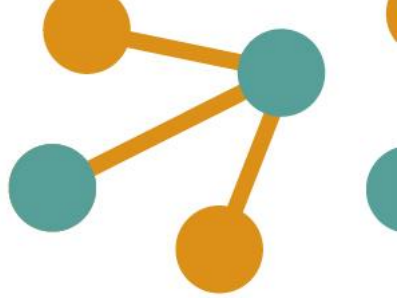


1. Insert the name of the municipality.
2. Select the country of the municipality from the dropdown.
3. This is updated automatically once you select the country.
4. Insert the population of the municipality.
5. Insert the annual population growth in % of the municipality.
6. Insert the income per capita of the municipality.
7. Insert the public budget of the municipality (total €).
8. Select the reference year from the dropdown.
   → This will be the year from which historical data will be used as a reference
9. Select the initial year from the dropdown.
   → This will be the year from which current data will be used as a starting point; must be after the reference year.
10. Select the final year from the dropdown.
    → This will be the year at which estimates will conclude/end, so it will be the ending point for forecasting purposes; must be after the initial year.
11. Insert the energy consumption in MWh of the municipality, for the
12. initial year for each sector – Housing (11), Tertiary (12) and Mobility (13)
13. → If the breakdown of total energy consumption is not available, please refer to our suggestion and adapt it accordingly.
14. Insert the energy consumption in MWh of the municipality, for the
15. reference year for each sector.
16. → If the breakdown of total energy consumption is not available, please refer to the tool proposal and adapt it accordingly.
17. Optional buttons to copy and paste the proposals automatically

Back to main

Model section

0. Brief comment on this section.
1. Type the name of the policy (optional).
2. Choose the municipal **sector** (housing, tertiary, mobility) in which the policy is directed from the dropdown.
3. Choose the municipal **subsector** in which the policy is directed from the dropdown.
   → For housing and tertiary sectors, there are 4 subsectors (heating, cooling, water heating, appliances) and for mobility sector, there are 2 subsectors (public transport and road transport).
4. Choose the policy type that best fits the policy to be implemented from the drop-down.
5. Determine a percentage of stock targeted with the horizontal scrollbar.
   → The stock targeted determines the policy penetration rate in the addressed stock, that is how many items (people, buildings, vehicles...) are going to be affected by the policy.
6. Determine a percentage of policy intensity with the horizontal scrollbar.
   → The policy intensity determines in which level does a policy wants to be implemented, being a 100% the maximum energy efficiency gains from the policy. Shrinking this level reduce its implementation costs.
7. Automatically determines a percentage of the total sector of the expected Energy Efficiency impact by that policy.
   The suggested value can be modified, so it can be adjusted to another value if wanted.
   → For example, if the policy intensity is set at 100%, then the policy will have the full impact.
   → Otherwise, a policy with a policy intensity of a 50% with a 10% expected EE impact, will have an impact of a 5%, for the X% of the stock targeted.



REFEREE Tool, the real value of energy efficiency

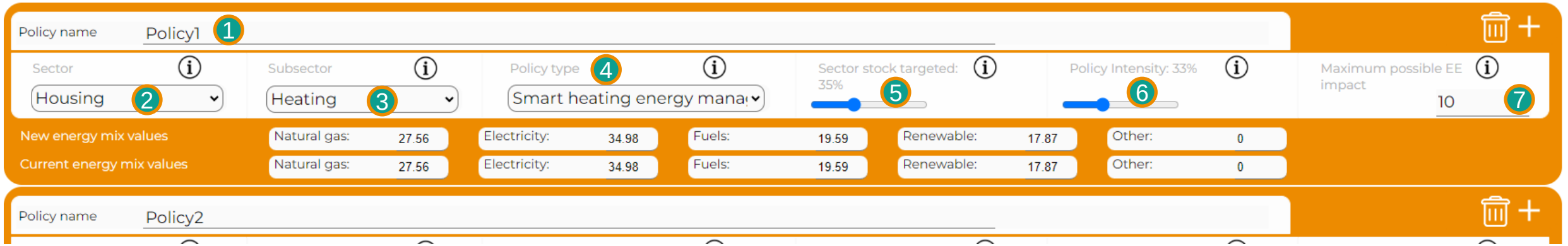
Local level policy assessment

Parameters | Model | Results

0

Add up to 34 energy efficiency policies in the housing, tertiary, and mobility sectors. All policies targeting one aspect of a specific subsector need to be aggregated into one input policy. For each policy, state which part of the existing sector stock will be addressed (e.g., affected share of total housing stock or share of mileage by private cars) and how likely the policy is to reach its full EE potential (policy intensity). For each sector and subsector, you may also alter current energy mix. For more details, check the Guidance handbook.

Guidance



Model section

Back to main

8 Erase this policy.

9 Create a new empty policy.

11 Run the model.

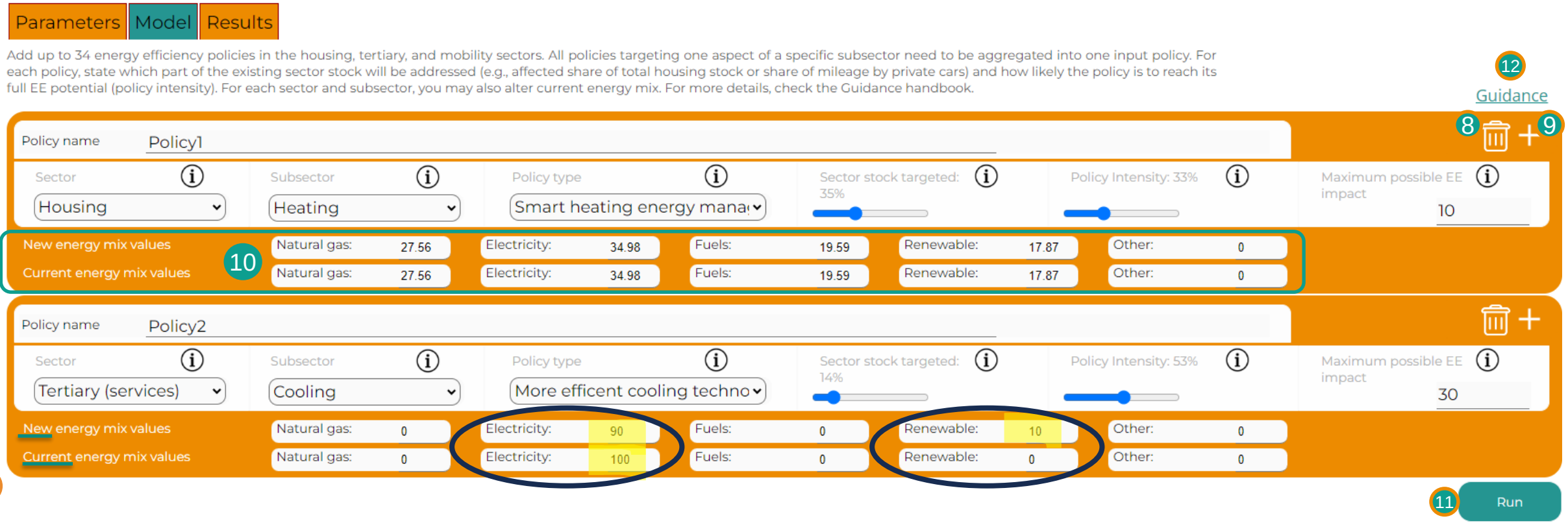
12 Open this Guidance

10 Adjust the energy carriers for that policy, to stablish the energy mix (EM).

→ Numbers represent the fractioned energy mix percentage, so the **total of them must sum 100%.** Energy carriers allowed by the model are natural gas, electricity, fuels (diesel, gasoline…), renewables (solar, wind, water force, waste…) and other. Model won't run if there is some policy for which the energy mix does not sum 100. It will tell which policy is not complaining with a pop-up advise when trying to run it.

→ For the **same subsector of the same sector, the energy mix must be the same**. If energy mix is changed from one policy, it is instantly updated to all other policies from the same subsector from the same sector.

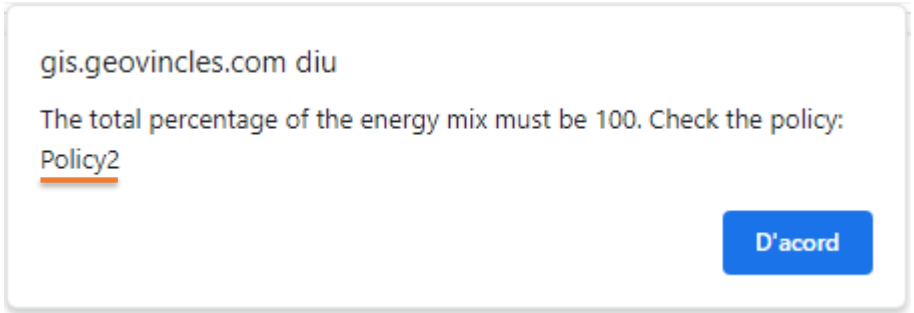
→ Predetermined values are **given/suggested by national data (it vary by country), but they are expected to be changed**. If they are not modified, model will run with the same energy mix from the initial (**current EM**) and final year (**new EM**). I.e. for "Policy2" the policy would shift some energy from electricity to renewable energy (solar panels, wind turbines…) from the initial year to the final, for the cooling of the tertiary sector.

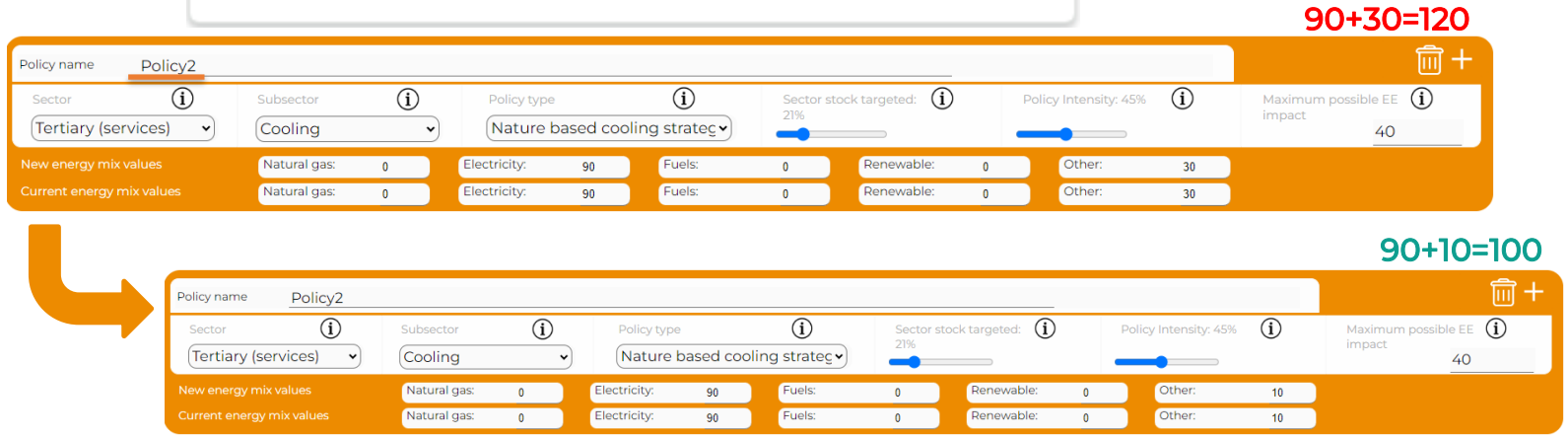


Back to main

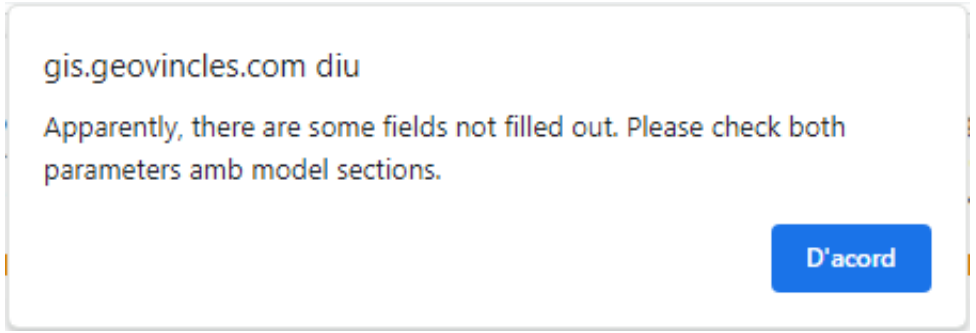
Frequent Errors

1. “Total percentage must be 100”
   Find the policy the pop-up indicates and correct the percentages of the **energy carriers**.



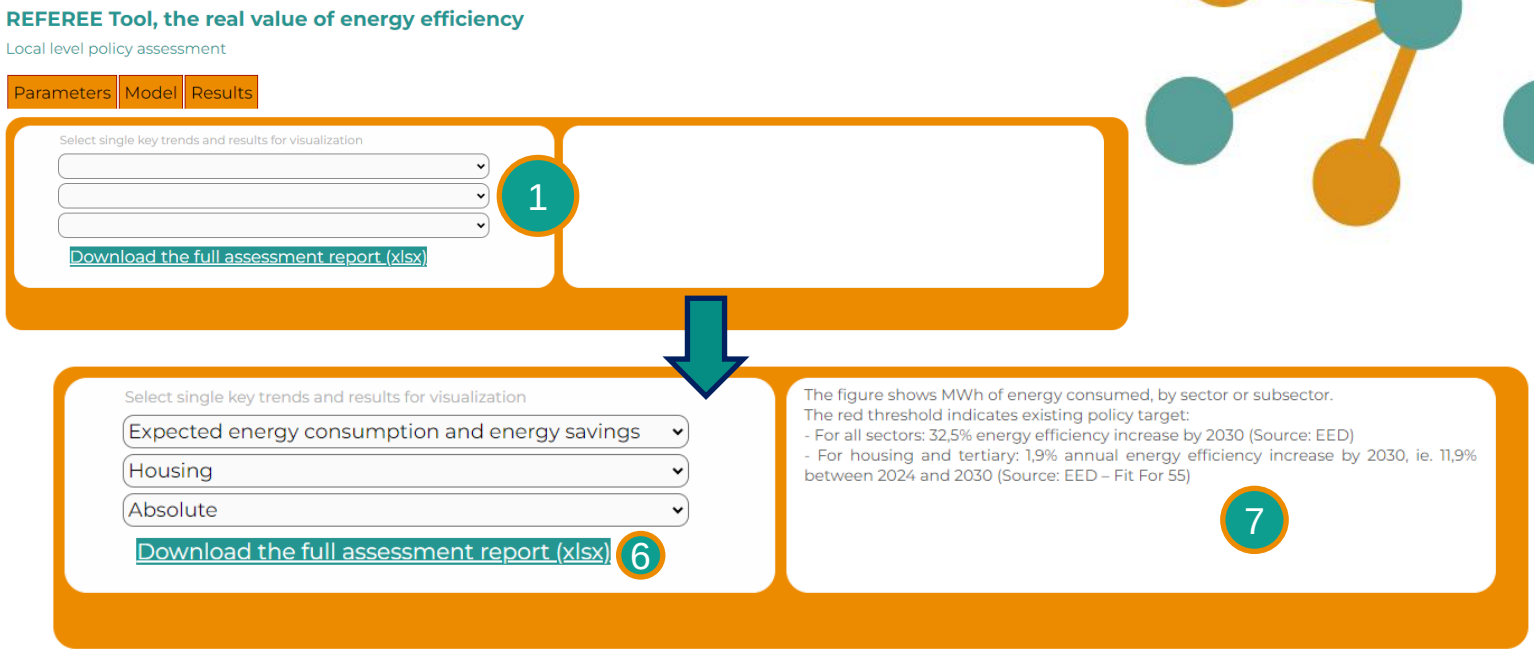


2. “Field/s not filled out”
   Go back to the **parameters section** and check that you did not miss any input. Then, check the **model section** in the same way.



Back to main

Results section



1. Select values to see simple charts in the online interface. There are three dropdowns. The first one, shows different values. The other dropdowns vary in function of the selected variable, according on what is willed to see.
   → For some combination, the third dropdown does not show a value, because the combo does not need it. In any case, user **needs to press the "-" option** to see the graphic, since it is uploaded when the three dropdowns are filled.

2. Graphic generated in the online interface.
   → In this case, we see a chart of the energy consumption for the heating subsector of the housing sector.
   → Data for the reference, initial and final year are displayed for a quick view comparison.

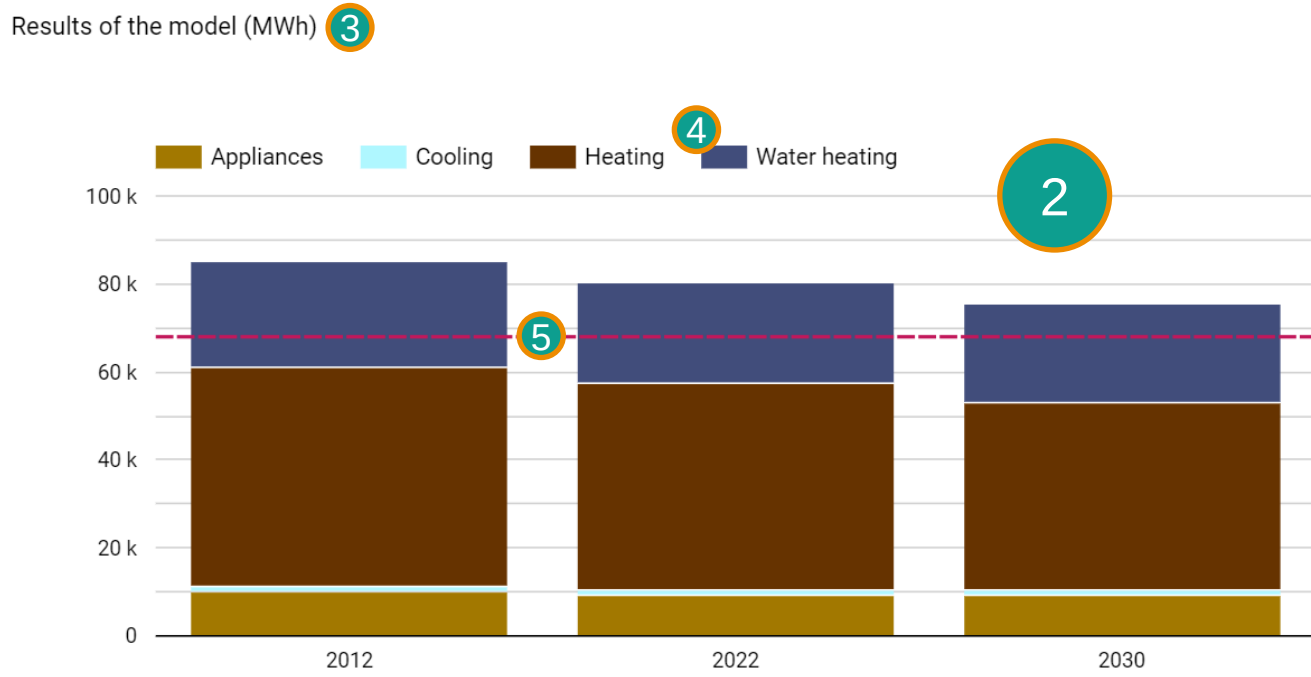
3. Units of the chart generated.

4. Legend of the chart.

5. Target line to be achieved (based on EU framework).
   → In this example, the 2030 (final year) column, surpass the red target line, meaning that target is not achieved in energy reduction. More efforts should be forecasted to end up below the line.

6. Click to download the Excel file of the model, where results are presented in a more elaborated and structured format.

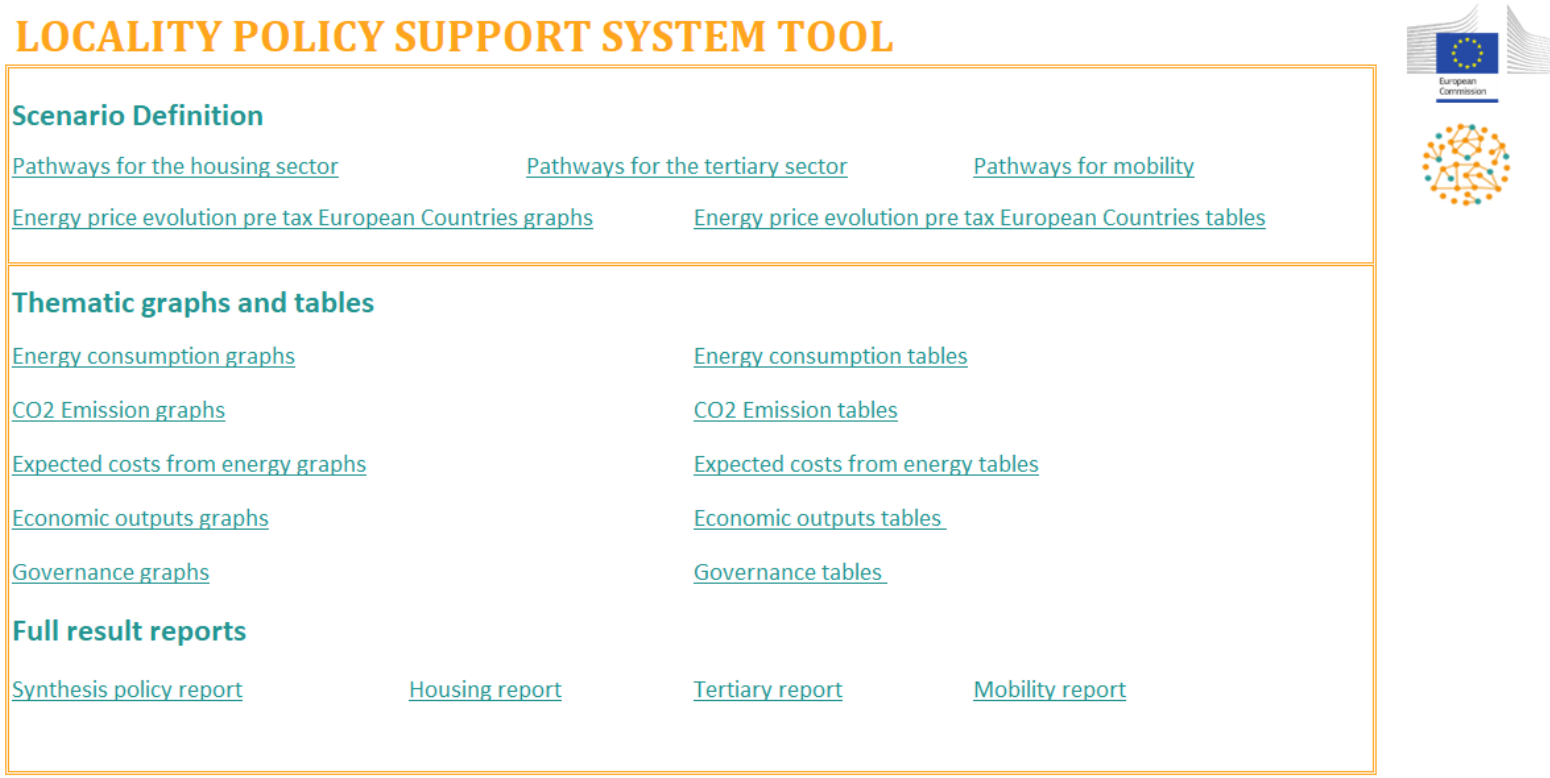
7. Brief description



Back to main

Local Policy Assessment Report

- Once downloaded and opened the Excel File, it will show the Main Page Menu. It allows to navigate through its different pages, which they have a “Go to Main Page button" to return to the beginning.



Back to main

Local Policy Assessment Report

- Report shows predefined charts from the different sections.
- Also, users will have tables for each section with the results of the run, so they have also the option to create their own charts if they wish to.

Emissions (tCO2) tables

By sectors and subsectors

Total	Housing	Tertiary	Mobility
2012	20.177,67	17.430,00	50.023,44
2022	16.602,98	12.329,30	47.096,16
Actual savings (2022-2030)	8.740,08	4.573,66	28.154,22
2030	7.862,90	7.755,64	18.941,94
Total savings (2012-2030)	12.314,77	9.674,36	31.081,49

Housing	Heating	Cooling	Water heating	appliances
2012	12.124,78	333,30	5.136,77	2.582,82
2022	9.976,74	274,25	4.226,73	2.125,25
Actual savings (2022-2030)	7.467,89	82,75	548,23	641,21
2030	2.508,86	191,51	3.678,50	1.484,04
Total savings (2012-2030)	9.615,92	141,79	1.458,27	1.098,79

Tertiary	Heating	Cooling	Water heating	Appliances
2012	5.396,89	5.536,65	15,42	6.481,03
2022	3.817,55	3.916,41	10,91	4.584,43
Actual savings (2022-2030)	150,42	3.039,64	0,43	1.383,17
2030	3.667,13	876,77	10,48	3.201,26
Total savings (2012-2030)	1.729,76	4.659,88	4,94	3.279,78

Mobility	Public transport	Road Transport
2012	5.683,34	44.340,10
2022	5.350,76	41.745,40
Actual savings (2022-2030)	2,14	28.152,08
2030	5.348,62	13.593,32
Total savings (2012-2030)	334,71	30.746,78

Back to main

Local Policy Assessment Report

- By clicking into “Synthesis policy report”, a summary of the different simulation results is shown. The user can freely explore the document to see the different results that are offered. Also, they can see if their policy pack comply with the different relevant European targets.

referee
real value of energy efficiency

Integrated Policy Selector

AGGREGATED IMPACTS

Global Key Impacts

Total policy intensity by sectors	12,74
Housing	9,97
Tertiary	3,89
Mobility	16,72

Energy	
Reference energy consumption (MWh)	339.915,00
Initial energy consumption (MWh)	320.213,00
Final energy consumption (MWh)	204.773,25
Total energy savings (MWh)	115.439,75
% energy saved	36,05

Emissions	
Reference CO2 emissions (tCO2)	87.631,10
Initial CO2 emissions (tCO2)	76.028,44
Final CO2 emissions (tCO2)	34.560,48
Total CO2 savings (tCO2)	41.467,95
% CO2 reduction	60,56

Economic costs and savings	
Initial cost of energy (without tax, €	48.541.336,90
Final cost of energy (without tax, €)	22.367.980,96
Total € savings	26.173.355,94
% € saved	53,92

Global Policy Targets

	Target	Simulated impacts	
Energy consumption efficiency (Source: EED)	32,50%	39,76%	complies
Yearly energy savings increase (Source: EED – Fit for 55)	1,90%	4,97%	complies
CO2 Emissions (Source: EED – Fit for 55)	55,00%	60,56%	complies

	Target	Simulated impacts	
Increase of renewable heating (Source: RED)	8,80%	21,04%	complies
Increase of renewable cooling (Source: RED)	8,80%	46,73%	complies
Less emissions intensity of transport fuels or	-14,50%	-30,23%	complies
Share of renewables in transport (Source: RED)	29,00%	26,59%	NOT OK. Review values obtain ← (minimum one of both should comply)

Back to main

E1

European regulation

Back to main

Current framework: 2030 targets

The **European Green Deal** was adopted in December 2019. This European strategy aims to "transform the EU economy towards a more sustainable future", and responds to the challenges posed by the fight against climate change based on **six main areas of action:** (1) energy efficiency through a transformation of industry and sources to more sustainable ones; (2) transformation towards a circular economy based on recycling and reuse processes of both products and their packaging; (3) efficiency in the construction sector with respect to construction processes and materials; (4) energy efficiency of buildings; (5) mobility aiming for a 90% reduction in emissions; and (6) sustainability in the food sector and a framework for biodiversity protection. With the approval of the European Green Deal, the process of updating the European **Circular Economy Action Plan 2015 begins.**

The European Union agreed in 2021 in **The European Climate Law** to increase the **reduction in emissions to 55% by 2030**, compared to emissions in 1991. In this way, efforts must be intensified to achieve the proposed objective. In addition, Europe has achieved the commitment to become the first climate-neutral continent by 2050 (emissions equal to or less than those eliminated through the planet's natural absorption).

The "**Fit for 55" package (COM 2021/550)** was proposed in 2021 to update the EU regulatory framework to achieve these objectives and realize the EU Green Deal. The proposals cover areas related to climate, land use, energy, transport, etc.

Due to the Russia-Ukraine war and the difficulties and disruptions in the global energy market, in mid-2022 the European Commission implemented the **REPowerEU Plan**. Its main objectives are to (1) save energy; (2) produce clean energy; and (3) diversify its energy supplies. This plan has impacted directives, such as the RED or the EED, increasing their overall level of ambition.

Back to main

Current framework: 2030 targets

The **Renewables Energy Directive (2009/28/EC)** was revised as part of the Fit for 55 package and the REPowerEU plan, given the need to accelerate the transition to clean energy in the EU. Since the introduction of the RED (2009/28/EC), the share of renewable energy sources in the EU's energy consumption has increased from 12.5% in 2010 to 21.8% in 2021. The revised Directive set a new increased target of 42.5% renewable energy by 2030, aiming for 45% and introduced sectorial targets. The directive also lays down common principles and standards for renewable energy support schemes, sustainability criteria for biomass, provisions to facilitate and accelerate permitting, and the right to produce and consume renewable energy and to establish renewable energy communities. It establishes rules to remove barriers, stimulate investments, and drive cost reductions in renewable energy technologies and empowers citizens and businesses to participate in the clean energy transformation.

The **Energy Efficiency Directive (2012/27/EU)** was also revised as part of the Fitfor55 package and further enhanced (Directive **(EU) 2023/1791)** as part of the REPowerEU plan, presented by the Commission in May 2022, which aims to decrease the EU's dependence on fossil fuel imports from Russia. The EU legislation establishes the "energy efficiency first" principle as a fundamental principle of EU energy policy. This means that EU countries must consider energy efficiency in all relevant policies and in all major investment decisions taken in the energy and non-energy sectors.

On top of regulatory progress, the EU also launched **NextGenerationEU,** a historical temporary recovery instrument to address the socio-economic consequences of the covid pandemic and support investment for a cleaner and more resilient future. It thus includes a **minimum of 37% spending on climate investments and 20% on support for the digital transition.** The funds focus on financing initiatives to promote clean energy, sustainable mobility and green vehicles, smart construction and building renovation, digital infrastructure, modernisation of public administration and human capital formation.

E2

European targets

Back to main

Energy targets

In the previous chapter, some of the main goals relevant for this topic where presented, as a part of the European background and framework. This chapter aims to go deeper on more concrete targets. The plans and strategies established at European level define binding and non-binding policy targets.

The Energy Efficiency Directive (2018/2002) established a headline EU energy efficiency target for 2030 of at least 32,5% (compared to projections of the expected energy use in 2030). The revised EED (2023/1791) establishes a new, and for the first time, **binding, energy efficiency target of reducing final energy consumption by at least 11.7%** compared to projections of the expected energy use for 2030

The Renewable Energy Directive is the legal framework for the development of renewable energy across all sectors of the EU economy, supporting clean energy cooperation across EU countries. It establishes the following targets:

- Reduce emissions intensity of **transport fuels by a 14,5% by 2030**, or ensure a share of **renewable in transport of at least 29%**;
- **Binding annual increase of 1.6% in the use of renewable energy in the industry sector**, with specific targets for hydrogen use from non-biological sources (42% by 2030 and 60% by 2035).
- (Indicative) Energy used in buildings should be **by 2030 of renewable origin in at least 49%**. Increase of the **renewable energy used for heating and cooling to 0.8% annually by 2025 and 1.1% by 2030;**

The European Climate Law (July 2021) establishes the following key targets in relation to GHG emissions:

- **Net zero greenhouse gas emissions by 2050**;
- **At least 55% GHG reduction by 2030** in relation to 1990;
- An **average 1,49% yearly energy saving**s gradually **reaching 1,9%** by the end of **2030**.

Back to main

Municipal Planning

According to the recast EED detailed planning will also be mandatory for heating and cooling, in the context of the National Energy and Climate Plans. Art 25 (1) mentions:

"As part of its integrated national energy and climate plan and its updates pursuant to Regulation (EU) 2018/1999, each Member State shall submit to the Commission a comprehensive heating and cooling assessment. That comprehensive assessment shall contain the information set out in Annex X to this Directive and shall be accompanied by the assessment carried out pursuant to Article 15(7) of Directive (EU) 2018/2001"

More importantly, all municipalities of 45000 or more will have to adopt a municipal plan too:

"Member States shall ensure that regional and local authorities prepare local heating and cooling plans at least in municipalities having a total population higher than 45 000".

This plan will be based, among others, on the figures of the national one and abide to the energy efficiency first principle. It will have to take into consideration criteria such as low-temp district heating readiness, waste heat availability and renewable energy in heating and cooling. Among other things the municipal plans will have to address "how to finance the implementation of policies and measures and identify financial mechanisms allowing consumers to shift to renewable heating and cooling"

Back to main

More info regarding EU targets

The countries of the EU are working individually on new legislation to reach these objectives at national level.

The REFEREE tool provides information whether the targets are accomplished or not, as an addition information provided, so policymakers can be aware if the policies applied are useful to comply the European targets.

To know more on policy targets in force in the EU and at Member State level, access the following brief:

DOWNLOAD PDF

referee
real value of energy efficiency

TOOL GUIDANCE - LOCALITIES

Press any chapter to navigate directly to it

REFEREE Tool

- R1. Purpose of the Tool
- R2. Defining Inputs and Outputs

Guidance

- G1. Introduction
- G2. Step-by-step guide

European context

- E1. European regulation
- E2. European targets

4 User tutorials

Two tutorial videos are available to users, one per each tool. They help the user to input the data required from the online interface and navigate through the different sections, step by step.

In particular, they:

- Show what is going to be displayed to the user, i.e., different options, capacities of the tool.
- Explain what the user is required to do in each case, and which are the steps to follow.
- Remind the availability of the guidance, which can be used in parallel during the simulation process.
- Provide tips to make a more accurate simulation.
- Allow to download the Policy Assessment Report from the online interface and briefly show the MS Excel files.

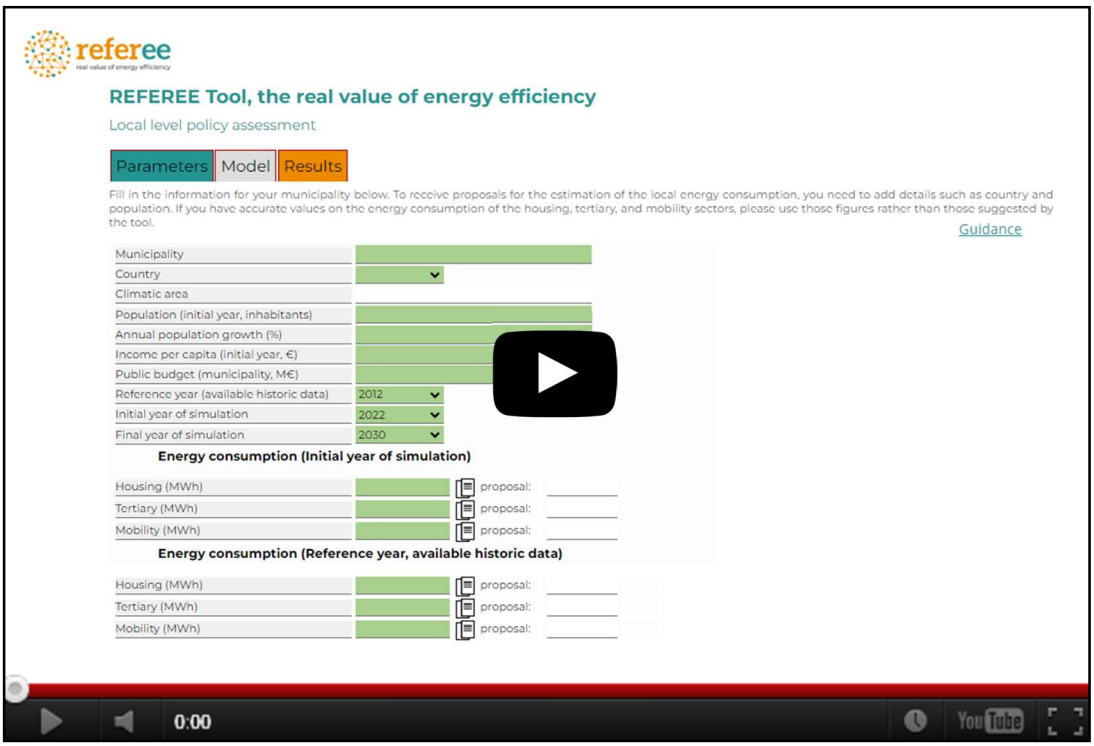


Figure 1. Screenshot of the tutorial video preview.