

Long-Term Macro Electricity Consumption Forecasting for Belgium

Presentation of the Belgian Calculator in the framework of the strategic reserve taskforce

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Agenda

- **Context of the mission for Elia**
- Overview of BECalc
- Electricity consumption in the different sectors
- Next steps


Project to improve the 'macro demand forecasting' values with transparent methodology and assumptions



Context

- Given **several comments** received in the past in the **framework of the strategic reserve** volume evaluation and **other studies**, Elia took the initiative to **improve the 'macro demand forecasting' values**
 - **IHS Markit** was used in the past as **referential** for total demand growth **for several reasons**:
 - External 'reliable' source well known by many stakeholders
- 
 - Neutral/independent position in the forecasting process
 - Sufficient frequency of publication for assumptions updates

However, this reference presents also **some limitations**

- 
 - Lack of transparency concerning the methodology and assumptions used
 - Not possible to make any sensitivity(ies)

** IHS Markit is an international consultancy agency providing, among other things, projection for total load growth of BE and other EU countries based on a multi-sector model*

Project to improve the 'macro demand forecasting' values with transparent methodology and assumptions

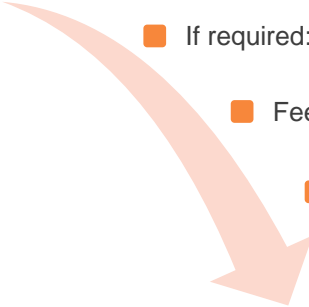


Goals

- Improve current methodology in Elia in order to replace the IHS Markit forecast for future studies
- More detailed approach in order to derive the main drivers behind the evolution of the total demand
- Better integrate policy changes in the demand forecasting (e.g. LEDs, electric vehicle penetration, energy efficiency measures, etc.)
- Develop a tool that will be open-source and that will ensure transparency in the forecasting process



Current process for the tool development/acceptability

- First presentation today – TF iSR
 - If required: organize workshop on methodology and tool
 - Feedback from market parties in the **coming month(s)**
 - Final calibration of the tool (**for end of the year**)
 - Tool deployment and publicly available, and can be used for upcoming studies
- 
- A large, light orange arrow pointing downwards from the first bullet point to the last bullet point, indicating a sequence or flow.

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webtool for experts

[LINK](#)

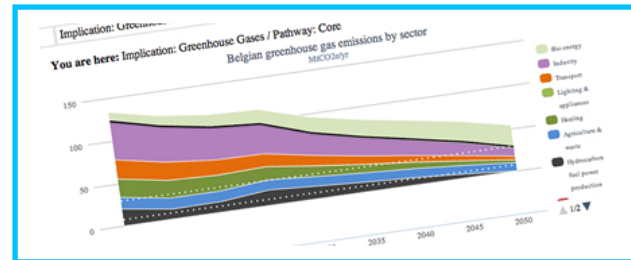
You are here : [Home page](#) > [Build your own scenario](#) > [webtool for experts](#)

Webtool for experts

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Under this project, the development of a sophisticated Belgian calculator was essential in order to be able to build different low carbon scenarios for Belgium and to analyse some of their impacts. The calculator is accessible via the image below.

The online Belgian calculator



This calculator will enable you:

- To explore in greater detail the impacts of the various scenarios described in the study 'Scenarios for low carbon Belgium by 2050'.
- To construct your own emission reduction pathway by activating the main reduction levers as you see fit and by choosing the main parameters determining these pathways.

<https://www.climat.be/2050/en-be/home>

Climact worked with several partners on a range of low carbon studies since 2013, bringing new insights to the previous study

Scope	Project	Subproject or content
Global	Global Calculator (for DECC)	<ul style="list-style-type: none"> • Model energy, emissions & resources
	Climate Transparency Initiative (CW Foundation)	<ul style="list-style-type: none"> • Regional models for EU, India, China, Americas, Brazil
	Science Based Targets	<ul style="list-style-type: none"> • Technical Board advisory
EU	Climate Transparency Initiative (for ECF)	<ul style="list-style-type: none"> • Net zero scenarios by 2050 • Focus on policy angle
	Low Carbon group (Bruegel)	<ul style="list-style-type: none"> • Net zero by 2050 analysis
	EUCalc (for commission)	<ul style="list-style-type: none"> • Model of energy, emissions, socio economic and resources
National	2050 Calculators (for administrations)	<ul style="list-style-type: none"> • > 15 countries ⁽¹⁾
	National analysis (SPF, BE.FIN, Heinrich Böll Stiftung, Greenpeace)	<ul style="list-style-type: none"> • Carbon pricing, circular economy strategy, macro economic impact, nuclear phase-out impact, Energy efficiency impacts
Regional	2050 Calculators & analysis	<ul style="list-style-type: none"> • Wallonia, Flanders, Brussels
	Sector roadmaps	<ul style="list-style-type: none"> • Walloon Buildings renovation strategy • Federations: Agoria, Cobelpa, FIV, Fedustria, GSV, Fetra, Febelgra
	Regional analysis (AWAC, DGO4, IBGE)	<ul style="list-style-type: none"> • socioeconomic impact of low carbon plans • Regional energy balance
Cities	City roadmaps	<ul style="list-style-type: none"> • Various analysis ⁽²⁾

NOTES: (1) Non-exclusive list: [Albania](#), Algeria, [Belgium](#), [Bosnia](#), [Croatia](#), [Kosovo](#), [Macedonia](#), [Montenegro](#), ...

(2) Ans, Les Bons Villers, Louvain-la-Neuve, Mons, Namur, Pont-à-Selle, Seneffe, Visé

Comprehensive expert
consultation for 2013
SPF study

The tool models 2050 low carbon pathways in terms of energy use and GHG emissions

DISCLAIMER

The model is primarily developed as a 2050 prospective tool

Scope of the tool

Sectors

- Agriculture
- Buildings
- Transport
- Industry
- Energy supply

Energy carriers

- Fossil fuels
- Biofuels
- Synfuels
- Hydrogen
- Electricity

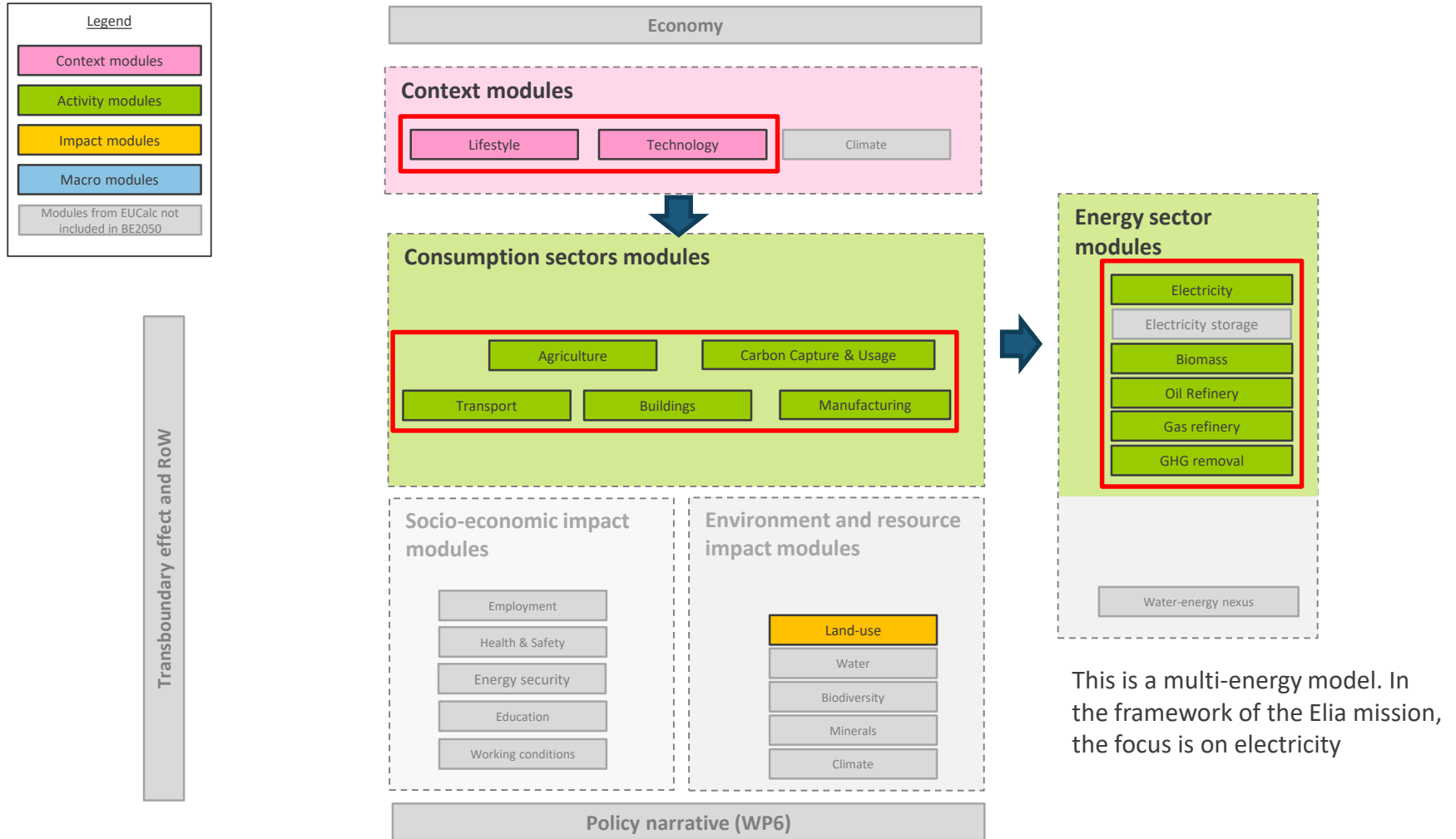
Geography

- Belgium
- Brussels
- Flanders
- Wallonia

Time

- Yearly data for 1990-2015
- 5-year projections from 2020 to 2050

Structure of the BE2050 Roadmap Tool that we are developing in 2019



This is a multi-energy model. In the framework of the Elia mission, the focus is on electricity

This study is focused on testing the implications of ambitious low carbon scenarios

What it covers

- The **development of scenarios** reaching the required GHG reductions, based on realistic and transparent assumptions
- A comprehensive and dynamic model, covering **all sectors and GHG emissions**
- An **open-source** model which will be complemented by an **online version** to increase reach and use
- The insights and sector findings gathered through a **large amount of previous engagements and expert consultations**
- Impacts on GHG emissions, energy and material and resources uses
- The identification of the **key decision points**, and of timing implications

What it does NOT do

- **Macro-economic analysis** and climate change co-benefits are partially covered in EUCalc but not in BECalc
- **Scenarios are in no-way projections**, no specific likelihood is attached to them, and the launch of the model will not include the choice of an ideal scenario.
- There is **no cost-optimization** in the model, and societal or utility costs are not covered, and neither are taxes or subsidies

Illustrative questions

- If you change this technical or behavioral lever, these are the consequences
 - This is the maneuver space per dimension, and its required implementation ambition
 - This is the impact of delaying action
 - Eating more meat requires so much more land in Belgian More travel demand by car increases the amount of steel production
-
- Amount of jobs created
 - The cost of the impact of Climate change, and specifically to Europe/Belgium
 - This is the best pathway for Belgium
 - For our children, low carbon is 3% cheaper

Harmonized ambition level definitions are used across all levers

With Existing Measures (WEM)



With Additional Measures (WAM)



Level 1	Level 2	Level 3	Level 4
<p>Projections of historical trends</p> <p>> Equivalent to WEM except if some existing measure already seem very ambitious and we want to reflect a wider range than this.</p>	<p>Intermediate level, more ambitious than a projection of historical trends but not reaching the full potential of available solutions</p>	<p>Very ambitious level, given the current technology evolutions and the best practices observed in some geographical areas</p>	<p>Transformational and requires some additional breakthrough or efforts such as important costs reduction for some technologies, very fast and extended deployment of infrastructures, major technological advances, strong societal changes, etc.</p>

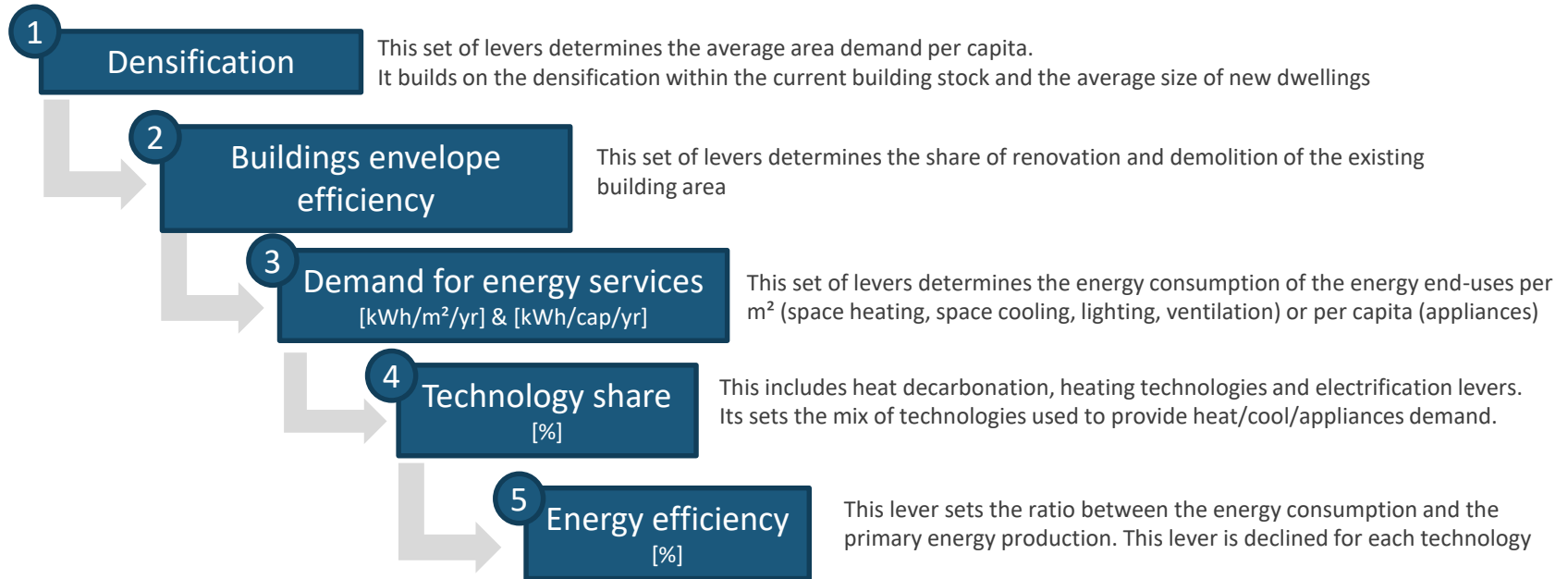
GLOSSARY NOTES:

- Levels 1,2,3,4: Ambition to reduce emissions
- “Projection of historical trends” : This corresponds to Ambition level 1: (which could be a definition of BAU). How to project is to be defined by every sector, and illustrated in the table below (i.e. extrapolation type and period length)
- WEM (With Existing Measures) : Is a scenario: Is above the WOM. Could be above Level 1 in case historical trends assumed weaker policies than what is planned now

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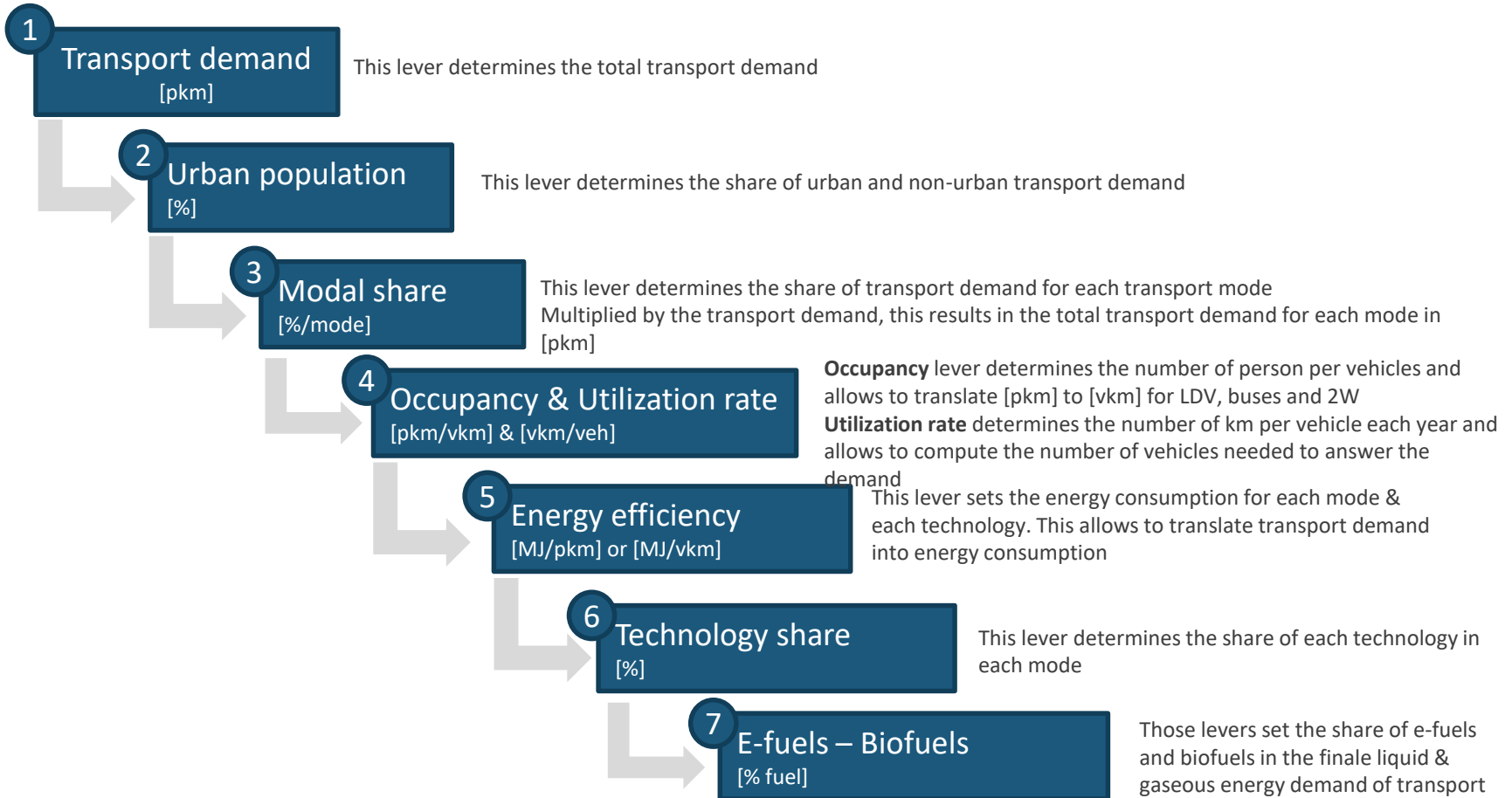
Calculation sequence of levers for the computation of energy and emissions in buildings



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Calculation sequence of levers for the computation of energy and emissions in transport



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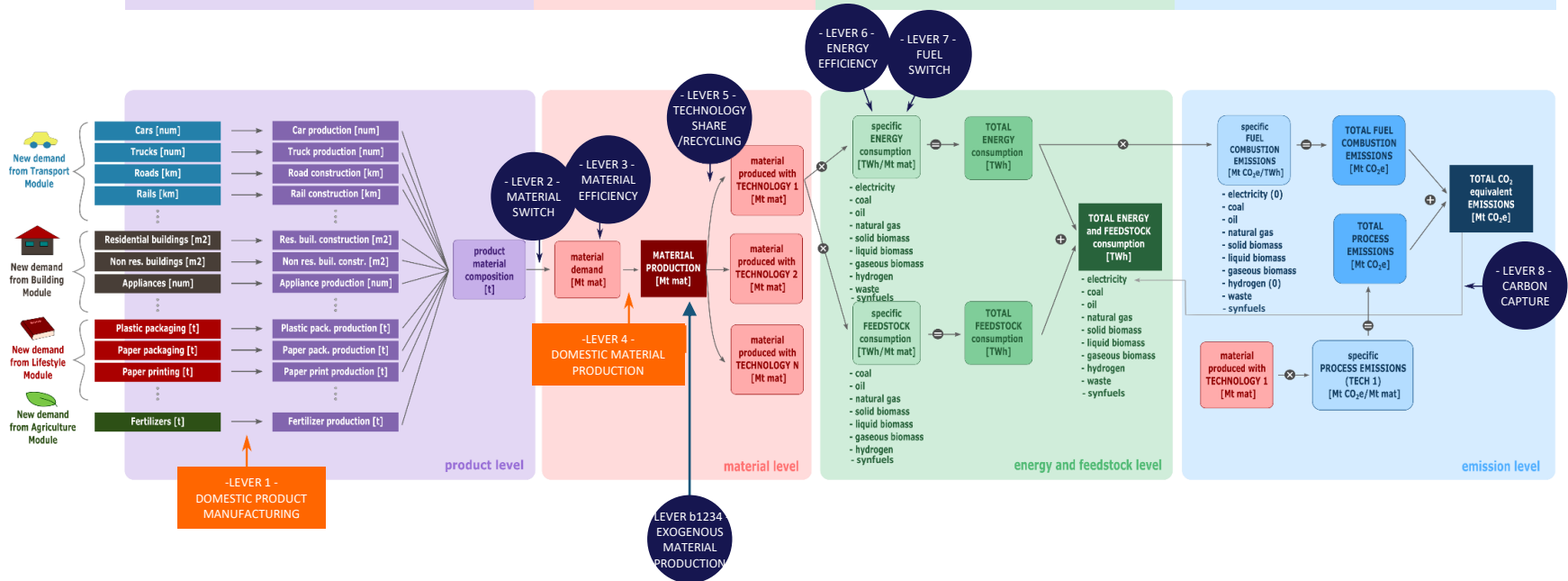
The manufacturing modelling logic goes sequentially from

Products ...

to materials...

to energy...

to emissions



Main product from the other sectors which drive the industrial activity

	Lifestyles	Building	Transport	Agriculture & land-use
Taken into account in the model	<ul style="list-style-type: none"> - Main appliances in houses - Packaging (plastic & paper) 	<ul style="list-style-type: none"> - New construction surface area⁽¹⁾ for residential and non-residential - Renovation surface area⁽¹⁾ for residential & non-residential 	<ul style="list-style-type: none"> - New car demand - New trucks demand 	<ul style="list-style-type: none"> - Fertilizers and Food processing from agriculture
NOT taken into account in the model ⁽²⁾	<ul style="list-style-type: none"> - Furnitures & other objects 	<ul style="list-style-type: none"> - / 	<ul style="list-style-type: none"> - Infrastructures (rail, road, cycle paths, etc.)⁽³⁾ - Trains, planes, etc. 	<ul style="list-style-type: none"> - Energy infrastructures (wind turbines, solar panels, power plants, electric network, gas network, etc.)

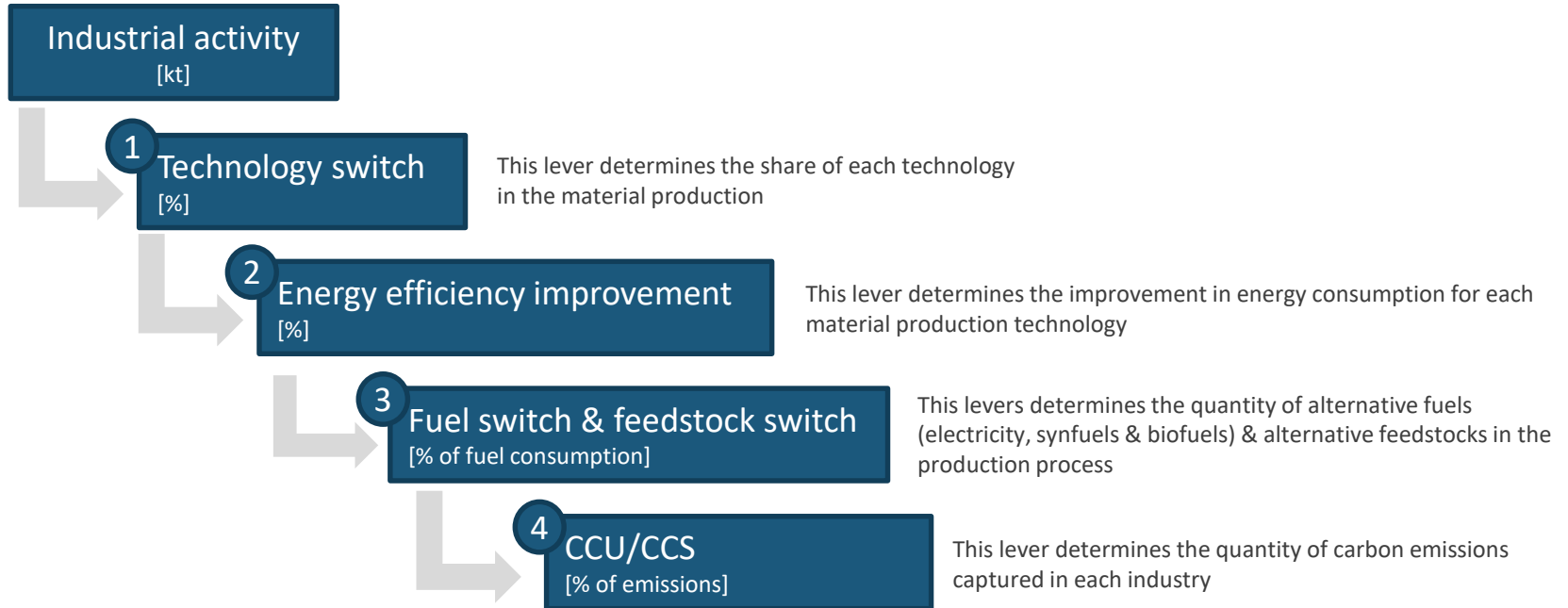
NOTE: (1) The product is a m² of new or renovated building

(2) We do not cover all the products, what is missing is simply assessed assuming the same evolution in the material demand

(3) Currently constant

SOURCE: Climact analysis

Decarbonizing industrial processes



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- **Preliminary results**

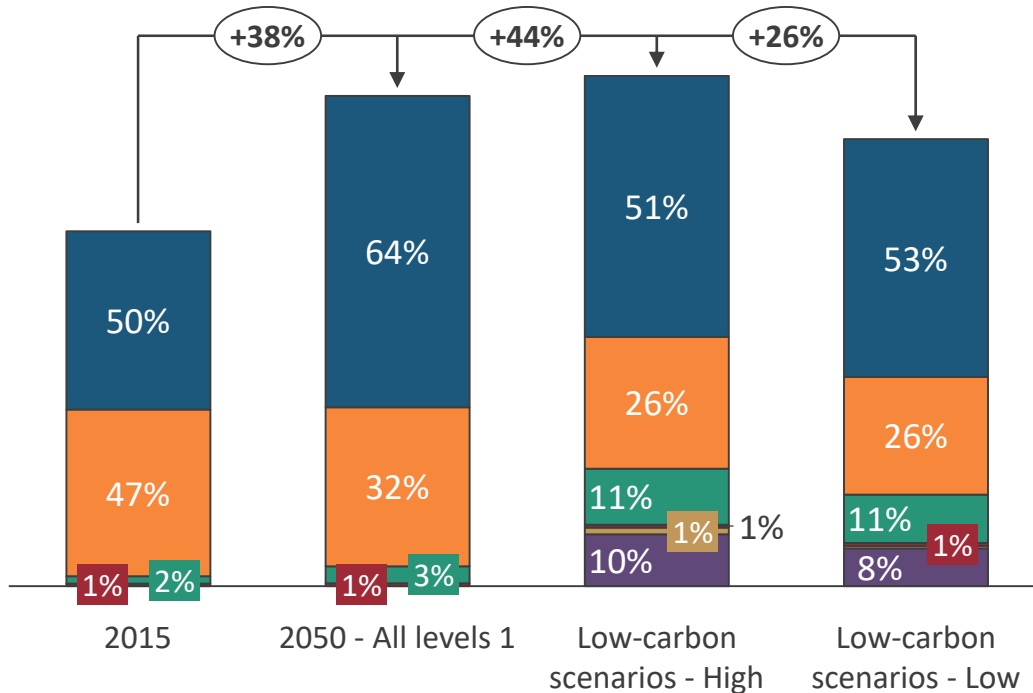
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Example of electricity demand from sectors in key scenarios

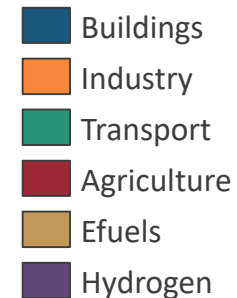
DISCLAIMER
Preliminary
results

Electricity demand per sector for the key illustrative scenarios in 2050 [TWh]



Preliminary insights

- Buildings & Industry are the main consumers of electricity
- Transport electricity demand increases in all scenarios
- Hydrogen and e-fuels production further increase electricity consumption



What does the tool currently look like?

[→ Current tool](#)

What will it eventually look like at the end of the project?

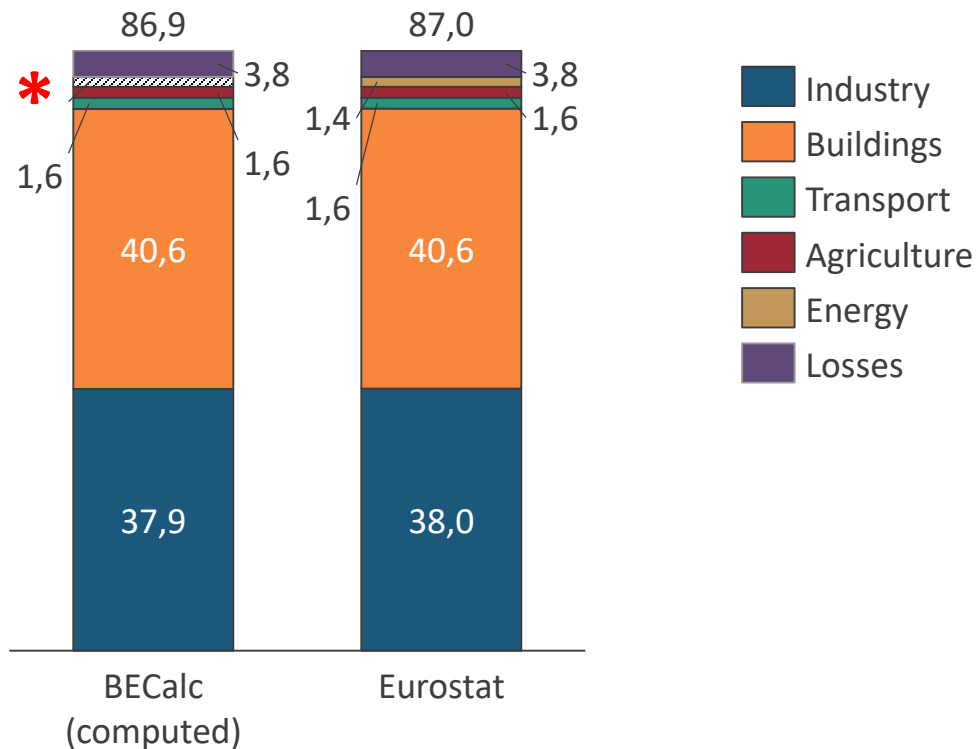
[→ Web interface of the 2013 version of the tool](#)

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The tool accurately reproduces the historical data for electricity consumption in Belgium

Final electricity consumption in Belgium , 2015 [TWh]



DISCLAIMER
Preliminary
results

* Electricity use in energy sector is largely related to refineries. It is currently not represented in the model

Sources:

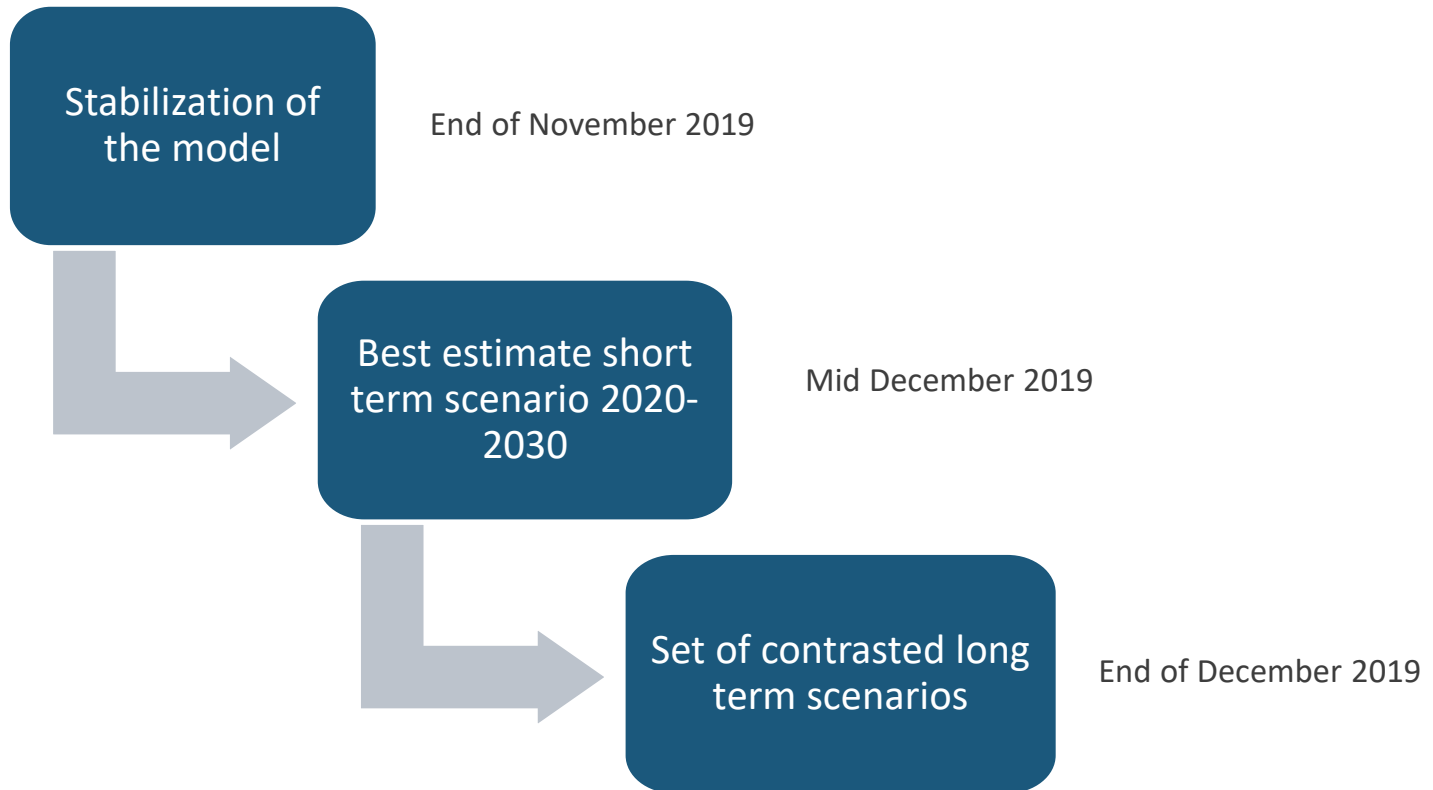
Eurostat, [Supply, transformation and consumption of electricity](#), 2019

Elia, [Elia total load](#), 2019

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The stakeholders can send their feedback on the following e-mail address for **Thursday 3 October 2019** at the latest:
bilal.hahati@elia.be

Thank you for your attention!

Benoît Martin
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