

Adapting the
2050 Pathways Calculator
to other regions

19th of September 2012 – Beijing

CLIMACT

Adapting the 2050 Pathways Calculator to other regions

- Context and objectives of the Belgian low carbon studies
- Adapting the Low carbon 2050 Pathways model to another region
- Wallonia can reduce its emissions by 80 to 95% by 2050

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Context and objectives of the Belgian low carbon studies

Adapting the Low carbon 2050
Pathways model to another region

Wallonia can reduce its emissions by
80 to 95% by 2050

Belgium, a small country
in the heart of Europe



Many (EU) organizations analyze 2050 energy and climate scenarios

NOT EXHAUSTIVE



2050 Pathways Analysis

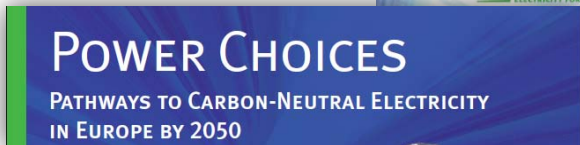


France, Germany, United Kingdom
Pathways towards a low-carbon
economy in 2050



COMMUNICATION DE LA COMMISSION
AU PARLEMENT EUROPÉEN, AU CONSEIL, AU COMITÉ ÉCONOMIQUE ET
SOCIAL EUROPÉEN ET AU COMITÉ DES RÉGIONS

Feuille de route vers une économie compétitive à faible intensité de carbone à
l'horizon 2050



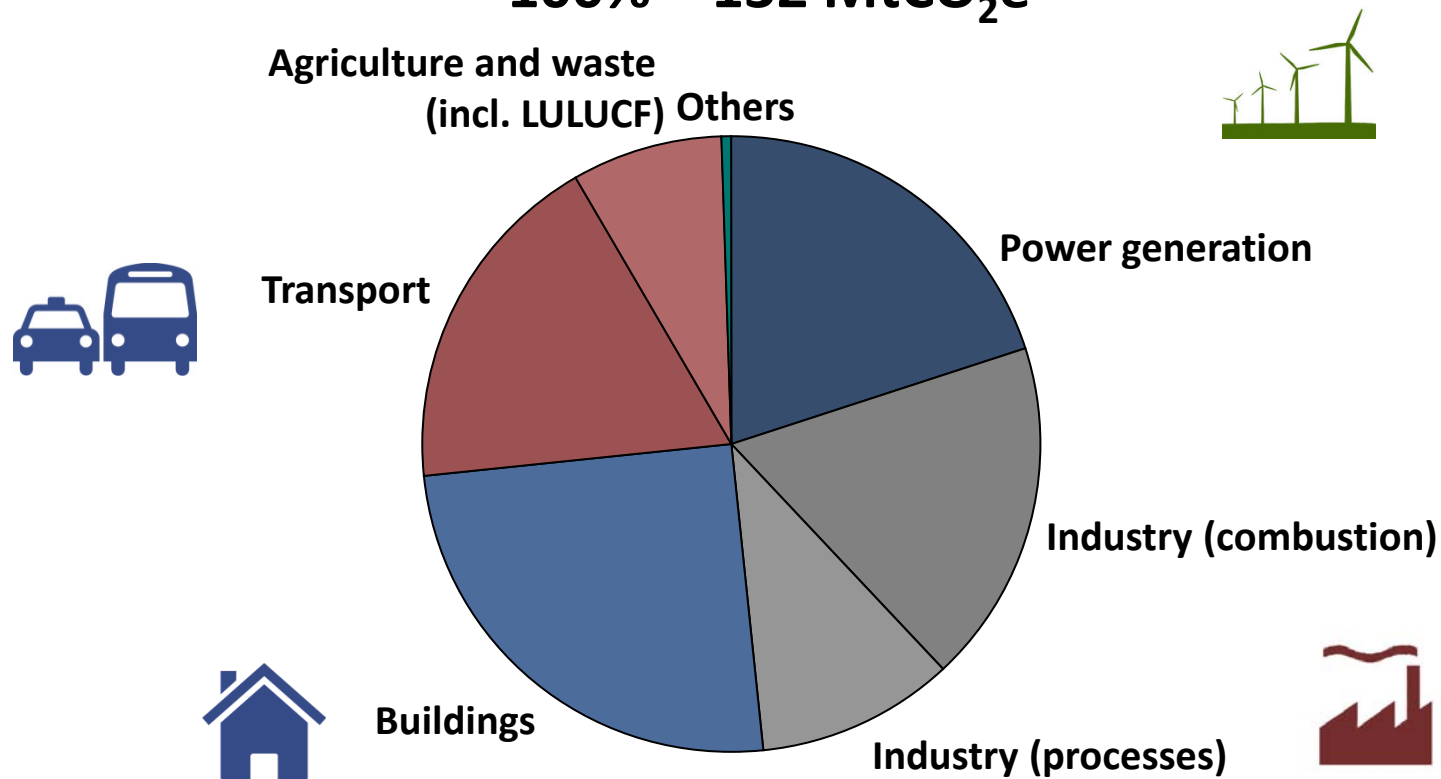
Trajectoires 2020 - 2050
vers une économie sobre
en carbone



Belgian emissions in 2010 are relatively equally distributed between power, industry, buildings and transport

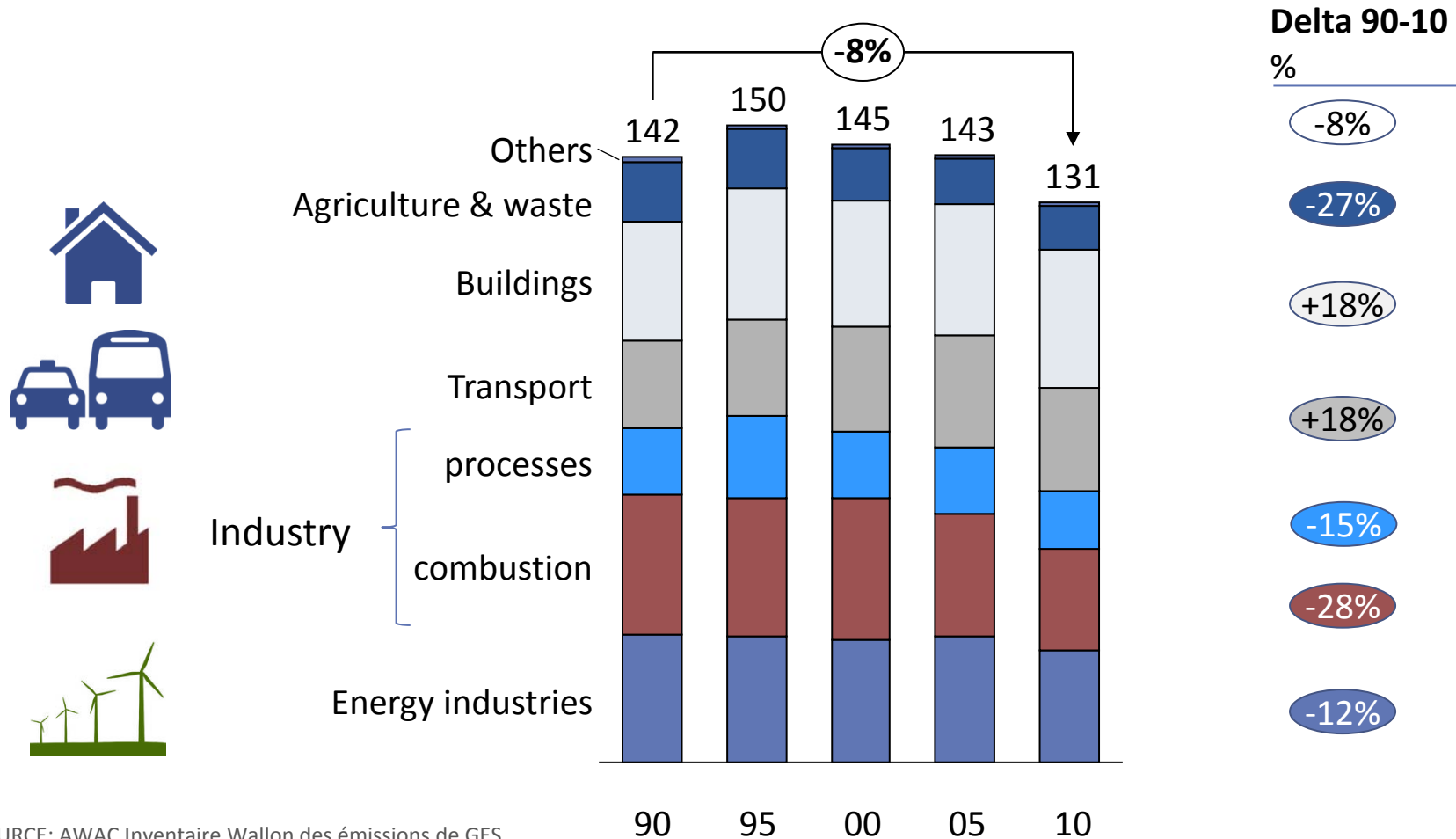
GHG emissions in Belgium, 2010, %

100% = 132 MtCO₂e



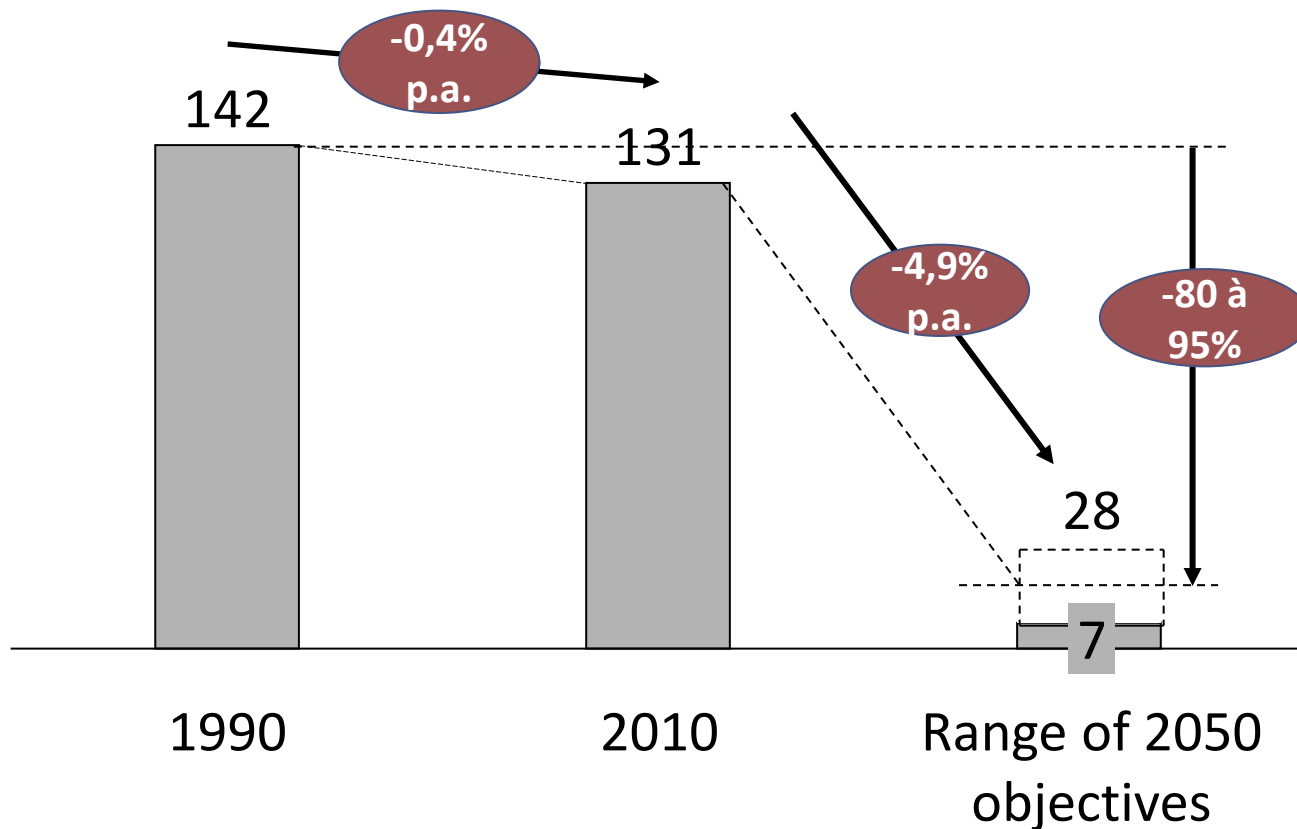
Belgium has reduced its emissions by ~8% since 1990

GHG emissions in Belgium, MtCO₂e per year



Belgium needs to massively increase its yearly GHG reduction pace in order to reach its objectives in 2050

GHG emissions in Belgium, MtCO₂e per year



Key objectives of the project « A Low Carbon Roadmap for Belgium »

Understand how to reach 2050 low carbon objectives

- **Develop low carbon scenarios** integrating existing technologies
- Clarify the **required implementation range** for key indicators

Engage key stakeholders

- Insure the development of **pragmatic and realistic conclusions in strong interaction** and with significant buy-in from **key stakeholders**

Support political decision making

- Encourage **a common vision for all**
- **Support short, medium and long term policies**

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Context and objectives of the
Belgian low carbon studies

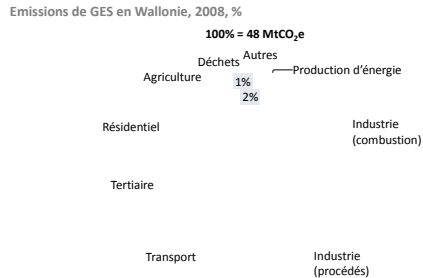
Adapting the Low carbon 2050
Pathways model to another region

Wallonia can reduce its emissions
by 80 to 95% by 2050

CLIMACT

A stakeholders-based approach can be used to develop the model

1 “Bottom-up” study by sector of potential GHG reductions

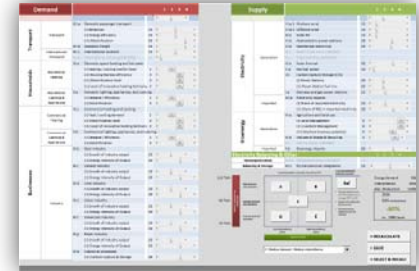


2 Test each sector with external experts

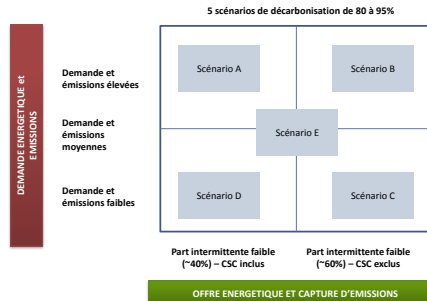
Workshops by sector with external experts

Discussions with international experts

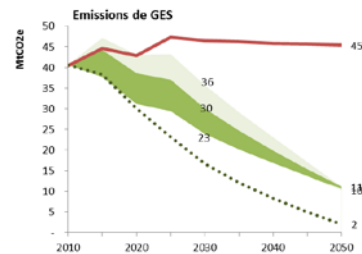
3 Adapt the DECC model to regional data and improve it



4 Define and model various scenarios



5 Detail the implications for these scenarios



6 Review conclusions with the Steering and Expert Committees

Walloon administration

Industry

Civil organisations

Academics

1 Industry was refined to work at the sector level

Industry analysis

Modeling industry production trajectories

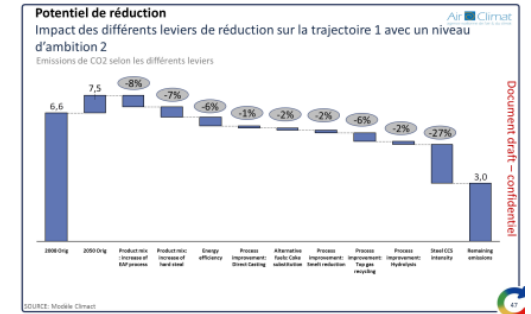
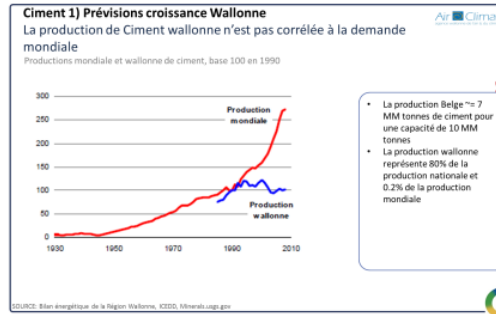
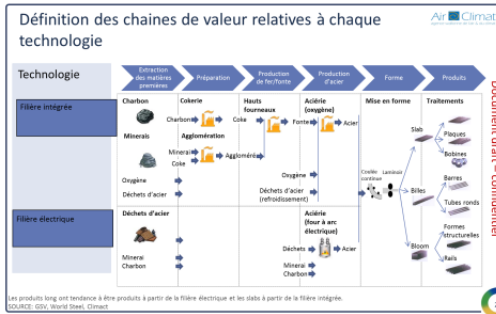
Modeling the potential for reducing GHG emissions

Analysis

Value chain definition

Growth analysis for key markets

GHG reduction levers potential/cost

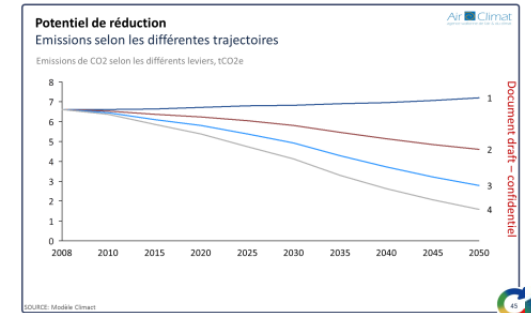
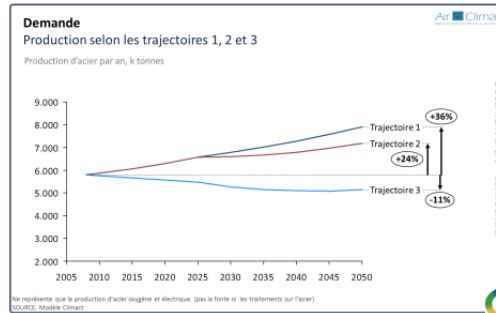
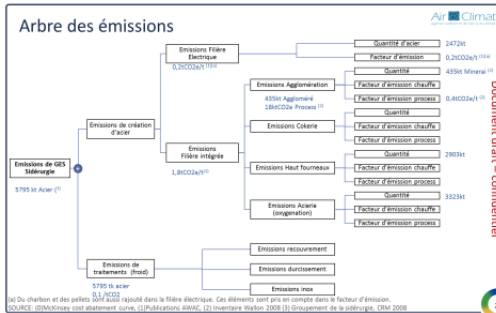


Results

Modeling emissions

Production trajectories

GHG trajectories after reduction



Many organizations and experts were involved

Interactions

- Project initiated by the regional and federal organisations
- Project is followed by an “technical support committee”

- **High level expert committee set up to give general direction to the study**

- Jean-Pascal van Ypersele, Vice-président du GIEC
- Damien Ernst, Université de Liège
- Isabelle Chaput, présidente Climate Platform FEB-UWE-VOKA-BECI
- Union wallonne des entreprises
- EDORA
- FEBEG
- ELIA, gestionnaire du réseau de transport de l'électricité
- ORES, gestionnaire du réseau de distribution de l'électricité
- Inter-Environnement Wallonie
- WWF Belgique
- DECC (Dpt énergie et changement climatique britannique)
- Mike Hogan, ancien directeur ECF en charge de la “2050 Roadmap”

- **Working groups and specific consultations on key sectors**

- Interactions through the communication and the webtool

Public organisations

Industry

Civil organisations

Academic experts

Consumers

2

6

Many organizations and experts were involved

Comité

d'accompagnement

AWAC

Cabinet Henry

Cabinet Nollet

SPW

SPF

CWEDD

Comité d'experts

ECF

DECC

RAP

UCL

ULG

IEW

WWF

UWE

EDORA

Plateforme Climat

FEBEG

A. Fourmeaux, G. Liebecq, A. Cuvelier

D. Defrise

J. Decrop

M. Schippers

V. van Steenberghe (invité)

O. Gulitte

R. Collyer, D. Acke

J. Kiso

M. Hogan

JP van Ypersele

D. Ernst

M. Cors

S. Vandenplas, J. Vandermosten

D. Paquot, A. Lebrun

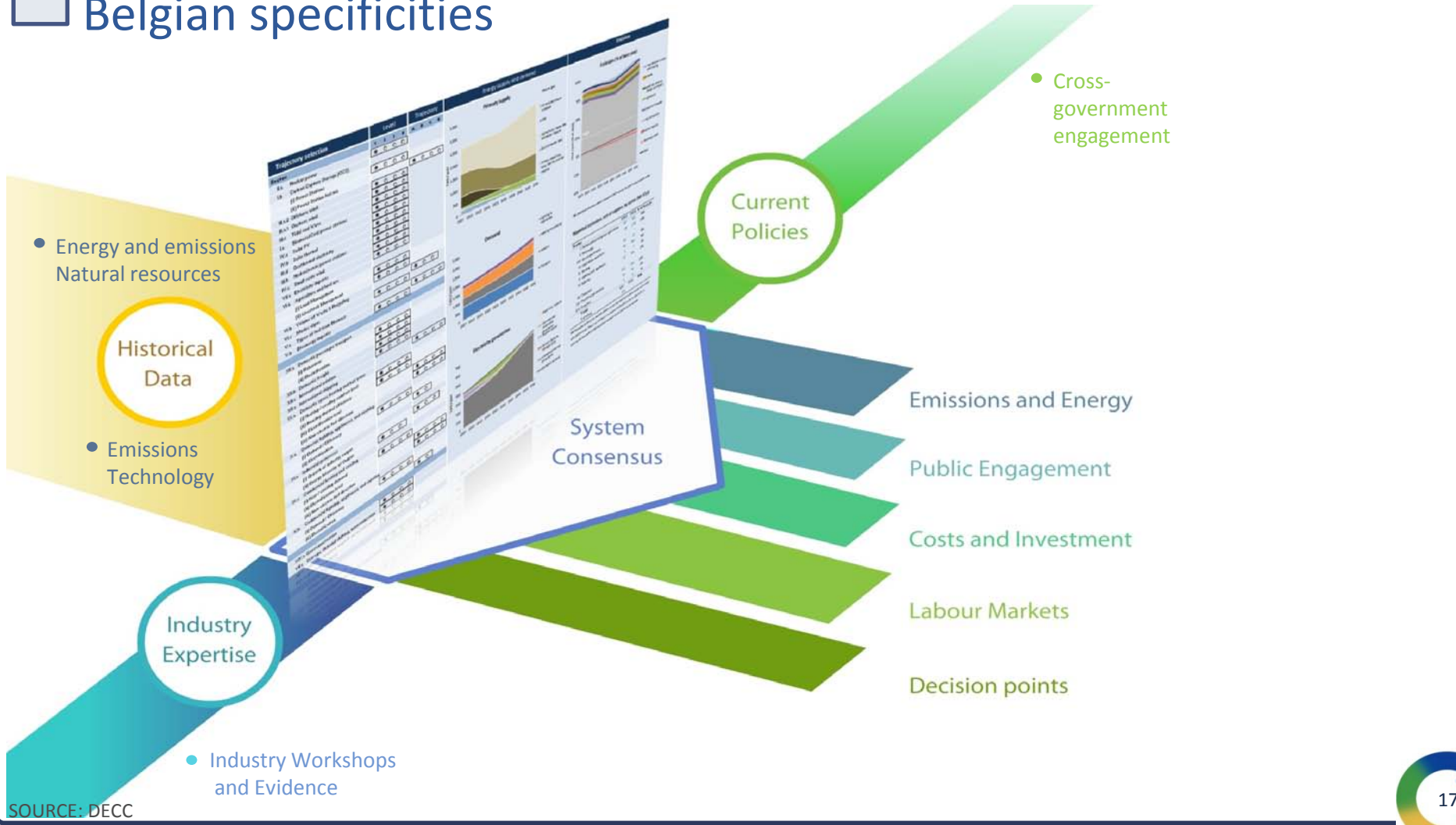
N. Laumont

I. Chaput

J. Herremans



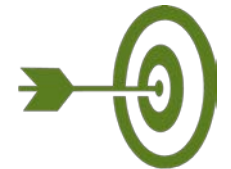
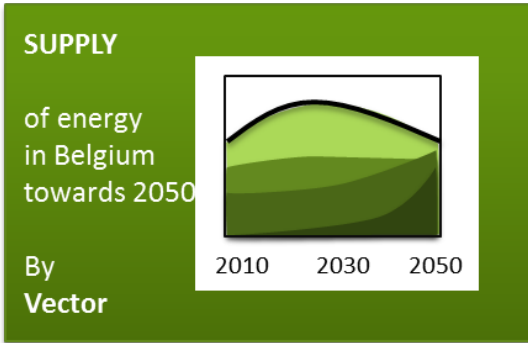
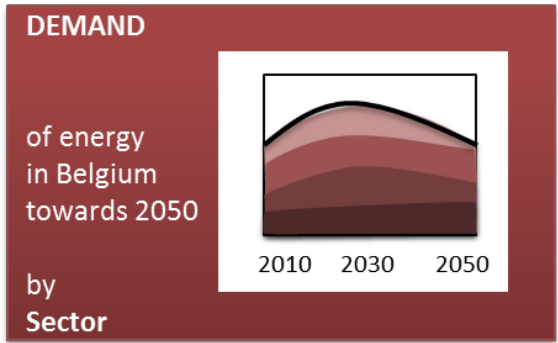
3 The model is the same as the one from the UK, but adapted to Belgian specificities



3

The set of input and levers is flexible and can be easily adapted based on the relevant local characteristics

Data



-80 to -95% GHG emissions vs. 1990

Levers



3 4 ambition levels are defined for each lever

Level 1

- Current minimum legal obligations
- No additional effort
- « Reference scenario »

Level 2

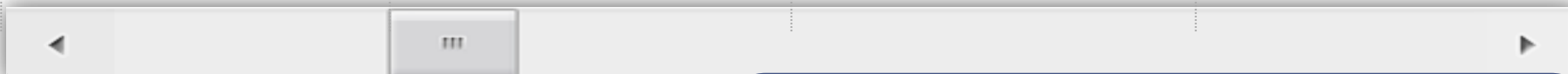
- Moderate effort relatively easily achievable according to the majority of experts

Level 3

- Significant effort requiring large changes, in terms of behaviours or investment requirements

Level 4

- Maximum technical potential based on technical or physical constraints



Levers



- These levels are developed based on the existing literature, expert input and workshops with a range of stakeholders
- They are updated easily directly in the model

3 A flexible model in Excel, usable by many, interface can be modified

TRANSPORT

HOUSEHOLDS

BUSINESS

Demand

		1	2	3	4			
Transport	Transport	XII.a Domestic passenger transport	25					
		(i) Behaviour	25					
		(ii) Energy efficiency	35					
		(iii) Electrification	35					
International Transport	International Transport	XII.b Domestic freight	35					
		XII.c International aviation	25					
		XII.e International shipping [UNUSED]	10					
Households	Residential Heating	IX.a Domestic space heating and hot water	2					
		(i) Heating / cooling comfort level	3					
		(ii) Housing thermal efficiency	3					
		(iii) Electrification level	3					
	Residential Lighting & Appliances	Residential Lighting & Appliances	X.a Domestic lighting, appliances, and cooking	2				
			(i) Demand / Efficiency	2				
			(ii) Electrification	3				
			IX.c Commercial heating and cooling	2				
	Commercial Heating	Commercial Heating	(i) Heat / cooling demand	2				
			(ii) Electrification level	3				
			(iii) Level of innovative heating technology	3				
	Commercial Lighting & Appliances	Commercial Lighting & Appliances	X.b Commercial lighting, appliances, and catering	2				
(i) Demand / Efficiency			2					
		(ii) Electrification	3					
Businesses	Steel Industry	Steel Industry	XI.b Steel Industry	20				
			(i) Growth of industry output	20				
			(ii) Energy Intensity of Output	30				
	Cement Industry	Cement Industry	Cement Industry	XI.c Cement Industry	20			
				(i) Growth of industry output	20			
			(ii) Energy Intensity of Output	30				
	Lime Industry	Lime Industry	Lime Industry	XI.d Lime Industry	20			
				(i) Growth of industry output	20			
			(ii) Energy Intensity of Output	30				
	Glass Industry	Glass Industry	Glass Industry	XI.e Glass Industry	20			
				(i) Growth of industry output	20			
			(ii) Energy Intensity of Output	30				
	Chemicals Industry	Chemicals Industry	Chemicals Industry	XI.f Chemicals Industry	20			
				(i) Growth of industry output	20			
		(ii) Energy Intensity of Output	30					
Paper Industry	Paper Industry	Paper Industry	XI.g Paper Industry	20				
			(i) Growth of industry output	20				
		(ii) Energy Intensity of Output	30					
Industry	Industry	Industry	XI.a Industrial processes	30				
			(iii) Carbon Capture & Storage	30				

Supply

		1	2	3	4	
Electricity	Generation	III.a.1 Onshore wind	13			
		III.a.2 Offshore wind	13			
		IV.a Solar PV	13			
		III.b Hydroelectric power stations	29			
		III.d Geothermal electricity	29			
		IV.c Small-scale wind [UNUSED]	15			
		III.c Tidal and Wave [UNUSED]	10			
		IV.b Solar thermal	30			
		II.a Nuclear power	10			
		I.b Carbon Capture Storage (CCS)	20			
		(i) Power Stations	20			
		(ii) Power Station fuel mix	20			
		I.a Biomass and gas power stations	23			
Bioenergy	Imported	VII.a Electricity imports	23			
		(i) Share of imported electricity	23			
		(ii) Share of RES in imported electricity	30			
		VI.a Agriculture and land use	4			
		(i) Land Management	4			
		(ii) Livestock Management	4			
		(iii) Walloon biomass potential	3			
		VI.b Volume of Waste & Recycling	3			
		VI.c Marine algae [UNUSED]	10			
		V.b Bioenergy imports	30			
Electricity Balancing & Other						
		XIV.a Geosequestration [UNUSED]	10			
		VII.c EU transmission integration	25			

110 TWh

90 TWh

70 TWh

5 decarbonisation scenarios from 80 to 95%
1 non-decarbonised reference scenario

High demand and emissions
Average demand and emissions
Low demand and emissions

Low intermittency (40%) High intermittency (60%)

ENERGY SUPPLY

C: Medium demand - Medium intermittence

Energy demand 86

Intermittence 50%

Elec. Production 125%

2050 GHG emissions

-80%

vs. 1990 level

> RECALCULATE

> SAVE

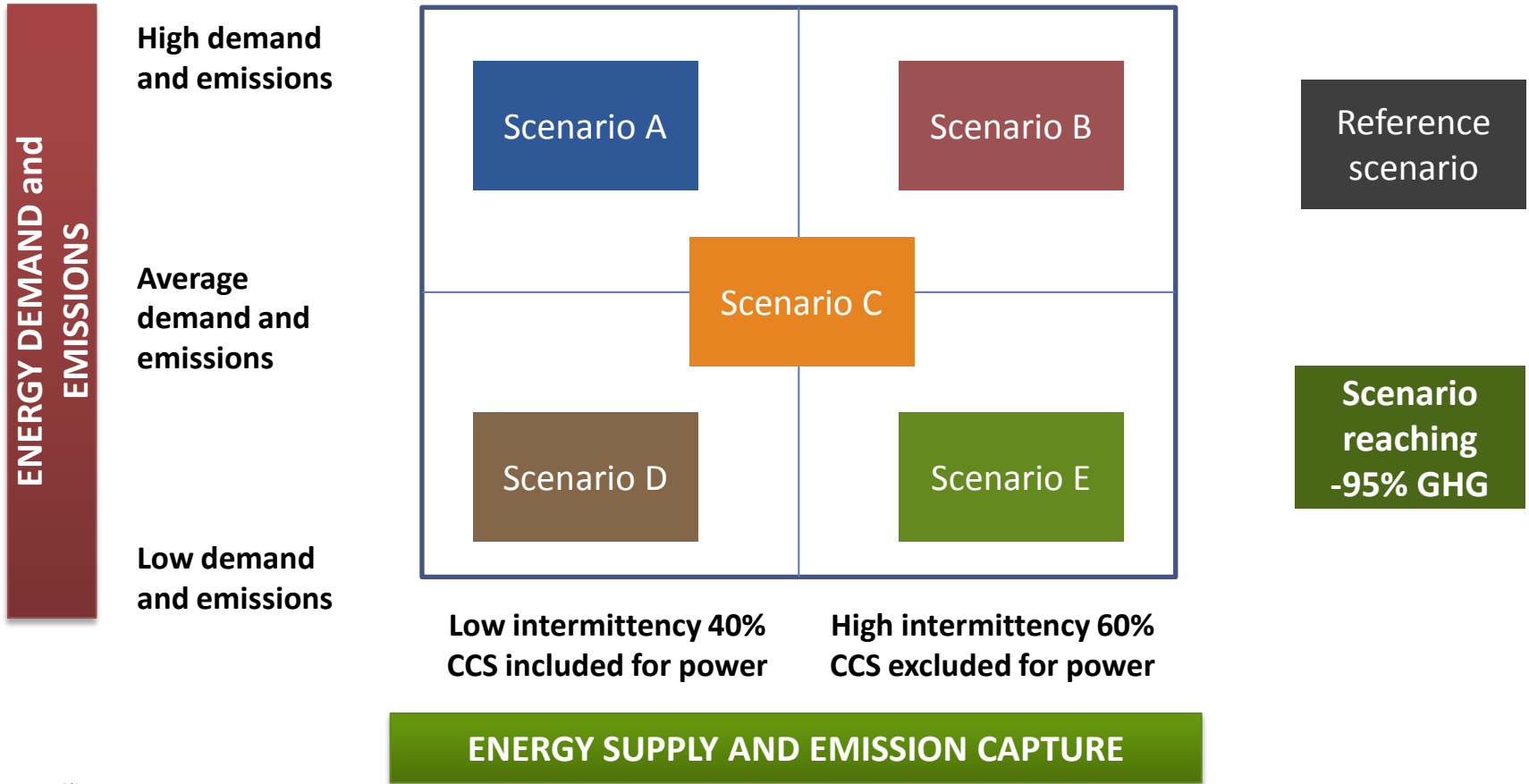
> SELECT & RECALC

SOURCE: DECC, Climact

20

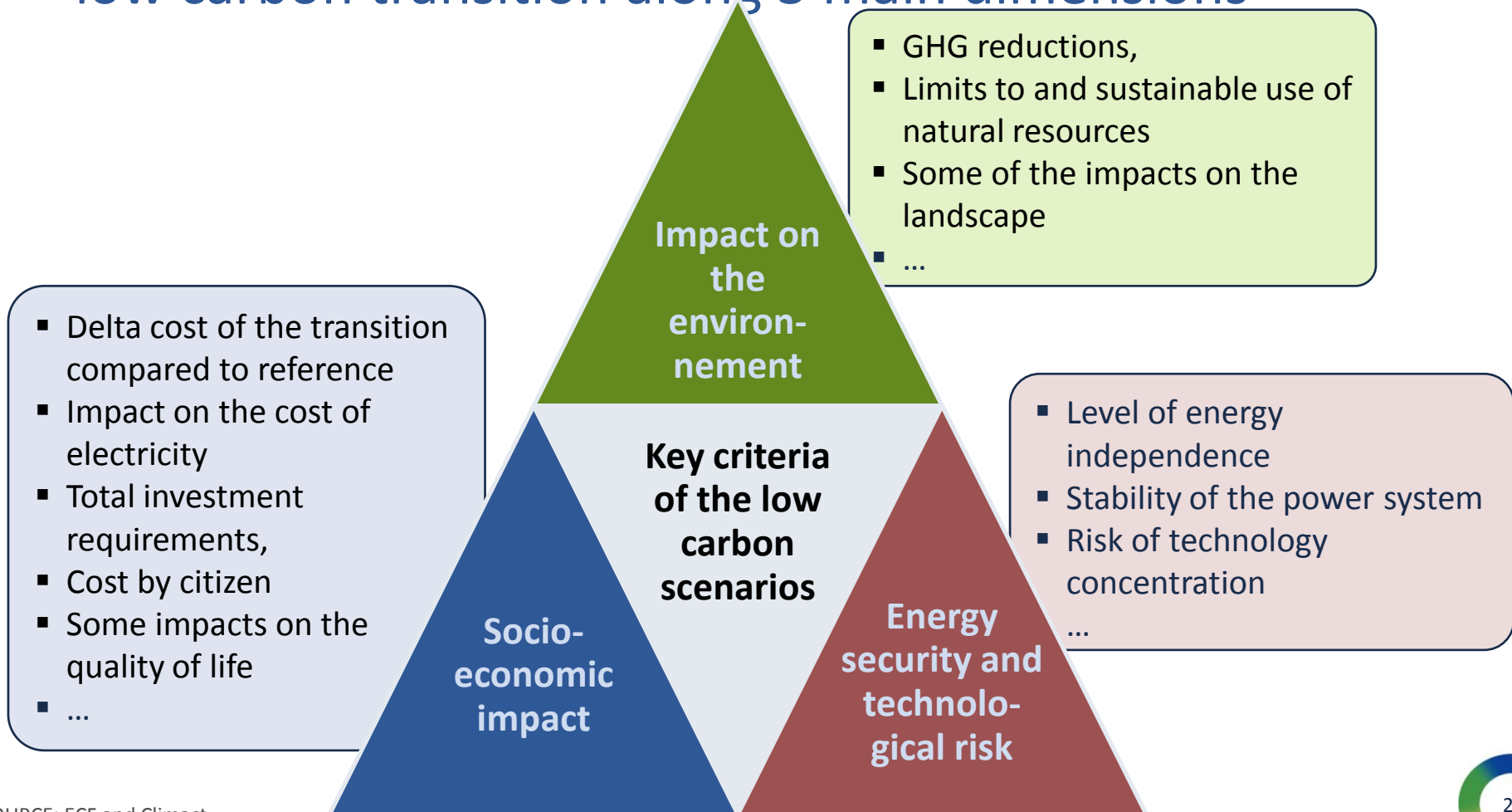
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Scenarios can be built extremely flexibly combining various levels of the key parameters



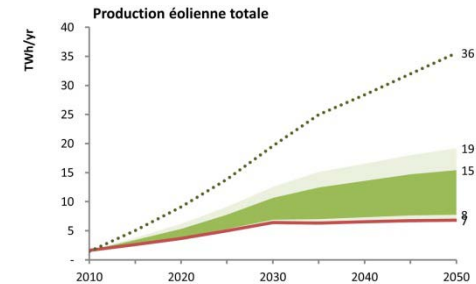
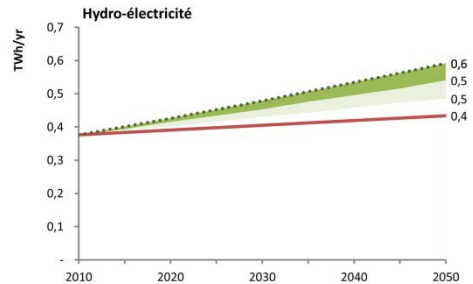
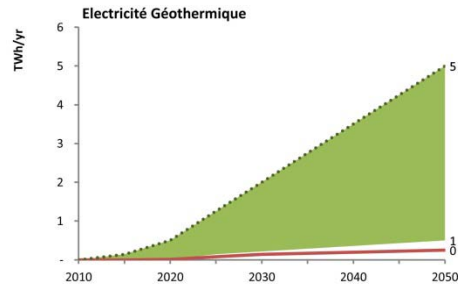
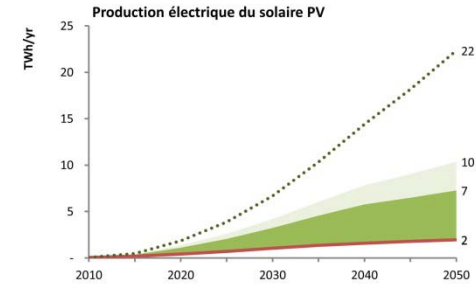
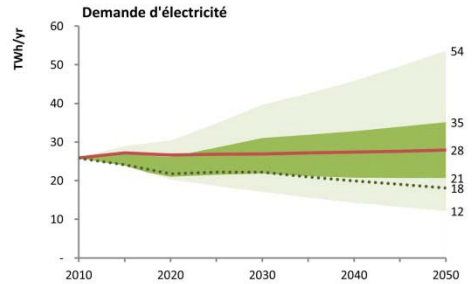
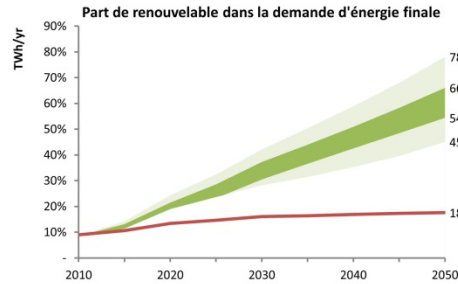
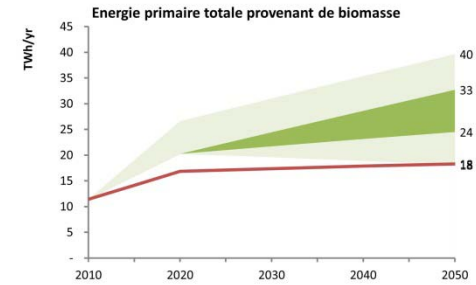
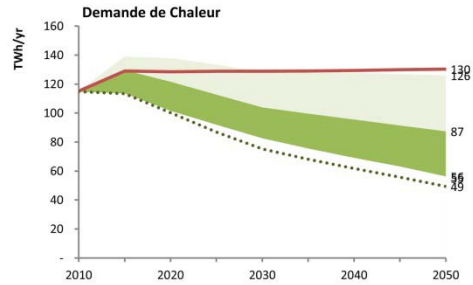
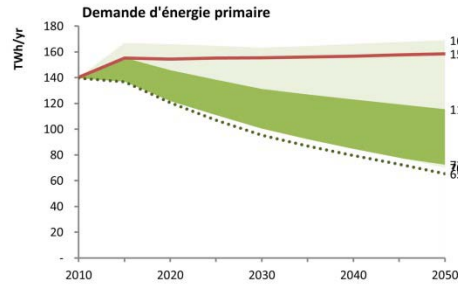
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The model allowed us to test key implications of a low carbon transition along 3 main dimensions



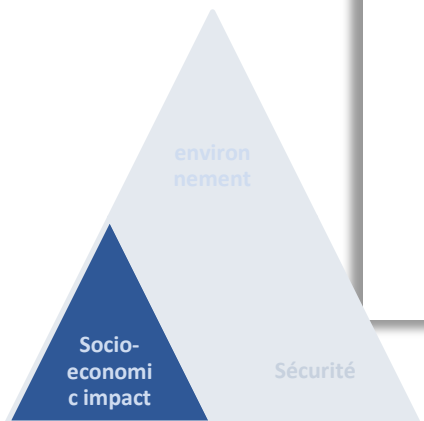
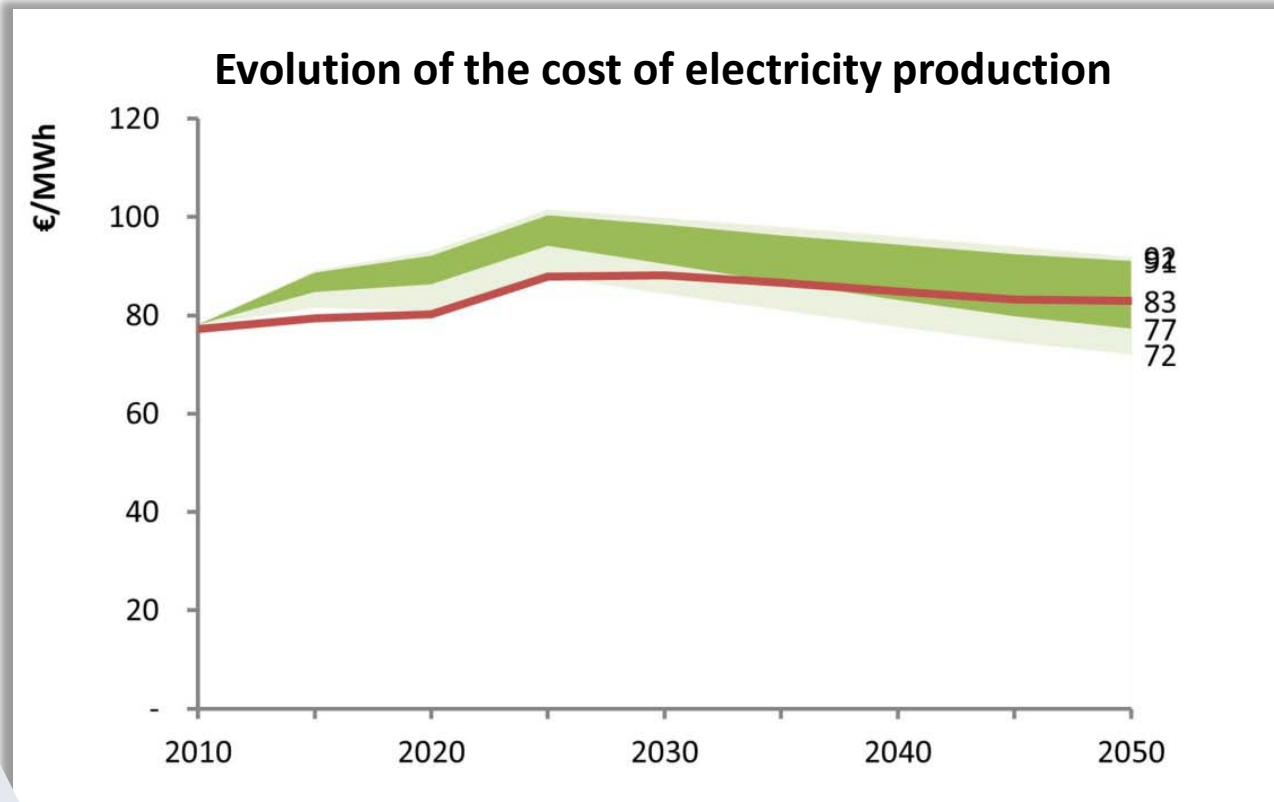
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Outputs are varied based on multiple parameters and can be adapted easily in the Excel model



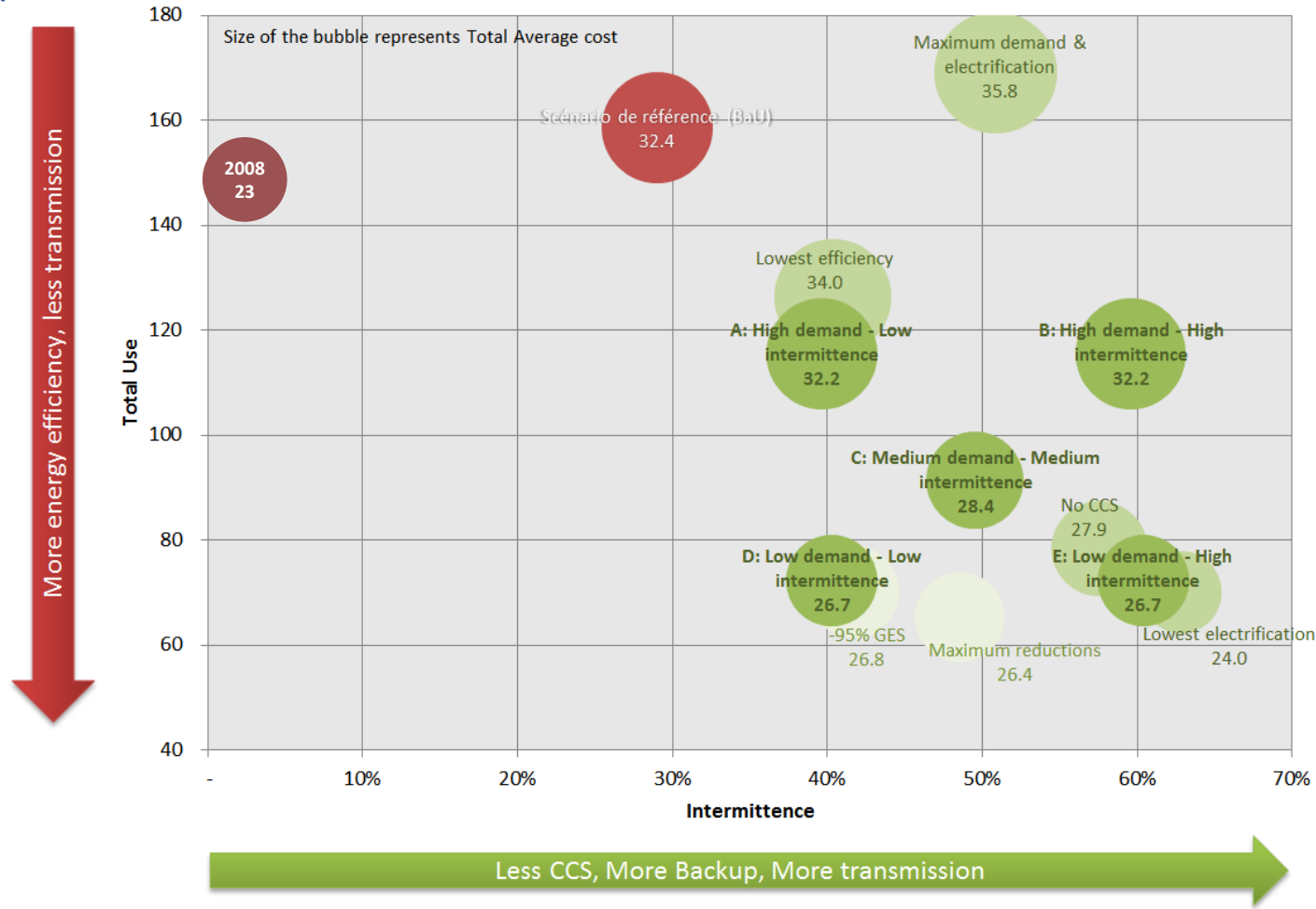
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One of these impacts is the cost of electricity, which we added to the DECC model



5

These outputs can be used to clearly illustrate the impact of the low carbon scenarios



6

A web version which can easily build on the excel tool

Plan Air Climat

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Taille du texte : a a a a

EN

Vers une Wallonie Bas Carbone en 2050

Energy Electricity Heat Emissions Economics

Generation pathway 1
TWh/yr of final energy

Generation pathway 2
TWh/yr of final energy

Generation pathway 3
TWh/yr of final energy

Choose a predefined scenario

Leviers et trajectoires Reference BAV RECALCULATE SHARE

DEMAND SUPPLY

Transport	Transport	Lorem ipsum dolor sit amet consectetur adipiscing elit	1 2 3 4
		Lorem ipsum dolor sit amet consectetur adipiscing elit	1 2 3 4
		Lorem ipsum dolor sit amet consectetur adipiscing elit	1 2 3 4
	Internation Transport	Lorem ipsum dolor sit amet consectetur adipiscing elit	A B
		Lorem ipsum dolor sit amet consectetur adipiscing elit	1 2 3 4
		Lorem ipsum dolor sit amet consectetur adipiscing elit	1 2 3 4

Details

- 1 Description bouton industry 3-1
- 2 Description bouton industry 3-2
- 3 Description bouton industry 3-3
- 4 Description bouton industry 3-4

WWW. WALLONIEBASCARBONE2050.BE



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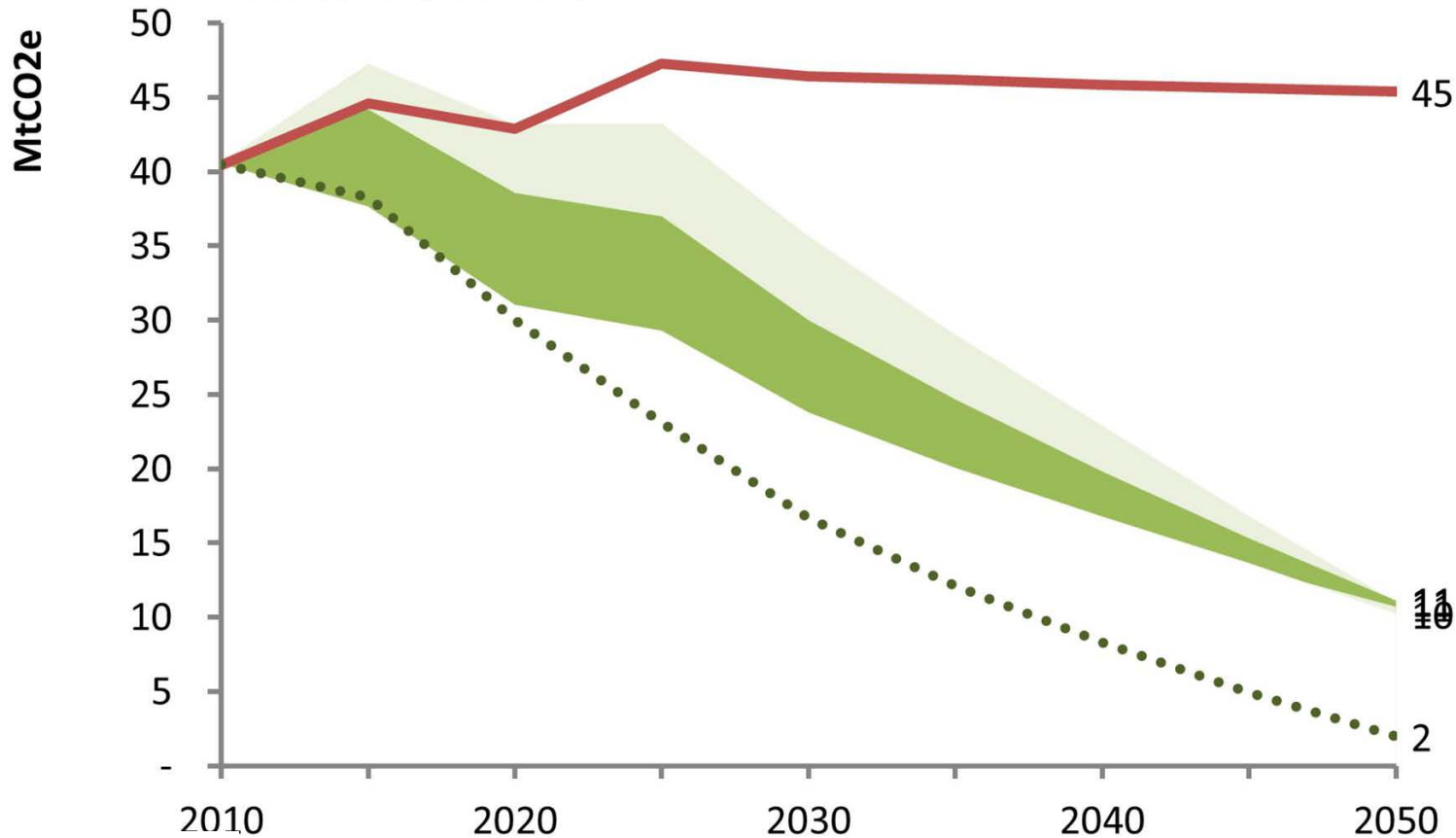
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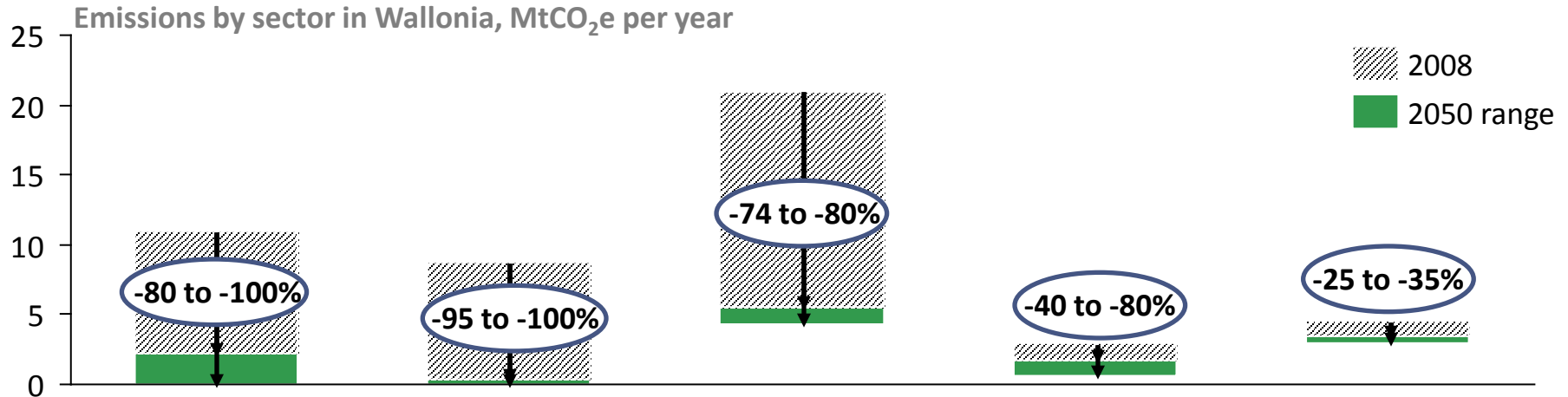
There are technical alternatives to reach the 80% to 95% GHG reduction objectives

- 80% scenarios
- Maximum technical potential
- Reference B-a-U

GHG Emissions in Wallonia



Required reduction ranges by sector between 2008 and 2050 to reach an 80% reduction (vs. 1990)



Transport



Sectors with large energy efficiency and electrification potential

Buildings



Industry



Energy efficiency potential, but CCS required to reach very large reductions

Energy production



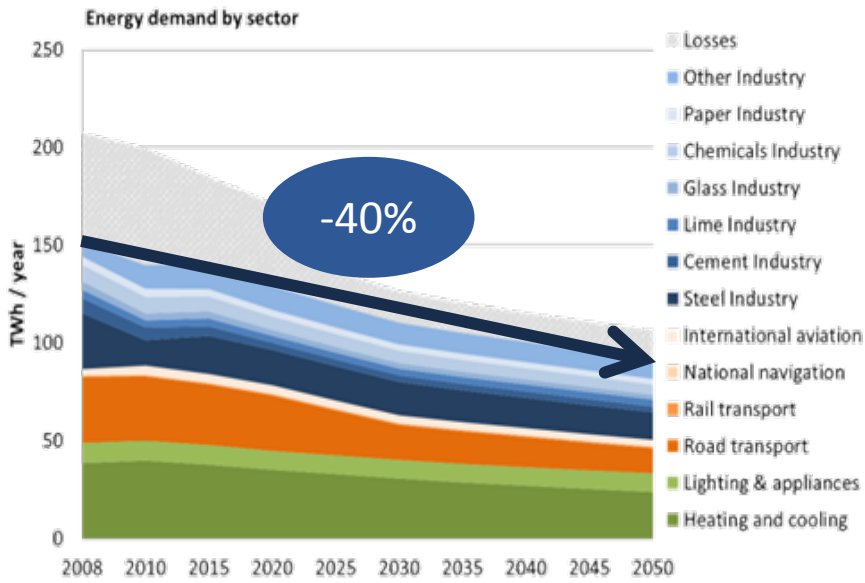
Current 75% nuclear production replaced in all scenarios

Agriculture

Limited technological alternatives, behavior changes required

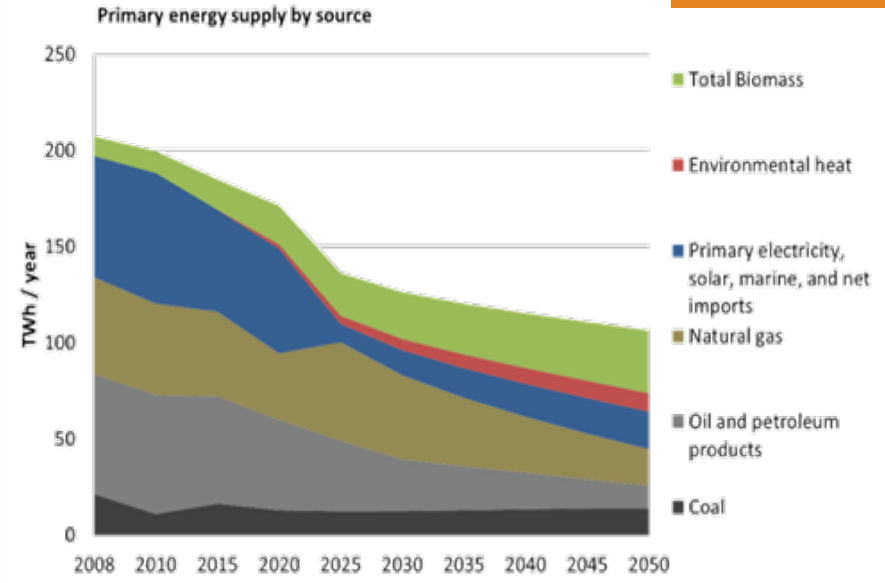
Our middle-ground scenario shows significant reductions in total primary energy demand, with a significant shift to renewable energy sources

Scénario C



150 TWh

90 TWh



Adapting the 2050 Pathways Calculator **to other regions**

Julien Pestiaux – jpe@climact.com

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