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Summer Study

Scaling-up energy sufficiency on a European level through a bottom-up modelling approach: lessons and perspectives

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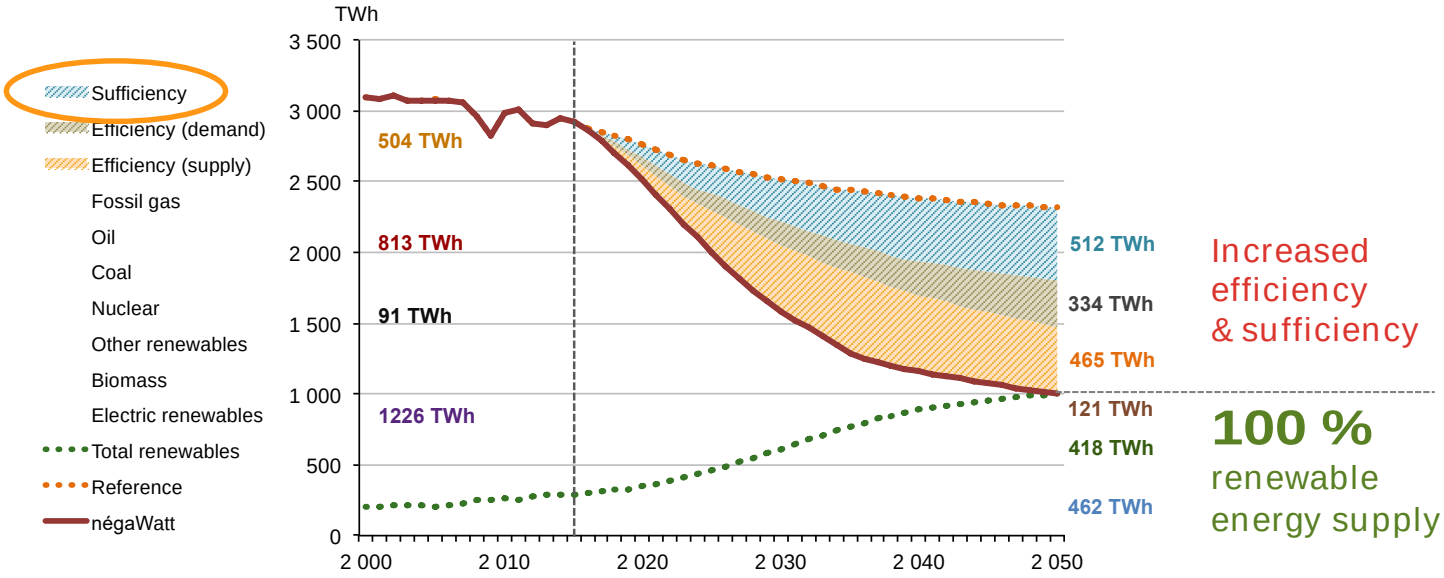
Scaling-up energy sufficiency on a European level through a bottom-up modelling approach: lessons and perspectives

1. **Objectives and general approach**
2. **Methodology and tools**
3. **Sufficiency indicators and corridors**
4. **Conclusions and perspectives**

Dreaming of a sufficiency-based European vision

Based on the French experience, and considering the status of European energy and climate scenarios and policies, the project started from the felt need of **raising awareness for the key role of sufficiency** on the European level

Primary energy consumption in the négaWatt scenario 2017-2050 for France



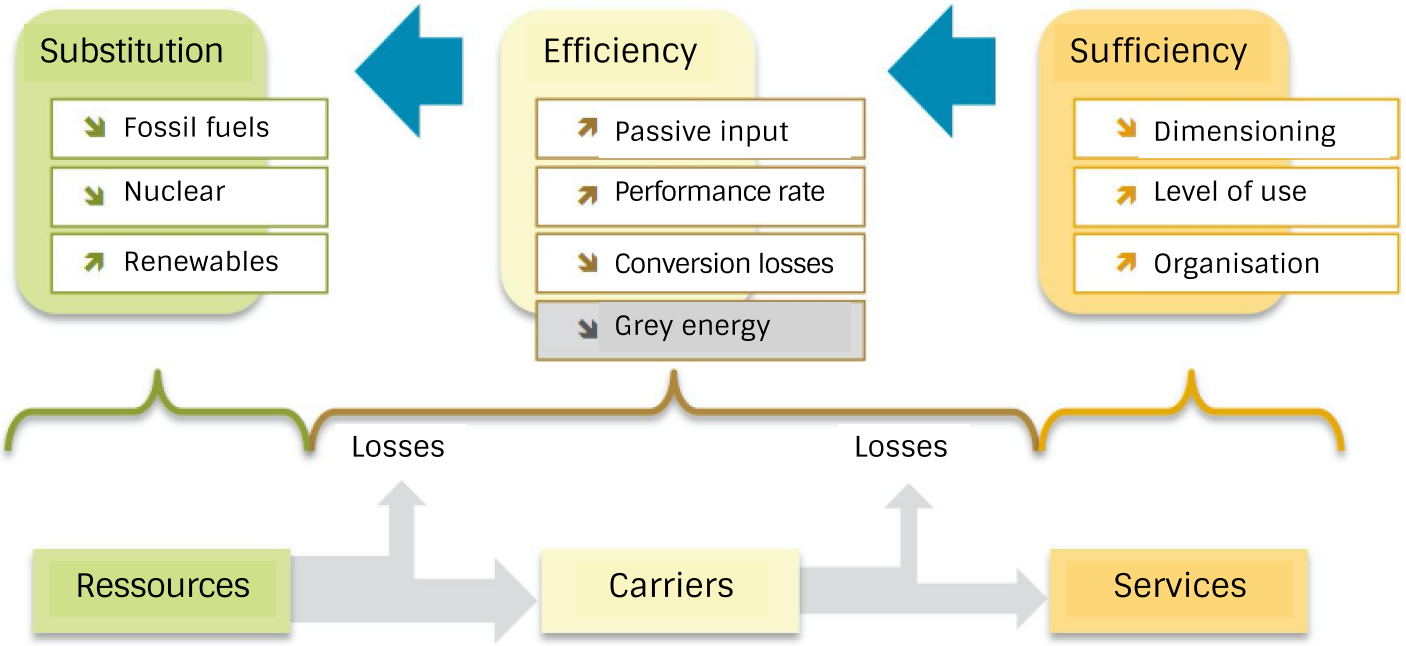
+ **Zero carbon**
Reaching carbon neutrality

+ **Environmental benefits**
Raw materials, pollution…

+ **Socio-economic benefits**
Jobs, social justice…

Thinking of a systemic order of priority

Sufficiency, as an action on services complementary to efficiency (the performance of delivering services), is seen as **a key sustainability leverage**



- Energy sufficiency is approached through the key **notion of energy services**, encompassing actions on the priorities, level and quality of services delivered
- Energy sufficiency is **a primary leverage** to reduce the need for resources and the impact of their consumptions and allow for substitution
- Taking into account issues of global impact on **sustainable development goals** (SDG), scalability, affordability, resilience… reinforces the priority for sufficiency

Aiming for an ambitious European pathway

The objective is to develop an integrated trajectory for Europe through **a bottom-up process**, based on national trajectories anchored in their contexts

European level objectives

Net-zero greenhouse gas emissions
on the European level
as soon as possible, and by 2050 at the latest

100% renewable energy supply

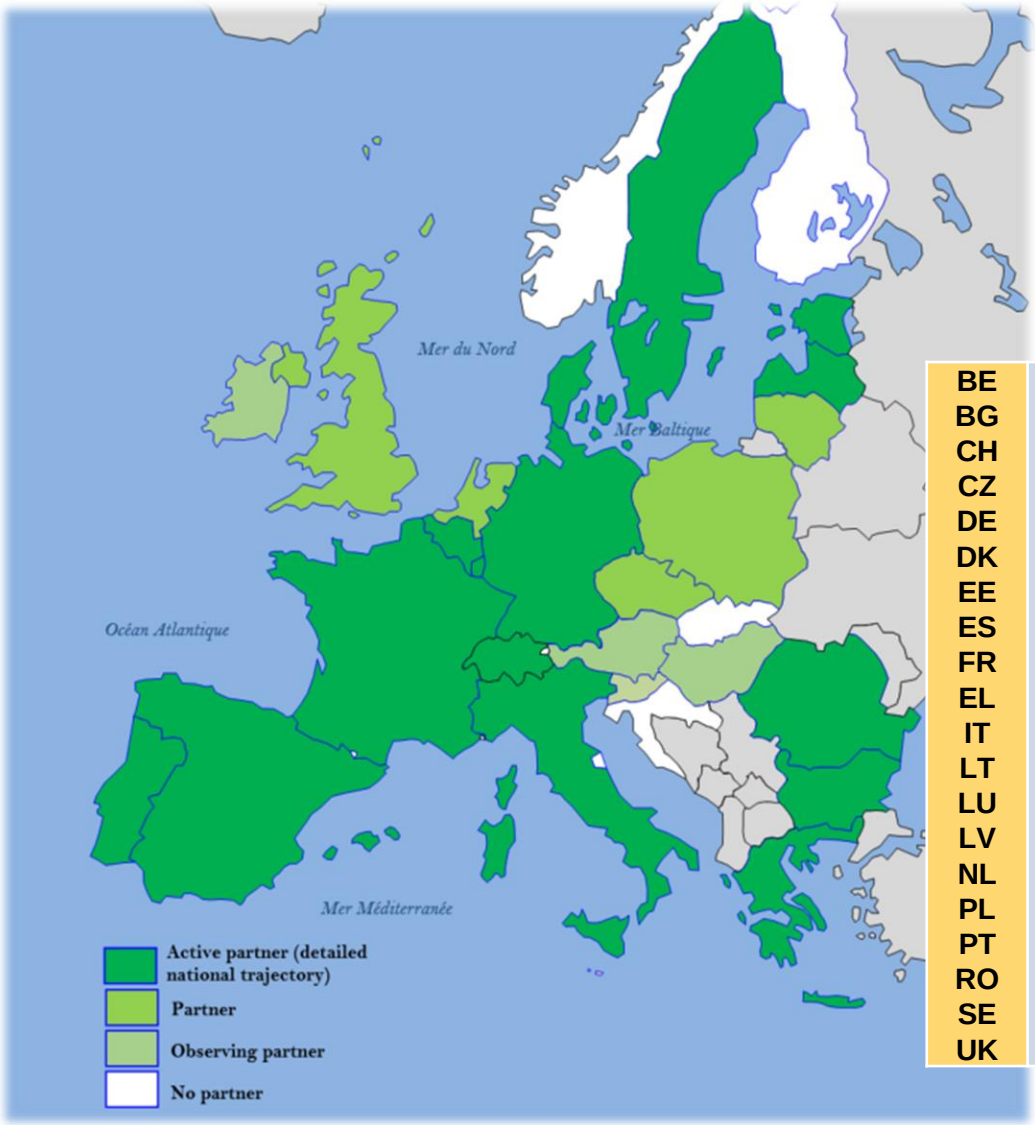
A common ambition to be shared between countries,
fully taking into account the national contexts

history / geographical specificities / economic situation / etc.

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Building a dedicated network



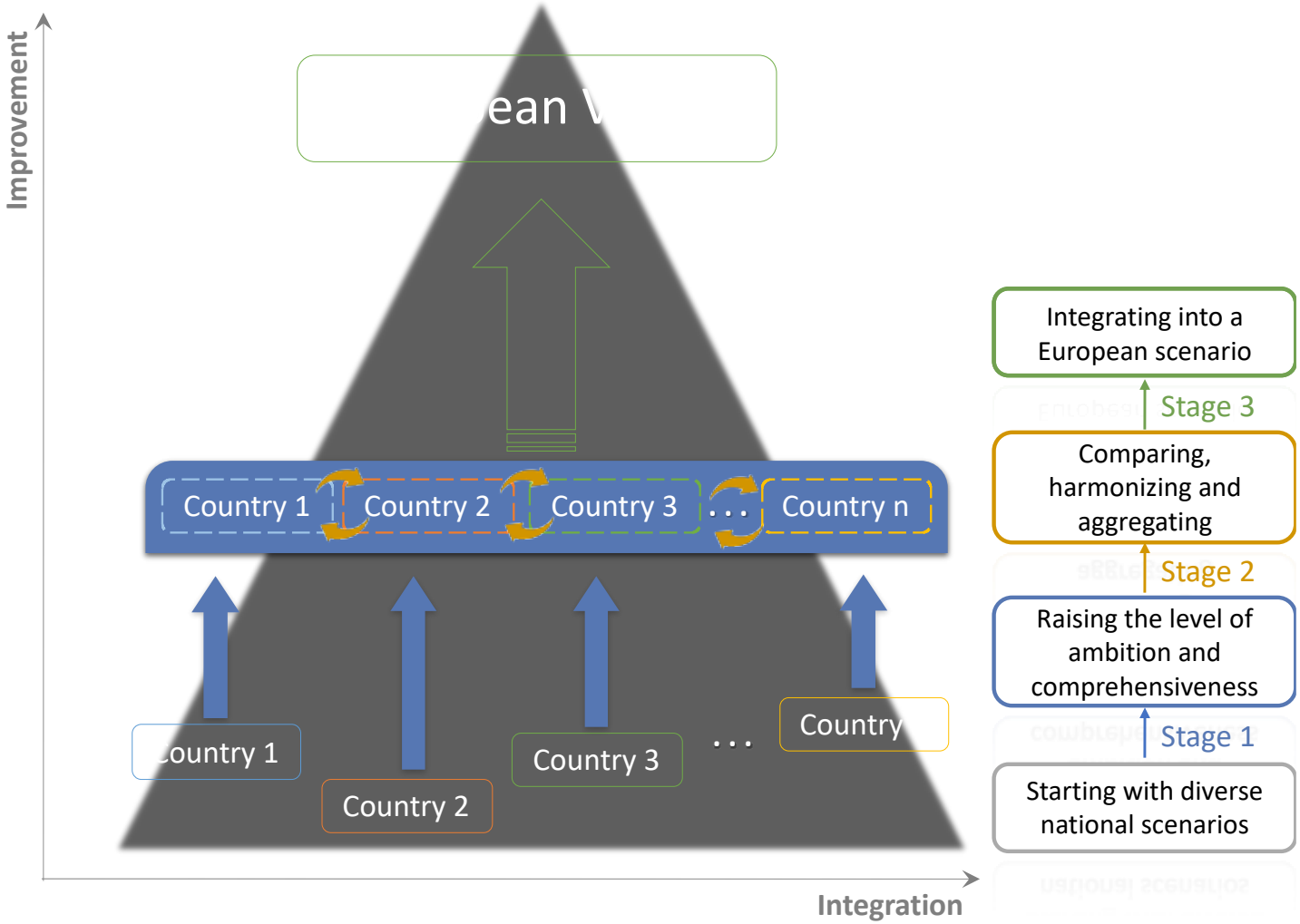
A network of **23 organisations** from **20 European countries*** set to bear national trajectories

BE	ICEDD; Sebastien Meyer
BG	Za Zemiata; Sofena
CH	NégaWatt Suisse
CZ	Charles University Environment Centre
DE	Wuppertal Institut; Univ. of Flensburg; Fraunhofer ISI
DK	INFORSE Europe
EE	Tallinn Technical University (Taltech)
ES	Ecoserveis Association
FR	NégaWatt Association
EL	National Observatory of Athens (NOA)
IT	EURAC Research; Politecnico di Milano
LT	Lithuanian Energy Institute (LEI)
LU	Consortium Cell/List
LV	Green Liberty - Zala Briviba
NL	Quintel
PL	WiseEuropa
PT	ZERO
RO	Energy Policy Group (EPG)
SE	Air Clim Coalition
UK	Center for Alternative Technologies (CAT)

* **18 EU Member States + UK + Switzerland**

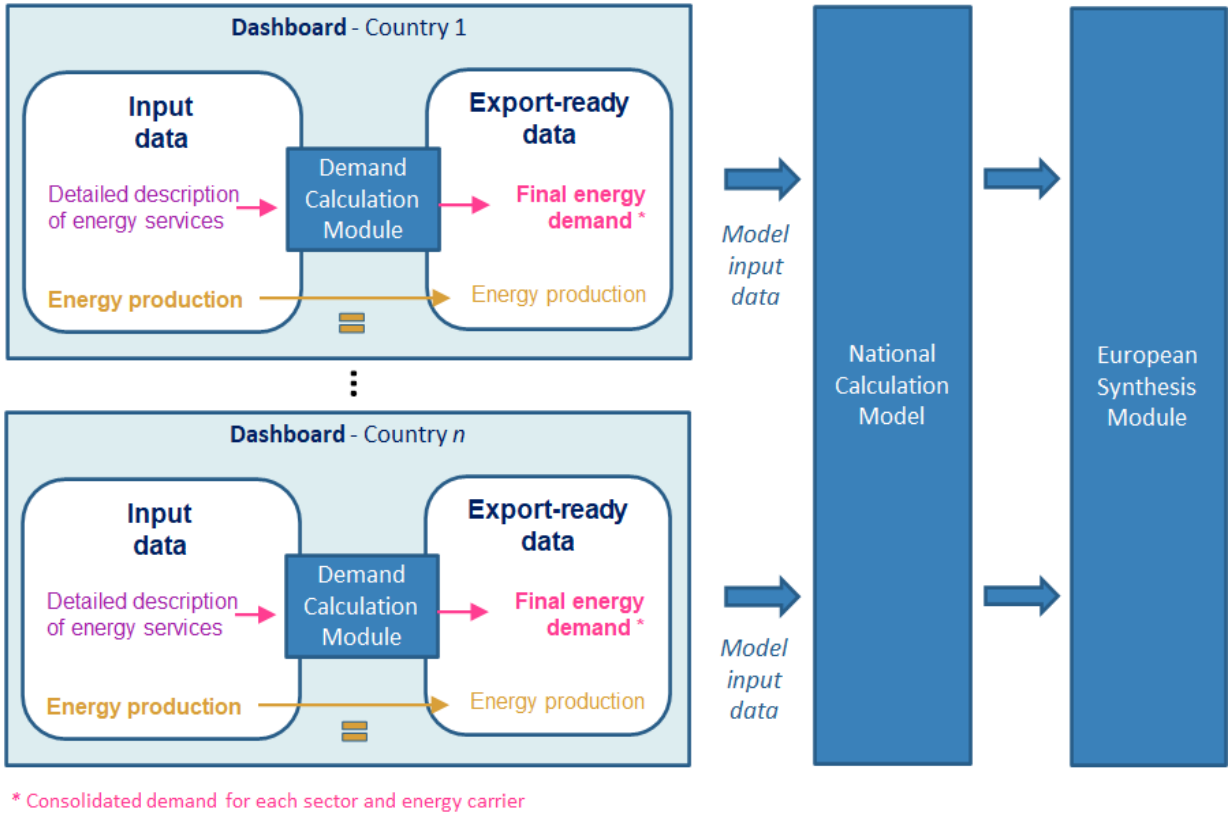
Processing the trajectory

A three-stage bottom-up integrating approach is set to progressively harmonize and reinforce the **national trajectories** until forming **a clear European vision**



Using a simple and robust model

A **simplified simulation model** is used to model energy balance, with input on final energy consumption by sector and energy carrier, and production potentials

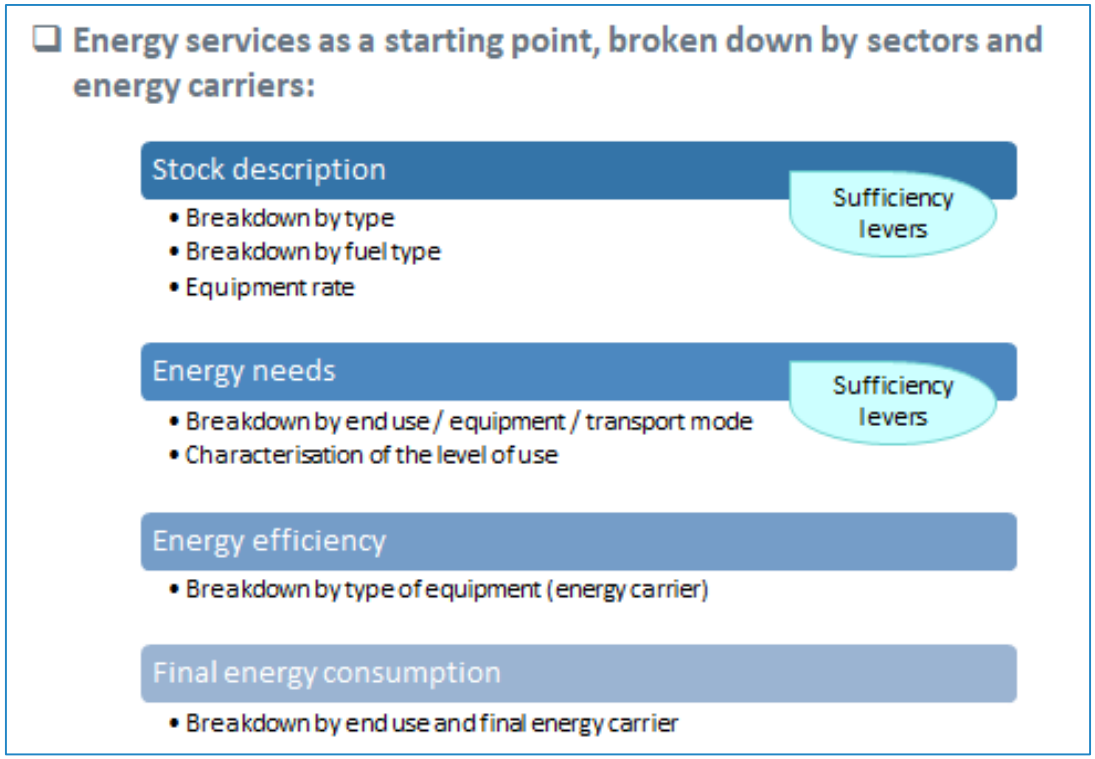


Energy transformations are modelled through a specific version of the **négaWatt PRES model**, to set the yearly balance between final demand and primary supply through all carriers, on all grids, etc.

Setting a comparative descriptive tool

A **common dashboard** has been developed to be filed with each national trajectory, providing a descriptive quantification for **discussion and comparison**

Example of the structure of the dashboard - Transports



The dashboard, containing **up to 600 indicators** set to describe various aspects of the energy system with a 5 years timeframe, provides a common framework to support the **technical dialogue** about trajectories

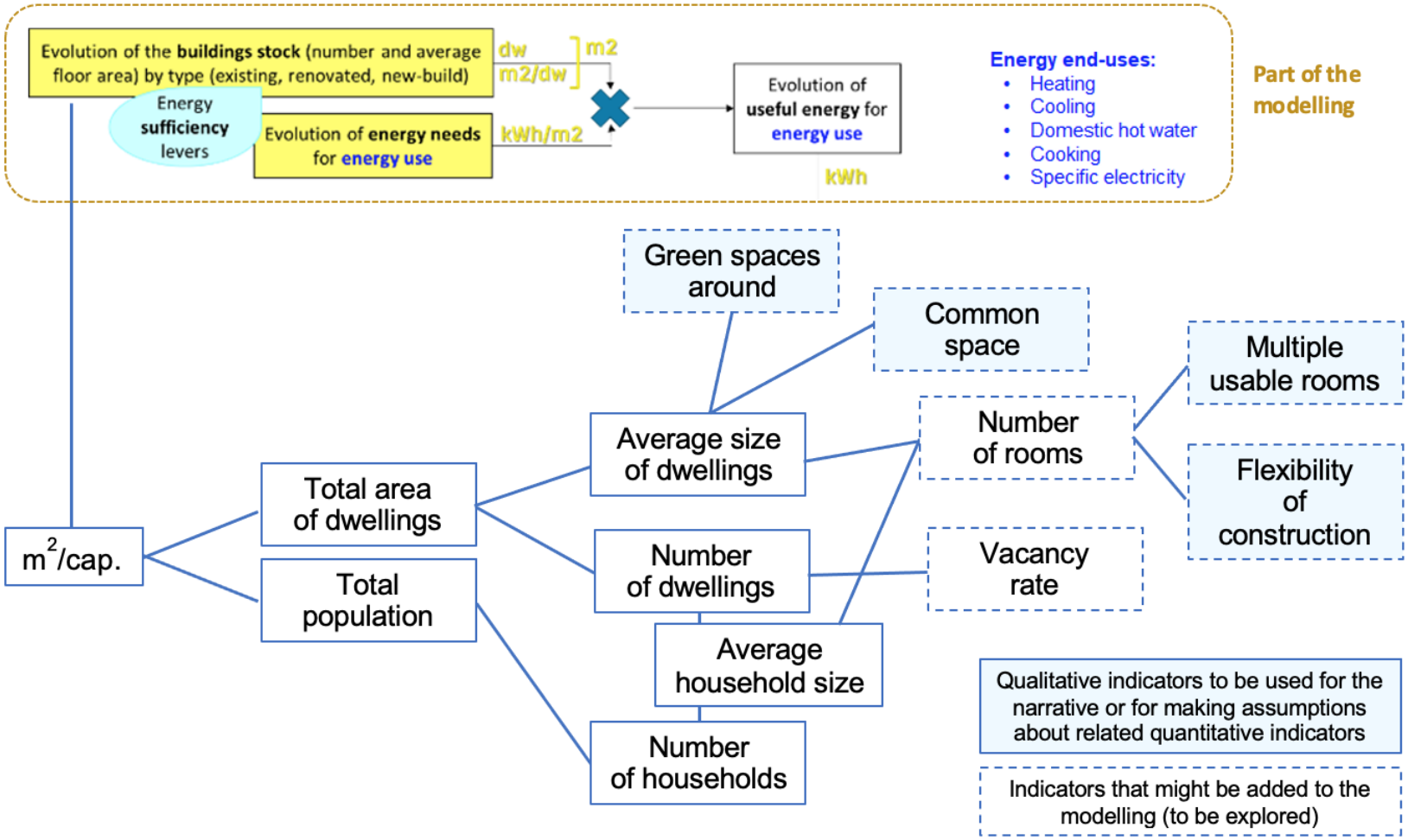
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Discussing sufficiency levers

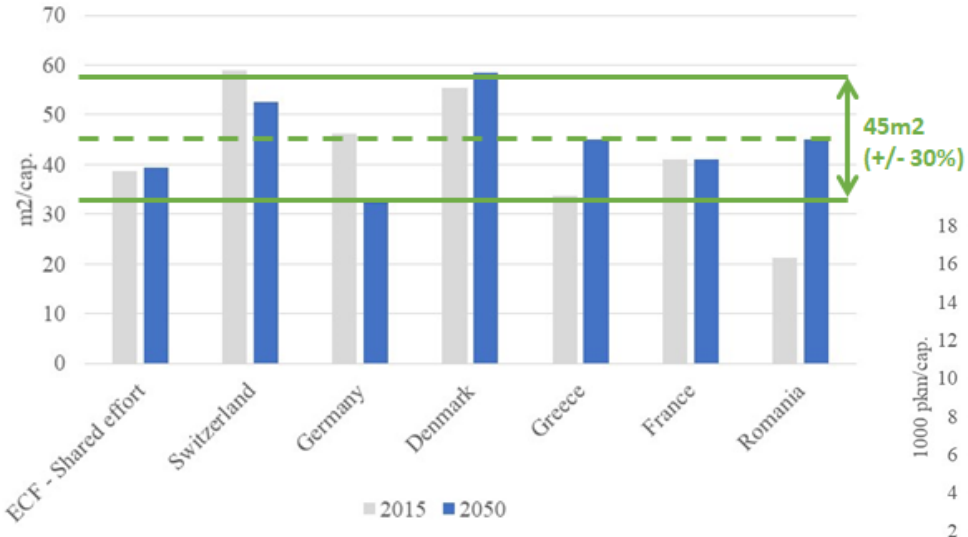
The technical dialogue on sufficiency first focuses on the understanding of **factors influencing sufficiency levers** (with policies to influence them in mind)

Example of exploring the interrelations between sufficiency-related factors: floor areas



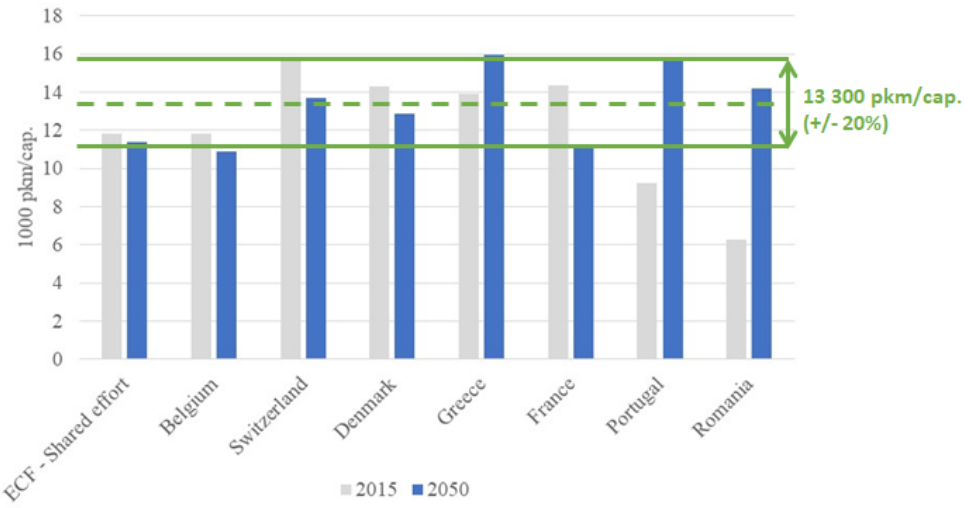
Defining sufficiency corridors (1/2)

Key sufficiency-related indicators are chosen to define **corridors** of convergence for **energy services**, to be reinforced through further discussion



Average residential floor area per person (m^2/cap)
Corridor of projections in the first set
of national trajectories

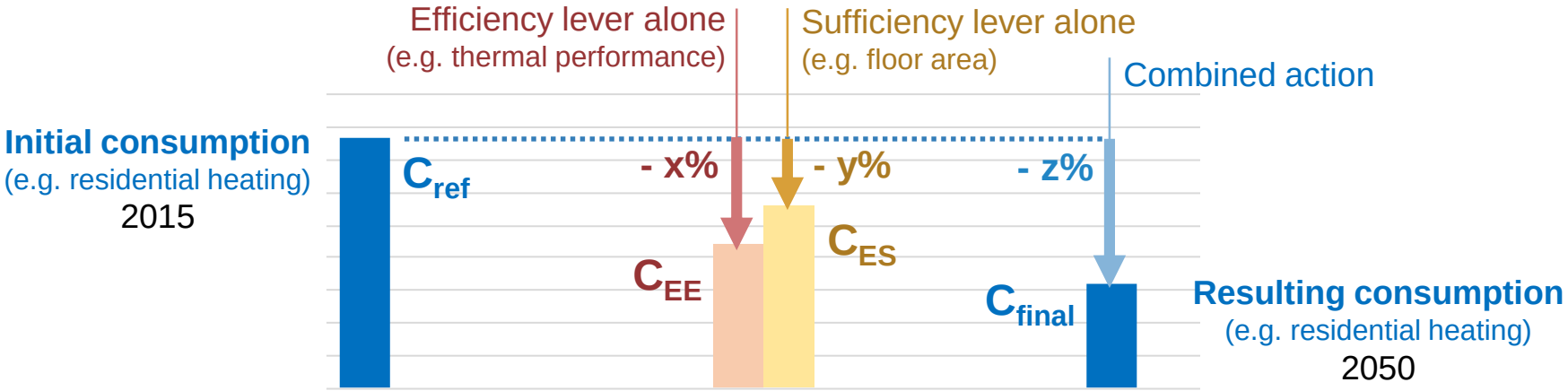
Average distance covered per person (p.km/cap)
Corridor of projections in the first set
of national trajectories



- Adjusted and normalised information filed in the dashboards is used to compare trajectories, and estimate the resulting range of chosen energy services / indicators
- This serves as a basis to set a common target, defined as a corridor of convergence
- The national trajectories can then be reinforced to aim for that target, taking into account national specificities in builiding and justifying the corresponding assumptions

Accounting for energy sufficiency

The introduction of specific sufficiency-related indicators in the modelling allows for a **distinct accounting of the role of sufficiency** in meeting the targets



1. Level of reduction		2. Percentage of reduction	3. Respective roles
C_{ref}	Energy consumption for the reference year (2015)	Sufficiency 1st = (C_{ES}–C_{ref}) / C_{ref}	Sufficiency: average between Sufficiency 1st and 2nd
C_{ES}	Energy consumption with only sufficiency drivers activated	Sufficiency 2nd = (C_{final} – C_{EE}) / C_{ref}	
C_{EE}	Energy consumption with only efficiency drivers activated	Efficiency 1st = (C_{EE}–Cref) / C_{ref}	Efficiency: average between Efficiency 1st and 2nd
C_{final}	Energy consumption with both types of drivers activated	Efficiency 2nd = (C_{final} – C_{ES}) / C_{ref}	

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Preparing for the next steps

Through the collective work of national partners and a continuing technical dialogue, methodological principles and tools have been set to develop an ambitious energy and climate vision for Europe, bridging the sufficiency gap

- The gathering of **a network of national partners** allowed for developing the project of a bottom-up, 100% renewables and carbon neutral **European scenario**
- The focus is to **bridge the sufficiency gap**, i.e. address the potential role of sufficiency, together with efficiency and renewables, in meeting long term sustainability objectives
- Priority was first given to setting the shared **methodological principles and tools** to build this European vision, based on trajectories set in each country's context:
  - # the integration of a **sufficiency-first principle** in a systemic sustainability approach
  - # the adaptation of **robust modelling tools** to allow for the building of the national trajectories and their integration into a European scenario
  - # the use of **a common dashboard** to describe and compare national trajectories, so as to discuss their harmonisation and reinforcement
  - # the selection of **sufficiency-related indicators** to discuss underlying assumptions, agree on convergence **corridors for energy services**, and quantify sufficiency
- The **technical dialogue** with partners will continue to reinforce these corridors, and to justifiy sufficiency assumptions in national contexts and consistent trajectories

Contact

We are happy to share, **extend our network** and **develop new exchanges** about sufficiency-based, ambitious energy and climate scenarios and policies in Europe



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