



ENERGY EVALUATION
EUROPE CONFERENCE 2025
SHOW ME THE EVIDENCE: EVALUATION AS THE DECISION
MAKER'S BEST RESOURCE
25 SEP - 26 SEP 2025
BERLIN



Is the European residential building sector deviating from its targets?

Insights from monitoring and modelling approaches

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Context and objectives

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Context : decarbonizing buildings in EU

Are Member States on track to decarbonize the residential sector ?

How can we check?

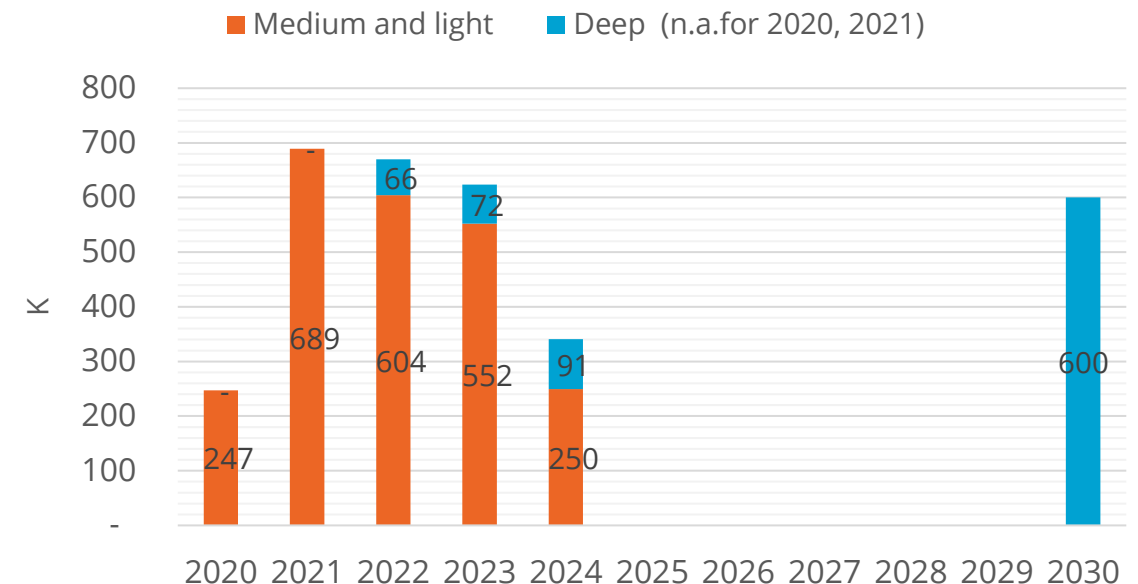
EU sets the ambition...

- EED, EPBD, RED, ESR
- 49% of REN in building's final energy consumption
- Residential : -16% primary energy use by 2030, -20% by 2035 , and 55% cuts from worst buildings

... but the pathways are national and flexible

- Renovation rates
- Heating system replacement
- EPC distributions...

Number of renovated buildings - France



Source : Anah, National Low-Carbon Strategy (SNBC-3) – currently under public consultation

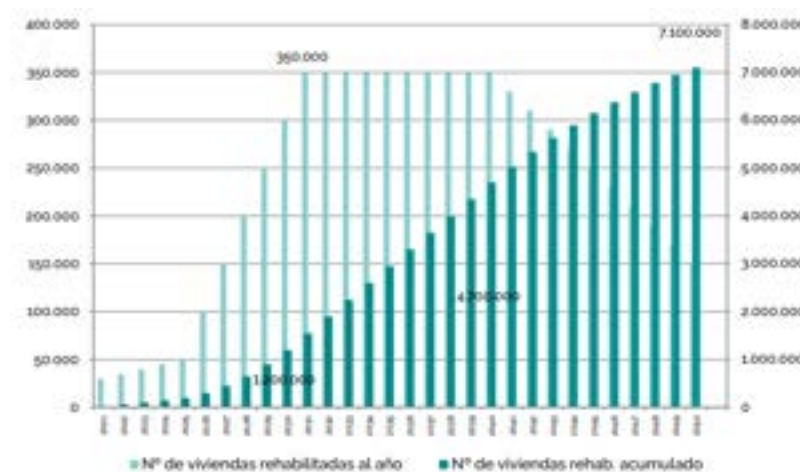
Context : challenges in monitoring



- Types of objectives vary by country
- Sometimes lack of consistent, reliable statistics or complex references (i.e. energy labelling)
- Data gaps: renovation rates, EPC coverage, heating systems
- Risks of poor policy alignment & strategic blind spots

Spain

- **Target** : Energy-renovated dwellings

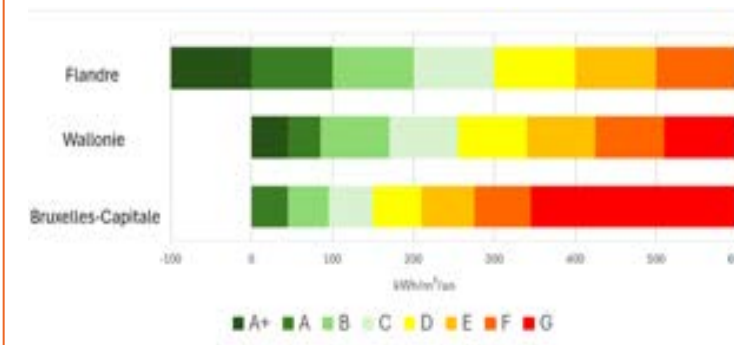


Source: ERSEE 2020 ISTAS – Proposed transition scenarios

- **Available data** : Renovation permits (all types combined)

Belgium

- **EPCs** : 3 different regional labelling scales



Source: Enerdata, based on the LTRS



Objectives : how we analyse the residential building sector



Focus on the residential building sector + methodological approach



STEP 1 : Mapping available national statistics and assessing their alignment with the formulation of national targets



STEP 2 : Qualitative analysis of recent and expected trends of the renovation market



STEP 3 : Alternative scenarios



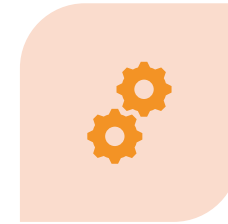
Methodology

Methodology - Assessing feasibility of renovation targets and exploring alternative scenarios

- **Residential sector (FR, BE, DE, IT, ES)**
- **Data sources**
 - National statistics
 - Official strategic plans
 - Academic and press reports
- **Calculations:**
 - Bottom-up model derived from Enerdata's model EnerMED
 - EPC distribution module



MONITORING



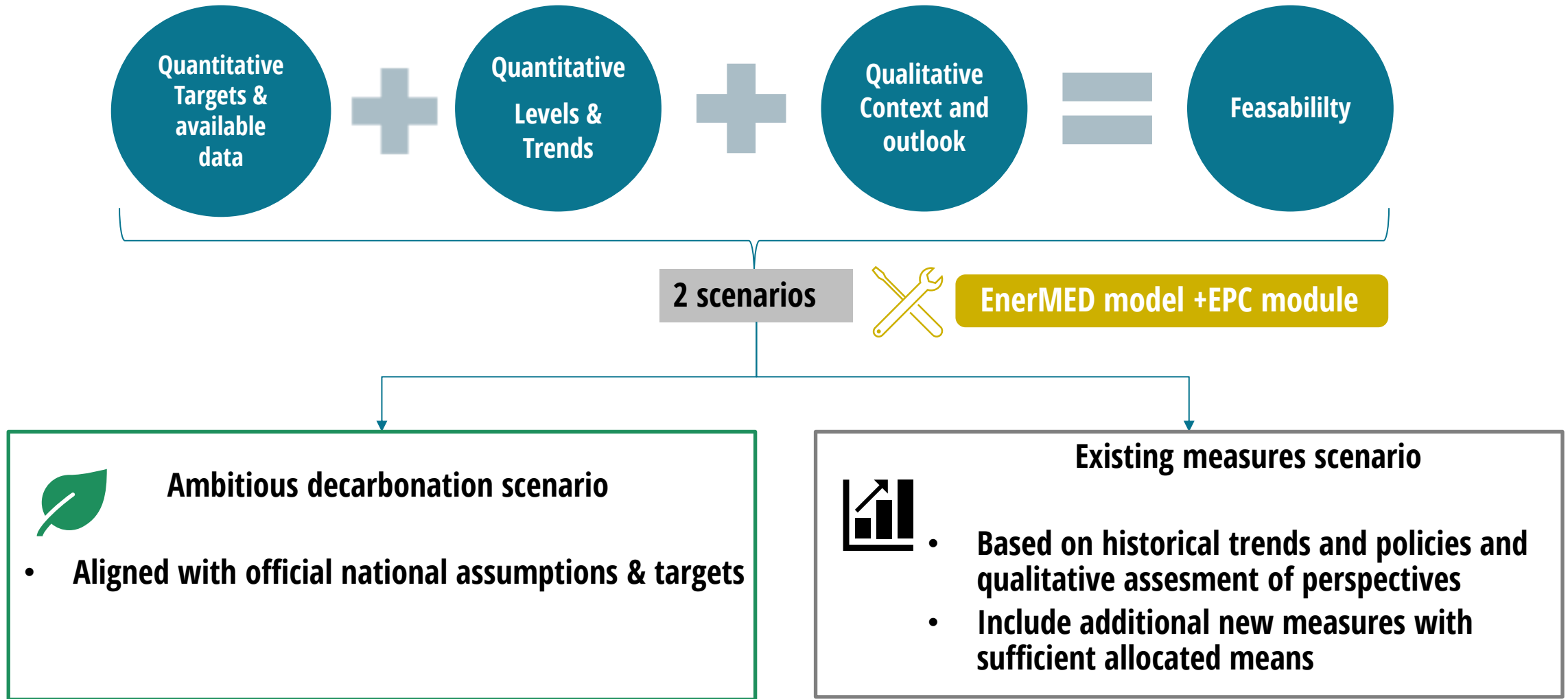
MODELLING



SCENARIOS



Methodology - Assessing feasibility of renovation targets and exploring alternative scenarios



Preliminary results

STEP 1 : Targets vs available data – Evaluating the ambition

- Focus on targets of national strategies
- Qualitative assessment of measure's contribution to decarbonisation :

	Strong
	Uncertain
	No contribution

Country	Renovation targets	Ban on fossil fuel heating systems	EPC targets
France	With explicit deep renovation targets	Ban	Targets on EPCs of buildings and ban on rentals
Italy	Target on renovation rate (no detail on deep renovation vs individual measures)	Target of % of REN in the final consumption (no ban)	2030 Targets on EPCs of buildings
Spain	With explicit deep renovation targets	No explicit national target	No explicit national target
Belgium	Region dependant	Ban (region dependant)	Region dependant

Source: Enerdata

→ Contrasting formulations and ambitions among countries

STEP 1 : Targets vs available data– Can renovation targets be monitored?

Example of France, Italy and Spain

Consistency between target and data:

Strong
Moderate
Weak

Country	Targets	Sources	Monitoring Metric	Consist.
France	Deep renovation : : 600k/y on average (400 k individual houses, 200 k collective dwellings) until 2030. (SFEC 2023 : 200k in 2024, 900k by 2030)	NECP (2024); Draft SNBC 3 (2024); SFEC (2023)	Number of renovations from various sources (Ma Prime Renov, ESCs, Anah, ...) No official source of aggregated data	
Italy	Renovation rates : 2020-2030: 1.9%/y 2030-2050: 2.7%/y	NECP (2024) ; PNIEC(2020, 2024)	No direct statistics on the number of renovations	
Spain	Deep renovation : 1.377 M dwellings by 2030 (i.e. 300 k/year in 2030), 7.1 M by 2050	NECP (2024); LTRS (2020)	Number of renovations available, but insufficient details on the type	

Source: Enerdata

➔ Similar consistency analysis on heating systems targets and on EPCs targets (see Appendix)



STEP 2 : Renovation Outlook to 2030, key trends and perspectives

Example of France

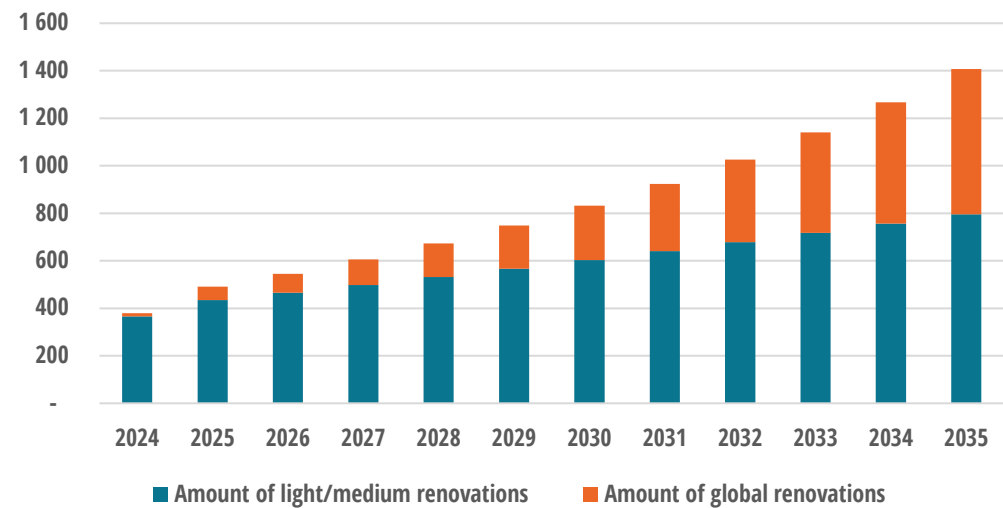
Theme	Indicator	Current Trend	2030 Outlook
Macroeconomics	 Skilled labour	- 60k jobs (2023-2024) 71% of leaders struggle	 Limited capacity : no major training programmes or salary increases
	 GDP/Sector activity	GDP +0,9% in 2023 Sector stable	 Stable activity, no major stimulus expected
	 Material costs/Inflation	Sharp rise 2022-2023; stabilising 2024	 Cost stabilise; inflation decreases
Policy	 RE2020/Ban on boilers	RE2020 ongoing; oil boiler phased out	 Some targets achievable; worst energy dwellings unlikely fully upgraded
Financing & Taxation	 MaPrimRénov', Eco-PTZ, Eco-PLS	Support uncertain, high « out of the pocket »	 Supports renovation; complexity remains barrier
Technical	 Construction methods	New methods reduce costs/delays but limited deployment	 Limited impact by 2030

➔ High risk of delay in reaching the official targets for France. Similar conclusions are drawn for the other countries.

STEP 3 - Exploring alternative scenarios – Impact on renovation, Germany

23% of dwellings renovated by in 2035

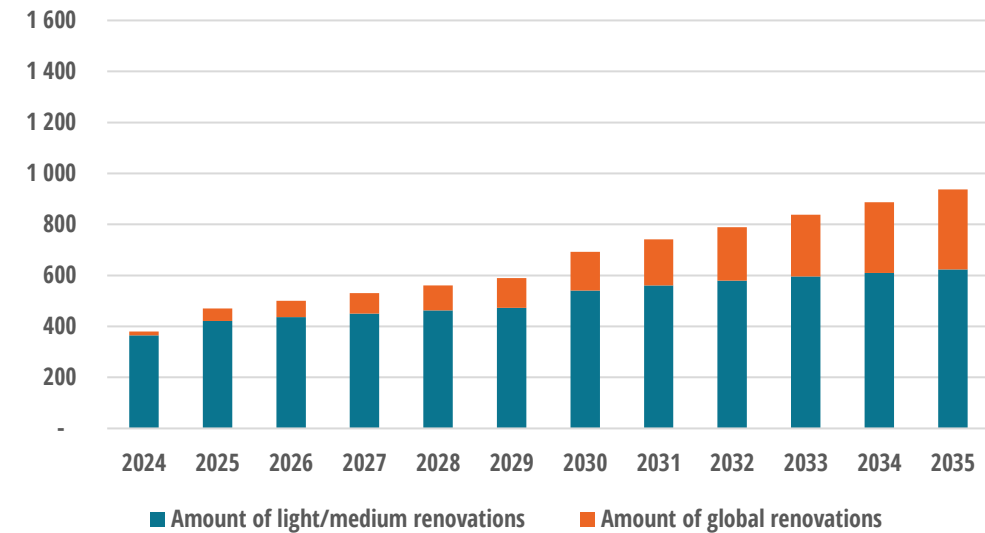
Decarbonisation scenario



Assumptions	2030	2035
Renovation rate	1.9% (DENA, based on KSG)	3.2%
Total amount of dwellings (k)	46 204	46 834

17% of dwellings renovated by in 2035

"Objectives delayed" scenario

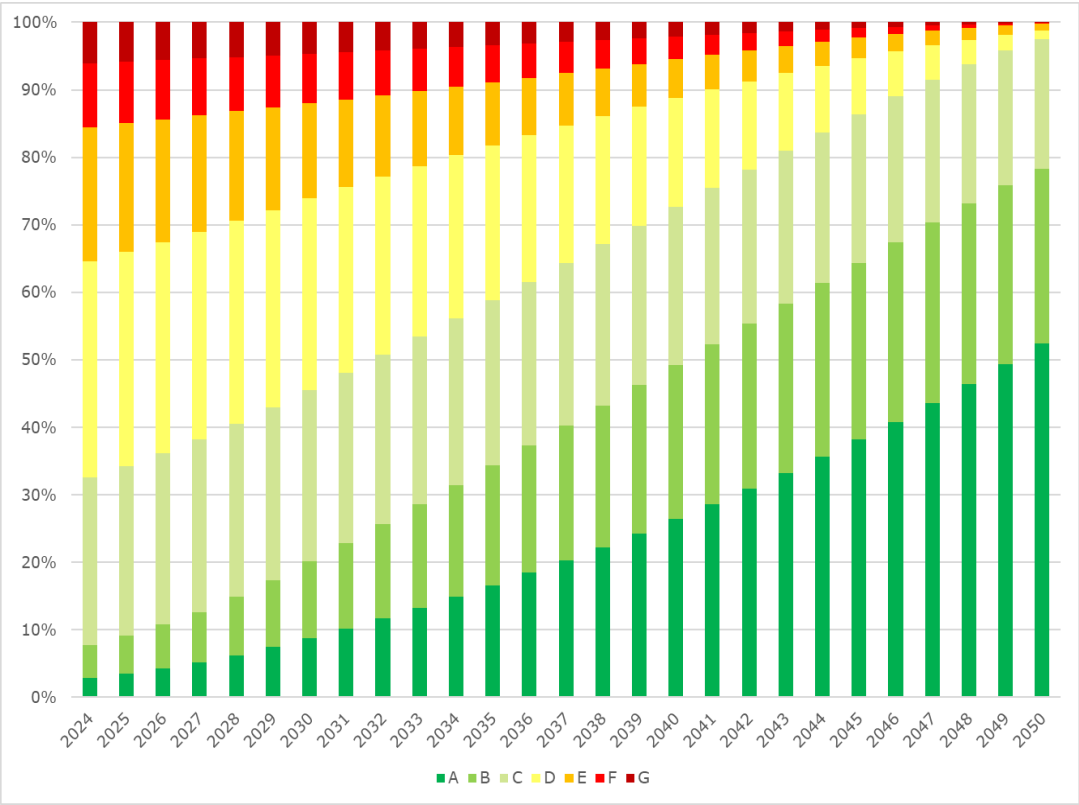


Assumptions	2030	2035
Renovation rate	1.5%	2%
Total amount of dwellings (k)	44 187	44 152

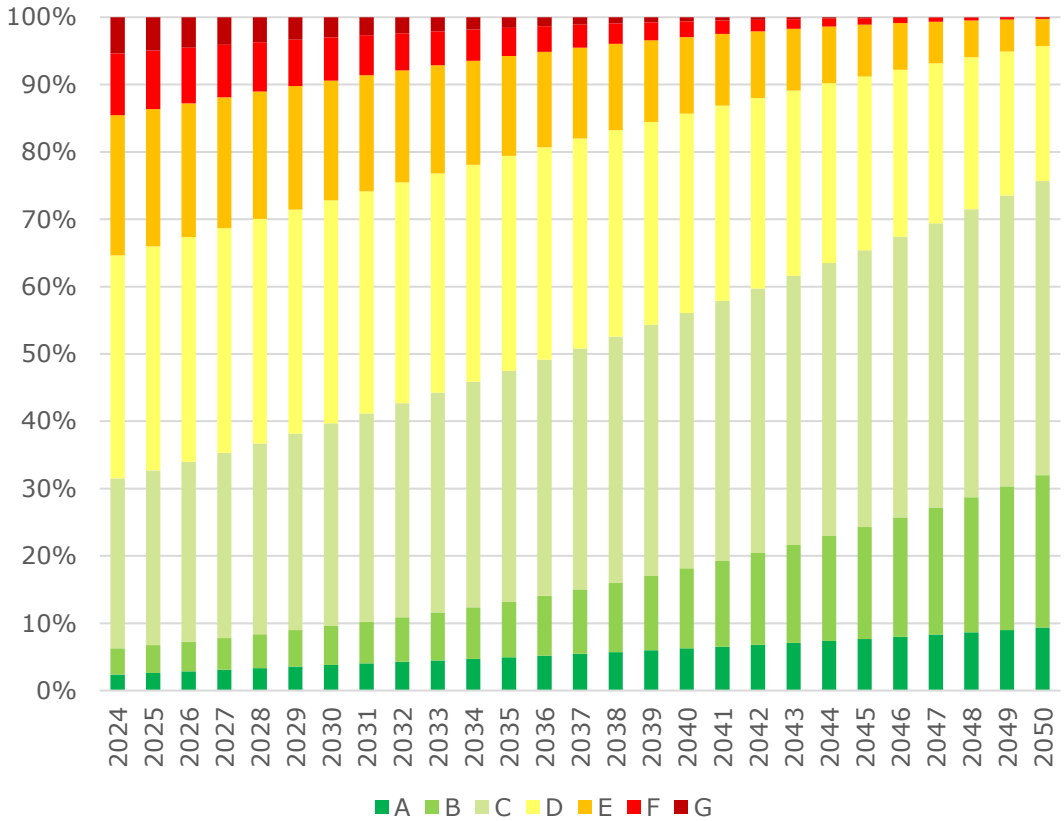


STEP 3 - Exploring alternative scenarios – Impact on EPCs – France

80% of performant dwellings in 2035



30% of performant dwellings in 2035



Driving action – Innovative financing and policy



Buildings : fragmented sector,
driven by many dispersed
actors → harder public action



Delays in additional measures :
risk of shifting effort to other
sectors, affecting other
priorities



Urgent need of action

Some Examples

- **On bill-finance** : 3d party covers upfront costs, customer repays via energy bill. No upfront costs, energy savings may offset payments.
- **Property Assessed Clean Energy (PACE)** : Municipality bonds fund energy renovations and renewable upgrades. Repayment collected by local authority (property tax), transferable on sale.
- **Energy Efficient Mortgages** : finance EE operations with favourable mortgage terms (future energy savings are considered)
- **Incremental property taxation** : efficient buildings pay less, inefficient ones pay more
- **One stop Shops** : one suppliers manages the entire renovation process between client, renovator, supply chain, on financial and legal aspects
- ...

Sources: https://energy.ec.europa.eu/topics/energy-efficiency/financing/innovative-products-and-schemes_en

P. Bertoldi, M. Economidou, V. Palermo, B. Boza-Kiss, V. Todeschi, 2021
How to finance energy renovation of residential buildings: review of current and emerging financing instruments in the EU
WIREs Energy Environ, 10 (1) (2021), Article e384, [10.1002/wene.384](https://doi.org/10.1002/wene.384)



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Conclusion and next steps

Conclusion and next steps

Goal : data sources identification, evaluation of national decarbonization targets and feasibility assesment



Useful for several key purposes :

Data mapping : identifies and qualifies national data sources

Target assessment : evaluates the plausibility of achieving national decarbonization goals

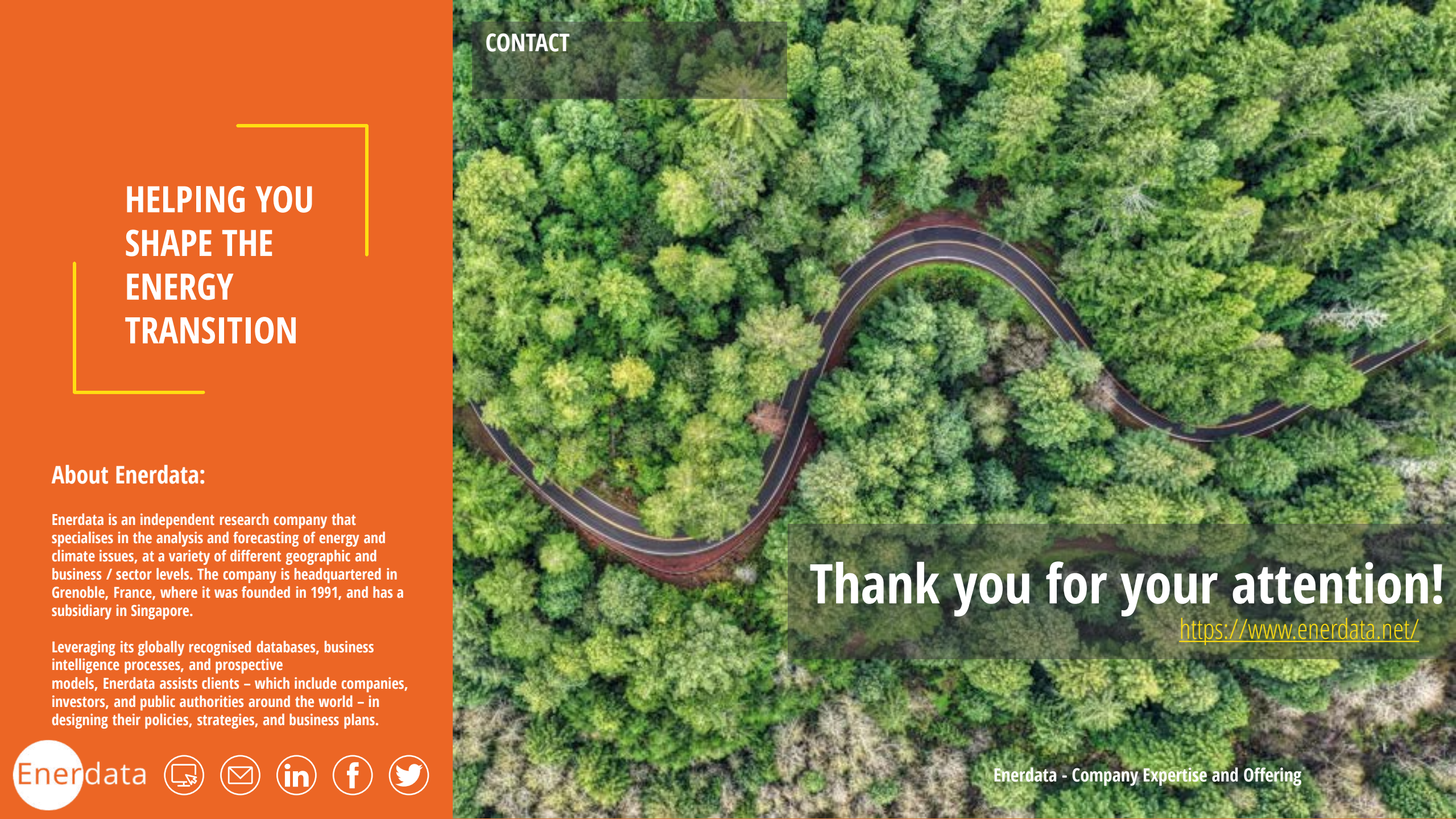
Policy design : help policy makers track progress and adjust strategies

Stakeholder information : provides indicators for governments, utilities and finance actors involved in building renovations



A first step toward an EU-wide renovation mapping and deeper insights



An aerial photograph of a lush green forest. A dark, winding road or path cuts through the dense canopy of trees, curving from the bottom left towards the top right. The trees are various shades of green, indicating a healthy, mature forest.

CONTACT

HELPING YOU SHAPE THE ENERGY TRANSITION

About Enerdata:

Enerdata is an independent research company that specialises in the analysis and forecasting of energy and climate issues, at a variety of different geographic and business / sector levels. The company is headquartered in Grenoble, France, where it was founded in 1991, and has a subsidiary in Singapore.

Leveraging its globally recognised databases, business intelligence processes, and prospective models, Enerdata assists clients – which include companies, investors, and public authorities around the world – in designing their policies, strategies, and business plans.

Thank you for your attention!

<https://www.enerdata.net/>

Enerdata - Company Expertise and Offering



STEP 1 : Targets vs available data – Can targets on EPCs be monitored?

Example of France, Italy and Belgium

Consistency between target and data:

Strong
Moderate
Weak

Country	Targets	Sources	Monitoring metrics	Consist.
France	80%-90% of EPCs A and B in 2050 2025: Ban on renting out G-rated properties. 2028: Ban on renting out F-rated properties. 2034: Ban on E-rated properties. (SFEC : obligation to realise energy audit when selling F & G-rated properties)	Loi Climat et Résilience (2021); SFEC (2023)	National ECPs observatory, CSTB database	
Italy	2030: All residential buildings must reach at least energy class E. 2033: All residential buildings must reach at least energy class D.	PNIEC (2024)	SIAPE : national + regional data	
Belgium	Walloon :EPC A in 20250 for all residential buildings (2040 for public buidings), ban on rental of EPC G from 2025 Flanders : all residential buldings with EPC E or F must be renovated to class D within 6 years after their selling (from January 2023). Bruxelles capitale : all residential dwellings are at least E class in 2033 and C in 2044	Stratégie Wallonne de Rénovation Energétique à long-terme du bâtiment (2020); Accord de gouvernement flamand (2024); Ordonnance du 7 mars 2024 (Bruxelles, 2024)	Regional data	



STEP 1 : Targets vs available data – Can targets on heating systems be monitored?

Example of Germany and Belgium

Consistency between target and data:

Strong
Moderate
Weak

Country	Targets	Sources	Monitoring Metric	Consist.
Germany	New buildings : from 2024: heating systems with at least 65 % renewable energy Existing buildings : phase out of fossil fuel boilers according to cities' size (from June 30, 2026 for cities> 100,000 inhabitants; June 30, 2028 in cities with up to 100,000 inhabitants) Obligation to replace all oil boilers older than 30 years. Boilers may be operated with fossil fuels until 31 December 2044 at the latest.	Updated GebäudeEnergieGesetz (2024)	Available data for new buildings on share (%) of heating systems by energy City-scale data for this item is not centralized	
Belgium	Walloon New buildings: ban on oil boilers from 1st March 2025. Existing buildings: replacement of oil or coal boilers forbidden from 1st June 2026. Flanders Existing buildings: Ban on oil boilers in deep renovated buildings from 1st January 2022. Replacement of oil boilers forbidden in gas heating zones. New buildings: Ban on oil boilers in from 1st January 2022. Interdiction to connect natural gas network for large buildings since 1st January 2021, from 2025 for others. Bruxelles-Capitale: from June 2025, ban on oil boilers	Plan Climat Air Energie 2030 (Wallonie, 2023); Plan flamand énergie et climat 2021-2030 (VEKP, 2019); Arrêté du Gouvernement de la Région de Bruxelles-Capitale (2024)	Official national statistics	

Source: Enerdata

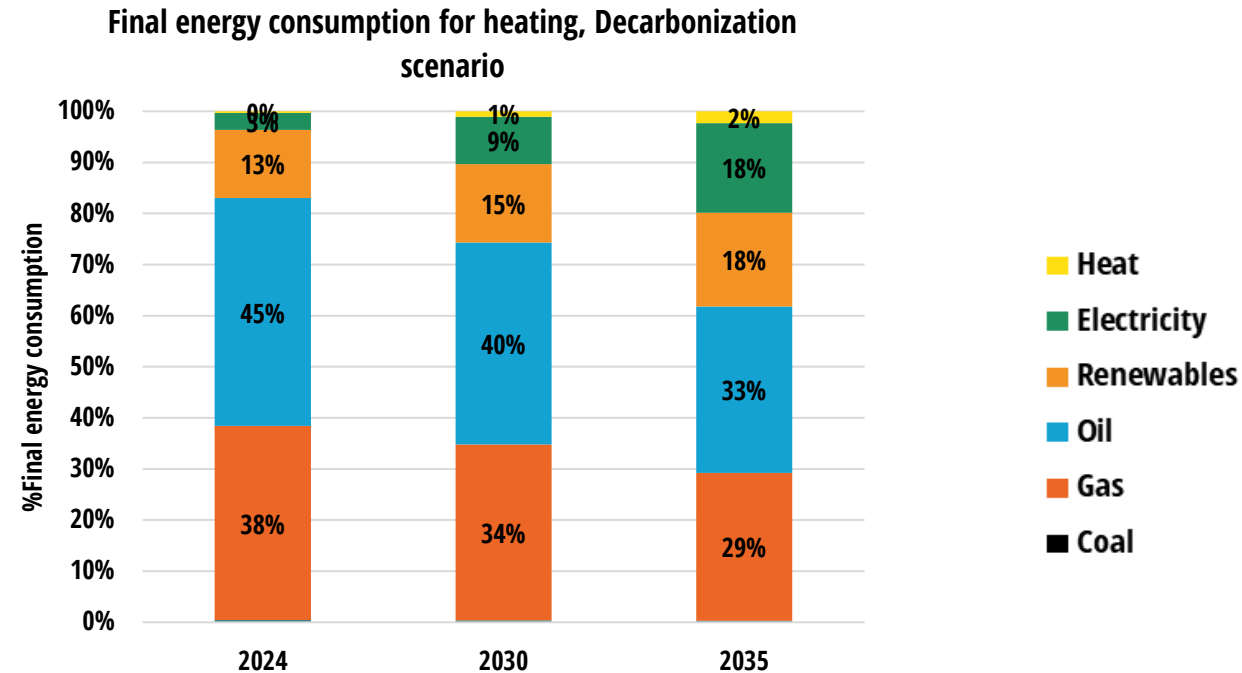


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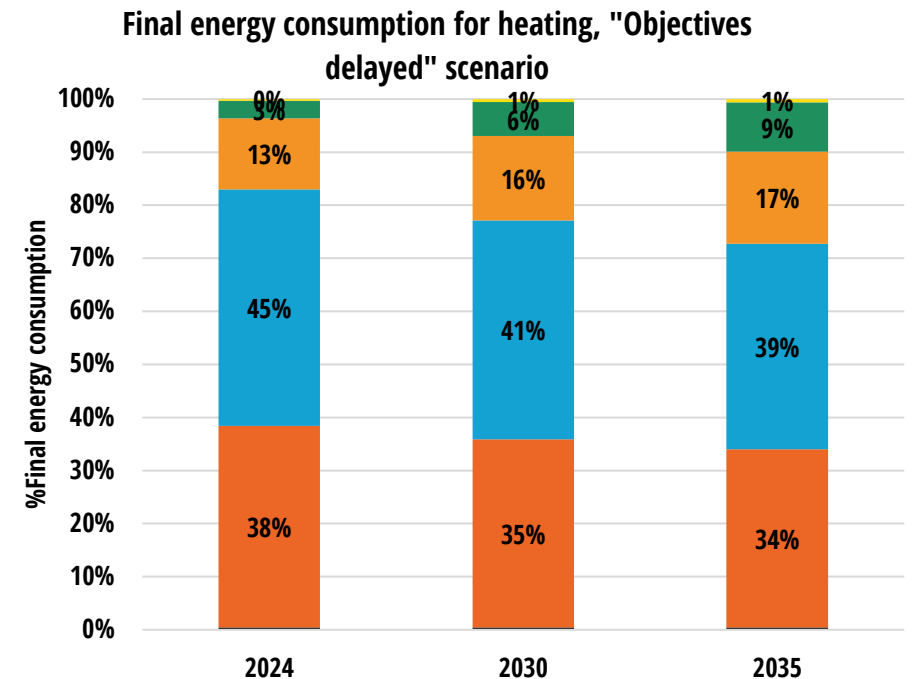


STEP 3 - Exploring alternative scenarios – Impact on heating systems – Belgium

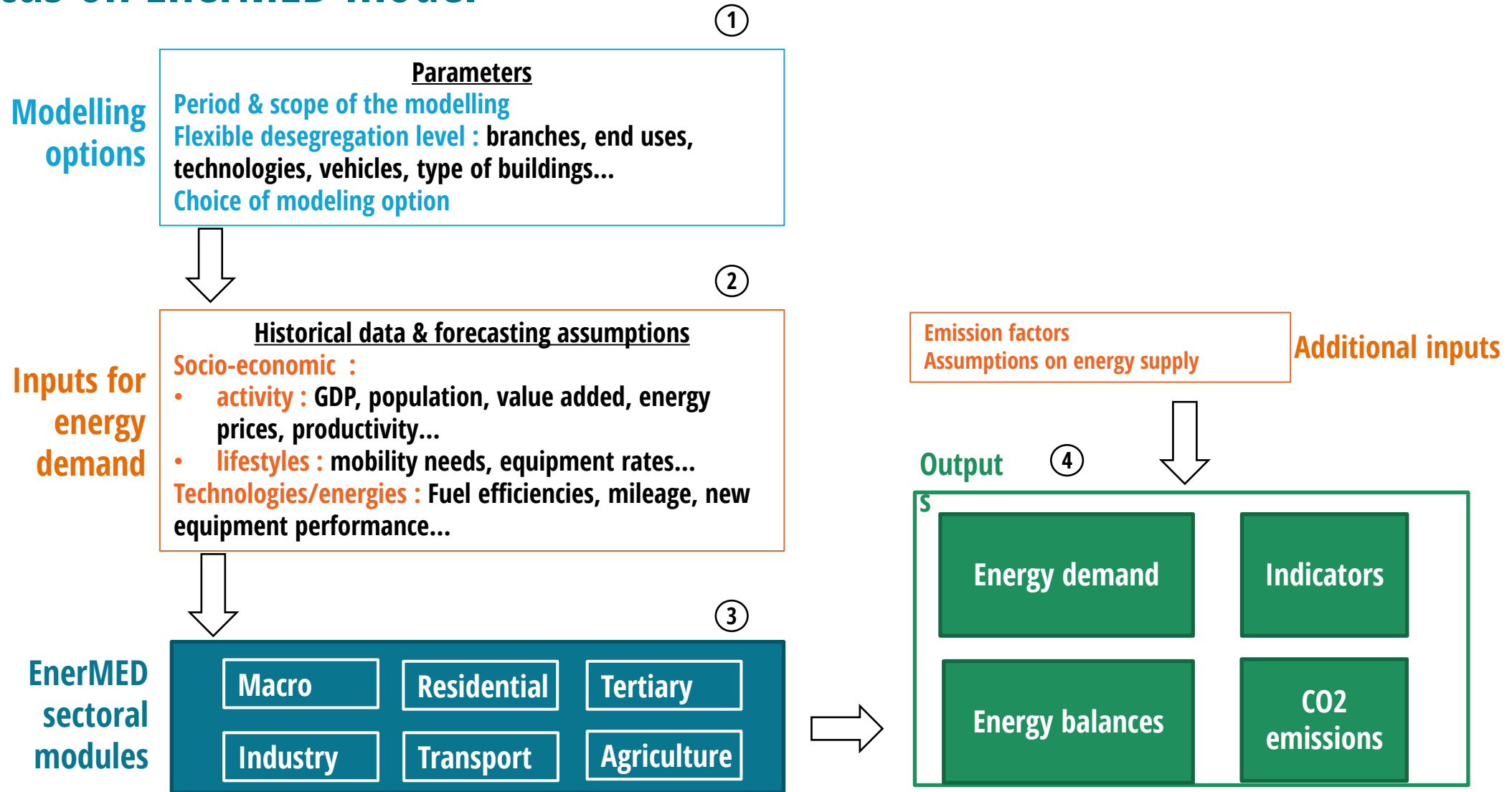
18% of electricity consumption by 2035



9% of electricity consumption by 2035



Focus on EnerMED model



Focus on EnerMED model : structure

Industry	• Branches (chemicals, food, non-metallic minerals, ...)	Up to 10 branches
	• Energy-intensive products (steel, cement, ...)	Up to 10 EIP and 3 processes per EIP
	• 3 uses : thermal uses, captive electricity, non-energy uses	
Transport	• Passenger/freight	
	• By mode	Up to 4 modes: road, rail, air, waterways
	• By type of vehicle (car, bus...)	Up to 7 types of vehicles
	• By type of energy/motor for road vehicles	Up to 9 energies/motors
Residential	• By type of building	Up to 10 types
	• By energy label of buildings for each type of building	Up to 10 labels
	• By end-use	Up to 6
	• Electrical appliances	Up to 10 types of appl.
Tertiary	• Lighting technologies	Up to 4
	• By branch (offices, hospitals, ...)	Up to 10 branches
	• By end-use	Up to 6
	• Electrical appliances	Up to 10 types of appl.
	• Lighting technologies	Up to 4

Focus on EnerMED model :Exogenous inputs and assumptions for scenarios

Socio-economic drivers:

- Population, households, urbanization
- GDP, sectoral breakdown, income
- Physical outputs, energy intensive products

Technical drivers:

- Energy performance of new equipment, dwellings, industrial plants,...
- Retrofitting of existing buildings, industrial facilities

Market shares:

- Gas, heat, electricity connections
- Distribution of new buildings, equipment, industrial plant according to main energy per end-uses
- Energy substitutions in existing buildings and factories

Energy demand

$$E_{S,I} = I_{S,I} \times BS_{S,I} \times PM_{S,I,E} / R_{S,I,E}$$

- socio-economic indicator for needs or activities ($I_{S,I}$)
- specific useful energy need ($BS_{S,I}$)
- energy market shares ($PM_{S,I,E}$)
- efficiencies ($R_{S,I,E}$)



EPC distribution module

Input data

- Building stock (construction/ destruction)
- Renovation rates
- EPCs distribution for the reference year
- Unit consumption (final energy) of each EPC class

Calculation

- Mean renovation improvement based on matrix : transfer between EPC classes and efficiency gains

Outputs

- EPCs distribution
- Final energy demand

	A+	A	B	C	D	E	F	G	H	Total	Gain Eff.
A+											
A											
B	40%	60%								100%	52%
C	20%	40%	40%							100%	50%
D	15%	25%	35%	25%						100%	51%
E	10%	15%	30%	35%	10%					100%	53%
F	5%	10%	20%	30%	30%	5%				100%	53%
G	0%	5%	10%	20%	35%	25%	5%			100%	51%
H	0%	0%	5%	10%	25%	40%	20%	0%		100%	52%

Example of a renovation improvement matrix

