

FSR - SECCA Training

Module 4
Energy efficiency

6 February 2025

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First Poll

Which type of light bulb is more energy efficient?

- A) Incandescent bulbs
- B) LED bulbs

Первый Опрос

Какой тип лампочек более энергоэффективен?

- A) Лампочки накаливания
- B) Светодиодные лампочки

Second Poll

Which transportation method is more energy efficient per passenger mile?

- A) Train
- B) Airplane
- C) Bus
- D) Personal Car

Второй Опрос

Какой способ транспортировки более энергоэффективен на пассажиро-милю?

- A) Поезд
- B) Самолёт
- C) Автобус
- D) Личный автомобиль

Third Poll

Which factor has the greatest impact on a home's heating efficiency?

- A) Insulation quality
- B) Heating system efficiency rating
- C) Thermostat settings and usage patterns
- D) Age of the building

Третий Опрос

Какой фактор оказывает наибольшее влияние на эффективность отопления дома?

- A) Качество изоляции
- B) Оценка эффективности системы отопления
- C) Настройки термостата и режим его использования
- D) Возраст здания

Fourth Poll

In the most basic sense, what does 'efficiency' mean?

- A) Using the least amount of resources to achieve a specific goal
- B) Completing a task as quickly as possible
- C) Reducing total cost
- D) Maximising output regardless of input

Четвертый Опрос

Что означает «эффективность» в самом простом смысле?

- A) Использование наименьшего количества ресурсов для достижения определенной цели
- B) Выполнение задачи как можно быстрее
- C) Сокращение общей стоимости
- D) Максимизация результата вне зависимости от вклада

Discussion



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Outline

Part I

1. Energy Efficiency: The Global Picture
2. Energy Efficiency in the EU
3. The Energy Efficiency Directive (EED)
4. Q&A

Comfort Break

Part II

5. The Energy Performance of Buildings Directive (EPBD)
6. Objectives, Principles and Governance of the Recast EPBD
7. Q&A

Energy Efficiency



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What is Energy Efficiency

- Using less energy to perform the same task
- Regulation (EU) 2013/1791, art 2(8): ‘the ratio of output of performance, service, goods or energy to input of energy’
- Energy efficiency or energy savings?

Fifth Poll

To reduce global greenhouse gas emissions, energy efficiency...

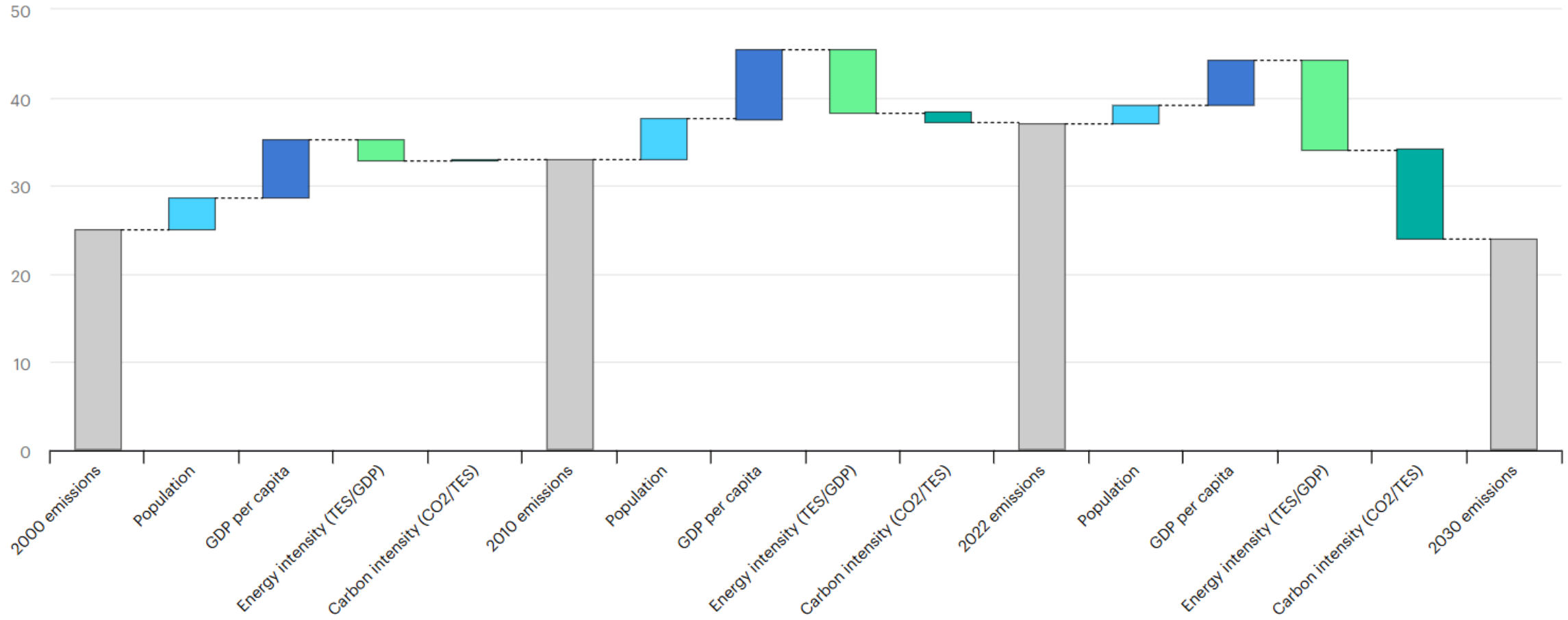
- A) is more important than increasing renewable energy production
- B) is as important as increasing renewable energy production
- C) can support renewable energy roll-out

Пятый Опрос

Для сокращения выбросов парниковых газов в мире энергоэффективность...

- A) важнее, чем увеличение производства возобновляемой энергии
- B) настолько же важна, как и увеличение производства возобновляемой энергии
- C) может поддержать внедрение возобновляемой энергии

GtCO₂



The 'First Fuel'

- Energy efficiency as the most cost-effective way to support energy system transformation
- The easiest and cheapest way to decarbonise energy is simply to produce and use less of it



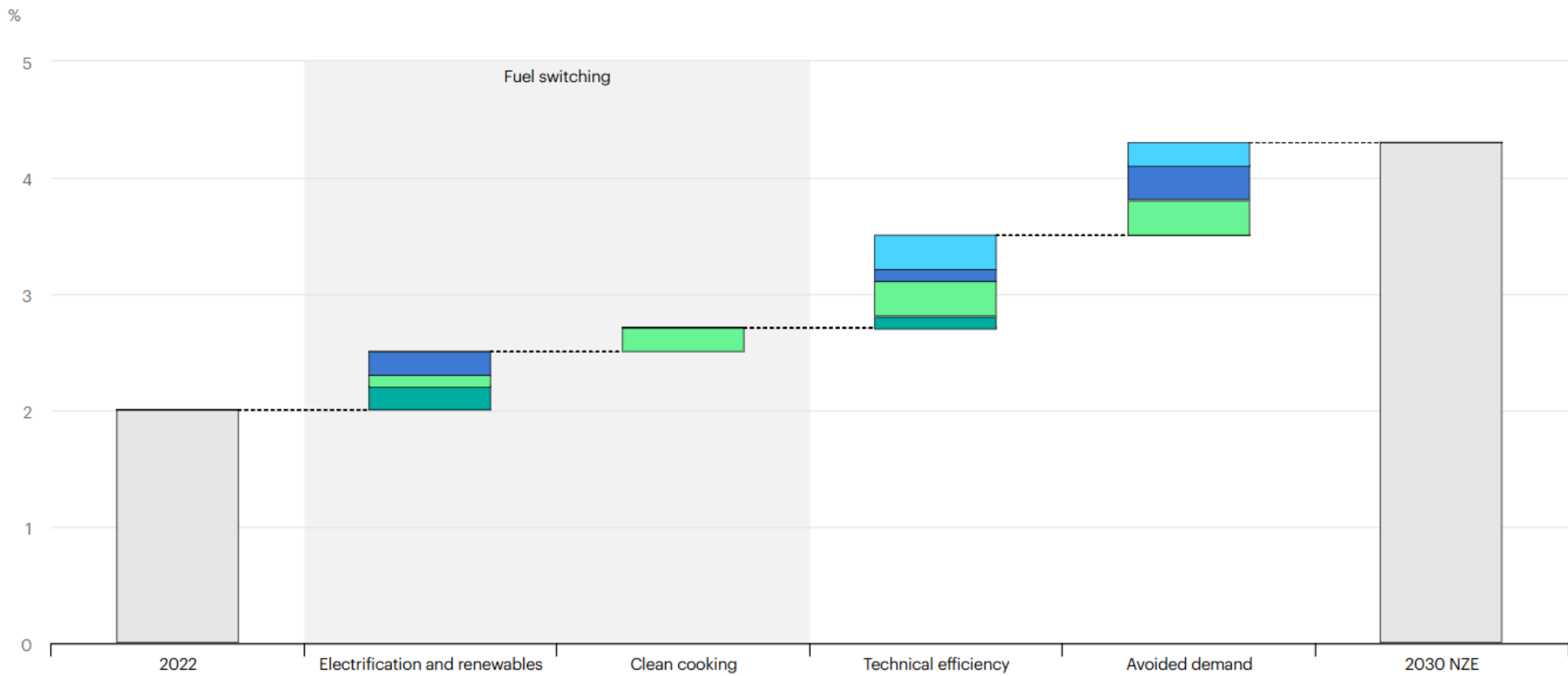
Energy Efficiency and Climate Change

- Energy efficiency improvements could deliver over a third of all CO₂ emission reductions between now and 2030

'We, Heads of State and Governments as the Participants in the COP28 Global Renewables and Energy Efficiency Pledge: [...] Commit to work together to **triple the world's installed renewable energy generation** capacity to at least 11,000 GW by 2030, taking into consideration different starting points and national circumstances. Commit to work together in order to collectively **double the global average annual rate of energy efficiency improvements from around 2% to over 4%** every year until 2030. Commit to put the principle of **energy efficiency as the "first fuel"** at the core of policymaking, planning, and major investment decisions'.

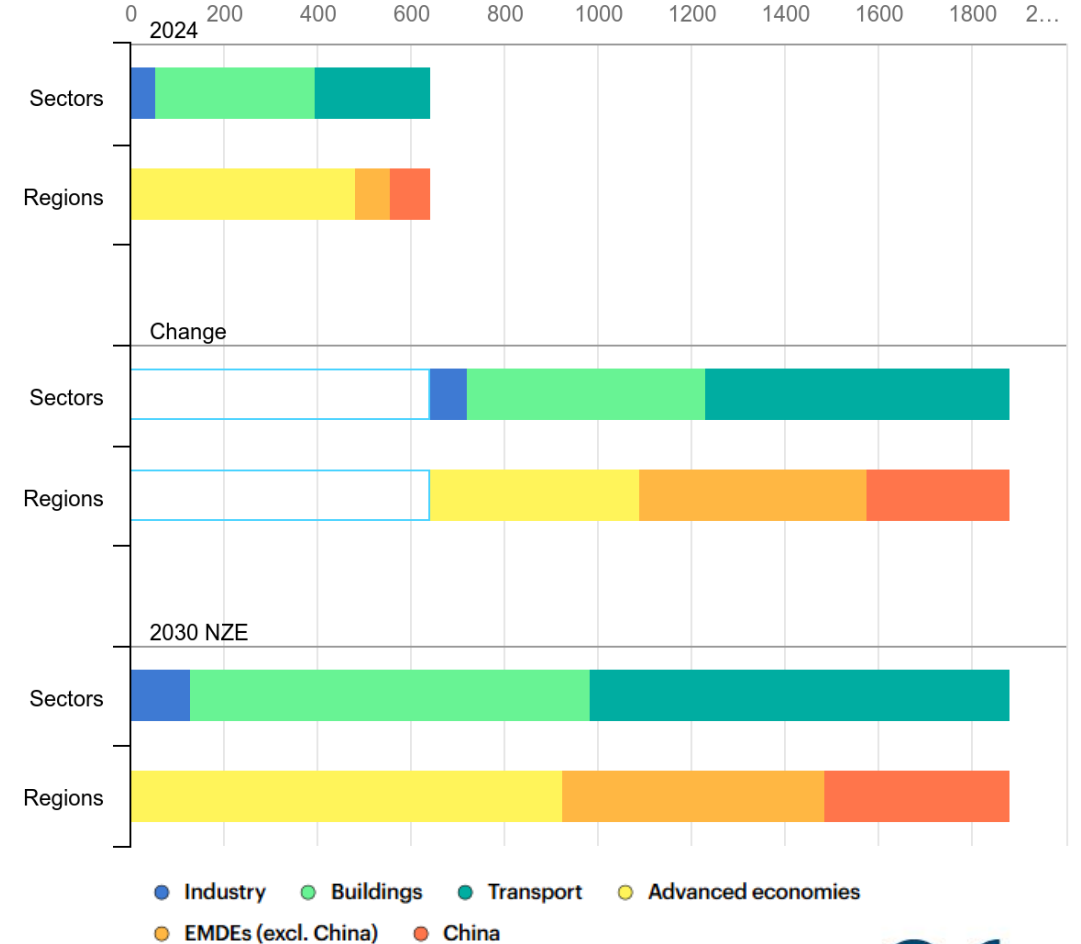
Global Renewables and Energy Efficiency Pledge, COP28 (2023)



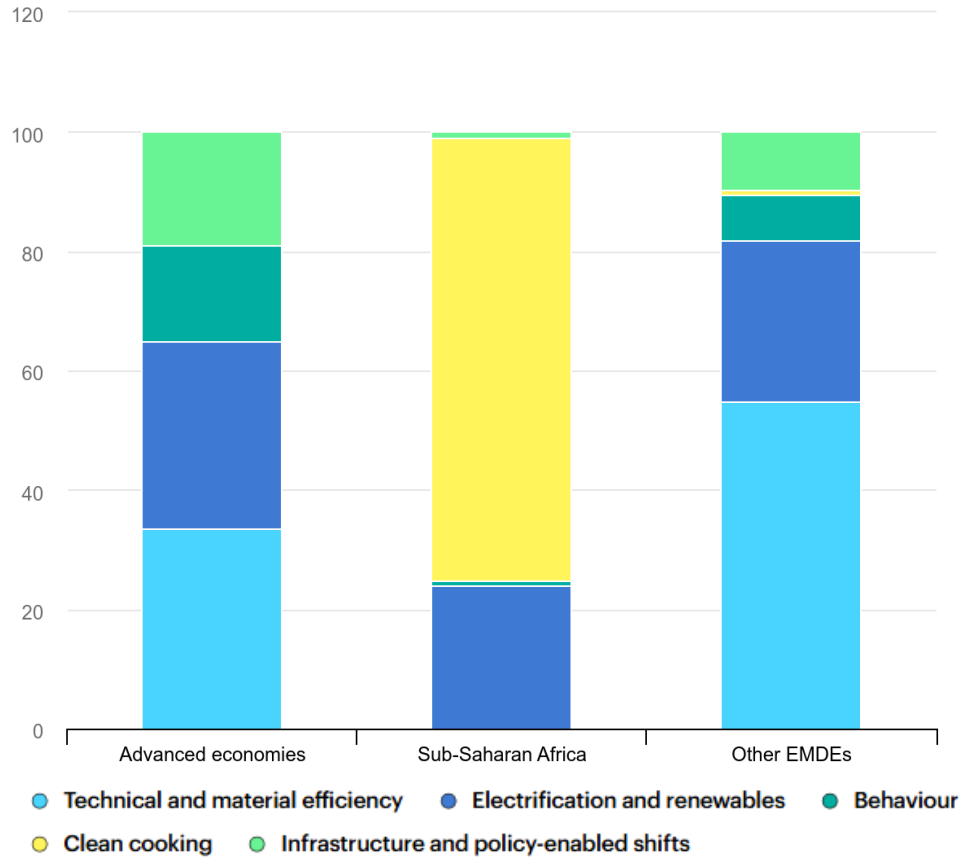


The Global Picture

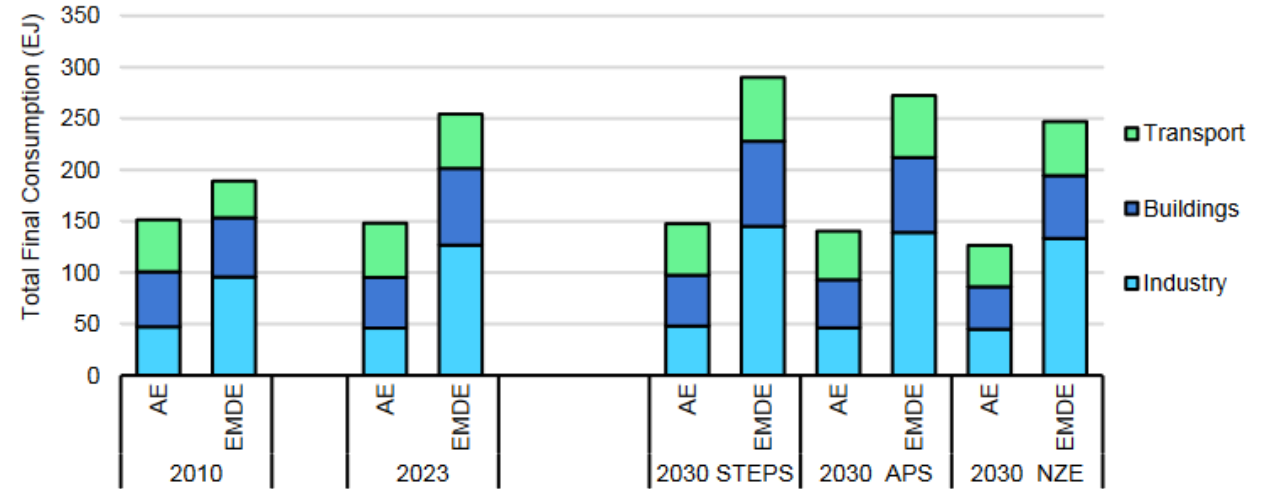
- The World is currently not on track to meet energy efficiency target
- 1% energy intensity improvement in 2024
- Investment in energy efficiency is highly concentrated



Global Differences in Energy Efficiency



Total final consumption by sector in advanced economies and emerging markets and developing economies, 2010-2023, and by scenario, 2030



IEA. CC BY 4.0.



Energy Efficiency Law and Policy in the EU

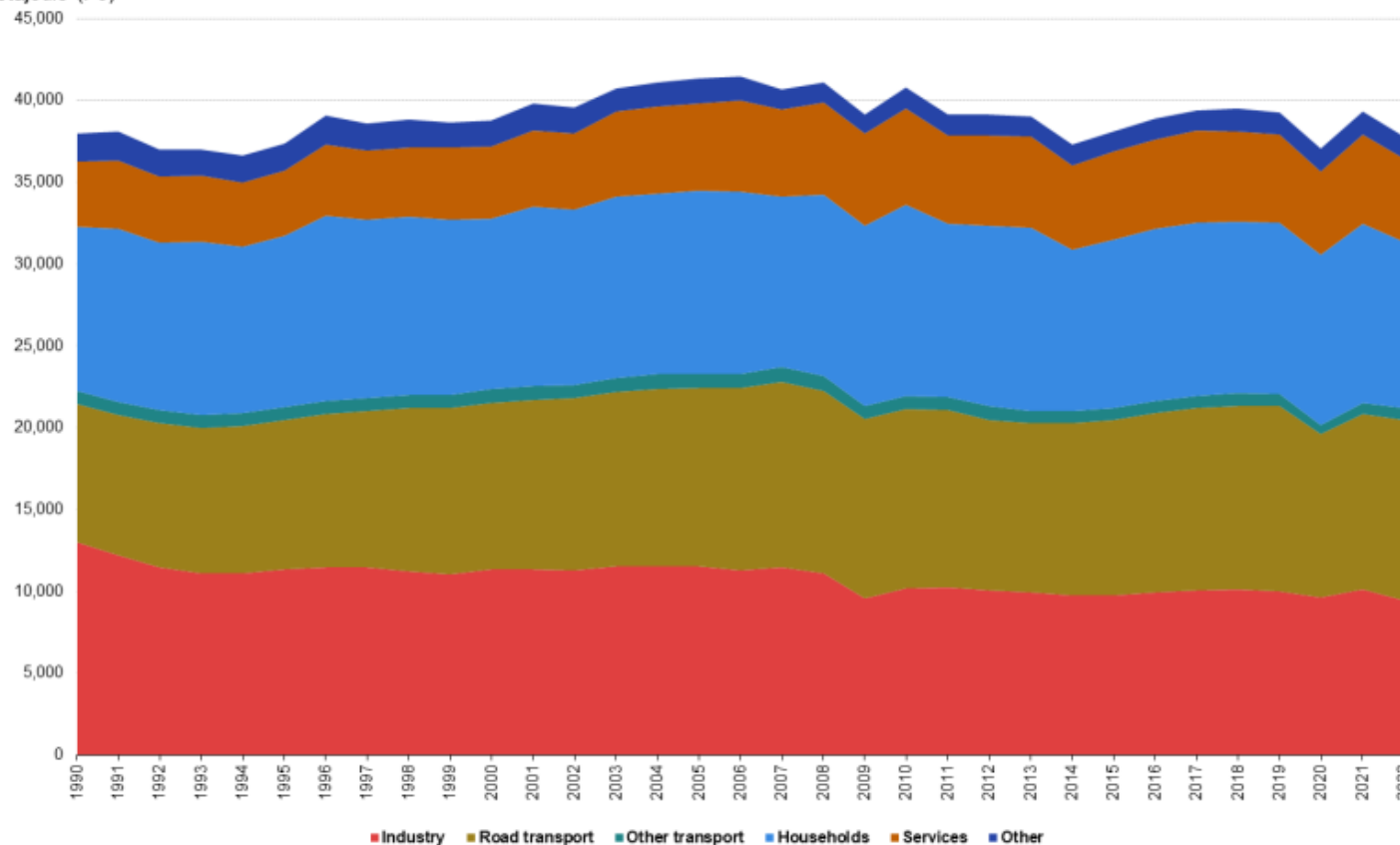


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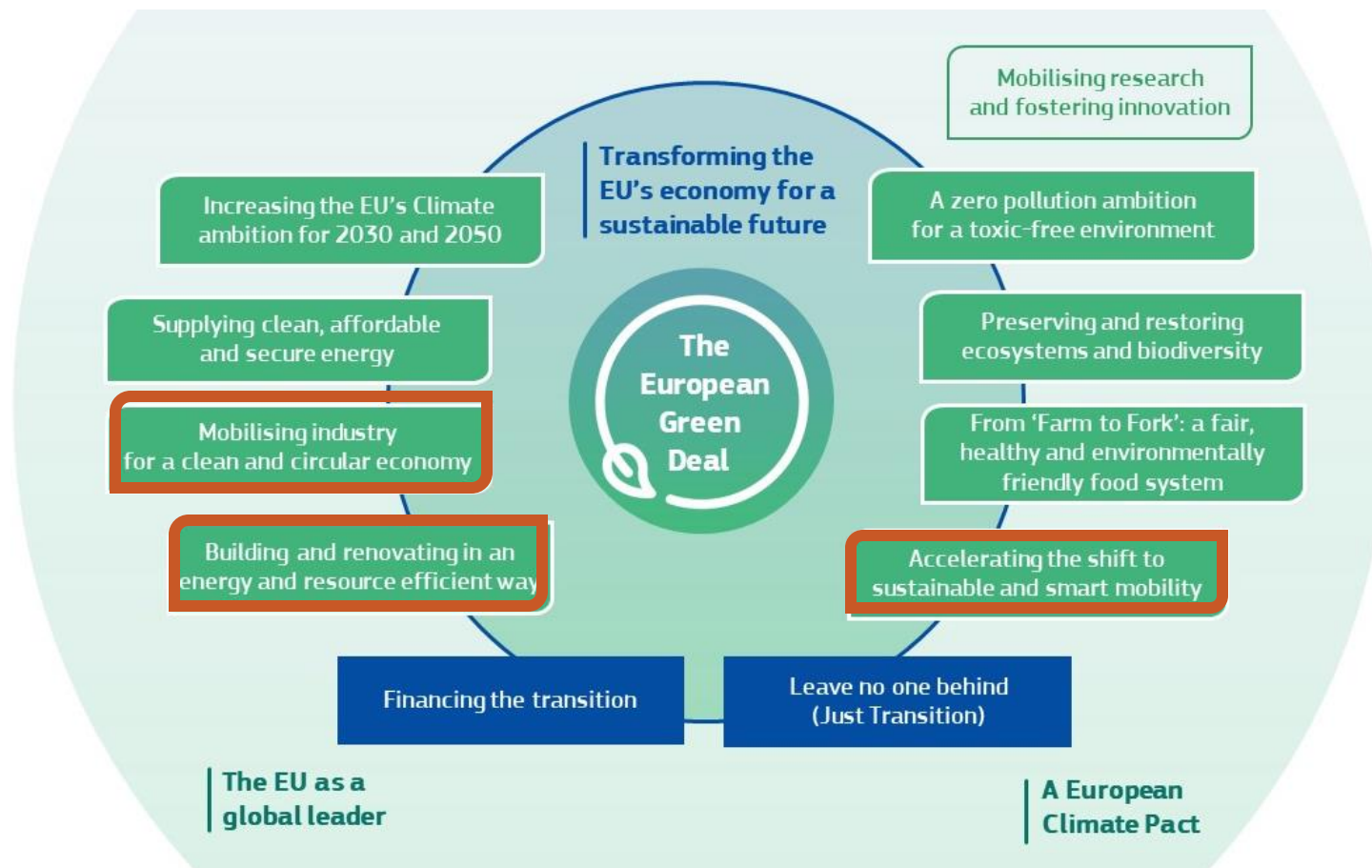
The Status Quo in the European Union

Final energy consumption by sector, EU, 1990-2022
Petajoule (PJ)



Source: Eurostat (online data code: nrg_bal_c)

The European Green Deal

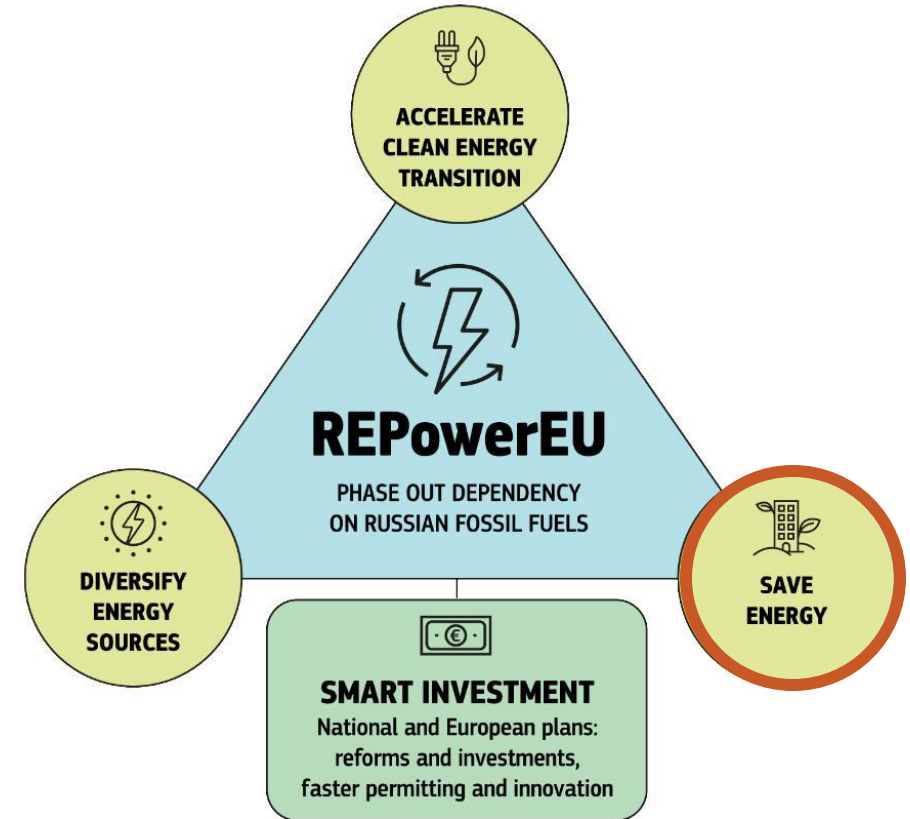


REPowerEU

- Energy efficiency recognised as important component of EU energy security and strategic autonomy

‘Reducing energy consumption cuts households’ and companies’ high energy bills in the short and long term, and decreases imports of Russian fossil fuels. Reducing energy consumption through higher efficiency is a vital component of the clean energy transition which increases the resilience of the EU economy and shields its competitiveness against high fossil fuel prices.’

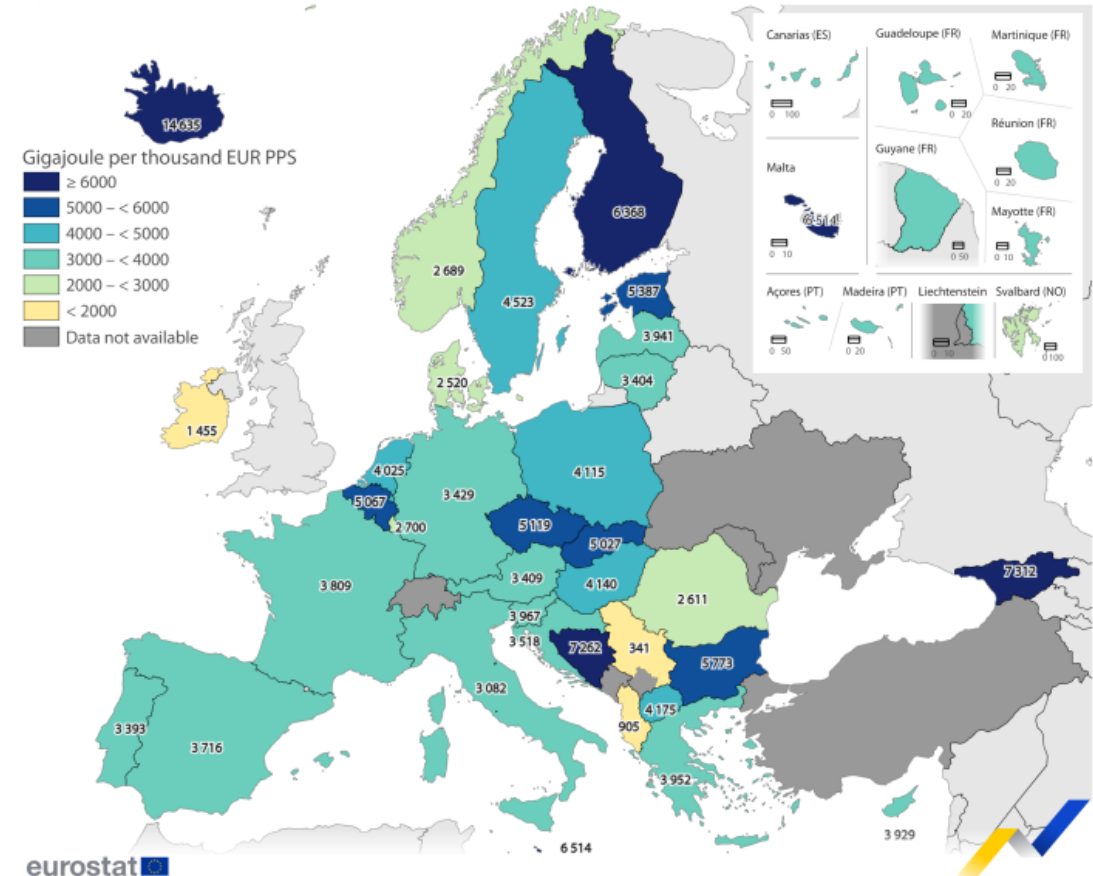
COM(2022) 230 final



What Does Energy Efficiency Mean in the EU?

- Energy efficiency levels vary across the European Union
- Member States face different energy efficiency challenges

Energy intensity of the economy, 2022



Sixth Poll

The European Union...

- A) should have the power to compel Member States to achieve energy efficiency gains
- B) should leave it up to Member States to increase energy efficiency by themselves given regional specificities

Шестой Опрос

Европейский Союз...

- A) должен иметь полномочия принуждать государства-члены добиваться повышения энергоэффективности
- B) должен предоставить государствам-членам возможность самостоятельно повышать энергоэффективность с учетом региональных особенностей

EU Intervention in Member States' Energy Policy

- Limited by founding Treaties
- Due to variety of Member State circumstances, Directives have been chosen as principal EU energy efficiency legislative instruments
- Energy Efficiency Directive, Energy Performance of Buildings Directive



Evolution of the EU Energy Efficiency Directive

Directive 2012/27/EU

- Targets for final and primary energy consumption in the EU (2020)
- Energy efficiency obligation schemes
- Exemplary role of the public sector
- Mandatory energy efficiency certificates for the sale or rental of buildings

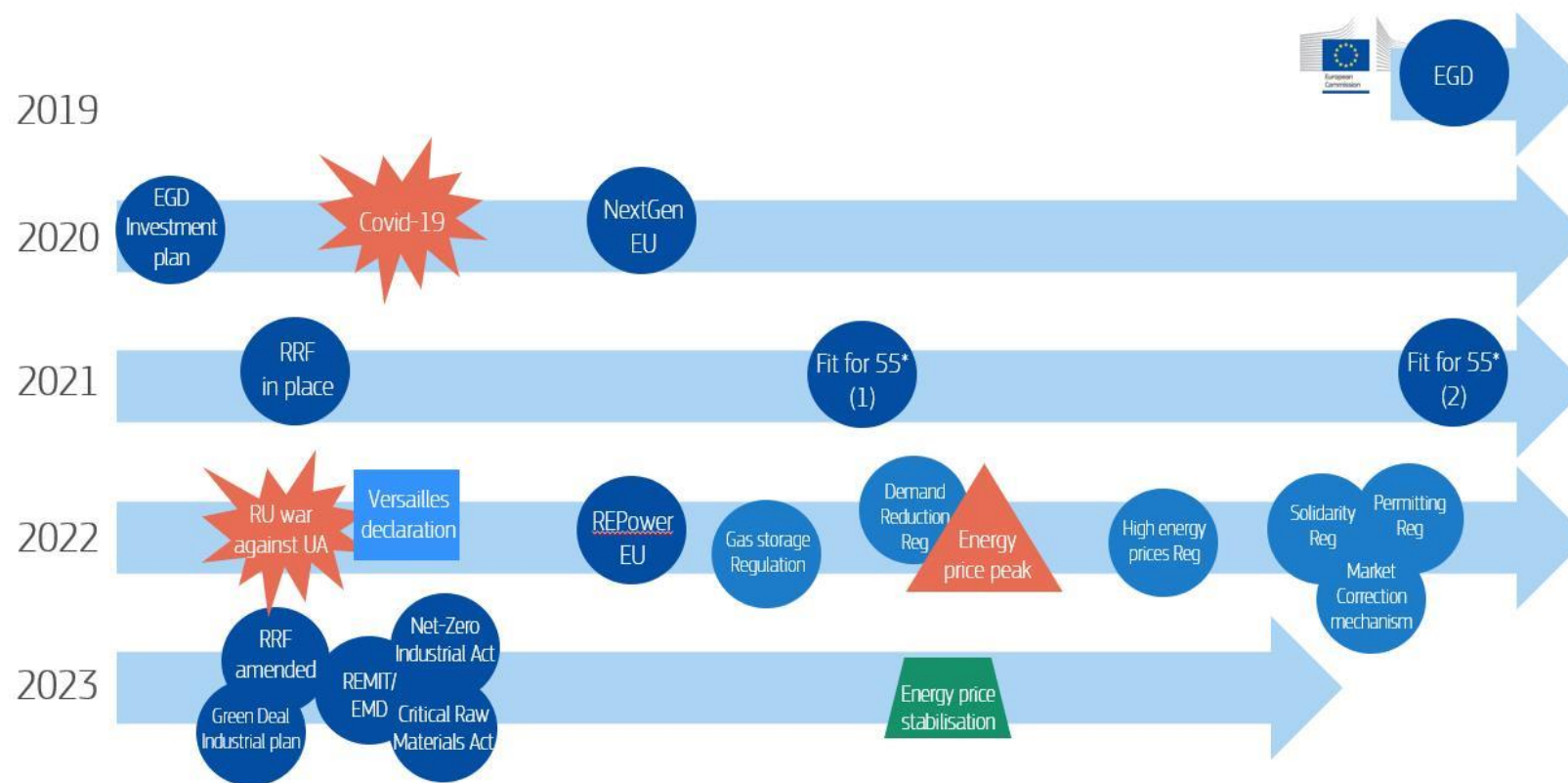
Directive (EU) 2018/2002 (amendment)

- Increase of targets
- Monitoring through National Energy and Climate Plans (NECPs)

Directive (EU) 2023/1791 (recast)

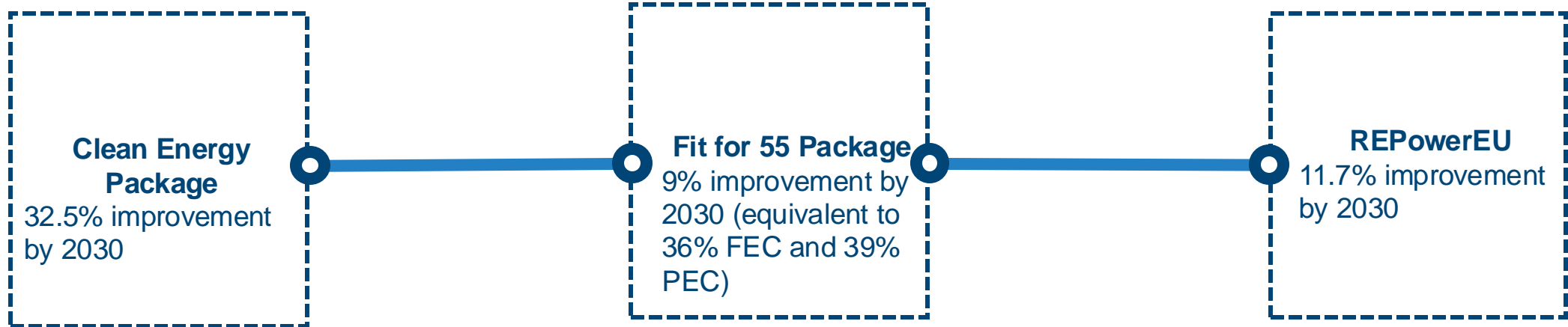
- Increase of targets
- Legislative basis for energy efficiency first principle
- Indicative national targets
- Modifies and strengthens public sector role and energy saving obligations
- One stop shops
- Provisions for vulnerable consumers

The EU's Changing Energy Acquis



COM(2023)650 final 5

Objectives and Targets



Energy Efficiency First

‘energy efficiency first’ means taking **utmost account** in energy planning, and in policy and investment decisions, of alternative cost-efficient energy efficiency measures to make energy demand and energy supply more efficient, in particular by means of cost-effective end-use energy savings, demand response initiatives and more efficient conversion, transmission and distribution of energy, whilst still achieving the objectives of those decisions

Regulation (EU) 2018/1999, art 2(18)

Directive 2023/1791

- Specific application of Energy Efficiency First Principle to energy systems and non-energy sectors with impact on energy consumption and energy efficiency
- Guidance on how to apply the principle
- Monitoring obligations

Energy Savings Obligations

Table 2

Rates to calculate the required amount of cumulative end-use energy savings for 2021 to 2030

Rate of annual savings achieved in: Rate of new annual savings from actions implemented in:	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2021	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %
2022		0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %
2023			0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %	0,8 %
2024				1,3 %	1,3 %	1,3 %	1,3 %	1,3 %	1,3 %	1,3 %
2025					1,3 %	1,3 %	1,3 %	1,3 %	1,3 %	1,3 %
2026						1,5 %	1,5 %	1,5 %	1,5 %	1,5 %
2027							1,5 %	1,5 %	1,5 %	1,5 %
2028								1,9 %	1,9 %	1,9 %
2029									1,9 %	1,9 %
2030										1,9 %
<i>Equivalent rates of total annual savings in each year</i>	0,8 %	1,6 %	2,4 %	3,7 %	5,0 %	6,5 %	8,0 %	9,9 %	11,8 %	13,7 %

Seventh Poll

The European Union...

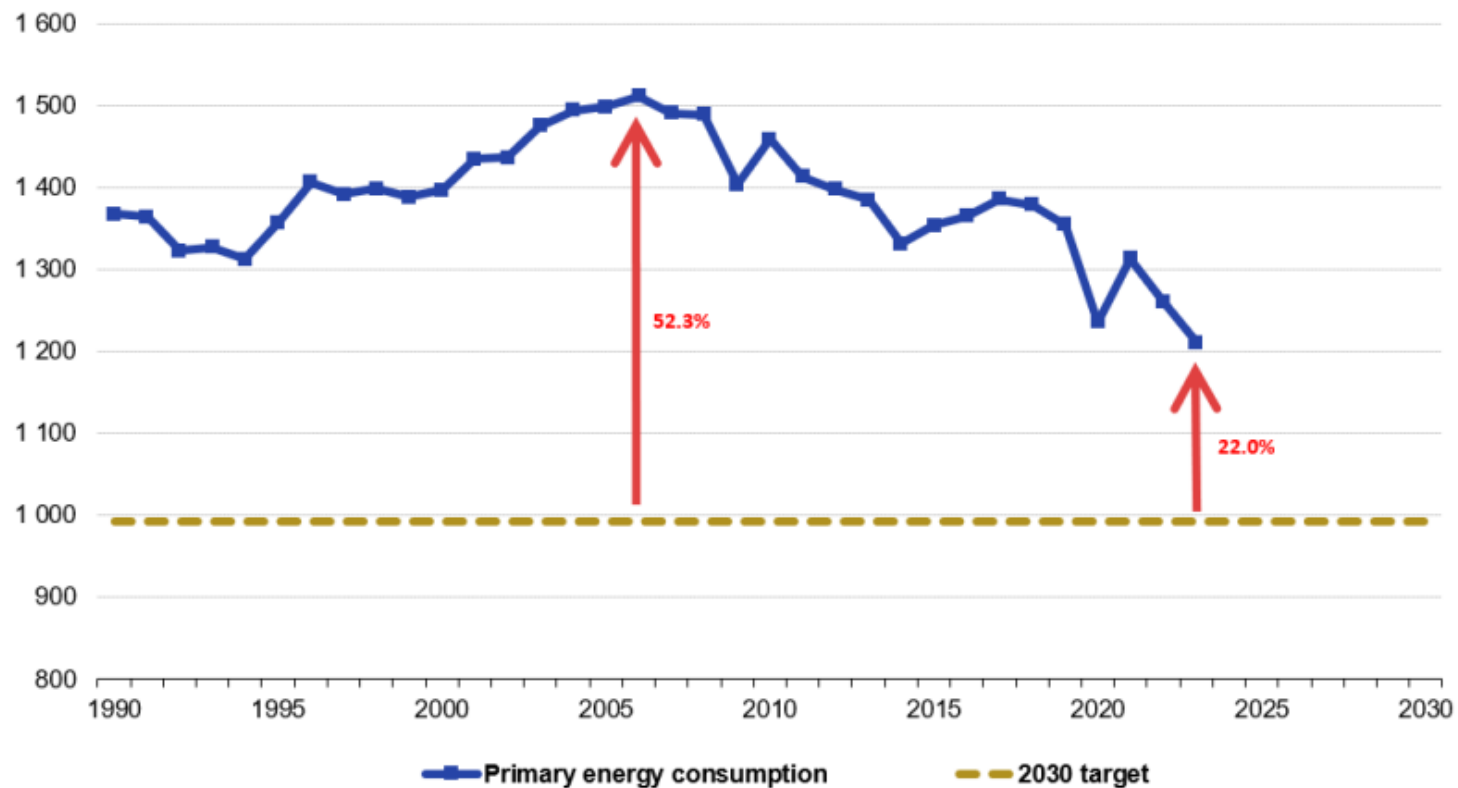
- A) is on track to meet its 2030 energy efficiency target
- B) is currently not doing enough

Седьмой Опрос

Европейский Союз...

- A) находится на верном пути к достижению своей цели по энергоэффективности к 2030 году
- B) в настоящее время не делает достаточно

Distance to 2030 target for primary energy consumption, EU (Mtoe)

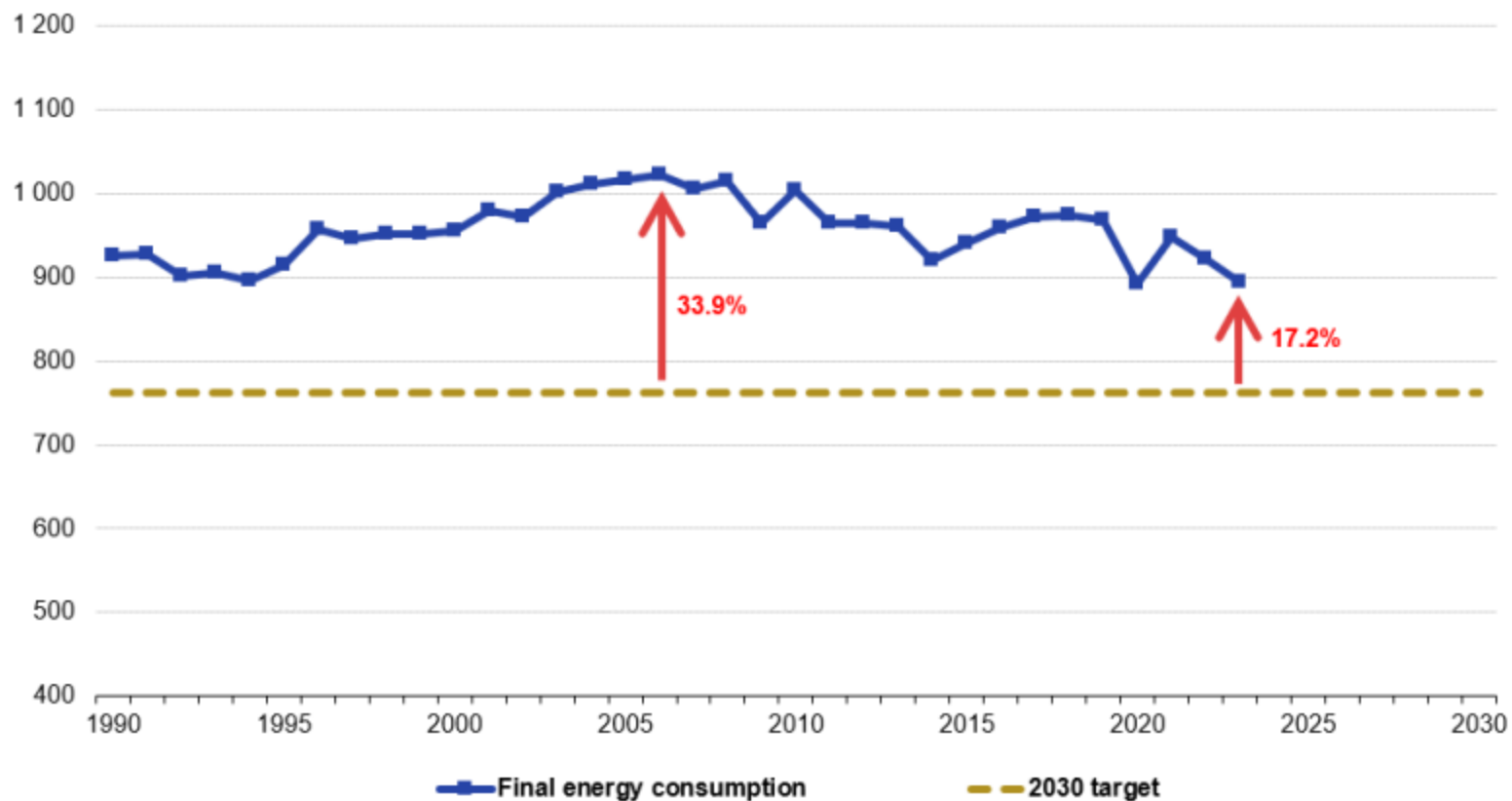


Note: y-axis does not start at 0.

Source: Eurostat (online data code: nrg_ind_eff)

Distance to 2030 target for final energy consumption, EU

(Mtoe)



Source: Eurostat (online data code: nrg_ind_eff)

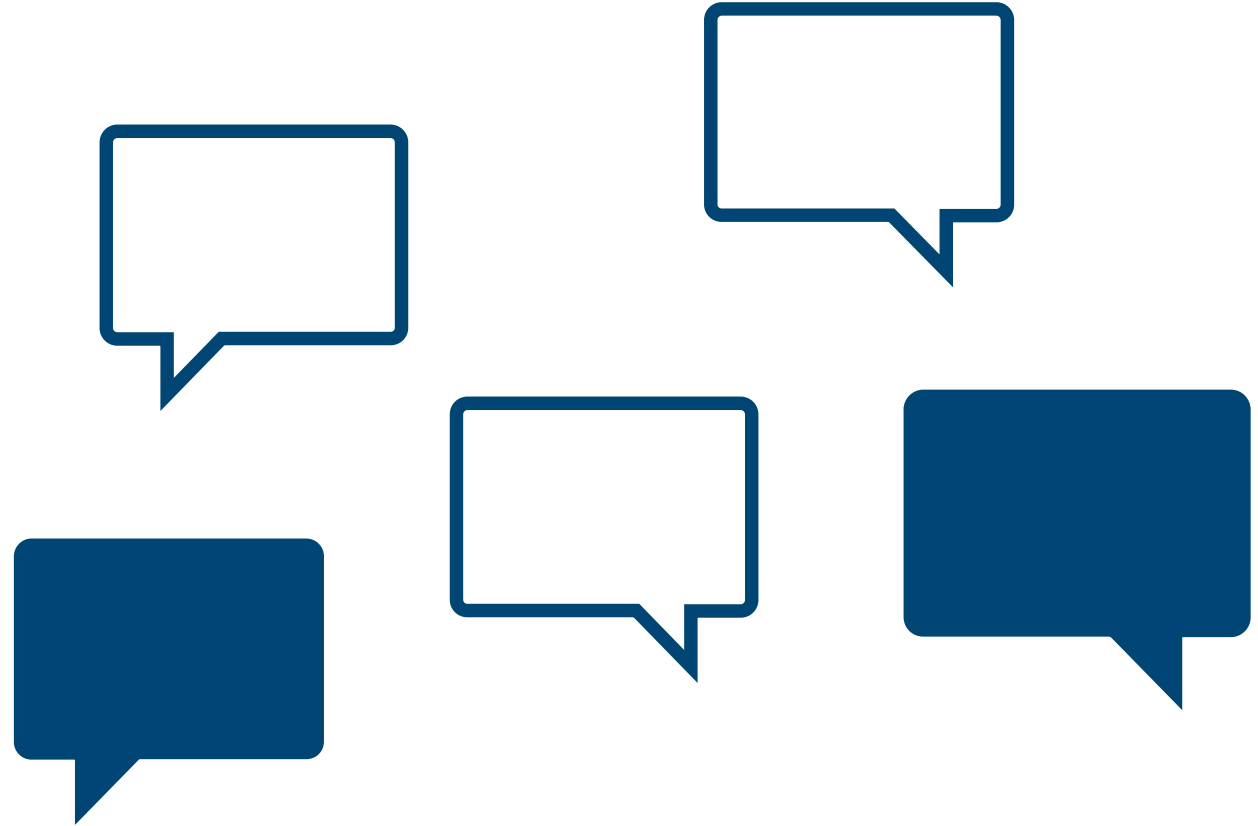
National Energy and Climate Plans

- EU Member States are currently not following through on delivering the updated 2030 target
- Assessment of NECPs revealed a gap of 5.8% to 2030 target

The preliminary aggregated assessment shows a substantial gap towards the achievement of the EU's 2030 energy efficiency targets for both primary and final energy consumption. For primary energy consumption, there is a gap of 75 Mtoe from the EU's 2030 indicative target. For final energy consumption, the gap stands at 53.1 Mtoe from the Union's 2030 binding target

COM(2023) 769 Final

Questions?



Energy Performance of Buildings



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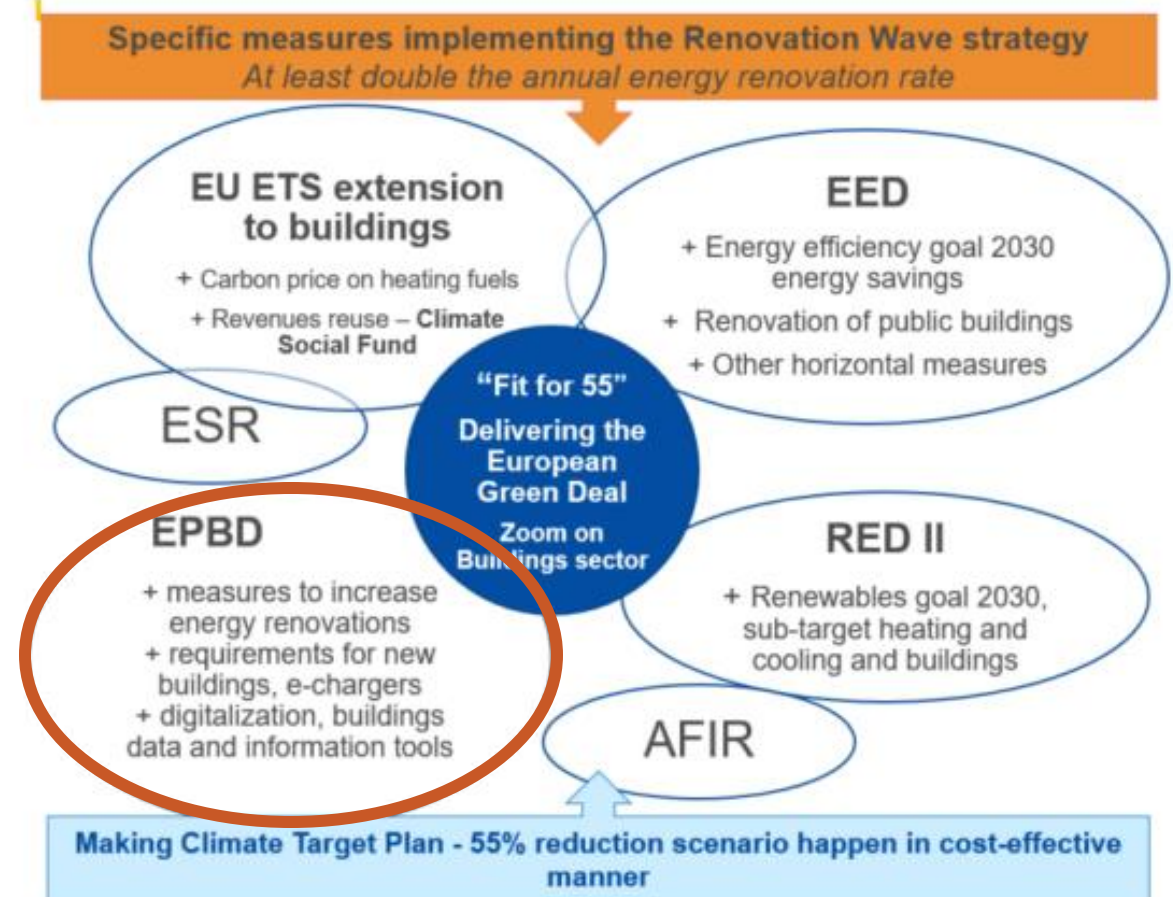


The Importance of Buildings for Decarbonisation

- Buildings are responsible for 40% of energy consumed in the EU
- Buildings are responsible for 36% of the EU's energy related greenhouse gas emissions
- Approximately 80% of the 2050 building stock already exists today
- Real speed of renovations (weighted for 'depth') is at approximately 1%

Buildings in the European Green Deal

2002	Energy Performance of Buildings Directive
2010	Recast EPBD
2014	Submission of Long-Term Renovation Strategies
2017	Update of Long-Term Renovation Strategies
2018	Amendment of EPBD as part of Clean Energy Package
2019	EU Green Deal Strategy
2020	Renovation Wave Strategy Submission of Long-Term Renovation Strategies
2021	New European Bauhaus Fit for 55 Package
2024	Adoption of recast EPBD

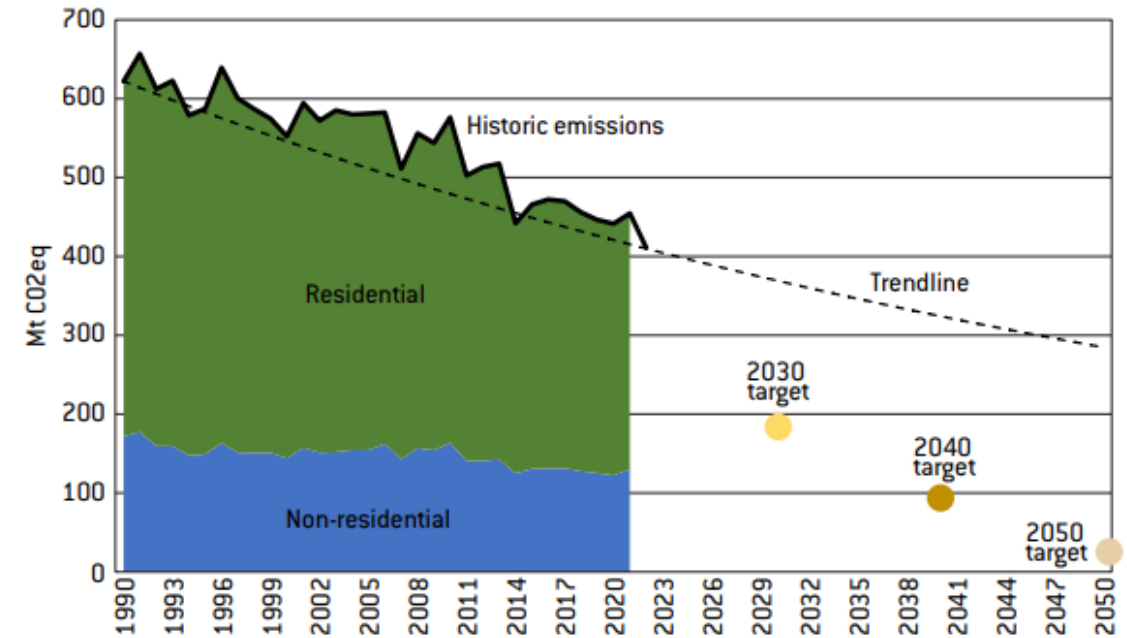


Commission, 'Impact Assessment Report Accompanying the Proposal for a Directive of the European Parliament and of the Council on the Energy Performance of Buildings (Recast)' SWD(2021) 453 final 8

Progress on Building Decarbonisation in the EU

- Progress made but too slow to reach net-zero objective of the European Green Deal
- Objective to at least double annual energy renovation rate, renovating 35 million building units by 2030
- Member State reporting incomplete and fragmented
- Led to ambitious recast proposal as part of the Fit for 55 Package

Figure 1: Fossil-fuel use in heating and cooling in residential and non-residential sectors, emissions reductions, 1990-2022, Mt/CO₂eq



Source: Bruegel based on EEA and UNFCCC. Note: Emissions from agriculture, forestry and fishing related buildings are excluded.

Ugnė Keliauskaitė and others, 'How to Finance the European Union's Building Decarbonisation Plan' (Bruegel 2024) Policy Brief 12/24, 3.

Eighth Poll

The EU's annual financing gap for energy savings from buildings is

- A) €500 mn
- B) €500 bn
- C) €150 bn
- D) €1 tn

Восьмой Опрос

Ежегодный дефицит финансирования ЕС для экономии энергии в зданиях составляет

- A) €500 млн
- B) €500 млрд
- C) €150 млрд
- D) €1 трлн

2030 Building Renovation in NECPs

- The Commission monitors implementation and progress on energy performance of buildings
- In NECP draft updates, only 4 countries updated their long-term strategies

‘in their final updated NECPs, Member States need to give a clearer description and a quantitative estimation of building-related policies and measures in terms of funding, costs and impacts on energy and emission savings’.

COM (2023) 796 final 11

Recast of the Directive as Part of the Green Deal

- Proposed as part of Fit for 55 Package aimed to increase ambition and harmonise reporting standards
- Envisioned more binding Minimum Energy Performance Standards (MEPS) to address shortcomings and variety in Member States approaches
- Controversial in EU institutions
- Recast EPBD adopted in May 2024

Italian politics threatens to torpedo EU buildings directive

By Nikolaus J.

EU's contested green buildings law limps towards the finishing line

By Nikolaus J. Kurmayer | Euractiv.com ⌚ Est. 4min

📅 7 Dec 2023

Objectives, Principles and Governance of the Recast EPBD



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Definitions

- **Nearly Zero-Energy Building (NZEB)**

- ‘a building with a very high energy performance, [...] where the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or energy from renewable sources produced nearby’

- **Zero-Emission Building (ZEB)**

- ‘requiring zero or a very low amount of energy, producing zero on-site carbon emissions from fossil fuels and producing zero or a very low amount of operational greenhouse gas emissions’

- **Deep renovation**

- Transforms a building into a NZEB before 2030 and a ZEB thereafter

Ninth Poll

Different types of buildings (public, private, new, historic)...

- A) should be treated differently – the difficulty of implementing energy efficiency measures differs
- B) should be treated the same – this is important to achieve decarbonisation at the speed necessary to reach carbon neutrality

Девятый Опрос

К разным типам зданий (общественным, частным, новым, историческим)...

- A) следует относиться по-разному — сложность внедрения мер по повышению энергоэффективности различна
- B) следует относиться одинаково — это важно для достижения декарбонизации со скоростью, необходимой для достижения углеродной нейтральности

Targets and Objectives

- Overall goal: Decarbonised, net-zero emissions building stock by 2050
- EPBD differentiates between new and existing buildings
- All new buildings must be ZEBs by 2028 (**publicly-owned**) and 2030 (**all buildings**)
- EPBD also differentiates between **residential** and **non-residential** buildings
- Decrease energy performance of the national **residential** building stock by 16% compared to 2020 and by 20-22% by 2035
 - 55% of the decrease through renovation of worst-performing buildings
- **non-residential** building stock
 - Designate and renovate 16% of worst-performing buildings by 2030
 - Designate and renovate 26% of worst-performing buildings by 2033
- Phase-out of fossil-fuelled boilers by 2040

Principles

- Energy Efficiency First
- Exemplary role of the public sector
- Target worst-performing buildings

Governance

1. National Building Renovation Plans
2. Minimum Energy Performance Standards (MEPS)
3. Energy Performance Certificates
4. Renovation Passports

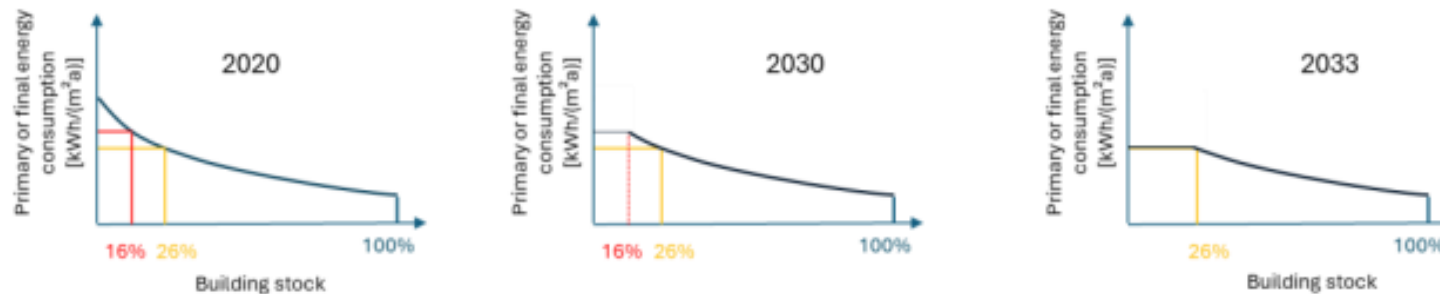
National Building Renovation Plans

- Replaces Long-Term Building Renovation Strategies
- Updated every five years, alignment with NECP process
- Key elements
 - Overview of the national building stock for different building types
 - Roadmap for 2030, 2040, 2050
 - Implemented and planned policy measures
 - Investment needs
 - Thresholds for ZEBs
 - MEPS for non-residential buildings
 - Trajectory for the progressive renovation of the residential building stock

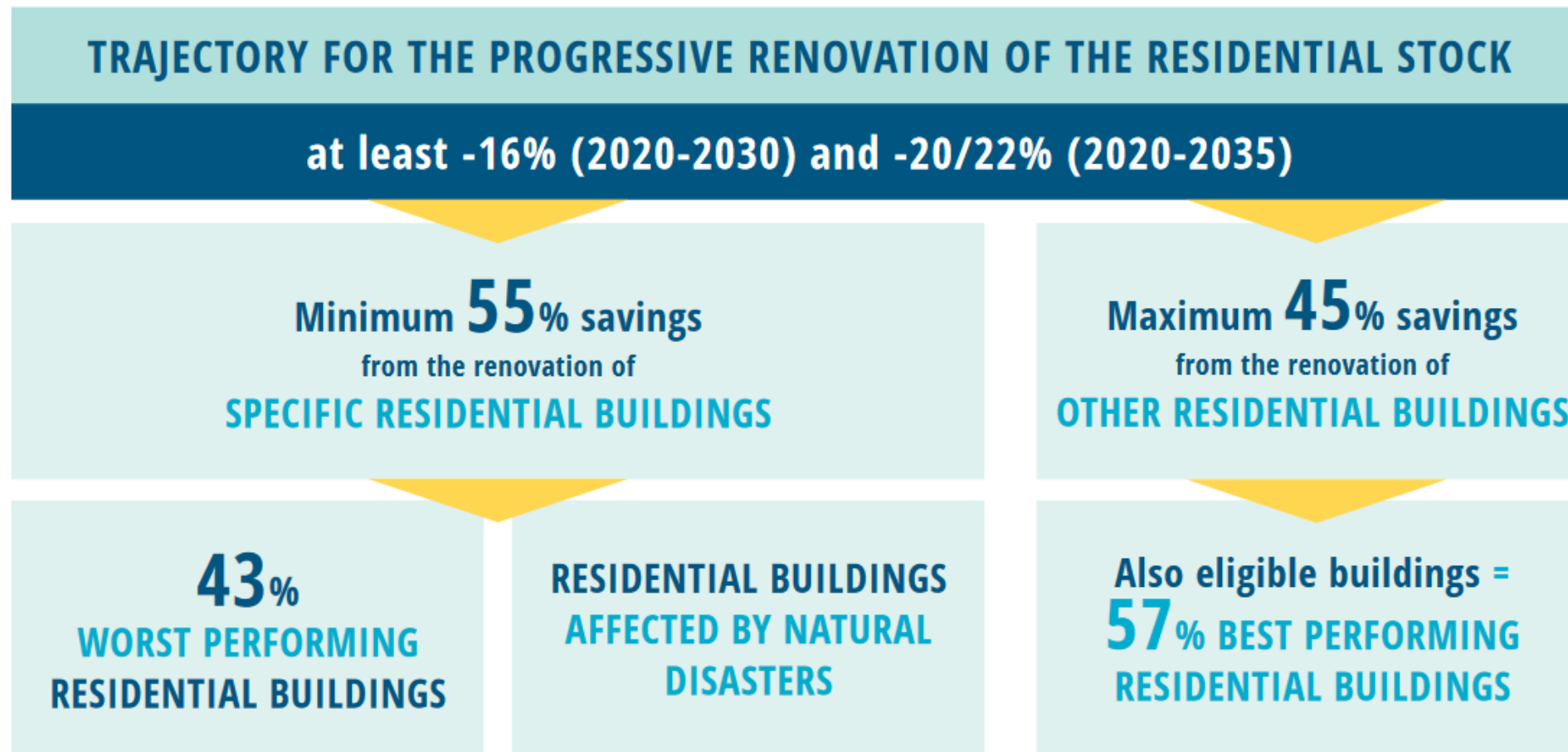
Minimum Energy Performance Standards

- Member States *shall* establish minimum energy performance standards for **non-residential** buildings (article 9)
- expressed by a numeric indicator of primary or final energy use in kWh/(m².y)
- Member States must set a *maximum energy performance threshold* and subsequently ensure improvement of the worst 16% (2030) and then 26% (2033) of non-residential buildings

Figure 1 Minimum requirements for non-residential buildings. MS must derive the 16% and 26% threshold of WPBs based on the primary or final energy consumption.

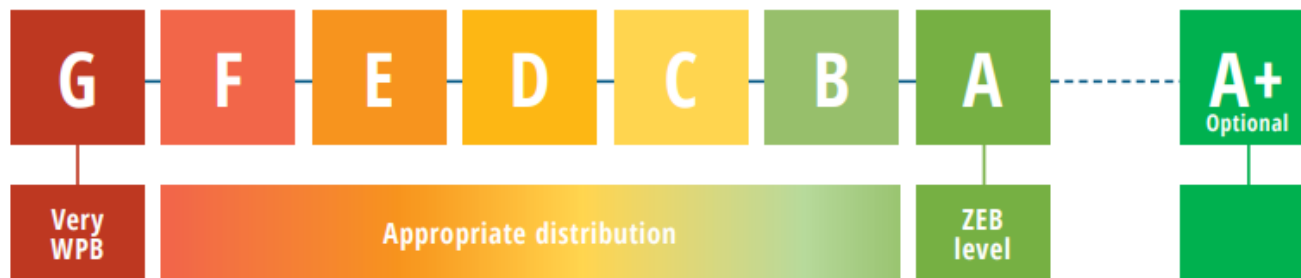


Residential Buildings



Energy Performance Certificates

- Introduced in 2010 EPBD and refined in recast Directive
- Numeric indicators, concrete reference values
- Recast EPBD includes template for EPCs (Annex V)
- A-class corresponds to zero-emission building, G-class to very worst-performing buildings
- Member States retain flexibility regarding ‘appropriate distribution’

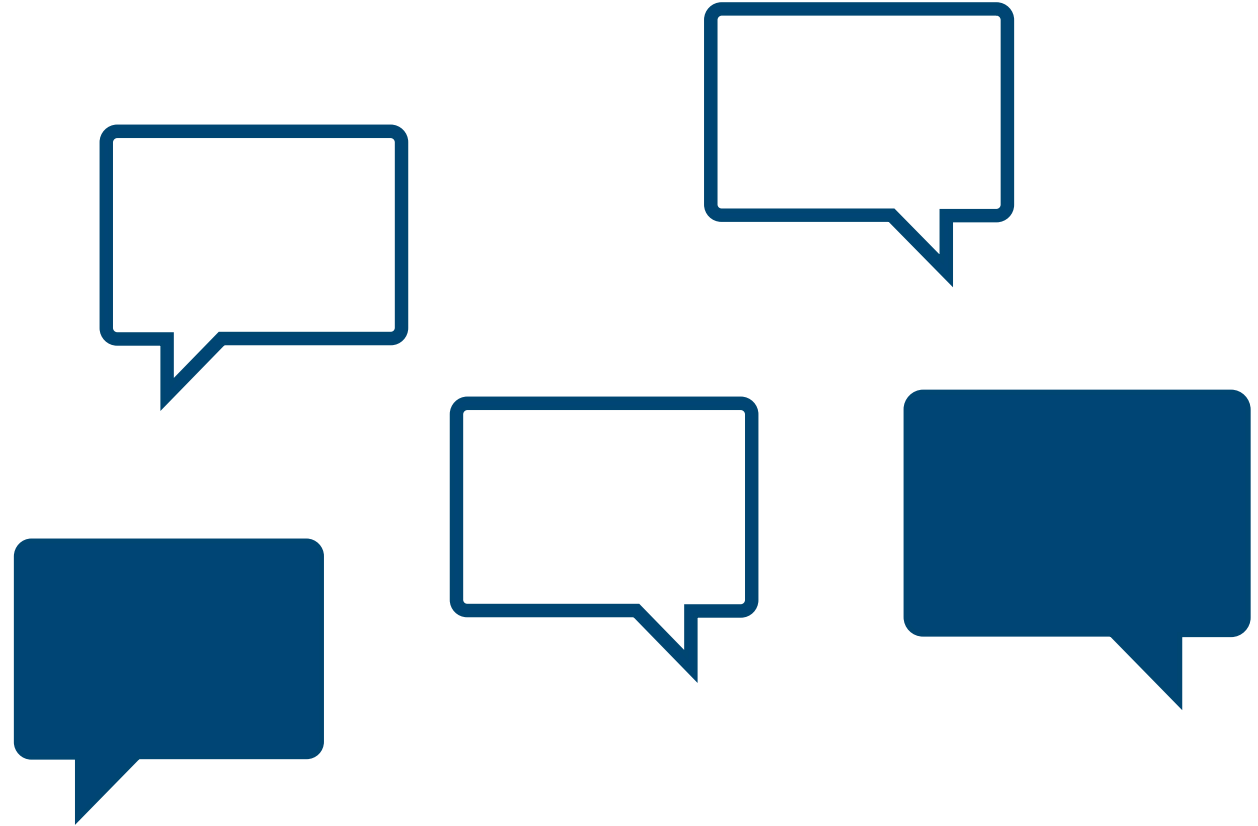


Hélène Sibileau and Volodymyr Vladyka, 'The EPBD Decrypted: A Treasure Chest of Opportunities to Accelerate Building Decarbonisation' (BPIE 2024).

Building Renovation Passports

- Optional roadmap for the deep renovation of a specific building in a maximum number of steps that will significantly improve its energy performance (article 2(19))
- Building Renovation Passport schemes to be introduced by Member States by 29 May 2026
- Linked to EPCs – frame improvement in terms of EPC class

Questions?



Thank you

Energy Efficiency

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FSR - SECCA Training
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