International Energy Agency

Energy Efficiency 2023 Briefing

7 December 2023, Leonardo Energy Webinar

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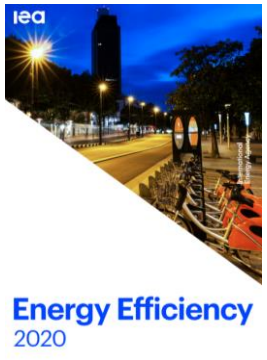
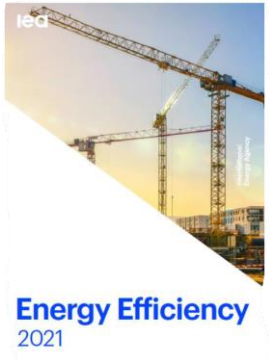
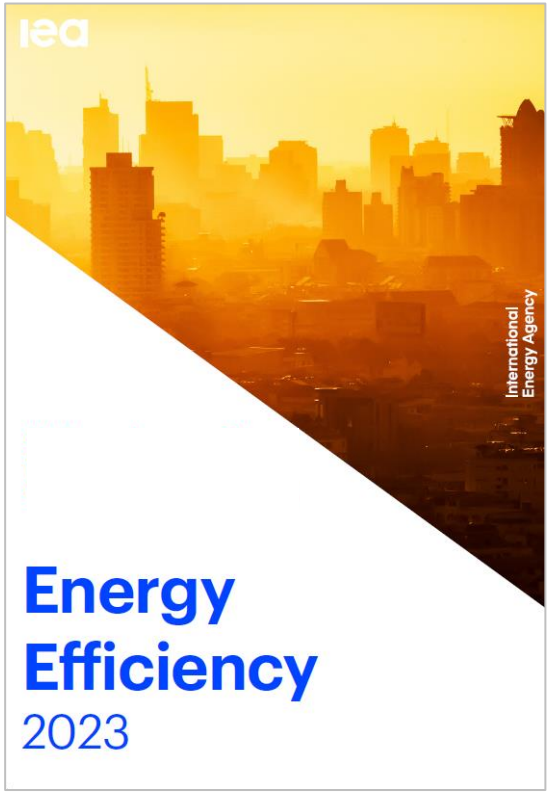
Overview

- The IEA's annual analysis on global developments in energy efficiency markets and policy
  - Relevant and timely – tracking key trends and topics
  - Resource for policy learning and exchange between countries
  - Platform for increasing the profile of efficiency







Logistics

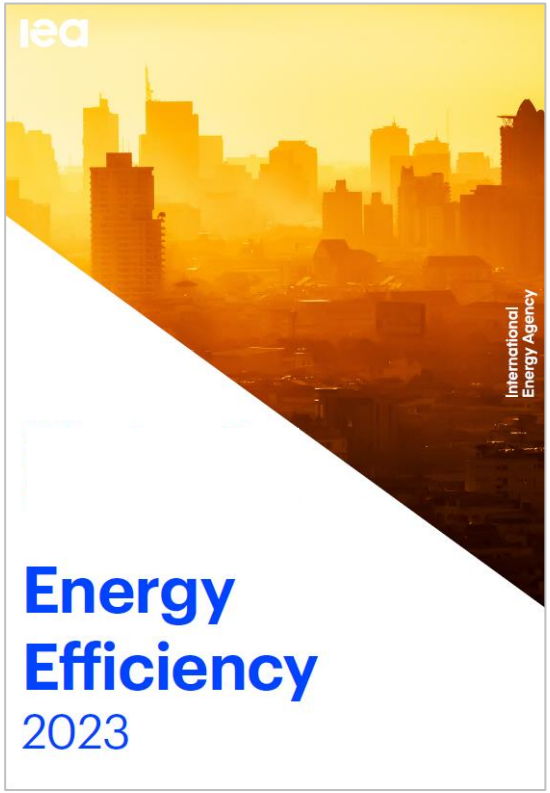
- Available for download at

  https://www.iea.org/reports/energy-efficiency-2023

- Energy end-uses and efficiency indicators data explorer

  https://www.iea.org/data-and-statistics/data-tools/energy-end-uses-and-efficiency-indicators-data-explorer

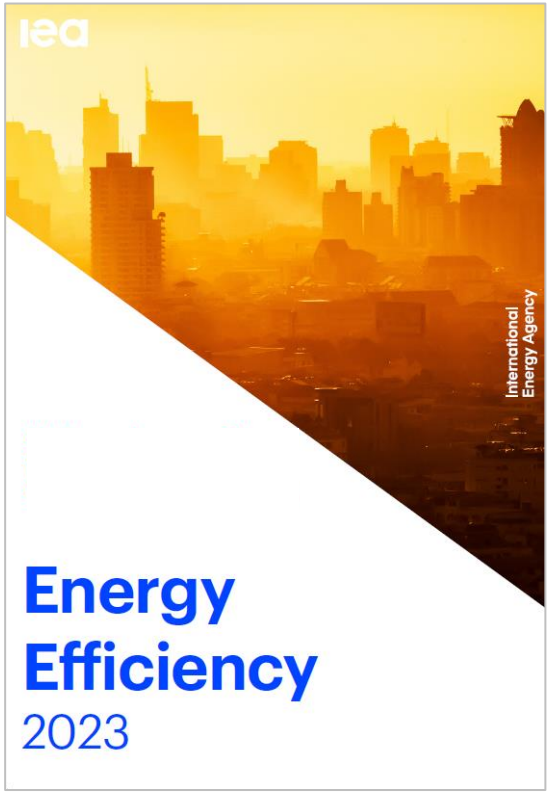
- Today's briefing: 60 minutes
  - Part 1: Report main body (20 mins)
  - Part 2: Key issues for policymakers (10 mins)
  - Part 3: Discussion (30 minutes)



Energy Efficiency 2023 overview

Recent trends in energy efficiency markets

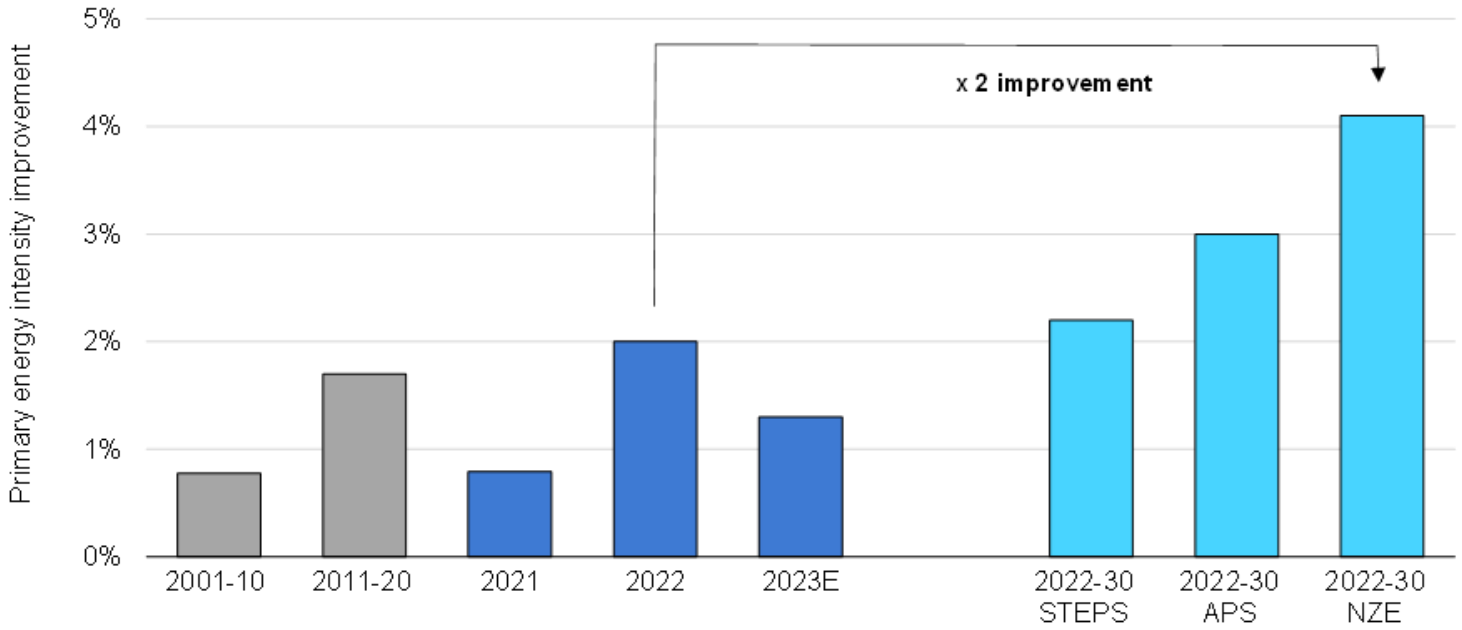
1. Energy intensity, demand and prices
2. Sector and system-wide trends
3. Investment and employment
4. Policy developments
5. Key issues facing policymakers this year
   - *Why is intensity progress slower this year?*
   - *What does doubling efficiency entail?*
   - *Record heat driving urgency for efficiency*
   - *Energy crisis and gas in residential heating*
   - *Consumer benefits from system efficiency*
   - *Cooling in India and thermal comfort for all*



Chapter 1 Energy intensity, demand and prices

Efficiency policy momentum builds but energy intensity progress slows

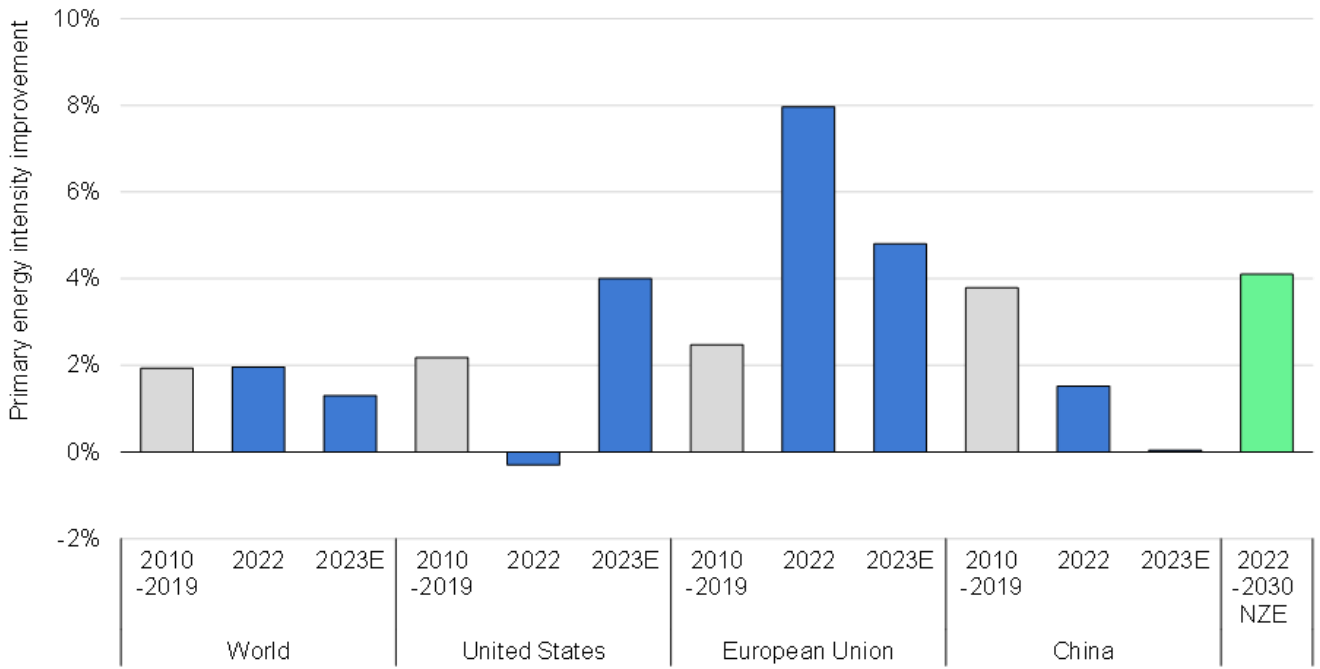
Annual global primary energy intensity improvement, 2001-2022, 2023E, and by scenario, 2022-2030



Energy intensity progress slows to 1.3% in 2023 driven by higher global energy demand of 1.7%
Momentum builds around a global target to double 2022 rate of progress each year this decade to 4%

Slower global progress hides transformations underway at country level

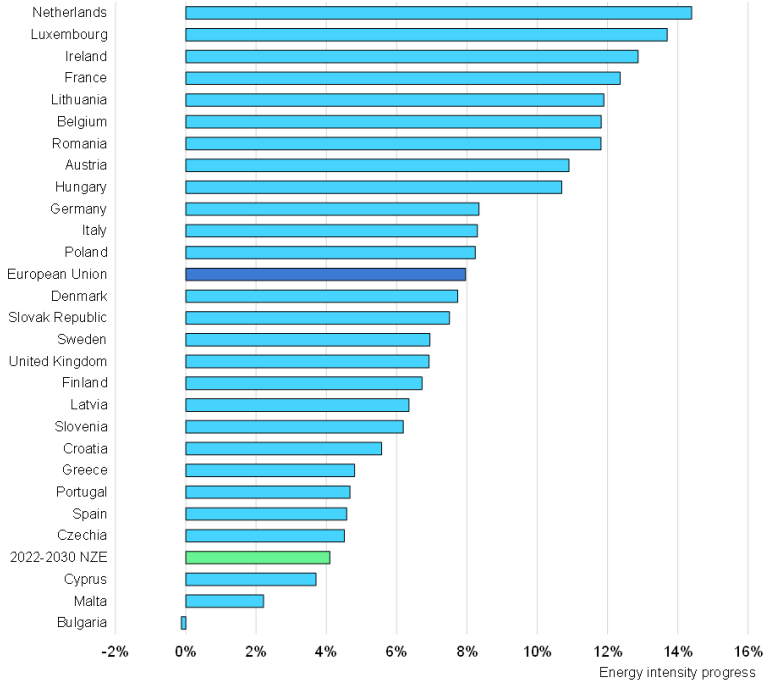
Annual primary energy intensity improvement, 2010-2023, NZE scenario 2022-2030



Since the crisis over 40 countries have reached or moved beyond the 4% level in the IEA Net Zero Scenario

Energy intensity progress moves to record levels in Europe

Energy intensity progress, selected EU countries and the United Kingdom, 2022

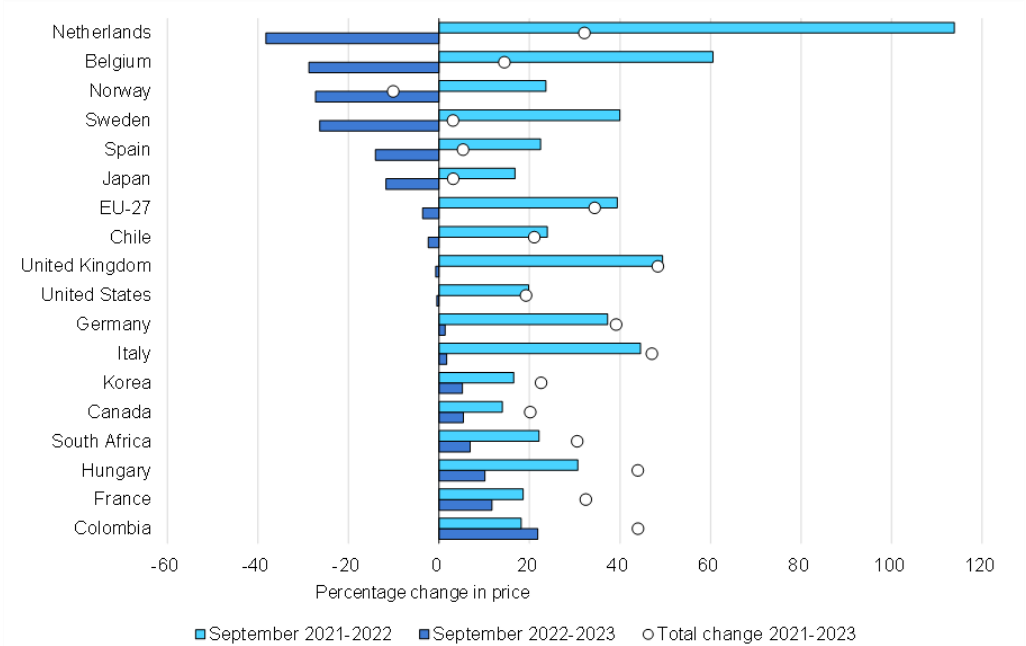


In 2022 almost all EU countries experienced intensity change between 4% and 14%

 Source: IEA (2023), World Energy Balances

Energy crisis is ongoing as consumer energy prices remain elevated

Percentage change in consumer energy prices, year on year, September, selected countries



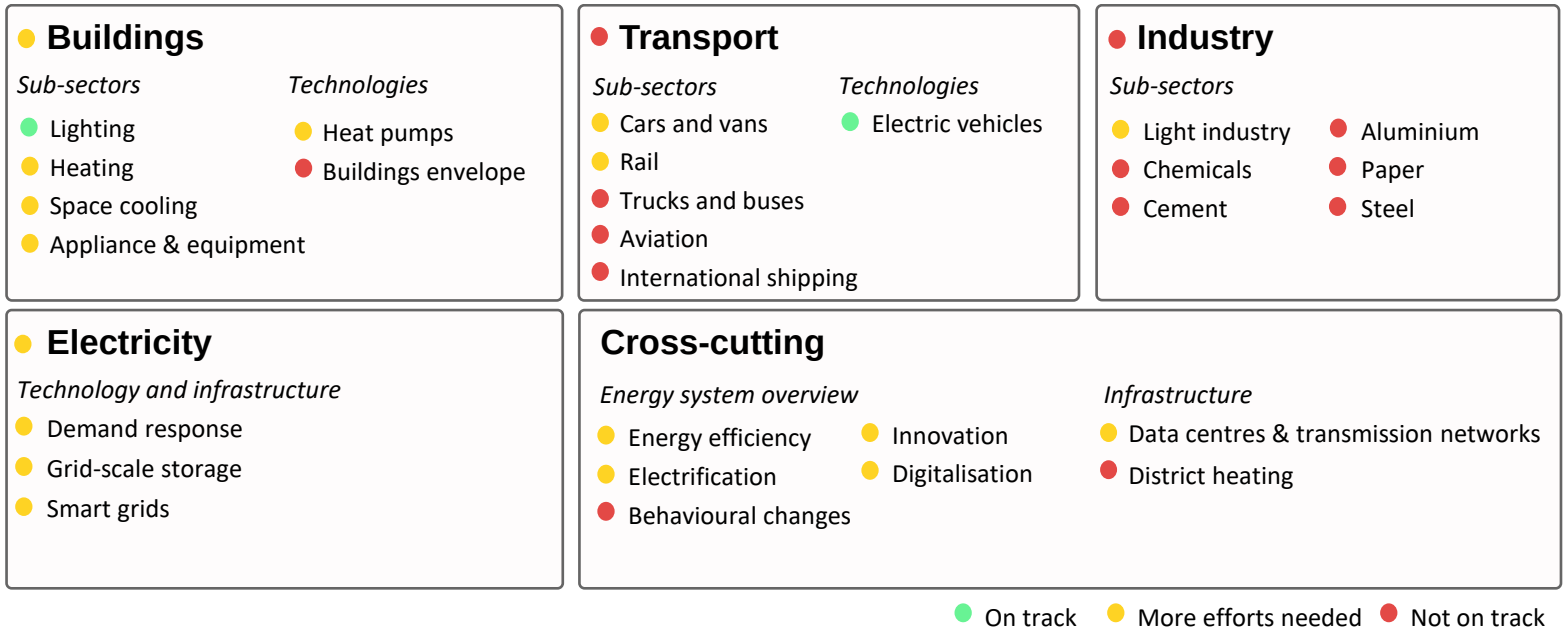
While commodity prices have fallen it can take time to feed through to energy bills with cost-of-living pressures still causing significant hardship for households and businesses

 Source: OECD (2023), OECD Energy Consumer Price Index Database

Chapter 2 Sector and system-wide trends

More efforts needed to reach efficiency levels for net zero globally

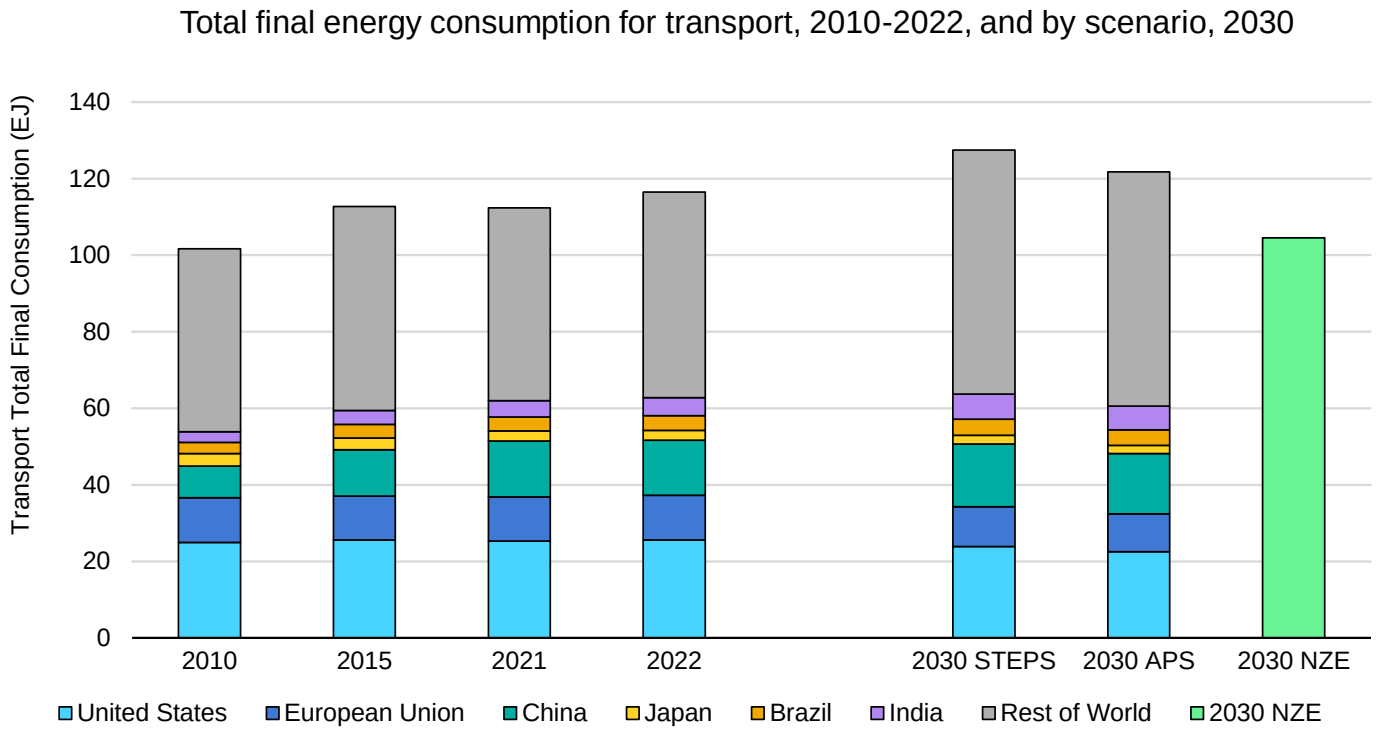
IEA tracking of the key elements related to energy intensity progress



Between 2000 and 2022 energy intensity improved most in the buildings and transport sectors – by 25%
In industry energy intensity progress was slightly slower with 20%

 Source: IEA (2023), Tracking Clean Energy Progress

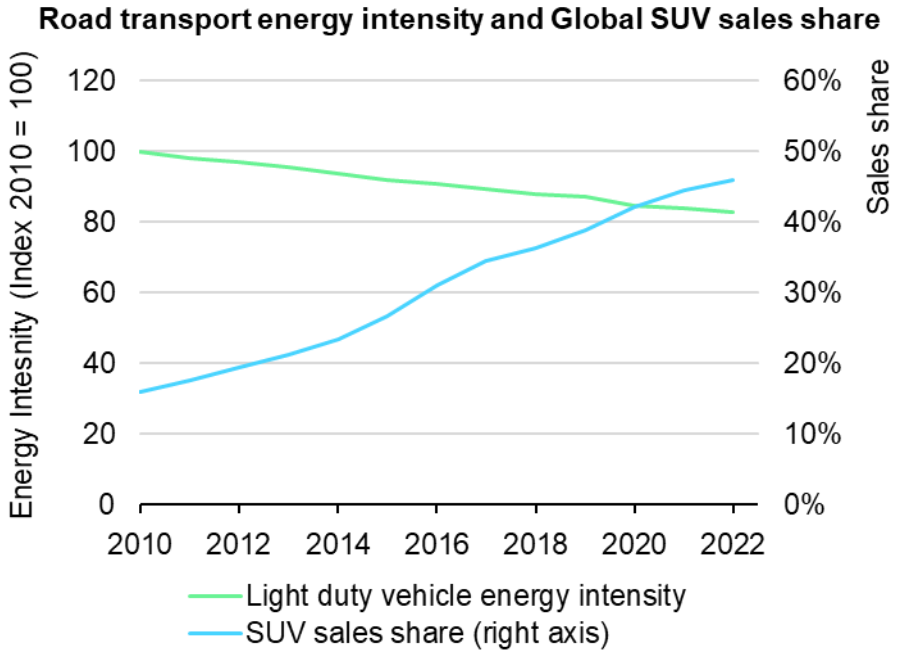
Transport: return to pre-covid levels as the transition gathers pace

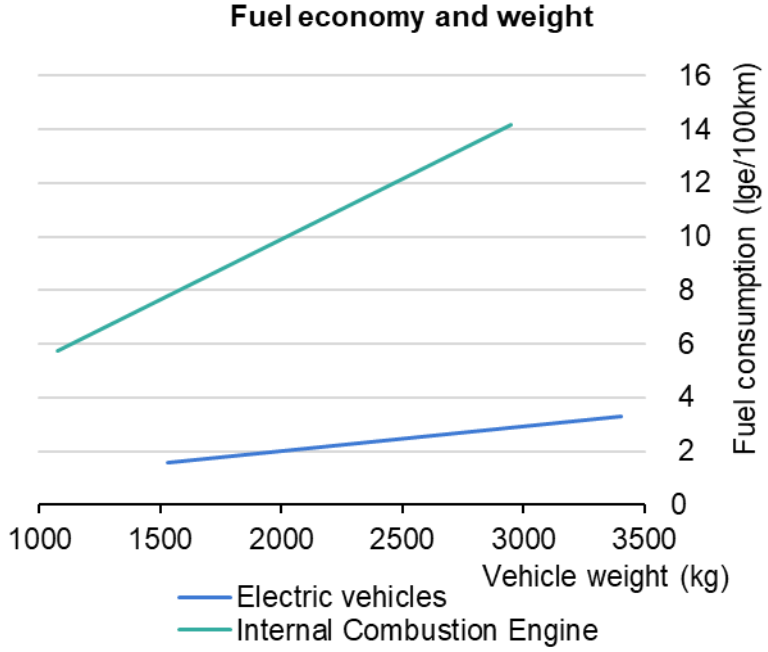


From 2010 to 2022, total transport energy consumption grew at an average of just under 1.2% per year despite a large increase in the distance travelled. It remained constant in the European Union

Shift to larger vehicles is slowing faster transport efficiency progress

Share of SUV in total car sales and relationship between fuel economy and weight

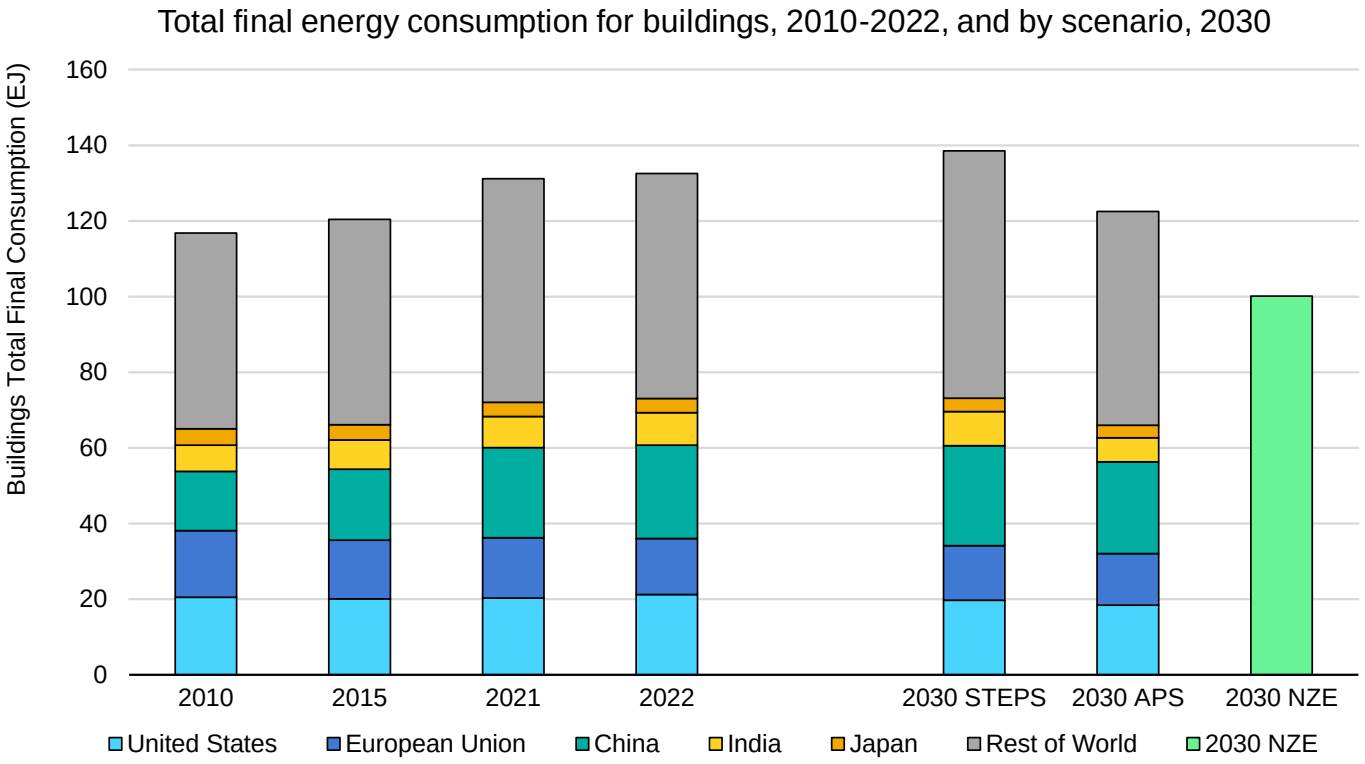




With larger vehicles more popular than ever electric vehicles offer radical efficiency breakthrough

 Sources: IEA (2023), Global EV Outlook 2023 and IEA (2023), Tracking Clean Energy Progress

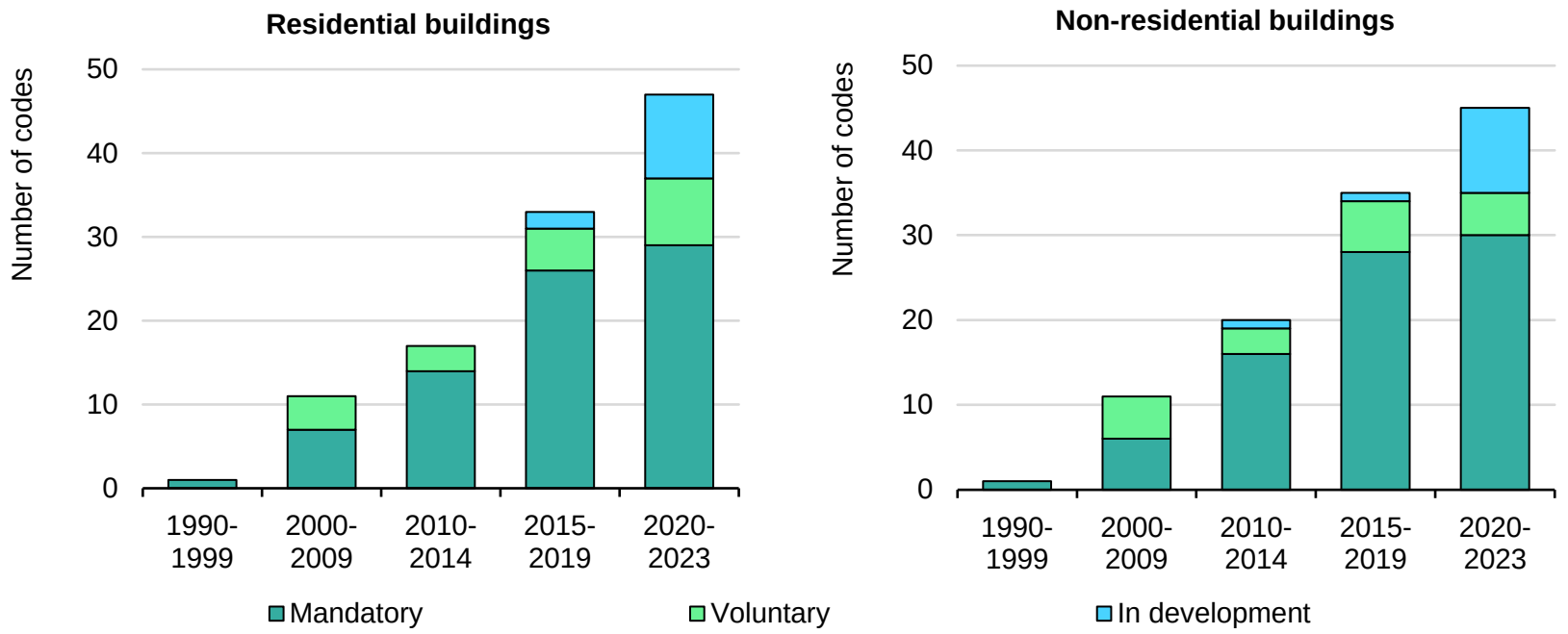
Buildings: emerging economies and space cooling leading growth



Global buildings energy consumption increased from 2010 to 2022 by an average of 1.1% each year, while falling by 1.3% per year in the European Union

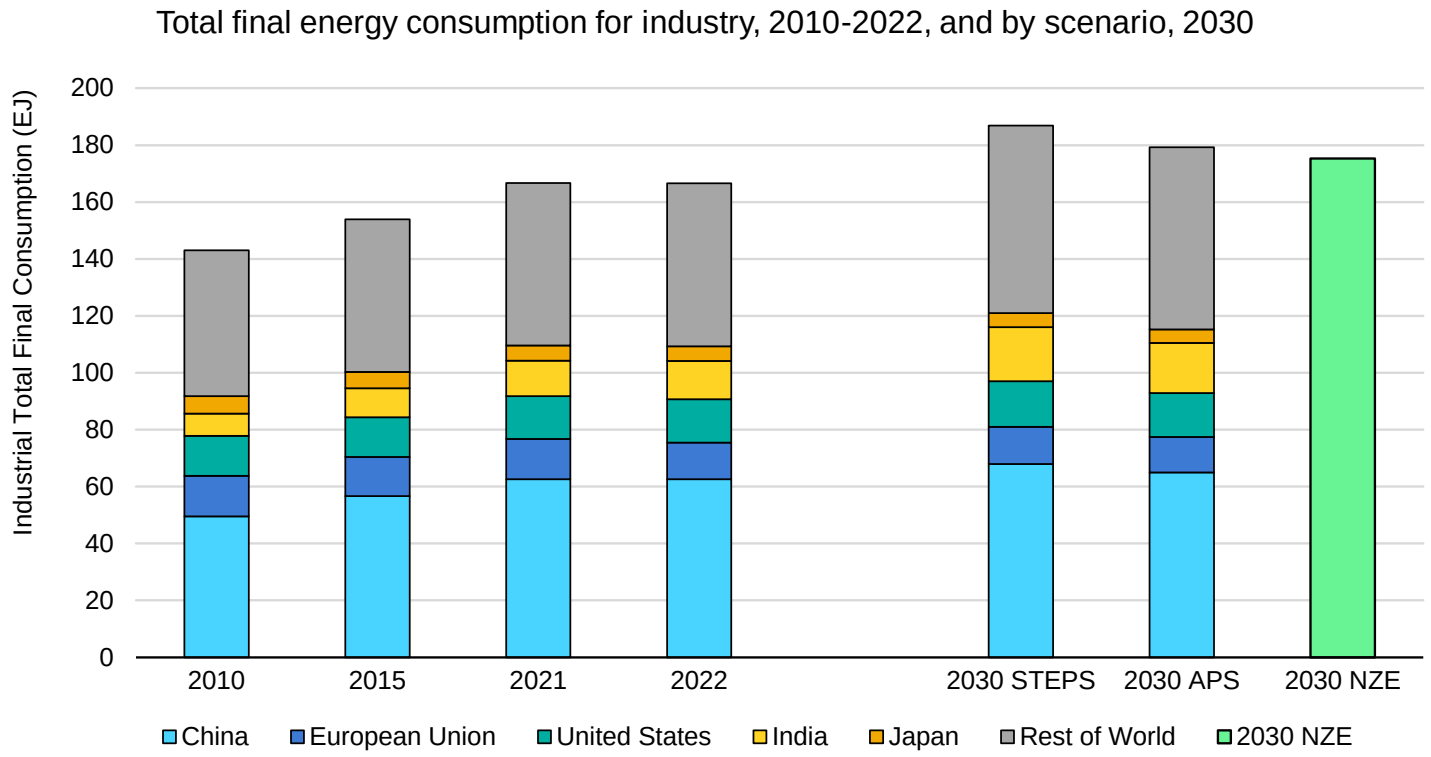
Mandatory building codes expand but older ones need to be updated

Building energy codes globally, year of most recent update, 1990-2023



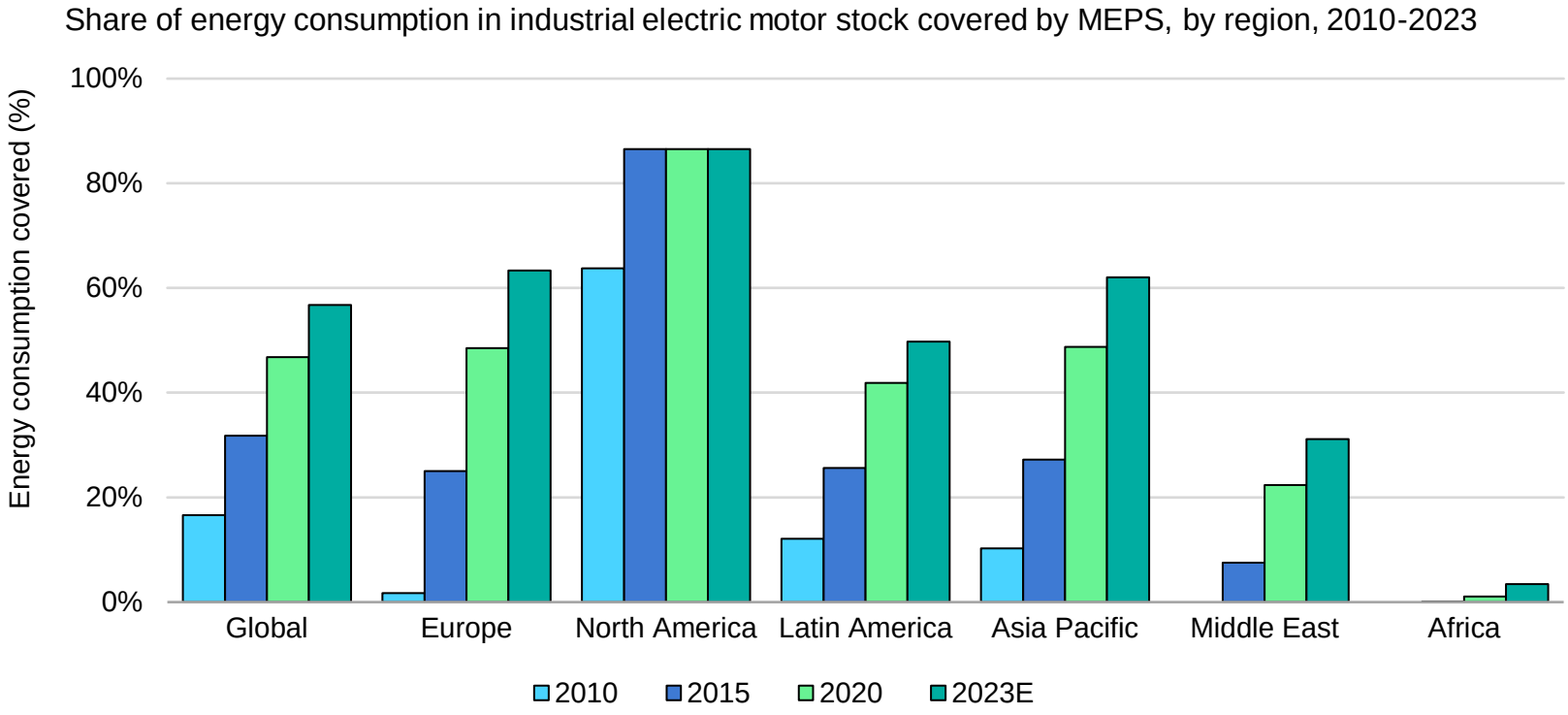
Around 80% of all building energy codes globally are mandatory, but one-third of them have not been updated since 2015.

Industry: consumption will continue to grow over the next decade



Industrial energy consumption has steadily risen by around 1.3% per year from 2010 to 2022 but it fell by 0.8% in the European Union

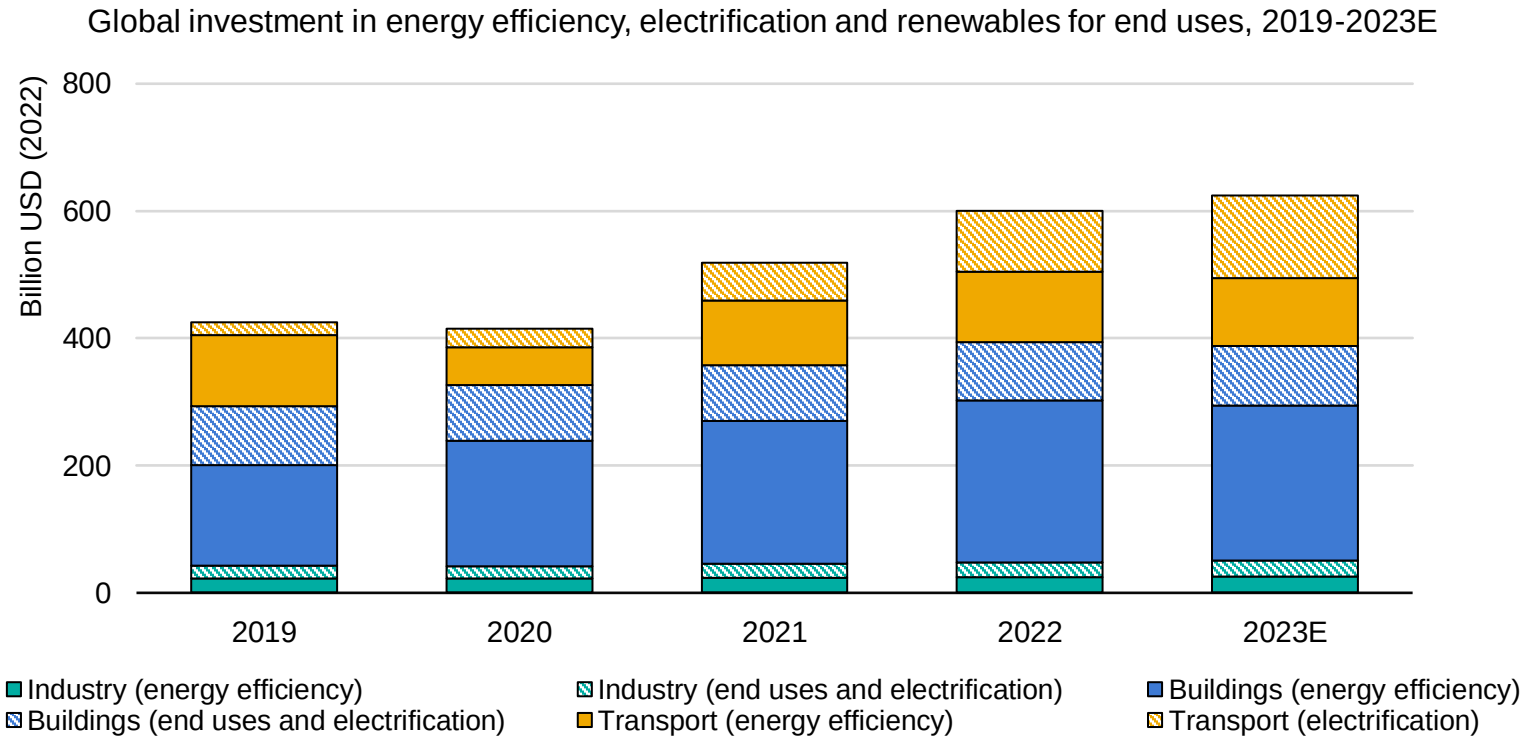
Policies to increase energy efficiency in industry are ramping up



More than half of the global energy consumption of industrial electric motors is now covered by MEPS

Chapter 3 Investment and employment

Investments continue to grow, despite headwinds

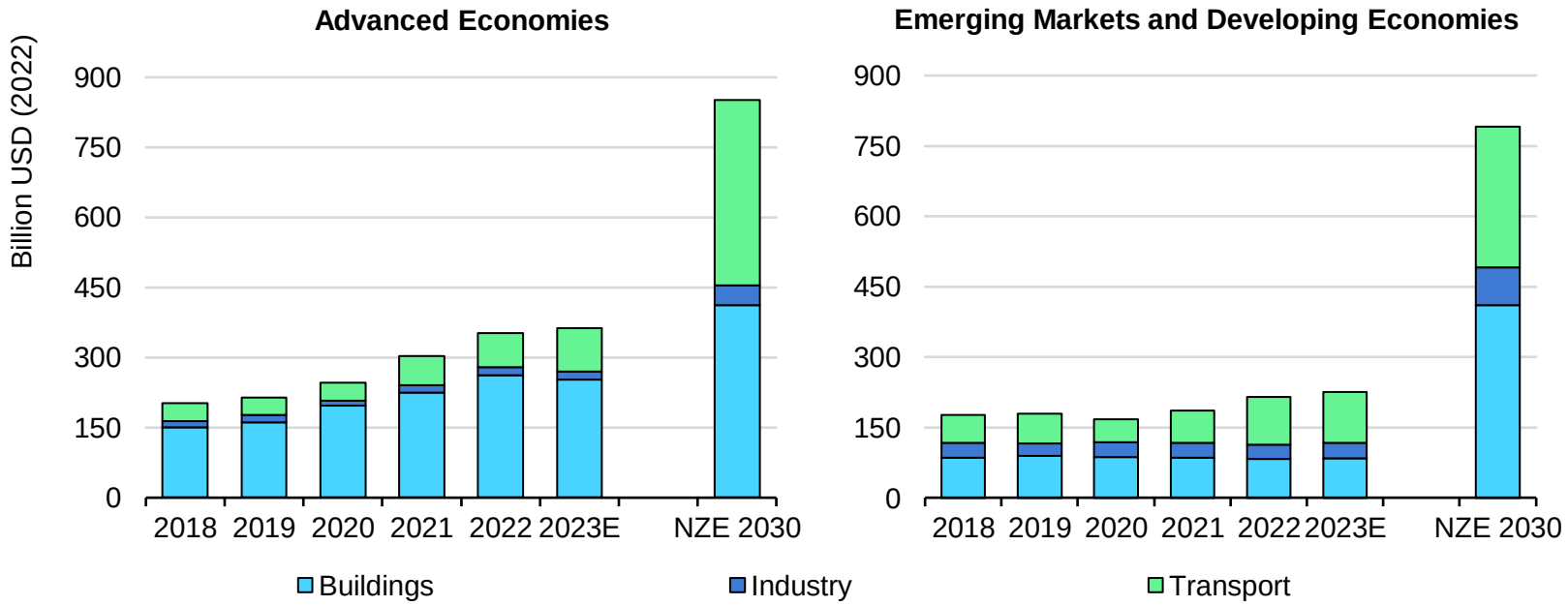


Dampened by inflation and rising interest rates, global investment in energy efficiency is expected to grow by just 4% in 2023 – though the total is 45% higher than in 2020.

 Source: IEA (2023), World Energy Investment 2023.

Greater investment must be unlocked

Investment in energy efficiency and end use in advanced economies and emerging markets and developing economies

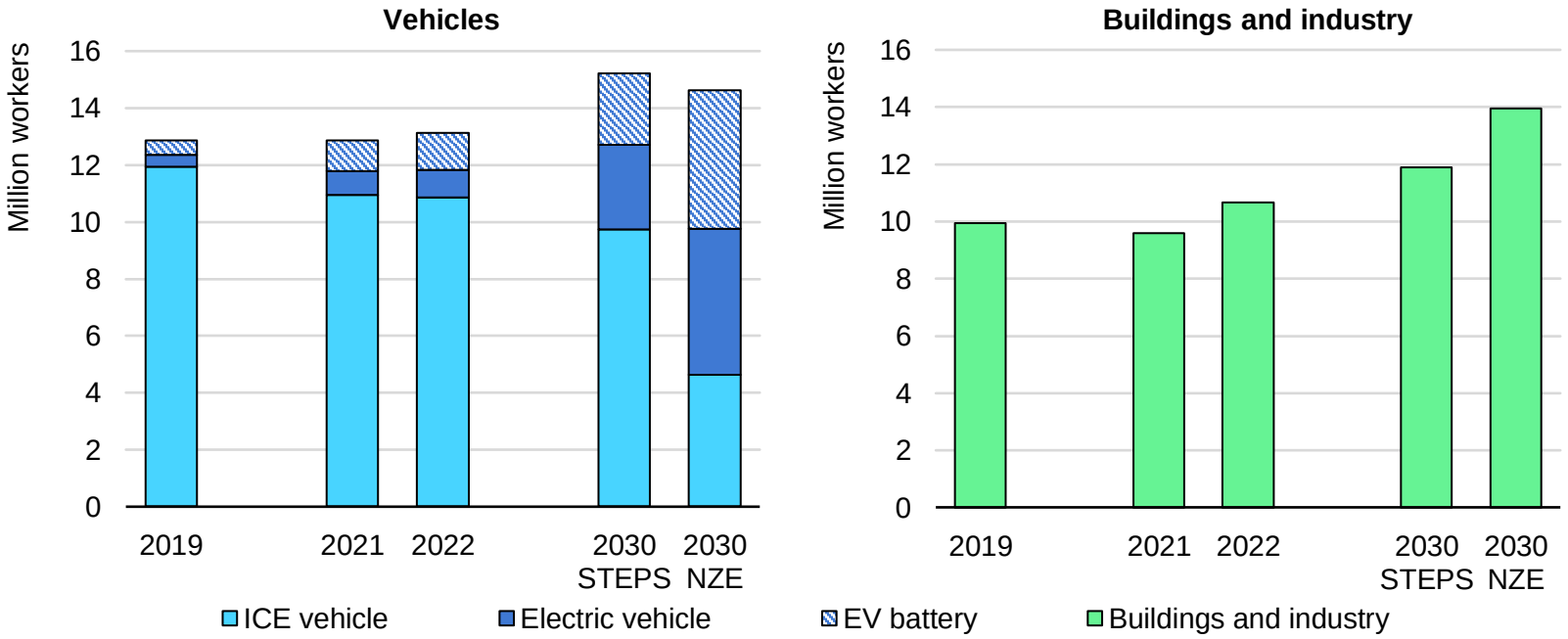


Key regional investment differences are emerging, and a tripling of investment is required by 2030 to meet climate goals.

 Source: IEA (2023), World Energy Outlook 2023.

Energy efficiency employment

Global employment in vehicle manufacturing, EV battery production, and efficiency-related activities in buildings and industry



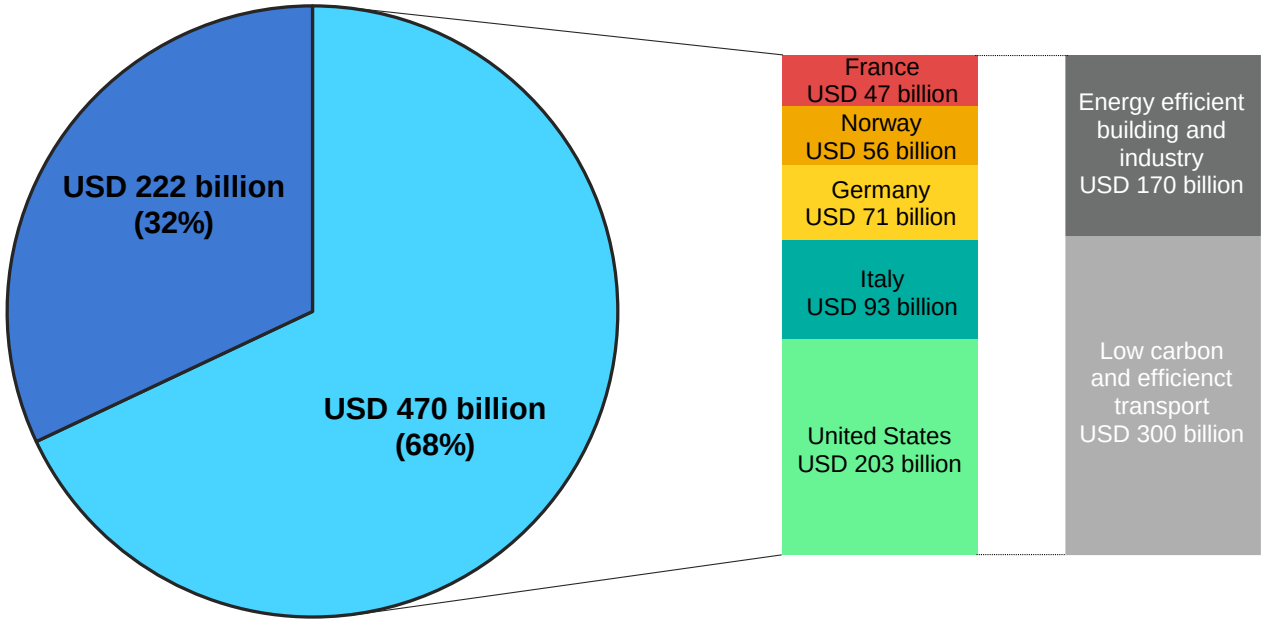
Efficiency-related activities have boosted jobs, with electrification driving a reshuffling in transport sector

 Source: IEA (2023), World Energy Employment 2023.

Chapter 4 Policy developments

Governments have spent 700 billion to support efficiency investment

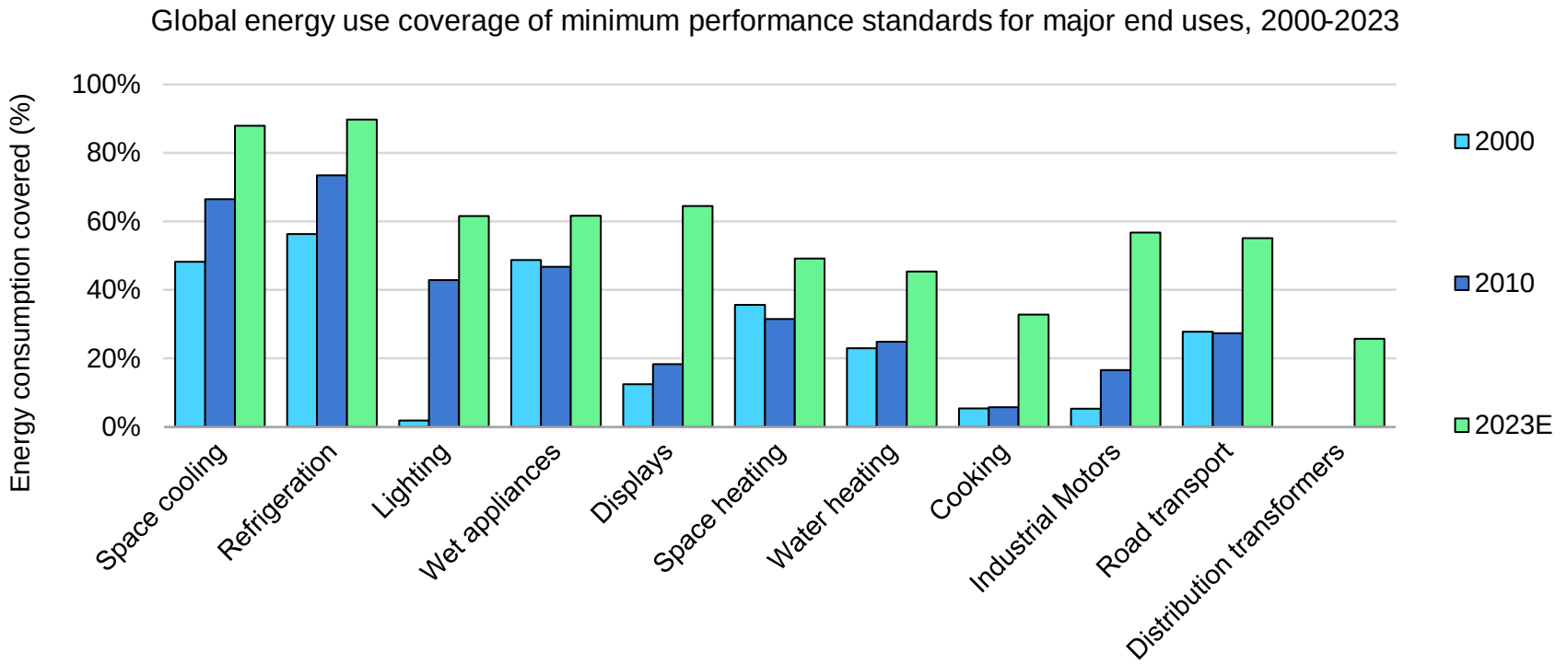
Government energy efficiency-related investment support, April 2020 – June 2023



However, 70% of the total government investment support was enacted by just five countries

 Source: IEA (2023), Government Energy Spending Tracker: Policy

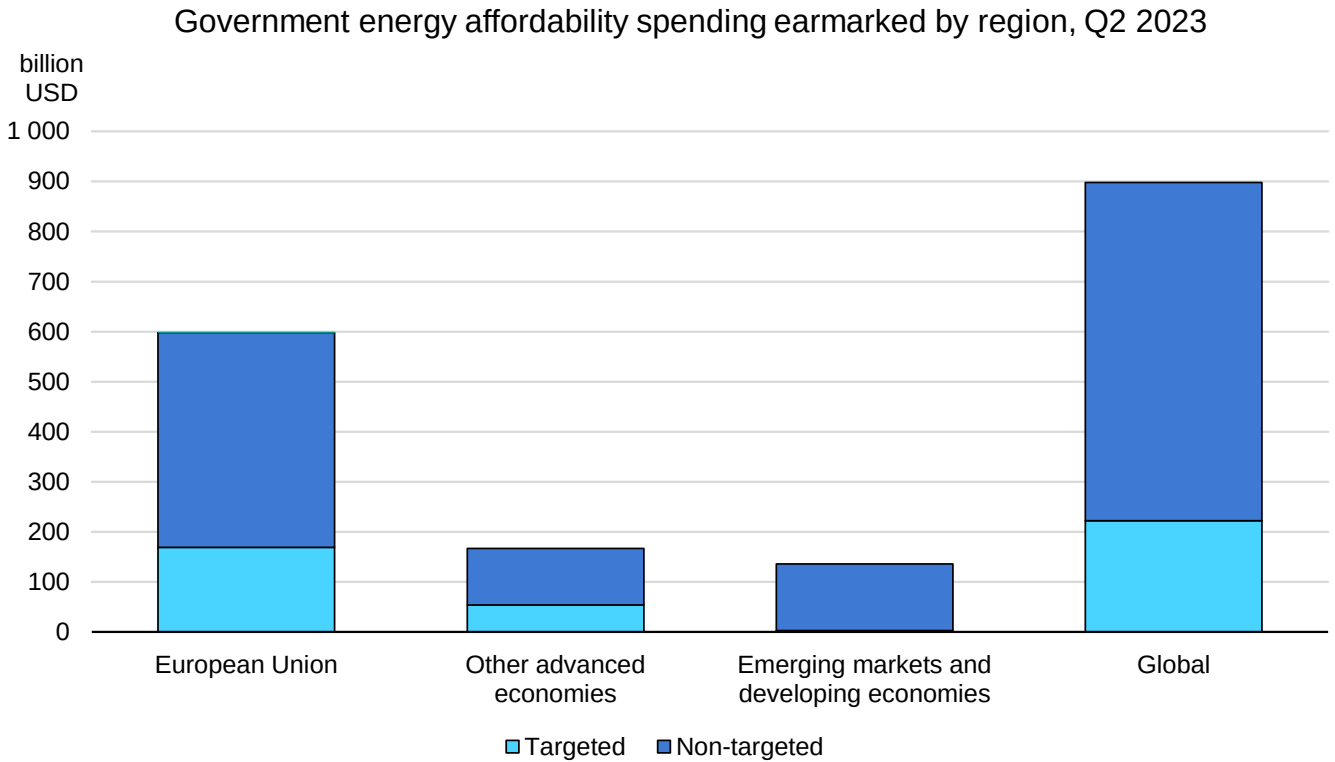
Policy coverage has been expanding rapidly



Major efficiency policy announcements have been made by countries covering over 70% of global energy demand

 Source: IEA (2023), Policies and measures (PAMS) database

Governments shielded consumers with record affordability spending

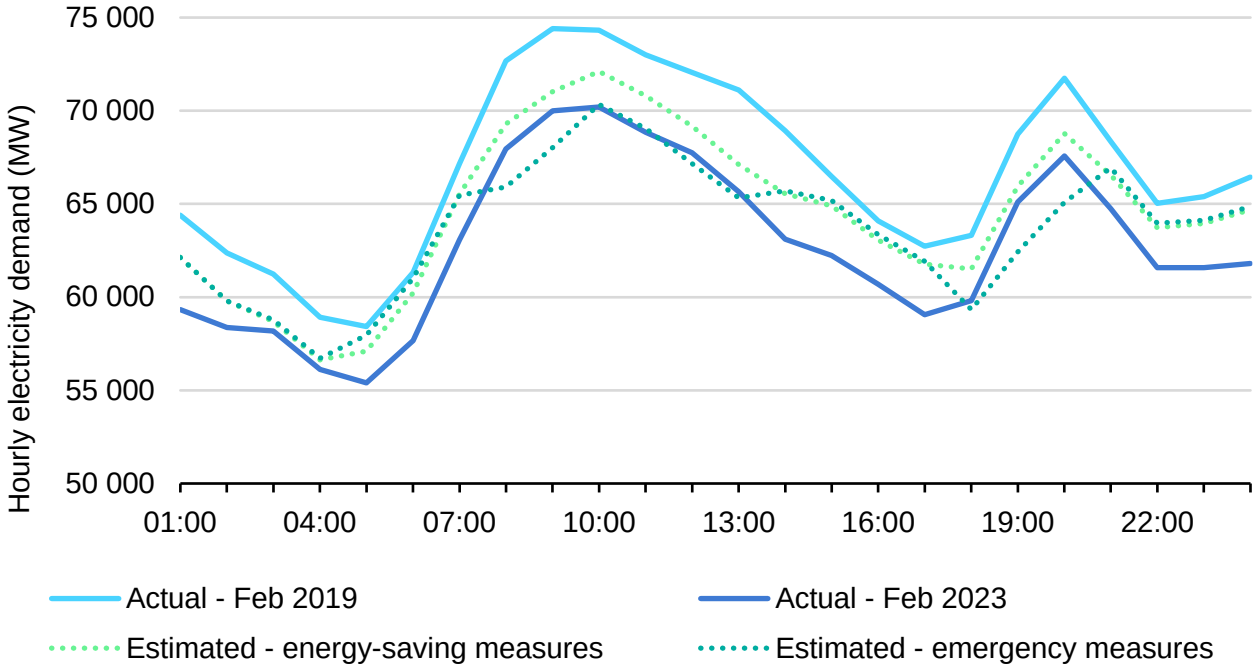


However, with 75% of affordability spending nontargeted, the issue of transitioning to more structural efficiency support is an important consideration going forward

 Source: IEA (2023), Government Energy Spending Tracker: Policy

Behaviour change has a significant impact on energy consumption

Hourly electricity consumption in France in February 2019 and 2023, compared with estimated effects of behaviour campaign saving and emergency recommendations



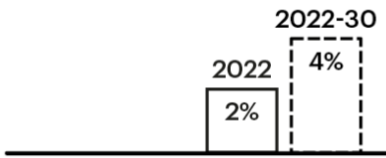
Peak electricity consumption was around 6% lower on a cold day in 2023 compared to a similar day in 2019

 Source: IEA analysis based on data from RTE.

What does doubling global progress on energy efficiency entail?

What does doubling involve?

What is doubling?



Global annual progress on energy intensity doubles this decade

The target is global, all countries have a part to play

The target will be formally considered at COP28

Doubling offers substantial rewards

Why should we double?

A critical step on the path to net zero

Over 7 Gt CO_2 emissions savings in 2030

Today's home energy bills in advanced economies lowered by a third

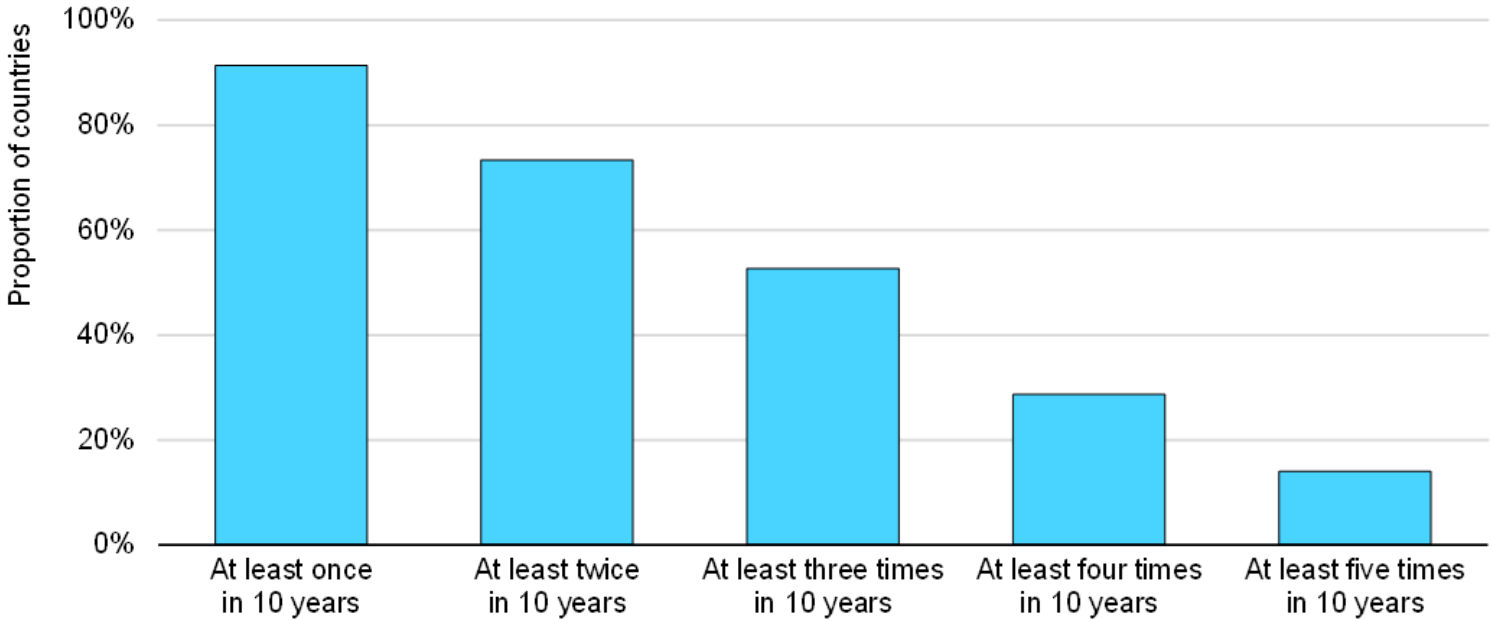
4.5 million more jobs than today

Energy savings equivalent to twice the EU's consumption in 2022

IEA has led the call for a global target to double energy efficiency progress this decade.

Doubling is within reach of all countries

Proportion of countries to surpass a 4% annual energy intensity improvement one or more times, 2012-2021

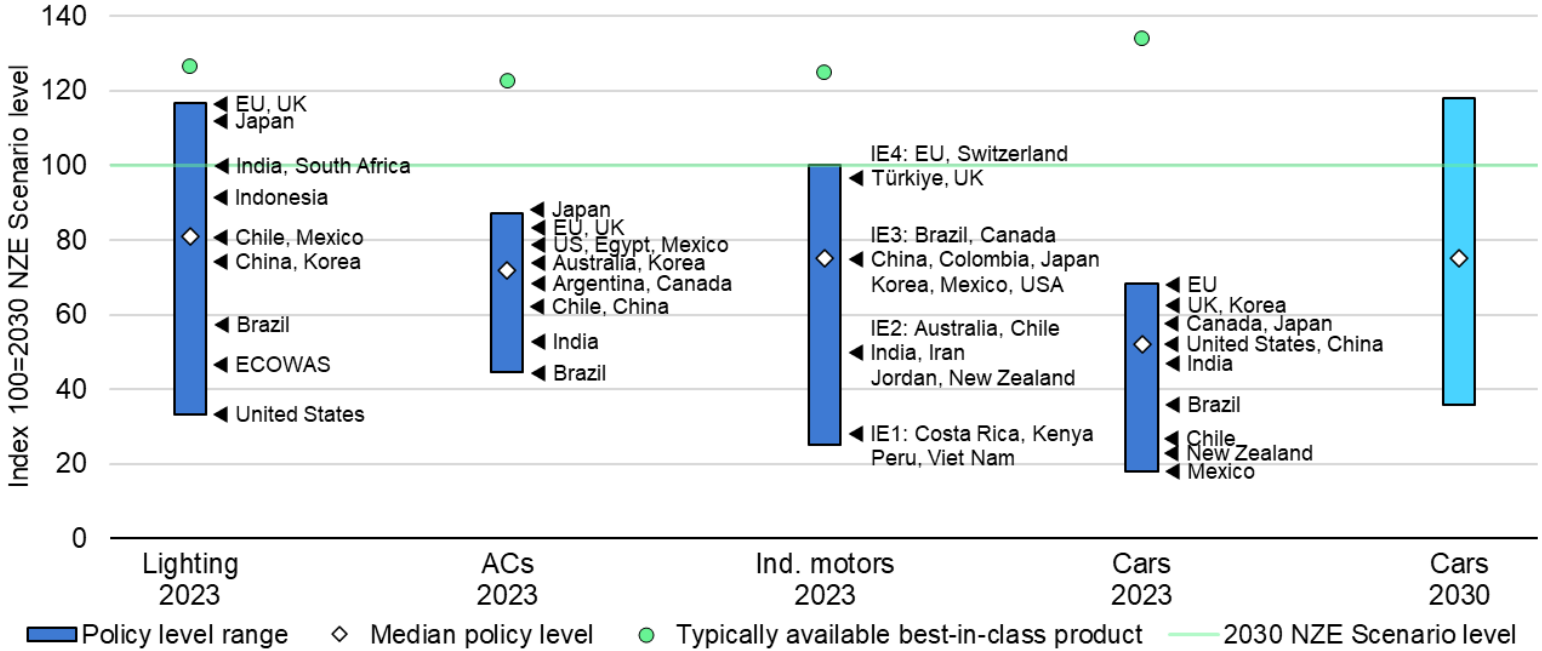


During the past 10 years, more than 50% of countries have surpassed an annual 4% Energy Intensity improvement at least three times.

 Source: IEA (2023), World Energy Balances

Policies and technologies for doubling already exist

Minimum Energy Performance Standards, IEA Efficiency Policy Level Index end uses, global country range, 2023 and 2030



The technologies needed to achieve a doubling already exist, and policy thresholds are rapidly moving towards the required level.

Energy efficiency and the doubling target at COP28

1. “Double the global average annual rate of energy efficiency improvements from around 2% to over 4% every year until 2030.”

2. “Put the principle of energy efficiency as the ‘first fuel’ at the core of policymaking, planning, and major investment decisions.”

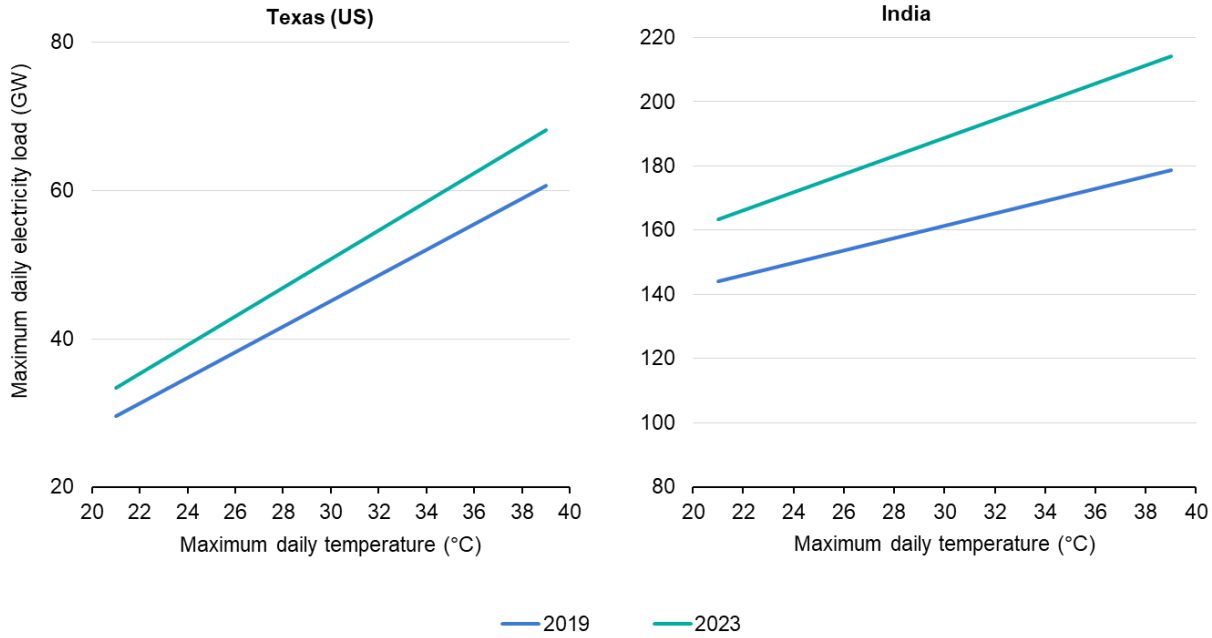
3. “Triple installed renewable energy generation capacity to at least 11,000 GW by 2030.”

123 countries signed the renewable energy and energy efficiency pledge as of today and called on other states to join the pledge

How does the hottest year on record drive urgency for efficiency measures?

Hot weather drives energy demand for air conditioning

Electricity load and maximum daily temperature, May-September, 2019 and 2023

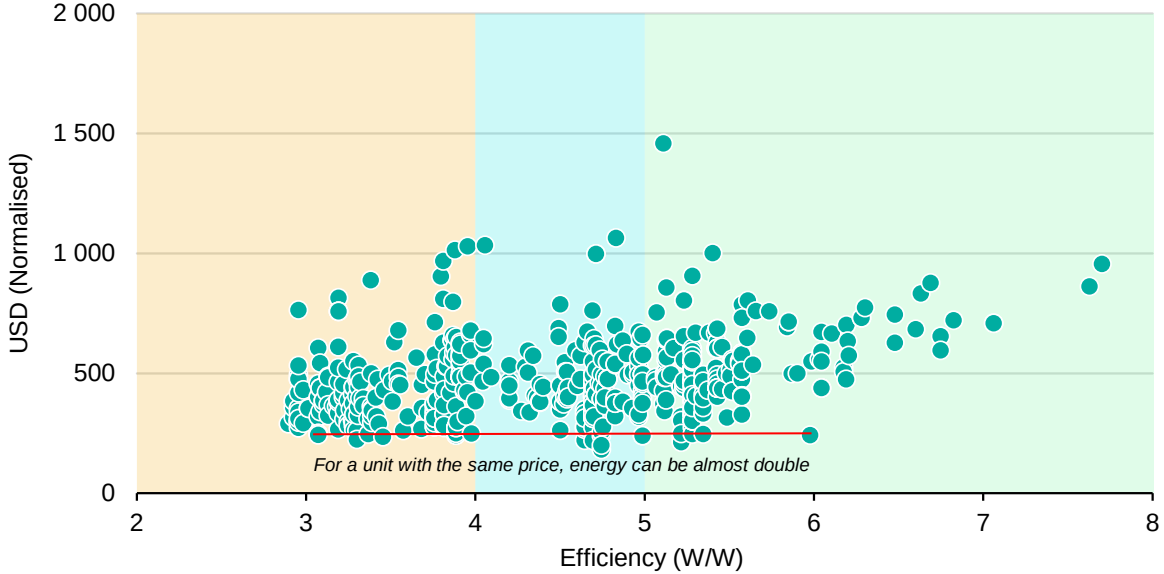


Every 1°C increase in the average daily temperature above 24°C drives a rise of about 4% in electricity demand in Texas, and a 2% gain in India, where air conditioner ownership is much lower.

 Sources: IEA (2023), Weather for Energy Tracker and IEA (2023), Real-Time Electricity Tracker.

More efficient air conditioners do not incur in higher upfront costs

Air conditioners' efficiency rating and retail prices (normalised) in Southeast Asia, 2023

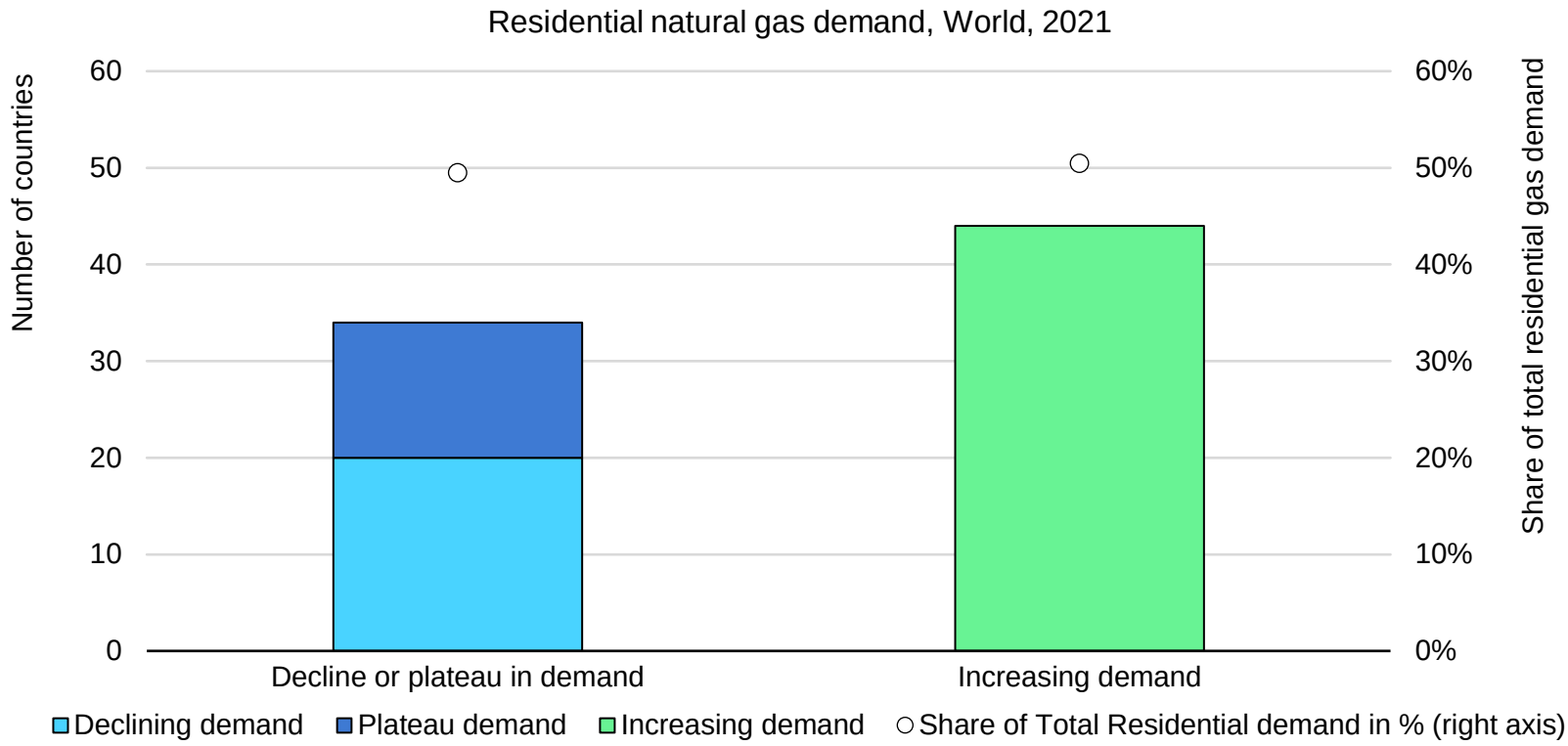


Notes: Air conditioners are wall-mounted single split type. Southeast Asia, including Indonesia, the Philippines, Thailand, and Vietnam, in 2022. Purchase prices are normalised to 12 000 BTU/hour cooling capacity. Low efficiency = below 4 W/W; Medium efficiency = 4-5 W/W; High efficiency = above 5 W/W.

In Thailand, consumers with a budget of USD 350 can choose between a low-efficiency unit (3 W/W) and one that is double as efficient (6 W/W), which are both selling at the same price.

Has the energy crisis accelerated the shift away from gas in residential space heating?

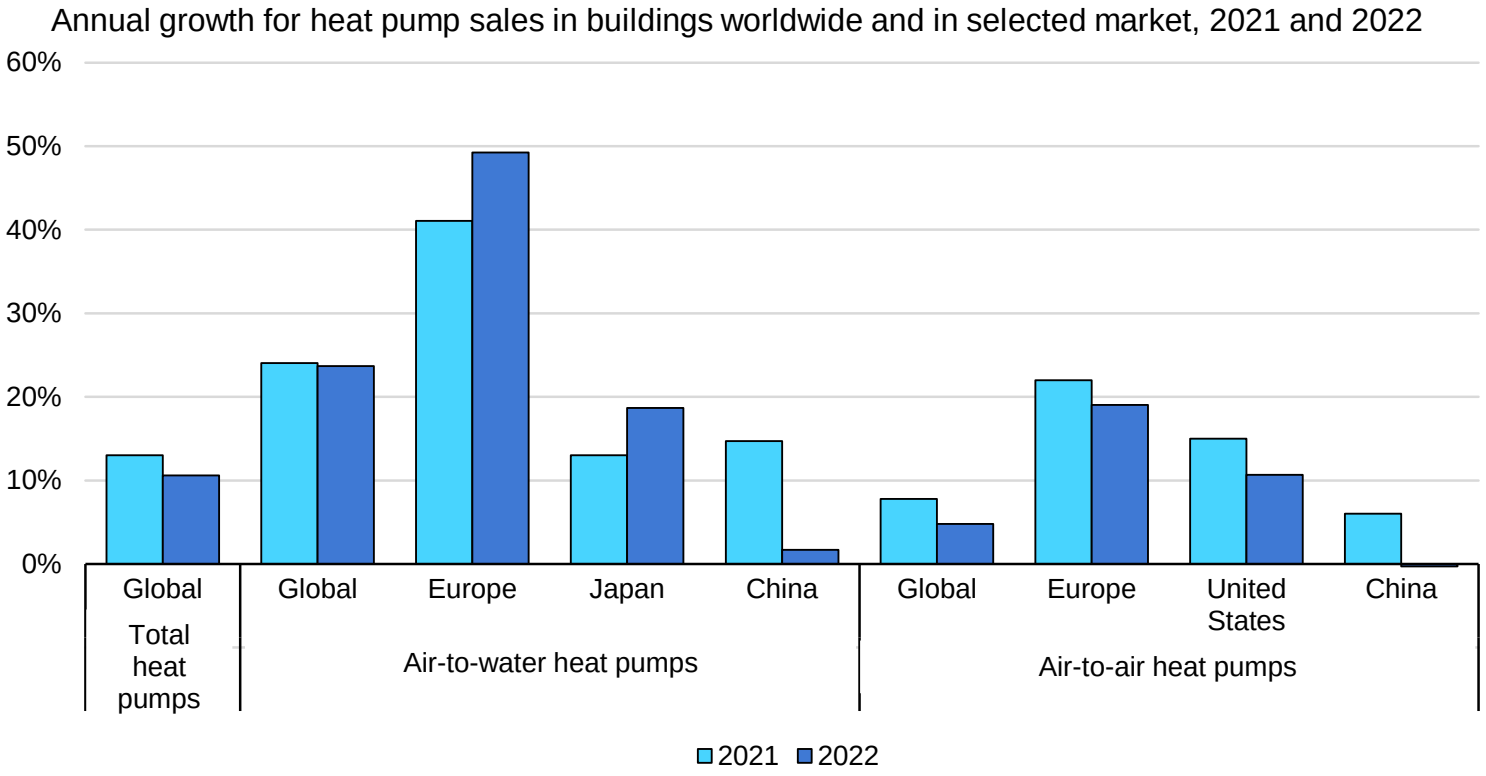
The energy crisis marked a turning point for residential gas demand



Countries representing 50% of global residential gas consumption have seen their demand peak, stabilize or fall

 Source: IEA (2023), World Energy Balances

Heat pump sales drive the shift away from residential gas heating



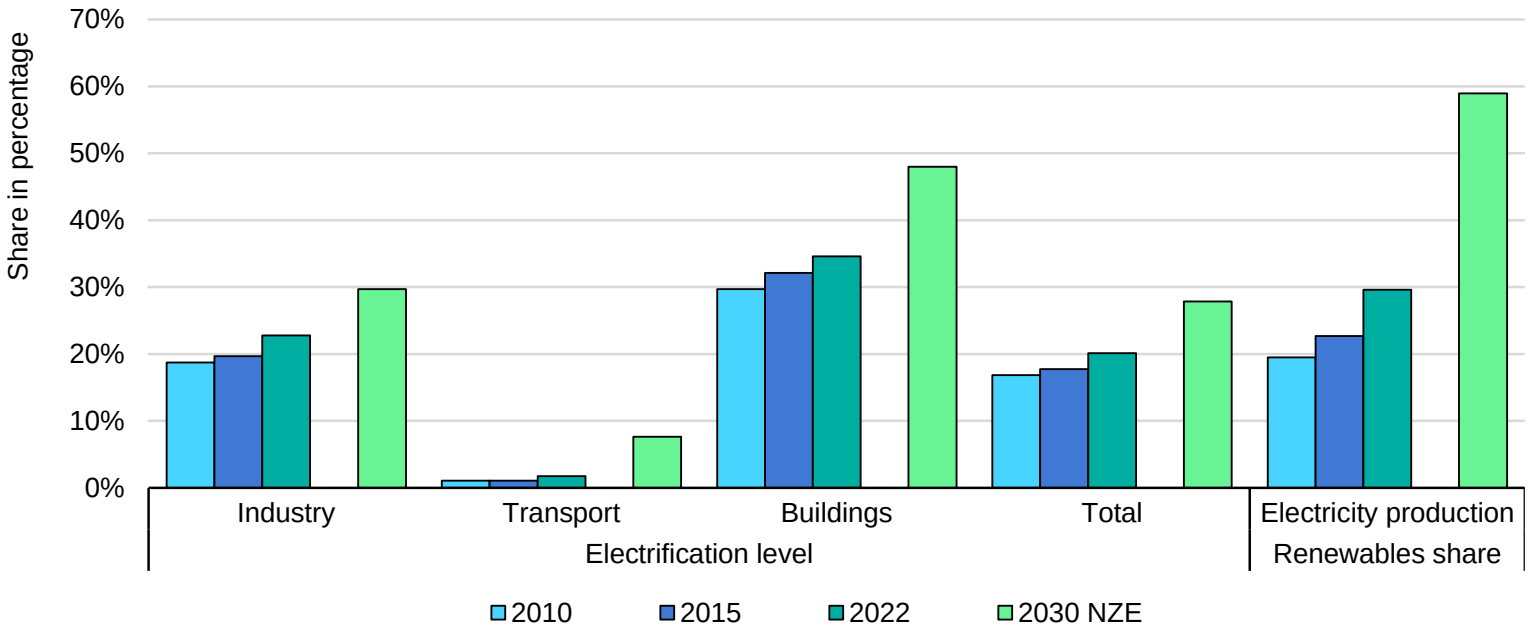
However, strong policy action remains necessary amidst potential delays of gas boiler phaseouts in some countries

 Source: IEA (2023), Global heat pump sales continue double-digit growth.

How are consumers benefiting from system efficiency?

Increasing electrification of end uses and share of renewables

Share of electricity in final energy consumption by sector and renewables share in electricity production, 2010-2022 and 2030 for the Net Zero by 2050 Scenario

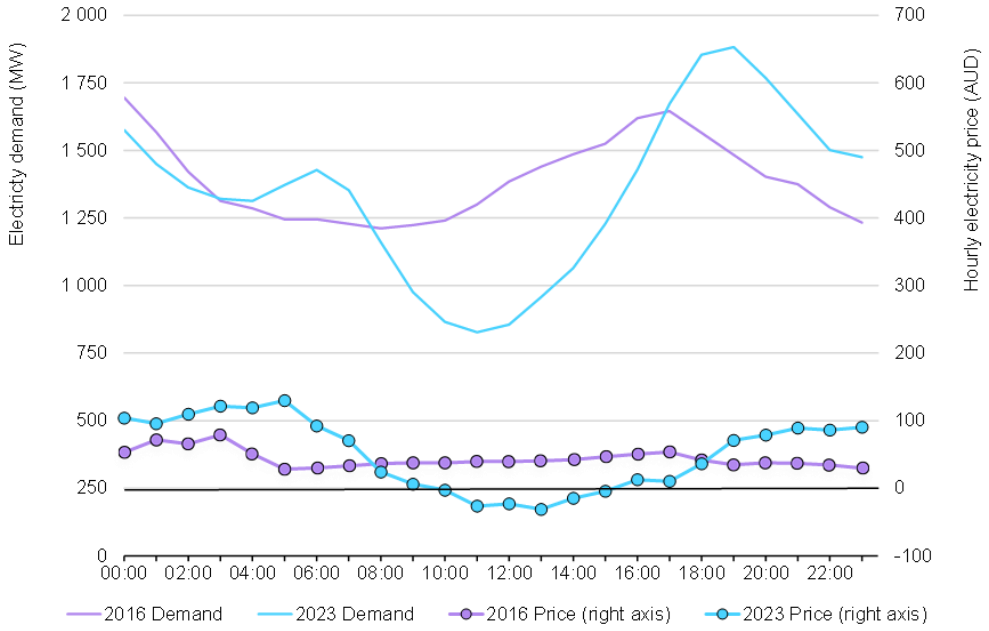


Expanded electrification of end uses such as EVs and clean cooking as well as rising consumption of appliances such as ACs create more variable energy demand which is not in line with the growing variability of production

 Source: IEA (2023), Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach: 2023 Update.

With more variable renewable energy – the role of efficiency evolves

Net electricity demand and wholesale prices in South Australia, hourly, January 2016 and 2023



A convergence of delivering energy savings, flexibility and localised renewables

Other IEA work on energy efficiency

IEA Annual Global Conference on Energy Efficiency

- The 8th conference held in Versailles, June 2023
- 46 governments endorsed the goal of doubling global energy efficiency progress by 2030
  - 118 countries signed up to the pledge at COP28 so far

9th conference in Nairobi, 21-23 May 2024

Contact us for more information

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