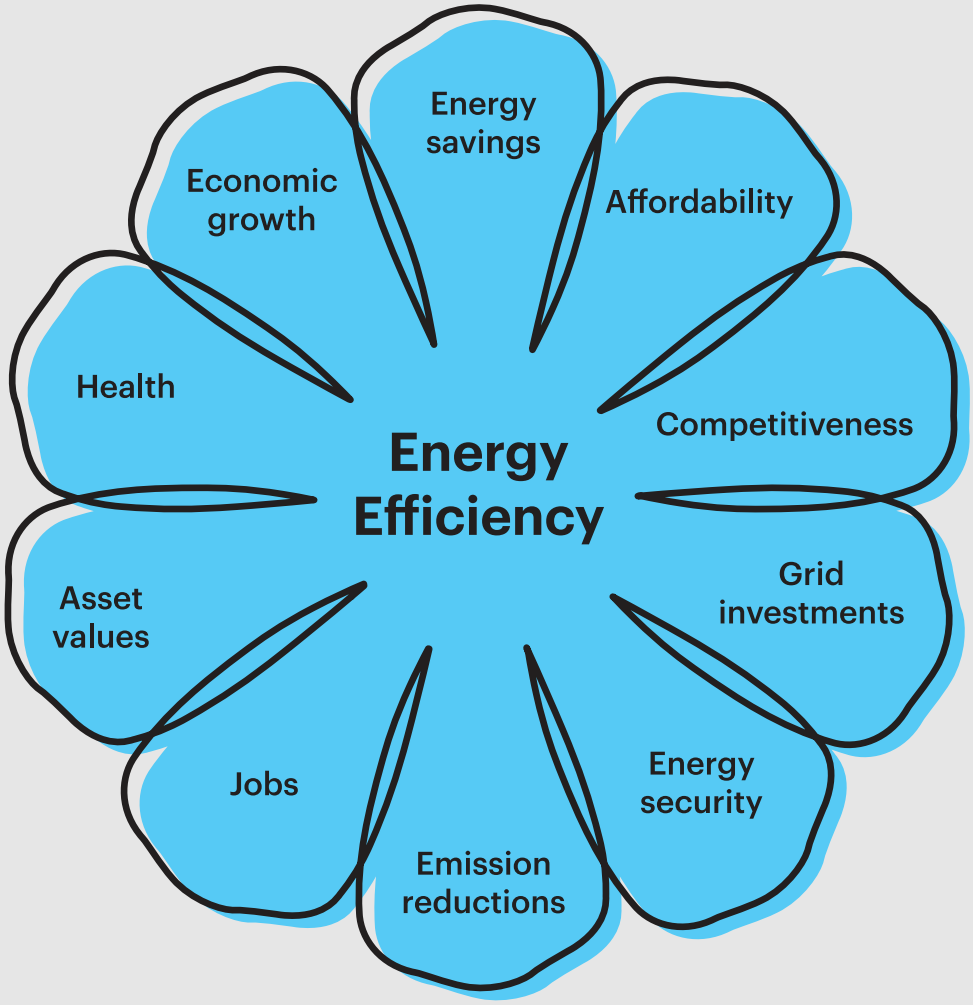

Multiple Benefits of Energy Efficiency

INTERNATIONAL ENERGY AGENCY

The IEA examines the full spectrum of energy issues including oil, gas and coal supply and demand, renewable energy technologies, electricity markets, energy efficiency, access to energy, demand side management and much more. Through its work, the IEA advocates policies that will enhance the reliability, affordability and sustainability of energy in its 32 Member countries, 13 Association countries and beyond.

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Source: IEA.
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Multiple Benefits of Energy Efficiency

Energy Savings

Why is energy efficiency important for energy savings?

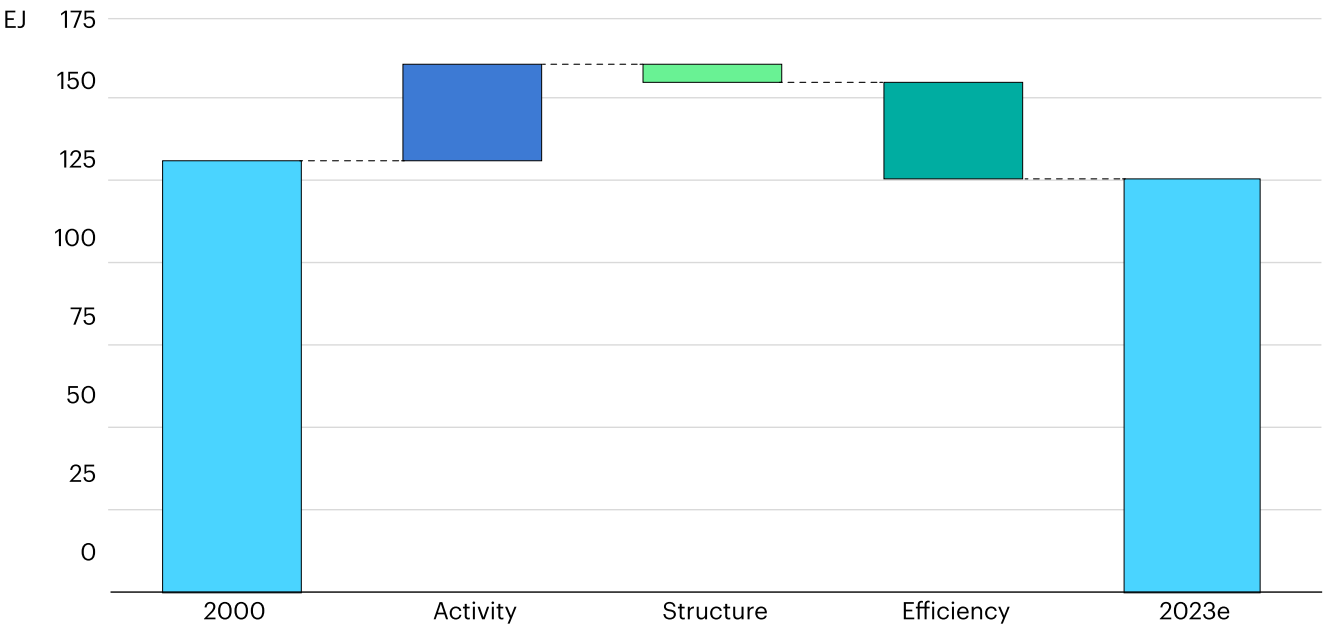
Energy efficiency measures **reduce the amount of energy required** to fuel and grow our economies. In economies where energy demand is set to grow significantly, efficiency also helps improve people's lives by increasing access to additional energy services.

- In the last two decades, efficiency measures have generated over 27 EJ of energy savings in IEA countries alone, equivalent to **20% of total energy demand.**
- The **industry** (including manufacturing) and **services** (including commercial buildings) sectors generated over half of the savings. In **transport**, most efficiency gains were achieved in passenger vehicles.

Key analysis

In selected IEA countries, increased economic activity – people using more energy services, firms increasing their production, and people travelling more – pushed energy use upwards by around 22% since 2000. However, efficiency improvements counteracted most of this demand growth, leading to cost savings and other benefits.

Energy demand decomposition, in selected IEA countries, 2000–2023



Notes
Selection of 24 IEA Member countries accounting for one-third of global final energy demand. Energy demand includes industry and services, residential buildings, and passenger and freight road transport. Structure refers to changes in economic structure. 2023 values are estimated.

Source
IEA (2025), Energy End-uses and Efficiency Indicators, (accessed on 04 April 2025).

A closer look at sectoral energy savings

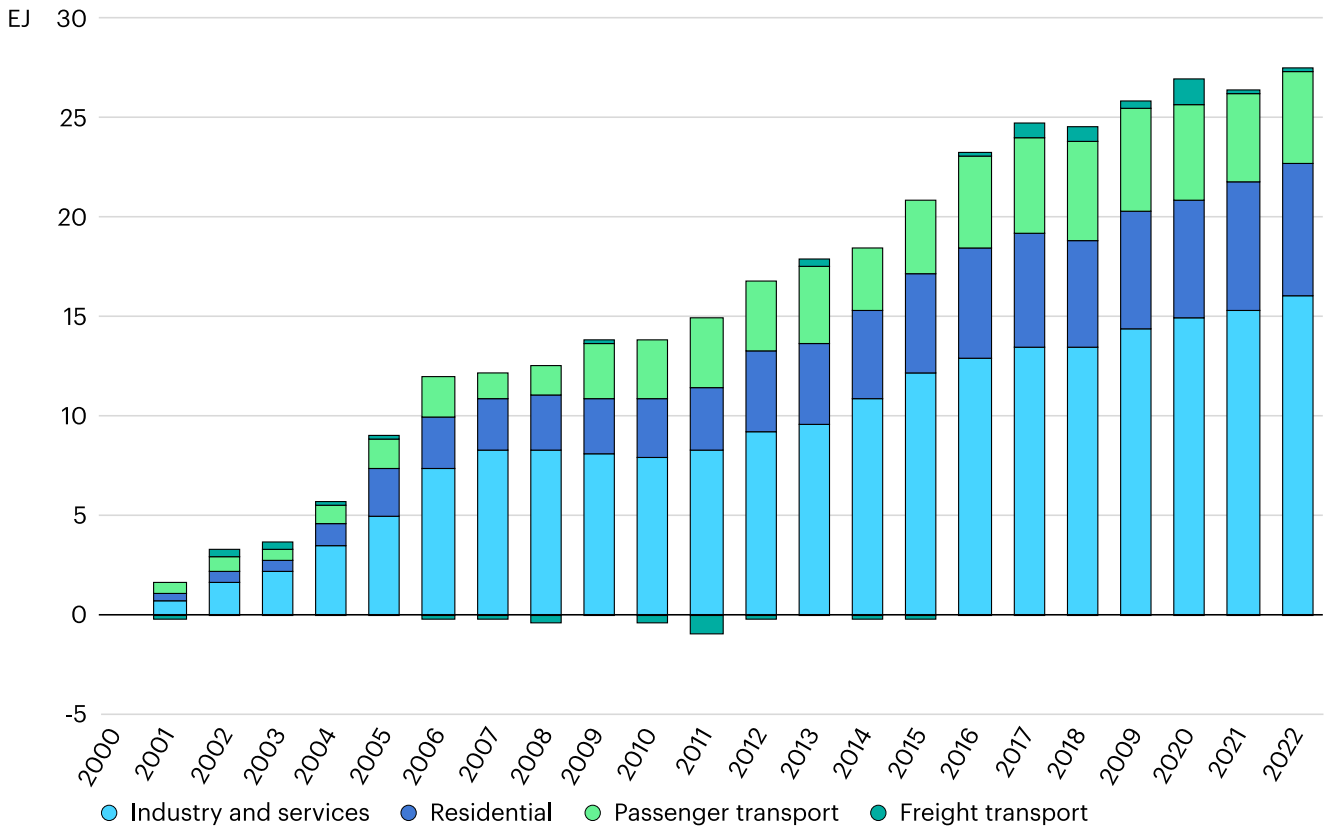
The **industry and services sector** realised the most energy savings due to improved efficiency, accounting for over half of the total savings. It also experienced the largest growth in activity in the last two decades, which pushed up energy demand.

Energy efficiency improvements in the **residential sector** accounted for around a quarter of total energy savings. This more than compensated for the increase in energy use due to increased activity, such as home building and increased home sizes.

In the **transport sector**, most efficiency improvements were realised in passenger vehicles – around one-sixth of the total. These energy savings were higher than the increased demand due to the rising number, frequency and distance of people travelling.

Efficiency improvements in **freight transport**, such as trucks, drove around 1% of the total energy savings. This was lower than the rise in freight transport activity over the same period.

Energy savings from efficiency improvements, by sector, selected IEA countries, 2000-2022



Notes
Selection of 24 IEA Member countries accounting for one-third of global final energy demand.

Source
IEA (2025), Energy End-uses and Efficiency Indicators, (accessed on 04 April 2025).

Need more information?

IEA (2025), Energy End-uses and Efficiency Indicators.
IEA (2023), Decomposition of change in IEA total final energy use.

Multiple Benefits of Energy Efficiency

Affordability

Why is energy efficiency important for affordability?

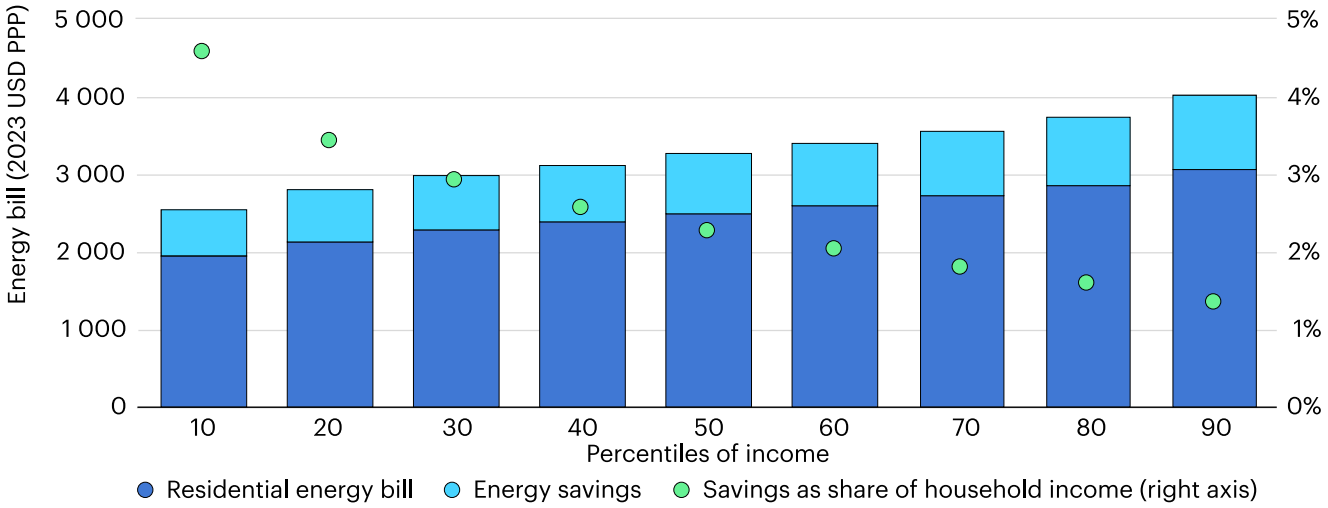
Energy efficiency measures can **reduce energy bills for households**, decrease energy poverty, and make access to energy services more affordable.

- Energy efficiency measures can reduce average household energy bills in advanced economies by up to **one-third**. In emerging economies, they can also improve access to energy services.
- For many products, such as refrigerators, highly efficient models use less than half of the energy of inefficient models. A best-in-class model **can save up to 40% in total lifetime cost** (purchase and energy) compared with an inefficient one.
- Energy efficiency can lead to an **improved quality of life**. For instance, in sub Saharan Africa, 80% of the population could afford to buy and use all key appliances – including lights, TV, fans and a refrigerator – when choosing high efficiency models, provided there is sufficient access to electricity. This figure drops to 50% when choosing low efficiency models, leading many households to live without some appliances like a refrigerator.

Key analysis

Energy efficiency lowers energy bills for all households. These savings represent a higher proportion of disposable income for lower-income households, who spend more on energy. Policies can consider these distributional effects and explicitly target lower-income households, in an effort to tackle energy poverty and ensure that a larger share of the benefits accrue to them.

Average annual household savings on residential energy bills due to efficiency gains since 2000 and share of household income saved, by income decile, advanced economies



Notes
Residential energy expenditure excludes transport expenditure by households. PPP = purchasing power parity.

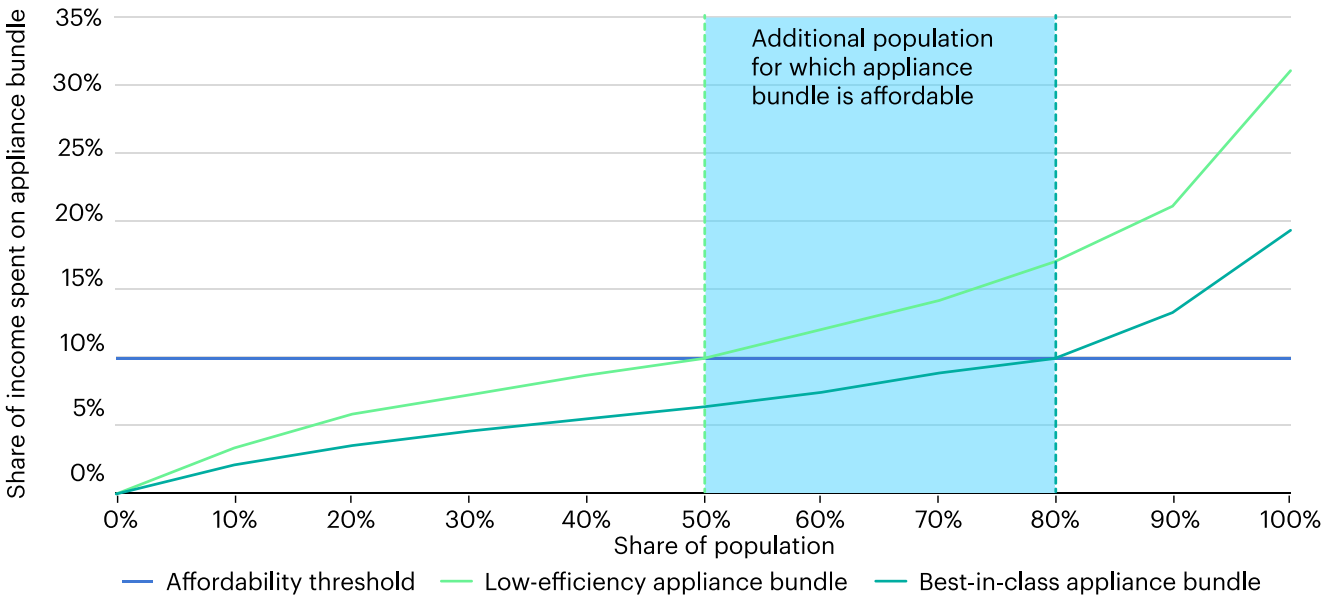
Source
IEA (2025), IEA Energy Prices (accessed on 06 April 2025); IEA Energy End-uses and Efficiency Indicators (accessed on 07 April 2025).

A closer look at affordability in emerging economies

In emerging and developing economies, **improved efficiency can increase the use of energy services** as more disposable income becomes available. Improved access to services such as air conditioners, lighting, and clean cooking can lead to higher comfort and quality of life. As a result, the energy savings of efficiency measures can be initially lower than expected. In India, time-saving appliance ownership, such as of washing machines or refrigerators, is associated with a 15% increase of employment among women and an increased school attendance by older children.

As people gain access to electricity, they acquire new equipment, often starting with light bulbs, followed by televisions, and finally fans, particularly in hot locations. As available power increases and electricity becomes more reliable, refrigerators are installed as well. For many products, such as refrigerators, highly efficient models use less than half of the energy of inefficient models. Efficiency can thus lead to improved access to affordable energy services. IEA analysis shows that only 50% of the population in sub-Saharan Africa could afford key appliances when using low efficiency models, while 80% could afford them when using best-in-class models.

Affordability of an extended bundle of appliances for low efficiency and best-in-class efficiency levels, by share of population in sub-Saharan Africa



Notes
Upfront cost is annualised by average lifetime. Average income per decile is used to determine the share of expenses. Appliance bundle includes four lightbulbs operating four hours per day, one fan running six hours per day, one TV running four hours per day and one refrigerator. Affordability is given when annualised upfront cost and energy cost are up to 10% of annual household income.

Source
IEA (2024), Energy Efficiency 2024.

Need more information?

IEA (2024), Strategies for Affordable and Fair Clean Energy Transitions.
IEA (2025) - Designing Energy Efficiency Policies to Enhance Affordability: Examples from G7 Countries

Multiple Benefits of Energy Efficiency

Competitiveness

Why is energy efficiency important for competitiveness?

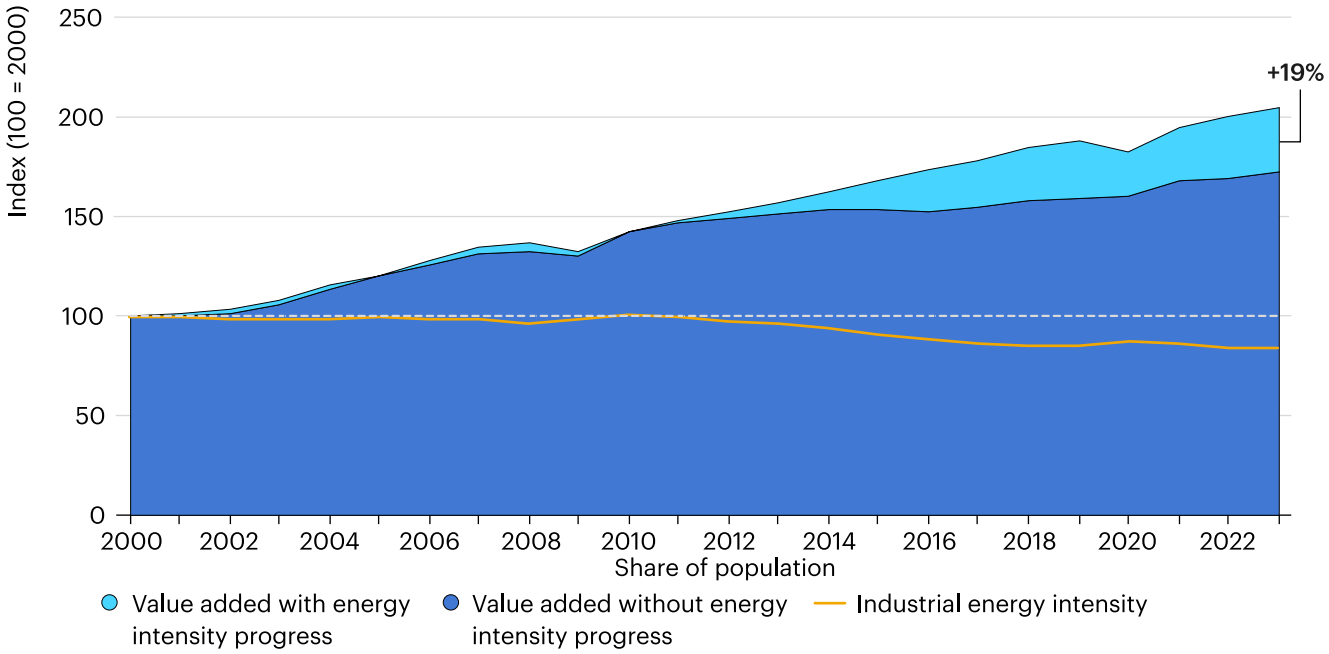
Increasing energy efficiency can improve competitiveness at both the **firm** level – by reducing costs, improving operations and increasing product value – and at the **country** level, by reducing the amount of energy required to produce economic output.

- Today the world's industries produce **nearly 20% more value added** with a given amount of energy, compared with two decades ago.
- In the industrial sector, energy management can lead to **more than 10% in annual energy cost savings** within three years, and up to 60% over the longer term as new savings are uncovered.
- On average, for every dollar in energy cost savings due to energy efficiency, firms also save one dollar or more from other benefits, from **improved resource use to higher productivity**.

Key analysis

Energy intensity improvements have enabled industries to produce 19% more value added with the same amount of energy now, compared to the year 2000. In the European Union, manufacturing industries produce 50% more value added with 25% less energy than in 2000.

Global industry sector energy intensity and value added, real development and hypothetical without energy intensity progress since 2000, 2000-2023



Source
IEA (2025), Global Energy and Climate Model.

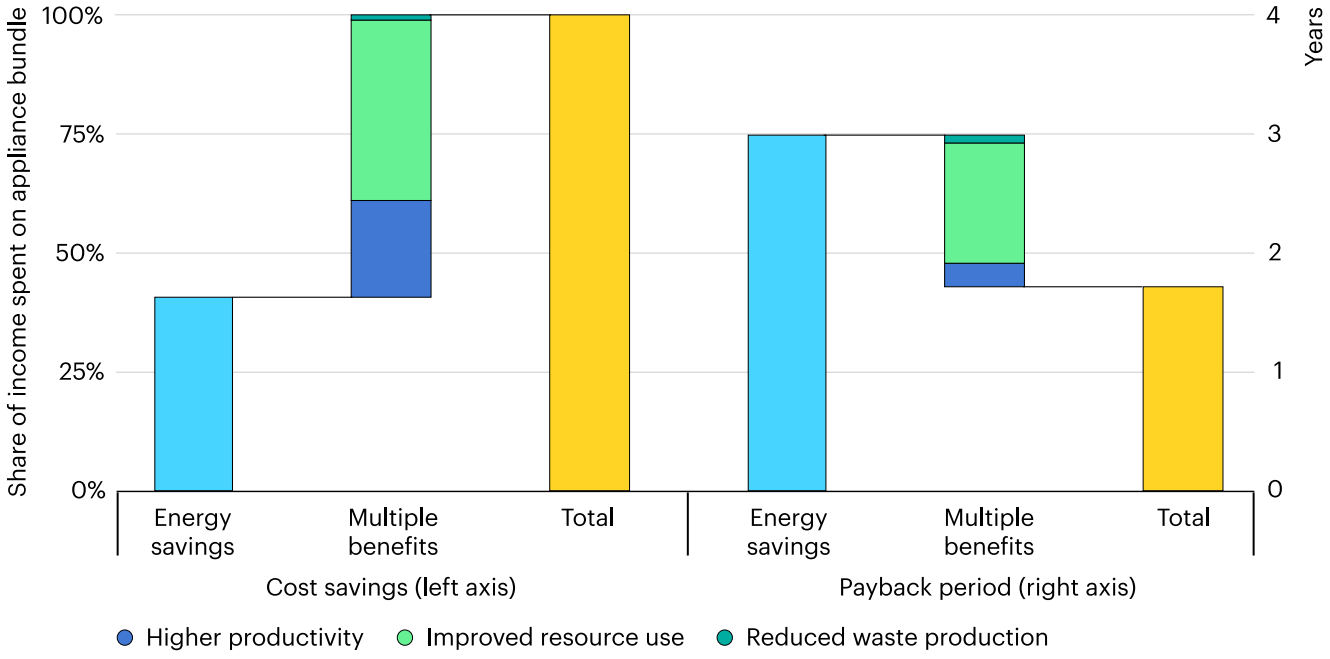
A closer look at energy efficiency in businesses

Energy management – a well-recognised strategic approach of adjusting and optimising energy consumption – is one of the key levers for industrial competitiveness. By embedding a culture of continuous improvement, firms can achieve significant reductions in energy costs, as well as a broader range of other benefits. These include:

- **Increased productivity**, such as higher capacity utilisation rates of the production equipment and increased production capacity, as a result of more efficient processes and lower production costs. Efficiency has also been shown to lead to improved product quality and consistency, contributing to brand reputation.
- **Improved resource use**, such as reduced equipment downtime and unplanned shutdowns, lower maintenance costs, and potentially reduced staff requirements for operation and monitoring. Efficiency has also been shown to increase worker health and safety, reducing the incidence of work-related accidents and health insurance costs.
- **Reduced waste production**, such as less use of materials and process water.

Combined, these multiple benefits can more than double the benefits of energy cost savings.

Cost savings and payback periods of 3 300 efficiency measures in small and medium-sized enterprises, in the United States, 2002-2024



Source
IEA analysis based on Industrial Assessment Center (IAC) (2002-2024), IAC Database (accessed on 24 April 2025).

Need more information?

IEA (2025), The Role of Energy Efficiency in Enhancing Competitiveness.

Multiple Benefits of Energy Efficiency

Grid Investments

Why is energy efficiency important for grid investments?

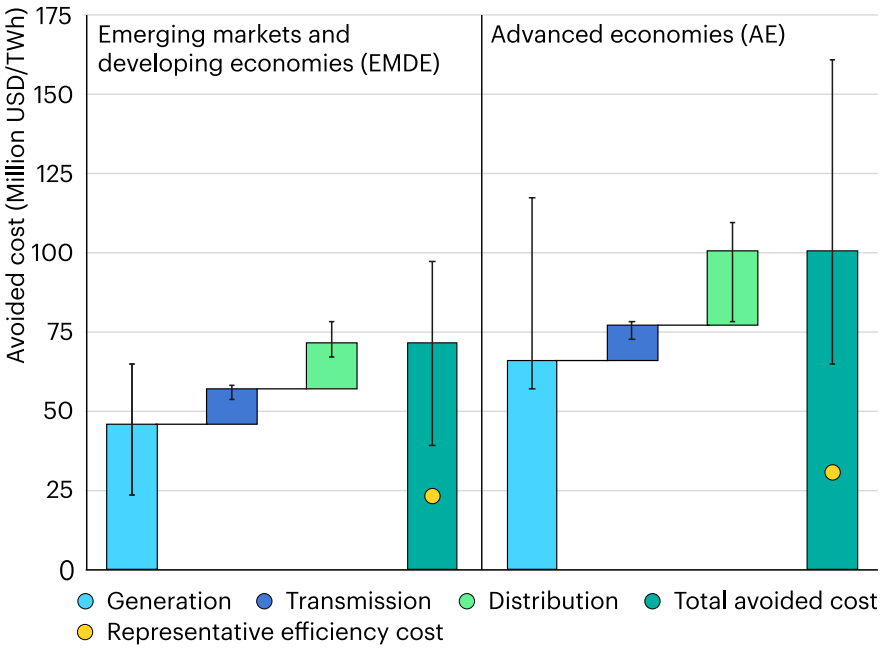
As we enter the Age of Electricity, global electricity demand is rising rapidly – and so is the demand for the expansion of electricity grids. Energy efficiency can help **close the gap between supply and demand**, but often at a **lower cost**, and **more quickly**, than new generation and grid expansion.

- On average, energy efficiency costs **less than half** the amount it would cost to build new generation capacity and grid infrastructure, per unit of energy.
- Energy efficiency measures can typically be deployed in **under a year**, while generation and transmission projects require between one and seven years to build on average, depending on technology, or over a decade for nuclear.

Key analysis

IEA analysis of nine major regions shows that increasing electricity generation and grid capacity by one terawatt-hour (TWh), will require investments of USD 30 to 110 million in emerging economies and USD 75 to 150 million in advanced economies. In order to save the same amount of electricity, energy efficiency measures would cost only between USD 10 million and 50 million.

Range of upfront investment costs for one terawatt-hour of energy, 2023-2030



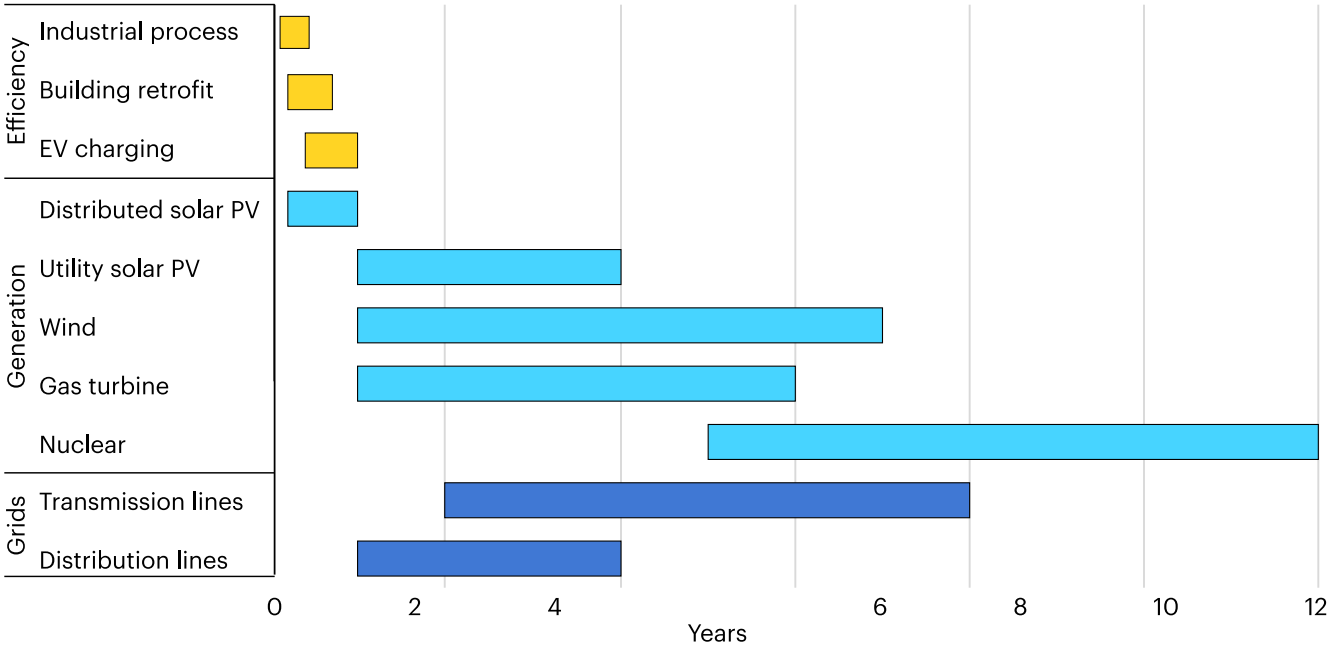
Note
The graph shows the average of all types of generation in the APS scenario for each World Energy Outlook model region (United States, European Union, Japan, other AE, China, India, Southeast Asia, Africa, and other EMDE). Columns denote average of all regions; spread indicators denote the range for all regions. Generation, transmission and distribution cost estimates will be sensitive to the cost of capital.

Source
IEA analysis based on IEA (2023), Electricity Grids and Secure Energy Transitions, IEA (2024), World Energy Outlook.

A closer look at grid management

The deployment of energy efficiency measures typically requires less time than the implementation of most new generation and grid infrastructure. On average, new generation and grid infrastructure can take years to implement, whereas efficiency measures, such as industrial process upgrades and building retrofits, take less than one year to deploy.

Typical development time for selected efficiency measures, electricity generation and grids



Note
EV = electric vehicle, PV = photovoltaic.

Source
IEA Analysis based on IEA (2025) The Path to a New Era for Nuclear Energy; Solar Reviews (2024), Solar Panels and Installation Time.

Demand-side measures can also reduce grid congestion, a key factor in determining costs to manage the system. These congestion management costs tripled in Germany, the United Kingdom and the United States from 2019 to 2022, and can constrain industrial expansion. Implementing energy efficiency and demand response measures can decrease and shift peak demand to less congested periods when electricity prices are lower and there is less stress on grid infrastructure. Demand response has seen rising uptake around the world, but further electrification and demand decarbonisation are expected to significantly increase its importance. For instance, in Australia, where various mechanisms have been successfully demonstrated, the value of demand response capacity could reach USD 11 billion per year by 2042. Globally, it could provide up to 50% of short-term flexibility needs in 2050.

Need more information?

IEA (2024), World Energy Outlook.
IEA (2023), Smart Grids.
IEA (2024), Digital Demand-Driven Electricity Networks Initiative (3DEN).
CREDS (2021), The role of energy demand reduction in achieving net-zero in the UK.

Multiple Benefits of Energy Efficiency

Energy Security

Why is energy efficiency important for energy security?

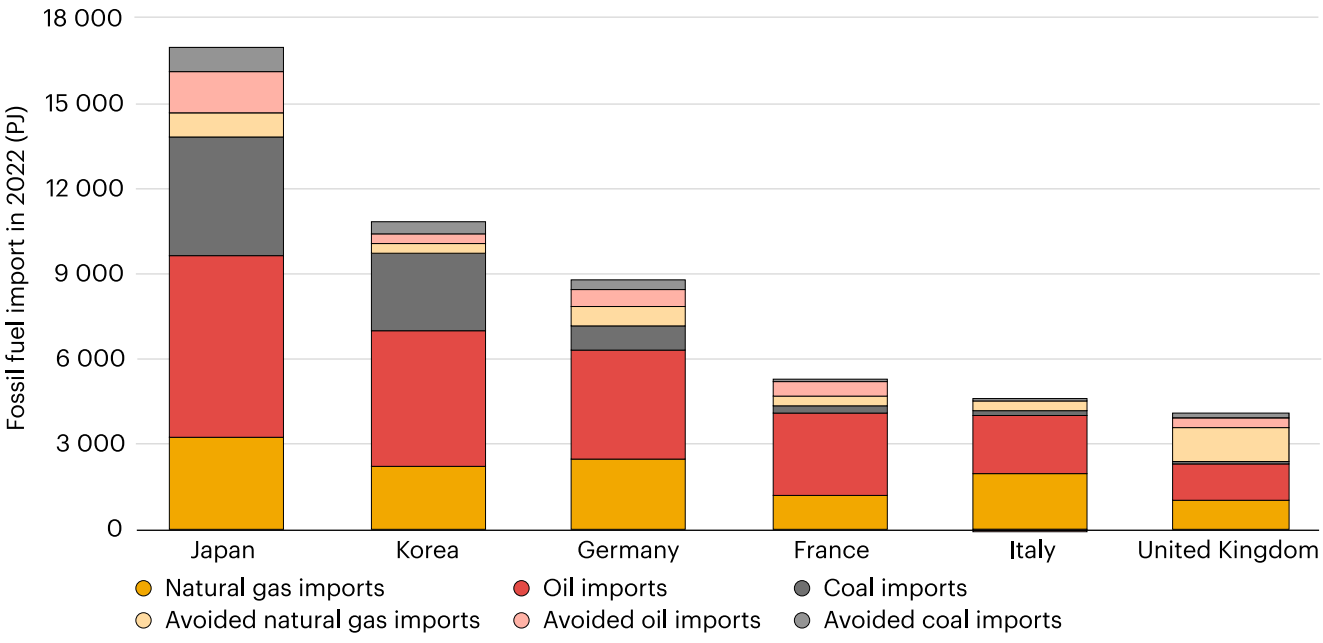
Energy efficiency can help **mitigate energy security risks** by reducing the reliance on fossil fuel imports, improving grid reliability, and acting as a buffer to supply shocks.

- Efficiency gains from the last two decades **avoided the need for 20% more fossil fuel imports** in IEA countries.
- Energy efficiency and demand response can support grid reliability by reducing peak demand. For instance, more efficient air conditioners in India could lower the impact of heatwaves on peak demand **by 20% by 2030** and help reduce the risk of blackouts.

Key analysis

Energy efficiency policies in different sectors have been effective in reducing fossil fuel imports. In the European Union, the strongest reduction was in gas imports, driven by strong energy efficiency improvements in the industrial sector. Meanwhile, in Japan the strongest reductions were in oil imports, due to some of the most stringent fuel economy standards both for passenger and commercial vehicles.

Net fossil fuel imports and avoided imports since 2000 due to energy efficiency improvements in selected IEA countries



Notes
PJ = petajoule.

Source
IEA (2025) Energy Prices, (accessed on 20 March 2025);
IEA (2025) Energy End-uses and Efficiency Indicators, (accessed on 20 March 2025).

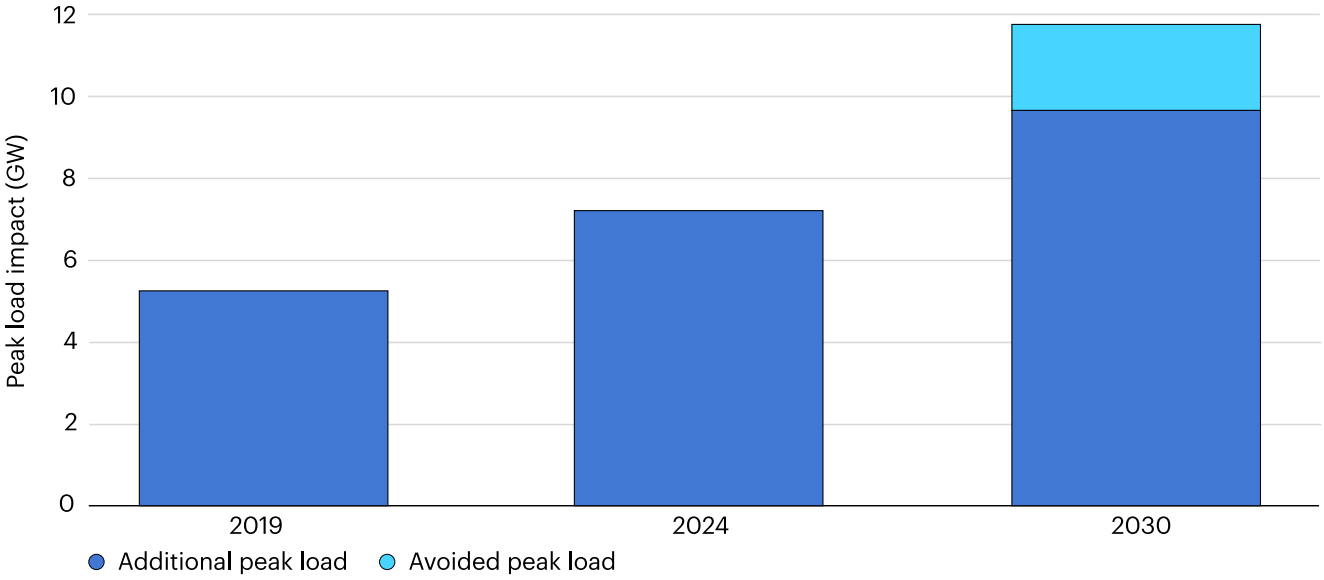
A closer look at electricity security

Energy efficiency and demand response policies can also contribute to electricity security by reducing the risk of outages resulting from peak demand.

Different programmes have demonstrated success in reducing peak electricity demand and preventing outages. Studies in the United Kingdom and the United States show that real-time feedback and pre-event communications lead to reductions in consumption and peak demand of about 3%.

This is especially relevant in regions where grid reliability is a significant concern. For instance, in India, increased electrification, combined with a rapid adoption of appliances such as air conditioners, is putting additional strains on power grids and leading to new peak demand records and resiliency challenges. In 2019, 1°C in outdoor temperature increase was associated with a 5 gigawatt (GW) increase in peak electricity demand; with rising air conditioner ownership and increasing temperatures, this value rose to 7 GW in 2024 and could further rise to 12 GW in 2030 without further efficiency action. If India were to experience similar heatwaves as in recent years – with temperature anomalies of over 4°C – the additional peak load would amount to 47 GW. However, if all new air conditioners in India were highly efficient (e.g. through increased minimum energy performance standards), peak load during a heatwave could be reduced by almost 9 GW or about 20%, significantly decreasing the risk of blackouts or brownouts.

Additional peak load caused by an outdoor temperature increase of 1°C, India, 2019 to 2030, and avoided peak load due to higher efficiency ACs sales, India, 2030



Notes
High efficiency scenario assumes replaced and new equipment from 2024 to 2030 to be in line with the IEA Net Zero emissions guide space cooling (SEER 5.0 – 6.5).

Source
IEA (2024) Real-Time Electricity Tracker, (accessed on 19 September 2024); IEA (2025) Weather, Climate and Energy Tracker, (accessed on 19 September 2024).

Need more information?

IEA (2025), Energy Security.

Multiple Benefits of Energy Efficiency

Emission Reductions

Why is energy efficiency important for emission reductions?

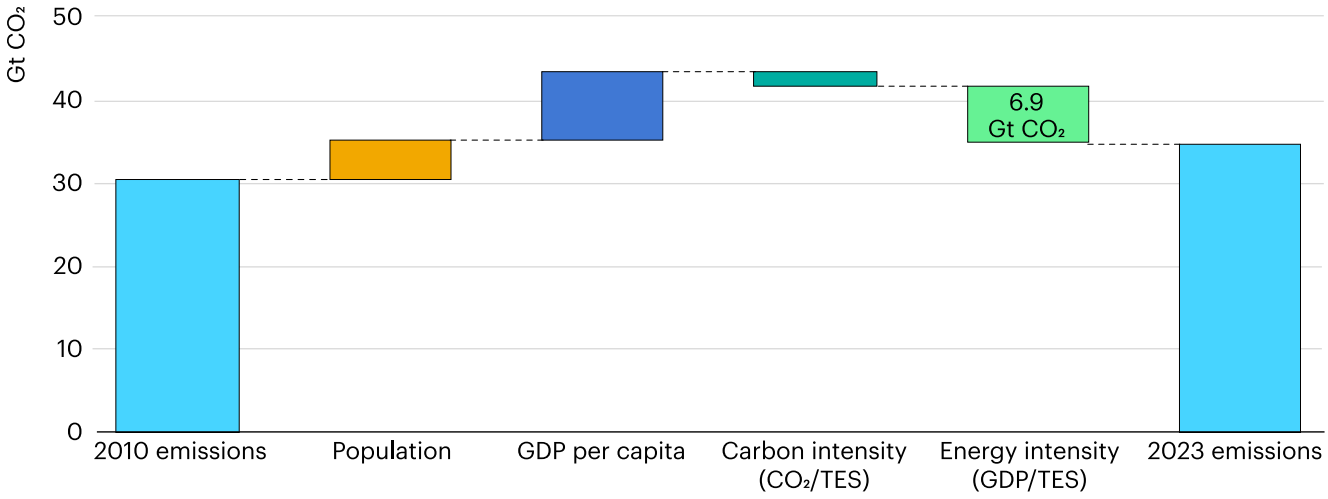
Energy efficiency can **reduce emissions of greenhouse gases** and **air pollutants** and make the energy system more sustainable.

- Since 2010, efficiency measures avoided energy-related carbon dioxide (CO_2) emissions equivalent to **nearly 20% of the global total** in 2023. This is more than the entire energy-related emissions of India and the European Union combined.
- Accelerating efficiency improvements could deliver a **third of all energy-related CO_2 emission reductions between now and 2030** in a pathway aligned with reaching net zero emissions by 2050 – the largest share of any sector or technology.
- Energy efficiency also improves **air quality** and people's health by lowering local air pollutants such as fine particulate matter (PM2.5) and nitrous oxide.

Key analysis

Global energy-related CO_2 emissions increased by around 15% between 2010 and 2023, driven by an increase in population and strong economic growth. Energy efficiency measures have helped counteract some of this rise in emissions, with a reduction of nearly 7 Gt of global energy-related CO_2 emissions over the same period – equal to around 20% of the total in 2023.

Change in global energy-related CO_2 emissions, 2010-2023



Notes
GDP = gross domestic product; TES = total energy supply. Decomposition analysis expresses the change in CO_2 emissions in four major indicators (carbon intensity, energy intensity, GDP per capita and population) using the logarithmic mean divisia index (LMDI) method.

Source
IEA (2024), Global Energy and Carbon Tracker, (accessed on 04 April 2025).

A closer look at sectoral air quality

Improving energy efficiency has additional benefits for **indoor and outdoor air quality**, by lowering the amount of particulate matter, nitrogen oxides and other harmful gases in the air:

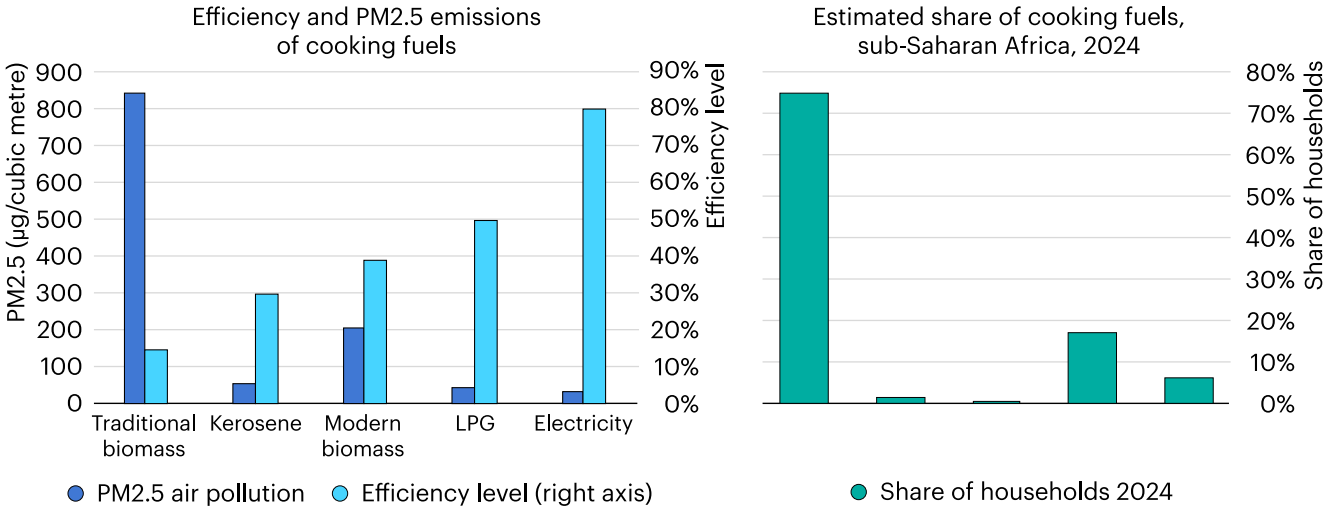
- Retrofitting poorly insulated houses can reduce indoor air pollutants in homes and commercial buildings, as long as these have adequate ventilation.
- Promoting efficient transportation in cities, such as through low-emission zones or a modal shift to public transport, can improve ambient air quality.

Given that many air pollutants have a localised effect, disadvantaged communities are often **disproportionally affected** by the environmental risks of low air quality and thus benefit the most from improvements. Urban air quality policies can therefore not only reduce air pollution but also reduce inequality.

In households that lack access to **clean cooking**, air pollution is linked to around 3.7 million premature deaths a year. Replacing open fires and inefficient stoves with cleaner, more modern stoves and fuels reduces household air pollution and improves efficiency.

Indoor air pollution from liquid petroleum gas (LPG) cookstoves is only around 5% of pollution from traditional biomass, while being over three times more efficient. Switching from LPG to electric cooking would further reduce indoor air pollution by 25% and is over 1.5 times more efficient.

PM2.5 air pollution and efficiency, by cooking fuel, cooking fuel share in sub-Saharan Africa, 2024



Notes
µg = microgramme; LPG = liquefied petroleum gas. Modern biomass defined as solid biomass, burned in Tier 4 ICS (improved biomass cookstove) or higher and bioethanol; Efficiency and PM2.5 refer to a pellet cookstove.

Source
IEA (2025), Global Energy and Climate Model. Khavari, B., Ramirez, C., Jeuland, M. et al. (2023), A geospatial approach to understanding clean cooking challenges in sub-Saharan Africa.

Need more information?

IEA (2024), Energy Security 2024.
IEA (2023), A Vision for Clean Cooking Access for All.

Multiple Benefits of Energy Efficiency

Jobs

Why is energy efficiency important for jobs?

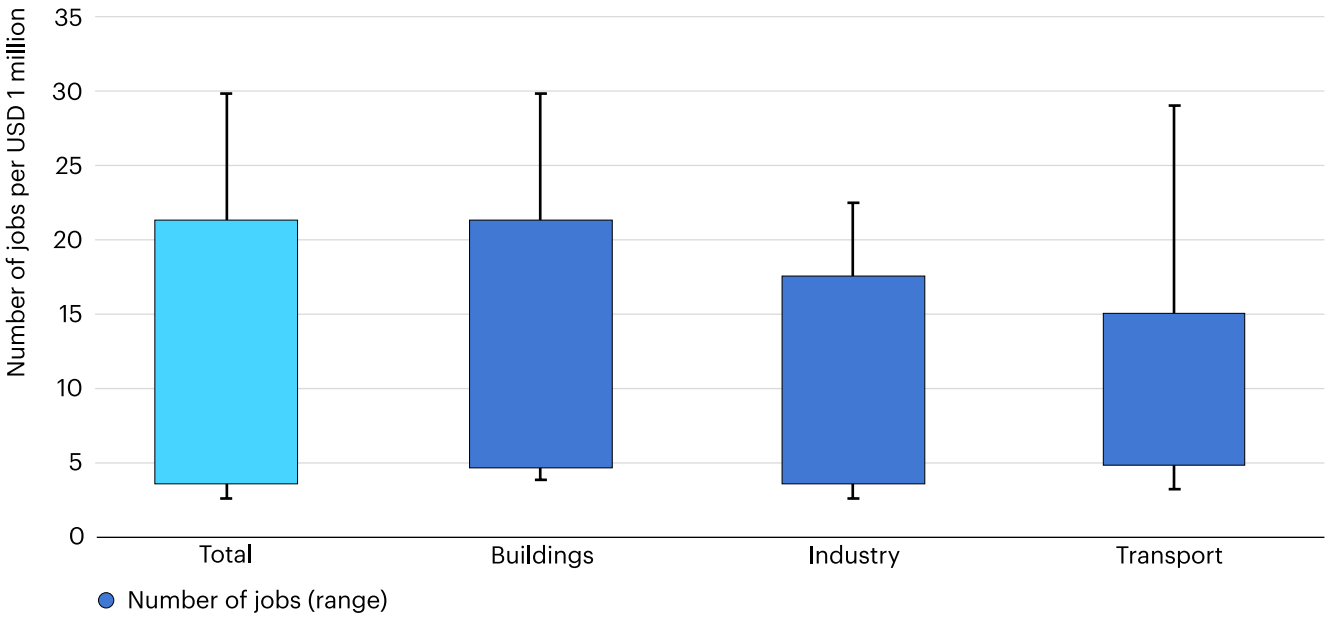
Investment in energy efficiency **creates jobs** in a wide range of occupations and geographic locations.

- Around **10 million people** work in energy efficiency-related jobs globally, representing nearly 15% of all energy-related jobs.
- Studies indicate that energy efficiency creates **between 4 and 22 jobs** per USD 1 million invested, depending on economic structure and energy efficiency measure. By lowering energy spending, energy efficiency also helps foster business growth and competitiveness.
- Energy efficiency offers a **wide array of job opportunities**, including in installation and repair but also in the manufacturing, supply and distribution of efficient equipment.

Key analysis

A review of studies shows that an investment of USD 1 million can create and maintain for one year between 5 and 22 jobs in the buildings sector, between 4 and 14 jobs in the industrial sector, and between 5 and 15 jobs in the transport sector.

Number of jobs created by energy efficiency action type, European Union, 2024



Notes
Columns denote the 20th and 80th percentile of countries; spread indicators denote the full sample.

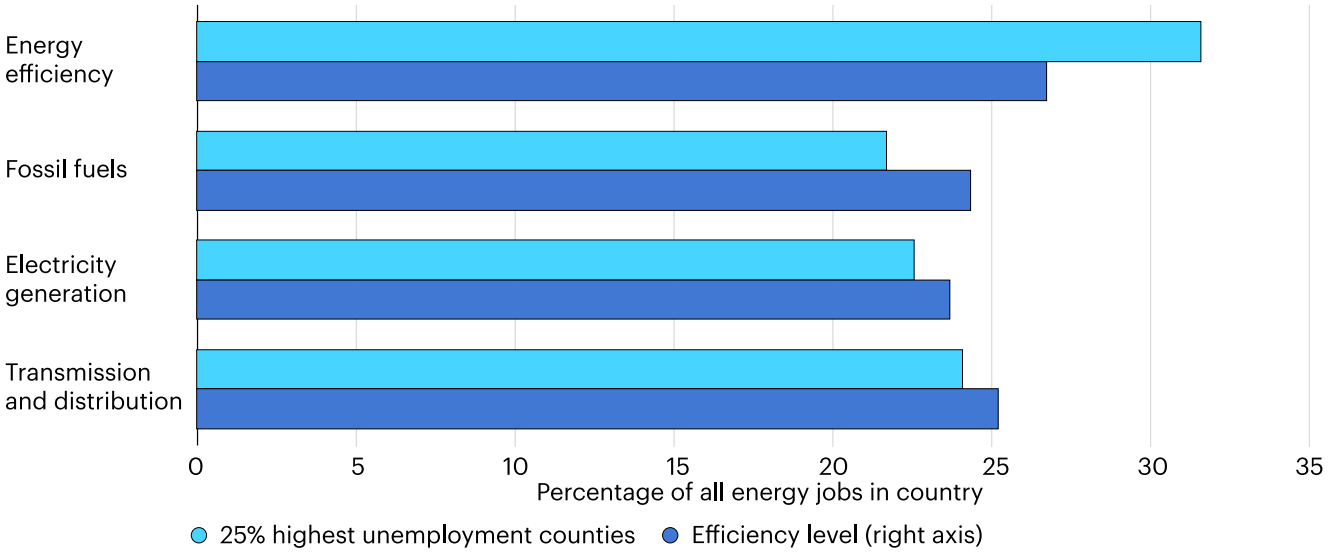
Source
IEA analysis based on data from MICATool.

A closer look at job location

Energy efficiency spurs job creation at the local level while creating economy-wide gains. While jobs in industrial efficiency and manufacturing tend to be more concentrated, sectors such as buildings, which require the deployment of technicians to install and repair equipment or energy auditors, can also boost local employment. Investments in qualification and upskilling can decrease the risk of skills and labour shortages and enable the economy to benefit from the full potential of energy efficiency job creation.

In the United States, IEA analysis shows that energy efficiency offers more jobs than other energy sectors – such as fossil fuel supply, power generation, or transmission and distribution – across a variety of locations. For instance, in areas with high unemployment rates, energy efficiency accounts for an even higher share of energy sector jobs than in areas with lower unemployment. Meanwhile, other energy sector jobs are more prevalent in areas with lower unemployment rates.

Distribution of energy sector jobs by local unemployment rate and by functional area, United States by county, 2024



Notes
Fossil fuels include provisioning and refinement.

Source
IEA analysis based on US Department of Energy (2024), 2024 U.S. Energy & Employment Jobs Report (USEER) (accessed on 08 April 2025) and data from Social Vulnerability Index, (accessed on 08 April 2025).

Energy efficiency investments also contribute to enhance the quality of jobs in other industries. Firms that invest in energy efficiency can significantly improve the quality of the working environment, with efficient lighting that provides increased visual comfort, or efficient ventilation systems that enhance air quality. By freeing up businesses' spending through reduced energy bills, energy efficiency helps minimise cost pressures and supports employers in safeguarding jobs.

Need more information?

IEA (2020), World Energy Outlook Special Report - Sustainable Recovery.
MICAT (2024), Empirical basis factsheet on Economic impacts - Employment effects.

Multiple Benefits of Energy Efficiency

Asset Values

Why is energy efficiency important for asset values?

Energy efficiency can **increase the value of assets**, such as homes, buildings or equipment, and lead to lower vacancy rates and longer equipment lifespans.

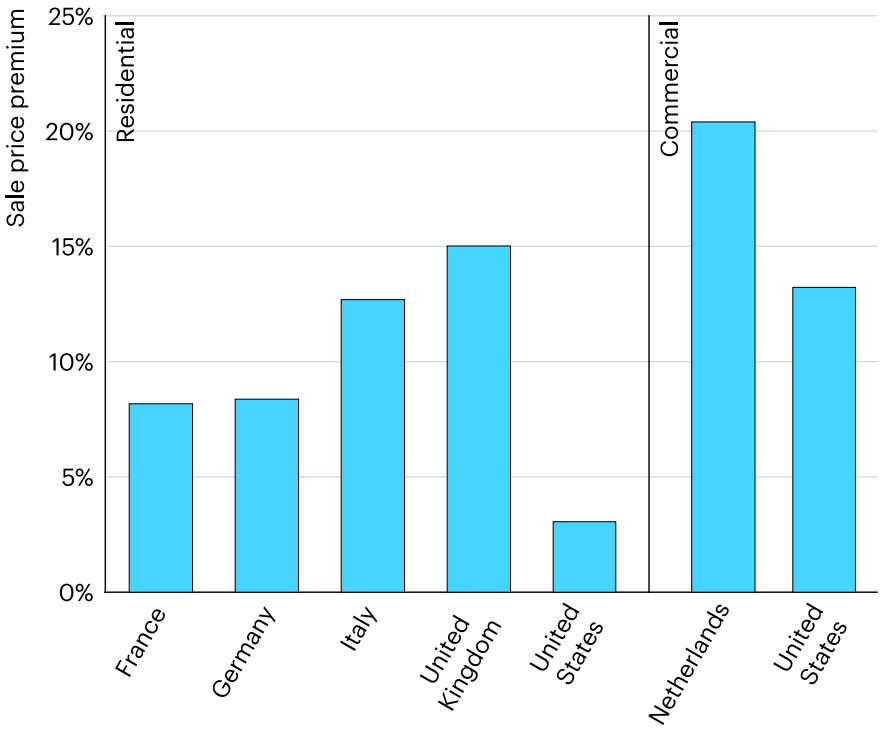
- Energy efficient buildings can command a **premium on sale and rental price** in both the residential and commercial sectors.
- Studies show that sale price premiums for energy efficient buildings range from **3% to 15% in residential buildings and 13 to 20% in commercial buildings**.

Key analysis

Studies show that individuals and businesses are willing to pay a higher rent and/or sales price for property with improved energy performance, such as that expressed in energy performance certificates. Evidence from the United States and Germany suggests that sales price premiums are about twice as high as rental price premiums.

Meanwhile, in the industrial and utility sectors, energy efficiency measures can increase asset values by improving productivity, reducing wear on equipment, and extending the operational life of machinery and infrastructure.

Sale price premium for residential and commercial buildings in selected markets



Notes
The European Union and United Kingdom use a scale from A to G on the energy performance certificate (EPC). The results are based on the following studies and assumptions. France: Zitouni, S., (2024), (B vs D EPC rating); Germany: Amaral, F. et al., (2024), (A compared to D-E EPC rating); Italy: Loberto, M. et al., (2023), (A compared to D EPC rating); United Kingdom : Perez, H., (2024), (B compared to E EPC rating); United States residential: Pigman, M. et al., (2022), (6 steps on Home Energy Score, about equivalent to A to E on EU EPC); The Netherlands: Eichholtz, P. et al., (2024), (above compared to below C EPC rating after announcement that all office buildings over 100m² have to be C rated or above); United States commercial: Eichholtz, P., (2013), (ENERGY STAR or LEED certification).

A closer look at rental properties

While sale and rental price premiums are positive impacts for building owners, it is important to also consider the effect energy efficiency improvements have on building occupants or renters. Increasing the quality of a rented space through energy efficiency can achieve increased thermal, noise and light comfort; improved health, safety and security, and reduced energy bills and operational costs. These benefits can result in improved tenant satisfaction and improved ability to rent the space.

Rent increases associated with the retrofit should be in line with energy cost savings to maintain affordability. Policy tools, such as mandatory energy performance ratings, financial incentives and tenant protections, can help ensure that asset value gains benefit both owners and occupants, especially vulnerable groups such as low-income households.

Meanwhile, a landlord may be hesitant to invest in new energy efficiency equipment, as they are responsible for the capital cost, while the tenant is the one benefiting from lower energy bills. This is often known as a "split incentive." However, evidence from the United States suggests that energy efficiency improvements are associated with reduced vacancy and tenant turnover, which reduces associated transaction costs and provide an incentive for landlords to invest.

Need more information?

Eichholtz, P. (2024), The Impact of Minimum Energy Performance Standards on the Commercial Real Estate Market.
Zitouny, S. (2024), On the capitalization of energy labels on the French housing market.
Amaral, F. et al., (2024), Green Signals: Energy Efficiency and German Housing Markets.
Pigman, M. (2022), How Does Home Energy Score Affect Home Value and Mortgage Performance?.

Multiple Benefits of Energy Efficiency

Health

Why is energy efficiency important for health?

Energy efficiency can **improve health** by creating healthy indoor and outdoor living environments with comfortable temperatures and humidity levels, and improved air quality.

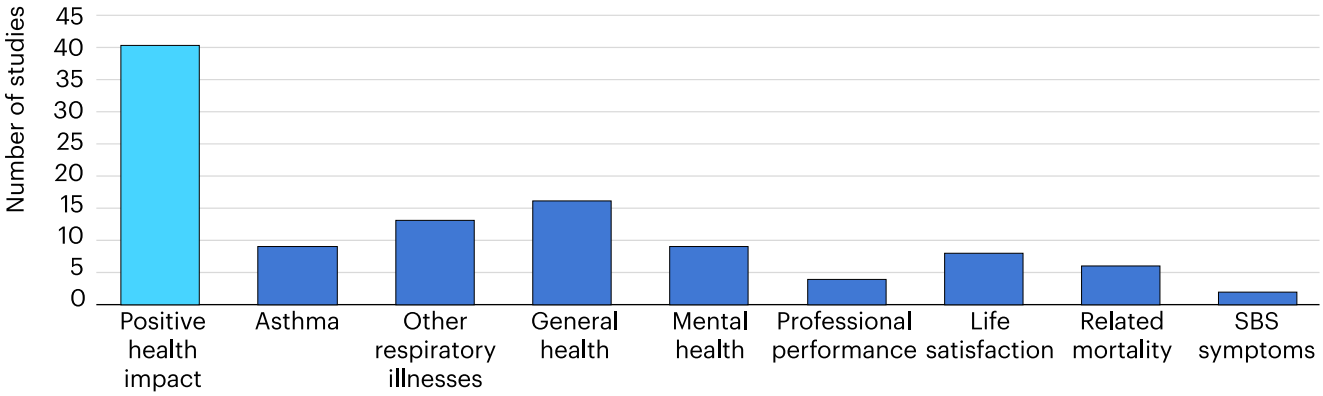
- Energy efficiency measures have been linked to **improved health**, such as fewer respiratory illnesses.
- Targeted energy efficiency programmes can **reduce doctor and hospital visits** and save health costs. In New Zealand, a retrofit programme led to a 43% reduction in hospital admissions for respiratory conditions, while a similar programme in Ireland reduced the frequency of doctor visits by 50%.

Key analysis

The World Health Organization estimates that household air pollution was responsible for more than 3 million deaths per year in 2020. Energy efficiency policies, such as home energy retrofits and weatherisation programmes, can create conditions that support improved occupant health and well-being, particularly among vulnerable groups.

A review of 45 academic studies finds that 90% reported positive health impacts from energy efficiency interventions in buildings. The most frequently reported improvements are related to respiratory illnesses and general health, as well as mental health and life satisfaction.

Studies finding positive health impacts from energy efficiency interventions, global



Notes
SBS = Sick building syndrome, whereby acute health effects appear to be linked to time spent in a building, but are not assigned to a specific illness. Related mortality refers to reduced mortality related to health outcomes of the energy efficiency intervention. Number of studies n=45. Study designs include negative health impacts associated with the lack of appropriate building energy efficiency and fuel poverty.

Source
IEA representation based on Chengju, W., Juan, W., Norbäck, D. (2022) – A Systematic Review of Associations between Energy Use, Fuel Poverty, Energy Efficiency Improvements and Health.

A closer look at wider health impacts

Energy efficiency policies across the world have shown positive health impacts for the population. For instance, in a programme in Australia, 49% of participants reported better health due to efficient heating systems. In a South African programme, energy retrofits led to a 81% reduction in self-reported illness among households. Meanwhile, the evaluation of the Warm Up New Zealand Programme concluded that 90% of all benefits are health-related, with hospital admissions for respiratory conditions dropping by 43%, saving the country over USD 1 billion in health costs. In Ireland, in an analysis of the Warmth and Wellbeing Scheme, participants report that the improved efficiency of their homes reduced the number of doctor visits by 50% and lowered hospital admissions by 40%.

In addition to physical health, energy efficiency can also lead to improvements to mental health, thermal comfort, and safety:

- **Mental health**: Studies show that thermal discomfort and fuel poverty have negative mental health impacts – such as anxiety, stress and depression – and that efficiency improvements can improve this. The impact on mental health may be enhanced if combined with financial support mechanisms and strong community engagement.
- **Thermal comfort**: Retrofits that include installing insulation are shown to enable occupants to raise indoor air temperatures to comfortable levels.
- **Safety**: Efficient public lighting can enhance safety perceptions. For instance, efficient streetlighting projects in Brazil and India reduced energy costs by up to 80%, improved visibility and perception of safer streets, and increased use of public spaces.

Lastly, improving efficiency has the most health effects among vulnerable groups such as children, the elderly, and those with pre-existing illnesses. Studies indicate that extensive renovations can lead to a 20% decrease in school absence for children with asthma and reduce by over 30% the mortality risk for those over 65 with a history of cardiovascular hospitalisation.

Need more information?

IEA (2025) - Blueprint for Action on Just and Inclusive Energy Transitions
Chengju, W., Juan, W., Norbäck, D. (2022), A Systematic Review of Associations between Energy Use, Fuel Poverty, Energy Efficiency Improvements and Health
Ministry of Economic Development New Zealand (2012), Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme

Multiple Benefits of Energy Efficiency

Economic Growth

Why is energy efficiency important for economic growth?

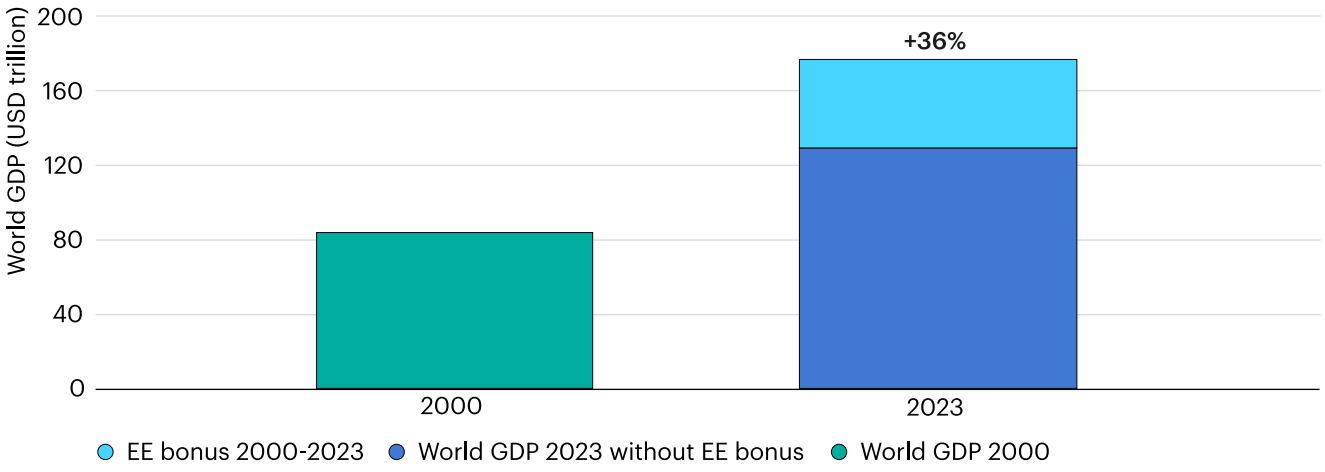
Energy efficiency allows countries to **generate more economic activity** using the same amount of energy. It is also linked to increased labour productivity and other economic benefits.

- Compared with 2000, today's global economy produces **36% more GDP** per unit of energy.
- Energy efficiency progress over the last 20 years means that **close to an extra USD 50 trillion** can today be produced using the same amount of energy. This energy efficiency bonus is equivalent to adding almost two times the GDP of the United States without needing to increase energy consumption.
- Energy efficiency can generate broader economic benefits, with studies also showing improvements in labour productivity and public budgets.

Key analysis

Energy is a fundamental input into nearly every aspect of the economy. As the economy grows, so does the demand for energy. However, energy efficiency plays a crucial role by allowing us to achieve more with less, enabling a gradual decoupling of economic growth from energy consumption over time.

World GDP and extra GDP produced with the same amount of energy due to energy efficiency (EE bonus), 2000 and 2023



Notes
World GDP in 2023 was nearly USD 180 trillion. If global energy intensity were the same as in 2000, only USD 130 trillion would be produced with the same energy input in 2023.

A closer look at economic benefits

Energy efficiency improvements can deliver benefits across the whole economy, with direct and indirect impacts on economic activity, employment, energy prices and other factors. While the impact of energy efficiency policies on macroeconomic performance still needs to be better understood and systematically measured, studies have highlighted some economic benefits:

- **Growth in economic activity**: Various studies have modelled the impact of select energy efficiency policies on economic activity and found a positive correlation. In Canada, an analysis of the country's policy package at the time found that every USD 1 spent on energy efficiency programmes would generate between USD 4 and USD 7 in GDP between 2017 and 2030. In the United States, a study study funded by the Department of Energy estimated that doubling energy productivity could result in a net GDP increase of USD 922 billion between 2015 and 2030.

- **Increase in labour productivity**: An analysis of over 15 000 European firms found that those investing in energy efficiency can see increases in labour productivity – the amount of economic activity per unit of labour – between 1.4% and 3.6% compared with firms with no investment in energy efficiency.

- **Improvement of public budgets**: Whether by reducing government expenditures on energy or by generating increased tax revenues through greater economic activity and/or increased spending on energy efficiency-related goods and services, energy efficiency improvements can have important impacts on the budgetary position of national and sub-national entities. In the European Union, a study found a reduction in public budget deficits as a result of energy efficiency investments. Other studies, including in Germany, also illustrate the benefits and costs to public budgets of energy efficiency policy.

Specific economic impacts will vary depending on the type of energy efficiency measure, country circumstances and other factors.

Need more information?

IEA (2024), Energy Efficiency 2024.
IEA (2020), World Energy Outlook Special Report: Sustainable Recovery.

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