

# ENERGY EFFICIENCY



## What is energy efficiency?

Energy Efficiency means using less energy for the same output or producing more with the same energy input that results in cost savings to consumers, and lowering energy bills. It provides cost effective CO<sub>2</sub> mitigation options primarily in the building, transportation and industry sector.

# Rise of the movement

The 1973-1974 energy crisis, triggered by an OPEC embargo, prompted the environmental movement to address the impact of reduced oil supply, leading to gas shortages and higher prices.

The Middle East instability caused a second crisis in 1979. While the 1970s saw the rise of the energy-efficient movement, carbon emissions reduction wasn't a policy priority until the last decade, highlighting the urgency of the climate crisis.

Home upgrades were not a major concern in previous years, but now, retrofitting is crucial, especially for low-income renters in older, less efficient subsidized apartments that consume more energy than other households.





## THE 2022 INTERNATIONAL ENERGY EFFICIENCY SCORECARD

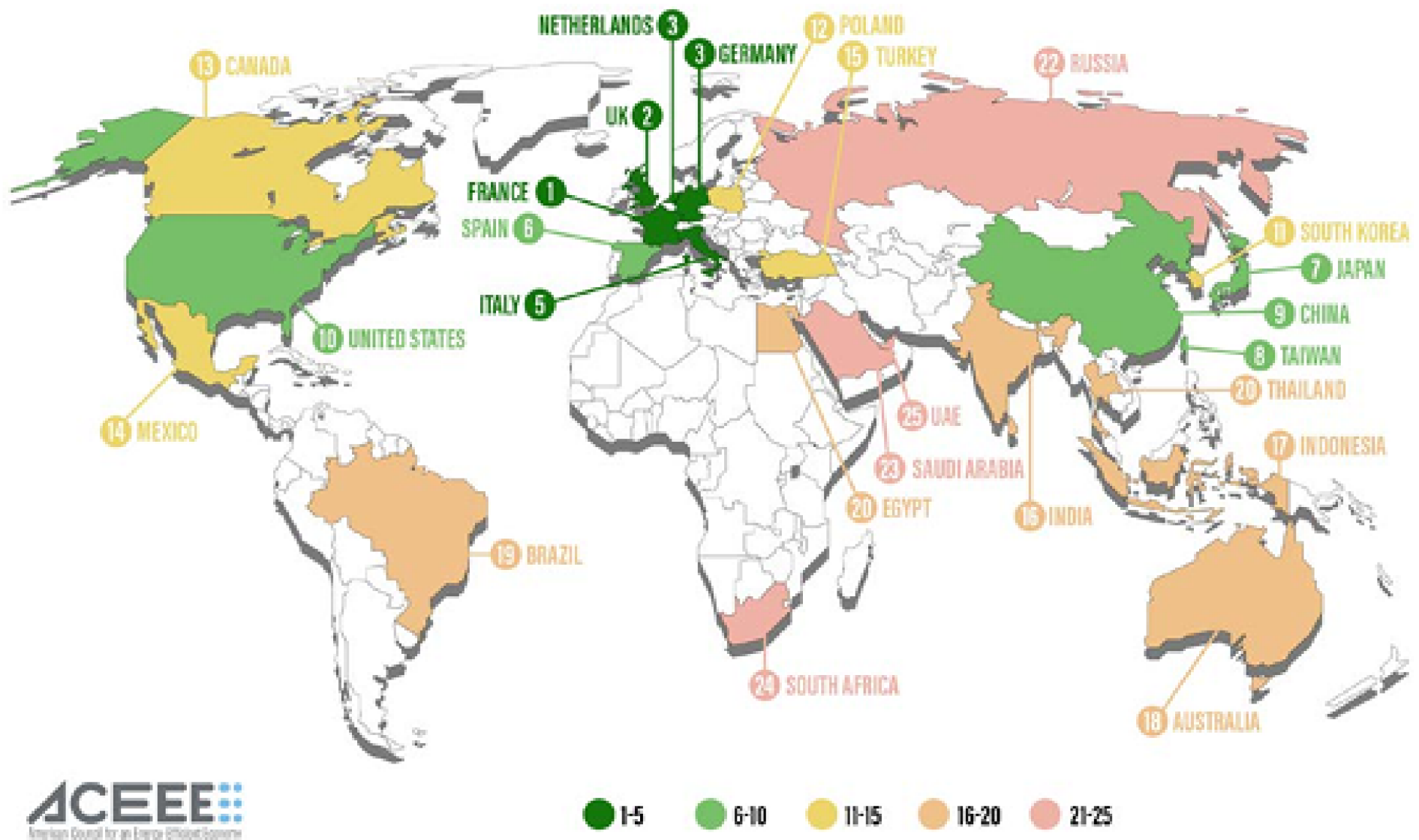


Figure ES1. Rankings by country

The 2022 International Energy Efficiency Scorecard evaluates 25 major energy users worldwide using 36 metrics across four categories: buildings, industry, transportation, and national efforts. These metrics cover aspects like energy intensity, savings, climate goals, appliance standards, and energy performance, among others, providing a comprehensive assessment for boosting energy efficiency globally.

# Around the World

## THE EUROPEAN UNION

In March 2023, the EU committed to enhancing energy efficiency by doubling the required annual energy savings rate, raising it from 0.8% to 1.49% by 2024.

## UNITED STATES

In 2022, the U.S introduced the \$4.5 billion High-Efficiency Electric Home Rebate program under the Inflation Reduction Act, offering households \$1400 to upgrade heating, cooling, insulation, and electrical systems, with the goal of substantial energy bill reduction.

## CHINA

In 2022, China intensified efforts to enhance energy efficiency in the industrial sector, targeting a 13.5% improvement in energy intensity by 2025 compared to 2020 levels. Specific goals were set for 17 high-energy industries like steel, aluminum, and cement.

## INDIA

India has passed new laws to strengthen building codes and policies that cover appliances, vehicles, industrial facilities and commercial buildings to support the mission of Lifestyle for Environment Initiative (LiFE).



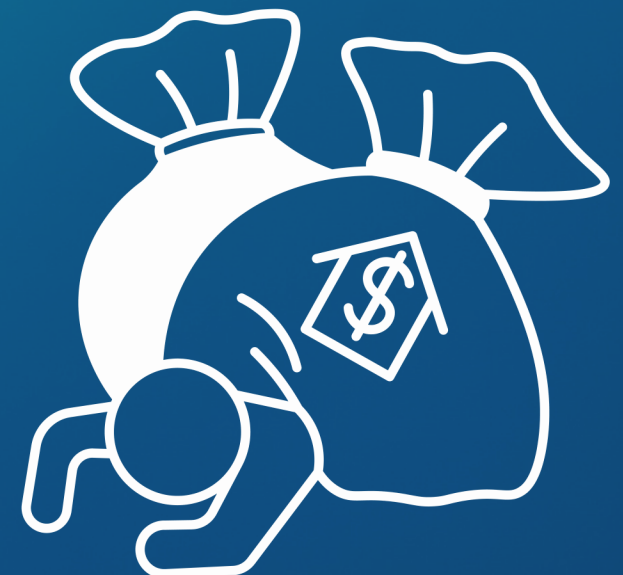


# Challenges and Barriers

In the building sector, economic obstacles, like split incentives, hinder the effectiveness of regulations and energy-saving obligations.

High capital costs and low consumer purchasing power, exacerbated by the financial crisis, are significant challenges in the transportation sector.

Additionally, inadequate infrastructure and planning, such as lacking bike and pedestrian accessibility, affect behavioral attitudes toward transportation and pose obstacles to energy efficiency deployment in this sector.





# Solutions by Sector

## Building and Construction

The energy used in buildings, for construction, heating, cooling, and lighting, contributes to over a third of global energy consumption and emissions. Energy Efficiency Retrofit involves upgrading older structures with improvements like better insulation, thicker windows, energy-efficient LED bulbs, heat pump replacements for heating and cooling systems, and smart devices for automated energy conservation. This can enhance safety and sustainability.



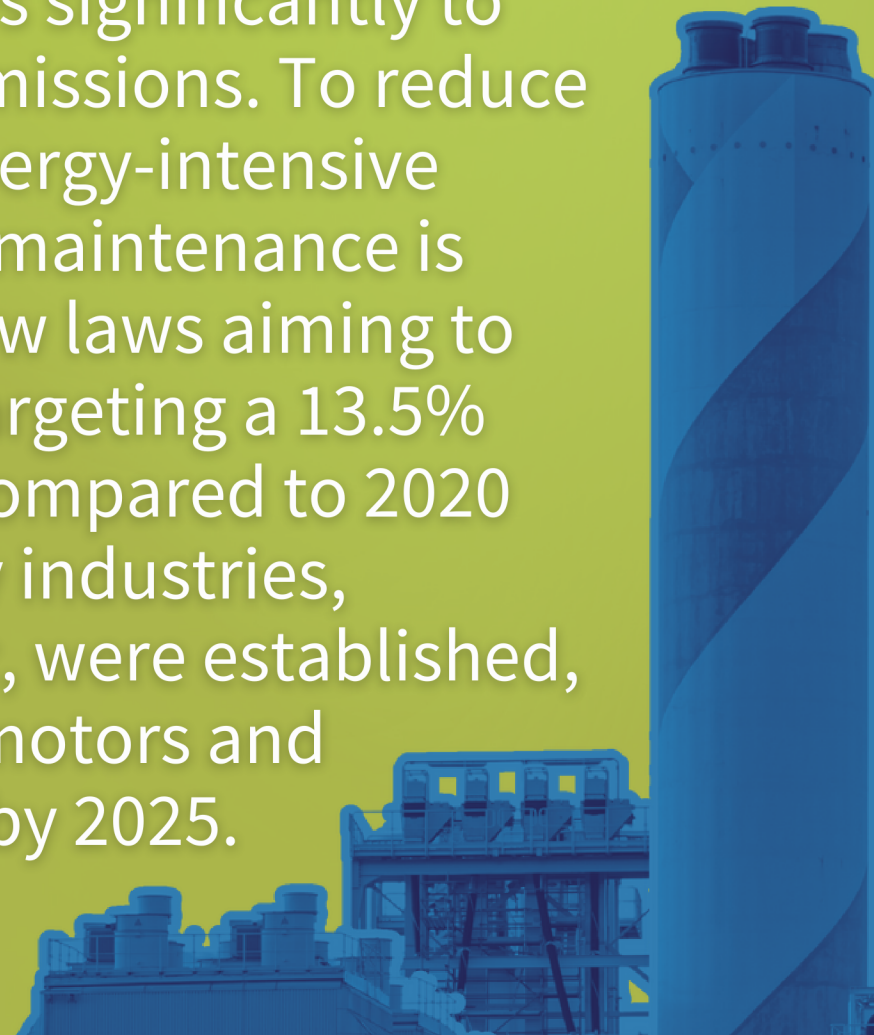


## Transportation

Transportation, responsible for two-thirds of global oil consumption, is a major contributor to greenhouse gas emissions. International shipping contributes to 70% of global emissions, while aviation accounts for 2%. Decarbonization strategies include electrifying road vehicles, integrating energy efficiency and renewable energy in international shipping, and adopting sustainable aviation fuels with significantly reduced emissions compared to conventional jet fuel.

## Manufacturing

The manufacturing industry contributes significantly to global energy consumption and CO2 emissions. To reduce its environmental impact, using less energy-intensive equipment with improved control and maintenance is crucial. In 2022, China implemented new laws aiming to enhance industrial energy efficiency, targeting a 13.5% reduction in energy intensity by 2025 compared to 2020 levels. Specific goals for 17 high-energy industries, including steel, aluminum, and cement, were established, along with targets to upgrade electric motors and transformers to more efficient models by 2025.



# The Future of the Energy Efficiency Movement

According to the International Energy Agency, energy efficiency must rise by over 4% per year through 2030 instead of the current 2.2% to achieve net zero by 2050

Efforts for energy efficiency could yield a significant 11-gigatonne drop in global carbon dioxide emissions by 2030, creating 12 million jobs and improving universal access to affordable energy. Despite current barriers, the market potential is substantial, estimated between \$310 billion and \$360 billion in 2011, surpassing renewable energy investments in 2013.



**+2.2%**  
**CURRENT**  
**2024**

YEARLY INCREASES IN EFFICIENCY

**+4%**  
**GOAL**  
**2030**



# The Future of the Energy Efficiency Movement

The IAE notes a 60% reduction in total final consumption in its member countries over the last four decades, highlighting energy efficiency as the "first fuel."

The largest emission reductions (40%) stem from energy efficiency measures. Progress includes increased electrification of transport and heating, with 1 in every 8 global car sales being electric, and a projected sale of nearly 3 million heat pumps in Europe alone in 2022.

Existing building codes are strengthened, and new ones are being introduced in developing countries as well as raising awareness of individual and community level action on energy consumption.

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# SOURCES

1. European Environment Agency. (n.d). Energy Efficiency. <https://www.eea.europa.eu/en/topics/in-depth/energy-efficiency>
2. IEA. (n.d). Energy Efficiency. <https://www.iea.org/energy-system/energy-efficiency-and-demand/energy-efficiency#tracking>
3. Donhof, Elizabeth. (2016). Energy Crisis of the 70s. The Journal of American Institute of Architects. [https://www.architectmagazine.com/technology/lighting/the-energy-crises-of-the-70s\\_o](https://www.architectmagazine.com/technology/lighting/the-energy-crises-of-the-70s_o)
4. Cohen, Rachel M. (2022). How to fight the affordable housing and climate crises at once. Vox. <https://www.vox.com/23025378/energy-efficiency-utilities-repairs>
5. Subramanian, Sagarika; Bastian, Hannah; Hoffmeister, Andrew; Jennings, Ben; Tolentino, Carolin; Vaidyanathan, Shruti and Steven Nadel, Steven. (2022). 2022 INTERNATIONAL ENERGY EFFICIENCY SCORECARD. American Council for an Energy Efficient-Economy. <https://www.aceee.org/sites/default/files/pdfs/i2201.pdf>
6. IEA. (n.d). Energy Efficiency - The Decade for Action- Ministerial Briefing. IEA. <https://iea.blob.core.windows.net/assets/f6df3a56-2257-4f47-a130-bf0862c31065/EnergyEfficiency-TheDecadeforAction.pdf>
7. The State Council of Information Office, The People's Republic of China. (2022). China details plan to boost industrial energy efficiency. The State Council of Information Office, The People's Republic of China. [http://english.scio.gov.cn/pressroom/2022-06/30/content\\_78297767.htm](http://english.scio.gov.cn/pressroom/2022-06/30/content_78297767.htm)
8. IEA. (n.d). LiFE lessons from India The benefits of advancing the Lifestyle for Environment (LiFE) initiative through the G20. IEA. <https://iea.blob.core.windows.net/assets/9b6305e3-c2d6-470d-b9b4-f85b67c9598f/LiFElessonsfromIndia.pdf>

