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# Energy Efficiency Policy Challenges and Outlook for 2024

## — Energy Efficiency Measures Required to Be Accelerated —

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# Key points

- As the impact of global inflation on business activities and households becomes more serious, energy efficiency and demand-side measures that require additional costs have entered a short-term adjustment phase. At the 28th Conference of the Parties to the United Nations Framework Convention on Climate Change known as COP28, meanwhile, an agreement came to enhance global efforts to double the pace of improvement in energy intensity from the current level by 2030. In 2024, each country will consider and formulate specific policies for enhancing domestic energy efficiency measures and for developed countries' support for developing countries, while taking into account burdens on consumers.

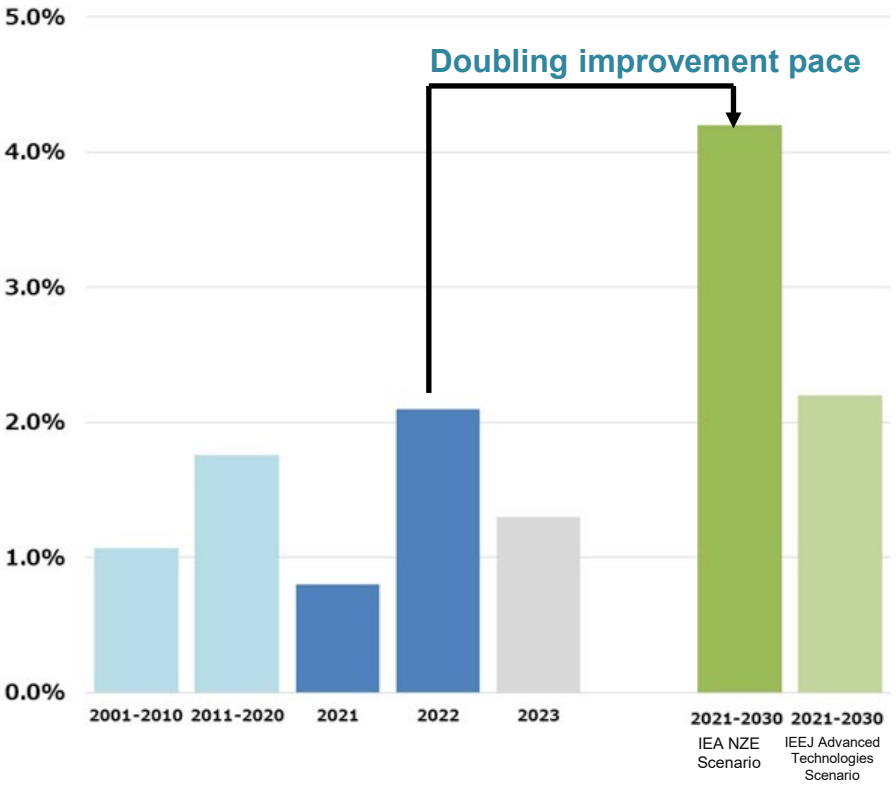
- Regarding energy efficiency technologies that hold the key to achieving the carbon neutrality goal, the manufacturing industry is supported under industrial policy mainly in developed countries and will continue to be so in 2024. This point needs to be closely watched from the perspective of the Japanese manufacturing industry's international competitiveness.

- For the household sector, where direct regulation is difficult, European and other countries have taken an important step toward strengthening measures to decarbonize or carbon-neutralize heat demand. Developed countries will take the lead to continuously enhance comprehensive measures for the promotion of consumers' energy efficiency investment, including the development of national debate, appropriate information services for consumers, and subsidies.

- Japan's support for Asian and other emerging market countries that have room to further improve energy efficiency, including financing for capital investment, energy management know-how transfers, and energy efficiency policy formulation, will remain important for achieving the goal of doubling the pace of improvement in energy intensity.

# Pace of global energy intensity improvement

Pace of improvement in primary energy supply per unit of GDP



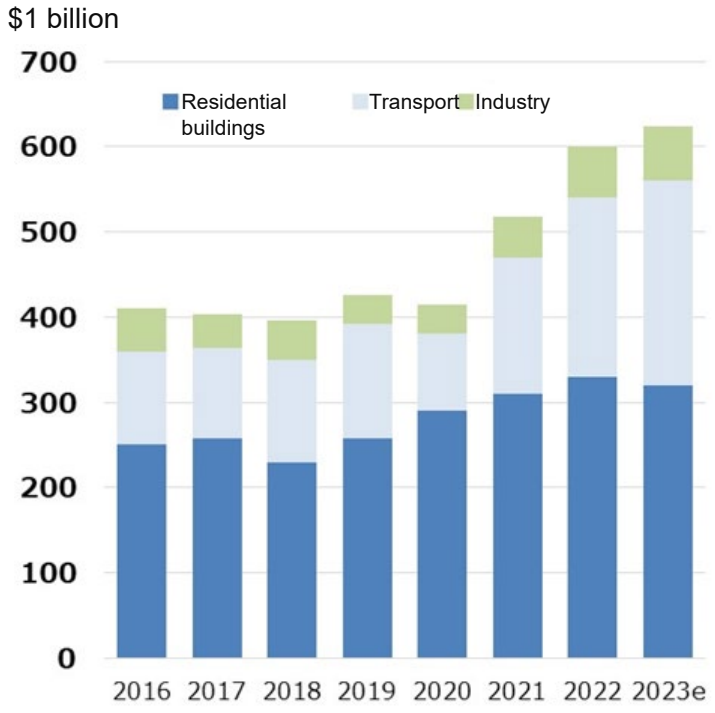

(Sources) IEA (2023) "World Energy Balances," IEA (2022) "Energy Efficiency Report 2022," IEEJ (2023) "IEEJ Energy Outlook 2024"

- Energy conservation made great progress in response to a global energy crisis in 2022.
- In 2023, the pace of improvement in energy efficiency was slower than in the previous year.
- The energy efficiency improvement pace must be doubled to accelerate energy efficiency as the first fuel to achieve net-zero emissions.
- Given the past trend, it is not easy to double the energy efficiency improvement pace. Institutional development, technology/knowhow transfers, and financial support are indispensable in not only developed countries but also emerging market countries that have the potential to improve energy efficiency.

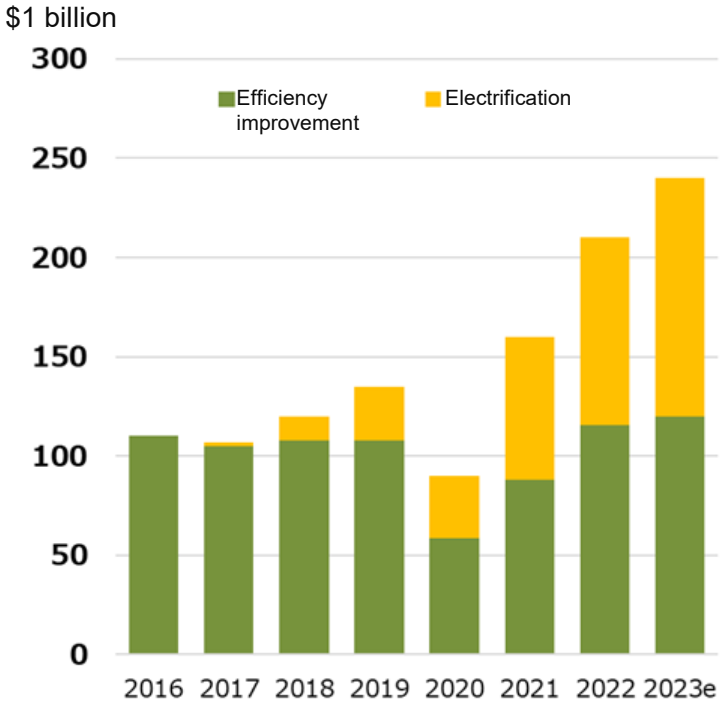
(Note) GDP data are based on purchasing power parity for IEA data and on currency exchange rates for IEEJ data.

# Energy efficiency investment trends: Growth in energy efficiency investment for residential buildings is slower than in the previous year in Europe, etc.

Global energy efficiency and electrification investment trends （2016-2023）




Transport sector efficiency improvement and electrification investment trends （2016-2023）




(Source) IEA (2023) “World Energy Investment 2023”

# Trends behind energy efficiency investment

## Industry

Energy efficiency investment was sluggish in 2022 due to soaring energy prices in Europe and other countries before recovering moderately in 2023.

- **Europe:** Production adjustment accounted for half of natural gas savings responding to the energy crisis. Energy price spikes forced capital investment in major industries to decline.
- **U.S.**: The Inflation Reduction Act provided economic incentives for the industry sector's decarbonization and the government promoted preferential purchases of green products.
- **Asia:** Energy efficiency investment picked up from 2022 to 2023 in China, India, and Southeast Asia.

## Transport

In 2023, almost half of the road sector's global energy efficiency investment was related to electrification.

- **Europe:** Electric vehicle sales totaled 2.7 million units in 2022 (posting a 15% increase from 2022, slower than in the past). Growth was affected by high inflation and sluggish consumer confidence. However, EV sales accounted for 20% of total vehicle sales.
- **U.S.:** EV sales in 2022 increased by 50% from the previous year. In 2023, the Inflation Reduction Act drove EV sales growth.
- **China:** EV sales in 2022 increased by 80% from the previous year. While government subsidies for EVs were abolished, the vehicle lineup expanded in response to tax incentives and new energy vehicle regulations, encouraging consumers to select EVs. EV sales in China accounted for 50% of global EV sales.
- **Asia:** In 2022, EV sales increased substantially, including two-wheelers and three-wheelers (India, Vietnam, Thailand, etc.).

## Buildings

Rising borrowing costs, soaring building materials prices, and economic uncertainties were limiting growth in energy efficiency investment in 2023.

- **Europe:** Subsidization led investment in insulation retrofitting and electrification to make major progress in 2022. In 2023, hikes in building materials prices and borrowing costs decelerated investment in residential buildings in Germany and other countries.
- **U.S.:** The expansion of Inflation Reduction Act measures such as heat pump introduction drove energy efficiency investment in 2023.
- **China:** In 2022, real estate investment declined by 10% from the previous year. Investment in green buildings also stagnated. A similar trend continued in 2023.

(Source) IEA (2023) "World Energy Investment 2023"

# Energy efficiency and demand-side measures in an adjustment phase
## German and U.K. cases

### Germany

**Initial proposal**

- The three-party coalition agreed on an amendment to **the Building Energy Act** in April 2023.
- The amendment required new heating equipment to use **renewable energy electricity for at least 65% of electricity consumption** from January 1, 2024.
- The amendment was approved by the Bundestag on June 15,2023.

**Revision**

- On July 5, 2023, the Constitutional Court decided that it would be impossible for the Bundestag to pass the amendment. **On September 8, 2023, the Bundestag passed a revised amendment.**
- The revised amendment requires new heating equipment in **newly developed areas** to use **renewable energy electricity for at least 65% of electricity consumption** from January 1, 2024.
- In other areas, the amendment will not apply until **local governments prepare heat plans.**

### U.K.

- 2020: The government announced it will **ban gasoline and diesel vehicle sales** in 2030.
- 2021: A **heat and buildings strategy** was formulated.
  - Demand-side carbon neutralization including heat pump diffusion
  - Enhancing energy efficiency measures under the Building Standards Act.
  - Banning inefficient rental apartments
  - Implementing hydrogen and biofuel supply consideration and demonstration projects

- On September 20, 2023, Prime Minister Rishi Sunak announced a **delay of net-zero emission measures** including those for vehicles and boilers.
  - Gasoline/diesel vehicle sales ban: from 2030 to 2035 (with quotas left for automakers)
  - Areas with no access to gas pipelines (16% of the total): A ban on new oil/LPG heating equipment will be delayed from 2026 to 2035.
  - Ban on fossil fuel heating equipment (2035): Low-income earners are exempted.
  - Ban inefficient rental apartments: Cancelled

# Reference: Key points of EU energy efficiency policy for enhancement

## Energy Efficiency Directive

A revised version was put into force (September 2023). Following are major revisions:

| | |
|---|---|
| Energy savings target | ● Reducing final energy consumption by 11.7% by 2030 (relative to the 2020 reference scenario)<br>● Increasing annual energy savings from 0.8% to 1.3% (2024-2025), then 1.5% (2026-2027) and 1.9% (2028-2030) for demand-side users of an obligation on energy suppliers and/or other alternatives |
| Public sector role | ● Introducing an annual energy consumption reduction target of 1.9% for the public sector<br>● Extending the annual 3% buildings renovation obligation to all the levels of public administration. |
| Response for low-income earners | ● Providing economic support for low-income earners to promote energy savings |
| Local heat supply | ● Promoting local heat supply plans |
| Data center energy savings | ● Bringing in a new obligation to monitor energy demand (500 kW or more) at data centers, with an EU-level database collecting and publishing data, from May 15, 2024 |

## Energy Performance of Building Directive

The EU Parliament and Council tentatively agreed on proposed revisions (December 2023)

| | |
|---|---|
| Residential and building energy savings | ● Reducing residential final energy consumption by 16% by 2030 and by 20-22% by 2035<br>● Improving minimum energy performance standards for commercial building stock gradually to renovate 16% of the most poorly performing buildings by 2030 and 26% by 2033 |
| Phasing out fossil fuel boilers | ● Banning subsidies for fossil fuel boilers from January 2025. Requiring member states to introduce legal regulations for setting heating conditions based on GHG emissions, fuels, renewable energy shares, etc.<br>● Seeking to completely ban fossil fuel boilers by 2040 |
| Zero-emission requirements for new housings/ buildings | ● New public buildings will be required to be zero-emission from January 1, 2028, and housings and buildings from January 1, 2030.<br>● New housings and buildings are required to be solar-ready. Solar PV will be phased in for existing public and commercial buildings from 2027 (as far as technologically, economically, and functionally possible). |

# U.S.: Electrification and gas use trends

**Ban on gas restrictions**

- As of November 2023, **25 states** had enacted **legislation to ban gas restrictions.** At present, **seven states are considering similar legislation**.

**Electrification promotion**

- **Regulations with a building standards act:** New York, Washington
- **Building standards act providing for electrification readiness**: California
- **Gas ban under consideration for new buildings**: Connecticut, Maryland, New Jersey, Rhode Island
- Cities: Denver, Los Angeles, New York City, San Francisco, Washington, D.C., etc. call for electrification for new buildings. Cities in Massachusetts State implement a pilot program to require electrification for new construction projects.

**Revising standards for heating equipment and water heaters**

- The Department of Energy implements the following revisions to standards for residential heating equipment and water heaters:
  - **Residential heating:** Minimum energy efficiency standard at 95% **for gas furnaces**
  - **Residential heating:** Revisions to the minimum energy efficiency standards for **gas/oil boilers** were proposed on August 14.
  - **Residential water heater:** Proposed **r**evisions to the minimum energy efficiency standards for **gas/oil/electric water heaters** were published on July 21.

(Sources) Various documents

# Industrial policy support unfolding for energy efficiency technology manufacturing in various countries

## U.S.

### Inflation Reduction Act

- Under the Inflation Reduction Act (enacted in August 2022), support for the manufacturing and introduction of technologies contributing to carbon neutralization is provided, including tax credits, subsidies, and low-interest loans.
- **Specifics:** EV purchases and manufacturing; steel, aluminum, cement, chemical, paper-pulp, and glass manufacturing; energy efficient housing introduction

## U.K.

### Clean Heat Market Mechanism

- The 2021 Heat and Building Strategy proposed the promotion of domestic heat pump production.
- Proposing the Clean Heat Market Mechanism (CHMM)
- **Specifics:** Under consideration in regard to the CHMM is gas/oil boiler makers' compliance with a certain heat pump production share (from 2024). Trading in credits for shortfalls may be introduced.

## EU

### Net-Zero Industry Act

- Under the Green Deal Industrial Plan, the Net-Zero Industry Act was proposed in May 2023, aiming to manufacture 40% of net-zero technologies in Europe by 2030. National subsidization and various EU funds will be utilized
- **Specifics:** Under consideration are renewable energy; nuclear; energy storage; CO2, methane, and nitrogen monoxide capture, transportation, injection, storage, and utilization; hydrogen; alternative fuels, heat supply and electricity networks; nuclear fusion; industry electrification and efficiency improvement; biomaterials; and recycling.

## France

### Green Industry Act

- The Green Industry Act was enacted in October 2023, aiming to accelerate the reindustrialization of France while promoting the transition to ecology. Simpler plant installation approval procedures and tax credits are under consideration.
- **Specifics:** Promoting the introduction of five major technologies – wind power generation, solar PV, heat pumps, batteries, and green hydrogen

# Asian countries: Overview of energy efficiency policies

| Country | Details |
|---|---|
| China | • China has set the so-called 3060 target and a target of improving the energy intensity by 13.5% within the 2021-2025 period through (1) improvement of equipment in steel, cement, and other industries, (2) promotion of manufacturers' concentration and joint utilization of equipment in industrial parks, and (3) promotion of energy efficiency for existing buildings in urban regions.<br>• Implementing green building standards, new energy vehicle promotion, technological innovation, regulation and standard development, and subsidization.<br>• In 2023, technological requirements were adjusted for tax incentives for new energy vehicle purchases. |
| Indonesia | • The new Energy Conservation Government Regulation No. 33/2023 was issued to revoke the previous Government Regulation No. 70/2009. The new regulation requires energy management for transportation and industry business operators that consume at least 4,000 tons oil equivalent per year and for commercial buildings that consume at least 500 TOE/y. Others are urged to implement energy management. |
| Malaysia | • The National Energy Policy 2022-2040 has been enforced, giving consideration to resilience, energy security, economic efficiency, and environmental sustainability. The National Energy Transition Roadmap has been implemented.<br>• The Energy Conservation Act was put into force in 2023, featuring pillars such as (1) energy savings by large energy consumers, (2) energy savings by buildings, (3) labelling of energy-efficient products, and (4) energy management and relevant educational organizations. |
| Thailand | • Electricity conservation campaigns were implemented in residential and commercial sectors in April 2023, requiring industry and commercial sectors to achieve some electricity savings rates if LNG prices shoot up by $50 per million British thermal units.<br>• Thailand has a target of improving energy intensity by 37% by 2037, utilizes digital technology for innovations, and promotes digitalization and energy conservation under the 4D1E (Decarbonization, Digitalization, Decentralization, Deregulation, and Electrification) policy. |
| Philippines | • The Philippines enhanced electricity conservation campaigns in response to the tightening electricity supply-demand balance in June and July 2023, decided on an energy conservation law and the National Energy Efficiency and Conservation Plan, and published the National Energy Efficiency and Conservation Roadmap 2023-2050, promoting subsidies for energy efficiency projects, energy conservation at government agencies, the minimum energy performance standards, an energy management certification system, energy conservation commendation, the certification of energy conservation education organization, etc. |

The Asia Zero Emission Community (AZEC) Leaders Meeting in Tokyo on December 18 adopted the AZEC Leaders' Joint Statement, calling for enhancing energy efficiency as "the first fuel," sharing information and best practices, coordinating policies, and undertaking human resources exchange and development.

(Sources) Various documents

# Japan's energy efficiency and conservation policy: Initiatives for carbon neutral energy demand

**Revision of the Act on Rationalizing Energy Use and Shifting to Non-fossil Energy in 2022**

**Expanding non-fossil energy use**

## Non-fossil fuel targets for industry and transport sectors

- Cement, paper-pulp, petrochemical, steel, and automobile manufacturers and transport business operators will set industry-wise guidelines for non-fossil fuels by 2030. Each will set a target based on the guidelines on its own responsibility and report annual progress towards the target.
- Industries subject to regular reports, other than the five industries, will set targets for the transition to non-fossil energy.

**Demand response**

## Major energy consumers' introduction of demand response

Business operators obliged to file regular reports are required to report demand response frequency (demand increase and suppression).

**Matters under consideration at the Energy Efficiency and Conservation Subcommittee in 2023 and 2024**

Residential water heaters

## Carbon neutralization of water heaters

- Under consideration are the improvement of energy efficiency for boilers and the direction of changes in boiler manufacturers' product mixes, including an increase in the share for water heaters contributing to carbon neutrality (heat pumps, hybrid heat pumps, and hydrogen-fueled water heaters).

Equipment

## Making equipment DR-ready

- The introduction of DR-ready requirements for equipment is considered. The cost-benefit balance for DR-ready equipment and cost transfer mechanisms is prudently considered. How to pave the way for the introduction of demand response is also under consideration.

Consumers' engagement

## Electricity/gas retailers' energy efficiency pledge & review

- Under consideration is a system in which electricity/gas retailers set consumers' energy saving targets for the government's review to increase consumers' engagement in energy efficiency.

(Sources) METI（2023）"Future Policy on Energy Efficiency and Conservation and Transition to Non-fossil Energy on the Energy Demand Side" https://www.meti.go.jp/shingikai/enecho/shoene_shinene/sho_energy/pdf/038_01_00.pdf, METI (2023) "Interim Report by the Energy Efficiency and Conservation Subcommittee – Demand-side Energy Policy Outlook" https://www.meti.go.jp/shingikai/enecho/shoene_shinene/sho_energy/pdf/20230726_1.pdf

# Japan: Matters under consideration for carbon neutralization of water heaters

## Measures to be considered in FY2024

| | | |
|---|---|---|
| **Targets and timing** | **Current status** | Since residential water heaters range wide from gas and oil water heaters to electric water heaters, heat pumps, hybrid water heaters, and residential fuel cells, product mixes differ from manufacturer to manufacturer. |
| | **Matters under consideration** | Before setting (1) the date for launching regulations and (2) the target fiscal year, the subcommittee will prudently consider water heater mixes that differ from manufacturer to manufacturer. |
| **Non-fossil energy targets** | **Current status** | The government, energy suppliers, and their groups will set medium- to long-term targets for non-fossil fuels and electricity to achieve carbon neutrality. Manufacturers will be required to produce water heaters that support supply-side carbon neutrality plans. |
| | **Matters under consideration** | The subcommittee will consider benchmarks to assess manufacturers' product portfolios in a technologically neutral manner (e.g., comprehensive benchmarks covering contributions of energy efficiency improvement, heat pumps, hydrogen, and e-methane to carbon neutrality). |
| **Consideration of demand characteristics** | **Current status** | Water heaters differ by region, housing category, and building ownership (e.g., heat pumps and residential fuel cells are less installed for collective housing or urban collective housing). |
| | **Matters under consideration** | Manufacturers will be encouraged to develop heat pumps for operation in cold areas and small hot-water tanks. The government will take powerful policy measures, including economic incentives for promoting technology development at water heater manufacturers. |

(Source) METI (2023) "Interim Report by the Energy Efficiency and Conservation Subcommittee – Demand-side Energy Policy Outlook"
https://www.meti.go.jp/shingikai/enecho/shoene_shinene/sho_energy/pdf/20230726_1.pdf

# Foreign cases' implications for Japan

# Implications for Japan's enhanced energy efficiency and conservation

- ✓ The following implications for Japan's promotion of energy efficiency and conservation can be derived from foreign cases:
  - ✓ As the top priority towards long-term green growth, each country is enhancing support for the manufacturing industry under industrial policy. This trend should be closely watched with a view to strengthening the international competitiveness of Japan's manufacturing industry. The government should commit and spread medium- to long-term support for energy efficiency and other private investments in domestic green transformation.
  - ✓ For the residential sector, where direct regulation is difficult, attention is being paid to the decarbonization or carbon neutralization of heat demand that is being promoted in European and other countries. In Japan, which aims to achieve carbon neutrality by 2050, it is important to steadily promote carbon neutralization. In doing so, Japan should present a long-term path while taking into account region-by-region differences in climate and demand, as well as future cost reductions, and changing technology standards and diffusion targets over time.
  - ✓ For emerging market countries that have room to further improve energy efficiency, Japan is required to provide support for energy management knowhow transfers, energy efficiency policy formulation, and financing for investment in energy efficient equipment. Given the joint statement adopted at the Asia Zero Emission Community Leaders Meeting in Tokyo, Japan is required to continue cooperation mainly in Asia.

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