



Energy Efficiency Policy Toolkit 2024

From Versailles to Nairobi

International
Energy Agency

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 31 member countries, 13 association countries and beyond.

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Introduction



Energy efficiency is central to improving the lives of all people. It provides affordable and reliable energy access, bolsters the security of energy supply, accelerates clean energy transitions and supports economic growth and resilience. For these reasons, energy efficiency policies can deliver many benefits to people – lowering energy bills, improving health outcomes, and creating new jobs, while ensuring these benefits are shared by all. A strong, early focus on energy efficiency is essential to achieve net zero emissions by 2050.

To accelerate action on energy efficiency, the International Energy Agency (IEA) created this Policy Toolkit for governments on the occasion of the **9th Annual Global Conference on Energy Efficiency**. This Global Conference in Nairobi is co-hosted by the IEA Executive Director Fatih Birol and the Kenya's Minister of Energy and Petroleum Davis Chirchir. The Policy Toolkit will help governments contribute to the global target of doubling energy efficiency progress by 2030, as agreed in the [UAE Consensus](#) reached at COP28 in Dubai and the [Versailles Statement](#) from the IEA's 8th Annual Global Conference on Energy Efficiency in 2023.

The Toolkit builds on the IEA's Policy Packages, which were launched at the IEA's [7th Annual Global Conference on Energy Efficiency](#) in Sønderborg. These Policy Packages provide a practical approach to

accelerate energy efficiency by guiding governments in the design of effective policy measures. They highlight key policies which should be combined to create strong outcomes across three pillars: regulation, information and incentives. They were updated for the [Versailles Conference](#) in 2023.

The **2024 Policy Toolkit** focuses on how the doubling goal can be achieved with concrete tools or specific instruments found in the Policy Packages. **The “Doubling Policy Tools” are meant to help policymakers with the implementation of energy efficiency policies that can contribute to annual progress** while improving living standards, public budgets, energy security and employment, and while supporting just and inclusive energy transitions.

This document is created as an accessible overview on policy instruments and includes useful links to more detailed information. For the 9th Global Conference, the IEA has developed 12 initial “doubling tools” that address the efficiency of buildings, appliances, industry and vehicles. It will be updated as more tools are added throughout the year.

10 strategic principles

Based on the IEA's analysis of best practices and the work of the [Energy Efficiency Policy Hub](#), the following strategic principles can help guide policy makers to enhance and expand their energy efficiency policies and programmes, and to accelerate energy efficiency gains through new and stronger policy.



1. Prioritise [cross-cutting energy efficiency action](#) for its economic, social and environmental benefits.



2. Act to [unlock efficiency's job](#) creation potential.



3. [Create greater demand](#) for energy efficiency solutions.



4. Focus on finance in the wider context of [scaling up action](#).



5. Leverage [digital innovation](#) to enhance system-wide efficiency.

6. [Lead by example](#) in the public sector.



7. [Engage all](#) parts of society.



8. [Leverage behavioural insights](#) for more effective policy.



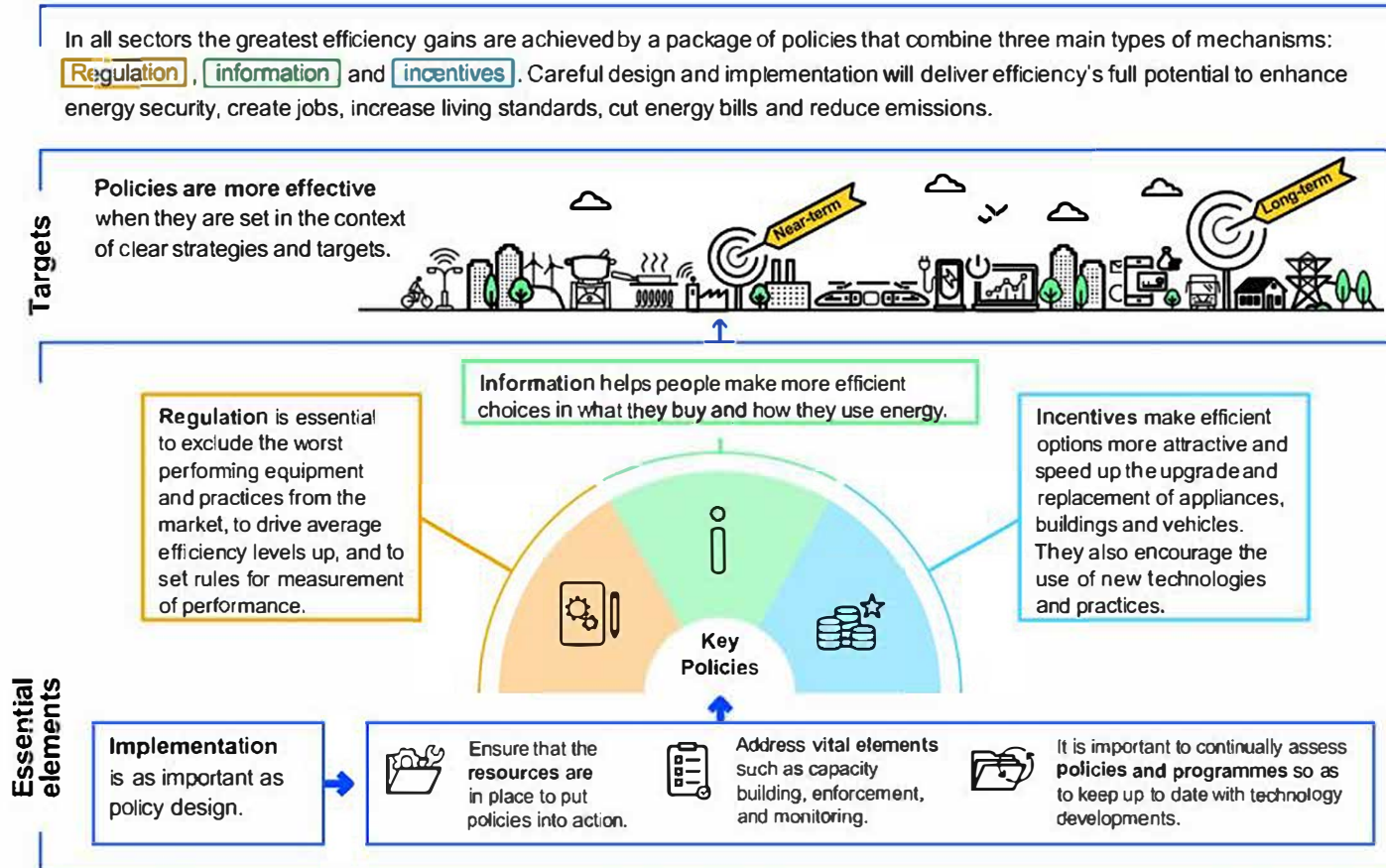
9. Strengthen [international collaboration](#).



10. [Raise global energy efficiency](#) ambition.



Policy Packages for Energy Efficiency



The Energy Efficiency Policy Packages contain instruments that cover different sectors and types of policies. While countries should work towards a framework that includes different instruments and covers multiple sectors, in the short term, it can be useful to prioritise. Some policies are quicker to implement or can have larger effects. This depends on national circumstances, such as the existing policy mix, the structure and size of the economy, available fiscal space and the country's institutions. The following questions aim to help policymakers identify first steps, given their specific situation:

1. **Which sectors contribute the most to national energy consumption?** Identifying the energy consumption of different sectors can help policymakers determine what to focus on. If the industrial sector is responsible for half of the country's energy demand, it can be useful to first spend effort on the Policy Package for industry. Strong data and reporting is essential to adequately analyse sectoral consumption.
2. **What are the national climate and energy policy goals?** Determining the targets and time horizons is important to identify potential policy instruments. For instance, countries expecting to expand their building stock can benefit from regulation and incentives for new buildings, while other countries might prioritise retrofits or other sectors. Policy targets in 2030 can require strengthening existing instruments, while new instruments can be considered for longer-term targets. It is also important to take existing national and international obligations and commitments into account.
3. **What are the existing energy efficiency policies?** Setting up new policy measures can take time. It can be more time-efficient to strengthen existing policies rather than developing and implementing new legislation or regulation.
4. **Which type of policy instruments should be the focus?** If a country already has a lot of incentives in a sector, additional incentives might not lead to as significant energy efficiency improvements as exploring other types of instruments such as regulation or information tools.
5. **What are the necessary resources and capacity?** The implementation of policy instruments might require skilled personnel, funding and time. Depending on these resources, countries can choose the best policy instruments for their context. Countries with limited fiscal space might consider regulatory or informational tools first, as incentives can sometimes be costly. Similarly, regulations require institutions to monitor and enforce them, which need to be in place before a regulation is implemented.
6. **Which policy measures can complement or strengthen the existing energy efficiency policy mix?** Many of the policy measures in the packages can reinforce each other. For example, a country with an existing labelling scheme might consider minimum energy performance standards, since a lot of the necessary infrastructure is already in place.

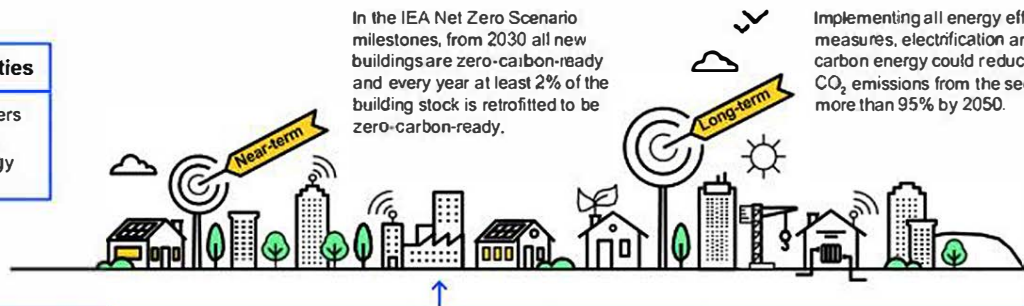
Policy Package – Buildings Energy Efficiency

Immediate opportunities

Replacing fossil fuel boilers with high efficiency heat pumps can reduce energy use by up to 75%.

In the IEA Net Zero Scenario milestones, from 2030 all new buildings are zero-carbon-ready and every year at least 2% of the building stock is retrofitted to be zero-carbon-ready.

Implementing all energy efficient measures, electrification and low-carbon energy could reduce total CO₂ emissions from the sector by more than 95% by 2050.



REGULATION

- **Targets for energy efficiency** in buildings, including for renovation rates, fosters market growth and facilitates long-term investment decisions.
- **Building energy codes** for new and existing buildings are essential to accelerate the transition to zero-carbon-ready buildings. It is important that they are regularly updated to increase coverage and stringency.
- **Minimum energy efficiency requirements** for existing buildings help guarantee performance and accelerate the process of renovation through instruments such as the standardisation of processes.
- **Regulations** can ensure that buildings are equipped with smart interactive technologies and can become demand response ready.



INFORMATION

- **Information on building performance** allows consumers to identify the most efficient options when buying or renovating buildings. Examples include energy performance certificates, disclosure programmes, one-stop shops for upgrades and renovation passports.
- **Smart interactive technologies** can show real-time energy performance, help adjust occupants' behaviour and optimise energy use based on signals from the grid.
- **Training and education programmes** for building sector workers are important to ensure a suitably skilled workforce.
- **Public awareness campaigns** designed to include behavioural insights encourage low-cost actions, such as thermostat adjustment and use of smart technologies.



INCENTIVES

- **Financial incentives** such as green mortgages, energy performance-based preferential loans and tax rebates and grants can motivate consumers and developers to increase investment in energy efficient solutions.
- **Expedited administrative procedures**, including accelerated permitting, targeted at high performing new build or retrofit projects, encourage the implementation of energy efficient measures.
- **Award and recognition programmes** encourage the development of highly energy efficient buildings.

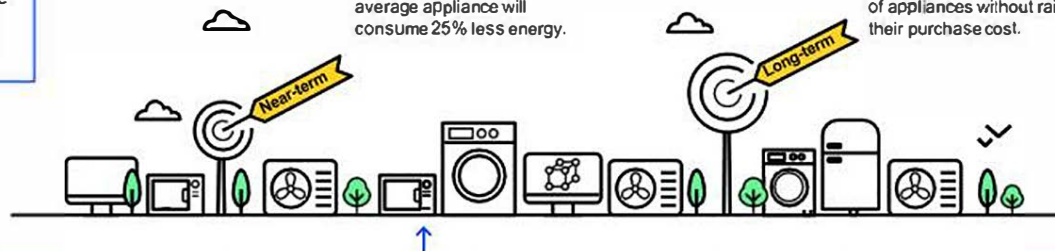
Policy Package – Appliance Energy Efficiency

Immediate opportunities

In most cases, it is possible to buy appliances that are twice as efficient as those typically purchased.

In the IEA Net Zero Scenario milestone for 2030 the average appliance will consume 25% less energy.

Long-term appliance policies can halve the consumption of appliances without raising their purchase cost.



REGULATION

- **Minimum Energy Performance Standards** exclude the least efficient products from the market. They should be in line with international best practices, while reflecting local circumstances; and be regularly updated. Regulations are essential for moving the market towards the best available technology in line with achieving net zero targets.
- **Regulation** can ensure that new appliances are demand response ready in order to offer flexibility to the end-user and the overall system, and reduce peak demand.
- **Regulating the import and performance of used appliances** can help avoid inefficient appliances entering the market.



INFORMATION

- **Comparative labels** help consumers, to identify the most efficient appliances and encourage purchases based on lifetime costs. Ensuring labels are appropriately displayed is also key.
- **High Efficiency Performance Specifications** identify the best performing products and are often used as the basis for labels and incentives.
- **Education and capacity building** encourage industry and retailers to produce and supply more efficient products.
- **Consumer information campaigns** help people make informed decisions. These are most effective when based on behavioural insights and targeted strategies.



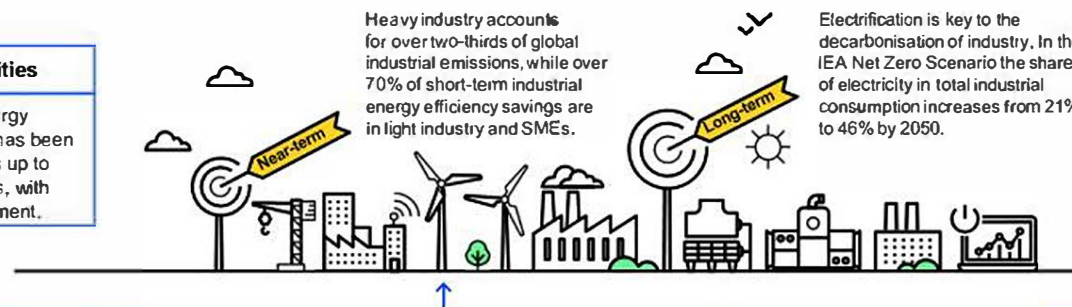
INCENTIVES

- **Rebates, grants and other financial offers** motivate consumers to buy highly efficient appliances. These could come directly from governments or schemes such as energy efficiency obligations.
- **Finance or taxation measures** on sales and imports can encourage manufacturers to produce appliances that are more efficient.
- **Dynamic electricity pricing** helps incentivise flexible demand.
- **Product lists** help companies and households identify efficient products which are eligible for loans, tax reductions, or other financial incentives.
- **Awards** promote the most efficient appliances and equipment.

Policy Package – Industry Energy Efficiency

Immediate opportunities

Implementing better energy management practices has been shown to deliver savings up to 15% in the first 1-2 years, with little or no capital investment.



REGULATION

- **Minimum Energy Performance Standards** for key equipment, such as motors and pumps, can drive up overall industrial efficiency levels.
- **Regulation** extends beyond technology to target areas such as research and development, energy auditing, mandatory consumption reporting, energy management systems, and upskilling of the workforce. Incorporating life cycle impacts into regulation helps promote material efficient choices at the design stage.
- **Regulatory instruments** yield best results when rooted in a good understanding of local context and include ambitious, regularly updated, standards.
- **Regulations to ensure demand side response capabilities** help provide flexibility to the grid.



INFORMATION

- **Benchmarking, indicators and other forms of detailed data** allow governments to track the progress of policies and allow industries to compare their energy performance with that of their peers.
- **Digital technologies** enable industries to track energy use in real time and help ensure flexible demand side response, resulting in energy optimisation and cost saving opportunities.
- **Sharing information on energy efficiency best practice** through targeted information and industry networking activities helps industries raise ambition and improve energy performance.



INCENTIVES

- **Incentives** such as preferential finance, links to carbon trading, obligations and tax-based measures can motivate crucial energy efficient decisions at the process design and equipment selection stage, supporting industry's transition to near zero emission technologies.
- **Free or subsidised energy audits**, often targeted at SMEs and other sectors of strategic importance, can help rapidly increase energy efficiency.
- **Policies to foster Energy Service Companies** provide industry with access to significant external energy expertise and attractive structured financial packages.
- **Incentives for the reuse and recycling of materials** reduce the need for higher-emission primary materials production.

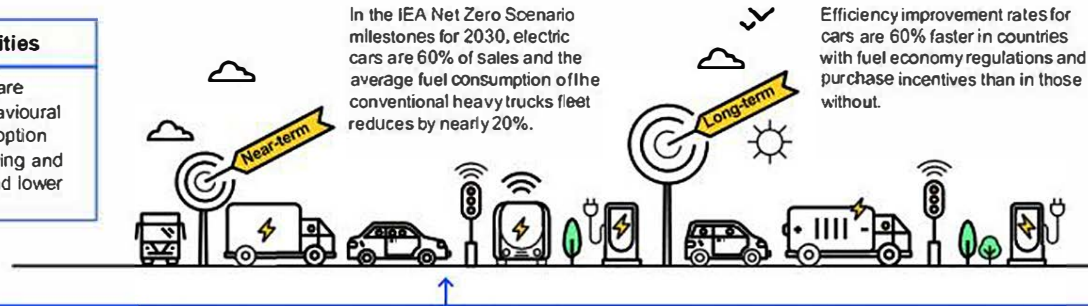
Policy Package – Vehicle Energy Efficiency

Immediate opportunities

Significant fuel savings are achievable through behavioural actions including the adoption of best practices for driving and vehicle maintenance, and lower speeds.

In the IEA Net Zero Scenario milestones for 2030, electric cars are 60% of sales and the average fuel consumption of the conventional heavy trucks fleet reduces by nearly 20%.

Efficiency improvement rates for cars are 60% faster in countries with fuel economy regulations and purchase incentives than in those without.



REGULATION

- **Vehicle fuel economy standards** result in greatly reduced fuel use provided they are kept up to date, well monitored and properly enforced.
- **Regulating the import and export of used vehicles** can help improve fleet fuel economy and ensure road safety and air quality benefits.
- **Regulatory and market signals**, such as through stringent standards and target setting, help bring electric vehicles to the market, by providing an impetus to manufacturers to develop these technologies.
- **Regulation** can also help ensure the required infrastructure, such as standardised charging, is in place.



INFORMATION

- **Information campaigns** on carsharing practices and more fuel-efficient driving help people take informed action relating to energy and cost savings. Campaigns are more effective when based on behavioural insights and targeted strategies.
- **Labels inform consumers**, identifying the most efficient vehicles allowing people to choose vehicles that cost less to run. Labels for new and used vehicles help ensure benefits for all vehicle purchasers.



INCENTIVES

- **Incentives** can make vehicle costs cheaper at point of purchase, such as through grants or lower registration fees. They can also reduce on-going costs, through for example free parking and exemptions from congestion tolls.
- **Government grants** for strategic charging infrastructure, such as charging stations in homes and workplaces or fast charging along expressways, encourage the adoption of electric vehicles reflecting that purchase decisions are influenced by the availability of infrastructure.
- **Such Incentives** facilitate the early adoption of electric vehicles and can be phased out as uptake grows.
- **Vehicle taxation and duties**, can be structured to incentivise the purchase of more efficient vehicles.

Policy Package – Energy Efficient Cities

National policy makers play an important role in accelerating urban energy transitions. Cities connect directly with communities and people to enhance implementation and better inform policy. National and city-level alignment in energy efficiency policy is a key dimension of clean energy transitions. Energy Efficient cities can use digital tools to make smarter, better-informed decisions and improve quality of life for all.



REGULATION

- **National governments help create the environment** for cities to take action through setting an overall vision including plans and targets.
- **Local regulations and codes** incorporating solutions such as smart data and metering help unlock system-wide efficiencies.
- **Planning** should be integrated and cross sectoral, taking a long-term view.
- **International standards and benchmarks** are important in enabling seamless communication across technologies and applications, critical for efficient urban energy systems.
- **National action that facilitates business models** for clean urban energy services, such as Public Private Partnerships and ESCOs, unlock new sources of finance.



INFORMATION

- **National Initiatives** can be used to build energy efficiency capacity in cities through creating training opportunities and partnerships, informed by international best practices.
- **Digitalisation creates new sources of data** e.g. on-air quality, energy consumption and traffic. Analysis and communication of this data can improve the operation of urban energy systems.
- **Digital solutions for energy efficiency** in cities, require open, transparent access to data, with privacy protected. National governments can facilitate this by developing guidelines and mechanisms to enable data use and sharing across sectors and levels of government.
- **Sharing information on energy efficiency best practices** and proven cost-effective technologies can help cities better understand and implement efficiency opportunities to improve performance.



INCENTIVES

- **Investing in city level action and enabling funding** to flow from the national to local level, through targeted funding models, can give the best returns on investment and accelerate inclusive clean energy transitions.
- **National governments can use their influence to leverage international programmes** aimed at cities, for example by creating innovation areas to attract digital and clean energy technology talent.
- **Seed funding and complementary finance from national governments**, can mobilise and help scale up private capital for investment in energy efficient cities.
- **Green procurement** for example through the incorporation of energy efficiency performance criteria into municipal tenders, mobilises the purchase power of public bodies, acting as a major driver for market deployment of efficient products.

Policy Package – Clean Efficient Cooking

Immediate opportunities

A successful strategy to achieve clean cooking goals needs to consider all available technologies and fuels.

For rural communities, replacing traditional stoves with improved solid fuel stoves is an important first step to better population health.

In the IEA Net Zero Scenario universal access to clean cooking is achieved by 2030. This can reduce GHG emissions by 870 Mt CO₂-eq equivalent to double Brazil's total annual CO₂-eq emissions from energy today.

Globally long-term policies prioritise electrical cooking appliances to reach climate goals. By 2050 reduced indoor air pollution due to clean cooking will result in 2.3 million fewer premature deaths per year.



REGULATION

- **Strong government regulation** of energy markets can help ensure clean energy supplies are available for consumers.
- **Minimum Energy Performance Standards** for clean cooking stoves and other cooking equipment remove the least efficient products from the market.
- **Targeted subsidies for the most vulnerable consumers** can help ensure equal access to clean cooking, such as efficient LPG or electric cooking.
- **Building codes and obligations on landlords** can ensure adequate ventilation and other health and safety requirements are met.



INFORMATION

- **Consumer information campaigns** help people make more informed decisions. They are most effective when based on behavioural insights and targeted strategies.
- **Local information provision** through field offices in rural areas and advisory centres can improve the standing of programmes among the local population.
- **Demonstrations** highlighting traditional dishes successfully cooked using new technologies can help transform perceptions.
- **Labelling and certification** help consumers to identify the most energy-efficient clean cooking technologies. This can create a market for efficient technologies and provides motivation for manufacturers to improve the efficiency of their products.



INCENTIVES

- **Measures such as rebates, grants and tax reductions** motivate consumers to choose efficient clean cooking appliances.
- **Appliance replacement programmes** encourage households to replace their old, inefficient cooking stoves with more efficient models including induction stoves.
- **Clean cooking initiatives** can be included in carbon credit and offset schemes.
- **Restructuring energy tariffs**, including those for electricity, to include provisions favouring clean cooking can incentivise consumers to switch from traditional biomass and other fossil fuels.

Policy Package – Financing Energy Efficiency

Immediate opportunities

Growth in energy efficiency investment is lower than it needs to be, but enacting the right policies delivers social and economic benefits promptly, such as doubling the number of energy efficiency related jobs by 2030.

Stronger policy action can facilitate a tripling of energy efficiency-related investment to almost USD 1.8 trillion per year by 2030 in the IEA Net Zero Scenario.

Reaching net zero emissions requires an unprecedented acceleration in action. The share of total energy investment related to energy efficiency will need to continue to increase from around 20% of the total today to about 50% in 2050.



REGULATION

- **Long-term strategies, targets and planning** emphasise government commitments to sustained change, attracting private investment.
- **Energy market structures** can facilitate the participation of private actors, including energy service providers, supporting investment over time.
- **Strong policy and governance frameworks** including transparency regulations, Minimum Energy Performance Standards and ESG (Environmental, Social and Governance) requirements, can attract international investment and ensure the long-term flow of capital.
- **Utility regulation** can spur investment and enable innovative financing approaches e.g. where outlay is recouped through energy bills.



INFORMATION

- **Training programmes and technical assistance** for financial institutions and project developers help improve understanding of business models, risks and opportunities.
- **Policies and digital tools** enhancing data availability and quality, including energy performance certificates, help to improve financiers' understanding, and to verify energy savings and payback periods.
- **Development of standardised contract templates and terms** help create trust, reduce transaction costs and simplify replication.
- **Dedicated information campaigns** raise awareness of preferential funding opportunities, and how to access them.



INCENTIVES

- **Streamlined and digitised administrative processes** for energy efficiency projects, including permits, licences or subsidies and one-stop shops reduce barriers to investment.
- **Public funding** can support de-risking mechanisms, like guarantee funds or risk-sharing facilities, helping to attract private capital.
- **Coordination platforms** and matchmaking services between project developers and private investors can improve access to funding.
- **Policies promoting innovative mechanisms** such as bulk procurement, on-bill financing and leasing models can achieve scale and amplify actions.
- **Energy subsidy reform** helps phase out poorly targeted fossil fuel subsidies while boosting direct support for energy efficiency measures, including for vulnerable groups.

Immediate opportunities

The expansion of heat pump manufacturing and installations has the potential to reduce CO₂ emissions, improve air quality, and generate employment.

Policy Package – Heat Pumps for Buildings



REGULATION

- Introduce **stringent Minimum Energy Performance Standards (MEPS)** to ensure that heating solutions including heat pumps adhere to high-efficiency requirements.
- Mandate that new heat pumps are equipped with **connected controls**, providing flexibility to end-users and the overall energy system, contributing to reducing peak demand.
- Establish **regulations, including building codes**, facilitating the integration of heat pumps. This includes adjustments related to thermal performance, and building permissions, as well as refining decision-making protocols in multi-owner buildings.
- Introduce **long-term policy support and regulatory certainty** with transparency on upcoming changes and providing opportunities for industry input.



INFORMATION

- Harmonise labels to inform consumers about the energy efficiency of heating solutions.
- Promote **consumer information campaigns**, informed by behavioural insights, to empower individuals to make informed decisions.
- Create **one-stop-shop platforms** for supporting consumers in the uptake of heating equipment.
- Promote upskilling through accreditation for heat pump specialists and the integration of **heat pump content into educational curricula** at all levels.
- Provide **criteria to define clean heat and improve heat pumps market data collection** and data accessibility to inform policy decision-making.



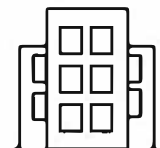
INCENTIVES

- Introduce **rebates, grants and other financial offers** to motivate consumers to buy highly efficient heat pumps.
- Introduce **finance or taxation benefits** to encourage manufacturers to scale up heat pump production.
- Establish **well-designed procurement processes** to increase the market share of heat pumps and drive innovation.
- **Adjust the price of electricity** to make the operating costs of heat pumps more favourable.
- Offer **dynamic electricity pricing** to help incentivise flexible demand and new business models.

Overview of the Doubling Policy Tools

The doubling policy tools are meant to help inform policymakers on possible energy efficiency policies they can use to contribute to the global doubling target. This policy toolkit contains 12 initial policy tools for four end-use sectors: buildings, appliances, industry, and vehicles. Each sector includes an overview of the regulation, information, and incentive policy tools, describing their relevance to the doubling target, basic implementation steps and best practices around the world, as well as useful links to more detailed information.

Click on a tool to immediately skip to the page with the relevant information.



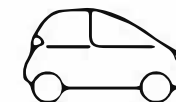
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[MEPS for Appliances](#)

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[Fuel Economy Standards](#)



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[Energy Labelling](#)

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Doubling Tools for Buildings

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RELEVANCE FOR DOUBLING

Buildings account for [about 30%](#) of final energy consumption globally and [more than half of electricity consumption](#). To stay on the pathway towards [net zero emissions](#) by 2050 and achieve a doubling of global annual energy intensity improvement between now and 2030, buildings need to rapidly become more efficient. An integrated policy approach combining regulation, information and incentives is the most effective way to achieve this goal. The following doubling tools can help governments to implement energy efficiency policy and contribute to the global doubling target.



Doubling Tool: [Building Energy Codes](#)

- Building energy codes set requirements for the minimum energy performance of buildings.
- Mandatory [zero-carbon-ready building energy codes](#) need to be in place globally for [all new buildings by 2030 in the net zero pathway](#).
- Buildings built after a code is introduced can use [up to 50%](#) less energy.



Doubling Tool: [Energy Performance Certificates](#)

- Energy performance certificates (EPCs) provide information and can increase awareness on the energy performance of a building.
- This helps consumers to make more informed decisions about retrofits, behaviour changes, and property investments.
- EPCs help governments design policies to improve the efficiency of buildings by providing data to identify areas needing intervention.



Doubling Tool: [Retrofit Grants](#)

- Retrofit grants play a crucial role in enhancing building energy efficiency by lowering the upfront investment costs of clean technologies.
- Grants are an effective tool that have increased uptake of energy efficiency measures in many countries.
- They can promote the most efficient technologies or target a specific subset of the population that needs the support the most.

WHAT THEY ARE

Building energy codes are a regulatory instrument in the [buildings policy package](#). They set minimum requirements for energy use in buildings. They may set requirements for the overall energy efficiency of an entire building (performance-based codes) or for individual building components such as insulation, lighting systems, or heating and cooling systems (prescriptive codes). They may include both types of requirements to provide flexibility to the market. Only buildings compliant with the energy code are allowed to be built.

To get buildings on track for a net zero emissions future, building energy codes should include not only energy efficiency requirements, but also requirements around on-site renewable energy production, embodied carbon, energy management and the [integration of smart appliances and equipment](#) to enable demand response. Building energy codes should be applied to both new buildings and existing buildings undergoing major renovations. They can also set deadlines for energy efficiency upgrades. They improve the efficiency of buildings and help industry prepare for, and adapt to, market changes. As of 2023, there were around 80 building energy codes in place across the world, with only 40% of new buildings constructed globally covered by requirements for energy efficiency.

HOW TO IMPLEMENT

Specific steps to implement building energy codes vary by country and should be adapted to the regulatory context. The most common implementation steps include:

1. **Assessment and planning:** Analyse the current state of energy use in buildings, identify opportunities for improvement in energy efficiency in different building types and climate conditions, and develop a strategic plan for implementing building energy codes.
2. **Code development:** Establish a task force with stakeholders from government, industry, and academia to discuss the code design. Consider aligning with international standards (e.g. International Energy Conservation Code) or existing successful codes in other countries. Then the actual drafting of the building energy code can commence, including specific requirements for construction and operation. Specify the scope, including building types, geographic areas, and the time frame. Lastly, establish mechanisms for compliance with the building energy code, including penalties for non-compliance.
3. **Public consultation:** Solicit input from industry professionals, builders, architects, and the general public to gather feedback on the proposed regulation.

4. **Approval and adoption:** Present the regulation to relevant authorities for approval and adopt the building energy code through legislative or regulatory means.
5. **Training and education:** Provide training programmes for architects, builders, contractors, code officials, enforcement personnel and other stakeholders. Raise awareness about the new building energy code and its requirements.
6. **Updates and revisions:** Regularly review and update the building energy code based on your monitoring efforts to incorporate technological advancements and industry best practices. Consider amendments based on lessons learned from implementation.
7. **Collaboration:** Foster collaboration between government agencies, industry experts and advocacy groups to support implementation.

HOW TO MONITOR

Setting up a monitoring and evaluation (M&E) system may include some of the following common steps:

- Identify key performance indicators (KPIs) and set measurable objectives for building energy codes, such as compliance rates, energy savings and wider socio-economic impacts.
- Determine data sources and collection methods. Collect data on energy consumption, building characteristics, and other relevant parameters, taking into account a variety of design and renovation practices, as well as climatic conditions.
- Establish a baseline for energy consumption and building characteristics (preferably before the regulation is developed).
- Develop a reporting system. Regularly publish results on the KPIs and areas for improvement.
- Implement regular audits and inspections focusing on compliance with the building energy code.

BEST PRACTICE EXAMPLES

- **Switzerland's** [Minergie 2023 standards](#) include a mix of requirements for maximising the use of solar energy, continuously improving energy efficiency, significantly reducing greenhouse gases, and ensuring the thermal comfort of occupants.
- In the **United States**, the [California 2022 Energy Code](#) includes mandatory requirements for electric-ready buildings, including space and pre-wiring requirements for more electric end uses.
- **Singapore's** [Code for Environmental Sustainability of Buildings](#), which made many previously [voluntary standards](#) mandatory, is based on energy performance criteria and a point-based system for environmental performance. It includes requirements for energy efficiency, renewable energy, and smart solutions. It is linked to a target that 80% of new buildings be [Super Low Energy](#) from 2030.
- **Nigeria's** [National Building Energy Efficiency Code](#) emphasises the role of [bioclimatic design strategies](#) for energy efficiency. These can enable significant energy savings ([up to 40%](#)) compared with business-as-usual buildings. Savings can reach 75% when combined with high-performing building envelopes and systems.

WHAT THEY ARE

Energy Performance Certificates (EPCs) are an information instrument in the [buildings policy package](#). EPCs are usually documents that inform on the energy performance of a building and its energy demand, indicating how efficient – and often how environmentally-friendly – a building is. EPCs can differ, but some of the key elements may include:

- **Energy Efficiency Rating:** A scale of several energy classes, for example from A (most efficient) to G (least efficient), visually represented, often as a color-coded bar chart.
- **Current and Potential Ratings:** Display the building's current state and its potential efficiency rating after recommended improvements.
- **Property Details:** Basic information about the property, including size and evaluation date.
- **Recommendations:** Specific, cost-effective advice on improving the property's energy efficiency, such as the addition of insulation, heating system upgrades, and the use of renewable energy.
- **Estimated Energy Use:** Projection of energy consumption and costs based on standard usage patterns, identifying potential savings.
- **Carbon Emissions:** Information on the building's carbon dioxide emissions, emphasising its environmental impact.

HOW TO IMPLEMENT

Implementing an EPC programme involves several steps to ensure it effectively encourages improvements in buildings. These may include:

1. **Legislative framework:** Set the scope, objectives and requirements, including which buildings need an EPC, under what circumstances (e.g., sale, rent, construction), and the validity period of certificates.
2. **Standards:** Develop a methodology to assess energy performance and calculate the efficiency rating. This should include guidelines on the evaluation process, data collection and calculation methods.
3. **Training and accreditation:** Set up a system to train and accredit assessors who carry out energy performance evaluations. Certified and competent assessors are crucial to the credibility of EPCs.
4. **Certification process:** Implement a process for issuing EPCs, including property inspections, data analysis, and the creation of the certificate with recommendations for efficiency improvements.
5. **Data collection and registry:** Establish a database to record and manage EPC information to facilitate the tracking of energy performance across the building stock and support policy analysis.
6. **Quality control and enforcement:** Put mechanisms in place to ensure the quality of EPCs, such as random checks or audits. Also, define penalties for non-compliance to enforce the requirements.
7. **Public engagement:** Launch initiatives to raise awareness among property owners, buyers, tenants and the general public about the importance of energy efficiency and the role of EPCs in promoting it.
8. **Updates and revisions:** Regularly review the effectiveness and update standards, trainings and methods to reflect technological advancements, changes in energy prices and other relevant factors.

HOW TO MONITOR

Monitoring the effects of EPCs is crucial to evaluate their impact on improving building energy efficiency, influencing real estate markets, and contributing to environmental goals. To track these effects, a comprehensive approach to data collection and analysis is needed. This may include the following elements:

- Collect data on the distribution of energy efficiency ratings across the building stock to understand the current state of buildings.
- Require regular updates to EPCs and track changes in buildings' ratings, especially after renovations or efficiency improvements.
- Track the implementation of energy efficiency recommendations provided in EPCs (for example, through [building energy passports](#)), such as insulation upgrades, heating system replacements, or the installation of renewable energy sources.
- Monitor energy consumption data (for example, with smart meters) before and after the implementation of EPC recommendations to measure energy savings.
- Compare actual energy savings (and/or reductions in greenhouse gas emissions) with estimated building energy performance made in EPCs to assess the accuracy of assessments and the effectiveness of recommended measures.
- Collect data on why recommendations are not implemented, such as financial constraints, regulatory barriers, or lack of awareness.
- Collect data to analyse the impacts of EPC ratings on property values, sales prices and rental rates to see how efficiency influences real estate market dynamics.

BEST PRACTICE EXAMPLES

- **Sweden's [EPCs](#)** use metered values and on-site visits, which enhance the quality of the certificates. This offers advantages, such as ensuring that they reflect the real energy efficiency of buildings, making the recommendations specific to each building. The EPC is also valid for a shorter time than is typical in other countries (five instead of ten years) which further encourages energy efficiency improvements in buildings.
- **South Africa's [EPCs](#)** offer a standardised approach to assess a building's energy performance and assign it to one of the five classes (A to G). It is mandatory for privately owned commercial buildings (>2000 m²) and publicly owned, rented and operated buildings (>1000 m²) to undergo the EPC assessment and disclose the results. Penalties for non-compliance include a fine of up to USD 260 000 and imprisonment of up to five years. EPCs help the government collect data and monitor energy use in buildings through a centralised repository.
- For **Portugal's [EPCs](#)**, achieving high energy ratings can lead to tax benefits, exemptions and favourable financing terms. The EPC process begins with an assessment to establish a baseline for the energy performance of the building, and to guide renovations to achieve energy and cost savings. A final EPC after renovating serves as a compliance check, confirming improvements and updating energy performance indicators.



WHAT THEY ARE

Retrofit grants are an incentive in the [buildings policy package](#). Grants can reduce upfront costs for energy efficiency technologies and make them more attractive and financially viable for consumers, builders and developers. This can help create a market pull, supporting stakeholders in implementing energy efficiency measures to comply with regulations to achieve higher levels of building energy performance.

Grants usually provide payment before the retrofit happens and cover part of the costs, such as adding insulation, upgrading heating or cooling systems, or installing solar PV. Grants may include requirements to improve the overall energy performance of the buildings (typically based on a theoretical assessment of the measures) and are sometimes linked to energy performance certification programmes. In addition to traditional grants, there are also market mechanisms that reward improved performance or [pay-for-performance](#) instruments.

HOW TO IMPLEMENT

The process depends on the depth of the retrofit, eligible measures, grant size and country context. Common implementation steps are:

1. **Objectives:** Identify goals, such as reducing energy consumption and emissions, or supporting vulnerable households. They should be specific, measurable, achievable, relevant and time-bound.
2. **Target audience:** Determine the recipients of the grant, which can

include homeowners (or specific groups based on income, dwelling type, household size, etc.) and businesses. Tailor the programme to the specific needs of the target audience.

3. **Design:** Outline the eligibility criteria, application process and compliance process. Provide clear guidelines to ensure potential participants understand how to qualify and apply. Make the process simple, preferably accessible online or through physical forms, where owners can submit details about the building and the retrofit project. **Performance criteria:** Define criteria that projects must meet to qualify for the grant, including the types of retrofits eligible, the energy savings required, a method to determine these savings (e.g. theoretical or metered data) and any relevant certification standards.
4. **Budget:** Establish a clear budget for the grant, identify funding sources and secure the funds. This can involve government funds, private investments, or public-private partnerships.
5. **Administrative capacity:** Establish a team or designate an agency responsible for administering the program. This includes processing applications, disbursing incentives and monitoring compliance.
6. **Raising awareness:** Provide information about the programme to the target audience. Use websites, social media, press releases and community events to promote the programme and its benefits.
7. **Monitoring and evaluation:** Develop mechanisms to monitor the progress and evaluate its impact on energy efficiency. This involves tracking participation rates, energy savings and cost-effectiveness.

HOW TO MONITOR

Monitoring and evaluation (M&E) of grant programmes for energy-efficient building retrofits are critical for assessing the effectiveness, impact, and efficiency of these initiatives. This process involves collecting, analysing and using data to track programme progress against its objectives and to inform future policy and programme design. Key steps include establishing clear metrics and indicators for success, such as energy savings, cost-effectiveness and participant satisfaction. Data is gathered through methods like metering, surveys and audits.

It is important that the process includes comparing pre- and post-retrofit energy use to quantify savings and determine if the programme met its goals. Measuring actual savings is important, as estimated savings risk being higher than reality if measures were not adequately implemented. This process helps identify best practices, areas for improvement, and supports data-driven decision-making to enhance the performance of energy efficiency programmes. It could also be beneficial (from the point of maximising energy savings) to provide larger grants to the achieved improvements in energy performance beyond what is required in the building regulations and/or link the grant to a [Pay-for-Performance \(P4P\) scheme](#).

BEST PRACTICE EXAMPLES

- In **France**, the "[MaPrimeRénov](#)" policy is a grant designed to support energy efficiency improvements in residential buildings. The programme brings together all grants that are available from

different organisations to make the application process easier. The scheme is available to all homeowners, but the amount of the grant depends on the income of the applicant. The programme is linked to Energy Performance Certificates and requires a minimum improvement of two energy classes, and an energy audit before and after the work to confirm the improved energy performance.

- **Australia's** incentives for efficiency in buildings are often set at the sub-national level and aligned with the building energy certification schemes ([NABERS](#) and [NATHERS](#)). The [Energy Savings Scheme](#) in New South Wales (NSW) offers grants to upgrade equipment for buildings that expect to get a NABERS energy rating of at least 0.5 stars higher than that of the average building stock within the same building type, or at least 0.5 stars higher than the building's historical energy rating. Another [incentive](#) in NSW supports measures to reduce peak electricity demand and pressure on the electricity grid.
- **Singapore** has the [Green Mark Incentive Scheme for Existing Buildings 2.0](#) to enhance the energy performance of existing structures and accelerate the goal of greening 80% of the country's buildings by 2030. The scheme offers grants to assist building owners in achieving higher energy performance, reducing the initial costs associated with energy efficiency upgrades, and enhancing investment returns, especially for buildings that reach [Super Low Energy or Zero Energy](#) standards. Funding is determined by the outcome, e.g. the certification level attained, and the degree of carbon emissions reduced through the energy enhancement projects, within the limits for each level of energy performance.



CONCLUSION

An effective policy package to improve the energy efficiency of buildings contains policy instruments on regulation, information and incentives. These work together to drive efficiency in buildings and contribute to the global target of doubling energy efficiency progress by 2030 and achieving net zero energy sector emissions by 2050.

Regulatory standards such as **building energy codes** are among [the most effective policies](#) to not only boost energy performance and reduce emissions, but also to improve occupants' health, comfort and productivity – while enhancing climate resilience and mitigating energy price fluctuations.

Information instruments such as **energy performance certificates** provide transparency about a building's energy use, allowing consumers to make better-informed decisions. They can also help deliver insights to governments on a country's building stock, which in turn can inform regulatory updates to the building energy code. Other information tools include campaigns to raise awareness and acceptance among stakeholders and one-stop-shops that facilitate easy access to grants and other incentives, alongside guidance and quality assurance.

Incentives such as **retrofit grants** can promote efficient technologies by lowering the upfront cost of the investment, making an energy efficiency upgrade more accessible and affordable. Grants can direct investments from stakeholders towards specific energy efficiency measures and motivate them to exceed minimum standards by reducing the upfront costs, adopt innovative technologies, and engage in best practices

Other supportive measures include mandatory energy and/or carbon disclosure programmes at the point of a building's sale and/or lease; other financial and non-financial incentives linked to building energy performance, utility-based rewards, procurement regulations; and training for architects, builders, building assessors and inspectors.

MORE INFORMATION

This toolkit provides an overview of the most important elements of each policy instrument, but we encourage policymakers to explore additional resources available for more in-depth information.

- IEA [Overview on Buildings](#)
- IEA [Working Group on Building Energy Codes](#)
- PNNL [Toolkit on how to develop building energy codes](#)
- UNEP [Handbook of Sustainable Building Policies](#)



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Doubling Tools for Appliances



RELEVANCE FOR DOUBLING

Appliances represent 45% of electricity demand in buildings and are responsible for almost 3 gigatonnes (Gt) of CO₂ emissions. To stay on the pathway towards [net zero emissions](#) by 2050 and achieve a doubling of global annual energy intensity improvement between now and 2030, appliances need to be between 30% and 40% more efficient by 2030. An integrated policy approach combining regulation, information and incentives is the most effective way to achieve this goal. The following doubling tools can help governments to implement stronger energy efficiency policies and contribute to the global doubling target.



Doubling Tool: Minimum Energy Performance Standards

- MEPS set requirements on the efficiency of appliances and help to eliminate the worst performing equipment from the market.
- In countries where standards and labelling programmes have been implemented, appliances are now typically consuming [30% less energy](#) than they would have otherwise.



Doubling Tool: Energy labelling

- The labelling of appliances is fundamental for tracking the energy efficiency trends of appliances in the market and informing consumers about their energy performance when purchasing a new device or equipment.
- Additionally, setting new and more stringent labelling schemes can pull markets towards more efficient equipment.



Doubling Tool: Loans and rebates for efficient appliances

- Rebates provide a discount on the purchasing price of an appliance, lowering the upfront cost of investing in an efficient appliance, while loans help consumers overcome credit barriers to financing. This helps consumers to be able to afford more efficient devices.
- They increase the average efficiency of products sold in the market and accelerate the replacement of old inefficient models.

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