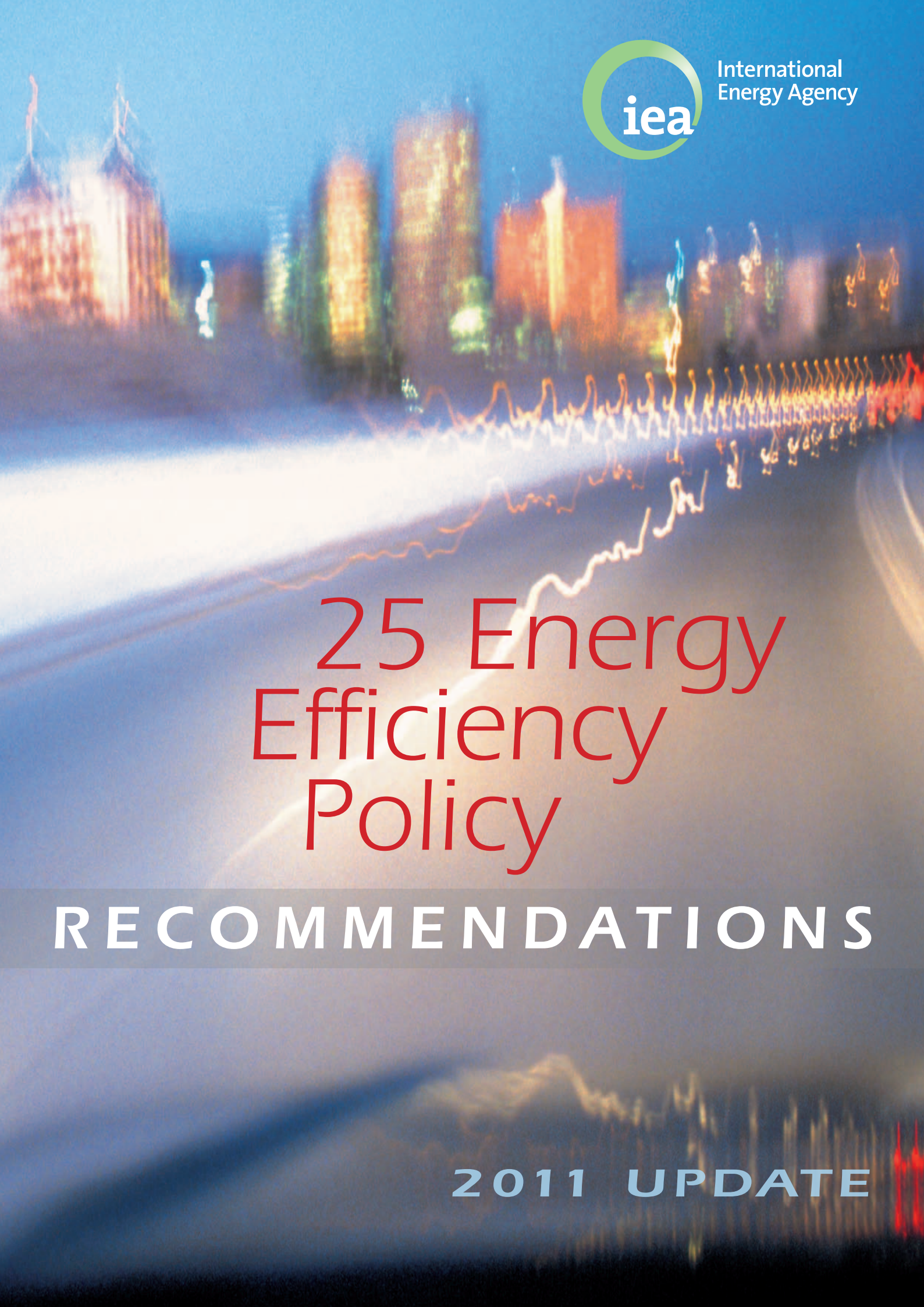

International
Energy Agency
iea
25 Energy
Efficiency
Policy
RECOMMENDATIONS
2011 UPDATE

IEA member countries

Australia

Austria

Belgium

Canada

Czech Republic

Denmark

Finland

France

Germany

Greece

Hungary

Ireland

Italy

Japan

Korea (Republic of)

Luxembourg

Netherlands

New Zealand

Norway

Poland

Portugal

Slovak Republic

Spain

Sweden

Switzerland

Turkey

United Kingdom

United States

The European Commission
also participates in
the work of the IEA.

Increasing energy efficiency is the quickest and least costly way of addressing energy security, environmental and economic challenges.

To help its member countries achieve the benefits of energy efficiency across their economies, the International Energy Agency (IEA) developed (in 2008) a set of 25 energy efficiency policy recommendations for seven priority areas:

- **Cross-sectoral**
- **Buildings**
- **Appliances and equipment**
- **Lighting**
- **Transport**
- **Industry**
- **Energy utilities**

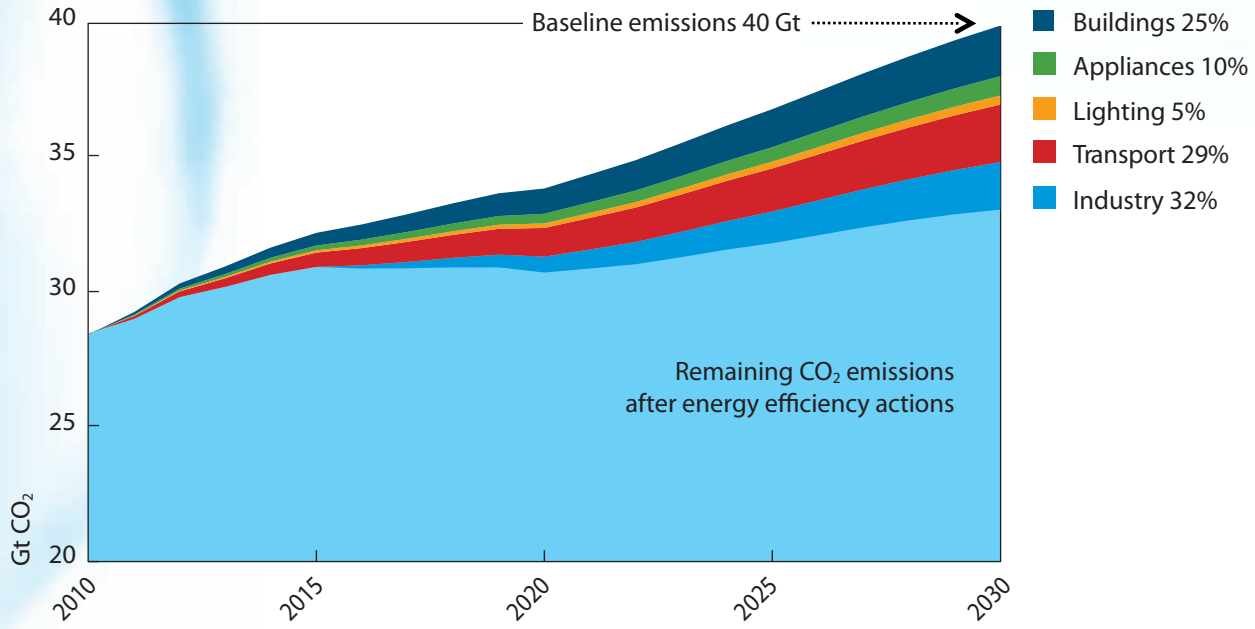
The 25 recommendations have received high-level political and stakeholder support, and resulted in increased implementation.

In order to reflect emerging priorities, the IEA, in consultation with international experts and member countries, has streamlined and updated the 25 recommendations.

The updated 25 recommendations cover a robust portfolio of policies that member and non-member countries should consider in the context of their energy economies. This portfolio includes policies to cost-effectively increase energy efficiency by establishing market signals to motivate effective action, accelerate the introduction of new technologies, and strengthen and enforce minimum energy performance standards (MEPS) for appliances, lighting, equipment and building energy codes.

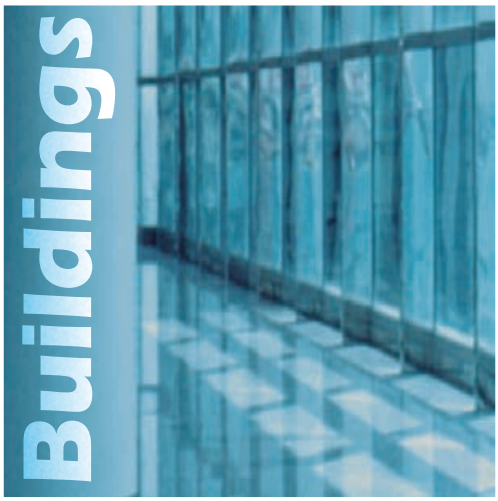
The IEA estimates that if implemented globally without delay, the proposed actions could save as much as 7.6 gigatonnes (Gt) CO_2/year by 2030 – almost 1.5 times current US annual CO_2 emissions. In 2010, this corresponded to energy savings of more than 82 EJ/year by 2030, or 17% of the current annual worldwide energy consumption.

CO_2 savings potential from energy efficiency recommendations



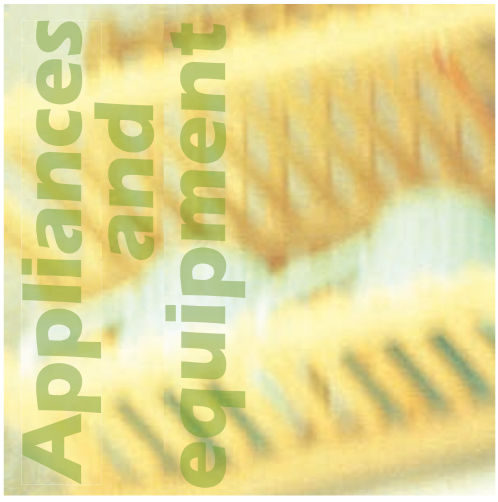
Cross-sectoral

1. Data collection and indicators
2. Strategies and action plans
3. Competitive energy markets, with appropriate regulation
4. Private investment in energy efficiency
5. Monitoring, enforcement and evaluation



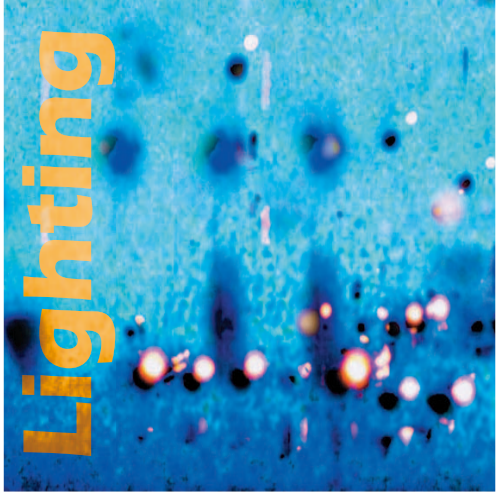
Buildings

6. Mandatory building codes and MEPS
7. Net-zero energy consumption in buildings
8. Improved energy efficiency in existing buildings
9. Building energy labels or certificates
10. Energy performance of building components and systems

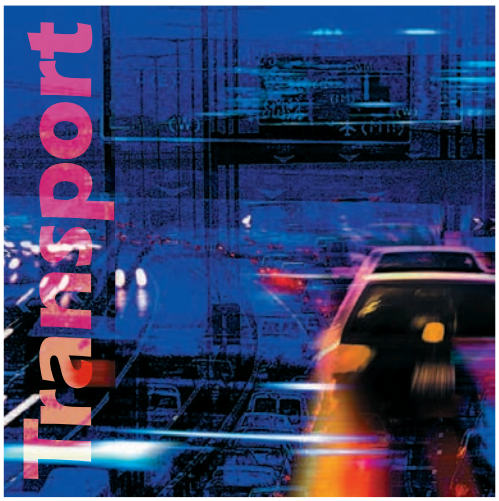


Appliances and equipment

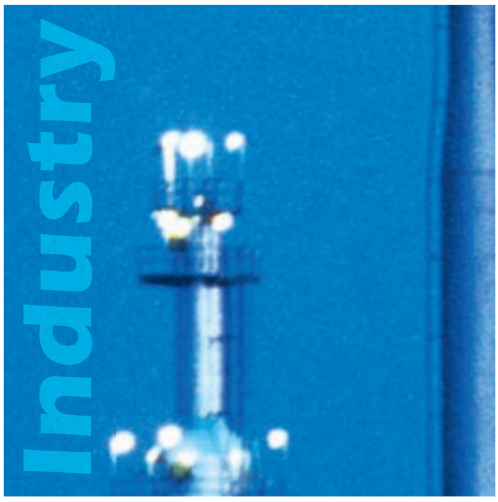
11. Mandatory MEPS and labels
12. Test standards and measurement protocols
13. Market transformation policies



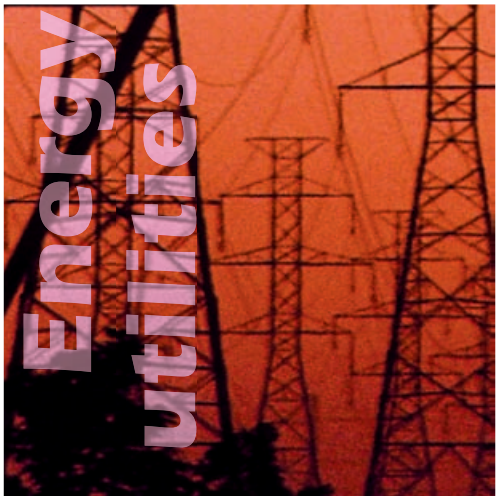
Lighting



Transport



Industry



Energy utilities

Cross-sectoral

Many of the barriers to energy efficiency affect all sectors. These obstacles include:

- higher initial capital costs
- principal agent problems
- uninformed investors with little familiarity with energy-efficient products
- risk exposure
- discount rate issues
- the difficulty of quantifying external benefits

As a result, it is important to coordinate policies in a way that addresses all of these barriers, across all sectors.

Governments play a crucial role in setting the cross-sectoral framework for energy efficiency. Governments can help to stimulate investment in energy efficiency and accelerate implementation through national energy efficiency strategies. Once in place, monitoring, enforcement and evaluation of such strategies are crucial to identifying gaps and achieving targets. Compiling end-use data and reporting it to the IEA will also lead to more informed energy efficiency policy decisions.

To improve energy efficiency across all sectors, the IEA recommends action in the following areas:

1 Energy efficiency data collection and indicators

Reliable, timely and detailed data on energy end uses, markets, technologies and efficiency opportunities in all sectors contribute to the development of effective energy efficiency strategies and policies. Governments should, in determining what data to collect, reference international data collection efforts, especially the IEA annual energy efficiency data template.

2 Strategies and action plans

Based on analysis of energy use, markets, technologies and efficiency opportunities, governments should formulate and regularly update strategies and action plans for improving energy efficiency throughout their domestic economies.

- Best practice strategies and action plans should:
- Identify barriers to cost-effective efficiency investments and, wherever feasible, attempt to remove, minimise or overcome such barriers.
- Assess opportunities for energy efficiency improvements and prioritise action in sectors and end uses in which government policies are most likely to yield the largest, most cost-effective improvements.
- Set clear objectives and timelines, and establish evaluation methods.
- Ensure coherence with energy, environmental/climate and economic strategies and plans.
- Take into account the considerable experience and analysis of other countries and international organisations.
- Strategies and action plans should provide for the continuous integration and co-ordination of new and emerging technologies.

3 Competitive energy markets, with appropriate regulation

Governments should periodically review regulations and subsidies to ensure that retail energy prices reflect the full costs of energy supply and delivery, including environmental costs.

4 Private investment in energy efficiency

Governments should facilitate private investment in energy efficiency by supporting energy efficiency capacity building, standardised measurement and verification protocols, private lending and energy efficiency technology research, development demonstration and deployment (RDD&D).

Measures should include:

- Energy efficiency knowledge generation and dissemination, and reliable technical assistance on energy efficiency opportunities in all sectors through networks or energy advisory services.
- Education and training programmes to ensure that all sectors have access to the skilled labour force necessary to effectively improve energy efficiency.
- Development of measurement and verification protocols to ensure consistency in methodology, overcome uncertainties in quantifying the benefits of energy efficiency investments, and stimulate increased private-sector involvement.
- Collaboration with private financial institutions to develop public-private partnerships and other frameworks that facilitate energy efficiency financing.
- Broad financial and collaborative support for RDD&D.

5 Monitoring, enforcement and evaluation of policies and measures

Governments should monitor, enforce, evaluate, and periodically update, energy efficiency policies and measures in all sectors.

Policies should be guided by the following principles:

- Policy and programme effectiveness should be evaluated during and after implementation, with the results used as an input to subsequent decision making. Monitoring and evaluation, with baseline assessments and periodic review and reporting, should be established when new policies and measures are implemented.
- Non-compliances should be identified with a fair and transparent process, and should be reported and made public. Associated penalties should be clear and serve as constructive deterrents to non-compliance.

Buildings

Buildings hold great potential for cost-effective energy savings. The IEA estimates that the energy savings potential in this sector in 2009 will be in the range of 20 exajoules (EJ) per year by 2030, which is the same as the current annual electricity consumption of the United States and Japan combined.

Barriers such as split incentives between tenants and landlords, lack of awareness of efficient technologies, absence of qualified "green" technicians and high initial investment costs threaten market-driven energy savings measures.

Governments can eliminate these barriers and achieve building sector energy savings by implementing a package of policies. In particular, governments should:

- Require all new buildings, as well as buildings undergoing renovation, to meet energy codes and minimum energy performance standards (MEPS).
- Support and encourage the construction of buildings with net-zero energy consumption.
- Implement policies to improve the energy efficiency of existing buildings with emphasis on significant improvements to building envelopes and systems during renovations.
- Require building energy performance labels or certificates that provide information to owners, buyers and renters.
- Establish policies to improve the energy efficiency performance of critical building components in order to improve the overall energy performance of new and existing buildings.

To tap savings in the buildings sector, the IEA recommends:

6 Mandatory building energy codes and minimum energy performance

Governments should require all new buildings, as well as buildings undergoing renovation, to be covered by energy codes and meet minimum energy performance standards (MEPS) that aim to minimise life-cycle costs. Energy codes and MEPS should be enforced, regularly strengthened and take a holistic approach that includes the building envelope and equipment.

7 Aiming for net-zero energy consumption in buildings

Governments should support and encourage the construction of buildings with net-zero energy consumption and take initiatives to make such buildings commonly available in the market, when economically viable based on a life-cycle cost analysis.

Policies should include:

- Targets for market share of net-zero energy consumption buildings in all new construction by 2020.
- The use of net-zero energy consumption buildings as a reference for mandatory MEPS in future updates of building codes.

8 Improving the energy efficiency of existing buildings

Governments should implement a package of policies to improve the energy efficiency of existing buildings, with emphasis on significant improvements to building envelopes and systems during renovations.

Policies should include:

- An ambitious timeline and renovation rate for cost-effective reduction of the energy consumption in existing buildings.
- MEPS for the building as a whole, including key building-envelope components and energy-using systems, to be met during renovations.
- Measures to aid building owners and occupants to improve energy efficiency in existing buildings, such as:
  - Energy audits, energy ratings and certification schemes.
  - Incentives to encourage investments in long-lasting building envelope and system improvements, and increased market penetration of new high-efficiency products.
  - Training and other measures to improve the quality and reliability of building retrofit services.
  - Information on financing options.
  - A strong commitment by governments to improve the efficiency of public-sector buildings.

9 Building energy labels or certificates

Governments should require building energy performance labels or certificates that provide information to owners, buyers and renters.

10 Improved energy performance of building components and systems

Governments should establish policies to improve the energy efficiency performance of critical building components, such as windows and heating, ventilating and cooling (HVAC) systems, in order to improve the overall energy performance of new and existing buildings.

Governments should implement a package of policies to:

- Improve the overall energy performance of windows and other glazed areas. This policy package should include:
  - Performance-based requirements or guidelines that identify the maximum share of glazed area that is appropriate for specific building types.
  - MEPS for windows and other glazing that minimise life-cycle costs.
  - A requirement for window and glazed-product manufacturers to provide performance labelling based on standard test protocols and certified product testing.
- Reduce energy demand from HVAC systems. This policy package should include:
  - MEPS for HVAC systems that are designed to minimise life-cycle costs.
  - A requirement for HVAC product manufacturers to provide energy efficiency labelling and further energy efficiency information for their products.
  - Information and training for building designers, owners and others to ensure that HVAC systems are appropriately sized, installed, tested and maintained so as to maximise building energy performance at least life-cycle costs.
- Promote energy management and control systems to reduce energy consumption and better target energy-saving opportunities.

Appliances and equipment

Residential appliances and equipment represent one of the fastest-growing energy loads. The IEA estimates that at least 3.7 EJ per year could be saved cost-effectively by 2030.

The suite of IEA appliance and equipment recommendations covers MEPS or labels, energy performance test standards and measurement protocols, and complementary market transformation policies.

Mandatory energy performance requirements and labels have proved to be a highly cost-effective policy tool for encouraging the reduction of average energy consumption in equipment without reducing consumer choice or triggering sustained increases in prices.

The effective implementation of energy efficiency policies for appliances and equipment relies upon the use of accurate energy performance measurement standards and protocols. National energy efficiency policy objectives will be undermined by energy measurement standards that fail to reflect actual energy use and/or provide a true in-use efficiency ranking of equipment. Furthermore, experience shows that international co-ordination on test standards for globally traded products can reduce industry compliance costs.

Governments should complement mandatory energy performance requirements and labels with a package of measures that accelerate the transformation of the appliance market towards high-efficiency products.

To achieve significant energy savings in this sector, the IEA recommends:

11 Mandatory MEPS and labels for appliances and equipment

Governments should adopt and regularly update the stringency of mandatory MEPS and labels across the full spectrum of appliances and equipment, taking into account proven international practices.

Governments should:

- Prioritise MEPS and labels for appliance and equipment types that are likely to result in the largest energy, economic and environmental benefits, taking into account likely future sales of new and replacement units, the introduction of new technologies, and emerging issues such as network-connected appliances and equipment.
- Allocate resources to monitoring compliance, verifying accuracy of claimed performance and enforcing mandatory MEPS.

12 Test standards and measurement protocols for appliances and equipment

Governments should ensure that product test standards and measurement protocols are regularly updated. They should also align national policies with the development and use of international test standards and measurement protocols in order to assist performance comparisons and benchmarking for traded products, and to reduce industry compliance costs.

13 Market transformation policies for appliances and equipment

Governments should aim to accelerate the transformation of the appliance and equipment market through incentives and other measures to support the introduction and uptake of new technologies and high-efficiency appliances and equipment.

Measures should include:

- Financial incentives, procurement programmes, endorsement schemes and other market-support measures focused on the most cost-effective, energy-efficient products available.
- Engagement in international collaboration and global dialogues with the aim of establishing co-ordinated policies that will help to increase the demand for and trade in efficient appliances and equipment

Lighting

Lighting represents almost 20% of global electricity consumption. This consumption is similar to the amount of electricity generated by nuclear power.

The latest IEA estimates show the total savings potential in residential and services lighting at more than 2.4 EJ per year by 2030.

To achieve energy savings in lighting, the IEA recommends governments:

- Phase-out inefficient lighting products as soon as technically feasible and economically viable.
- Require and promote improved lighting systems design and management by ensuring that building codes promote the use of natural light and include MEPS for lighting systems.

To achieve significant energy savings in the lighting sector, the IEA recommends:

14 Phase-out of inefficient lighting products and systems

Governments should phase-out inefficient lighting products (including inefficient ballast, lamp, lamp housing, fixture and lighting controls) as soon as technically feasible and economically viable.

Governments should:

- Adopt lighting quality, reliability and MEPS for new and existing lighting products.
- Support the development, use and regular updating of international test standards and measurement protocols to enable performance comparisons and benchmarking for traded products, to reduce industry compliance costs and to support national policy requirements.

15 Energy-efficient lighting systems

Governments should require and promote improved lighting systems design and management. This should be done by ensuring that building codes promote the use of natural light and include MEPS for lighting systems. Further measures include information and training directed at architects, builders, owners and managers.

Transport

The transport sector remains one of the most challenging areas for improving energy efficiency. The IEA estimates that the potential energy savings achievable through improved efficiency in the transport sector, as of 2009, are in the range of 30 EJ per year by 2030, or the equivalent of the current annual oil consumption of the European Union.

The IEA recommends several measures to tap energy-savings in this sector.

Notably, governments should:

- Implement and periodically strengthen mandatory fuel-efficiency standards for light- and heavy-duty vehicles.
- Put in place policies to improve the performance of tyres, air conditioning, lighting and other non-engine components that affect a vehicle's fuel efficiency.
- Adopt measures such as labelling, incentives and taxes to encourage the sale of more efficient vehicles.
- Promote eco-driving by making it a required element of driver's education programmes and requiring feedback instruments in new vehicles.
- Enable policies that increase the overall energy efficiency of national, regional and local transport systems, and promote shifts of passengers and freight to more efficient modes.

To achieve significant energy savings in this sector, the IEA recommends:

16 Mandatory vehicle fuel efficiency standards

Governments should adopt and regularly update fuel-efficiency standards for road vehicles.

Fuel-efficiency standards should:

- Introduce and regularly strengthen mandatory fuel-efficiency standards for light-duty vehicles.
- Establish testing procedures for measuring fuel efficiency of heavy-duty vehicles and adopt fuel-efficiency standards for those vehicles.
- Harmonise or increase the comparability of vehicle fuel-efficiency test methods.

17 Measures to improve vehicle fuel efficiency

In addition to mandatory vehicle fuel-efficiency standards, governments should adopt measures such as labelling, incentives and taxes to boost vehicle efficiency and accelerate the market penetration of new efficient vehicle technologies.

Measures should include:

- Vehicle fuel economy labels.
- Vehicle taxes to encourage the purchase of more fuel-efficient vehicles.
- Infrastructure support and incentive schemes for very low CO_2-emitting and fuel-efficient vehicles.

18 Fuel-efficient non-engine components

Governments should adopt measures to reduce the negative impact on fuel efficiency of vehicle components, such as tyres and air-conditioning systems, that are often excluded from vehicle fuel-efficiency testing and requirements.

To improve the performance of non-engine components, governments should:

- Adopt new international test procedures for measuring the rolling resistance of tyres, and establish labelling and maximum rolling resistance limits for road-vehicle tyres.
- Adopt measures to promote proper tyre inflation levels. This should include mandatory fitting of tyre-pressure monitoring systems on new road vehicles.
- Introduce energy efficiency requirements for air-conditioning systems or include the energy efficiency of such systems in fuel-economy testing.

19 Improving vehicle operational efficiency through eco-driving and other measures

Governments should ensure that measures to increase the operational efficiency of light- and heavy-duty vehicles, such as eco-driving, are a central component of initiatives to improve energy efficiency and reduce CO_2 emissions.

Governments should adopt a range of measures to improve vehicle operational efficiency, including:

- Making eco-driving a required element of driver training.
- Requiring manufacturers to provide in-car feedback instruments in new cars.

20 Transport system efficiency

Governments should enable policies that increase the overall energy efficiency of national, regional and local transport systems and promote shifts of passengers and freight to more efficient modes.

To achieve these objectives, government should adopt transport policies that ensure:

- Users pay the economic, environmental and energy security-related costs of the transport system.
- The transport infrastructure is built and maintained to support the most energy efficient, economically efficient and environmentally benign transport modes.
- Urban and commercial development planning takes into account the likely implications for transport and energy demand.

Industry

IEA analysis shows that substantial opportunities to improve industrial energy efficiency exist. Overall potential energy savings in the industrial sector in 2010 amount to at least 26 EJ per year by 2030, or the current annual electricity consumption of the United States and China combined.

Much of this potential can be captured through policies for promoting use and optimisation of energy-efficient industrial equipment and systems, and improving overall efficiency through energy management.

To achieve energy savings in the industrial sector, the IEA recommends that governments:

- Support industry adoption of energy management protocols.
- Mandate MEPS for electric motors.
- Implement a package of measures to promote energy efficiency in small and medium-sized enterprises (SMEs).
- Put in place complementary financial policies that promote energy-efficient investment.

To achieve significant energy savings in the industrial sector, the IEA recommends:

21 Energy management in industry

Governments should require large, energy-intensive industry, and encourage other industrial energy users, to conform to ISO 50001 or an equivalent energy management protocol. Actions to deliver cost-effective energy savings should be implemented, and industry should periodically report on their efforts.

Energy management measures should include:

- Identifying and assessing energy saving opportunities by benchmarking, measuring and documenting energy consumption.
- Implementing actions to capture identified energy-saving opportunities.
- Publicly reporting the energy-saving opportunities identified and the actions taken to capture them.

22 High-efficiency industrial equipment and systems

Governments should adopt MEPS for electric motors and other categories of industrial equipment, and implement portfolios of measures to address barriers to the optimisation of energy efficiency in the design and operation of industrial systems and processes.

Policies should include:

- Mandatory MEPS for electric motors and other categories of industrial equipment such as distribution transformers, compressors, pumps and boilers.
- Comprehensive policy portfolios to address barriers to the optimisation of energy efficiency in the design and operation of industrial processes such as electric motor-driven, hot water and steam, and cogeneration systems. Measures could include providing information on equipment energy performance, training initiatives, audits, technical advice and documentation, and system-assessment protocols.

23 Energy efficiency services for small and medium-sized enterprises (SMEs)

Governments should develop and implement a package of specially designed policies and measures to promote energy efficiency in SMEs.

Measures directed at improved energy efficiency in SMEs should include:

- A system for ensuring that energy audits, carried out by qualified engineers, are widely promoted and easily accessible for all SMEs.
- Provision of high-quality and relevant information on proven practice for energy efficiency that is appropriate to each industrial sector.
- Energy performance benchmarking information that can be easily used by SMEs and structured to allow international and within-economy comparisons.

24 Complementary policies to support industrial energy efficiency

Governments should support improvements in industrial energy efficiency by removing energy subsidies, internalising environmental costs, providing targeted incentives and ensuring ready access to financing.

- To promote economically efficient investment in energy efficiency improvements, governments should:
  - Remove energy subsidies and internalise the external costs of energy through policies such as carbon pricing.
  - Encourage investment in energy-efficient industrial equipment and processes by putting in place targeted financial incentives such as tax incentives for energy-efficient investments in industry (in particular in SMEs). Foster private finance of energy efficiency upgrades in industry through risk-sharing or loan guarantees with private financial institutions and enabling the market for energy performance contracting.

Energy utilities

An energy utility's resources, customer access and technical know-how means that it is in a unique position to design and deliver effective low-cost energy savings. Government incentives for utilities to take such energy efficiency actions have largely been successful.

Over time, these schemes can deliver sustained energy savings, which result in significantly lower energy intensities among the targeted end-users than non-targeted ones.

Utility schemes often combine a requirement to meet energy efficiency with the use of market-based instruments to enable utilities to trade savings obligations and to allow competition in the delivery of energy services towards savings targets.

Through properly structured schemes, utilities can recover costs and maintain revenues and profits by sharing the costs and benefits with the final consumer. This gives utilities a large incentive to ensure energy savings are delivered at least cost.

Energy utilities can play an important role in promoting energy efficiency.

25 Energy utilities and end-use energy efficiency

Governments should establish regulatory and other policies to ensure that energy utilities support cost-effective, verifiable end-use energy efficiency improvements.

Governments should:

- Ensure that verifiable energy efficiency options are allowed to compete directly with energy supply options in resource procurement and wholesale markets.
- Oblige the appropriate energy sector entity (e.g. regulated utility, competitive retail supplier or third-party entity) to deliver cost-effective energy efficiency to end-use consumers.
- Require that energy customers be provided with cost-reflective pricing, supporting information and technology necessary for consumers to better understand and manage energy use.
- Utilise energy tariffs as a funding mechanism for energy efficiency.

FOR MORE INFORMATION

www.iea.org/efficiency

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