

INTERNATIONAL ENERGY AGENCY



Energy Efficiency Policy

RECOMMENDATIONS

Worldwide Implementation Now

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.

The IEA projects global primary energy demand could grow by 55% from 2005 to 2030, raising serious energy security and environmental sustainability concerns. How will we meet energy demand? How will we mitigate the resulting 57% increase in carbon dioxide emissions?

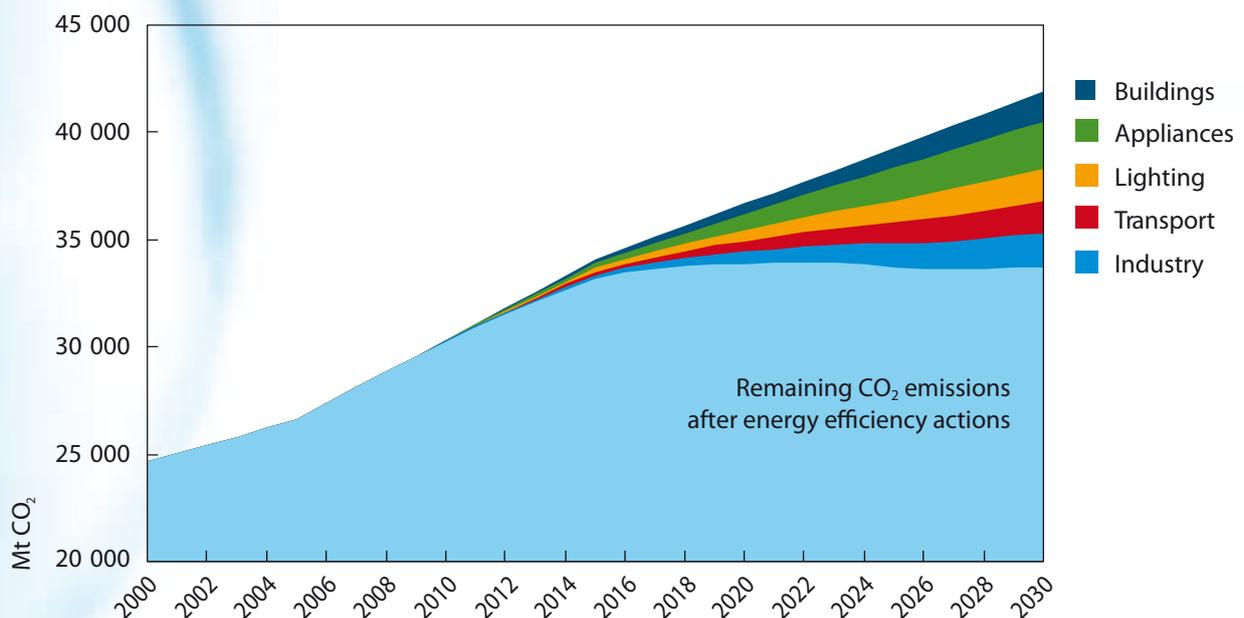
Rapidly implementing energy efficiency measures is the crucial first step towards addressing these challenges at low or negative costs. Many countries have made significant gains in energy efficiency, but more needs to be done.

To advance global energy efficiency efforts, the IEA developed a set of 25 policy recommendations that, if implemented, could reduce global CO₂ emissions by 20% per year (8.2 GtCO₂/yr) by 2030.

The recommendations aim to:

- save large quantities of energy at low cost
 - address existing market imperfections or barriers
 - address significant gaps in existing policy
 - encourage widespread implementation

CO₂ savings potential from energy efficiency recommendations





Cross-sectoral

- 1.1** Measures for increasing investment in energy efficiency
- 1.2** National energy efficiency strategies and goals
- 1.3** Compliance, monitoring, enforcement and evaluation of energy efficiency measures
- 1.4** Energy efficiency indicators
- 1.5** Monitoring and reporting progress with the IEA energy efficiency recommendations themselves



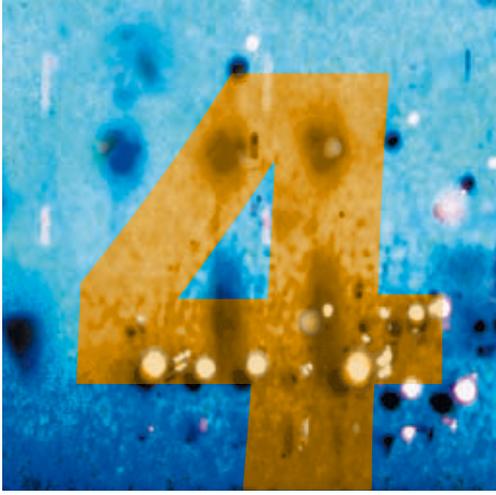
Buildings

- 2.1** Building codes for new buildings
- 2.2** Passive Energy Houses and Zero Energy Buildings
- 2.3** Policy packages to promote energy efficiency in existing buildings
- 2.4** Building certification schemes
- 2.5** Energy efficiency improvements in glazed areas



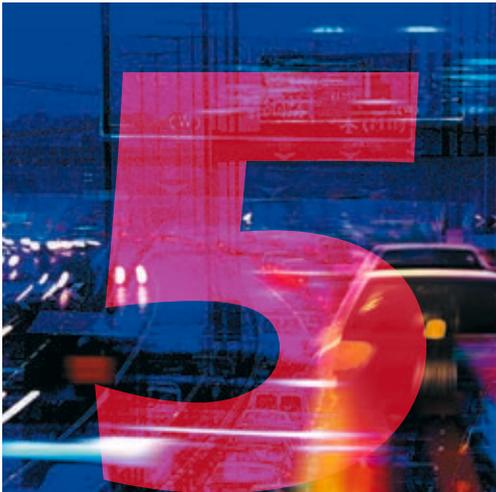
Appliances and equipment

- 3.1** Mandatory energy performance requirements or labels
- 3.2** Low-power modes, including standby power, for electronic and networked equipment
- 3.3** Televisions and "set-top" boxes
- 3.4** Energy performance test standards and measurement protocols



Lighting

- 4.1** Best practice lighting and the phase-out of incandescent bulbs
- 4.2** Ensuring least-cost lighting in non-residential buildings and the phase-out of inefficient fuel-based lighting



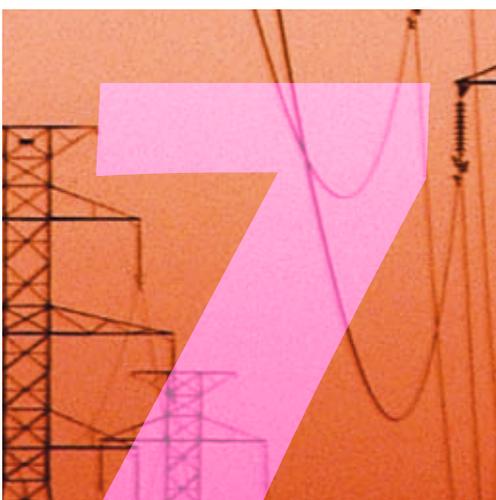
Transport

- 5.1** Fuel-efficient tyres
- 5.2** Mandatory fuel efficiency standards for light-duty vehicles
- 5.3** Fuel economy of heavy-duty vehicles
- 5.4** Eco-driving



Industry

- 6.1** Collection of high-quality energy efficiency data for industry
- 6.2** Energy performance of electric motors
- 6.3** Assistance in developing energy management capability
- 6.4** Policy packages to promote energy efficiency in small and medium-sized enterprises



Energy utilities

- 7.1** Utility end-use energy efficiency schemes

Cross-sectoral

1

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.

The IEA recommends action on energy efficiency across sectors. In particular, the IEA calls for action on:

1.1 Increased Investment in Energy Efficiency

- Governments should facilitate the private sector's involvement in energy efficiency investments by:
 - Adopting, and publicising to the private sector, a common energy efficiency savings verification and measurement protocol, to reduce existing uncertainties in quantifying the benefits of energy efficiency investments and stimulate increased private sector involvement;
 - Encouraging financial institutions to train their staff and develop evaluation criteria and financial tools for energy efficiency projects;
 - Reviewing their current subsidies and fiscal incentive programmes to create more favourable grounds for private energy efficiency investments;
 - Collaborating with the private financial sector to establish public-private tools to facilitate energy efficiency financing;
 - Promoting risk mitigation instruments, such as securitisation or public-private partnerships; and
 - Putting in place institutional frameworks to ensure regular co-operation and exchanges on energy efficiency issues between the public sector and financial institutions.

1.2 National Energy Efficiency Strategies and Energy Efficiency Goals

- Governments should set goals and formulate action plans for improving energy efficiency in each sector of their domestic economies, utilising on-going IEA works for developing sectoral energy efficiency benchmarks and compiling best practices.
- Best practice action plans should:
 - Assess energy consumption by end-use in all sectors;
 - Identify the economy's energy savings potentials; and
 - Establish objectives and adequate methods for evaluating the success of the plan.
- Energy efficiency policy agencies should be adequately resourced.

1.3 Compliance Monitoring, Enforcement and Evaluation

- Governments should ensure that both voluntary and mandatory energy efficiency policies are adequately monitored, enforced and evaluated so as to ensure maximum compliance. At a minimum, this should include:
 - Considering and planning for optimal compliance, monitoring and evaluation procedures at the time new policies and measures are formulated;
 - Establishing legal and institutional infrastructure for ensuring compliance with energy efficiency requirements;
 - Ensuring transparent and fair procedures for assessing compliance, including specification of the methods, frequency and scope of monitoring activities;
 - Ensuring regular and public reporting of monitoring activities, including instances of non-compliance;
 - Establishing and implementing a suite of enforcement actions commensurate with the scale of non-compliance and the value of lost energy savings; and
 - Establishing and implementing a robust system for evaluating policy and programme success during and after implementation.

1.4 Indicators

- Governments should ensure that their energy efficiency policies are supported by adequate end-use information by substantially increasing their efforts to collect energy end-use data across all sectors and relating to all energy-types.
 - This will require governments to increase the resources allocated to energy end-use data collection.
 - At a minimum, governments should ensure that they are able to complete and submit the annual energy efficiency data template developed by the IEA in co-operation with other organisations.

1.5 Monitoring and Reporting Progress with IEA Energy Efficiency Recommendations

- Governments should agree to track progress in implementing each of the concrete recommendations and to provide the IEA with regular updates.

Buildings

2

Buildings account for 40% of energy use in most countries and hold great potential for cost-effective energy savings.

Barriers such as split incentives between tenant 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 as high as 1.4 GtCO₂/year by 2030 through targeting:

- **New buildings:** implementing and strengthening mandatory energy efficiency standards through changes in building codes.
- **Passive Energy Houses (PEH) and Zero Energy Buildings (ZEB):** actively supporting construction and availability of PEH and ZEB constructions can increase the share of building stock with drastically reduced emissions.
- **Existing buildings:** halving energy consumption is possible by setting high efficiency standards (especially for windows) for renovated or refurbished buildings.

Urgent action will ensure cost-effective energy savings across the buildings sector.

Buildings account for about 40% of energy used in most countries. To save a significant portion of this energy, the IEA recommends action on:

2.1 Building Codes for New Buildings

- Governments that do not currently have mandatory energy efficiency standards for new buildings in building codes should urgently set, enforce and regularly update such standards.
- Those governments that currently have mandatory energy efficiency standards for new buildings should significantly strengthen those standards.
- Energy efficiency standards for new buildings should be set by national or state governments and should aim to minimise total costs over a 30-year lifetime.

2.2 Passive Energy Houses and Zero Energy Buildings

- Governments should support and encourage the construction of buildings with very low or no net energy consumption (Passive Energy Houses and Zero Energy Buildings) and ensure that these buildings are commonly available in the market.
- Governments should set objectives for PEH and ZEB market share of all new construction by 2020.
- Passive Energy Houses or Zero Energy Buildings should be used as benchmarks for energy efficiency standards in future updates of building regulations.

2.3 Existing Buildings

- Governments should systematically collect information on energy efficiency in existing buildings and on barriers to energy efficiency.
- Standardised indicators should also be calculated for energy efficiency in buildings for international comparison, monitoring and selection of best practices.
- Based on this information governments should construct a package of initiatives to address the most important barriers to energy efficiency in buildings.
 - This package should set standards to ensure that energy efficiency improvements are achieved during the refurbishment of all buildings; and
 - Also, the package should increase awareness of efficiency in the building sector and raise the market profile of a building's energy performance.

2.4 Building Certification

- Governments should take actions to make building energy efficiency more visible and to provide information on major energy-saving opportunities. This should include:
 - Mandatory energy certification schemes that ensure that buyers and renters of buildings get information on the energy efficiency of buildings and major opportunities for energy savings; and
 - Structures that ensure that energy efficiency information is available to all actors in the building sector at all times.

2.5 Windows and Other Glazed Areas

- Governments should set up a policy package to improve energy efficiency in windows and other glazed areas. This policy package should include:
 - Minimum energy efficiency standards for windows and other glazing that are based on least lifetime costs;
 - A requirement for window and glazed-product manufacturers to provide energy efficiency labelling for their products; and
 - Governments establishing demonstration projects for efficient windows and implementing energy-efficient window procurement policies.

Appliances and equipment

3

Global use of appliances represents one of the fastest growing energy loads. Residential appliances, alone, account for over 30% of the electricity consumption in most countries.

The IEA estimates that, if implemented globally, the following recommendations could cost-effectively decrease appliance consumption by one-third by 2030. This savings could equal 12.8 EJ/year for a total of 2.2 GtCO₂/year by 2030.

Effectively implementing energy efficiency regulations for appliances is essential. Moreover, as standby power represents 2-11% of the residential electricity use in IEA member countries, the IEA 1-Watt Initiative and effective power management can lead to a 5-70% reduction in standby power.

The expansion of more complex, multifunction televisions that remain on for longer periods of time could cause the global energy consumption of televisions to double by 2020. Promoting the most efficient technologies available and stimulating the market to make new technologies commercial will be crucial to achieving energy savings in this sector.

Appliances and equipment represent one of the fastest growing energy loads in most countries. The IEA recommends action on:

3.1 Mandatory Energy Performance Requirements or Labels

- Governments should adopt mandatory energy performance requirements and, where appropriate, comparative energy labels across the spectrum of appliances and equipment at a level consistent with international best practices.
- Adequate resources should be allocated to ensure that stringency is maintained and that the requirements are effectively enforced.

3.2 Low-power Modes for Electronic Equipment

- Governments should adopt the same “horizontal” 1-Watt limit and apply it to all products covered by an International Electrotechnical Commission definition of standby power with limited exceptions.
- Governments should adopt policies which require electronic devices to enter low-power modes automatically after a reasonable period when not being used.
- Governments should ensure that network-connected electronic devices minimise energy consumption, with a priority placed on the establishment of industry-wide protocols for power management.
 - In order to enhance energy efficiency across electronic networks, governments should:
 - Instruct relevant public and private standards authorities to ensure that industry-wide protocols are developed to support power management in appliances and equipment, including networked devices; and
 - Ensure such protocols are developed and implemented.

3.3 Televisions, Television “Set-top” Boxes and Digital Television Adaptors (DTAs)

- The IEA concludes that international best practice with respect to energy-efficient set-top boxes are policies that establish a minimum efficiency standard for Digital Television Adaptors. These regulations should:
 - Specify the maximum power levels while “on” and “off”; and
 - Ensure that the consumer can easily switch the unit to the lower power level.
- A second aspect of best practice is to ensure that government-subsidised units meet higher efficiency requirements.
- Governments should implement energy efficiency policy measures for TVs and set-top boxes designed to:
 - Promote the best-performing current TV products and technologies;
 - Stimulate the market entry of new television technologies which aim to halve TV energy consumption compared to current performance levels; and
 - Minimise the energy used by TVSP customers in receiving TV services by ensuring that such requirements are included in relevant franchise or licensing agreements that allow TVSPs to operate.

3.4 Test Standards and Measurement Protocols

- Governments should:
 - Review energy measurement standards currently used, to determine whether they are consistent with national policy requirements; and
 - Support the development and use of international measurement standards, where appropriate, in order to assist performance comparison and benchmarking for traded products while also reducing compliance costs.

Lighting

4

Lighting represents almost a fifth of electricity consumption. At least 38% of global lighting energy consumption could be saved cost-effectively by greater use of efficient lighting technologies. These savings equal 9.3 EJ/year and 1.2 GtCO₂/year by 2030.

Phasing out conventional incandescent lamps in favour of CFLs that are four to five times more efficient is a first priority.

Most electricity for lighting is consumed indoors. To achieve maximum indoor savings, policies are needed that target the performance of the lighting system as a whole and that place responsibility upon the agents who design, install and operate such systems.

For outdoor lighting, simply replacing inefficient mercury vapour lamps with ceramic metal halide lamps or high pressure sodium lamps would reduce energy costs by 40% and have a rate of return of around 50%.

Much also needs to be done for the 1.6 billion who have no access to electricity and must rely on inefficient wood fuels and kerosene. Access to more sustainable sources of energy would decrease carbon dioxide emitted from deforestation and drastically improve quality of life.

Saving energy by adopting efficient lighting technology is very cost-effective. The IEA recommends action on:

4.1 Best Practice and Incandescent Phase-out

- The IEA recommends that governments endorse the objective of across-the-board best practice in lighting.
- Governments should move to phase out the most inefficient incandescent bulbs as soon as commercially and economically viable.
- In aiming for this objective, there is a need both for appropriate time scales and performance targets to be established; and
- Also government and industry actions must be coordinated internationally to ensure a sufficient supply of good-quality higher efficiency alternative lamps.

4.2 Non-residential Buildings and Phase-out of Inefficient Fuel-based Lighting

- Governments should put in place a portfolio of measures to ensure energy-efficient least-cost lighting is attained in non-residential buildings. The portfolio of measures should include the following:
 - The inclusion of energy performance requirements for lighting systems within building codes and ordinances applicable to the installation of lighting in the commercial, public, industrial, outdoor and residential sectors. These requirements should:
 - Include targeted measures to stimulate better control of lighting and the avoidance of illumination of unoccupied spaces;
 - Specify that general service lighting systems in new non-residential buildings, or substantial retrofits of existing non-residential buildings, should draw no more than 10W of power per square metre of internal floor area when averaged over the whole building;
 - Be based upon a review of recommended lighting levels, including a full peer review comparing local recommendations with those applied internationally to ensure that there are no excessive lighting levels recommended in national guidelines; and
 - Hasten the phase-out of inefficient street lighting technologies such as mercury vapour lamps.
- Governments should support international efforts to stimulate the adoption of higher efficiency alternatives to fuel-based lighting in off-grid communities e.g. via supporting the diffusion of solar powered solid state lighting devices.

Transport

5

Significant energy savings can be made in the transport sector. These savings rely on urgent widespread implementation of policies to:

- Lower rolling resistance and promote appropriate tyre inflation pressure.
- Set fuel efficiency standards with enough warning for manufacturers to cost-effectively respond.
- Promote eco-driving by making it a central part of government initiatives to reduce CO₂ emissions.

If implemented globally, these actions could lead to savings of 23 EJ/year and 1.4 GtCO₂/year by 2030.

About 60% of world oil is consumed in the transport sector. To achieve significant savings in this sector, the IEA recommends action on:

5.1 Fuel-efficient Tyres

- Governments should:
 - Adopt new international test procedures for measuring the rolling resistance of tyres, with a view to establishing labelling, and possibly maximum rolling resistance limits, where appropriate, for road-vehicle tyres; and
 - Adopt measures to promote proper inflation levels of tyres.
 - This should include governments, acting in cooperation with international organisations including UNECE, making the fitting of tyre-pressure monitoring systems on new road vehicles mandatory.

5.2 Mandatory Fuel Efficiency Standards for Light-duty Vehicles

- Governments should:
 - Introduce new mandatory fuel efficiency standards for light-duty vehicles if they do not already exist, or, where they do exist, make those standards more stringent;
 - Announce the more stringent content of the proposed standards as soon as possible; and
 - Harmonise, where appropriate, as many aspects of the future standards as possible.

5.3 Mandatory Fuel Efficiency Standards for Heavy-duty Vehicles

- For heavy duty vehicles, governments should introduce:
 - Fuel efficiency standards; and
 - Related policies including labelling and financial incentives based on the vehicle's fuel efficiency.

5.4 Eco-driving

- Governments should ensure that eco-driving is a central component of government initiatives to improve energy efficiency and reduce CO₂ emissions.
 - Governments' support for eco-driving should include promotion of driver training and deployment of in-car feedback instruments.

Industry

6

Industry accounts for nearly one-third of total global primary energy supply and 36% of CO₂ emissions.

Industry's final energy-use grew 61% between 1971 and 2004. There are substantial opportunities to reduce consumption in this sector. These potential savings are around 18.9 EJ/year and 1.6 GtCO₂/year by 2030.

Policies are needed that target industrial electric motors that consume approximately 40% of all global electricity. If all countries were to adopt best practices for minimum performance standards (MEPS) for motors, between 240 and 475 TWh of electricity could be conserved by 2030.

Energy management (EM) programmes address the way an industrial plant is managed to exploit cost-effective energy savings opportunities. Global adoption of EM measures could produce industrial energy demand savings of 3-7%.

Large energy savings can also be made from light industry that consumes 30% of industrial energy use by increasing EM programmes in this sector.

In order to improve energy efficiency in industry, action is needed on:

6.1 High-quality Energy Efficiency Data for Industry

- Governments should support the IEA energy efficiency indicator work that underpins critical policy analysis by ensuring that accurate energy intensity time series data for industrial sectors is reported regularly to the IEA.

6.2 Minimum Energy Performance Standards for Motors

- Governments should consider adopting mandatory minimum energy performance standards for electric motors in line with international best practice.
- Governments should examine barriers to the optimisation of energy efficiency in electric motor-driven systems and design and implement comprehensive policy portfolios aimed at overcoming such barriers.

6.3 Energy Management

- Governments should consider providing effective assistance in the development of energy management (EM) capability through the development and maintenance of EM tools, training, certification and quality assurance.
- In addition, governments should encourage or require major industrial energy users to implement comprehensive energy management procedures and practices that could include:
 - The development and adoption of a formal energy management policy:
 - Progress with implementation of this policy should be reported to and overseen at company board level and reported in the company report.
 - Within this policy companies would need to demonstrate that effective organisational structures have been put in place to ensure that decisions regarding the procurement of energy-using equipment are taken with full knowledge of the equipment's expected life-cycle costs and that procurement managers have an effective incentive to minimise the life-cycle costs of their acquisitions.
 - The appointment of full-time qualified energy managers at both the enterprise and plant-specific level as appropriate; and
 - The establishment of a scheme to monitor, evaluate and report industrial energy consumption and efficiency at the individual company, sector and national level.
 - As a part of this effort, appropriate energy performance benchmarks should be developed, monitored and reported at levels deemed suitable in each sector.

6.4 Small and Medium-sized Enterprises

- Governments should consider developing and implementing a package of policies and measures to promote energy efficiency in small and medium-sized enterprises (SMEs). This package should include:
 - A system for ensuring that energy audits, carried out by qualified engineers, are widely promoted and easily accessible for all SMEs;
 - The provision of high quality and relevant information on energy efficiency best practice;
 - The provision of energy performance benchmarking information that ideally would be structured to allow international and within economy comparisons; and
 - Appropriate incentives to adopt least-life cycle cost capital acquisition and procurement procedures.

Energy utilities

7

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. Action is needed to promote:

7.1 Utility End-use Energy Efficiency Schemes

- Governments and utility regulators should consider implementing mechanisms that strengthen the incentives for utilities to deliver cost-effective energy savings to end-users such as:
 - Establishing regulation which decouples utility revenue and profits from energy sales and allows energy savings delivery to compete on equal terms with energy sales; or
 - Placing energy efficiency obligations on energy utilities, the stringency of which is periodically raised based on continuing cost effectiveness in delivering energy services, and where:
 - Such obligations may be tradable and structured such that utility costs are recoverable through the rates;
 - The obligations are designed to be consistent with any corresponding mandatory or voluntary CO₂ emission target imposed on utilities; or
 - Allowing energy efficiency measures to be bid into energy pools, on an equal basis to energy supply options; or
 - Other appropriate policy measures that encourage utilities to play an active part in funding and/or delivering end-use efficiency improvements among their customer base.

FOR MORE INFORMATION

www.iea.org/G8/2008/G8_EE_recommendations.pdf

Contact: Efficiencyinfo@iea.org

INTERNATIONAL ENERGY AGENCY

9 rue de la Fédération, 75739 Paris Cedex 15

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