The Future of Energy Efficiency Finance

Workshop background document

Introduction

Economic policy instruments in the form of tax incentives, grants, subsidies, financial mechanisms, market-based instruments, and public direct investments are used by all IEA countries as tools to improve energy efficiency in different sectors. Economic policy instruments can address market failures such as externalities where energy end-users do not pay the full cost to society of their energy consumption and other barriers such as the uncertainty and risk associated with recoupment of the costs of energy efficiency investment in the future, and behavioural failure in the form of inertia and bounded rationality.

The objectives of the IEA energy efficiency economic instruments project are to evaluate the use of economic instruments in energy efficiency policy across different sectors and identify future financing mechanisms to deliver improved energy efficiency.

This should help policy makers better design and select appropriate economic instruments to improve energy efficiency in individual sectors.

The appropriate choice of economic policy instrument to address a lack of investment in energy efficiency may differ depending on the circumstances and sector. For example, taxes, tax relief, and small grants are likely to be more suitable tools to balance externalities by readjusting energy and energy-using equipment prices to promote energy-efficient behaviour and investments. However, high upfront costs for big energy efficiency projects in industry or in buildings may require other kinds of economic policy instruments in the form of financial mechanisms, since the significant finance needed to fund these projects may not be available from traditional sources due to a range of factors. Countries have different sectoral priorities with regard to energy efficiency and therefore knowing which economic policy instruments are likely to be more suitable to address energy efficiency in that sector is important.

Secondly, the design of economic policy instruments may have a stronger influence on the effectiveness and economic efficiency of the policy than the type of policy instrument chosen. This project evaluates the experience with economic policy instruments in energy efficiency policy across different countries and sectors. This should draw out (distil some insights for policy makers trying to identify and design the most applicable policies in their national circumstances to improve energy efficiency in different sectors.

Definitions

The terminology used for economic, financial and fiscal policies in the area of energy efficiency policy is not well-defined. For clarity, we provide the following definitions for the relevant terms:

Economic instruments: includes all policy instruments that relate to fiscal, financial and other economic incentives and disincentives to deliver energy efficiency improvements across all sectors. Their objective is to "employ market forces to secure a more efficient balance between the supply of (…) services, on the one hand, and the demand for and benefits of such services on the other" (Andersen 2001). Economic instruments provide market signals in the form of a modification of

relative prices (e.g. taxation on certain products) and/or a financial transfer (payment of a charge)[1].

In the case of energy efficiency we use economic instruments to encompass fiscal policy instruments such as taxes that include the external costs associated with energy use, tax relief for energy-efficient activity, and user charges on electricity and district heating; financial mechanisms such as grants and loans; market-based instruments such as white certificates and carbon emissions trading schemes; and public direct investments in R&D and infrastructure that enable energy efficiency improvements. It is important to consider not only the type and design of economic instrument best suited to deliver a given objective but also the level and source of funding required.

Fiscal policy instruments refers to the use of policy instruments such as taxation, tax relief, and user charges on electricity and district heating.[2]. These are generally funded from central budgets and disbursed by a government institution directly. The OECD database defines environmentally-related *taxes* as "any compulsory, *unrequited* payment to general government levied on tax-bases deemed to be of particular environmental relevance. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments".[3] User charges are requited payments in that the payment is made in proportion to a service rendered. Tax relief is an economic instrument that effectively reduces taxes on particular goods to correct market failures and in this case overcome barriers to energy efficiency. It is referred to by the OECD as *tax expenditures* and defined as "provisions of tax law, regulation or practices that reduce or postpone revenue for a comparatively narrow population of taxpayers relative to a benchmark tax". There are several types of tax relief that reduce tax liability when investments in energy-efficiency are made. These are:

- *Tax credits* which allow purchasers or businesses to set a percentage of the investment cost associated with the qualifying equipment as a credit against taxes on business profits or individual income

- *Tax deductions* which reduce the sales tax of qualifying equipment immediately at the point of sale

- *Tax rebates,* which allow for a refund of purchase or sales taxes of qualifying equipment, similar to tax deductions but must usually be applied for later

- *Accelerated depreciation allowances* which allow purchasers to write-off the cost of depreciation of qualifying equipment more rapidly than standard equipment, thus effectively reducing the total cost of the equipment

- *Tax or custom exemptions* which relieve purchasers from paying custom taxes on qualifying imported equipment or excise tax on consumption or purchase of specified products

Financial measures include all policies and measures that assist with financing an activity to improve energy efficiency. These may take many forms of subsidy such as publicly-funded loans, grants, or share participation in companies. The sources of funding can be from central government budgets (i.e. the Treasury) or a government agency, through a dedicated public or public-private fund, or

[1] Barde, J.-P. (1994) Economic Instruments in Environmental Policy: Lessons from the OECD experience and their relevance to developing economies. Working Paper No. 92. OECD, Paris. http://www.oecd.org/dataoecd/25/36/1919252.pdf

[2] User charges on electricity and district heating can be in addition to taxes (requited payments) applied *i.a.* to internalise externalities (unrequited payments).to increase the cost of energy-intensive activities and reward low energy-using activities. these payments tend to be made to publicly owned companies – and the prices are often directly regulated by public authorities.

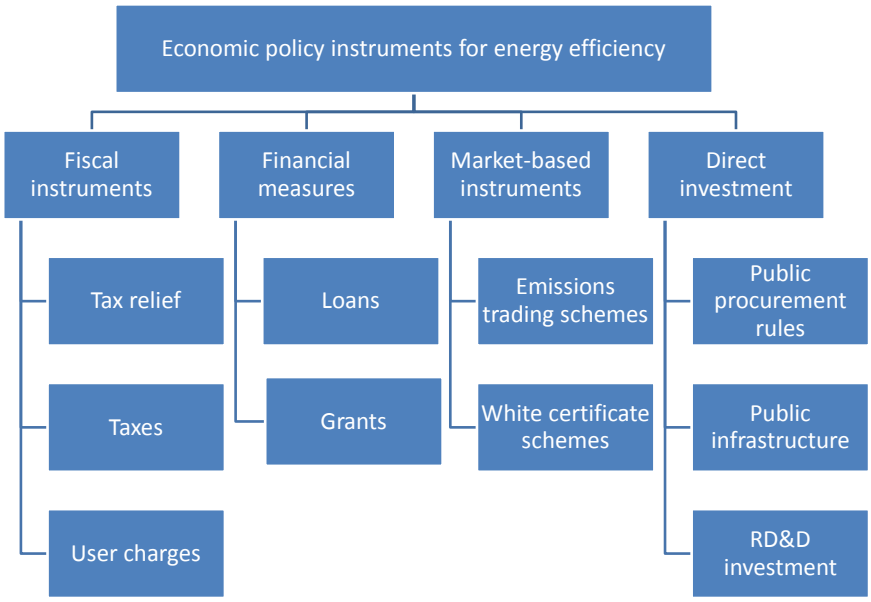
[3] OECD (2010) Tax Expenditures in OECD Countries. OECD, Paris.

through third party finance, backed by publicly-funded guarantees and/or capital, for investment in energy efficiency.

- *Grants:* an amount of money is provided to individuals or businesses that covers all or part of the energy efficiency investment. The award of a grant may be for specific pieces of energy-efficient equipment (on a technology list for example) or may be tied to energy performance, and may be set at a fixed amount or as a share of the investment needed. Grants are mainly sourced from central government budgets or special dedicated funds.
- *Loans:* government support for loans for energy efficiency investment can be provided through a multitude of financial mechanisms. In some cases a public bank is established to provide loans at preferential rates for energy efficiency projects. In other cases public-private partnerships are involved whereby public funds are provided as dedicated credit lines to local financial institutions (LFI's) to deliver preferential rate loans or risk sharing facilities for energy efficiency projects. Third party finance, where funds are raised from private capital markets, may also be used to fund energy efficiency programmes.

Market-based instruments (mbi's) are policies that "primarily operate through changing relative prices or making trading opportunities available where they did not previously exist".[4] Although sometimes the term mbi is used interchangeably with economic instruments, in this case we use mbi refers to "the direct use of markets and the creation of markets (…) to achieve the governments objective" Hepburn 2009). This implies creating a market for energy efficiency improvements or energy savings directly through instruments such as white certificates or indirectly through GHG emissions trading schemes.

Figure 1: schematic diagram of economic policy instruments for energy efficiency.



Direct investment policies refers to public strategic investments to enable energy efficiency improvements. Examples include investment in infrastructure such as smart meters in households, smart grids; investment or subsidy of research and development for advanced /pre-commercial

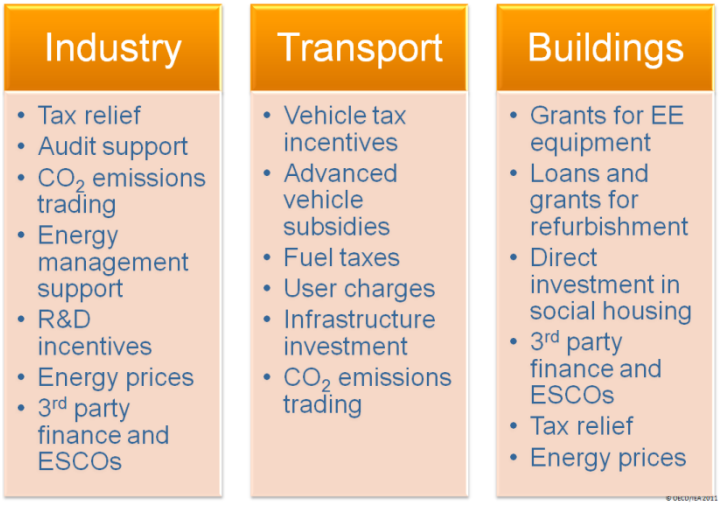
[4] Hepburn (2009) Alternatives to Traditional Regulation, OECD Report. Paris. http://www.oecd.org/dataoecd/17/5/42245468.pdf

energy-efficient technologies; or the introduction of public procurement rules that implicitly will require public expenditure through purchase of higher cost energy-efficient goods.

Economic instruments in different sectors

There are many examples of economic instruments used in energy efficiency policy in different sectors throughout IEA member countries and Fig. 2 shows the main economic instruments in use to support energy efficiency in the industry, transport, and buildings sectors. IEA is working on collecting more information about them and evaluating their performance.

Figure 2: examples of economic instruments to promote energy efficiency



A first analysis has been carried out for tax relief schemes for energy-efficient equipment in the industrial and services sectors and passenger cars. The analyses show that these programmes appear to have been cost-effective in many cases but that careful design is needed to reduce free-ridership, avoid reduced government revenues, overlapping policies, and administrative costs while achieving an ambitious level of environmental improvement.

Economic instruments for energy efficiency in the buildings sector

Previous IEA work has identified the scale of the energy savings potential in the buildings sector. The Energy Technology Perspectives 2010 estimates that energy consumption in the buildings sector can be reduced by one third compared with business- as-usual or the baseline scenario and nearly two thirds of these energy savings come from the residential sector. This will require significant additional investment of USD 12.3 trillion in buildings compared with business-as-usual. The additional investment would be used to "ensure new buildings meet more stringent building codes, to refurbish around 60% of the IECD building stock still standing in 2050 to a low-energy standard, and for additional investments in heat pumps, solar systems, CHP systems, lighting systems and appliances"[5]. Nearly one quarter of all investments will be needed in the refurbishment of building shells in OECD countries. However, when the fuel and electricity savings are taken into account, the net discounted savings are estimated at USD 5.3 trillion.[6]

However barriers remain to energy efficiency finance in the private sector and therefore the role of governments is increasingly one of facilitating the scale-up of energy efficiency finance in the private

[5] *Energy Technology Perspectives 2010*. IEA/OECD, Paris.

[6] This is estimated at a discount rate of 10%. A 3% discount rate would deliver estimated net savings of USD 18.6 trillion.

sector. This will include putting innovative policies in place that can deliver finance for energy efficiency investments such as loan guarantees, preferential rate loans, or setting up 3rd party financing options through energy service companies or public green banks. In addition, some incentives in the form of subsidies may be necessary to encourage greater take-up of finance of energy efficiency improvements in buildings.

From the IEA Policies and Measures database[7] it can be seen that nearly all IEA countries have at least one economic instrument in place to support energy-efficient new and existing buildings. More than one third of economic instruments to support investment in energy efficiency in buildings in IEA countries are in the form of grants to owners of residential and commercial buildings that are used to subsidise the sale of energy-efficient equipment in buildings such as boilers, heating, ventilation and lighting systems, as well as renewable energy systems. They have also been used to improve the building envelope with a focus on insulation in most countries. However, it is becoming clearer that the award of grants and tax incentives alone to support energy efficiency improvements is unsustainable; once they are disbursed they are no longer available for public use. Government budgets are also limited and therefore the amounts available may not be enough to deliver the level of investment needed to maximise the energy efficiency potential of buildings in the future. Also, it is perhaps inequitable to expect public funds to pay for the totality of energy efficiency investment in buildings and therefore policy and capital to facilitate 3rd party finance is a trend set to continue in most countries.

Workshop objectives

More analysis is needed of the effective use of economic instruments to drive energy efficiency investment across all sectors. The information base is still low and there is a lack of evaluation of effectiveness and efficiency of economic instruments in many cases. IEA is thus working to deepen the knowledge base in this regard.

The objectives of the workshop are to assist in understanding and evaluating the use of economic instruments to improve energy efficiency, particularly in buildings. It should achieve the following aims:

- To enable a discussion between policy makers and experts on the subject of economic instruments and their role in scaling up investment in energy efficiency. This should address key issues such as what is the most suitable policy input to achieve the level of investment needed in energy efficiency in the future.

- To provide a forum for exchange between government officials from finance and energy ministries responsible for incentive programmes in their respective countries and enable the sharing of their experiences in implementing and administering these programmes and gain insight into successful features and lessons learned.

- To encourage the sharing of data on the use of economic instruments to scale up investment in energy efficiency. The various presentations and discussions should reveal the latest data and knowledge on the subject and provide material for carrying out the evaluation of programmes to date.

A workshop report will be produced soon after the workshop that should summarise the discussion and be available for a wider audience. This will feed into a series of papers on the use of economic instruments in energy efficiency that will be published early summer.

[7] Available at http://www.iea.org/textbase/pm/?mode=pm