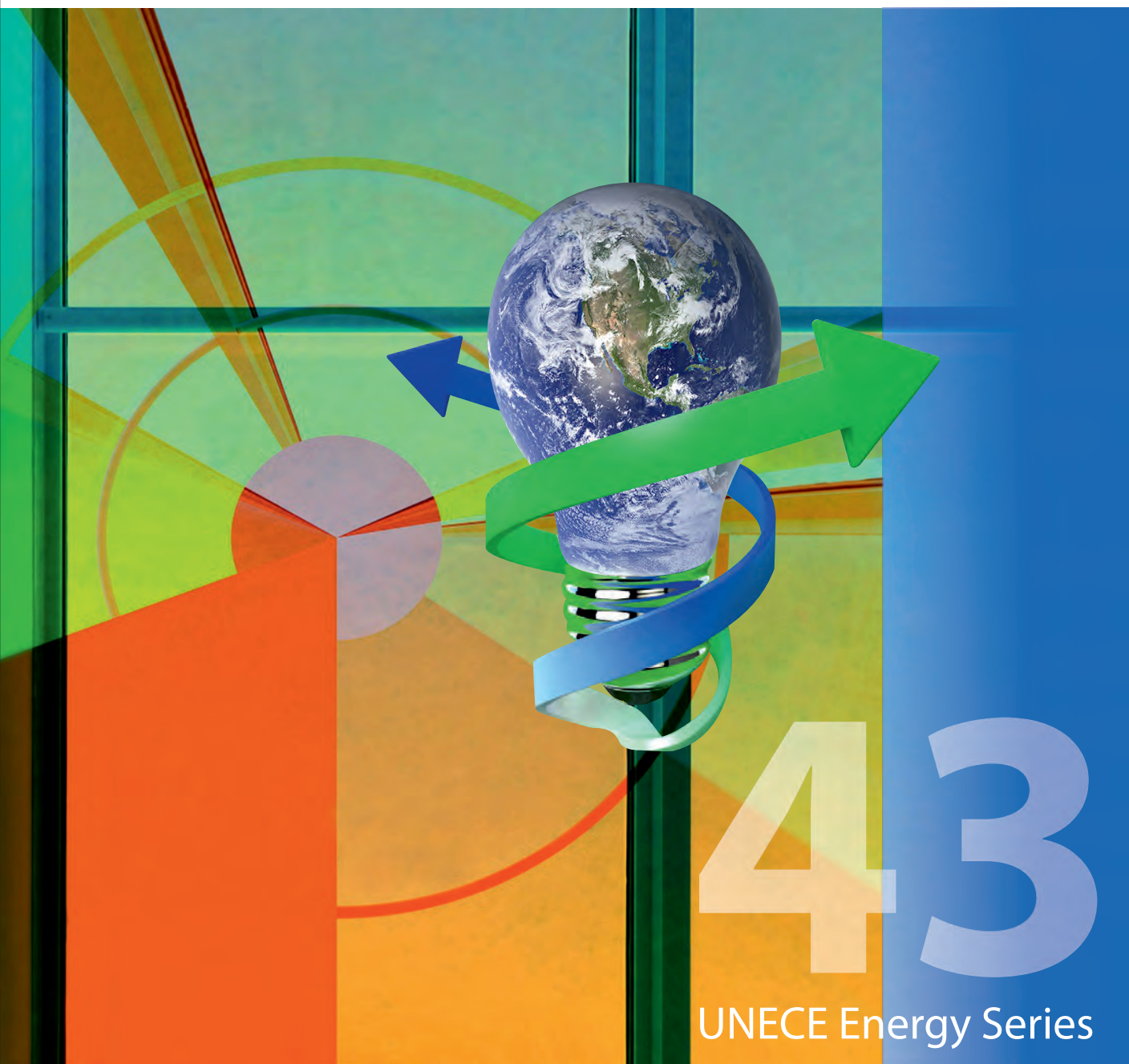


UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

BEST POLICY PRACTICES FOR PROMOTING ENERGY EFFICIENCY



43

UNECE Energy Series



UNITED NATIONS

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BEST POLICY PRACTICES FOR PROMOTING ENERGY EFFICIENCY

A STRUCTURED FRAMEWORK OF BEST PRACTICES IN POLICIES
TO PROMOTE ENERGY EFFICIENCY FOR CLIMATE CHANGE MITIGATION AND
SUSTAINABLE DEVELOPMENT



UNITED NATIONS

NEW YORK AND GENEVA, 2015

NOTE

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Foreword

The United Nations General Assembly declared 2014-2024 as the International Decade of Sustainable Energy for All (SE4All), following the UN Secretary General's initiative and emphasizing the importance of energy issues for sustainable development. One of the three objectives of the SE4All initiative is to double the global rate of improvement in energy efficiency by 2030.

Improving energy efficiency is supposed to be easy to do and contributes to energy security, a better environment, quality of life, and economic well-being for all. Energy efficiency is called “the first fuel” as it is the best way of getting more out of existing resources, supporting economic growth, and reducing energy costs. Significant potential for improving energy efficiency exists worldwide, but attempts to improve it often fall short because of inadequate national policy frameworks or lack of enforcement of appropriate legislation. Among the drawbacks are policies that artificially lower energy prices and thus encourage wasteful consumption; production and consumption subsidies that distort markets; poorly-managed housing stock; and barriers to entry for new market participants.

Despite the multiple benefits, improving energy efficiency remains elusive. The state of the global economy and the economics of energy markets have prioritized short-term economic considerations, and geopolitics has moved energy security to the forefront of policy considerations. To make the first step in overcoming the current inertia, countries need to develop policies and capabilities in the private and public sectors at the local level to identify, formulate and present energy efficiency investment projects that are bankable; introduce policy and institutional changes to support energy efficiency investments; and create favourable conditions for financial institutions and commercial companies to invest in energy efficiency projects.

This publication has been prepared in the framework of the United Nations Development Account project “Promoting Energy Efficiency Investments for Climate Change Mitigation and Sustainable Development”, which is implemented jointly by all five UN Regional Commissions, with UNECE being the lead agency. The publication highlights best policy practices for promoting energy efficiency in the UNECE region and beyond. It presents a structured framework of policies and measures to promote energy efficiency investments for climate change mitigation and sustainable development, as well as to develop a menu of energy efficiency policies and measures.

Governments, the business community, experts, project developers, and other stakeholders may find this publication to be a useful companion for understanding and applying best policy practices in improving energy efficiency.



Christian Friis Bach
Executive Secretary
UNECE



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ACRONYMS AND ABBREVIATIONS

AAU	- Assigned Amount Units for energy efficiency (Estonia)
APEC	- Asia-Pacific Economic Cooperation
APERC	- Asia-Pacific Energy Research Centre
Arab-SEMED	- Arab-Southern and Eastern Mediterranean Region
ASEAN	- Association of Southeast Asian Nations
BASREC	- Baltic Sea Region Energy Cooperation
BEEC	- Building Energy Efficiency Certificates
BEEP	- Bankable Energy Efficiency Projects
BER	- Building Energy Rating (Ireland)
BRT	- Bus Rapid Transit system
C2E2	- Copenhagen Centre on Energy Efficiency (Denmark)
C40	- The C40 Cities Climate Leadership Group
CBD	- Commercial Building Disclosure Program (Australia)
CCAP	- Centre for Clean Air Policy (USA)
CEE	- Energy Saving Certificate (Certificats d'économie d'énergie)
CEEDS	- Cooperative Energy Efficiency Design for Sustainability
CEEF	- Commercializing Energy Efficiency Finance Initiative
CENN	- Caucasus Environmental NGO Network
CESC	- Clean Energy Solutions Centre
CFEI	- Caucasus Fuel Economy Initiative
CHEEF	- China Energy Efficiency Financing Programme (China)
CHF	- Swiss Franc
CHUEE	- China Utility based Energy Efficiency Programme (China)
CIF	- Climate Investment Funds
CIPEC	- The Canadian Industry Program for Energy Conservation (Canada)
CNY	- China Yuan Renminbi
CO₂	- Carbon dioxide
CTF	- Clean Technology Fund
DoE	- Department of Energy (United States)
DSM	- Demand-side Management
EBRD	- European Bank for Reconstruction and Development
ECLAC	- UN Economic Commission for Latin America and the Caribbean

ECS	- Energy Charter Secretariat
EE	- energy efficiency
EEN	- Energy Efficiency Networks (Switzerland, Germany)
25EEPR	- 25 IEA Energy Efficiency Policy Recommendations
EERE	- Office of Energy Efficiency and Renewable Energy of United States DoE
EERF	- Energy Efficiency Revolving Fund (Thailand)
EEW	- Energy Efficiency Watch (Intelligent Energy Europe project)
EFTA	- European Free Trade Association
EIB	- European Investment Bank
EMIS	- Energy Management Information System (Croatia)
ENOVA	- Norwegian National Energy Agency
EPA	- United States Environmental Protection Agency
ESCO	- Energy Service Companies
ESMAP	- Energy Sector Management Assistance Program
EU	- European Union
EUR	- Euro
EUREM	- European Energy Manager, a standardized training of further education, that enhances the skills of technical experts in the field of energy efficiency improvement
FIA	- International Automobile Federation (Federation Internationale de l'Automobile)
GDP	- Gross Domestic Product
GEF	- Global Environment Fund
GFEl	- Global Fuel Economy Initiative
GGF	- Green for Growth Fund
GHG	- Greenhouse gas
HDV	- Heavy Duty Vehicle
ICCT	- International Council on Clean Transportation
ICPE	- International Center for Promotion of Enterprises
ICT	- Information and Communication Technologies
IDR	- Indonesian Rupiah
IEA	- International Energy Agency
IEA IDR	- IEA In-depth Review
IFC	- International Finance Corporation
IFI	- International Financial Institutions

IIP	- Institute for Industrial Productivity (China)
IPEEC	- International Partnership for Energy Efficiency Cooperation
IRENA	- International Renewable Energy Agency
IRR	- Internal Rate of Return
ISO	- International Organization for Standardization
ITF	- International Transport Forum
JI	- Joint Implementation
JPY	- Japanese Yen
KEMCO	- Korean Energy Management Corporation
KfW	- German government-owned development bank
KPI	- key performance indicators
LAC	- Latin America and the Caribbean
LDV	- Light duty Vehicle
LED	- light-emitting diode
LEEN	- Learning Energy Efficiency Networks
LTA	- Long Term Agreement
M&V	- Monitoring and Verification
MEPS	- Minimum energy performance standard
MOTIE	- Ministry of Trade, Industry and Enterprise (South Korea)
Mtoe	- Million tonnes of oil equivalent
NABERS	- National Australian Building Energy Rating
NAPEE	- National Action Plan for Energy Efficiency
NEEAP	- National Energy Efficiency Action Plan
NGO	- Non-governmental organization
NL	- Netherlands
ODYSSEE-MURE	- Measures for Rational Use of Energy (Mesures d'Utilisation Rationnelle de l'Energie) in the Member States of the EU
OECD	- Organisation for Economic Co-operation and Development
OEE	- Natural Resources Canada Energy Efficiency Office (Canada)
PAMS	- IEA Policies and Measures Database
PEEREA	- Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects
PEPDEE	- IEA Policies for Energy-Provider – Delivered Energy Efficiency
PfRS	- Partnership for Road Safety Foundation
PJ	- Petajoule

PPEC	- Plan for Promoting Electrical Energy Consumption Efficiency (Portugal)
PPP	- Public-private partnership
PREE	- Peer Review of Energy Efficiency
PT2x	- 2005 Lagos State Transport Master Plan to double public transport mode share, Nigeria
PV	- Photovoltaic
RAP	- Regulatory Assistance Project
REEPR	- Regional Energy Efficiency Policy Recommendations
SE4All	- Sustainable Energy for All
SEE	- South-East Europe
SEFF	- EBRD Sustainable Energy Financing Facilities
SEI	- EBRD Sustainable Energy Initiative
SEP	- United States DoE State Energy Program
SME	- Small and Medium Enterprises
TOD	- Transit-oriented development
TRACE	- Tool for Rapid Assessment of City Energy
UN	- United Nations
UNDP	- United Nations Development Programme
UNECE or ECE	- United Nations Economic Commission for Europe
UNEP	- United Nations Environment Programme
UNIDO	- United Nations Industrial Development Organization
USD	- United States dollar
VA	- Voluntary agreements
VFES	- Vehicle Fuel Economy Standards
WEC	- World Energy Council

EXECUTIVE SUMMARY

Today, any answers to the question ‘what should we do to improve energy efficiency?’ will have to advance beyond the notion of simply ‘saving energy’ to an enhanced paradigm of policy options prompted by:

- the United Nations Secretary General’s call to ‘double the global rate of energy efficiency improvement by 2030’ in order to advance economic and social development and address global climate challenges;
- a growing recognition that policies are most successful when they stimulate private sector investment in energy efficiency;
- recent analysis that shows that energy efficiency is available at a scale that over time can become the ‘first fuel’ for many countries;
- a desire in many nations for smart stimulatory alternatives to the austerity responses to the 2008 global financial crisis;
- more is expected from energy efficiency policies than in the past. Countries seek policies that deliver substantial economic outcomes from investments. Energy efficiency policies must deliver social and economic ‘Multiple Benefits’ as well as environmental outcomes, and act as a tool for development in emerging countries.

This report sets forth a suite of existing energy efficiency policies that stand out as best practices. The policies identified in this report include exemplars of best practices in energy efficiency policies from around the globe, drawn from respected and objective policy evaluations and databases.

The primary audience is policy makers from the member States of the United Nations Economic Commission for Europe (ECE), though this exploration of best practices should be useful in other regions. For countries starting to develop energy efficiency programmes, the policies outlined offer guidance into what works and can offer confidence when exploring and selecting options. For countries with established and proficient energy efficiency programmes, this report can assist by validating policies and offering a set of policy benchmarks.

In many of these exemplars, implementing governments are already being rewarded with high rates of return from lower energy costs, reduced health costs due to better living conditions, improved productivity for businesses, and improved access to energy. In order to tap into the vast reserve of potential efficiency improvements, governments need to commit to sound governance, improved data, and enabling policy frameworks that lead to efficient investment decisions. An enabling framework of governance and financial policies remains the key challenge in most countries. Figure 1 summarizes this report’s findings and presents cross-sectoral policies as foundations for energy utility policies and operational policies in households, transport and business sectors.

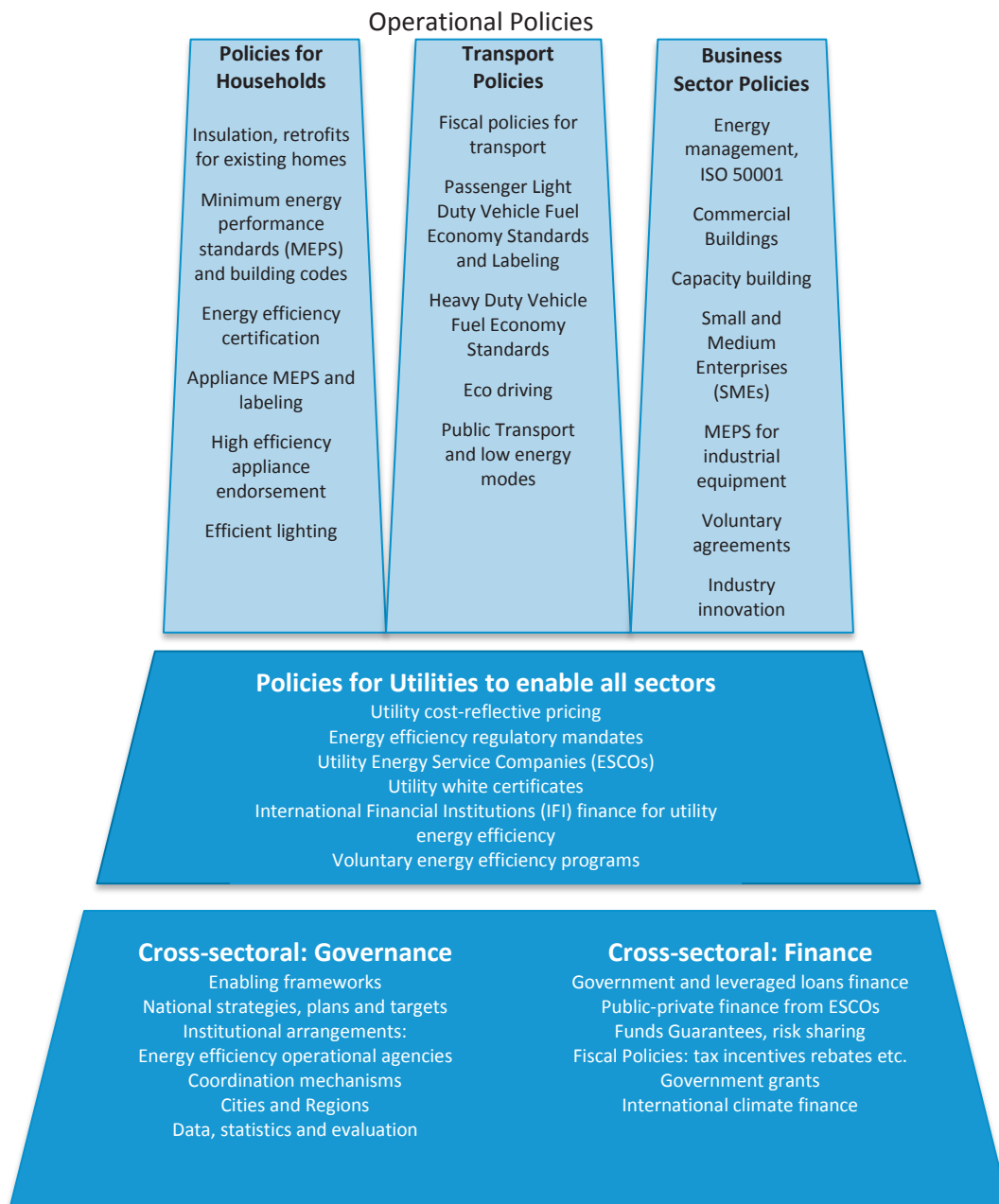
Best practice policies can only be effective if they are fully applied in a local context. Policies that have worked well in one setting do not automatically work well in another. The exemplars that are offered as concrete examples of policies and measures are best in the settings for which they have been designed. All countries should reflect carefully on their respective development needs, the local conditions that need to be recognized and motivated, and the priorities for tailored energy efficiency policy.

Governments have choices in how to approach energy efficiency and which policies and measures to pursue. No country can ignore the development, social and economic opportunities that are being unleashed by relevant energy efficiency policies and measures around the world. To do so is to be left behind as other nations like China make massive productivity gains and discover new levels of social wellbeing. This report highlights that capacity in governance and finance underpins and enables all energy efficiency policies and measures. Energy efficiency is not ‘nice to have’ or ancillary to mainstream policy functions. It is necessary for governments to fundamentally rethink energy efficiency and treat it as an energy source in its own right, representing the value of energy saved.

Therefore it must be given primary consideration in national policies, and be integrated into mainstream economic planning, local government and business development processes in general.

Concerted regional efforts like the China’s 5-year plans and the European Union’s Energy Efficiency Directive and successful energy efficiency strategies are based on collective learning and shared efforts to develop effective policy implementation. The member States of the ECE face a challenge to cooperate more closely in co-operative implementation of the best practices in this report. The same challenge exists for other regional efforts, non-governmental organizations (NGOs) and dedicated energy efficiency programmes.

Figure 1. Summary of Best Practice Policies for Energy Efficiency



A foundation of cross-sectoral governance and finance policies

INTRODUCTION

This report develops a structured framework on which to identify and base a menu of best practice energy efficiency (EE) policies and measures suitable for adaptation and adoption by member States of the United Nations Economic Commission for Europe (UNECE). It provides a comprehensive but simple system that encompasses the description, identification, nomenclature, and classification of energy efficiency policies and measures, in response to the need to enhance energy efficiency policies and concrete outcomes.

The framework includes recognized effective and economic policies and measures that when applied will accelerate achieving the energy efficiency objective of the Sustainable Energy for All (SE4All) Initiative of the UN Secretary-General.

The process that this report outlines includes three phases:

1. identifying an effective typology and content for a menu of measures with effective and economic measures;
2. active engagement with ECE member States;
3. initiating a longer term regional evaluation, learning and collaboration process.

This report focuses on the first phase: creating a menu of high-impact policies and measures suited to the region, the 'best practices' in energy efficiency policies that can with confidence be pursued by member States in the region. However, these best practices are proposed with the recognition of phases 2 and 3: intra-regional cooperation and sustained collaborative learning are critical to the increase in uptake of the policies and measures identified in phase 1.

The degree to which these perform as best practices is very dependent on how they are implemented. Member States will have to ensure:

- effective governance, accountabilities and resourcing;
- an active process of performance evaluation;
- ensuring complementarity with other infrastructure and energy policies;
- that utilities support and complement energy efficiency policies;
- timely review and refinement of policies.

Policy makers are encouraged to complement the best practice policies offered here by researching any policy or technology option that makes sense in the settings that they are targeting.

There remains a significant scope to learn from policy design and implementation. Effective evaluation of all outcomes from energy efficiency policies remains paramount in advancing a common understanding of energy efficiency potentials and the best ways to capture value from them. To that end, this report does not claim to be the last word on best practices in energy efficiency policies, and it is hoped that it motivates policy makers to continue to innovate, explore and share their experiences.

The information cut-off date for this publication is 12 March 2015.

1. INVESTMENT IMPERATIVE

Policies and Prices drive investment in energy efficiency

Recent publications highlight the need for energy efficiency policies to deliberately motivate investments in energy efficient practices and technologies. The Energy Efficiency Market Reports of the International Energy Agency (IEA 2013 and IEA 2014) highlight that globally energy efficiency has already evolved to the state where it is the largest contributor to energy services, the 'first fuel' in IEA member countries, and is an existing global market place valued at over USD 310 billion.

An estimated additional investment of the order of USD 11.8 trillion is required until 2035 to put in place a low carbon and more sustainable global economy according to the IEA's Efficient World Scenario. This investment is paid back handsomely by an USD 18 trillion boost in economic output. Direct payback of the investment comes from energy cost reductions of USD 17.5 trillion and avoided supply-side investments of USD 5.9 trillion. (IEA 2012)

The UNECE project *Promoting Energy Efficiency Investments for Climate Change Mitigation and Sustainable Development* developed a study "Analysis of National Case Studies on Policy Reforms to Promote Energy Efficiency Investments", in which case studies of 17 countries from the various regions of the world were examined, including 7 from ECE member States. In most countries a range of barriers to investments remains, with many countries struggling to attract the required level of investment for the implementation of energy efficiency investments (Box 1).

Box 1. Promoting Energy Efficiency Investments for Climate Change Mitigation and Sustainable Development

Factors Identified for successful funding and implementation of energy efficiency policies included:

- *an identified need for energy saving due to high resource costs;*
- *the existence of appropriate legislation, norms and standards, government programs and policies;*
- *support for regional and municipal authorities and national government;*
- *willingness of company/organization managers to implement energy efficiency improvements;*
- *high level of project profitability;*
- *energy audits and implementation of energy management;*
- *support from international donors;*
- *possibility to repay and service loans with savings generated from improved efficiency.*

Source: materials of a Workshop under the project "Promoting Energy Efficiency Investments for Climate Change Mitigation and Sustainable Development" UNECE 2013¹

Clearly some good progress in accelerating energy efficiency is being made in some countries. The best progress seems to occur where local financial institutions are enabled by supportive governance and policy contexts, with innovative financing relationships with

¹ http://www.unece.org/fileadmin/DAM/energy/se/pdfs/gee21/Inter-regional_Workshop_EE_Bangkok_April_14/InformationReportThailandFinal.pdf

multilateral banks, central banks, and financial markets. There is scope to expand and deepen the range of concrete policies and measures that enable and motivate consumers, local governments, utilities, and service providers to advance energy efficiency outcomes.

The past few years have seen an emerging sustainable energy focus in finance. The European Bank for Reconstruction and Development (EBRD) Sustainable Energy Initiative² (SEI) has been something of a market leader, establishing a deliberate focus on funding sustainable energy, and developing the financial, technical and commercial tools to minimize the transaction costs and risks and increase the ability to fund at scale diverse energy efficiency opportunities. Other multilateral development banks and commercial banks are developing similar portfolios for sustainable energy and energy efficiency.

There is much scope for energy efficiency to be funded by a wider range of funding sources than normal equity and debt funds. A number of innovations are still emerging, but financiers are exploring the use of pension funds, insurances and crowd financing to match lower cost funds to the risk return characteristics for energy efficiency programmes.

Crowd-funding involves relatively modest contributions from a large group of individuals (rather than seeking substantial sums from a small number of investors) and are typically conducted online, often in conjunction with social networking sites. The European Commission notes that crowd-funding is an emerging alternative source of financing³ and is exploring the potential and the risks of this relatively new and growing form of finance, as well as the national legal frameworks applicable to it, in order to identify whether there is value added in European level policy action in this field. So far, crowd-funding in the energy sector seems targeted at renewable energy³, while energy efficiency could be an equally attractive target.

An important opportunity is the bonds market. The Climate Bonds Initiative⁴ is an international, investor-focused not-for-profit focusing on mobilizing the USD 100 trillion bond market for climate change solutions. Energy efficiency is a recognized substantial contributor to climate change mitigation.

The Bonds and Climate Change⁵ report highlights progress made in climate bonds and outlines the prospects for this market. Although many of the bonds are for low carbon infrastructure programmes like modern rail systems with inherent energy efficiency features, bonds are also financing more obvious mainstream energy efficiency areas such as high efficiency appliance and electric vehicle manufacture. A breakdown of bond financing in the report for the Buildings and Industry sectors, shows that of USD 13.5 billion in bonds issued in 2013, 8% were applied to light-emitting diode (LED) technology, 31% to energy efficient appliances, 4% to energy efficient lighting, 26% to ESCOs, 16% to green buildings, all familiar applications of energy efficiency finance. The report projects rapid growth of the bonds market.

² <http://www.ebrd.com/what-we-do/sectors-and-topics/sustainable-energy-initiative.html>

³ See examples in <https://www.abundancegeneration.com/>, <https://www.trillionfund.com/>, and <http://www.larevuedurable.com/fr/energie-et-climat/998-le-financement-participatif-au-secours-de-la-transition.html>

⁴ <http://www.climatebonds.net>

⁵ <http://www.climatebonds.net/files/files/-CB-HSBC-15July2014-A4-final.pdf>

Multiple Benefits: social and economic development from energy efficiency investments

Investments in energy efficiency deliver two types of outcome: reduction in the demand for energy, and improvements in service quantity and quality. The reality is that the service improvements are often overlooked; energy efficiency is naively misperceived as ‘saving energy’, so that substantial improvements in productivity and welfare have often gone unnoticed.

A recent major study ‘Capturing the Multiple Benefits of Energy Efficiency’ (IEA 2014a) draws together the evidence base for multiple benefits from around the world (Box 2).

Box 2. Multiple Benefits of Energy Efficiency

Macro-economic Impacts. Reduced energy consumption and improved productivity from energy efficiency can have substantial positive economic impacts. Economic output changes attributed to energy efficiency can be in the region of 0.25 to 1% of gross domestic product (GDP) growth. Future economic development may be transformed by cost saving energy efficiency gains rather than the current paradigm of consumer spending to exploit cheap energy.

Employment. The degree to which jobs are directly and indirectly stimulated by a policy and the conditions in local employment markets make analysis of employment from any policies specific to a unique situation. Estimates from studies show 7-22 job-years are created per EUR 1 million invested.

Public Budget Impacts. Investment in energy efficiency has the potential to increase tax revenue, provide higher returns on investment, and lower the costs of unemployment and social welfare. A study of macro-economic impacts from renovation of EU public sector buildings showed an annual investment of USD 56 billion could create 760,000 jobs each year, and a direct net annual improvement to public budgets of USD 41-56 billion, which can more than double to USD 91-174 billion when broader economy-wide benefits are taken into account.

Health and Wellbeing Impacts. Positive health outcomes are consistently strongest amongst vulnerable groups of the population: children, the elderly, and those with pre-existing illnesses. Improvements include reduced respiratory disease symptoms, and lower rates of excess winter mortality in cold climates. Energy efficiency policies can positively address mental health impacts alleviating the chronic thermal discomfort and fuel poverty that is associated with anxiety, stress, depression and concern about physical health. With health impacts representing 75% of total outcomes, and benefit–cost ratios as high as 4:1, several governments are now addressing fuel poverty by using energy efficiency as a central element of energy policy.

Industrial Productivity. Energy efficiency can be a strategic investment for businesses leading to improved competitiveness, reduced operating and maintenance costs and improved working conditions. Where the monetized values from multiple benefits are included the payback periods of industrial energy efficiency investments are typically halved.

Energy Delivery Impacts. Energy suppliers are shifting to a new paradigm, profiting by delivering energy services and multiple benefits to consumers, instead of just selling more units of energy. Direct benefits to energy suppliers include lower transmission and generation costs, and indirect benefits from reduced customer management costs. In one United States utility, an overall benefit-cost ratio of 2.3:1 was derived from multiple benefits of the services offered. Cost-benefit assessments for energy efficiency obligations are increasingly accounting for multiple benefits.

Source: Capturing the Multiple Benefits of Energy Efficiency. IEA 2014b

Multiple benefits of energy efficiency contribute directly and indirectly to both micro- and macro-economic development. A growing body of evidence points to substantial value in the multiple benefits of energy efficiency. In many cases the value of improved service can be

greater than the value of reduced energy demand, and the value of energy efficiency policies is underestimated.

Importantly for many ECE member States, multiple benefits of energy efficiency have additional impact in emerging economies, where the positive rebound from improved services can be greater than in developed economies:

- poverty can be alleviated by designing energy efficiency policies to target disadvantaged groups;
- trade improvements from reducing reliance on imports and developing exportable sustainable energy capabilities;
- local air and water pollution can be addressed by targeting sources;
- energy access is enhanced as more consumers can gain more productivity from existing energy infrastructure;
- transformational shifts from outmoded technologies to entirely new ways of providing social services and productive outputs.

Role for governments in energy efficiency finance

Often governments struggle to develop durable and strategic portfolios of energy efficiency policies. There is a prevailing view that energy efficiency is ancillary to mainstream policies and a misperception that governments must fund energy efficiency. This means that energy efficiency does not attract the same attention, commitment, and resourcing as supply-side policies.

A more strategic view of energy efficiency, particularly one that incorporates the value of multiple benefits to society, shapes energy efficiency policies to deliver a more strategic and durable suite of energy efficiency policies by:

- enabling pricing of energy that reflects the costs of supply to all players in the energy system, making the opportunity costs and reward for energy efficiency clear to all;
- improving the legislative and policy frameworks to ensure the country is investment ready;
- creating a conducive climate for investors and encouraging private capital investment by instituting policies for energy efficiency and enabling local and development banks to implement lines of credit, and loans for energy efficiency projects;
- reducing barriers and enhancing skills for developing bankable projects;
- ensuring policy-makers, businesses, financial institutions, local authorities and households understand the full value of energy efficiency measures;
- improve the targeting of social support by replacing tax deductions or energy price subsidies with energy efficiency subsidies.

Role for finance institutions

Banks can also improve their ability to finance energy efficiency and together with supportive government policies enable a more productive environment for financing energy efficiency by:

- exploring the development of an energy efficiency portfolio;
- developing technical and policy capability within bank staff so that the supporting context and technical attributes are understood;
- understanding how energy efficiency projects develop returns on investment from lower energy costs and multiple benefits such as productivity improvements, and

- improving staff skills in energy efficiency project assessment to ensure reliable return investments;
- identifying 'match-makers' and intermediaries or experts that can translate the bank's financial needs into the language of would-be investors, and in turn relate project characteristics into the bank's financial language.

EBRD SEI is a best practice example of a bank's development of a portfolio capability in sustainable energy (Box 3).

Box 3. EBRD SEI

The EBRD addresses energy efficiency and climate change projects including renewable energy and adaptation projects by improving the business environment for sustainable investments and removing key barriers to market development.

Sustainable Energy Initiative projects are diverse and include energy efficiency improvements in the corporate sector, agribusiness, manufacturing and service sectors and increasing the efficiency of energy production and networks. It provides credit lines to local financial institutions in 30 countries, which allow these institutions to on-lend funds to their clients to enable them to finance sustainable energy projects.

From 2006 to 2013, the EBRD invested EUR 13 billion in 756 sustainable energy projects in 35 countries. When market barriers are too high to allow projects to go forward, the Bank can support eligible clients by obtaining donor funds from bilateral and global partners such as the Climate Investment Funds (CIF), the Global Environment Facility (GEF), the EU, and others.

SEI projects benefit from the Bank's ability to deliver technical assistance to its clients and governments. For example, to support its clients with project preparation and implementation, the Bank can offer technical assistance products such as market analyses, feasibility studies, energy audits, and training and awareness raising.

As part of its policy dialogues with countries, the SEI works with governments to support the development of strong institutional and regulatory frameworks that incentivize sustainable energy investments.

Source: EBRD

2. IDENTIFYING BEST PRACTICE POLICY OPTIONS IN ENERGY EFFICIENCY

Recognized energy efficiency policies

A number of agencies have reviewed progress in energy efficiency policies and proposed menus of recommended policies for energy efficiency. This section reviews these in order to identify potential best practice policy options.

World Energy Council (WEC)

The 2013 study “*Energy Efficiency Policies – What works and What Doesn’t*”⁶ concludes with a set of eight main recommendations of energy efficiency policies for World Energy Council members (Box 4).

Box 4. Energy Efficiency Policy Recommendations of the World Energy Council

1. Energy prices should reflect real costs and give more incentives to consumers.
2. Consumers should be better informed.
3. Innovative financing tools should be implemented to support consumers’ investments.
4. The quality of energy-efficient equipment and services should be controlled.
5. Regulations should be enforced and regularly strengthened.
6. Behaviour should be addressed as much as technologies, relying on information and communications technologies (ICTs).
7. Monitoring achievements is necessary to evaluate the real impact of energy-efficiency policies.
8. International and regional cooperation should be enhanced.

Source: *Energy Efficiency Policies – What Works and What Doesn’t*. WEC 2013

The report reviews progress in a number of key efficiency sectors and the recommendations offer a clear sense of some of the priorities and objectives, but do not offer sufficient detail on what constitutes effective and economic policy instruments that can be practically applied in individual countries. The WEC online policy database⁷ includes energy efficient policies from WEC member countries and is a resource for policy designers.

International Energy Agency (IEA). The IEA’s *25 Energy Efficiency Policy Recommendations*⁸ (25EEPR) were produced in 2008 at the request of the G8 and updated in 2011 following two reviews of member country progress in 2009 and 2011. The recommendations cover across seven priority areas: cross-sectoral activity, buildings, appliances, lighting, transport, industry and energy utilities. The recommendations drew on IEA technical/economic modeling, studies of international policy experience and experiences from experts and

⁶ World Energy Council. <http://www.worldenergy.org/publications/2013/world-energy-perspective-energy-efficiency-policies-what-works-and-what-does-not/>

⁷ <http://www.wec-policies.enerdata.eu/>

⁸ http://www.iea.org/publications/freepublications/publication/25recom_2011.pdf

stakeholders. Recommendations were subject to criteria that, in the absence of further ex-post analysis, are characteristic of best practices:

- saving a large amount of energy at low cost and with considerable economic advantages to consumers;
- addressing market imperfections or barriers by enabling consumers to make informed decisions and fully benefit from their investments;
- targeting a significant gap in existing policy.

The IEA 25 energy efficiency policy recommendations provide a useful portfolio of cost-effective options for countries to consider in the context of their economies. The policy recommendations meet the attributes of effective and economic policies and have been successfully implemented in a wide range of countries. A challenge for many countries is that the policies, while sufficiently generic to be universally applied, are perceived as better suited to OECD (Organisation for Economic Co-operation and Development) countries. Emerging ECE member States might question the suitability of some of these policies to their own situations, but should also recognize that most of these policies will be best practices for any country, simply because there is a limited range of practical policy options and these policies have passed ongoing policy reviews in many countries and in international reviews. They have undergone a 'survival of the fittest' refining process over time.

Notwithstanding the degree to which policies may be universally applied or not, the strategic inclusion of energy efficiency in significant policy commitments to energy efficiency like those in China's 11th and 12th 5-year plans and the resulting massive investments undertaken has been prompted and shaped by the policies in the IEA 25EEPR.

The IEA has for a number of years recognized that its 25EEPR are not an immediate fit for non-OECD countries. Its production in 2014 of the first of a series of *Regional Energy Efficiency Policy Recommendations* for the Arab-Southern and Eastern Mediterranean (Arab-SEMED) Region⁹ responded to a need to develop policy recommendations tailored to the cultural, political and language contexts of different countries. The Regional Energy Efficiency Policy Recommendations (REEPR) process engages countries and regional energy efficiency experts in a workshop process of identifying successful policies and measures to create policies that respond to the economic and social development objectives of countries. REEPR for the Arab-SEMED and South-East Asia¹⁰ regions have already been developed. A workshop to develop REEPR for the Latin America and the Caribbean (LAC) region was undertaken with the UN Economic Commission for Latin America and the Caribbean (ECLAC) in October 2014. An important feature of the REEPR process is strong engagement with countries and experts in the region. This not only creates tailored policies, but creates strong buy-in and ownership from countries and regions, while engaging supporting agents like non-governmental organizations (NGOs), international financial institutions (IFIs) and enhances regional political alliances in shaping the policy options that can be applied within a region. Figure 2 from the Arab-SEMED REEPR report presents the policies identified by the process.

⁹ <http://www.iea.org/publications/freepublications/publication/regional-energy-efficiency-policy-recommendations-.html>

¹⁰ http://www.reeep.org/sites/default/files/FINAL_SEA_Recommendations_Brochure.pdf

Figure 2. Prioritizing Policy Recommendations for the Arab-SEMED Region

Prioritising Recommendations

Recommendation	Policy type	Sector	Relevance	Savings	Ease of implementation	Timeline (yrs)
Strongly recommended as they provide a strong foundation for national energy efficiency strategy						
1. Establish energy data collection capacity	Institutional	All	High	N/A	Less difficult	1-2
2. Develop national energy efficiency plans						
Recommended for immediate adoption by all governments in the region						
9. Require energy performance standards for appliances	Regulatory	Appliances	High	Very large	Less difficult	1-2
17. Require adherence to energy management protocols		Industry				
Recommended for strong consideration by all governments in the region and immediate adoption in most countries						
3. Facilitate private investment	Economic	All	High	Large	Can be complicated	2-3
4. Designate lead energy efficiency institutions	Institutional					
6. Require and enforce energy efficiency building codes	Regulatory	Buildings				
10. Monitor, verify and enforce standards	Institutional	Appliances				
11. Phase-out energy-inefficient lamps	Regulatory	Transport	High	Very large	Can be complicated	2-3
14. Encourage light duty vehicle fleet renewal	Economic					
Recommended but require special attention and additional consideration before adoption						
5. Progressively remove energy price subsidies	Economic	All	Very high	Very large	Very difficult	3-5
13. Require fuel economy standards for vehicles	Regulatory	Transport				
Recommended for consideration and adoption						
7. Encourage energy efficient building renovations	Economic	Buildings	High	Significant	Less difficult	1-2
8. Encourage use of high-efficiency building components						
12. Put in place high efficiency street lighting	Information	Appliances	Significant	Large	Significant	1-2
15. Promote eco-driving						
16. Support public transport development	Economic	Transport	Large	Very large	Difficult	5-10
18. Require energy performance standards for equipment	Regulatory	Industry	High	Large	Less difficult	2-3
19. Promote energy efficiency for small and medium enterprises	Information					
20. Put in place complementary industrial energy efficiency policies	Economic Information					

Source: Regional Energy Efficiency Policy Recommendation Arab – South-East Mediterranean Region. IEA 2014.

For individual countries, the focused advice for advancing energy efficiency policies found in the IEA *In-depth Energy Policy Reviews*¹¹ is more useful. Here evaluation of the prevailing policy efforts and progress prompts more targeted recommendations. IEA member countries undertake these reviews every 4 years ensuring a periodic external perspective on

¹¹ IEA Country reviews <http://www.iea.org/publications/#reviews>

their policy directions. Ukraine¹² (2012) and the Russian Federation¹³ (2014) have also undertaken IEA In-depth Reviews.

The IEA online Policies and Measures Database¹⁴ (PAMS) includes energy efficiency, renewable energy and greenhouse gas (GHG) policies from up to 108 countries, and is a resource for policy designers.

ODYSSEE-MURE (Mesures d'Utilisation Rationnelle de l'Energie)¹⁵ provides information on energy efficiency policies and measures that have been carried out in the Member States of the European Union. The information is accessible by setting a query in the database. The distribution of measure by type can be visualized through radar graph. Finally several facilities enable specific queries. The database is a resource for policy designers.

The Asia-Pacific Economic Cooperation (APEC) Energy Working Group developed a voluntary *Peer Review of Energy Efficiency*¹⁶ (PREE) in 2008, and has undertaken policy reviews and provided recommendations for 10 APEC member economies between 2009 and 2013.

During the implementation of PREE, Asia-Pacific Energy Research Centre (APEREC) initiated a related policy process: Cooperative Energy Efficiency Design for Sustainability¹⁷ (CEEDS) that draws from PREE reviews to identify and promote 'high-performance' energy efficiency policies and measures for APEC economies. The CEEDS process has produced reports on best practices in 4 areas:

- Promotion of Energy Service Companies (ESCOs)¹⁸;
- Energy Efficient Urban Passenger Transportation¹⁹;
- Building Codes and Labeling²⁰;
- Appliance Energy Efficiency Standards and Labeling²¹.

The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects²² (PEEREA). Through the implementation of PEEREA, the Energy Charter provides its member countries with a menu of good practices and a forum in which to share experiences and policy advice on energy efficiency issues. There are two types of reviews conducted by the Energy Charter in its member countries: regular monitoring based on a standard review format and in-depth energy efficiency reviews. Countries of the ECE region reviewed to date by PEEREA are identified in Table 1 along with other reviews.

There is much value in the various peer review processes. External perspectives from a team of experts test policies and progress against a context of country experiences. Policy choices and decisions that are informed by a peer evaluation process should be more objective and draw on wider experiences than those drawn from an exclusively internal framework or perspective.

¹² <http://www.iea.org/publications/freepublications/publication/energy-policies-beyond-iea-countries---ukraine-2012.html>

¹³ http://www.iea.org/w/bookshop/474-Russia_2014

¹⁴ <http://www.iea.org/policiesandmeasures/energyefficiency/>

¹⁵ <http://www.measures-odyssee-mure.eu>

¹⁶ <http://aperc.iecej.or.jp/publications/reports/pree.php>

¹⁷ <http://aperc.iecej.or.jp/publications/reports/ceeds.php>

¹⁸ http://aperc.iecej.or.jp/file/2014/1/27/2013_ewg_CCEEDS_rpt.pdf

¹⁹ http://aperc.iecej.or.jp/file/2013/12/24/Final_Report_CCEEDS_Phase_3.pdf

²⁰ http://aperc.iecej.or.jp/file/2014/2/5/Final_Report_CCEEDS_Phase_2.pdf

²¹ http://aperc.iecej.or.jp/file/2010/9/26/Final_Report_CCEEDS_Phase_1_20100114.pdf

²² http://www.encharter.org/fileadmin/user_upload/document/EN.pdf#page=141

INOGATE is a regional energy cooperation programme between the European Union and 11 Partner Countries in Eastern Europe, Caucasus and Central Asia. Project INOGATE Technical Secretariat and Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives was launched in order to support Member States in the process of increasing the energy independence, the security of supply and preventing climate change. INOGATE has been active in facilitating energy efficiency uptake in the buildings and industry sectors while in the near future the transport sector is also targeted. Member States of the INOGATE area are: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Ukraine, Tajikistan, Uzbekistan and Turkmenistan.

Table 1 summarizes the work to date in reviewing and developing energy efficiency policies in ECE member States.

Table 1. National EE Plans and Independent Reviews of EE Policies in ECE Member States

Member State	Energy Efficiency Policy Review	National EE Action Plan (NEEAP) ²³ or its equivalent, year of adoption
Albania	ECS PEEREA 2013 ECS regular EE review 2008	NEEAP, 2011
Andorra		
Armenia	ECS PEEREA 2005 IEA IDR underway in 2014	The Action Plan of the Government of Republic of Armenia Aimed at the Implementation of the National Program on Energy Saving and Renewable Energy of Republic of Armenia, 2010
Austria	IEA IDR 2014	NEEAP, 2014
Azerbaijan	ECS PEEREA 2013 IEA IDR underway in 2014	
Belarus	ECS PEEREA 2013 IEA IDR underway in 2014	
Belgium	IEA IDR 2009	NEEAP, 2014
Bosnia and Herzegovina	ECS PEEREA 2012 ECS regular EE review 2008	NEEAP, 2012
Bulgaria	ECS PEEREA 2008	NEEAP, 2014
Canada	IEA IDR 2015 pending	
Croatia	ECS regular EE review 2010	NEEAP, 2014
Cyprus		NEEAP, 2014
Czech Republic	IEA IDR 2010	NEEAP, 2014
Denmark	IEA IDR 2011	NEEAP, 2014
Estonia	IEA IDR 2013	NEEAP, 2014
European Union	IEA IDR 2014	European Commission Action Plan on Energy Efficiency, 2006
Finland	IEA IDR 2013	NEEAP, 2014
France	IEA IDR 2009	NEEAP, 2014
Georgia	ECS PEEREA 2012 IEA IDR underway in 2014	
Germany	IEA IDR 2013	NEEAP, 2014
Greece		NEEAP, 2014
Hungary	IEA IDR 2011	NEEAP, 2014 (pending)

²³ The 2006 EU Directive on Energy End-Use Efficiency and Energy Services (Energy Services Directive) requires Member States to submit NEEAP in 2007, 2011 and 2014. NEEAPs set out estimated energy consumption, planned energy efficiency measures and the improvements individual EU countries expect to achieve. <http://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans>

Iceland		
Israel		
Italy	ECS regular EE review 2009	NEEAP, 2014
Kazakhstan	IEA IDR underway in 2014	
Kyrgyzstan	ECS regular EE review 2011 IEA IDR underway in 2014	Action Plan to the Programme of Energy Conservation of the Republic of Kyrgyzstan, 2008
Latvia	ECS PEREEA 2008	NEEAP, 2011
Liechtenstein		
Lithuania		NEEAP, 2014
Luxembourg	IEA IDR 2014	NEEAP, 2014
Malta	ODYSSEE-MURE 2012 Energy Efficiency Watch (EEW) 2013	NEEAP, 2014
Republic of Moldova	IEA IDR underway in 2014	NEEAP, 2013
Monaco		
Montenegro		NEEAP, 2014
Netherlands	IEA IDR 2014	NEEAP, 2014
Norway ²⁴	IEA IDR 2011	
Poland	IEA IDR 2011	NEEAP, 2014
Portugal	IEA IDR 2009	NEEAP, 2013
Romania	ECS PEREEA 2006 ODYSSEE-MURE 2012	NEEAP, 2014
Russian Federation	IEA IDR 2014 ECS regular EE review 2007	
San Marino		
Serbia		NEEAP, 2013
Slovak Republic	ECS PEEREA 2009 ECS regular EE review 2006	NEEAP, 2014
Slovenia		NEEAP, 2014 (pending)
Spain	IEA IDR 2009	NEEAP, 2014
Sweden	IEA IDR 2013	NEEAP, 2014
Switzerland		NEEAP, 2008
Tajikistan	ECS PEEREA 2013 IEA IDR underway in 2014	
The former Yugoslav Republic of Macedonia	ECS regular EE review 2006 ECS PEEREA 2007	NEEAP, 2014
Turkey	ECS PEREEA 2014	NEEAP (under development)
Turkmenistan	IEA IDR underway in 2014	
Ukraine	ECS PEEREA 2013 IEA IDR 2012 IEA IDR underway in 2014	NEEAP (under development)
United Kingdom	IEA IDR 2012	NEEAP, 2014
United States	IEA IDR 2014	National Action Plan for Energy Efficiency (NAPEE), 2006
Uzbekistan	IEA IDR underway in 2014	

Source: *Energy Efficiency Policies and Measures. World Energy Council, Enerdata, Agence de l'Environnement et de la Maîtrise de l'Énergie 2015; Energy Efficiency Action Plans by country. European Commission 2015; Energy Community Secretariat 2015; Austrian Energy Agency 2015; A common Nordic end-user market: Consequences of the EED (Berit Tennbakk et al.); Nordic Council of Ministers 2014.*

²⁴ Norwegian National Energy Agency (ENOVA), established 2001, works on EE improvement, production of energy from renewable energy sources, promoting new technologies and enhancing general knowledge about the possibilities for using efficient, environmentally friendly energy solutions. <http://www.enr-network.org/enova.html>

The above efforts to review and develop energy efficiency policy and measure capacity highlight that there is already a strong resource base of policies in place, although many are not yet at the capacity necessary to substantially progress energy efficiency.

The PREE, CEEDS and PEEREA policy review processes have much to offer countries seeking to identify effective energy efficiency policy options for their particular situations. They are a useful option for further regional co-operation actions on energy efficiency policies in the ECE region. In particular, ongoing support for and engagement in PEEREA makes much sense for ECE member States not already involved in an ongoing policy development – evaluation process.

Policy Developments and Challenges in Delivering Energy Efficiency²⁵ is a relevant study undertaken by the Energy Charter Secretariat in 2007. The report highlights a need for governance and capacity development for energy efficiency, and the need to address cross-sectoral aspects of energy efficiency as well as resourcing for operational policies²⁶. The report argued that energy efficiency “needs to be integrated into other economic, social policy areas”. While much has changed since 2007, there is no update of this regional analysis that might indicate that substantive progress has been made beyond the few countries that have managed to maintain durable policy commitments and progress.

Given the importance of policy effectiveness in determining best practices, the next section looks into resources that have assessed the effectiveness of policies.

Existing Studies of Energy Efficiency Policy Effectiveness

In order to identify best practices, the effectiveness of actual policy applications needs to be better understood. Most evaluation occurs within a country context where the results and analysis are a function of local political priorities and the local policy environment. Few policy evaluations are published outside of government. There are real differences in energy efficiency capability, capacity and progress in ECE member States. The EU states have operated in a large centrally coordinated context for some time now with integrated and substantive energy efficiency objectives and regular cross-state evaluation. Other ECE countries have developed diverse policies with a less rigorous context and approach.

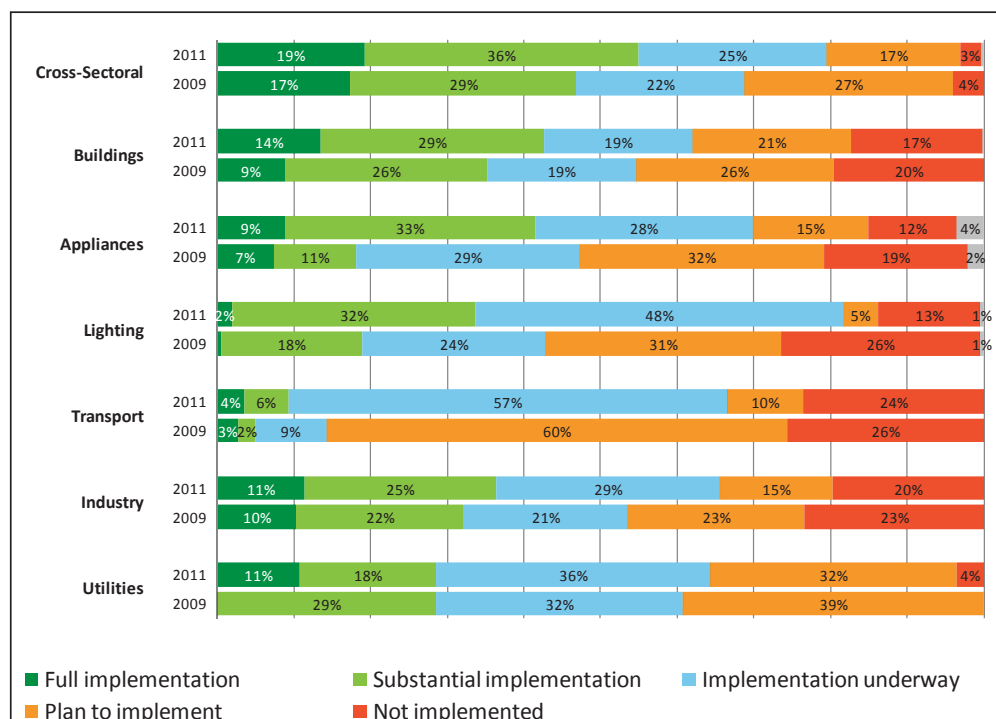
Of 29 IEA member countries, 26 are also included in the ECE membership of 56 states. These include some of the largest economies such as the US, Germany, France, and the UK. IEA evaluation of energy efficiency policy progress in its member countries can help identify best practices in energy efficiency policies.

The 2011 IEA review of member country progress against the IEA’s 25 Energy Efficiency Policy Recommendations in *Progress Implementing the IEA 25 Energy Efficiency Policy Recommendations* (IEA 2011a) shows progress has been made in implementing these policies between 2009 and 2011.

²⁵ <http://www.encharter.org/index.php?id=274&L=0>

²⁶ EBRD Energy Operations Policy 2006, reported in ECS

Figure 3. IEA Member Country Progress in Energy Efficiency Policy Implementation from 2009 to 2011



Source: *Progress Implementing the IEA 25 Energy Efficiency Policy Recommendations*. IEA 2011

Figure 3 shows policies that are being adopted and the change in implementation over a two-year period. It also highlights that in most countries, the recommended policies are pursued to some degree, and the breadth of adoption shows acceptance that a portfolio of policies should be pursued. There appears to be value in identifying and agreeing a suite of effective policies. However this analysis does not identify which of these IEA 25EPR are the most effective, nor which policies might be best practices or useful exemplars for the ECE member States.

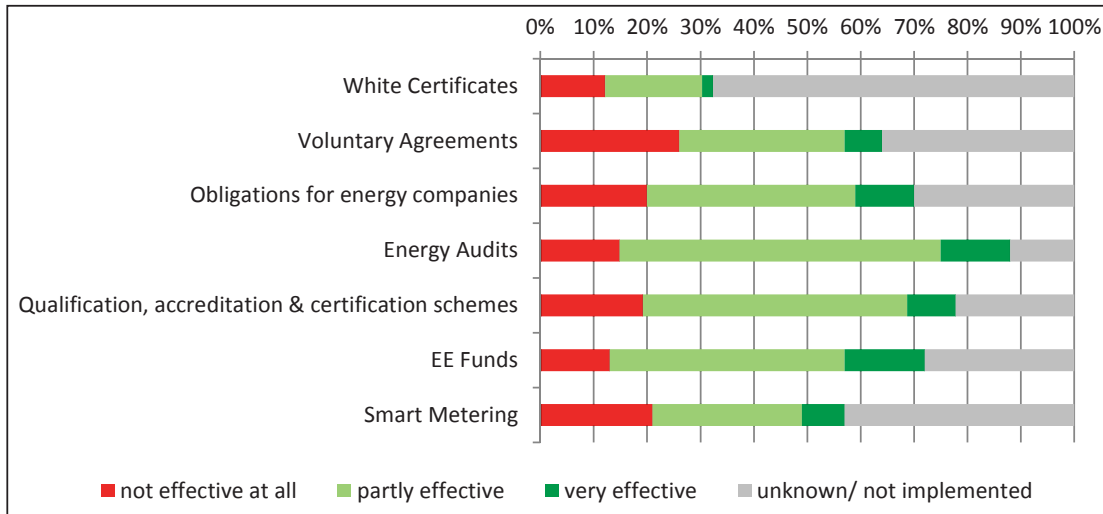
The IEA Energy Efficiency Market Reports are a recent effort to evaluate energy efficiency policies and their national and global impacts in monetized terms. As two thirds of the reports are made up of country case studies, these provide reliable sources of policy experiences with quantification of outcomes.

The IEA report *Capturing the Multiple Benefits of Energy Efficiency* (IEA 2014a), focuses on quantification of policy outcomes in a broader socio-economic framework, ideal for identifying policies that could contribute to economic development, as well as minimizing energy demand. Importantly it shows that energy efficiency policies can contribute outcomes to a wide range of other policy priorities.

28 EU members make up half of the ECE membership so it is relevant to review efforts to evaluate EU policies. The EU undertakes regular monitoring of member state progress towards NEEAP objectives. One of the few published studies that seek to determine policy effectiveness of EU member NEEAPs is the 2012 Energy Efficiency Watch (EEW) review of EU NEEAPs: *Progress in energy efficiency policies in the EU Member States – the experts perspective* (Energy Efficiency Watch 2012). The study draws on a pool of 700 experts from the region to identify in a qualitative manner which country NEEAPs have effective policies and are likely to meet their objectives.

Feedback was also sought on seven established energy efficiency policies: White Certificates, Voluntary Agreements, Obligations for Energy Companies, Energy Audits, Qualification, Accreditation and Certification schemes, Energy Efficiency Funds, and Smart Metering. Energy audits, for example, are ranked first with 74% of experts rating this policy measure as either partly or very effective. In some countries where these policies have a strong history, energy audits are very well regarded: Denmark 93%, Austria 92% and the Czech Republic 90%. However in other countries energy audits are regarded as less effective: Cyprus 50%, Lithuania 31% and Belgium 31%.

Figure 4. Perceived effectiveness of seven energy efficiency policies in 27 Member States of the European Union

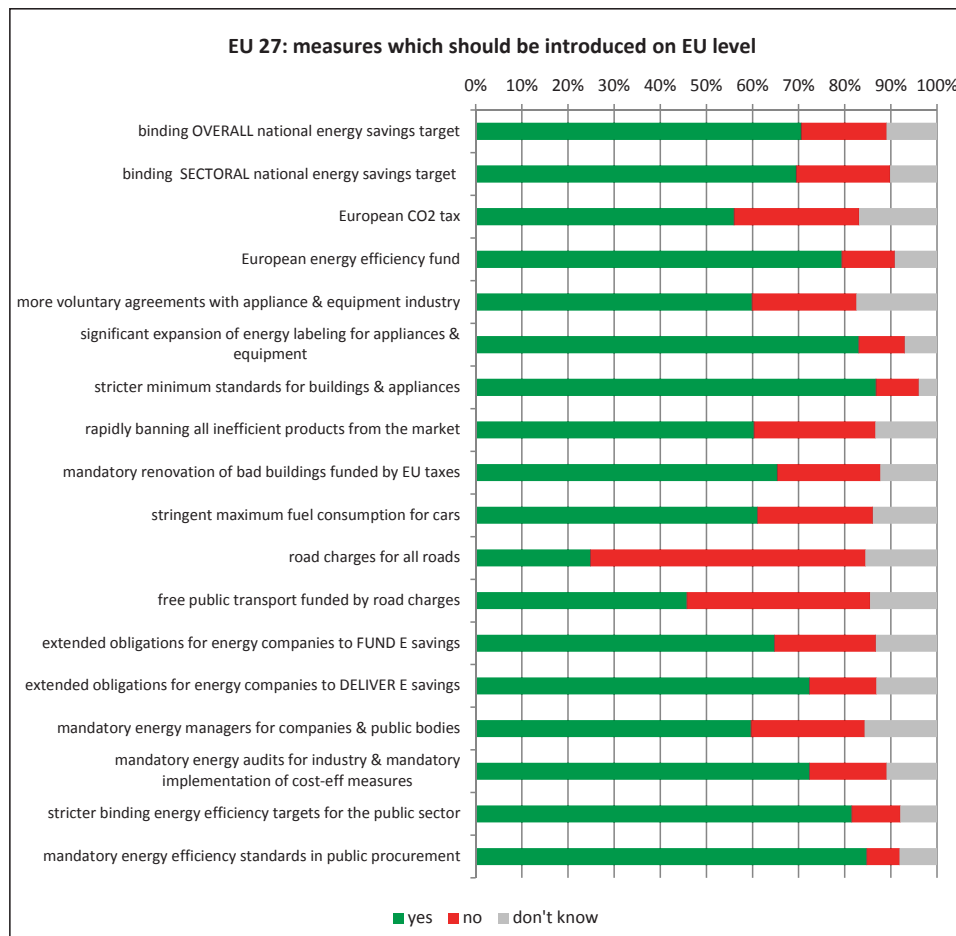


Source: *Progress in energy efficiency policies in the EU Member States – the experts perspective. EEW 2012*

This diversity of responses highlights the degree to which local experience and preferences affect a policy’s likely adoption, impact and effectiveness but the responses are also shaped by the familiarity that experts have with different policies.

The report more usefully tables the response from 700 experts to the question “where experts see the greatest need to act”. The experts’ response to this question starts to draw out what they regard as the most effective policies. Figure 5, drawn from the report, highlights these policies, which are regarded as ‘should be introduced’ policies, and gives insight into potential best practices in energy efficiency policies.







































Figure 5. Expert views of policy measures that should be introduced in the European Union



Source: *Progress in energy efficiency policies in the EU Member States - the experts' perspective. EEW 2012*

There appears to be also a strong country preference for particular policies, which may reflect country experiences with the policies, as well as their political, policy and cultural preferences (Figure 6).

Figure 6. Country experts likes and dislikes, preferences of energy efficiency policies in European Union Member States

	LIKE 		DISLIKE 	
White Certificates	 France	63%		
	 Italy	57%		
	 UK	45%		
Voluntary Agreements	 Sweden	84%	 Austria	53%
	 NL	79%	 Lux	50%
	 Denmark	73%	 Spain	45%
Obligations for energy companies	 Denmark	100%	 Cyprus	38%
	 UK	86%	 Lithuania	38%
	 Slovenia	73%	 Hungary	33%
Energy Audits	 Denmark	93%	 Cyprus	50%
	 Austria	92%	 Lithuania	31%
	 Czech R.	90%	 Belgium	31%
Qualification, accreditation & certification (e.g. E Service Providers)	 Estonia	82%	 Cyprus	50%
	 Austria	75%		
	 Denmark	73%		
EE Funds	 Slovenia	100%	 Italy	32%
	 Cyprus	88%	 Portugal	37%
	 Czech R.	82%	 Romania	29%
Smart Metering	 Finland	80%	 NL	39%
			 Estonia	36%
			 Germany	36%
			 Slovenia	36%

Source: Progress in energy efficiency policies in the EU Member States - the experts' perspective. EEW 2012

Again this indicates likely best practice policies – by familiarity and popularity as much as anything, but does not offer much more insight into best practices. It does also caution that a small or discreet set of policy options is unlikely to satisfy the breadth of political, policy and cultural contexts in ECE member States, and a diverse set or 'smorgasbord' of best practice options is likely to be more useful to the individual member States.

The above studies prompt some observations:

- best practices in energy efficiency polices are unlikely to be a discreet set of single best practice policies – a diverse set of exemplars that can be adopted to different policy and cultural settings is more likely to be useful;
- clear quantification of policy outcomes and costs is an important attribute that should be addressed in identifying policy best practices: indeed only those policies that have clear quantification of outcomes should be considered;
- clearly, policies that integrate well to local policy preferences and market conditions are regarded as much more likely to be effective. The capacity to influence markets in stimulating investment in energy efficiency is an important attribute.

In order to be useful, identified best practices will need to be more prescriptive and informative than the generic descriptions normally used in policy recommendations. Identifying specific examples of best practices or exemplars that have been well applied is required, and is an important extension to the current discussions about energy efficiency policies. The next section (and Annex 1) presents a structured or framework approach to drawing on these conclusions to explore a structured set of attributes for best practices.

3. BEST PRACTICES IN ENERGY EFFICIENCY: HIGH IMPACT POLICIES AND MEASURES

To date various policy recommendations have tended to be structured around a sectoral approach, and offer generic recommendations. To varying degrees the available policy recommendations try to promote policies and measures that are essentially cost effective, politically palatable and where there is a recognized experience base. Typically, existing policy recommendations stop short of recommending actual policies and programmes. There is now sufficient experience and development of policies and measures to be able to highlight best practice policies and measures as exemplars supported by evaluated experience and cost effectiveness analysis.

Taxonomy of policy selection attributes

Annex 1 develops a set of policy attributes or selection criteria that can be used to assess the suitability of energy efficiency policies. By preparing this taxonomy of attributes, a set of desirable policy attributes with high relevance to best practices is defined that enable a deliberate identification of concrete policies and measures. In short a best practice policy should have the following attributes.

Four key attributes are used to identify best practice policies. Best practice policies for energy efficiency will each have:

1. **Significant outcomes.** An ability to contribute to a large energy demand reduction and significant multiple benefits. Best practices are those policies that have demonstrated that they produce or are essential to delivering significant quantifiable results.
2. **Complementarity,** synergies and integration attributes enable an easy fit with other national, regional and international efforts, ensuring ease of implementation and a supportive complementarity with other policies.
3. **Political alignment,** governance and accountability attributes help ensure policies are politically palatable and are likely to work and persist in multi-layer governance frameworks where national, regional and local governance influence effectiveness of policies and enable outcomes.
4. **Marketability** and market impact ensure policies can and will work in the global and local markets that supply energy efficient technologies, are attractive to decision-makers, and are likely to attract investment finance.

These best practice attributes are used in a framework process to identify best practices:

- policies with a strong fit to those attributes are identified from existing literature;
- policies are arranged in terms of market function or sector to offer a structured menu of high impact or best practice policies including:
 - cross-sectoral policies – Governance;
 - cross-sectoral policies – Finance;
 - policies for Utilities;
 - policies for Households;
 - transport Policies;
 - policies for the Business Sector – Industry and SME policies.
- identified policies are augmented with exemplars: examples of applications of the policies from around the world that have been evaluated and can be drawn on by countries as models for local adaptation and application.

The identified policies are best practices largely because they have passed ongoing policy reviews and improvement cycles in their own countries and in international reviews, to become a set of evolved policies that have a 'survival of the fittest' track record.

The following tables (one for each of the policy functional sectors) plot the identified best practice policies against the selected policy attributes along with identified exemplars. The policy attributes are color coded to signify the strength of fit between the policy and the attributes. A green background signifies a strong fit between attribute and the identified policy, orange signifies a concern that should be considered and addressed if the policy is to be applied.

A Balanced Portfolio

The best practice policies outlined below are a smorgasbord from which policy makers can select options to develop priority areas in their jurisdictions. There is a need to balance selected policies in a strategic approach in order to:

- focus on priority energy efficiency potentials where tangible economic gains can be made;
- ensure balance of effort and actions over sectors in the society;
- ensure an effective mix of resources (financing) delivery capability (energy efficiency operational agency, utilities, and ESCOs) and market motivators (labeling, regulations, etc.) are developed;
- ensure a critical mass of effort.

The development of a national strategy within a statutory framework provides the balance and makes clear to all the intent, capabilities that are mobilized, and accountabilities in order to deliver a balanced and effective programme. The process of developing a national strategy is inherently a consultative process, where the different players in the economy can be drawn in to identify practical opportunities and priorities and help identify the policies and resources that will need to be mobilized in an effective implementation.

Energy efficiency: best practices and exemplars

The following tables list a range of best practices based on the attributes identified in Annex 1. The measures are tabulated as follows:

The best practice policies

Notes outline how the policy meets the 'best practice' attributes. Orange shade denotes an area for attention

Exemplars – referenced examples of policies and measures of the best practices from around the world

Policy / measure	Policy Attributes			
	Significant economic energy demand reductions and significant multiple benefits	Complementarity, synergies and integration attributes	Political alignment, governance and accountability attributes	Marketability and market impact
Government grants	Typically grants are best applied to demonstrate, leverage funds, or initiate market transformation programmes. Ideally grants will have a defined exit strategy so they do not displace private funds.	Good design of grants can ensure synergies between the different policy priorities in a country. Grants can be tailored to needs and be phased in and out to balance and synergize with other policy priorities.	Consumers see grants as a tangible and usually welcome offer from government.	Consumers and market players receive tangible incentive signals such as financial or tax benefits.
UK Warm Front. From 2002 to 2013 the United Kingdom government offered grants for thermal insulation to tackle energy poverty under its Warm Front Scheme. 1.7 million United Kingdom households took up grants resulting in a reduction of heating energy intensity of 35% from 63 GJ/m ² in 2001 to 0.41 GJ/m ² in 2011.				

CROSS-SECTORAL POLICIES: GOVERNANCE

This section is structured around the extensive work undertaken by the IEA reported in *Innovations in Multi-level Governance for Energy Efficiency* (IEA 2010) and the *Energy Efficiency Governance* handbook, which is available in both English (IEA2008E) and Russian (IEA2008R) language versions. These reports introduce the concept of multi-level governance, the “complex system of interactions between actors at all levels of government, engaged in the exercise of authority”. This approach facilitates understanding of the coordination actions that must be undertaken in developing an effective suite of policies that has the capability and capacity to deliver the desired outcomes in an economy.

Best practices in energy efficiency policies require: good design of robust programmes, evaluation, alteration of underperforming programmes, at all levels in an economy. This in turn requires: a sound enabling foundation or statutory framework; clear strategies and plans; institutional operational capability; integration across all levels; and objective evaluation of progress.

Table 2. CROSS-SECTORAL POLICIES: GOVERNANCE

Policy / measure	Policy Attributes			
	Significant economic energy demand reductions and significant multiple benefits	Complementarity, synergies and integration attributes	Political alignment, governance and accountability attributes	Marketability and market impact
Enabling Frameworks	By giving clear durable direction to energy efficiency actions the laws and statutes that enable energy efficiency policies and their implementation underpin all policy outcomes.	A statutory base provides a durable mandate that signals commitment and enables ongoing plans and policies to be firmly established.	An environment for cooperation is established with clear accountabilities and roles for related departments.	Well-defined policy foundations send clear signals to energy users and private sector of new directions and create investment certainty.
	<p>EU Energy Efficiency Directive. The new Directive entered into force on 4 December 2012. This Directive establishes a common framework of measures for the promotion of energy efficiency within the European Union in order to ensure the achievement of the Union’s 2020 20% headline target on energy efficiency and to pave the way for further energy efficiency improvements beyond that date. http://ec.europa.eu/energy/efficiency/eed/eed_en.htm</p> <p>Belarus (a). The Law of the Republic of Belarus on Energy Conservation July 15 1998 No. 190-3 forms a durable statutory basis for energy efficiency policies in Belarus. Directives and decrees for policy actions supplement the Law, as the country’s needs and energy efficiency policy progressively evolve. Since the law was introduced in 1998, energy intensity has halved. http://www.unece.org/fileadmin/DAM/energy/se/pp/eneff/IEEForum_Tbilisi_Sept13/Day_2/ws1/Minenkov_e.pdf</p>			

National Strategies, Plans and Targets	Prescribed analysis of policies, actions, targets and costs ensure consistent resourcing and analysis of outcomes.	Integrated design of selected policies into an effective suite of policies, and regular review ensures best outcome for applied resources.	Governments chose policies to suit economy and are accountable for progress to targets.	Varies – some policies are better than others. In particular the role played by effective marketing design is underestimated in many policy applications.
<p>EU NEEAP. The EU Energy Efficiency Directive requires EU states produce and pursue a NEEAP. These are central to implementing EU energy efficiency policy, which currently targets a 20% improvement in energy intensity by 2020. Evaluation of NEEAPs in 2012 showed that a 17% improvement in energy intensity had been achieved already, and motivated EU to extend the target to a 27% improvement by 2030. http://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans</p> <p>Belarus (b). The Republican Programme on Energy Conservation for 2011-2015 (approved by the Resolution of the Council of Ministers of the Republic of Belarus of December 24, 2010, No. 1882) builds on the base of the Energy Conservation law above, setting out a medium term strategy with targets for 29-32% reduction in energy/GDP intensity during 2011 to 2015 and a further 20% during 2016-2020. http://www.unece.org/fileadmin/DAM/energy/se/pp/eneff/IEEForum_Tbilisi_Sept13/Day_2/ws1/Minenkov_e.pdf</p> <p>Estonia NEEAP is recognized as reasonably ambitious and effectively balanced across the countries priorities. It focuses effort on priority sectors and sound measures including finance options for upgrading Estonia’s older inefficient buildings. http://www.energy-efficiency-watch.org/fileadmin/eew_documents/Documents/EEW2/Estonia.pdf</p>				
Energy Efficiency Operational Agencies	Analyzing and designing an effective suite of energy efficiency policies, suited to the needs of the economy is a core task, and ensures policies are designed, implemented, evaluated, and deliver economic benefits.	An energy efficiency agency works alongside other central, regional, and local policy agencies to enable an effective integration with other policy priorities.	An energy efficiency agency works alongside other central, regional, and local agents to enable an effective implementation at all levels of society.	Energy efficiency agencies undertake market analysis and design programmes that effectively motivate and transform markets to deliver energy efficiency outcomes.
<p>A continuum of different approaches can be taken, and a range of operational functionalities is possible, while delivering energy efficiency policies to different policy objectives. Quite different examples of best practices in the function and role of an energy efficiency operational agency include:</p> <p>Natural Resources Canada Energy Efficiency Office. The Office of Energy Efficiency (OEE) is Canada's center of excellence for energy, efficiency and alternative fuels information. OEE is a department within the government’s environment ministry, Natural Resources Canada. The OEE operates a classic suite of policies across all energy use sectors, supported by multi-disciplinary policy and evaluation analysis, and offers grants and other resources. http://www.nrcan.gc.ca/energy/offices-labs/office-energy-efficiency</p> <p>Korea KEMCO. Korean Energy Management Corporation (KEMCO) is an independent corporation accountable to the South Korea’s Ministry of Trade, Industry and Enterprise (MOTIE). KEMCO implements policies aimed at rationalizing energy use in response to climate change, energy efficiency and new renewable energy objectives. KEMCO’s Programmes also develop green growth, energy productivity and technology development outcomes in a way that integrates both public and private sector techniques. http://www.kemco.or.kr/new_eng/pg01/pg01050000.asp</p>				

<p>Co-ordination Mechanisms</p>	<p>In order to achieve scale of impact and utilize diverse resources, successful policies work across different levels of society.</p>	<p>Coordination mechanisms are designed to integrate and coordinate efforts by different players in order to maximize the impact from each player in society.</p>	<p>Recognizing the role that regional or local government can play in a formal structure is a key to empowering and enabling their commitment and action.</p>	<p>Often the coordinated input from one sector of society is a key to motivating a regional or sectoral market.</p>
<p>United States DoE – State Energy Program (SEP) operates within the United States Federal Department of Energy’s (DoE) Office of Energy Efficiency and Renewable Energy (EERE). It provides leadership, outreach, technology development, and resources to states and United States territories with grants from an USD 3.2 billion budget to address local energy priorities and adopt energy efficiency technologies. http://energy.gov/eere/wipo/state-energy-program</p> <p>Switzerland SwissEnergy is a comprehensive programme of cooperation and negotiation between the Swiss federal government and the regional administrations or cantons. Cooperation is required as the Swiss constitution assigns to cantons responsibility for buildings efficiency while the federal government has jurisdiction over energy efficiency in vehicles and appliances. http://www.bfe.admin.ch/energie/00458/index.html?lang=en</p>				
<p>Public Sector Energy Efficiency</p> <p>Cities and Regions</p>	<p>In many countries regional government and cities have significant policy-making and implementation capability.</p>	<p>Municipalities operate utilities, lead city planning social and economic development as well as implementing national or federal policies.</p>	<p>Regional or local government can empower and enable the commitment and policies of central government and coordinate and support citizen-motivated action. Local taxes can be used to fund policies.</p>	<p>Municipalities and regional government often lead or motivate change in markets in their jurisdictions, and can add their significant resources to enable market activities.</p>
<p>PEEREA. Energy Efficiency in the Public Sector identifies where the energy efficiency potential lies in the public sector, and how governments can capture it. Policy measures are described for public buildings, transportation, utilities ranging from public lighting to heat providers, and other facilities. The Policies and Instruments section covers crosscutting energy efficiency programmes, procurement, facilities construction and retrofitting, operations and maintenance, utility management, and capacity development programmes. http://www.encharter.org/fileadmin/user_upload/document/Public_Sector_EE_2008_ENG.pdf</p> <p>ESMAP Tool for Rapid Assessment of City Energy (TRACE) is a decision-support tool designed to help cities quickly identify under-performing sectors, evaluate improvement and cost-saving potential, and prioritize sectors and actions for energy efficiency intervention. It covers six municipal sectors: passenger transport, municipal buildings, water and wastewater, public lighting, solid waste, and power and heat in three modules: an energy benchmarking module which compares key performance indicators (KPIs) among peer cities, a sector prioritization module which identifies sectors that offer the greatest potential with respect to energy-cost savings, and an intervention selection module which functions like a “playbook” of tried-and-tested measures and helps select locally appropriate interventions. http://www.esmap.org/TRACE</p>				

	Diversity in country and local government make identification of generic best practices difficult. Understanding how to overcome institutional, multi-level and multi-agent failures with planning and a range of motivating initiatives is key to liberating local government action. The C40 Cities Climate Leadership Group ²⁷ (C40) and Covenant of Mayors ²⁸ offer a range of peer developed policy tools like sustainable energy plans that offer best practices in local government policies to support energy efficiency.			
Data, Statistics and Evaluation	Reliable and timely end use data is essential to sound policy design and programme application and underpins success.	An integrated approach to data collection ensures statistics departments, regional and sector data centers and central government maximize the amount of necessary data for minimal cost.	Sound data underpins an evidence based decision-making process. It enables effective policy design and evaluation and minimizes risks.	Consumers and markets will respond to sound evidence that a productive potential exists or that a large opportunity is available.
<p>Energy Management Information System (EMIS). Developed by UNDP Croatia this unique energy management tool is used as a tool for monitoring of actual consumption in public buildings. The system collects, analyses and reports on data for energy consumption in publicly owned buildings and facilities. Every public building is obliged to enter the data on energy consumption by law. Currently there are more than 9.000 facilities entered into EMIS by most ministries, counties and cities in Croatia. Hence the transfer from UNDP to public bodies the system had obtained widespread use. EMIS is also used in other neighboring countries in South-East Europe (SEE) region. www.isge.hr</p> <p>Canada Office of Energy Efficiency. Statistics and Analysis. In 1991 OEE launched its National Energy Use Database in order to better understand how energy is being used. By supporting a series of sectoral Data and Analysis centers, OEE maintains a survey and data collection system that enables rich database of end-use energy characteristics for policy-making. An annual publication Energy Efficiency Trends in Canada publishes analysis of progress. (Energy Efficiency Statistics at www.nrcan.gc.ca)</p> <p>New Zealand's Domain Plan for Energy Statistics outlines a cross-government process to assess energy data information needs and establish priorities and solutions for new data gathering activities. http://www.stats.govt.nz/browse_for_stats/industry_sectors/Energy/energy-domain-plan.aspx</p> <p>IEA Energy Statistics Manuals and data resources are available from the IEA Energy Statistics web page. They offer guidance on energy and activity data gathering, data management and the development of reliable energy information. http://www.iea.org/statistics/</p> <p>IEA Energy Statistics Manual: http://www.iea.org/publications/freepublications/publication/energy-statistics-manual.html</p> <p>IEA Energy Efficiency Indicators: http://www.iea.org/publications/freepublications/publication/energy-efficiency-indicators-fundamentals-on-statistics---.html</p>				

²⁷ <http://www.c40.org/>

²⁸ http://www.covenantofmayors.eu/index_en.html

CROSS-SECTORAL POLICIES: FINANCE

Following the global financial crisis many governments embarked on austerity drives – reducing public budgets and programmes including energy efficiency. At the same time, the finance sector started to ‘discover’ energy efficiency, and many banks are developing energy efficiency investment portfolios. Multilateral Development Banks are important resources for emerging and developing economies, increasingly working through local commercial banks to underwrite risk and leverage commercial funds to energy efficiency and other sustainable energy projects. Governments should not shy away from energy efficiency policies because of a concern that they might not be able to fund them as the private sector has significant funds available and is adept at funding successful projects.

Table 3. CROSS-SECTORAL POLICIES: FINANCE

Policy / measure	Policy Attributes			
	Significant economic energy demand reductions and significant multiple benefits	Complementarity, synergies and integration attributes	Political alignment, governance and accountability attributes	Marketability and market impact
Government and International Financial Institutions (IFI) leveraged loans funding	Schemes recycle funds and attract significant private sector co-funding to funds offered at preferential rates by development institutions or governments.	Funds grow market for energy efficiency and enable implementation of other Government energy efficiency policies.	These policies respond to governments' need to grow energy efficiency delivery capability, while maintaining public budget.	Loans are delivered via commercial relationships and marketing efforts of retail banks, developers and ESCOs.
Dedicated credit lines	<p>Germany KfW. The German "KfW programme" provides funding from the national government for deep renovation and construction of low energy buildings. In most cases, the owners/investors are given long-term, low-interest loans supported with professional and independent energy advice. Due to its size (about EUR 2 billion per year are spent) and the fact that it is well known, it has succeeded in setting new standards. EEW 2012 (IEA 2013) http://www.energy-efficiency-watch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf; http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2013.html</p> <p>EBRD Sustainable Energy Financing Facilities (SEFF) are dedicated credit lines working through over 80 local financial institutions in 20 countries. SEFF includes a robust monitoring and verification (M&V) process that manages the key uncertainties in turn reducing underlying technical risk and improving project performance. Over EUR1.5Bn investments have been made in sustainable energy. http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014</p> <p>China Energy Efficiency Financing Programme (CHEEF) is a dedicated credit line by the World Bank and Global Environment Fund offering finance to large and medium industry via local banks, which then match these funds. From 2008 to 2010, USD 200 million funds were allocated via two financial institutions. A further USD 200 million was made available in 2010. By 2011 CHEEF had achieved 1:4 leverage. (IEA 2014) http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014</p>			

	<p>Thailand. Energy Efficiency Revolving Fund (EERF) scheme introduced in 2002 provides public funded credit lines of between USD 2.5-10 million to 11 million Thai banks at zero interest rates. As finance volumes grew, banks increasingly co-funded the loans. The initial EERF allocation was USD 60 million. The EERF was phased out in 2011 after leveraging total energy efficiency investments of USD 521 million from USD 236 million. It was assessed that banks could now continue funding energy efficiency without government support, indicating successful market transformation.</p> <p>Green for Growth Fund (GGF). The EBRD, European Investment Bank (EIB) and KfW funded GGF provides funds to local financial institutions for on-lending to private households, small and medium-sized enterprises as well as direct financing to large companies and municipalities for investments in energy efficiency via partnerships with financing institutions and direct financing in the Southeast Europe and European Neighborhood Region. The GGF Technical Assistance Facility provides capacity building and training to GGF's partner institutions (both financial institutions and non-financial institutions), awareness raising and market enabling activities, validation and monitoring. http://www.ggf.lu/</p>			
<p>Public – Private Finance</p> <p>Including ESCOs</p> <p>See also Utilities - ESCOs in the next section</p>	<p>A financed implementation package with guaranteed returns overcomes key barriers to implementation and scale.</p>	<p>By integrating technical and financial risks, discontinuities between consumers, service providers and financiers are removed.</p>	<p>The ability to leverage private funds is a key to maintaining low public budgets while enabling sound energy efficiency investments.</p>	<p>ESCOs often face unfamiliarity from clients about the nature of the contracts used to guarantee returns, manage assets and risks.</p>
	<p>United States. Utility and public sector programmes for educational, health and government facilities have driven the ESCO market. In 2011 United States Federal facilities were directed to enter in USD 2 billion of energy performance contracts by the end of 2013. (IEA 2013) http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2013.html; http://energy.gov/eere/femp/federal-energy-management-program</p> <p>In the Czech Republic, energy performance contracting is becoming more popular: good projects have multiplied and now more than 150 projects have been realized. The growing number of projects has increased confidence in this instrument. The ESCOs have also taken a very active role in promoting the instrument and have recently formed an association. EEW 2012 http://www.energy-efficiency-watch.org/fileadmin/ew_documents/EEW2/EEW_Survey_Report.pdf</p>			
<p>Fund Guarantees and risk sharing for energy efficiency</p>	<p>Financiers offer underwriting for the perceived risks in energy efficiency investments at a wholesale level to mitigate commercial bank risks to scale up energy efficiency.</p>	<p>By supporting risk mitigation with local banks, IFIs complement local financial service providers rather than compete with them.</p>	<p>Governments can support and enable existing service providers and avoid competing or distorting financial services operators while still offering leveraged financial support.</p>	<p>Banks receive strong signal of support as well as financial mitigation solutions for risk, enabling them to more easily fund energy efficiency.</p>
	<p>Commercializing Energy Efficiency finance (CEEF). A joint International Finance Corporation (IFC) and GEF initiative, CEEF provide guarantees of up to 50% of the loss from loan defaults to energy efficiency investments in Eastern Europe. (IEA 2014) http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014</p>			

Fiscal Policies (Tax incentives and rebates)	<p>It is difficult to discern direct impacts of tax incentives from other policy instruments and free rider effects, particularly where multiple fiscal instruments exist.</p>	<p>Good design of fiscal incentives can ensure synergies between the different policy priorities in a country.</p>	<p>This can be a reliable way of motivating change where governments have a preference for centrally motivating desired actions by fiscal incentives.</p>	<p>Market players receive tangible monetary tax and incentive signals.</p>
<p>Italy. Between 2007 and 2013 a 55% tax deduction offered in the Energy Efficiency Tax Rebate Programme scaled-up investment in new appliances and equipment by EUR23Bn in 1.8 million applications. The cost of the scheme was EUR 13 billion. (IEA 2014) http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014</p>				
Government grants	<p>Typically grants are best applied to demonstrate, leverage funds, or initiate market transformation programmes. Ideally grants will have a defined exit strategy so they do not displace private funds, or designed to crowd-in loan funding over time.</p>	<p>Good design of grants can ensure synergies between the different policy priorities in a country. Grants can be tailored to needs and phased in and out to balance and synergize with other policy priorities.</p>	<p>Grants are perceived by consumers as a tangible signal and are usually a welcome offer from government.</p>	<p>Consumers and market players receive tangible monetary tax and incentive signals.</p>
<p>UK Warm Front. From 2002 to 2013 the United Kingdom government offered grants for thermal insulation to tackle energy poverty under its Warm Front Scheme. 1.7 million United Kingdom households took up grants resulting in a reduction of heating energy intensity of 35% from 63GJ/m² in 2001 to 0.41GJ/m² in 2011. (IEA 2014a) http://www.iea.org/W/bookshop/475-Capturing_the_Multiple_Benefits_of_Energy_Efficiency</p>				
International Climate Finance and Carbon Finance	<p>Given the large role for energy efficiency in minimizing GHG emissions it should be expected that the large climate fund initiatives would be keen to fund energy efficiency.</p>	<p>Linking carbon funds and energy efficiency financing makes sense as energy efficiency makes the single largest contribution to GHG mitigation.</p>	<p>Governments may see this as an effective way to recycle carbon revenues, and gain extra GHG reductions.</p>	<p>Uncertainty over global carbon prices means that markets cannot expect durable flow of carbon finance.</p>
<p>Climate Investment Funds have been one of the world's largest climate finance mechanisms since establishment in 2008. With USD 7.5 billion total funds, USD 5.2 billion is in the Clean Technology Fund (CTF) that focuses on country-initiated projects in energy efficiency and related clean technology areas. 17% of CTF funds went to energy efficiency in the period to March 2014. (IEA 2014) http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014</p> <p>Estonia has "earmarked" revenues of the sales of "unspent" Joint Implementation (JI) quotas of Assigned Amount Units (AAUs) for energy efficiency. Amounts in the order of several EUR100M are invested in building programmes, in the residential and in the public sector. This included significant amounts also from the Austrian government. "EEW 2012" http://www.energy-efficiency-watch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf</p>				

POLICIES FOR UTILITIES

Utilities provide the generation, transmission and delivery of electricity, gas, water, heat, and communications services. Utilities can motivate economic investment in demand and supply side energy efficiency by implementing cost-reflective prices. With established technical, financial, managerial and marketing capabilities, utilities are well placed to deliver energy efficiency policies. In some emerging economies, utilities are the only agent with all these capabilities and are an essential actor in establishing energy efficiency policies and programmes. Smaller countries could usefully start their energy efficiency programmes with utility ESCOs.

A wide range of voluntary and mandated policy options and programmes are possible. Unless this role is allowed or prescribed in the electricity market regulatory policies it is often difficult for utilities to play a role where they can advance energy efficiency. However when they are able to do this, the results from energy efficiency actions reduce unprofitable energy sales and improve demand management pay back investments for both consumers and the utilities. A detailed appraisal of the range of multiple benefits from utility efficiency programmes is included in Chapter 6 of IEA2014a Energy delivery impacts of energy efficiency²⁹. 50 case studies of competent utility delivery of energy efficiency programmes are outlined in Energy Provider-Delivered Energy Efficiency³⁰.

Table 4. Policies for Utilities

Policy / measure	Policy Selection Attributes			
	Significant economic energy demand reductions and significant multiple benefits	Complementarity, synergies and integration attributes	Political alignment, Governance and accountability attributes	Marketability and market impact
Utilities – Cost reflective pricing and energy price subsidy reform	Shifting energy subsidies to motivate more rational investments reduces demand on public budgets and also enables investment in more economic alternatives like energy efficiency across the entire market.	There is no more effective motivator for economic investments in energy efficiency, renewable energy and conventional supply-side investments than dynamic cost-reflective prices.	Governments need to choose to reduce complexity and allow price to allocate resources. Governments can decide to reallocate subsidies to targeted social measures.	The impact of cost reflective pricing is universal.
	<p>Germany. Domestic hard coal producer support of EUR 5 billion was 0.3% of GDP in 1999. As production is uneconomic, the government decided to phase out the subsidy by 2018. In 2011 EUR 2 billion of public funds were ‘saved’ as the phase-out progressed. (IEA 2014a)</p> <p>http://www.iea.org/W/bookshop/475-Capturing the Multiple Benefits of Energy Efficiency</p>			

²⁹ [http://www.iea.org/W/bookshop/475-Capturing the Multiple Benefits of Energy Efficiency](http://www.iea.org/W/bookshop/475-Capturing_the_Multiple_Benefits_of_Energy_Efficiency)

³⁰ [http://www.iea.org/publications/insights/EnergyProviderDeliveredEnergyEfficiency WEB.pdf](http://www.iea.org/publications/insights/EnergyProviderDeliveredEnergyEfficiency_WEB.pdf)

	<p>Indonesia. In November 2014, fuel subsidies in Indonesia were reduced by USD 9.6 billion from a budgeted USD 30 billion or 18% of public budget in 2015. Increasing the price of fuel by USD 0.16 has been softened by the introduction of social welfare protection smart card that directly gives 15.6 million poorer families IDR 200,000 (USD 15.6) a month for at least the next 2 months, to help them cope with the impact of the fuel price hike. Analysis by Dartanto of the Indonesian situation (http://econ.fe.ui.ac.id/uploads/201206.pdf) highlights how adjustment of subsidies impacts welfare, so the manner in which the reduction of subsidy is treated in the economy is a key to successful policy implementation. By directing subsidies to targeted families, reducing subsidized energy commodities less, and setting a fixed fuel subsidy amount, the government has subsidized social development needs in a far more economically efficient manner.</p> <p>A number of countries have established liberalized electricity markets with dynamic cost reflective pricing. Exemplars include: Australia, some Canadian provinces, New Zealand, Norway, some states of United States, and the EU progress to a wholesale market across Europe. These reforms are undertaken for a wide variety of economic security and resource management reasons. While not specifically energy efficiency policies, these energy markets effectively motivate a wide range of sustainable energy options including and especially energy efficiency and renewables by ensuring all the players in an energy system receive effective price signals for their decisions. Market operators in each country generally have a significant amount of information about the function and performance of these systems.</p>			
<p>Energy Efficiency Regulatory Mandates</p>	<p>Experience from North American electricity markets show that utilities can derive up to 2.9:1 benefit cost ratios from energy efficiency policies.</p>	<p>With direct customer relationships, technical and financial capacity utilities are often the most able to deliver energy efficiency and do it in a way that minimizes other resource costs.</p>	<p>Utilities are often best placed to implement a political decision to advance energy efficiency. Utilities have an integrated technical, financial and marketing capability that may not be available elsewhere.</p>	<p>Utility led programmes impact across entire customer classes in an economy and can send powerful motivations with smarter tariffs and Demand-side Management (DSM) activities.</p>
<p>United States. In 2011 USD 7 billion was invested in ratepayer funded energy efficiency projects producing an estimated 117 TWh of energy reductions. In 2012, there were 25 states with energy efficiency resource standards and a further 9 states adopting other policies. (Foster Wallace and Dahlberg 2013) http://library.cee1.org/sites/default/files/library/10533/CEE Annual Industry Report.pdf</p> <p>Vermont, United States. Recent analysis of Efficiency Vermont, the energy efficiency operator in Vermont, shows 110GWh energy reductions over a ten year period at a cost of USD 35 million with a levelized cost of USD 39/MWh, but with multiple benefits to consumers totaling USD 105/MWh. (Efficiency Vermont) www.energycorner.com/docs/about_efficiency_vermont/annual_reports/2010 Annual Report.pdf</p> <p>California, United States. The California Public Utilities Commission policy rules and related reference documents outline the administration, oversight, and evaluation of energy efficiency programmes funded by ratepayers in California. http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Cost-effectiveness.htm</p> <p>China. In 2010 the Chinese government issued an "Electricity Demand-side Management (DSM) Implementation Measures" regulation requiring all grid companies to deliver energy reduction of at least 0.3% of the previous year sales and peak demand reductions of at least 0.3% of the previous year peak demand. (IEA 2013) http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2013.html</p>				

Utilities – ESCOs	20% per year growth in USD 7 billion per year United States ESCO industry. Chinese ESCO industry grew to USD 10 billion with potential to USD 100 billion.	United States ESCO programmes are often integrated in state utility regulatory systems.	Some governments (e.g. United States and China) prefer development of energy efficiency industry capacity.	Combination of utility marketing, customer relationship and entrepreneurial ESCO behavior seems to work.
<p>China. One of the key responses to the Chinese regulation on electricity has been the establishment of a number of subsidiary ESCOs. China’s ESCO sector is the world’s largest with 4800 ESCOs investing USD 12 billion producing 17 Mtoe of energy demand reductions in 2013. (Sun et al.) in (IEA 2014) https://ryanschuchard.files.wordpress.com/2011/06/chinas-escos-industry-2010.pdf; http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014</p> <p>APERC. APERC CEEDS analysis of best practices in ESCOs highlights a need to develop capability in financial institutions, 3rd party monitoring, verification and evaluation systems, accreditation for ESCOs, development finance, supporting regulatory standards, and alignment of ESCO contracts with real world business practices. http://aperc.ieej.or.jp/file/2014/1/27/2013_ewg_CCEEDS_rpt.pdf</p>				
Utilities – White Certificates	It is difficult to discern impacts of white certificates from other policy instruments, and free-rider effects.	Are expected to initiate diverse operational outcomes depending on cost effective potentials.	Can fit the political desire to motivate utilities to deliver energy efficiency when no other incentives exist.	Variable implementations as these schemes rely on utilities being motivated to step beyond their traditional roles.
<p>PEEREA. Trading Mechanisms for Delivering Energy Efficiency covers policies such as White Certificates Schemes, in place in a few countries. This study examines the experiences with White Certificates Schemes, identifies the key design features that affect performance, evaluates effectiveness and offers advice on how developed and transition economies might proceed with such schemes. http://www.encharter.org/fileadmin/user_upload/document/White_Certificates_2010_EN_G.pdf</p> <p>Italy. The 2005 white certificate scheme costs EUR 172 million per year, and has achieved 35 GWh per year in energy demand reduction at a cost of EUR 0.005 per kWh avoided energy demand. (IEA 2013) http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2013.html</p> <p>France. The French white certificate scheme CEE (Certificats d’économie d’énergie, Energy Saving Certificate) applies to energy suppliers (including transport fuel suppliers since 2011). From 2006-2009, the scheme achieved EUR 4.3 billion lifetime energy cost savings from EUR 3.9 billion investment at a cost of EUR 0.0042/kWh avoided energy demand. (IEA 2013) http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2013.html</p>				
Utilities - Loan Finance for Energy Efficiency	The ability for utilities to implement widespread investment across their customer bases makes them an ideal delivery agent for energy efficiency policies and financiers.	Utilities can optimize the application of energy efficiency policies to address the range of pressures on an energy delivery system.	Can fit the political desire to motivate utilities to deliver energy efficiency when no other incentives exist.	Utility marketing and customer relationships overcome a number of barriers that slow investment in energy efficiency.

	<p>China. An IFC programme, the China Utility based Energy Efficiency Programme (CHUEE) provided USD 520 billion in loans that were leveraged to a total USD 936 project investments to 78 companies without a default loss. In its 3rd phase CHUEE moved beyond its utility base to work through a wider range of medium sized financial institutions to reach more industrial consumers and SMEs. (Kato et al. 2014) http://www.oecd.org/env/cc/Scaling_up_CCXGsentout_May2014_REV.pdf</p> <p>Switzerland. Prokilowatt is a tender based funding programme based on a levy on transmission charges. CHF 15 million was granted to 67 projects and 9 programmes following the third round of calls for tenders in 2012 with cost effectiveness of 2.4 Swiss centimes per kilowatt-hour for programmes, and 3.2 Swiss centimes per kilowatt-hour for projects, well below the long run marginal cost of new supply. From 2013 onwards, the maximum level of available funding is CHF 25 million. Within the framework of “Energy Strategy 2050”, it is planned to extend financial support to projects and programmes in the areas of electricity production and distribution and to raise the level of funding to a maximum of CHF 50 million per annum by 2020. At time of writing, Germany was looking at adopting this programme. www.prokilowatt.ch</p>			
<p>Utilities – Voluntary Energy Efficiency Programmes.</p> <p>Including reductions in transmission and distribution losses</p>	<p>The ability for utilities to implement widespread investment across their customer bases makes them an ideal delivery agent for energy efficiency policies and financiers. Utility profitability can be significantly enhanced.</p>	<p>Utilities can apply a range of advisory, financial, installation, and procurement techniques including on-bill financing to suit their situation.</p>	<p>When facing system constraints utilities can be highly motivated to offer low cost solutions to traditional supply-side investments by developing demand-side capacity.</p>	<p>Utility marketing and customer relationships overcome a number of barriers that slow investment in energy efficiency.</p>
	<p>Portugal. Demand Side Energy Efficiency Plan (PPEC) consists of a tender mechanism, by which eligible promoters submit measures to improve electricity efficiency. These measures are selected through technical and economical evaluation criteria. Evaluation of the benefits from PPEC in 2008 were much higher than the correspondent costs, with a ratio of 8:1 in the residential segment; 9:1 in the services segment and 7:1 in the industrial segment. From 2007 to 2008, the expected cumulative avoided consumption more than doubled from 390 GWh to 878 GWh. http://www.erse.pt/eng/engefficiency/Paginas/default.aspx?master=ErsePrint.master#</p> <p>South Africa ESKOM. In 2008 South Africa faced a 10% shortfall in capacity due to high demand growth and insufficient investment. The national electricity supplier ESKOM accelerated its DSM efforts with a suite of measures including; a large scale National Efficient Lighting Programme, focused demand management efforts with industrial customers. Electricity demand reductions of over 7 TWh per annum and 2 GW of demand reduction have been achieved. (IEA PEPDEE) http://www.iea.org/publications/insights/EnergyProviderDeliveredEnergyEfficiency_WEB.pdf</p> <p>EU District Heating. Article 14 of the EU Energy Efficiency Directive 2012/27/EU issues comprehensive guidance on: identifying and implementing adequate measures for efficient district heating and cooling infrastructure, the development of high-efficiency cogeneration, the use of heating and cooling from waste heat and renewable energy sources, where benefits exceed the costs. Procedures for operators of electricity generation installations, industrial installations and district heating and cooling installations to ensure that they carry out an installation-level cost-benefit analysis on high-efficiency cogeneration and/or the utilization of waste heat and/or connection to a district heating and cooling network when they plan to build or refurbish capacities above 20 MW thermal input or when they plan a new district heating and cooling network. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52013SC0449:EN:NOT</p>			

POLICIES FOR HOUSEHOLDS: Homes and Appliances

The massive transformation that is required to develop new zero energy buildings and significantly upgrade existing buildings at scale is universally recognized as a priority in the ECE region.

Building codes remain a key vehicle for advancing energy efficiency, but are difficult to translate directly from state-to-state as they are inherently customized to local environmental and market conditions. It is important that codes are regularly reviewed and updated.

Despite ongoing debate about what is a zero energy or near-zero energy homes, the cost and reliability of key technologies such as high efficiency glazing, retrofit insulation systems, photovoltaics (PV) and advanced heating system is now at a stage where zero energy buildings are a practical proposition if the various parties (owners, financiers, government, utilities, construction industry and occupiers) can be aligned. Market leading programmes like Energiesprong in the Netherlands are emerging and are pertinent prototypes of best practices in this necessary market transformation. Policies need to move beyond the state of the art efforts on codes to actively accelerate the market transformation of the building industry.

Table 5. POLICIES FOR HOUSEHOLDS: Homes and Appliances

Policy / measure	Policy Selection Attributes			
	Significant economic energy demand reductions and significant multiple benefits	Complementarity, synergies and integration attributes	Political alignment, governance and accountability attributes	Marketability and market impact
<p>Existing homes insulation / weatherization</p> <p>Includes a wide array of technology options: double glazing, draught sealing, insulation, heating and cooling options, shading, low emissivity coatings for 'cool roofs', lighting and appliance replacement and disposal etc.</p>	<p>Heating is 40% of household energy. Health benefits in programmes at up to 4:1 benefit-cost ratio significantly exceed energy cost reductions providing strong returns to government.</p>	<p>Energy efficiency policies can deliver a range of wellbeing, social and health outcomes, including addressing energy poverty.</p>	<p>Opportunity to offer direct social benefit. Can be used to redirect energy subsidies for improved social outcomes, and offers a delivery path for diverse government priorities.</p>	<p>Can develop new product and supplier activities as well as delivering diverse new services.</p>
	<p>Netherlands. The government has committed EUR 150 million to a EUR 600 million revolving fund, EUR 400 million in grants for rental houses and funds for local government implementation of housing energy efficiency. The Voluntary Energy Saving agreement for the rental housing sector targets 1 million retrofits by 2020 with energy savings of 21 PJ. Energiesprong is a related market development programme working with owners, financiers and industry to refurbish 111,000 social housing units to near zero energy levels with a 30 year energy performance contract funded from long term energy savings. http://energiesprong.nl/transitionzero/</p> <p>New Zealand Warm Up Heat Smart provided USD 300 million of grant-tiered targeted energy efficiency grants to households. The monetized benefits include health impacts and an overall programme benefit-cost ratio of 4:1. Over a 20-year period the programme delivers USD 1-1.5 billion in benefits, 99% of which are health benefits with reduced mortality accounting for 74% of benefits. http://www.eeca.govt.nz/eeca-programmes-and-funding/programmes/homes/insulation-programme</p>			

	<p>China. The Heat Reform and Building Energy Efficiency Project for China aims to increase energy efficiency in urban residential buildings and central heating systems in China's cold climate regions by integrating three components: 1) operational demonstrations that the greatest energy efficiency gains and cost savings in residential space heating can be achieved by simultaneously addressing the thermal integrity of buildings, the operational efficiency of heat supply systems, the provision of means for heat control by consumers, and the implementation of heat metering, cost-based heat pricing and consumption-based heat billing; 2) cooperation with central government; 3) promoting simultaneous development of heating sector reforms and building energy efficiency improvements in Chinese municipalities. http://www.worldbank.org/projects/P072721/heat-reform-building-energy-efficiency-project?lang=en</p> <p>Denmark / Germany. With an extensive history of district heating, there are many insights into technical and commercial challenges and the planning, multi-level governance and operational measures to motivate new central heating and cooling systems and upgrade existing systems abound. Chittum and Østergaard survey planning and policy issues in District Heating³¹. There are also real challenges to the ongoing economics of district heating as new buildings progress to zero and low energy constructions. Späth and Rohracher discuss policy issues in this conflicting context³².</p> <p>PEEREA. Cogeneration and District Heating – Best Practices in Municipalities, addresses the role of local authorities in promoting cogeneration and district heating, which are used in many Energy Charter member countries but often not to their full potential. Successful programmes are contingent upon the capacity of local authorities to implement measures that meet local needs. http://www.encharter.org/fileadmin/user_upload/document/Energy_Efficiency_-_Cogeneration_and_District_Heating_-_2006_-_ENG.pdf</p>			
<p>New and existing homes and buildings</p> <p>Minimum energy performance standards (MEPS) via Building Codes</p>	<p>Heating is 40% of household energy. Health benefits in programmes at up to 4:1 benefit-cost ratio significantly exceed energy cost reductions providing strong returns to government.</p>	<p>Energy efficiency policies can deliver a range of wellbeing, social and health outcomes, including addressing energy poverty.</p>	<p>Opportunity to offer direct social benefit. Can be used to redirect energy subsidies for improved social outcomes, and offers a delivery path for diverse government priorities.</p>	<p>Can develop new product and supplier activities as well as delivering diverse new services.</p>

³¹ Chittum A. and Østergaard P.A. 2014. How Danish communal heat planning empowers municipalities and benefits individual consumers. Energy Policy 74 (2014) 465-474. Elsevier.

³² Späth P. and Rohracher H. Conflicting strategies towards sustainable heating at an urban junction of heat infrastructure and building standards. Energy Policy 78 (2015) 273-280 Elsevier.

	<p>EU Directive on Energy Performance of Buildings. Updated in 2010, this policy targets ‘nearly zero energy buildings’ in 2020, by MEPS for buildings and certification of building energy performance.</p> <p>APERC CEEDS. Building codes and Labeling emphasizes market preparation activities, an increased focus on code requirements for building retrofit projects, better efforts to track actual building performance, improved third party inspection and enforcement, measures to minimize peak electrical demand as well as building thermal energy, measures to encourage better design as well as prescriptive and performance measures, better enabling of new technologies.</p> <p>http://aperc.ieej.or.jp/file/2014/2/5/Final_Report_CCEEDS_Phase_2.pdf</p>			
<p>Energy efficiency certification of buildings</p>	<p>Widespread application of certification labels can have significant impact on consumer purchase behavior.</p>	<p>Can be integrated with rental quality or environmental programmes to address persisting information gaps.</p>	<p>Ideal where governments wish to motivate consumers to demand and grow the market for energy efficient homes.</p>	<p>Offers consumers and suppliers confidence in market offerings.</p>
	<p>Ireland. The Energy Performance Certificates scheme came into effect in 2009 and became mandatory information for sales and leases. By mid-2014 25% of homes had Building Energy Ratings (BERs) and certificates. A one-step increase in BER rating has been valued at a 2.8% increase in sale price and 1.4% of rent. (IEA 2014a)</p> <p>http://www.iea.org/W/bookshop/475-Capturing the Multiple Benefits of Energy Efficiency</p>			
<p>MEPS, Standards and labeling for household appliances</p>	<p>Standards and Labeling programmes have had widespread global impact, and have more than halved the energy consumption of some appliances.</p>	<p>Use of international standardization ensures alignment and access to global appliance markets for local industry.</p>	<p>Regulatory action is measurable and deliberate. Programmes have been assessed at providing up to 17:1 return on government investments.</p>	<p>A regulated ‘level playing field’ offers consumers and suppliers confidence to invest in higher efficiency products.</p>
	<p>EU Eco-design Directive. 16 of the most energy intensive household products are regulated to minimize energy costs and environmental impacts over their respective life cycles. (EU)</p> <p>http://ec.europa.eu/enterprise/policies/sustainable-business/ecodesign/</p> <p>Korea not only manufactures many types of appliances, it also operates an extensive product efficiency programme. Over 30 appliances are regulated for minimum energy performance. The E-Standby low standby power programme with its ‘Energy boy’ endorsement label and a certification programme for high efficiency appliances complement this. Together these generate a strong market push-pull for efficiency. (IEA 2013)</p> <p>http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2013.html</p> <p>APERC CEEDS. Appliance Energy Efficiency Standards and Labeling outlines best practices from the APEC region including: global and regional cooperation and harmonization to minimize costs, regional cooperation on test laboratories, linkages to complementary policies, consumer education, compliance monitoring and enforcement.</p> <p>http://aperc.ieej.or.jp/file/2010/9/26/Final_Report_CCEEDS_Phase_1_20100114.pdf</p>			

<p>Endorsement of highest efficiency appliances</p>	<p>Globally one of the largest most durable energy efficiency programmes – governments can easily link into existing global trade for ENERGY STAR compliant products. 45,000 products in 70 different product classes are certified to carry the ENERGY STAR label.</p>	<p>An important complement to MEPS and energy rating labels, ENERGY STAR is creating a strong push-pull market transforming impact.</p>	<p>As a recognized global voluntary programme ENERGY STAR is a palatable option when governments are reluctant to regulate but wish to align with established global markets.</p>	<p>An existing global brand with effective retailer and manufacturer partnerships and strong brand recognition.</p>
<p>ENERGY STAR. This United States Environmental Protection Agency (EPA) - DoE programme is formally used in the EU, Canada, Australia, the European Free Trade Association (EFTA), Japan, New Zealand, Switzerland and Taiwan. It has broader global impact as ENERGY STAR products are freely traded to many other countries. ENERGY STAR specifications draw on international Standardization processes and maintain a threshold whereby only the top 25% of efficient products may carry the label. The use of third party certification ensures governments and consumers can have confidence in the brand. The ENERGY STAR Office Equipment Program is ideal for government procurement programmes. In 2013 in the United States alone, 300 million ENERGY STAR products were purchased providing nearly 0.5 TWh of energy demand reductions. http://www.energystar.gov/</p>				
<p>Efficient Lighting</p>	<p>Lighting is 15% of global electricity demand and can be reduced to 10% of current demand.</p>	<p>The en.lighten initiative integrates the phase-out of incandescent lamps with the promotion of efficient lighting. The global lighting industry is already involved.</p>	<p>Strong support by many (over 60) governments and industry.</p>	<p>Programme works in sync with strong industry marketing of efficient lighting technology. Rapid market uptake in Thai and Japanese markets over 5 years demonstrates high effectiveness.</p>
<p>UNEP-GEF en.lighten Initiative. Over 60 developing and emerging countries have joined the en.lighten Global Efficient Lighting Partnership Programme and committed to transition their markets to energy efficient lighting by phasing out inefficient incandescent lamps by 2016. 80% of the world’s population lives in countries which have phased-out inefficient incandescent lamps. The Global Efficient Lighting Partnership Programme members will save over USD 7.5 billion and 35 million tonnes of CO₂ annually. The on-grid efficient lighting transition would also save approximately USD 210 billion in avoided investment costs for 252 large coal-fired power plants. http://www.unep.org/</p>				

POLICIES FOR TRANSPORT: Passenger and Freight

In recent years an increasing focus on fuel economy of vehicles has emerged, but it is increasingly recognized that mobility must be also improved in many countries. Transport consumes 27% of global energy with land-based transport responsible for 76% of this. Road vehicles (cars, buses and trucks) make up 94% of land-based transport.

The Global Fuel Economy Initiative (GFEI) has a 2050 target of at least doubling the efficiency of the global vehicle fleet from an average of 8 l/100 km to 4 l/100 km (a 50% reduction in new car fuel consumption) compared to 2005 levels. ECE member States, including the United States, Canada, and EU member states, have a range of transport fuel economy policies in place. Those ECE region economies that do not already have fuel economy policies in place are regarded by GFEI as having a high level of readiness.

In the ECE region, the former Yugoslav Republic of Macedonia, Montenegro, Armenia, Azerbaijan, Georgia and the Russian Federation are actively working as GFEI contact countries by collaborating with practical in-country support and by holding an international Fuel Economy Conference in Tbilisi in 2013.

Table 6. POLICIES FOR TRANSPORT: Passenger and Freight

Policy/ measure	Policy Selection Attributes			
	Significant economic energy demand reductions and significant multiple benefits	Complementarity, synergies and integration attributes	Political alignment, governance and accountability attributes	Marketability and market impact
Fiscal policies (taxation and user charges) for transport	Changes to new car purchase habits can over the medium term significantly alter average fleet efficiency.	Reflecting the impacts of fuel economy decisions in registration and purchase prices sends a tangible signal to consumers and complements vehicle fuel economy standards and labels.	Fiscal incentives can be made to be fiscally neutral and reward decisions to purchase efficient vehicles. Can complement other vehicle initiatives e.g. safety.	Effective across entire markets. Can have widespread impact.
	<p>France ‘bonus–malus’ scheme. By offering an incentive to purchasers of efficient vehicles and a disincentive for inefficient vehicles the government is skewing purchases to high efficiency vehicles. Also known as ‘fee bate’ (fee/rebate) schemes these policies can be designed to be fiscally neutral, balancing the discounted life cycle costs to consumers of inefficient vehicles against the benefits of efficient vehicles, with little or no costs to government.</p> <p>In Ireland, a change in car taxation in 2008 is deemed to be a success. The new system moved away from assessing vehicles based on engine size to one that is based solely on the CO₂ emissions per km. This provided a strong encouragement to buy smaller and more efficient cars: between 2007 and 2011 CO₂ emissions dropped from 164 g/km to 133 g/km. EEW 2012 http://www.energy-efficiency-watch.org/fileadmin/eww_documents/EEW2/EEW_Survey_Report.pdf</p>			

Passenger Light duty Vehicle (LDV) Fuel Economy Standards (VFES) and Labeling	Cars make up 70% of transport oil consumption globally, with significant potentials for efficiency improvements to engine, transmission and operation.	Addressing the efficiency of vehicles entering the fleet is fundamental to improving fleet productivity and underpins efforts to improve mobility and reduce dependence on imported oil.	The Global Fuel Economy Initiative (UNEP, International Transport Forum (ITF), IEA, International Automobile Federation (FIA), International Council on Clean Transportation (ICCT)) has an objective of making LDVs 50% more efficient by 2050.	Vehicle importing countries should consider phasing in and aligning VFES with their predominant vehicle suppliers.
<p>EU and Japanese vehicle fuel economy standards are the most stringent at less than 6 l/100km trending to less than 5 l/100km by 2020. Globally VFES are standardizing on the New European Drive Cycle test standard.</p> <p>EU VFES. New passenger cars must meet a weight based corporate fleet average CO₂ emission regulation of 130 g/km by 2015. The share of <130g/km cars sold is already changing. For example, in Spain the share has gone from 30-40% of vehicle sales in 2005 to above 50% in 2012. (ODYSSEEMURE 2014) in (EEMR 2014) http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014</p> <p>Japanese VFES (Top Runner). The Japanese top runner standard for cars in its 1st phase to 2010 reduced oil demand by 6.6 Mtoe at a manufacturing cost of JPY 41.5 billion with cost saving to consumers of JPY 107 billion. The second phase to 2015 will avoid a further 3.9 Mtoe oil demand³³. Notably the Top Runner vehicle energy reductions exceed the total energy reduction of the next 9 Top Runner product classes.(Kainou in IEA 2013) http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2013.html</p> <p>Caucasus. The Caucasus Fuel Economy Initiative (CFEI) by the Caucasus Environmental NGO Network (CENN), in cooperation with Partnership for Road Safety Foundation (PfRS), has begun implementing the initiative – '<i>Initiation of an Auto Fuel Efficiency Programme in Georgia & Development of the Caucasus Fuel Economy Initiative (CFEI)</i>'. As the first initiative to address auto fuel economy specifically in the region, this project is a part of the Global Fuel Economy Initiative (GFEI). http://www.gfei-caucasus.org/index.php/en/</p>				

³³ Kainou, K. 2009. Why do Top Runner Energy Efficiency Standard Regulations Result in Large Positive and Negative Costs? – Risk of Investment in High Energy Efficiency Products and Risk of Government Regulation Failure. Research institute of Economy Trade and Industry, Tokyo.

Heavy Duty Vehicle (HDV) Fuel Economy Standards (VFES) and Labeling	HDVs make up 10% of the global vehicle fleet but consume 600 Mtoe (over one third of global transport fuel). Road freight is projected to grow 37% to 2020, mainly in non-OECD countries. (IEA 2014) Potentials for 45% fuel economy and 20% logistics improvement. (IEA 2012b) ³⁴	Addressing the efficiency of vehicles entering the fleet is fundamental to improving fleet productivity and underpins efforts to improve trade and reduce dependence on oil.	G20 have committed to improve HDV fuel economy and emissions Recommendations for strengthened standards and green freight programmes will be developed in 2015.	Vehicle importing countries should consider phasing in and aligning HDV VFES with their predominant vehicle suppliers as the G20 process unfolds.
	<p>Canada and the United States enacted HDV VFES in 2013. EU, Japan, Korea and China are developing policies for 2020.</p> <p>United States. From 2014, weight class based regulations (fuel consumption per 1000 tonne.km) costing USD 8 billion will provide USD 50 billion in cost savings over vehicle life. (US EPA 2011) http://www.epa.gov/fueleconomy/</p> <p>Canada has GHG based regulations assessed to be equivalent to the United States HDV VFES regulations. (ICCT 2013) referenced in (IEA 2014) http://www.theicct.org/; http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014</p>			
Eco Driving	While aggressive driving can waste up to 50% of fuel, calmer safer eco driving practices can achieve up to 15% reduction in fuel consumption.	Eco driving techniques provide significant safety and fuel economy outcomes as well as reducing vehicle operating costs and providing GHG reductions.	A complement to all other fuel economy efforts, and a useful policy option where regulatory options are difficult.	Transport fleet operators adopt eco driving as part of driver training.
	<p>Canada. The Eco Driver programme informs drivers about buying, maintaining and driving efficient vehicles. Energy cost savings vary but can be up to 15%. www.ecodriver.com</p>			
Public Transport and low energy modes	23% fewer vehicle kilometers, and a reduction in 27,000 square kilometers of parking is possible by 2050 by applying shift and avoid polices to reduce the need for energy intensive modes. (IEA 2014) ³⁵	Energy efficiency and mobility service quality improvements can pay for the necessary maintenance and renovation of older public transport systems, and minimize future land use impacts.	The returns from energy efficiency offset costs and enable governments maintaining close control of budgets to advance public transport projects.	Engaging the many stakeholders that are involved in urban transport is critical to policy success.

³⁴ <http://www.iea.org/publications/freepublications/publication/name,28130,en.html>

³⁵ http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014

The huge diversity of different policies, each tailored to the unique situation in many cities, makes it difficult to identify individual best practices. However the IEA publication, *A Tale of Renewed Cities* is a comprehensive guide to transforming cities by improving the efficiency and the delivered mobility services of urban transport systems, and contains case studies and policy guidance. Two relevant examples from this publication are:

Poland. EBRD-EIB public-private funding of efficiency upgrades to Warsaw metro and tram companies in 2011. By working with local commercial banks, EUR 130 billion was leveraged with EU Cohesion funds to provide a EUR 740 billion improvement programme to 2030.

Nigeria. The 2005 Lagos State Transport Master Plan set economic development targets for a sustainable public transport system that doubled public transport mode share (PT2x) by 2025. The resultant bus rapid transit system has reduced average transport costs by 50% for commuters while reducing congestion on bus rapid transit (BRT) routes by 40%.(IEA 2013b)

<http://www.iea.org/publications/freepublications/publication/name,39940,en.html>

APERC CEEDS. Best practices in Energy Efficient Urban Passenger Transportation outlines policies that: **avoid** or reduce the need to travel or use motorized vehicles with policies that promote livable communities and transit-oriented development (TOD); **shift** people to using more energy efficient modes of travel including non-motorized transport and carpooling, and improving and promoting the use of public transit systems; **improve** the fuel economy of new vehicles with fuel economy standards and/or emissions standards, development of efficiency vehicle technologies, and monetary policies to incentivize improvements in fuel economy.

http://aperc.ieej.or.jp/file/2013/12/24/Final_Report_CCEEDS_Phase_3.pdf

POLICIES FOR THE BUSINESS SECTOR: Industrial and Small-Medium Enterprises

Energy efficiency offers a strategic approach to improving productivity in the business sector. While this may be obvious for larger energy intensive industries, it is also important for small to medium enterprises where energy costs are less obvious but may be more manageable as they are defined by business practices rather than process plant thermodynamics. Productivity improvements include: better product quality, lower operating and maintenance costs, lower production costs, improved working conditions and environmental emissions.

Governments generally prefer a light-handed approach to working with industry, (particularly with export industries exposed to global market pressures) so effective voluntary measures (or at least measures where the obligation is around cooperation and information) are important policies. The importance of motivating managerial focus on energy efficiency cannot be underestimated. The significant over-performance of energy-intensive firms against assigned energy-conservation goals in China's 11th Five-Year plan (2006–2010) is analyzed by Wu et al.³⁶ and concludes that: Goals can "overcome such behavioral constraints to accelerate the commercialization of energy-efficiency technologies, reduce uncertainty and hesitancy of relevant investment, facilitate the enrichment of information, and concentrate the attention of firms on energy conservation".

Table 7. POLICIES FOR THE BUSINESS SECTOR: Industrial and Small-Medium Enterprises

Policy / measure	Policy Selection Attributes			
	Significant economic energy demand reductions and significant multiple benefits	Complementarity, synergies and integration attributes	Political alignment, governance and accountability attributes	Marketability and market impact.
Energy Management ISO 50001	Particularly applicable to larger businesses and energy intensive processes.	ISO 50001 encompasses a management approach to improving energy productivity in businesses enabling a range of operational challenges to be addressed in an integrated way.	This voluntary policy option can be offered as supporting measure minimizing the need for other regulatory and fiscal measures.	Adoption of ISO 50001 is expanding globally and is particularly useful for businesses with global market operations.
	<p>Ireland. 73 companies of the 173 members of the Sustainable Energy Authority's Large Industry Energy Network have achieved or are working to ISO 50001 certification and are achieving a 10% reduction in energy demand. (IEA 2014a) http://www.iea.org/W/bookshop/475-Capturing the Multiple Benefits of Energy Efficiency</p> <p>Clean Energy Solutions Centre (CESC) is an initiative of the Clean Energy Ministerial and offers a global no-cost clearinghouse for energy efficiency support for both policy makers and industry. Services include: Ask an Expert, Web-based training, Resource library, Clean energy analysis, and a unique policy response capability. https://cleanenergysolutions.org/</p>			

³⁶ Wu, D., Y. Xu, Y. Leung, and C.W. Yung, 2015. The Behavioral Impacts of Firm-level Energy-conservation Goals in China's 11th Five-Year Plan. *Environmental Science & Technology*, 49(1):85–92.

Energy Management Capacity Building	Developing the capability to identify and implement strategic and operation productivity changes in industry is key to unlocking the vast energy efficiency potential across heterogeneous industries.	Other industry development and productivity policies are enhanced by an energy management capability.	Developing the capacity to assist industry develop its productivity is a politically acceptable intervention.	Productivity gains and the development of new skills and services industries is a valuable market stimulus.
<p>China. The Top 10,000 Energy-using Enterprise Programme covers over 15,000 enterprises using more than 10,000 tonnes coal equivalent per year. In the first phase of the programme, (1,000 industries) an investment of CNY 50 billion in 2007 achieved an energy demand reduction of 115 Mtoe by 2010. The key to expansion of the programme was the newly learned scope and methods for capturing efficiency gains. (IEA 2013) http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2013.html</p> <p>Sweden. The Swedish industrial efficiency programme successfully introduced energy management schemes. Those undertaking a set of measures get a modest rebate on the energy tax. The comparatively small financial signal has unleashed investments that would have been profitable but were not taken so far. EEW 2012 http://www.energy-efficiency-watch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf</p> <p>European Energy Manager (EUREM) is a standardized training of further education that enhances the skills of technical experts in the field of energy efficiency improvement. The EUREM programme is offered in 30 countries and covers nearly all the energy-relevant issues that can arise in companies. The target group for Energy Manager Training is technical experts and companies executives as well as energy service providers. The training is usually held extra-occupational and consists of face-to-face training (160 units) and a final project work (80 units). http://www.ihk-eforen.de/display/eurem/About+EUREM</p>				
Commercial Buildings	In the services and SME sectors building energy use can be reduced by focusing on the commissioning, operations and maintenance of energy intensive, lighting air conditioning and specialist systems.	The strategies that apply to residential buildings and building codes, and Standards and Labeling policies overlap with commercial building opportunities, and are often supported by buildings labeling initiatives that disclose the energy efficiency characteristics of the buildings.	As government operations occupy both offices and specialist facilities like hospitals and schools, a public sector focus on building energy is a good example of government leadership.	Policies capitalize on the need for tenants and owners to understand the energy implications of purchase or lease of a commercial building. Analysis shows markets respond to energy efficient buildings with higher rentals and longer tenancies.

	<p>Australia. The Commercial Building Disclosure (CBD) Program requires energy efficiency information to be provided when commercial office space over 2,000 m² is offered for sale or lease. The aim is to improve the energy efficiency of Australia's large office buildings and to ensure prospective buyers and tenants are informed. A Building Energy Efficiency Certificate (BEEC) must be provided to potential buyers or lessors when requested at the time of sale, lease or sublease and must be publicly accessible on the Building Energy Efficiency Register with the building's National Australian Building Energy Rating (NABERS) energy star rating and must also be included in any advertising material for the sale, lease or sublease. http://www.cbd.gov.au</p> <p>Sweden. Building owners are required to provide an energy performance certificate for their buildings. This measure, introduced in connection with the Energy Service Directive (2006/32/EC) was amended in 2012. The energy performance certificate must be presented whenever a building is sold or leased. A certificate can only be obtained after an on-premises inspection by an authorized expert. In buildings frequented by the public, the certificate has to be disposed in a visible place. Energy performance certificates are valid for ten years. http://www.boverket.se/</p>			
<p>Small and Medium Enterprises</p> <p>Industry networks</p>	<p>An important policy area as SMEs provide greater employment and GDP growth potential than energy intensive industries.</p>	<p>This policy is consistent with developing employment and entrepreneurial businesses.</p>	<p>Potentially a useful economic development enhancement policy.</p>	<p>Productivity gains and the development of new skills and services industries is a valuable market stimulus.</p>
	<p>Germany. Learning Energy Efficiency Networks (LEEN) support innovative companies increase energy efficiency and improve their competitive position. By learning from each other a multitude of companies cooperate in order to save energy in the most cost-effective way. The main starting points of the cooperation in the networks are efficiency improvements with respect to cross-cutting technologies (e.g. compressed air systems, combined heat and power systems, electrical drives). Evaluation of 30 networks in Germany showed 4,000 profitable measures with average IRR 35%. Companies cooperating in LEEN networks increase their efficiency twice as fast as the German industrial average. http://leen.de/en/leen-netzwerke/</p> <p>Ireland. Over 2007-2011 the Irish Sustainable Energy Authority SME programme has supported 1,470 SMEs with 130,000 employees. In 2012, 200 SMEs with 2,000 employees were supported, achieving cost reductions of EUR 2 million from a total EUR 19.7 million energy bill. (IEA 2014) http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014</p> <p>Switzerland / Germany. Energy Efficiency Networks (EEN). The first EEN was founded in Switzerland in 1987 and transferred to Germany in 2002. In EENs, 10 to 15 regionally based companies from different sectors share their experiences in efficiency activities in moderated meetings. Results from 70 networks in Switzerland and 20 in Germany show that the efficiency improvements of participating companies are accelerated by 100% compared to the autonomous progress. Almost every company has a profitable (internal rate >12%) efficiency potential between 5 and 20% of its present energy demand. Learning tools include: contract templates, checklists, technical manuals, and software-based techno-economic calculation tools under a unified user interface. EENs are financed and operated mainly by industry itself and represent an innovative approach for companies worldwide. http://proceedings.eceee.org/visabstrakt.php?event=1&doc=3-325-11</p> <p>China. The Institute for Industrial Productivity (IIP) Supply Chain Initiatives Database is an interactive and user-friendly database of case studies that describe supply chain initiatives for energy savings and GHG mitigation in industry. http://www.iipnetwork.org/databases/supply-chain#sthash.Bz5m82EP.dpuf</p>			

MEPS for industrial equipment	MEPS Programmes have widespread global impact and target essential energy intensive equipment such as electric motors.	Use of international standardization ensures alignment and access to global appliance markets for local industry.	Regulatory action is measurable and deliberate. Programmes have been assessed at providing up to 17:1 return on government investments.	A regulated 'level playing field' offers consumers and suppliers confidence to invest in higher efficiency products.
	<p>EU Eco-design Directive. Four of the most energy intensive industrial products (electric motors, circulator pumps, fans and water pumps) are regulated to minimize energy costs and environmental impacts over their respective life cycles and will lead to energy demand reductions across the EU of 195 TWh by 2020. The policy has been accompanied by significant technology development and has initiated EU and global standardization processes. http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0125</p>			
Voluntary Agreements	By focusing on large energy industry sectors (pulp and paper, refining etc.) governments can help industries learn with each other about ways in which productivity can be advanced.	All industries have in common a range of managerial techniques, HR practices and process management skills that can be improved by benchmarking and management.	Governments are creating a supportive environment for productivity gains, while leaving the means to improvement to industry experts. 'Voluntary but not without obligations'.	Productivity gains and the development of new skills and services industries is a valuable market stimulus.
	<p>Netherlands. Long tradition of voluntary agreements (VA). From 2001 to 2008, energy efficiency improvements by these Long Term Agreement (LTA) members were 2.4% versus 1% for non-LTA industries. The paper sector achieved an 11.4% efficiency gain over 2010. http://iet.jrc.ec.europa.eu/energyefficiency/sites/energyefficiency/files/files/documents/event_s/nl_-_energy_audits_madrid_20032014.pdf</p> <p>Canada. The Canadian Industry Program for Energy Conservation (CIPEC) is a longstanding partnership between private industry and the Canadian federal government improving Canadian industry energy efficiency and reducing GHG emissions. 1,400 companies and trade associations are partners in a programme that includes: sector task forces, a cost-shared assistance programme for ISO 50001 implementation pilots, process integration studies, industry networking and customized energy efficiency workshops. http://www.nrcan.gc.ca/energy/efficiency/industry/cipec/5153</p> <p>Finland voluntary agreement programme 2009 -2016 includes 90% of Finnish industry. The latest series of VAs includes utilities as well as industry and government under the agreements. http://www.iea.org/publications/insights/insightpublications/EnergyProviderDeliveredEnergyEfficiency.pdf</p>			
Industry Innovation and exports	The ability to grow a new market capability while improving energy efficiency potential is a win-win opportunity.	Complementarities arise from an industry ready to make an innovative step and a market ready for a new technology or service.	Politically this is an innovation or development opportunity as much as an energy efficiency option.	Potential to grow new markets or take a lead in an existing market.

	<p>Japan. Replacing incandescent lamps to LED reduces Japan’s lighting demand by 92 GWh. In 1998 the government invested USD 48 million in development of white light LED lighting. In 2005 an accelerated depreciation rate was applied to LED replacements for incandescent lamps, in 2008 the government asked manufacturers to cease selling incandescent lamps by 2012 and in 2009 provided Eco-point Programme incentives for uptake. This persisting market transformation is driving LED replacements at less than 2-year payback rate. http://ccap.org/assets/CCAP-Booklet_JapanEcoPoints.pdf</p> <p>Netherlands. The energy-saving technology manufacturing and services industry has grown by 9% per year since 1995 with goods and services valued at EUR 4.1 billion in 2012. (IEA 2014a) http://www.iea.org/W/bookshop/475-Capturing_the_Multiple_Benefits_of_Energy_Efficiency</p> <p>Ireland. Sales of energy efficiency related products (mostly insulation and efficient lighting) grew by 66% from EUR 100 million in 2010 to over EUR 170 million in 2012. (IEA 2014a) http://www.iea.org/W/bookshop/475-Capturing_the_Multiple_Benefits_of_Energy_Efficiency</p>
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Menu of energy efficiency policies and measures

Table 8 summarizes the energy efficiency best practice policies based on the best practice attributes framework. Notably, there is a 'richer' set of policies for finance and utilities than normally seen on other energy efficiency policy recommendations, reflecting both the critical roles that finance and utility capabilities play in energy efficiency and the expansion of policy experiences in these areas in recent years. The more traditional operational policies are maturing. Some of the exemplars provided show that policies that were in common use over the past 10 years or so. These have advanced in scope and impact and can be expected to continue to do so with high level of demand from UN SE4All and regional and country policy commitments to energy efficiency and development. All the policies offered conform to the selection attributes. Those that have a particular feature that warrants particular attention in policy design are marked with an exclamation mark.

The policies identified here stand out. But there are of course other policies and measures. Some will meet the attribute criteria used in this study, but they have not yet been evaluated or their evaluations have not been reported. This report does draw on recognized published analysis.

Some options are less like policies and more like technology interventions that might be used within an operational implementation programme established by a policy. Discrete technological options that have a limited geographical application, or have a demand management function rather than energy efficiency focus such as smart meters have been less obvious and are perhaps less relevant than recognized energy conserving technologies.

Policy makers are encouraged to complement the best practice policies offered here by researching any policy or technology option that makes sense in the setting that they are targeting.

Table 8. Summary of Best Practice Policies for Energy Efficiency

Note: A tick mark (✓) denotes the policy complies with the attribute, and an exclamation mark (!) cautions that the policy attribute requires a particular attention when applying this policy.

Policy types	Best Practice Policies	Policy Attributes			
		Outcomes	Synergies	Alignment	Marketability
Cross-sectoral: Governance	Enabling frameworks	✓	✓	✓	✓
	National strategies, plans and targets	✓	✓	✓	✓
	Institutional arrangements: Energy efficiency operational agencies	✓	✓	✓	✓
	Coordination mechanisms	✓	✓	✓	✓
	Cities and Regions	✓	✓	✓	✓
	Data, statistics and evaluation	✓	✓	✓	✓
Cross-sectoral: Finance	Government and IFI leveraged loans finance	✓	✓	✓	✓
	Public-private finance including ESCOs	✓	✓	✓	✓
	Funds Guarantees, risk sharing	✓	✓	✓	✓
	Fiscal Policies: tax incentives, rebates	!	✓	✓	✓
	Government grants	!	✓	✓	✓
	International climate finance	✓	✓	✓	✓
Policies for Utilities	Utility cost-reflective pricing	✓	✓	✓	✓
	Energy efficiency regulatory mandates	✓	✓	✓	✓
	Utility ESCOs	✓	✓	✓	✓
	Utility white certificates	!	✓	✓	!

	IFI finance for utility energy efficiency	✓	✓	✓	✓
	Voluntary energy efficiency programmes	✓	✓	✓	✓
Policies for Households	Existing homes insulation/weatherization	✓	✓	✓	✓
Homes and Appliances	New and existing homes MEPS, codes	✓	✓	✓	✓
	Energy Efficiency certification	✓	✓	✓	✓
	Appliance MEPS and labeling	✓	✓	✓	✓
	High efficiency appliance endorsement	✓	✓	✓	✓
	Efficient lighting	✓	✓	✓	✓
Transport	Fiscal policies (taxation and user charges) for transport	✓	✓	✓	✓
Passenger and Freight	Passenger Light Duty Vehicle (LDV) Fuel Economy Standards (VFES) and Labeling	✓	✓	✓	✓
	Heavy Duty Vehicle (HDV) Fuel Economy Standards (VFES) and Labeling	✓	✓	✓	✓
	Eco driving	✓	✓	✓	✓
	Public Transport and low energy modes	✓	✓	✓	✓
Business Sector	Energy management, incl. ISO50001	✓	✓	✓	✓
Industry and Commerce	Commercial Buildings	✓	✓	✓	✓
	Energy management capacity building	✓	✓	✓	✓
	Small to medium enterprises (SME)	✓	✓	✓	✓
	MEPS for industrial equipment	✓	✓	✓	✓
	Voluntary agreements	✓	✓	✓	✓
	Industry innovation and exports	✓	✓	✓	✓

The policies form a menu or smorgasbord from which countries can select a suite of best practices that best suit their political, market and cultural contexts.

While it would not be expected that country might adopt all the policies offered here, a government should also consider that an effective programme of policies should include:

- necessary governance foundations in statute, coordination mechanisms, data, and operational capabilities;
- an ability to access and utilize private finance;
- a role for utilities in motivating rational use of energy resources and transmission systems;
- measures that span the sectorial mix and priorities in a country;
- learning evaluation and innovation processes.

4. IMPLEMENTING THE MENU: DEVELOPING POLICY IMPLEMENTATION CAPABILITY IN THE ECE REGION

The UNECE has a unique ability in convening a regional cooperative approach to developing social and economic outcomes from energy efficiency. The leadership role played by UNECE in the annual International Forums on Energy for Sustainable Development is consistent with and supportive of advancing energy efficiency.

UNECE can act as a regional promoter of regional peer-to-peer learning on energy efficiency and focal point for support resources. This will enhance the uptake of concrete measures, and support the extension of the best practices outlined in this report in a manner consistent with the activities already planned and underway.

Practical support resources for countries developing and implementing policies are outlined below.

Practical Resources and Support for Policy Implementation

Russian language portal. The website of the Russian Energy Agency of the Russian Ministry of Energy can be used as the Russian-language information resource on energy efficiency, http://rosenergo.gov.ru/about_the_organization. The Russian Energy Agency cooperates with the UN, IEA and IFC. The Russian Energy Agency also has partnership relations with the United Nations Industrial Development Organization (UNIDO), the Organisation for Economic Co-operation and Development (OECD), the Baltic Sea Region Energy Cooperation (BASREC), and the International Partnership for Energy Efficiency Cooperation (IPEEC).

The Institute for Industrial Productivity³⁷ (IIP). IIP is an independent non-profit organization whose role is to accelerate the uptake of industrial energy efficiency practices by partnering with both industry and governments. IIP's work focuses on the countries and sectors that drive industrial demand and offer major opportunities for improvement – such as in the cement, iron and steel, and chemicals sectors in China, India and the United States. IIP focus on the adoption of continuous improvement energy management systems by working with relevant governments on policy implementation, partnering with key companies, investors and associations to create projects that can be effectively scaled up.

IIP has experience in programme design and implementation, spurring energy efficiency action in industrial supply chains, and the development of industrial energy efficiency databases and tools. IIP's databases provide comprehensive information about energy efficiency policy, programmes, finance mechanisms, supply chain initiatives and technology and offer a rich resource for policymakers, industry, NGOs, and researchers.

Global Fuel Economy Initiative³⁸ (GFEI). The FIA Foundation, IEA, ITF and UNEP and ICCT have been working in partnership as the Global Fuel Economy Initiative to improve fuel economy worldwide. GFEI work with governments in developing policies to encourage fuel economy improvement for vehicles produced or sold in their countries, to supporting regional awareness initiatives that provide consumers and decision makers with the information they need to make informed choices.

³⁷ <http://www.iipnetwork.org/about-iip>

³⁸ <http://www.unep.org/transport/gfei/autotool/>

The 3 core activities of the GFEI are: a) data development and analysis of fuel economy potentials by country and region; b) support for national and regional policy-making efforts outreach; c) awareness raising to stakeholders (e.g. vehicle manufacturers).

GFEI launched the 50by50 campaign (saving over 6 billion barrels of oil per year by 2050, and close to half of CO₂ emissions from cars by 2050) and is active in Latin America, India, Australia, the ASEAN, and Central and Eastern Europe with a global GFEI Clean Vehicles and Improved Fuel Efficiency Toolkit. GFEI is actively developing national pilot projects in all regions, including in Indonesia, Chile, Colombia and Ethiopia. An example of their implementation work is the Caucasus initiative '*Initiation of an Auto Fuel Efficiency Programme in Georgia & Development of the Caucasus Fuel Economy Initiative (CFEI)*' – the first initiative to address auto fuel economy specifically in the region.

Clean Energy Solutions Centre³⁹ (CESC). CESC is an initiative of the Clean Energy Ministerial⁴⁰ that helps governments design and adopt policies and programmes that support deployment of clean energy technologies. It offers no-cost expert policy assistance, webinars, and training forums, clean energy policy reports, data and tools in partnership with over 35 leading international and regional clean energy organization. Key tools include: 'Ask an Expert', Web-based training and peer learning, a resource library, and Clean Energy Analysis. A good example of the support provided through CESC is the recent project where CESC experts worked with the Government of Albania to develop a residential energy efficiency programme⁴¹.

UNEP-GEF en.lighten initiative. In 2009 UNEP and GEF established en.lighten as a public-private partnership to accelerate a global market transformation to efficient lighting. Its strategies include: development and support of country lighting strategies, phase-out of incandescent lamps, identification of global best practices, and a platform for managing technical and quality issues. Specific initiatives include: Country lighting assessments; Policy Regulatory and Finance; Consumer, Environmental Protection, and Recycling; Off-grid Lighting. The Global Efficient Lighting Partnership Programme “supports interested countries to design and implement National Lighting Strategies including relevant policies that will enable their country to make the transition to energy-efficient lighting quickly and cost-effectively.”⁴²

Global Energy Efficiency Accelerator Platform. Sustainable Energy for All, an initiative led by the UN Secretary-General and the President of the World Bank, has doubling of the global rate of improvement in energy efficiency by 2030 as one of its three objectives. To meet this ambitious energy efficiency goal a range of economy-wide activities are required. The Global Energy Efficiency Accelerator Platform⁴³ was established to help reach this objective by driving action and commitments by all sectors of the economy. The Copenhagen Centre on Energy Efficiency (C2E2) in its role as the SE4All Energy Efficiency Hub is supporting the Global Platform' that aims to increase the uptake of energy efficiency policies and programmes in areas with high potential. Accelerators for the following policy sectors have been developed:

- Appliances and Equipment;
- Buildings Efficiency;

³⁹ <https://cleanenergysolutions.org/>

⁴⁰ <http://www.cleanenergyministerial.org/>

⁴¹ <https://cleanenergysolutions.org/expert/impacts/albania-residential-energy-efficiency>

⁴² <http://www.enlighten-initiative.org/CountryActivities/GlobalEfficientLightingPartnershipProgramme.aspx>

⁴³ <http://www.se4all.org/energyefficiencyplatform/>

- District Energy;
- Lighting;
- Vehicle Fuel Efficiency;
- Industry.

An accelerator for the Power Sector is under consideration. Countries and cities interested in further information or participating in the accelerators can visit the websites of SE4All⁴⁴ or C2E2⁴⁵.

The Regulatory Assistance Project⁴⁶ (RAP). RAP is a global, non-profit team of experts focused on the long-term economic and environmental sustainability of the power and natural gas sectors, providing technical and policy assistance to policymakers and regulators on a broad range of energy and environmental policy issues. With expertise in regulatory and market policies that promote economic efficiency, environmental protection, system reliability and fair allocation of system benefits among consumers. RAP has worked extensively in the United States since 1992 and in China since 1999. Programmes and offices were established in the European Union in 2009 and RAP have supported requests for regulatory assistance in nearly a dozen other countries.

IEA Energy Training Week⁴⁷. Each year the IEA operates a full week energy-training programme aimed at the needs of emerging economies. The programme covers a diverse set of energy issues and includes a full training stream on energy efficiency. The IEA training programme also develops tailored training workshops and is able to draw on experts to meet a range of training needs.

IEA Energy Data and Statistic Training⁴⁸. Each year the IEA operates a two-day training workshop for energy statisticians. The ECE membership is also large enough to work with IEA trainers to develop a regional programme in energy statistics training that would include regional as well as international trainers. Some countries in the ECE region have already engaged with IEA statistics and utilized IEA expertise in developing energy and end use statistics.

UNIDO Professional Development Programme on Sustainable Energy Solutions. Each year UNIDO Institute for Capacity Development, together with the International Center for Promotion of Enterprises (ICPE) holds a Professional Development Programme on Sustainable Energy Solutions⁴⁹.

Developing active engagement on energy efficiency policies in the ECE region

In order to advance beyond existing energy efficiency policy recommendations by the IEA, WEC, ECS, International Renewable Energy Agency (IRENA) and propose additional implementation capabilities for ECE member States, this section discusses some of the ways in which best practices in energy efficiency policy can be advanced and implemented. This includes ways in which ECE member States might co-operate and share experiences to enable and encourage an increased application of energy efficiency policies.

⁴⁴ <http://www.se4all.org/energyefficiencyplatform/>

⁴⁵ <http://www.energyefficiencycentre.org/>

⁴⁶ <http://www.raponline.org/>

⁴⁷ <http://www.iea.org/training/>

⁴⁸ <http://www.iea.org/training/trainingthemesandmodules/energystatistics/>

⁴⁹ <http://institute.unido.org/programmes/professional-programme>

The objective is to identify options that can accelerate delivery of SE4All objectives and encourage implementation of the actions promoted in the Joint Statement of the Executive Secretaries of the United Nations Regional Commissions to the 5th International Forum on Energy for Sustainable Development (Hammamet Declaration)⁵⁰.

Develop a set of policy recommendations suited to the region by active engagement with ECE member States. This process could be based on the successful IEA process for developing tailored Regional Energy Efficiency Policy Recommendations (REEPR)⁵¹ and should build on and integrate with PEEREA. This process engages country policy and industry experts, and regional energy efficiency experts in a workshop process to identify policies and measures that suit local cultural, political and language contexts. The experts tailor policies that respond directly to the social and economic development objectives in the region.

Member States in sub-regions such as Central Asia, Caucasus, Eastern and South-Eastern Europe could usefully engage in a process of exploring and identifying policies that will work well in the countries in those regions with ECE liaison and support⁵².

Support an ongoing programme of energy efficiency policy peer review. By continuing and supporting energy efficiency policy evaluations, ECE member States that are not IEA or EU members have a concrete option for collaborative learning. This activity could simply extend the existing PEEREA evaluations, or draw on features of the PEEREA, IEA In-Depth Reviews and APEC PREE reviews and develop a review structure that delivers a broader sustainable energy perspective. This type of initiative usefully provides a base of experience that can then be used to undertake comparative exercises to develop capabilities in priority policy areas in a process like APEC CEEDS.

Support collaboration on common policy challenges. An initiative like the APEC CEEDS programme offers a lot of potential for the region. By focusing on a common and substantive policy challenge, member countries can develop an enhanced focus on best practices based on what is being successfully implemented and actually works well. In this initiative the identification and development of best practices moves beyond policies to include actual measures and private sector initiatives.

Compile an ECE regional energy efficiency policies database. As part of the above processes, ECE could approach IEA to utilize the IEA Policy and Measures Database (PAMS) as a repository for ECE member States energy efficiency policies. The PAMS database is already a global repository for renewable energy policies (with IRENA), energy efficiency policies (with CEM CESC) and greenhouse gas policies. A standard PAMS update request is sent each year to cooperating countries, ensuring a regular update. This could include features such as a Russian language portal for ECE countries, and could extend to other regional commissions adding a valuable policy databases resource to SE4All.

⁵⁰ http://www.unece.org/fileadmin/DAM/energy/se/pdfs/ee21/Forum_November_Tunisia/Joint_Statement_Fifth_International_Forum_Final_All.pdf

⁵¹ <http://www.iea.org/publications/freepublications/publication/regional-energy-efficiency-policy-recommendations-.html>

⁵² In 2014 the IEA attempted to initiate a REEPR in Central Asia. This was welcomed by many but did not proceed due to funding challenges.

Bridging the gaps to implementation

But the real challenges to accelerating energy efficiency lie in its policy foundations: the policy governance frameworks, the bankability that is enabled by sound financial policies and utilities that enable energy efficiency with cost-reflective prices and supportive measures.

1. Cross-sectoral governance. About half the countries in the ECE membership have a history of solid policy commitments and achievement from their energy efficiency commitments. For these countries, there is scope to further develop the social and economic gains that can be made from energy efficiency, for others there is a pending need to establish effective governance and policy processes. The critique from the PEEREA report Policy Developments and Challenges in Delivering Energy Efficiency (2007) summarizes that status of energy efficiency as follows:

*“Alongside many international declarations and forms of commitment, including those from the Environment for Europe process, national governments are more and more appreciating the need for a comprehensive approach to energy efficiency with respect to both energy and climate change policies. However, despite this stronger commitment, **many believe energy efficiency is still not fully integrated into energy policies**⁵³. Furthermore while the difference between the approaches taken by western countries and transition countries may be narrowing, there is still a large gulf.”*

There seems to be a need to enhance the ability of countries to develop the statutory and policy foundations for energy efficiency to enable sound governance and implementation of economic policies and measures.

2. Cross-Sectoral Finance. Studies like the Bankable Energy Efficiency Projects (BEEP) – Experiences in Central and Eastern European Countries⁵⁴ focus on the identification, development and financing stages of projects. The BEEP project concludes:

*“There still exists a great potential for energy efficiency projects in CEE countries, which is worth tapping. However, **success will require careful consideration of the framework conditions**⁵⁵, and a consistent approach. To focus on projects with a realistic chance of implementation is crucial. But even promising projects have to be presented to financial institutions and potential investors with documentation of a high standard, in order to achieve financial closure.”*

Banks like the EBRD have established networks of local banks, effective project risk management tools and an understanding of the policy and technical features, the gap to be addressed seems to be around the policy context within countries.

3. Utilities. Without a survey of utility pricing and operational policies it is difficult to establish the exact state and prospects for utility delivery of energy efficiency in countries in the region. However it is clear from a number of perspectives that there is a general failure in price signals and operational capabilities in utilities that mean energy efficiency will remain underdeveloped. Again the PEEREA report; Policy Developments and Challenges in Delivering Energy Efficiency (2007) analysis emphasizes this failure:

*“In these countries, electricity tariffs are still relatively low and in the majority of cases below cost recovery. **Low and unbalanced tariffs, compounded by payment***

⁵³ Bold emphasis added

⁵⁴ http://www.cres.gr/kape/pdf/download/BEEP_Project_Brochure.pdf

⁵⁵ Bold emphasis added

arrears and low collection rates, are at the core of poor financial and technical performance by power utilities. This means that they have not had the resources to invest in energy efficiency improvements. In the Kyrgyz Republic, Turkmenistan and Uzbekistan, electricity consumers pay less than two US cents per kilowatt-hour, compared with a cost-recovery level of two to three times that amount. Efforts to address low cost recovery are constrained by poverty. Reforms need to be complemented by parallel measures to mitigate potential affordability problems for low-income consumers.”

When the role that utilities play in heat delivery as well as electricity and gas supply is considered their role is delivering improved service and efficiency is further highlighted. Improvements in district heating are only possible at the scale required if utility structure and commercial drivers are addressed. In the first instance the scale and impact of this persisting policy gap needs to be assessed and understood. Solutions that overcome this policy inertia, while addressing structural barriers and consumer affordability, can then be proposed.

4. Operational Policies and measures. Most operational policies, like standards and labeling policies, building codes, vehicle fuel economy measures etc. are well established in many nations. The principles, the economics and programme response dynamics have been developed. Standards and supporting marketing and technical measures are established and policies include active review and improvement processes. Early adopters have shouldered the risks and the practices are now a low-risk option for countries yet to engage in them.

There is still ongoing work to expand these policies globally, assisting new-adopters (as en.lighten does with lighting and GFEI do with vehicle fuel economy standards) and standardizing and packaging policies into ready-to-apply streamlined measures.

Table 9 summarizes the next steps that can be taken and starts to shape a role for ECE leadership.

Table 9. Next steps to enhancing policy capabilities

Policies	Status	Needs	Role for UNECE
1 Cross-sectoral governance foundations for the rest of the policies	Governance. Diverse governmental contexts and governance structures, suggest that some governments underestimate the role of a robust policy foundation to implementing and achieving energy efficiency outcomes.	Identify what constitutes a durable statutory and policy context and benchmark country policy and governance capabilities.	Benchmark country governance and energy efficiency policy capabilities to highlight areas where countries can improve their policy foundations for energy efficiency.
2 Cross-sectoral finance policy foundations for the rest of the policies	Finance. Energy efficiency is still largely equity funded, or linked to grants. Increasingly local banks are retailing IFI and central bank funds targeted at sustainable energy. Bond financing of energy efficiency is a significant emergent opportunity for energy efficiency.	Explore which financing strategies work best, how governments can improve their bankability and their scope to expand private financing of energy efficiency.	Working with energy efficiency financiers to analyze energy efficiency finance options in the region: benchmark the statutes and policies that underpin a country's bankability and identify policies that will increase bankability of energy efficiency and identify best practices in finance strategies.

3 Utilities	The role for utilities in developing social and economic outcome is only really established in North America. In most other countries, energy market policies disable the policies for rational demand and supply side implementation of energy efficiency like cost-reflective prices.	Effort at energy market policy level that mandates, enables and motivates utilities to profit from improved retail and distribution policies and practices.	Working with experienced utility policy developers (like RAP), identify the barriers and options for developing utility delivery of energy efficiency in the ECE region. Work with governments to develop and implement policies to address gaps.
4 Operational policies for households, transport and Industry sectors and stakeholders	The fundamental economics and market response dynamics are understood. Necessary standards and supporting marketing and technical measures are established in international processes that include active review and improvement processes. Early adopters have shouldered the risks and the practices are now a low-risk option for countries yet to engage in them.	Ongoing support for countries that have yet to engage in these policies and processes with adaptation pathways. The agencies listed in Practical Resources and Support for Policy Implementation already support some of these policies – there is scope to do more.	Identify the key operational policy priorities for member States and provide platforms for collective action. Partner with experienced operational policy development agents like; en.lighten and GFEI and countries that are leading adopters, to provide an effective platform for expanding already developed policies and measures across countries in the region.

REFERENCES

C40 <http://www.c40.org>

CCAP 2012. Case study, Thailand's Energy Conservation (ENCON) Fund – How Financial Mechanisms Catalyze Energy Efficiency and Renewable Energy Investments. Centre for Clean Air Policy (CCAP) Washington DC. http://ccap.org/assets/Thailand-Energy-Conservation-ENCON-Fund_CCAP-Oct-2012.pdf

Chittum A. and Ostergaard P.A. 2014. How Danish communal heat planning empowers municipalities and benefits individual consumers. Energy Policy 74 (2014) 465-474. Elsevier.

Covenant of Mayors <http://www.covenantofmayors.eu>

EBRD. European Bank for Reconstruction and Development. Sustainable Energy Initiative. <http://www.ebrd.com/what-we-do/sectors-and-topics/sustainable-energy-initiative.html>

ECS. Energy Charter Secretariat 2007. Policy Developments and Challenges in Delivering Energy Efficiency <http://www.encharter.org/index.php?id=274&L=0>

Efficiency Vermont. 2012 Annual Report 2010 Efficiency Vermont. www.ency Vermont.com/docs/about_efficiency_vermont/annual_reports/2010_Annual_Report.pdf

Energy Efficiency Watch. 2012 Progress in energy efficiency policies in the EU Member States - the experts perspective. http://www.energy-efficiency-watch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf

ENERGY STAR <http://www.energystar.gov/>

EU Eco-design Directive <http://ec.europa.eu/enterprise/policies/sustainable-business/ecodesign/>

Foster Wallace and Dahlberg 2013. 2012 State of the Efficiency Program Industry – Budgets, Expenditures, and Impacts. Consortium for Energy Efficiency, Boston. http://library.cee1.org/sites/default/files/library/10533/CEE_Annual_Industry_Report.pdf

GFEI. Global Fuel Economy Initiative. <http://www.globalfueleconomy.org/Pages/Homepage.aspx>

ICCT <http://www.theicct.org/>

IEA 2008E Promoting Energy Efficiency Investment, Case Studies in the Residential Sector. <http://www.iea.org/publications/freepublications/publication/name,34308,en.html>

IEA 2008R. Promoting Energy Efficiency Investment. Case Studies in the Residential Sector. Russian Language Version. <http://www.iea.org/publications/freepublications/publication/name,35337,en.html>

IEA 2010 <http://www.iea.org/publications/freepublications/publication/name,3868,en.html>

- IEA 2010E Energy Efficiency Governance Handbook. English language version.
<http://www.iea.org/publications/freepublications/publication/name,3931,en.html>
- IEA 2011R Energy Efficiency Governance Handbook. Russian language version. 2011
<http://www.iea.org/publications/freepublications/publication/name,15748,en.html>
- IEA 2011. 25 Energy Efficiency Policy Recommendations, 2011 update. International Energy Agency. 2011. <http://www.iea.org/publications/freepublications/publication/name,3782,en.html>
- IEA 2011a. Progress Implementing the IEA 25 Energy Efficiency Policy Recommendations. IEA 2011
http://www.iea.org/publications/insights/insightpublications/progress_implementing_25_ee_recommendations.pdf
- IEA 2012. World Energy Outlook, 2012. International Energy Agency. 2012.
https://www.iea.org/publications/freepublications/publication/WEO2012_free.pdf
- IEA 2012a Joint Public-Private Approaches for Energy Efficiency Finance.
<http://www.iea.org/publications/freepublications/publication/name,20561,en.html>
- IEA 2012b. Energy Management Programmes for Industry
<http://www.iea.org/publications/freepublications/publication/name,28130,en.html>
- IEA 2013. Energy Efficiency Market Report 2013. International Energy Agency 2013
<http://www.iea.org/publications/freepublications/publication/energy-efficiency-market-report-2013.html>
- IEA 2013a. Energy Provider-Delivered Energy Efficiency
http://www.iea.org/publications/insights/EnergyProviderDeliveredEnergyEfficiency_WEB.pdf
- IEA 2013b A Tale of Renewed cities. A policy guide on how to transform cities by improving energy efficiency in urban transport systems. International Energy Agency. 2013
<http://www.iea.org/publications/freepublications/publication/name,39940,en.html>
- IEA2013c Efficient World Scenario - World Energy Outlook 2013. International Energy Agency. 2013.
- IEA 2014. Energy Efficiency Market Report, 2014. International Energy Agency. 2014.
http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014
- IEA 2014a. Capturing the Multiple Benefits of Energy Efficiency. International Energy Agency. 2014.
http://www.iea.org/W/bookshop/475-Capturing_the_Multiple_Benefits_of_Energy_Efficiency
- IEA 2014b. Regional Energy Efficiency Policy Recommendations for the Arab-SEMED Region. International Energy Agency. 2014.
<http://www.iea.org/publications/freepublications/publication/RegionalEnergyEfficiencyPolicyRecommendations.zip>
- IEA PAMS Policy and Measures Database. <http://www.iea.org/policiesandmeasures/>
- Kato et al. Kato T., Ellis J., Pauw P., Caruso R. 2014. Scaling Up And Replicating Effective Climate Finance Interventions. OECD.
http://www.oecd.org/env/cc/Scaling_up_CCXGsentout_May2014_REV.pdf

Kainou, K. 2009. Why do Top Runner Energy Efficiency Standard Regulations Result in Large Positive and Negative Costs? – Risk of Investment in High Energy Efficiency Products and Risk of Government Regulation Failure. Research institute of Economy Trade and Industry, Tokyo.
www.reiti.go.jp/en/columns/a01_0215.html

Späth P. and Rohracher H. Conflicting strategies towards sustainable heating at an urban junction of heat infrastructure and building standards. *Energy Policy* 78 (2015) 273-280 Elsevier.

Sun et al. Sun X., Zhu L., Taylor B. 2011. China's ESCO industry: saving more Energy Everyday through the Market.
<https://ryanschuchard.files.wordpress.com/2011/06/chinas-esco-industry-2010.pdf>

UNECE 2013. Promoting Energy Efficiency Investments for Climate Change Mitigation and Sustainable Development. http://www.unece.org/energy/gee21/promoting_eei.html

United States EPA. Vehicle Fuel Economy. <http://www.epa.gov/fueleconomy/>

WEC 2013. Energy Efficiency Policies – What works and What Doesn't. World Energy Council. 2013.
<http://www.worldenergy.org/publications/2013/world-energy-perspective-energy-efficiency-policies-what-works-and-what-does-not/>

Wu, D., Y. Xu*, Y. Leung, and C.W. Yung, 2015. The Behavioral Impacts of Firm-level Energy-conservation Goals in China's 11th Five-Year Plan. *Environmental Science & Technology*, 49(1):85–92.

ANNEX: ATTRIBUTES FOR IDENTIFYING HIGH IMPACT POLICIES

Desirable qualities of a policy selection framework

To date various policy recommendations have been structured around a sectoral approach. The available policy recommendations promote cost-effective and politically palatable policies in sectors with a recognized experience base. Typically, existing policy recommendations stop short of recommending actual policies and programmes. There is now sufficient experience and development of policies and measures to be able to highlight individual best practice policies and measures as exemplars where an evaluated experience and cost effectiveness is available.

An evaluation process should identify a taxonomy or system of attributes with which to identify effective policies. These attributes should in turn be those that can highlight highly effective and economic policies. This annex proposes a set of attributes.

Attributes that offer direction on best practices in policies

Significant economic energy demand reductions and significant multiple benefits. These are policies that have been designed and improved with experience, to realize significant cost-benefit effectiveness to both governments and energy consumers. This cost-effectiveness derives from: the prevailing costs for energy, and both the value of reduced demand for energy and the delivery of multiple benefit outcomes, that are often greater in value than the value of avoided energy demand. These include: related productivity improvements in businesses; health and wellbeing improvements in households; reductions in public budgets; improved value in utilities; local environmental improvements; and macroeconomic gains. The IEA publication *Capturing the Multiple Benefits of Energy Efficiency* highlights how many of these multiple benefits are monetized, with case studies from successful energy efficiency policies and measures. *High relevance.*

Complementarity, synergies and integration attributes. Policies that act in an integrated way with other policies are able to achieve greater impact. Some policies offer strategic support and underwrite the performance of many other policies. For example: cost reflective pricing of energy and the transfer of energy subsidies to alternative means of social subsidy, create a strong price driver for all other energy efficiency policies and measures. The corollary of this effect is that policies that are implemented in isolation of an integrated strategy will underperform as they are often neutered by pre-existing conditions such as energy price subsidies reducing the incentive for consumers and undermine the returns available from policies and measures.

Policies and measures that operate on a global or regional basis meet this attribute by developing a critical mass of reinforcing demand for higher efficiency products. *High relevance.*

Political alignment, Governance and accountability attributes. To gain support in a countries wider policy programme and gain access to essential resources, any policy must be palatable to political leaders and respond to the prevailing policy priorities of a particular government. *High relevance.*

Marketability and market impact. All policies must convince a consumer or decision-maker that their interests are best served by investing in the proposed energy efficiency measure. Even regulations require a supporting marketing effort to inform suppliers and consumers about the policy, how they must comply, the implications of non-compliance, and the benefits of compliance. Few energy efficiency policies in use in any country have very effective marketing efforts, yet this ability to convince consumers is critical to achieving policy outcomes. Policies with a recognized

success at changing consumer perceptions, and those that capitalize on an already successful or global marketing effort will deliver better result than those with little or no marketing design. There is a strong need to increase the marketing capability and impact of energy efficiency policies and measures. *High relevance.*

Complexity of Policy. Both simple and complex policies are successful. An ability to be easily marketed and quickly implemented is desirable, suggesting that simplicity is a desirable attribute. Complexity in policy design can be offset against development time and speed to market. Best practices are typically developed over time through a continuous process of implementation, evaluation and improvement. The complexity of the policy itself is much less important than an ongoing cycle of sound implementation, evaluation and improvement. *Low relevance.*

Sectoral structure. This attribute is often used to tabulate and show the arrangement of measures. An alternative option is to allocate policies and measures into market segments, arranging programmes around decision makers: business shareholders, householders, Central government, municipal governments, etc. While useful for visualizing the balance of polices and measures across sectors: residential, industry, transport etc., this attribute offers little insight into the policies themselves or as a determinant of best practices. *Low relevance.*

Main institutional or underlying policy mechanisms. As with the sectoral structure attribute, this attribute can help define policy types, and is useful in design and evaluation of policies. Some governments may prefer some policy mechanisms or institutional arrangements. The policy mechanism is critical within these preferences and so this attribute is therefore really a function of political preference when seeking to use it as an attribute for selecting best practices. *High relevance and included within the political alignment attribute.*

Temporal – time to market impact. Both time to market and the timeliness of consumer responses is an important factor in policy selection. In the pace and pressures of government election cycles there is often pressure to show rapid results. This is important when initiating a new policy, but experience also shows that policies become best practices after they have evolved and only really deliver substantive results over time as they transform markets, investment decision and behaviors. *Medium relevance.*

Targets, Objectives, Potentials. Having clear objectives and targets is essential to motivating the various decision makers in an economy and being able to track progress. However these are part of the larger policy planning process (all polices should state the objectives and targets as a matter of course) and should be an inherent part of policies rather than attributes in themselves. *Relevant as a necessary planning and marketing tool but low relevance as an attribute of best practice.*

Implementation attributes. This is a diverse area. There are many operational and design elements that impact implementation, but these are inherently part of the marketing design of a policy and are already included in the marketing attribute above. *A relevant attribute included within the marketability attribute.*

Prioritization. In a country governance context, prioritization is espoused by the government. A *relevant attribute, included within the Political alignment, Governance and accountability attribute.*

A proposed taxonomy of policy selection attributes

Table 10 offers a set of policy attributes or selection criteria that can be used to assess the suitability of energy efficiency policies. By preparing this taxonomy of attributes, a set of policy qualities is defined that enable a deliberate identification of concrete policies and measures.

The rankings indicate the degree to which an attribute helps discern the value of a policy option in a framework. Attributes with high rankings are likely to be useful in identifying high performing

policies. Attributes with lower ranking may still be essential attributes, but are less valuable for discerning best policies.

Some attributes describe application or implementation characteristics. These are universal and necessary strategic attributes that must be considered in strategy development. These are universal and highly recommended for implementation, but less useful for discerning policy capabilities and identifying best policy options.

Table 10. Potential policy attributes for a structured menu of energy efficiency policies and measures

Framework Policy Attribute	What are the key qualities or features of this attribute?	Why is this quality important in developing a menu of policies and measures?	Relevance to discerning best practices
Potential for large energy demand reductions and significant multiple benefits	Cost effectiveness, Energy reduction impact, Multiple benefits: monetized social, health, and productivity outcomes.	This attribute indicates which policies and measures will have (all things being equal) highest impacts. N.B. Outcomes are very susceptible to local context and implementation.	High
Complementarity, synergies and integration attributes	Policies shown to integrate well with other national policies and international efforts in a strategic way to work together: global ISO and/or IEC Standards, ENERGY STAR, etc.	The performance of individual policies and measures improves significantly when integrated with complimentary regional, national, and international policies.	High
Political alignment, Governance and accountability attributes	Central government, Municipal government, Business shareholders / investors, Citizens / households, etc.	Ensures policies suit motivations. Indicates where accountabilities for resourcing and delivery lie.	High
	Prioritization and urgency. Some policies are precedents to others.	This attribute is unique to individual markets and therefore not that relevant in a general or regional context.	
Marketability and market impact: Government funding leverage and private sector involvement	Programmes with high market transformation impact and a proven capability to motivate consumers.	Policies that can be easily presented and are effective in convincing consumers to make energy efficient decisions have impact and drive investment.	High
	PPPs, ESCOs, etc. Minimal funding by government to reach critical mass and high leverage of government funding.	Leverage of business dynamics and private resources is important. The ability to motivate market based private funding is a key to success.	

Citizen engagement and empowerment	Interest groups, local initiatives.	Endorsement, legitimacy, acceptability and ease of implementation are all important market transformation attributes for consumers.	
Potential for technical and organizational innovation	Seizing a need for developing competitive products and services.	Porter hypothesis – policies that develop competitive advantage are a key market transformation and are best options.	
Temporal – time to market impact	The time to impact in a market can be important for energy technologies with short life cycles as well as demonstrating early results.	Once policies are established, normal evaluation and review cycles tend to respond to market dynamics.	Med
Complexity of Policy	Some policies have intensive processes to develop outputs e.g. Regulations require standards, consultation and enforcement.	Complexity is manageable and can be traded-off against timeliness and costs where a complex policy option is merited by its potential impact.	Low
Sectoral frame	Cross-sectoral, Utilities, Transport (Passenger, Freight), Industry, Small Medium Enterprises, Households, Services, Commercial, etc.	Helps develop balance across a country's sectors and helps ensure are inclusion of key sectors such as infrastructure and utilities. Naïve sector demarcations can also limit scope.	Low
Main institutional or underlying policy mechanisms	Policy mechanisms can be categorized into: i) coercive (mandatory or normative standards); ii) economic (e.g. tax breaks); iii) marketing and communication-based (e.g. labels).	Policy packages applying different mechanisms can reinforce each other and offer synergies, but the use of a particular mechanism does not imply or guarantee effectiveness.	Low
Targets, Objectives, Potentials	National targets for energy efficiency, Sectoral objectives, Operational e.g. (kWh/m ² -year).	Useful to engage stakeholders, generate a sense of purpose, and commitment.	Med
Implementation attributes	National strategies, policy design, implementation, compliance, management, evaluation.	These are essential and universal features of policy design, essential attributes rather than choice values.	Low

Four key attributes have been identified as having a high relevance to determining best practice policies. Best practice policies for energy efficiency will each have:

1. **Significant outcomes.** An ability to contribute to a large energy demand reduction and result in significant multiple benefits. Best practices are those policies that have demonstrated that they produce or are essential to delivering significant quantifiable outcomes.
2. **Complementarity,** synergies and integration attributes enable an easy fit with other national, regional and international efforts, ensuring ease of implementation and a supportive complementarity with other policies.
3. **Political alignment,** governance and accountability attributes help ensure policies are politically palatable and are likely to work in the multi-layer governance framework where national, regional and local governance influence effectiveness of policies and enable outcomes.
4. **Marketability** and market impact ensure policies can and will work in the global and local markets that supply energy efficient technologies, are attractive to decision-makers, and are likely to attract investment finance.

BEST POLICY PRACTICES FOR PROMOTING ENERGY EFFICIENCY

This publication is prepared in the framework of the United Nations Development Account project "Promoting Energy Efficiency Investments for Climate Change Mitigation and Sustainable Development", which is implemented jointly by all five UN Regional Commissions with UNECE as the lead agency. This publication highlights the best policy practices for promoting energy efficiency in UNECE region and beyond. The objective of the publication is to present a structured framework of policies and measures to promote energy efficiency investments for climate change mitigation and sustainable development, as well as to develop a menu of energy efficiency policies and measures.

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