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**Global Strategy to promote energy efficiency market  
formation**

**Submitted by UNECE**

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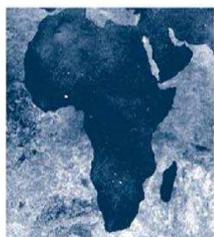


# Global Strategy to promote energy efficiency market formation

draft



- March 2011 -



ECONOLER



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## **ABBREVIATIONS AND ACRONYMS**

<b>BEEF</b>	<b>Bulgarian Energy Efficiency Fund</b>
<b>BMZ</b>	<b>Federal Ministry for Economic Cooperation and Development</b>
<b>CAMA</b>	<b>Canadian Appliance Manufacturers Association</b>
<b>CFC</b>	<b>Chlorofluorocarbon</b>
<b>CFL</b>	<b>Compact Fluorescent Lamp</b>
<b>CLASP</b>	<b>Collaborative Labeling and Appliance Standards Program</b>
<b>CSE</b>	<b>Committee on Sustainable Energy</b>
<b>CO<sub>2</sub></b>	<b>Carbon Dioxide</b>
<b>EBRD</b>	<b>European Bank for Reconstruction and Development</b>
<b>EC</b>	<b>Energy Conservation</b>
<b>ECA</b>	<b>Economic Commission for Africa</b>
<b>ECE</b>	<b>Economic Commission for Europe</b>
<b>ECLAC</b>	<b>Economic Commission for Latin America and the Caribbean</b>
<b>ECREEE</b>	<b>Regional Centre for Renewable Energy and Energy Efficiency</b>
<b>EE</b>	<b>Energy Efficiency</b>
<b>EE2000</b>	<b>Energy Efficiency 2000</b>
<b>EE 21</b>	<b>Energy Efficiency 21</b>
<b>EEIGGR</b>	<b>Energy Efficiency Improvements and Greenhouse Gas Reductions</b>
<b>EMCA</b>	<b>Energy Management Company Association</b>
<b>EPC</b>	<b>Energy Performance Contracting</b>
<b>ESCAP</b>	<b>Economic and Social Commission for Asia and Pacific</b>
<b>ESCO</b>	<b>Energy Service Company</b>
<b>ESCWA</b>	<b>Economic and Social Commission for West Asia</b>

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<b>FBI</b>	<b>Federal Building Initiative</b>
<b>FEEL</b>	<b>Financing Energy Efficiency Investments for Climate Change Mitigation</b>
<b>GEE21</b>	<b>Global Energy Efficiency 21</b>
<b>GEF</b>	<b>Global Environment Facility</b>
<b>GHG</b>	<b>Greenhouse Gas</b>
<b>GoC</b>	<b>Government of China</b>
<b>GIZ</b>	<b>Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation)</b>
<b>HVAC</b>	<b>Heating, Ventilation and Air Conditioning</b>
<b>IDB</b>	<b>Inter-American Development Bank</b>
<b>IEA</b>	<b>International Energy Agency</b>
<b>MEPS</b>	<b>Minimum Energy Performance Standards</b>
<b>NEEP</b>	<b>National Energy Efficiency Program</b>
<b>RC</b>	<b>Regional Commission</b>
<b>RCREEE</b>	<b>Regional Center for Renewable Energy and Energy Efficiency</b>
<b>RE</b>	<b>Renewable Energy</b>
<b>SA</b>	<b>South Africa</b>
<b>SAAEs</b>	<b>South African Association of Energy Services Companies</b>
<b>S&amp;L</b>	<b>Standards and Labels</b>
<b>UN</b>	<b>United Nations</b>
<b>UNDP</b>	<b>United Nations Development Programme</b>
<b>UNECA</b>	<b>United Nations Economic Commission for Africa</b>
<b>UNECE</b>	<b>United Nations Economic Commission for Europe</b>
<b>UNECLAC</b>	<b>United Nations Economic Commission for Latin America and the Caribbean</b>
<b>UNEP</b>	<b>United Nations Environment Programme</b>

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<b>UNESCAP</b>	<b>United Nations Economic and Social Commission for Asia and Pacific</b>
<b>UNESCWA</b>	<b>United Nations Economic and Social Commission for West Asia</b>
<b>WB</b>	<b>World Bank</b>

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## TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS .....	2
TABLE OF CONTENTS .....	5
EXECUTIVE SUMMARY .....	7
<b>1 INTRODUCTION .....</b>	<b>11</b>
<b>2 ENERGY EFFICIENCY MARKET CONDITIONS AND REGULATORY FRAMEWORK .....</b>	<b>13</b>
<b>2.1 EE Market Conditions.....</b>	<b>13</b>
2.1.1 The ECE Region.....	13
2.1.2 The ESCAP Region.....	14
2.1.3 The ECLAC Region.....	16
2.1.4 The ECA Region.....	17
2.1.5 The ESCWA Region.....	18
<b>2.2 Regulatory Framework.....</b>	<b>19</b>
2.2.1 The ECE Region.....	19
2.2.2 The ESCAP Region.....	20
2.2.3 The ECLAC Region.....	21
2.2.4 The ECA Region.....	21
2.2.5 The ESCWA Region.....	22
<b>3 ANALYSIS OF ENERGY EFFICIENCY MARKET FORMATION IN HIGH CARBON EMISSION-PRODUCING COUNTRIES FROM VARIOUS REGIONS .....</b>	<b>23</b>
<b>3.1 completed ee market formation programmes .....</b>	<b>23</b>
3.1.1 The ECE Region.....	23
3.1.2 The ESCAP Region.....	23
3.1.3 The ECLAC Region.....	25
3.1.4 The ECA Region.....	26
3.1.5 The ESCWA Region.....	27
<b>3.2 ongoing ee market formation programmes .....</b>	<b>28</b>
3.2.1 The ECE Region.....	28
3.2.2 The ESCAP Region.....	28
3.2.3 The ECLAC Region.....	29
3.2.4 The ECA Region.....	30
3.2.5 The ESCWA Region.....	30
<b>4 SPECIFIC INSTRUMENTS FOR IMPLEMENTING GLOBAL STRATEGY - UNECE EXPERIENCE.....</b>	<b>32</b>
<b>4.1 UNECE instruments at Regional level.....</b>	<b>32</b>
4.1.1 Information Campaigns.....	32
4.1.2 Capacity Building .....	32
4.1.3 Internet Resources .....	33

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4.1.4	EE Regulatory and Policy Reforms .....	33
4.1.5	EE Dedicated Fund .....	34
4.2	National level .....	34
5	<b>PROSPECT FOR GLOBAL STRATEGY IMPLEMENTATION IN THE REGION .....</b>	<b>35</b>
5.1	Global strategic approach .....	35
5.1.1	Thematic programmes .....	35
5.1.2	Cross Cutting Programmes .....	36
5.1.3	RCs Institutional structure .....	36
5.2	Recommandations for UN RC Action Plan .....	37
5.2.1	The ESCAP Region .....	37
5.2.2	The ECLAC Region .....	38
5.2.3	The ECA Region .....	40
5.2.4	The ESCWA Region .....	41
6	<b>CONCLUSION.....</b>	<b>44</b>
6.1	Key Rekommandations .....	44
6.2	The Next Steps Towards Promoting EE Market Formation in the UN Regional Commissions.....	45
	<b>REFERENCES .....</b>	<b>46</b>
	<b>APPENDIX 1: DESCRIPTION OF SELECTED NATIONAL EE POLICIES IN GERMANY.....</b>	<b>1</b>

#### LIST OF TABLES

Table 1:	Summary of Rekommandations .....	9
Table 2:	EE Legislation in the ECE Region .....	19
Table 3:	EE Legislation in the ESCAP Region .....	20
Table 4:	National legislation for EE in the ECLAC Region.....	21
Table 6:	National legislation for EE in the ESCWA Region.....	22
Table 7:	EE Barriers in the ESCAP Region .....	37
Table 8:	Rekommandations for ESCAP Region .....	38
Table 9:	EE Barriers in the ECLAC Region .....	39
Table 10:	Rekommandations for ECLAC Region .....	39
Table 11:	EE Barriers in ECA Region Member States.....	40
Table 12:	Rekommandations for ECA Region.....	41
Table 13:	EE Barriers in ESCWA Region Member States.....	42
Table 14:	Rekommandations for ESCWA Region .....	42

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## EXECUTIVE SUMMARY

The present report is a draft global strategy to promote market formation and self-financing Energy Efficiency (EE) improvements for implementation through the Regional Commissions (RCs) of the United Nations (UN) system. These are the United Nations Commissions for Europe, the United Nations Economic Commission for Africa (UNECA), the United Nations Economic Commission for Latin America and the Caribbean (UNECLAC), the United Nations Economic and Social Commission for Asia and Pacific (UNESCAP) and the United Nations Economic and Social Commission for West Asia (UNESCWA). The objectives of the current draft global strategy to promote EE market formation are to (i) give an overview and analysis of EE policies and market development in the various UN RCs and (ii) recommend instruments for implementation to scale up EE development in the UN RCs through collaborative measures that the United Nations Economic Commission for Europe (UNECE) and the RCs can undertake.

### **EE Market Conditions and Regulatory Framework**

In the recent years, both developed and developing countries have paid greater attention to improving EE because of the rising prices of electricity and the growing demand for finite and diminishing fossil fuel resources. To date, EE has now become one of the priority fields in the energy, economic and climate policies of many countries within the RCs. In fact, an overview of the EE market in the RCs shows that it is mature in developed economies across the RCs (e.g., Japan, Western European countries, Canada, the US). In these economies, the EE market is dominated by energy-efficient technologies and sustainable EE services (supply and demand) because of the specific EE policy and regulatory instruments developed and implemented. These instruments include awareness raising, information campaigns and capacity building of EE experts, financial institution staff and government officials. Moreover, the current policy and regulatory framework in place fosters the development and introduction of more efficient technologies. Furthermore, economies in transition (particularly Eastern European countries, most Asian countries and Latin America countries) have established an EE market which is growing because the governments of these countries have coupled their national initiatives with sub-regional, regional and international cooperation initiatives in the field of EE. However, in some countries, the regulatory and policy framework for EE market formation has not been developed and implemented yet. For example, these countries do not have a dedicated EE legislation. As a result, such economies, which are the least developed, need to take actions, with the technical support of international cooperation, to create the conditions conducive to EE market development.

Although potential EE benefits in terms of lower energy costs, enhanced energy security and reduced environmental impacts are widely understood, several barriers still prevent countries within the RCs to scale up EE project investments.

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## **Barriers to EE in the UN RCs**

Needless to say, barriers to the development of EE vary from one region to another. However, the main barriers mentioned by EE experts in their discussion during the international EE forum<sup>1</sup> include legislative and regulatory barriers, lack of economic incentives, existing fossil fuel subsidies, artificially low energy tariffs and the relatively small size of individual projects, which limits the interest of beneficiaries<sup>2</sup>. Additional barriers stated by EE experts include lack of local capacity in preparing project proposals up to market standards, financier requirements, lack of interest and knowledge in the banking community in financing EE projects and lack of awareness among businesses about the benefits of implementing EE measures. The relative importance of each barrier varies greatly from one region to another.

## **Recommendations**

The following recommendations are important and easily implementable in order to achieve short term effects.

At a global level, it is recommended to undertake EE activities in the scope of suggested thematic EE programmes which are awareness raising, institutional framework, intermediaries, financing and cross-cutting programmes (capacity building).

It is also recommended that the UN RCs consider the inclusion in their organizational structure of an EE specific task force or committee that will serve as an efficient vehicle to carry out the projects and programmes and to assist member countries in their efforts to implement various activities EE market formation and development. The ECE region has already made a step in the right direction with the creation of the Steering Committee of the Energy Efficiency 21 project within the Committee on Sustainable Energy which initiates and implements EE projects or programmes and assists ECE member countries in their efforts to develop their EE market. The UN ESCAP has established an AD Hoc Expert Group on End Use Energy Efficiency toward promotion of a Sustainable Energy Future within its Environment and Development Division. Also, the ECLAC region has recently launched<sup>3</sup> a similar initiative through the ongoing Regional Policy Dialog on Energy Efficiency in Latin America and the Caribbean. The main objective of the Regional Policy dialog is to strengthen the institutional, technical and regulatory Latin American and Caribbean countries to implement national energy efficiency programs through cooperation, exchange and intra-regional dialogue with other regions. Hence, the other RCs can draw lessons from the experience<sup>4</sup> of the ECE and ESCAP regions in this regard.

We would also recommend the creation of a network between the RCs in order to encourage exchange of information and views in the field of EE promotion.

At a regional level, a number of specific initiatives are recommended for the replication of the UNECE experience with regard to EE market formation under the Financing Energy Efficiency

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<sup>1</sup> The International EE Forum took place in Astana, Kazakhstan on September 28-30, 2010. It was organised jointly by the Government of Kazakhstan, UNECE, ESCAP, the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP).

<sup>2</sup> The barriers mentioned in this section are taken from the forum summary report at [http://www.unescap.org/esd/Energy-Security-and-Water-Resources/energy/efficiency/2010/IEEF/documents/AstanaForumFinalDoc\\_e.pdf](http://www.unescap.org/esd/Energy-Security-and-Water-Resources/energy/efficiency/2010/IEEF/documents/AstanaForumFinalDoc_e.pdf)

<sup>3</sup> The first regional policy dialog was held in November 2010 in Santiago, Chile.

<sup>4</sup> The Committee on Sustainable Energy has already been active in the field of EE for at least one decade

Investments for Climate Change Mitigation (FEEI) project, within UNECA, UNECLAC, UNESCAP and UNESCWA. The recommendations are summarised in [Table 1](#), below:

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**Table 1: Summary of Recommendations<sup>5</sup>**

Recommendations	ECA	ECLAC	ESCAP	ESCWA
Identify and present EE benefits in terms of socio-economic benefits	▲	▲	▲	▲
Initiate capacity building programmes for human resources (EE experts, bank staff, government officials and senior decision makers)	▲	-	-	-
Reinforce capacity building efforts for human resources (EE experts, bank staff, government officials and senior decision makers)	-	▲	▲	▲
Initiate information dissemination campaigns	▲	-	-	-
Scale up information dissemination campaigns	-	▲	▲	▲
Continue efforts to strengthen the EE regulatory, institutional and policy framework in member states	▲	▲	▲	▲
Encourage and strengthen international, regional and sub-regional cooperation	▲	▲	▲	▲
Continue efforts to establish an EE-dedicated fund	▲	▲ <sup>6</sup>	▲	▲

Some of the recommendations relate to activities which are already underway or considered by the given UN RC. However, they are recommended with a particular need to continue, increase or scale up their level due to their key role in EE market formation. Given the fact that there is still much to do in this respect, the report recommends a continuation of the efforts to help reform policies in RC member states.

It is important noting that the report has not made specific recommendations related to technology transfer and tariff management. In fact, technology transfer is a long term measure. It is therefore important to put an emphasis on the widespread utilization of existing energy efficient technologies in order to achieve short term energy efficiency goals. Moreover, tariff management should not be a focus for RCs because this issue is complex and is out of the scope of UN RCs jurisdiction in promoting energy efficiency market promotion within country members. This should be left to each country to deal with according to its realities. The RCs can advise and build the capacity of policy

<sup>5</sup> ▲ = Recommended

<sup>6</sup> Activities are already underway to establish a regional EE fund.

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makers in energy tariff policy formulation and implementation, but it should not be imposed to the country members. However, the report does not intend to minimize their importance in promoting EE market formation.

### **The Next Steps**

Active pursuit of EE market formation still lags behind in many countries within the UN RCs despite their recognition of the important of EE measures in sustaining economic growth. Regarding how to move forward it is important that each UN RC considers the following steps:

- First, create a network between the RCs in order to encourage exchange of information and views in the field of EE promotion.
- Second, gain a better understanding of the current EE institutional and policy framework within its member countries.
- Third, there is a need to assess EE benefits and present them in term of socio-economic benefits for the country. This is vital as parliamentarians or policy-makers need to see the contribution of energy efficiency to socio-economic development more clearly to provide sufficient funding and political support.
- Fourth, there is a need to establish an EE expert group within the UN RCs where this group is not yet established. While, there is a need to reinforce the capacity of existing expert groups in the UN RCs where this group already exists. Based on their understanding of the current EE framework and on the recommendations presented in the present report, the said EE expert group, which is comprised of the country members' representatives, will identify the gap and draw a concrete action plan for accelerating EE market formation in the region.
- Last, the UN RC and the member countries national governments will jointly implement the action plan for scaling up EE market formation at a regional and national level.

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# 1 INTRODUCTION

It is clear that government officials in many countries are increasingly aware of the necessity to make better use of their energy resources because of the rapid growing energy demand and climate change challenges that they face. In fact, EE has been an issue of higher importance at the recent meetings of G8 Heads of State (from Gleneagles in 2005 to Muskoka in 2010) during which they reaffirmed the critical role that improved EE can play in addressing energy security, environmental and economic objectives. In addition, the International Energy Agency (IEA) proved that EE improvements led to savings in energy consumption and Carbon Dioxide (CO<sub>2</sub>) emissions between 1973 and 2005 for a group of 11 of its member states (IEA 11). Without the EE improvements that occurred between 1973 and 2005, energy use in the IEA11 would have been 58% (or 59 EJ) higher in 2005 than it actually was<sup>7</sup>.

There is a wide international consensus on how the promotion of EE at a larger scale can make a difference in revolutionising the way that energy is supplied and used. Currently, the concept of EE improvement is the most economic and readily available means used to increase energy security and reduce Greenhouse Gas (GHG) emissions. In fact, EE leads to more energy services, which include lighting, production, transport and heat, per unit of energy input (electricity, fuel, etc.). In addition, EE promotion yields important benefits such as increased energy security, reduced energy costs and lower environmental impacts.

Current policy initiatives for the promotion of EE vary across the various UN regions of the world (e.g., ECA, ECE, ECLAC, ESCAP and ESCWA). A description of the main initiatives in each region mentioned above can be found in the following chapters. Some countries, specifically ECE member countries, seem to have developed successful regional initiatives such as the Energy Efficiency 21 (EE21) programme. The latter aims at assisting economies in transition to develop and promote sustainable energy policies, pursue EE strategies, reduce GHG emissions in order to meet international environmental treaty obligations under the UNFCCC and enhancing the security of energy supplies. The Global Energy Efficiency (GEE21) project was proposed in September 2008 to the UN Secretary General at the UN System Regional Commissions Retreat in Torino by all Executive Secretaries and formally adopted in the inter-regional programme of work. In November 2008, following the positive impact of EE 21, the UNECE Committee on Sustainable Energy mandated the Global Energy Efficiency 21 (GEE 21) project to transfer the experience of the EE projects in the Economic Commission for Europe (ECE) region to the following regions: Economic Commission for Africa (ECA), Economic Commission for Latin America and the Caribbean (ECLAC), Economic and Social Commission for Asia and Pacific (ESCAP) and Economic and Social Commission for West Asia (ESCWA).

The current report analyses the current EE situation in all regions and gives recommendations on how to enhance EE in these regions. The report does not focus on Renewable Energy (RE) as part of the supply side management because this is out of the scope of the terms of reference. However, it has covered domestic solar water heater technologies as they are considered demand side management resources. Chapter 2 of the report provides an overview of EE market conditions in the RCs and analyses the policy and regulatory framework. In addition, Chapter 3 analyses past and ongoing EE market formation activities in the RCs. Chapter 4 describes the specific

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<sup>7</sup> IEA, 2008, "Worldwide Trends in Energy Use and Efficiency," p.26.

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instruments used by UNECE for implementing global EE. Finally, Chapter 5 provides recommendations for the successful replication of UNECE valuable experience in other RCs.

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## 2 ENERGY EFFICIENCY MARKET CONDITIONS AND REGULATORY FRAMEWORK

### 2.1 EE MARKET CONDITIONS

This section highlights EE market developments in the UN RCs. In addition, it also describes the EE market conditions prevailing in selected countries of each region. Furthermore, it presents the main product, service and technology companies in said countries.

#### 2.1.1 The ECE Region

The EE market in the ECE region, particularly Western European countries, is considered to be matured or on the way to becoming mature. However, the EE market in the ECE region as a whole varies greatly from one country to another based on the level of development. These countries can be divided into two groups depending on the development stage of their EE market: Western European and North American countries on the one hand and Eastern European and Central Asian countries on the other.

Because the governments of ECE member states, particularly Western European and North American countries, provide EE market enabling measures, businesses and consumers in Western European and North American countries are investing in EE projects in all economic sectors. These measures include setting minimum standards and code requirements, establishing rating systems and providing financing and training for EE market players and energy end-users. As a result, homeowners are retrofitting their homes in record numbers. In the commercial and residential sectors, renovations include the installation of insulation materials, energy-efficient windows and doors as well as other materials which increase EE. In the industrial sector, EE promotion includes the manufacture, purchase and use of more efficient industrial equipment such as motors, pumps, transformers, compressors, boilers and lighting technologies.

For instance, in Canada, under the Canadian Industry Program for Energy Conservation, industries have access to financial incentives for energy retrofit projects, energy assessments, energy management workshops and toolkits, technical information and calculators. In the residential sector, utilities and state programmes offer rebates and incentives for selected Energy Star qualified products. As a result, the Canadian market share from 2003 to 2010 of Energy Star labelled refrigerators, automatic washers and dishwashers significantly increased from 37% to 58%, 24% to 69% and 49% to 96%, respectively<sup>8</sup>. Another important initiative that has promoted EE in Canada is the Leadership in Energy and Environmental Design (LEED) programme in buildings. LEED is a green building rating system, based on a collection of standards in multiple categories including sustainable sites, water efficiency, energy and atmosphere, material & resources and indoor environmental quality. For example, over the last six years (2004 to 2010), the number of LEED-certified projects in Canada has gone up from 20 to 320<sup>9</sup>.

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<sup>8</sup> Canadian Appliance Manufacturers Association (CAMA), **Annual Energy Star data 2003-2010**.

<sup>9</sup> [http://www.dtzbarnicke.com/client/JJB/JJB\\_LP4W\\_LND\\_WebStation.nsf/resources/2010+Market+Reports/\\$file/GreenBuildingTrends\\_Q4-2010.pdf](http://www.dtzbarnicke.com/client/JJB/JJB_LP4W_LND_WebStation.nsf/resources/2010+Market+Reports/$file/GreenBuildingTrends_Q4-2010.pdf)

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Likewise, the use of Energy Performance Contracting (EPC), as practiced by Energy Service Companies (ESCOs), has grown rapidly in Canada. The EPC concept was first introduced in the early 1980s after the oil price shock of the early 1970s. As of 2011, eight ESCOs are qualified under the Federal Building Initiative (FBI) programme. They include Ameresco Canada Inc., Direct Energy Business Services Limited, Ecosystem, Honeywell Limited, Johnson Controls L.P., MCW Building Technologies Ltd. and Trane Canada. To date, there have been over 86 retrofit projects under the FBI, attracting CAD 320 million in private sector investments and generating over CAD 43 million in annual energy cost savings. These FBI projects have demonstrated on average energy savings of 15%-20% and have also helped reduce the impact of operations on the environment, cutting GHG emissions by 285 kilotons<sup>10</sup>.

On the other hand, Kazakhstan has a high energy intensity and not much has been done so far to address the problem. Notably, the energy intensity of the residential sector has increased by 90% since 1997. Furthermore, a recent publication by UNESCAP indicated that the residential sector is registering considerable heat loss (approximately 50% to 60% higher than in developed countries)<sup>11</sup>. Furthermore, there are no ESCOs operating in Kazakhstan at this time. On a brighter note, a number of initiatives are now underway to create an EE market in the country (details of the initiatives are given in Chapter 3 of this report).

The energy efficiency context of the ECE region is difficult to portray due to the various levels of development of the EE market. For instance, in Croatia, there is significant potential to improve EE in buildings (e.g., commercial, institutional and industrial sectors). A strong EPC market is currently in development with the presence of two main ESCOs operating in the country, including a national utility that has been performing extremely well over the last eight years.

Although some countries are considerably more advanced than others in the region, the potential for more EE initiatives remains high in each country where potential benefits and market driven activities have gone unnoticed.

### 2.1.2 The ESCAP Region

ESCAP countries have undertaken consistent efforts to create and sustain their EE market. Therefore, markets have been opened for EE appliances and equipment. Furthermore, over the past several years, the EPC concept has become a better-known business model in many countries to assist building and industrial owners and managers in optimising energy use. At the same time, builders within the region have quickly adopted green building certification programmes and other tools for improving the efficiency and mitigating the environmental impacts of commercial buildings.

In China, the economy has gone through an unprecedented era of growth, which has boosted the energy demand and increased pollution from coal use. China's energy consumption has been steadily rising over the past nine years and is expected to continue to soar. The Government of China (GoC) has undertaken to build strong infrastructures to create enabling EE market development conditions. In addition, the 11th Five-Year Plan of the GoC had set a goal of reducing

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<sup>10</sup> <http://oee.nrcan.gc.ca/communities-government/buildings/federal/federal-buildings-initiative.cfm>

<sup>11</sup> UNESCAP, *Promotion of Energy Efficiency in Industry and Financing of Investments*, Part 4 at <http://www.unescap.org/esd/energy/publications/finance/index.html>,

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energy consumption per unit of GDP by 20% before the year 2010.<sup>12</sup> As a result, with support from the international community, the GoC opened a market for EE technologies (e.g., household appliances, lighting products and industrial electric equipment) by implementing a series of Minimum Energy Performance Standards (MEPS). The GoC has also expanded the coverage of its voluntary energy efficiency label to over 40 products, including residential, commercial and selected industrial products. Furthermore, the Chinese electric equipment market is dominated by local manufacturers who also export EE technologies in other countries. An impact assessment conducted by the Collaborative Labeling and Appliance Standards Program (CLASP) indicated that the standards and labels programmes currently in place in China are expected to save a total of 1,143 TWh by 2020, or 9% of the cumulative consumption of residential electricity to that year<sup>13</sup>. Moreover, the EPC concept was first introduced in 1998 in China. The Energy Management Companies Association was founded in April 2004 and its number of registered ESCOs has been growing impressively since then. At the present time, ESCOs in China develop different types of EPC concepts including shared savings and guaranteed savings. Additionally, they outsource energy management and represent one of the most important drivers of the EE market in the country.

Likewise, Thailand has set goals to improve energy intensity by 25% across all sectors by 2030, compared to 2005. Consequently, the Government of Thailand has created a market for EE technologies including household appliances, lighting products and electric motors. Sanyo Universal Electric of Thailand, Toshiba, National Mitsubishi and Hitachi all manufacture and market energy-efficient products in Thailand. In addition, the EPC business, which was introduced in 1999, has grown and was reinforced in 2008 with the creation of a USD 35 million ESCO Fund to promote investments in energy conservation and alternative energies as well as to facilitate the development of the carbon market. These EE investment projects target factories and commercial buildings. As of April 2010, the EE investment projects financed under the ESCO Fund had resulted in energy savings of 32 ktoe/year and USD 18 million per year in energy savings<sup>14</sup>. To date, there are around 24 ESCOs operating in the country registered with the national ESCO association (Thai ESCOs). Since 2001, the market has reached a stage where EPC is accepted by customers, ESCOs and banks.

In Australia, the government has created enabling conditions for a sustainable EE market through the implementation of a favourable legislative and policy framework. The EPC concept was introduced in the country in the late 1990s. To date, ESCOs operating in Australia are mainly constituted of equipment suppliers and control companies with some participation from utilities and independent ESCOs. Key players include Honeywell, AGL, Energy Conservation Systems, Total Energy Systems and Dalkia. ESCOs in Australia provide a full range of engineering solutions to cut back on energy and water consumption. Moreover, EE market conditions were reinforced in 2006 with the coming into force of the Energy Efficiency Opportunities Act (EEO). The EEO aims to stimulate the business sector to take on a more rigorous approach to energy use and energy efficiency by addressing information failures and the organisational barriers to identifying and implementing cost-effective improvements. Furthermore, there is an established market for energy-efficient products ranging from household appliances to industrial equipment such as boilers,

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<sup>12</sup> <http://www.efchina.org/FNewsroom.do?act=detail&newsTypeld=1&id=4>

<sup>13</sup> CLASP, 2007, **Impacts of China's Current Appliance Standards and Labeling Program to 2020**, p. 68.

<sup>14</sup> Prasert Sinsukprasert, **Financing Energy Efficiency and Renewable Energy: Thailand's ENCON Fund**, Presentation at the International Energy Efficiency Forum, Astana, KAZAKHSTAN, September 27-30, 2010.

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electric motors, etc. Manufacturers such as Whirlpool Australia and Electrolux market their products in Australia.

### 2.1.3 The ECLAC Region

According to a report<sup>15</sup> released in 2008 by the Inter-American Development Bank (IDB), Latin American and Caribbean countries could save an estimated USD 36 billion or 143,000 GWh over the next decade by adopting affordable and available technologies to improve their EE. Such savings would represent only 10% of total energy consumption over the next decade. EE improvements would request an investment of about USD 16 billion. The same report indicates that in the event where the ECLAC region does not increase its EE level, it will need to spend around USD 53 billion to build the equivalent of 328 gas-powered open cycle generators (250 MW each) necessary to produce the same 143,000 GWh of power. The figures above indicate that the EE potential is huge and mainly untapped in the region. In the same way, one of the important lessons learned from a study conducted by the ECLAC region is that the market for ESCOs remains underdeveloped<sup>16</sup>, limiting the potential important role of intermediaries. The capability of tapping this tremendous EE potential depends on existing market conditions, which vary widely based on the level of industrialisation from one country to another. Therefore, the Latin America and the Caribbean region can be divided into two groups which include, on the one hand, countries where the EE services market exists and, on the other, countries where certain EE market actors such as ESCOs are not yet established, which somehow represents their level of EE development.

For instance, since the mid-1990s in Brazil, the presence of a unique fund called the ANEEL fund has been a major driver in the introduction and implementation of EE projects around the country. Financed through an obligation by electric utilities to invest a small percentage (less than 0.5%) of their earnings in EE activities, it has stimulated the development of many intermediaries that have not been driving the EE market in the country. This has also led to greater activity on the part of engineering companies in EE and increased efforts by energy-efficient equipment manufacturers. The EE services sector has rapidly expanded. As a matter of fact, the Brazilian ESCO Association, which was founded in 1997, currently totals 75 associate entities versus 15 in 1997. In addition, subsidiaries of large companies such as Johnson Controls, Siemens Building Systems and many others are active in manufacturing and marketing their EE equipment in Brazil. Among many others, adjustable speed drives as well as energy-efficient Heating, Ventilation and Air Conditioning (HVAC) equipment, lighting and electric motors can be found in the market, which has been opened since the introduction of labels and MEPS in 1984.

As another example, Chile's economy is based on energy-intensive industries, particularly copper mining, pulp and paper, textiles and food processing. Generally, as has happened in other countries, the systematic, structured quest for energy efficiency in Chile was spurred by the actual needs of the country, in which insufficient electrical supply and a pronounced dependence on oil and gas played an important role. As a result, industries are under pressure to reduce production costs, part of which results from the consumption of expensive electricity. In the same way, as is the case in Brazil, EE technologies are available on the Chilean market. International energy-efficient lamp manufacturers such as Philips, General Electric, Osram, Sylvania as well as various

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<sup>15</sup> IDB, 2008, "How to save up to \$36 billion without turning off the light."

<sup>16</sup> ECLAC, 2010, **EE in LAC: Situation and Outlook**, p. 11.

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Asian manufacturers sell CFLs in Chile. In addition, electric motor manufacturers such as ABB, General Electric, WEG and other Chinese manufacturers sell motors in the country. However, it is worth noting that the presence of energy-efficient equipment on the market started in the year 2000 with the introduction of labels and MEPS. One important fact regarding Chilean energy efficiency programmes is that despite the attempts to improve energy efficiency, they neither have been long-lasting nor have they had major impacts. Another important fact pertaining to Chile is that the initiatives designed to improve energy efficiency are solely based on international cooperation. As a consequence, considering that such cooperation is subject to very precise time and funding limits, when international cooperation projects end, they leave no structure in place to carry on their efforts<sup>17</sup>. In summary, there is a need to reform the EE framework in Chile to support and reinforce the establishment of a sustainable EE market.

In the Caribbean, the EE market is still at the early stage of its development, if not inexistent. However, the EE technology market is dominated by solar water heaters, which are manufactured locally. Some examples include Solar Dynamics Limited and Aqua Sol Limited, which are the leading solar water heating companies in Barbados and which have expanded operations in Saint Lucia. Moreover, Isratech Limited is a leading solar water heating company in Jamaica. There are at least three other companies involved in solar water heating in Jamaica. Nevertheless, we can say that even though in the majority of countries the high cost of energy should stimulate the EE market, there is no real such commercially significant EE market in most countries. In fact, considerable work remains to be done in terms of legal framework, awareness and the creation of active intermediaries.

#### 2.1.4 The ECA Region

The EE market in the ECA region is characterised by a large potential in the industrial, commercial and residential sectors. However, the EE situation varies depending on the level of industrialisation from one country to another.

For example, in South Africa (SA) and Tunisia, energy-efficient lighting technologies and solar water heaters are manufactured locally and distributed on the local market. Major lighting technology manufacturers such as Philips have started building factories (e.g., Lesotho) to produce CFLs locally. Some of the main companies active in solar water heater technologies in SA are Budget Solar (Pty) Ltd., Solar Geysers, Atlantic Solar, Gosolar, Genersys South Africa, etc. These companies are specialised in the manufacturing, wholesale supply, export and import of solar water heating systems, evacuated tube and flat plate solar collectors and solar water heating system components. Many ESCOs are currently operating in South Africa. There is an association of ESCOs known as the South African Association of Energy Services Companies (SAAEs) which comprises corporate members that have the ability to develop and implement energy management projects involving technologies and services. SAAEs also comprises nine associate members which have the capability to supply energy management technologies and services. These members include trade associations, equipment suppliers or service providers. However, the EPC concept is not as widespread in South Africa as it is in Europe and North America. The first contract using the EPC approach was signed in March 2010 between the city of Johannesburg and a local ESCO.

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<sup>17</sup> ECLAC, 2010, **EE in LAC: Situation and Outlook**, p. 72.

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Even though there have been initiatives to create enabling conditions for the development of an EE market, there is too much to do to sustain the market. In fact, the Government of Tunisia has introduced mandatory minimum energy performance Standards and Labels (S&L) for refrigerators. According to CLASP, the introduction of S&L for air conditioners<sup>18</sup> is being considered. Furthermore, in July 2010 in Tunisia, there were only three ESCOs in operation. It is worth noting that ten ESCOs are registered at the National Agency for Energy Conservation. Standard new efficient equipment such as variable speed drives, efficient lighting, controls, combined with thermal efficient measures, constitute most of the technologies offered by Tunisian ESCOs. The main EE technologies that are likely to be utilised are energy-efficient burners and boilers, variable speed drives, high-efficiency motors, power factor improvements, compressors, controls, steam, and heat recovery devices.

The situation is somewhat similar in most Sub-Saharan African countries, except in SA. Low-quality and energy-inefficient technologies dominate the market. For example, in Côte d'Ivoire, Benin and Togo there is no efficient lighting technology manufacturer. Moreover, all lighting products in the country are imported. There is a number of small local ESCOs operating in countries of Sub-Saharan Africa (e.g., Côte d'Ivoire and Kenya). However, ESCOs are still suffering from the major financial barriers that impede the development of the ESCO industry, which is currently limited to offering EE services such as energy auditing and feasibility studies.

### 2.1.5 The ESCWA Region

Although EE improvement is regarded as an important means to stabilise the energy balance of West Asian countries, the EE market is still at an early stage.

In Egypt, the EE targets that the government has adopted to be achieved by the year 2022 correspond to 20% of the final consumption of 2008. Industry has the highest efficiency potential representing approximately twice that of the transport and residential/commercial sectors, respectively. Therefore, the government deployed efforts to stimulate the promotion of EE in the country. These efforts include the introduction of standards for solar water heating systems (in 1987). This was reinforced in 2007 with new standards covering test methods for solar collectors, outdoor test methods for the performance characterisation of solar heating systems and yearly predictions of solar-only systems. In addition, mandatory S&L were introduced for household appliances.

Moreover, under the Energy Efficiency Improvements and Greenhouse Gas Reductions (EEIGGR) (2005-2009) project implemented with the assistance of international cooperation, Egypt has established ESCOs to provide advice in EE and financing. These ESCOs boast the following expertise: utilities, equipment supply, electro-mechanical contracting and consultancy. The EEIGGR project has also drafted EE codes for residential and commercial buildings. To date, the draft EE codes have neither been adopted nor promulgated by the government. In summary, despite the efforts described above, the EE market has not yet taken off in Egypt as it is still facing significant market barriers such as subsidised energy tariffs and an inadequate EE framework.

In Jordan, there is still much to do to promote an EE market. For instance, there has not been any initiative yet to stimulate EE in public buildings. However, there have been initiatives to introduce

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<sup>18</sup> <http://www.clasponline.org/index.php>

EE in the private sector. In fact, ESCOs are private sector firms whose mission is to develop and implement EE investments and projects at energy end-user facilities. Currently, there are four ESCOs identified in Jordan. They include Energy Management Services (EMS), Green Tech, Eco Sol and Terra Vertis. However, their activities have not developed because of significant barriers, such as lack of technical capacities to develop and implement EE projects, lack of capacity to monitor and verify energy savings and lack of awareness about EE benefits on the part of facility owners and managers. The EE technology market is dominated by HVAC and lighting equipment. HVAC equipment suppliers of split systems are seen everywhere: Carrier, Trane, York, Mitsubishi, LG, Daikin, etc. Even Daikin's variable refrigerant volume technology is available on the market. In addition, there are companies that design centralised building control systems. Johnson Controls and Honeywell products have been identified on the market but these components are assembled in control panels bearing the brand of local control companies. The market is also characterised by the availability of thermal system equipment suppliers. The main suppliers of condensing boilers and solar water heaters are Viessmann and De Dietrich, which is represented by the Izzat Marji group.

## 2.2 REGULATORY FRAMEWORK

### 2.2.1 The ECE Region

In general, although the progress made has not been uniform across the region, most ECE member states have implemented legal frameworks favouring EE improvements in a variety of sectors. Additionally, some countries have put in place national EE funds. On the other hand, their level of implementation and success varies considerably. Table 2 below summarises the legislation in ECE countries. It is worth noting that several changes have happened since then.

**Table 2: EE Legislation in the ECE Region<sup>19</sup>**

EE Framework	Legislative and Regulatory Instruments	Countries
Dedicated legislation for EE	Dedicated primary and secondary legislation	EU-27, Canada, Iceland, Israel, Kyrgyzstan, Norway, Switzerland, USA
	Dedicated regulation but partial implementation or lack of secondary legislation	Albania, Azerbaijan, Moldova, Russian Federation, Turkey
	Regulatory provisions from other frameworks but no dedicated legislation	Armenia, Belarus, Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro, Serbia, Uzbekistan
	Regulation currently under development	Georgia, Kazakhstan, Tajikistan, Turkmenistan, Ukraine
Availability of	Yes	EU-27, Armenia, Canada, Croatia, Iceland, Israel,

<sup>19</sup> Source: UNECE, 2010, "Financing Global Climate Change Mitigation"

national EE funds		Norway, Switzerland, USA
	Partially established or very limited	Kyrgyzstan, FYR Macedonia, Moldova, Serbia, Ukraine
	No	Albania, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Montenegro, Russian Federation, Tajikistan, Turkmenistan, Turkey, Uzbekistan

The specific instrument provisions under the EE laws are detailed in Chapter 4 of the current report.

## 2.2.2 The ESCAP Region

As they recognise its importance and benefits, a large number of ESCAP member countries have already implemented legislation to promote EE, as shown in the table below.

**Table 3: EE Legislation in the ESCAP Region<sup>20</sup>**

Dedicated EE Legislation	Countries
Dedicated primary legislation	Armenia, Azerbaijan, Australia, China, Japan, India, Indonesia, Kazakhstan, Kyrgyzstan, Malaysia Netherlands, New Zealand, Philippines, Republic of Korea, Russian Federation, Singapore, , Tajikistan, Thailand, Turkey, Uzbekistan
Dedicated secondary legislation (Policies, guidelines, or decrees)	Kazakhstan, Tajikistan, Uzbekistan, India, Nepal, Sri Lanka, Cambodia, Indonesia, Philippines, Singapore, Thailand, Bangladesh, Brunei Darussalam, Cambodia, Fiji, Indonesia, Malaysia, Marshall Islands, Mongolia, Palau, Papua New Guinea, Samoa, Vietnam
Dedicated legislation to be approved	Georgia, Kazakhstan, Russian Federation, Pakistan
No legislation	Turkmenistan, Bhutan, Maldives, Myanmar

The situation varies in the region with regard to policy implementation to encourage EE market formation. While countries like Japan, Australia and China have shown considerable progress in the development and implementation of EE policies and measures, other countries, such as Bangladesh, lack EE policy measures.

For instance, Japan has implemented policies which target all economic sectors including buildings, appliances, lighting, transportation, industries and utilities. Unlike Japan, other low-income countries such as Bangladesh have not taken any initiatives to tap their EE potential. However, the energy policy drafted in 2008 contains policy instruments that address EE. They include standards for lighting technologies, appliances and industrial equipment (e.g., motors). Moreover, the draft policy contains exemptions of tax and duty for importing materials used to produce energy-efficient appliances.

<sup>20</sup> Author's compilation from *UNECE, 2010, "Financing Global Climate Change Mitigation"* and *ESCAP, 2010, "Assessment Report on Energy Efficiency Institutional Arrangements in Asia"*

### 2.2.3 The ECLAC Region

As in other UN regional commissions, the EE legislative framework is diverse in ECLAC member countries. The table below presents the EE law situation in ECLAC member countries.

**Table 4: National legislation for EE in the ECLAC Region<sup>21</sup>**

Dedicated energy efficiency legislation	Countries
Dedicated primary and secondary legislation	Brazil, Colombia, Costa Rica, Mexico, Peru, Uruguay
Dedicated regulation but partial implementation or lack of secondary legislation	Argentina, Dominican Republic, Ecuador, Nicaragua
Regulatory provisions from other frameworks but no dedicated legislation	Barbados, Bolivia, Cuba, El Salvador, Grenada, Guyana, Haiti, Honduras, Jamaica, Panama, Paraguay, Suriname, Trinidad and Tobago, Venezuela
Regulation currently under development	Chile, Guatemala

Some countries in the ECLAC region have adopted policy measures to enable an EE market. For instance, Mexico has adopted different policy types such as incentives/subsidies, education outreach and voluntary agreements to promote EE. These policy types target sectors such as appliances and buildings. Alternatively other countries from the Caribbean and other low-income countries of Latin America do not have any specific law in place targeting EE. However, it is identified as a major objective. In addition, some of these countries conduct EE awareness campaigns using various media only.

### 2.2.4 The ECA Region

As in other UN regional commissions, most ECA countries, particularly from Sub-Saharan Africa, do not have a specific legislation on EE, as shown in [Table 5](#), below. However, they include directives and policy guidelines for promoting EE and Energy Conservation (EC) in their national energy policies.

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**Table 5: National legislation for EE in the ECA Region<sup>22</sup>**

EE Legislation	Countries
Dedicated frameworks or programmes	South Africa
Provisions for other regulatory frameworks	Ghana, Kenya, Morocco, Namibia, Tunisia, Zimbabwe

<sup>21</sup> Idem

<sup>22</sup> Idem

EE Legislation	Countries
No regulation	Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Democratic Republic of the Congo, Côte d'Ivoire, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia

It is worth noting that South Africa has dedicated frameworks for EE programmes. Countries such as Tunisia, Ghana and Algeria have adopted MEPS for appliances to address EE in the residential sector. Other countries such as Côte d'Ivoire, Senegal and Benin are currently taking steps towards developing energy-efficient building codes.

### 2.2.5 The ESCWA Region

EE legislation differs from one country to another, as shown in [Table 6](#), below.

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**Table 6: National legislation for EE in the ESCWA Region<sup>23</sup>**

EE Legislation	Countries
Dedicated frameworks or programmes	Syria
Provisions from other regulatory frameworks	Egypt, Jordan, Qatar, Sudan, Yemen
Policy directives or guidelines but no legislative framework	Iraq, Palestine, Saudi Arabia, United Arab Emirates
Dedicated legislation to be approved	Lebanon
No legislation	Bahrain, Kuwait, Oman

In addition to the EE legislation in the ESCWA region, some countries have adopted EE policies and measures. For example, energy performance standards and labels for home appliances in the residential and commercial sectors are implemented in Syria, Egypt, Jordan and Saudi Arabia. Moreover, other policy instruments for EE promotion are under consideration in the ESCWA region.

<sup>23</sup> Idem

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## 3 ANALYSIS OF ENERGY EFFICIENCY MARKET FORMATION IN COUNTRIES FROM VARIOUS REGIONS

### 3.1 COMPLETED EE MARKET FORMATION PROGRAMMES

This section presents selected activities of the RCs and national activities implemented in the past years to address EE challenges in countries eligible under their criteria. This obviously excludes all countries from the EU and North America.

#### 3.1.1 The ECE Region

Most ECE member states have long been concerned about EE. Numerous EE projects have been run by several organisations including UN organisations (UNDP, UNECE, UNEP), the World Bank, the European Commission, the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank. The Global Environment Facility (GEF) financed many of these projects. The most significant project undertaken at regional level was the “Energy Efficiency 2000 (EE2000)” project, which ran from 1991 to 2000. The EE2000 project assisted Central and Eastern Europe as well as Commonwealth of Independent States (CIS) countries in enhancing their EE and security to ease the energy supply constraints of the economic transition<sup>24</sup>. The EE2000 project has been successful in leveraging modest resources to achieve its stated objectives. Not only has EE2000 produced direct results that are way beyond what might be expected from available resources, it has also been a catalyst for additional bilateral, multilateral and private initiatives<sup>25</sup>.

Several EE projects were initiated at national level as well. For example, in Kazakhstan, UNDP implemented the “Improving the Energy Efficiency of Municipal Heating and Hot Water Supply” project from 2007 to 2010. The project aimed to remove the barriers to EE in municipal heat and hot water supply to develop local possibilities, strengthen the legal, regulatory and institutional framework and create incentives for the implementation of new institutional and financing mechanisms to leverage new sources of financing. Consequently, EE practices introduced in residential buildings in some of Kazakhstan’s most polluted cities, including Almaty and Karaganda, resulted in a 45% reduction in energy consumption for heating water in buildings as well as savings of up to 20% for heating costs<sup>26</sup>.

#### 3.1.2 The ESCAP Region

The economy in the ESCAP region has been growing rapidly these past years, and energy security was among the major concerns of countries in Asia and the Pacific. Thus, the promotion of EE was identified as an effective tool to manage the demand for energy. In that context, the ESCAP region undertook activities to support energy conservation measures as it is essential not only from the point of global warming prevention but also from the vision of energy resource security, and so sustainable development of economy.

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<sup>24</sup> <http://www.ee-21.net/article/staticview.php?i=254537254343254141254343253934253544>

<sup>25</sup> Idem.

<sup>26</sup> <http://www.undp.kz/projects/start.html?type=internet>

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In November 2002, the ESCAP region organised the AD Hoc Expert Group Meeting on End-Use Energy Efficiency towards Promotion of a Sustainable Energy Future in Thailand<sup>27</sup>. Some of the main points discussed during the meeting were the (i) policy options for improvement of energy efficiency, (ii) recent trends in national policies and regulatory measures and (iii) on-going electricity sector reforms and energy efficiency promotion. The expert group meeting led to important energy efficiency and conservation measures<sup>28</sup> among which the APEC's Energy Standards Information System<sup>29</sup>. It is a useful web-based tool for accessing information on energy testing standards, minimum efficiency standards, and energy labelling programmes in the Asia-Pacific region. Countries in the region can use this tool to identify existing and proposed standards in the region.

Another important initiative is the "Strengthening Institutional Capacity to Support Energy Efficiency in Asian Countries" launched in 2008<sup>30</sup>. The objective of the project is to strengthen the institutional capacity of Asian countries to develop policy options in support of promoting energy efficiency. It targets policymakers from 23 Asian countries who are responsible for taking action to establish effective institutional arrangements and appropriate national mechanisms, including standards, codes, and legislation to promote energy efficiency. Past activities of the said project include the compilation of case studies on effective institutional development in EE promotion within and outside Asia and the Pacific in 2009. In the same year, the project undertook the Review and identification of the roles of existing national, regional and international institutions in promoting and implementing EE policies and legislation in 23 countries from three Asian sub regions: Central, South, and South East.

In brief, the past EE market formation activities within the ESCAP region focused on capacity building in the area of policy framework and strategy development.

National governments within the ESCAP region took initiatives to develop their respective EE market. In particular, GEF, with the World Bank as implementing agency, financed in Thailand the "Building Chiller Replacement" project in 2001. The project, which was implemented from 2001 to 2005, aimed to create a market for high-EE chillers in the country by initially replacing about 24 Chlorofluorocarbon (CFC) chillers on a pilot basis to demonstrate the economics and feasibility of the technology. The final evaluation report indicated that the non-CFC chiller replacement market, which was virtually non-existent before the project, had been created by replacing 17 CFC chillers. This market is now flourishing as private enterprises are increasingly replacing old CFC chillers with non-CFC, energy-efficient chillers without any government subsidy, thereby generating impressive energy savings. As reported by one supplier, more than 50 non-CFC chillers are being installed each year through private fund for the replacement of old CFC chillers<sup>31</sup>.

Another example is the GEF-financed "Efficient Industrial Boilers" project implemented by the World Bank from 1997 to 2004 in China. One of the objectives of the project was to broadly disseminate energy-efficient industrial boiler technologies across China through institutional strengthening, improved information exchange as well as EE and environmental policy reform.

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<sup>27</sup> [http://www.unescap.org/esd/Energy-Security-and-Water-Resources/energy/efficiency/egm\\_2002/](http://www.unescap.org/esd/Energy-Security-and-Water-Resources/energy/efficiency/egm_2002/)

<sup>28</sup> [http://www.unescap.org/esd/Energy-Security-and-Water-Resources/energy/efficiency/egm\\_2002/Conclusions%20and%20Recommendations.pdf](http://www.unescap.org/esd/Energy-Security-and-Water-Resources/energy/efficiency/egm_2002/Conclusions%20and%20Recommendations.pdf)

<sup>29</sup> [www.apec-esis.org](http://www.apec-esis.org)

<sup>30</sup> <http://eeasia.unescap.org/project.html>

<sup>31</sup> <http://www.gefonline.org/projectDetailsSQL.cfm?projID=540>

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Therefore, the project worked with boiler manufacturers that had become joint-stock companies or privately owned companies. According to the final evaluation report, the western technology for greater boiler efficiency and lower emissions of pollutants is now well understood by the main boiler manufacturers of China. As a result, the new models developed with support from GEF have been penetrating the market in a sustainable way. In addition, the new boilers are now manufactured locally. Finally, these models can meet China's increasingly stringent standards for the emission of pollutants<sup>32</sup>.

### 3.1.3 The ECLAC Region

In the last years, ECLAC undertook activities which aimed to boost the capacity of its member states to manage and ensure the sustainable use of their natural resources in general and to make efficient use of energy in particular<sup>33</sup>. Examples of such activities are described as follows:

- The ECLAC RC published sectoral documents on energy efficiency policies between 1998 and 2009.
- The “Eco-efficient and Sustainable Urban Infrastructure Development in Asia and Latin America” project ran from 2008 to 2010 and targeted selected countries in Asia-Pacific as well as in Latin America and the Caribbean. The project was jointly implemented by ESCAP and ECLAC with the partnership of the United Nations Human Settlements Programme (UN-HABITAT). The project aimed to equip policy makers and planners with a methodology to assess the eco-efficiency and social inclusiveness of urban infrastructures in an integrated manner and develop strategies and policies for improvement<sup>34</sup>. In doing so, the project built the capacities of target groups through a “learning-by-doing” approach, increased awareness and understanding about issues at stake through analysis and capacity building workshops and facilitated participation in clean energy and EE investments as well as in carbon markets by identifying opportunities.

In addition to regional activities, significant initiatives have been undertaken at national level to develop the EE market. In Mexico, the government has initiated numerous efforts over the past 15 years to promote EE. Hence, the main EE initiatives include (i) the development of MEPS with the Mexican Official Energy Efficiency Standards for different equipment and systems; (ii) the adoption of building codes; (iii) the introduction of the green mortgage programme to integrate EE measures in housing; and (iv) demand-side management programmes such as incentive and residential lighting programmes. The impacts of these different initiatives are significant. For example, in the 1990s, Fideicomiso para el Ahorro de Energia Electrica (FIDE) supported a number of end-users by providing financing for energy audits and energy savings projects for the residential, industrial, commercial and services sectors as well as for public lighting and water pumping in municipalities. Under the FIDE programme, the cost of high-efficiency equipment and the substitution and optimisation of chillers is supported with a grant from the World Bank. FIDE financial support resulted in electricity savings of approximately 11,100 GWh<sup>35</sup> in 2007.

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<sup>32</sup> <http://www.gefonline.org/projectDetailsSQL.cfm?projID=97>

<sup>33</sup> UNECE, 2010, “Financing Global Climate Change Mitigation.” P. 90.

<sup>34</sup> <http://www.unescap.org/esd/environment/infra/daproject.asp>

<sup>35</sup> [http://www.ewg.apec.org/documents/EWG34PledgeReview\\_Mexico.pdf](http://www.ewg.apec.org/documents/EWG34PledgeReview_Mexico.pdf)

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### 3.1.4 The ECA Region

At regional level, ECA interventions in the energy sector mainly focused on (i) the improvement of energy accessibility especially to the disadvantaged population; (ii) the improvement of energy policies and management; and, (iii) the development of RE sources. A review of the official ECA website did not reveal information dedicated to EE activities undertaken by the regional commission. EE market development activities do not seem to benefit from much attention at regional level due to the other rising challenges faced by member states.

However, EE market development initiatives have been undertaken at sub-regional level. In fact, in August 2010, the Economic Community of West African States (ECOWAS) launched the Regional Centre for Renewable Energy and Energy Efficiency (ECREEE) to initiate activities in the scope of five thematic programmes which aim to mitigate barriers to the deployment and application of RE & EE technologies and services in the region. ECREEE covers West African States which are Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. The five thematic programmes include (i) tailored policy, legal and regulatory frameworks and quality standards; (ii) capacity development and training; (iii) advocacy, awareness raising, knowledge management and networking; (iv) investment and business promotion through tailored financial mechanisms; and, (v) demonstration projects and showcases with potential for regional scaling-up. For example in April 2010, ECREEE organized a regional workshop on EE in Ouagadougou with the support of the French Ministry of Foreign and European Affairs (MAEE), the French Environment and Energy Management Agency (ADEME) and the International Institute for Water and Environment Engineering (2IE). The objective of the workshop was to define a regional action plan to address the issues of energy efficiency in ECOWAS/West African Monetary Union (UEMOA) region. The workshop also sought to identify priorities for national and regional action plans on EE. In summary, the workshop proposed concrete EE related actions to be submitted to the ECOWAS/UEMOA region's development partners<sup>36</sup>. Hence, ECREEE seeks to achieve its objectives through the promotion of regional markets for RE and EE.

Moreover, the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) which was launched in 2008 has been active in EE field. The RCREEE is a platform which guarantees experience sharing and which makes coordinated policy possible. It covers Egypt, Algeria, Libya, Morocco, and Tunisia. RCREEE has worked with the governments of its member countries by supporting the formulation and dissemination of policies aiming to promote REs and EE and by supporting the development of new technologies in the field of REs and EE. For example, with the support of the Danish Government, RCREEE has completed an assessment report on EE in its member countries. RCREEE also encourages the private sector to actively participate and play a leading role in the development and production of REs and EE.

EE market development actions were also taken at national level. In fact, because ECA member states are faced with power supply challenges, they have centred their EE activities on demand-side management, which involved the deployment of EE technologies such as CFLs, commercial lighting, solar water heaters and hot water load control to reduce the power demand. It is worth noting that most of the above initiatives consisted in phasing out energy-inefficient technologies,

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<sup>36</sup> Taken from the ECREEE Quaterly Newsletter, n°1, September 2010

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were supported by GEF and were implemented by agencies such as the World Bank, UNDP, UNEP and the United Nations Industrial Development Organization (UNIDO).

### 3.1.5 The ESCWA Region

In the last years, ESCWA implemented a set of activities through its energy programme to support its member countries in developing their respective EE market. These activities aim to build capacity in EE and enhance cooperation among member countries including training workshops, advisory services and field projects. In addition to these initiatives, ESCWA conducted EE-related studies to document and inform private and public market actors in the ESCWA region about best EE practices. Moreover, ESCWA published thematic reports and promotional material on EE as part of its policy to enhance the capacity of member countries to formulate and adopt environmentally-sound policies and improve the sustainable management of natural resources with particular emphasis on energy. For example, ESCWA led a study in 2007 on the rationalisation of energy consumption and on EE improvement in major energy production sectors of selected ESCWA member countries.

At a sub-regional level, the RCREEE (see section 3.1.4 above) has been active in the ESCWA region particularly in Jordan, Lebanon, Palestinian territories, Syria Yemen and Egypt, which is a member of both the ECA and ESCWA. It is worth noting that the RCREEE energy efficiency activities in both the ECA and ESCWA regions could provide lessons learnt for regional or sub regional collaboration in terms of EE promotion. Furthermore, a number of national initiatives to develop the EE market are worth being mentioned.

In Saudi Arabia, the government launched in 2002 the National Energy Efficiency Program (NEEP) which aimed to assist the energy sector in meeting the rapidly growing power and energy demand through efficient and rational consumption patterns. The objective was also to protect the local environment while providing a sustainable alternative to increased energy supply and generation capacity<sup>37</sup>. The NEEP initiative was implemented by the United Nations Department of Economic and Social Affairs (UNDESA) and UNDP. NEEP activities involved supporting energy auditing in the industrial and commercial sectors; utility load management; setting policies and regulations for residential buildings and energy-consuming appliances efficiency; improving EE information exchange; promoting energy services and private sector investments and utilisation of efficient technologies. Energy audits conducted under the NEEP allowed to conclude that an estimated annual market of SR 1.2 billion is available in educational buildings, shopping malls and the industrial sector alone<sup>38</sup>. At its inception, the NEEP initiative was expected to enhance and foster outreach and awareness building initiatives on EE through campaigns, workshops and capacity building.

Likewise, a USD 5.9 million GEF-supported project was carried out between 1999 and 2008 in Egypt. The EEIGGR project aimed to remove technical, institutional and capacity barriers to EE promotion in Egypt. The project target was to reduce transmission losses from 7% to 5%, energy consumption by 0.17 MTOE and CO<sub>2</sub> emissions by 0.48 Mtons. The project succeeded in reducing

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<sup>37</sup> [http://esa.un.org/un-energy/mapping/DESA.EFF/51\\_Saudi%20Arabia\\_National%20EE%20programme.htm](http://esa.un.org/un-energy/mapping/DESA.EFF/51_Saudi%20Arabia_National%20EE%20programme.htm)

<sup>38</sup> UNECE, 2010, Financing Global Climate Change Mitigation. P. 121.

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transmission losses to 3.68% per year in 2005<sup>39</sup>. Eight ESCOs were established through this project to provide advice in EE and financing.

## 3.2 ONGOING EE MARKET FORMATION PROGRAMMES

This section presents the on-going activities of the RCs.

### 3.2.1 The ECE Region

The ongoing EE market formation initiatives in the ECE region stems from the EE2000 programme which proved to be successful. EE 21 is a region-wide programme which aims to assist economies in transition in developing and promoting sustainable energy policies, pursuing EE strategies and reducing GHG emissions to meet international treaty obligations. It also aims to assist these economies in enhancing the security of energy supplies by producing the specific outputs from operational activities in the industry, housing and services, transport and energy sectors through national actions, bilaterally and multilaterally, especially through UNECE<sup>40</sup>. The ECE region, through EE 21, runs five sub-regional projects, one country-oriented project (Removing Barriers to Energy Efficiency Improvements in the State Sector in Belarus), one inter-regional project (Global Energy Efficiency 21) and two inter-divisional sections. The five sub-regional programmes are (i) Financing Energy and Renewable Energy Investment for Climate Change Mitigation (FEEL); (ii) Regional Network for Efficient Use of Energy and Water Resources in Southeast Europe (RENEUER); (iii) Energy Efficiency Market Formation in South-Eastern Europe; (iv) Increasing Energy Efficiency for Secure Energy Supply; and, (v) Development of Renewable Energy Sector in the Russian Federation and CIS Countries.

In addition to the aforementioned activities, UNECE provides national governments and institutions with services as regional advisor on sustainable energy. To sum up, ECE continues to put particular emphasis on the enhancement of regional and global cooperation for EE market formation and investment project development to reduce GHG emissions. In that respect, ECE works in close collaboration with national institutions, private sector companies, international financial institutions, commercial banks and international organisations including UNDP, GEF and the World Bank (WB).

A good example of one of the most successful initiatives in the region is the creation of the Bulgarian Energy Efficiency Fund (BEEF). Even though modestly financed by the World Bank through a GEF grant of USD 10 million and a USD 5 million grant from the Austrian government in 2006, BEEF has been operating in a self-sustaining way while providing adapted financing for more than 100 projects of over USD 50 million in the last six years.

### 3.2.2 The ESCAP Region

There are numerous ongoing activities towards EE market formation in the ESCAP region.

An on-going activity is the “Strengthening Institutional Capacity to Support EE in Selected Asian Countries” project mentioned in section 3.1.2. Under the project the ESCAP region organise

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<sup>39</sup> <http://smap.ew.eea.europa.eu/fol120392/prj844883>

<sup>40</sup> EE21 website at <http://www.ee-21.net/article/staticview.php?i=2545452543302546432543442538444a254433>.

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regional workshops on supporting energy efficiency in Asia and the Pacific. The most recent was in April 2011 in Bangkok. The region has also organised sub regional (South East Asia, Central Asia and South Asia) and national workshops on strengthening institutional capacity to support energy efficiency. It is worth noting that ESCAP often teams up with various international, sub-regional and national partners such as the Association of Southeast Asian Nations (ASEAN), the Asia Pacific Centre for the Transfer of Technology (APCTT), the South Asian Association for Regional Cooperation (SAARC), the Asian Development Bank (ADB) and the Eurasian Economic Community (EurAsEC).

Moreover, the UNDP is implementing the Barrier Removal for Energy Standards & Labelling (BRESL) project, which will end in 2013. BRESL is aimed at rapidly accelerating the adoption and implementation of energy standards and labels across a number of Asian countries, and in so doing bring about energy savings from the use of energy efficient appliances/equipment. The project also facilitates harmonization of test procedures, standards and labels among developing countries in Asia, when appropriate<sup>41</sup>. The BRESL will lead to a regional programme on energy efficiency standards and labelling, which will pave the way to develop a regional standards.

The capacities of institutions to promote EE are perceived to be weak and challenged in the ESCAP region. Therefore, it is found vital to reduce, if not eliminate, this gap by undertaking activities which focus on capacity building in the area of policy framework and strategy development.

Another important ongoing initiative within the region, particularly in China, is the "Provincial Energy Efficiency Scale-Up Program" which is supported by GEF and the WB as the implementing agency. The project development objective is to improve the quality and sustainability of provincial energy efficiency programmes in Shandong, Shanxi and Jiangxi Provinces through technical assistance and institutional capacity building. The project was endorsed in February 2011 and project implementation is expected to start in June 2011. The programme is said to have a strong potential for replication as many provinces are looking for guidance and lessons learned to implement and strengthen their energy efficiency programmes. In fact, the provincial-level policies as well as the institutional and financial mechanisms established in the three provinces through the proposed GEF project will be replicated and adopted by other provinces.

### 3.2.3 The ECLAC Region

The main on-going activity in the ECLAC region is the programme for cooperation in EE, which is supported by the Governments of Germany and Italy. One of the priorities of the cooperation is the creation of a regional EE fund for Latin America and the Caribbean that will help establish an intra-regional and international dialogue on the best practices to be applied in the region.

ECLAC is a partner of the IDB, which promotes sustainability in low-income households through a new fund that will support EE programmes in Latin America. As part of the EE activities planned in the region, the IDB launched the new Microcarbon Development Fund (USD 50 million) to extend EE technologies at grassroots level. Colombia and Mexico will be the first countries targeted for the fund's projects. Later to be funded are Brazil, Ecuador and Central America. The development fund is expected to provide financing and grants amounting to at most 10 projects that will get between

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<sup>41</sup> [http://www.undp.org.bd/projects/proj\\_detail.php?pid=76](http://www.undp.org.bd/projects/proj_detail.php?pid=76)

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USD 2 million to USD 8 million each. Investments will be made in residential, commercial and municipal programmes. With the support of the German Technical Cooperation<sup>42</sup> (GIZ), ECLAC is launching a new initiative aiming to stimulate and coordinate a deeper discussion about the need for more sustainable EE policies in Latin America and the Caribbean. The project's overall objective is to contribute to strengthening horizontal and international cooperation in EE in Latin America and the Caribbean by establishing an EE policy dialogue and an "ad-hoc" regional fund for EE.

In addition to these on-going activities, it is important to highlight that numerous EE market formation activities are going on as well at national level. Particularly, in Chile, GEF endorsed in 2010 a USD 35 million climate change project to boost EE that should start in 2011. The IDB will implement this project which aims to create an EE market in Chile by promoting the active participation of engineering firms and ESCOs as intermediaries in the development of energy savings and efficiency programmes<sup>43</sup>.

### 3.2.4 The ECA Region

There is no on-going activity specifically dedicated to EE in the ECA region. However, the ECREEE which is active in the field of EE in the West African region is working on the implementation of EE promotion activities in its member countries. In fact, the ECREEE is currently seeking for the support of international cooperation to implement the recommendations that resulted from the regional EE workshop held in Ouagadougou in April 2010 (See section 3.1.4).

Another ongoing EE activity is the pilot project on energy-efficient lamps in Nigeria in collaboration with Cuba. The project aims to replace one million incandescent lamps with CFLs in Nigeria.

### 3.2.5 The ESCWA Region

As is the case with other UN RCs, ESCWA is currently working towards the formation of an EE market in its member states. Some of the on-going activities in the ESCWA region include (i) the development and publication of promotional material on improving the efficiency of the power sector; (ii) the conduct of a study on policies and measures promoting sustainable energy use in the transport sector; and, (iii) the provision of advisory services for the application of EE measures.

At a sub-regional level, for example, one of the on-going EE activities in RCREEE member countries is the project on EE indicators that was launched in partnership with *Plan Bleu*. The objective of this project is to implement a set of indicators to monitor and assess the EE policies in RCREEE member states (Morocco, Algeria, Egypt, Lebanon, Syria, Jordan, Libya, Palestine, Tunisia and Yemen)<sup>44</sup>.

In addition to the activities listed above, major initiatives are currently underway at national level with the support of international cooperation. For example, the Government of Jordan, through its

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<sup>42</sup> It is worth noting that the German Technical Cooperation (formerly GTZ) is now part of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) which was established in January 2011. GIZ brings together under one roof the GTZ, the long-standing expertise of, the German Development Service (DED) gGmbH and Inwent – Capacity Building International, Germany.

<sup>43</sup> [http://www.ecoseed.org/en/politics/funding-a-incentives/article/35-funding-incentives/8287-latin-america-focus-of-\\$-50-million-energy-efficiency-funding](http://www.ecoseed.org/en/politics/funding-a-incentives/article/35-funding-incentives/8287-latin-america-focus-of-$-50-million-energy-efficiency-funding)

<sup>44</sup> <http://www.rcreee.org/ViewLibraryArticle.aspx?article=22625313448858315053>

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Ministry of Planning and International Cooperation, has received grant financing in the amount of USD 1 million from GEF through the WB and EUR 1.56 million from the French Global Environment Facility through the *Agence Française de Développement* (French Development Agency) (AFD) to develop the market of energy-saving in the industrial and commercial sectors. The initiative will also help industrial and commercial Jordanian institutions to obtain the necessary funding for RE and EC projects. The establishment of the fund is currently ongoing as the ministry in charge of energy short-listed, in October 2010, the companies for the provision of consulting services for the establishment of the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF).

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## 4 SPECIFIC INSTRUMENTS FOR IMPLEMENTING GLOBAL STRATEGY - UNECE EXPERIENCE

UNECE has deployed a certain number of policy instruments at regional level to stimulate the EE market across various sectors of its member states. Moreover, a number of instruments have been set up at national level to develop the EE market. This section of the report will emphasise on what has been done to date at UNECE level. It will also provide examples of specific instruments implemented at national level (e.g., Germany) to promote EE.

### 4.1 UNECE INSTRUMENTS AT REGIONAL LEVEL

The instruments used within the UNECE region to promote the formation of an EE market and foster EE investments comprise information campaigns, capacity building, regulatory and institutional reforms, incentives, innovative financing mechanisms in its member countries and an EE fund. The latter, which are developed to remove specific barriers to EE investments in UNECE member states, are described as follows:

#### 4.1.1 Information Campaigns

UNECE has been doing significant work to enhance awareness and knowledge of EE benefits. A major programme designed and implemented within a few UNECE member countries is the “Green Label Purchase” project. The project aimed to “achieve the raising of awareness and knowledge concerning energy labels as a simplifying instrument for “green” procurement in public and private departments; identification of main barriers against the implementation of energy related “greener” procurement and target specific actions to overcome them; developing and disseminating a set of standardized tools and a harmonized procedure to support a wider distribution of labelled products for “greener” procurement procedures; involving a selected group of public and private stakeholders in the development of a significant number of “greener” procurement pilot projects, based on labelled products and a standardized procedure to be used as the first step for the introduction of a comprehensive green procurement in Europe.”<sup>45</sup>

A review of EE awareness raising activities in the ECE region shows that the programmes undertaken in that respect target all ranges of society. Indeed, the information campaigns target schools, energy end-users, national government ministries, policy makers, local authorities and the private sector, particularly from the perspective of creating a non-distorted energy market.

In conclusion, it is important to stress that the information campaigns have been an efficient instrument to introduce EE consciousness across UNECE member countries.

#### 4.1.2 Capacity Building

Capacity building is another instrument being used by UNECE to assist its member countries in enhancing their EE and promoting the formation of an EE market so that cost-effective investments can provide a self-financing method for reducing GHG emissions. This specific instrument is

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<sup>45</sup> [http://www.unece.org/se/eneffic.html#gree\\_lbs](http://www.unece.org/se/eneffic.html#gree_lbs)

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central to UNECE activities to address the lack of professional skills in the preparation of bankable projects. Also, it is crucial in addressing the lack of know-how, professional expertise and experience of decision makers, municipalities and property owners regarding EE measures and energy-efficient building technologies within member countries. In particular, the EE 21 programme has extensively worked on building the capacity of senior policy makers, EE experts and bank managers. In that respect, various training sessions in financial engineering, business planning, ESCO project development and carbon emissions trading have been organised in various countries. For instance, from May 2001 to October 2003, 186 experts were trained in financial engineering and business planning in Belarus, Bulgaria, Kazakhstan, the Russian Federation and Ukraine.

It is clear that capacity building of key EE market actors increases the number of investment projects as EE project owners/developers can complete business plans that are acceptable by financial institutions.

#### **4.1.3 Internet Resources**

UNECE has introduced an innovative internet communications network as an instrument to develop and sustain the EE market in its member countries. The best example is the EE 21 website which has been established to enhance regional cooperation for EE market formation and investment project development to reduce GHG emissions in economies in transition. The EE 21 website also provides EE practitioners with up-to-date information on EE-related activities within UNECE. It also contains important material on EE policy reform issues and research results.

Another key resource is the official website of the FEEI project launched in 2010. It provides timely information on project activities and supports communication and coordination between project partners, the project management team, national coordinators and participating institutions from the 12 countries. It also targets actors interested in EE investments to provide the needed material and background information for developing sustainable business projects and applications for financing under the project's dedicated fund.

Moreover, a Web survey conducted in 2005 to evaluate the usefulness of the services provided by and through the EE 21 website indicated that its activity had grown rapidly. In fact, statistics indicated that daily visits had gone up from 10 to 20 for 2001 and 2002 to 160 to 180 in 2005. In addition, the webmaster found that 90% of the visits were from interested individual parties from many countries around the world.

In summary, the success of the EE 21 website indicates that it plays a key role in carrying the EE promotion message not only in UNECE member countries but also in other regions across the world where EE market formation initiatives are also being promoted.

#### **4.1.4 EE Regulatory and Policy Reforms**

UNECE, through its project activities, has encouraged and contributed to EE policy reforms within its member states. In fact, UNECE reinforced its EE policies through studies, multilateral expert meetings and consultations with international consultants and its regional adviser on energy. For example, UNECE, in cooperation with UNESCAP, has published the guideline for the formulation and implementation of energy conservation regulations in economies in transition (i.e., the Russian Federation, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan). Furthermore, to

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strengthen the EE policies, UNECE established energy efficiency demonstration zones that provided a practical demonstration of policy reforms and EE technologies on a limited scale. The concept of “energy efficiency demonstration zone” has already proven successful in Western European countries within UNECE. It demonstrates, on a city-wide scale, the combined effect of EE technologies, energy pricing policies, favourable tariff structures, advisory services, information campaigns, metering, monitoring, controls, measurement in emission level changes, energy audits, tax incentives, grants, government-guaranteed loan schemes, international technical assistance and trade development programmes. The intention is to replicate successful measures nationally, once proven on a limited scale<sup>46</sup>.

In summary, EE regulatory and policy reforms have played a key role in the formation of sustainable EE markets within UNECE member states.

#### 4.1.5 EE Dedicated Fund

As part of its strategy to mobilise private investments in EE and RE within its region, UNECE is currently finalising the development of a private-public partnership investment fund for EE and RE projects in Central and Eastern Europe as well as in Central Asia. This investment fund will work on commercial terms, thus fostering market formation and demonstrating that EE projects can become business-as-usual for the financial sector. UNECE expects the creation of this fund to open the door for the replication of similar funds in other countries of the UNECE region and worldwide. The impacts of EE dedicated funds on the development of EE markets have been documented and many examples exist within the ECE region. BEEF best illustrates the importance of such funds in the development of EE markets.

## 4.2 NATIONAL LEVEL

Some UNECE member countries have developed national policy measures to increase private investments in EE projects. This report will focus on the case of Germany. However, the report does not intend to present the case of Germany as the ideal policy measure for EE market development in countries targeted by the UN. It is presented to provide an example of what can be done at national level to develop instruments for EE market formation. Germany implemented a policy mix comprising mostly mandatory standards, voluntary agreements, grant schemes, a suite of soft loan schemes deployed by Germany’s development bank, KfW, and the labelling of energy-using products (mainly appliances, lamps).

**Mandatory Standards:** They are implemented in the tertiary and household sectors to improve the EE performance of buildings. The Energy Savings Ordinance adopted in 2002 aimed to reduce the energy requirements of new buildings by an average of 30% compared to current standards and take a fully integrated approach covering heating supply as well as heating demand. Moreover, an energy-profile certificate, which includes important information on the energetic characteristics of a building is required for all new buildings. The goal is to increase transparency for building owners and tenants, thereby strengthening efforts to save energy.

Other policy measures are presented in Appendix 1 of the present report.

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<sup>46</sup> UNECE, **Energy Efficiency Investment Project for Development for Climate Change Mitigation**, Final report on project implementation, p. 8.

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## 5 PROSPECT FOR GLOBAL STRATEGY IMPLEMENTATION IN THE REGION

The RCs need to undertake actions to create or reinforce the EE market within all their member countries. This section of the report presents global and region-specific recommendations based on what has already been done in the regions and also on the relevant experience in EE market formation implemented in the UNECE region.

The implementation of the following recommendations can build on the past and ongoing collaboration and partnership between the different RCs and international UN agencies/commissions such as UNDP, UNEP, the United Nations Foundation (UNF), UNESCAP and other donors and IFIs such to develop EE markets. Even though all the recommendations herein can be applied at global and regional levels, it is worth noting that their implementation in an economy will have to be adapted on the actual development level of their respective EE market.

### 5.1 GLOBAL STRATEGIC APPROACH

It is necessary to undertake EE activities in the scope of the following recommended thematic programmes:

#### 5.1.1 Thematic programmes

##### Information

Awareness of the opportunities offered by EE technologies and measures is low among both public and private sector stakeholders in a significant number of member states of the aforementioned UN RCs. There is a need for information dissemination on EE resources, technology availability, benefits and opportunities to the general public – directed to government officials and policy makers as well as users, investors and service providers.

##### Institutional Framework

Unlike economies whereby the EE market is mature, several other countries do not have appropriate framework to support the development of a sustainable EE market. For example there is a lack of a national body that can be responsible for prioritizing, planning and establishing appropriate policy and regulatory frameworks to ensure affordable access to energy efficiency technologies and services. There is a need to undertake programmes that: (i) support or create EE public sector agencies and (ii) support the formulation and implementation of adapted EE laws and policy<sup>47</sup>.

##### Intermediaries

Consulting engineering firms, architects, entrepreneurs, EE products distributors and manufacturers as well as ESCOs need to play a key role in the identification, development and

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<sup>47</sup> Even though, energy tariffs can be an incentive for the development of an EE market, it is important that this topic should not be a focus when reforming the EE framework in all the countries. In fact, Energy tariffs reforms can be irrelevant for some countries because of their economic and social situations.

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implementation of a sustainable EE market within an economy. There is a need to undertake activities that support the creation of such intermediaries in order to trigger and sustain the development and the growth of a sustainable energy market

## Financing

One of the important barriers to the development and implementation of EE investment projects is often related to the non-availability of risk-capital and low-cost and long-term adapted financing. It is therefore crucial to undertake programmes that support the creation of adapted financing mechanisms within the economy. Also, it is important to support the development of public private partnership (PPP) initiatives within economies where need arises, targeting among others the public sector facilities..

### 5.1.2 Cross Cutting Programmes

There is still a shortage of qualified personnel in the different RCs in both the public and private sectors. Technical knowledge is needed to build a critical mass of policy analysts, economic managers and engineers who will be able to manage all aspects of EE technologies and services development within the RCs. Therefore there is a crucial need to build capacities in designing, developing, manufacturing, installing and maintaining EE technologies as well as adequate EE policy formulation for their successful implementation. In addition, it is important to undertake programmes that maintain and improve the knowledge acquired.

### 5.1.3 RCs Institutional structure

It is recommended that each UN RC establishes a strong institutional structure that supports EE market formation activities in their member states. Some RCs have already a step in that direction. In that regard, the UNECE Committee on Sustainable Energy (CSE) can serve as a good example. It is a principal intergovernmental body responsible for promoting international cooperation in the field of energy. The Committee provides a forum for the exchange of information, views and experiences among ECE member states on general energy issues. Significantly, the CSE consists of subsidiary bodies including the Steering Committee of the Energy Efficiency 21 project, the Intergovernmental Task Force on Reforming Energy Prices for Sustainable Development, just to mention a few. In conclusion, through this committee, EE experts from ECE member states exchange experiences with regard to EE market formation initiatives, learn lessons and can find solutions to address EE issues in their country.

Moreover, the UNECLAC has already initiated the implementation of a similar structure with the support of the GIZ and the German Federal Ministry for Economic Cooperation and Development (BMZ) through the Regional Policy Dialog on EE in Latin America and the Caribbean region. The first meeting was held in November 2010 in Santiago. The second meeting is scheduled for November 2011 in the Dominican Republic<sup>48</sup>. The main objective of the Regional Policy dialog is to strengthen the institutional, technical and regulatory Latin American and Caribbean countries to implement national energy efficiency programs through cooperation, exchange and intra-regional dialogue with other regions.

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<sup>48</sup> Telephone conversation with an ECLAC official

As already mentioned, not all the other UN RCs have this type of institutional structure. Therefore, it is recommended that these RCs consider the inclusion in their organizational structure of an EE specific task force or committee that will serve as an efficient vehicle to carry out the projects and programmes and to assist the RC member countries in their efforts to implement various activities EE market formation and development.

Assuming that this first recommendation will be adopted, we would also recommend the creation of a network between the RCs in order to encourage exchange of information and views in the field of EE promotion.

## 5.2 RECOMMENDATIONS FOR UN RC ACTION PLAN

### 5.2.1 The ESCAP Region

#### Barriers

Despite the existence of institutions promoting EE at country and regional levels, promoting EE on a large scale is still hampered by several barriers that vary from country to country within the ESCAP region. These barriers (i.e., informational, financial/funding and institutional) are summarised in [Table 7](#), below.

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**Table 7: EE Barriers in the ESCAP Region<sup>49</sup>**

Barriers	Examples
Financial	<ul style="list-style-type: none"> <li>Unstable and unadapted financing support</li> </ul>
Informational and awareness	<ul style="list-style-type: none"> <li>Insufficiency or absence of interactions and communications among government structures and other potential participants (energy companies, producers of energy-efficient equipment, financial institutions, R&amp;D, final consumers)</li> </ul>
Regulatory, institutional and policy	<ul style="list-style-type: none"> <li>Insufficiency or absence of legislative basis, national strategies and plans for EE</li> <li>Insufficient organisation of and coordination among institutional structures</li> <li>Insufficiency or absence of coordination and flexibility within the government</li> <li>Weak capacity of human resources</li> <li>Insufficient capacity to develop and undertake EE programmes and projects</li> </ul>

#### Recommendations

The following recommendations are meant to contribute to removing the identified barriers that prevent larger-scale EE project investments and implementation within the ESCAP region.

<sup>49</sup> Adapted from ESCAP, 2010, **Assessment Report on Energy Efficiency Institutional Arrangement in Asia**, p. xviii.

**Table 8: Recommendations for ESCAP Region**

Barriers	Recommendations to Address the Barriers
<b>Informational and awareness</b>	<ul style="list-style-type: none"> <li>• Continue efforts to build capacity for the development of EE investment projects. This is about training EE experts and linking them by Internet and any other channels for communication, information transfer and distance learning. Training courses should put an emphasis on financial engineering and business planning. Workshops on EE business development should be organised as well. Other tailored trainings and workshops should be set up for local bank staff, government officials and senior policy makers in countries where there is still a need for capacity building.</li> <li>• Scale-up information dissemination campaigns. There has been a lot done in that respect mainly in more advanced countries of the region such as China, Australia and Japan. UNESCAP should increase and sustain efforts to educate, train and inform the public, particularly in countries of the region that do not currently take efficient actions in that regard.</li> </ul>
<b>Regulatory, institutional and policy</b>	<ul style="list-style-type: none"> <li>• Continue efforts to strengthen EE regulatory, institutional and policy frameworks in member countries.</li> <li>• Encourage and strengthen regional and sub-regional cooperation. Even though most countries in the ESCAP region have already demonstrated significant progress in the development and implementation of EE policies and measures. UNESCAP should design specific programmes for its member countries where EE projects have not taken off yet.</li> <li>• Identify socio-economic benefits of energy efficiency and translate this into market potential of energy efficient products and initiatives. In the region, while the political statements often include strong support to energy efficiency, they often lack concrete support.</li> <li>• Assist the governments of member countries to strengthen human resources and also strengthen management and leadership structure. As a result, countries within the ESCAP region that do not have relevant macro and micro institutions will build a special state institution such as an energy conservation agency or committee under ministerial control at national level. Legally and financially strengthen existing energy conservation departments or units at all levels. Establish new EE units.</li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• Have financial service companies and international financial institutions establish an EE dedicated fund with commercial banks and private investors. This fund should aim to remove financial barriers to access to capital in countries where these obstacles still prevent the development of EE markets. It is clear that the establishment of an EE investment fund will open the door for the creation of such funds in other countries within ESCAP, hence reinforcing EE market conditions.</li> <li>• Continue to reinforce international cooperation in EE.</li> </ul>

### 5.2.2 The ECLAC Region

#### Barriers

Although the ECLAC region has undertaken significant initiatives to promote the EE market within its member countries, several barriers impede improved and effective options for EE in most

member countries. These barriers can be divided into five main categories: institutional, legal, financial and economic, information, and market. The barriers to promoting EE at national level in the ECLAC region are summarised in [Table 9](#) below.

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**Table 9: EE Barriers in the ECLAC Region<sup>50</sup>**

Barriers	Examples
Market	<ul style="list-style-type: none"> <li>Market for ESCOs remains underdeveloped</li> </ul>
Financial	<ul style="list-style-type: none"> <li>Lack of adapted financing for equipment and project development</li> </ul>
Information and awareness	<ul style="list-style-type: none"> <li>Lack of awareness on the part of government officials, business sector actors as well as individual users</li> </ul>
Regulatory, institutional and policy	<ul style="list-style-type: none"> <li>Lack of programme and institutional strengthening</li> <li>Weak regulatory framework</li> <li>Little involvement on the part of electricity and fuel providers</li> </ul>
Technical	<ul style="list-style-type: none"> <li>Scarcity of national/regional technical personnel dedicated to EE</li> </ul>

### Recommendations

The following recommendations are meant to contribute to removing the identified barriers that prevent larger-scale EE project investments and implementation within the ECLAC region.

**Table 10: Recommendations for ECLAC Region**

Barriers	Recommendations to Address the Barriers
<b>Financial</b>	<ul style="list-style-type: none"> <li>Have financial service companies and international financial institutions establish an EE dedicated fund with commercial banks and private investors. This fund should aim to remove the financial barriers to access to capital in countries where these obstacles still prevent the development of EE markets. It is clear that the establishment of an EE investment fund will open the door for the creation of such funds in other countries within the ECLAC region, hence improving EE market conditions. In that regard, it is worth noting that with the support of the German Technical Cooperation (GIZ) ECLAC is launching a new initiative aiming to stimulate and coordinate a deeper discussion about the need for more sustainable EE policies in Latin America and the Caribbean. The project's overall objective is to strengthen horizontal and international cooperation in EE in Latin American and the Caribbean by establishing an energy efficiency policy dialogue and an "ad-hoc" regional fund for EE (energy efficiency fund).</li> </ul>
<b>Information and awareness</b>	<ul style="list-style-type: none"> <li>Increase efforts to educate, train and inform the public. There has been a lot done in that respect mainly in the most advanced countries of the region such as Brazil, Mexico and Argentina. UNECLAC focuses its efforts in countries that do not currently take efficient</li> </ul>

<sup>50</sup> Adapted from ECLAC, 2010, *EE in LAC: Situation and Outlook*, p. 11

	actions in that regard.
<b>Regulatory, institutional and policy</b>	<ul style="list-style-type: none"> <li>• Undertake capacity building initiatives to strengthen existing institutions before creating new ones. Tailored trainings and workshops should be organised for government officials and senior policy makers in countries where there is still a need for capacity building at decision making level.</li> <li>• Assist member countries with policy reforms by integrating EE in their energy policy. It should also generate a political "dialogue" inside and among region countries with the purpose of sharing experiences and jointly advancing towards a sustainable path.</li> </ul>
<b>Market and technical</b>	<ul style="list-style-type: none"> <li>• Continue efforts to build capacity for the development of EE investment projects. This is about training experts and linking them by Internet and any other channels for communication, information transfer and distance learning. Training courses should put an emphasis on financial engineering and business planning. Workshops on EE business development should be organised as well. Other tailored trainings and workshops should be organised for local bank staff in countries where there is still a need for capacity building.</li> </ul>

### 5.2.3 The ECA Region

#### Barriers to Energy Efficiency Investments

In the ECA region, particularly in Sub-Saharan Africa, the EE market conditions are similar because not much is being done in the ECA region to promote EE market formation. The barriers to EE investments in the ECA region can be summarised in the table below.

**Table 11: EE Barriers in ECA Region Member States**

Barriers	Examples
Market	<ul style="list-style-type: none"> <li>• Market organisation and price distortions that prevent customers from appraising the true value of EE</li> <li>• Investors do not seem to be able to reap the rewards of improved efficiency (the classic case being the landlord-tenant situation)<sup>51</sup></li> <li>• EE investments are a new type of activity, as the return on investment is based upon operating cost savings</li> </ul>
Financial	<ul style="list-style-type: none"> <li>• Lack of understanding of EE investments or aversion to perceived risk on the part of financial institutions</li> <li>• Lack of financing for EE investments</li> </ul>
Information and awareness	<ul style="list-style-type: none"> <li>• Inadequate information available in the industrial sector</li> <li>• Industrial end-users are more concerned with enhancing operations through improved production and productivity rather than through reduced operational costs, including EE measures</li> <li>• Lack of public awareness</li> </ul>
Regulatory, institutional and policy	<ul style="list-style-type: none"> <li>• Lack of policies</li> <li>• Lack of trained personnel in the relevant government agencies</li> <li>• Lack of EE agencies</li> <li>• Lack of EE dedicated laws and regulations</li> </ul>
Technical	<ul style="list-style-type: none"> <li>• Lack of expertise and intermediaries who could develop projects</li> <li>• The existing ESCOs are derived from consulting firms and have limited knowledge of the measurement and verification protocols</li> </ul>

<sup>51</sup> IEA, 2007, *Mind the Gap: Quantifying the Principal-Agent Problems in Energy Efficiency*, p.27.

(Source: Adapted from information provided by the ECA RC respondent)

## Recommendations

The following actions, which are recommended for implementation in ECA member countries, contribute to removing the barriers mentioned in [Table 11](#), above.

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**Table 12: Recommendations for ECA Region**

Barriers	Recommendations to address the barriers
<b>Financial</b>	<ul style="list-style-type: none"> <li>• Have financial service companies and international financial institutions establish an EE dedicated fund with commercial banks and private investors. This fund should aim to remove the financial barriers to access to capital in countries where these obstacles still prevent the development of EE markets. It is clear that the establishment of an EE investment fund will open the door for the creation of such funds in other countries within the ECA region, hence improving EE market conditions.</li> </ul>
<b>Information and awareness</b>	<ul style="list-style-type: none"> <li>• Educate, train and inform the public on EE benefits and practices. There has not been anything done in that regard. This can be explained by the fact that the ECA region has mainly focused its energy sector activities on the improvement of energy access and energy provision infrastructures. A few countries have taken initiatives at national level. Tailored trainings and workshops should be organised for government officials and senior policy makers to build capacity at decision making level.</li> </ul>
<b>Regulatory, institutional and policy</b>	<ul style="list-style-type: none"> <li>• Conduct a regional EE and security study of member countries. This is a Pan-African assessment study on EE for ECA member countries. It targets the elaboration and implementation of an action plan for training, communication, policy formation and project identification. This will be done by reviewing the existing framework for EE in said countries prior to the policy reforms for EE promotion. Such an exercise has been done at sub-regional level within the cooperation framework between the RCREEE and the Danish government.</li> <li>• Prioritise international cooperation with international UN agencies such as UNDP, UNEP, other UN RCs as well as international donors such as GEF.</li> </ul>
<b>Market and technical</b>	<ul style="list-style-type: none"> <li>• Build capacity for the development of energy efficiency investment projects. This is about training experts and linking them by Internet and any other channels for communication, information transfer and distance learning. Training courses should put an emphasis on financial engineering and business planning. Workshops on EE business development should be organised as well. Other tailored trainings and workshops should be organised for local bank staff in countries where there is still a need for capacity building.</li> </ul>

### 5.2.4 The ESCWA Region

#### Barriers

UNESCWA has undertaken a number of initiatives to promote the EE market within its member countries. However, several barriers impede improved and effective options for EE in member countries. These barriers can be divided into five main categories: i) market; ii) financial; iii)

information and awareness; iv) regulatory, institutional and policy; and, v) technical. These barriers are summarised in [Table 13](#) below.

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**Table 13: EE Barriers in ESCWA Region Member States<sup>52</sup>**

Barriers	Examples
Market	<ul style="list-style-type: none"> <li>Lack of effective market policies</li> <li>lack of knowledge and cautious attitude toward EE</li> </ul>
Financial	<ul style="list-style-type: none"> <li>Lack of access to EE funds</li> </ul>
Information and awareness	<ul style="list-style-type: none"> <li>Lack of awareness of EE benefits</li> </ul>
Regulatory, institutional and policy	<ul style="list-style-type: none"> <li>Lack of consistent rules at national and local levels</li> </ul>
Technical	<ul style="list-style-type: none"> <li>Lack of technical capacity of projects developers</li> </ul>

## Recommendations

The following actions, which are recommended for implementation in ESCWA member countries, contribute to removing the barriers mentioned in [Table 13](#) above.

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**Table 14: Recommendations for ESCWA Region**

Barriers	Recommendations to Address the Barriers
<b>Financial</b>	<ul style="list-style-type: none"> <li>Have financial service companies and international financial institutions establish an EE dedicated fund with commercial banks and private investors. This fund should aim to remove financial barriers to access to capital in countries where these obstacles still prevent the development of EE markets. It is clear that the establishment of an EE investment fund will open the door to the creation of such funds in other countries within the ESCWA region, hence improving EE market conditions.</li> </ul>
<b>Information and awareness</b>	<ul style="list-style-type: none"> <li>Scale up actions to educate, train and inform the public about EE benefits and practices. There have been initiatives undertaken in that respect in most member countries. However, UNESCWA should increase and sustain efforts to educate, train and inform the public, particularly in countries that do not currently take efficient actions in that regard.</li> </ul>
<b>Regulatory, institutional and policy</b>	<ul style="list-style-type: none"> <li>Continue to provide support to member countries in reinforcing their EE policy and regulatory frameworks to increase investment and financial flows.</li> </ul>
<b>Market and technical</b>	<ul style="list-style-type: none"> <li>Increase efforts to build capacity for the development of EE investment projects. This will be done by establishing and encouraging specialised training to prepare human resources for</li> </ul>

<sup>52</sup> Adapted from ESCWA, 2009, Fact sheet : *Best Practices and Tools for Large-scale Deployment of Renewable Energy (RE) and Energy Efficiency (EE) Techniques*, Technical Paper.3

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investible EE projects. Also by training experts and linking them by Internet and any other channels for communication, information transfer and distance learning. Training courses should put an emphasis on financial engineering and business planning. Workshops on EE business development should be organised as well. Other tailored trainings and workshops should be organised for local bank staff in countries where there is still a need for capacity building.

- Support the establishment of EE service companies. It should also correct EE project perception and develop risk management approaches to overcome the lack of knowledge and cautious attitude toward EE.

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## 6 CONCLUSION

### 6.1 KEY RECOMMENDATIONS

In summary, though several initiatives have been undertaken to improve EE in the member states of the various UN RCs, there is still much to do in order to promote market formation and self-financing Energy Efficiency (EE) improvements. Though they have recognized the importance of EE programmes and policies, they are mostly not sustained especially at times when oil prices are lower. Based on an overview and analysis of EE policies and market development both at regional and national levels, the report has recommended actions for implementation to scale up EE development in the various UN RCs.

At a global level, it is recommended to undertake EE activities in the scope of the thematic programmes such as information, institutional framework, intermediaries and financing. In addition, it is recommended that cross cutting activities, with an emphasis on capacity building, be directed to both the public and private sectors in the EE market.

Also, it is recommended that the UN RCs strengthen or establish an institutional structure that is conducive to the development of EE market formation activities. More specifically, the RCs need to include in their organizational structure an EE specific task force or committee that will serve as an efficient vehicle to carry out the projects and programmes and to assist their member countries in their efforts to implement various activities EE market formation and development. Nevertheless, important observations have to be made with regard to the role of RCs in supporting the development of EE market within their member states:

- It is important not to put a focus on energy tariff reforms at national level because it is quite complex and goes beyond EE considerations. RCs would need to be very practical in dealing with the situation they have in each country as far as tariffs are concerned. RCs would also need to make the best use of their efforts to find EE opportunities in the current context in the economy. Energy Tariffs issues would need to be dealt with at the national level by relevant government agencies and institutions with EE consideration.
- It also important to focus on the creation of intermediaries at regional level as private sector driven approaches are essential in the successful development of EE markets.

At regional level, it is recommended that the various UN RCs undertake the following actions:

- i) Reinforce capacity building efforts for human resources (EE experts, bank staff, government officials and senior decision makers);
- ii) Initiate capacity building programmes for human resources (EE experts, bank staff, government officials and senior decision makers);
- iii) Initiate or scale up information dissemination campaigns;
- iv) Continue efforts to strengthen the EE regulatory, institutional and policy framework in member states;
- v) Encourage and strengthen international, regional and sub-regional cooperation and
- vi) Continue efforts to establish an EE-dedicated fund.

It is worth noting that the implementation of the said recommendations should build on the past and ongoing experiences in EE market promotion within the UN RCs. Therefore, it is suggested to

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create a network between the RCs in order to encourage exchange of information and views as well as dissemination of best practices in the field of EE promotion.

## **6.2 THE NEXT STEPS TOWARDS PROMOTING EE MARKET FORMATION IN THE UN REGIONAL COMMISSIONS**

Active pursuit of EE market formation still lags behind in many countries within the UN RCs despite their recognition of the important of EE measures in sustaining economic growth. Regarding how to move forward it is important that each UN RC considers the following steps:

- First, create a network between the RCs in order to encourage exchange of information and views in the field of EE promotion.
- Second, gain a better understanding of the current EE institutional and policy framework within its member countries.
- Third, there is a need to assess EE benefits and present them in term of socio-economic benefits for the country. This is vital as parliamentarians or policy-makers need to see the contribution of energy efficiency to socio-economic development more clearly to provide sufficient funding and political support.
- Fourth, there is a need to establish an expert group on EE within the UN RCs where this group is not yet established, or reinforce the capacity of existing expert groups on EE in the UN RCs where this group already exists. Based on their understanding of the current EE framework and on the recommendations presented in chapter five above, the said EE expert group, which is comprised of the country members' representatives, will identify the gap and draw a concrete action plan for accelerating EE market formation in the region.
- Last, the UN RC and the member countries national governments will jointly implement the action plan mentioned for scaling-up EE market formation.

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## APPENDIX 1: DESCRIPTION OF SELECTED NATIONAL EE POLICIES IN GERMANY

This section provides a brief description of selected policy measures to support the promotion of EE in Germany.

**Voluntary agreements:** Under a voluntary agreement for the 1995-2001 period between the German government and the German industrial sector, industries committed to reducing the specific energy consumption of member companies by 20% in 2005 with reference to 1990. The industry branches are non-metallic minerals, mining (potassium mining), pulp and paper, chemical, non-ferrous metals, iron/steel, sugar and textile. Another voluntary agreement for the 1995-2005 period occurred between the German government and the German automobile industry to reduce the fuel consumption of new cars built in Germany by 20% compared to the average values of 1990.

**Grant schemes:** Grant schemes have been used to support housing stock modernisation in federal states. The programme provides subsidies up to 20% or a maximum of EUR 250/m<sup>2</sup> to modernise heating systems, thermal insulation and other housing-related energy saving measures. Grants were also used between 2002 and 2010 to stimulate the installation of small CHP plants provided that the electricity is fed in the grid. Moreover, grants have been used since 1991 to subsidise the cost of energy advisory services for residential buildings built before 1984 in the old federal states and before 1989 in the new federal states. This grant scheme allows house owners who take on-site advice by professional experts on potential energy conservation measures to receive an amount of EUR 325 for 1/2-family houses and between EUR 350-450 for multi-family houses.

**Soft loan schemes:** Several loans have been implemented throughout the period targeting environmental protection and EE in buildings. They have been implemented by German state-owned development bank, KfW. The interest rate charged to borrowers is below market rates and/or has longer maturities than what the market typically offers.

**Labelling of energy-using products:** Germany has implemented EU directives related to the labelling of electric household appliances. Another directive imposes disclosure of consumer information on the fuel consumption and CO<sub>2</sub> emissions of new vehicles.



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