

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

UNITED NATIONS DEVELOPMENT PROGRAMME

United Nations Development Account project  
**Promoting Energy Efficiency Investments  
for Climate Change Mitigation and Sustainable Development**

Case study

## CROATIA

LESSONS LEARNED FROM UNDP-GEF PROJECT IN CROATIA



*Empowered lives.  
Resilient nations.*



## Executive Summary

Croatia is on course to join the European Union in 2013 and it faces the imperative of reducing inefficient energy use in order to respond to global and European economic competition. As is the case in many countries emerging from state socialism, energy use remains wasteful: per unit of GDP, Croatia consumes 12 percent more energy than the European Union average. This brief case study describes how—with assistance from UNDP and the Global Environment Facility (GEF)—Croatia is doing this. It also describes how Croatia's energy efficiency programme is not limited to economic or environmental dimensions: it also has important social and governance components.

Large inefficiencies in energy use is a mayor challenge—particularly in public sector buildings, many of which were constructed under Yugoslav socialism when heat and electricity tariffs were held below cost-recovery levels. Energy imports contribute to the trade deficit that keep the kuna (local currency) under pressure and further jeopardized Croatia's recovery from the global financial crisis during 2010-2011.

Started eight years ago (2005) with funding from the Global Environment Facility and with UNDP support, this programme has produced some \$18 million in cost savings and cut annual greenhouse gas emissions by 63,000 tons of CO<sub>2</sub> equivalent, through measures costing little or nothing. Total cost savings are now set to rise exponentially as investments generated by the programme come on line. The programme has been incorporated into the National Energy Efficiency Action Plans (2008-2010 and 2011-2013) and is still being implemented by UNDP (2013) with almost 100% national funding i.e. financing from the Croatian Fund for Environment Protection and Energy Efficiency.

As in many countries, buildings in Croatia are among the biggest contributors to climate change. At the project start, no policies existed to monitor or manage, much less reduce, energy use at any level of the Croatian public sector. First, the city of Sisak—Croatia's ninth-largest city, with a population of 50,000 and a legacy of polluting industries and lingering damage from Croatia's war of independence in the 1990s—agreed to serve as a site for energy savings investments piloted by UNDP and financed by the GEF. Over two years, 24 demonstration projects in public buildings in Sisak cut energy consumption by 13 percent, saving the city budget \$220,000 per year.

The purpose of this report is to identify, collect and analyze lessons learned (LL) and best practices from Croatia UNDP/GEF Energy Efficiency project implementation. It is taking an extra departure from the usual considerations in LL: expanding the area of interest to find the underlying causes for observed issues and where possible to find suggestions for improvement.

The report is structured with the following sections:

- (1) Sector Characteristics,
- (2) Current Policy

- (3) Energy Efficiency Potential
- (4) Assessment Methodology
- (5) Economic, Environmental and Policy Analysis
- (6) Policy Design Considerations
- (7) Conclusions and Recommendations

The focus of the report is highlighted with the following elements:

- (a) A policy reform that has transformed one or more economically attractive investment projects into a bankable project which has been financed;
- (b) An assessment of the 'scaled-up' potential environmental, economic and financial impact of the case study for selected projects or 'classes' of projects including reductions of greenhouse gas emissions;
- (c) Recommendations on new reforms to introduce market based energy systems based on case study.

## (1) SECTOR CHARACTERISTICS: THE REPUBLIC OF CROATIA

The Republic of Croatia, with the area of 56 594 km<sup>2</sup>, is populated by 4.4 million inhabitants with the average density of 78.3 inhabitants per km<sup>2</sup>.

World Bank data shows that Croatian nominal GDP in 2009 was 63.034 \$billion, or \$14,222 per capita. According to Eurostat data, Croatian PPS GDP per capita stood at 64% of the EU average in 2009.

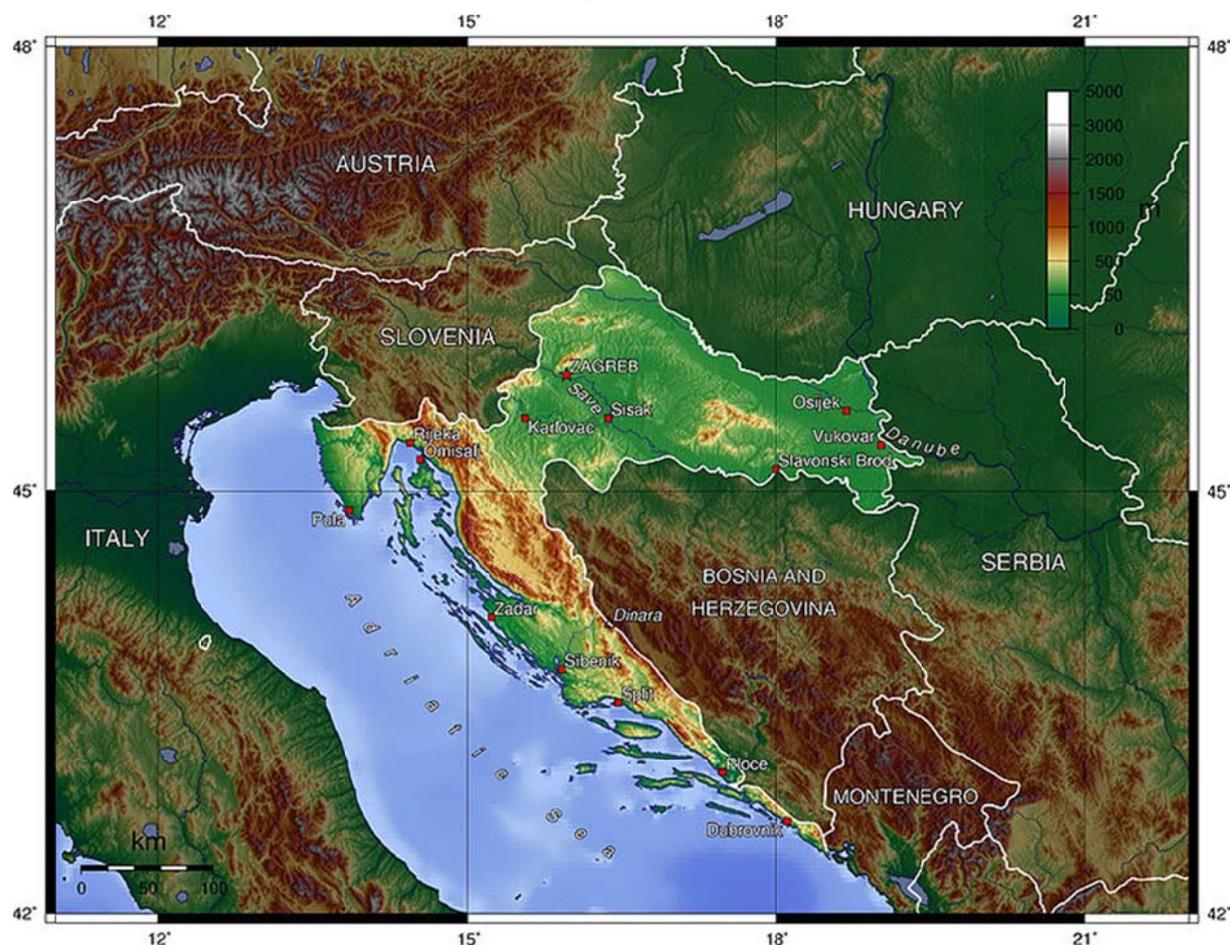


Figure 1: Croatia topographic map

(source: <http://en.wikipedia.org/wiki/Croatia>)

In 2009, economic output was dominated by the service sector which accounted for 73,6% of GDP, followed by the industrial sector with 20,5% and agriculture accounting for 5,9% of GDP. The Croatian state still controls a significant part of the economy, with government expenditure accounting for as much as 40% of GDP.

In 2009 for realization of one thousand USD 2005 determined by PPP, 135 kilograms of oil equivalent of total energy was used, which is 6.8% above the energy intensity of European average (EU 27).

Table 1: Potential for financial savings due to increased energy efficiency

Energy expenditures in Croatia	= 20% BDP
Energy exp. in Croatia 2009.	12,6 \$billion
Potential for savings (EU targets 2020)	20%
or	2,52 \$billion
	= 4% BDP

The service sector (public and commercial) alone is responsible for more than 10% of total final energy consumption in Croatia (Figure 2). However, it is important to emphasise that this sector is the fastest growing economy sector in Croatia and at the same time it records the fastest growth in electricity consumption, which is the fact that confirms the necessity to focus energy efficiency improvement efforts on that sector.

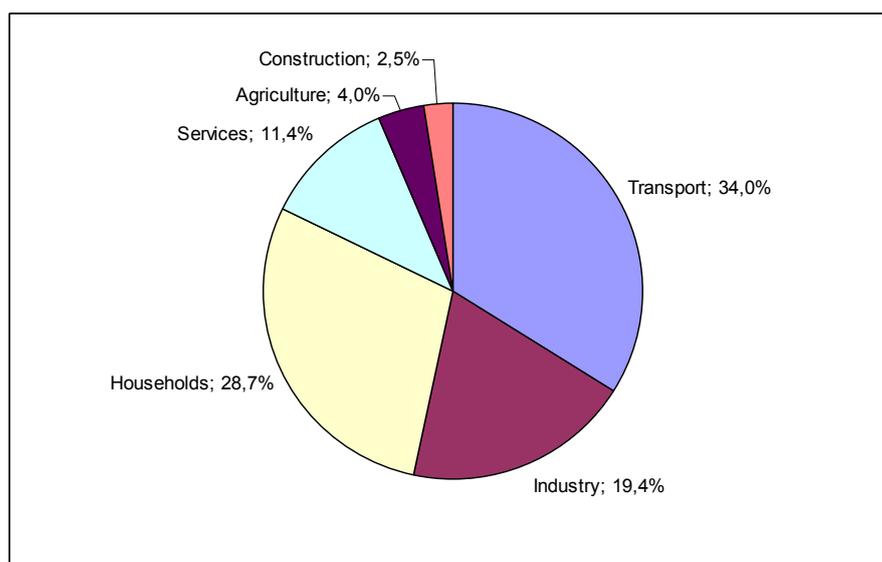


Figure 2: Shares of sectors in final energy consumption in the Republic of Croatia in 2009

## (2) CURRENT POLICY

This section gives a summary of the relevant policies in place **before** the reforms were introduced. Baseline conditions for energy management in Croatia were simple to determine: there was none existing practice of managing energy use in buildings on any level of the public sector operations.

### THE SITUATIONAL ANALYSIS

#### Policy framework

Croatia had adopted an Energy Strategy in 2001 which needed to be updated in 2007. There were no specific EE strategic documents.

#### Legal and regulatory framework

Croatia had no EE law or a specific action plan in line with EU acquis at the time of project implementation.

Identified barrier:

- Lack of EE laws, bylaws and action plans in line with the EU acquis.

#### Institutional framework

The line ministry in charge of EE was (and actually still is) seriously understaffed to carry out its mandate.

Identified barrier:

- Weak institutional framework to initiate, develop and implement EE policy and regulatory framework, as well as support national programmes and projects related to energy efficiency

#### Financial framework

Financial barriers are also the reason for failures on the supply and demand side of the market. On the demand side the problem is in high investment costs. Because of weak purchasing power of end-users (combined with general lack of knowledge especially on financial benefits of improved energy efficiency) investments are made according to the least initial cost and not life cycle cost approach. On the supply side there is not sufficient interest and know-how in bank sector for evaluating and accepting feasible projects. However, bank sector in Croatia was very dynamic and there were a number of banks competing for clients and offering credit lines for reconstructions/adaptations of houses as well as non-purpose loans that for smaller amounts require very little or no guarantees or evidence on credit

worthiness. Namely, a survey among bank representatives was made<sup>1</sup>, which showed that banks are able and willing to provide financing for commercially viable energy efficiency projects, however there is the lack of market demand for financing such projects, which leads to previously identified barrier – lack of information and knowledge.

Some of the identified barriers of relevance to the institutional framework that could impede the project was its weakness to initiate, develop and implement as below:

- High up-front costs of energy efficiency investments, combined with the limited financial resources of the targeted end user groups to invest on energy efficiency on their own;
- Lack of local capacity, information and experience in establishing and operating new institutional and financial mechanisms such as Energy Service Companies (ESCOs) or utility driven demand side programs to develop, finance and implement energy efficiency projects;
- Lack of experience and high perceived risks of the local financing institutions to finance energy efficiency projects, which in general effectively hamper the possibilities to obtain financing for EE projects.

### Status of EE market

In Croatia, the situation in the energy efficiency market is characterised by weak demand and underdeveloped supply, resulting in very few implemented projects (Fig. 3). Energy statistics are also showing that energy efficiency market, not only in countries with economies in transition like Croatia but also in well developed countries, is not functioning properly and thus not utilise cost-effective energy efficiency measures and technologies. This is referred to as “market failure” caused by number of “market barriers”.

A capacity assessment of market players should provide realistic estimation of their potential and development needs. Key market players are:

- Energy end-users from the project selected target groups:
  - City authorities
  - Public buildings directors
  - Maintenance personnel of the public buildings
  - Employees of public buildings
  - Children

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<sup>1</sup> Raiffeisen Consulting, 2006, *Market evaluation and analysis related to banking market relevant for financing energy efficiency projects in residential and service sectors in Croatia*, Zagreb: UNDP

- Population at large
- Companies maintaining and operating residential buildings;
- Providers of EE services and products;
- Policy makers who create legal and regulatory framework for EE
- Retailers that are trading with EE products;
- Professional providers of services related to EE (designers, builders, installers, energy auditors, etc.) that set technical standards and code of conducts;
- Financial institutions involved in financing EE projects;

Identified barriers:

- Local experience and capacity to successfully identify, specify and implement EE projects was low or non-existing
- Existing EE manufactures and service providers are fragmented and narrowly specialized and unable to provide turnkey integrated EE solutions

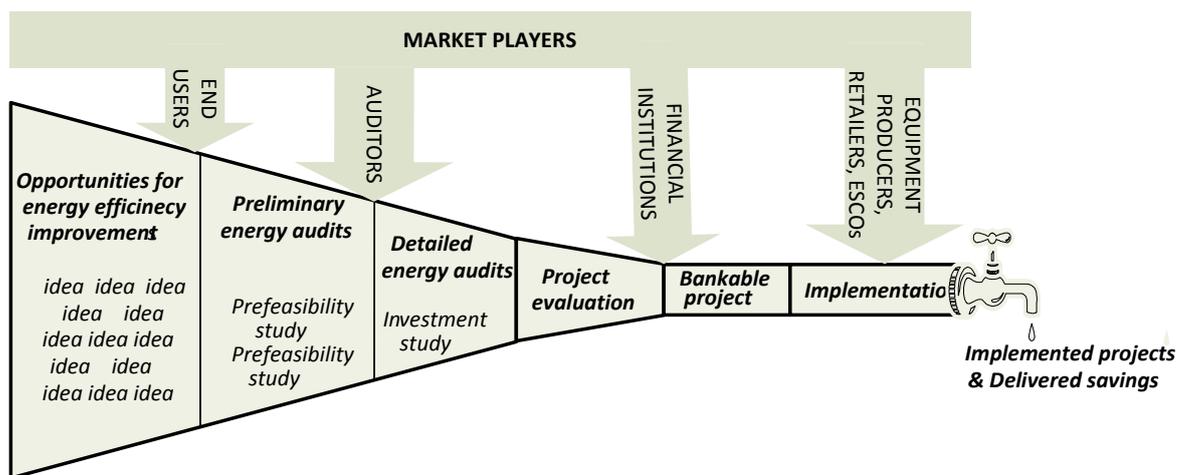


Figure 3: EE projects' development cycle and EE markets

### Status of public awareness on EE issues

The major barrier to the use of the EE technologies and implementation of the EE measures was lack of awareness and information within the different end user groups on the available energy saving technologies and measures and their financial benefits.

The baseline status was missing for public awareness because during the project preparation no effort was dedicated to establish a proper baseline and propose a methodology on how to monitor progress. The EE project in Croatia

ordered a specific survey by a professional polling company (GfK) to assess energy awareness. Our experience proved that existing statistics do not offer effective tools for measuring the progress of these project aspects.

### **Capacities for EE in the country**

Local and regional authorities in Croatia faced especially strong barriers to energy efficiency improvements:

- Lack of experience and capacity of the local stakeholders to develop “bankable” EE projects and to take energy efficiency (EE) aspects otherwise into account in planning;
- Non-existence of organisational structure for energy management system, which will include both people (responsible energy managers) and technology.
- Incompetence or impossibility to change organisational structure in order to strengthen own capacities for energy management;
- Lack of awareness on long-term benefits resulting from energy management, energy efficiency improvements and renewable energy use (lack of foresight, analyses, planning and ways of decision making).
- Inherited attitude and opinion that energy costs are fixed expenditures;
- Restricted possibilities and very complicated procedures for allocation of budget means to energy efficiency projects;
- Lack of financial assets for realisation of investment projects and budget limitations;
- Insufficient approach to long-term investments;
- Lack of capabilities to initiate and implement EE projects, public outreach and other activities related to energy efficiency;
- Lack of human resources with specific knowledge on energy management;
- Low motivation and awareness about possibilities for and benefits of energy efficiency improvements among the employees;
- Lack of adequately prepared energy efficiency projects;
- Lack of capacity and resources of the owners/operators of the public buildings to work on energy efficiency in addition to running their core business.

### **(3) ENERGY EFFICIENCY POTENTIAL**

An assessment of the energy savings and CO<sub>2</sub> emission reductions possible from the envisaged energy management practice, controls, technology or efficiency improvement will be given in this section.

Project interventions were tailored against realities of the implementing environment identified during the inception stage. It was decided to target public sector as the driver for EE market transformation supplemented with a nation-wide awareness raising campaign for general public.

### Policy framework

In collaboration with the Ministry of Economy (and with its significant co-financing), the EE project developed the update of the Energy strategy and the EE master plan for Croatia (Programme for Efficient Use of Energy 2008-2016), which provided the necessary policy framework for all other EE activities in the country.

### Legal and regulatory framework

The project proposed and collaborated on the elaboration of the Act on Efficient End-Use of Energy based on the EE Master Plan, as well as preparation of the First National Energy Efficiency Action Plan 2008-2010 (NEEAP) of the Republic of Croatia based on the same Master plan, and according to the requirements of the EU Energy Service Directive.

### Institutional framework

Project provided support to the Ministry in carrying out its duties by assigning couple of team members to the Ministry's disposal on part-time bases. The support was mainly directed to the development of the Act on Efficient End-Use of Energy, related bylaws and regulation concerning energy auditing and information system for monitoring and verification of energy savings. However, this practice only temporarily enabled sufficient capacity for implementation of all activities within the Ministry.

The Project did its best to support establishment of an Energy Efficiency Agency which would have been a sustainable solution for institutional capacity improvement, but this was not accepted by the relevant ministries.

### Status of EE market

It is important to properly understand the status of EE market, because based on that understanding appropriate interventions and tools and timing thereof can be programmed (Figure 4). The status of energy efficiency market in Croatia was such that it required strong promotion campaign to stimulate the demand for energy efficiency projects and capacity building necessary for implementation of EE projects in the country.

### Tools of intervention

A mix of tools and project instruments was used to address identified barriers for energy efficiency:

- **Free energy audits (EA).** The instrument was designed by the original PRODOC to stimulate demand for energy efficiency projects. It has been used by the project but with a limited impact because it was pre-mature for

the status of the market at the time when implemented. However, one side benefit was that with the project support, the market of energy audits-providers started to develop. The number of providers of energy audit services has increased, the quality of work delivered (i.e. energy audits) was accessed and reported to relevant ministries. Project could not engage further in improving the quality of (EA) service providers because it was outside the project mandate and means.

- **Partial guarantees fund.** In the initial project design the largest amount of money was allocated to the partial guarantees fund. Analyses of the financial sector showed that lack of partial guaranties it is not a “deal-breaker” causing the lack of interest in banks, as it was a secondary barrier actually induced by primary barrier – the lack of prepared bankable projects that need financing. It was thus, first decided to lower initial financing allocated for partial guarantees, and after two years to completely cancel the instrument and to alternatively finance other instruments that would contribute to demand-side and development of energy projects pipeline, e.g. scaling up of Systematic energy management in cities and counties project, free energy audits and promotional campaign.
- **Project development fund.** That was an instrument of the original PRODOC. This instrument aimed to co-finance project investment documentation (up to 50% of total costs of the investment study). Potential users were both end-users and suppliers of equipment/services (ESCOs, consultants). It was planned as a revolving fund, but never could work like one, because simply the time frame for revolving funds was not appreciated at the design stage.

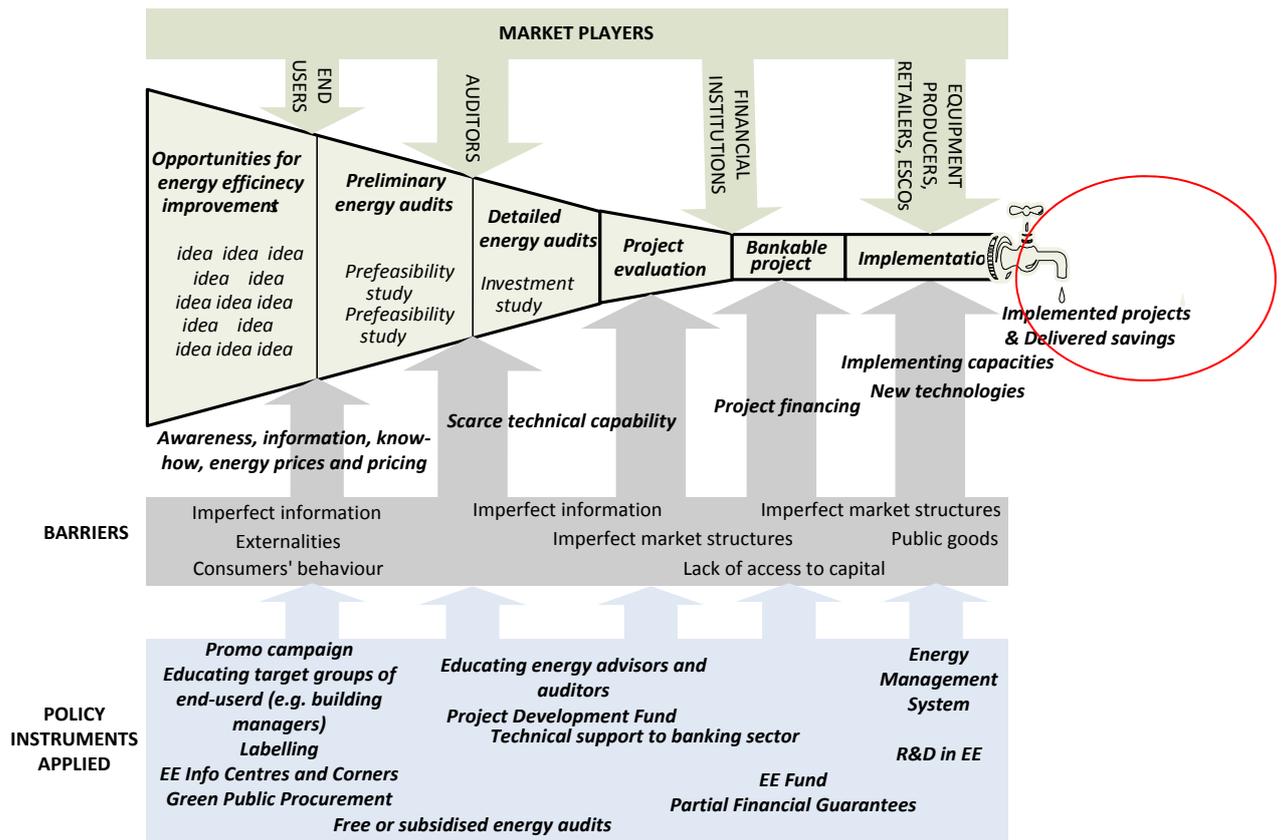


Figure 4: Defining EE project instruments based on actual status of a specific EE market

- **Technical assistance (TA).** This was a new measure designed by the project, based on established Project Management and Technical Support Unit (PMTSU). According to the original PRODOC, the project should have been run by a project manager and two assistants, hence within any in-house technical capacities. These has been changed so that upon project launching the PMTSU was staffed with electric, mechanical and a civil engineer, part time marketing specialist, project manager and his assistant. The PMTSU offered TA to all market players (end-users, banks and others) engaged in the process of development, evaluation and approval of energy efficiency projects. For this purpose Project Management and Technical Support Unit was engaged in direct marketing activities through contacts, workshops and technical support to target groups.
- **Comprehensive promotion campaign.** That was a new instrument introduced by the project. Strategic marketing approach was introduced concentrating on two major components:
  - **National promotion campaign** as instrument to address the general lack of energy efficiency awareness in Croatian society in whole. Strong info-educational campaign that uses principals of social marketing was launched in February 2007. Social marketing is focused on promoting energy efficient way of thinking, living and behaving and

not only to buying and consuming products/services. It is based on “benefits recognition principle”, meaning that each market player will find their own commercial interest in offering or consuming energy efficient products and services leading to sustainable and long-term energy efficiency market development. The campaign lasts three years and comprises of TV, radio and newspaper advertising, outdoor billboards, free of charge advisory phone line and web service.

- **Local promotion.** Local promotion is structured in a way that enables continuous and sustainable information sharing and training of local authorities, citizens and business sector interested in energy efficiency improvement measures implementation.
  - It builds upon the main messages and recommendations communicated within the national info-educational campaign, but it provides more precise advices on energy efficiency improvement measures and offers additional sources of technical and commercial information for designing and installing systems related to energy consumption.
  - Media communication includes broadcasting of educative materials and contact-shows in local TV and radio stations as well as preparation and publication of informative and educative articles in local newspapers, magazines and web-portals.
  - Interactive information systems include EE info centres, EE offices and EE corners as places of direct communication and education of citizens. EE galleries and EE panels are also used with purpose to educate and inform citizens about activities undertaken by the public authorities within the EE project. This way, the citizens are monitoring the progress of local authority's activities and projects and are informed about achieved results. This is motivating citizens and business sector to change their behaviour and to implement energy efficiency improvement measures following the communicated examples.
  - Within local promotion campaign, presentations, workshops and seminars are organised for the chosen target groups (citizens, local authorities and business sector). Additionally, there are a number of promotion and expert publications available on line and in hard-copies for continuous dissemination.
- **Introducing systematic energy management to public buildings as an implementation platform.** These were new activities introduced by the project focused on institutional capacity building and introduction of energy management practice in cities, counties and government ministries with aim of creating competent and effective implementing structures and mechanisms. Active involvement of the public authorities will start to transform the market because it will stimulate demand for EE projects. Increased demand will require adequate deliveries from producers, i.e. from the supply side. The supply side will be tackled by creating informal networks of producers and distributors of EE products demonstrating

energy efficient technologies (appliances, building materials, ect.) in EE corners placed in retail stores. The aim is that the adequate supply is formed at the right time as a response to the increased demand for EE projects, in the public and other sectors.

- **National scaling up: Building capacities and competences of public sector: Energy management in cities and counties and Government House in order program** –The public authorities have to be the "triggers" of EE activities, so capacitating them for implementing EE policies is the key to the lasting success. Only by strong and comprehensive implementing capacities at these levels, the model for actions in all sectors (business, civil society and media) could be established. Therefore based on the experience from the pilot project in Sisak and some other cities, national scaling up was launched at a conference in Split (May, 2008), where the Croatian energy charter was introduced, and subsequently signed by all mayors and prefects within 8 months.

Funding for national scaling-up has been provided by Croatian Environment Protection and Energy Efficiency Fund, in total amount that is four times higher than initial GEF funding. These two national programmes are still being implemented by UNDP (2013) in Croatian cities, counties and central-government buildings.

- **EE credit line.** As a result of the UNDP national promotion campaign and project activities in the City of Sisak, OTP Bank opened a new credit line for energy efficiency projects. This is a result of the increased local awareness of energy efficiency needs and benefits. The OTP Bank recognized that many building owners have difficulty obtaining financing due to cumbersome procedures and high requirements for collateral, and intends to create mechanisms to facilitate easier, cheaper and more accessible credit schemes with government support, e.g. with reduced interest rates and shorter procedures.
- **Collaboration with the HEP ESCO.** The project had intensive collaboration with the HEP ESCO (the energy service company of the national energy utility), whereby the project and the local government primarily provided information, technical support and free energy audits, and the ESCO provided investment-grade audits and investments. Since there was a lack of cooperation between line Ministries on the enabling legal framework for ESCO contracting with public entities, the project made a thorough analyses of Local and Regional authorities budgeting regulation and practice as a background document for development of new enabling sub-laws and regulation at the national level.

#### (4) ASSESSMENT METHODOLOGY

This section gives a description of the analytical tool or models used to assess the potential efficiency improvement and to measure results including energy savings and CO2 reductions.

## Highlights of the EE project terminal evaluation<sup>2</sup>

The project has delivered remarkable results that are unique not only compared to other countries in the region, but Europe-wide.

It introduced and established energy efficiency as a policy priority and as a practical tool for effective housekeeping in the whole public sector in the country, including local and county authorities, as well as central government ministries and agencies. The project has implemented Energy Management System covering practically all public facilities in Croatia. The country became a leader in EMS in public sector in Europe.

During project implementation and based on results in pilot cities, the project has attracted exceptionally high local cash co-financing that was fourfold of the GEF budget. The GEF funds served as seed money, but it was the local funding that actually allowed country wide roll-out and implementation of EMS in the whole public sector.

The project has completely changed the perception and the business-as-usual practice concerning energy efficiency in public sector. But it also changed the awareness and attitude towards energy efficiency in the whole society by its information campaigns, outreach activities and free energy efficiency advisory services, targeting primarily the residential sector.

More than 5 500 public authority officers, energy experts, including auditors, have been trained in energy efficiency.

The results achieved and the impact the project had delivered are evaluated more than Highly Satisfactory.

These results would not materialize without the strong leadership and drive of the Project Manager who combined international best-practice experience with a detailed knowledge of the local market.

## (5) ECONOMIC, ENVIRONMENTAL AND POLICY ANALYSIS

This section gives an appraisal of the overall impact of the policy measures.

### Impacts from implementing context

Energy efficiency is a typical cross sectoral multi-stakeholder issue at every level, because energy is a necessity required by everyone. Energy efficiency can be only improved at the point of use. Strategic documents can be prepared elsewhere, but the actual EE measures can be implemented only there where energy is used and involving people using it.

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<sup>2</sup>TERMINAL EVALUATION REPORT, of the UNDP-GEF Full Size Project:  
**Removing Barriers to Improving Energy Efficiency of the Residential and Service Sectors in Croatia**, Project number: CRO/00/G31/A/1G/99, PIMS: 715, prepared for UNDP CO Croatia by Jiří Zeman, International Evaluator; May 2011

Improving EE is a process of change – people should change the way they use energy, and change their attitude towards energy use – and this is a difficult part. Changing technologies is a straightforward thing, but changing people brings in complexities and unpredictability.

Specifically when one aims to introduce such a change across the whole national public sector, than the extent of complexity starts to shape up.

Further, at the start of the project in 2005 in Croatia the concept of multi-stakeholders cooperation, i.e. business-government-civil society in policy making and implementation was still new. It was necessary to introduce innovative (for Croatia at least) approach for bridging traditional boundaries between them.

Multiple and ever growing number of stakeholders created an emerging project environment that was evolving all the time, requiring adaptive interventions and influencing the beneficiaries over whom the Project could not exert direct management control.

Hence against a background of:

- Multiple stakeholders,
- Implementing EE being equivalent to implementing a change process,
- Complexity of relationships and interdependencies,
- Ever changing and emerging project environment,

an appropriate project structure developed and execution approach need to be developed.

Because of an evident lack of capacity in the country for introduction of energy management, and because hiring international consultants for that was not an option (on the account of available budget, but also language barrier, etc), it was apparent from the beginning that the Project needed to develop and maintain in-house capacity to support beneficiaries through all the stages of energy management introduction.

## Project Launching

Project launching comes after detail project work breakdown, activity list, schedules, budgets and assignment of resources to project efforts are all done. The goals are transformed into action plans and milestones are established.

Project goes into life and changes from inward based activities of inception phase toward outward based activities of implementation phase.

From the beginning one should take care about establishing and maintaining high standards of communication and performance. Project must strive achieve high visibility, credibility, authority and competence reputation with its internal and external stakeholders and partners.

Launching phase lasted for six months. During that time all initial activities were conducted including:

- Detail planning of activities and resources;

- Establishing and activating the Project Steering Committee;
- Staffing and equipping the PMTSU;
- Releasing public announcements related to project;
- Organising a line of “Energy breakfast” workshops across the Croatia to directly inform and to get to know various stakeholder groups on local level (Local authorities, Banks and Financial Institutions, Croatian Institutions for Preservation of Cultural Heritage, Managers of the Buildings, Representatives of the Flat Owners, Large Retail Chains and Stores, NGO’s and association for protection of consumers, Energy Distributors in Croatia);
- Establishment of all strategic partnerships needed for successful project start-up (designated ministries, WB, HBOR, HEP ESCO, Fund for environmental protection and energy efficiency);
- Selection of area for pilot project, political decision and agreements on intervention, start of activities.

### **Kick off project activities – area piloting**

The City of Sisak was selected as a pilot to have a real life example and a role model for successful implementation of energy management system under the Croatian circumstances. Sisak is a medium size city of some 50,000 inhabitants (9th out 127 cities in Croatia), and as such is representative for a number of cities in Croatia, which makes replication in other areas relevant and easier. The main goal was to create capacity for energy management and implementation of energy efficiency measures at the city administration.

Main interventions in the city were as follows:

- Introduction and development of the Energy Management System;
- Walk through energy audits of all the buildings that belong to the City (80 objects);
- Energy audit of public lighting system;
- Energy audit of the water supply system;
- Continuous technical assistance to the city and to the first Croatian EE team (established in 2007) to plan, budget, implement, monitor and report on implementation of energy efficiency improvement measures.

To yield concrete results as soon as possible, strategic alliance with HEP ESCO was built, thus securing financial construction for the first energy efficiency investments.

Nevertheless, leveraging practice that is now referred to as the “best practice” even outside of Croatia could not happen in the short period of time. It took more than two years of continuous work in the City of Sisak providing expert, technical and financial support in implementing energy management system and related energy efficiency measures to have a real show-case city in place. Energy efficiency improvement projects were realised in 24 public

buildings resulting in approximately USD 220,000 savings per year (about 13% of the annual municipal budget for energy), as well as 350t/CO<sub>2</sub> reductions per year.

Successful demonstration of the energy management concept in the City of Sisak immediately raised interest in other cities and counties, starting with cities of Bjelovar, Koprivnica, Split and Karlovac, and Splitsko-dalmatinska and Sisacko-moslavacka counties.

After the city wide energy management attracted attention of some other cities and got them involved, scaling up proposal for two national programs were drafted and initiated:

- Energy management in cities and counties
- Energy management in all government buildings – ‘House in order program’

This was a response to the emerging situation where it became apparent that a bold and ambitious program might succeed in a transformational change of the EE landscape in public sector.

Therefore a clear vision for these programs was expressed aiming at preparing a building stock register of all public buildings in Croatia and creating capacities in public sector (government and local administration) for energy management.

The initial seed funds were secured through internal budget reallocation (from non-functional partial guarantee instrument), and a high level launching event was organized.

## Scaling up

Addressing all the identified issues and barriers for effective implementation of the EE project strategy included coordinated major and long-term efforts of various government institutions, cities and counties, businesses and civil society organizations. These activities are going on for almost 8 years now, with 1 more year to follow, and are beginning to deliver positive results.

The scaling up strategy was based on five main pillars:

- Based on the initial project achievements establish UNDP as a trustworthy expert partner to the Government and securing national funds for three large scale national programmes;
- Roll out energy management implementation from pilot in Sisak to all cities and counties in Croatia;
- Government leading by example through implementing energy management in its own buildings nationally;
- Running a three-year public information and promotion campaign aiming at raising awareness on profitable EE measure for residential sector;
- Stimulating transformation of EE market by parallel activities in cities aiming at strengthening demand and supply for EE products, goods and services, and implementing specific EE improvement measures and projects.

### 1st Phase of the scaling-up EE project (2007-2010) was focused on:

- Developing and running the national info-educational campaign as a three-year program (2007-2009);
- Raising political commitment on highest level as the precondition for cities, counties and ministries to start continuous and systematic energy management in their own buildings. Political support was gained through the initiative for signing the “Energy charter” of the city majors and county prefects, and strong promotion through yearly conferences with international participants (1st in Split, 2nd in Zagreb, 3<sup>rd</sup> in Dubrovnik) in order to raise EE issue high on the political agenda in Croatia (and broader), create a network for collaboration among public institutions in Croatia and whole Europe.
- Establishment of appropriate organisational structure within public administrations (Energy management office), with people that are trained and provided with continuous support. In addition, appointment and training of a person designated for energy management on site of their buildings;
- Collection of buildings data for the Building Stock Register. In parallel development of the Energy Management Information System (EMIS) to support the registry with remote (and automatic where possible) data collection, storage and analysis on the energy and water consumption;
- Introduction of the process of weekly monitoring energy consumption;
- Training activities with several modules for different stakeholders;
- Local promotion, education and information campaigns for citizens and businesses; (All brochures, information and promotion publication, training materials and presentations are available on the EE project web page: <http://www.energetska-efikasnost.undp.hr/> ).
- Completing all steps of the project intervention for at least one city in each county (20 in total in Croatia) so they are capable for independent energy planning, budgeting, implementing, monitoring and reporting.
- Provision of free energy audits (EA) through specialized companies. Although the initial goal of EAs was to launch an investment cycle in EE improvement measures, in reality it has more contributed to the capacity development of the auditing companies and developing market for the EAs. Couple of hundreds EA carried out at the beginning of the project were not utilised, but gradually the concept of selection of buildings for the EA has changed from systematic covering of all buildings in pilot areas to selection through consultation with stakeholders, taking into consideration preliminary calculations and investment plans of local authorities. Furthermore, in 2005, there were about 3 companies with 3-4 employees involved in energy efficiency auditing in Croatia. After five years and more than 1.000 energy audits were completed with intense cooperation and quality control of performance of energy auditing companies, there are

about 20 active companies with over 150 professionals working in this field .

Completing all steps of the introduction of the energy management system was possible only in the cities and counties that have started with the implementation immediately, and vigorously worked ever since. However, capacity of the majority of the cities, counties and ministries for implementation of the systematic energy management activities is still low, and the process itself is very slow and technically demanding where new issues were emerging regularly.

**For these reasons, in the second phase (2011-2012)** it was necessary to continue on already started processes and achieved results and to extent expert and technical support to the cities and counties for the minimum of two years.

Activities in the second phase are twofold:

- In those cities and counties that have already achieved a certain degree of independence, it is necessary to take it a step further – again on example of the pilot City of Sisak the concept of “Smart Energy City” was developed - based on the networked infrastructure for improvement and more efficient public services management. First and unavoidable activity in the direction of Smart City is installation of remote metering in at least each county governance building and major town buildings.
- In those cities, counties and ministries that are now in different phases of EMS implementation (most of them) it is necessary to work with them until they are able to manage all energy related issues in all their buildings independently and proactively.

#### Current state of the Project (January 2013)

As a result of parliamentary elections in December 2011, the new Government was established, which entirely changed the institutional set-up in the country. This required not only to re-establish relationships on high policy and decision-making level, but also has changed the main implementing partner for the Energy Efficiency (EE) Project. The implementing partner responsibility changed from the Ministry of Economy to the Ministry of Construction and Physical Planning. Also, the project is 95% financed by Croatian Environment Fund, where there were a couple of changes at Directors' position within a year. There is still a high-level political duel between two main coalition partners on who will manage the energy-budget of the Environment Fund and who will oversee the energy investments in the country, which was identified as one of priority sectors

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<sup>3</sup> Program Ujedinjenih naroda za razvoj (UNDP) u Hrvatskoj, 2010, *Iskustva provođenja energetske pregleda zgrada u sklopu projekta „Poticanje energetske efikasnosti u Hrvatskoj“*, Zagreb: UNDP, (Intern document in Croatian delivered to relevant ministries only)

for investments that should contribute to economic recovery in the country. All these changes resulted with delays in key decision-making and required more efforts in keeping UNDP's position as the main responsible party for implementing project activities. Despite delays, these changes brought new enthusiasm on the side of Government, the main partner at the Ministry fully understood the importance and the value of energy efficiency activities UNDP has been doing in Croatia in the past seven years. The experts from EE Project team have been involved in drafting new technical regulations and in revision of national legislation for energy efficiency in buildings sector. Amongst other factors and information, data from the EE Project databases of buildings have been used to prepare the national programme of public buildings retrofit, which is starting up slower than planned and with many complex issues still to be solved, but what changed is that there is political will and intent to invest into energy efficiency measures in public sector buildings.

In addition to responding to ad-hoc expert and technical assistance requests from the Ministry of construction, the EE project continued with its regular activities of systematic energy management in public sector buildings. The project works in 95 cities and 20 counties and at all 20 ministries – the number of which increased from 16 due to post-elections Government restructuring. Energy efficiency planning has been supported when requested, especially in the process of nomination of buildings for Government programme of public sector buildings retrofit. There were 19 energy audits and 60 energy certificates for public buildings issued. There are 41 smart metering systems installed, 9 investment studies, 9 main projects for reconstruction and more than 30 conceptual design projects prepared for energy efficiency reconstruction of objects. The number of EE information-points increased to 116 all over the country, all have been monitored and supported as necessary. The Energy Management Information System has been improved with new functionalities and data had to be transferred, verified for accuracy and locked. This process still continues while the number of buildings is increasing (now at roughly 11.000) so the volume of buildings entered into the system is at 75%. Contracts for co-financing the fifth project year have been signed, with an agreed framework for transfer of capacities to national institutions, which will be in focus in 2013.

UNDP – Energy Efficiency project experts participated, at a request of the Ministry of Construction and Physical Planning, in technical working groups for preparation of national regulations related to energy audits and energy certification of buildings, to preparation of revision of the Law on end-use efficiency.

EE Project - public buildings registry activities reached the number of 3783 identified objects owned or used by the central government, 3948 objects owned by 82 cities and 3100 objects owned by 19 counties, which makes the total number of public sector buildings increased to close to 11.000. Of that number, data on energy and water consumption for 7103 objects are entered into the national Energy Management Information System (EMIS), which enables weekly/monthly monitoring and management of energy consumption. <https://www.isge.hr/>

As a follow-up of energy audits conducted in previous years, 60 energy certificates were issued for public buildings that is requested by regulation that came in force in 2012. Round 20 project technical documentation and investment studies have been prepared for different types of public sector buildings, which are in the process of raising funds for investment, either from the Croatian Environment Fund, either from different EU funds, with co-financing planned in their own budgets for 2013. All this results for now in savings on energy bills of about \$16 million, with more to come after investments.

### Lessons learned

- Project intervention strategy was embedded in sound national EE policies and international frameworks aiming at creating enabling environment for EE improvements. The real place for implementation was in the cities and counties where energy is actually used. **Developing implementing capacities on local level for embracing full-scale energy management systems in public service is therefore the most important part of the project interventions.**
- Implementation on the local level will not happen without appropriate institutional setup, capacities and strong proactive leadership in policy implementation, i.e. without:
  - Enduring political will to implement policies in place;
  - Ensuring adequate implementing capacities;
  - Appropriate resources and competences supported by
  - Provision of an Energy Management Information System (EMIS) – it is an ICT tool developed by the project for monitoring, and evaluating results of implemented EE measures.
- A crucial point for the success of the project is the active project support to public administration and the politicians to introduce and carry through the EMS activities. Public acknowledgments of such efforts as well as press coverage are the most important tools to improve the interest of the involved parties.

- Full-scale application of the EE project in Croatian cities has demonstrated that the total city's annual energy consumption could be reduced by 20-30%. However, the time required to achieve self-sustainability of local EE teams so that they can continue operating without outside support is at least 3-4 years!
- Concentrated, tailor-made and dedicated support efforts over a sufficient period of time are pre-requisites for creation of effective implementing capacities for EE policies on the ground in the cities which must be the promoters and carriers of actions, awareness and behaviour changes related to energy efficiency
- The project results cannot be scaled up if interventions rely on donor resources without thought to existing organizational capacity and financial resources. Indigenous resources are required for successful scaling up.
- Right timing of project instruments application. Energy audits should not start before the beneficiary has established organisational structure with developed capacity (EE team) to handle energy audit reports and turn them into the bankable projects that would be ultimately implemented and secured at least initial funds for the follow up on the energy audit. Earlier start of the EMIS development, developing the Register of buildings data base and collecting data on consumption, introducing Green office and green procurement practise, would be much more beneficial.
  - Project implementation should consider sequencing of project interventions based on development of capacity among the project counterparts and staff.

A complex project that aims to achieve systematic improvements in energy efficiency and energy management must be implemented in several stages that build capacity, put in place national provisions for reinforcing project activities, and measure and disseminate results.

In the Croatia EE project, the proper sequencing of interventions was:

- To get political commitment of local authorities (Energy Charter)
- Institutional and organizational capacity development (Letter of Intent)
  - Establish an energy management responsibility
  - Initiate training
  - Prepare building stock register,
- Start monitoring of energy use, establish baseline consumption, set targets
- Budget for EE activities
- Mobilize qualified service providers.
- Sustainability of results requires building ownership by local and national authorities.

Provisions for local ownership and sustainability must be factored in from the very beginning. Local ownership and sustainability was achieved by:

- Securing firm political and financial commitments before starting technical activities. All mayors and prefects (147) signed onto the Croatian Energy Charter within 8 months. This was followed by a requirement to declare and approve their own energy and environmental policy, and then by a letter of intent where the cities gave firm commitments on setting up their own energy management teams. Only when these terms were in place, UNDP started engaging in supporting them for introduction of energy management, and for other technical activities.
  - Mutual commitments: The project entered into partnership and provided technical and other assistance only to those local and regional governments that officially committed to appoint the responsible person and include the new practices in their operational structure (to establish an EE office).
  - Professional development: Personnel working in the EE offices were continuously trained on different issues to ensure they gain basic knowledge and skills necessary for independent performance of their duties in the future. This training was performed on-the-job and on the workshops, and the growing number of cities involved caused growing requirements for the project team size, composition and competence.
  - Tools and technical assistance: An ICT tool, the Energy Management Information System (EMIS), was created to help local authorities to continuously collect, store and analyse all data related to energy consumption and performance of buildings in their jurisdiction: Personnel in EE offices were trained on the usage of EMIS, and technical help was provided to collect all initial data on buildings.
- Implementation of strategic projects is complex process with many stakeholders. One of the issues that should be considered is the time frame to assure sustainability, i.e. how much time would it take to make EE practice a daily routine? Our experience tells us that it takes 2-3 years for a city to absorb the EE practices, but the overall project duration should be at least 5 years.

## **(6) POLICY DESIGN CONSIDERATIONS**

This section give implications for promoting this successful policy more widely on a national basis.

### **Transition to national projects**

The project strategy was from the beginning oriented to use GEF funds as the seed money for the pilots, scaling up activities and mobilising national funds and capacities for nationwide interventions in the scope of the two EE project components: SGE and HiO programmes. In setting the dynamics of the development and growth of those components, exit strategy for the GEF EE project has been taken into account, so that at the time of the GEF EE project

closing phase, SGE and HiO projects are at the peak of their activities, equipped with full capacity and financially secured to undertake all project activities for next three years.

### **Transition to national institutions**

While policy definition is in the hands of the government, i.e. Ministry of economy, labour and entrepreneurship and to less extent Ministry of environmental protection, physical planning and construction, they don't have the capacities to deal with policy implementation issues. Therefore, project developed two transition proposals.

The first one was for establishment of a national EE agency, as governmental implementing body, which was even embedded in the original EE Master plan, but was aborted later on, by political decision during inter-ministerial discussions. Since it was decided that Croatia will not have an independent EE Agency, but that instead the Ministry of Economy and Environment Protection and Energy Efficiency Fund have assumed its functions, the second transition plan was made to gradually convey EE project activities and the key capacity to the Fund. Although the second proposal was discussed on numerous bilateral and multilateral meetings, no formal decision was made upon it, and so it gradually died out. Discussions on transition and transfer of activities were re-opened with the new Government (post-December 2011 elections change) in 2012, and a framework for transfer has been agreed although it is still not clear (in 2013) who is a national designated institution to coordinate and facilitate energy efficiency activities in the country.

### **Securing sustainability**

The national institutions (such as national agencies) have major role in initiating EE programmes, coordination of activities and especially in evaluation, monitoring and verification activities, the real-life implementation happens at the local level. Local authorities are the closest to places where energy is consumed, still having executive powers. That is why one of the project goals was to secure formal status of EE offices in cities and counties, so they could continuously stay as the main drive for the implementation of EE measures.

Actions that local authorities should continue to undertake are twofold: firstly, energy consumption in facilities and services in their jurisdiction should be properly managed, and secondly, they have to make information publicly available and cooperate with civil society organisations, businesses and media to improve citizens' awareness and facilitate change of energy related behaviour and attitude.

However, the project activities are still continuing for two more years on exclusively local financing, hence there is still time to address the issues of sustainability.

## Lessons learned

- Building local capacities to energy management activities is the most important precondition for successful uptake of energy efficiency project implementation and delivering further savings targets after the EE project is completed. Introduction of full-scale energy management is instrumental here, which could be a backbone for evolution to 'smart energy cities' and sustainable urban development. The energy management solutions applied in the public sector could be easily adjusted and applied in business sector as well.
- Designated ministries in charge for energy policy definition do not have capacities for initiating implementation of EE programmes, coordination of activities and monitoring and verification activities. It would be necessary to establish a dedicated national institution with capacity and authority of energy efficiency agency in order to enable continuous support to all sectors in Croatia for further up taking and implementing new EE initiatives.

## (7) CONCLUSIONS AND RECOMMENDATIONS

For future policy development nationally and implications for adoption of a similar approach in neighbouring countries will be presented in this section.

### Main conclusions

The project has delivered remarkable results that are unique not only compared to other countries in the region, but Europe-wide.

It introduced and established energy efficiency as a policy priority and as a practical tool for effective housekeeping in the whole public sector in the country, including local and county authorities, as well as central government ministries and agencies. The project has implemented Energy Management System covering practically all public facilities in Croatia. The country became a leader in EMS in public sector in Europe.

During project implementation and based on results in pilot cities, the project has attracted exceptionally high local cash co-financing that was fourfold of the GEF budget. The GEF funds served as seed money, but it was the local funding that actually allowed country wide roll-out and implementation of EMS in the whole public sector.

The project has completely changed the perception and the business-as-usual practice concerning energy efficiency in public sector. But it also changed the awareness and attitude towards energy efficiency in the whole society by its information campaigns, outreach activities and free energy efficiency advisory services, targeting primarily the residential sector.

More than 5 500 public authority officers, energy experts, including auditors, have been trained in energy efficiency.

These results would not materialize without the strong leadership and drive of the Project Manager who combined international best-practice experience

with a detailed knowledge of the local market. It was the newly appointed Project Manager who redefined project activities and included the EMS component and focus on public sector in his Inception Report already in reaction to partly out-dated Project Document.

### **Remained barriers**

However, there still remain challenges and barriers to energy efficiency in the country. In response to the financial crisis, the Ministry of Finance has introduced an effective ban on new loans in public sector. This ban even covers third-party financed EPC projects, despite the fact that this out-of-budget financing is particularly beneficial during the period of public budget restrictions, because it has no negative impact on public budgets. This ban on EPC projects in public sector is unfortunate especially in a country where operates one of the most successful ESCO companies whose establishment and operation was assisted by the World Bank – the HEP ESCO. In response to these restrictions, HEP ESCO had to cancel its activities in public sector and to focus on customers in other commercial and industrial sectors. The only source for financing energy efficiency projects in public sector in Croatia is thus nowadays Environmental Protection and Energy Efficiency Fund – EPEEF, which provides up to 40% subsidies for energy efficiency projects in public sector. (The remaining investment is financed directly from budgets of public authorities, and thus increasing their debt.)

In the residential sector there still exist key barriers that prevent practically any building level investment in multi-apartment buildings. There is a 100% quorum required for any building level investment decision, including energy efficiency. In existing buildings, district heating bills are based on floor area of apartments and do not reflect actual energy consumption, and building level heat meters and individual heat cost allocators are not installed (with some exceptions). The legislation has been harmonized with the EU Directive 2006/32/EC on energy end-use efficiency and energy services which requires “energy billing based on metering” only concerning new buildings built after III/2005, but not concerning the existing multi-apartment building stock. A policy action is needed to remove these barriers.