BASELINE STUDY ON THE CURRENT STATE OF EPC/ESCO PROJECT DEVELOPMENT AND IMPLEMENTATION IN THE PUBLIC SECTOR OF PARTNER COUNTRIES

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EIHP - Energy Institute Hrvoje Požar (Croatia)
e-code (Slovakia)
CRES - Centre for Renewable Energy Sources and Saving (Greece)
KSSENA - Energy Agency of Savinjska, Šaleška and Koroška Region (Slovenia)
AE3R - Energy Efficiency and Renewable Energy Agency Ploiesti-Prahova (Romania)
SCTM - Standing Conference of Towns and Municipalities (Serbia)
FIATU - Finance & Technology Ukraine (Ukraine)
ZREA - Zemgale Regional Energy Agency (Latvia)

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31 October 2015

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Abbreviations and Acronyms

AE3R  Energy Efficiency and Renewable Energy Agency Ploiesti-Prahova
AGFW  German Efficiency Association for Heat, Cold and Cogeneration
ALTUM  Latvian development financial institution
APN  Agency for Transactions and Mediation in Immovable Properties
ASEW  Joint Working Group for the Efficient Use of Energy and Water in the Germany Association of Municipal Services (VKU)
BAFA  German Federal Office of Economics and Export Control
BDEW  German Association of Energy and Water Industries
BEA  Berlin Energy Agency
BGL.  German Federal Law Gazette
e-code  Education for continuous development
CCFI  Climate Change Financial Instrument
CEB  Council of Europe Development Bank
CRES  Greek Centre for Renewable Energy Sources and Saving
dena  German Energy Agency
DIN  German Institute for Standardization
EBRD  European Bank for Reconstruction and Development
ECM  Energy conservation measures
ECS  Energy Community Secretariat
EDL-G  Law on energy services and other energy efficiency measures - Energiedienstleistungsgesetz
EE  Energy Efficiency
EESI  European Energy Service Initiative
EIB  European Investment Bank
EIHP  Energy Institute Hrvoje Požar (Croatia)
EN  European Norm
EnEG  Energy Savings Act - Energieeinsparungsgesetz
EnEV  Energy Savings Ordinance - Energieeinsparverordnung
ENSI  Energy Saving International AS (a Norwegian consulting company)
EPC  Energy Performance Contracting
ERAB  Economic Recovery Advisory Board
ESC  Energy Supply Contracting
ESCO  Energy Service Company
EU  European Union
EU28  European Union of the 28 Member States
DENEFF  German Energy Efficiency Network
FIATU  Finance & Technology Ukraine (Ukraine)
FP7  Seventh Framework Programme on Research and Innovation
Geea  German Alliance for Energy Efficiency in Buildings
GD  Romanian Government Decision
GEF  Global Environment Facility
GIZ  Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (Germany)
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWh</td>
<td>Gigawatt_hour (1 GWh = 1,000 MWh)</td>
</tr>
<tr>
<td>H2020</td>
<td>HORIZON 2020 - European Union Research and Innovation Programme</td>
</tr>
<tr>
<td>Hg</td>
<td>Mercury</td>
</tr>
<tr>
<td>IEA</td>
<td>International Energy Agency</td>
</tr>
<tr>
<td>IEE</td>
<td>Intelligent Energy Europe</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>J</td>
<td>Joule (1 J = 0.278 · 10⁻⁶ kWh)</td>
</tr>
<tr>
<td>KEA</td>
<td>Klimaschutz- und Energieagentur Baden-Württemberg (Germany)</td>
</tr>
<tr>
<td>KSSENA</td>
<td>Energy Agency of Savinjska, Šaleška and Koroška Region (Slovenia)</td>
</tr>
<tr>
<td>kWh</td>
<td>Kilowatt_hour</td>
</tr>
<tr>
<td>LVS</td>
<td>Latvijas Standarts</td>
</tr>
<tr>
<td>m²</td>
<td>square meter</td>
</tr>
<tr>
<td>MBO</td>
<td>Musterbauordnung - Model Building Regulation -</td>
</tr>
<tr>
<td>MWh</td>
<td>Megawatt_hour (1 MWh = 1,000 kWh)</td>
</tr>
<tr>
<td>NAPE</td>
<td>National Action Plan for Energy Efficiency</td>
</tr>
<tr>
<td>NERM</td>
<td>Non energy-related measures</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-government organization</td>
</tr>
<tr>
<td>NIB</td>
<td>Nordik Investment Bank</td>
</tr>
<tr>
<td>ÖffPrivPartG</td>
<td>Act to Accelerate the Establishment and to Improve the Legal Framework for Public Private Partnership</td>
</tr>
<tr>
<td>OG</td>
<td>Official Gazette</td>
</tr>
<tr>
<td>PJ</td>
<td>Petajoule (1 Petajoule = 10¹⁵ J = 278 GWh)</td>
</tr>
<tr>
<td>PPP</td>
<td>Public-private partnership</td>
</tr>
<tr>
<td>RS</td>
<td>Republic of Serbia</td>
</tr>
<tr>
<td>SCTM</td>
<td>Standing Conference of Towns and Municipalities (Serbia)</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium-sized Enterprise</td>
</tr>
<tr>
<td>TPF</td>
<td>Third Party Financing</td>
</tr>
<tr>
<td>TRANSPARENSE</td>
<td>Increasing Transparency of Energy Service Markets</td>
</tr>
<tr>
<td>TWh</td>
<td>Terawatt_hour (1 TWh = 1,000 GWh)</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>VfW</td>
<td>German Association of Heat Supply</td>
</tr>
<tr>
<td>VKU</td>
<td>German Association of Municipal Services</td>
</tr>
<tr>
<td>WP</td>
<td>Work package</td>
</tr>
<tr>
<td>y</td>
<td>year</td>
</tr>
<tr>
<td>YREKA</td>
<td>Greek Ministry of Environment, Energy and Climate Change</td>
</tr>
<tr>
<td>ZREA</td>
<td>Zemgale Regional Energy Agency (Latvia)</td>
</tr>
<tr>
<td>ZVEI</td>
<td>German Electrical and Electronic Manufacturers' Association - Zentralverband Elektrotechnik- und Elektronikindustrie</td>
</tr>
</tbody>
</table>
**Executive Summary**

This baseline study is based on the consultation of 408 stakeholders who provided their feedback in summer 2015 in 8 of the 9 partner countries (see Figure 3 on page 11). Stakeholder consultations in Greece are still on-going and their results will be included in the update study due at the date of project completion in February 2017.

The results of these stakeholder consultations may be summarized as follows:

To date, the ESCO markets in the partner countries are representing three different levels of market development:

- **Established ESCO market**: Germany
- **Emerging ESCO markets**: Croatia, Slovakia, Slovenia
- **Prospective ESCO markets**: Greece, Latvia, Romania, Serbia and Ukraine

In all of these markets ESCOs, if there are any active in the country, focus their contracting businesses on energy supply contracting (ESC) rather than on energy performance contracting (EPC). ESC is closer to the ESCOs traditional business models than EPC and can directly build upon the already existing business relations between energy suppliers and their public customers.

In public services the development and use of EPC business models is, in particular in emerging or prospective markets, often starting with EE improvements in street lighting. EE improvements of street lighting are requiring relatively low investment per saved MWh of electricity and provide relatively fast and reliable pay-back compared to EE improvements in buildings. Baseline consumption and maintenance cost as well as guaranteed and actually achieved energy savings and saved maintenance cost are more transparent and much easier to be assessed and monitored from both the suppliers’ of EPC for street lighting and their public customers’ points of view.

The economic and technical risk and the uncertainties related to the determination and verification of energy performance guarantees in public buildings is much higher for both the ESCO on the supply side as well as for the public building owner on the demand side of EPC projects. This is why EPC for public buildings, despite the large economical and technical energy savings potentials, is still an underdeveloped niche market all over Europe, even in established ESCO markets like Germany. In none of the partner countries, the market for EPC in public buildings has emerged to a level of self-sustaining growth, which would be necessary to attract additional actors on both the demand and the supply side of the market, including relevant facilitators.

Energy and cost saving potentials and needs of public authorities are however much higher in the public buildings sector than in street lighting. Therefore, the initiation and development of a faster market uptake of EPC business models for EE improvements in public buildings will allow public authorities to contribute to the EE targets of European and national energy policies.

One of the biggest obstacles for the emerging of a market for EPC in public buildings in the partner countries is the lack of a sufficient number of economically attractive EPC projects tendered out on the market place by the public building owners. In this situation, each new EPC project initiated by participants in EnPC-INTRANS capacity development may contribute to the creation of new impulses for the emerging of an EPC market in these countries.

Each EPC project newly initiated by participants in EnPC-INTRANS capacity development, awareness building and information activities will be monitored with its expected impacts as an outcome of the project.

As the delay from the initiation of a new EPC project to a public call for tenders will in most cases be longer than the duration of the project, each of the newly initiated projects pending at the date of completion of the project will be monitored as an outcome of the project. An ex-post evaluation performed 3-5 years after the date of completion of the project might focus on the monitoring of how many of these pending projects will have finally been implemented. Such an ex-post evaluation might also focus on the more reliable quantification of investments actually triggered and of energy savings actually achieved as an outcome of the project.

The project partners reserve their right to perform such an ex-post evaluation in their own countries and on their own discretion at any time following the date of completion of the project, even though this is not mandatory in the context of the EnCP-INTRANS work programme.
1. Introduction

1.1 EnPC-INTRANS – the project

EnPC-INTRANS is a project implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in cooperation with the Climate Protection and Energy Agency of Baden-Württemberg/Germany and European competence centres on Energy Performance Contracting (EPC) in Croatia, Greece and Slovenia, a competence centre for e-learning in Slovakia, and key actors for the promotion of EPC at the local level in Latvia, Serbia, Romania and Ukraine.

Objective of EnPC-INTRANS is to increase the market uptake of technologies for the improvement of energy efficiency (EE) in public buildings and services by means of fostering private sector participation in innovative financing schemes for EE investments. This will be achieved by means of implementing large-scale capacity building for local public authorities and small- and medium-sized enterprises (SMEs) to jointly set-up and use adapted EPC models for EE services.

The partner countries of the project comprise:

- Croatia
- Germany
- Greece
- Latvia
- Romania
- Serbia
- Slovakia
- Slovenia
- Ukraine

These countries have been selected in order to cover in the project a wide range of European countries which are currently at different stages of transition towards an energy efficient low-carbon economy. They are represented by the following partners in the project:

- GIZ Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (Germany).
- KEA Klimaschutz- und Energieagentur Baden-Württemberg (Germany).
- EIHP Energy Institute Hrvoje Požar (Croatia).
- e-code (Slovakia).
- CRES Centre for Renewable Energy Sources and Saving (Greece).
- KSSENA Energy Agency of Savinjska, Šaleška and Koroška Region (Slovenia).
- SCTM Standing Conference of Towns and Municipalities (Serbia).
- FIATU Finance & Technology Ukraine (Ukraine).
- ZREA Zemgale Regional Energy Agency (Latvia).

During project implementation, European best practices in EPC are adapted to local conditions (Work Package 2 – WP2) and presented to relevant target groups in the partner countries (WP3). Training needs of local public authorities and SMEs are assessed in intensive stakeholder dialogue, providing the basis for design and implementation of efficient training concepts and tools making use of advanced on-line technologies for European-wide capacity development (WP4). Trainers are trained throughout the partners’ networks (WP4) and the developed training concepts and tools are demonstrated in national and international cooperation seminars (WP5). The achieved impact of large-scale capacity development on the European market for EPC projects is continuously monitored and evaluated (WP6) and the project results are disseminated to all EU28 member states (WP7). This study refers to WP6 “Impact Monitoring & Evaluation” and provides the baseline information for the monitoring and evaluation of expected impacts. It is expected that at least 50 trained trainers and 3,000 trained and informed experts will directly benefit during project implementation from the project and cater for the initiation and development of EPC projects in the partner countries and beyond.
1.2 Scope of the baseline study

The baseline study has two major tasks to fulfil:

- Provide reference information for the monitoring of impacts achieved during the implementation of the project with reference to the three indicators outlined in the monitoring concept (see chapter 4.1, p. 33).
- Define indicators for the assessment of energy savings and new investments triggered by the EPC projects which are newly initiated by participants in EnPC-INTRANS capacity development during project duration and during the first few years following the end of the duration of the project.

GIZ developed appropriate instruments (questionnaire, checklist) for the collection of information for the baseline study while the partners (for Germany: KEA) collected relevant information and data from their own countries on the basis of the agreed methodology (see chapter 2). The report was drafted by GIZ and thoroughly reviewed and finally approved by all partners.

Following the work plan of the project, this baseline study is complementary to three further reports compiled by project partners:

- EPC business models adapted to needs of the public sector in the partner countries (D2.1).
- Stakeholder opinion on EPC/ESCO concepts (D3.1).
- Training needs assessment report (D4.1).

These additional reports will be available at the end of 2015 and will go more into specific detail while building upon the information provided in this baseline study.

2. Applied methodology

The methodology applied for this baseline study focusses on:

- Proposing clear structure and procedures for the monitoring & verification of planned energy efficiency measures.
- Identifying/developing energy saving indicators and proposing ways how to make use of these indicators for the monitoring of project impacts.

GIZ presented this methodology and instruments to a SC meeting in July 2015 in Belgrade for review and approval. The partners used the approved methods and instruments to collect the requested information by means of desk research and stakeholder consultations in their countries. All partners reported to GIZ, who drafted the baseline study and presented it to the partners for peer review and final approval in October 2015.

The scope of this study is to give baseline information to which the monitoring and evaluation of expected impacts can refer during project implementation and evaluation, and to develop a methodology and indicators for the verification of energy savings and investments triggered as an outcome of the project. The study covers all partner countries of the project and is based upon three major methodical pillars:

- Consultation of stakeholders.
- Investigation of the current status of national framework conditions for EPC.
- Review of available information from existing literature and other sources.

An overview of methods applied in each of these three pillars is given in the following paragraphs.

2.1 Stakeholder consultations

Activities performed under the EnCP-INTRANS project are based upon a sound review of the specific interests of key stakeholders and experts in the partner countries. This is why the project partners are consulting representatives of the following stakeholder groups that may be involved in the promotion of EPC models for public buildings in their countries, such as e.g.:

- National authorities influencing the legal, regulatory and administrative framework for EPC projects.
- Local decision makers and authorities.
- Energy agencies providing advice and support on energy issues to local authorities.
- Facilitators and advisers of local public authorities who would like assisting public authorities in developing their EPC projects up to the tendering stage.
- ESCO companies.
- SMEs who would like joining the ESCO market.
- International institutions, as far as they are relevant in the country (e.g. in Ukraine, Serbia).
- Financing institutions.
- Other stakeholders and experts.

The partners contacted representatives of these target groups for interviews (in personal meetings, by phone, or by email). In support of this baseline study the interviews focused on questions presented in Table 1.

<table>
<thead>
<tr>
<th>Have you ever been concerned with the development and implementation of EPC projects in your country?</th>
<th>( ) YES   ( ) NO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>If yes:</strong> What was your role?</td>
<td>( ) Building owner ( ) Public administration</td>
</tr>
<tr>
<td></td>
<td>( ) ESCO           ( ) Financing institution</td>
</tr>
<tr>
<td></td>
<td>( ) Technical / economic / legal adviser</td>
</tr>
<tr>
<td></td>
<td>( ) Other: ____________________________</td>
</tr>
<tr>
<td>Have these projects been implemented (achieved results)?</td>
<td>Please explain:</td>
</tr>
<tr>
<td>What are your conclusions &amp; recommendations?</td>
<td>Please explain:</td>
</tr>
</tbody>
</table>

Table 1: Interview questions asked during stakeholder consultations

A total of 408 stakeholders from 8 partner countries gave their feedback and answered these questions until 20 October 2015. In average 51 stakeholders responded in each of these partner countries (see Figure 1).

Figure 1: Geographical distribution of consulted stakeholders
More than 40% of the consulted stakeholders (see Figure 2) represent the local demand side of the market for EPC in public buildings (local authorities and public utilities). 23% of interviewed stakeholders represent local energy agencies and other potential local facilitators (lawyers, engineers, consultants) who may support municipalities in the development and implementation of EPC projects in municipal public buildings. The supply side of the EPC market (ESCOs, SMEs) is represented by 13% of the interviewed stakeholders, as well as relevant national authorities. Financing institutions are represented by only 1% of the interviewed stakeholders. Others (9%) include for example:

- International organizations (e.g. UNDP) promoting EE.
- Universities and other technical education institutes.
- Research institutes.
- National or regional chambers of commerce and industries.
- Industrial associations and individual industries.
- Local and regional development agencies.
- NGOs promoting energy efficiency.

In total, the involved stakeholders cover all major target groups involved in markets for EPC in public buildings in a well-balanced way. The only underrepresented group are the financing institutions which obviously come into the market at a relatively late stage when the framework conditions are set and EPC projects with proven feasibility are at stake.

![Target groups involved in stakeholder consultation](image)

**Figure 2:** Target groups involved in stakeholder consultations

In all countries, except Croatia, the local authorities are the biggest of the target groups involved in the consultations (see Figure 3). In all countries, except Ukraine, local authorities together with potential local facilitators are representing the majority of interviewed stakeholders.

In Croatia, the biggest group among the interviewed stakeholders are facilitators and the second biggest group are national authorities. This may correspond with the fact that the Croatian partner is as a national institution one of the most important facilitators for EPC projects in the country and has very good access to the existing networks of facilitators (engineers, consultants etc.) as well as to national authorities. The big share of local authorities (>50%) in
the group of stakeholders consulted in Serbia corresponds with the fact that the Serbian partner is the national association of towns and municipalities and has very good access to all municipalities in the country.

In Ukraine national authorities are the second biggest group following local authorities. Together these groups are representing almost 80% of the interviewed stakeholders. This is mirroring the intensive dialogue between local and national authorities concerning the necessary framework conditions for EPC projects in municipal public buildings during the past few years, which was pushed by the energy crisis emerging in the context of the on-going political changes.

In Latvia and Romania the large groups of public utilities providing their feedback on the questions asked in Table 1 are coherent with the trend that more and more of the public power and heating utilities are interested in developing and implementing their own EPC business models as an ESCO in order to diversify their portfolio of services offered to the municipalities.

![Target groups involved in stakeholder consultations in the partner countries](image)

**Figure 3: Stakeholder groups consulted in the countries**

In Greece stakeholder consultations with 111 stakeholders are still on-going. The economic and political situation made it difficult in Greece to get feedback from relevant stakeholders during the last few months. Feedback of Stakeholders from Greece will be included in the update study (D6.3) which will follow up on this baseline study in February 2017.

The big share of facilitators among the interviewed stakeholders may also be the reason why a relatively high percentage of the stakeholders interviewed in Croatia were already involved in some way in the design of EPC projects, in most cases in the field of street lighting.
Furthermore, the results of the stakeholder consultations (see Figure 4 and Figure 5) indicate that the biggest potential to further develop and implement an identified potential EPC project in public buildings is so far in Germany and in Slovenia. Here almost all interviewed stakeholders who were involved in the planning of EPC projects have already implemented EPC projects, or have projects pending at different stages of decision making, permitting, or tendering. Thus, Germany and Slovenia can be seen as the most developed markets for EPC in public buildings among the partner countries.

The high percentages of stakeholders with pending projects in Serbia and Ukraine is caused, at least in part, by the fact that international donors (e.g. GIZ, UNDP, EBRD) are currently promoting EPC demonstration projects in these countries. Facilitators involved in these donor-supported projects were among the interviewed stakeholders.

In Latvia the strong involvement of an ESCO from the Netherlands (e.g. Renesco) in the ESCO market creates a number of EPC initiatives. Some projects are finished, others in preparation in the field of multi-residential buildings.
In addition to the results of stakeholder consultations performed in due course of EnPC-INTRANS, the results of the stakeholder consultations performed in the context of TRANSPARENSE\(^1\) are also taken into consideration. They provide additional stakeholder feedback from EPC providers and facilitators on the status of EPC project development and implementation in Germany, Greece, Latvia, Slovakia, and Slovenia.

In 2015, TRANSPARENSE interviewed a total a 112 EPC providers and facilitators from 20 different countries, including 7 from Germany, 11 from Greece, 7 from Latvia, 7 from Slovakia, and 6 from Slovenia. It is assumed that most of the institutions represented in the stakeholder consultations performed in TRANSPARENSE were also involved in stakeholder consultations performed in EnPC-INTRANS.

Nevertheless, the data collection performed by TRANSPARENSE can give some additional insight into the status of EPC project development and implementation in these countries. Whenever the results presented in chapter 3 refer to input provided from data collection performed in TRANSPARENSE, this is clearly indicated.

### 2.2 Review of the status of development of framework conditions for EPC

Each of the partners performed a sound analysis of the framework conditions for EPC projects in its country, focusing on:

- National laws, bylaws, energy efficiency action plans, building rehabilitation action plans, budgets, EE funds etc. which are currently promoting, supporting or facilitating EPC projects in general and in particular for public buildings.
- National and international (donor-funded) programs in the country promoting the use of EPC in the country in general and in particular in public buildings.
- Model contracts or contract template for EPC projects published in the country by national or international actors.

A directory of relevant documents is presented in each of the country-specific chapters 3.1 to 3.9.

### 2.3 Review of information from other sources

The baseline study is in its third pillar based on the review of information provided by on-going European projects, in particular the following:

- EU Seventh Framework Programme on Research and Innovation (FP7) Intelligent Energy Europe (IEE) Project Number IEE/12/678/SI2.644737: Additional stakeholder feedback on Germany, Greece, Latvia, Slovakia, and Slovenia:
  - EPC Market databases (launched in 2015).
  - Summary Report documenting the collected information on recommendations for EPC markets (published in February 2014).
  - European markets overview (published in December 2013).
- European Energy Services Initiative (EESI and EESI 2020): Additional country-specific information on Germany, Romania, Slovakia, and Slovenia.

Other sources of information, if quoted, are referenced in footnotes in the text.

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1 TRANSPARENSE is a project funded under the EU Seventh Framework Programme on Research and Innovation (FP7) Intelligent Energy Europe (IEE) Project Number IEE/12/678/SI2.644737 (see also page 23)
3. **Country-specific baseline information**

Stakeholder consultations were performed by the partners from June 2015 until the mid of October 2015. A total of 408 stakeholders from 8 countries (in average 51 per country) gave until now their feedback on the questions summarized in Table 1. The geographic distribution of stakeholders interviewed during the stakeholder consultations is presented in Figure 1.

3.1 **Croatia**

In Croatia, through a World Bank project, one utility based ESCO was created in 2003 starting with energy services for public lighting and schools. In the framework of this World Bank initiative 80 ESCO projects have been developed so far with a total investment of 13.5 million EUR, most of them in the field of public lighting and buildings.

During a workshop, organized in the context of the European ManagEnergy initiative in Croatia on 26-27th March 2013, participating stakeholders were consulted. They agreed that the Croatian EPC market was still in an early stage. There was only one ESCO active in the market at that time. Limited legal framework and public procurement rules were in 2013 seen as big barriers for the dissemination of EPC in the country. In addition, the lack of reliable energy consumption data was an important barrier to EPC development in Croatia, another one was the mistrust towards ESCOs.


The Act on energy end-use efficiency (Official Gazette (OG) 152/08, 55/12, 101/13, 14/14) was transposing the European Directive 2006/32/EC on energy end-use efficiency and energy services (ESD) into national legislation.

Today, the ESCO Market in Croatia is still at an early stage of development. In recent years, some activity of market participants has been noticed.

HEP ESCO is still the only ESCO in the country. It is owned by the national utility company HEP. HEP ESCO has so far implemented approximately 100 projects in industry, energy supply, buildings and public lighting, most of them in the form of energy service contracts with fixed payments. Energy performance guarantees are not yet given in the usually applied business models. Investment per project has typically been in the range from 0.13 to 1.3 million € (~1-10 million HRK). Calculated pay-back periods are in the range of 5-10 years.

Other companies taking position on EPC in the market are small start-ups and sister companies of large energy companies such as Slovenian Petrol waiting for the market to steep-up.

The slowly developing supply side of the market is facing a large potential demand for the EE rehabilitation of public buildings in the country. The public building stock in Croatia comprises 80,196 buildings with 13.8 million m² of floor space. Almost two thirds (53,911) of these buildings, which provide 45% (6.2 million m²) of the total floor space, were built before 1980 and now urgently need to be refurbished following the EE standards set in national legislation. Standard heating demand of new-built buildings in Croatia is less than 100 kW/m²*y. Buildings erected in Croatia e.g. before 1980 have a significantly higher heating demand than buildings erected during the past 30 years (see Figure 6).

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2 ManagEnergy is a technical support initiative of the Intelligent Energy - Europe (IEE) programme of the European Commission which aims to assist actors from the public sector and their advisers working on energy efficiency and renewable energy at the local and regional level.

3 These include e.g.: Sense ESCO (est. 2012), Rudan d.o.o. (specialized in water ESCO projects), Eko ESCO d.o.o., Energoglobal d.o.o., Veritas ESCO d.o.o., ESCO CONSULT d. o. o., ESCO d.o.o. (est. 2013), ESCO Management d.o.o. (est. 2013), Esco savjetovanje i financiranje d.o.o. (est. 2013), ZTB ESCO d.o.o. (est. 2013)

4 Data source: EIHP
Figure 6: Specific energy consumption of public building in Croatia depending on the year of construction and the regional location

If EPC would be used to achieve 20-30% energy savings in the heating of 5% of the floor space in public buildings built in Croatia before 1987, this would result in energy savings in the range from 185 to 316 GWh/y.

Taking other energy saving potentials in the fields of domestic hot water, cooling, air conditioning, lighting etc. also into consideration for EPCs would further increase the energy savings that might be used to pay back on ESCO investments on EPC projects.

a) Information collected during stakeholder consultations in Croatia

In Croatia, 34 stakeholders provided their feedback during stakeholder consultations performed in the context of the project until now. Almost one third (11) of them has already been involved somehow in the design and development of EPC projects. Almost half of them (7 of 11) succeeded in keeping EPC projects pending or even in implementing some first EPC projects.

The national Agency for Transactions and Mediation in Immovable Properties (APN), which runs the national programme for the refurbishment of public buildings, complains that most of the potential EPC projects are put aside because of a lack of the political will to implement proposed solutions. These EPC projects are not real EPC projects because the savings are not based on the real measured savings achieved after the project implementation, the savings are based on the detailed energy audit and are defined before they are actually achieved. APN is implementing some refurbishment projects but those are too new as to talk about achieved results. A few EPC projects based on the public buildings refurbishment programme developed by APN and EIHP are still pending in the decision making phase.

One facilitator (Society for Sustainable Systems design) succeeded to implement EPC projects with funding from the World Bank (WB) and from the Global Environment Facility (GEF) while it was benefiting from specific regulations connected directly with the GEF programme. The Croatian Government Real Estate Agency is actually implementing some projects but those are too new as to talk about achieved results.

In general, most of the interviewed stakeholders express themselves quite pessimistic concerning the potential for EPC in Croatia. Those who tried but did not yet succeed in developing and implementing EPC projects indicated the following major market barriers e.g.:

- Lack of awareness of and interest in EPC business models among local decision makers.
Non-existence of the necessary regulatory framework until 2013.
Numbers of changes in the regulatory framework since 2013.
Delays in the issuing of necessary by-laws.
Higher risk of EPC projects for public buildings than of EPC projects for private sector customers.
Low number of trusted players on the market.

In the end, EPS seems as to be too complex for many of the interviewed stakeholders as to negotiate the EPC contracts and trust their credibility.

b) Country-specific framework conditions for EPC/ESCO projects in public buildings

The legal and political framework for EE investments in the rehabilitation of public buildings, and for EPC projects, is set as follows:

i) Most relevant legal acts promoting EPC in the country
- Act on energy end-use efficiency (Official Gazette (OG) 152/08, 55/12, 101/13, 14/14).
- Act on energy efficiency (OG 127/14) transposing the EED into national legislation.
- Building Act (OG 153/13).

ii) Key regulations relating to technical issues of EPC
- Ordinance on energy audits of construction works and energy certification of buildings (OG 81/12, 29/13, 78/13).
- Technical regulation on rational use of energy and thermal insulation in buildings (OG 110/08, 89/09, 78/13, 90/13).
- Regulation on contracting and implementation of energy services in the public sector (OG 69/2012).
- Ordinance on the methodology for monitoring, measuring, and verifying energy savings in direct consumption (OG 77/2012).

iii) The key programs and plans related to promotion of EE and RES are:
  This is the national strategy frame for reaching the objectives of Europe 2020 strategy of the EU.
  It was adopted in 2008 and revised in 2009 pursuant to the Act on efficient energy use in final consumption. The programme is the basis for the Ministry of Economy for the establishment of the National Energy Efficiency Action Plan.
  This Plan was adopted in July 2014. It sets a national savings target in final energy consumption for 2016 at 20 PJ as compared to 2006.
  The National Action Plan defines the total national target for renewable energy use in line with prescribed methodology and sectorial objectives and trajectories in the production of electricity, heating and cooling from renewable sources.

c) Conclusions regarding the monitoring of expected impacts of EnPC-INTRANS in Croatia

The need for EE rehabilitation of public buildings in the country is high and the lack of public funding makes EPC an interesting business model for public building owners in the country. The legal framework conditions are set. The state-owned ESCO is already implementing EPC contracts reaching close to 100 implemented projects. These projects are however designed as ESC arrangements providing the customer with a fixed price for provided services without providing any energy performance guarantee. In order to ensure an optimum impact of implemented ESCO
projects on energy savings and CO₂ emission reduction, the introduction of EPC into the market is urgently recommended.

All EPC projects and concepts including energy performance guarantees which are launched by the participants in EnPC-INTRANS capacity building actions during project duration and during the first years after the completion of the project will be monitored as outcome of the project.

3.2 Germany

In 2013, PROGNOS AG et. al. published the results of a study of the ESCO market in Germany. This study was based upon an enquiry among 300 providers of ESCO services of which 72 responded to the enquiry. The result was that the smallest market segment of the ESCO market in Germany is still the EPC market. Whereas at least 500 ESCOs were found to offer energy supply contracting services, there were hardly more than 15 companies who had EPC services also in their portfolio. Nevertheless, in Germany the EPC market is the most dynamic among the partner countries. PROGNOS sees the biggest market potentials for EPC in municipal public buildings.

Hot spots in the German EPC market have so far been major cities like e.g. Berlin, Bremen, Munich, Stuttgart, etc. where more than 1,300 buildings pooled in 25 ESCO contracts have been upgraded in the past. Hot-spot-regions for the development of the German EPC are for example Baden-Württemberg and Hessen.

Smaller cities and municipalities in the range below 100,000 inhabitants own and operate the majority of 185,000 public buildings in Germany. They are spending more than 4 billion Euros per year on energy. These smaller cities and municipalities are hardly making use of their EPC potentials so far. This is why e.g. the Ministry of the Environment, Climate Protection and the Energy Sector Baden-Württemberg launched its own Contracting-Initiative aiming at promoting EPC to more than 1,100 municipalities and other building owners. This initiative is managed by the Climate Protection and Energy Agency of Baden-Württemberg (KEA) which established the “Cmpetence Center Contracting” since summer 2015. KEA was honoured with the European Energy Service Award (EESA) for its EPC activities and innovative approaches in this field. In June 2015, KEA compiled an inventory of success stories in the field of energy contracting on behalf of the Ministry of the Environment, Climate Protection and the Energy Sector Baden-Württemberg, including five examples of EPC projects successfully implemented in municipal public buildings, and two EPC project implemented in commercial premises and in a hospital. Additionally, KEA will accelerate the EPC-market in the frame of the Initiative Energy Performance Contracting and Energy Supply Contracting (InEECo) supported by the European Investment Bank (ELENA program).

There are a number of further programmes and initiatives supporting the promotion of EPC business models in Germany:

- The National Action Plan for Energy Efficiency (NAPE) initiated by the Federal Ministry for Economic Affairs and Energy includes 2 specific EPC-related activities:
  - EPC related activity 1: Grants for Facilitating contracting-projects and preliminary studies.
  - EPC related activity 2: Bank guarantee program especially for EPC-projects.
- The Energiewende Platform Buildings, which was initiated by the Federal Ministry for Economic Affairs and Energy, promotes among other things the development and implementation of EPC business models for the improvement of EE in public buildings.
- Sector-driven initiatives promoting EPC business models are e.g.:
  - German Alliance for Energy Efficiency in Buildings (geea).
  - German Energy Efficiency Network (DENEFF).
  - Competence Center Contracting, part of German Energy Agency (dena) including an expert group on contracting (facilitators).
  - The Germany Association of Heat Supply (VfW) representing ESCOs.
  - ESCO forum organized by German Electrical Electronic Manufacturers’ Association (ZVEI).
  - Associations (BDEW, AGFW, ASEW, VKU) representing utilities and municipal utilities.

Information: Berliner Energieagentur
The market situation in Germany is very good for energy supply contracting. More and more public utilities develop and promote ESC products and services in particular for private and commercial customers. The market for EPC is however still stagnating at a low level in Germany.

a) Information collected during stakeholder consultations in Germany

In Germany a total of 63 stakeholders from the different target groups provided their input to the performed stakeholder consultations. 19 of them (i.e. 30%, see Figure 4) have already been involved in the implementation of EPC projects. Only one of them (see Figure 5) did not succeed to proceed towards project implementation. This was a district utility which found it too difficult to provide evidence for the economic advantages of the planned EPC model in comparison to traditional owner-financed investment.

One of the consulted stakeholders (an NGO promoting EE) is still at the planning stage of its project. The client is a mutual association and it is time-consuming to convince all associates of the benefits of an EPC for the energy efficient lighting of the association’s premises.

The other 17 stakeholders involved in the development of EPC projects reported about successfully implemented projects. The most active of the interviewed stakeholders is the Berlin Energy Agency (BEA) with 26 implemented EPC projects pooling 1,400 individual buildings and achieving energy savings of approximately 25% in average. Another interviewed facilitator who implemented an EPC for a city pooling 40 buildings reported that from his experience it is difficult in Germany to find contractors for smaller projects.

One of the interviewed contractors (a power supply company) achieves with its projects energy savings in the range of 250,000 € per year and CO₂ emission reductions in the range of 30%. It applies the energy service contracting (ESC) business model type, because this is closer to its standard business model and to the usual type of business relations with its customers.

Contractors succeeding in implementing EPC models in Germany take it as proved that EPC is well feasible, but transaction cost are still too high. Simplified and standardized EPC procedures should apply. Standard contract models should be accepted by all permitting authorities.

The detailed economic comparison of the EPC with the traditional model of owners’ own investment is complex, costly and time consuming. It is regarded as obsolete by the interviewed stakeholders who are active in implementing EPC projects, as their experience shows that EPC for non-residential public buildings is always economically favourable compared to owners’ own investments in energy efficiency improvements. Therefore some stakeholders request that the relevant regulations should be changed.

Some SMEs, even if they have a good reputation in the local market, see themselves excluded from the implementation of complex projects because of the municipalities’ obligations to go for European-wide tendering procedures with projects above a certain cost limit. For service contracts of municipalities this limit is in most cases 207,000 €. ⁶

In general, potential contractors see the small number of projects tendered out on the market place, and the comparatively high sales effort for EPC projects, as major market barriers.

Complex procedures and long lead times of projects are seen as a major obstacle for the development of the EPC market. A large city developing its own EPC projects confirmed that it has to allocate the same internal manpower to an EPC project as to an own investment project.

Most of those projects which have actually been implemented by the involved stakeholders work with contract durations of +/- 10 years and result in energy savings in the range of 15-30%. Much higher energy saving effects (70-90%) are assumed to be achievable only in EPC projects concentrating on investments in energy efficient lighting systems.

Many of the actors expressed their concern that the EPC model has still a bad reputation among potential customers. This is among other things due to bad examples where contractors are either failing to fulfil their

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performance guarantees, or to give proper evidence. Therefore the interviewed stakeholders recommend improving the methods applied for the development and implementation of EPC projects in five steps:

- Provide sufficient lead time.
- Involve technical and economic advisers on the municipalities’ side from the beginning of project design.
- Determine clear quality criteria during project development.
- Check plausibility of contractor’s energy savings forecasts.
- Manage quality consequently at all stages of project implementation.

In order to allow for the development of more EPC projects and to foster further market development, more intensive technology transfer and active knowledge sharing between experienced actors and potential beginners in the EPC market are seen as urgently required.

b) **Country-specific framework conditions for EPC/ESCO projects in public buildings in Germany**

The legal framework conditions for EPC in public buildings are given in Germany.

Budget rules for public entities including regulations regarding the economic comparison of EPC models and standard financing models for public investments, as well as specific requirements on the permission of EPC, are however different in the federal states.

Most of the interviewed stakeholders complain about complex procedures and rules to be followed in EPC projects for public buildings.

i) **Most relevant legal acts promoting EPC business models in Germany**

German legislation and regulations on energy efficiency issues is very complex. The most relevant laws and regulations promoting the development and implementation of EPC business models are:

- Law on energy services and other energy efficiency measures (EDL-G) from 4. November 2010 (BGBl. I S. 1483).
- DIN 31051 Fundamentals of maintenance from June 2003, last amended on September 2012.

In addition to these specific laws and regulations, the federal and state budget laws and ordinances play an important role for the design and implementation of EPC models, as well as the municipal codes in the German states, and the existing public procurement laws and regulations, of which the most specific with regard to the promotion of EPC models may be:


ii) **National alliances promoting EPC business models in Germany**

- Alliance for Energy Efficiency in Buildings (geea).
- German Energy Efficiency Network (DENEFF).
- Competence Center Contracting, part of German Energy Agency (dena) including expert group Contracting (facilitators).
- The association of heat supply (VfW) representing ESCOs.
- ESCO forum organized by German Electrical Electronic Manufacturers' Association (ZVEI).
iii) German participation in other European and international projects promoting EPC business models

Most important are:
- H2020: EPC Plus (ASEW involved as German partner, further information on the programme: see p. 22).
- IEE: TRANSPARENSE (BEA involved as German partner, further information on the programme: see p. 23).
- European Energy Services Initiative EESI 2020 (BEA involved as German partner).

iv) Contract templates for EPC in Germany

Currently both the national energy agency (dena) and the energy agency of Baden-Württemberg (KEA) are currently compiling and updating contract templates for EPC business models in Germany. Those are expected to be available by the beginning of 2016. Other contract templates are available for Bayern and Hessen from the following web pages:
- http://www.energieland.hessen.de/energiespar-contracting

c) Conclusions regarding the monitoring of expected impacts of EnPC-INTRANS in Germany

The political and legal framework conditions in Germany are quite in favour of EPC in public buildings for the improvement of energy efficiency, although the interviewed stakeholders are still asking for improvements.

The ESCO contracting business is almost only focussing on energy supply contracting, because this is closer to both the traditional business models of utilities and the traditional energy consumer behaviour of building owners and users.

An important administrative barrier for EPC is the need to provide detailed evidence in each new project of the fact that the EPC involving the private sector is economically more favourable for the authority than the traditional scheme of financing investments from the building owner’s own funds and loans. Although this has been proofed manifold in existing EPC projects, it is costly and time-consuming to give reliable evidence of this fact for each new project in advance.

It is known that some authorities decided in the past to go for the economically less favourable traditional financing scheme for their investments instead of using EPC, because they did not succeed in getting their calculations of the economic benefits of EPC approved by the controlling authorities.

Nevertheless, there are a number of municipalities in the country which have already established their own EPC projects. Their projects are usually based on a business model aiming at achieving 20-30% energy savings and a full pay-back of investments from energy savings within a period of 8-15 years (EPC basic). Experience shows that ESCOs tend to go for large-scale projects pooling a number of buildings in one EPC rather than for small-scale EPC for individual buildings.

Few projects have also been implemented (by dena or BEA) demonstrating a business model allowing for the deep renovation of buildings (EPC plus). In this model, the ESCO invests in energy conservation measures including the insulation of the thermal envelope (ECM) and takes the risk of achieving guaranteed energy savings in order to pay back on its complete costs.

Each EPC project initiated by participants in this project will be monitored as an outcome of the project.

3.3 Greece

In Greece, 14 ESCOs have already been accepted into an ESCOs Registry, which is operated officially by the Ministry of Environment, Energy and Climate Change. Moreover, approximately 100 ESCOs are under evaluation to be accepted into the ESCOs Registry. Nevertheless, no ESCO has implemented so far an EPC project in public buildings in
Greece, despite the fact that the necessary legislative framework is in place. The economic recession and the administrative barriers in the public sector hinder the expansion of an ESCO market.

Stakeholder consultations are going on in Greece and stakeholder feedback will be evaluated in the context of the follow-up study (D6.3) which is due to be completed at the end of the project implementation period in February 2017. Nevertheless, a detailed picture of the current status of development of the EPC in Greece can be gained from the following information provided by the Greek partner CRES, which is also involved in all major national and international programmes promoting EE and EPC in public buildings in the country.

a) The legal framework for EPC in Greece

The existing Law 3855/2010 (Government Gazette No 95, Series I, 23-06-2010) ‘Measures to improve energy efficiency in end use, energy services and other provisions’ establishes the framework necessary to promote energy saving measures in Greece, and also harmonizes Greek law with Directive 2006/32/EC on energy end-use efficiency and energy services.

Law 3855/2010 established the institutional framework for the provision of energy services. More specifically, Article 10 introduced the requirement to establish an ESCO Registry for the registration of ESCOs providing energy services and other measures to improve energy efficiency. Article 16 of the Law 3855/2010 provides a detailed description of the issues relating to the Energy Performance Contract (EPC), an agreement concluded in writing between the final customer and the Energy Service Company (ESCO) and contains the formal data to be included in a contract, as provided for in Law 2251/1994 (Government Gazette, Series I, No 191, 16-11-1994) on consumer protection.

The EPC should specify, among other things:

- The design and management of the energy service.
- The methodology for assessing energy savings and valuing the resulting overall financial benefit.
- The purchase, installation and commissioning of the necessary energy-using equipment, such as electromechanical and electronic systems, as well as building envelope materials, whether fixed or not, improving energy end-use efficiency.
- The management, the operating method and the maintenance of the equipment.
- The overall cost of the project, which consists of the cost of supply and installation of the necessary equipment, the cost of its operation and maintenance, the financing cost and the fee paid to the ESCO.
- The procedure for assessing the energy benefit.
- The reimbursement method and time.

The details on the operation of the ESCO Registry were established by Ministerial Decision D6/13280/07.06.2011 (Government Gazette, Series II, No 228) entitled “Energy Service Companies. Operation, Register, Code of Conduct and relevant provisions”.

This Ministerial Decision determined, among other things, the establishment and organisation of the ESCO Registry (Article 3), its content (Article 4), the registration procedure (Article 5), the criteria for inclusion and supporting documents for registration of ESCOs in the Registry (Article 6), and issues related to the handling and use of its entries (Article 8).

Article 7 of this Ministerial Decision defined the ESCO categories. Specifically, the companies registered in the ESCO Registry are classified in the following categories:

- Category A, which includes all the companies registered in the ESCO Registry:
  - Subcategory A1, if they have implemented projects with ESCOs with a total budget of at least EUR 300 000.00 for the last five years.
  - Subcategory A2, if they have implemented energy projects with a total budget of at least EUR 1 million for the last five years.
  - Subcategory A3, for all other companies registered in the ESCO Registry.
- Category B, which includes all the natural persons registered in the ESCO Registry,
The Directorate for Energy Policy and Energy Efficiency of the Secretariat-General for Energy and Mineral Raw Materials of the Ministry of Environment, Energy and Climate Change is in charge of keeping the ESCO Registry and of providing information to consumers on energy services.

The same Ministerial Decision establishes several issues regarding the conditions of establishment and operation of ESCOs (Article 9), the energy services provided (Article 10), the criteria for the proper performance of their duties (Article 11), incompatibilities with their duties (Article 12) and administrative sanctions applicable to them (Article 13).

Finally, Article 14 establishes the Code of Ethics regarding the principles and the commitments that the ESCOs registered in the respective register must comply with to ensure the smooth operation and the proper development of the market for energy services.

Moreover, in the 3rd National Energy Action Plan, under the scope of Article 7 of the Energy 2012/27/EU, Measure 8 provides incentives to boost the business activity of Energy Service Companies (ESCOs) by creating specific financial means (guarantee or lending special purpose Fund), which improve the financial activity and/or liquidity of the businesses concerned and enable them to implement energy performance contracts by ESCOs to implement energy saving projects in tertiary sector buildings.

Finally, it is also envisaged that the Green Fund will provide funding to ESCOs for the implementation of projects to improve energy efficiency.

The National Law for the adaptation of national legislation to Directive 2012/27/EU on energy efficiency is expected to be harmonised in the near future.

b) National and international programs promoting the use of EPC in public buildings in Greece

In Greece, besides EnPC-INTRANS, another three international cooperation projects are currently promoting the use of EPC in the country:

- At the national level, CRES is implementing a project entitled ‘Supporting and monitoring of the pilot implementation of energy efficiency improvement projects in public buildings by Energy Service Companies (ESCOs)’, which is funded by the Operational Programme ‘Environment & Sustainable Development’ for the period 2007-2013 (Priority Axis: 1).

  CRES has undertaken to determine major energy consumers, the technical specifications and preparation of the process, to monitor the implementation of contracts, to assess the benefits of energy interventions and to organize exemplary actions.

  ESCOs will implement energy efficiency improvement measures in the building envelope in 5 selected public sector buildings.

  The project aims to standardize procedures and remove regulatory barriers to the implementation of measures to improve energy efficiency in public sector buildings by ESCOs through energy performance contracts (EPC). Specifically, the project aims are:

  - Support the Ministry of Environment, Energy and Climate Change (YPEKA) in developing the ESCO market and, through selected pilot applications, in identifying technical, procedural and regulatory parameters and conditions for the implementation of these kinds of contracts and projects.

  - Ensure that ESCOs have access to energy efficiency programmes for public sector buildings and make use of Third Party Financing (TPF) in order to achieve the national energy targets in public sector buildings, through the expertise and funds of the private sector.

  - Disseminate the results of the project so they serve as a guide and to specify the implementation framework for the developing ESCO market and to implement energy projects in the remainder of the public sector and broader public sector buildings.

- Energy Performance Contracting Plus – European Project (HORIZON)

  The aim of the EPC+ project is to reduce transaction costs of energy service packages drastically so that smaller investments and projects in SMEs become possible for companies offering energy services. This can only happen if both the technical solutions as well as the contractual issues of energy services are highly standardized. The
energy services offered can be either partly or wholly financed with innovative financing solutions, or may be more service-oriented solutions with guaranteed energy performances.

The major outputs of the project include:

- The development of commercial, standardized energy service packages for SMEs.
- The implementation of pilot projects for the EPC+ packages.
- To set-up and management of clusters of companies offering energy services to the SME market.
- The training of these clusters of companies.
- The development of an international e-market for energy service providers.

TRANSPARENSE Increasing Transparency of Energy Service market- European Project (IEE)

The goal of the TRANSPARENSE project is to increase the transparency and trustworthiness of Energy Performance Contracting (EPC) markets throughout Europe. With its twenty partners covering both mature and emerging EPC markets, the project is exploiting its potential to transfer the know-how across Europe, support EPC markets in Europe and thereby achieve substantial energy efficiency improvement.

c) Contract template for EPC in public buildings in the country

The Directorate for Energy Policy and Energy Efficiency of the Ministry of Energy and Environment prepared and posted two EPC models - the guaranteed savings and shared savings EPC models. The major difference between these two models is that in the former case the performance guarantee is the level of energy saved, while in the latter this is the cost of energy saved:


d) Conclusions regarding the monitoring of expected impacts of EnPC-INTRANS in Greece

As there has no EPC project been implemented in Greece so far, each EPC project initiated by any of the participants in the project during project duration and during the first few years following the end of project duration will be monitored as an outcome of the project.

3.4 Latvia

The political support for the improvement of EE, including EE in public buildings, is very strong in Latvia.


Currently the Ministry of Economics in cooperation with social partners and related institutions is elaborating Energy development guidelines for 2014-2020 period, this draft contains proposals for Latvia’s government for political basic principles, purposes and action directions in energy sector for next seven years.

a) Baseline information collected during stakeholder consultations in Latvia

Among the stakeholders interviewed in Latvia, there were 40% (10 of 24) who had been involved in the development and implementation of EPC projects before. Half of them (5 of 10) managed to develop EPC projects close to the start of the project, or have already started them.

State Joint Stock Company «State Real Estate» started an EPC type project in two state-owned buildings in 2015 and is waiting to assess achievements after the first year of operation. An ESCO company (Renesco) has realised complex refurbishment projects of 15 multiresidential buildings (total area~41 000 m², 660 apartments). All projects were based on ESCO principle, where EPC is applied with all building community. The “Fortum Jelgava”, which is the local heat supply and distribution utility of Jelgava city was involved in pilot project “Jelgava district heating system modernization”, which could be indirectly related to some elements of ESCO. A consulting firm (EKODOMA) reports on completed projects focussing on energy efficient street lighting.
In the context of the Jelgava District Heating System Modernization Programme - 2 multi-residential buildings were refurbished, reaching energy consumption savings ~ 50%. This programme is implemented in the context of the Latvian environmental protection pilot project co-financed by Jelgava City and the German Federal Ministry of Environment, Nature Conservation and Nuclear Safety Federal. An ESCO was not involved in this project. Nevertheless this project may be used as a role model for the development of EPC business models in Latvia.

b) Legal framework conditions of EPC in Latvia

A draft “Law on Energy efficiency” was submitted in Parliament on 26.05.2015. The aims stipulated in the draft law are:

- Increase energy efficiency in energy generation, transmission, distribution and end-use.
- Develop energy efficiency services and their market.
- Strengthen the role of the state as a good example in field of energy efficiency.

The draft law provides for the establishment of state/municipal EE funds supporting EE initiatives, and it sets the conditions for energy services and EPC, including:

- Definition of EPC.
- Conditions for energy services.
- Energy services cost sources.
- Risk allocation.

The draft law also stipulates that the Ministry of Economics shall publish in its web page:

- Guidelines for EPC elaboration.
- Information about available financial sources for energy services providers.
- Best practices on concluded EPCs.
- Information about independent intermediary operation options in EE services market.
- Examples of EPC in the public sector, etc.

Since January 2013 the Latvian Law on Energy efficiency of buildings is in force, which transposes the European Energy Performance in Buildings Directive (2010/31/EU) into national legislation. On the basis of this law, the Cabinet of Ministers issued a number of rules which have to be taken into consideration in the design and implementation of EPC projects in public buildings:

- Rules of the Cabinet of Ministers of 9th July 2013 No. 383 „Rules on energy certification of buildings”.
- Rules of the Cabinet of Ministers of 25th June 2013 No. 348 „Calculation method for building’s energy efficiency”.
- Rules of the Cabinet of Ministers of 9th July 2013 No. 382 “Rules on independent experts in field of energy efficiency of buildings”.
- Rules of the Cabinet of Ministers of 28th September 2010 No. 907 „Rules on inspection of residential buildings, their equipment and communication, on servicing and repair of buildings”.

In Latvia EPC for public buildings must comply with the Public Procurement Law. Article 67 of this law stipulates that public authorities may conclude contracts for period longer than 5 years, if this is necessary for proper contract enforcement or due to specific technical and economic conditions. This means that the public procurement law would theoretically allow for the procurement of EPC services. But in practice the public procurement structure is impeding the conclusion of EPCs by public authorities.

c) National and international programs promoting the use of PC in public buildings in Latvia

The EPC market in Latvia is still weak on both the demand and supply side.

Over the period of the last 10 years up to 8 ESCO or ESCO type companies have been active in field of multi-residential buildings in Latvia. This was possible because of the national renovation program for the residential sector. From 2010 till 2015 under ERDF funded national programs activity “Improvement of heat insulation measures in multi-residential buildings “ 625 refurbishment projects have been finished and another 190 projects are in the process of refurbishment. Resulting energy savings amount to 5 million EUR per year.
Different types of public buildings have been refurbished since 2010 by means of the Climate Change Financial Instrument (CCFI) which was a national budget program, administered by the Ministry of Environment and Regional development. The aim of CCFI was to promote prevention of global climate changes, adaptation to its created consequences and to facilitate greenhouse gas emissions reduction (e.g. by implementing EE in buildings). A total of 131 CCFI projects have been implemented in public buildings (municipal buildings, educational buildings). The CCFI is closed now and the Ministry of Environment and Regional Development works on developing a new financing scheme based on emission allowances auctioning.

From 2008 to 2010 a European Regional Development Fund (ERDF) activity in Latvia focused on heat insulation improvement measures for municipal social housings. By 2015 half of the social housings owned by municipalities are refurbished. Currently the Ministry of Economics is working on a Cabinet of Ministers rules draft on growth and employment establishing the promotion of EE in residential and public buildings as a specific support objective. The EE of buildings program 2014-2020 is planned to receive EU financial support in the amount of 323 million EUR addressing e.g.:

- EE in multi-residential buildings - 150 million EUR.
- EE in state-owned buildings – 98 million EUR.
- EE in industrial buildings – 32 million EUR.
- EE in municipal buildings – 43 million EUR.

Responsible for the implementation of this programme is the Ministry of Economics).

d) Financial constraints impeding EPC in public buildings in Latvia

In the beginning of 2015 the Economic Recovery Advisory Board (ERAB) carried out deep due diligence analysis of the Latvian ESCO market aiming at clarifying the technical, legal and financial options for a financial instrument supporting ESCOs in Latvia. An operational problem found in Latvia for ESCO is capital adequacy problem. ERAB intends to offer ESCOs a special purpose vehicle. This shall borrow long term financial resources from ERAB (or other credit institutions) and refinance ESCOs’ loans, thus releasing companies’ balance sheets from long term accounts payable.

e) Conclusions regarding the monitoring of expected impacts of EnPC-INTRANS in Latvia

To date there are less than 5 EPC projects implemented in public buildings in Latvia and there has only one commercial ESCO been implementing EPC projects in Latvia so far. Therefore all EPC projects initiated by participants in EnPC-INTRANS during project duration, or during the first few years following the end of project duration, will be monitored as an outcome of the project.

3.5 Romania

In Romania, an EBRD-financed programme for the introduction of the ESCO model in the public sector was launched in 2010. Now there are some 30 ESCOs in the country, most of them small companies and only few medium and large companies. Romanian companies (EnergyServ being among the oldest ESCO in the market) are sharing the market with subsidiaries and joint ventures of international companies like Veolia Energie Romania, SE GES SA (company of the Romanian American Fund, with the support of EBRD), EnergoEco (joint-venture between the Canadian ESCO Econoler and the Romanian company EnergoBit) and ESA1.

The ESCOs are mainly involved in the industrial and co-generation sectors, but also in a few district heating and street-lighting projects. The most common types of contract used by the Romanian ESCOs are built-own-operate-transfer and shared savings. However, guarantee savings contracts, contract energy management and - very rarely - leasing contracts and delivery contracting are also used.

No EPC for public buildings has been concluded with local authorities in the country until today. The only EPC project for public buildings identified in the country was concluded between the international ESCO Veolia and the French Embassy (see below).
a) Baseline information collected during stakeholder consultations in Romania

Only 9 of 65 (~14%) of stakeholders interviewed in Romania have already been involved in the development of EPC projects so far. But only 1 of these 9 (~11%) succeeded in implementing EPC projects. The international ESCO Veolia implemented EPC models in a commercial office building, in the French Embassy and in the French School.

One project was implemented by an ESCO in the context of the European Energy Service Initiative (EESI) aiming at creating an official public framework contract and methodology for EPC projects.

The Romanian market for EPC in public buildings is yet to emerge.

b) Country-specific framework conditions for EPC/ESCO projects in public buildings

The legal framework is not yet very specific for EPC in Romania:

- The National Energy Efficiency Strategy was approved through GD 163/2004. The objective of the strategy by 2015 was to reduce primary energy intensity by 40% against 2003.
- The Energy Strategy of Romania in the period 2007-2020 was approved through GD 1069/2007. It identified the following priority action fields for the public sector:
  - Efficiency increase and reduction in the public lighting consumption.
  - Efficiency increase and reduction in the water supply installation consumption.
  - Public building efficiency increase.
- The Romanian government approved by Government Decision (GD) 1661/2008 the National Programme on the Increase of EE and use of RES in the Public Sector. This programme identified further priority EE measures (incl. EPC) for the public sector and it ensured co-financing of the projects whose direct beneficiaries are the local public administration authorities relating to the following types of investment objectives:
  - Rehabilitation and modernization of the district heating systems.
  - Thermal rehabilitation of certain public buildings.
  - Modernization of interior and exterior public lighting.
- Ministerial Order no. 1767/2009 by the Ministry of Economy allows externalization of energy management from all energy consumers under the obligation to have authorized energy managers.

The Romanian Energy Efficiency Fund (FREE) offered various programs running at national and regional levels, but all are closed right now.

ANRE is working on a model contract for EPC projects in Romania, but it is not finished yet.

c) Conclusions regarding the monitoring of expected impacts of EnPC-INTRANS in Romania

There are several EPCs in the Romanian public sector so far in different stages of development, but during the discussions with the different stakeholders it became obvious that the level of knowledge is rather limited to general information especially in the public sector (municipalities, facilitators, services etc.) and there is a lack of connection with the private sector (ESCOs, SMEs). Proper know how transfer and training is needed before a real market for EPCs in public buildings has any chance to emerge.

All EPC projects initiated by participants in EnPC-INTRANS capacity development activities during project duration, or during the first few years following the end of project duration, will be monitored as outcome of the project.
3.6 Serbia

a) Baseline information collected during stakeholder consultations in Serbia

Of the 63 stakeholders interviewed in Serbia, 17 (~27%) have already been involved in the development of EPC projects, 9 of them are (~53%) are still preparing or have already implemented their projects. The most active among the interviewed stakeholders in developing projects in Serbia were the Slovenian ESCOs GGE and Eltec Petrol.

The City of Nis developed two EPC projects on the basis of public-private partnership (PPP):

- Replacement of fuel oil boilers to pellet boilers in schools and preschools in City of Niš. The project proposal is completed and the approval from the City Council was obtained. The PPP Committee gave also a positive opinion and the project was approved by the Assembly of the City of Niš. Tender documents and draft contract were prepared. Opinion from the Directorate for assets whose equipment is installed in facilities is still lacking. Also lacking is the opinion for unifying bills for 29 facilities involved project.
- ESCO project for improvement of EE in street lighting (replacing Hg bulbs). Project proposal was done with the help of EBRD consultants. The approval from the city council was achieved. The PPP Committee decided on the project and, with some slight changes, will give a positive opinion.

Municipality of Topola reported about a project realized in the field of street lighting and three others Vrbas, Varvarin and Vranje are in different stages of project preparation. The Building Directorate of the Municipality of Vrbas has gone furthest in this process and is currently preparing a call for tenders for an EPC contract for public lighting. Some projects have been planned with international technical assistance support provided by GIZ. The Ministry of Mining and Energy is also reporting about four projects being in the beginning of project development.

a) Country-specific framework conditions for EPC/ESCO projects in public buildings in Serbia

The main legal sources for EPC in Serbia include:

- Energy Law (Official Gazette of RS Nos. 57/2011, 80/2011, 93/2012 and 124/2012) – in particular, Articles 3, 4, 6, 22, 52, 57, 60, 66
- Law on Public Procurement – The Public Procurement Law (Official Gazette of RS No. 124/2012) – in particular, Articles 13, 71, 73, 85
- Law on Communal Services (Official Gazette of RS No. 88/2011) – in particular, Articles 4, 5, 9, 13, 24, 30
- Law on PPP and Concessions – The PPP Law (Official Gazette of RS No. 88/2011) – in particular, Article 2, 4, 7

Relevant by-laws are:

- Rulebook on establishing a model contract on energy services regarding implementation measures for improvement of EE when the users are from the public sector (Official Gazette of R” No. 41/2015)
- Ordinance on EE in buildings, (Official Gazette of RS No. 61/2011)
- Ordinance on the conditions, content and manner of issuing certificates for the energy performance of buildings, (Official Gazette of RS, No. 69/2012)

A budgetary EE fund was established in Serbia by the Energy Law. But this fund, which shall among other things support EPC, is relatively small in available finances.

Serbia is one of the beneficiaries of the EBRD Regional Energy Efficiency Programme for the Western Balkans. The other beneficiaries are Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Kosovo, an Montenegro. For a direct financing facility included in this programme a total of €50 million has been allocated by the EBRD to replenish the funding provided by the programme. This will be invested in both medium-scale renewable energy and energy
efficiency improvements in industrial enterprises. Furthermore, the facility intends to provide financing to ESCO projects.

a) Conclusions regarding the monitoring of expected impacts of EnPC-INTRANS in Serbia

Only very few EPC projects have been prepared or implemented at the level of municipalities in Serbia most of them on street lighting. All new EPC projects for public buildings initiated by participants in EnPC-INTRANS capacity building during project duration or during the first few years following the end of project duration will be monitored as outcome of the project.

3.7 Slovakia

More than 20 EPC projects in public sector were implemented in Slovakia by 2005. But since then the market did not show much dynamics. There are currently no national programs in the country promoting. One of the reasons for the stagnation of the EPC market in Slovakia may be that the legislation on the regulation of district heating prices, reflected in edicts of the Regulatory Office for Network Industries, forces district heating companies to reduce consumer prices whenever they succeed in reducing input costs. This prevents district heating systems from making use of EPC services offered by existing ESCOs, because the achieved energy savings cannot be used to pay back on ESCOs’ investments.

In the context of the TRANSPARENSE project, a total of eight ESCOs providing EPC services were identified in Slovakia. During stakeholder consultations a number of seven ESCOs and facilitators in Slovakia were interviewed in 2015. Each of them succeeded in starting at least one EPC project in 2011-2013 and six of them succeeded in initiating at least 1 new EPC project in 2014-2015. All of expect the EPC market to grow slowly.

a) Baseline information collected during stakeholder consultations in Slovakia

The lack of experience with and trust in EPC models was also characterising the attitude of most of another 24 stakeholders interviewed during stakeholder consultations in the context of this project. None of them was actively working on an EPC project in the past.

b) Country-specific framework conditions for EPC/ESCO projects in public buildings in Slovakia


Another legislation which affects energy services, especially EPC, is philosophy of regulation of prices of heat from district heating systems which is being reflected in edicts of Regulatory Office for Network Industries.

a) Conclusions regarding the monitoring of expected impacts of EnPC-INTRANS in Slovakia

There are a number of companies trying to promote EPC services in the country, but only very little number of EPC projects have been implemented in public buildings so far. Each new project initiated by participants in EnPC-INTRANS capacity building may be monitored as an outcome of the project.

3.8 Slovenia

In Slovenia ESCOs have developed and promoted EPC models since the nineties. An average of 2 new EPC projects is currently recorded per year. More than 20 EPC projects have been realized before 2006. Since then the EPC concept (and commercial financing in general) has been crowded out by EU Structural funds in the public sector. This situation changed again in 2012 when most recently four new EPC projects were developed.

A number of EPC contracts have been implemented in Slovenia by the ESCO ELTEC Petrol, which took its current company form with the 2011 merger of Eltec Mulej and an ESCO branch in the Petrol energy company. The biggest was the project with Maribor University with an EPC for the period 2010-2025 which includes 33 buildings with a total of 140,000 m², with financial value of the savings achieved in the first year of approximately 300,000 EUR.
However, the first extensive EPC project, also including energy supply contracting in many cases, for public buildings in Slovenia was established by ELTEC Petrol (ELTEC Mulej) with the city municipality of Kranj, starting in 2002. It included 9 elementary schools and its subsidiaries, 2 swimming pools, one sports hall, a city stadium and the municipalities administrative building, 14 buildings in total, although some buildings were added to the project at a later stage with an amendment of the EPC contract. The duration of the contracts was set to 15 years. Other EPC projects, such as for ZPO Celje (refurbishment of a sports hall and an indoor swimming pool), Hotel Špik, Unior Zreče, municipality of Koper and so on were focused on the rehabilitation of HVAC systems (boiler houses, ventilation and recuperation, heat distribution systems, etc) and public lighting.

In the context of the TRANSPARENSE project, a total of 6 ESCOs and facilitators were interviewed in 2015 in Slovenia. Each of them had EPC projects started in the country during the period 2011-2013, in total more than 50 projects. Four of them were with their EPCs serving only the public sector while two of them have also commercial clients. Only one of them reported in 2015 about a fast growing (>5% growth rate) market for EPC, whereas the other five interviewed actors reported about a stagnating market with little or no growth. Three actors reported that they succeeded in initiating 1-5 new projects 2014-2015, whereas the two remaining did not succeed in initiating any new project in Slovenia during this year.

a) Baseline information collected during stakeholder consultations in Slovenia

Of the 51 stakeholders interviewed in Slovenia, 10 (~19%) have already been involved in the development of EPC projects, all of them having already implemented EPC projects. The most active among the interviewed stakeholders in developing projects were the ESCOs Eltec Petrol, GGE, ENERGEN, ENERGEN and Gen-I ESCO (see above). A number of local and regional energy agencies play an important role as facilitators for EPC projects at the local level.

The “Jožef Štefan Institute” Center for Energy Efficiency is advocating further improvements of the political and legal framework conditions for EPC in public buildings in the country. In its position paper on EPC published in 2012, the institute confirmed that “training sessions for a variety of officials in local authorities, as well as politician are needed to strengthen demand-side competence on EPC”.

Municipalities involved in EPC projects and the above mentioned ESCOs form a small peer group in the country. Further promotion of the market for EPC in the country may build upon their experience.

b) Country-specific framework conditions for EPC/ESCO projects in public buildings in Slovenia

There is no binding legislation in place that promotes EPC. There is however, an important legal document in development called Guidelines for the conduction of energy efficiency measures in public sector buildings. The draft outlines the budgetary, legal and implementation aspects of EPC in public buildings in Slovenia. The document is being coordinated between the Ministry of Infrastructure, local decision makers, energy agencies, engineers and other experts. It has not yet been finalized.

Otherwise, the main legislation that indirectly outlines the implementation of EPC includes:

- Public Private Partnership Act (Official Gazette n. 127/06), passed on November 23rd 2006
- Public Procurement Act (Official Gazette n. 12/13), passed on November 23rd 2006
- Act Regulating Public Procurement in Water, Energy, Transport and Postal Services (Official Gazette RS n. 72/11), passed on November 23rd 2006
- Rules on the efficient use of energy in buildings, passed on June 22nd 2010

This year the government passed the consolidated version of the National Action Plan for Energy Efficiency for the period from 2014-2020 according to the EU Directive on energy efficiency (2012/27/EU). The goal is to reduce the use of primary energy so it will not exceed 7.125 million toe (tons of oil equivalent) or 82.86 GWh. This stipulates the refurbishment of about 260,000 m² of surfaces per year, averaging at about 50 million € of investment per year.

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These investments are projected to bring about additional savings in energy cost in the tune of about 2 million € per year, achieving a total of 12 million € in 2020.

c) National and international programs promoting the use of EPC in public buildings in Slovenia

The most important support for promoting investment in energy efficiency and renewable energy sources is conducted through the Slovenian Eco-fund (Slovenian Environmental Public Fund), which is financed directly through extra fees charged for energy utilities. The Eco-fund publishes publicly available tenders for both natural and legal persons and covers EE (external building fixtures, thermal envelope, recuperation systems, etc.), renewable energy sources (biomass boilers, solar collectors, micro solar-PV, wind and hydro power plants, micro cogeneration units, etc.) including water resource protection and sustainable waste management. Besides this, Slovenia also competes for EU investment mainly through the European Regional Development Fund (ERDF), European Social Fund (ESF) and Cohesion Fund (CF), as well as specific grants for climate protection and energy.

In this respect, the most essential program is the Operational Programme for the Implementation of the European Cohesion Policy in the 2014-2020 period adopted by the European Commission on December 16th 2014, where the fourth priority is “supporting the shift towards a low-carbon economy in all sectors”.

A sample EPC contract was made available within the guidelines for the conduction of energy efficiency measures in public sector buildings. It is available at


The sample contract is in Slovenian. The model contract located in the below link is substantially similar:


d) Conclusions regarding the monitoring of expected impacts of EnPC-INTRANS in Ukraine

The monitoring of expected impacts of the EnPC-INTRANS project on the market for EPC in Slovenia has to take into consideration that the national EPC market, even though not yet growing fast, is developing since approximately 15 years. Only those projects initiated by participants in EnPC-INTRANS capacity development, which have not been involved in the development of EPC projects yet, shall be monitored as outcome of the project.

3.9 Ukraine

An EPC market has not yet emerged in Ukraine although the need for the involvement of the private sector in investments for the improvement of EE in public buildings is well recognized at both the local and national level of decision makers. Therefore, the State Agency on Energy Efficiency and Energy Saving of Ukraine developed a clear vision for the development of the potential for implementation of ESCO contracts for public institutions by means improving legislation and providing institutional support. Some major legislative steps towards the implementation of this vision have recently been finalized:

- Recently adopted laws promoting ESCO services including EPC:

- Subordinate legislation adopted on the basis of the above Laws:
  - The methodology for estimation of the baseline annual level of consumption of the fuel and energy resources and utility services (Part 1 of Article 3 of the Law No. 327-VIII) – Act of the Ministry of Regional Development, Construction and Housing and Utility Sector.
Further action needs for the promotion of ESCO services and EPC for use in the public sector in Ukraine are according to the State Agency on Energy Efficiency and Energy Saving of Ukraine related to:

- Subordinate legislation which are still to be brought into compliance with the above Laws:
  - Procedure for undertaking long-term budget obligations for energy servicing – changes in the Order of the Ministry of Finance of 02.03.2012 No. 309 "On Approval of the Procedure for Registration and Recording of Budget Obligations of Spending Units and Recipients of Budget Funds with the Bodies of the State Treasury Service of Ukraine".

- Necessary methodological recommendations to ensure the capabilities of the parties to the energy servicing contract:
  - Recommendatory explanations for spending units with regard to the implementation of the procedure for procurement of energy services (Ministry of Economic Development);
  - Recommendatory explanations for estimation of the baseline level of consumption of utility services and energy resources for spending units (Ministry of Regional Development, Construction and Housing and Utility Sector);
  - Recommendatory explanations for internal procedures of entry into energy servicing contracts including development of the draft model decision of local self-government bodies on approval of the terms and conditions of the energy servicing contract (State Agency on Energy Efficiency and Energy Saving of Ukraine, Ministry of Finance).

International cooperation is supporting the implementation of this vision through different programs and projects, such as e.g.:

- German-Ukrainian cooperation on “Energy Efficiency in Municipalities”, a technical cooperation project implemented by GIZ.
- USAID funded project on „Municipal Energy Reform in Ukraine“
- EBRD funded “Legal Infrastructure for Private Sector Energy Efficiency Projects”

The legal framework conditions for EPC have improved during 2015 and the municipalities’ awareness of the need of EE improvements is very high, as well as the local decision makers’ interest in making use of EPC business models for the energy efficient rehabilitation of public buildings in their spheres of responsibility. A lack of experience with and of trust in public-private cooperation on the basis of ESCO services including EPCs is still impeding the market uptake of EPC in public buildings in Ukraine.

a) Baseline information collected during stakeholder consultations in Ukraine

Out of 66 stakeholders consulted in Ukraine, only five (8%) have been involved in any attempts to establish EPC projects in public buildings in the country. Although they did not yet succeed in implementing any project, they take the recent legislative provisions for the promotion of ESCO services including EPC as an additional motivation to continue their efforts on the development and implementation of EPC projects for the EE rehabilitation of public buildings in Ukrainian municipalities. The technical know-how regarding necessary technical measures is there, and an increasing number of municipalities are establishing energy management systems on site. Nevertheless, the lack of experience in the use of EPC business models is a major know-how barrier which has to be overcome by means of training of local decision makers, administrative experts, and potential local facilitators.

b) Conclusions regarding the monitoring of expected impacts of EnPC-INTRANS in Slovenia

As EPC for public buildings is a new concept for all stakeholders and actors in the country, all projects initiated by participants in EnPC-INTRANS capacity development during project duration, or during the first few years following the completion of the project, may be monitored as an outcome of EnPC-INTRANS.
3.10 Summary

To date, the ESCO markets in the partner countries are representing three different levels of market development:

- Established ESCO market: Germany
- Emerging ESCO markets: Croatia, Slovakia, Slovenia
- Prospective ESCO markets: Greece, Latvia, Romania, Serbia and Ukraine

In all of these markets ESCOs, if there are any active in the country, focus their contracting businesses on energy supply contracting (ESC) rather than on energy performance contracting (EPC). ESC is closer to the ESCOs traditional business models than EPC and can directly build upon the already existing business relations between energy suppliers and their public customers.

EPC, in particular if applied in emerging or prospective markets, is in most cases still focusing on EE improvements in street lighting. EE improvements of street lighting are requiring relatively low investment per saved MWh of electricity and provide relatively fast and reliable pay back compared to EE improvements in buildings. Baseline consumption and maintenance cost as well as guaranteed and actually achieved energy savings and saved maintenance cost are more transparent and much easier to be assessed and monitored from both the suppliers’ of EPC for street lighting and their public customers’ points of view.

The economic and technical risk related to the determination and verification of energy performance guarantees in public buildings is much higher for both the ESCO on the supply side as well as for the public building owner on the demand side of EPC projects. This is why EPC for public buildings, despite the large economical and technical energy savings potentials in public buildings in all European countries, is still an underdeveloped niche market all over Europe, even in established ESCO markets like Germany. In none of the partner countries, the market for EPC in public buildings has emerged to a level of self-sustaining growth, which would be necessary to attract additional actors on both the demand and the supply side of the market.

Energy and cost saving potentials and needs of public authorities are much higher in the public buildings sector than in street lighting. Therefore the initiation and development of a faster market uptake of EPC business models for EE improvements in public buildings is an important challenge in order to allow public authorities contributing to the EE targets of European and national energy policies.

One of the biggest obstacles for the emerging of a market for EPC in public buildings in the partner countries is the lack of economically attractive EPC projects tendered out on the market place by public building owners. In this situation, each new EPC project initiated by participants in EnPC-INTRANS capacity development may contribute to the creation of new impulses for the emerging of an EPC market in these countries.

Each EPC project newly initiated by participants in EnPC-INTRANS capacity development, awareness building and information activities will be monitored with its expected impacts as an outcome of the project.

As the delay from the initiation of a new EPC project to a call for tenders will be longer, in most cases, than the duration of the project, each of the newly initiated projects pending at the date of completion of the project will be monitored as an outcome of the project. An ex-post evaluation performed 3-5 years after the date of completion of the project might focus on the monitoring of how many of these pending and of further projects initiated as an outcome of the project have finally been implemented until the. Such an ex-post evaluation might also focus on the more reliable quantification of investments finally triggered and energy savings actually achieved as an outcome of the project.

The project partners reserve their right to perform such an ex-post evaluation in their own countries and on their own discretion at any time following the date of completion of the project, even though this is not mandatory in the context of the EnCP-INTRANS work programme.
4. Conclusions for the monitoring & verification of expected impacts of the project

4.1 Expected output and impacts

The following results are expected to be achieved as the minimum output from performed project activities:

- A total of at least 250 stakeholders and experts from the public sector, from ESCOs and from SMEs in the partner countries are involved in stakeholder consultations and in training needs assessment.

  This expectation has already been exceeded by the 408 stakeholders providing their feedback during stakeholder consultations performed in September and October 2015 (see chapter 2.1, page 8 ff.).

- A total of at least 50 trainers from the partner countries are trained for the implementation, dissemination and replication of capacity building and training measures developed in due course of the project.

  The training of trainers will take place in Bratislava during the week of 22-26 February 2016. Almost 50 trainees are already pre-registered for the training of trainers, including experts from all nine partner countries.

- A total of at least 1,000 local stakeholders, actors and community representatives in the partner countries are reached by the performed road show and a total of at least 2,000 technical, legal and financial experts and local decision makers from partner countries participate in the training programme offered in the forms of webinars, e-learning courses and on-site trainings.

  The planned road show events, seminars, and webinars will be organized in all nine partner countries in 2016.

It is expected that 3,000 trained and informed experts, officials, other stakeholders and local decision makers will cater for the initiation and development of new of EPC projects for a total of at least 360 public buildings (at least 40-60 public buildings in each of the partner countries).

The impact of applying EPC business models on energy savings in public buildings is expected to be significant for the achievement of European energy saving targets. Some evidence may be drawn from the following figures:

- In 2012 the German Federal Office for Economic Affairs and Export Control (BAFA) published a report about energy saving potentials in the public sector. The total of energy consumption in the public sector in Germany was estimated to be 54.94 TWh/y in 2016 (baseline 2007: 59 TWh/y). In the report the public sector was subdivided in federal states, municipalities and federation sub-sectors. The main potential in energy saving options was seen in the municipalities through reduction of the electricity (mostly lightning) and heating consumption. The total energy saving would be 4.42 TWh/y in 2016 which municipalities can realize 2.8 TWh/y of the total savings. The report also quantifies the share of contracting in all energy saving measures (bottom-up) with an amount of approximately 56 GWh/y in Germany.

- In 2012 The Energy Community Secretariat (ECS) in Vienna published a market assessment for its signatory countries. It identified among other things energy saving potentials in public hospitals and schools amounting to 512 GWh in Serbia and 3,406 GWh in Ukraine. In average, the ECS calculates that the energy savings potential, which can be addressed with ESCO contracts in these public buildings, is at least 50%, which means that the overall energy saving potentials in hospitals and schools in these two countries would already be 2,000 GWh. If only 2.5% of the schools and hospitals in Serbia and Ukraine would be subject to EE investments financed through EPC business models, this would result in energy savings of 50 GWh per year.

- Data provided by EIHP for Croatia indicate that the improvement of public buildings constructed in the continental areas of the country before 1980 to the EE standard of public buildings constructed in the country in 2010 would result in energy savings for heating only in the range of 130-210 kWh/m² per year, depending on the actual age of the building (compare Figure 6 on page 15). Energy efficient rehabilitation of only 5% of floor space provided in older public buildings in Croatia during the coming years would thus result in energy saving effects as follows:

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8 BAFA: BfEE Report on Energy Efficiency – Public Sector, February 2012
9 ECS/ENSI: Energy Efficiency in Buildings in the Contracting Parties of the Energy Community, February 2012
10 Maragareta ZIDAR, EIHP: Presentation on “Energy efficiency in buildings sector in Croatia” available for download at www.enpc-intrans.eu
EE rehabilitation of 5% of public building space constructed 1941-1970 in Croatia (in continental areas):
- 26 GWh/y heating energy savings
- 31 GWh/y total final energy savings (incl. heating, cooling, air conditioning, lighting etc.)

EE rehabilitation of 5% of public building space constructed 1971-1980 in Croatia (in continental areas):
- 20 GWh/y heating energy savings
- 30 GWh/y total final energy savings (incl. heating, cooling, air conditioning, lighting etc.)

EE rehabilitation of 5% of public building space constructed 1981-1987 in Croatia (in continental areas):
- 12 GWh/y heating energy savings
- 24 GWh/y total final energy savings (incl. heating, cooling, air conditioning, lighting etc.)

In total, the rehabilitation of 5% of the public building space constructed in Croatia between 1941 and 1987 to the EE standard of public buildings constructed in the same regions in 2010 would result in total heating energy savings of 58 GWh/y, respectively in total final energy savings of 85 GWh/y in the country.

In Berlin, Munich and Stuttgart a total of 1,300 public buildings have been subject to EPC already. Total energy savings achieved per year, based on the calculated savings of 68,000 tons of CO2 emissions may be equivalent to approximately 22 million litres of fuel oil, respectively some 220 GWh primary energy savings.\textsuperscript{11}

From the experience gained in Berlin, Munich, and Stuttgart, it can be concluded that EPC contracts successfully implemented in public buildings in Europe may result in average in 170 MWh primary energy savings per building and year.

These figures lead to the expectation that newly initiated EPC projects for the EE rehabilitation of public buildings in the partner country, when implemented, would be expected to create an impact providing for primary energy savings of more than 60 GWh per year. Based on the experience gained in Croatia during the past few years (80 EPC projects triggered 13.5 million Euro investments), it is expected that a total number of 360 or more public buildings rehabilitated through EPC business models will trigger a total amount of new investments of at least 60 million Euro.

### 4.2 Monitoring concept

Three indicators are defined in the grant agreement, which are to be monitored in order to provide evidence on the achievement of intended impacts:

- Market stakeholders with increased skills/capability/competencies on energy issues developed by the project
  - Target value: 3,000
- Cumulative investments triggered by the project in sustainable energy
  - Target value: 60 million Euro in total
- Energy savings triggered by the project
  - Target value: 60 GWh per year

All three indicators will be thoroughly monitored in three steps:

- The here presented baseline study including the development of energy saving indicators on the current state of EPC/ESCO project development and implementation in the public sector of partner countries (study to be compiled in the beginning of the project).
- Continuous evaluation of awareness building and training activities through the trainees by means of questionnaires and checklists.
- Update study on the current state of EPC/ESCO project development and implementation in the public sector of partner countries by the date of completion of the project, providing among other things an inventory of new EPC/ESCO projects initiated by former trainees of EnPC-INTRANS capacity development measures.

\textsuperscript{11} Own calculation based on CO2 emission savings data provided by Berliner Energieagentur and conversion rates provided on [www.prima-klimaweltweit.de](http://www.prima-klimaweltweit.de)
The monitoring will be performed in two parallel processes:

- Monitoring of trained and informed actors (numbers and represented target groups)
- Monitoring of projects newly initiated by trained and informed actors

In order to provide a sound methodological basis for the monitoring and verification of the above given minimum of energy savings triggered by the project, the partners will establish as close as possible working contacts with participants in EnPC-INTRANS project activities and invite them to report back on their own efforts regarding the development and implementation of EPC/ESCO projects in municipalities.

4.3 Monitoring procedures

The main source of information for the monitoring of expected impacts are the actors participating in the following activities in the project:

- Road show events
- Seminars
- Webinars
- Downloads of e-learning courses

In order to allow for a sound monitoring follow-up with these actors, each of them will be registered with her or his name, institution, telephone number and email-address upon prior written consent.

Those who are registered with their data as participants in any of these activities will be involved three times in the monitoring of the project:

- First time: At the date of registration for the event or at the date of download of the e-learning course
  - Monitoring of individual starting conditions
- Second time: At the end of the event or at the end of the e-learning course.
  - Participants immediate feedback on the performed events or on the e-learning course.
- Third time: During the last 6 months prior to the date of completion of the project.
  - Feed-back on the impact of lessons learnt during the project on the development of new EPC projects

For each step, a formalized web-based questionnaire will be developed and presented to the Steering Committee for review and approval during a Steering Committee meeting in January 2016. The main questions included in these questionnaires will be:

- Main questions for the assessment of individual starting conditions:
  - Have you been involved in the planning and implementation of EPC projects in public buildings before? If yes, what was your role and what were the outcomes (investment volumes, energy savings) If not, what was the reason why you did not contribute to the development and implementation of EPC projects in the past?
- Main questions for the collection of participants immediate feed-back on the performed events or on the e-learning course
  - Were the concept and the content of the event fitting to your needs?
  - Are your questions concerning EPC for public buildings answered?
  - Are there any questions left open? If yes, which?
  - Will you be able to make use of the lessons learnt for new EPC projects?
    If yes, do you have specific buildings/projects in mind for which you would like using EPC business models?
- Main questions for the collection of participants feed-back on the impact of lessons learnt during the project on the development of new EPC projects
  - Did you have since you participated in the EnPC-INTRANS project activities an opportunity to support the initiation, planning or implementation of new EPC projects for the EE rehabilitation of public buildings? If not, what were the main reasons?
If yes, please specify (if possible for each individual project):
- Number, types and sizes (m²) of public buildings comprised by the EPC concept?
- Year of period of construction
- Planned/perform/estimated total/ESCO’s/owner’s investment (e.g. estimated in Euro)?
- Expected/measured/estimated energy savings (e.g. in %; in MWh/y)?
- Expected/measured/estimated cost savings (e.g. in %; in Euro/y)?
- Planned/agreed duration of contract (years)?
- Envisaged/realised year of commencement of EPC services?

Detailed questionnaires will be presented to the Steering Committee for review and approval during a Steering Committee Meeting in the beginning of 2016. The monitoring procedures will start with the participants in the training of trainers in February 2016.

Collected data will be stored and processed anonymously without any reference to the personal data of participants answering the questionnaire. Monitoring results will be published in anonymous form in presentations to national and European events as well as in the due monitoring reports, which will in no case allow for the identification of individual participants or of specific peer groups. No personal data on any of the participants will be disclosed to the public.

4.4 Approximation of energy efficiency indicators

If an actor can provide for a newly initiated EPC project the full set of data required for the monitoring of the three main indicators (number of buildings, total investment in €, expected energy savings in MWh/y), these data will be directly be integrated in the monitoring of overall project impacts.

It is however expected that for many newly initiated projects, the participants will during project duration not yet be able providing reliable data on actual investment cost, achieved energy savings and agreed contract duration of the EPC. In particular the estimation of expected energy savings may be difficult at an early stage of project development.

In such case, the project monitoring will refer to information collected from ESCOs and EPC facilitators from 20 European countries by the TRANSPARENSE project in 2013 and 2015 (see Figure 7). These figures indicate that almost half of ESCOs are offering energy savings guaranteed in the range of 16-30% while the share of ESCOs offering higher performance guarantees is increasing.

Figure 7: Most common energy savings guaranteed in EPC projects
Therefore, for those newly initiated EPC projects for which there is no better data available, it may be realistic to assume target energy savings of approximately 30% as an average. This assumed average of approximately 30% will be taken as an indicator for the assessment of energy savings expected from newly initiated EPC projects, if more exact data is not provided by the stakeholder reporting on this project.

### Specific energy consumption in public buildings in Croatia (data source: EIHP)

<table>
<thead>
<tr>
<th>Period of construction</th>
<th>Continental location</th>
<th>Coastal location (Mediterranean)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Typical heating demand kWh/m²*y</td>
<td>Typical total final energy demand (heating, cooling, hot water, air conditioning, lighting etc.) kWh/m²*y</td>
</tr>
<tr>
<td>2010-2011</td>
<td>62</td>
<td>148</td>
</tr>
<tr>
<td>2006-2009</td>
<td>102</td>
<td>282</td>
</tr>
<tr>
<td>1998-2005</td>
<td>125</td>
<td>332</td>
</tr>
<tr>
<td>1981-1987</td>
<td>169</td>
<td>374</td>
</tr>
<tr>
<td>1971-1980</td>
<td>271</td>
<td>473</td>
</tr>
<tr>
<td>1941-1970</td>
<td>247</td>
<td>367</td>
</tr>
<tr>
<td>Prior to 1940</td>
<td>190</td>
<td>237</td>
</tr>
</tbody>
</table>

Table 2: Specific energy consumption in public buildings in Croatia

If there is no baseline data available at an early stage of project development, to which these 30% could refer to, an approximation could be allowed taking the age and size of a building as the baseline and the data reported on average energy consumption per square meter in public buildings of this age. If there is no country-specific data available, the data presented by EIHP for the specific energy consumption in buildings of different ages shall be taken as an approximation (Table 2; see also Figure 6, page 15).

On this basis, if there is no better data available on a building than the period of construction and the estimated size of the building (in m²), an approximation for the expected energy savings can be calculated as follows:

\[
\text{Roughly estimated expected energy savings per building (in kWh/y)} = \text{Size of the building (m²)} \times \left( \text{Approximate demand (see Table 2) (kWh/m²*y)} \times 30\% \right)
\]

Table 3: Approximation method for the rough monitoring of energy savings expected from newly initiated EPC projects for those projects for which specific data are not available yet

Total investment is much more difficult to be approximated, as there may be subsidies involved and uncertainties regarding energy cost, interest rates and contract durations may create uncertainties regarding the net present value of calculated energy savings.

First of all, the total investment which can be paid back from the achieved energy savings is depending on the acceptable EPC contract duration. Data presented by the TRANSPARENSE project (see Figure 8) as an outcome of ESCO feedback from 20 European countries indicate that the majority of EPC is currently concluded for project durations in the range of 5-10 years with a clear trend towards longer contract durations.
If there is no better data available, average contract durations of approximately 10 years will be assumed for newly initiated EPC projects monitored as an outcome of the project. This may lead to an estimation of the expected investment volume as the investment that can be amortized during a simple pay-back period of 10 years:

![Most EPC common contract durations](image)

**Figure 8:** Most EPC common contract durations

If there is no more data available on a project, the calculated indicators cannot be taken as a reference for the further project planning, but they may be sufficient to provide an approximate quantification of project impacts.

These indicators will be elaborated in the follow-up study (D6.3) due for delivery at the end of project duration. All performed approximations will be made transparent in the follow-up study so that each interested party can review and revise, if so intended, the quantification of achieved impacts on the basis of its own assumptions.

<table>
<thead>
<tr>
<th>Roughly estimated feasible investment per building (in Euro)</th>
<th>Roughly estimated expected energy savings per building (in kWh/y)</th>
<th>x</th>
<th>10 years</th>
<th>x</th>
<th>Current energy cost in the country(^\text{12}) (Euro/kWh)</th>
</tr>
</thead>
</table>

\(^\text{12}\) Energy cost based on EUROSTAT (http://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity_and_natural_gas_price_statistics) or other relevant energy cost sources