

Monitoring report on EPC - ESCO

Project partner: PP3 Hedmark County Council

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1. Presentation of the EPC/ESCO tool

1.1. About EPC and ESCO

Energy Performance Contracting (EPC) is a model for implementation of Energy Efficiency measures with guaranteed results in public or private buildings owned by an EPC client.

In an EPC project energy savings are used to cover the costs of the investments and both technical and financial risk is hence outsourced to an Energy Service Company (ESCO), also called the EPC provider.

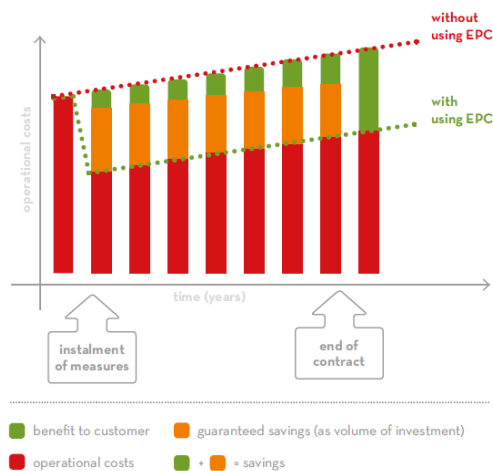


Table 1: The EPC model

1.2. Current knowledge and implementation of the tool

EPC is a well-documented and tested EE model used in many European countries and in the Nordic countries (Sweden, Denmark, Norway and Finland) for the last 10-15 years. It has also been introduced in some of the other countries in the Trans National Working Group (TNWG) of the Effect4Building project such as Poland, Estonia and to some extent in Latvia, but the model is still not well known in the latter three countries.

This report will mainly focus on EPC in public sector – The Effect4Buildings' main target group.

In Denmark and Finland, the EPC market is strong and healthy. Denmark has had about 30 municipal projects (of 98 municipalities in total) and after the introduction to hospitals in 2016 more EPC projects in Danish hospitals are on their way. In Finland the initial public EPC projects were smaller than in the rest of the Nordic countries, but in the last few years several larger municipal projects have been implemented with success. Hence Finland seems to be the fastest growing EPC market of the four Nordic countries now.

Norway had a very strong and growing market with approximately 60 municipal projects (of 428 municipalities in total) up until two years ago. The market has since then had a considerable decline and ESCOs seem to have less interest participating in the official bids.

The Swedish EPC market has also experienced problems in the past connected to uncertainties tied to governmental support schemes, legal complexity as well as trust issues between EPC clients and providers. The market seems to have raised above these problems and new, healthy projects has been seen in the last years and hence the market may be slowly growing.

1.3. Target group: Who use EPC today / who wants to use EPC

In all the above mentioned Nordic countries there has been projects in both public and private sector. We will however focus on public sector – hence municipalities, counties and other public building owners.

Public sector is the projects main target group, but it is also an important target group for the EPC model. This sector is very promising in terms of public energy and climate goals, saving potential, customer demand and project volumes. In addition, public sector is easier to monitor and has already been monitored to some extent by energy authorities based on reporting connected to financial support schemes and/or other governmental support schemes.

2. Motivation for using EPC

2.1. Why is EPC relevant to work with?

The EPC model is relevant for public building owners as it can help them to

- Modernise technical systems of buildings through a specialised Energy Service Company (ESCO)
- Bring a new model to install EE measures and possibility of funding through future benefits
- Enjoy guaranteed cost savings through reduced energy consumption with no or little own investments
- Strongly reduce the CO2 emissions of the buildings
- Catch up with maintenance lag in public buildings
- Reach goals in public energy and climate action plans (SEAPs)
- Outsource EE tasks to professionals for performance-based remuneration

Other motivation/benefits of EPC

- The ESCO provides a contractual guarantee of achieved savings and return on investment
- Long-term reduction of energy consumption and other operational costs
- A single supplier implements the project from start to finish:
 - Prepares project documents
 - Implements planned measures
 - Guarantees the extent of achieved savings
- The supplier and the customer share the same motivation – ensuring the optimal extent of investment with the highest possible savings
- Option of having the project financed by the energy service provider
- Improved comfort levels in the buildings
- Outsourcing of risks

Energy authorities in Norway have pointed at EPC as a suitable model to kick-start the green shift needed in municipal buildings and even gone as far as to claiming that the energy targets in the official energy and climate plans can only be met using EPC. Recent national support schemes are hence designed to priorities EE projects utilizing the EPC model.

The overall motivation for using the EPC model is that it provides higher security for implementation and better energy saving results to a lower price. Experience show investments in a higher share of mapped building area within a much shorter time span than when implementing traditional energy saving projects.

2.2. Policies/ legislation hindering or promoting EPC

The most seen policies/legislations hindering and perceived as threats to EPC are

- Building owners and decision makers fear of legal challenges and risks involving EPC.
- Lack of involvement and support from political support and support schemes from authorities is a big threat since successful EPC market development seems to have been seen as a quality stamp and hence break down some of the uncertainties brought about by the complexity of the model.
- Public building owners and administrations has shown a tendency to want to reduce outsourcing of EE and other technical services in favour of inhouse solutions and the wish to build up an control own technical capacities and skills.
- Since 2015 there were uncertainties and legal obstacles connected to the Eurostat guidance note¹ as this restricted the approval of EPC in indebted communities in some of the EU states. This has recently (2018) been adapted to allow third party financing in these public owned buildings and hence appease the situation for EPC contracts.

The most seen policies/legislations promoting/providing opportunities for EPC are

- The need and wish to fulfil the energy saving targets of public energy and climate plans (both municipal and regional plans)
- Public CO₂ reduction targets (nationally, regionally and locally)
- Public/national support schemes – both dissemination schemes and financial schemes
- Exemplary role of public sector

3. Energy saving potential

3.1. EPC energy saving potentials

The saving potential an average Nordic EPC project² at the end of 2015 was between 18 – 50 % with an average in the mid 20-ties. The investments were paid back in between 5 and 20 years. Both the savings and the pay-back time depended on how many "non-profitable" measures or high hanging fruits were included. Each project made investments between 3 – 20 MEUR in energy improvement in public buildings. The largest projects were and can still be found in Denmark, and the smallest ones were in Finland where the market has experiences growth since then.

Similar saving results have been documented in Best Practise Cases³ from several countries in Europe and in the Nordic Countries.

EPC can also increase the number of implemented measures in existing buildings according to a survey⁴ done by the Norwegian energy agency, Enova. The assessment was based on 252 energy saving projects initiated by Norwegian municipalities from 2010 to 2016. The numbers were collected from Enovas grant programs. 208 of these were traditional projects, while the remaining 44 were EPC projects. 80 % of the municipalities implementing EPC reached their energy reduction goals, while only 13 % of the municipals using traditional projects did the same.

¹ Eurostat Guidance Note: The Impact of Energy Performance Contracts on Government Accounts (Aug.2015)

² EPC in the Nordic Countries: <http://norden.diva-portal.org/smash/record.jsf?pid=diva2%3A900555&dsid=-4924>

³ European Best Practise Database: <https://guarantee-project.eu/bestpractice/>

⁴ Presentation of the survey, April 2016 and input from with preliminary findings from resent survey among EPC clients, Øyvind Moe, Enova SF. Presentation in Hamar April 2018 by Anders Solem, Enova SF.

From the survey Enova highlights the following main findings.

Facts about energi efficiency projects in Norwegian municipalities/counties		
2010 - 2015	Traditional EE projects	EPC projects
Number of projects	208	44
EE measures implemented after mapping work	27 %	96 %
Share of building area where measures are implemented	15 %	88 %
Investment per kWh in average per project	0,75 €	0,59 €
Average number of months from mapping to investment	22 months	5 months
Energy reduction compared to mapped potential	5 %	32 %
Achived goals of Energy and Climate Plans in own building stock	13 %	80 %
		ENOVA

Table 2: Facts about EE projects in Norwegian municipalities/counties (Enova SF)

Comparisons of EPC projects to more traditional methods where the municipalities implement energy measures themselves shows that traditional projects have lower energy savings at a higher cost. The implementation period is longer; hence it takes more time to achieve the results and all risks lies with the building owner.

In traditional projects 27 % of the municipalities move on to investments after mapping of the building stock, when as many as 96 % move forward with EPC projects (Figure 1). Using traditional projects they invest in 15 % of the mapped area and as many as 88 % of the mapped area in EPC projects. Energy reductions are around 5 % compared to mapped potential and of around 32 % for EPC (Figure 2), investments are 0,75 Euro/kWh and for EPC the investments are 0,59 Euro/kWh. The traditional projects take 22 months from mapping to investments in average, whilst the average for EPC is around 5 months (Figure 3).

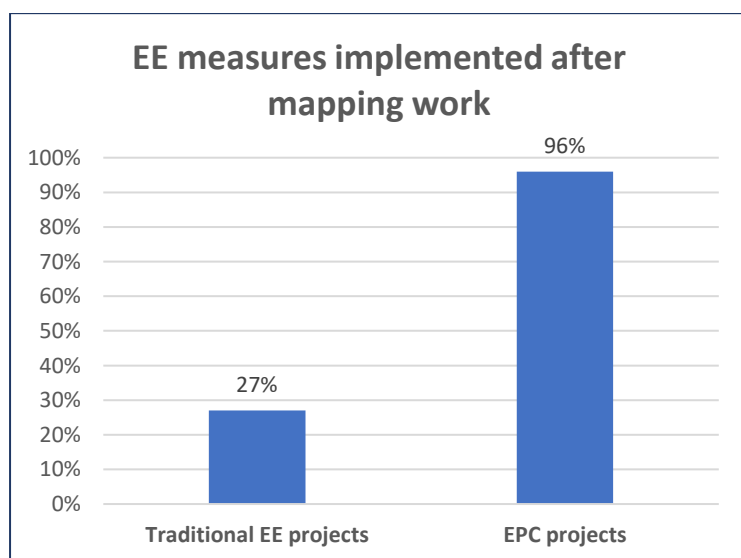


Figure 1: EE measures implemented after mapping

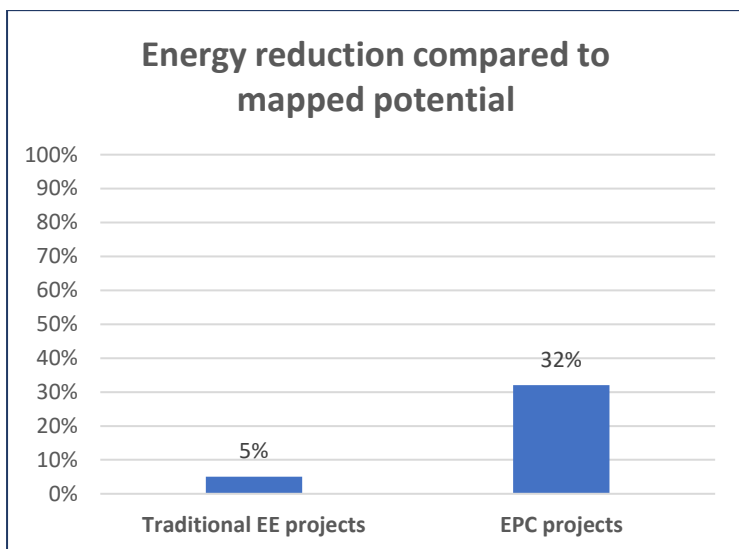


Figure 2: Energy reduction compared to potential

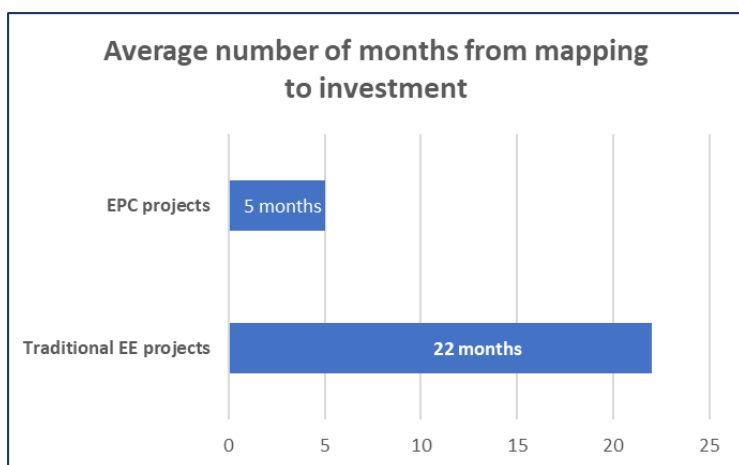


Figure 3: Number of months from mapping to investments

The survey also shows that the municipalities' experience of good projects diminishes as the EPC facilitator “finishes” their assignment. Hence, Enova think it is important that the facilitator takes part in all phases of an EPC project, to a higher degree than what is currently common in the market.

As much as 9 out of 10 municipalities would recommend EPC to other municipalities and the 10th would recommend EPC in general but have some issues with their ESCO. In EPC – as in all other projects – good and balanced communication between customer and provider is essential.

The overall conclusion was that the EPC model give a higher security for implementation, better energy saving results to a lower price, investments in a higher share of mapped building area and within a much shorter time span than for traditional energy saving projects. The latter point is especially important with a view to achieve goals of the municipal energy and climate plans, but also for achieving the saving targets of the energy authorities themselves.



Best Practice Case:
EPC in Kongsberg municipality, Norway

Kongsberg is a town municipality with 30 000 inhabitants. Approximately 200 EE measures was implemented through an EPC project in 2013 in 36 municipal buildings, covering 70 000 m2 and 70 % of the municipal building stock.

The EPC contract guaranteed 36 % energy saving compared to baseline with a project duration of 11 years. During these years the project will save 6,25 MEuro each year and 68,75 MEuro during the project lifetime.



Table 3: Best Practice Case: Kongsberg

3.2. How EPC can help increase the number of EE measures implemented in existing public buildings?

To achieve the documented saving potential of the EPC model, the aim is to develop an improved model for implementing EPC to lower the obstacles and promote best practise to increase knowledge and trust in a balanced model that ensures profit for both clients and providers.

One of the findings from the above-mentioned surveys of EE projects in Norwegian municipalities/counties illustrates how EPC lead to a much higher number of implemented EE measures than traditional EE projects (Figure 1 page 5).

4. Best practise

4.1. The European best practise for using EPC

There is a European Best Practise Database⁵ for EPC being build up though several EU-project⁶ initiatives. Relevant project examples from most countries represented in the TNWG can be found in this database. The EPC model varies slightly from country to country. The Best Practise cases can hence be view separately on their own value and achieved savings and serve as success stories and good examples of implemented EPC projects.

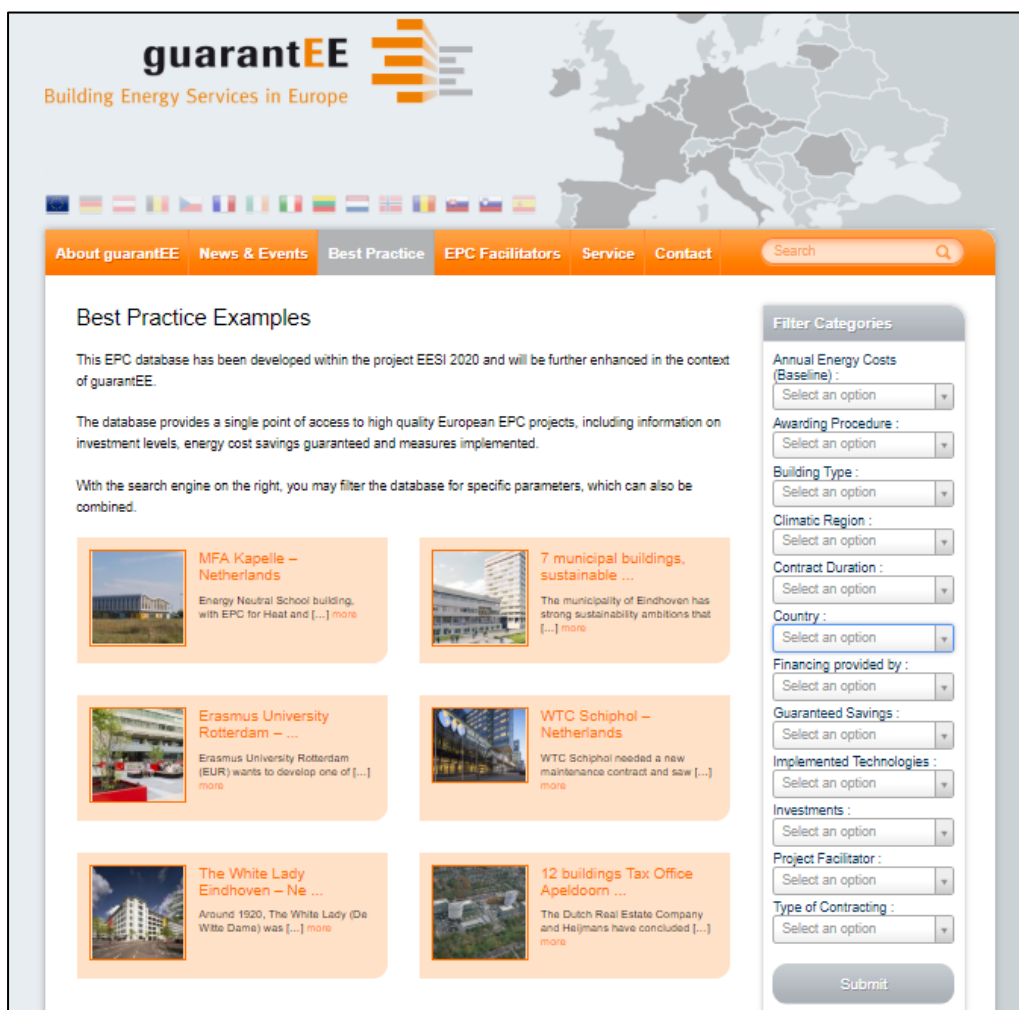


Figure 4: European Best Practice Database

An EPC market report⁷ based on a survey involving various stakeholders (clients, ESCOs and facilitators) in 14 European countries was launched in 2017 and includes best practice and experiences.

In most of the countries (10 out of 14) the average saving potential for EPC is higher than for traditional EE projects. This is a high number considering that 9 of the 14 partner countries are emerging EPC markets while only 5 of the countries included in the survey are considered mature.

⁵ European Best Practise Database: <https://guarantee-project.eu/bestpractice/>

⁶ The EU-projects Transparence (www.transparence.eu), EESI2020 (www.eesi2020.eu) and guarantEE (www.guarantee-project.eu)

⁷ European EPC market report: https://guarantee-project.eu/wp-content/uploads/2017/10/guarantEE-D2.2-EU_EPC_Market_Report_EN.pdf

The main findings from analyses of strengths, weaknesses, opportunities and threats in the public EPC sector are listed in the illustration below:



Figure 4: SWOT Analyses EPC Market Public Sector ⁸

4.2. EPC frontrunners

Some of the EU-projects on EPC promotion (TransparensE/guarantEE) have described partner countries such as Germany, Austria, the Czech Republic, France along with Norway, Denmark, Sweden (and lately Finland) as mature EPC markets whereas most others are considered emerging.

There are examples of successful projects in all mature EPC markets, but frontrunners have been in focus for special activities such as in

- **Upper Austria** where EPC projects can be subsidized with up to €75.000 or as much as 40 % of investments cost, causing a dynamic EPC market with 140 supported projects between 2006 and 2015. Combined these projects showed an investment volume of 39 M€ with granted subsidies of 3,2 M€.
- **Slovinia** where the availability and allocation of EU Cohesion Fund for technical support and funding of deep energy renovation in public buildings via integrated EPC and ESCO models have proven successful.
- **Norway**, where an official standard for EPC contracts (NS6430) was developed by a consortium of market players based on model documents developed in former EU projects were launched in 2014 and has been used as the basis for most public tenders for EPC since then.
- **Denmark**, where they have had long-lasting and large municipal EPC projects including deep renovation and in some cases overachieving saving targets.

⁸ European EPC market report: https://guarantee-project.eu/wp-content/uploads/2017/10/guarantEE-D2.2-EU_EPC_Market_Report_EN.pdf

4.3. Other project and initiatives

EPC promotion in Europe (www.guarantee-project.eu) 2016 - 2019

- European Market Study (https://guarantee-project.eu/wp-content/uploads/2017/10/guarantEE-D2.2-EU_EPC_Market_Report_EN.pdf)
- Register of national qualified EPC-Fasilitators
- National Online Pre-Check for building owners
- Triple-win-approach for rented facilities (https://guarantee-project.eu/wp-content/uploads/2017/10/guarantEE_D2.5_Brochure_Triple-Win-Solution.pdf)
- European Best Practise database (<https://guarantee-project.eu/bestpractice/>)
- EPC Customer Handbook (https://guarantee-project.eu/wp-content/uploads/2017/10/EESI2020_EPC_Marketing_Brochure.pdf)
- Facilitators Guideline (https://guarantee-project.eu/wp-content/uploads/2017/10/EESI2020_EPC_Facilitators_Guideline.pdf)
 - Baseline Calculation, Tender documents, contract documents, business models

EPC in the Nordic Countries (report 2016)

- <urn:nbn:se:norden.org:diva-4309>

EPC Code of conduct (www.transparensse.eu)

Other EU projects on EPC

- QualitEE: improving ‘good quality’ for energy efficiency services
- EnPC (www.enpc-intrans.eu)
- EPC business model: <http://www.enpc-intrans.eu/language/en/epc/business-models/>

4.4. How do we learn from the best practices?

Best Practices have proven to be crucial for development in new market areas as they are seen as pilots paving the way for new projects, reducing insecurities and other market barriers for new market actors to follow. Real learning however happens when cases also reveal obstacles that where overcome and problems that were solved. Hence all lessons learned should be a part of mapping and comparisons of best practice cases when learning is the goal.

5. Need of development

5.1. Current development stage

The EPC model is a developed and well-known model in the Nordic countries and in most of the countries in the Effect4Building. It has been implemented in the four Nordic countries over the last 10-15 years, and can be described as a mature concept there - whereas it is more recently introduced in Poland, Estonia and Latvia. In the three latter countries there is a need for testing and adaptation of the model and dissemination of awareness and knowledge to all market actors.

Being well known and implemented does not necessarily mean that it does not have flaws, and experiences from slow marked development and recent experiences – particularly in Norway – is proof that the model needs to be examined, compared and improved to lay the ground for future healthy market growth in the TNWG.

5.2. Main barriers for working with the EPC

- No designated legal framework for working with the tool in partner countries
- Lack of knowledge of the model – and also knowledge asymmetries between client and provider
- Lack of good practice examples and documented results (especially in Estonia, Latvia, Poland)
- Recent bad experiences and deviation from official standard for EPC (in Norway)
- Lack of trust in the model
- Complexity of the model/concept
- Lack of facilitators (initiating and development of tender documentation)
- Complexity of public procurement laws
- Too good to be true?

6. Summary – development of the EPC /ESCO tool

6.1. Development work

The Effect4Buildings project will provide comparisons of the EPC model in the different countries involved in the tool development. This will result in an analysis of strengths and the weaknesses, and it will ultimately in recommendations for further development and adaptation of the model, including user friendly and tangible tools to make the results known and disseminated in the target region (TNWG).

Based on the case plan for all tools and instruments there are 8-9 partners in the Effect4Building project we will have 8-9 development cases and 3-4 test cases for the EPC/ESCO tool.

Based on planned cases and current experiences we will have a fair possibility to analyse both success stories (Best Practise cases) and pitfalls to avoid. Based on this we will attempt to gather enough input to make recommendations on how to improve the EPC-model in the future accompanied by useful and tangible material to help pave the way for various market actors with emphasis on public building owners.

6.2. Development plan

- 1) Gather input/data from all partner cases
 - Based on "Development Case Diary" (template presented in Copenhagen)
 - Case description
 - Quantitative data
 - EE savings, CO2 reduction, EE investments, Etc.
 - Qualitative data
 - Lessons learned, Process issues, Stakeholders' input,
 - Combination of tools/instruments

Partners (PP1, PP2, PP5, PP7+8, PP10 – and of course PP3) will report experiences and results by filling in Development Case Diary

- 2) Draw up draft whitepaper based on findings
- 3) Implement findings in Level 1 test case(s)
- 4) Final White paper

Timeline

The timeline for implementation of the EPC tool development as set out in the workplan are as follows:

Tool development plan	Period 1 and 2
Diaries from level 2-5 cases	Period 2 and 3
Draft of white paper	Period 4
Draft tested	Period 4-5-6
Final White paper	Period 6

Exact deadlines and dates will be set and distributed to partners.

6.3. Development cases needed

To develop the EPC tool mapping of both success stories and failures are needed. The project will focus on real-life condition cases. Most of the cases will be level 2-4 cases using data from existing EPC projects in the target group (L4), cases from prepared EPC contracts or investment decisions (L3) and EPC projects where signed contracts and investments will be made during the project lifetime (L2). To gather data and experiences we will use a common "Development Case Diary"

resulting in mapping and comparison of the development cases. Findings from these cases will form the basis for a draft whitepaper.

The next step of the development will be to implement the results, findings and recommendations from the draft whitepaper in the cases using these findings in test cases within the project lifetime (L1).

According to the work program some cases will already from the start be real cases for implementing EE measures, becoming both development cases and test cases. This means that the level 2-4 cases must have an earlier deadline than the level 1 cases as experiences from level 2-4 cases should be implemented in the level 1 development cases.

Whitepaper

The EPC/ESCO whitepaper will be based on 8-10 case studies. 4-5 cases will be gathered from the Norwegian partner (PP3) and 4-6 cases from other partners. The whitepaper will focus on analysing experiences, challenges and political obstacles and drivers in the involved partner countries for using EPC, as well as advantages and disadvantages with different EPC-models. This will include ways of financing investments and other experiences among the target group in the BSR. Information about content, experiences, model documents and guidelines will be shared with all partners.

6.4. Obstacles and drivers of the EPC market

Some obstacles and drivers are common for the EPC market in most European countries, and present to a smaller or larger degree depending on the maturity of the market.

Main obstacles for developing the EPC tool

- Lack of designated legal framework for EPC
- Lack of active and competent EPC fasilitator
- Lack of dissemination of good practice examples (success stories) and documented results in some partner countries (Poland, Estonia, Latvia)
- Complexity of the EPC model
- Complexity of the public procurement laws
- Lack of knowledge and knowledge asymmetries between clients and providers
- Lack of trust – in the model and between the contract parties
- Too good to be true?

Main drivers for development of the EPC tool

- Large documented saving potential in public buildings
- Modernisation and maintenance backlog and needs for refurbishment in public buildings
- Chance of combining EPC with deep renovation
- Openness for outsourcing and long commitment to between contract partners
- Governmental financial support schemes
- Governmental information and promotion (dissemination of knowledge)
- Model documents, guidelines and official standards
- Municipal energy- and climate plans
- European energy legislations and directives

7. What does EPC have in common with the other project tools?

The EPC model include several elements from the other tools and instruments in the Effect4Building project. The EPC model implements several technological solutions in the clients building stock using financial calculations on energy efficiency solutions to reach its saving targets and is of an in itself a method for purchasing energy efficiency solutions.

Other tools and instruments integrated in the EPC model are

- Bundling methods; where new findings around critical masses of investments may make EPC even more desirable for investors, ESCOs and funding parties.
- Energy investment funding; other funding sources may also be interesting for both clients and providers of EPC
- Multi service contracts; findings from this tool may have valuable input to the development of the EPC model. Measures not known as EE measures with low payback time is already included in several large EPC projects resulting in longer payback time – such as deep renovation and general maintenance measures. It is possible to imagine other "non-energy measures" being included in EPC in order to reach security, aesthetic, social or other goals of public building owners.

And finally, the "Ability to convince decision makers" is important for all tools and instruments and crucial when introducing the EPC model known for its' complexity.