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Monitoring of Article 5 implementation progress – cost effectiveness of measures

Final Report 2.7

Core theme Public Sector - public buildings and public purchasing

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1 Summary

1.1 Background and motivation

Working Group 2.7 aimed to investigate whether and how Member States (MS) have understood and implemented the requirement for the cost effectiveness of the measures used in the implementation of Article 5 of the Energy Efficiency Directive (EED), both in "the default and alternative" approach, when developing energy efficiency projects in public buildings.

Article 5(1) of the EED stipulates that each MS shall ensure that, as from 1 January 2014, 3% of the total floor area of heated and/or cooled buildings owned and occupied by its central government is renovated each year to meet at least the minimum energy performance requirements set by the Directive 2010/31/EU (EPBD) ("the default" approach).

Article 5(6) also gives MS the option to choose equivalently "the alternative" approach.

"Cost effectiveness" is referred to twice in Article 5:

- "Member States shall require that central government buildings with the poorest energy performance be a priority for energy efficiency measures, where cost effective and technically feasible" (Article 5(1)).

- "…they take other cost effective measures, including deep renovations and measures for behavioural change of occupants…" (Article 5(6)).

The main questions this report addresses are: What is cost effectiveness? Is it important and possible to implement energy efficiency measures in public buildings cost-effectively? How cost effective do we need to be? What cost effective measures have been implemented? What calculation methodologies or tools are used to assess cost-effectiveness (especially for behavioural change programmes)?

2 Recommendations/Conclusions

2.1 Conclusions

1. The majority (64%) of Member States have decided to implement art. 5 of the EED based on the "alternative approach". This is reported to be because of the higher number of measures that can be considered, the higher energy savings that can be achieved as well as the lower investment costs associated.

2. There are no relevant differences related to the financing sources between the alternative and default approaches, and MS try to use the best financial mechanisms currently available, from the European Structural and Investment Fund to national funds (including governmental budgets), using in several situations a combination of different funds.

3. EPBD requirements have a relevant impact on cost-effectiveness of the projects. In several MS there is a recognised association between the cost-effectiveness and the cost-optimal methodology developed under the EPBD to define the requirements that must be fulfilled (e.g. HVAC, envelope and lighting). A small number of MS have defined cost-effectiveness themselves.

4. Inability to check cost-effectiveness ex-post is a weak point of Article 5 implementation in the majority of MS. There are different reasons why such a check is not carried out; lack of methodologies and technical standards, insufficient human capacity, no need or interest. Lack of courage/ desire to learn the real cost-effectiveness of public investment was also mentioned. In addition ex-post evaluation of the cost-effectiveness of the projects does not seem to be a major concern for the majority of the countries.

5. Standard economic factors, such as Payback Time (PBT), Net Present Value (NPN) and Internal Rate of Return (IRR), in general fail to reveal the full benefits of public sector building renovation. Improved methods of evaluation are required to assess the full benefit.

6. Behavioural changes are considered for the energy saving calculation in the majority of the MS that adopted the alternative approach. This is probably the clearest example of low investment costs and high energy savings potential.

7. The use of Energy Performance Contracting (EPC) to support the implementation of article 5, based on the default approach, presents a challenge due to the long payback periods of energy efficiency measures in the building envelope. Some countries have solved this problem by providing some support (that has to be non-reimbursable) in order to allow the development of integrated energy efficiency projects in central government buildings.

2.2 Recommendations

1. Harmonisation is needed between cost effectiveness (EED), cost benefit (EED) and cost optimal (EPBD). It could also be useful to clarify the differences and how MS can develop their own policies.

2. Only one country (Denmark) has developed a calculator to evaluate the cost-effectiveness of the projects. This could be used as a good practice example for several other countries.

3. Some countries have defined systems to manage and monitor energy consumption of public buildings, allowing a clearer understanding of how energy is used in central government buildings. These initiatives should be evaluated by other countries as this experience could be used to develop more effective energy efficiency policies.

4. The existence of ex-post cost effectiveness evaluation seems to be of special relevance for measuring the success of energy efficiency projects, and would allow MS to quantify the savings achieved and the success of the legal, financial and administrative instruments that were developed for that purpose.

3 Practical Examples

During the sessions at the plenary meeting in the Hague the following good examples were presented and discussed:

Mrs Irena Križ-Šelendić (HR): Public procurement procedures.

- Public sector should among others build and invigorate EPC+Public Private Partnership market.

The Government of the Republic of Croatia adopted the Programme of energy renovation of public sector buildings for the period 2014 – 2015.
Programme goals:

- To contract and completely renovate 200 public sector buildings - approximately 420 000 m^2 of heated floor area.
- To decrease energy consumption in refurbished buildings for 30 - 60% (approximately 150 kWh/m^2 per year).
- To decrease CO_2 emission for approximately 20 500 t per year.
- To mobilise investments amounting to approx. 400 million kuna.
- To start an energy services market (ESCO).

Mr Josip Kobescak (HR): Energy efficiency project in Croatia:

- Mobilisation of all resources.
- Deep involvement of the government.

Key steps to introducing energy management in public buildings:

- A political decision on project implementation alongside a public declaration of an Energy policy and its aims.
- Establishing and organising an Office for Energy Management (energy efficiency team) within the organisational structure in public administration and local management.
- Establishing a buildings' registry.
- Using the Energy Management Information System (EMIS).
- The identification and implementation of measures that improve energy efficiency (Energy audits are the key instrument in identifying economically feasible measures in order to improve energy efficiency, and their implementation is recommended before initiating any investments).
- Local promotion of a sustainable use of energy and the implementation of measures that improve energy efficiency in the public sector.
- Training and capacity building (public administration, energy efficiency team, technical staff, employees).

Ms Kirsten Engelund Thomsen (EPBD): Cost optimum methodology within the EPBD.

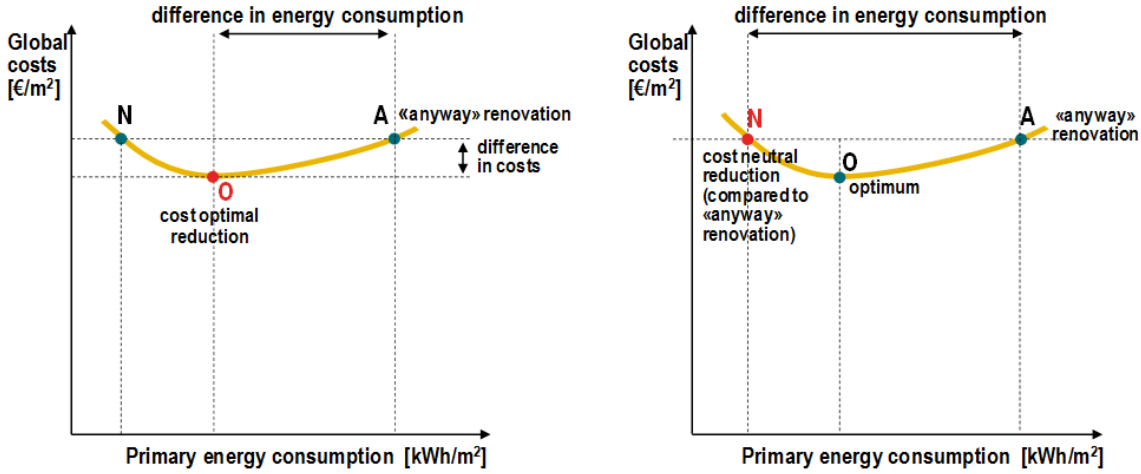
- A voice from the EPBD has been very useful. Ms Thomsen shared the achievements already achieved in the pursuit of EPBD implementation.

Guidelines for calculations (EPBD):

- Establish at least nine reference buildings – one for new buildings and two for existing buildings subject to major renovation - for single-family, multi-family, and office buildings respectively.
- Define packages of energy efficiency measures to be applied to these reference buildings.
- Assess the primary and final energy needs of the reference buildings and the impact of the applied improvement measures.
- Calculate the life cycle cost of the building after energy efficiency measures are implemented, by applying the principles outlined in the comparative methodology framework.
- Derivate a cost-optimal level of energy performance for reference buildings.

Finding cost-optimal solution in building renovation is a subject of careful choice based on a well-balanced mix of knowledge and practice (figure 1).

Figure 1: Global cost curve after renovation



Mr Alan Ryan (IE): Cost effective implementation of Article 5.

Energy Conservation in the Public Service:

- Ireland's National Energy Efficiency Action Plan (NEEAP) requires Public Service Organisations to provide an exemplary role.
- Public Sector Target = 33% energy reduction by 2020.
- Originally thought to be ambitious but the Office of Public Works (OPW) well on the way to achieving this goal.
- No room for complacency.
- Energy Conservation Programmes – easiest savings are the initial savings.

The key success factors:

- Three key elements to programme:

  1. Technology.
  2. Specialist Expertise.
  3. Continuous Staff Engagement.

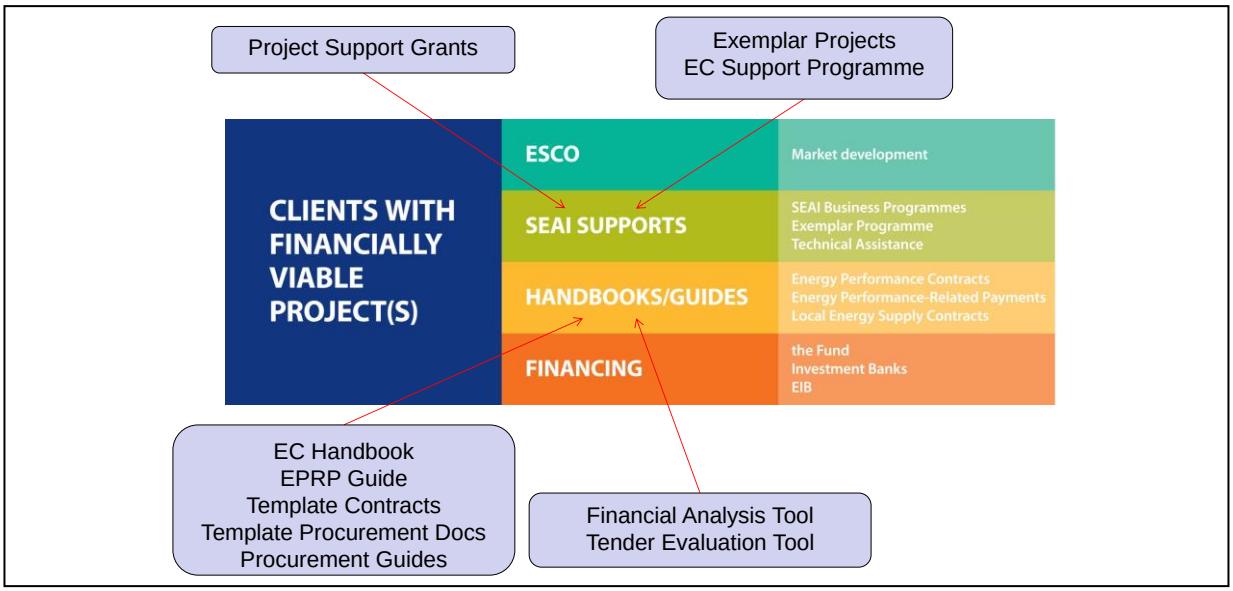
- Endorsement at Senior Management level.
- Active energy teams within participating buildings cornerstone of the campaign.

Crucial elements of Ireland's National Energy Services Framework are presented in figure 2. Activity and co-operation are prerequisites for success.

Figure 2: Active Energy Teams: The Key to Success

The practical approach of the Ireland's programme is depicted in figure 3. Clear objectives, tools and support build up a framework which works.

Figure 3: National Energy Services Framework in Ireland[1]



Cost-effectiveness turns out to be difficult in implementation. The model solutions presented give optimism as they show that practical solutions have successfully been implemented in a few countries. Future progress will be based on the experience of the few leading MS.

[1] EC - Energy Communities; EPRP - Energy Performance Related Payments Guide; EIB - European Investment Bank; SEAI - The Sustainable Energy Authority of Ireland

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The Concerted Action for the Energy Efficiency Directive (CA EED) was launched by Intelligent Energy Europe (IEE) in spring 2013 to provide a structured framework for the exchange of information between the 29 Member States during their implementation of the Energy Efficiency Directive (EED).

For further information please visit **www.ca-eed.eu** or contact the CA EED Coordinator Lucinda Maclagan at **lucinda.maclagan@rvo.nl**

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