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Postgraduate Energy Efficiency Services: an example of good practices.

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1. Abstract

The debate on energy and sustainability is of main interest. Special attention and priority is continuously given to reduce the emission of greenhouse gasses (GHG), in particular to avoid CO_2 emission as this is an important aspect in global warming. The heating of buildings, both public and private, is a large energy end-user. It is obviously clear that besides energy reduction also energy efficiency as well as energy flexibility will need to be successful. One is only interested to perform sustainable investments if lower cost can be guaranteed, so together with new technologies, new business models must be developed. In addition the alternatives need to be faithfull and of high quality. Besides energy and environmental aspects Non Energy Benefits (NEB) are generated as well during energy efficiency processes, so there is a need to discuss and determine values and visions.
The university college PXL has recently started an interdisciplinary postgraduate EES Energy Efficiency Services including three modules: ***iterative output driven energy efficiency services, project cycle costs and*** *aspects of in- and external communication. There is a mixed partnership of public and private stakeholders. Let us hope that we can counter our environmental problems either with better application of existing technologies or by inventing new (applications of) clean technologies together with new business models.*

Keywords: PXL University College, ESCo, Energy Efficiency Services

2. Introduction

A lot of people perceive the following trends as catastrophic: the sea level, the melting of the pole ice, the numbers of tornados, floods and forest fires, the national security and the potential of 192 million climate migrants in 2060. One of the most obvious trends, with definitely a global impact, is CO_2 emission. This is largely related to the traditional energy facilities dealing mainly

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with fossil fuels. The European commission has decided within the 2030 Framework for Climate and Energy to increase the goals in comparison to 2020 targets namely: -40 % GHG emissions (20%), 27 renewable energy (20 %), 27 % energy efficiency (20) and 15 % interconnection (10%). As we can see in fig. 1 and 2 the contributions of buildings in energy consumption as well as in GHG emissions is significant. It is clear that the energy efficiency services for buildings can contribute on a large scale to achieve the climate goals by 2030 (see fig. 1 and 2) [1,2].

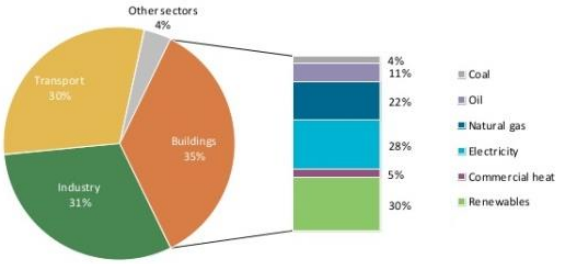

Figure 1 Final energy consumption by sector and building energy mix, 2010

The ecological footprint for Flanders is problematic (5th position worldwide) due to older buildings and bad traffic. So the RL 2010/31 has in the Flemish part of Belgium its own implementation namely EPB/RL. This includes a Nearly Zero Energy for new buildings in 2021 and energy performance requirements for existing buildings. In addition the feasibility for testing alternative energy should in any case be tested. Recently the province of Limburg (BE) first stated its ambition to become a sustainable, climate neutral region. Aim has been set at 2050, with a 30% reduction in greenhouse gas (GHG) emissions by 2020. It was estimated that over 20% of the yearly regional GHG emissions were related to domestic heating and cooling and another 5-7% to that of public and (semi)commercial buildings.

3. The postgraduate

The PXL University College is a young, dynamic and vibrant organisation; a centre of expertise for innovation, creativity and entrepreneurship. PXL offers professional bachelor programmes in several domains but is also active on lifelong learning projects and is responsive to (local) needs (research and education). As for the province Limburg a large amount of the regional GHG emissions were related to heating and cooling; a strong focus was laid on improving the energy efficiency of buildings, both public and private.

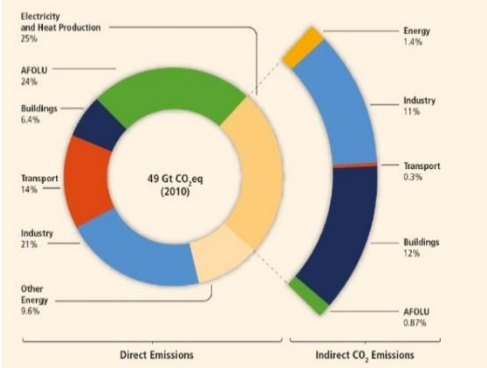

Figure 2 Global Greenhouse gas emissions by economic sectors

The PXL together with the province partnered up with several organizations in order to effectively help overcome most thresholds for thorough energetic refurbishing. And although sustainable building has evolved to a more mainstream concept, it soon became apparent that even building professionals often lacked specific knowledge and insights. Consequently a customized postgraduate is developed with the strong interaction of several dedicated stakeholders: the PXL as a University College, BELESCO (Belgian ESCo association), Infrax (a public ESCo), Encon (a private ESCo), Dubolim (sustainable building) and the (local) government of the province Limburg.

In order to come to a reduced energy consumption in buildings the TRIAS energetica method (see fig. 3) is often applied [3].

Figure 3 TRIAS Energetica scheme

However this is not enough to obtain the (energy and climate) goals. In addition the chronological procedure is not very effective as there is no concrete feedback and moreover the interaction is complicated as it is multidisciplinair (technology, engineers, architects, energy sources, financing, legal aspects). In the concept of Energy Efficiency Services all these stakeholders are integrated by means of the facilitator/ESCo. As we can see in fig. 4 there are several individual and combined possibilities "to optimise" the energy consumption in buildings [4]. The system is also an output driven project cycle and is accompanied by a strong measurement and verification system in order to go beyond the level of trias energetica. So in module 1(56h) special attention is given to the iterative project cycles, including the audits, measurements and verification and the role of facilitator. Furthermore the link between building and mobility is a subject (as in the near future, buildings can be part of smart grids/electrical vehicles), as well as attention for monuments (as special regulations can occur in view of the (indoor and outdoor) building shell). The timescale in an energy efficiency project can be very variable. This depends on the ambition in view of energy reduction together with the (external) financial possibilities.

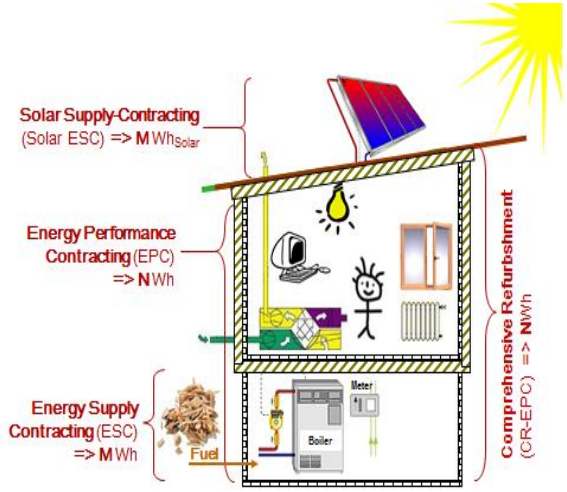

Figure 4 Different energy contracting methods

The general cost scheme for an EES is shown in fig. 5 [5]. These financial possibilities andt the elements to describe the project cycle costs are studied in module 2 (36h). It is obvious that the legal conditions should be discussed and worked out in advance.

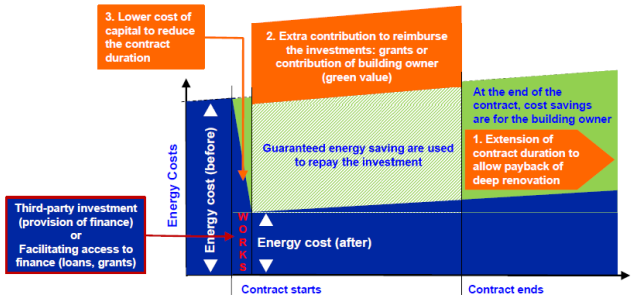

Figure 5 Example: Cost reduction using EES

Only in this way the measurement and verification protocol can be performed properly, in order to monitor the energy savings and so the distribution between the ESCo/owner of the realised cost reductions. In addition the concept of the green value/added value is discussed.

In module 3 (26h) special attention is given to in- and external communication. A well organised change management strategy

will be needed as an EES project is performed during a longer period (in comparison to quick win opportunities) and often NEB are present. This is strongly linked to the optional module 4 which deals with transition and sustainability methods.

4. Conclusion

4.1 Postgraduate EES

This postgraduate programme can be a catalysator for more projects in SME in our region. With this knowledge the project scope can be broadened and the time horizon can be prolonged, so we can really make the transition that is needed (climate, energy, ….). The collaboration between early adapters and the steering committee is important and helps to develop the "ESco" market. The PXL has recently started an EES project for its own buildings and is looking to apply this approach on its new locations as well.

4.2 General

Enterprise Flanders and Flanders Investment & Trade have launched last year a project call "ESKIMO" to stimulate the ESCo market for SME in Flanders. In addition in april 2015 the flemish minister for energy Ms Turtelboom instructs to investigate the installation of an ESCo-fund. As it is clear that SME have low interest to optimise their energy costs when the payback time is between 5-10 year.

5. References

1. Technology Roadmap, Energy-Efficient Buildings: Heating and Cooling Equipment, OECD, IEA, Paris (2010).
2. IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
3. Duijvestein C.A.J. Het nieuwe ecologische bouwen, Delft: SOM (in Dutch) (2002)
4. Bleyl, J. et al. Energy Contracting to Achieve Energy Efficiency and Renewables using Comprehensive Refurbishment of Buildings as an example in "Urban Energy Transition" edited by Peter Droege, Elsevier (2008).
5. Bullier, A. and Milin, C. Alternative Financing Schemes for Energy Efficiency in Buildings, ECEEE Summer Study (2013).

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