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## DRAFT Version

# Non-Energy Benefits of energy efficiency

### *Widening and improving the business case for investment decisions*

#### **SUMMARY**

*Energy efficiency is one of the main pillars of a future proof, resource efficient and sustainable economies across the EU. Currently, two of the most decisive EU framework legislations governing this area are up for revision and political discussions; **The Energy Efficiency Directive** and the Directive on **Energy Performance of Buildings**.*

*Traditionally, energy efficiency has primarily been discussed and economically assessed with energy savings – and specifically the potential savings on the energy bills - being the prime focus. This is obviously an important aspect, but it is far from the whole picture of the drivers and benefits from further investments in energy efficiency. This regardless if the scope is EE improvements in industrial sectors or in the building sector.*

*This briefing provides a walk-through of the concept of **Non-Energy Benefits (NEBs) at project level** [and provide examples where those are assessed]. Specifically related to building renovation the briefing briefly touch upon the cost-optimality calculations which EU member states applies in their national building regulations and outline potential for including the economic value of non-energy benefits in this regard.*

*The Danish Ecological Council recommends an enhanced focus on NEBs in both the residential and non-residential/industry sector to visualize the multiple benefits and potential drivers for further EE-investments. Specifically, with regard to building renovation it is strongly recommended that the values of the NEBs are consistently integrated via an update of the relevant parts of the common EU cost-optimality calculation methodology and via nationally drafted guidance tailored to the specificities of the member state in question.*

## Introduction

The term "**Non-energy benefits**" (NEBs) aims to capture a reality that is often overlooked: investment in energy efficiency can provide many different benefits to many different stakeholders. In discussions and literature, the wider benefits of energy efficiency have been variously labelled "*co-benefits*", "*ancillary benefits*" and "*multiple benefits*" - terms often used interchangeably.

The purpose of "labelling" those benefits is to adequately capture them under a conceptual umbrella, which is broad enough to reflect the heterogeneous nature of all the outcomes of energy efficiency improvements and to avoid pre-emptive prioritization of various benefits; different benefits will be of interest to different stakeholders. Also, the weigh and value of the benefits will differ depending on which level those are assessed on.

The International Energy Agency (IEA) placed focus on the issue by their comprehensive study "Capturing the multiple benefits of energy efficiency", where they identified a need to

***"expand the perspective of energy efficiency beyond the traditional measures of reduced energy demand and lower greenhouse gas (GHG) emissions by identifying and measuring its impacts across many different spheres" and concluded that "... the potential of energy efficiency to support economic growth, enhance social development, advance environmental sustainability, ensure energy-system security and help build prosperity, .....repositions energy efficiency as a mainstream tool for economic and social development."***

It was however, also highlighted by the IEA that despite those significant values, non-energy benefits are mostly left out of most policy and program design and evaluation and that this results in lack of coherent data and evaluation methods etc.

There is a need to move on from general and dispersed talking about the wider benefits of energy efficiency to ensuring that those are more systematically assessed, economized and captured. To this end, NEBs need to be an integrated part of our EU framework policies for energy efficiency and in the national implementation of those.

## EE beyond the energy bill – Different levels of valuable Non-Energy Benefits

NEBs can be assessed on different levels. As illustrated below a general differentiation can be made between the project level, where NEBs are experienced by the individual business or building owner and the country or societal level, where the NEBs benefit the country's economy and society as a whole.

Example of NEBs	
<b>Country</b>	Job creation along the whole value chain, positive GDP effects, reduced import (supply security), health-cost related savings, national competitiveness, savings in energy poverty related subsidies, reduced environmental impacts (CO2 and other GHG emissions + air pollution) etc. <sup>1</sup>
<b>Project</b>	Increased asset value (building and/or production line), increased industrial productivity and product quality, reduced maintenance costs, increased indoor climate, noise reduction (from inside and outside sources), brand value (sustainability), improved light and comfort levels etc <sup>2</sup> .

Looking at the different levels of NEBs can help policy makers to better understand possible drivers for the individual project in order to design policies and ensure strategies for implementation which support and supplement regulatory requirements. Likewise, there is a scope for the actors in the business and construction industry to be more aware of the potential NEBs part of the business case when they assess potential energy efficiency projects - and for those of them that are in an advisory role, to be more vocal on the objective potentials of the NEBs relevant to a specific project.

## NEBs on project level – the Danish NEB project

So far, most analysis on NEBs has been made on the macro-economic and national socioeconomic level and while this is obviously of great importance to the general overview and political assessment of policies to promote energy efficiency, there is a need to shed more light on the NEBs and their potential significant economic value on project level and how those are to be included in the business case and hence the specific investment decisions.

In Denmark, a project on NEBs and the development of a tool has been carried out in 2012-2016. The project "*Energieffektiviseringer er mere end energi*" (*energy efficiency is more than energy, red.*) NEB 1+2 has carried out in depth work on scoping criteria and assessing various methodologies to give value NEBs and subsequently developed an online NEB

<sup>1</sup> Deeper assessment and analysis of macro-economic and other country and EU level NEB effects of EE can be for example be found in "The Macroeconomic and Other Benefits of Energy Efficiency", European Commission, August 2016 or "Capturing the multiple benefits of energy efficiency", IEA, 2014.

<sup>2</sup> For details on health and well-being related impacts see also "Capturing the multiple benefits of energy efficiency", IEA, 2014. For further information on NEBs on project level assessments has been showcased as a part of the Danish Elforsk project: NEB and NEB2

valuation tool. The tool has been applied on more than 100 Danish energy efficiency cases from sectors ranging from energy companies, process industry, retail and office buildings.

In practice the tool allows for different approaches to the valuation of NEBs. In some cases, there has been a preference for a calculation based method, where data has been subtracted directly from an existing business or production management system. In other cases, emphasis has been on the valuation of the NEBs by a person closely related to project and the operations affected and hence centrally placed to assess the impacts. In practice, many cases have been evaluated by a combination of methodologies.

Looking across the more than 100 different cases it is clear, that the character of the projects and the size of the investments varies significantly. Also, the different NEBs vary for the projects, but in all cases a number of specific NEBs were identified and evaluated in terms of added value for each case. While the size of the project is somewhat limited in an EU context it certainly gives food for thought that the NEB valuation resulted in an average value increase in the cost efficiency of the energy efficiency projects of a factor 1,4, which in practice would mean an average reduction of the calculated payback time with on average of 30% -in many cases actually a halving or more of the calculated payback time.

## **The current revision of the EU EPBD – how to get the NEBs operationalized?**

With the publication of the so-called winter package, i.e. the legislative Clean Energy for All package in November 2016 the Commission started the process of revision for the two main legislative EU frameworks for energy efficiency, namely the Energy Efficiency Directive and the Energy Performance of Building Directive. Roughly speaking those will constitute the frameworks EU countries will act within, when they determine their national policies and requirements for energy efficiency in their member states.

When it comes to energy efficiency in buildings, an important driver is the requirement for member states to set ambitious minimum energy performance criteria for their buildings (new and undergoing major renovations). Those requirements are laid down in the EPBD (energy performance of building directive).

## **How are the appropriate levels of energy performance determined?**

In the current EU-legislation the individual member states are required to determine cost-optimal levels of minimum performance requirements for buildings and key building elements (walls, roof, windows etc.) using the so-called *cost-optimality methodology*. The purpose of this is to support that cost-efficient energy savings potential is obtained in the different member states, while taking into account national specificities. Hence this methodology also functions as a benchmark mechanism, which enables comparison between different member states' progress towards fulfilling the objectives of the EPBD. Today the methodology is having effects even outside the EPBD, as it was considered when

assessing the preconditions under the EU structural and investment funds' energy efficiency section and also the benchmarks are used by the European Investment Bank to assess the expected effectiveness of investments into e.g. buildings renovation projects<sup>3</sup>

In practice member states are to use the methodology to calculate the cost-optimal level of energy performance requirements in a number of categories i.e. for both new and existing buildings (renovation) and for both residential and non-residential segments, which should then be reflected in their national implementation.

## How are the cost-optimal levels calculated and how are NEBs currently accounted for?

The definition of cost-optimality is placed in art 2 (14) of the existing EPBD. The methodology applied is basically a cost-benefit analysis with only the conventional financial, project related aspects included (e.g. the initial investment (incl. any financing costs), O&M costs, energy cost, possible earnings and demolition). The effects are accumulated over the life time of the building, which is determined as 20 years for non-residential and 30 for residential buildings. Member states determine country specific parameters such as discount rates, energy prices etc. in their calculations.

To a question on how NEBs are included in this assessment, the short answer is: They are not. This is clearly stated in the Commissions progress report on cost-optimality COM(2016)464, where it is specified that given that the methodology is based on conventional cost-benefit analysis it does not account for external factors which can affect the lifecycle cost, neither does it include account for the positive impacts in form of societal benefits related to job and wealth creation or project level benefits such as productivity, health and building value.

## Why is this a problem?

*For the ambition level of national standards:* The Commission emphasizes that the cost-optimality framework is only to be understood as a minimum, hence that member states can go choose to set national standards that go above the cost-optimal level. This is obviously true, but it doesn't change that fact that you have an EU-methodology which sets a benchmark, that doesn't capture the full benefits of the given project and investment.

By doing so, you put policy makers and building administration in an unfair disadvantages situation, where they will have to argue that going beyond cost-optimal is *actually cost-optimal* because the official methodology neglects the value of significant benefits. To this end they would have to develop their own individual assessment framework to include the value of NEBs to complement the official methodology, which is bound to be a resource intensive process.

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<sup>3</sup> COM(2016)464 final

*For the **individual investment decisions***: The national standards are the *regulatory* framework for private investment decisions. But also, they constitute the frame for the expert guidance for energy renovation professionals, which are to advise on investments and the project owners who are to decide if a given project can show a satisfactory payback time on the investment. Depending on the type of project the inclusion of the value of potential NEBs can reduce the calculated payback time substantially.

## What should be done?

*In short: There is a need to **further highlight and quantify the NEBs in terms of investments in different type of energy efficiency related projects** in order to ensure that those are sufficiently reflected.*

### POLICY LEVEL

A rigid and narrow focus on the cost-optimality methodology gives a too pessimistic picture of the benefits created -both on the individual project level and for society as a whole and hence it hampers sufficiently ambitious national renovation requirements.

*Recommendation*: The Commission should thoroughly analyze the aspect of NEBs include those in the methodology for cost-optimality as part of an update process. In parallel, the Commission shall provide member states with guidance on how to properly include NEBs in their own cost-optimality calculations and where relevant assist member states in providing national guidance to the professionals in the sector (see below). *→ This should be included in the text of the Energy Performance of Building Directive (EPBD), which is currently under revision.*

### PROJECT LEVEL

Actors involved in or advising on potential energy efficiency or “modernization” projects should have a greater knowledge and awareness of NEBs relevant to their specific investments. This is key to include all relevant elements in a potential project, but also to evaluate the NEBs properly for their value to be included in the business case, which is to be presented when the investment decision is approved. This will also provide a good baseline for subsequent follow up and monitoring of the implementation of the project.

*Recommendation*: member states should update their cost-optimality in order to include a NEB-perspective and on this basis, reassess their national requirements. Likewise, member states should provide guidance to building owners and building sector professional on how to assess and include NEBs on project level. This should be with input from relevant stakeholders in order to ensure a cross sector understanding of the issue and to produce a guidance tailored to the national specificities of different project types. *→ This should be included in the text of the Energy Performance of Building Directive (EPBD), which is currently under revision.*