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ENERGY EFFICIENCY
FINANCIAL INSTITUTIONS GROUP

Multiple Benefits of Energy Efficiency Investments for Financial Institutions

Final report

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MULTIPLE BENEFITS OF ENERGY EFFICIENCY INVESTMENTS FOR FINANCIAL INSTITUTIONS

FINAL REPORT

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1 Executive Summary

The topic of multiple benefits in energy efficiency has been explored in different contexts over the past years and is slowly gaining momentum. Multiple benefits such as job-creation, energy poverty alleviation, public health and environmental sustainability are increasingly considered by policymakers. However, these benefits are not yet fully part of the financing and investment decision making routines of financial institutions. Other benefits relevant for investment decision makers, since they are directly linked to the asset (such as improved comfort, higher property value, healthier inhabitants/users), are very often not considered in decision making.

There is a common understanding that properly analysing the potential of these co-benefits can significantly increase the attractiveness of energy efficiency measures and boost their deployment.

This is specifically true for buildings, as for example health benefits are not realized only through a switch of the heating system but mostly through an efficient renovation. This reduces draught, outdoor air pollution and indoor air quality (IAQ).

Multiple benefits are important for all actors involved in decision making. For financial institutions it is important to value their positive impact on project performance and risk profile, as well as their overall benefits for individuals and the society as a whole.

In this context and focussing on financial institutions, the working group on multiple benefits explored two main areas:

- methodologies to monetise the multiple benefits and to integrate them in investment decision-making and financing procedures

- decision-making processes by investors as well as in financial institutions related to energy efficiency investments and how multiple benefits can play a role in increasing the uptake of energy efficiency measures.

In addition to an extensive background research (including a literature review, annexed to the present report), the working group conducted eight meetings around key thematic focusses:

- The first two meetings dealt with the background and the general context of multiple benefits including the macro-economic effects in the context of the COVID recovery

- In the third and fourth meeting the working group discussed **health and well-being**, in particular in the context of social housing

- The fifth meeting focussed on **EU Taxonomy and building certification** schemes and their relation to multiple benefits

- Multiple benefits in the context of managing and supervising of **ESG risks** for credit institutions and investment firms were the focus of the sixth meeting

- During the seventh meeting's multiple benefits of energy efficiency in the context of **impact investing** were discussed

- Finally, the eighth meeting was dedicated to the formulation of the **policy recommendations**.

Major lessons learned from the working group meetings with regard to financial institutions are:

- Multiple benefits are not yet widespread knowledge for stakeholders working in financial institutions. In particular, for financial institutions, it is unclear how the consideration of multiple benefits improves their business.

- At corporate level, the use of pertinent indicators will help understanding how multiple benefits can improve the work beyond energy efficiency. This is a prerequisite for the dissemination of best corporate practices. on

- Multiple benefits can be achieved on multiple levels – the societal or regional or asset level. To properly operationalize multiple benefits, it is important to define the necessary context (who receives the benefits?) according to the needs. The benefits relevant for financial institutions can be very different from the benefits for the investor or the society

- The consideration of non-energy benefits, especially better comfort, healthier homes and workplaces, and reduced energy poverty, in the of can help designing energy efficiency programs that are better adjusted to the customers' needs and therefore to stimulate demand building renovation efforts.

In addition, the working group delivered thematic inputs on three topics, which were produced in cooperation with working group members. They cover the most relevant topics identified in relation to the non-energy benefits associated with energy efficiency investments: health and social benefits (section 6.1), the Sustainable Finance Taxonomy and green building rating tools (section 6.2) and impact investing (section 6.3). Additionally, the consortium developed a quantification and monetisation tool for commercial real estate, which is presented in section 6.4.

Key recommendations from the thematic inputs are:

- The Taxonomy screening criteria should also cover multiple benefits which are currently outside the scope of the taxonomy. The multiple benefits of energy efficiency are a wide topic, which is not fully covered in the taxonomy at the moment.

- Many of the non-energy benefits overlap with the environmental, social and governance (ESG) criteria that financial institutions and their stakeholders use to screen investments and measure their portfolios against. Disclosure and reporting initiatives should be considered as a basis to identify these non-energy impacts, improving data collection and disclosure practices. This requires the development of voluntary standards to measure and report about multiple benefits from a financial industry perspective. Further

research activities have to find ways to operationalize this to increase the project pipeline for energy efficiency investments.

- The impact investment framework can provide useful pointers as to how non-energy benefits should be valued. The identification and evaluation of multiple benefits strengthens the connection between energy efficiency investing and impact investing and can increase their attractiveness to impact investors. Impact investment should be considered as a role-model for the consideration of societal multiple benefits. Future work needs to focus on communicating such positive role models.

- The lack of data is one major issue to develop the integration of multiple benefits into decision making procedures. Data on multiple benefits should be collected in a more systematic way. For EU and national support programmes this could be part of the support conditions. This data then should be used to make multiple benefits operational for the various stakeholders including the financial institutions. Further research should focus on this topic, as it has been identified as a major barrier towards the operationalisation of multiple benefits. The balance between administrative burdens and the potential benefits needs to be considered when defining the scope of the data collection.

- N.B. Since the conclusion of the project and its working group meetings, the importance of energy efficiency to avoid energy waste has become a new dimension due to the consequences of Putin's aggression against Ukraine which is having severe impacts on energy prices and security of energy supply in Europe. Valorising energy efficiency for its contribution to energy security is almost impossible though, as it would be cynical to calculate the investments into energy efficiency against the costs of war and human suffering. However, it is obvious in the European Commission's RePowerEU strategy published on 8 March 2022 that energy efficiency will have to play a much more significant role to secure Europe's resilience against external shocks related to energy supply and to avoid that Europe can be blackmailed by external forces.

2 Introduction

This report is prepared in the context of the assignment "Multiple Benefits of Energy Efficiency" (EC request for service N° ENER/C3/FV2018-556/2/FWC2018-464/09), signed on October 10, 2019. It is the draft Final Report under the service request and it summarises the outcome of the EEFIG Working Group (WG) on the topic of multiple benefits of energy efficiency. The draft final report is based on the second interim report and has been updated to include the proceedings, agendas and presentations of the eight working group (WG) meetings, which took place during the entire period of the service agreement. The working group has been set up with the purpose to identify the range of non-energy benefits associated with energy efficiency investments and to contribute to documenting the positive links between energy efficiency improvements and the associated non-energy benefits. The working group was also tasked to formulate recommendations that would help reinforcing this link. The working group explored two focus areas:

- methodologies to monetise the multiple benefits and to integrate them in investment decision-making and financing practices

- decision-making processes related to energy efficiency investments and how multiple benefits can play a role in increasing the uptake of energy efficiency measures.

This report has seven chapters including this introduction (chapter 2). Chapter 3 provides a definition of multiple benefits and outlines the major challenges related to their integration in financing decision making. Chapter 4 explores in detail multiple benefits in the context of the industry and the building sectors. Chapter 5 gives an overview of the up-to-date knowledge on multiple benefits including the main barriers to their quantification and integration in financial decision making. This analysis is followed by an overview of the main topics and outcomes discussed by the working group in chapter 6. This chapter also includes a methodology to estimate the monetary value of multiple benefits and a generic valuation model for commercial real estate that draws on the available literature and evidence base. Finally, chapter 7 presents the main conclusions and policy recommendations discussed by the working group.
The annex of this report includes the minutes of the meetings, list of the WG members, data and literature on which the quantification tool is based, draft communication of the results and PowerPoint slide deck of the main results.

2.1 Objectives of the WG

The scope and main objectives of the working group were to:

- *Identify the range of non-energy benefits associated with energy efficiency investments, at both macroeconomic and project levels, including the various stakeholders who accrue these benefits.* A broad variety of multiple benefits have been identified in the literature review. The main task of the working group was to identify the benefits that are most relevant for financial institutions*. (see chapter 5)*

- *Show evidence on the link between energy efficiency improvements and their benefits other than energy cost savings (e.g. comfort, health, air quality, productivity etc.).* There is growing availability of information and literature; however, the evidence base is still somewhat patchy and lacking granularity for financial institutions to fully use it in their risk assessments and underwriting decisions. The task of the working group was to identify existing evidence, raise awareness and clearly communicate this evidence in line with the needs of financial institutions. The evidence base related to health and comfort were identified as the most relevant benefits. *(see chapter 6.1)*

- *Propose robust methodologies that can be used for estimating the monetary value of the benefits identified.* The assessment and monetisation of multiple benefits have been identified as one of the key challenges by the working group in its first meeting. Quantification of energy savings is already a complex issue for financial institutions. Extending the analysis to multiple benefits implies further difficulties and additional costs (e.g. data needs related to documentation and tracking of multiple benefits, as well as the availability of KPIs, metrics and benchmarks). Given these barriers, a practical, yet robust, approach has been developed and presented during the last meeting *(see chapter 6.4).*

- *Assess the role different benefits play in the decision-making processes and highlight the ones which are more likely to inform/drive a decision to invest in energy efficiency*. This objective has been approached from various perspectives: (1) reviewing social and health benefits; (2) linking multiple benefits to the EU Sustainable Finance taxonomy criteria (especially the environmental and social do-no-significant-harm criteria), (3) identifying overlaps between multiple benefits and ESG risk management practices; (4) leveraging the impact investment framework to draw out synergies with multiple benefits. The working group also assessed existing data collection practices of financial institutions and additional metrics and data points on multiple benefits required for financial decision-making. *(see chapter 6.1-6.3)*

- *Assess the behavioural aspects of (irrational) decision-making of building owners with regard to energy efficiency retrofit investments.* Residential renovation decisions are seldom solely driven by economic and rational considerations, such as expectations of energy cost savings and associated financial payback. For most owners, the renovation decision is driven by a complex intertwine of economic and emotional factors, in which "softer" issues, such as aesthetics, ambience and 'feel' and match to personality are all relevant factors. The fact that residential renovation decisions are not merely taken on a narrow view of costs and financial benefits, presents the financial institutions with an additional challenge of capturing these additional benefits which from the financial institutions' point do not constitute a value-addition. These "non-monetary" benefits have been discussed during the meetings on the health and social benefits and have been described in the relevant issue paper.

- *Assess the need for policymakers to devote more attention to different investment* behaviour *of different household profiles and the need for more profile-specific design and implementation of policy interventions.* The working group looked at the needs of social housing tenants and landlords as well as those who are energy poor. The concept of technical assistance and one-stop-shops has been explored and recommendations put forward for public authorities and financial institutions *(see chapter 6.1 and 7)*

- *Formulate (policy) recommendations on how to better use these multiple benefits and behavioural insights in order to drive the decision-making process of buildings owners and companies, and also to attract more finance to energy-efficiency improvements of buildings, industry, tertiary and transport services.* The working has produced 3 issue papers with detailed recommendations organised according to the stakeholders' target audience and thematic areas including: (1) health and social benefits, (2) taxonomy and sustainability rating tools, as well as (3) impact investing. The final meeting of the group had a sole purpose to review recommendation to encourage financial institutions to scale up financing of building energy efficiency retrofits by aligning ESG risk management and achieving multiple benefits, including health and social development goals. *(see chapter 7)*

- *Structured input for the EEFIG Underwriting toolkit, Update of the EEFIG Underwriting Toolkit.* The results in chapter 6 and in particular the part on impact investment has been drafted to give input to this task. In the next update of the underwriting toolkit, this input will be used. (see chapter 6)

- *Communication for the EEFIG website.* The issue papers written by the consortium in cooperation with WG members were intended as communication materials for the EEFIG website. The original plan to use the issue papers as stand-alone publications has later been revised by the EC and the issue papers were not published in the end, although these could still be useful for later publications should the EC wish to do so. The only material published was the health and benefits papers which found its way to an Italian publication, with the support of FIRE, in a slightly edited (shortened) version (see chapter 6).

2.2 The working group meetings

Six physical meetings were planned initially (The ToR requested 5-6 meetings in total).

Table 1: Key deliverables

Deliverables	Date
Official Project Start	10.10.2019
Kick-Off Meeting	22.10.2019
Draft Inception Report	17.12.2019
Inception Report	10.01.2020

Interim report	10.04.2020
Interim Meeting	11.04.2020 - 01.05.2020
Second interim report	10.09.2020
Short presentation at EEFIG plenary	Feb. 2021
Draft Final Report	10.05.2021
Possibly presentation at EUSEW (together with other WGs)	June 2021
Final Meeting	11.05.2021 - 31.05.2021
Final Report	10.07.2021

Due to the Covid restrictions, meetings were moved onto virtual platforms. Eight meetings have been organised with a good attendance (on average 20-25 participants). The working group members were frequently asked to engage in the preparation of the issue papers. The format of the meetings was targeted at motivating a broad participation. However, input from financial institutions to the discussions and the preparation of the issue papers in the working group was limited mainly to GNE Finance and Societe Generale. In general, there was only a limited number of active participants, whereas most participants did not contribute consistently. The following table gives an overview of the working group meetings. Due to the ongoing health-related circumstances, only one of the meetings was held as a physical meeting on February 17th in Brussels. The other meetings were held as virtual meetings.

Table 2: Overview of the WG meetings

Meeting	Content of the meeting
1st working group meeting **(17.02.2020)**	Introduction of the general concept Overview presentations and discussions
2nd working group meeting **(08.07.2020)**	Additional background presentations Macro-economic effects of multiple benefits in the context of the COVID recovery Scoping of the working group
3nd working group meeting **(10.09.2020)**	Multiple benefits in the context of social housing as well as environmental aspects beyond energy efficiency with a focus on health and well-being

	Scoping and background presentations
4th working group meeting **(20.11.2020)**	Multiple benefits in the context of social housing as well as environmental aspects beyond energy efficiency with a focus on health and well-being Reading of the 1st issue paper
5th working group meeting **(08.12.2020)**	EU Taxonomy, green building certification schemes and multiple benefits. Background presentations Reading of the 2nd issue paper
6th working group meeting **(23.03.2020)**	Multiple benefits in the context of managing and supervising of ESG risks for credit institutions and investment firms Updating the EEFIG underwriting Toolkit
7th working group meeting **(28.04.2021)**	Multiple benefits of energy efficiency in the context of impact investing
8th working group meeting **(31.05.2021)**	Discussion of Policy recommendations Wrap up

Additional meetings were held with smaller groups to develop three issue papers as agreed with the EC. Meetings have been assisted by external guest speakers from the European Commission, European Banking Authority, US Environmental Agency, Irish Government, financial institutions and the Global Impact Investment Network. The involvement of these external institutions and guest experts have been carefully selected with the aim to explore all the potentially relevant angles of multiple benefits and make (the impacts of) multiple benefits meaningful for financial institutions. Furthermore, the involvement of experts sought mobilise the finance community, facilitate information gathering and build bridges between different communities that have a role in accounting and realising multiple benefits. Background papers have been developed and provided ahead of every meeting.

3 Description of the problem and the main challenges

Research and market reports have consistently shown that the non-energy benefits of renovations often outweigh energy benefits, which are "traditionally" being understood as savings on the energy bill. The IEA report "Capturing the Multiple Benefits of Energy Efficiency" (2014) was a milestone and seminal piece that has firmly inserted the topic on the agenda of both policymakers and building sector stakeholders.

On the EU level, the Horizon2020 programme has financed several projects that focus on multiple benefits, including COMBI[1], Odyssee-Mure[2] and M-Benefits[3]. Other projects such as x-Tendo[4] and QualitEE[5] are working on including multiple benefits and additional features to existing EPC regimes. As Fraunhofer and BPIE are both involved in most of these projects, learnings from these projects fed directly into the background and issue papers as well as discussions in the WG. The M-Benefits project was a particularly relevant reference point in the working group meetings, given its focus on both industry and building energy efficiency improvements.

The EEFIG underwriting toolkit[6] has also considered multiple benefits in the "Value / Risk appraisal" section, therefore the tool has also been an agenda item of the WG meetings.

These different reports and studies have resulted in a broad range of definitions and classifications of what is considered as "multiple benefits". That said, most analyses focus on the societal and macro-economic benefits of energy efficiency measures. Benefits such as job-creation, energy poverty alleviation, public health and environmental sustainability are not part of the ESG commitments of most financial institutions. However, there is a compelling case to be made that these impacts are able to shape the investment strategy and should be integrated in credit decisions and risk management all the way to external reporting.

Multiple benefits of energy efficiency have a material impact on investment outcomes. Besides the positive impact on the risk-profile of the investment and financing institution, multiple benefits can also improve the reputation and corporate value as well as investors/investees relations. The wider benefits of energy efficiency which are likely to bear an impact on the asset's risk profile, market value and/or investment worth will vary significantly between different markets and regions, type of property, but also the purpose of lending or investment as well as the type of financial institution and their ESG commitments. Recent research has incrementally taken into account the

1 COMBI - Calculating and Operationalising the Multiple Benefits of Energy Efficiency in Europe www.combi-project.eu
2 www.odyssee-mure.eu
3 M-Benefits - Valuing and Communicating Multiple Benefits of Energy-Efficiency Measures, https://www.mbenefits.eu/
4 https://x-tendo.eu/
5 https://qualitee.eu/
6 http://www.eefig.com/index.php/underwriting-toolkit

investor perspective and has shown that multiple benefits can be monetised and integrated into the company's risk assessment framework, although this integration might require adapting existing business models and/or development of new business partnerships.

Best practice examples, such as the ones provided in the M-Benefits project, can help showcase these benefits for the investors/companies. Nevertheless, as many of them need to be calculated on a case-by-case basis, it is difficult to have a blueprint for the valuation of these benefits. What is important as a first step is to clearly communicate with business partners and investors to ensure that they are aware of benefits and risks. Beyond the good practice examples, a broader statistical evidence that would help the benchmarking and monetisation is still lacking. Attempts to include multiple benefits in the DEEP database have failed due to the lack of available data. Evidence on the macro-economic benefits is available through projects like COMBI but this is of limited use for a quantitative project assessment on a project level which requires granular and dynamic market evidence.

Tangible and observable features of buildings in general have a stronger influence on market decisions than more "hidden characteristics" such as energy efficiency and related benefits which are not easily observable for financial institutions. They remain difficult to communicate, report, track and monetise due to the lack of standardised metrics and lack of market transparency. The translation of multiple benefits into actionable and meaningful financial information therefore depends on the ability to assess and communicate these benefits through clear KPIs and evidence from reliable sources.
In this sense, the first step is to make energy efficiency and associated benefits visible and measurable through consistent and "financial sector"-friendly metrics. Energy Performance Certificates (EPCs) could play an important initial role in this regard as they are the most readily available information tools, although it should be recognised that different lenders and investors may have different needs in terms of transparency, granularity and due diligence processes. Equally, EPCs focus mostly on energy performance aspects while social and health indicators are outside of their scope for now.
The main challenges for integrating multiple benefits in financial decisions are:

- Many terms and thematic investment areas (e.g. energy efficiency and affordable housing) are not universally defined, making it difficult to identify benchmarks, KPIs and set industry best practices;

- There is a lack of data, standard measurement practices and often prohibitive costs to collect such data per project; as the benefits are currently not analysed in a broad and consistent manner, only anecdotical evidence is currently available. For financial institutions, there is only little added value in collecting such data in a systematic way which contributes to the persistence of a vicious circle of data gaps and perceived value of data;

- Coordination between financial institutions, building experts and (in the case of health impacts) the medical community to assess and measure these factors is lacking. This would need more awareness among these professionals for the issue as well as an exchange of data which is often not possible due to data protection constraints;

- Housing quality is assessed focusing on the technical and environmental performance aspects, whereas broader social objectives and impact categories may be more appropriate to fully capture multiple benefits;

- Public authorities lack capacity to coordinate between health, buildings, climate, financing departments at national and regional levels.

Lenders are often keen to point out that they do not control the buildings on which their loans are secured and that they have little or no ability to require additional data from their borrowers, which are relevant for the quantification of multiple benefits, partly because this data is not available and partly due to data protection concerns. Banks already struggle to collect energy consumption data and are trying to estimate this data using information they already possess, including building type, floor areas, age of construction, EPC rating, use and occupancy rates. As long as the data has no impact on the business model of the lenders, motivation to collect additional data remains rather low.
Investors, fund and portfolio managers, however, may need more than an EPC to be able to assess and disclose real performance, assess improvement opportunities, set KPIsand monitor progress towards these targets. They also seem to have more consistent data management and due diligence practices in place due to increasing and more and stringent disclosure and reporting requirements.
As mentioned above, EPCs are the most widely available tool conveying the quality and energy performance of buildings. For the case of multiple benefits, EPCs are not comprehensive enough and do not include information on health benefits, indoor environmental quality, pollution and tenant satisfaction that would make the quantification of project-level and societal benefits (affordability, energy security, job creation, public health) possible. The usefulness of the EPC for financing decision-making is also hampered by notorious issues related to quality, comparability (methodology, scope), but also by the ability of banks and institutional investors to access and interpret the EPCs.
In addition to EPCs, sustainable building assessment frameworks, such as Level(s), and commercial certifications (e.g. BREEAM, LEED, DGNB, HQE) can play an important role in the financial assessment of sustainable properties. Definitions and certifications provide a basis for investors to measure and compare properties, which can constitute a critical foundation for financial analysis. Even though environmental certifications touch upon energy efficiency related benefits such as comfort, wellbeing or indoor air quality, they do not anticipate how the market responds to such performance. Accordingly, environmental certifications are an important building performance indicator, but are a few steps away from offering financial insights. Additional efforts, such as coupling building performance data with up-to-date and comparable financial performance data (e.g. price or rental premiums and discounts) are needed to clearly link the sustainability performance to the financial risks/benefits associated with the building.
What is clear is that no single **certification or rating system** is deemed sufficient in conducting a financial assessment of the multiple benefits of energy efficiency. At a minimum, the specific threshold requirements necessary to obtain benefits from regulators, building occupants, and investors must be identified and evaluated for each specific property.

Currently there is no straightforward way to account for energy efficiency and wider benefits available for investors and lenders. While the deemed or perceived benefits of some assets may translate into part of e.g. market value or investment worth, others will not. Yet the translation of efficiency investments into financial value cannot be assumed as an implicit fact, there is a clear recognition that energy efficiency has the potential to contribute to long-term value creation and preservation. Energy efficient properties may therefore be of a lower risk to lenders and investors, especially as energy efficiency upgrades are commonly coupled with other measures and benefits, resulting in an overall quality improvement of the property.

Because of this lack of sufficient and reliable data and inadequate technical skills to verify and track the sustainability credentials of buildings coupled with low awareness for multiple benefits, energy efficiency considerations remain insufficiently considered in risk assessments and investment decisions. The EU Sustainable Finance package is however expected to play a significant role in shaping business models and investment decisions in the decades to follow. The taxonomy has the potential to act as a catalyst for the EU to mobilise the financial sector to help fund the transition to zero energy buildings. The taxonomy will become relevant for energy efficiency and the consideration of multiple benefits either through preferential financing conditions for better performing assets or limited access to financing if investments and loans do not meet the criteria set out in the taxonomy.

4 Definitions on multiple benefits

"Non-energy benefits" is a term widely used term in literature to describe benefits other than energy savings associated with energy projects. Within this report we use the term "multiple benefits" because it has a broader meaning and entails a wider scope of benefits. The term "non-energy benefits" does not include direct- or energy-related benefits (e.g. GHG-emissions savings). "Multiple benefits" includes all benefits from energy efficiency measures. The term "multiple benefits" has also become widely adopted after the publication of the IEA report on the multiple benefits of energy efficiency.

Two main market segments – buildings and industry – have different multiple energy benefits:

1. **Buildings**: Where the key benefits are non-energy ones- indoor climate & health benefits, such as indoor air quality, which in turn results in higher productivity, reduced asthma risks and reduced risks of mould. Sustainable buildings and reducing climate risks are also becoming important to end-consumers.
2. **Industry**: Where the key benefits are (i) operational ones, such as reduced maintenance, saved process time and increased production capacity; and (ii) product-related benefits such as quality improvements – a by-product of implementing energy efficiency investment in energy intensive industries.

Lines between these two categories are not necessarily always clearly defined. For example, commercial investors are generally more interested in the operations and maintenance benefits, rather than the health issues, especially if these cannot be monetised.

The possibility to capture value or monetise multiple benefits will vary between at least five market segments:

1. Industry (including SMEs)
2. Commercial real estate
3. Residential owner-occupied buildings
4. Residential rental buildings
5. Public buildings

Those market segments have their own specific characteristics and therefore need - as in energy efficiency in general specific approaches to address the topic of multiple benefits. Depending on the stakeholder's perspective they might rather focus on micro or macro-economic benefits. For example, in public buildings, topics like local job creation and urban recreation can be important topics, whereas in commercial real estate asset value and rental value are important benefits.

5 Overview of up-to-date knowledge on the topic

This chapter gives an overview of the current understanding of multiple benefits in the context of the industry and the building sectors. It also reviews key barriers and provides insights into current decision-making practices. Findings from the M-Benefits project, led by Fraunhofer ISI have been included, as this project has just ended recently.

5.1 Industry

The industrial sector in large parts is highly dependent on energy costs. Energy intensive value chains make energy efficiency a valid option for cost savings. However, the implementation of energy efficiency measures oftentimes requires far-reaching changes in the production system leading to extended periods of production outages and elevated investment needs. Accounting for energy cost savings alone is therefore not considered in the industrial context.
Macroeconomic impacts such as economic growth, positive employment impacts, poverty alleviation and public budget impacts such as lower health-related costs have been more extensively studied (e.g. EPA 2011[7], Ürge-Vorsatz et al. 2016[8]). However, microeconomic impacts on the company level are of crucial importance for decision makers in companies as well as financing bodies. Companies and especially industrial manufacturing companies can benefit from an improved product quality, higher flexibility of processes, reduced production times, reduced production losses or lower risk (Cooremans, 2015)[9].
Further benefits were observed as part of the recent M-Benefits project[10]. Maintenance costs of energy efficient devices are often lower than those of dated and less efficient devices. Inefficiency of processes often manifests itself in a large amount of waste heat that in effect leads to a less favourable working climate for the employees. This effect is particularly prevalent in the industrial sector. Hence, higher energy efficiency increases workplace comfort and safety (Rohde and Cooremans 2019)[11] which in turn are linked to lower occurrences of sick leave days for direct negative impacts of the working environment to the physical or mental health of employees (Montano 2019)[12].
Industrial productivity improvements have also been observed in the M-Benefits project. Production times were oftentimes lower and the rejection rate of products decreased. The G20 report on multiple benefits (2017)[13] states

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"Integrating the multiple benefits of energy- efficiency into real estate, consumer and corporate lending products can drive customer demand and improve creditworthiness"

Unfortunately, to date there is no generally agreed methodology in place, which energy managers and experts can use to evaluate the multiple benefits in a systemic way. The evidence base for microeconomic multiple benefits is equally rather limited. Such information is crucial for decision makers in industrial companies to convince investors and company-internal decision-makers of new energy efficiency investment projects (Rohde and Cooremans 2019). Future research could try to fill this knowledge gap by collecting information on multiple benefits on a project level systematically.

In order to achieve the goal of successfully implementing energy efficiency projects in industrial companies, an approach that goes beyond monetisation is necessary.

Energy cost savings in themselves are not particularly salient with the term "salient" uniting several meanings: visible, likely to be noticed, prominent, important, aligned with people's norms and expectations. Neither are the energy-cost savings considered high-priority to investment decision-makers. Hence, a new approach is needed that can give insight into companies' approach to energy efficiency investments or the lack thereof. The authors cited in the following paragraphs do not represent a uniform commitment to one or another method, but they do share several conceptual differences with the monetisation/cost-benefit-approach. They emphasise the importance of understanding the real decision-making logic of different stakeholders, starting from a shared observation that cost-benefit analysis is not salient. In the literature following the salience logic, two emerging themes can be identified:

1) a focus on strategic and core business objectives (regardless of energy or other resource issues);
2) the importance of uncertainty and risk in shaping investment decisions, and the ways in which decision-makers think about and assess future impacts of their decisions.

Cooremans (2012[21]) argues that the strategic character of an investment (defined as the contribution of this investment to a company's competitiveness in performing its core business) is the main influence on decision-making. This holds true for energy efficiency investment projects just as much as for other kinds of investments. The three dimensions of competitive advantage are:

- the value proposition (e.g. does the investment contribute to better product quality and reliability?)
- reduced costs (for instance due to reduced product loss or maintenance cost)
- reduced risks (due, for instance, to increased workplace safety).

This argument has far-reaching consequences for the energy efficiency community, as it represents a fundamental criticism of the conventional approach based on a narrow financial viewpoint (concerned with investment return).

According to Pye and McKane (2000)[14], the approach framed in terms of payback (cost-benefit analysis) may actually make the arguments less persuasive, because they are not linked to the core business and strategic focus

[14] Pye, M. and McKane, A. (2000) Making a stronger case for industrial energy efficiency by quantifying non-energy benefits, Resources, Conservation and Recycling 28 (3): 171–183.

of business decision-makers. There are no guarantees that management will implement energy efficiency projects even if they make sense from a financial perspective. Other investments or projects may have greater financial returns than energy efficiency projects, capital may be unavailable, or certain projects may not fit with a company's strategic plan. Cooremans therefore proposes that practitioners (e.g. energy auditors), scholars and public program developers should approach energy efficiency investment projects from a strategic perspective rather than from a classical financial perspective, based on financial payback.

Cooremans and Schönenberger (2017) find that the strategic character of an investment is key in investment decision-making among 305 firms: where energy efficiency investments are seen to meet strategic goals, they stand a better chance of being implemented.

Russell (2009)[15] sets up a 'strategic profit model' which proposes a way to coordinate the engineering, operations and finance decisions needed to maximize energy efficiency investments. Components of the model are different aspects of the financial context in which a firm operates: tax burden, interest burden, operating margin, asset turnover and financial leverage. Russell (2013)[16] argues that capital investment decision-making activities depend on the workplace culture of individual companies, business units, and facilities, so very similar companies may have very different strategies for capital investment. The heterogeneity of business leads Russell to conclude that 'energy efficiency programs will need to evolve to a new level of interaction with industry.' This echoes previous research on the importance of corporate culture and sub-cultures in organisational decision-making (Cooremans, 2011[20], 2012[21]).

Making energy use visible and salient is an important first step on the way to energy efficiency becoming a strategic objective. The authors state, that policy should encourage further institutionalisation of monitoring and reporting practices and, if appropriate, combine energy efficiency messaging with a broader eco-efficiency agenda.

Cooremans (2011[20], 2012[21], 2015[17]) has developed a categorisation of energy-efficiency investments according to their contribution to the three dimensions of competitive advantage. This approach requires the analyst, e.g. an internal or external energy consultancy, to start by understanding what is important to the firm, whether or not that includes energy or energy efficiency. When the strategic priorities and decision-making culture of the firm are understood, the analyst can then look for ways in which energy efficiency investments might align with those strategic goals.

Russell (2015)[25] classifies multiple benefits for business activities in four main categories:

1. revenue enhancement;
2. expense reduction, income enhancement;
3. capital performance enhancement;
4. risk mitigation.

[15] Russell, C. (2009) What's in It for Me? The Financial Dynamics of Corporate Energy Management. ACEEE Summer Study on Energy Efficiency in Industry, panel 2-pp. 24–32, American Council for an Energy Efficient Economy.
[16] Russell, C. (2013) Corporate Protocols for Capital Investment: Implications for Industrial Energy Program Design. ACEEE Summer Study on Energy Efficiency in Industry, panel 2, pp. 1–12, American Council for an Energy Efficient Economy.
[17] Cooremans, C. (2015) Competitiveness benefits of energy efficiency: a conceptual framework. eceee Summer Study, European Council for an Energy Efficient Economy, pp. 123–131.

Rasmussen (2014)[18] develops a categorisation matrix for NEBs according to their quantifiability and time frame. In this way, they can be included in the decision-making process at the right stage. The matrix is shown in the following figure:

[18] Rasmussen, J. (2014) Energy-efficiency investments and the concepts of non-energy benefits and investment behaviour. eceee Industrial Summer Study, European Council for an Energy Efficient Economy, pp. 733–744.

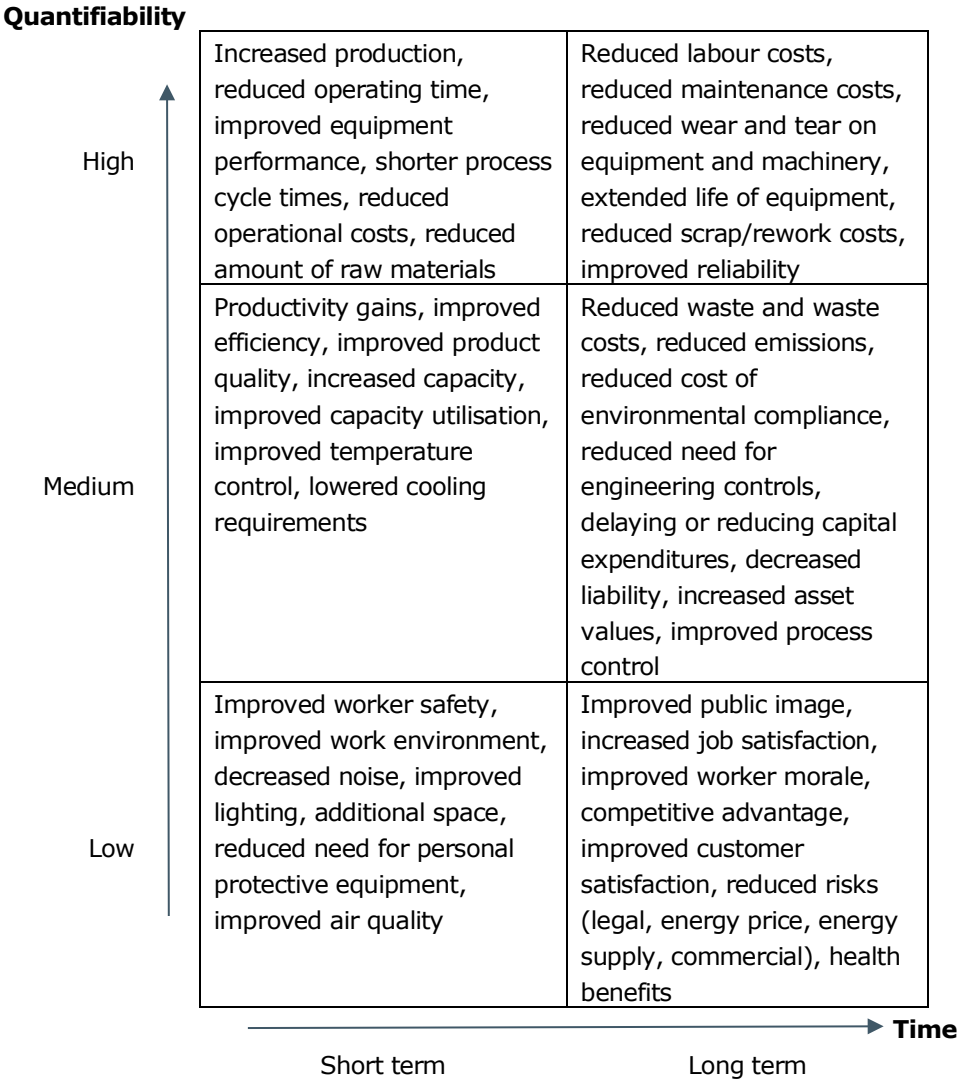

Figure 1: Matrix defining industrial NEBs. Source: Rasmussen (2014)

Decision making in industry is very often driven by strategic considerations rather than the pure monetary value of the investment. Therefore, we strongly suggest to change the traditional narrative of energy efficiency with low payback and good financial figures. It has its clear limitations and should be substituted by a broader and more holistic approach.

5.2 Buildings

Many of the findings from the M-Benefits project and others apply for buildings as well as for industry. The decision-making for building owners is similar to the one for larger companies . The multiple benefits identified in the value chain in the following figure are relevant for different stakeholders.

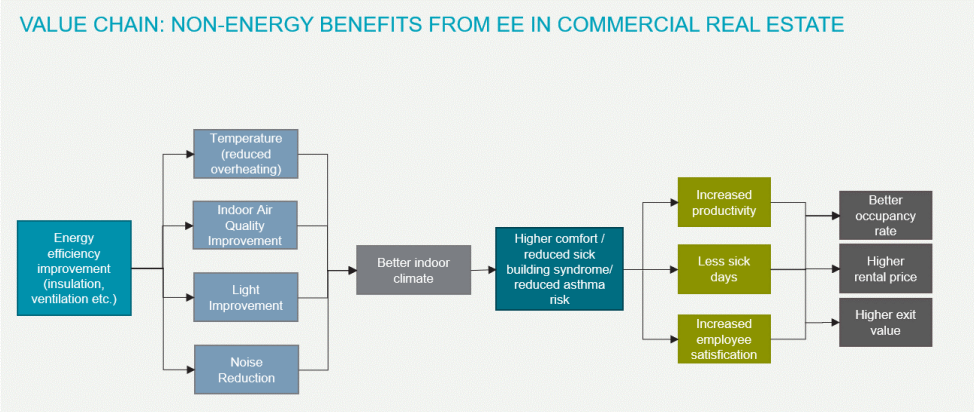

Figure 2: Value chain: Non-energy benefits from energy efficiency improvements in commercial real estate. Source: authors

The multiple benefits and impacts in buildings are well documented as accruing on both societal and on an individual building level. Nevertheless, building owners, financing institutions and public authorities are often not aware of them and therefore do not consider them when planning investments and financing of renovation activities. A structured consideration of multiple benefits in cost-benefit analyses and risk assessments of renovation projects would therefore be helpful. It would illustrate these benefits and additional cost savings. A structured and transparent consideration of all the non-energy benefits and impacts are assumed, in turn, to translate also into monetary value and other non-monetary advantages.

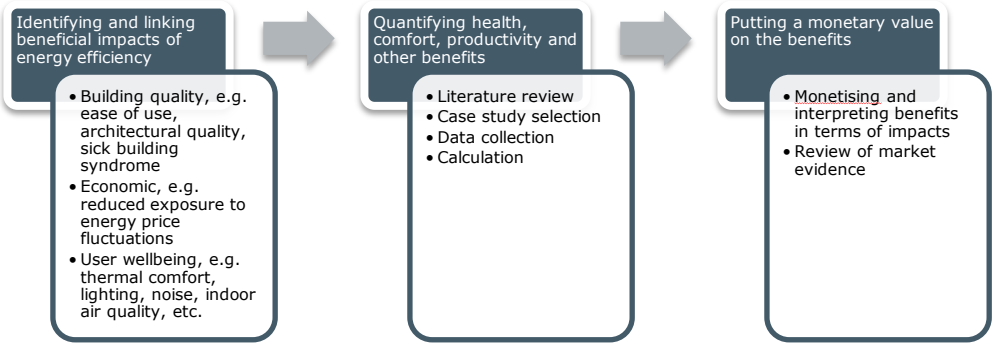

Figure 3: Structured approach for quantification of impacts of energy efficiency. Source: authors

High renovation rates of residential buildings lower energy bills and reduce the exposure to fluctuating energy prices and energy poverty. Additionally, buildings with an upgraded building envelope have less problems with mould, air drafts and noise nuisances and thereby add to the health and wellbeing of their occupants. Thermal comfort of a building is among others influenced by relative humidity, air temperature and mean radiant temperature as well as air velocity

which can be controlled more easily in renovated buildings (The inner value of a building, BPIE 2018).

Long-term benefits of energy efficiency also produce macroeconomic benefits which span across environmental, economic and social categories. These are summarised in the Table below.

Table 3: Overview of project level and macroeconomic benefits

Multiple benefits of energy efficiency improvements in buildings			
Project level benefits		Macroeconomic benefits	
Building quality	Reduced sick building syndrome	Environmental	Reduction of air pollution
	Ease of use		Climate change mitigation
	Safety		Resource efficiency and biodiversity
	Aesthetics	Economic	Lower energy costs
Economic	Lower operating and maintenance costs		Innovation and new business opportunities
	Higher market value or rent		Job creation
Wellbeing	Thermal comfort		Improved productivity
	Lighting	Social	Reduced fuel poverty
	Indoor air quality		Comfort
	Noise		Public health
	Pride, prestige		Energy security

Homeowners who are aware of the full range of multiple benefits for themselves and society, are more likely to support deep renovation measures. Energy advisors have a key role to play in this context, by providing measurable information on the additional benefits of different renovation measures and how to achieve the highest value. Comprehensive monitoring of the renovation works by energy advisors before, during and after completion of the measures should be ensured in order to guarantee and demonstrate improved indoor air quality. Measurements after energy-related renovation projects can make the positive impacts more tangible for both homeowners and financial institutions, therefore energy advisory services could be incentivised to point these benefits out in a more explicit way.

Comprehensive (before/after) monitoring of air quality, moisture and airtightness can better communicate the positive effects of renovation activities. A visual representation of the improved thermal performance – and, if possible, the health effects – helps to make the benefits of renovation more tangible. Independent energy advisory services can help to identify cost-effective renovation measures, although limited budgets often mean thermal images are not being made. Meaningful thermographies usually involve before and after comparisons which are only possible over a longer period of time after the completion of the renovation. Finally, creating an emotional connection between energy-efficient renovation and an improved quality of life can lead to positive decisions and increase in the uptake of renovation measures (Health and wellbeing benefits in owner-occupied buildings, BPIE 2020).

Finally, as discussed above residential energy efficiency renovations are seldom solely driven by economic and rational considerations, such as expectations of energy cost savings and associated financial payback. The fact that residential renovation decisions are also influenced by a range of emotional benefits creates a misalignment with financial institutions for whom these sentiments do not constitute a value-add. However, the emotional factors will have implications for how lenders are going to market the energy efficiency renovation products. Future marketing strategies that merely focus on saving energy may not create the necessary demand from building owners.

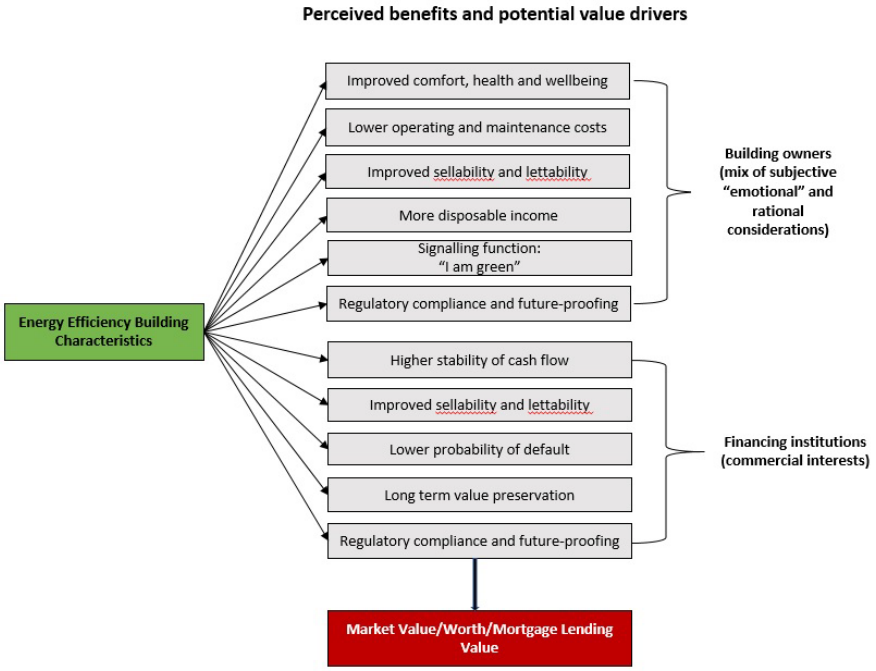

Figure *4*, Perceived benefits and potential value drivers according to building owners and financing institutions. Source: Hartenberger, Lorenz, Sayce and Toth, 2017

5.3 Barriers and drivers of multiple benefits[19]

The main barriers and drivers regarding the inclusion of multiple benefits through financial institutions have been identified as the following:

As a main barrier, the lack of familiarity of financial institutions with energy efficiency (EE) projects results in an unfavourable financing climate for the EE projects. Investment risks are perceived as high, (i) in part due to the irreversibility of energy efficiency investments and (ii) the low rate of return due to hidden and transaction costs, as well as sometimes due to overestimations made on energy savings[20].

[19] The following findings are mainly taken from the scientific paper on the literature review on firm-level multiple benefits by Killip et al. (2019)[19].

[20] Cooremans, C. (2011) Make it strategic! Financial investment logic is not enough. *Energy Efficiency* 4 x(4): 473–492.

Main barriers to increasing the rate of energy efficiency investments are (i) low awareness about non-energy benefits (NEBs) (see chapter 6.1 and 6.4), (ii) lack of understanding of energy efficiency financing by financial institutions (see chapter 6.2, 6.3 and 6.4), (iii) bureaucracy, and (iv) low energy prices.
The most important elements needed to increase viability of investing in an energy-efficiency project are: (i) Tax incentives and (ii) Low-interest loans; (iii) stricter energy-efficiency standards, training and awareness programmes, (iv) favourable legislation, and (v) de-risking investments through Government support programmes. Different target groups in energy efficiency are exposed to each of the barriers to a different extent, which influences their role in decision-making[21].
However, most of the barriers to deploying energy efficiency investments are **behavioural**, rather than economic or technical.[22] Some examples of behavioural barriers are as follows: (i) lack of integrated design and whole-system thinking; (ii) inadequate commissioning and operating documentation;(iii) lack of training of building operators; (iv) appraisals that do not include energy efficiency; split incentives between owners and tenants; (v) and short time periods of leases.
When it comes to companies, they are found to be more motivated by risk avoidance, rather than the promise of gains (e.g. energy cost savings), as companies have the impression that energy consumption is not salient, and that it is not linked to strategic value increase. Energy efficiency investments are often classified as discretionary maintenance costs rather than investments in productive capacity. That said, there is a pressure to reduce costs, which is why top management started to give mandate to company's energy managers to underline their arguments with data and make EMS among important cost-reduction drivers.[23]
Another set of obstacles to deployment comes from the **lack of robust data**, suboptimal operations, classified as data/quantification barriers. The following fall under this category: (i) lack of data; (ii) difficulty of quantification; (iii) variation/inconsistency in observed results; (iii) lack of skills or time; multiple benefits may be too small to be worth the effort, etc. [24] [25] [26].
While a series of different obstacles to energy efficiency are identified, there are so far only a few pointers of what the solutions are. The relevance of the M-

[21] Cooremans, C. (2012) Investment in energy efficiency: do the characteristics of investments matter? *Energy Efficiency* 5 (4): 497–518.

[22] Andrews, R.N.L. and Johnson, E. (2016) Energy use, behavioral change, and business organizations: Reviewing recent findings and proposing a future research agenda. Energy Research & Social Science 1: 195–208.

[23] Nehler, T., Parra, R., Thollander, P. (2018) Implementation of energy efficiency measures in compressed air systems: barriers, drivers and non-energy benefits. Energy Efficiency (11). pp.1281-1302

[24] Lung, R.B., McKane, A., Leach, R., and Marsh, D. (2005) Ancillary Savings and Production Benefits in the Evaluation of Industrial Energy Efficiency Measures. 2005 ACEEE Summer Study on Energy Efficiency in Industry, panel 6, pp. 103–114, American Council for an Energy Efficient Economy.

[25] Newberger, J., Hall, N., Roth, J., Horowitz, P. and Weber, D. (2007) Custom NEBs: Are They Worth It? – Experiences, Challenges, and Directions in Massachusetts. Chicago International Energy Program Evaluation Conference, pp. 701–

[26] Russell, C. (2015) Multiple Benefits of Business-Sector Energy Efficiency: A survey of Existing and Potential Measures. American Council for an Energy Efficient Economy, Washington DC. Report IE1501.

Benefits project is given by its focus on information of the strategic aspects of energy efficiency investments.
In the table below, we summarise drivers and obstacles to deployment of energy efficiency in the buildings sector:

First conclusions from the M-Benefits project can be interesting for financial institutions, as they include lessons learned from companies which have tried to integrate the multiple impacts of energy efficiency measures in their project planning and have assessed their real value after the end of the project.
Lessons learned from the pilot projects with companies in M-Benefits:

- Multiple benefits are not yet widespread knowledge for stakeholders working in companies and therefore are not a top priority for investment.

- It is important to emphasise the resulting benefits for the company and show some indicators on how multiple benefits can improve the work beyond energy efficiency.

- In companies, the multiple benefits approach can promote collaboration and communication across business units/departments that may not interact often. The multiple benefits approach helps promote common cause between e.g., finance, operations, HR, sustainability/energy, and upper management.

- Multiple benefits help firms think creatively and generate insights.

- By opening communication channels across departments, the approach can even lead companies to extend/relax the financial return criteria to allow for more projects to receive funding.

- The approach is not a "copy and paste". It is a tool that can be applied to many different types of organisations; however, the process and analysis requires time, commitment, and practice. The types of benefits and how to quantify them will vary across companies.

- The pilot projects identified and quantified different types of benefits and their contribution to competitiveness (value proposition, reduced costs and risks). Some of the benefits quantified in the case studies include safety improvements, time savings, enhanced productivity, improved occupant comfort, reduced maintenance costs, and reduced carbon (CO2) costs.

- While the process at a high-level can be applied to all types of companies and organisations, companies are not homogenous, so the benefits differ and are not always obvious. Structured tools and practical examples (from the project) can contribute to better understanding of these benefits.

- Multiple benefits are spoken about at multiple levels –traditionally the societal or regional level –so it is important to define the level and make the context clear (who receives the benefits?)

- The focus on non-energy benefits especially better comfort, healthier homes and workplaces, and reduced energy poverty can help stimulate demand for a host of programmes including building renovation efforts.

- More harmonisation and standardization of the approach and the benefits, through for example a taxonomy, can lead to benchmarks for monetising these benefits (links to investor-level and ESG/impact investors).

- Enhancing energy audits to account for and clearly include multiple benefits in the results and recommendations is a clean synergy. However, energy auditors will require training on the method and tools and there needs to be a business driver/case since applying the method requires more time (and hence cost).

5.3.1 Decision-making in organisations

The main issues discussed in this section apply to companies due to the extensive research conducted in the Horizon2020 project M-Benefits. While decision-making in real-estate companies has not been analysed specifically in that project, it has been counted as part of the commercial sector as well and the following results are expected to hold true as well for real-estate companies. Private homeowners mostly do not follow strict decision-making routines, which will enlarge the subjective factor in prioritising or not prioritising a certain investment.

Russell (2015, p.7)[25] gives a stark account of energy use in large business organisations: they tend to lose awareness of energy use among their many other daily priorities. If staff have little or no accountability for energy performance, then potential energy-derived value is often left out. Not every business enterprise employs a professional energy manager. Most energy managers may only influence and advice rather than compel the rest of their organisation's energy choices. Top business managers vary widely in their perception of what counts as a benefit, as well as in their motivation to measure and attain them. Business leaders who underestimate energy value may delegate responsibility to staff with little authority to encourage its capture. Low-level staff may also have limited understanding of energy efficiency, expecting nothing more than reduced utility bills. The task of an analysis of multiple benefits is therefore to overcome the lack of importance given to energy cost by top management and to garner their support in other areas.

UNEP (2017) argue that energy efficiency decisions in companies are often made by the same people as core business decisions and often indicate a low priority for energy efficiency as it is not in line with core business objectives. ClimateWorks (2014)[27] makes a similar point when they identify factors impeding the uptake of energy efficiency opportunities as an intersection between 'company capability', 'company motivation' and 'project attractiveness'.

Andrews and Johnson (2016) identify three levels at which decisions within organisations can be considered: the individual level (e.g. a decision-maker's attitudes, beliefs, values, habits, etc.); characteristics of the organisations themselves (for instance organizational goals and expectations, structures and

[27] ClimateWorks (2014) Energy management and company competitiveness, Australian Government Department of Industry, ClimateWorks, Investor Group on Climate Change Australia

procedures, group norms, incentives, etc.); and wider institutional rules, structures and logics (e.g. markets, regulations, sectoral and professional norms, "conventional wisdom" among business and professional peers, etc.).

5.3.2 The role of multiple benefits in decision-making

The consideration of multiple benefits in companies can entail effects in two main ways: a monetary effect increasing the positive aspects of the cost-benefit-analysis and a strategic (or salience) effect supporting the strategic orientation of the company (Killip et al. 2019)[28]. When considering energy efficiency investments, private actors compare the costs with the benefits and determine a payback period, as they would do for any one investment. First and foremost, this includes saved energy costs. Thereby, a wide range of other monetary benefits are excluded from the calculation, inter alia increased workforce productivity, reduced production pauses due to technical breakdowns, fewer employee sick days or reduced costs for the purchase of ETS certificates. Including these multiple benefits leads to significantly more advantageous investment payback times.

In order to accordingly account for multiple benefits in cost-benefit-calculations, Worrell et al (2003)[29] propose a four-step process:

- Identifying and describing the measure's multiple benefits;
- Quantifying these impacts;
- Identifying the underlying assumptions to translate multiple impacts into monetary benefits;
- Calculating the monetary benefits linked to the measure's multiple impacts.

Although some benefits are more difficult to quantify and monetise, the application of this method enables a stringent and transparent process. In order to alleviate the frequent lack of data, Hall and Roth (2003)[30] recommend to use average values for the calculation. Even though this can render the results less accurate, the distortion is far greater when multiple benefits are neglected altogether.

However, this whole approach perceives investments in energy efficiency merely as a liability that is to be minimised with energy savings and monetised multiple benefits. Thereby, this perspective is oblivious to the strategic potential of the multiple benefits. Furthermore, in contrast to the approach's underlying assumption, investment decisions regarding energy efficiency are often not based on a purely rationale and monetary basis (Killip et al, 2019).

The salience approach attempts to capture these shortcomings by focusing on 'salient' aspects in companies' decision-making. In spite of monetary multiple benefits seemingly surpassing the strategic aspects, the latter often play a significantly greater role, with unprofitable investments often going ahead when perceived as strategic (BANKS 2012). As Killip et al. (2019) point out, the

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28 Killip, G., Fawcett, T., Cooremans, C., Crijns-Graus, W., Krishnan, S., Voswinkel, F. (2019) Multiple benefits of energy efficiency at the firm level: a literature review. *ECEEE SUMMER STUDY PROCEEDINGS*: 303-312.

29 Worrell, E., Laitner, J. A., Ruth, M. and Finman, H. (2003) Productivity benefits of industrial energy efficiency measures. Energy 28 (11): 1081–1098.

30 Hall, N.P. and Roth, J. (2003) Non-energy benefits from commercial and industrial energy efficiency programs: energy efficiency may not be the best story 2003. *Energy Program Evaluation Conference*, Seattle, International Energy Program Evaluation Conference: 689–702.

related literature mainly concentrates on the relevance of aspects influencing strategic and core business objectives and the importance of uncertainty and risk and their influence on decision-making. Cooremans (2012) further argues that an investment's contribution to the company's competitiveness is the central criterion in decision-making, subdividing it into three main aspects:

- Product improvement;
- Cost reduction;
- Risk reduction.

Therefore, it is relevant to assess measures' impact on the core product, its marketing, and its production process. Energy efficiency improvements are often implemented through the replacement of old and obsolete assets. As seen in several M-Benefits projects, they frequently have positive impacts on the product quality. Furthermore, given the expectation towards companies to contribute to the green transition, energy efficiency measures can help shaping a positive image of the company in the public perception and thereby contribute to a larger customer base. This effect is also relevant with regard to financing against the backdrop of increasingly green portfolios and the quest for sustainable investment opportunities. Another strategic issue concerning companies is the recruiting of skilled workers, which is likely to be less difficult and expensive with up-to-date facilities. The impact of energy efficiency on companies' risks can comprise different types of risk. Saving energy reduces the risk of exposure to price volatility, for energy as well as for ETS certificates. Through the replacement of obsolete assets, safety and production interruption risks can be reduced, lowering the costs of insurance policies. All these risk reductions signify that contingency funds can be downsized, freeing up more capital for strategic investments.

To conclude, the consideration of multiple benefits in the corporate context should slightly edge away from a mere monetisation approach. Although still relevant, a greater emphasis should be placed on the strategic impacts of multiple benefits for companies, in order to expediently contribute to companies' decision-making routines.

6 Approaches for integrating multiple benefits in investment and lending decisions for the financial sector

This section brings together the three issue papers produced by the working group over the course of the service agreement. The issue papers cover the most relevant thematic areas identified in relation to the non-energy benefits associated with energy efficiency investments: health and social benefits (section 6.1), the Sustainable Finance Taxonomy and green building rating tools (section 6.2) and impact investing (section 6.3). These were drafted by the project consortium in close cooperation with selected members of the working group, who are experts on the topics. The papers have been written for the main target audience of financial institutions, but they also include recommendations and calls for action aiming to public authorities and building sector stakeholders. In addition, the consortium has also developed a methodology to estimate the monetary value of multiple benefits and a generic valuation model for commercial real estate that draws on the available literature and evidence base (sections 6.4 and 6.5). These tools can be a role model for future developments as it presents a simple and straightforward approach to handle multiple benefits. Taken together, these papers and the quantification models represent the main outcome of the working group.

6.1 Investing for Health: Boosting Sustainable Renovation in the Residential Sector

Building renovation is an investment in public health. The built environment impacts our physical, mental and community health through a variety of factors including indoor and outdoor air quality, thermal comfort, noise and lighting. The Covid-19 crisis highlighted this connection even more as many are now working from home and organisations are reimagining the workplace and the role of offices. Residential building renovation is a priority for European and national policymakers, as well as for the financial and building sectors - especially now, given the role buildings can play in health and the economic recovery.

Investing in buildings contributes to a fair, inclusive and resilient society. People and communities should be at the heart of climate change mitigation and adaptation as well as economic recovery. The built environment can drive societal transformation through a purpose-led approach and maximisation of the socio-economic impacts of energy efficiency investments. Energy efficiency renovations represent an enormous investment opportunity to create genuine impact, such as improved health, quality of life and social resilience across all communities, with a specific focus on those most vulnerable groups. A comprehensive renovation strategy, including smart financing and comprising both physical and social initiatives can transform disadvantaged areas into attractive, liveable and healthy spaces while avoiding gentrification.

A combination of both public and private financing can help boost the renovation wave and maximize social and environmental impact. The public sector cannot accomplish the renovation efforts alone. Achieving a healthy, sustainable and

decarbonised building stock by 2050 will require the effective mobilisation of public and private finance. Investing in healthy buildings and promoting well-being and comfort provides additional value to private investors and property owners as market demand for such buildings will increase in response to the Covid-19 crisis and increased awareness of the health impact of indoor air pollution. To scale up private finance contribution, effective public-private partnerships are needed that combine the expertise, knowledge and resources from public authorities and private financiers. One Stop Shops (OSS) are an example of such partnerships.

6.1.1 Societal cost of inadequate housing

Today, nearly 35 million of Europeans are unable to keep their homes warm[31] and an even higher estimated number face the risk of energy poverty. Medical conditions and health-related accidents, resulting in substantial healthcare costs have not been properly evaluated in the EU as a whole nor have been integrated into Member States' housing policies, creating a critical gap in policymaking. Energy-efficient renovation is a solution to improve the environmental, social and economic impact of housing.

We spent about 90% of our time indoors[32] and 2/3 at home before the pandemic and that proportion is even higher today. According to the Healthy Homes Barometer[33], one in six Europeans lives in unhealthy homes. Such buildings are defined as having a "leaking roof or damp floor, walls or foundation, a lack of daylight, inadequate heating during the winter or overheating problems."

Respiratory illnesses, asthma, and poor mental health have been associated with living in damp, cold housing, which is a breeding ground for mould.[34] 2.2 million Europeans have asthma, partly as a result of their living conditions.[35]

"We breathe about 11,000 litres of air every day; a third of all that air you breathe will be in your bedroom."[36] Indoor air quality is critical for our health.

65% of Europeans who live in major urban areas are exposed to dangerously high levels of noise pollution, which leads to health issues such as stress, high

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[31] European Commission (2020) Renovation Wave Communication (COM 2020 662 final)
[32] https://www.evia.eu/indoor-air-quality/
[33] RAND Europe (2019) Healthy Home Barometer 2019
[34] https://www.worldgbc.org/sites/default/files/20181204_WGBC_Homes-Research-Note_FINAL_spreads.pdf
[35] Velux. 2017. Healthy Homes Barometer. https://www.velux.com/health/healthy-homes-barometer-2017
[36] https://homes.forhealth.org/wp-content/uploads/sites/9/2019/05/Harvard_Healthy_Buildings_Program_Homes_for_Health_May-2019.pdf

blood pressure, hypertension and strokes.[37] Chronic noise exposure can also adversely affect children's cognitive development.[38]

The WHO estimates that poor indoor air quality is responsible for around 99,000 deaths a year in Europe.[39]

Recent studies have shown that radon in homes causes about 20,000 lung cancer deaths in the European Union (EU) each year[40]. This is about 9% of the total lung cancer deaths in the EU and about 2% of cancer deaths overall.[41] multiple benefits of energy efficiency investments increase with proper ventilation thus reducing dampness and pollutant levels such as CO2 and Radon.

The annual total cost to EU economies of letting people live in inadequate housing is nearly €194 billion.[42] If all necessary improvements were completed at once, the cost to EU economies and societies would be repaid within 18 months by projected savings such as lower healthcare costs and better social outcomes. In other words, for every €3 invested, €2 would payback in one year.[43]

6.1.2 The renovation gap: investment needs and current level of investment in energy efficiency renovations

Achieving a healthy, sustainable and decarbonised building stock by 2050 will require the effective mobilisation of public and private finance. Additional investment needed to reach EU 2030 energy and climate targets is around 325 billion annually, with approximately EUR 250 billion for residential and EUR 75 billion for public buildings. Similar magnitude of annual investment is needed to reach climate neutrality by 2050 (Roadmap to Renovation Wave).

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[37] Münzel, T., Gori, T., Babisch, W. and Basner, M. (2014) Cardiovascular effects of environmental noise exposure. European Heart Journal. DOI:10.1093/eurheartj/ehu030) from European Commission study 'Science for Environment Policy' Thematic Issue: Noise impacts on Health January 2015, Issue 47.

[38] Klatte, M., Bergstrom, K. & Lachmann, T. (2013) Does Noise Affect Learning? A Short Review on Noise Effects on Cognitive Performance in Children. Frontiers in Psychology. August 2013, Volume 4, article 578.

[39] World Health Organisation (2014) Burden of disease from household air pollution for 2012.

[40] S Darby, D Hill, A Auvinen, J M Barros-Dios, H Baysson, F Bochicchio, H Deo, R Falk, F Forastiere, M Hakama, I Heid, L Kreienbrock, M Kreuzer, F Lagarde, I Mäkeläinen, C Muirhead, W Oberaigner, G Pershagen, A Ruano-Ravina, E Ruosteenoja, A Schaffrath Rosario, M Tirmarche, L Tomásek, E Whitley, H-E Wichmann and R Doll. Radon in homes and risk of lung cancer: collaborative analysis of individual data from 13 European case-control studies.

[41] JRC (2005) An overview of Radon surveys in Europe

[42] Eurofund (2016) Inadequate housing in Europe: Costs and consequences

[43] Ibid.

A 2019 report prepared by Ipsos & Navigant[44] for the European Commission estimates that in the period 2012-2016, 54 billion EUR per year was spent on "medium" and "deep" energy renovations in the EU-28 (i.e. renovations triggering more than 30% energy saving reduction). The Commission estimates that in order to achieve the 55% climate target by 2030, around EUR 275 billion of investments are needed per year.[45]

Homeowners and tenants' drivers for healthy buildings

Increasing homeowner desire for healthier and more comfortable homes is crucial and this can only be ensured by increasing awareness of the benefits of sustainable renovation and building trust through independent advice to facilitate the most optimal renovation choices. The transition to high performing buildings will not be driven by energy savings alone. Instead, it must be approached through a more comprehensive perspective. Owners do not usually 'buy' energy efficiency, they rather tend to solve a problem, add value to their properties or seek an emotionally charged benefit, e.g. thermal comfort, safety, pleasure, privacy, etc. Equally, tenants are not primarily looking for energy-efficient homes, but they might want to improve health and quality of life. Thus, the multiple benefits of a good energy strategy (impacting comfort, health, productivity, etc.) are key in increasing demand for energy efficiency in buildings. Homeowners, in particular the energy-poor, may also need to be accompanied along the customer journey, for instance by technical assistance provided by an OSS.

Social impacts: community regeneration and accessibility

While the immediate benefits of energy efficiency renovations (energy and cost savings, improvements in health, comfort, etc.) primarily accrue to building occupants, the wider and less tangible impacts can be felt in the surrounding neighbourhoods. These wider benefits may include a growth of local businesses and local job creation as a result of urban regeneration and improvement of community facilities, safety and public spaces. Synergies for renovation become evident when scaled up to district and community approaches.[46] Urban regeneration initiatives underscore the importance of co-design, social support, community engagement to achieve maximum impact and ensure a socially inclusive transformation.

[44] https://ec.europa.eu/energy/studies/comprehensive-study-building-energy-renovation-activities-and-uptake-nearly-zero-energy_en
[45] European Commission (2020) Renovation Wave Communication (COM 2020 662 final), p.9
[46] European Commission (2020) Renovation Wave Communication (COM 2020 662 final)

Figure 5: The multiple benefits associated with community and urban regeneration. Source: BPIE & Rockwool.

6.1.3 Challenge: multiple benefits remain difficult to communicate, report, track and monetise

- Many terms and thematic investment areas (e.g. energy efficiency and affordable housing) are not universally defined, making it difficult to identify benchmarks, KPIs and set industry best practices[47]

- Energy savings are sometimes taking too long to repay deep renovations costs. A more holistic approach accounting for the impact on the value of the asset (owner) and on the improved quality (tenant) is necessary to encompass all the benefits of energy renovation in housing

- Outcomes on which impacts are assessed have multiple dimensions, and sometimes are only felt in the long run[48]

[47] PRI (2018) Impact Investing Market Map, and UNEPFI (2018) Positive Impact Investment in Real Estate Discussion Paper
[48] Eurofound (2016), Inadequate housing in Europe: Costs and consequences

- Housing quality is assessed narrowly focusing on the technical and environmental performance aspects, whereas broader policy objectives and impact categories may be more appropriate to fully capture multiple benefits

- There is a lack of data, standard measurement practices and often prohibitive costs to collect such data per project

- Coordination between financial institutions, building experts and the medical community to assess and measure these factors is lacking

- As above, public authorities also lack capacity to coordinate between health, buildings, climate, financing departments at national and regional levels.

How can multiple benefits help the Renovation Wave?

- Clear and consistent communication activities at the national, city and OSS levels, involving a diverse set of communication channels and marketing strategies, such as endorsements from homeowners and other credible sources. The main message that should be conveyed is that health, well-being and comfort are direct benefits of home renovation

- Data dashboard showing societal benefits resulting from of the home and building renovation at the city, regional and national level

- Dashboard showing the property owners benefits as a result of the home and building renovation at the city, regional and national level

- Encourage public authorities to work with banks, impact investors, ESG investors and others who are already dedicated to maximising social, economic and environmental impacts.

How to make multiple benefits more widely known?

- Install meters and sensors capable of measuring and monitor key performance aspects used in the evaluation of multiple benefits (e.g. air quality) – to minimise performance gaps and collect data that can help to report, track and monetise multiple benefits; this could focus in particular to public buildings and social housing; in addition metring campaigns could support a broader awareness rising

- Carry out post-renovation surveys about the perception of typical performance aspects, i.e. comfort, safety, air quality, noise, quality of life and services in the neighbourhood, etc. with the purpose of improving qualitative and quantitative data as well with a view to refining business models

- Dashboard to provide building occupants with real-time information about current state of their properties (e.g. comfort, air quality, energy, etc.) methodologies to evaluate multiple benefits (e.g. www.mbenefits.eu)

- Implementing community-centric marketing and communications efforts clearly highlighting multiple benefits of sustainable renovation

6.1.4 A call to action: recommendations for key stakeholders

Investors and banks are increasingly defining their sustainable investment strategies in terms of macro-objectives such as the Sustainable Development Goals (SDGs) and target both "market" and "sustainable" returns. If the multiple benefits were properly integrated into business models, private money would flow more easily towards energy efficiency investments in the residential sector. When demand picks up, financial institutions will finance renovation at multiple levels (social landlords, homeowners, solutions providers…) and aggregate these loans in vehicles designed for placement to investors. Integration of multiple benefits in green mortgages offering would increase private owners' access to finance for healthy and energy efficiency building renovation.

- Engage with public administrations and find synergies, explore public-private partnership models and co-investing with the public sector. Support the public sector in setting up de-risking mechanisms

- Provide customer-friendly financing and lending solutions (affordable and easy to obtain). Financial institutions and banks are encouraged to provide information about energy efficiency products and the multiple benefits for homeowners, in addition to savings on the energy bills. Where appropriate, banks could design tailored products (e.g. green and healthy mortgages)

- Commit to tracking social and environmental impacts of financial products

- Showcase investment and business models reflecting the multiple benefits and positive value & risk implications of energy efficiency.

Public authorities have a key role to play in ensuring that home and building renovation programmes maximise social and environmental impacts in their communities. The Renovation Wave is an opportunity to better integrate multiple benefits in investment decisions involving sustainable renovation of homes and apartment buildings. Public authorities can undertake the following actions:

- Ensure that home renovation is accessible for all: De-risking investments in sustainable building renovation with public funds will attract private investments, drive down the cost of financing, and broaden access to financing to include low-income consumers. De-risking can be done by establishing dedicated guarantee funds, co-investing with the private sector and setting up first loss guarantees to mitigate the risks of non-payment. The EU Recovery and Resilience Funds can be used to set up the de-risking instruments. Public authorities can also support the development of green mortgages offering, as banks are a major source of finance for building renovations

- Establish effective public-private cooperation focused on improving comfort, health and wellbeing of citizens living in private and social housing. Market-driven, economically self-sustainable One-Stop Shops are key in increasing energy renovations

- Ensure that OSSs offer project development and implementation support, including technical support and contractor training and certification to ensure trust and quality of works

- Support energy poor communities with appropriate grants and subsidies as means to improving health and wellbeing in addition to improving energy efficiency

- Commit to tracking social and environmental impacts of renovation programmes and make data and metrics widely available

- Clearly communicate and raise awareness about the multiple benefits of renovation to the citizens by highlighting individual and community-based impacts of healthy and sustainable homes.

6.1.5 Conclusions

The Renovation Wave recognises that building refurbishment is a critical green investment that contributes to economic recovery and climate neutrality, while improving living conditions of Europeans. In the context of the Covid-19 pandemic, Member States should incorporate energy efficiency and healthy building renovation plans in their national recovery and resilience plans and capture the opportunity to simultaneously invest in health and support the climate transition.

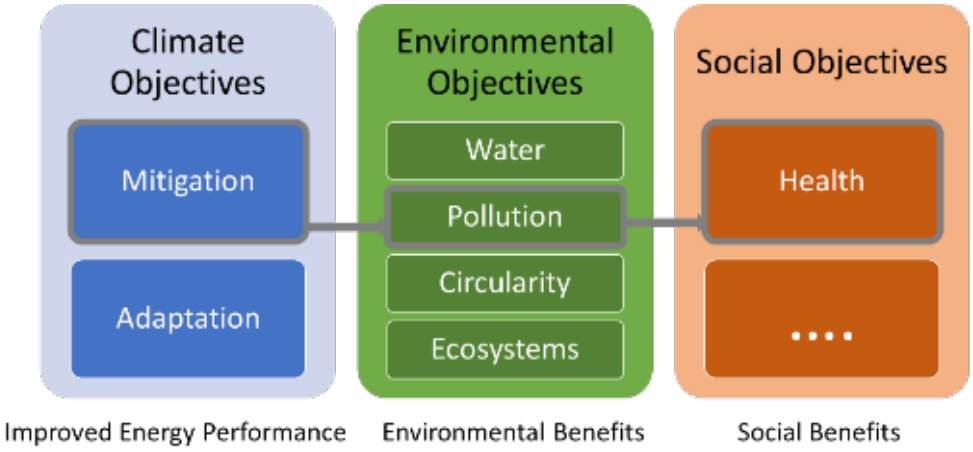
6.2 The EU Taxonomy and Green Building Rating Tools

The EU taxonomy establishes a list of environmentally sustainable economic activities within a classification system in order to help the EU scale up sustainable investment and implement the European green deal. This includes criteria for energy efficiency equipment for buildings. Investors and financial institutions can use the EU Taxonomy to channel capital towards assets that meet the Taxonomy criteria in order to reduce risks and positively contribute to societal outcomes. The new EU Taxonomy represents a holistic approach to recognising climate change mitigation and adaptation efforts as sustainable investments. However, climate change mitigation and adaptation contribution efforts will only be eligible if they do not lead to significant harm in relation to four other environmental objectives for which full Taxonomy systems are yet to be developed.

From a construction and real estate perspective, investments made in improving the energy and carbon performance of buildings also have to demonstrate fulfilling the so-called "Do No Significant Harm (DNSH)" criteria for the other

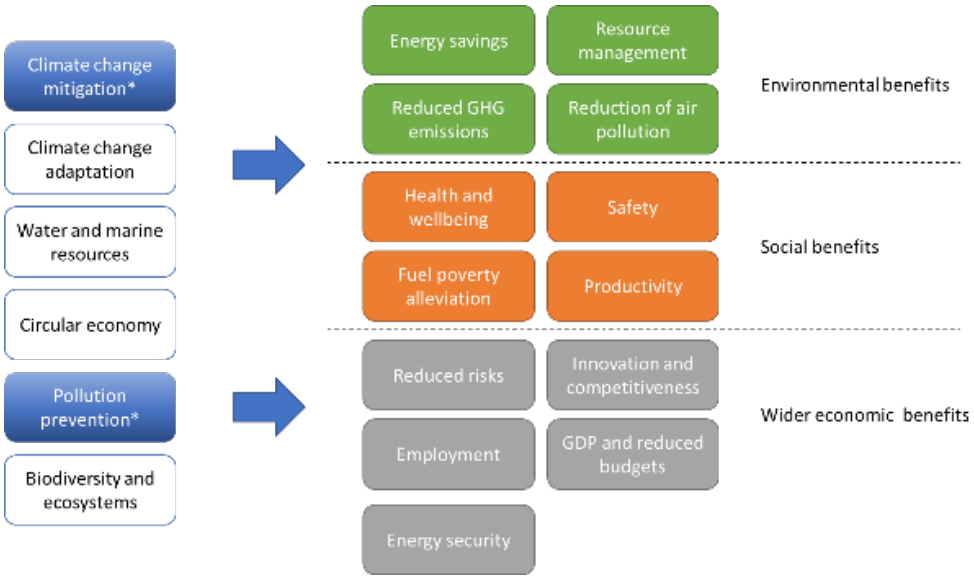
environmental objectives and to comply with minimum (social) safeguards. Figure 1 exemplifies how the climate objectives of the Taxonomy not only lead to energy efficiency improvements but also result in both additional environmental and social positive outcomes (see Figure 4).

Figure 6: Linkages between Taxonomy climate objectives and environmental and social benefits



Sustainability certification schemes have become the de-facto market standard for commercial buildings. Although sustainability certification is not yet a standard practice across all building typologies (in particular residential properties), given that their criteria cover a wider range sustainability impacts of buildings, i.e. going beyond energy and carbon performance, they offer an opportunity to also capture multiple benefits.

Figure 7: Taxonomy technical screening criteria and alignment with multiple benefits (Source: authors)



How to materialise multiple benefits through the EU Taxonomy?

The successful materialisation of investments in multiple benefits through the EU Taxonomy, involves:

- the need to define clear multiple benefits indicators and targets
- developing methodologies for monitoring, measurement and risk assessment processes in terms of multiple benefits
- a thorough assessment of trade-offs and split-incentives (e.g. the question of who is actually "benefitting" from multiple benefits?)
- strengthening social multiple benefits (health, affordability) within the EU Sustainable Finance Taxonomy
- measuring impacts ex-ante and ex-post

The role of certification and certification bodies vis-à-vis multiple benefits

Through assessing and awarding buildings which meet pre-defined environmental (and in some cases also) social performance requirements or standards, sustainability certification schemes improve market participants' understanding of a building's (sustainability) attributes.

While the initial focus of certification schemes was more on energy and carbon performance, they are now also increasingly aligning the scope of their certification criteria with broader sustainability objectives, such as issues related to health and well-being, resource efficiency and sustainable communities and cities – all issues that would qualify as multiple benefits of energy efficiency investments. By covering this widened range of sustainability aspects and by being a source of verified documentation, certification schemes are potentially capable of capturing multiple benefits while equally acting as a source of verified data and information.

At EU level, the Commission has developed the Level(s) tool to assess and report on sustainability aspects throughout the lifetime of buildings. The objective is to provide a common language on sustainability and circularity of buildings targeting the mainstream market. Level(s) is an easy entry point to sustainability assessment, especially for new building and refurbishment projects which currently consider such an assessment as being too complex and costly. It is not a new standalone building certification scheme, nor does it establish performance benchmarks, but rather links the individual building's environmental impact with other priorities such as healthy and comfortable spaces, adaptation and resilience to climate change, and whole building life cycle cost and value.

As established market instruments, sustainability certifications not only help drive the market towards more sustainable sectoral practices through signalling, awareness raising and provision of training, they can also potentially:

- provide valuable feedback from real projects in terms of market readiness for capturing multiple benefits of energy efficiency investments

- point to what kind of specific data should be collected to be able to document, visualise and monetise multiple benefits.

6.3 Connecting the multiple benefits of Energy Efficiency and Impact Investing

Definitions

The wider non-energy benefits of energy efficiency investments have, so far, only been partially addressed by mainstream and ESG financing practices. Impact investment, having an explicit focus on generating measurable, social and environmental benefits alongside financial returns, is able to capture the full the breadth of multiple benefits. Hence, the impact investment framework can provide useful pointers for the better assessment and integration of multiple benefits in all other types of investments.

Impact investing is defined as making investments with the intention to generate positive, measurable social and environmental impact alongside a financial return[49].

The 2017 EEFIG Underwriting Toolkit[50] recognised the importance of multiple benefits in a way, which is fully in line with the impact investment approach:

Energy efficiency investments create value in many ways, over and above the value of energy saved.

These multiple sources of value, or non-energy benefits, can include many factors such as: increased asset value*, reduced operations and maintenance costs, improved productivity and improved health and well-being of employees or building occupants.*

These multiple sources of value should be recognised, assessed, and where possible valued as part of appraising energy efficiency investments.

The growth of impact investing

Impact investing was first defined in 2003 and is used to describe investments made across all asset classes, sectors and regions. In 2020 the Global Impact Investing Network (GIIN) has estimated that over 1,720 organizations manage USD 715 billion in impact investing Assets Under Management (AUM)[51]. In the last few years there has been considerable growth in the last few years in

[49] Cf. Global Impact Investing Network (GIIN), https://thegiin.org/impact-investing/need-to-know/#what-is-impact-investing
[50] EEFIG (2017) Underwriting Toolkit, https://valueandrisk.eefig.eu/valueandriskappraisal
[51] GIIN (2020) 2020 Annual Impact Investor Survey, https://thegiin.org/research/publication/impinv-survey-2020

Environmental, Social and Governance (ESG) funds and this growth is set to continue driven by a combination of regulatory and market factors. Research by PwC estimates that assets in sustainable investment products in Europe will reach EUR 7.6 trillion over the next five years and will grow from 15% to 57% of the European fund sector[52]. Impact investing can be considered as a sub-set of ESG investing in the sense that impact investing is a fully comprehensive approach to both managing all negative impacts and the intention to creating measurable positive benefits for people and planet. ESG investing looks at the underlying investment's ESG practices alongside conventional financial measures. Impact investing explicitly targets from the outset a specific positive improvement in some environmental or social factor(s).

The UNEP FI advocates the development of impact-based business models 'where the delivery of positive impacts is a driver of business success' as a key part of bridging the financing gap for achieving the Sustainable Development Goals[53]. Going further UNEP FI argue for an impact-based economy where solutions are built to achieve the desired impact and the economy is organised around 'impact value chains'.

The five part framework set out in the Principles for Responsible Investing start with 'identifying positive and negative real-world outcomes related to investees' operations, products and services'[54].

Furthermore, the Principles of Responsible Banking[55], which provide a framework for sustainable banking, include as Principle 2, 'Impact and target setting':

'We will continuously increase our positive impacts while reducing the negative impacts on, and managing the risk to, people and environment resulting from our activities, products and services. To this end, we will set and publish targets where we can have the most significant impacts.'

Multiple benefits of energy efficiency and impact investing

The consideration of multiple benefits, and impact investing, both utilise a systems view of the impacts of an investment which is in contrast to traditional approaches to investment appraisal.

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[52] https://www.ft.com/content/5cd6e923-81e0-4557-8cff-a02fb5e01d42
[53] UNEPFI (2018) Rethinking Impact to Finance the SDGs, https://www.unepfi.org/wordpress/wp-content/uploads/2018/11/Rethinking-Impact-to-Finance-the-SDGs.pdf
[54] UN PRI (2020) Investing with SDG Outcomes, https://www.unpri.org/sustainable-development-goals/investing-with-sdg-outcomes-a-five-part-framework/5895.article
[55] https://www.unepfi.org/wordpress/wp-content/uploads/2019/07/PrinciplesOverview_Infographic.pdf

Measuring impact

One of the key issues within impact investing, and multiple benefits alike, is how to measure impact. A number of frameworks have been developed and are in use by different investors. The Impact Management Project[56] (IMP) provides a forum for building global consensus on measuring, managing and reporting impacts on sustainability'. It convenes over 2,000 practitioners. It has defined impact as follows[57]:

What is impact?

- Impact is an outcome caused by an organisation. An impact can be positive or negative, intended or unintended.

Impact can be measured over five dimensions:

- What tells us what outcome the enterprise is contributing to, whether it is positive or negative, and how important the outcome is to stakeholders.
- Who tells us which stakeholders are experiencing the outcome and how underserved they are in relation to the outcome.
- How much tells us how many stakeholders experienced the outcome, what degree of change they experienced, and how long they experienced the outcome for.
- Contribution tells us whether an enterprise's and/or investor's efforts resulted in outcomes that were likely to better than what would have occurred otherwise.
- Risk tells us the likelihood that impact will be different than expected.

Data categories:

- The IMP has defined 15 data categories. These have not been designed to replace existing frameworks and standards and many organisations collect data across the categories but may have different names for them. The data categories are shown below.

Table 4: Impact data categories according to IMP

Impact dimension	**Impact data category**
What	Outcome level in period
	Outcome threshold
	Importance of outcome to stakeholder
	SDG or other global goal
Who	Stakeholder
	Geographical boundary
	Outcome level at baseline
	Stakeholder characteristics

[56] https://impactmanagementproject.com

[57] https://impactmanagementproject.com/impact-management/impact-management-norms/

How much	Scale
	Depth
	Duration
Contribution	Depth counterfactual
	Duration counterfactual
Risk	Risk type
	Risk level

How enterprises can manage their impact.

- There are three types of impact that enterprises can manage. At a minimum, enterprises can *act to avoid harm*. They can actively *benefit stakeholders*, or they can *contribute to solutions* to pressing social or environmental problems.

How investors can manage their impact.

- Investors can set goals about (a) the impacts they do, or don't, (b) the impacts underlying enterprises / assets to have on people and the planet, as well as (c) the contribution they want to make to enable that to happen.

Using multiple benefits of energy efficiency in investment appraisal

Traditionally energy efficiency investments have been considered in a predominantly one-dimensional way: invest EUR X and save EUR Y in reduced energy costs, giving a return that is measured in simple payback, IRR or NPV. This approach has two major problems:

- It misses the value of the non-energy multiple benefits, many of which have real and measurable financial impact e.g. improved productivity. This reduces the forecast financial returns from the project.

- It fails to link the proposed investment to the strategic direction of the enterprise. Catherine Cooremans has identified the importance of strategy in investment decisions[58] and how energy efficiency investments are typically not seen as strategic, which reduces the probability of the investment being approved.

These two factors: the reduction in financial returns from not counting multiple benefits in financial appraisal, and failure to make energy efficiency investments strategic are major contributors to the energy efficiency gap, i.e. the gap between financially viable projects and what is actually invested. The EU Commission estimates that in order to achieve the 55% climate target by 2030, around EUR 275 billion of additional investments are needed per year.

The Horizon 2020 funded M-Benefits project[59] has researched multiple benefits and developed a tool for quantifying and communicating multiple benefits of proposed investments. The project has demonstrated that by identifying and valuing multiple benefits energy efficiency investments can have significantly higher financial returns and be made more strategic. Although the project has primarily focused on enterprises making investments from their own funds, the

[58] https://link.springer.com/article/10.1007/s12053-011-9125-7
[59] https://www.mbenefits.eu

approach is equally valuable for third-party investors financing energy efficiency projects.

EU policies and impact investing

The European Green Deal and the Just Transition Mechanism aims to support regions to transition to a green economy, without forgetting the inclusion of vulnerable groups. Additionally, the new InvestEU fund targets social enterprises and microfinance, bringing together a range of existing European financial instruments to overcome fragmented markets and policies. Impact tracking and reporting will be a cross-cutting objective of the InvestEU programme. The recently released EC guidance on sustainability proofing for the InvestEU fund[60] should be used in a broader context of accounting for social and environmental benefits.

One of the current policy focuses at the EC at the moment is to support the take up of the SOC approach and generate projects in less mature ecosystems in the EU (like CEE countries, where the need for paradigm change and building capacity in social service provision is much higher) and to focus the energy of both policy makers and financial and civic sectors on particular key challenges. Social inclusion and empowerment of vulnerable groups is, like energy efficiency, broad and transversal as topic, yet focused enough so that it may mobilise stakeholders across countries.

Linking multiple benefits to impact investing

Energy efficiency investments can clearly be considered impact investing in that they have a direct, intended impact on reducing energy consumption and hence the environmental impact resulting from energy use. The identification and evaluation of multiple benefits such as improved productivity, increased employee satisfaction, better health outcomes, better learning outcome etc., strengthens the connection between energy efficiency investing and impact investing.

There is a clear connection to be made between the techniques of identifying and valuing multiple benefits, as developed by the M-Benefits project and the techniques of impact investment measurement as developed by the Impact Management Project.

Each of the benefits identified can be analysed using the IMP's five dimensions of impact: what; who; how much; contribution; risk. An example for linking M-Benefits and IMP is shown below, *using the multiple benefits identified in one particular project*.

[60] European Commission (20210 Technical guidance on sustainability proofing for the InvestEU Fund, https://europa.eu/investeu/investeu-fund/about-investeu-fund_en

Table 5: Example of benefits identified in a specific M-Benefits project

Impact management project dimensions	**What**	**Who**	**How much**	**Contribution**	**Risk**
Impact data category	• Outcome level in period • Outcome threshold • Importance of outcome to stakeholder • SDG or other global goal	• Stakeholder • Geographical boundary • Outcome level at baseline • Stakeholder characteristics	• Scale • Depth • Duration	• Depth counterfactual • Duration counterfactual	• Risk type • Risk level
Lower water consumption	• X m3 • >10% reduction in water use • Moderate • SDG 12	• Project host	• Significant scale • Significant • Multiple years	• Zero change to water consumption	• Risk of variation in outcome • Low
Lower maintenance costs					
Lower consumption of consumables (PPE)					
Reduced energy costs					
Increased safety					
Increased reliability					
Increased staff satisfaction & loyalty					
Contribution to vision & strategy					
Reduced accident risk					
Reduced legal risk					
Reduction in break down risk					

The above matrix is not intended to be an exclusive list of multiple benefits but rather an example showing the specific benefits that were present for a particular project (M-Benefits). Many other potential multiple benefits exist, e.g. improved health and well-being, improved health outcomes from hospital stays, improved learning outcomes in schools etc. multiple benefits are situation specific, and need to be identified and assessed for any particular investment. The table is only intended to suggest how the multiple benefits approach and the IMP approach could fit together.

Conclusions and recommendations

There is a need to increase investment into energy efficiency. The identification and evaluation of multiple benefits can help to increase investment by a) improving projected financial returns and b) making investments more strategic for the host organisation. Impact investing and lending is becoming mainstream. Identifying and assessing the multiple impacts of energy efficiency investments will increase their attractiveness to impact investors. Therefore, there is a need to link the two approaches.

This can be assisted by policy measures including:

› Put forth the multiple benefits of energy efficiency investments which can measurably improve financing return of investment projects and clearly

define other multiple benefits with strategic relevance . Show the link between the consideration of multiple benefits and successful financing.

- Ensuring that energy audit regulations and training include the identification and assessment of multiple benefits
- Requiring the assessment of multiple benefits and use of impact measurement approach in assessing public investments into energy efficiency
- integrate impact measurement and management into the tools used by public and financial institutions
- Establishing a fully developed environmental and social Taxonomy to fully capture multiple benefits and for impact investors to more easily and reliably find an opportunity that fits their desires, potentially increasing the amount of money flowing into energy efficiency
- Encourage the use of impact measurement approaches in the business cases for energy efficiency projects
- Promoting energy efficiency investments among impact investors and communicating energy efficiency investments as potential impact investments. It should be noted that many 'traditional' energy efficiency investments are at the minimum impact level of reducing harm. Wider energy transition projects including energy efficiency can maximise ESG benefits in multiple dimensions and contribute to creating solutions, significantly impacting society, environment, and the economy (beyond what the scope of what creates or erodes value for the business)
- Encourage data sharing and exchange of best practices to build capacity and develop impact investing in less advanced markets.

6.4 Methodologies for estimating the monetary value of multiple benefits

Estimation of the monetary value of multiple benefits in buildings and industry could provide important insight for the stakeholders in relation to energy efficiency investments:

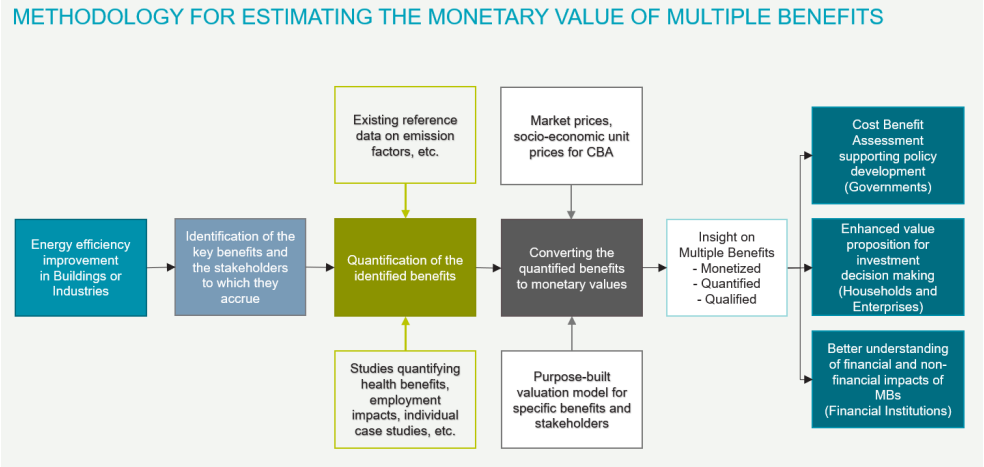
- It may contribute to the Cost Benefit Analysis (CBA) supporting policy development by governments
- It may enhance the value proposition for a renovation project in investment decision making by households and enterprises
- It may provide better understanding of both financial and non-financial impacts for financial institutions.

A consistent methodological approach for estimating the monetary value of multiple benefits will need to include the following key steps:

1. Identification of the key benefits and the stakeholders to which they accrue
2. Quantification of the identified benefits
3. Converting the quantified benefits to monetary values.

This is illustrated in the chart below and described in the following figure.

Figure 8: Methodology for estimating the monetary value of multiple benefits (Source: authors)



Identification of the key benefits and the stakeholders to which they accrue

There is by now an emerging understanding of the existence and importance of the multiple (non-energy) benefits of energy efficiency. While these multiple benefits are increasingly recognised and studied, they have until recently not been quantified in a systematic manner and are still today rarely quantified in monetary terms.

At the same time, understanding of the distribution of these multiple benefits among stakeholders is important for the purpose of policy development including targeting information campaigns, designing incentives for specific stakeholder action and identification of market failures requiring regulation.

The multiple benefits for energy efficiency in buildings include:

- *Benefits accruing to the residents of the buildings*
  - Improvements in thermal comfort (reduced overheating av. over year)
  - Indoor air quality improvement
  - Light improvement

- Noise reduction

- *Benefits potentially accruing to the non-resident owners of the buildings*
  - Improved investment return through potential for improved occupancy rate, reduced vacancy periods, increased rental price and increased exit value.
  - Reduced risk of stranded assets due to changes in costs and regulation as well as increased consumer demand for better environmental performance.

- *Benefits accruing to the broader society*
  - Reduced healthcare costs due to reduced respiratory diseases
  - Increased productivity due to less sick days and wellbeing
  - Job creation from buildings renovation
  - Reduced air pollution (NOx, SO2, PM emissions) and climate change mitigation through reduced GHG emissions
  - Reduced investment pressure in new renewable energy generation, transmission and distribution capacity
  - Increased energy supply security and reduced foreign exchange spent on fossil fuels import

The multiple benefits of energy efficiency in industry include:

- *Benefits accruing to the enterprises implementing energy efficiency*
  - Reduced maintenance costs
  - Improved process productivity
  - More efficient raw material use
  - Contribution to CSR targets and a green corporate image

- *Benefits accruing to the country / broader society*
  - Job creation (energy management and consulting, ISO certification, renovation projects)
  - Reduced air pollution (NOx, SO2, PM emissions) and climate change mitigation through reduced GHG emissions

- Reduced investment pressure in new renewable energy generation, transmission and distribution capacity
- Increased energy supply security and reduced foreign exchange spent on fossil fuels import

Quantification of the identified benefits

Before assigning a monetary value to the benefits there is a separate exercise in establishing the size of the individual benefits based on existing research where available.

In the building sector, examples of such research on health benefits is the BPIE (2018) meta study which quantifies the benefits of energy renovation investments in schools, offices and hospitals in terms of improvements in temperature (reduced overheating av. over year), indoor air quality improvement, light improvement, and noise reduction.[61] In the building sector there is also research available on employment generation such as BPIE (2020) which quantifies the number of jobs created by investments in energy renovation of buildings (an average of 18 jobs for every €1 million invested across EU)[62].

For quantification of emission reductions from reduction of energy use, there are standard emissions factors available at EU and MS level reductions in CO2, NOx, SO2 and PM at sector and energy source level.

In industry where projects are less standardised, only limited reference data on non-energy benefits is available and typically in the form of case studies. The recent M-benefits project[63] provides tools for enterprises to analyse and motivate investments that generate energy savings as well as multiple benefits which can enhance the combined value proposition for the investment.

Converting the quantified benefits to monetary values

A key question is whether existing standard unit values are available that can be used to convert the quantified benefits to monetary values.

For CO2 emission reductions market values are available from the EU ETS, and many national governments have standard assumptions used in economic and energy sector planning. Furthermore, market-based tools are also available,

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[61] BPIE (2018), Building 4 People: Quantifying the benefits of energy renovation investments in schools, offices and hospitals (https://www.bpie.eu/publication/building-4-people-valorising-the-benefits-of-energy-renovation-investments-in-schools-offices-and-hospitals/)

[62] BPIE (2020), Building Renovation: a kick-starter for the EU recovery (https://www.renovate-europe.eu/wp-content/uploads/2020/06/BPIE-Research-Layout_FINALPDF_08.06.pdf)

[63] Home - Multiple benefits of energy efficiency (mbenefits.eu)

such as the Climate Value at Risk (CVAR) developed by Carbon Delta and the Carbon Value Analyser developed by PWC, DENEFF and BPIE.[64]

For other energy sector emissions (reductions in NOx, SO2 and PM) market-based values are typically not available, but again many national governments have standard assumptions used in economic and energy sector planning.

For health effects such as reduced respiratory deceases a lot of research has been performed in quality-adjusted life-year (QALY) as a generic measure of disease burden, including both the quality and the quantity of life lived.

For job creation the salary of the jobs created is often used, but it should be noted that some national governments (in countries close to full employment) do not allow valuation of jobs creation in cost benefit assessments of projects supported by the government.

For benefits where no standard approach is available a purpose-built valuation model can be developed. The EEFIG MB WG has done this specifically for the value creation in commercial real estate from the multiple (non-energy) benefits of energy renovation, drawing on existing studies of health benefits from energy renovation and the value of sustainability certification of buildings (see section 6.5). The model uses the effects on rental price, the exit value and the occupancy rate under alternative assumptions to calculate the resulting effect on investor return.

Perspectives
It is noted that estimation of the monetary value of multiple benefits from energy efficiency is still at a relatively early stage.

Energy efficiency and wider benefits can be reflected in the valuation process in different ways. Literature on this topic identifies three main approaches:

1. lump-sum adjustments on the preliminary valuation result;

2. calculation of a dedicated correction factor to adjust the preliminary valuation results; and

3. direct adjustment of comparable sales data or of single valuation-input parameters such as gross or net rents, risk premiums within the determination of discount and capitalisation rates, maintenance costs and other capital expenditures, lease terms and lease provisions, growth rates, marketing costs and marketing time frames, and depreciation.

From a methodological viewpoint, the last approach (i.e. adjusting comparables or single valuation parameters) is the preferred and most consistent approach.

[64] https://www.carbon-delta.com/climate-value-at-risk/ and https://www.pwc.de/de/pressemitteilungen/2020/energie-und-klimaperformance-von-immobilien-carbon-value-analyser-berechnet-chancen-und-risiken.html

It also works within nationally and internationally accepted valuation methods. But basically, any approach for reflecting energy efficiency in the valuation process is about assessing the position of the property in the competitive marketplace with regard to its energy efficiency and wider benefits, as well as about making the necessary adjustment based on this assessment. This assessment can be based on both, quantitative and/or qualitative reasoning (i.e. the valuer´s professional judgement).

While there is a growing market evidence providing credible value differentiation for certain multiple benefits (e.g. CO2 emission reductions) and there are standard values available to be used in Cost Benefit Analysis (other environmental effects, jobs creation), there is still a wide range of multiple benefits for which no monetary value can be attached other than through purpose-built (and therefore not objective or generally accepted) models.

An example of such as purpose-built model for the value creation in commercial real estate from the multiple (non-energy) benefits of energy renovation was developed under the EEFIG WG (see section 6.5 below). This was however only possible as extensive prior work has gone into quantification (but not monetisation) of the health benefits of buildings renovation.

In areas where limited research on the quantification of the impact is available any attempt to establish monetary values will be dependent on project specific data and the ability to draw general conclusions outside of the specific context will be limited.

On this basis, it is proposed that multiple benefits are recognised and treated as being in one of three different groups in specific situations:

- Monetised - Benefits that can be credibly quantified and have a credible monetary value attached to them
- Quantified - Benefits that can be credibly quantified, but are difficult to attach a monetary value to
- Qualified - Benefits that are likely to result from an investment but are difficult to quantify

Additional research in the area will gradually move benefits that can currently only be qualified to be credibly quantified. Similarly, additional research of benefits that can currently be credibly quantified but are difficult to attach a monetary value to, may result in generally accepted models and approaches for monetisation.

Establishing a robust Monitoring, Reporting and Verification (MRV) mechanisms that track the generated impacts (or proxies for these), such as the ones used e.g. by impact investors in their investment decisions, will be clearly be needed to capture multiple benefits which are often less tangible and observable than reductions in the energy bill.

6.5 Quantifying and monetising the multiple benefits associated with energy efficiency - the case of commercial real estate

For commercial real estate, we have developed a generic excel model that draws on existing studies of health benefits from energy renovation and the value of sustainability certification of buildings. The model is attached as Appendix X to the draft final report.

The model uses the effects on rental price, the exit value and the occupancy rate under alternative assumptions to calculate the resulting effect on investor return. The underlying logic is illustrated in the value chain illustration below.

Energy efficiency improvements such as insulation, ventilation, etc. result in improved temperature control (reduced overheating), improvements in indoor air quality, improved light as well as noise reductions. This overall improvement in indoor climate leads to higher comfort and reduces sick building syndrome and asthma risk. This in terms leads to increased productivity, less sick days and increased employee satisfaction - all benefits which accrue to the tenants. Ultimately, the benefits for the tenants partly spill over to the building owners in terms of better occupancy rate, higher rental prices and higher exit value when selling a renovated property on the market.

The key data source health benefits from energy renovation used is the BPIE meta study[65] which assessed a wide range of research papers on achieved and achievable percentage improvements in performance/productivity. The specific data used relates to offices and comparison between a building with a high Indoor Environmental Quality (IEQ) and a standard building.

Key findings of the BPIE study are (see list of background studies in excel model for further references):

- TEMPERATURE
  The average reduction in overheating across Europe is assumed to be 6°C during the summer period which, depending on location, varies from four to seven months of a year. When averaged over a year, this equates to 2-3°C. Based on the evidenced tests, each degree-Celsius improvement is associated with a 3.6% increase in performance, so the overall performance increase is 7-12%.

- INDOOR AIR QUALITY
  The average indoor air quality improvement across Europe is assumed to be an increased ventilation rate of 4-7 litres per second per person throughout the year. Based on the evidenced tests, each 1 l/s/p is associated with a 0.8% increase in performance, so the overall performance increase is 3-

[65] BPIE (2018). "Building 4 People: Quantifying the benefits of energy renovation investments in schools, offices and hospitals" https://www.bpie.eu/publication/building-4-people-valorising-the-benefits-of-energy-renovation-investments-in-schools-offices-and-hospitals/

6%, depending on location in Europe, with the higher values applicable to buildings with high levels of pollutants, such as those near busy roads or heavy industry, or with significant internal sources of pollution.

- LIGHT
  The average light improvement across Europe is assumed to be in the range 800-1200 lux during the winter months when there is inadequate daylight throughout the normal working day. On average across Europe, this equates to five months of the year. The light improvement, when averaged over a year, is then 333-800 lux. Based on the evidenced tests, each 100 lux improvement is associated with a 0.8% increase in performance, so the overall performance increase is 3-6%, depending on location in Europe, with the higher values applicable to northern parts of Europe with longer winters and less solar influx.

- NOISE
  The average noise attenuation across Europe is assumed to be 5-10db for offices throughout the year. Based on the single evidenced test, each decibel improvement is associated with a 0.3% increase in performance, so the overall performance increase is 1.7-3%.

The excel model looks at non-energy benefits in commercial real estate acquisition, energy renovation and sale on the market after 5 years.
The model initially lets the user vary parameters such as the percentage improvements in productivity in offices achievable from different Multiple Benefit sources and provides guidance on achievable levels based on the BPIE study.

Table 6: Improvement in productivity through energy renovation. Source: BPIE

multiple benefits	Assumed percentage improvement (user selected)	Achievable percentage improvements in productivity in offices (default)
Temperature (reduced overheating av. over year)	7%	7-12%
Indoor Air Quality improvement	3%	3-6%
Light improvement	3%	3-6%
Noise reduction	2%	1.7-3%

The model assumes a direct relation between the multiple benefits from building renovation and the benefits accruing to tenants (e.g., reduced overheating drives increased productivity; indoor air quality drives reduced sick days; light improvements and noise reduction drives increased employee satisfaction). The important assumption is not the distribution but that the sum of benefits accrues directly to the tenants.

Table 7: Assumed improvements for tenants through energy renovation

Assumed benefits for tenants	Assumed percentage improvement (user selected, with default)	Driven by
Increased productivity %	7%	Temperature (reduced overheating av. over year)
Reduced sick days %	3%	Indoor Air Quality improvement
Increased employee satisfaction %	5%	Light improvement & Noise reduction

The model then assumed that benefits accruing to tenants will be reflected in their selection of and willingness to pay for commercial property. Specifically, it is assumed that benefits accruing to tenants in terms of increased productivity, reduced sick days, and increased employee satisfaction will pro rate be reflected in the increase in occupancy rate, unit rental price and market value.

Table 8: Assumed impacts of various value drivers

Assumed impact on building value drivers	Assumed percentage improvement	Assumption
Increase in occupancy rate	5%	Pro rate with average benefits for tenants
Increase in unit rental price	5%	Pro rate with average benefits for tenants
Increase in market value	5%	Pro rate with average benefits for tenants

These assumptions are then fed into a standard real estate financial model established with inspiration from publicly available sources[66].
The excel model takes point of departure in property assumptions, acquisition and exit assumptions, and operating assumptions to establish a property pro-forma accounts and IRR calculations for the project and the investor with and without multiple (non-energy) benefits:

Table 9: Modelling results

Modelling results	With non-energy benefits	Without non-energy benefits
Unleveraged Internal Rate of Return (IRR):	9,2%	7,5%
Leveraged Internal Rate of Return (IRR):	14,4%	10,6%

The model looks at non-energy benefits in commercial real estate acquisition, energy renovation and sale on the market after 5 years.
The specific example modelled is based on Brussels Leopold where prime office rent is 320 €/m2/year, and prime yield is 4.00%[67].
The model results suggest that non-energy benefits associated with energy renovation of commercial real estate could increase unleveraged IRR by around 2percentage points and leveraged IRR by around 4 percentage points.

[66] http://www.mergersandinquisitions.com/real-estate-financial-modeling/

[67] Cushman Wakefield (2021) Europe, The DNA of Real Estate, Fourth Quarter 2020 (https://cw-gbl-gws-prod.azureedge.net/-/media/cw/emea/a-emea-shared/insights/pdf-reports/2020-q4-dna-real-estate-europe-cushman-wakefield.pdf?rev=971ffbb2c52c4a878215bed223859ba8)

For reference, recent research (Jones Lang LaSalle, 2020)[68] demonstrates that sustainable buildings in central London have a rental premium and lower vacancy and that even with a potential increase in construction costs, the rental premium and yield compression could increase profit on cost for sustainable building by 5%.

[68] Jones Lang LaSalle (JLL) (2020). "The impact of sustainability on value".
(https://www.jll.co.uk/en/trends-and-insights/research/the-impact-of-sustainability-on-value)

7 Conclusions and recommendations

The built environment is the sector with one of the highest influence and impact on the health and wellbeing of people and the environment. It supports people, businesses and communities while being the largest consumer of energy and other raw materials. Therefore, opportunities for recognising and delivering positive societal and individual impact through energy efficiency investments are significant.

Many financial institutions and building sector stakeholders today understand that energy efficient buildings can contribute to value preservation and reduced risks but still struggle to account for the multiple benefits. Multiple benefits remain difficult to communicate, report, track and monetise due to lack of common definitions, benchmarks, widely accepted KPIs and lack of reliable data. These challenges are often coupled with lack of coordination with regard to project development between financial institutions, building communities and public authorities, which prevent the capturing of broader policy objectives and impact categories beyond technical and environmental performance aspects such as specific energy consumption.

The policy recommendations set out below encapsulate the outcomes of the discussions of this working grouped by thematic area discussed in the issue papers, as this was also the way it was done in the working groups. The different stakeholders which are addressed have been highlighted, in order to link the recommendations to them as well as the thematic issues, which are addressed.

7.1 Accounting for health and social benefits

Public authorities

Public authorities have a key role to play in ensuring that home and building renovation programmes maximise social and environmental impacts in their communities. The Renovation Wave and EU Recovery and Resilience Facility (RRF) are opportunities to better integrate multiple benefits in investment decisions involving sustainable renovation of homes. Public authorities can undertake the following actions:

- Implement green procurement policies or improve existing rules to support clean technologies and sustainable value chains for public buildings. Simplify the public procurement procedures to enable cooperation with the private sector in technology-driven aspects

- Ensure that energy efficient home renovation is accessible for all. De-risking investments in sustainable building renovation with public funds will attract private investments, drive down the cost of financing, and broaden access to financing to include low-income consumers. De-risking can be done by establishing dedicated guarantee funds, co-investing with the private sector and setting up first loss guarantees to mitigate the risks of non-payment. The EU Recovery and Resilience Funds can be used to set up the de-risking instruments. Public authorities can also support the development of green mortgages offering as banks are a major source of finance for building renovations

- Establish effective public-private cooperation focused on improving comfort, health and wellbeing of citizens living in private and social housing. Market-driven, economically self-sustainable one-stop-shops (OSS) are key in increasing energy renovations

- Ensure that OSSs offer project development and implementation support, including technical support and contractor training and certification to ensure trust and quality of works on energy efficiency measures in buildings

- Support energy poor communities with appropriate grants and subsidies as means to improving health and wellbeing in addition to improving energy efficiency

- Make public funding for building renovation, e.g. from EU structural funds, conditional on achieving improved indoor environmental quality. Monitoring of such projects post-renovation will help build up experience and the knowledge base.

- Commit to tracking social and environmental impacts of renovation programmes and make data and metrics widely available

- Clearly communicate and raise awareness about the multiple benefits of renovation to the citizens by highlighting individual and community-based impacts of healthy and sustainable homes.

Financial institutions

Financial institutions are increasingly defining their sustainable investment strategies in terms of contributions to Sustainable Development Goals (SDGs) and target both "market" and "sustainable" returns. If the multiple benefits were properly integrated into business models, private money would flow more easily towards energy efficiency investments in the residential sector. When demand picks up, financial institutions will finance renovation at multiple levels (social landlords, homeowners, solutions providers) and aggregate these loans in vehicles designed for placement to investors. Integration of multiple benefits in green mortgages offering would increase private owners' access to finance for healthy and energy efficient building renovation. Financial institutions are called to:

- Engage with public administrations (on national and EU level) and find synergies, explore public-private partnership models and co-investing with the public sector for energy efficiency funding. Support the public sector in setting up de-risking mechanisms.

- Provide customer-friendly financing and lending solutions – affordable and easy to obtain - financial institutions and banks are encouraged to provide information about energy efficiency products and the multiple benefits for homeowners, in addition to savings on the energy bills. Where appropriate, they could design tailored products (green and healthy mortgages).

- Commit to tracking social and environmental impacts of financial products which include multiple benefits or energy efficiency

- Showcase investment and business models reflecting the multiple benefits and positive value & risk implications of energy efficiency

7.2 Taxonomy

Energy efficiency investments are directly connected to climate change mitigation and pollution prevention criteria, and, indirectly, to other criteria on a case-by-case basis. Targeting Taxonomy compliance via energy efficiency investments can also generate wider benefits which are currently outside the scope of the screening criteria. Establishing a fully developed Taxonomy including both environmental and social criteria, as well as avoiding Taxonomy silos are therefore essential to fully capture multiple benefits and fostering investment in multiple benefits of energy efficiency.

Financial institutions:

- Are advised to collect wider datasets as part of their Taxonomy reporting efforts and capture wider benefits beyond energy efficiency for future reference. Even if they do not use that data now, it will enable them to use it in risk assessments with regard to future requirements to report on non-energy/carbon related aspects of investments made in energy performance.

Policymakers

- Establish a fully developed social Taxonomy to fully capture multiple benefits – an environmental Taxonomy will only be able to partially capture non-energy benefits

- Translate OECD Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights into a social Taxonomy for the real estate and construction sector, fully integrating social criteria within climate and environmental objectives (the Institute for Human Rights and Business' (IHRB) Dignity in the Built Environment Framework[69] provides guidance on this)

- Avoid the creation of Taxonomy silos which might lead to burden shifting and split incentives. For the ongoing development of existing and future Taxonomies, it is important to clarify the non-energy benefits and the interlinkages between environmental and social impacts

Develop standardised metrics and optimise data collection for capturing of and reporting against multiple benefits (with third party verification)

Certification schemes as part of the taxonomy

- Should be more transparent about the underlying raw data of certifications which would help with building the correlation of energy and carbon investments and multiple benefits

- Given the impressive number of building certifications in use globally, it is far from easy to understand their similarities and differences. The various

[69] Available at: https://www.ihrb.org/focus-areas/built-environment/framework-for-dignity-built-environment

systems have not been developed with a uniform focus and weighting of attributes in mind: some focus on a single criterion such as health and wellbeing, others on environmental factors and others again on sustainability from a broader perspective. Overall, most rating systems still place more emphasis on the environmental pillars rather than on the full sustainability attributes.[70] More alignment across the various criteria and how they are evaluated/weighed (e.g. by introducing a section showing synergies with Level(s)) would help building owners and financial community better understand sustainability and multiple benefits.

7.3 ESG risk assessment and management

Many of the non-energy benefits overlap with the environmental, social and governance (ESG) criteria financial institutions and their stakeholders use to screen investments and measure their portfolios against. Disclosure and reporting initiatives provide guidance and benchmarks around determining financial materiality or the likely impact on financial condition or operating performance. Such initiatives are instrumental to identifying these non-energy impacts, improving data collection and disclosure practices.

Policymakers

- Improve consistency and quality of EPC schemes and NZEB across EU Member States to make it is a useable proxy for calculating the Green Asset Ratios and level of alignment with the Taxonomy
- Consider extending the scope of EPC to include non-energy aspects (e.g. indoor environmental quality)
- Align ESG risks with decarbonisation pathways

7.4 Impact investing

The impact investment framework can provide useful pointers as to how non-energy benefits, both social and environmental, could be valued. Energy efficiency investments can clearly be considered impact investing in that they have a direct, intended impact on reducing energy consumption and hence the environmental impact resulting from energy use. The identification and evaluation of multiple benefits such as improved productivity, increased employee satisfaction, better health outcomes, better learning outcome etc. (all of which have been measured), strengthens the connection between energy efficiency investing and impact investing and can increase their attractiveness to impact investors.

Policymakers

- Ensure that energy audit regulations and training include the identification and assessment of multiple benefits

[70] Cordero et al. (2019) Green Building Rating Systems and the New Framework Level(s): A Critical Review of Sustainability Certification within Europe, Energies

- Require the assessment of multiple benefits and use of impact measurement approach in assessing public investments into energy efficiency
- integrate impact measurement and management into the tools used by public and financial institution
- Establish a fully developed environmental and social Taxonomy to fully capture multiple benefits and for impact investors to more easily and reliably find an opportunity that fits their desires, potentially increasing the amount of money flowing into energy efficiency
- Promote energy efficiency investments among impact investors and communicating energy efficiency investments as impact investments if these simultaneously avoid harm and maximise benefits in all ESG dimensions, as well as contribute to creating solutions, significantly impacting society, environment, and the economy (beyond what the scope of what creates or erodes value for the business)
- Encourage data sharing and exchange of best practices to build capacity and develop impact investing in less advanced markets

The evidence linking multiple benefits to financial value should be communicated more widely, and in more explicit and targeted way, by e.g.:

- Including the more findings on multiple benefits in the EEFIG underwriting toolkit.
- Providing tailored information for financial institutions (e.g. as a condensed working paper)
- Including tailored information on the website and in social media channels
- Including multiple benefits in policy instruments such as the EED, EBPD etc.

The remaining problems and challenges to be tackled therefore are the following:

- Identify investors and financial institutions already using multiple benefits and their relevant practices.
- Collect best-practices on the consideration of multiple benefits in decision-making procedures of financial institutions.
- Collect and condense up-to-date scientific literature on the topic.
- Communicate the results in appropriate formats.
- Assess the relevant metrics & KPIs currently in use and review the process of how these are used by financial institutions.

A more holistic approach accounting for the impact on the value of the asset (owner) and on the improved quality (tenant) is necessary to encompass all the benefits of energy renovation in housing.

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