

Energy efficiency finance and Multiple Benefits – two sides of the same coin

Zsolt Toth
Buildings Performance Institute Europe
Rue de la Science 23
B-1040 Brussels
Belgium
zsolt.toth@bpie.eu

Clemens Rohde
Fraunhofer-Institut für System- und Innovationsforschung ISI
Breslauer Straße 48
76139 Karlsruhe
Germany
clemens.rohde@isi.fraunhofer.de

Keywords

multiple benefits, energy efficiency financing, Taxonomy, ESG

Abstract

Over the past couple of years, the topic of Multiple Benefits of energy efficiency investments has been explored from multiple angles. In the policy context, Multiple Benefits are beginning to be more consistently referred to in the development of regulatory measures and assessment of policy impacts. At the same time, in financial decision-making, non-energy benefits, such as climate resilience, improved comfort, healthier occupiers which are directly linked to the asset value and risk profile, are seldom explicitly targeted, measured or fully considered.

There is a common understanding that Multiple Benefits of energy efficiency have a material impact on investment outcomes. Accounting and realising these additional co-benefits can significantly increase the value and quality of energy efficiency measures. The main challenge faced by financial institutions is that Multiple Benefits remain difficult to communicate, report, track and monetise due to the lack of standardised metrics and lack of market transparency.

This paper presents the main findings of the Energy Efficiency Financial Institutions Group (EEFIG) Working Group on Multiple Benefits. It argues that the translation of Multiple Benefits into actionable and meaningful financial information depends on the ability to assess and communicate these benefits through clear KPIs and quantitative/qualitative evidence. Identifying and assessing the multiple impacts of energy efficiency investments will increase their attractiveness to responsible investors and owners seeking to realise their fiduciary duty to understand and actively manage environmental, social,

governance (ESG) and climate-related risks. Linking Multiple Benefits to both the Taxonomy and impact investment framework can provide the required standards and definition of materiality that would facilitate the incorporation of non-energy benefits in financial decision-making.

Building on a short review of the context and relevance of the topic, three aspects will be addressed in more detail: (1) social and health impacts of energy efficiency investments relevant for financial institutions; (2) the role of the EU taxonomy in supporting the articulation of and strengthening the business case for Multiple Benefits; and (3) linking the Multiple Benefits agenda to the impact investment framework. The paper concludes with a list of recommendations addressed to public authorities and relevant market actors.

Introduction

The COVID-19 pandemic has exposed the intimate relationships between the environment and our livelihoods. Policy efforts to initiate a green recovery bring an important opportunity to better connect environmentally positive measures with the goal of a more inclusive and healthier built environment. Investing in buildings can create a fair, inclusive and resilient society. Thus, people and communities should be at the heart of climate change mitigation and adaptation. Buildings represents an enormous investment opportunity to improve health, quality of life and social resilience across all communities, with a specific focus on the most vulnerable groups.

The Multiple Benefits of energy efficiency are those benefits that arise from energy efficiency investments other than energy savings. Many different benefits have been identified, and in

many cases, these have been quantified and valued. The type of Multiple Benefits that occur are very situation specific and can include factors such as productivity improvements, quality improvements, health improvements, better health and education outcomes, reduction in the need for energy generation infrastructure, employee satisfaction, improvement in property value, job creation and local economic development etc. Multiple Benefits can occur at the level of the project host, or at a wider societal level.

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 integrate Multiple Benefits in their existing decision-making practices. Linking Multiple Benefits to ESG risk management or capturing broader policy objectives and social impact categories can facilitate the identification, measurement, monetisation, as well as explicit targeting of Multiple Benefits by financial institutions.

The Energy Efficiency Financial Institutions Group (EEFIG) Working Group on Multiple Benefits has been set up by the European Commission (DG Energy) and the United Nations Environment Programme Finance Initiative (UNEP FI) 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 explored a number of thematic areas including, health and social benefits, ESG risks, taxonomy, sustainability rating tools and impact investing with the purpose to encourage financial institutions to scale up financing of building energy efficiency retrofits. The outcomes of the working group discussion are summarised below.

Social and health aspects of energy efficiency investments

Today, nearly 35 million of Europeans are unable to keep their homes warm 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 efficiency renovations are a solution to improve the environmental, social and economic impact of housing.

People spent about 90 % of our time indoors and 2/3 at home before the pandemic and that proportion is even higher today. According to the Healthy Homes Barometer¹, 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. The WHO estimates that poor indoor air quality is responsible for around 99,000 deaths a year in Europe.² Respiratory illnesses, asthma, and poor mental health have been associated with living in damp, cold housing, which is a

breeding ground for mould.³ 2.2 million Europeans have asthma, partly as a result of their living conditions.⁴ In addition, 65 % of Europeans who live in major urban areas are exposed to dangerously high levels of noise pollution,⁵ which leads to health issues such as stress, high blood pressure, hypertension and strokes. Chronic noise exposure can also adversely affect the cognitive development of children.⁶

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 2050.⁷ The annual total cost to EU economies of leaving people living in inadequate housing is estimated at nearly €194 billion. 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.⁸

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 aiming to save energy, 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 one-stop shops.

However, beyond the lack of market demand and consistent support from the public sector to maximise social and environmental impacts of building renovation programmes, the main challenge faced by financial institutions and proponents of Multiple Benefits is that they are difficult to communicate, report, track and monetise. The remaining barriers are summarised below:

- many terms and thematic investment areas (e.g. energy efficiency and affordable housing) have not been universally defined, making it difficult to identify benchmarks, KPIs and set industry best practices⁹

1. RAND Europe (2019) Healthy Home Barometer.

2. World Health Organization (2014) Burden of disease from household air pollution for 2012.

3. WGBC (2018) A guide to healthier homes and a healthier planet.

4. Velux (2017) Healthy Homes Barometer.

5. Münzel, T., Gori, T., Babisch, W. and Basner, M. (2014) Cardiovascular effects of environmental noise exposure.

6. Klatte, M., Bergstrom, K. & Lachmann, T. (2013) Does Noise Affect Learning? A Short Review on Noise Effects on Cognitive Performance in Children.

7. European Commission (2020) Renovation Wave strategy.

8. Eurofund (2016) Inadequate housing in Europe: Costs and consequences.

9. PRI (2018) Impact Investing Market Map, and UNEPFI (2018) Positive Impact Investment in Real Estate Discussion Paper.

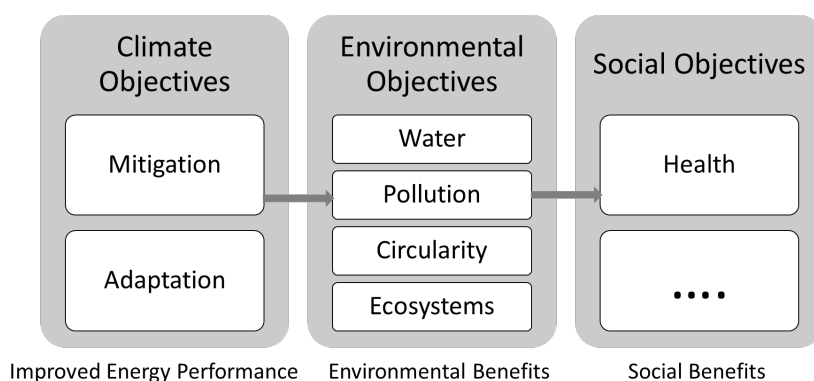


Figure 1. Linkages between Taxonomy climate objectives and environmental and social benefits.

- energy savings are not sufficient 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
- 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
- lack of data, lack of standard measurement practices and often prohibitive costs to collect such data per project
- lack of coordination between financial institutions, building experts and e.g. the medical community to assess and measure these factors
- as above, public authorities also lack coordination between health, buildings, climate, financing departments at national and regional levels. Since Multiple Benefits tackle multi-disciplinary issues, the solutions should be multi-disciplinary too.

The role of the EU Taxonomy in fostering investments in Multiple Benefits

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. Although the current EU Taxonomy for Sustainable Finance does not overtly cover Multiple Benefits, linkages can be made between the climate objectives and the related environmental and social benefits. This section explores how the Taxonomy can support the articulation of and strengthen the business case for Multiple Benefits.

The new EU Taxonomy represents a comprehensive 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 as well as 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 1).

MAPPING TAXONOMY SCREENING CRITERIA AGAINST MULTIPLE BENEFITS

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 alignment 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 silos¹⁰ are therefore essential to fully capture Multiple Benefits and fostering investment in Multiple Benefits of energy efficiency. Further work needs to be done to 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 to fully integrate social criteria within climate and environmental objectives (the Institute for Human Rights and Business’ (IHRB) Dignity in the Built Environment Framework¹¹ provides guidance on this).

HOW TO MATERIALISE MULTIPLE BENEFITS THROUGH THE EU TAXONOMY?

The successful materialisation of investments in Multiple Benefits through the EU Taxonomy thus 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

10. E.g. the development of screening criteria in isolation without considering the links and trade-offs between other environmental and social objectives.

11. Available at: <https://www.ihrb.org/focus-areas/built-environment/framework-for-dignity-built-environment>

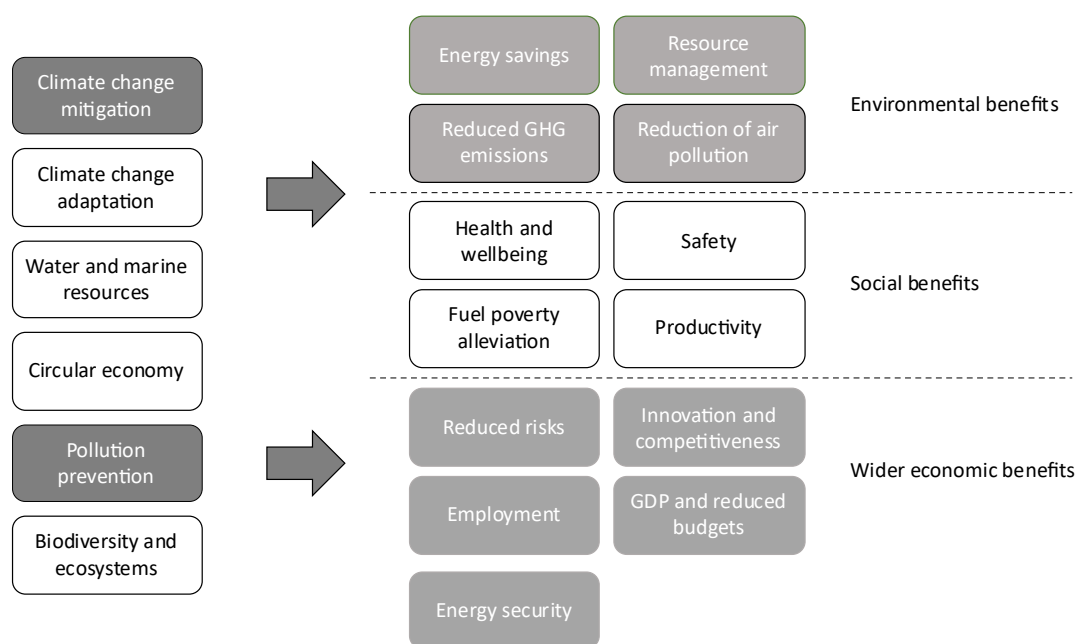


Figure 2. Taxonomy technical screening criteria and alignment with Multiple Benefits.

- 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 Taxonomy
- measuring impacts ex-ante and ex-post.

Clear and transparent measurement of impacts beyond energy savings and carbon emission reduction is a cornerstone to realising the Multiple Benefits. Tangible and observable features of buildings in general have a stronger influence on market decisions than Multiple Benefits which are often “hidden characteristics” 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.

Building certification schemes (both public and private) can be relevant tools to provide the required measurement and evidence base to substantiate Multiple Benefits claims although, so far, these were predominantly focusing on energy and carbon performance only. More recently, they are 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.

Given the impressive number of building certifications in use globally, financial institutions and real estate actors find it difficult to understand their similarities and differences. The various 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.¹² More alignment across the various criteria and how they are evaluated/weighed (e.g. by introducing a section showing synergies with the EU’s Level(s) sustainability reporting framework) would help building owners and financial community better understand sustainability and Multiple Benefits.

Regardless of developments in the field building sustainability assessments, financial institutions are advised to collect wider datasets as part of their Taxonomy reporting efforts - capturing 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.

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

Connecting the Multiple Benefits of Energy Efficiency and Impact Investing

Another potentially relevant approach to identify benchmarks, KPIs, set industry best practices and, ultimately, to mobilise investments in Multiple Benefits is to articulate these non-energy benefits within the language of “impact investing”. Impact investing is defined as making investments with the intention to generate positive, measurable social and environmental impact alongside a financial return.¹³ It 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 organisations manage USD 715 billion in impact investing Assets Under Management (AUM).¹⁴ In the last few years there has been considerable growth in 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.¹⁵

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.¹⁶ 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’.

MEASURING IMPACT

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. Traditionally energy efficiency investments have been considered in a predominantly one-dimensional way: i.e. 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: (1) it misses the value of the non-energy Multiple Benefits, many of which have real and measurable financial impact e.g. improved productivity; (2) it fails to link the proposed investment to the strategic direction of the enterprise, which reduces the probability of the investment being approved.¹⁷ 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 ma-

major contributors to the energy efficiency gap, i.e. the gap between financially viable projects and what is actually invested.

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 (IMP)¹⁸ provides a forum for building global consensus on measuring, managing and reporting impacts on sustainability'. It has defined impact as 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.

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. Equally, 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.

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. (all of which have been measured), 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 Horizon 2020 funded MBenefits project¹⁹ 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 MBenefits and IMP is

13. Cf. Global Impact Investing Network (GIIN).

14. GIIN (2020) Annual Impact Investor Survey.

15. <https://www.ft.com/content/5cd6e923-81e0-4557-8cff-a02fb5e01d42>

16. UNEPFI (2018) Rethinking Impact to Finance the SDGs.

17. Cooremans (2011) Make it strategic! Financial investment logic is not enough.

18. <https://impactmanagementproject.com/impact-management/impact-management-norms/>

19. <https://www.mbenefits.eu>

shown below, using the Multiple Benefits identified in one particular 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 MBenefits and IMP is shown below, using the Multiple Benefits identified in one particular project.

Conclusions

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. Investors and lending institutions 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. ESG and impact investing and lending is becoming mainstream. Identifying and assessing the multiple impacts of energy efficiency investments will increase their attractiveness to responsible investors seeking to understand the materiality of non-financial risks and growth opportunities. Linking Multiple Benefits to both the Taxonomy and impact investment framework can provide the required standards and definition of materiality that would facilitate the incorporation of non-energy benefits in financial decision-making.

To realise these opportunities, the EFIG working group concluded that financial institutions and policymakers should act on the following recommendations:

Table 1. Example of benefits identified in a specific MBenefits project.

IMPACT MANAGEMENT PROJECT DIMENSIONS	<i>What</i>	<i>Who</i>	<i>How much</i>	<i>Contribution</i>	<i>Risk</i>
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					
Reduced energy costs					
Increased safety					
Increased reliability					
Increased staff satisfaction & retention					
Contribution to vision & strategy					
Reduced accident risk					
Reduced legal risk					
Reduction in break down risk					

NB. The above framework is not intended to be an exclusive list of Multiple Benefits but rather an illustration only of the benefits that were shown to be present for a particular project. 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 and the 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.

- Establish effective public-private cooperation focused on improving comfort, health and wellbeing and facilitate market-driven, economically self-sustainable one-stop-shops (OSS)
- Establish a fully developed social Taxonomy and 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)
- Commit to tracking social and environmental impacts of financial products
- Use the impact measurement and management approach in assessing public investments into energy efficiency
- Showcase investment and business models reflecting the Multiple Benefits and positive value & risk implications of 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
- Encourage data sharing and exchange of best practices to build capacity and develop impact investing in less advanced markets.

References

- 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.
- Cooremans (2011) Make it strategic! Financial investment logic is not enough, *Energy Efficiency*, 4, pp. 473–92.
- Cordero et al. (2019) Green Building Rating Systems and the New Framework Level(s): A Critical Review of Sustainability Certification within Europe, *Energies*.
- Eurofund (2016) Inadequate housing in Europe: Costs and consequences, Inadequate housing in Europe: Costs and consequences | Eurofound (europa.eu).
- European Commission (2020) Renovation Wave strategy, COM(2020) 662 final.
- GIIN (2020) Annual Impact Investor Survey, <https://thegiin.org/research/publication/impinv-survey-2020>
- Global Impact Investing Network (GIIN), <https://thegiin.org/impact-investing/need-to-know/#what-is-impact-investing>
- International Energy Agency (2014) Capturing the Multiple Benefits of Energy Efficiency.
- 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.
- Münzel, T., Gori, T., Babisch, W.
- PRI (2018) Impact Investing Market Map, <https://www.unpri.org/download?ac=5426>
- RAND Europe (2019) Healthy Home Barometer.
- UNEPFI (2018) Positive Impact Investment in Real Estate, <https://www.unepfi.org/wordpress/wp-content/uploads/2018/06/Positive-Impact-Investment-Real-Estate-Discussion-Paper.pdf>
- 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>
- Velux (2017) Healthy Homes Barometer. <https://www.velux.com/health/healthy-homes-barometer-2017>
- WGBC (2018) A guide to healthier homes and a healthier planet, https://www.worldgbc.org/sites/default/files/20181204_WGBC_Homes-Research-Note_FINAL_spreads.pdf
- World Health Organisation (2014) Burden of disease from household air pollution for 2012, https://www.who.int/phe/health_topics/outdoorair/databases/FINAL_HAP_AAP_BoD_24March2014.pdf

Acknowledgements

The authors are grateful to the EEFIG working group on Multiple Benefits for their input, in particular to Kristina Klimovich (GNE Finance), Philippe Weill (Société Générale), Ursula Hartenberger (CPEA) Stephen Fawkes (ep group) and Dirk Peters von Rosenstiel (EU Commission) who provided extensive comments and substantial contributions during the drafting of background materials for the paper.

