



EEFIG

ENERGY EFFICIENCY
FINANCIAL INSTITUTIONS GROUP

Stimulating Consumers' Demand for Energy Efficiency Investments

Final Report, June 2023

The information and views set out in this study are those of the author(s) and do not necessarily reflect the official opinion of the European Commission.



EUROPEAN COMMISSION

Directorate-General for Energy

Directorate B: Just Transition, Consumers, Energy Efficiency & Innovation

Unit B.2 — Energy Efficiency

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Stimulating Consumers' Demand for Energy Efficiency Investments

FINAL REPORT

June 2023



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CLIMATE & STRATEGY
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Manuscript completed in 2023

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PDF

ISBN 978-92-68-08935-4

doi: 10.2833/444676

MJ-03-23-422-EN-N

Luxembourg: Publications Office of the European Union, 2023

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ABBREVIATIONS

EC	European Commission
EE	Energy Efficiency
EE1st	Energy Efficiency First
EED	Energy Efficiency Directive
EEFIG	Energy Efficiency Financial Institutions Group
EIB	European Investment Bank
ELENA	European Local Energy Assistance (Facility)
ENPOR	Horizon 2020 project: Energy poverty in the private rented sector
EnR	European Energy Network
EPBD	Energy Performance in Buildings Directive
EPC	Energy Performance Certificate
ESCO	Energy Service Company
ETS	Emissions Trading System
IEA	International Energy Agency
JRC	Joint Research Centre of the EC
MS	Member State
NECP	National Energy and Climate Plans
PRS	Private Rented Sector
REACT	Regional Energy Action
RED	Renewable Energy Directive
SMEs	Small and Medium-sized Enterprises
WG	Working Group

Executive summary and policy recommendations

Energy efficiency in buildings, industries and products are a key enabler for the ambitious climate ambitions of the EU and the EC has developed a broad policy foundation for energy efficiency including legislative instruments such as Ecodesign Regulation, Energy Labelling Framework Regulation, the Energy Efficiency Directive (EED) and the Energy Performance of Buildings Directive (EPBD).

This policy framework is supplemented by policies and programmes at the national, regional and local levels through transposing EU policies and by initiating others including different financing programmes and support facilities to promote energy efficiency.

However, the demand for energy efficiency investments from the consumers and final energy users' side is still sub-optimal to sufficiently contribute to the Europe Green Deal, the objectives of the REPowerEU Plan and the EU's commitments to the Paris Agreement on climate change.

The objectives of the WG were to identify and assess the main barriers and drivers to stimulate demands for EE investments from consumers and final users, identify best practices, and formulate general and specific recommendations on what tools and policy instruments are likely to be most effective in increasing consumers and final users demand for EE investments.

The members of the WG were Financial Institutions, EU funded projects within demand activation and EE financing, public energy agencies, housing associations, technology providers and industry associations, research institution and consultancy, as well as the European Commission.

Types of consumers and final energy users

A typology of consumers and final energy users was established to allow differentiated analysis of barriers and best practice interventions. This included differentiation between owners, tenants and investors, differentiation between single and multiple unit buildings, and recognition of the special challenges for energy poor and vulnerable households and for SMEs.

Barriers faced by different types of consumers and final energy users

The vast literature on barriers to demand for EE investments from consumers and final users was reviewed and the barriers were classified based on when they occur at different decision steps. The priority barriers for different types of consumers were identified and linked to best practice interventions and specific examples of such interventions.

The key barriers covered by the analysis were Information barriers (understanding the need, solutions and benefits), Incentive barriers

(getting incentives aligned in rental property), Trust barriers (trusting market participants), Coordination barriers (agreeing joint action for multi-family, multi-business properties), Finance barriers (inability to secure financing for the investments), and Preference barriers (prioritizing the investment over other needs).

The WG assessed the barriers hindering the demand for energy efficiency investments, discussed the importance of different barriers to individual groups of consumers and final energy users.

Based on this, best practices for stimulating consumers and final energy users' demand for energy efficiency investments were identified. On a generic level this included various policy instruments and tools for stimulating demand for energy efficiency investments and on a specific level best practices to stimulate demands for energy efficiency investments were identified based on experience from initiatives funded EU and national funds, the One-Stop Shops funded by EIB ELENA, and third-party financing solutions.

Summary of recommendations

Chapter 5 provides the full list of recommendations from the Working Group to sector stakeholders, Member States, EU institutions and financial institutions. The key ones that need immediate attention are highlighted below.

Sector stakeholders should facilitate consumer uptake of EE solutions through clear and trustworthy information, attractive renovation value propositions, simplified customer journeys, and cooperation with governments and financial institutions:

- Ensure consumers receive appropriate information to help their decision-making process. For instance, information providers (e.g., One-Stop Shops or national/regional energy agencies) should work closely with energy efficiency technology and service providers to ensure that information provided is reliable and in line with market conditions.
- Collectively agree and adhere to meaningful quality assurance standards, codes of practice and standardised project development processes to promote trust in EE solutions and savings. In this context EU-wide standards should be encouraged to promote consistency and credibility.
- Roll out at scale support schemes such as One-Stop-Shops or initiatives targeting specific market segments (e.g., SMEs), offering a suite of project information, project facilitation and finance services to local consumers and businesses.
- Maintain regular contact and network with governments at all levels and other stakeholders to monitor progress and discuss measures to accelerate consumer demand.

- Increase engagement with consumers and consumer associations on feedback of progress to accelerate consumer demand and to better understand on-going obstacles.

Member States should facilitate the necessary framework conditions for consumers demand and uptake of EE solutions:

- Ensure that EE lending products for building renovations are offered by financial institutions and are visible and accessible to consumers.
- Facilitate blending of commercial financing for EE with public grants, guarantees and loans when this is necessary to incentivise consumer uptake of EE financing products.
- Consider introducing or increasing incentives to improve EE for vulnerable groups and ensure that the application process be made as easy to follow as possible.
- Provide forward visibility of EE and electrification policies and building performance standards, including specific technical pathways for removing fossil fuels from the energy system.
- Promote deep retrofits over single measures and reflect this in public support programmes.
- Invest in training on EE, RE and good practice in retrofit for suppliers that interact directly with consumers and businesses.
- Assess how One-Stop-Shops, or similar initiatives, can have impact on consumer decisions to invest in EE at the decision point and throughout the renovation process.
- Provide strong, positive signals to consumers of the importance of EE and of the co-benefits that can be derived from such investments.
- Work closely with regional and local agencies, social services and other key stakeholder to ensure appropriate engagement with consumers and stakeholders.
- Continue to share experience and lessons learned on EE measures through the European Energy Network (EnR) network and other such bodies.

EU institutions should continue to lead the establishment of a policy framework supporting demand activation for EE investments and facilitate replication of best practice examples outside of the geography where they are originated:

- Ensure an ambitious and effective EE policy framework that gives adequate treatment to vulnerable segments of the economy.

- Monitor progress at the Member State level in the development of energy services markets and energy performance contracting as an instrument for supporting demand activation.
- Ensure Concerted Action for the EPBD and EED are effectively analysing and sharing experience to improve implementation of the directives and scaling up demand for EE throughout the EU.
- Consult with the financial community to understand their concerns and to get their full engagement in supporting the development of EE financing instruments and willingness to work with blended financing including partial risk guarantees to enable EE financing offerings for SMEs and low-income households.
- Ensure that EE demand activation projects funded through the EU have clear replication strategies and that funding options for replication of successful cases outside of the original country are available.
- Develop an on-line system to share best-practice cases on successful EE demand activation projects (whether funded by EU, national public funds or private sector) to ensure information is readily available.
- Provide more support for de-risking projects that facilitate demand activation for consumers and SMEs (e.g. TrustEE, eQuad, ICP, etc.).
- Support efforts to ensure the intermediaries can effectively help asset owners of buildings and SMEs.

Financial institutions should develop dedicated EE financing instruments, engage with national governments on blending of public guarantees and private funding for EE, and embed EE1st principles in their financing procedures:

- Take into account the EE1st principle in engaging with households and SMEs and offer solutions favouring deep retrofits over single measures.
- Invest in innovation around the business models and programme designs to develop dedicated EE financing instruments for households, building owners and SMEs, including in cooperation with solution suppliers.
- Engage actively with the public sector on the challenge of home refurbishment, including on blending of public guarantees and private funding for EE.
- Develop creative initiatives inspired by the successful Energy Efficient Mortgage Label (EEML) initiative to create awareness for consumers and businesses to invest in EE measures.
- Work with other stakeholders to promote the benefits of investing in EE.

- Simplify existing products and standardise lending procedures as much as possible to make it easier for consumers to access financing support.

1 Introduction

This Draft Final Report is prepared in the context of the assignment “Launch and facilitate the implementation of a new EEFIG Working Group on Stimulating consumers’ demand for energy efficiency investments, specific contract N° ENER/C3/FV2020-476/01/FWC2018-464/14/ SI2.848711 implementing framework contract (FWC) ENER/C3/2018-464, the provision of services lasting for 24 months.

1.1 Background for the Working Group

The objectives of the Working Group on “Stimulate consumers’ demand for energy efficiency investments” are to:

- > Identify and assess the main barriers and drivers to stimulate demands for energy efficiency investments from consumers and final users;
- > Identify best practices, their key features and possible obstacles they have to face, assessing the potential to replicate them and under which circumstances;
- > Establish a platform for dialogue on stimulating consumers’ demand for energy efficiency investments between financial institutions, property owners, homeowners' associations, housing cooperatives, civil society organisations, and real estate professions;
- > Formulate both general and specific differentiated recommendations on what tools and policy instruments are likely to be most effective in increasing consumers and final users demand for energy efficiency investments;
- > Identify possible ways to address split incentives, the fact that benefits of energy efficiency to consumers or society are not passed to investors and long-term payback periods for some energy efficiency investments.

While multiple studies have shown the economic growth potential and multiple benefits of energy efficiency investments, and despite in the EU, national and regional authorities having activated different financing programmes and support facilities, the demand for energy efficiency investments from the consumers and final energy users’ side is still sub-optimal to sufficiently contribute to the Europe Green Deal, the objectives of the REPowerEU Plan and the EU’s commitments to the Paris Agreement on climate change.

In order to develop effective and efficient policy instruments (regulatory and financing) aimed at increasing the demands for energy efficiency investments, the European Commission as well as the national energy authorities need updated information about existing practices in the field,

with a particular focus on experience and recommendations from stakeholders active in the real estate sector.

Improving energy efficiency to reduce energy demand and GHG emissions is one of the three key targets of the EU climate and energy objectives. To reach the overall goal behind the European Green Deal, i.e. a climate neutral Europe by 2050, a balanced, realistic, and prudent pathway to climate neutrality by 2050 has to be taken. The Communication on stepping up Europe's 2030 climate ambition (COM(2020) 562 final) indicates that apart from a more ambitious emissions reduction target of 55% by 2030, energy efficiency improvements will need to be significantly stepped up as well to around 36% of savings in terms of final energy consumption by 2030.

In July 2021 the European Commission published its Fit for 55 package¹ that sets out the legislative changes to meet the greater ambition. For the consumer demand WG, the important changes are to the Energy Efficiency Directive (EED) and Renewable Energy Directive (RED) as well as the proposed changes to the Energy Performance in Buildings Directive (EPBD) published late in 2021. The revisions are currently going through the final approval process by EU institutions and should be approved in the first half of 2023. The Commission's proposal for a revised EED e.g. introduces a new requirement on Member States to take measures to implement energy efficiency improvements for people affected by or at risk of energy poverty, vulnerable customers and those living in social housing. It would also establish a clear legal basis for applying the 'energy efficiency first' principle (introduced in the 2018 EED) and ensure its practical implementation.

Specifically, Article 21 of the EED Recast proposal strengthens the obligations towards consumers, in particular the availability and provision of information, the awareness raising measures and the technical and financial advice or assistance offered. It is underlined that creation of one-stop shops, single points of contact and out-of-court mechanisms for the settlement of disputes are structures that will significantly help to empower customers and final users. Furthermore, the Article includes obligations to identify and lift barriers relevant to the split incentives between tenants and owners or among owners.

Furthermore, Article 22 of the EED Recast introduces an obligation for Member States to implement energy efficiency improvement measures as a priority among vulnerable customers, people affected by energy poverty and, where applicable, people living in social housing, to alleviate energy poverty.

The European Commission estimates (SWD(2020) 98 final), the overall transformation investment gap for both public and private investments residential and business energy efficiency as EUR 180bn per year. These figures were estimated on the basis of the EU targets in force at the time,

¹ https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3541

and it is expected that investment needs will be higher still with the newly proposed more ambitious strategy.

In May 2022, the European Commission published its Communication on the REPowerEU Plan², its response to the hardships and global energy market disruption caused by Russia's invasion of Ukraine. The measures included energy savings, diversification of energy supplies, and accelerated roll-out of renewable energy to replace fossil fuels in homes, industry and power generation. The package included also an EU 'Save Energy' Communication³. This communication included a two-pronged approach to accelerate energy demand efforts:

- Achieving immediate energy savings through voluntary choices; and
- Accelerating and strengthening structural, mid- to long-term energy efficiency measures.

Types of support actions that can be taken can therefore be divided into:

- **Awareness and information actions** – to ensure the different types of energy users understand the importance of reducing energy demand and know what they can do to contribute, and
- **Incentives and supporting actions** – to help energy users in their efforts to reduce energy consumption, for example by offering rebates on the purchase of the most efficient appliances.

The IEA estimates that these types of short-term gas-related measures could achieve a 5% reduction in (final) gas use over a year.

The Communication also included accelerating and strengthening structural, mid-to long-term energy efficiency measures.

In view of the need for increased private finance, the Communication stated that the Commission will launch, in co-operation with Member States, a high-level European Energy Efficiency Financing Coalition with the financial sector, based on the successful EEFIG.

In July 2022, the EC called for MS to reduce gas consumption through voluntary measures. On July 26, the European Council approved a proposal for EU countries to voluntarily cut gas use by 15% in the August-March period from the average from 2017-2021⁴.

On July 13th 2022, the Industry, Research and Energy (ITRE) Committee of the European Parliament adopted its reports regarding the revision of the Renewable Energy Directive (RED III) and the Energy Efficiency Directive

² COM (2022) 230 final

³ COM (2022)240 final

⁴ There are exceptions to the general proposal, e.g. Cyprus is entirely exempted as it is physically disconnected from the EU.

(EED). Particular attention needs to be given to significantly increase deep renovations in buildings to support the goals of the Renovation Wave. Currently, there are many approaches at the local, regional and national levels, many of which have been in place for years. Nevertheless, taken as a whole, they are nowhere close to achieving the needed increase in consumer demand to meet the EU long-term targets. The European Parliament is currently negotiating with the European Council to approve the changes to the directives.

Against this background, a main challenge for the EEFIG in general and the WG on stimulating consumer demand in particular is to offer realistic, but ambitious, solutions for increasing consumer demand for energy efficiency to help meet the proposed new energy efficiency target in the *Fit for 55 package*.

While the emphasis has been on increasing consumer demand for energy efficiency investments in residential buildings, the WG has also given special attention to increasing demand in SMEs, with particular focus on their buildings.

The WG did not seek to add independent new research to the already extensive ongoing work at EU and MS level on barriers to and solutions for demand activation for EE investments. Rather, it summarised their emerging conclusions and identified best practice cases with potential for broader deployment.

After almost two years of activity, including holding six half-day thematic meetings the work programme has concluded with this final report which documents the activities of the Working Group.

1.2 Structure and content of the report

The report builds on the discussion at thematic WG meetings in relation to decision-making processes in households and enterprises, information and awareness raising, value propositions for deep renovation of residential buildings, and demand activation for EE investments in SMEs.

The report provides an updated assessment of the barriers hindering the demand for energy efficiency investments from the consumers and final users' side, including a categorisation of type of barriers and challenges per type of consumers and final energy users.

There is also an overview of existing and innovative tools, policy instruments and best practices for stimulating consumers and final energy users' demand for energy efficiency investments, including an assessment of replication potential per type of consumers and final energy users across EU Member States and regions.

This resulted in a set of actionable recommendations for the Commission, financial institutions, sector stakeholders and Member States. It is hoped

that these findings will also provide a source of insight and inspirations for policy makers at both EU and MS level, financial institutions, and sector stakeholders in relation to the design and implementation of interventions that can activate demand for EE investments among consumers and final users.

The report is structured as presented in Table 1 below:

Table 1 Report structure and content overview

CHAPTER	CONTENT
Executive summary and policy recommendations	> A separate executive summary.
Chapter 1 – Introduction	> An introduction to the scope and background for the working group.
Chapter 2 - Results of the EEFIG Working Group	> A description of the work of the Working Group, with milestones and presentation of the meetings.
Chapter 3 – Assessment of barriers hindering the demand for energy efficiency investments	> An updated assessment of the barriers hindering the demand for energy efficiency investments from the consumers and final users' side, including a categorisation of type of barriers and challenges per type of consumers and final energy users.
Chapter 4 – Best practices for stimulating consumers and final energy users' demand for energy efficiency investments	> A collection of existing and innovative tools, policy instruments and best practices for stimulating consumers and final energy users' demand for energy efficiency investments, including an assessment of replication potential per type of consumers and final energy users across EU member states and regions.
Chapter 5 - Conclusions and recommendations	> The conclusions and the recommendations of the Working Group.
Appendix A, PowerPoint presentation	> A PowerPoint presentation of the main results, conclusions, and recommendations.
Appendix B, Composition of the Working Group	> The composition of the Working Group.
Appendix C, Working Group meetings package	> Agendas, presentations and minutes of meetings from all Working Group meetings.
Appendix D, Data on which the analysis is based	> A detailed overview of best practices and research about stimulating demand for energy efficiency investments.

2 The work of the EEFIG Working Group

2.1 Composition of the Working Group

The initial composition of the Working Group was based on call for Expressions of Interest to EEFIG members to join the Working Group in September 2021 and parallel direct contacts to identified institutions and key experts who could contribute to the Working Group (taking into account the need to involve real estate professions, SMEs and homeowners' associations not previously engaged in EEFIG). The call and the parallel direct contact to preidentified institutions succeeded in establishing a WG with good and balanced initial presentation across:

- > Financial Institutions including public and private banks, commercial and impact investors
- > EU funded projects within demand activation and EE financing
- > Public energy agencies
- > Housing associations
- > Technology providers and industry associations
- > Research institution and consultancy
- > European Commission (DG ENER, CINEA, JRC)

The Working Group has subsequently been increased with new members participating in specific WG meetings, including as speakers and panellists.

The updated list of WG members (38 institutions excluding the supporting consultants) is included in Appendix B and minutes of the WG meetings are included in Appendix C.

2.2 The Working Group meetings

The scope of the WG topic – stimulating consumers' demand for energy efficiency investments - is complex covering the range from decision processes in households and enterprises; differences in the barriers faced by homeowners, tenants, and property investors; targeted approaches to information and awareness raising; value propositions for deep renovation of residential buildings; and demand activation for EE investments in SMEs.

Against this background the WG process was structured around a series of thematic meetings with context specific inspirational presentations and discussion of the specific issues.

The timeline, WG meetings and reporting milestones for this EEFIG WG are shown in the table below.

Table 2 Working Group timeline and key milestones

ACTIVITY	TIMING	THEMATIC FOCUS
Inception Report	August 2021	Framing the scope of the Working Group
1. WG Meeting	6 December 2021	Kick-off with 360-degree presentations around the demand activation issue by Energy agencies, Housing sector, FIs and NGOs
2. WG Meeting	1 March 2022	Thematic meeting on decision processes in households and enterprises
First Interim Report	January 2022	Presenting the Working Group and the outcome of the first WG meetings
3. WG Meeting	22 June 2022	Thematic meeting on Information and awareness raising
Second Interim Report	August 2022	Reporting on intermediary results and detailing next steps
4. WG Meeting	17 November 2022	Thematic meeting on Value propositions for deep renovation of residential buildings
5. WG Meeting	24 January 2023	Thematic meeting on Demand activation for EE investments in enterprises
6. WG Meeting	28 March 2023	Review of conclusions and recommendations of the Working Group
Draft Final Report	20 April 2023	Draft reporting on the results of the Working Group, its conclusions, and recommendations
Final Report	June 2023	Final reporting on the results of the Working Group, its conclusions, and recommendations

2.3 The 1st WG meeting – 360-degree around the demand activation issue

The first meeting of the new WG was held on 8 December 2021. The meeting was well attended with 33 participants.

The meeting was opened by DG ENER followed by a tour-de-table of WG members highlighting key reasons why they joined and what they expect from the WG.

DG ENER framed the EC expectations from the WG in the context of the objectives of the Renovation Wave, the Fit for 55 package and the to-be-revised EPBD, and the EC noted that their expectations from the WG is to provide:

- A clear categorisation of different market segments and types of consumers
- An identification of the barriers for scaling up energy efficiency investment demand in the individual categories, and
- Specific recommendations for the EC in this respect.

The role and working process of the WG was outlined by the consultant. This was then followed by two panel discussions:

Panel 1 – Energy Agencies and Financial Institutions on what is happening to accelerate consumer demand for energy efficiency:

- Josephine Maguire, SEAI, outlined activities by energy agencies to accelerate consumer demand for EE and what more can be done
- Isidoro Tapia, EIB, discussed how the financial community can play a bigger role
- Christophe Milin, CINEA, presented the impact of projects for demand activation funded by EC through H2020.

Panel 2 – Non-governmental views on barriers and opportunities to accelerated renovation:

- Cristina Preda, Management of a home association in Romania, discussed on promoting consumer demand for EE
- Sorcha Edwards, Housing Europe, outlined what they can do to link increased renovations to the climate strategies
- Dario Di Santo, FIRE Italia, reflected on how SMEs can play a role in increasing consumer demand.

Finally, a discussion followed on how this WG can add value to ongoing efforts, where EEFIG can best contribute and how this should frame the thematic focus for subsequent WG meetings.

The first WG meeting discussed and agreed potential themes for subsequent WG meetings:

- Decision processes in households and enterprises
- Information and awareness raising
- Renovation value propositions for residential buildings
- Demand activation for EE investments in enterprises.

These will contribute to deepening the insight of the WG in key aspects of the matter and feed into emerging conclusions in the second interim report and detailed conclusions and recommendations in the final report.

Based on this it was agreed that the theme of the second WG meeting will be decision processes for EE investments in households and enterprises.

2.4 The 2nd WG meeting – Decision processes in households and enterprises

The second meeting of the WG was held on 1 March 2022. The meeting was attended by 24 participants, excluding consultants.

The meeting had a thematic focus on decision processes for EE investments in households and enterprises and included an inspirational presentation of recent research on mobilising citizens to invest in energy efficiency, panel discussions on accelerating investment decisions in households and on decision making in enterprises, as well as open discussion among WG members of the behavioural aspects of EE investment decisions and implications for policy design.

The meeting was introduced by Hadrien Michel of DG ENER who noted that the need to reduce reliance on single suppliers of gas puts energy efficiency even more in the centre of EU energy policies.

In her inspirational presentation, Nives Della Valle, EC JRC, presented a recent JRC study⁵ that aims to further stimulate the policy integration of the human factor by providing policy actors, who are interested in encouraging citizens' decisions to invest in EE, with key conceptual and practical insights from four examples of energy-related social sciences. In particular, she underlined that although energy efficiency is a socioeconomic optimal and a rational decision from the individual point of view, decisions are complex. Such decisions cannot be fully understood from neoclassical economics but must take into account the insights of behavioural economics and psychology. Removing barriers to energy efficiency investment decisions therefore requires, inter alia, targeting of interventions based on motivation, nudging strategies (providing options to self-present when products increase social status), etc.

After this a panel discussion on accelerating investment decisions in households followed. Rui Fragoso, ADENE Portugal, presented a recent study on the Role of Energy Agencies in implementation of public policies

⁵ [JRC Publications Repository - Mobilizing citizens to invest in energy efficiency \(europa.eu\)](https://publications.jrc.ec.europa.eu/publication/?id=JRC115750)

for buildings renovation.⁶ Hanna Westling, Anthesis Group presented the experience from accelerating the energy-efficiency renovation of single-family houses in Sweden.⁷ Finally, Thomas Osdoba, Programme Director, NetZeroCities (H2020 project), reflected on the important role of cities to accelerate investments.

This was followed by a panel discussion on decision making in enterprises. Catherine Cooremans, HEC Faculty of Business and Economics, Department of Strategy, Globalization and Society (SGS), Université de Lausanne, presented the most recent research insights and noted that the strategic character of an investment is key to the investment decision in enterprises, but the same investment may be more or less strategic to different managers and across different enterprises, and the solution is therefore to make energy efficiency strategic and thus more attractive. Ivana Rogulj, Institute for European Energy and Climate Policy, outlined the DEESME Horizon 2020 research experience on EE investment decisions in SMEs, with the key barriers including lack of awareness, low capital availability, limited access to additional finance, lack of internal technical resources and doubts around actual savings potentials. Hannes McNulty, McNulty Consulting, provided reflections on decision making in SMEs based on the new Covenant of Companies for Climate and Energy (CCCE). Finally, Patrik Thollander, Linköping University, noted that increased focus on scope 3 emissions in large companies is becoming a key driver for decarbonisation and energy efficiency in their supply chains.

The WG members then discussed decision processes for EE investments in households and enterprises. This discussion was lively and wide-reaching, proving that the objective of establishing a platform for dialogue is both necessary and welcome.

2.5 The 3rd WG meeting – Information and awareness raising

The third meeting of the WG was held on 22 June 2022. The meeting was attended by 23 participants, excluding consultants.

The meeting had a thematic focus on information and awareness raising and included an inspirational presentation on digital demand activation tools, panel discussions on Successful One-Stop Shops (OSS) and on awareness raising activities by FIs, market actors and communities, as well as open discussion among WG members of what works and how it can be scaled and replicated.

⁶ [Comparative study on the of EnR Network agencies in the implementation of public policies for building renovation – European Energy Network \(enr-network.org\)](#)

⁷

https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2021/8-buildings-technologies-and-systems-beyond-energy-efficiency/accelerating-the-energy-efficiency-renovation-of-single-family-houses/

Hadrien Michel of DG ENER welcomed the participants and noted that developments since the launch of the WG in December 2021 has made energy efficiency investments even more important. The REPowerEU plan and the EU Save Energy communication underline this and include a more ambitious EE target along with a strengthening of the current ETS, a proposed new ETS for buildings and road transport and the related Social Climate Fund. The EU Save Energy communication paves the way for future actions including continuing the work of EEFIG on innovative financing schemes for energy efficiency and launching a new coalition on energy efficiency financing.

In his inspirational presentation, Michael Reuss, VMAS, provided a demonstration of the Danish Energy Agency's digital demand activation tools, which showcases what can be done in terms of personalized information and targeted campaigns when integrating with a public Energy Performance Certificate (EPC) database.

This was followed by the first panel on information & awareness raising activities by financial institutions and market actors. Luca Bertalot, European Mortgage Federation - European Covered Bond Council, presented the Energy Efficient Mortgage Ecosystem for households in Italy and Europe. Florian Bonert, CoBenefit, presented a digital platform coordinating key actors involved in climate action schemes at resident level. Uwe Bigalke, German Energy Agency (DENA), presented Energiesprung: Building new markets and industries for NetZero retrofitting as an attractive product to "industrialise" renovations.

After this a panel discussion on successful OSS followed. Louise Sunderland, Regulatory Assistance Project, outlined the role of OSS in stimulating customers' demand for energy efficiency investment. Seamus Hoyne, Technological University of the Shannon, Midlands Midwest discussed scaling up residential energy retrofits in Ireland and the evolution of the Electric Ireland Superhomes OSS. Davide Cannarozzi, GNE Finance, discussed the complexity of public-private partnerships and solutions to stimulate consumer demand based on OSS best practices from Spain. Finally, Giovanni Vicentini, Municipality of Padova, presented the H2020 project PadovaFIT EXPANDED and discussed OSSs to make homes more energy efficient including the ongoing replication from Italy to Bulgaria and Romania.

The WG members then discussed a broad range of challenges and opportunities related to information and awareness raising as tools to stimulating consumers' demand for energy efficiency investments.

2.6 The 4th WG meeting – Renovation value propositions for residential buildings

The fourth meeting of the WG was held on 17 November 2022. The meeting was attended by 17 participants, excluding consultants.

The meeting had a thematic focus on value propositions for deep renovation of residential buildings. It started with an inspirational presentation on demand activation for energy poor households in the private rented sector, followed by two panels on 'Stimulating demand for tenants and vulnerable groups' and 'Accelerating demand from owner-occupiers', respectively. Finally, there was time for an open discussion on what tools and policy instruments are likely to be most effective in increasing consumers' and final users' demand for energy efficiency investments in residential property, taking into account a stratification of consumers and final energy users in Homeowners, Tenants, and Property investors.

In his inspirational presentation, Vlasios Oikonomou, IEECP, presented the H2020 funded ENPOR project on alleviating the impact of increasing energy costs and slow progress on improved energy efficiency in the private rented sector.

He noted that the private rented sector generally has the poorest energy performance relative to the rest of the housing stock. Split incentive is a key problem, but it is often not taken into account in design of public support programmes leading to very few low-income households actually receiving the subsidies. More customized support packages are required, but several countries have no definition of Energy Poverty and engagement are often with the landlords and not the tenants. Energy efficiency solutions and policies in the private rented sector need to cover technical, political, social and financial issues, and they need to engage with both parties as access to funding and information remains an issue for both tenants and landlords.

This was followed by the first panel on Stimulating Demand for Tenants and Vulnerable Groups. Presentations were provided by Sibylle Braungardt, Öko-Institut, on splitting of costs between landlords and tenants; Sorcha Edwards, Housing Europe, on value propositions for renovation of social housing; and Andriana Stavrakaki, ICCS, presenting the project SocialWatt on the role of utilities in addressing energy poverty.

The second panel discussed accelerating demand from owner-occupiers. Presentations were provided by Cristina Preda, homeowner association in Romania, on best practice for accelerating demand from owner-occupiers in Romania; Afroditi Psatha, EuroACE, on insight from Europe wide campaigning for energy renovation of buildings; and Sébastien Descours, Énergies Demain, on the experience with SERAFIN (Service territoriaux de Rénovation: Accompagnement et FINancement).

The Working Group members then discussed key issues raised during the panels on demand activation for deep renovation of residential properties and the needs to differentiate interventions between homeowners (dwellers owning their property), tenants (dwellers not owning their property), and property investors (non-dweller property owners). Furthermore, the specific challenges of vulnerable and energy poor households (as homeowners and tenants) and of the private rented sector (both tenants and landlords) were highlighted.

2.7 The 5th WG meeting – Demand activation for EE investments in enterprises

The fifth meeting of the WG was held on 24 January 2023. The meeting was attended by 22 participants, excluding consultants.

The meeting had a thematic focus on demand activation for EE investments in SMEs, mainly relating to their buildings.

The WG meeting started with an inspirational presentation on scaling up climate action in SMEs, based on the Danish project Climate Ready SME which worked with Science-Based Targets and scope 3 emission accounting in the Danish manufacturing supply chain.

This was followed by two panel discussions on how to motivate industry to invest in EE. The first panel focussed on EE in SMEs in retail, service, etc. and included presentations by Armin Mayer, EP, on the standardised ESCO-in-a-box solution, Zsolt Toth, BPIE, on decarbonizing retail property; and Hrvoje Hucika, HEP ESCO Croatia, on working with SMEs and businesses to activate energy efficiency investments.

The second panel on EE in Industrial SMEs included presentations by Guido Lena, SMEunited & CCCE; Stefan Buettner, UN ECE Task Force on Industrial EE; and Shane McCullough, Strategic Banking Corporation of Ireland (SBCI).

Thereafter an open discussion among the WG members underlined the importance of taking successful examples from individual countries and replicate them in other countries in cooperation with local teams.

Finally, the results of the December 2022 WG survey on barriers hindering demand for energy efficiency investment from the side of consumers and final user was presented.

2.8 The 6th WG meeting – Conclusions and recommendations

The 6th (and final) WG meeting was held on 28 March 2023 to discuss of the draft conclusions and recommendations of the WG.

The draft final report was circulated to all WG members prior to the meeting and several WG members representing Research Institutions, Financial Institutions and Consumer Organisations provided detailed written comments prior to the final WG meeting.

At the final WG meeting a summary of the results and conclusion included in the final report, as well as the detailed recommendation for each of the main stakeholder groups were presented by the WG lead. The WG members provided additional feedback which has been incorporated in the present version.

2.9 Other WG activities

In December 2022, the WG support group launched a survey on barriers hindering demand for energy efficiency investment from the side of consumers and final user. The survey consisted of question regarding barriers, consumer groups and existing initiatives for breaking barriers. The survey was sent to all Working Group members, and 9 detailed responses were received by the end of 2022.

The results contributed further to the understanding of priority barriers hindering demand for energy efficiency investments by type of consumer and final energy user.

For homeowners in residential property, the most important barriers are information barriers (understanding the need, solutions and benefits) and financial barriers (limited capital and/or inability to secure financing). These barriers are particularly important for vulnerable and energy poor households.

For tenants and property investors in residential rented property, information and finance barriers are again important, but incentive barriers (the split incentive problem) become a very important additional challenge. Again, these barriers are particularly important for vulnerable and energy poor households.

For non-residential property (commercial buildings), preference barriers (not perceiving energy efficiency as the most pressing investment need) tend to be more important than information and finance.

The survey questionnaire is attached in Appendix F. Please refer to chapter 3 for further discussion of the individual barriers.

3 Assessment of barriers hindering the demand for energy efficiency investments

It is important to understand what is holding back demand for energy efficiency investments at the level of consumers and final energy users.

The present section provides an overview of the key barriers hindering the demand for energy efficiency investments from the consumer's and final user's side. The overview is based on discussions during the five WG meetings as well as how the barriers have been addressed in existing literature, including conclusions on how to alleviate these barriers. Barriers have been analysed since the oil crises of the 1970s but, as consumers change, as economic conditions change, so do the barriers. Only through a full understanding of barriers can appropriate policy packages be developed.

Finally, a categorisation of the types of barriers and challenges per type of consumers and final energy users is established as basis for a discussion of the need for targeted interventions for specific groups of consumers and final energy users.

While the increase in energy prices during 2022 has reduced the payback time for energy renovations it has also significantly increased the cost of financing the investments. At the same time savings are the quickest and cheapest way to address the current energy crisis and reducing energy consumption of households and companies is now not only important for the decarbonisation of the EU economy but also vital to the resilience of the EU economy and its competitiveness.

3.1 The key barriers to uptake of energy efficiency investments

To increase the uptake of energy efficiency measures, particularly with respect to the deep renovation of buildings, we first need to understand the problem – the reason why asset owners have not taken practical, straightforward action. For years analysts have been puzzled why owners

have not taken advantage of cost-effective measures. With increased climate ambitions, the problem gets even more complicated because deep renovations that are cost-effective from a societal perspective may not always be so from a narrow energy cost-savings perspective. Many will argue that there have been endless analyses of barriers and that they do not need to be re-visited. But, in light of the need for deep renovations, we now need to consider not just barriers to energy efficiency, but barriers to deep, whole-building transformation projects.

Barriers to demand for energy efficiency investments from consumers and final users occur at different decision steps and include:

- > Information barriers (understanding the need, solutions and benefits):
 - Lack of knowledge, support and advice
 - Uncertainty of the benefits
 - Perceived financial and technological risks
- > Incentive barriers (getting incentives aligned in rental property):
 - Split incentives hinder willingness to invest in energy efficiency
- > Trust barriers (trusting market participants):
 - Low trust in the supply chain
- > Coordination barriers (multi-family, multi-business):
 - Agreeing joint action
 - Coordination of works
 - Overcoming legal and bureaucratic barriers in obtaining relevant permits for deep renovations
- > Finance barriers:
 - Limited (or no) access to capital and/or inability to secure financing for the investments
- > Preference barriers (prioritizing the investment over other needs):
 - Present bias
 - Businesses and individual consumers preferences and behaviour
 - Lack of salience (prominence in the mind of the decision maker)

The individual barriers are explained and discussed below.

3.1.1 Lack of knowledge, support and advice

Access to knowledge of energy efficiency interventions is a significant barrier of implementation. In general, some asset owners lack awareness of the importance of energy savings and/or the available technical solutions which prevent initiatives to take place. Furthermore, households may lack sufficient knowledge on the performance on their own building. Particularly, deep renovations require qualified knowledge to identify, scope, select, manage, and secure timely delivery of projects. In addition, insufficient support and advice also stands as a barrier to implementation of energy efficient projects, whereas information on ways that end-users can finance or secure funding for energy efficiency interventions is scarce.

Existing research on information, empowerment, and training measures in Member States' National Energy Efficiency Action Plans (NEEAP) finds that comprehensive plans and programmes for dissemination or relevant knowledge often exist. However, among final users there is often still a lack of knowledge with respect to the economic potential of implementing EE measures and how to exploit these measures in practice. A key analysis by JRC (2016)⁸ concludes that information measures, and how information is distributed, are crucial for the demand of EE measures among final consumers.⁸

The barrier regarding inefficient distribution of information has been a returning subject on WG meetings. Overall, WG members argue that energy retrofits are microeconomic decisions made by individual households or business and requires provision of relevant information during the decision process. Hence, there is a need to raise general awareness of the importance of energy savings and the issue of energy poverty. However, as the information is known to exist and available to consumers, group members raise the concern of consumers being overwhelmed with information and different, often conflicting, offers. Therefore, there is an increasing need for households to receive tailored information, that will enable them to change their behaviour, take informed decisions, as well as plan, finance and actually implement energy efficiency interventions. Thus, the tailored information should ideally be supported by a trusted personal dialogue with the homeowner. This concern highlights that not only is information important, but also the choice of communication channel has an influence on the end consumer receiving the information. This points towards the value of One-Stop-Shops, information campaigns and engagement strategies targeted to specific consumer segments, and digital solutions where personalised information is generated based on information such as the EPC of the home of the recipient. For One-Stop-Shops (OSS) this is exemplified by the results achieved by the OSS in Ireland (Superhomes, Tipperary and Electric Ireland Superhomes) and Italy (PadovaFIT EXPANDED). For targeted information campaigns and digital solutions this is exemplified by the Danish Energy Agency's digital demand activation tools, which showcases what can be done in terms of

⁸ [JRC \(2016\) Effective information measures to promote energy use reduction in EU MS](#)

personalized information and targeted campaigns when integrating a public EPC database with a virtual One-Stop-Shop (SaveEnergy) and a tool for municipalities to generate targeted campaigns and invitations to citizens meetings.

3.1.2 Uncertainty or lack of awareness (or foresight) of the benefits

Final energy users that do not have experience with energy renovation of buildings perceive that the gains of energy efficiency initiatives, like future costs savings or technology performance, have uncertain benefits at some point in the distant future. For instance, homeowners often lack the ability foresee the impact on a measure on future property valuations.

Existing research argues that even though energy efficiency has proven to be cost-effective, some consumers don't always recognise it. An article researching the value of energy labels, finds that in 14 out of 15 cases better energy labelling improves property values.⁹

The WG has also discussed how the role of quality labels can contribute to increased awareness of EE performance. A recent study from the European Energy Network¹⁰ points to quality labels as a part of the solution, arguing that (recognised and standardised) quality labels for buildings and materials can address the lack of awareness and information of the benefits among consumers. Additionally, the WG commended the initiatives of imposing minimum energy standards for rental properties in EU countries and the UK. Particularly, the implementation of minimum EPC label for rentals (France) and rent freezes/indexation stop for low energy performance buildings (Brussels) were highlighted. Furthermore, the proposed revision of the Energy Performance of Buildings Directive includes requirements that residential buildings would have to achieve, at a minimum, energy performance class E by 2030, and D by 2033 - on a scale going from A to G, the latter corresponding to the 15% worst-performing buildings in the national stock of a member state. Non-residential and public buildings would have to achieve the same ratings by 2027 and 2030 respectively. Member states will establish the measures needed to achieve these targets in their national renovation plans.

⁹ [What will you pay for an "A"? – a review of the impact of building energy efficiency labelling on building value](#)

¹⁰ [Comparative study on the of EnR Network agencies in the implementation of public policies for building renovation – European Energy Network \(enr-network.org\)](#)

3.1.3 Perceived financial and technological risks of investment

Final energy users may be concerned about the financial and technological risk of the energy efficiency investment due to insufficient or conflicting information.

While the cost of the upfront investment will become known prior to an investment decision, the savings will depend on fluctuations in fuel and energy prices as well as interest rates. In addition, this may also relate to perceived technology performance risk, where expected actual energy savings might differ from expected savings. Although key technologies including residential heat pumps are maturing and implementation experience is accumulating with both installers and consumers, consumers may still be reluctant to be first movers in their local neighbourhood.

3.1.4 Split incentives hinder willingness to invest in energy efficiency

Consumers renting a property are less likely to invest in renovation or efficient appliances, whilst owners of rental properties are also less likely to invest if the rent does not encompass the cost of utility bills. On the other hand, tenants are less likely to try and optimise energy use, if their rent encompasses utility bills.

Split incentives may also be present within a company, for example a manager may have limited or even no incentives to initiate an energy efficiency investment with a payback period longer than the time-period that they remain in their position. Similarly, a contracted provider of services such as facilities or maintenance is unlikely to initiate long-term energy efficiency actions if they are on a short-term contract.

The WG sees the split incentive as a key problem. They point out that design of public support frequently fails to account for the split incentive issue, where access to information and support for both tenants and landlords remains an issue. Furthermore, the WG points to the fact that current policies insufficiently target low-income tenants, and do not sufficiently recognize the challenges of energy renovation in the private rented sector. According to the WG, in many Member States the ownership of rental property tend to be consolidated on a few larger investors. Convincing these investors to implement EE measures could make a great impact.

The complex problem of split incentives is also the subject of existing research. It is well illustrated in a comparative study of Sweden and Germany¹¹. In Sweden all-inclusive rents have historically been common practice, with energy costs paid by landlords and no individual metering of tenants. Here, tenants do not face demand side incentives for energy

¹¹ [Splitting energy costs between landlords and tenants: What can Sweden and Germany learn from each other? \(ecee.org\)](http://ecee.org)

efficient behaviour, and while landlords have an incentive for cost efficient heating supply, they risk the benefits being capitalised by excessive use. This is different in Germany, where heating costs are borne fully by tenants, and costs of thermal retrofit can only be passed on to tenants by increasing the rent within a maximum limit of 8%. Here, tenants have demand side incentives for energy efficiency, but landlords have limited incentives for larger thermal retrofits as investment costs may be too high to pass on. This emphasises the complexity of the split incentive problem, and the main question of how to efficiently balance the costs and incentives for landlords and tenants to increase investments in building retrofit.

A solution targeted to the social housing sector in Netherlands include an agreement between the tenants' union and social housing providers on rent increases conditional on energy bill reduction ensuring that the total cost did not go up.¹²

A targeted solution for commercial rental property in the US is the Metered Energy Efficiency Transaction Structure (MEETS) which has been developed over the last decade with a number of pilot projects¹³. It protects utility revenues, eliminates utility risk, and provides strong financial returns for investors in deep (35% savings or greater) energy efficiency. With MEETS, the utility sells energy services (heating, cooling) rather than kilowatt hours (kWhs) to the building's tenants. The utility initially receives the same gross revenue that it would have received had the building been built and operated to code (i.e., the tenants pay for the combined used energy plus the saved energy). Then the utility pays an amount based on metered energy saved back to the investors, valued at a negotiated rate at the time and adjusted over time for inflation, minus a portion to cover administrative expenses.¹⁴

3.1.5 Low trust in the supply chain

In some countries there is low trust in the supply chain for building renovation projects in general and energy efficiency renovations in particular. Three main issues can be identified: (i) a long legacy of grant schemes has resulted in a 'race to the bottom' in terms of the quality of implementation of energy efficiency measures, eroding customer trust; (ii) customers do not have faith that established supply chains - such as those servicing and replacing gas-fired heating - are able to specify and install energy efficiency measures, particularly 'whole-house' solutions (reflecting a lack of EE managers able to coordinate integrated solutions as well as a lack of suppliers that are willing to take a risk on integrated solutions); (iii) high project management resource required to scope, select and then manage operatives to deliver.

¹² Source: HousingEurope

¹³ <https://www.meetscoalition.org/>

¹⁴ [Microsoft Word - 3-433-Meek ACEEE16 MEETS rev..docx](#)

Against this, WG members have emphasised that the Covid-19 pandemic and the subsequent energy crisis have caused a significant shift in the market for energy efficiency renovations. Before, the key challenge was activating demand, whereas now we see an increase in the need in parallel to activate market players on the supply side. Overall, market players need to ensure quality, mobilising big market leaders to drive the market scaling and reliability. They also need to ensure that the renovations achieve significant energy performance improvements to meet Europe's long-term energy and climate objectives. Furthermore, it was underlined that a limiting factor of the market is the lack of skilled labour, and that developing capacity for energy renovation in the supply chain is time consuming.

3.1.6 Agreeing on joint intervention

In multi-family, multi-business and mixed building units – whether owner occupied, rental or mixed - any significant energy renovation will require agreement on joint intervention on the content and level of ambition of the project. This is often a multiyear negotiation process.

3.1.7 Limited (or no) access to capital and/or inability to secure financing for the investments

Consumers and energy end-users may have limited (or no) access to capital for the investments, from own funds and savings and they may be unable to secure financing, such as a loan for energy efficiency investments due to a poor credit history or instability in employment and irregular income.

High investments costs and/or high interest rates also prevent consumers from implementing interventions. This is, in particular, a problem for deep retrofit projects as they typically have a very long payback period. This problem is exacerbated by stop-start grant funding and facilitation schemes.

Research finds that investments in EE measures are positive related to income, where the effects are larger for lower income level. Furthermore, design of grant scheme are often not targeted to the poorest households (e.g. disbursement after completion). Thus, an increase in income leads to a big increase in the probability to invest in up-front costs whereas low-income household are credit constrained. This indicates that measures to overcome credit constraints could result in increased demand of implementation of EE measures.¹⁵ The barriers of low-income groups have also been discussed during WG meetings, as it was pointed out that the conditions on the housing market do not currently allow for low-income owners to implement renovations affordably at the necessary scale. For the energy poor / lowest income households, experience in some countries show that even with significant investment discounts and the remaining

¹⁵[Determinants of households investment in energy efficiency and renewables.pdf \(greengrowthknowledge.org\)](https://www.greengrowthknowledge.org/f(Determinants_of_households_investment_in_energy_efficiency_and_renewables.pdf))

investment to be paid off through on-bill financing uptake may be very low¹⁶.

Further research argues that the understanding of both informative (deliberative) and social norms (heuristic) thinking is important when considering the mechanisms behind investment decisions among homeowners. The study finds that informative arguments prevail over social norms in the decision process. However, some dwellers do not install EE measures despite having knowledge of for example monetary savings. Hence, the research concludes, that investment costs stand as a significant barrier of implementation of EE measures. Concluding, that providing information on financing schemes might increase the demand of EE investments.¹⁷

The role of the financial community has been discussed among the demand activation WG members. It was underlined by the WG members, that final users need clear, simple and easy finance products. Adding, that there is a need for easy access to information regarding the availability of financial incentives and procedures for accessing them.

3.1.8 Present bias

Present bias describes the situation where consumers tend to react more to an actual decrease in equipment prices compared to an equivalent expected future increase of energy prices.

The two factors (energy price and equipment price) should theoretically play the same role in the financial viability of works. However, a decrease in the price of devices would be immediately tangible, whereas the future energy price is uncertain and longer term. This also explains why public support schemes that bring down the cost of equipment investments tend to be very popular.

3.1.9 Businesses and individual consumers preferences and behaviour

Decision making differs across consumers due to different behavioural and preference profiles. For example, some consumers might devalue future rewards compared to others or exhibit greater aversion to loss (related to costs of intervention).

An example from the WG is that offering an attractive investments case, to a decision maker that is not finance constrained, may sometimes be insufficient to trigger demand. At the same time other (non-financial)

¹⁶ SocialWatt CEZ Vanzare

¹⁷ [Are dwellers deliberative or heuristic in their decisions to invest in energy efficient renovation measures? \(ecee.org\)](https://www.eceee.org/en/are-dwellers-deliberative-or-heuristic-in-their-decisions-to-invest-in-energy-efficient-renovation-measures/)

arguments, such as resulting environmental gains, or improved consumer comfort could sometimes trigger demand for the same decision maker.

This is also supported by existing research, which maps out segments of energy consumers based on attitude, values, and demographic characteristics. The research concludes that it is important to target the communication message for demand activation on EE investments, with segment tailored arguments matching the preference of among different consumers.¹⁸

3.1.10 Lack of salience

Salience describes our tendency to focus on items or information that are more noteworthy while ignoring those that do not grab our attention.

Energy efficiency unfortunately has (at least until the recent increases in energy prices during 2022) lacked salience as from a consumer's point of view, energy efficiency benefits of any home upgrade or product purchase made a very limited contribution to its desirability. Against this its ability to improve comfort, lifestyle, perceptions, or value signalling was far more important.

Households that are experiencing fuel poverty were an exception to this, but by definition the ability of these households to invest in energy-saving measures is very limited.

3.2 The importance of different barriers to individual groups of consumers and final energy users

3.2.1 Typology of consumers and final energy users

The EEFIG Working Group has thoroughly reviewed the barriers presented above at the various WG meetings to assess whether the current definition of barriers should be modified to link them with the need to significantly accelerate consumer demand.

The importance of the different types of barriers and challenges vary significantly between different types of consumers and final energy users. When formulating both general and specific differentiated recommendations on what tools and policy instruments are likely to be most effective in increasing consumers and final users demand for energy efficiency investments, we will therefore use the following stratification of consumers and final energy users which has been developed with input from the WG.

¹⁸ [Intelligent energy feedback: Tailoring advice based on consumer values \(ecee.org\)](https://ecee.org)

List: Typology of consumer or final energy user

- > Residential property
 - Homeowners (dwellers owning their property)
 - > Single house
 - > Multi-family
 - > Vulnerable and energy poor households
 - Tenants (dwellers not owning their property)
 - > Single house
 - > Multi-family
 - > Vulnerable and energy poor households
 - Property investors (non-dweller property owners)
 - > Private rented sector (individual landlords)
 - > Social housing (housing association or local authority)
- > Commercial buildings (owners and managers)
- > Public buildings (owners and managers)
- > Industry
 - SMEs owners and administrators
 - Energy Intensive Industry (owners and administrators)
 - Other large industry (owners and administrators)

This typology proved useful in understanding the differences in barriers faced by different groups of consumers and energy users, and hence the differences needed in designing interventions to overcome the barriers.

3.2.2 Key barriers by type of consumer and final energy users

To increase the uptake of energy efficiency measures, particularly with respect to the deep renovation of buildings, it is critical to understand the underlying problem, the reason why asset owners have not taken practical, straightforward and often economic rational action.

The Working Group has across the different thematic meetings reviewed experience and research in the area and grouped barriers to demand for energy efficiency investments from consumers and final users in six relatively distinct groups of barriers as they tend to occur along the decision process from idea to final decision to invest:

- > Information barriers (understanding the energy efficiency opportunities, the economic and broader benefits and risks, and the process for support and implementation)
- > Incentive barriers (getting split incentives aligned in rental property)
- > Trust barriers (trusting market participants in the supply chain)
- > Coordination barriers (agreeing joint action in multi-family and multi-business buildings, coordination of works, obtaining relevant permits)
- > Finance barriers (limited or no access to financing for the investments, or support arrangements that inadequately target less affluent households)
- > Preference barriers (prioritizing other needs over energy efficiency investments).

Based on the review of literature and input from the WG meetings and the December 2022 WG survey we have below prioritised the important and critically important barriers by type of consumers and final energy users.

Figure 1: Importance of barriers by type of consumer and final energy users- Residential property

		Decision step					
		Understanding the need, the solutions and the benefits	Getting incentives aligned	Trusting suppliers	Agreeing joint action	Financing the investment	Prioritizing the investment
Residential property		Barriers					
		Information	Incentives	Trust	Coordination	Finance	Preferences
Homeowners (dwellers owning their property)	Single house	✓ Important		✓ Important		✓ Important	✓ Important
	Multi-family	✓ Important		✓ Important	✓ Very important	✓ Important	✓ Important
	Vulnerable and energy poor households	✓ Very important		✓ Important		✓ Very important	✓ Important
Tenants (dwellers not owning their property)	Single house	✓ Important	✓ Very important	✓ Important		✓ Important	✓ Important
	Multi-family	✓ Important	✓ Very important	✓ Important	✓ Very important	✓ Important	✓ Important
	Vulnerable and energy poor Households	✓ Very important	✓ Very important	✓ Important		✓ Very important	✓ Important
Property investors (non-dweller property owners)	Private rented sector (individual landlords)	✓ Very important	✓ Very important	✓ Important		✓ Very important	✓ Important
	Social housing (housing association or local authority)						

Figure 2: Importance of barriers by type of consumer and final energy users- Non-residential property

		Decision step					
		Understanding the need, the solutions and the benefits	Getting incentives aligned	Trusting suppliers	Agreeing joint action	Financing the investment	Prioritizing the investment
Non-residential property		Barriers					
		Information	Incentives	Trust	Coordination	Finance	Preferences
Commercial buildings (owners and managers)							✓ Important
Public buildings (owners and managers)							✓ Important
Industry (owners and administrators)	SMEs (retail and service - owned individual building)	✓ Very important		✓ Important		✓ Very important	✓ Important
	SMEs (retail and service - rented / joint building)	✓ Very important	✓ Very important	✓ Important	✓ Very important	✓ Very important	✓ Important
	SMEs (industrial)	✓ Very important		✓ Important		✓ Very important	✓ Important

It is noted that two types of barriers are very important but specific to individual types of consumers and final energy users. This concerns first the split incentive problem which is specific for tenants and landlords in rented properties and remain a significant barrier here. Secondly, it concerns the coordination challenges of agreeing on joint interventions in multi-family, multi-business and mixed building units – whether owner occupied, rental or mixed.

It is furthermore noted that some barriers are important to most types of consumers and final energy users in residential properties, but very important to vulnerable and energy poor households (whether owners or renters) as well as to individual landlords in the Private Rental Sector (independent of the income level of the renters). This concerns both access to information and access to finance.

In addition, it is noted that lack of trust in suppliers is a general barrier in the residential sector where many decision makers have limited hands on experience with energy renovation. Finally, energy renovation always competes with other needs for attention and allocation of limited funds – needs that often provide more instant gratification and therefore may seem more attractive (e.g., renovation of kitchen and bath, exotic holidays, etc.).

4 Best practices for stimulating consumers and final energy users' demand for energy efficiency investments

The present section provides a collection of existing and innovative tools, policy instruments and best practices for stimulating consumers and final energy users' demand for energy renovation, and ultimately energy efficiency investments, including an assessment of replication potential per type of consumer and final energy user across Member States and regions.

The Working Group has given most of its attention to exploring ways to significantly increase consumer demand. The previous section discussed the barriers that are faced. The important aspect now is to build on those insights to identify solutions that have been successfully tested to a greater or lesser extent and may be ripe for replication or scale-up. The WG has therefore build on the experience gained with both policy tools, instruments and best practices generally applied at the EU and national level, and recent experience with innovative tools, policies and practises applied successfully on a more limited scale at national and regional level that potentially could be scaled up or replicated across regions or countries. In this context it was recognized that significantly increasing consumer demand for energy renovation will require not only alleviating real and perceived barriers, but also creating strong incentives for consumers to prioritise time and capital for energy renovations.

4.1 Policy instruments and tools for stimulating demand for energy efficiency investments

4.1.1 Policy framework

The EU has developed a broad policy foundation for energy efficiency over recent years. This includes many legislative instruments Ecodesign, Energy Labelling Framework Regulation, the Energy Efficiency Directive and the Energy Performance of Buildings Directive, in particular.

Beyond these and other sector or technology specific policy measures, the EU has placed significant focus on energy efficiency as part of its overall legislative and political efforts on climate and energy, seeking to create an enabling environment for greater investments in energy efficiency. The European Green Deal communication, for example, has identified a series of climate, energy and environmental legislation that needs to be reviewed and if necessary revised in order to achieve such increased ambition, including the Renewable Energy Directive (RED)¹⁹ and the EPBD. During 2022, this was supplemented by the REPowerEU Plan on rapidly reducing

¹⁹ RED 2018/2001, currently under review with proposal published in July 2021.

dependence on Russian fossil fuels by fast forwarding the clean transition and the related EU 'Save Energy' plan on achieving immediate energy savings through voluntary choices and accelerating and strengthening structural, mid- to long-term energy efficiency measures.

The revised EPBD would set the vision and outline the tools for achieving a zero-emission building stock by 2050, introducing a new definition of zero-emission building and refining existing definitions such as 'nearly-zero energy building' (NZEB) and 'deep renovation'. As of 2030, all new buildings in the EU must be zero-emission buildings, while all new public buildings must be zero-emission as of 2027. Existing provisions on renovation will be complemented by the introduction of Minimum Energy Performance Standards, in order to trigger an increase in the renovation rate of the worst-performing buildings, where the potential for efficiency improvements is greatest and the risk of energy poverty is highest. The worst-performing residential buildings will need to reach at least class F by 2030 and class E by 2033.

The Renovation Wave Strategy²⁰, part of the European Green Deal, aims to improve the energy performance of buildings across Europe. The strategy seeks to at least double annual energy renovation rates of residential and non-residential buildings by 2030 and foster deep energy renovations. According to the Renovation Wave Strategy it is necessary to “mobilise forces at all levels towards these goals will result in 35 million building units renovated by 2030.” Existing barriers throughout the renovation chain – from the conception of a project to its funding and completion – will be addressed through a set of policy measures, funding tools and technical assistance instruments.

The earlier Clean Energy for All Europeans package, first proposed in November 2016 by the EC, meanwhile, proposed changes to the legislative framework and included Smart Finance for Smart Buildings (SFSB), an investment guarantee mechanism backed by the European Investment Bank (EIB) that aims to unlock €10 billion for efficiency projects. Wider EU efforts around energy market reform are also intended to increase investments – including and notably by consumers – in demand-side technologies that can be used to enhance a more modern and decentralised EU electricity system.

In addition, to achieve a prominent role for energy efficiency, the EU adopted the principle of “Energy Efficiency First” (EE1st) in 2015 (COM(2015) 80), as the leading principle for energy efficiency, which is one of the EU’s five pillars²¹. Following a strong support from the European

²⁰ COM(2020)662 – Communication on a Renovation Wave for Europe

²¹ 'Energy efficiency first' (EE1st) means taking utmost account of cost-efficient energy efficiency measures in shaping energy policy and making relevant investment decisions.

Parliament, it was embedded in the Governance Regulation 2018/1999 and in the recast of the EED from July 2021.

This policy framework is supplemented by policies and programmes at the national, regional and local levels through transposing EU policies and by initiating others. The closer these policies and programmes are to the consumer, the more impact they have on them and thus there is a need for a comprehensive, integrated approach.

4.1.2 Information

Information plays a key role in stimulating consumer demand for energy efficiency investments and consists of several separate, but often interlinked, aspects. Good sources of baseline information on the existing energy consumption and the opportunities for improvements is the starting point and include Energy Performance Certificates (EPCs) for buildings and Energy Audits for companies²² and large commercial buildings.

Key elements of successful demand activation information campaigns are creating awareness among key stakeholders, providing practical knowledge and advice that enables informed decisions, ensuring that the information is easy to access and credible, and ensuring that necessary baseline information on the asset to be renovated (EPCs) are easy to access and include relevant information. This is further discussed below.

- > **Creating awareness** is important for final consumers and also for technology and service providers to appreciate market opportunities. Awareness is important for decision makers to understand the need to set appropriate priority to energy efficiency. Senior decision-makers can provide important signals to final consumers and service providers. For example, a long-term commitment can convince technology providers to build a new plant knowing the market will grow.
- > **Providing practical knowledge and advice** is key to making investment decisions on energy renovation happen. A discussion paper from the Energy Advice Exchange states: "Significantly increasing the rate and depth of renovations will not happen, even if the big question of financing has been addressed, unless the consumer is enabled to identify and access the appropriate technologies for their situation and understand how they interact in the building as a system. Advisory services create consumer awareness that leads to increased demand for ambitious energy renovations, can overcome market barriers and distortions from a malfunctioning market, secure actual delivered

²² Energy Audits are only mandatory for the larger companies, but there is emerging evidence they can also be a useful tool for SMEs, see e.g., the EU funded project DEESME (<https://www.deesme.eu/>) that promoted energy audits for SMEs.

energy and carbon savings, and address social inclusion and fairness.”²³

- > **One-Stop-Shops** for accessible and transparent consumers and energy advisory services, on relevant energy efficiency renovations and financial instruments have proved to be an effective approach to support the mobilisation of investments in energy renovation. But most One-Stop-Shops are in a limited geographic area and models for replicating and scaling them to reach millions of consumers remain to be tested.
- > Finally, labelling of buildings through **Energy Performance Certificates (EPCs)** and gradual standardisation and improvement of EPCs is an important instrument that contributes to the focus on and enhancement of the energy performance of buildings. EPCs play a central role in the context of the Article 20 (2) EPBD, which asks Member States to provide information on the energy performance certificates and the inspection reports, on their purpose and objectives, on the cost-effective ways and, where appropriate, on the available financial instruments to improve the energy performance of the building to the owners or tenants of the buildings.²⁴

4.1.3 Intermediaries/Capacity Building

Intermediaries play an important role in building knowledge with and supporting the needs of the final consumer to decide to take action and then to help them undertake the action. One-Stop-Shops, mortgage lenders, national, regional and local energy agencies can play an important intermediary role. ESCOs can also play such a role as seen in de-risking projects to help private and public sector organisations develop, finance and implement energy efficiency measures.

At the same time, intermediaries often need capacity building themselves as we see with training for energy auditors or energy experts in helping to quantify multiple benefits. Deep renovations are more complex and capacity building is needed for a broad group of stakeholders from homeowners, renters and property managers, over financiers, to installers, designers and architects. As EEFIG has found, the financial community can benefit from capacity building through the EEFIG Underwriting Toolkit²⁵.

²³ Catrin Maby, Rod Janssen, Louise Sunderland, *Efficiency First means Consumers First: the crucial role of energy advisory services in realising the EU's energy ambitions*, Discussion Paper, Energy Advice Exchange, September 2016

²⁴ https://ec.europa.eu/energy/eu-buildings-factsheets-topics-tree/energy-performance-certificates_en

²⁵ https://eefig.ec.europa.eu/going-activities_en#eefig-underwriting-toolkit

4.1.4 Financial instruments

A good review of available financial instruments has been undertaken by the EEFIG WG on Financial Instruments (SR07)²⁶. What is important is how they are used and whether they are available to the consumers and final energy users who need them most.

For deep renovations, often one source of funding is not sufficient and there is a need for a combination of grants and loans as well as technical assistance to give the consumer the confidence to go forward. Specific energy efficiency financing vehicles such as ESCOs, Super ESCOs, local authority formed vehicles, energy service contracts and procurement frameworks that develop projects, can be created by combining technical assistance, funds and credit lines. This is further described in the EEFIG report on evolution of financing practices for energy efficiency in buildings, SME's and in industry²⁷.

Advice to building owners and other final energy users on the available financial instruments and how they can be combined will be essential to meet the financing gap that needs to be filled if we are to meet the Renovation Wave goals. In this respect both financial institutions operating in the individual national markets and consumer facing organisations including OSS (discussed further below) will be important.

4.1.5 Behavioural instruments

Another important policy tool, that is often overlooked, is behavioural instruments (e.g. nudging and boost). The integration of behavioural aspects in policy integration has also been discussed heavily during WG meetings. Recent research on how to understand and encourage decisions in EE investment pinpoint, that human behaviour is often seen as a trivial factor in policy areas.²⁸ It is argued that encouraging measures such as financial instruments have played a prominent role in the promotion of EE investment. However, they have not unlocked the full potential. The authors point to nudges and boosts as relevant policy instruments, that are efficient in stimulating EE investments.

- Nudging enables behavioural failures that prevent individuals from executing their intentions by altering the decision structure. In policy making, the tool of nudging can change the effort required to select an option. For example, small inclusions of commitment devices, reminders and goal setting techniques can assist decision makers in overcoming behavioural failures. Here among, barriers as

²⁶ https://ec.europa.eu/eefig/document/download/db9c43c4-b5f0-45f3-a394-09d996c5a067_en

²⁷ https://eefig.ec.europa.eu/evolution-financing-practices-energy-efficiency-buildings-smes-and-industry_en

²⁸ [JRC Publications Repository - Mobilizing citizens to invest in energy efficiency \(europa.eu\)](https://publications.europa.eu/en/publication-detail/-/publication/11111111-1111-1111-1111-111111111111)

present bias, which prevent individuals from investing in EE measures.

- Boosts differs from nudging, as it targets competencies rather than behaviour. It is argued that boosts enable individuals to make complex decisions autonomously, by promoting simple core competencies. Here the authors set the example of basic financial concepts. Promoting these skills among decision makers, will back decision makers to derive simple energy related calculations, easing the EE investment decision.

4.1.6 Regulatory Framework

The regulatory framework can have an important impact on increasing consumer demand. While voluntary measures can have some influence, a more mandatory approach is likely to be needed to achieve the demand levels required to meet the 'Fit for 55' objectives.

The EED mentioned above which contains several provisions that support the empowerment of citizens and consumers and how national governments have implemented the Directives at the national level. Key policy instruments in this context include the EPC for buildings, the energy efficiency obligations and the national energy efficiency funds.

The EPBD Recast mentioned above requires that Member States shall adopt measures to ensure that energy efficiency lending products for building renovations are offered widely and in a non-discriminatory manner by financial institutions and are visible and accessible to consumers.

The Ecodesign Directive provides consistent EU-wide rules for improving the environmental performance of products, such as household appliances, information and communication technologies or engineering. The directive sets out minimum mandatory requirements for the energy efficiency of these products.

The Energy Labelling Regulation incentivises consumers to purchase best-in-class energy-related products and appliances placed in buildings.

4.2 Best practices to stimulate demands for energy efficiency investments

Identification and dissemination of best practice examples are a key tool enable broader replication and scale up of initiatives to scale up financing of energy efficiency measures in all sectors that have proved to be effective in one country or sector.

Below we have structured the findings along the following lines:

- > Best practices to stimulate demands for energy efficiency investments, financed by national funds or EU funds such as H2020
- > Initiatives in Member States, financed by the recent Recovery and Resilience Facility (RRF) under the National Recovery and Resilience Plans
- > One-Stop-Shops (OSS), including those financed by the EIB's ELENA Facility
- > Third-party financing solutions, including ESCOs.

Furthermore, we provide an overview of relevant research about stimulating demand for energy efficiency investments.

Finally, we provide an assessment of replication potential per type of consumers and final energy users across EU Member States and regions.

4.2.1 Best practices to stimulate demands for energy efficiency investments (financed by national funds or EU funds such as H2020)

The following will be an excerpt of some of the practices to stimulate demands, that has been presented and discussed among the WG. Hence, the following list is not exhaustive of best practices that has been under review.

In Appendix D we have included as Table D.1 an updated set of best practices to stimulate demands for energy efficiency investments from consumers and final users. This has been expanded over the life of the WG with input from WG members and discussions at WG meetings.

ENPOR project – Energy Poverty in the Private Rented Sector

The ENPOR project is funded by the Horizon 2020 and represents the key stakeholder across the Private Rented Sector (PRS). Its main objectives are to deepen the understanding of energy poverty and associated policies for the PRS, monitor dimensions of energy poverty in the PRS and to support the set-up and implementation of energy efficiency policies to alleviate energy poverty in PRS. The project consists of different REACT groups (Regional Energy Action groups), that aims to develop ENPOR policies, discuss insights, provide monitoring data, and facilitate the adoption of the policies by households, property owners and related market players. This project stands out, as most policies do not target the PRS directly. Hence, the ENPOR project is specifically focused on the barrier of the split incentive between landlords and tenants presented in Chapter 3.1.4.

The Energy Efficient Mortgage Label (EEML), Italy and Europe

The Energy Efficient Mortgage Label (EEML) 'Ecosystem' is an open-source platform that is accessible for a wide range of market actors - home owners, investors, SMEs, and public services. The goal of the platform is to align strategies and actions using data and additional services through an OSS, with the overall aim to stimulate consumer demand in EE renovations of buildings. The platform 'Ecosystem' is the centre of the initiative and supports the user through the whole decision process. Firstly, the platform identifies possible energy renovations and present an overview of energy savings if those measures were implemented. Secondly, it outlines what finance options are available, that fits the users chosen EE measure. Lastly, it provides users a point of entry to a range of possible suppliers. This initiative minimizes the effect of several barriers, by providing the user with transparent and relevant information for the decision, financing options and efficient matches for consumers to the supply side. All barriers that have been repetitively raised as concerns during WG meetings.

Serafin, France

Serafin is a network founded by third-party financing companies and their partners. The network aims to strengthen technical assistance and lending offers for energy-efficient renovations, by offering technical and financial support to homeowners to achieve energy efficient renovations. The third-party financing companies can offer direct loans to homeowners and multi-family housing owner associations without having a banking status. Accommodating the barrier of finance, by making finance options available to all. A key objective of Serafin is also to increase the completion rate of the number of efficient renovations.

SocialWatt

SocialWatt is a Horizon 2020 project that aims to enable utilities, energy suppliers and energy service companies across Europe to develop, adopt and spread innovative schemes to alleviate energy poverty. SocialWatt emphasizes the importance of establishing partnerships with key stakeholders, such as social services, and utilities to effectively engage with energy poor households. In addition, it underlines how targeted information and funding campaigns can effectively raise demand in poor households. Most importantly, it emphasises the importance of funding and/or facilitating financing of EE interventions in energy poor households, especially since cost remains the key barrier for energy poor households.

Global Energiesprong

Global Energiesprong Alliance (formerly Energiesprong) aims to enable residents to invest in energy retrofits and renewable energies of their home

in the Baltics. By doing this, the initiative considers themselves as market developers by aggregating consumer demand locally and making retrofits a scalable solution. In order to scale energy retrofits, GEA cooperates with vendors that produces prefab elements to retrofit, making the project more time and costs effective. By working specifically with the supply chain, this project addresses the barrier of trust by securing optimal elements during the retrofit project.

DEESME

DEESME is a three-year projected funded by Horizon 2020. The aim of the project is to enable SME to manage energy transition by taking profit of multiple benefits and energy management approach. The DEESME approach is based on information and training, energy audits and implementation of energy management systems. During this process the initiative offers support to the companies by guiding them through their energy efficiency comping, sharing knowledge and best practices and policies, minimising the barrier of information. DEESME will be completed in 2023, followed by DEESME2050.

4.2.2 Initiatives in Member States, financed by the RRF under the National RRFs

We have since the First Interim Report established a separate overview of initiatives in the Member States, financed by the Recovery and Resilience Facility (RRF) under the National Recovery and Resilience Plans. This is presented in Appendix D as Table D.2.

It is noted that energy efficiency interventions are vaguely described in most RRFs, but that a handful of countries include extended descriptions of well-structured initiatives which may emerge as best practices at a later stage.

The Bulgarian National RRF includes financing of large-scale energy efficiency renovation of residential, public and commercial buildings, and targeted reforms to facilitate investments in energy efficiency. The Plan also features a reform to facilitate investments in energy efficiency renovations in residential buildings. The reform aims at tackling barriers to energy efficiency investments by facilitating the decision-making by owners of multi-apartment buildings. Moreover, the Plan includes a reform which consists in setting up a one-stop shop for renovations that is expected to reduce administrative burden linked to the renovation process by assisting citizens and businesses with information, technical assistance and advice different issues related to energy efficiency improvement projects. In addition, the Plan is expected to contribute to tackling energy poverty and protecting vulnerable consumers by introducing in the Energy Act and secondary legislation a definition of "energy poverty" and criteria for identifying households in energy poverty and vulnerable consumers and includes a reform aimed at boosting energy efficiency and renewable energy projects through the energy bills.

The Croatian National RRP includes energy efficiency and post-earthquake reconstruction of residential and public buildings. This includes setting up on-line and physical one-stop shops, to reduce the administrative burden and combine the energy and post-earthquake renovation and contribute to increasing the efficiency of public administration.

The National RRP for Cyprus includes financing for various support schemes to implement energy efficiency measures and renewable energy investments and to combat energy poverty. The RRP furthermore includes the establishment of digital one stop shops for licensing Renewable Energy Sources projects and facilitating energy renovations in buildings.

4.2.3 One-Stop-Shops (OSS), including those financed by EIB ELENA

“One-Stop-Shops” (OSS) type advice centres is a concept which aims to meet households’ demand for more simplified energy renovation processes. The need for OSS has arisen as navigating the energy renovation market has proven to be complex for the consumer, whether it be selection of the renovation solution, securement of the right financial plan or navigating the market of solution suppliers. This complexity results in homeowners not undertaking their otherwise intended energy renovation work. Support from OSS help consumers access relevant information and available public support schemes as well as further engage EU citizens in the energy transition. OSS aim to simplify processes by bringing services together that may already exist in a dispersed manner, such that they become comprehensive and easy to access.

The European Commission and the European Investment Bank underlined the necessity for OSSs, when they expressed their support for the setup of OSSs in the joint initiative Smart Finance for Smart Buildings. The initiative gives priority to accelerating energy efficiency projects in existing buildings and encourages Member States to “set up local or regional one-stop shops for project developers. These one-stop shops would cover the entire customer journey from information to monitoring savings, including technical assistance, structuring and offering financial assistance. They should allow more locally designed project pipelines and strong and secure partnerships with local players, the key being to match the supply and demand for finance”²⁹.

The EED underlines that OSS contribution can include: Technical, administrative and financial advice and assistance; Facilitation of necessary administrative procedures or of access to financial markets; Guidance with

²⁹ <https://librairie.ademe.fr/urbanisme-et-batiment/5299-comparative-study-of-the-roles-played-by-renewable-energy-network-agencies-in-the-implementation-of-public-policies-for-building-renovation-and-the-main-lessons-learned.html>

the national and European legal framework, including public procurement rules and criteria, and the EU Taxonomy; and Multiple audiences/target groups including citizens, SMEs and public authorities. The Energy Performance of Buildings Directive encourages OSS that are accessible to all building ecosystem's stakeholders, including homeowners and administrative, financial and economic actors, including SMEs.

Regardless of the services provided by OSS, the European Consumer Organisation (BEUC) argue that it should be consumer friendly. In summary, the BEUC states that OSS must combine the following dimensions to become consumer-friendly³⁰:

- Consumers need a trustworthy process to find, contract, and interact efficiently with reliable and accredited installers.
- Consumers need guarantees and clear procedures in terms of who is liable when something goes wrong, and this should be included in the scope of services provided by One-Stop-Shops.
- Consumers need clear, burden-less processes to follow.
- One-Stop-Shops should provide solutions also to low-income and vulnerable consumers.
- Consumers in multi-unit building should be supported by accredited building managers.
- Landlords should benefit from specific technical and financial support to fulfil their obligations.

The number of OSS in the EU has steadily increased over time. In 2021, the JRC counted a total of 63 OSSs in the EU spread across 22 different Member States³¹. All of the OSSs provide renovation solutions to homeowners through tailored guidance and securing financial solutions, however the models of the OSSs can vary greatly. Through their analysis of the 63 OSSs JRC constructed a typology of services that OSSs generally offered: Evaluation of the energy performance of buildings; Planning of interventions; Access to finance; Support for the implementation of the renovation work; Quality control, Monitoring and follow-up; and cross-cutting activities.

Experience from ELENA support for OSS

The EC and the EIB initiated the European Local Energy Assistance (ELENA) programme which, among other things, aims to support implementing energy efficiency in residential buildings. So far more than 12 different European countries have been granted ELENA support within this area³². At

³⁰ [beuc-x-2021-048 how to make One-Stop-Shops consumer-friendly.pdf](#)

³¹ <https://publications.jrc.ec.europa.eu/repository/handle/JRC124675>

³² [ELENA Projects in Europe \(eib.org\)](#)

this stage three projects have been completed, two in France and one in Ireland.

The first project, Picardie Pass Renovation (France), ran from 2014 – 2018³³. The project used the ELENA grant to establish the regional Public Office for Energy Efficiency. The public office acted as an OSS, providing individual and collective homeowners with advice, an energy audit, recommendations for renovation measures and help with long-term financing for the work. The EIB also provided a loan to help finance the housing renovation measures.

By the end of the programme, the public office had successfully helped mobilize and support 1,240 private homeowners implement investments that improved the energy performance of their homes. This was done through thermal insulation, installation of new windows and upgrading heating and ventilation systems. The programme prioritised units that were heated by oil or electricity.

In 2017 the Tipperary Energy Agency (TEA) in Ireland launched their ELENA supported project Superhomes, Tipperary³⁴. TEA used the ELENA grant to fund an OSS concept, which supported the implementation of energy savings in residential and non-residential buildings and public lighting. This was done by preparing energy audits and feasibility studies for various stakeholders. The aim was to make the renovation affordable by tailoring financing to fit the needs of the specific homeowners.

The programme aimed to convert private residential buildings to “Superhomes” – defined as homes equipped with good insulation, windows that are energy-efficient, advanced ventilation, no open fireplaces and heating and hot water from renewable energy sources such as solar panels or heat pumps. A spill-over benefit from “Superhomes” was better indoor air quality. As many citizens of Tipperary still used inefficient and polluting coal fireplaces to heat their homes, this benefit could also help encourage homeowners to invest.

The ELENA grant funded a project team within the energy agency and hired external experts. The project team acted as the main contact point for the project clients, and they were responsible for engaging with the individual house or facility owners to encourage the investment. This was among other things done by writing robust business cases for each project³⁵. The external experts included mainly technical surveyors, designers and experts as well as legal and financial advisers. They provided assistance to

³³ [elena-completed-pass-renovation-en.pdf \(eib.org\)](#)

³⁴ [51-project-factsheet-tipp.pdf \(eib.org\)](#)

³⁵ [Solutions for energy efficiency - 10 years of European Local Energy Assistance \(ELENA\) \(eib.org\)](#)

homeowners in the energy efficiency housing retrofit programme. The project's target is to have 35,000 "Superhomes" by 2030.

In continuation of the earlier experience, the Electric Ireland Superhomes is an OSS established in support of the national plans of renovating 500,000 homes in Ireland. As the project offers support during all key stages of a home energy retrofit, including engaging management, funding, and completion of the project it also addresses several barriers. The initiative consists of advisors, retrofit engineers and leasing contractors that guide and support the homeowners undergoing the retrofit project. Securing trustful and thorough information to consumers through the whole process, minimizing barriers of information, trust and finance.

We have furthermore established an overview of successful One-Stop Shops (OSS) including those financed by the ELENA facility. This is presented in Appendix D as Table D.3.

4.2.4 Third-party financing solutions

The WG has reviewed initiatives and solutions that facilitate flows of third-party capital into residential and non-domestic retrofit. As described in the section 1.1 of this report, the capital requirement for residential and business energy efficiency across Europe is estimated at EUR 180bn per year, and it is unrealistic to expect that all, or even most, of this investment will be provided by public finance. Yet current practices are demonstrably not enabling capital flows at anything approaching the required rate, so there is a need for solutions – business models, facilitation practices, new financial instruments and products – that can address this.

While the subject of third-party finance for energy efficiency has been covered extensively by other EEFIG working groups, this WG focused particularly on whether the availability of suitable finance – particularly when offered as part of an easy-to-use pathway for developing and implementing a retrofit scheme – can act to increase uptake of energy efficiency measures. To some extent this moves the focus of the discussion away from the precise source and form of finance (although clearly these aspects remain important) and towards how finance is experienced by the building owner or occupant who uses it.

Successful finance for energy efficiency must account for the nuances of decision-making by households and companies (particularly SMEs). In many cases the decision to undertake an energy efficiency initiative is not based on a rigorous investment case or return-on-investment threshold. Rather it rests on a nebulous combination of intuition, the desirability of the proposed product or solution, timing and affordability. These factors are defined and delineated in Chapter 3 of this report, and this analysis highlights that the availability of suitable finance or funding for an energy efficiency project is critical but is one of several critical conditions that must be satisfied for the project to proceed. By the same token, the rate of borrowing and the underlying cost of capital are important factors in the

investment decision. Instead, issues such as ease of access to finance, the trustworthiness of the provider, simplicity, and flexibility of repayment, and in some cases the ability to pay entirely from energy savings, may all be equally or more important. Any financial product or instrument that is launched into a market where the other critical barriers to energy efficiency are not being actively addressed will experience very limited uptake. But similarly, launching incentive schemes, One-Stop-Shops and other forms of facilitation without providing access to finance will only stimulate 'shallow' action on energy efficiency. All critical barriers must be addressed simultaneously for demand for deep renovation to be increased, and for capital to flow into delivery of projects.

It appears certain that a mosaic of finance solutions will make up the EUR 180bn investment requirement. Consumer finance is an important component but cannot be a universal solution given its reliance on the creditworthiness of individual households, so it will need to be combined in varying proportions with other sources, including grant subsidy for homes with limited ability to pay. Similarly, numerous business models, project facilitation, delivery and repayment mechanisms are being proposed and piloted across Europe, targeting households and businesses on a geographical basis or other market segmentation. The WG has considered many of these initiatives and identified a set of success factors for mobilising third-party finance for energy efficiency renovation, shown in Table 3.

Table 3- Key success factors for schemes that seek to increase flows of third-party capital into energy efficiency renovations in homes and businesses. More details on these schemes can be found in Appendix C

	Key success factor
1	<p>Addressing project origination</p> <p>A clear theory of change for how demand for energy efficiency will be stimulated in the target market. Solutions that do not incorporate facilitation or offer a compelling value proposition – e.g., consumer finance products that must be sought out by householders – are considered unlikely to have any impact on stimulating demand.</p>
2	<p>Integration with facilitation services that lower other critical barriers</p> <p>This may be through e.g., online information sources, One-Stop-Shops, solution / technology providers.</p>
3	<p>Tailoring for specific needs of target market</p>

	Suitability for key consumer segments including social housing, owner-occupied, privately rented, businesses (SMEs), based on a well-developed profile of the segment(s).
4	<p>Suitability for deep retrofit</p> <p>Solutions should fund either a deep / whole-house retrofit or a partial retrofit that represents a step towards a whole-house solution as part of a renovation plan. The latter is more likely while whole house solutions remain expensive. Solutions that arguably make deep retrofit more difficult to achieve – e.g. single-measure grants for 'low-hanging fruit' – should be avoided.</p>
5	<p>Easy, robust repayment mechanism</p> <p>The repayment mechanism must be easy from the householder's perspective and robust from the finance provider's perspective. For SMEs and low-income households which are perceived as more risky by FIs this will often require inclusion of a guarantee mechanism.</p>

Several models use performance-based mechanisms such as forms of energy performance contract (pay from savings, pay-for-performance) or other forms of contract that rely on the energy cost savings experienced by the consumer exceeding the repayments to be made on finance. This principle is used around the world by 'energy services companies' (ESCOs) to offer energy efficiency solutions on a cash-neutral or cash-positive basis to (primarily business) customers. ESCO models inherently incorporate credit-enhancing measures from the perspective of the finance provider, and de-risk the project from the consumer's point of view by introducing performance-linked repayments.

However, an open question remains about the suitability of these models for deep retrofits. The cost of a deep retrofit for a single home remains high and given the variation in housing stock across Europe it will take several years for economies of scale and improved supply chain capacity to materially bring down the cost. And while the resulting energy savings are necessary from a climate perspective, from the householder's perspective a deep retrofit may take 20-30 years to 'pay for itself' from energy cost savings, which may be longer than the householder intends to occupy the home.

So, while ESCO-like models appear to have a role to play in residential deep retrofit, there is a risk that overuse could result in only 'shallow' retrofits taking place, most likely projects that avoid expensive fabric upgrades. The opportunity to carry out a deep retrofit at the property may not then recur for many years. This risk can be mitigated if the repayment mechanism is robust to changes in occupant, but this in turn carries downsides. In many cases the householder may prefer to spread payment for the project over a

shorter time period in the knowledge that they will experience a net cash outflow over that period (i.e. savings will not cover repayments), but that the benefits of the project will be fully paid-for and incorporated into the value of the property.

The ESCO-like approach appears easier where homes are in social tenure, where stock is more consistent allowing for cheaper retrofit solutions, and where buildings have a long-term owner. This sector is the focus of the Energiesprong programme³⁶ that is delivering deep retrofits in several EU countries using a performance-based solution. Projects for businesses and other non-residential buildings, where energy bills are likely to be much higher, can also be viable on an ESCO basis.

4.2.5 Research on stimulating demand for energy efficiency investments

During WG meetings, relevant literature on how to stimulate the demand for energy efficiency investments has been reviewed and surveyed. A fraction of this research has been presented throughout the analysis, whereas as a total overview is included in Appendix D table D.5. The following will highlight selected relevant literature in detail, that has been used during the analysis or presented during WG meetings.

The European Energy Network (EnR), a voluntary network of European energy agencies which aims at promoting sustainable energy good and best practice, has conducted a study on the Role of Energy Agencies in implementation of public policies for buildings renovations. The study identified and assessed 8 types of interventions to support building renovation and 4 cross cutting subjects. From these assessments, the EnR network developed 7 recommendations for supporting building renovations.³⁷

- Support development of OSS
- Create a loan mechanism dedicated to the energy renovation of building
- Evaluate the role that assisted self-renovation can play in the massification of energy renovation
- Foster capacity building and qualification of professionals

³⁶ <https://energiesprong.org>

³⁷ [Comparative study on the of EnR Network agencies in the implementation of public policies for building renovation – European Energy Network \(enr-network.org\)](#)

- Foster capacity building for the implementation of circular and low carbon solutions for building renovations
- Strengthen area-based approaches (collective, neighbourhood)
- Support the use of digital tools to facilitate the projection and engagement of stakeholders

Whereas several of these recommendations fall in line with the discussed aspects from WG meetings and points from the previous analysis. Here among, the efficiency of OSS and the need of dedicated loan mechanisms and expanded capacity of suppliers.

Information

The barrier of information has been identified as important for almost all defined consumer groups. The barrier of information often appears early in the decision process. A primary reason is that the understanding of the need, solutions and benefits are vital for consumers to initiate the decision of either implementing or researching possible EE measures. Recent studies also take this barrier in to account, and how to overcome the issues of missing awareness regarding the benefits of EE measures³⁸.

JRC 2016 - Effective information measures to promote energy use reduction in EU Member States.

Silvia Rivas,
Barbara Cuniberti,
Paolo Bertoldi.

The study is an analysis of information, empowerment, and training measures in Member States National Energy Efficiency Action Plans. The study finds that all EU MSs integrate, to a greater or lesser extent, public awareness, information, and benefit campaigns, towards a behavioural change in energy use in their EE policy. However, when identifying the weaknesses of NEEAPS information campaigns, the study finds that mass media information campaigns are heavily used. Due to this, the information campaigns often lack tailored information to target groups making the campaigns less effective. The study also underlines that, the effectiveness of information campaign relies mostly on the effectiveness of delivered messages. They must be simple, adequate to the targeted group, easy to understand and inspiring. Pinpointing that the typical arguments of “save money and save the planet” has proven to not be very successful. Therefore, the outcome of the study has resulted in the recommendation of including social norms should be at the core of the information and awareness measures, which has not been implemented so far according to the study.

The WG is supportive of the fact that information measures are of great importance to activate the demand of EE measures. Also, that targeted campaigns for different consumer groups would be most effective.

Incentives

The problem of incentives, mainly split incentives, is relevant for the consumer groups of tenants (dwellers not owning their property) and the private rented sector. The problem arises when two agents, e.g., tenants and landlords are having difficulties in aligning their incentives. Recent research investigates the problem of split incentives in Germany and Sweden, whereas the case brings to light that the structure of costs

³⁸ [DOC_1 \(europa.eu\)](#)

between tenants and landlords brings for different drivers in regards of split incentives³⁹.

Splitting energy costs between landlords and tenants: What can Sweden and Germany learn from each other?	In Sweden landlord's all-inclusive rents are common practice, different in Germany where heating costs are borne by tenants. Split incentives between landlords and tenants are known to be a barrier for energy efficiency and renewable energy in buildings; For landlord's economic profitability of investments in thermal retrofit measures increases, on the other hand tenants have incentive to energy saving behavior.
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The paper raises a line of key questions, that the authors believe is necessary to address across countries. Here among how to efficiently balance the costs and incentives between landlords and tenants, and how to support visibility of energy and CO2 costs in rented buildings. Pointing to target group specific programmes for vulnerable household, which in turn could lower risk of energy poverty and the need for direct income support. The conclusion on targeted programmes, has also been discussed and supported during WG meetings.

Trust

The barrier of trust is primarily referring to the existence of low trust in the supply chain and has been identified as relevant for large scale of the defined consumer groups. Research argues that the adoption of EE measures is not only consumer driven, but also affected by intermediaries from the supply chain⁴⁰. Making the trust level among intermediaries and the consumer an important aspect for EE measures to be fulfilled. This argument has also been presented among the WG members.

The influence of intermediaries' advice on energy-efficient retrofit decisions in private household	Even though energy efficiency (EE) refurbishment in the building sector is an important lever to reach the goal of a climate-neutral building stock, retrofit rates stagnate at a very low level. Since most house owners are laypeople in retrofitting, they consult intermediaries for planning the EE-retrofit. In our study, we therefore aimed for investigating the relative impact of these intermediaries on EE-retrofit decision making in private households compared to other commonly known drivers and barriers for such decisions. Findings indicate that not only monetary aspects but particularly the intermediaries' advice affect retrofit decisions of house owners.
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Coordination

Coordination is mostly relevant for multifamily houses, from which problems of agreeing on joint intervention can occur. It is important to consider, that the missing coordination can be due to different preferences, which will be

³⁹ [Splitting energy costs between landlords and tenants: What can Sweden and Germany learn from each other? \(ecee.org\)](https://ecee.org)

⁴⁰ [The influence of intermediaries' advice on energy-efficient retrofit decisions in private households \(ecee.org\)](https://ecee.org)

elaborated later on. Underlining, as previously stated, that barriers can overlap. Research upon different type of property owners and their dimensionality of decisions, shines light to the fact that different owners value different arguments⁴¹.

The multi-dimensionality of decisions on energetic refurbishment: Results of a qualitative study covering different types of property owners	This paper describes the key results of a German qualitative study carried out by order of KfW Bankengruppe addressing the question why some property owners decide to refurbish while others don't, with focus on the interplay between different (economic, ecologic, social, personal) arguments. Generally, it was found that every decision on refurbishment has two stages – each with specific barriers that are considered and balanced against possible benefits. The identified interdependences between a wide range of decision-making factors and barriers suggest that approaches to promote energetic refurbishment of homes should ideally address several financial and non-financial aspects.
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Finance

A large scale of the existing research focuses on the financial barriers in relation to energy efficiency. This has also been an important subject among the WG members during discussion. WG members has emphasized that the capital for retrofitting actually exists and is available, however the schemes for distributing the money are sometimes not known to the end consumer. Furthermore, the complexity of funding programmes should be reduced and resulting offers to consumers should be clear, simple and transparent. A recent study about funding programmes raises the same concerns as the WG⁴².

Financing energy efficiency in buildings: an overview of current and upcoming European funding programs	Research what EU funding programmes can support energy efficiency interventions in buildings. The lack of capital availability is often acknowledged as one of the main barriers to energy efficiency interventions. To overcome the problem, the European institutions have launched several programmes and initiatives. The researchers point to the fact, that it is not capital availability that is the barrier, but the missing knowledge and complexity of the EU funding schemes that apprehend market players to invest in energy efficiency as they are not aware of their finance possibilities. The researchers therefore encourage to increase awareness towards EU funding programmes, alongside encourage private lenders to increase their interest in financing EE interventions in buildings.
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Preferences

When consumers are considering implementing EE measures, prioritizing the investment is an important decision step. Different consumer groups, and different individuals in a specific consumer group are all subject to individual preferences and behaviour patterns. Hence, arguments or initiatives concerning demand activation in EE measures might not be

⁴¹ [The multi-dimensionality of decisions on energetic refurbishment: Results of a qualitative study covering different types of property owners \(eceee.org\)](https://www.eceee.org/)

⁴² [Financing energy efficiency in buildings: an overview of current and upcoming European funding programmes \(eceee.org\)](https://www.eceee.org/)

applicable or substantiate for all. One study, investigates agent-based modelling of private household energy retrofitting behaviour, points to the fact that behavioural research rather than traditional economic theory serves as a valuable tool in policy making.⁴³

Agent-based modelling of private household energy retrofitting behaviour

The paper presents the 'Household Energy Retrofit Behaviour' model (HERB), which is an agent-based simulation of household energy retrofit decisions based on leading retrofit behavioural research, allowing for estimations of different policies' impact on energy use. The paper pinpoints how Agent-based modelling of energy retrofitting based on behavioural research rather than economic theory serves as a valuable tool in policymaking. By basing the simulation on what households do, a more accurate picture of policies' effectiveness can be achieved.

Another study also uses agent-based modelling to investigate the effects of behavioural and traditional (subsidies etc) instruments on the adoption of EE measures.

Modelling thermal insulation investment choice in the EU via a behaviourally informed agent-based model

The paper presents a model that simulates the investment choice of 19,538 homeowners based on their perceived financial situation and environmental concern, and introduces unobserved networks on which adoption by imitation occurs. The model investigates the effect of a financial incentive, a pro-environmental campaign and a norm-based intervention on the adoption rate. Results show that the interplay between economic, behavioural, and social motives produces unexpected outcomes: policies that leverage only one motive are nonetheless affected by the others.

4.2.6 Best practices for stimulating demand by types of consumers and final energy users

A wide range of policy instruments and tools for stimulating demand for energy efficiency investments were assessed and discussed, ranging from EU and national policy interventions, information campaigns, easy availability of EPC data and individual energy consumption data for multi-unit buildings, One-Stop-Shops, and capacity building, to market based and subsidised financial instruments and intermediaries.

On a MS level, easy availability of EPCs, information campaigns targeted to specific user groups, blending of grant and loans, support scheme targeted to vulnerable consumers, as well as physical and virtual One-Stop-Shops do deliver. But although there are many good individual examples, they are rarely replicated across national boundaries.

⁴³ [Agent-based modelling of private household energy retrofitting behavior \(ecee.org\)](http://ecee.org)

There are also many successful examples of individual actions among the H2020 projects but again they are rarely replicated out of original national context. This could call for a separate Horizon Europe support tranche for replicating successful interventions outside of original countries.

The EIB ELENA funded OSS are still at a relatively early stage, but there are very good examples emerging that may be easier to transfer across boundaries than nationally originated initiatives.

Among the RRF funded initiatives, a few good examples are available, but energy efficiency financing does not appear to have been a main focus area in most countries.

With respect to third-party financing, there appears to be growing recognition that targeted, market-segment-specific solutions are needed, and that the availability of a financial product does not in itself act to stimulate demand. Examples of good practice can be found that relate to consumer finance, including green mortgages and related products; performance contracting; repayment mechanisms such as On Bill Financing Schemes (where funding is arranged to an energy utility); public and private cooperation, for example around refurbishment of social housing.

Based on the analysis of barriers by type of consumer and final energy user and the analysed best practices, the following simple and non-exhaustive typology of interventions by type of barrier has been established. This has in turn been used to link types of consumers and final energy user, the priority barriers they face, the generic best practice interventions for the barriers, and specific best practice examples that potentially could be replicated. The best practise examples have been identified by the WG members based on presentations and discussions at the WG meetings. The selection of the best practise examples is based on a qualitative assessment by the WG of the suitability of the best practise examples for addressing the specific barriers and their usefulness as inspiration for future interventions in other countries. A quantitative assessment of the achieved results of the individual best practise examples has not been possible.

The resulting overview is provided in the table below:

Table 4: Overview of typology of interventions by type of barrier with project examples

Decision step	Barriers	Specific barrier	Priority barrier for type of consumer	Best practice interventions	Project examples
1. Understanding the need, the solutions, and the benefits	Information	Lack of knowledge, support and advice	Very important to vulnerable and energy poor households, private rented sector and SMEs. Important for homeowners, tenants, property investors and Industry.	One Stop Shops Targeted information campaigns	The Electric Ireland Superhomes (OSS), SaveEnergy, CoBenefit, ESCO in a box, HolaDomus (OSS), casA+, EUROPA
2. Getting incentives aligned	Incentives	Split incentives	Very important for tenants, private rented sector, and SMEs in rented/joint buildings.	Emerging experience on negotiated agreements in social housing sector	ENPOR Project, Comparison study of Germany and Sweden, Agreement between Tenants' Union and Social Housing providers in the Netherlands,
3. Trusting suppliers	Trust	Low trust in the supply chain	Important for homeowners, tenants, private rented sector and industry.	One Stop Shops Work with supply chain	TrustMark, RetrofitWorks, Energiesprong
4. Agreeing joint action	Coordination	Agreeing on joint intervention	Very important for homeowners, tenants, and SMEs in multifamily / mixed use buildings	One Stop Shops Targeted information campaigns	Home Analysis, Copenhagen Energy Focused Urban Renewal
5. Financing the investment	Finance	Access to finance	Very important to vulnerable and energy poor households, private rented sector and SMEs. Important to homeowners and tenants.	Blending of grant and loans Support scheme targeted to vulnerable consumers Targeted financial instruments	The Energy Efficient Mortgage Ecosystem, Sustainable Loans for citizens in Limburg, HEP-ESCO

6. Prioritizing the investment	Preferences	Individual preferences and behaviour	Important to all types of final energy users	Targeted information campaigns	SocialWatt (targeting Vulnerable Consumers), Optimised Retrofit Programme (Targeting Social Housing), STEP-IN (targeting vulnerable consumers), Climate Ready SME, Covenant of Companies
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4.2.7 Replication potential of the identified best practices

Below we provide an assessment of replication potential per type of consumers and final energy users across EU member states and regions.

We consider the most replicable examples of good practice to be those that:

- (i) Address multiple barriers simultaneously or can be easily integrated with other solutions that address other barriers. This recognises the fact that barriers to energy efficiency action are interlinked and mutually reinforcing. For example, solutions such as One-Stop-Shops address multiple barriers provided they are based on best practice and represent a solution with strong replication potential. Meanwhile, a solution such as a financial instrument targets a single barrier for a single context and must therefore be incorporated with other solutions to achieve any impact.
- (ii) Can be easily but meaningfully adapted to local contexts. For example, a specific information and engagement campaign for retail SMEs may not be easily adapted to light industrial SMEs nearby. In this case a fundamental re-write of the campaign would be needed due to the different drivers and decision-making behaviours of the stakeholders.
- (iii) Incorporate best practice into a clear theory of change. The most attractive solutions for replication are those rooted in practices that have a track record of achieving impact. While there is clearly space for innovation, particularly in the area of business models and financial solutions, there is an even clearer need for scaling up of policies and solutions that are known to be effective.

The WG has been presented with a number of best practice examples that ideally should be replicated across national boundaries with the inevitable adjustments this requires to adapt to differences in national regulation and practises.

On a national level the WG has seen best practice examples of Easy availability of EPCs (including integration with personalised information in virtual demand activation tools), Information campaigns targeted to specific user groups, Blending of guarantees, grant and loans, Support scheme targeted to vulnerable consumers, and well-funded One-Stop-Shops with a comprehensive remit and toolkit to lower barriers across multiple categories of consumers and final energy users. Nationally in the MS, there is many

best practice examples, they are often developed and refined over a number of years, but they are rarely replicated across national boundaries.

Similarly, there are many best practice examples among the EU funded H2020 and Intelligent Energy Europe (IEE) projects. This includes One-Stop-Shops as well as projects addressing specific barriers. However, again the good examples are rarely replicated out of original national context.

This indicates that there may be a need for a separate mechanism (e.g., a dedicated Horizon Europe support tranche) for replicating successful demand activation interventions outside of original countries (irrespective of whether the original was nationally, or EU funded).

The WG has furthermore seen several emerging examples of promising One-Stop-Shops under EIB ELENA which may become another key source of inspiration for national demand activation.

Under the RRF the WG has seen a few good best-practise examples, but demand activation for energy efficiency investments appears to have limited focus on most RRFs.

Finally, third-party financing schemes offer inspiration in terms of Green mortgage and consumer finance products, coupled with initiatives to lower other barriers (in particular trust, information, and salience), Joint public-private initiatives to channel third-party capital into projects initiated by the public sector for discrete programme of investment, such as social housing retrofit, and Combination of finance solutions with project facilitation, such as One-Stop-Shops.

5 Conclusions and recommendations

5.1 General

The Working Group includes experts from the full range of stakeholders that can influence consumer demand activation. Key is the policy framework and the EU has a robust, comprehensive policy foundation that includes the Energy Efficiency Directive (EED), the Energy Performance of Buildings Directive (EPBD), Ecodesign and Energy Labelling.

Currently the EED and EPBD are under revision as part of the Fit for 55 package. When approved, the revised directives will provide strengthened support for demand activation. The EC proposed new targets under the EED to reduce primary (39%) and final (36%) energy consumption by 2030, to become legally binding. The current target – of 32.5% overall by 2030 – is non-binding. Furthermore, Draft Articles 21 and 22 of the proposal focused on consumer empowerment and information and acknowledged the opportunity to recognise the role of energy communities in reaching out to citizens and providing support to undertake energy savings measures. According to the proposal, energy efficiency programmes and financial incentives should prioritise support for low-income citizens to deliver, together with energy savings, high positive social impacts. For the EPBD, the proposal calls for Minimum Energy Performance Standards.

Overall, encouragingly, the Working Group is positive that the EU can accelerate consumer demand and, in fact, must accelerate consumer demand.

A key objective of the Working Group was to establish a clear categorisation of different market segments and types of energy consumers, identify the key barriers for scaling up energy efficiency investment demand in the individual categories, and provide specific and sub-sectorial recommendations for the EC in this respect.

The WG members discussed the issue at lengths and concluded that demand activation for deep renovation of residential properties needs to differentiate interventions between homeowners (dwellers owning their property), tenants (dwellers not owning their property), and property investors (non-dweller property owners). Furthermore, the need to address the specific challenges of vulnerable and energy poor households (as homeowners and tenants) and of the private rented sector (both tenants and landlords) was highlighted by the WG.

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This typology proved useful in understanding the differences in barriers faced by different groups of consumers and energy users, and hence the differences needed in designing interventions to overcome the barriers.

Barriers faced by different types of consumers and final energy users

To increase the uptake of energy efficiency measures, particularly with respect to the deep renovation of buildings, we first need to understand the underlying problem, the reason why asset owners have not taken practical, straightforward and often economic rational action.

The WG reviewed experience and research in the area and grouped barriers to demand for energy efficiency investments from consumers and final users in six relatively distinct groups of barriers as they tend to occur along the decision process from idea to final decision to invest:

- > Information barriers (understanding the energy efficiency opportunities, the economic and broader benefits and risks, and the process for support and implementation)
- > Incentive barriers (getting split incentives aligned in rental property)
- > Trust barriers (trusting market participants in the supply chain)
- > Coordination barriers (agreeing joint action in multi-family and multi-business buildings)
- > Finance barriers (limited or no access to financing for the investments)
- > Preference barriers (prioritizing other needs over energy efficiency investments).

The WG has thoroughly discussed and reviewed these barriers at the various WG meetings and noted that the importance of the different types of barriers and challenges vary significantly between different types of consumers and final energy users.

When formulating both general and specific differentiated recommendations on what tools and policy instruments are likely to be most effective in increasing consumers and final users demand for energy efficiency investments, it is therefore useful to prioritise the most salient barriers for each type of consumers and final energy users.

Based on the review of literature, the discussion at WG meetings, and a December 2022 WG survey, the important and critically important barriers by type of consumers and final energy users were identified.

Key insights from this process are:

The split incentive problem and the coordination challenge are very important barriers, but also specific to individual types of consumers and final energy users. The split incentive problem is specific for tenants and landlords in rented properties and remains a significant barrier here. The coordination challenges of agreeing on joint interventions is a significant

barrier in multi-family, multi-business and mixed building units – whether owner occupied, rental or mixed.

Information and access to finance are important to most types of consumers and final energy users in residential properties - but very important to vulnerable and energy poor households (whether owners or renters) and to individual landlords in the private rental sector.

Lack of trust in suppliers is a general barrier in the residential sector where many decision makers have limited hands-on experience with energy renovation and where energy renovation always compete with other needs for attention and allocation of limited funds (needs that often provide more instant gratification).

Best practices for stimulating demand for energy efficiency investments

A wide range of policy instruments and tools for stimulating demand for energy efficiency investments were assessed and discussed, ranging from EU and national policy interventions, information campaigns, easy availability of EPC data, One-Stop-Shops, and capacity building, to market based and subsidised financial instruments and intermediaries. This included initiatives in MS financed by national funds and by RRF, EU funded initiatives such as H2020, EIB ELENA funded OSS, and third-party financing solutions such as ESCOs.

On a MS level, best practices relate to easy availability of EPCs and data on individual energy use in multi-unit buildings, information campaigns and engagement strategies targeted to specific user groups, blending of grant and loans, support scheme targeted to vulnerable consumers, as well as physical and virtual One-Stop-Shops do deliver. But although there are many good individual examples, they are rarely replicated across national boundaries.

There are also many successful examples of individual actions among H2020 projects but again they are rarely replicated out of their original geographical context. This could call for a separate Horizon Europe support tranche for replicating successful interventions outside of original countries. A source of inspiration could here be the European Urban Initiative that helps transfer and replicate solutions⁴⁴.

The EIB ELENA funded OSS are still at a relatively early stage, but there are very good examples emerging that may be easier to transfer across boundaries than nationally originated initiatives.

⁴⁴ <https://www.urban-initiative.eu/what-european-urban-initiative>

Among the RRF funded initiatives, a few good examples are available, but energy efficiency financing does not appear to have been a main focus area in most countries.

With respect to third-party financing, schemes offering inspiration for replication exist within green mortgage and consumer finance products, coupled with initiatives to lower other barriers, Joint public-private initiatives to channel third-party capital into projects initiated by the public sector, and Combination of finance solutions with project facilitation.

Based on the analysis of barriers by type of consumer and final energy user and the analysed best practices, the following simple and non-exhaustive typology of interventions by type of barrier has been established. This has in turn been used to link types of consumers and final energy user, the priority barriers they face, the generic best practice interventions for the barriers, and specific best practice examples that potentially could be replicated. An overview without project examples is provided below.

Table 5: Overview of typology of interventions by type of barrier

Decision step	Barriers	Specific barrier	Priority barrier for type of consumer	Best practice interventions
1. Understanding the need, the solutions, and the benefits	Information	Lack of knowledge, support and advice	Very important to vulnerable and energy poor households, private rented sector and SMEs. Important for homeowners, tenants, property investors and Industry.	One Stop Shops Targeted and two-way information campaigns
2. Getting incentives aligned	Incentives	Split incentives	Very important for tenants, private rented sector, and SMEs in rented/joint buildings.	Agreements between Tenants' Union and Social housing providers in the Netherlands.
3. Trusting suppliers	Trust	Low trust in the supply chain	Important for homeowners, tenants, private rented sector and industry.	One Stop Shops Work with supply chain
4. Agreeing joint action	Coordination	Agreeing on joint intervention, coordination of works, obtaining relevant permits	Very important for homeowners, tenants, and SMEs in multifamily / mixed use buildings	One Stop Shops Targeted and two-way information campaigns Assistance for consensus building
5. Financing the investment	Finance	Access to finance	Very important to vulnerable and energy poor households, private rented sector and SMEs. Important to homeowners and tenants.	Blending of grant and loans Support scheme targeted to vulnerable consumers Targeted financial instruments higher support levels for the very low income category
6. Prioritizing the investment	Preferences	Individual preferences and behaviour	Important to all types of final energy users	Targeted and two-way information campaigns

5.2 Conclusions on a stakeholder level

Addressing the barriers to scaling up demand for energy efficiency investments (described above) requires parallel action by several groups of stakeholders, including sector stakeholders (including builders and enterprises in the supply chain), national and local governments in the Member States, EU institutions, as well as public and private financial institutions.

In this context, the role of the different stakeholder groups is summarized below and specific recommendations for each of the groups are provided in the following section 5.3.

Sector stakeholders including builders and enterprises in the supply chain

- > Getting the consumer to understand the context and to understand why they need to take more action has been supported by the energy price shocks and the threats of shortages of gas and electricity for basic services.
- > Providing appropriate information is still fundamental. What type of information is best depends on circumstances, so information providers need to assess needs first. Furthermore, the consumer needs to trust the quality of the information to act upon it.
- > The role of intermediaries is important to support consumers. These can be One-Stop-Shops for individual consumers or SMEs. They can also be ESCOs. But many categories of consumers need guidance, and in some countries, there is a need for building the capacity of as well as consumer confidence in the supply chain.
- > The building sector is complex and there is a need for separate demand activation strategies for the private sector and the rental sector.
- > Addressing the specific needs of SMEs has been difficult in most Member States. However, best practise examples of significantly scaling up engagement with SMEs through gradual conceptualisation of targeted communication and capacity building on Scope 3 emission accounting and identification of interventions in the manufacturing supply chain provides a replicable example for inspiration.

Member States

- > The policy foundation is strengthening and that is important. The foundation has had to be strengthened because of external events, such as the Covid pandemic, the war in Ukraine and the gas availability and cost from Russia.

- > The recent energy cost crisis has re-confirmed the need to take actions to protect the most vulnerable.
- > Clear policy signals play a key role in convincing consumers that they too need to contribute to overall long-term climate and energy goals. In this context, the messaging from MS to the public on the need for accelerated action on energy efficiency to meet medium to long-term goals has a strong impact if done well.
- > Governments and their energy agencies need to provide a wide range of information dissemination through campaigns, virtual platforms, and other forms of citizen engagement at different levels of complexity to gain the confidence of the population and the various consumer categories.
- > Member States need to share experience amongst each other to better understand what works and what doesn't. Concerted Action for the EPBD and for the EED, bringing national experts together in a systematic approach, is an excellent opportunity to do so needs to be continued. Successful best practices still need to be adapted to the region, building stock and awareness of consumers where it is being replicated.
- > It is necessary to regularly evaluate demand activation programmes to see how impact can be improved and to understand how consumers are reacting to them.
- > Some Member States lack sufficient administrative capacity to develop and implement measures that are needed to meet long-term climate and energy objectives. This lack of capacity has had an impact on the priority given to energy efficiency, especially on deep retrofits that are essential to meet the EU climate objectives.

EU institutions

- > Over the past years, much has been done to develop the European Green Deal and to increase the priority for energy efficiency improvements. The process has been complicated by the change in the context affecting overall priorities.
- > The approval process for the revised EED and the EPBD has been slow, but recent initiatives such as REPowerEU and EU Save Energy have increased ambitions and kept up the momentum until the overall policy foundation is re-established.
- > With the experience and lessons learned from individual projects funded by the EU, there is a need to ensure that best practice is shared and that the need for replicability is integrated within individual projects (and programmes) from the beginning.

Financial institutions

- > Financial institutions certainly have an important role to play in energy efficiency investment decisions made by their customers. Mortgage financing decisions often happen at the time of sale for a property and the availability of suitable financial instruments can play a key role for energy renovation by new home buyers. In this context there are important ongoing initiatives to develop, and market dedicated financial instruments such as green mortgages.
- > For the SME segment, the Strategic Banking Corporation of Ireland provides an important example of how a state-owned bank can work directly with SMEs in particular, to take an overall sector approach which includes a low-cost loan scheme, help with providing guarantees in building the business case for lenders, helping to standardise processes and provide case studies.
- > Energy Efficiency First is a central principle of European energy policy. However, its adoption within the finance sector is still limited. Every day many investment and lending decisions are taken which ignore profitable energy efficiency opportunities. EEFIG is therefore working with financial institutions on applying the Energy Efficiency First principle in sustainable finance⁴⁵. The result of this work is reported separately in parallel with the present report and provides guidance for financial institutions on operationalising energy efficiency first and recommendations for the EC on supporting measures.
- > International financial institutions such as the EIB and the European Bank for Reconstruction and Development (EBRD) are playing ever more important roles in financing renovations. Equally important, the ELENA Facility under the EIB plays a key role in supporting project development.

5.3 Policy recommendations

Sector stakeholders including builders and enterprises in the supply chain, should facilitate consumer uptake of energy efficiency solutions through clear and trustworthy information, attractive renovation value propositions, simplified customer journeys, and cooperation with governments and financial institutions:

- > Ensure consumers receive appropriate information to help their decision-making process (what are the relevant technical solutions, what are the typical investment costs, what are the typical savings, what is the lifetime, how can it be financed, are there any subsidy schemes available, who are the suppliers and certified local installers). Information providers (e.g. one-stop shops or national/regional energy

⁴⁵ A separate report from the EEFIG Working Group on applying the EE1st principle in Financial Institutions is published in parallel with the present report.

agencies) should work closely with energy efficiency technology and service providers to ensure that information provided is reliable and in line with market conditions.

- > Collectively agree and adhere to meaningful quality assurance standards, codes of practice and standardised project development processes to promote trust in energy efficiency solutions and savings.
- > Cooperation between supply chain, One-Stop Shops and government on developing capacity for energy renovation (e.g., upscaling the supply chain).
- > Roll out at scale support schemes such as One-Stop-Shops or best practise national initiatives like the gradual conceptualisation of capacity building for SMEs, offering a suite of project information, project facilitation and finance services to local consumers and businesses.
- > Maintain regular contact and network with governments at all levels and other stakeholders to monitor progress and discuss measures to accelerate consumer demand.
- > Increase engagement with consumers and consumer associations on feedback of progress to accelerate consumer demand and to better understand on-going obstacles.

A good example is the Global Energiesprong Alliance (GEA) which works with the supply chain to enable residents to invest in energy retrofits and renewable energies of their home⁴⁶.

Member States should facilitate the necessary framework conditions for consumers demand and uptake of energy efficiency solutions:

- > Ensure that energy efficiency lending products for building renovations are offered by financial institutions and are visible and accessible to consumers.
- > Facilitate blending of commercial financing for energy efficiency with public grants, guarantees and loans when this is necessary to incentivise consumer uptake of energy efficiency financing products or ensure that energy efficiency lending products for building renovations are offered widely and in a non-discriminatory manner.
- > Design and promote renovation programmes and schemes that have multi-annual budget to create stable framework conditions for market participants.

⁴⁶ <https://energiesprong.org/>

- > Consider introducing or increasing incentives to improve energy efficiency for vulnerable groups and ensure that the application process be made as easy to follow as possible.
- > Provide forward visibility of energy efficiency and electrification policies and building performance standards, including specific technical pathways for removing fossil fuels from the energy system.
- > Capacity building on energy efficiency for the building renovation supply chain through investment in training on energy efficiency, renewable technologies and good practice in retrofit for suppliers that interact directly with consumers and businesses.
- > Assess how One-Stop-Shops, or similar initiatives, can have impact on consumer decisions to invest in energy efficiency at the decision point and throughout the renovation process.
- > Ensure that EPC data on buildings level is easily available for stakeholders and provide strong, positive signals to consumers of the importance of energy efficiency and of the co-benefits that can be derived from such investments.
- > Promote deep retrofits over single measures and reflect this in public support programmes.
- > Work closely with regional and local agencies, social services and other key stakeholder to ensure appropriate engagement with consumers and stakeholders.
- > Continue to share experience and lessons learned on energy efficiency measures through the EnR network and other such bodies.

A good example of this is Ireland which have an ambitious national plan for scaling up home renovation supported by an ecosystem of One Stop Shops and for scaling up energy efficiency in SMEs supported by dedicated instruments from a national development bank, the Strategic Banking Corporation of Ireland (SBCI).

EU institutions should continue to lead the establishment of a policy framework supporting demand activation for energy efficiency investments and facilitate replication of best practice examples outside of the geography where they are originated:

- > Accelerate the approval process for energy efficiency legislation to ensure the most ambitious and effective policy framework is in place.
- > Ensure that the energy efficiency legislation gives adequate treatment to address vulnerable segments of the economy.

- > Monitor progress at the Member State level in the development of energy services markets and energy performance contracting as an instrument for supporting demand activation.
- > Ensure Concerted Action for the EPBD and EED are effectively analysing and sharing experience to improve implementation of the directives and scaling up demand for energy efficiency measures throughout the EU.
- > Continually consult with the financial community to understand their concerns and to get their full engagement in supporting the development of energy efficiency financing instruments and willingness to work with blended financing including partial risk guarantees to enable energy efficiency financing offerings for SMEs and low-income households.
- > Ensure that energy efficiency demand activation projects funded through the EU have clear replication strategies and that funding options for replication of successful cases outside of the original country are available.
- > Develop an on-line system to share best-practice cases on successful energy efficiency demand activation projects (whether funded by EU, national public funds or private sector) to ensure information is readily available.
- > Provide more support for de-risking projects that facilitate demand activation for consumers and SMEs (e.g. TrustEE, eQuad, ICP, etc.).
- > Support efforts to ensure the role of intermediaries can effectively help asset owners (buildings or SMEs).

A good example of this is the increased ambition of the EED Recast which is supported by additional focus on the exemplary role of governments at all levels and increased emphasis on the importance of making targeted financial solutions available, for energy efficiency in general and for energy poor households in particular.

Financial institutions should develop dedicated energy efficiency financing instruments, engage with national governments on blending of public guarantees and private funding for energy efficiency, embed Energy Efficiency EE1st principles in financing procedures:

- > Take into account the Energy Efficiency 1st principle in engagements with consumers and SMEs and offer solutions favouring deep retrofits to single measures.
- > Invest in innovation around the business models and programme designs to develop dedicated energy efficiency financing instruments

for households, building owners and SMEs, including in cooperation with solution suppliers.

- > Engage actively with the public sector on the challenge of home refurbishment, including on blending of public guarantees and private funding for energy efficiency.
- > Develop creative initiatives inspired by the successful Energy Efficient Mortgage Label (EEML) initiative to create awareness for consumers and businesses to invest in energy efficiency measures.
- > Work with other stakeholders to promote the benefits of investing in energy efficiency.
- > Simplify existing products and standardise lending procedures as much as possible to make it easier for consumers to access financing support.

In this context, the Energy Efficient Mortgages Initiative (EEMI)⁴⁷ which has been the catalyst for the growth of a new, integrated, multi-stakeholder energy efficient mortgage ecosystem, should be highlighted as a successful initiative which could serve as a source of inspiration for other sector-based initiatives. Furthermore, the results and recommendations of the EEFIG Working Group on Applying the Energy Efficiency First Principle in Sustainable Finance⁴⁸ will be a source of inspiration for embedding Energy Efficiency EE1st principles in financing procedures.

⁴⁷ <https://energyefficientmortgages.eu/>

⁴⁸ https://eefig.ec.europa.eu/working-group-applying-energy-efficiency-first-principle-sustainable-finance_en

Appendix A PowerPoint presentation

[separate file]

Appendix B Composition of the working group

Name	Organization	Type of organization
Abderrahim Khairi	Housing Europe	NGO
Adam Hirny	BNP Paribas Bank Polska SA	Financial Institution, PF4EE
Alessandro Asmundo	Finanza Sostenibile	FI
Andreas Wade	Viessmann	Technology provider
Benjamin Langer	Allianz Lebensversicherungs-AG	Financial Institution
Boglárka Király	SMEunited	Association
Catherine Cooremans	Université de Lausanne	Research
Christophe Milin	CINEA	EU Commission
Cristina Preda	Home association, Romania	Housing association
Dario Di Santo	FIRE Italia	Energy agency / association
Davide Sabbadin	EEB	NGO
Davide Cannarozzi	GNE Finance	Financial Institution, Impact investing
Dine Rodrigues	EIB	FI
Dorin Lucian Beu	RoGBC	Green Building Council
Eddy Deruwe	Flemish Energy and Climate Agency	Energy agency
Florian Bonert	CoBenefit	Digital platform
Francoise Refarbert	Energies Demain	H2020 project
Guillaume Joly	BEUC	NGO
Hadrien Michel	DG ENER	EU Commission
Hanna Westling	Anthesis Group	Consultant
Hannes McNulty	McNulty Consulting	Consultant
Isidoro Tapia	EIB	Financial Institution
Ivana Rogulj	Institute for European Energy and Climate Policy	Research
Josephine Maguire	SEAI	Energy agency
Konstantinos Pavlou	Piraeus Bank, Greece	Financial Institution, PF4EE
Louise Sunderland	The Regulatory Assistance Project	NGO
Luca Bertalot	EMF-ECBC	Association (FI)
Marcel Lauko	Association of Energy Services Providers (Slovakia)	Association (industry)
Matteus Arinaga	Flemish Energy and Climate Agency	Energy Agency
Michael Pachlatko	Joule Assets Europe	Financial Institution
Mira Conci	Climate-KIC	EU funded Knowledge and Innovation Community
Nicolas Albuquerque Wolf	GNE Finance	Financial Institution, Impact investing

Nives Della Valle	European Commission - JRC	EU Commission
Oronzo Daloiso	CINEA	EU Commission
Thomas Osdoba	NetZeroCities	H2020 project
Patrik Thollander	Linköping University	Research
Paolo Bertoldi	European Commission - Joint Research Centre	EC
Paolo Sonvilla	Creara	Solution provider
Petr Holub	Buildings21	NGO
Rui Fragoso	ADENE Portugal	Energy Agency
Seamus Hoyne	Technological University of the Shannon: Midlands Midwest	Research
Sebastian Descours	Energie Demains	H2020 project
Shane McCullough	Strategic Banking Corporation of Ireland	Financial Institution
Sorcha Edwards	HOUSING EUROPE	NGO
Stefan M. Buettner	EEP - Institute for Energy Efficiency in Production	Research
Uwe Bigalke	German Energy Agency (DENA)	Energy Agency
Carsten Glenting	Viegand Maagøe	EEFIG Consortium
Rod Janssen	EEIP	EEFIG Consortium
Alex Rathmell	ep group	EEFIG Consortium
Andriana Stavrakaki	Institute of Communications and Computer Systems (ICCS)	EEFIG Consortium
Marianne Thomas	Viegand Maagøe	EEFIG Consortium
Dinne S. Hansen	COWI	EEFIG Consortium

Appendix C Working group meetings package

[separate file]

Appendix D Data on which the analysis is based

The following appendix includes an overview of best practices and research about stimulating demand for energy efficiency investments:

Table D-6	Examples of best practices to stimulate demands for energy efficiency investments
Table D-2	Initiatives in MS, financed by the Recovery and Resilience Facility (RRF) under the National Recovery and Resilience Plans
Table D-3	Successful One-Stop Shops (OSS) financed by EIB ELENA facility
Table D-4	Third-party financing solutions, including ESCOs
Table D-5	Relevant research about stimulating demand for energy efficiency investments

Appendix E Working Group Survey Questionnaire

[separate file]

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of the European Union

ISBN 978-92-68-08938-5