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Directorate C - Renewables, Research and Innovation, Energy Efficiency

STAKEHOLDER CONSULTATION ON THE RENOVATION WAVE INITIATIVE

SYNTHESIS REPORT

The contributions received under the public consultation summarised in this report cannot be regarded as the official position of the Commission and its services and thus do not bind the Commission.

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1. Introduction and overall public consultation strategy

The public consultation strategy for the Renovation Wave initiative has been designed to invoke a strong stakeholder engagement both via ad-hoc participation, as well as via structured feedback. It built on three elements:

1. **Engagement and consultation via ad-hoc contributions** (January 2020 – August 2020): included more than 100 in-depth exchanges with a very wide range of stakeholders. In total, 120 ad-hoc contributions were received from 81 stakeholders¹. These exchanges include inputs sent to the Commission services in writing via email (position papers, etc.), as well as in the context of ad-hoc bilateral meetings. The Commission ensured targeted participation at events such as the Covenant of Mayors Investment Forum-Energy Efficiency Finance Market Place (18-19 February 2020), Construction Forum (17 June 2020), engagement with social partners from the construction industry (19 June 2020) and an event at the EUSEW (23 June 2020), among other numerous fora and meetings.

The objective of this consultation activity was to take stock of the views, positions and ideas of stakeholders on how to launch a Renovation Wave very early in the process and to inform the subsequent elements of the consultation strategy on barriers to building renovation and relevant policy responses and seek to validate them.

This activity ensured targeted consultations with more focused interactions and/or dialogue in view of tapping expertise more efficiently, in view of the specificity and level of technical detail of the subject.

2. **Feedback on the Renovation Wave roadmap** (11 May 2020 – 9 June 2020). The feedback encouraged inputs in free format and uploading position papers. A total of 187 feedbacks were received and are publicly available ([here](#)), a significant part of which with attached position papers.

The objective of this consultation activity was to further engage with stakeholders in a structured manner and allow for an elaborated input on the problems that the Renovation Wave tackles, as well as on what and how it aims to achieve.

The participation and analysis of the inputs from points 1 and 2 are presented in section 2 and have been used to sharpen the Open Public Consultation (OPC) questionnaire (see next point).

3. **Open public consultation** (10 June 2020 – 9 July 2020). The OPC relied on a very detailed and in-depth technical questionnaire via the [EU Survey tool](#) that has been designed on the basis of input from earlier consultation steps, taking into consideration existing technical knowledge and in close cooperation among experts from different parts of the Commission.

As a result, the European Commission has gathered views and input on the Renovation Wave initiative in a transparent manner from a very broad range of stakeholders concerned by the initiative, ranging from national, regional and local authorities to businesses and business associations, trade unions and employers' organisations, non-governmental organisations, civil society organisations, industry associations, education organisations, consumer groups, research and

¹ A number of stakeholders submitted multiple contributions over time.

innovation organisations, as well as individual citizens. The coverage has ensured the consultation of stakeholders affected by the policy; stakeholders engaged in delivering the initiative and stakeholders who have a stated interest in the buildings policy.

Inputs from the public consultation strategy have been used to distil the main message of the Communication and validate alignment with stakeholders' goals and plans. The analysis of the public consultation has thus constituted an important contribution to the Renovation Wave Communication.

2. Analysis of the stakeholder feedback: ad-hoc contributions and feedback to the roadmap

In the period January - August 2020, 120 contributions on ad-hoc basis have been received (e.g. position papers via email and/or as preparation or follow-up from bilateral meetings) from 81 stakeholders. Organisations, business associations, companies, public authorities and citizens who are responsible for or directly or indirectly affected by buildings renovation have shared proactively their expertise on existing bottlenecks to building renovation, on most effective policies to address these and future developments to scale up the uptake of building renovation. Annex I provides a list of stakeholders who have contributed on ad-hoc basis and have provided their consent to have their submissions publicly available².

Further to this, 187 contributions have been submitted as feedback to the Renovation Wave roadmap in the period from 11 May 2020 to 9 June 2020 and came from a wide range of stakeholders and countries of origin as indicated in the following tables³. Annex II provides a list of stakeholders who have provided feedback to the Renovation Wave roadmap, while Table 1 and Table 2 below summarise the roadmap feedback submissions by stakeholder category and by country of origin/affiliation, respectively⁴.

Table 1. Feedback to the Renovation Wave roadmap: by type of stakeholder

Stakeholder type	Nr of replies: Roadmap feedback
Business association	73
Company/business organisation	40
NGO (Non-governmental organisation)	22
Public authority	19
Other	14
EU citizen	6
Academic/research institution	4
Trade union	4
Environmental organisation	4
Consumer organisation	1
Total	187

² To be published once explicit publication consent is obtained from all the parties concerned.

³ There is a natural overlap between these two consultation activities (ad-hoc and roadmap feedback): on a number of occasions, the same inputs have been submitted in an ad-hoc manner and as part of the feedback process. The overlap represents around 20%.

⁴ The breakdown by stakeholder group and by country of origin is provided for the roadmap and for the open public consultation as stated by the respondents. In the case of the ad-hoc contributions, there is no mechanism to systematically collect statements of the respondents qualifying their stakeholder group and/or country of origin/affiliation; therefore such breakdowns are not provided for the ad-hoc contributions in order to avoid inconsistencies.

Note: Stakeholder categories based on a list pre-defined by the European Commission and applicable to all initiatives at the [Have Your Say portal](#)

Table 2. Feedback to the Renovation Wave roadmap: by country of origin/affiliation

Country	Nr of replies
Belgium	84
Germany	24
France	21
Netherlands	9
Spain	9
Sweden	7
Italy	6
Denmark	5
Poland	3
Austria	2
Croatia	2
Finland	2
Ireland	2
Romania	2
Slovakia	2
Norway	2
Bulgaria	1
Greece	1
Portugal	1
United Kingdom	1
United States	1
Total	187

All inputs submitted on ad-hoc basis and via the roadmap feedback mechanism have been processed and analysed in terms of qualitative content; their summarised content is encoded in an analytical spreadsheet developed for operationalising this assessment in qualitative terms and, to a lesser extent - given the nature of the inputs and the fact that the consultation does not generate statistically representative input - quantitative terms.

The main message coming from the vast majority of these contributions is a strong expectation for an ambitious and solid policy initiative to boost building renovation rates across the EU. Overall, an emphasis is placed on the environmental, social and economic role of buildings in the short (in the context of Recovery), as well as medium and long term. Other key recurring messages include the urgency to act at all governance levels (EU, national and regional/local) to deliver on renovation and, among other, ensure implementation, as well as genuine commitment, especially when it comes to financing and setting progress targets/milestones. There is a prevailing view that it is necessary to target immediate solutions delivering on the short-term, as well as to use renovation to build a green, digital, resilient and inclusive economy for the 21st century. The fundamental role of Member States and authorities is repeatedly being emphasised. Many stakeholders call for a dedicated building renovation fund and this topic occurs on a recurrent basis also in the context of the open public consultation (especially the free text comments and suggestions).

Other recurring messages include calling for mandatory renovations (in different formats and with enabling conditions, see more details later in sub-sections 3.3.3.1, 3.3.4.1 and 3.3.7), while at the same time also pointing to cost aspects, affordability and broader social issues in the context of renovation. Circularity principles also appear in a number of contributions, as well as emphasising the role of the wider benefits of renovation as triggers for renovation. The opinions are split on technology neutrality, with a number of stakeholders very vocal in defending a technology-neutral approach. Another equally vocal message is calling for a ban of fossil fuels (often a blanket ban on all fossil fuels).

2.1. Barriers to building renovation

A large majority of the stakeholders that participated in this consultation activity pointed to and analysed existing barriers to the uptake of building renovation. The most frequently mentioned ones relate to different aspects of the lack of transparent and reliable information about renovation, a lot of (perceived) effort and ‘hassle’ demotivating owners and occupants, as well as a lack of trust in the market and perceptions of high risk and transaction costs involved in renovation projects. Stakeholders have also raised difficulties to access financing (long payback periods, difficulty to get a bank loan for renovation of residential buildings, unpredictability of costs/cost variation throughout the renovation, high upfront payment before receiving financing, etc.). Insufficient technical expertise amongst local and regional authorities and in financial institutions, along with shortage of skilled workforce and insufficient quality interventions. Some stakeholders argue that funding availability in itself is not the problem and even that higher amounts of funding alone and not combined with other policies (e.g. advice and technical support) might bring their own risks as home owners lack the knowledge to carry out deep renovation works.

Several stakeholders point to difficulties in decision making in multiple ownership residential buildings, as well as energy performance not influencing real estate prices. Some stakeholders point to a limited deployment and availability of environmentally friendly materials with low carbon footprint, lack of awareness about the multiple benefits of building renovation and insufficient cooperation within the industry and between authorities, in particular at regional level.

Some stakeholders offered specific perspectives: for example, associations of owners pointed first, to the uncertainty about the future use of the building and thus, reluctance to renovate (changes in services, demography, rural exodus, etc.) and second, to the difficulty of population relocation for private building owners. Several stakeholders from the non-governmental sector, as well as businesses, mentioned that the European building stock is not climate change resilient and that in certain cases, e.g. renovation following an earthquake, legislative and administrative obstacles delay renovation⁵. Complex and lengthy procedures in public procurement system and limited ESCOs activities have also been indicated as barriers.

Some cautious statements from the construction industry include that even comprehensive renovations may not reduce running costs, that shallow renovations may help to reduce running costs but also increase the cost of buying and renting, that renovation may be economically unattractive and that there is a certain insecurity of the general public about the toxicity and safety of some materials.

⁵ For example lengthy approval procedures for new electric devices, lack of coordination and implementation of measures or very strict specific required criteria to access funding. According to certain stakeholders, there is evidence to suggest that some schemes in the past (e.g. Green Deal in the UK) were too administration-heavy and costly for SME installations to be involved in the scheme.

2.2. Policies and measures

The analysis of stakeholders' input points to a wide range of ideas on policies and policy packages to deploy faster and deeper renovation. Broadly speaking, these policies and policy packages target one or more aspects of the following categories: regulatory approaches, information and general awareness, financing and technical assistance, skills, technology aspects and circularity.

Typically, business associations and companies express strong support and ambition in favour of the above, including, in some cases, mandatory requirements and technology neutrality. Some NGOs call for mandatory requirements and much greater ambition (e.g. 4% renovation rate, greener public procurement rules, etc.) as well as for a clear end of fossil fuel subsidies and for a robust and comprehensive regulatory framework. Respondents related to property owners and some social partners from the construction industry occasionally call for caution in terms of housing affordability, and flag the issue of social criteria in construction.

Information and regulatory tools

A message that comes on a recurring basis is the need to deploy better Energy Performance Certificates (EPC), as well as Building Renovation Passports (BRP) and digital building logbooks with a focus on reliability, consistency and comparability, notably by assuring that the evaluation criteria are the same across all EU MS and that they follow a harmonised template. The EPC are seen as a way to empower building owners/occupiers in the newly built as well as rental markets, as a planning tool for the renovation of specific building segments (e.g. social housing) and with the provision of additional information for investments in building stock renovation. A strong potential is seen in integrating EPC in BRP or strongly linking them to each other. BRP will serve as a tool to support building owners to undertake deep renovation and to coordinate improvement measures. These information tools will track continued improvement and monitor renovation depth and energy performance. Furthermore, they could be complemented by an environmental passport that would include materials' circularity potential to facilitate future dismantling, reuse and recycling.

A number of stakeholders calls for integrating Energy Performance Certificates into the EU grants in order to promote staged deep renovations.

Several stakeholders across industries call for a strengthening of energy audits, for a strict implementation of building energy audits, a deployment of Smart Readiness Indicator (SRI) and focus on circular solutions, along with the sustainability assessment at the building level and the inclusion of all environmental aspects. Conditioning the EU co-funded investments by either a *ex-ante* energy audit or the deployment of energy management system could ensure a real cost-effectiveness.

One idea that has been often flagged by stakeholders is mandatory renovation targets for certain categories of buildings (e.g. commercial, industrial and residential rental properties). See further discussion under the section on worst performing buildings.

When it comes to broader awareness raising, the Green Deal's proposal on platforms is very welcome, also leveraging existing networks in order to launch these platforms. The platforms require innovative governance models to ensure they are inclusive, accessible, and gain consensus of the community.

The point on creating awareness on the wider benefits of energy efficiency measures emerges strongly from the inputs received. One example is for healthier buildings reducing pressure on healthcare and social services. It appears that climate change is not perceived as an immediate

incentive for home owners on its own and that putting the focus on the wider benefits of renovation (not only environmental, but also economic and societal) could help trigger renovation at the scale that is needed.

Financing and technical assistance

Stakeholders attribute special importance to the post-COVID phase and the recovery plan: strengthening financial means, in particular via cohesion policy in general (Operational Programmes directing structural and cohesion funding towards building renovations), the Resilience and Recovery Facility, InvestEU, as well as the Just Transition Fund and the European Social Fund (ESF+) in terms of upskilling and reskilling of workers. Stakeholders also stress the importance of the Long Term Renovation Strategies under the Energy Performance of Buildings Directive and, more importantly, their implementation on the ground and the realisation of their objectives and measures in practice.

Several calls have been made to introduce a fiscal stimulus to incentivize the development of new technologies.

In terms of financial solutions as such, stakeholders suggest to strengthen the current funding schemes and to assure their use. Very importantly, the accessibility of funding to a wide range of interested parties should be improved and innovative funding instruments, assessed and experimented at local level, should be introduced. Many companies and business associations call for tax incentives for citizens if they decide to carry out renovations or to support the rollout of digital design. The latter includes tax deductions, lower VAT on construction products and labour, and eco-bonuses. The role of energy taxation is also mentioned on a few occasions.

A number of stakeholders pronounced themselves explicitly against the introduction of new funding schemes, advising to focus on improving and streamlining the current ones. For example, several business associations and organisations called for not creating additional funds but making the existing ones more attractive and accessible. A limited number of stakeholders raised the topic of the Emission Trading Scheme (ETS): some put the emphasis on the redistribution of ETS revenues to fund renovation projects/to promote renovation in residential and tertiary sector; others called for the revision and extension of the ETS to the building sector.

A number of NGOs call for ensuring a financing stream starting from the early design phase of renovations, for loans to be coupled with socially targeted subsidies and to be long-term so that monthly instalments are not higher than the energy savings generated. Additionally, they support a view that fiscal incentives should be created for the direct use of re-useable building components as well as new circular materials in refurbishment operations.

A business association suggested the creation of a European Social Housing Financing Bank that could be part of the EBRD. A financial institution called for exploring “Financing not linked to costs of operations” (FNLCO) for the ERFD financing dedicated to energy efficiency. Other calls include extending the scope of the Smart Financing for Smart Buildings initiative, the creation of special renovation funds/facilities (a Renovation Fund for All Europeans, Just Renovate facility with the EIB, European Renovation Financing Facility), unlocking the mortgage industry potential and the power of public procurement, off-balance financing.

A general need is identified for more assistance to project proponents (e.g. property owners) in the whole process of renovation, in particular for funding applications and an overview of possibilities available. The assistance could be carried out by public authorities themselves or by counselling organizations accredited at the European level in order to assure the same quality of advisory in all

EU MS. All-embracing support went to the development of one-stop-shops (OSS) at regional and local level, which are seen to be crucial in the further development of renovation. Some stakeholders pointed to the need for accreditation and certification of OSS (e.g. by European bodies or institutions) to create trust. To ensure economic viability of OSS, it is proposed to encourage MS to earmark funds from the Recovery and Resilience Facility to set up and manage all-inclusive OSSs at local level and by streamlining the EU financial support and technical assistance.

Skills, training and education

An idea emerging strongly from the public consultation is to provide an international and/or national pull factor for skilled labour by enhancing and promoting construction professions and their potential in the future, especially in the current context of COVID-19 crisis. Numerous stakeholders state that a significant part of labour force impacted by the crisis could be reskilled and redirected to the construction sector, calling for action at European level to foster upskilling and reskilling in the construction sector.

Extensive trainings and educational programs are seen as necessary for workers in the field but also for public servants and employees of financial institutions. The programs are especially needed on green skills, new technologies and services, methods and materials, and environmental, circular and digitalization aspects of renovation. Agreements with local companies should allow the development of apprenticeship and help to boost employment in this high-potential sector. The creation of jobs can be favoured by the establishment of “transition bridges” for the actors of the social and solidarity economy in order to encourage the return to employment of low-skilled people.

A further avenue is modernizing the building profession and making it attractive to young people. , Various ways to do so are encouraged, for instance by linking it more strongly to environmental issues to which young people are very sensitive nowadays, but also by increasing the esteem of building-related jobs in the public opinion. Stakeholders point to experience with existing EU projects, such as Build Up Skills.

Technology aspects and circularity

A number of stakeholders point to the need for the construction sector to develop new ways and methods across the whole value chain, from the conception to the construction of structures. The aim is to achieve a competitive, sustainable building market with an additional focus on material and resource efficiency, waste management, circularity and consideration of the lifecycle approach in line with circularity, integration of e-mobility infrastructure and digitalization aspects. Monitoring and ensuring the effective implementation of the EPBD provisions concerning smart technologies, building automation and controls and digital tools should constitute the first, very crucial, step towards this goal. Stakeholders point to interlinks to policy initiatives such as the Circular Economy Action Plan, the SME strategy or the EU Industrial Strategy. Materials used for construction and renovation should retain their value at the end of a building’s normal lifespan by fostering circular design approaches, increasing recycling targets and favouring wherever possible the use of secondary raw materials for construction and renovation products.

The general solicited direction goes towards an increased data availability, transparency of products and system performance. Leveraging Artificial Intelligence (AI) in buildings and data analytics is seen as key enabler to monitor, manage and automatically adjust energy consumption but also to thoroughly follow the building’s envelope and thus, provide timely input for necessary and/or suitable renovation works.

Some specific proposals include calculating climate debt (total in ton CO₂-eq) for each newly built building that would subsequently need to be compensated by investments into renovation of existing buildings and examples of methods and methodologies for sustainable structural design.

2.3. Identifying priorities for building renovation

A set of segments denominated as requiring close attention and/or being treated as a matter of priority recur throughout numerous inputs, namely the worst performing buildings (notably residential), public buildings, heating and cooling and integrated renovation projects for entire districts.

Worst-performing buildings

The overwhelming majority of stakeholders call for mandatory minimum performance standards or renovation requirements in different forms and often in combination with EPCs. Different ideas have been proposed in terms of policy approaches to be deployed, e.g. mandatory energy savings pathways, caps on emissions, the introduction of milestones to realise the full energy savings potential of the building stock by 2050, obligations to renovate buildings during specific moments of their lifetime. In general, ideas cover different metrics to be used such as enforcement calendars, type of building segments, etc. Banning the rental or sale of a building under a certain energy performance standard appears regularly as a welcomed measure. Many stakeholders indicate that the mandatory standards should be tailored to each building segment.

At the same time, there is also caution expressed about mandating renovations and emphasis on the importance of careful (national) design and sufficient lead times. Opposing voices point to a risk of sub-optimal investments, unnecessary financial burden (especially for vulnerable groups), disproportionate burden on local authorities and a distortion of already established renovation strategies that might have had a different path for decarbonisation.

Some business associations demand that demolition is considered as an adequate and easy-to-carry-out option when more efficient. The reason is that the worst performing buildings may not offer enough flexibility for new functional/social needs with simple renovation, neither to significantly increase the building life expectancy, nor to have a strong impact on the energy efficiency, CO₂ reduction, or resilience (seismic risk, structural performance, material degradation). Swiss legal assessment of buildings is cited as an example for the latter.

Public sector

Overall, the public sector is expected to lead the renovation as a role model. Its renovation should be ambitious, with many stakeholders calling for a 3% annual renovation rate. The building stock covered should comprise publically owned buildings but also those that are rented and used by the public authorities as a whole, as well as public service buildings. Ambitious cities vow to go in this direction; however, municipalities and regions also express concerns regarding a disproportionate burden on local authorities and a probable necessary removal or significant modification of any established renovation strategy.

NGOs, trade unions as well as companies and business associations, call for fostering green and social public procurement. The inclusion of mandatory social and carbon footprint clauses in the procurement contracts would significantly support the role of social enterprises in the field of renovation and provide a significant environmental and social value to tenders.

Heating and cooling

A big part of stakeholders, mostly from the heating industry but not only, is in favour of replacing old and inefficient space and water heating equipment, for example by introducing scrappage schemes. Depending on the industry, business associations and companies are suggesting the coupling of the latter with hybridisation programmes with infrastructure that can for example support hydrogen for already efficient heating systems. Environmental organisations and certain interest groups are generally cautious about the possibility of locking-in existing gas infrastructure and therefore, slowing down the decarbonisation of the building sector. In their logic, if the use of heating and cooling technologies can continue running on the already broadly available gas, enriched with hydrogen in the future, the end-users would not consider alternative solutions to the gas grid. Thus, depending on each Member State's current situation, they call for the exploration of options to e.g. ban the sales of fossil fuel heating equipment as of 2030 or 2040, as well as to set up a mandatory GHG emission criteria in the building sector (as a mandatory addition to the energy performance requirements currently in force).

The promotion of district heating is particularly encouraged by various stakeholders and is often seen as a tool to eradicate energy poverty and to enable a form of "energy solidarity" between producers of low-carbon waste heat. This can be from data centres or commercial centres and more vulnerable clients often suffering from energy poverty. Yet, according to some, it may not always be the most efficient solution, e.g. in less populated areas. A general call is also made to introduce systematic checks and efficiency labelling of space and water heating equipment.

Neighbourhood approaches

The neighbourhood or district approach was called for by the quasi-totality of stakeholders. However, very concrete and developed ideas seem sparse. The stakeholders call for an integration of policies at the district and community level for renewable energy, heating and cooling systems, for the improvement of resilience by thermal comfort, and for the exploitation of the potential of digitalisation and Artificial Intelligence. A large majority of stakeholders who have raised this point agree that the renovation agenda should be integrated in an urban agenda where long-term planning looks at how residential and non-residential buildings fit into tomorrow's urban landscape. Local authorities will play an important role in this sense but for a bigger success, a significant engagement from various citizens' organizations is needed too.

3. Results from the Open Public Consultation survey

As a next step in the public consultation strategy, an open public consultation questionnaire has been designed to extend the scope and go more in depth of the major points/recurring topics raised in the previous stages via a series of questions on the following topics:

- What is building renovation and barriers to building renovation (section 1);
- Assessing the existing mechanisms for mobilising building renovation (section 2);
- Facilitating mechanisms for mobilising building renovation (section 3)
- Further policies and measures to boost building renovation rates and depth, including accessible and attractive financing (section 4);
- Expected impact of the Covid-19 pandemic on building renovation (section 5);
- Key enabling factors for supportive policymaking and implementation to deliver building renovation (section 6);
- How best to target the worst performing buildings (section 6);
- Fostering the role of central, regional and local authorities and new actors (section 7);
- Scaling up the role of the private sector, industries, and decentralised solutions (section 8);
- Scaling up the role of the private sector, new actors and industries, decentralised solutions for improved operational energy performance (section 9)
- Most promising approaches and best practices for targeting the residential sector (including affordable housing aspects, energy poverty and social housing), for targeting the SMEs at large and for targeting schools and other educational institutions, hospitals and other public buildings (sections 10, 11, 12 and 13);
- Wider benefits of renovating the EU building stock (section 14);
- Smart technologies for transforming today's buildings into the buildings of the future (section 15).

3.1. Content of the survey and results generated

The questionnaire consists of mandatory and optional questions. The mandatory questions cover the definition of renovation and barriers to building renovation (Sections 1 and 2), the assessment of the importance of existing mechanisms for mobilising building renovation (section 3), additional policies and measures to boost renovation rates and depth (Section 4), reaching out the worst performing buildings (Section 6) and the wider benefits of renovating the EU building stock (Section 14). Sections 2 and 3 offer a choice between a simplified mandatory shortlist of responses and the option to rate replies that are more detailed by sector.

The large majority of questions provide a very detailed list of statements and ask respondents to rate them in terms of their relevance and/or importance, namely as "Very important", "Important", "Slightly important", "Not important at all", "No opinion" (respectively the same categories with "relevant" instead of "important")⁶. The factual summary in the following sections of this report points to those "top" statements that have been rated as "Very important"/"Very relevant" or "Important"/"Relevant" **by at least 70% of the respondents**.

In the case of mandatory questions, the sample size is the full survey participation of 441. In the case of optional questions, the 70% threshold is based on the total number of replies received (not on the

⁶ These correspond to the categories presented on charts in this report and in Annex. For optional questions there is a bar "No answer" to give an indication of what share of the total sample of 441 respondents did not answer the respective question.

total number of respondents) in order to ensure consistency, i.e. by removing the no-reply entries. As a general rule, the no-reply entries in optional questions account for around a fifth for most of the optional questions (see corresponding charts throughout the report and in the Annex). All rating questions include a closing category “Other”, whereby respondents can introduce free-text. These entries have been reviewed and analysed in a qualitative manner and a summary is presented under each section below.

The mandatory questions in sections 1 and 3 ask respondents to select statements, allowing multiple choices without ranking these choices. The findings from these mandatory questions are presented factually in this report in terms of the number of respondents who have selected a given statement and the ratio of respondents with respect to the total sample (441 replies).

Finally, the questions in sections 10, 11, 12 and 13 are entirely based on free-text inputs, which have been reviewed and analysed in a qualitative manner.

3.2. Overview of participation

Between 11 June 2020 and 9 July 2020, 441 stakeholders replied to the open public consultation. Almost half (45%) of the respondents are business associations and company/business organisations, followed by public authorities (13%), EU citizens (12%), NGOs (11%) and academic/research institutions (7%). Trade unions, consumer organisations, environmental organisations and non-EU citizens accounted for 0.5-2% of the total.

Table 3: Type of respondents

	Answers	Ratio
Business association	117	27%
Company/business organisation	79	18%
Public authority	59	13%
EU citizen	53	12%
Non-governmental organisation (NGO)	47	11%
Other	36	8%
Academic/research institution	31	7%
Trade union	9	2%
Consumer organisation	6	1%
Environmental organisation	2	0.5%
Non-EU citizen	2	0.5%
Total	441	100%

The survey attracted responses from 30 countries, including 25 EU Member States and 5 non-EU member states (Brazil, Isle of Man, Turkey, United Kingdom and United States). The largest share of respondents is from Belgium (29%), followed by Germany (10%), France (10%), Spain (6%) and Italy (4%). A bit less than half (43%) of the respondents indicated that they or their organisations primarily deal with building renovation.

Table 4: Country of origin

	Answers	Ratio
Belgium	129	29%
Germany	72	16%
France	45	10%
Spain	27	6%

Italy	18	4%
Austria	14	3%
Portugal	14	3%
Sweden	13	3%
Ireland	12	3%
Netherlands	11	2%
Denmark	10	2%
Slovenia	10	2%
Croatia	7	2%
Finland	7	2%
Greece	7	2%
Romania	7	2%
Czechia	6	1%
Slovakia	6	1%
Poland	4	1%
Hungary	3	1%
Luxembourg	3	1%
Bulgaria	2	0,5%
Estonia	2	0,5%
Cyprus	1	0,2%
Malta	1	0,2%
<i>Brazil</i>	1	0,2%
<i>Isle of Man</i>	1	0,2%
<i>Turkey</i>	1	0,2%
<i>United Kingdom</i>	4	1%
<i>United States</i>	3	1%

3.3. Responses by topic

The following sections summarise, in a factual manner, the responses received under each of the 15 sections of the questionnaire and illustrates these with a number of charts⁷.

3.3.1. Building renovation elements and assessment of the main barriers (Questions 1 and 2)

3.3.1.1. *Building renovation: definition*

Almost 60% of respondents see building renovation as oriented towards the improvement of the energy performance of buildings by boosting the energy efficiency of one or more building elements, by optimising operations and maintenance, and by deploying renewables.

More than one third of respondents (also) see renovation in a very holistic manner and define renovation in an integrated way: improving the energy performance along with circular economy

⁷ The charts throughout the report and in Annex III show the rating on the statements from the respective sections of the questionnaire. Some individual statements are very long and occasionally may not fit for full display on the charts. The full version of the questionnaire remains publicly available in English under the EUSurvey tool ([here](#))

principles, improving the usability and the sanitary conditions of the building, and enhancing its preparedness for climate impacts and climate adaptation, earthquakes and fires.

Table 5: What elements describe best a building renovation?

	Answers	Ratio
Improving the energy performance of buildings by improving the energy efficiency of one or more building elements (including the building envelope –roof, windows, façade- , heating and air-conditioning systems, domestic hot water system, lighting, appliances, etc.), by optimal operation and maintenance, and by deploying renewables	263	60%
All replies	157	36%
Applying circular economy principles, such as reuse or high-quality recycling of construction materials, phasing out hazardous substances, ensuring building performance last longer to avoid numerous renovations, incorporate waste treatment and pollution prevention principles	144	33%
Improving the usability of the building (including accessibility for persons with disabilities and elderly people), its market value and adapting to new uses	115	26%
Other	112	25%
Improving the preparedness for climate impacts, including climate-related events such as flooding, hail, windstorms, sea-level rise (e.g. carrying out structural reinforcement of buildings) and/or climate adaptation (e.g. improving response to higher summer temperatures)	94	21%
Improving the sanitary conditions of dwellings by removing harmful substances, such as asbestos	71	16%
Improving the preparedness for events such as earthquakes and fires by carrying out structural reinforcement of buildings	20	5%

Note: Multiple answers possible. The ratio is calculated with respect to the total sample (441 replies) and thus adds to more than 100%. A total of 59 separate combinations of different selections.

Recurring elements that respondents introduce under “Other” include references to moisture resistance, wind-uplifting resistance, indoor light, soundproofing and fire protection. Entries by public authorities include calls for building closer together to use less space and having more compact and geographically closer homes, indirectly related to savings on roads, traffic and congestions, meters of utilities and the like. Building professionals also define renovation as deploying personal comfort systems, educating on adaptive comfort and (re)making energy visible (Not something you forget being switched "ON").

Specific inputs from energy supply companies and manufacturers define renovation as a deployment of the newest technologies to put buildings at the forefront of the provision of flexibility and a clean energy system. This can be achieved through the integration of distributed energy sources, storage & intelligent energy management systems, while also keeping an eye on affordability. Among others, the result of the above will also be an increase of the market value of the building.

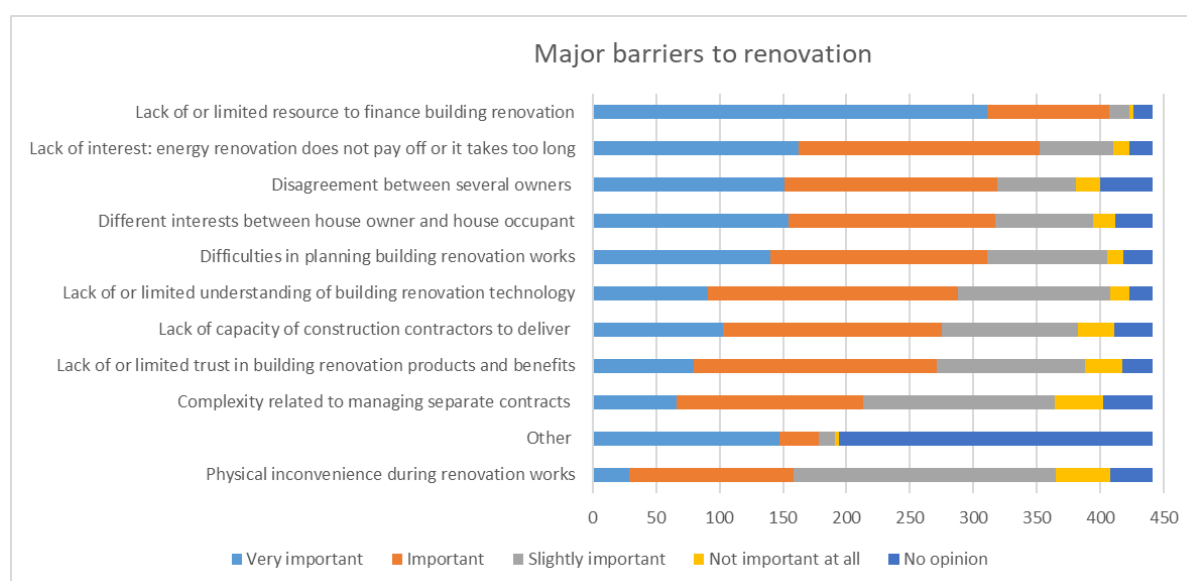
Other ideas include using Building Information Modelling for buildings allowing 3D visualisation, as well as proceeding with caution for a wide array of important aspects ranging from the prevention of social dumping and the strengthening of social dialogue and workers’ participation to an increased attention to fire-safety characteristics that can be significantly changed during renovations.

3.3.1.2. Barriers to building renovation (all buildings)

When it comes to the broad assessment of **the barriers to building renovation** of residential and non-residential buildings (Question 2.1), the top replies are:

- Lack of or limited resource to finance building renovation: 92%
- Lack of interest because energy renovation does not pay off in an immediately evident way or it takes too long: 80%
- Different interests between house owner and house occupant, disagreement between several owners (e.g. multi-apartment buildings) and difficulties in planning building renovation works (obtaining permits required, obtaining financing, insurances, etc.): >70%

Figure 1. Major barriers to renovation, all buildings



Recurring elements that respondents cover under “Other” include lack of political will & incentives, lack of understanding of potential social benefits and too much hassle. Specific views include building professionals pointing to the lack of know-how (including LCC and LCA) and money for investments, division of (administrative) responsibilities, complex and slow public tendering processes that are not sufficiently bundling larger building stocks, low energy prices and hidden costs (especially for historical buildings), rebound effects, infrastructure bottlenecks and/or lock-ins, as well as pressure from the real estate and banking industries. Building professionals also point to the existence of parallel financing tools requiring specific criteria and triggering red tape for project owners, as well as to the difficulties combining guarantees at national and European levels that prevent mass financing. Some construction companies point to a poor information sharing and insufficient and/or ineffective interaction between stakeholders, as well as to the failure to differentiate incentives between big house owning companies, residential building cooperatives (including municipally owned), house owners and flat owners.

Public authorities point to the lack of staff to prepare and control implementation and to the insufficient push of the construction sector to offer more efficient and more affordable renovation solutions. Some energy supply companies touch on the perceived complexity and the consequent lack of trust in solutions (e.g. Energy Performance Contracts), as well as the complexity related to managing the installation of e.g. building integrated photovoltaics. Heritage professionals point to

the lack of sufficient financing for heritage buildings, as well as to the failure to engage with cultural heritage authorities and design and craft professions.

Subsequently, respondents are provided with an option to rate barriers to residential and to non-residential buildings in more details (Question 2.3 and 2.4) with results as follows.

3.3.1.3. Barriers to the renovation of residential buildings

Zooming into **barriers to renovation of residential buildings** (Question 2.3.), the following emerge as top barriers (see Figure 10 in Annex III for the rating of all replies to this question).

- Insufficient understanding of energy use and savings related to different energy efficiency measures: 85%
- Lack of simple, attractive and easily accessible public incentive measures for renovation (e.g. grants or tax incentives): 83%
- Energy renovation does not pay off in an acceptable timeframe: 82%
- Disagreement between several owners (e.g. multi-apartment buildings): 79%
- Lack of information/low awareness of available public and/or private financing products for building renovation: 77%
- Cumbersome procedures and/or financial constraints for accessing public financial support: 76%
- Lack of trust or guarantee that renovation will deliver the energy and money savings or other benefits, lack of quality assurance: 76%
- Different interests between house owner and house occupant: 75%
- Lack of simple, attractive and accessible private financing products for renovation (e.g. loans): 74%
- Lack of interest – renovation to decrease energy consumption is not attractive for me, need for additional advantages: 70%
- Regulatory and administrative barriers and complexity in planning, including permits required, etc.: 70%
- Perceived lack of government support, unambitious policies: 70%

Different categories of respondents include under “Other” a wide array of issues. For example, building professionals point to the lack of early stage evaluations of alternative strategies, increases in property taxation after renovation in some Member States, low amounts of energy renovation loans and subsequently high transaction costs for banks to assess loan applications. Energy supply companies point to the lack of engagement of consumers in renovation. Manufacturers and suppliers indicate that regulatory complexity is driving traditional partners (architects, installers...) out of the market in favour of developers. Other items raised include failures to acknowledge that residential renovation may have a high rate of DIY with inadequate results, as well as underdeveloped energy efficiency markets and lack of mainstream financial products.

3.3.1.4. Barriers to the renovation of non-residential buildings

As for the most pertinent **barriers to non-residential buildings** (Question 2.4.), the large majority of respondents⁸ pointed to the following (see Figure 11 in Annex III for the rating of all replies to this question).

- For publicly owned buildings: lack of funding – 79%
- Lack of attractive and easily accessible financial incentives (loans, grants, tax incentives etc.): 77%
- Lack of interest - Sustainability not a priority and thus public/private entities lacking or not allocating sufficient financial resources (equity, debt) for building renovation: 77%
- Lack of staff in public/private entities with skills to deal with the renovation process (i.e. bundling or pooling a larger number of units, identifying legal, technical and contractual solutions, etc.): 77%
- Energy renovation does not pay off in an acceptable timeframe: 75%
- Insufficient information on energy use and savings related to different energy efficiency measures, never completed an energy audit: 73%
- Restrictive rules on procurement, annual budgeting and accounting: 72%
- Perceived lack of government support, unambitious policies: 71%
- Lack of mainstream financing products (such as energy efficiency mortgages) that offer also covering the building renovation costs in a single package: 70%

Different categories of respondents include under “Other” issues such as public debt ceilings for public authorities that hamper their borrowing capacity, the lack of enabling frameworks for third-party ownership of self-consumption that hinders the ability of SME's to enter into renewable corporate Power Purchase Agreements, the lack of reliable calculation on co-benefits considering the increased "productivity" and building value in the real estate market, as well as the lack of equal treatment with regard to tax subsidies for commercially used real estate.

3.3.2. Experience with EU funds for building renovation (Question 2 continued)

The large majority of respondents do not have any direct experience with the use of EU funds for building renovation.

Table 6. Experience with EU funds for building renovation

No direct experience with the use of EU funds for building renovation	279
I have direct experience with the use of EU funds for building renovation and would like to share specific issues encountered	52
I have direct experience with the use of EU funds for building renovation, but I prefer not to share any specific issues encountered	31
No answer	79
Total	441

⁸ Here we consider replies whereby 70% or more of the respondents who replied to that question rate the statement as “Very important” or “Important”. For non-compulsory questions the sample is smaller than for compulsory questions (441 entries in the latter case), with approximately 20% of respondents not replying to non-compulsory questions.

Of those who have, the following broad responses emerge along with statements about the funds with which certain stakeholders have experience:

- **Building professionals:** complicated administrative procedures and difficulties in accessing funds (especially if the applicant is a condominium or a housing association); limitations of support because condominiums managing multi-apartment buildings where the majority of apartments is owned by natural persons are considered as internal market actors; renovation support accounted as increase in equity and subsequently taxed. A specific suggestion called for a better articulation of ERDF and national loan schemes that target the same goals: notably ERDF funds are granted following an expense logic, while the volume of zero-interest renovation loans (known as “Eco-prêt” in some countries) may be defined in function to the energy gain triggered by the renovation work. One solution would be to apply the energy gain logic when granting ERDF funds, allowing de-linkage of the financing to the operations (Common provisions regulation on ESIF, Art.89), therefore allowing to use both tools simultaneously.)
- **Manufacturers, suppliers:** first-come-first-served basis for projects in building renovation in Member States and not linked to performance/results; cost eligibility period for ERDF and CF limited to 10-year projects (7 years of the MFF +3) (also raised by public authorities).
- **Others:** lack of skills in local administrations, misalignment of project implementation times with respect to spending times.

3.3.3. Key existing policies to mobilise building renovation: assessment (Question 3)

When asked to select the **key policies to mobilise building renovation** (Question 3), the majority of respondents pointed to appropriate public incentives and easily accessible public financing, along with information and advice on all aspects of building renovation, simplification of administrative procedures and building implementation support (see Table 7)

Table 7 Key policies necessary to mobilise building renovation in general

	Answers	Ratio
Increase in the availability of appropriate public incentives (grants or fiscal measures) for building renovation	347	79%
Increase in the availability of attractive and easily accessible public financing	303	69%
Information and advice about all aspects of building renovation	281	64%
Simplification of administrative procedures	279	63%
Implementation support for building renovation (e.g. one-stop shop)	271	61%
Regulatory requirements for building renovation	248	56%
Changes in energy taxation or carbon pricing to internalise the cost of greenhouse gas emissions	229	52%
Increase in the availability of attractive and easily accessible private financing	225	51%
Other	104	24%
None of the above	4	1%

Note: Multiple answers possible. The ratio for each statement is calculated with respect to the total sample (441 replies). 182 different combinations of answers.

When it comes to proposing other key policies under this broadly formulated question, recurring topics include EPCs, Building Renovation Passports, and engagement of regional and local level and one-stop shops. Some public authorities point to the strengthening of the local network of

renovation specialist companies, along with the establishment of decentralized one-stop-shops close to the citizens and making some renovation materials tax-free (especially to renovate heating systems). Some of the issues are echoed by construction companies reduced VAT at 5% for all energy efficiency renovation in existing buildings, a tax on the total kWh consumed, the CO₂ emitted, and the non-renewable kWh consumed, etc.) and energy auditors (local community based social enterprises to drive a large scale programme of retrofitting with community engagement). Ideas put forward by some manufacturers / suppliers include an obligation on MSs to introduce BRPs and minimum mandatory standards for buildings within a harmonized EU framework, as well as carbon policy measures for buildings and making a clear “diagnostic” message of the cost of non-renovation. Other ideas include combining public funding for the renovation of private rental housing with rent caps, requirements for energy management systems in certain categories of buildings, such as large non-residential buildings and certain public buildings.

Respondents have subsequently the possibility to separately rate existing policies in more detail by policy type, namely: (a) regulatory and administrative tools (Question 3.3), (b) economic instruments and financing (Question 3.4.), (c) information, communication, technical assistance, as well as skills and knowledge (Question 3.5).

3.3.3.1. Regulatory and administrative tools

When it comes to the **regulatory and administrative** tool category (Question 3.3.), the top rated ones by the large majority of respondents are mandatory minimum energy performance standards of the whole building (82%) or of building elements and technical building systems (77%) along with renovation targets, including renovation targets as part of voluntary agreements (70%). Note: Optional question

Figure 12 in Annex III summarises ratings of all regulatory and administrative tools in this question.

When it comes to proposing other regulatory and administrative tools, respondents offer a diversity of ideas. For example, building professionals call for mandating climate action roadmaps for each building and, as indicated in the previous section, reduced VAT rates for renovation and using taxation tools more broadly, as well as excluding financing tools such as the « intracting » in the frame of Energy performance contracts from debt calculations (which is already possible with the revised statistical treatment of Eurostat for Energy performance contracts, but not necessarily applied). Different groups of stakeholders call for regulatory tools to mandate Indoor Environmental Quality, including better lighting, living quality standards, further integration of circular economy principles into the renovation requirements, as well as mandatory inspections looking at the fire resilience of renovation materials and technologies.

3.3.3.2. Economic instruments and financing

As for **economic instruments and financing** (Question 3.4.), the following list of existing policies gets top rating as very important and important. Note: Optional question

Figure 13 in Annex III provides more details.

- Non-repayable rewards (including EU, national or regional public grants and subsidies): 84-87%
- A combination of public grants and finance mechanisms (loans, guarantees, etc.): 83%
- Tax reductions and deductions for building renovation (income tax credit/deductions, property taxation, including local property taxation, lower VAT rates, etc.): 83%

- Debt and equity financing (loans/soft loans, revolving funds, green leasing, energy service agreements, Energy Performance Contracting, etc.): 77%
- Innovative financing models for repaying the upfront investment, such as repayment of investments to the utility bill (on-bill financing), municipal bonds to finance renovation (on-tax financing), energy efficiency as a service model: 72%
- Energy efficiency loans and/or mortgages offered by commercial banks: 71%

In addition to the tools listed in the question, respondents offer a diversity of ideas. Non-repayable support is a recurring topic also under “Other” (even if it is already included in the list of tools to be rated) and the idea of a European Renovation Fund to provide long-term and low cost finance, grant financing and technical assistance also appears on a number of occasions.

Some building professionals call for an EU Renovation fund with long-term and low-cost finance, as well as using carbon/energy efficiency property taxation. Other ideas from this stakeholder group include “bring a friend” schemes with increased financial incentives, as well as payments for avoided carbon emissions, whereby the future emissions of a building are calculated and a monetary carbon credit is established to be spent on energy renovation programmes; operationally the idea is to have carbon bank accounts accessible to certified actors of the zero emissions pathways.

On the side of energy supply companies there is a call for innovative financing mechanisms, such as pooling of small-scale solar projects to address specific barriers faced by citizens and energy communities, for stronger and simpler economic support instruments and for reduced VAT rate for building demolition/reconstruction. Some public authorities call for educating citizens about lifecycle costs, along with differentiated financing instruments in accordance with the building type, its condition as well as the different ownership structures.

Finally, diverse actors remind about the need for free renovation for low-income households.

3.3.3.3. Information, communication and provide technical assistance, skills and knowledge

With regard to tools to enhance **information, communication and provide technical assistance, skills and knowledge** (Question 3.5.), the top rated ones by the large majority of respondents are:

- Advice and assistance in legal, planning, technical, administrative and financing matters, implementation support to building owners and operators: 91%
- Enhanced knowledge on renovation benefits, including wider benefits such as health (indoor and ambient air quality), comfort, higher disposable income, preparedness to climate impacts: 86%
- Up- and re-skilling of workers/staff through training or education, cooperation with education & training institutions to improve building performance: 86%
- Development of energy audits, information via energy performance certificates, energy labelling, informative metering and billing: 77%
- Information on overall environmental performance of building materials and technical systems, including water efficiency, energy efficiency, presence/emission of hazardous chemicals, reparability/reusability/recyclability: 70%

Figure 14 in Annex III provides more details. A recurring topic added by respondents under the category “Other” is up- and re-skilling of workers. Some building professionals call for an energy calculation tool, which predicts the actual energy demand in a simple way, as well as for clear requirements for advisors and advisory services to ensure renovation quality. Some public

authorities indicate the need for promoting an increased use of certified green buildings, as well as for (digital) tools linking building owners to specific proposals for their building (type) and to the people and companies able to help them to renovate their building.

3.3.4. The way ahead: [Further policies and measures](#) to boost building renovation rates and depth by increasing demand and fostering innovation (Question 4)

Respondents are subsequently asked via a series of mandatory questions to also rate further policies and measures separately for the residential and for the non-residential sectors, using the same categories of policies, namely: (a) regulatory and administrative tools, (b) economic instruments and financing, (c) information, communication, technical assistance, as well as skills and knowledge. Some general observations with regard to specific points on both residential and non-residential sectors, raised by different stakeholders come next, before presenting the results per category of policies for the residential and non-residential sectors in a factual manner.

Observations with regard to prospective regulatory and administrative tools in both segments that come from diverse stakeholder groups include binding renovation targets at national level and minimum mandatory requirements with associated rental bans of non-compliant properties. While some call for legal limits for CO₂ emissions (CO₂ caps) for major renovations and heating system replacements, there are also doubts raised about fossil fuel bans and calls for technology-neutral incentives.

General observations with regard to promising economic and financing tools in both segments that come from diverse stakeholder groups include calls for avoiding double funding and a multiplicity of funding sources that cause confusion, the establishment of a joint funding strategy with the participation of the EU, national, regional and local authorities, a standardisation of financial tools, as well as for lower insurance premiums for renovated energy-efficient resilient buildings along with comprehensible tax regimes and easy financing tools for renovation projects. The latter should target building renovation in an integrated manner (energy performance, structural safety, recyclability or combinations, resilient buildings).

When it comes to technical assistance, aggregation, information and communication, the recurring topic is targeting owners/tenants/leaseholders of buildings with information on consumption, performance, inspections, financing and technologies. Other proposals include calls for reliability of EPC, training for EPC providers, scaling up BRPs, one-stop-shops and ensuring quality of advisory services, along with a generally proper monitoring and the enforcement of building codes. There are calls to differentiate between orientation advice from central contact points (e.g. consumer advice) and more extensive renovation concept advice (from energy efficiency experts).

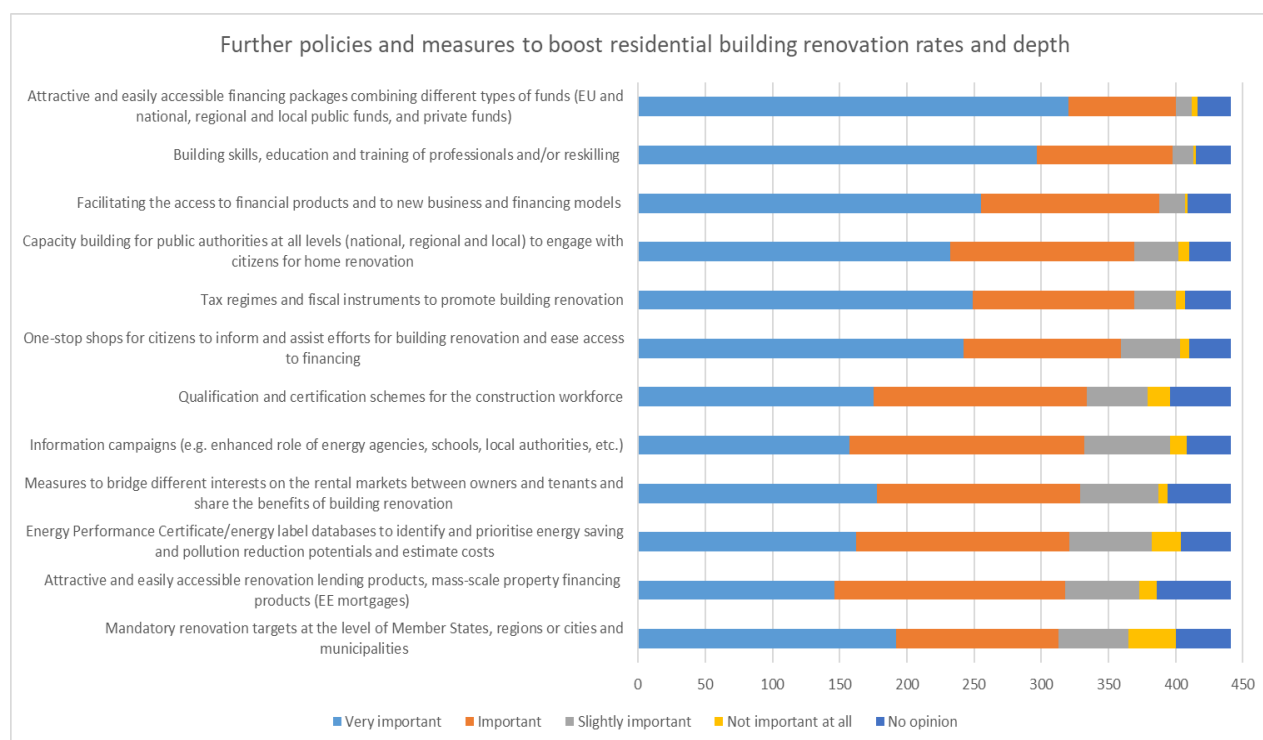
Finally, with regards to skills and knowledge, there are calls for facilitation of self/citizen/community renovation (also led by public/professional associations), including efficiency in professional education curricula and a guarantee that building professionals also have skills related to indoor environmental quality, accessibility and an increasing awareness of ESG investments by the market. Other topics include a severe shortage of professionals, e.g. in the electrical installation sector, the need for stronger digital and green skillsets, as well as the possibility to make use of Vocational Education and Training (VET) to ensure supply of skilled professionals (among others, for Europe's historic built environment). There are some calls to establish a broad stakeholder group as a forum for consultation, policy formulation and feedback on practical issues and obstacles to renovation.

3.3.4.1. The way ahead: residential sector

In order to present a comprehensive package of the most promising policy packages, Figure 2 below summarises the mix of all regulatory and administrative tools, economic instruments and financing aspects, as well as information, communication, technical assistance and skills items that are rated as Very Relevant and Relevant by at least 70% of all respondents to compulsory questions 4.1.1, 4.1.2, 4.1.3 and 4.1.4. For a detailed overview of all policy responses rated under each policy category (question), see Figure 15 until Figure 18 in Annex III.

As can be seen in Figure 2 that combines the top statements from all categories, there is a balanced view on the combination of financing, skill and capacity building, along with information, regulatory and administrative aspects.

Figure 2. Further policies and measures to boost residential building renovation rates and depth: compilation of the top-rated choices from all policy categories



Note: Selection of policies based on responses that were rated as Very Important and Important by at least 70% of all respondents to compulsory questions 4.1.1 until 4.1.4. (n=441)

More than 90% of the respondents consider **attractive and easily accessible financing packages for building renovation combining different types of funds** (EU and national, regional and local public funds, and private funds) as very important/important. **Building skills, education and training** for all relevant actors come next (90%). These include architects and installers, engineers, heritage professionals and construction workforce and/or reskilling to energy, resource and water efficiency (including avoiding hazardous materials), pollutant emission reduction, building integrated and related renewable energy, resilience to climate change impacts, urban green and blue infrastructure, digitalisation and innovation.

Facilitating access to **financial products and to new business and financing models** (88%), along with **capacity building for public authorities** at all levels to engage with citizens for faster take up of home renovation (84%), **tax regimes and fiscal instruments** to promote building renovation (84%)

and **one-stop shops for citizens** (81%) to inform and assist efforts for building renovation and ease access to financing are seen as very important/important by more than 80% of all respondents.

Qualification and certification schemes for the construction workforce, information campaigns, measures to bridge different interests on the rental markets between owners and tenants (occupants) of buildings and sharing of the benefits of building renovation are seen as very relevant/relevant by 75-76%.

The list of the top rated policies emerging from this part of the survey also encompasses **Energy Performance Certificates/energy label databases** to identify and prioritise the potential for energy savings, pollution reduction and costs estimations (73%), the deployment of attractive and easily accessible **renovation lending products and/or enabling the mass-scale property financing products** (72%) and **mandatory renovation targets** at the level of Member States, regions or cities and municipalities (71%).

In more detail and as seen from Figure 15 until Figure 18 in Annex III, most of the policies included in the survey are supported by a large majority of the respondents. In the case of regulatory and administrative tools, more than 60% also gave top rating to measures ensuring that the building performance impacts the value of the building, to energy performance improvements in respect of heritage value of buildings, to targets for average performance of the residential stock, minimum energy performance standards at transaction points (with or without cost-efficiency requirement), housing laws ensuring efficient decision-making procedures for homeowners associations and to measures creating incentives for building renovation instead of demolition.

A variety of additional proposals are made by different stakeholder groups on *regulatory and administrative tools in the residential sector*. For example, some building professionals call for requirements for the whole lifecycle carbon footprint of buildings, for limits to the Global Warming Potential of construction materials, for developing tools specific to historic buildings and for binding natural and artificial lighting standards. Manufacturers and suppliers have called for measures to progressively introduce real performance metrics as a complement to calculated performance to e.g. facilitate the financing of energy renovation linked to guaranteed savings. Different stakeholders point to the role of buildings for Demand Side Flexibility. Some suggest an obligation to put structurally unoccupied housing back on the market after renovation, as well as public funding to only go to projects with a thorough participation of tenants along with general support for collective citizen actions.

Additional proposals in the context of *economic instruments and financing for the residential sector* include divergent ideas. For example, some building professionals propose low carbon renovation grants, financing schemes in the form of joint loans to homeowner associations (mixing grant and loan components), revolving renovation funds. Some public authorities indicate that no further funds are needed, that purely incentive-based approaches are insufficient in themselves and that further measures should be limited to the removal of obstacles, such as complex standardization and legislation, discrepancy between computational needs and actual performance, lack of standardization in some areas, perception of the renovation by the customer as a burden (and not as an increase in comfort). Energy auditors call for accounting for non-energy benefits and additional revenue streams e.g. flexibility revenues in the cash flow projections, as well as a pedagogical website with “all financial options listed”. Manufacturers/ suppliers call for aggregation of projects, once again refer to a dedicated EU renovation facility with a combination of grants, soft loans and guarantees to national banks and renovation programs and call for caution on making any extension of the EU ETS to buildings compatible with other instruments pricing carbon at EU level (Energy

Taxation Directive) or Member State level (national instruments including minimum price, tax or market mechanisms). Various stakeholders also raise the issue of acting against unoccupied housing in view of an increasing supply and the one of resources release for renovation and insulation.

Additional proposals in the context of *technical assistance, aggregation and information and communication for the residential sector* coming from e.g. building professionals include doubling the ELENA facility, increasing the capacity of local and planning authorities, calling for BRPs, as well as for lifecycle analysis indicators with a focus on climate adaptation/resilience. Many stakeholders call for bundling of renovation projects (project aggregation), especially in the case of social housing organisations or possibly as a voluntary scheme with inspiration and a good offer for house owners in a neighbourhood. At the same time, on some occasions caution is expressed that bundling renovation projects can lead to an excessive generalisation, omission of important details/specific characteristics of individual buildings and thus, not applying the most adequate renovations. Another criticism against bundling is that individual building problems (e.g. on the technical/ownership side) can negatively impact the progress of the renovation of other buildings bundled with it (e.g. funding can be stopped or postponed, the works as well etc.).

Different stakeholders call for specific trainings, including social housing providers in energy deficiency and tax authorities, and enhanced usage of EPC e.g. connected to procurement platforms and/or digital market places or for the creation of colour-coded maps of advertised properties. There is a call for special support structures to help homeowners associations scaling up renovation of multi-apartment buildings, especially e.g. in Central and Eastern Europe. Some energy supply companies and manufacturers/suppliers call for access to smart meters data to assess the need for renovation based on energy consumption, as well as for the aggregation of projects or works with the community. The role of technical assistance is emphasised, also in the context of designing renovation programs, addressing regulatory barriers and improved coordination and cooperation between engaged institutions. Public authorities point to the need for ensuring independent and reliable information to build confidence in renovation, for supporting citizen-led organisations tackling building renovation, and for the development of local/regional coordination services (e.g. one-stop-shops).

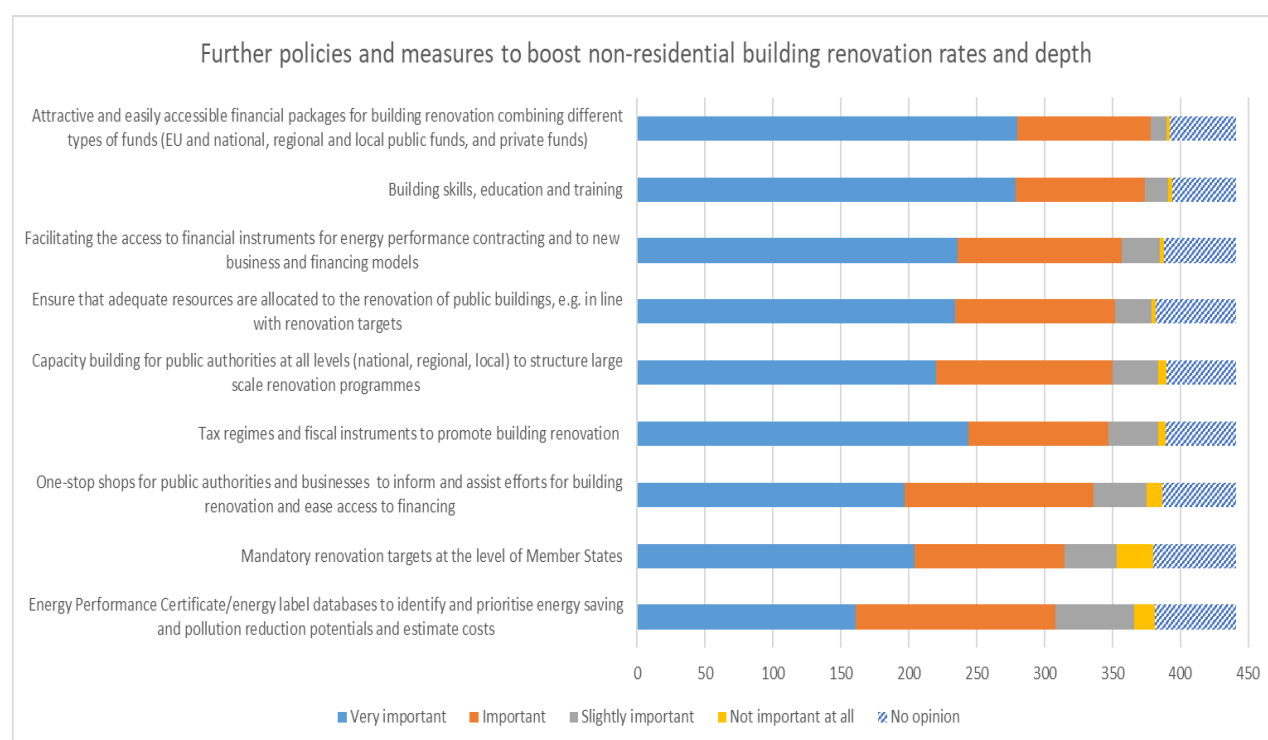
When it comes to *skills and knowledge for residential sector renovation*, some building professionals and energy auditors call for training of professional house managers to lead the renovation of condominiums, as well as for training leading to the creation of a Climate Action Roadmap for all buildings and capacity building for social housing providers at all levels (national, regional and local) and their representative bodies. Once again, issues such as facilitating cross-discipline cooperation and pooling of installers from various branches together, training and upskilling of installers (while avoiding business disruptions given the very small size of such companies), monitoring and evaluation of requalification, education, training and certification to guarantee the quality of the results appear recurrently. Some energy supply companies point to the **growing need of digital experts to process data linked to renovation work**. They also mention that up-skilling energy management to make better use of energy information and acknowledging that construction professionals, installers, maintenance staff and chimneysweepers are at the first line of the renovation wave and that buildings skills, education and training should also include circular economy approaches and safety aspects like fire safety.

3.3.4.2. The way ahead: non-residential sector (Questions 4.2.1 until 4.2.4)

The responses for the non-residential sector are rather similar with the top three policy responses being **attractive and easily accessible financing packages for building renovation combining different types of funds** (86%), along with **building skills, education and training** (85%) and **facilitating the access to financial instruments for energy performance contracting and to new business and financing models** (81%).

Other policies to reach the non-residential sector that have been rated as very important/important by more than 70% of all respondents are aiming to ensure that adequate resources are allocated to the renovation of **public buildings** (e.g. in line with renovation targets; 80%), **capacity building for public authorities** to structure large scale renovation programmes (79%), **tax regimes and fiscal instruments** to promote building renovation (79%), **one-stop shops for public authorities and businesses** (76%), as well as **mandatory renovation targets** (71%) and **Energy Performance Certificate/energy label databases** to identify and prioritise energy saving and pollution reduction potentials and to provide cost estimates (70%). Figure 3 combines the top statements from all policy categories and shows again that these are a combination of financing, skill and capacity building, along with information, as well as regulatory and administrative aspects. Figure 19 until Figure 22 in Annex III present a detailed overview by type of policy.

Figure 3. Further policies and measures to boost non-residential building renovation rates and depth: compilation of the top-rated choices from all policy categories



Note: Selection of policies based on responses that were rated as Very Important and Important by at least 70% of all respondents to compulsory questions 4.2.1 until 4.2.4. (n=441)

A variety of additional proposals are made by different stakeholder groups on *regulatory and administrative tools in the non-residential sector*. These include implementation of energy management systems, model contracts, tax reliefs based on energy savings, as well as specific requirements for self-consumption at building or community level. Different stakeholders, such as energy supply companies and manufacturers/suppliers are occasionally cautious about mandating renovation at specific transaction points as this may cause sub-optimal lock-ins. In this sense, there

are some calls for stepwise renovation and regulations setting clear goals and step-by-step plans to achieve them. Some manufacturers/suppliers also call for measures to promote cities' densification (additional storeys to existing buildings) and for phasing-out inefficient components such as single glazing. Various other ideas include measures to promote the creation of a digital building twin at transaction points and measures to link renovation benefits to building users' priorities, such as reduced infection rates in hospitals, and better student performance in schools. The input on fossil fuel phase-out is not unambiguous with some supporting a blanket ban and others pointing to the benefits of fuel switch away from e.g. oil to gas.

Additional proposals in the context of *economic instruments and financing for the non-residential sector* also include divergent ideas. For instance, some building professionals call for a Green Bank Model and for pre-filled/ready-made documents to facilitate financing from commercial banks, including typical contractual baseline and profit-sharing schemes, allocating risks and benefits among project affiliates. Consumer organisations point to the potential of interest-free loans by state banks, while some energy auditors propose making energy advice free for all citizens. Some energy supply companies indicate crowdfunding as a way to involve citizens in renovations projects, call for the Commission to address the transparency, effectiveness and cumbersome procedures of the existent financial tools for building renovation and encourage a gradual phase-out of subsidies moving towards mobilising private financing and adopting de-risking measures for public-private partnerships. Modernisation of state aid rules is also mentioned, e.g. in the context of energy contracting under the de-minimis rules.

Additional proposals in the context of *technical assistance, aggregation, and information and communication for the non-residential sector* coming from building professionals include e.g. technical assistance on the spot at town halls, prioritising frameworks for and tenders of local contractors and consultants, inclusion of architectural design advice at energy efficiency one-stop shops and new methodologies to account for passive solar systems (in energy performance improvement). Consumer organisations indicate that administrative tasks related to renovation should be carried out by service providers as owners are deterred by hurdles. While some call for specific requirements in Green Public Procurement guidelines, others (e.g. some public authorities) indicate that environmental, social and governance performance procurement criteria should remain voluntary. Some manufacturers/suppliers point to the use of digital tools and Artificial Intelligences to map the potential of energy savings in an area-based approach, while different stakeholders call for quantification of renovation co-benefits in term of productivity and building real estate value.

When it comes to *skills and knowledge for non-residential sector renovation*, building professionals propose information papers to private investors and homeowners, while also pointing that economically attractive building renovation pulls demand and installers skill themselves. Some manufacturers/suppliers criticise the lack of harmonisation at national and EU level with regards to the skills required of the workforce preventing the mobility of workers and point that the development of contracting knowledge is of particular relevance for public building owners.

3.3.5. Building renovation in the context of post-Covid recovery (Question 5)

A clear and overwhelming majority of respondents see building renovation as fundamental for post-Covid economic recovery, with a central role in any recovery plan.

Table 8. How do you see building renovation in the context of post-Covid19 economic recovery?

		Answers	Ratio
Building renovation is fundamental for economic recovery. It should be central to any recovery plans (EU, national, regional, local)		297	67.35%
Building renovation has a positive impact in the context of economic recovery. It should be part of recovery plans, but should not be prioritised over other economic activities		157	35.6%
Building renovation has a neutral impact in the context of economic recovery. Building renovation should not be part of recovery packages, but existing schemes should be kept		14	3.17%
Other		77	17.46%
No Answer		10	2.27%

Note: at most two choices to allow for selecting "Other" in addition to any of the qualifying responses; the percentages are calculated in comparison to the total sample (n=441). However, some respondents have also selected e.g. the first two choices (fundamental and positive) and some respondents have selected the second and third choices (positive and neutral), which brings the total number of answers under all categories above the total sample. A total of 10 combinations of responses.

Some general observations put forward by respondents include that wide notion of building renovation should be broken down into policy packages depending on their time to market and readiness in order to ensure that funds are actually funnelled into the real economy.

Some private actors companies (energy supply companies, manufacturers/suppliers) point that jobs must be at the heart of recovery, that there is a need for a dedicated fund for urgent building renovation of poor city neighbourhoods with high overcrowding rate (also in order to decrease the risk of Covid-19 contamination) and/or for health care and elderly care buildings to enable flexible use and adaptability in the occurrence of a pandemic. Other observations include emphasising the role of energy management systems and the importance of prioritising and promoting circular economy provisions from production and consumption side.

3.3.6. Key enabling factors for building renovation (Question 6)

Most of the enabling factors for supportive policymaking and delivering on building renovation that were listed in the survey were rated as Very relevant and Relevant by the large majority of respondents. See Figure 23 in Annex III for further details.

- Emphasis on building renovation in the context of efforts to adapt to climate impacts: 85%
- Targeted support to facilitate upskilling and/or reskilling of workers: 83%
- Link financial support to energy performance increase levels in terms of efficiency improvements and/or savings achieved, renewable energy increase: 82%
- Strengthen the requirement on public sector to lead by example (e.g. compulsory targets and adequate resources allocated to the renovation of public buildings): 82%
- Facilitate easy combinations of public and private financing for renovation: 82%
- Emphasis on building renovation in the context of the recovery plan after Covid-19: 82%
- Support capacity building of public authorities and their mandated bodies to structure renovation programmes and foster uptake of successful examples: 80%

- Active engagement and interest of the private sector (Energy Service Companies, energy communities, housing associations, financing institutions and communities, etc.): 80%
- Simplification of administrative procedures related to building renovation at local and national levels: 80%
- Requirements to set roadmaps for building renovation (per building type, class, construction year, etc.): 79%
- Use of data and digitalisation for energy, resource and water efficiency and flexible renewable energy use in buildings, data-based energy management; enabling the consumers to be rewarded for efficient behaviour: 77%
- Active involvement of public and private lenders and investors in development and roll out of attractive, accessible, mass-market financing products that include renovation costs without additional burden or additional collateral requirements: 76%
- General awareness raising and media campaigns: 76%
- Targeted support to project development units and advisory services on building renovation and financing, investment platforms, etc.: 76%
- Ensure reliable, consistent and comparable building data: Energy Performance Certificates (EPC) and their extended use, possibly in combination with Building Renovation Passports; availability of EPC ratings and potential use of the certificates as reliable evidence for financial institutions: 75%
- Newly introduced obligation to set targets for mandatory renovation at the level of Member States, sectors, etc. : 75%
- Capacity building, education and training for stakeholders not directly involved on-site (e.g. administration, managers, financial sector): 74%
- Ensure reliable, consistent and comparable environmental sustainability information for building materials and technical systems: 72%
- Guarantees in terms of energy savings and/or money savings and/or reduced pollutant emissions and/or other benefits: 70%

Additional elements put forward by stakeholders in the context of key enabling factors include a wide range of ideas. For example, some manufacturers/suppliers note the absence of EU regulations on the summer performance of buildings, as well as the impact of building envelopes on the heat island phenomenon in cities leading to a continuous increase in summer consumption. The same stakeholder category also calls for progressively tightened minimum energy performance standards for existing buildings, for promotion of renovation lifecycle to decrease risk of unsatisfactory renovation and for ensuring that the taxonomy framework creates a level playing field between the various building solutions. Some construction companies and/or building professionals call for taxonomy of worst performing buildings, for passive house certificates and for technology neutrality in order to not restrict technology innovation. Stakeholders such as energy auditors and energy supply companies propose return on renovation investment guarantees (e.g. by premium to short payback projects), as well as call for using the Smart Readiness Indicator to assess network serviceability of buildings; they also point to the need to support citizens, in particular lower-income households, in their new role as prosumers and fight energy poverty by reinforcing aid devices and digital solutions.

Some public authorities note that training on material efficiency in building processes would empower building and construction industries and deliver lower embedded emissions in the built environment. Furthermore, they call for more clarity and research on the dependencies between housing and climate policy goals and instruments and the effects on the market. A differentiation is

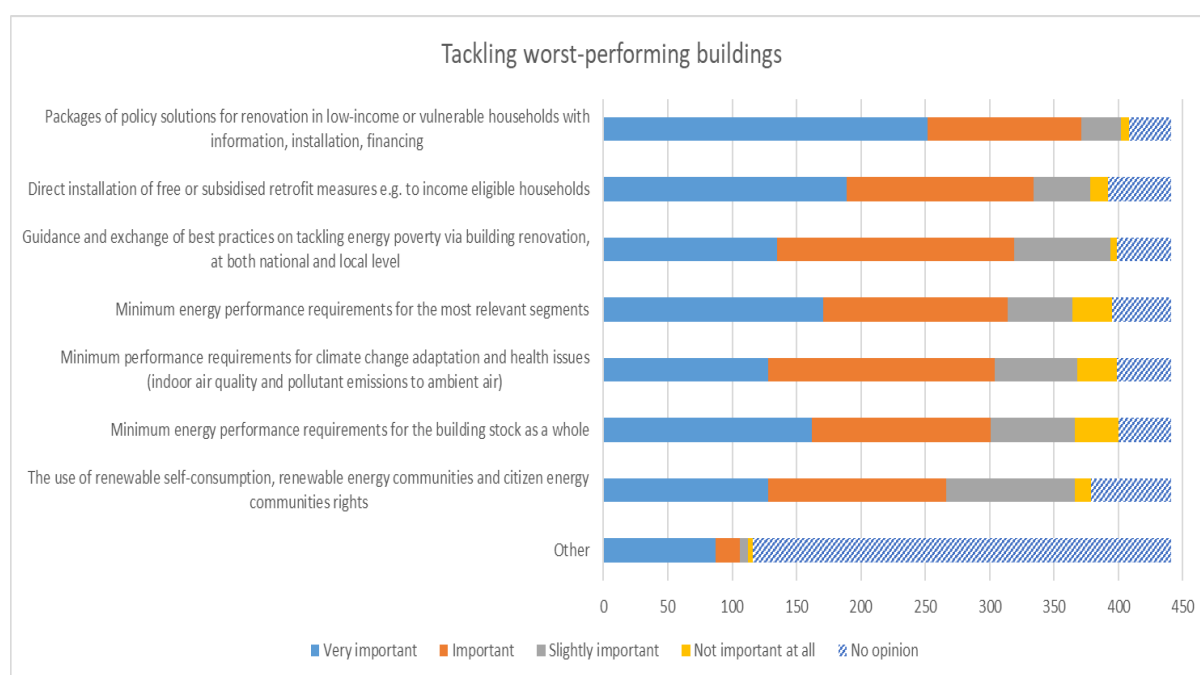
made among the enabling power of media campaigns and the tailor-made campaigns are necessary for specific target groups (e.g. people in energy poverty).

Other ideas proposed by different groups of stakeholders include benchmarking per building typologies in different context (grouping buildings in EU stock in homogeneous clusters featured by similar climate, cultural, social, technical characteristics), recalling of the importance of involving national social partners in construction, emphasise the need for clear and common standards for technical inspections of buildings and for mandatory goals for indoor air and light quality. Another idea is documenting in a database the real characteristics of existing buildings, their energy behaviour and the quality of their interior spaces (similar to Building Renovation Passports, but with a mandatory nature).

3.3.7. Tackling the worst performing buildings (Question 7)

With regard to reaching to the worst performing buildings, more than three quarters of respondents see as a way forward **packages of policy solutions for renovation in low-income or vulnerable households with information, installation, financing** (84%), as well as **direct installation of free or subsidised retrofit measures** (76%). In this context, guidance and exchange of best practices of tackling energy poverty via building renovation is seen as very relevant (72%), along with **minimum energy performance standards** for the most relevant segments (71%).

Figure 4. Tackling the worst-performing buildings



A recurring notion that emerges from the inputs under the category “Other” is the need to targeted financing instruments for low-income households (non-repayable support, upfront investment fund scheme, etc.). Some specific ideas coming from different stakeholders include personal assistance by social workers and rental bans of inefficient properties, as well as emphasising measures like inspections of electrical installations, fire safety checks, prevention, smoke alarms and awareness.

Other proposals include energy checks to means-tested low-income households, analysing the potential and broader societal benefits for renovation of buildings and tackling renovation of worst performing buildings from a community perspective with the aim to improve neighbourhoods as a whole.

On some occasions caution is called for with regard to the effect of setting minimum energy standards for social housing, without providing funding for the required investment to carry out renovation work, which could have the potential effect of deterring social housing provision particularly for smaller social housing providers.

3.3.8. Fostering the role of the central, regional and local authorities (Question 8)

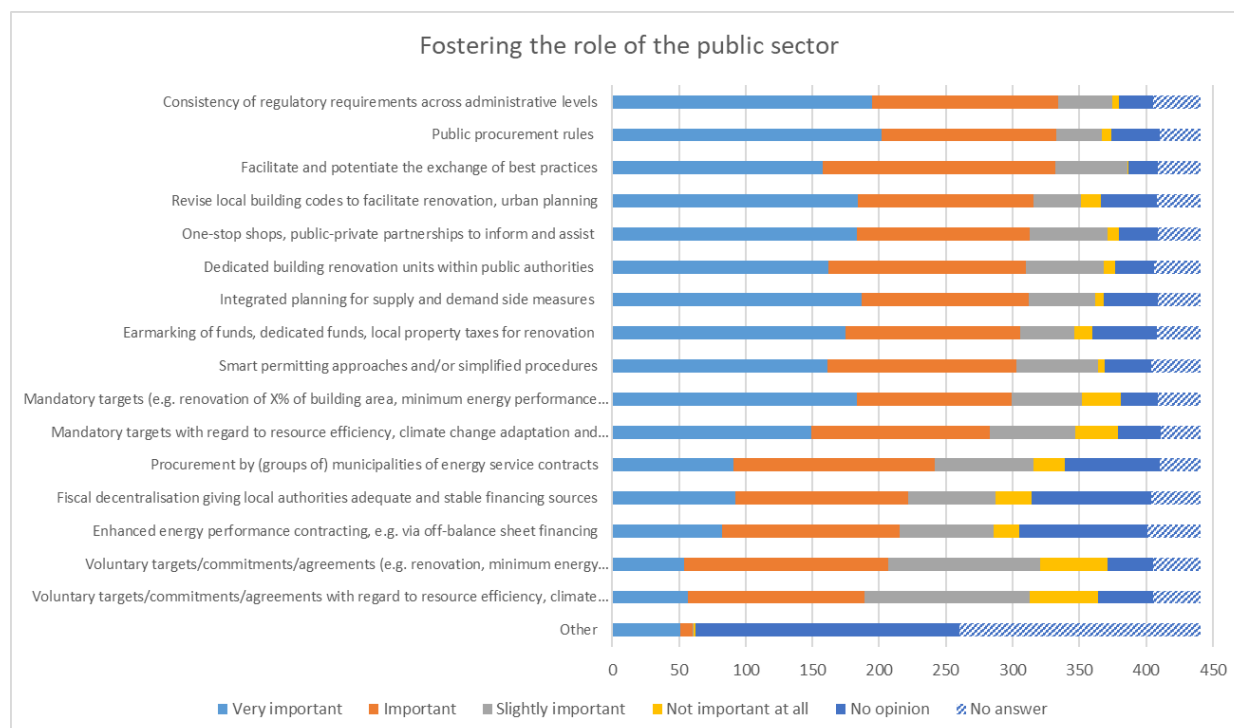
When it comes to fostering the role of central, regional and local authorities, the top policy responses are: **coordination of regulatory requirements** to ensure consistency across the different administrative levels (82%), as well as **public procurement rules** that take into account energy efficiency, water and resource efficiency and overall environmental performance, renewable energy, climate adaptation, air quality, urban green and blue infrastructure and circular economy considerations (81%), along with general facilitation of the **exchange of best practices** (81%). In addition, the rest of the top rated policies include:

- revising **local building codes to facilitate renovation** and improve urban planning for renovation and promote green infrastructure (77%),
- **one-stop shops, public-private partnerships** to inform and assist efforts of public authorities for building renovation and ease access to financing(77%) ,
- creation of **dedicated building renovation project development units** within public authorities at all levels, retention of skilled and experienced staff (76%)
- **Integrated planning** for supply side and demand side measures in the building sector (e.g. district approaches, access to low-emission transport infrastructure, alignment of local renovation strategies with the national energy and climate plans, building renovation chapter in the Covenant of Mayors) (76%)
- **Earmarking of funds for renovation** (EU, national, regional or local), dedicated funds, including novel approaches for redistribution of local property taxes stimulating renovation investments (75%)
- **Smart permitting approaches** and/or simplified building renovation procedures (75%)
- **Mandatory targets** (e.g. renovation of X% of building area, minimum energy performance requirements) (75%)

Recurring topics that emerge from the inputs under the category “Other” are mandatory targets, exchange of best practices and one-stop-shops. Some building professionals call for development of networks of regional and local competency and expertise in the design and procurement of building renovations to support local authorities implement low carbon building strategies, for mutualising procurement of traditional building materials, along with ensuring public authority staff dedicated to renovation programs (including workers such e.g. carpenters). This last view is not universally shared and other building professionals express themselves in favour of professional home managers acting as renovation project development units instead of public authorities. Some public authorities call for possibilities under public procurement to let projects be integrated with social, environmental and green solutions on a local level.

Some statements caution against advantages favouring public ESCOs or public management of projects. Some call for a consultation process with relevant stakeholders to come up with a scalable and replicable solution for off-balance sheet treatment for energy efficiency investments.

Figure 5. Fostering the role of the central, regional and local authorities



3.3.9. Engaging industries, third party services such as Energy Service Companies, and new 'aggregators' (Question 9)

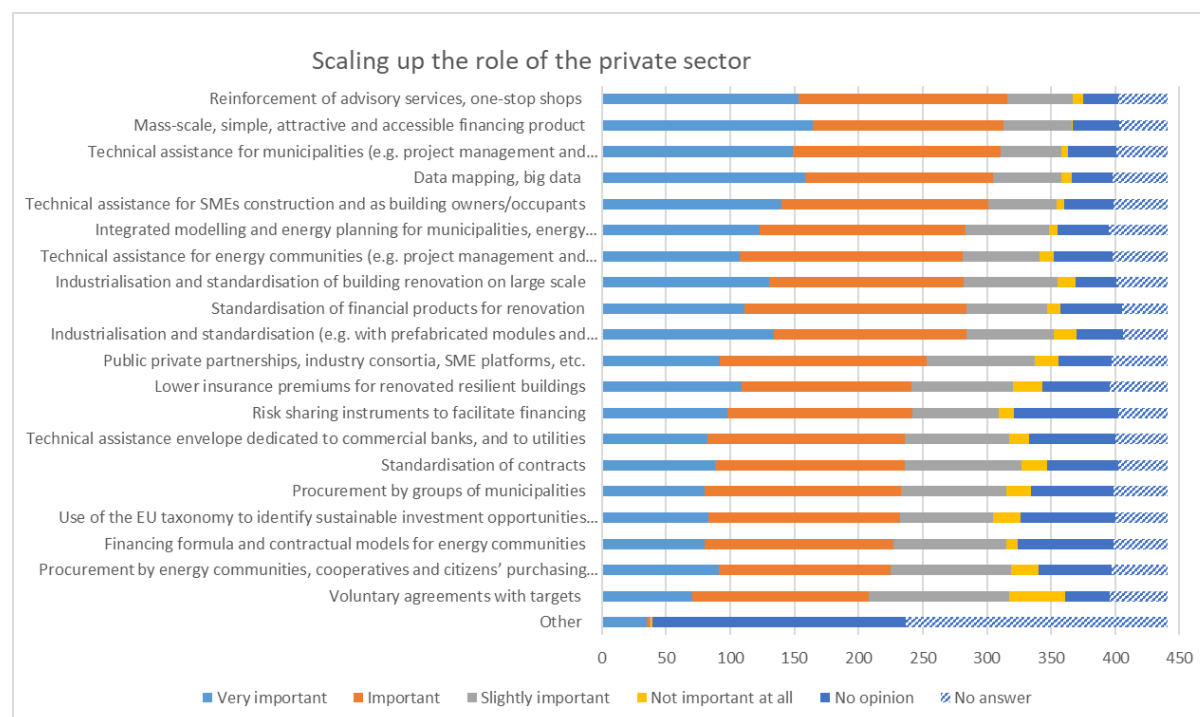
With regard to scaling up the role of the private sector, new actors and industries (utilities, large property owners/managers), decentralised solutions for improved operational energy performance, stakeholders have been asked to rate policies and measures to engage industries, third party services such as Energy Service Companies, and new 'aggregators' (e.g. national promotional banks, commercial banks, mortgage lenders, utilities, renewable energy communities, citizen energy communities, industry consortia, consumer associations, energy agencies, etc.) to deliver faster and deeper building renovation.

The top three policy responses are: reinforcement of **advisory services and one-stop shops** to inform, motivate, facilitate and finance building renovation (79%), development and deployment of **mass-scale, simple, attractive and accessible financing products**, such as energy efficiency mortgages, where the additional costs of renovation are covered by a single loan under the attractive conditions (78%) and **technical assistance for municipalities** (e.g. project management and financing) (78%).

Stakeholders have also pointed to the potential of **data mapping** (big data for improving the performance of the building stock; collecting, collating and usage of data) (77%), **technical assistance for SMEs** in the renovation and construction sector, and as building owners/occupants as

well as for **energy communities** (75%), as well as **integrated modelling and energy planning** for municipalities, energy communities and other citizens groupings for aggregated refurbishment projects (72%). **Industrialisation and standardisation** also feature prominently as a way to scale up the role of the private sector: in terms of building renovation on large scale (e.g. **districts, large property owners**) and in terms of using **prefabricated modules and integrated technologies** (70%), as well as **standardisation of financial products for renovation** (70%).

Figure 6. Scaling up the role of the private sector



Recurring topics that emerge from the inputs under the category “Other” are risk sharing instruments to facilitate financing, public private partnerships and technical assistance. Some energy auditors call for advanced use of virtual reality and digital technologies to facilitate energy improvements, as well as proper data monitoring and follow-up.

An idea proposed in the context of industrialisation of renovation is standardisation of renovation products with automated sizing using building scans and automated prefabrication in factories with computer-controlled robots. Other proposals evolve around the role of the Sustainable Finance taxonomy to help to identify sustainable investment opportunities and direct finance to such investments and an invitation to consider as alternatives to the minimum energy performance increase, such as the percentage of the surface of the building envelope or in terms of the value of the building.

3.3.10. Most promising approaches for targeting focus areas (Questions 10, 11, 12 and 13)

This section builds on keyword analysis of the free text inputs under questions 11, 12, 13 and 14. Each of these questions addresses a specific sector or segment and respondents are asked to share,

in free text boxes, their views on the most promising approaches at the European, national and/or regional/local level for the Renovation Wave to reach to these.

The following sections present in a factual manner the main/most frequently occurring proposals under each question as they have been put forward by stakeholders. The proposals are kept under the questions as submitted by respondents.

3.3.10.1. Residential sector (Question 10)

One overarching message that comes with regard to targeting the residential sector is the need to strengthen existing instruments at national level, introduce more controls on the implementation of the EU legislation and go beyond transposition.

European level

A very broad range of diverse ideas emerge to address residential building renovation via European level policies and measures, some more developed and concrete than others. Some examples include different financing mechanisms (also for very specific purposes like acquisition of abandoned areas/buildings or ensuring capacity in the construction sector) and supporting environment for financing (e.g. standardised contracts), as well as different regulatory approaches (mandatory minimum requirements, requirement for complete EPC coverage for buildings constructed after a certain year, fossil fuel heat bans and/or scrappage schemes, legislating to mandate renovation combined with financial instruments including public guarantee funds that cover the risk of default and that have instruments for recovery). Other ideas flagged include internalising externalities, linking EPCs to funds and taxes, embedding energy efficiency standards in rents, enhancing possibilities for local construction companies, defining accurate accounting rules to measure and confirm the substitution effect of using biogenic products instead of carbon-intensive materials, establishing a EU-wide harmonized interface between house energy management system and energy network management including energy consumption measurement with harmonized cyber security requirements.

Some ideas call for specific outcomes such as to improve attractiveness, security, safety and openness of poor neighbourhoods, provide green traveling (e.g. bike lanes, etc.), take forward the concept of a '15min city' with support of urban planners, architects, educators.

National level

Ideas proposed here include again a mixture of regulatory tools, such as energy standards (in kWh/m²/a, or CO₂/m²/a, kWh/capita/a) for each segment of residential buildings, renovation requirements for all building owners, rental restrictions for poor performance buildings, tightening minimum performance requirements for existing buildings, controls on performance requirements and on energy renovation works to guarantee their quality and neutralize fraudulent companies. In terms of proposed economic and/or financial instruments: national or regional public grants and subsidies, national/federal tax rebates (e.g. property tax, carbon tax) for renovated buildings and tax scale mirroring EPC scale, a Feed-Out-Tariff for energy savings, subsidised renovation for homes of low-income groups on the basis of energy audits (and not on EPC alone), along with tax breaks and soft loans for middle-income home owners, attractive tax depreciation (10% for 10 years) also for owner-occupied real estate, taxation of kWh consumed, the CO₂ emitted, and the non-renewable kWh consumed, harnessing green public procurement and scaling up the role of DSOs.

Local level

The role of the local level is widely recognised with proposals for faster building permit procedures, create local heating maps/strategies, creating one-stop-shops or equivalent aggregators and in general technical assistance including free advice/expertise and training for local administrations, encourage bottom-up initiatives that test new models for renovation, matching investors with renovation investment opportunities at local level, involve educational institutions. One respondent proposes a device (application), which would make it possible to ask a question on the interpretation of the regulations and their application to any innovative project in energy renovation, to the national ministerial administration or the competent European administration.

Mandatory solar requirements at regional and local level are mentioned, along with incentives for de-paving in densely inhabited areas. One respondent proposes that in cases where regional and local rules are more comprehensive, they have to be allowed to prevail to surpass the national and EU legislation. In general coordination between all three levels – EU, national and regional/local - and EU's role in creating a framework is vital to avoid fragmentation.

3.3.10.2. Affordable housing (Question 11, part 1)

The vast majority of stakeholders who responded under this question call for a clear definition of energy poverty in all MS and the establishment of mandatory renovation objectives, also in the context of e.g. local urban planning. The overall consensus is about the central role of affordable and social housing in the Renovation Wave and in the context of recovery. Recurring proposals include non-repayable financial support, banning renting of poor quality and poor performance houses and the creation of a dedicated e.g. Renovation Fund or EU Renovation Management Facility to channel renovation funds and technical assistance to MSs and targeting in particular low-income households and social housing.

European level

Proposals to take affordable housing at European level include calls for combining finance sources (including blending finance) to facilitate affordable housing, deploying highly flexible instruments (such as COSME and InnovFin) and taxation of large stockowners to finance affordable housing.

The role of aggregation of projects (such as the Renovation Accelerator in the Netherlands) occurs often with a concrete proposal to identify measures that can apply to different building segments (multi-apartment dwellings, single dwellings, etc.) throughout the EU and bundle them into a single campaign to be applied by banks in view of visibility and uniformity of implementation. One respondent has questioned deep renovations, calling for broad renovations instead to modernize a significantly larger number of buildings.

Other proposals include call for financial and legal support to civil society cooperatives, massive awareness raising campaigns and participation of tenants in the electricity revenues of photovoltaic systems (tenant electricity model).

National and local levels

Ideas shared in the context of affordable housing at national and local levels include customized financing tools (such as bullet loans), transferrable tax deductions deduction for renovation to unlock zero-upfront cost renovations (i.e. like in Italy), as well as including energy performance among the compulsory elements to be included when promoting new social housing, step-wise planning maps, fostering digital technology and the R2S approach in all renovation projects. The role

of long-term local management structures for renovation, as well as mandatory integration of energy performance in rent indexation have also been emphasised.

3.3.10.3. Social housing (question 11, part 2)

Ideas to support renovation in social housing at European level include the creation of a special European modernization fund targeting social housing, as well as excluding national social housing policies from state aid rules. For the social housing sector in particular, there are calls to focus on integrated envelope-plant interventions, off-site constructions and guarantees of real building performance.

When it comes to proposals at national level, there are calls for coupling social housing promotion and energy performance, establishing minimum energy requirements for social housing stock, smart combinations of regulation and versatile incentives (communication, financing, etc.), subsidised renovation with rent freezes, “warm” rents that include the cost of heating and tenant electricity models, along with bundling of private home-owners renovation projects. The example of Denmark is quoted with a new social housing agreement passed in May 2020, which introduces a new green state fund to accelerate and guarantee investments in energy efficiency and incorporate private partners in the social housing sectors green transition.

Finally, when it comes to local level, proposals include Pay-for-Performance to drive costs down per kWh saved with market actors aggregating projects to deliver more ‘negawatts’ at a lower price, promoting the emergence of local housing renovation sectors and ensuring that every social housing company has a renovation manager, renovation budget and renovation plan. One stakeholder called for a hiring programme to train residents on renovation techniques, along with a hiring programme to form a “public renovation brigade” (carpenters, masons etc.)

3.3.10.4. Tackling energy poverty (question 11, part 3)

European level

Ideas to tackle energy poverty at European level include earmarked funding for the worst performing buildings, regulating rental markets (including energy and rent cost caps for low-income occupants and rental bans of poor performance properties), as well as prioritisation of renovation in buildings where energy poverty is high, along with awareness raising and identification of overconsumption or deprivation with administrative and technical support for the implementation of works.

In the context of tackling energy poverty, one stakeholder calls for mandatory climate action roadmap whereby each building must have an individual plan mapping out the steps/investments necessary to reach climate neutrality in operation until 2050 at the very latest. This roadmap prevents lock-in of fossil technology and stranding of assets by use of Life Cycle Assessment and Life Cycle Cost, and minimizes risks for owners. Another proposal is to create carbon usage budgets per person, make them a tradable asset, and regulate the market for rents

National and local level

At national level, proposals include deploying energy efficiency obligations for identified energy vulnerable consumer categories, on-bill financing with a requirement on energy providers to implement, targeted subsidies, as well as earmarking part of the income from energy taxes to financially relieve low-income households. Other ideas include a system of conventional rental with

minimum requirements for energy and housing quality, and a system of maximum prices with a fixed price of the energy package linked to the EPC.

There is also a call for developing a pro-active offer for the renovation of homes for the most vulnerable target group via a mix of outreach work with route guidance and cost-neutral financing instruments.

At local level, ideas include framework contracts with ESCO-type companies that changes the model of the "energy voucher" for the payment of quotas to the ESCO, converting social payments for energy consumption into isolation premiums, as well as social employment projects. The role of information is also flagged, especially when it comes to the best use of buildings to maximize the reduction in energy consumption.

3.3.10.5. Renovation of buildings owned and/or occupied by SMEs (Question 12, part 1)

In order to help SMEs to improve the performance of buildings they own/occupy, respondents call for easy access to financing, mostly in the form of non-repayable grants and subsidies, for boosting their demand for renovation through the creation of a market for building renovation and though providing training to assure upskilling. Overall, there is a call to combine European and national renovation policies with specific policies for SMEs. The topics of renovation goals for SMEs, as well as specific SME obligations for minimum energy performance levels, supported by premiums / tax incentives.

Proposals for EU-level action to stimulate the renovation of buildings owned/occupied by SMEs include a broad range of instruments from a general stimulus package, to revision of Article 8 of the Energy Efficiency Directive on energy audits to apply it to SMEs and to the so-called intracting in the form of an internal and revolving fund to finance renovation. Another proposal made is to exclude financial support for building renovations and consultations for SMEs from state aid rules.

At national level, proposals include SME bundling for one-stop solutions, mutualisation of thermal studies / technical details of similar buildings, defining districts and prioritize tenders from companies registered locally, as well as local campaigns and awarding prizes.

At local level, ideas flagged by respondents include tax rebates and advantages given to "virtuous" SMEs in public procurement criteria, affordable advisory schemes for SMEs, specific taxation of companies based on occupied buildings, as well as promoting lower-cost carbon saving measures for SMEs.

3.3.10.6. SMEs in the construction sector (Question 12, part 2)

Proposals for EU-level action to help SMEs in the construction sector again range from broad liquidity support via financial programmes to more specific ones like ELENA technical support facility, allowing SME to take in a relevant amount of refurbishment work regardless of their fiscal capacity, as well as facilitating municipalities and local clients to more easily commission local SMEs. In terms of skills and training, there are calls for schemes for standardization of works and worker education, stimulating working in SME construction teams and facilitating access to VET training programmes with the objective to also facilitate apprenticeship programmes for future construction workers.

Other recurring proposals include free audits, post-renovation tax reductions, as well as allowing renovation tax deduction to be transferred to companies and banks.

Proposals for national level action include channelling Just Transition Mechanism funds to SMEs, lowering the VAT for renovation works, offering preferential tax treatment of SMEs in the construction sector that have a high share of their work on deep renovation. One respondent calls for caution when it comes to industrialization of renovations, pointing that SMEs can offer tailor-made solutions for every building.

Finally, at local level, ideas flagged include SME mutualisation of materials (procurement, logistics, storage), faster renovation of public buildings and breakdown of public contracts into small lots, developing standard Corporate Power Purchase Agreement for SMEs to enter into renewable PPAs. Other proposals include qualification measures for local SME in the construction sector, promotion of local value-chains directly or indirectly involved in building renovation, as well as local authorities facilitating training of the SME construction workforce and creating platforms to put in contact qualified construction SMEs with prospective clients.

3.3.10.7. Targeting schools and other educational institutions, hospitals and other public buildings (Question 13)

Stakeholders acknowledge that public buildings should lead by example and are central to the Renovation Wave. Therefore, many stakeholders call for a wide European framework of detailed mandatory requirements and standards for public buildings. They raise the importance of having a uniform EU-level terminology and standards regarding measurement, energy data and energy optimization to ensure the equality of offers across EU borders.

Recurring ideas that come up once more under the public sector include the creation of European Renovation Fund supporting particularly social housing, school and hospital renovations, as well as smart combination of realistic regulations and versatile incentives (communication, subsidies, advanced funding instruments etc.).

Educational institutions

Proposals for EU-level action to foster renovation of educational institutions include setting minimum indoor light requirements, defining comfort conditions for pupils and requirements for indoor air quality, as well as pledging that all schools are zero-emission & climate adaptive as a showcase and educational tool and supporting renovation best practice training and exchange with ERASMUS-like scheme.

Similarly, the proposals for national level action include speeding up administrative procedures and introducing minimum quality and renovation plans by 2050.

At local level, there is a call to increase the use of educational infrastructure (beyond teaching hours) and integrate pupils into the renovation process.

Hospitals

In the context of renovating hospitals, recurring proposals include direct state funding (though some stakeholders see a need to provide grants only for highest efficiency standard and innovative products), non-repayable support. Some stakeholders call for a labelling system that publicly reports on what has been achieved, permanent campaigns to improve human-building interaction as part of facility management, training and certification of technical staff, enhanced quality control

mechanisms, reinforced energy efficiency audit schemes. There are calls for minimum performance thresholds to be reached, with centralized and simple financial assistance, for easier procurement rules that include green and social criteria. In terms of technological solutions, it is pointed that there is not only the need for holistic energetic renovation due to highly complex technical systems, but also for efficient operation and that incentive mechanisms for specialized operator concepts must be created. Furthermore, there are calls to have the use of building automation on an equal footing with insulation, to limit air conditioning needs and develop natural ventilation concepts, to improve accessibility for elderly people and people with disabilities, to ban certain technological solutions (e.g. direct resistive or radiating electric heaters, direct conversion of any fuels into heat), as well as in favour of grey water heat recovery, condensation heat recovery, central heated appliances, air heat recovery, central cooling.

At European level, proposals include dedicated EU-wide grant program/EU Renovation fund as a part of the recovery package, classifying hospitals as energy infrastructure in the TEN-E framework to access CEF and Project of Common Infrastructure funding. Legislative measures are proposed too, such as targeted revision of the public procurement directive to strengthen the social dimension (equal treatment of workers) and to include collective bargaining clauses, extending the obligation under Art 5 of the Energy Efficiency Directive to all public buildings and complementing it with energy management system requirement, removing public policy budgets dedicated to the renovation of hospitals from the SEC 2010 standard for calculating the public debt of Member States, exempting deep renovation projects with guaranteed performance from tender procedure would allow to speed up interventions and facilitate innovation-oriented public-private dialogue processes

There are calls for better alignment of EU health and energy policy agenda, especially in the post-Covid context. An example is also provided of correlation between daylight and a decrease in the length of hospital stays and recovery times.

Proposals to foster renovation of hospitals at national and local levels include mandatory modernisation plans, low-cost renovation loans to municipalities, compulsory life cycle analysis and Global Warming Potential limits, for technical and business know-how collection and sharing, for cooperation between different financiers. It is acknowledged that hospital renovation can present difficulties by interrupting the use of hospitals: obligations to present comprehensive rehabilitation plans studied and structured in different phases by groups of nearby hospitals are proposed, as well as standard ESCO contracts for deep renovation. It is pointed that local authorities need to determine whether hospitals can be connected to heat networks.

Other public buildings

Overall, for public buildings, European level action is proposed to promote global renovation framework implemented at local level with European financing instruments at each stage.

At national level, ideas flagged include compulsory life cycle analysis for public buildings and GWP limits, renovation rate of 5% per year and calibrating incentives and relief of regulatory burden towards Nearly Zero Energy Retrofit (with guaranteed performance and low cost modular packaged solutions that guarantee a performance update of the components).

At local level, some proposals center on project aggregation, planning, prioritisation of needs and technical assistance, while also flagging the potential for additional utilization of often mono-functional diverse public buildings to work in a more community-supporting manner.

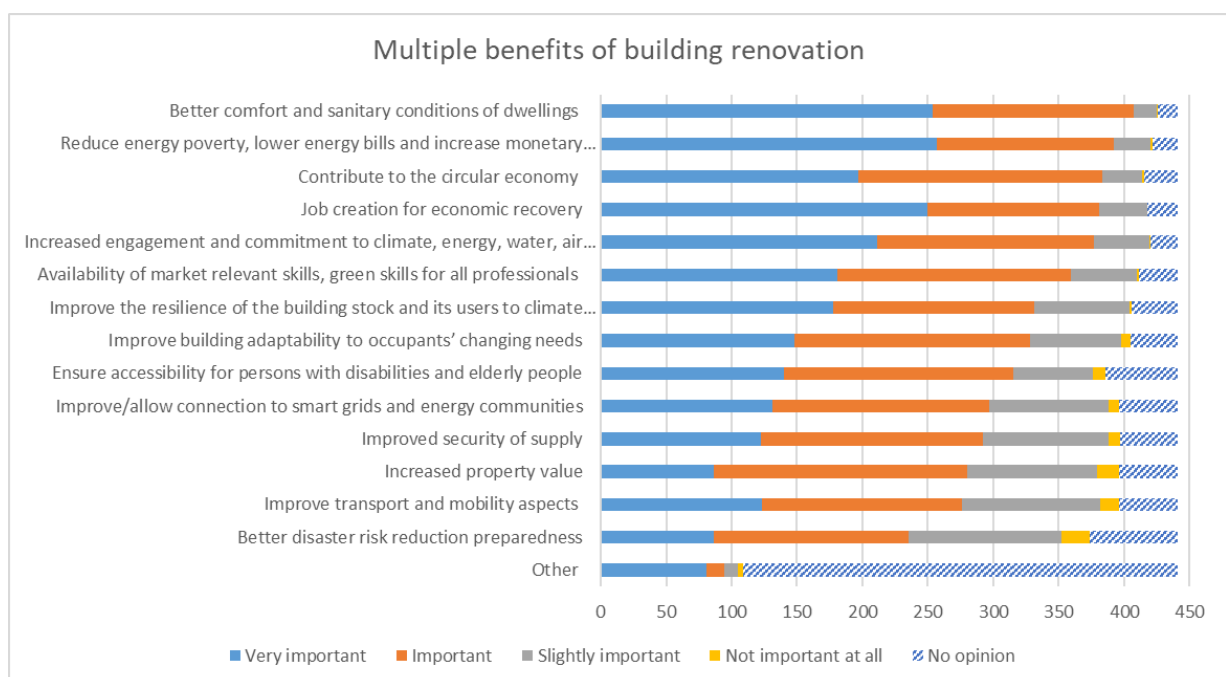
3.3.11. Wider benefits of renovation (Question 14)

Asked to rate the importance of the wider benefits of building renovation, around 90% of respondents put at the forefront as very relevant/important **better comfort and sanitary conditions of dwellings** to improve health, safety and air quality (including e.g. by replacing outdated heating installations, removing potentially hazardous materials, providing shading & natural cooling in heatwaves, increasing urban green spaces), along with **reducing energy poverty, lowering energy bills and increasing monetary savings**.

More than 80% recognised building renovation for its contribution to **energy saving, circularity, job creation for economic recovery** potential, as well as **increased engagement and commitment** to climate, energy, water, air quality and other environmental and biodiversity objectives by citizens and communities and availability of **labour-market relevant green skills** for all professionals in the construction and buildings sector.

Other top wider benefits include improving the **resilience of the building stock and its users to climate change impacts** (e.g. water retention by green roofs and walls reduces pluvial flooding), improving building **adaptability to occupants' changing needs** and ensuring **accessibility for persons with disabilities and elderly people**.

Figure 7. Multiple benefits of building renovation



Recurring topics that emerge from the inputs under the category “Other” are emphasis on jobs and sustainable growth, enhanced benefits to health, safety and well-being in the broadest sense. Other ideas mentioned as co-benefits of renovation are opportunity for densification of urban areas and reduction of land demand, as well as side benefits of automation in buildings to enable non-energy related services such as improved facility management, security and entertainment services.

3.3.12. Towards climate neutral and sustainable homes and non-residential buildings (Question 15)

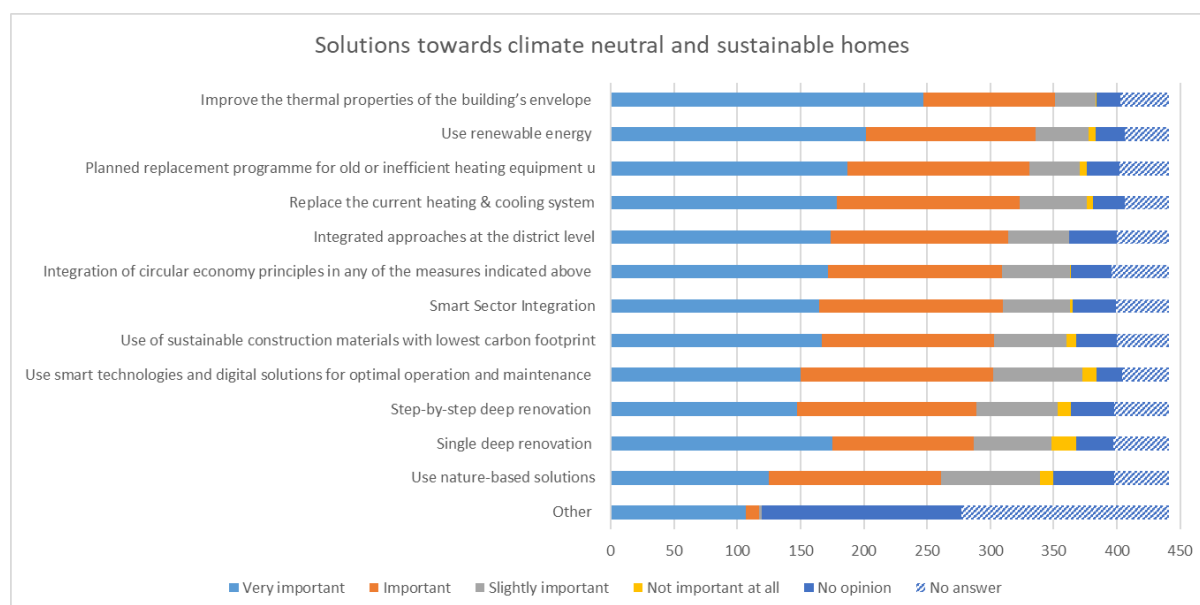
3.3.12.1. *Climate neutral and sustainable homes*

Asked to indicate and rate the preferred renovation solutions towards climate neutral homes, stakeholders took a broad and integrated vision. Almost all of the solutions under this question are rated as “very important” or “important” by more than 70% of the respondents (see Figure 8). The five top rated solutions for the residential sector are primarily energy related, namely:

- Improve the **thermal properties of the building’s envelope** through better insulation and windows
- Use **renewable energy** on-site (e.g. solar thermal, PV panels, geothermal, etc.) or off-site through district heating/cooling networks
- Planned replacement programme for old or inefficient **heating equipment** using solid or liquid fossil fuels with renewable heating solutions
- Replace the current **heating & cooling system** by a more efficient and renewable based system (e.g. replace old boiler by a heat pump)
- Integrated approaches maximizing the synergies between energy efficiency and renewable energy at the **district level**

Other top-rated solutions for the residential sector include integration of **circular economy principles** in any of the measures indicated above (such as reuse or high-quality recycling of construction materials, phasing out hazardous substances, ensuring building performance last longer to avoid numerous renovations) and **energy system integration** (integration of renewables that increase flexibility in buildings and in the wider energy system to which the building is connected, integration of waste heat supply solutions, installation of e-vehicle charging infrastructure, providing safe bike parking, thermal storage, connection to smart grids). Respondents also rate as very important/important the use of **sustainable construction materials** with lowest carbon footprint, the use of **smart technologies and digital solutions** for optimal operation and maintenance (e.g. building automation and control systems, smart thermostats and room temperature controls, smart meters, etc.) and enable consumer rewards for energy-saving/, or load-shifting behaviour. They also acknowledge with very similar ratings the potential of **step-by-step deep renovation** (a combination of measures carried out over time rather than in one single renovation) along with this of **single deep renovation** (a combination of measures carried out at the same time). Figure 8 provides further details.

Figure 8. Solutions towards climate neutral and sustainable homes



In terms of other ideas proposed, recurring ideas featuring both for residential and non-residential buildings include targeting operational CO₂ emissions and net energy balance; optimising the use of materials (sourcing only locally produced ones); better data for monitoring and more tailored incentives; phasing out toxic chemicals from construction materials; time sequencing of step-by-step approaches; remaining technology neutral. Other notions include an emphasis on accessibility-first; use shading devices on windows; acknowledging simple technological solutions too (e.g. room temperature controls or hydronic balancing without digitalisation). One stakeholder indicates that Europe has all the skills to develop a European Airbus for intelligent buildings and call for mandating digital tool integration.

As for specific solutions proposed by stakeholders to deploy climate neutral and sustainable homes include some energy supply companies calling for upgrading current heating and cooling systems by hybrid solutions including direct heat renewables as solar thermal, modern biomass, geothermal and for developing of a strong market pull for innovative solar technologies. Some energy auditors underline the potential of training for residents in use of smart apps that allow control and better consumption management, as well as the installation of such systems by social housing bodies; another call is to consider all energy devices in a technology neutral way.

Some building professionals propose better integration of biodiversity within renovation projects and fostering « positive biodiversity » and different stakeholders call for better labelling of carbon footprint of materials taking into account the whole cycle, nature-based solutions and ensuring that smart sector integration is in the center of the initiative.

3.3.12.2. Climate neutral and sustainable non-residential buildings

The results for non-residential buildings are similar, while reflecting the different consumption patterns. Almost all solutions under this question are rated as “very important” or “important” by more than 70% of the respondents (see Figure 9). The five top rated solutions for the non-residential sector are primarily energy related, namely:

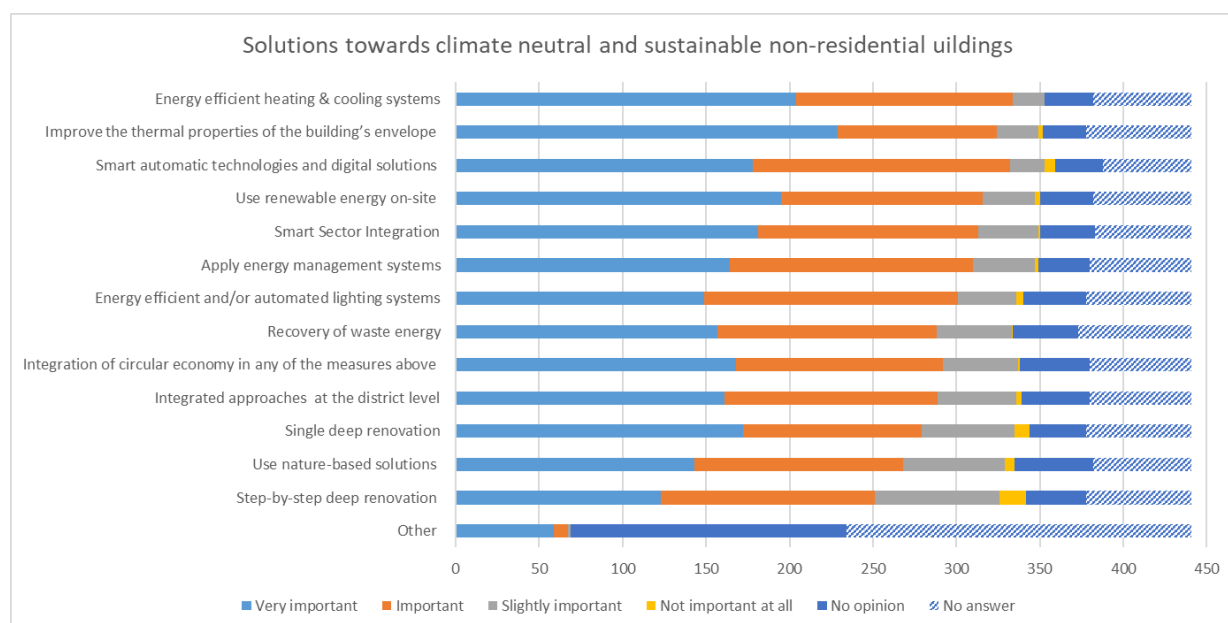
The five top rated solutions for the non-residential sector are:

- Introduce more energy efficient **heating & cooling systems**
- Improve the **thermal properties** of the building's envelope through better insulation and windows
- Use **smart automatic technologies and digital solutions** for optimal operation and maintenance (e.g. building automation and control systems, smart thermostats and room temperature controls, smart meters, etc.)
- Use **renewable energy** on-site (e.g. solar thermal, PV panels, geothermal, etc.) or off-site through district heating/cooling networks
- **Smart Sector Integration**: integration of renewables that also increases flexibility in buildings and in the wider energy system to which the building is connected (e.g. solar roof panels), integration of waste heat supply solutions, installation of e-vehicle charging infrastructure, safe bike parking, thermal storage, connection to smart grids, enable consumer rewards for energy-saving, or load-shifting behaviour

Other top-rated solutions for the residential sector include applying **energy management systems**, introducing more energy efficient and/or automated **lighting systems**, recovery of energy that otherwise must be ventilated (**waste energy**), integration of **circular economy and environmental principles** in building renovation in any of the measures and **integrated approaches** maximizing the synergies between energy efficiency and renewable energy at the district level. In the case of non-residential buildings, much more respondents have rated a **single deep renovation** as a top measure than step-by-step deep renovation.

Additional perspective included by manufacturers/suppliers include a call for focussing on non-residential buildings should be the focus, favouring building materials with high thermal mass (especially beneficial for the performance of thermally activated building structures) and creating possibilities of feeding excess heat into networks, remunerating this and adding it to the energy balance of the building. One statement calls for improving the analysis of the performances and the beneficial costs (e.g. a green roof in seismic areas may worsen seismic performance and sustainability as it is too heavy, or a metal roof worsens the heat island effects).

Figure 9. Solutions towards climate neutral and sustainable non-residential buildings



3.3.13. Additional comments

Approximately half of the respondents chose to introduce free text input in the final section of the questionnaire, which offers the possibility to provide further comments on aspects relevant for building renovation. In general, most of the topics addressed are already covered under different preceding sections of the questionnaire; nevertheless, these are summarised below.

Recurrent topics include the emphasis on circularity, fire safety, accessibility of buildings in the view of ageing population, smart buildings, accessible funding, plug & play solutions, EPCs and BRPs. Heating is among the most commonly addressed topics in this section with a call for promotion of a variety of options available, including condensing gas boilers, gas heat pumps, micro-CHP, fuel cells, hybrid technologies to supply buildings with renewable heat, and green gases transported in the existing gas infrastructure. Another recurrent request is that the focus should be on improving the current policy framework rather than new policy measures.

Looking at contributions per stakeholder group, building professionals' input relate to a diversity of topics: calling for energy efficiency mortgages action plan, ecological and social incentive taxation (including ideas related to emission or other sustainability taxation, tax reliefs and depreciation for renovation similar to these for monument protection), enforceable energy performance requirements, quality labels and norms for public authorities to comply with, including penalty schemes in case of non-compliance, as well as bringing broader concepts of linking climate adaptation of new buildings with climate renovation of existing building. Next to the existing extensive know how on renovation in all forms (old-school analogue to smart building), some stakeholders underline, the importance of building ownership in the context of renovation barriers and policies, and ask for an easiness to qualitatively assess current energy performance of buildings in a non-intrusive manner. There is an observation that the circularity aspect is not sufficiently clear.

Proposals coming from some building professionals include creating a market for integrated turn-key renovation service providers that are an aggregator and intermediary between supply and demand and offer technical expertise, financial solutions, as well as energy performance guarantees. There are calls to also look into the energy consumption and energy performance of hospitality buildings (including optimising their use outside of tourist periods), as well as refugee structures. The importance of design for disassembly that supports reuse and adaptation, as well as flexible designs that adapt easily to the changing societal needs, is underlined too.

Suggestions coming from public authorities include calling for support on citizen cooperatives, pointing to renovation rates needed to meet the 2050 objectives and the implications of these for the construction industry and owners, calling for new job profiles such as "Energy Community Managers", "Renovation Coach" or "Technical Assistance Advisor for Energy & Climate Integrated Renovation projects" and bringing best practice examples. There is a cautious statement that the market for technical solutions is still developing and any binding renovation targets may therefore force e.g. social housing corporations to make sub-optimal investments. On a more technical/technological level, there is a call for a better integration of embedded emissions, a focus on testing radon concentration (before-after renovation that affects the ventilation of a building), modern ventilation systems, power storage, a circular approach to waste disposal and small-scale local desalination, adapting infrastructure needs to climate change.

Suggestions from construction companies and manufacturers/suppliers include taking community-owned non-profit utilities as renovation partners, recognising the role of cogeneration, creating a market for recycled metals and by-products, as well as ensuring that renovation programs are streamlined e.g. with the new requirements of the European Product Database for Energy Labelling (EPREL), with implementing legislation on registration, evaluation, authorisation and restriction of chemicals (REACH) and on restriction of hazardous substances in electrical and electronic equipment (RoHS), as well as with energy efficiency and circular economy principles. Some of these stakeholders call for ensuring to the maximum possible extent that the waste generated by renovation works is sorted at site and made available to the recycling industry, for digital due diligence of HVAC systems performance to identify energy savings potential and for a unified water label.

Some energy supply companies propose an increase in the electric vehicle infrastructure in the EPBD and call for recovery funding for e.g. grid upgrades in urban areas for multi-user charging hubs at non-residential buildings along with national or local EV charging infrastructure incentive schemes. Caution is called for with regard to mandatory energy audits for all companies as for companies with low energy consumption the implementation of the energy audit may exceed the energy savings that could be generated.

Finally, various stakeholders bring forward topics such as emission and pollution standards for all heating and cooling systems along with timelines for inefficient equipment bans. A couple of specific raised topics include the difficulties for sports clubs to finance renovation via own equity and unfavourable financing conditions and the need for interoperability and accessibility of technical interfaces and data formats.

Annex I. Ad-hoc contributions

Table 9. List of stakeholders who have submitted contributions on ad-hoc basis

AcrPlus
Aedes
Association for Building Ecology
Autorités Francaises
BPIE
Bureau européen des unions de consommateurs (BEUC)
CEMBUREAU
CEMR
CEPI
Cerame-Unie
ChargeUp Europe
Cobaty
COGEN Europe
Consortium (ECF, EC Delft)
Consortium (ECFD, Eurofuel, Fuels Europe, UPEI)
Consortium (EHPA, EuropeOn, REScoop, Solar Power Europe, SmartEn)
Consortium (UIPI, FIEC, EBC)
Consortium Better Building Alliance (E3G, EHPA, EUBAC, EuropeOn, EU-ASE, SmartEn, SolarPower Europe)
Consortium Skills4Climate (Avere, Cecapi, EHPA, EUEW, Europacable, EuropeOn, KNX, Lighting Europe, Schneider Electric, SolarPower Europe, T&D Europe)
Construction 2050 Alliance
Covenant of Mayors
Danish Ministry of Climate, Energy and Utilities
Dirk Van Orshoven
EC Power
Electrification Alliance (Eurelectric)
EmpowerMed
Energy Cities
Energy Transitions Commission
Entso-e
Equilibre des energie (EdEn)
EU Smart Cities Information System (SCIS)
EU-ASE
EU-Networks (Energy Cities, Climate Alliance Eurocities, Fedarene, ICLEI-Europe, CEMR)
Euralarm
Eurima
Eurocities
Europa Nostra
European Builders Confederation (EBC)
European Construction Industry Federation (FIEC)
European Control Building Automated Association (EU BAC)

European Council of Civil Engineers (ECCE)
European Federation of Building Societies (EFBS)
European Heat Pump Association (EHPA)
EuropeOn - The Electrical Contractor's Association
EVN
Federal Ministry of the Interior, Building and Community DE
Fire Safe Europe
Fraunhofer Research Alliance Cultural Heritage
Gdw Housing Germany
Glass for Europe
Groupe La Poste
Habitat for Humanity
Heimo Scheuch (Wiener Berger) & Pierre-André de Chalendar (Saint-Gobain)
Hellenic Federation of plumbers
High Level Tripartite Strategic Forum of Construction 2020
House of Representatives NL
Housing Europe
International Monetary Fund (IMF)
International Union of Tenants
KfW
Knauf Insulation
Ministerstwo Rozwoju
Ministry of Construction and Physical Planning HR
Ministry of Infrastructure and water management NL
Ministry of Interior NL
Observatorio Ciudad 3R
Pwc
Region Hauts-de-France
Regulatory Assistance Project (RAP)
Renovate Europe
Rockwool
Routledge
RREUSE
Schneider Electric
Senertec
Smart Building Alliance for Smart Cities (SBA)
SolarPower Europe + LUT University
Swedish Construction Federation
Transport & Environment (T&E)
Union Sociale pour l'Habitat (USH)
World Green Building Council

Annex II. Contributions to the feedback to the roadmap

Table 10. List of stakeholders who have provided feedback to the Renovation Wave roadmap

All contributions are available at the Have Your Say webpage ([here](#))

Aedes
AFECOR
AGFW e.V.
Andalusian Energy Agency
ANERR Asociación nacional de empresas de rehabilitación y reforma
Association of Finnish Local and Regional Authorities
Association of German Pfandbrief Banks (vdp)
ATMO Grand Est
Austrian Federal Economic Chamber (WKÖ)
AVERE
Bayerisches Staatsministerium für Wohnen, Bau und Verkehr
BIBM - Federation of the European Precast Concrete Industry
Bioenergy Europe
BPIE
Branchevereniging VHG
Build Europe
Bundesverband energieeffiziente Gebäudehülle (BuVEG) e.V.
Bundesverband Erneuerbare Energie e.V.
Carbery Housing Association CLG
CEEP- the European Centre of Employers and Enterprises providing Public Services and Services of General Interest (SGIs)
CEI-Bois
CEMBUREAU - The European Cement Association
ChargeUp Europe
City of Ghent
City of Stockholm
City of Utrecht
Climate Action Network Europe (CAN Europe)
Climate Alliance
Climate-KIC
COBATY International
COENOVE
COGEN Europe
COGEN Europe on behalf of PACE project
COLEGIO DE REGISTRADORES DE ESPAÑA
Common Weal (Scotland)
Confederación Nacional de la Construcción (CNC)
Confederation Construction
Confederation of Danish Industry (DI)

Confedilizia
Consiglio Nazionale dei Periti Industriali
Danfoss A/S
DENEFF - German Business Initiative for Energy Efficiency
Deutsche Säge- und Holzindustrie Bundesverband e.V. (DeSH)
Deutsche Umwelthilfe (DUH)
E.ON SE
Economic Board Utrecht
ECOS - European Environmental Citizen's Organisation for Standardisation
ECSPA - European Calcium Silicate Producers Association
EdEn (Equilibre des Energies)
EDF
Edison
EDP - Energias de Portugal, S.A.
EFBWW
EFBWW
EFIEES - European Federation of Intelligent Energy Efficiency Services
EGEC Geothermal
EGEC Geothermal
EHI - European Heating Industry
Electrification Alliance
Emerson
ENEA
Enedis
Enel
Energiehuis Stad Antwerpen
ENERGIES DEMAIN
Energiesprong Foundation
Energy Cities
EnergyVille
EOS-OES European Organization of the Sawmill Industry
ESMIG- European Smart Energy Solutions Providers
EUGINE - European Engine Power Plants Association
Eumeps
Eurelectric
Eurima
EuroACE (European Alliance of Companies for Energy Efficiency in Buildings)
EUROCITIES
Eurofuel
Eurogas
EUROGYPSUM
Euroheat & Power
European Alliance to Save Energy
European Association for External Thermal Insulation Composite Systems (EAE)

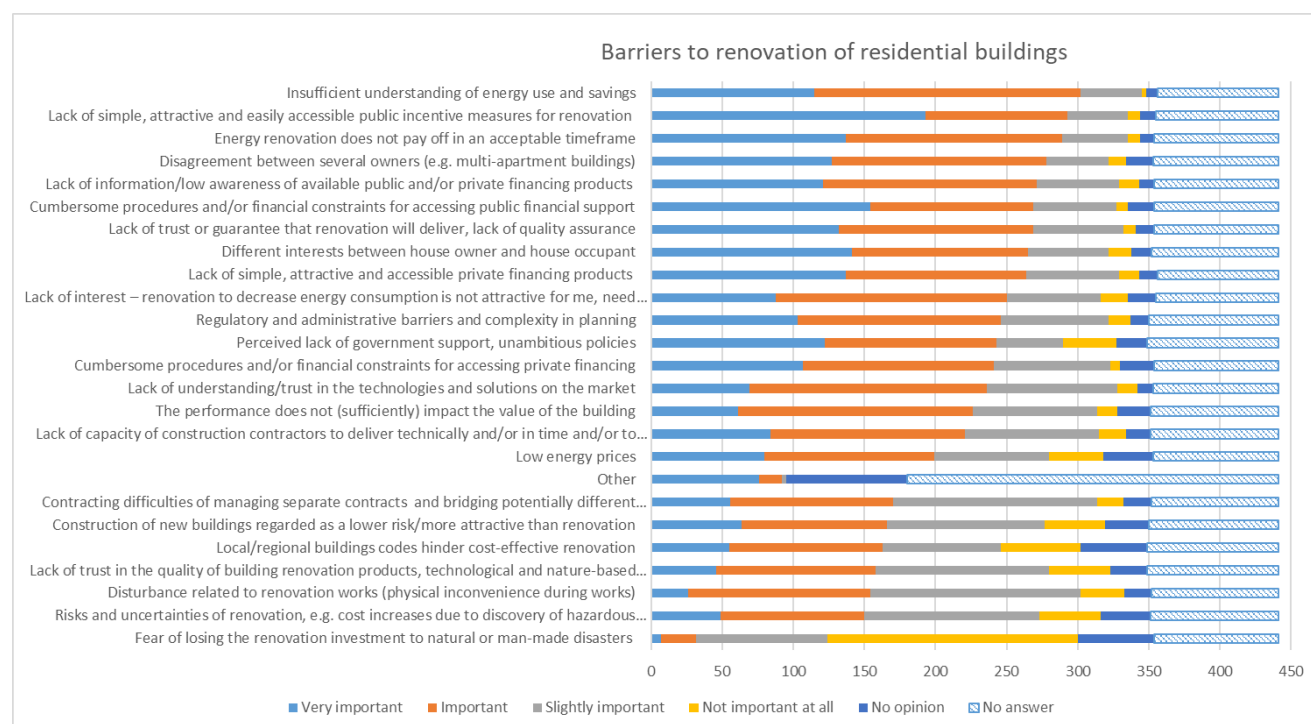
European Autoclaved Aerated Concrete Association
European Builders Confederation
European Cellulose Insulation Association
European Confederation of Fuel Distributors (ECFD)
European Copper Institute
European Environmental Bureau
European Federation of Allergy and Airways Diseases Patients' Associations
European Federation of Building Societies
European Heat Pump Association
European Panel Federation
EuropeOn - The Electrical Contractor's Association
Eurovent
Eurovent Certita Certification
EuroWindoor AISBL
EVN Bulgaria EAD
FEAD
FEANTSA
FEDERATION FRANCAISE DU BATIMENT
Federation of German Industries (BDI)
FEP - European Federation of the Parquet industry
FIEC- European Construction Industry Federation
Fire Safe Europe
Friends of the Earth Europe
Gas Distributors for Sustainability (GD4S)
Gas Infrastructure Europe
Gas Networks Ireland
GasNaturally
Geoplac
Glass for Europe
GRDF
Hauptverband der deutschen Bauindustrie e.V.
Haus & Grund Deutschland
Housing Europe
Hydrogen Europe
Iberdrola, S.A.
Institute of Small Enterprises of Hellenic Confederation of Professionals, Craftsmen and Merchants
Institutul Național al Patrimoniului / National Institute of Heritage
International Association of Oil & Gas Producers (IOGP)
International Union of Property Owners (UIPI)
Knauf Energy Solutions
Knauf Insulation
LightingEurope
Liquid Gas Europe
LSF Energie

L'Union sociale pour l'habitat
Ministry for the Ecological Transition and Demographic Challenge
Ministry of Construction and Physical Planning
Ministry of Interior and Kingdom Relations - The Netherlands
Ministry of construction and physical planning
Municipality of Amsterdam
Nadacia Habitat for Humanity International
Naturgy
Naturschutzbund e.V.
Nelfo
PGNiG SA
Plataforma de Edificación Passivhaus
Polish Ecological Club Mazovian Branch
PU Europe
Public Housing Sweden
Region Gävleborg
Region Hauts-de-France
Renovate Europe Campaign
Republiková únia zamestnávateľov
REScoop.eu
Saint-Gobain
SBA - Smart Buildings Alliance for Smart Cities
Schneider Electric
SINTEF
smartEn
SMEunited
SMEunited
Snam
SolarPower Europe
Stad Brugge
Swedish Property Federation
SYNERGI
Taltek a ry
The Coalition for Energy Savings
The Danish Federation of Construction Workers
The Swedish Construction Federation
Thüringer Ministerium für Umwelt, Energie und Naturschutz
Toulouse Métropole
Transport & Environment
UFE (Union of French Electricity Industry)
UNITI Bundesverband mittelständischer Mineralölunternehmen
Universidad Politécnica de Madrid
Urban Innovation Vienna
Vattenfall

VBO FEB
VELUX Group
Veolia
Viessmann
Villaägarnas Riksförbund
Wirtschaftsinitiative Smart Living
Wirtschaftsinitiative Smart Living
World Green Infrastructure Network
ZPPS - Polish Glass Manufacturers Federation
ZVEI e.V.
2 organisations : CLER-French network for energy transition & négaWatt Association

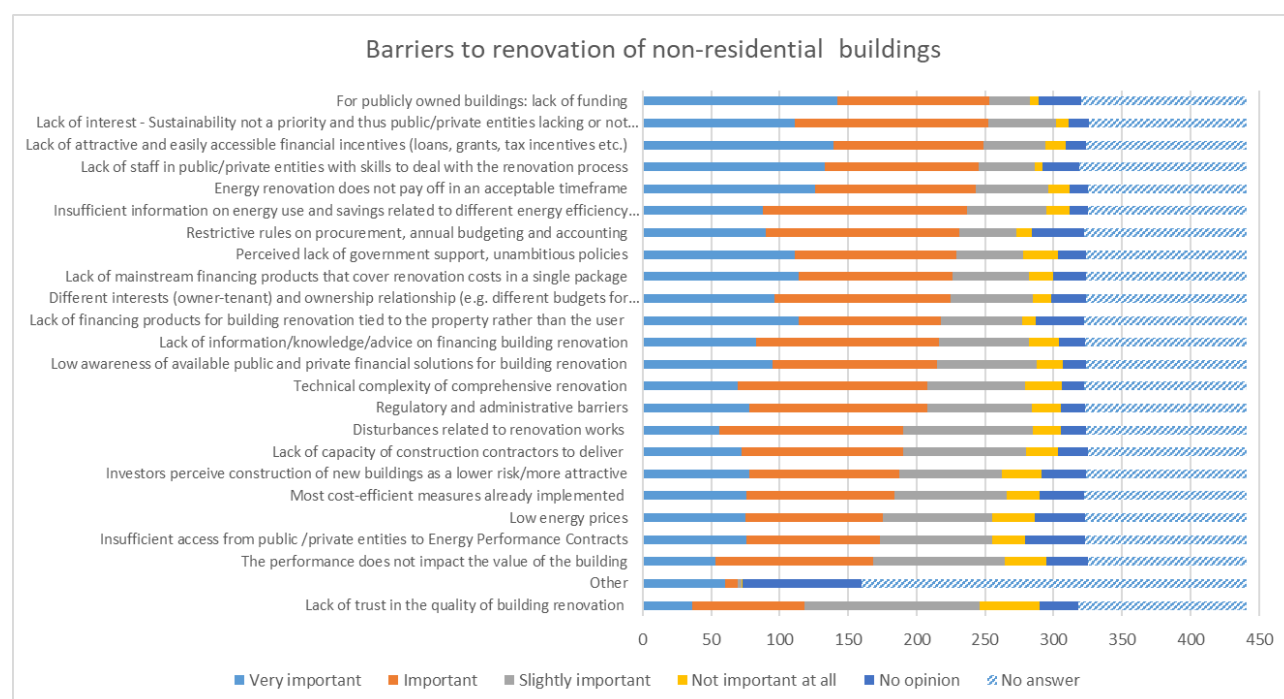
Annex III. Open public consultation: results from the online EU survey

Figure 10. Barriers to renovation of residential buildings



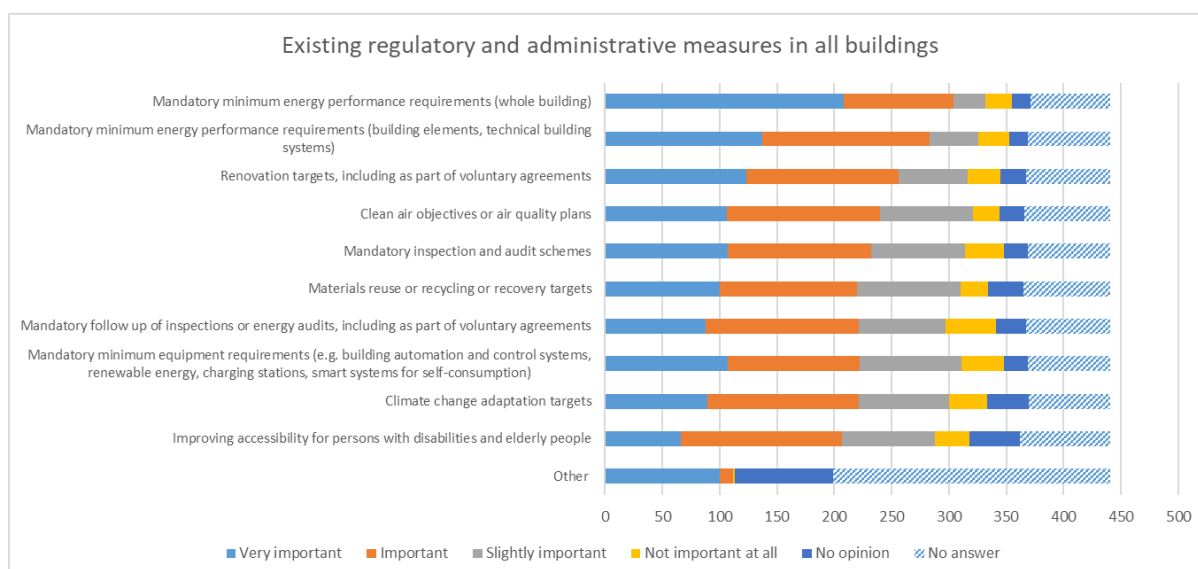
Note: Optional question

Figure 11. Barriers to renovation of non-residential buildings



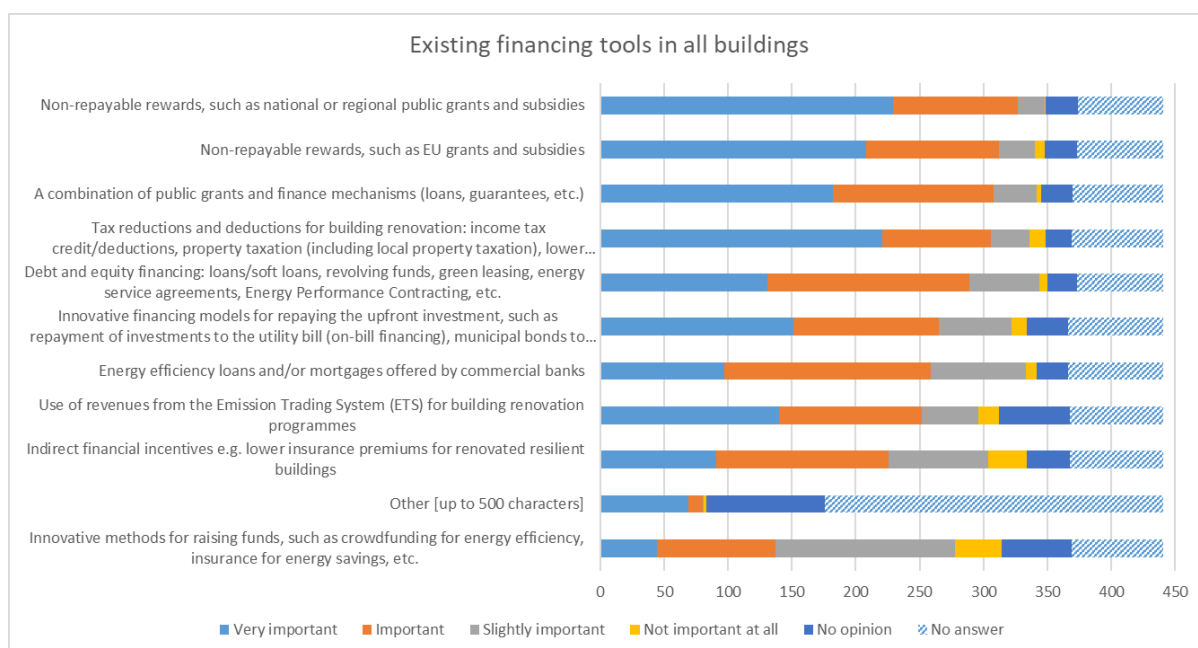
Note: Optional question

Figure 12. Existing regulatory and administrative measures in all buildings



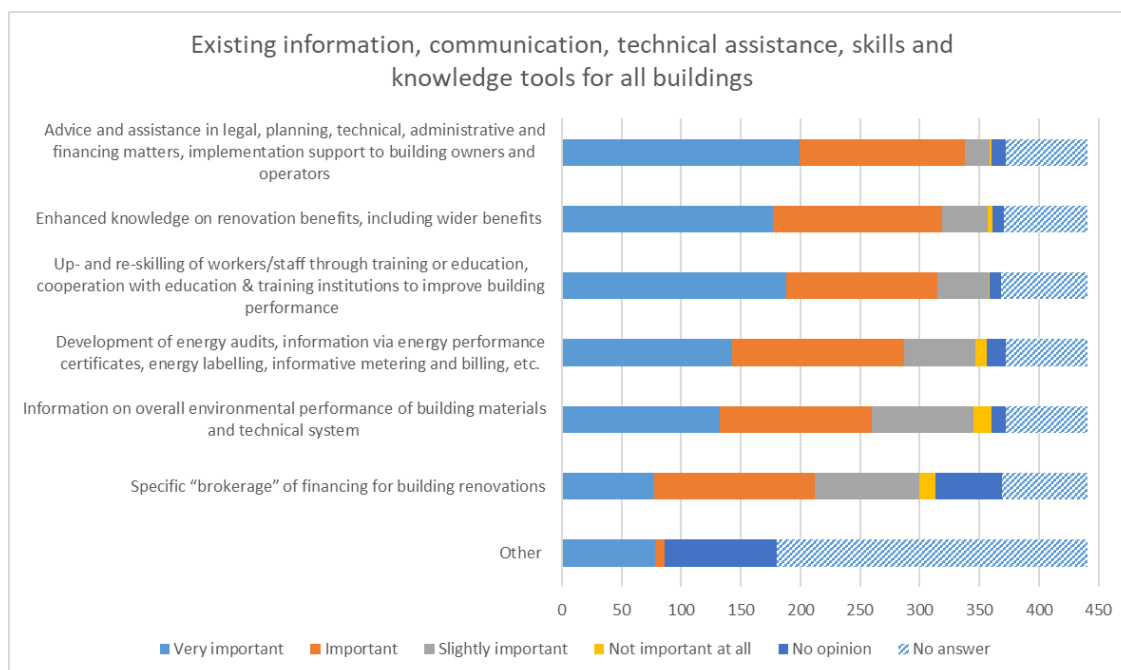
Note: Optional question

Figure 13. Existing financing tools in all buildings



Note: Optional question

Figure 14. Existing information, communication, technical assistance, skills and knowledge tools for all buildings



Note: Optional question

Figure 15. Prospective regulatory and administrative tools in terms of their effectiveness to achieve residential building transformation

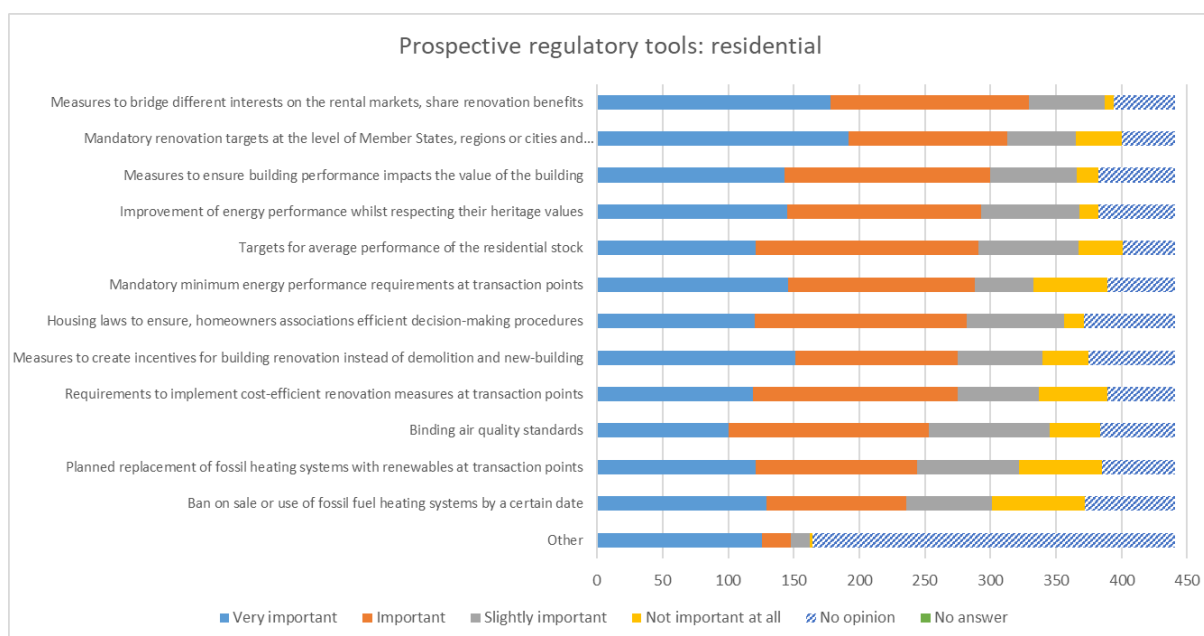


Figure 16. Prospective economic and financing tools in terms of their effectiveness to achieve residential building transformation

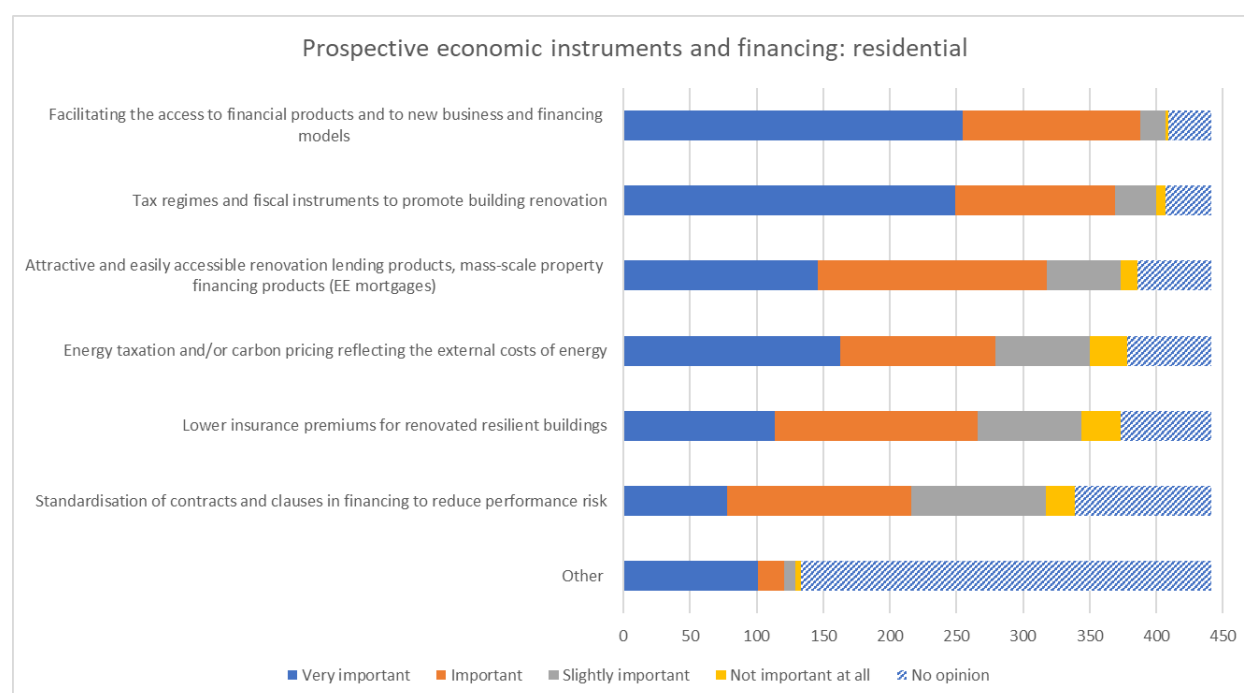


Figure 17. Prospective technical assistance, aggregation, information and communication tools in terms of their effectiveness to achieve residential building transformation

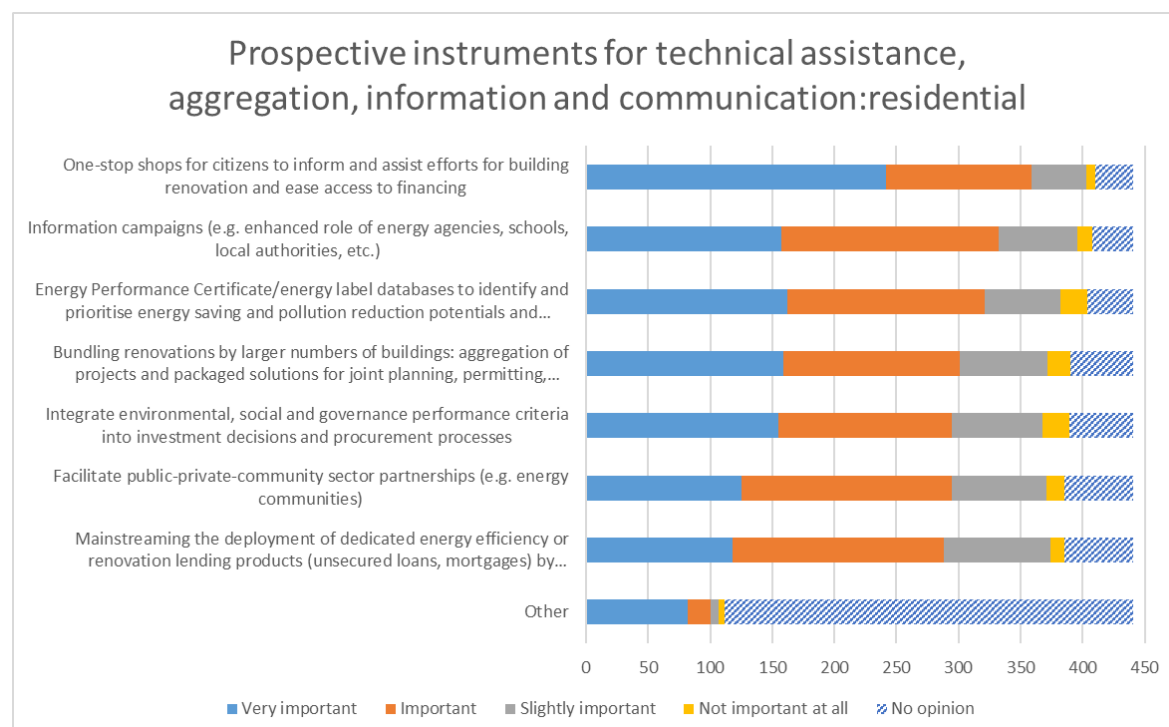


Figure 18. Prospective skills and knowledge tools in terms of their effectiveness to achieve residential building transformation

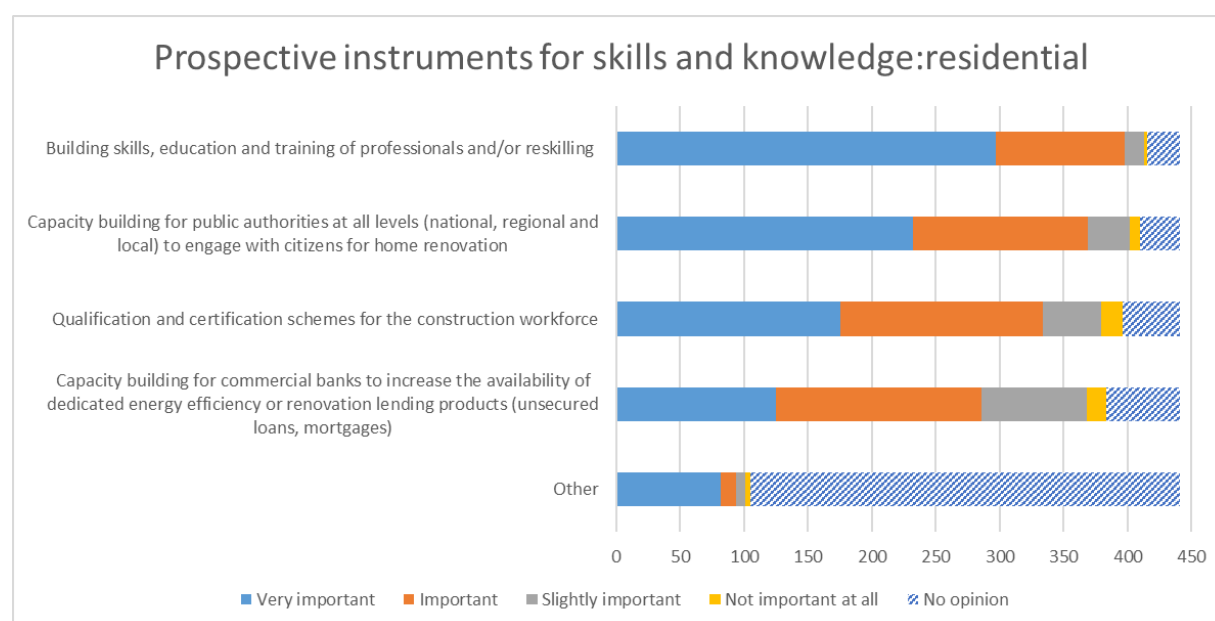


Figure 19. Prospective regulatory and administrative tools in terms of their effectiveness to achieve non-residential building transformation

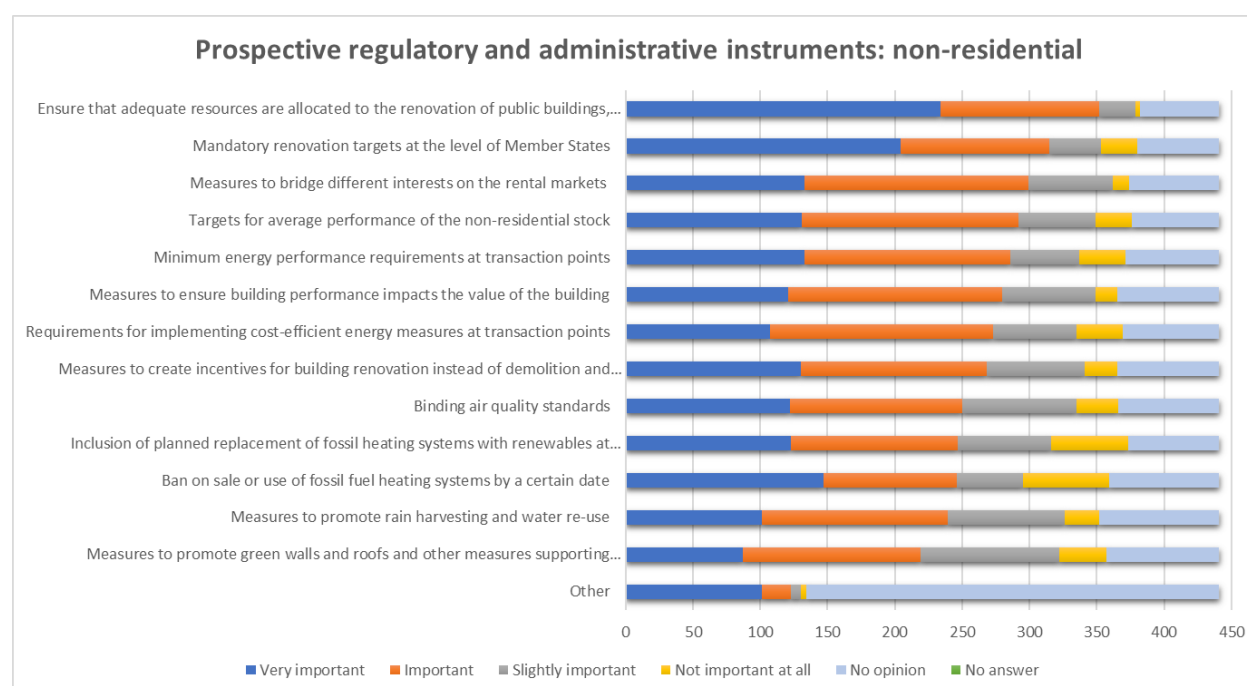


Figure 20. Prospective economic and financing tools in terms of their effectiveness to achieve non-residential building transformation

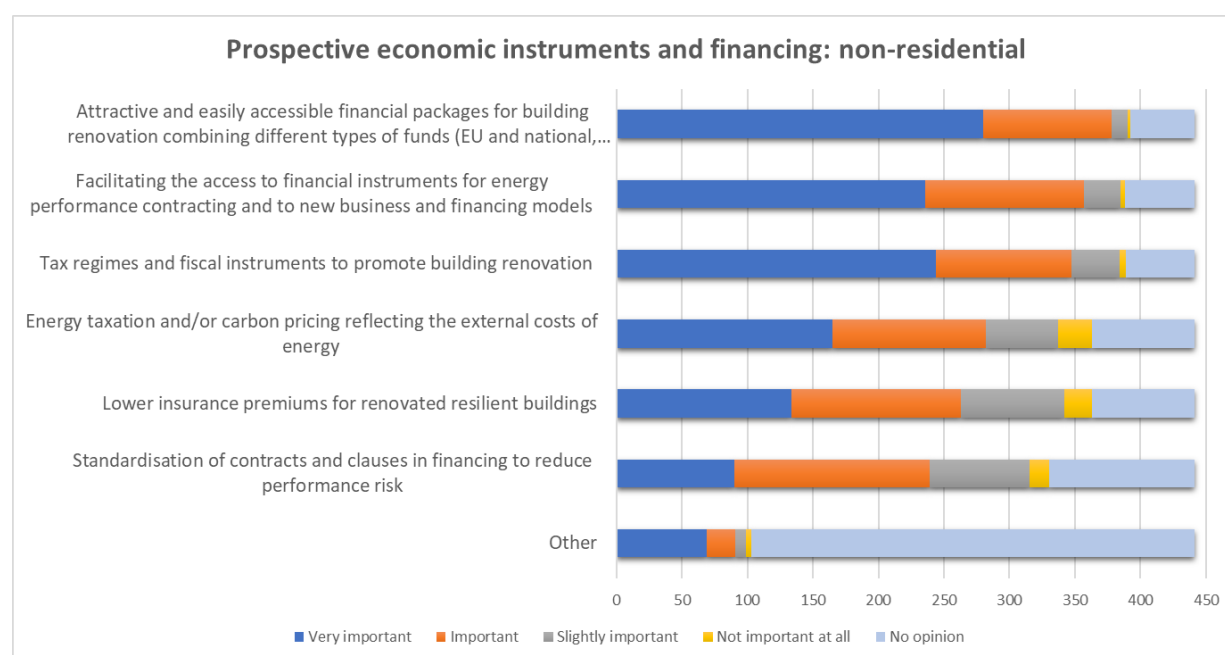


Figure 21. Prospective technical assistance, aggregation, information and communication tools in terms of their effectiveness to achieve non-residential building transformation

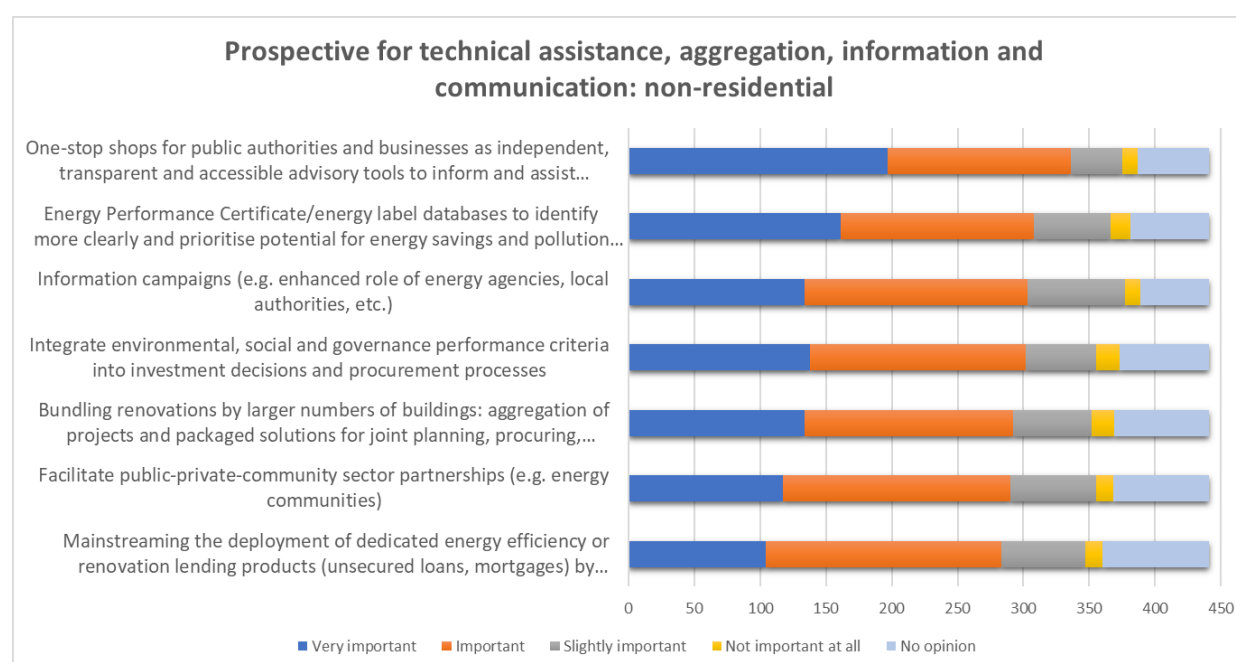


Figure 22. Prospective skills and knowledge tools in terms of their effectiveness to achieve non-residential building transformation

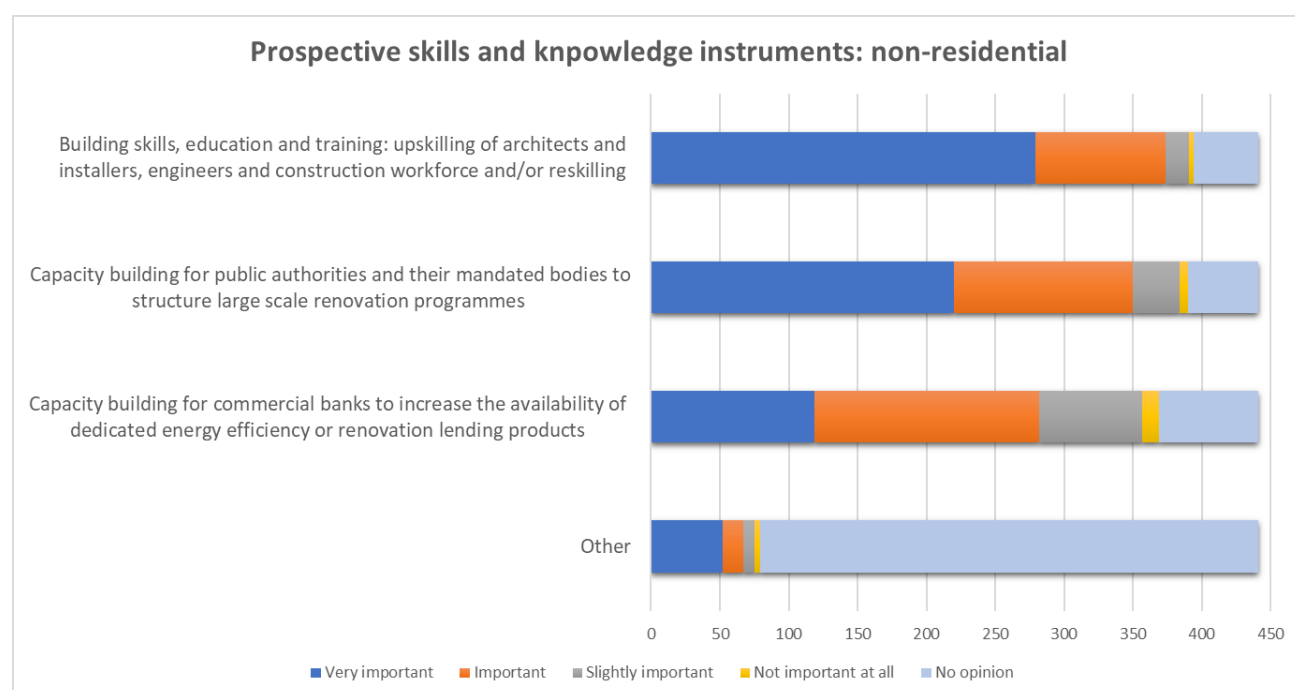


Figure 23. Key enabling factors

