



EPC/retrofitting actions - stakeholders ÷ perspective: needs, barriers and general acceptance

Deliverable 2.3: Report on analysis of the results – Survey at retrofitting companies, energy efficiency programs stakeholders and final users

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INTRODUCTION TO THE REPORT

This report was developed within the project *ENERFUND – An ENergy Retrofit FUNDing tool* and it documents the work done in Task 2.3 *Analysis of Status Quo and needs (retrofitting companies & energy efficiency programs stakeholders)* and Task 2.4 *Analysis of needs, barriers and general acceptance of EPC/retrofitting actions from the final user perspective*.

ENERFUND is funded by the European Union's Horizon 2020 programme and poses itself the ambitious objective of enhancing funding investments for deep renovation of buildings, working on three components: public awareness and trust, funding schemes and incentives and trustworthy retrofitting opportunities. A comprehensive state of the art evaluation of existing barriers and needs in these fields will enable the development of the ENERFUND tool, which will address these shortcomings and expectations. The tool will then be promoted within the scope of the project and its impacts on deep-renovations will be monitored and measured.

The aim of the performed analysis is to research and document the needs of retrofitting companies & energy efficiency program stakeholders for the development of a tool/marketplace for deep renovation, as well as to investigate and analyse the needs, barriers and general acceptance of EPC/retrofitting actions with the final user in mind.

In order to set the grounds for the development of the ENERFUND tool, the first activities carried out focussed on market analysis and the defined approach, having in mind the following objectives:

- To document conditions needed to facilitate the financing for deep renovation of buildings,
- To collect relevant data from existing initiatives and other sources needed for the development of a tool/market place for deep renovation,
- To analyse the current situation with regard to EPC implementation in the real estate market,
- To investigate the needs, barriers, and general acceptance of EPC/retrofitting actions from the final users' perspective,
- To conduct targeted interviews / questionnaires in the participating countries with stakeholders with regard to their needs / expectations for the development of a tool / market place for deep renovation.

This market analysis was performed under project tasks *T2.1: Analysis of EPC systems in EU* and *T2.2: Analysis of the EPC implementation on real estate market*. The findings of the analysis were included in the Deliverable 2.1: Report on current status of EPC in targeted countries, relevant data from existing initiatives, and on EPC implementation in the real estate market.

Based on these outcomes, targeted interviews/ questionnaires were carried out in all participating countries, with the following key stakeholders regarding energy renovation of existing buildings:

- Energy Service Companies (ESCO) – Questionnaire no.1,
- Investors / banks / financial institutions – Questionnaire no.2,
- Building owners / property managers – Questionnaire no.3.

The results of these three surveys are presented in this report. Thus, the report is structured in three distinct parts:

- I. Perspective of Energy Services (ESCO) and retrofitting companies
- II. Perspective of banks, financial institutions, property valuers
- III. Perspective of building owners, communities

Methodological approach

The English questionnaires were adapted for application in each project country and translated into respective national languages. The questionnaires were distributed in several different ways by the project partners. In some cases the questionnaires were filled in directly by the respondents. In other cases, they were used as interview guidelines for personal interviews conducted face to face or on the telephone, depending on the preference of the addressed person. In some countries, the questions were tailored for on-line surveys.

A list of organisations and individuals representing the stakeholder groups under investigation was compiled. Starting from the Task T2.1 and Task 2.2 results, desk research was done in order to narrow potential stakeholder groups down and to identify those most relevant to the current survey. The target was to receive responses from at least 30 stakeholders. The survey was based on a qualitative approach and served to close information gaps identified in Tasks T2.1 and T2.2.

ESCOs and retrofitting companies

Focus of ENERFUND survey: Companies active or interested in the field of Energy Contracting, companies offering deep renovation (and their associations), and companies offering products needed for renovation.

Banks, financial institutions, property valuers

Focus of ENERFUND survey: Banks at national and regional level providing financing, national bank providing state aid for energy efficiency in buildings and renewable energy systems, real estate valuers determining the monetary value of properties needed for economic decision-making and annual balance sheets.

Building owners, communities

Focus of ENERFUND survey: Communities and building owners as final users of the ENERFUND tool (Private and public buildings, non-residential, group of residential buildings, central and local administration, building managers).

Energy efficiency renovation opportunities in the **residential sector** are strongly influenced by the condominium legislation and tenant protection legislation.

Together with the outcomes included in D2.1 report, the results presented in this report provide the basis for developing the ENERFUND-Tool. It will be used to decide which information from the EPC should be presented in what form in ENERFUND, and what type of information will be necessary to complement EPC information, in order to facilitate decision making about investments in deep renovation.

SUMMARY OF RESULTS

This chapter presents a short overview of results from the surveys done in Task 2.3 and Task 2.4. It summarises the results of all ENERFUND partners by stakeholder group. At the end of this chapter, a short overview of recommended inputs for the development of the ENERFUND-Tool is presented. Detailed information is available in the respective parts of this report.

Perspective of Energy Services Companies (ESCO) and retrofitting companies (summary of all countries)

I.1 Criteria for energy contracting – building focus

The information used for decision making is the level of energy consumption, compared to benchmarks for similar buildings, the ROI (Return on Investment) period, the potential costs, the status of the building services technologies and the envelope, the building use, as well as existing funding opportunities etc.

Energy expenses and energy consumption baselines are most important, as the client expects guaranteed energy savings.

A short contract duration for payback of energy efficiency investment is important, typically around 5 years.

Categories of buildings to be considered for energy contracting:

- (1) old non-upgraded buildings,
- (2) new buildings designed prior to implementing the EPBD,
- (3) new buildings without adjusted building services technologies.

I.2 Usual business cases

Any measures with a payback time less than five years will be welcomed by the contractors.

Typical energy efficiency measures concern the building envelope (replacement of windows), but mainly the building services systems: transformation of the lighting systems (LED) and retrofitting of the ventilation systems (sensors and automation), heating, cooling, and domestic hot water.

Usually, there is only partial improvement of the building envelope (windows replacement). Comprehensive reconstruction of buildings cannot be financed only from energy savings and additional financial resources are necessary.

The lack of information delivered to the general public and to customers is often cited as a roadblock. The latter are often not aware of opportunities for renovation and related funding. Clear and pedagogical communication materials on these issues could help to unlock the potential for energy refurbishment.

Not only energy efficiency measures but also renewable energy technologies could be an interesting field for energy services companies.

I.3 Customer acquisition

There are several options to find customers: through partners, thanks to a recommendation from previous clients, by participating in public tenders, randomly thanks to website, through sales departments.

I.4 Contract duration

Contract duration depends on the conditions given by the client, and it depends on the expected amortization period. Usually, contract duration is around 5 years and not more than 10 years. Apart from a few cases, this excludes deep renovation (comprehensive refurbishment including the insulation of the building envelope). In Denmark can the contract duration be up to 20 years in some cases. Duration is very much influenced by the payback time of the measures used and the energy saving strategy of the client.

I.5 Building type

Transaction costs must be as low as possible. The ideal candidates are large non-residential buildings with simple building services installations and high energy expenses. ESCOs always prefer buildings with single owners because the project development is simpler (avoid mixed ownership and mixed building use). However, all building types are dealt with if a business case can be identified.

I.6 Client

The most important clients are owners of public buildings, i.e. large public buildings owned by the municipalities, the regional authorities or the state, which are often lagging behind in respect to energy retrofitting. Other kinds of building owners like social housing companies and large offices and commercial centre owners are attractive candidates.

I.7 Environment to enable deep renovation contracting

Deep renovation has never been relevant to ESCOs. On the contrary, the main interest for ESCOs is to find low-hanging fruit, i.e. energy saving measures that are easy to carry out with a low budget and have a quick payback.

The conditions needed to offer deep renovation mainly concern access to funding and incentives to finance the project, as well as ROI period (which is in fact often too long – over 20 years). In addition, the willingness of the client to financially contribute to and to believe in the advantages of deep renovation is important.

Trust and relations between the contractors and the clients are of utmost importance, and there is a need for transparent communication and continuous support in all steps of the process. Information is needed on access to low cost and flexible finance (schemes must not be too restrictive), competent contractors and Quality Assurance schemes for contractors. There also needs to be more case studies to prove deep retrofit works, clear legal frameworks for public-private partnerships, and non-reimbursable funding to reduce higher energy and environmental costs (which increase the economic feasibility of renovation projects).

Deep renovation solutions are probably best undertaken as part of a whole building refurbishment, at which point holistic solutions including upgrades to building fabric and fundamental changes in building services can be designed in. This is fundamentally different from the work of many existing energy performance contractors

whose interests are in energy services not in acting as principal contractor for major building refurbishment projects.

I.8 Use of Energy Performance Certificate

The opinion concerning use of EPC in the context of renovation differs. While some countries say that EPCs are not used due to various reasons including, because they are not available, the quality is questionable (at least for non-residential buildings), they are based on default values and therefore actual energy consumption cannot be deduced from the EPC, other countries say that the EPC gives a global overview of building energy performance and that ESCOs use the EPCs for their work. The information used is the energy band, consumption measured in kWh and greenhouse gas emissions level, as well as benchmarks given for similar buildings.

EPCs are more commonly used in the residential sector than in the non-residential sector.

The EPC as such is not sufficient to identify energy savings potentials, but it could help in narrowing down possible cases for energy contracting.

I.9 Information relevant for energy renovation of existing buildings

Many companies point out the fact that they would benefit from a tool showing which area offers the best opportunities for energy renovation. This could be based on EPCs as well as other information such as past renovations, average prices for renting/selling properties etc. Companies would certainly benefit from more transparent information. What could be interesting for them would be a map not only showing EPCs but also detailing the potential measures, value of real estates, and the opportunities and incentives for funding in this specific area.

A dynamic map of ESCOs showcasing the best projects in a given area will be useful if a number of parameters representing the individual case studies allow for the comparison of renovated buildings or buildings being renovated. Among these parameters, the energy performance before and after the renovations is important. Furthermore, the performance must be expressed in EPC rating and energy use converted to primary energy consumption and carbon emissions.

I.10 Management of buildings in stakeholder's own responsibility

Data of buildings being part of an ESCO programme are continuously recorded by sensors and energy metering. Hence the impact of the renovation and the estimated energy saving can always be controlled.

Whilst ENERFUND will help rank buildings for retrofit opportunity, there will always be other factors that are more subjective - e.g. "We need to focus on the HQ building because that's the one the public see", or "That building may be closed in 3 years depending on..." These sorts of factors often override logical rankings for investment opportunity.

Perspective of banks, financial institutions, property valuers (summary of all countries)

Usually banks do not offer financing products based on energy savings, as this financing model is offered by ESCOs. Funding of energy efficiency projects in buildings is supported either by specific programs or by the involvement of banks or other financial institutions. The availability and level of development varies from country to country. Feedback was obtained from one to eight respondents per country representing either banks or organisations managing or being involved in the funding of energy renovation projects in buildings.

II.1 Financing of energy efficiency in buildings

The number of energy renovation building projects vary from a few cases per year up to 4000 projects per year, but some organisations do not record any statistics for energy renovation building projects.

Mostly, the decision is made on a case by case scenario and the credit granting procedure takes between 2 – 4 months. Banks and investors rarely have a specially developed financial programme/instrument.

For small-and-simple 'fast track' investments, an open list of best performing equipment is published to enable creditworthy companies to use the program without the need for an external study. For large and complex investments and for municipal investments, appropriate techno-economic studies are requested (or even provided by the funding organisations).

The most relevant information when a person or company is applying for credit is its financial status; every single detail is analyzed to avoid unpleasant situations for both involved parties.

A typical business case is the Austrian funding scheme for individual legal entities (i.e. persons), through which beneficiaries apply for funding and if they meet the funding criteria (e.g. buildings older than 20 years, insulation of the outer walls and ceilings, windows / doors replacement) they will get a lump sum at the end of the project. The grant is maximum of 3,000 Euro per apartment (increased to up to 4,000 Euro if insulation material based on renewables is used) and is limited to 30% of eligible cost, while additional grants for the installation of solar thermal systems, biomass heating systems and PV systems are possible.

Other business cases are the regional operational program (Romania) and EERSF (Bulgaria) for energy efficiency in public and residential buildings and street lighting. For EERSF the maximum repayment term of the loan is 7 years, with an interest rate of 4% - 7% and a minimum 10% financial contribution from the borrower (no fees and commissions and free of prepayment fee after the second year). An initial assessment of the feasibility of the project is presented with the supporting documentation, while creditworthiness of customers is assessed based on the balance sheet and profit and loss accounts for the past three years and the current period, available liabilities and receivables, and more.

An interesting case could involve renovation to a high-energy performance levels (high energy savings) with energy cost savings being seen as one of multiple benefits.

II.2 Financial tools/programs for building renovation

Financial instruments dedicated to “sustainability” are under development with a focus on: “Crowd for Climate” and “Crowd for Energy” (with rather long payback periods). It

is probably more promising to approach investors such as insurance companies and pension funds than private investors (as for them the risk is too high).

In Bulgaria, EERSF acts as financier granting loans and credit guarantees for realization of investment projects in energy efficiency, providing only consideration financing, co-financing or guarantees over other financial institutions (no grants). In Cyprus, an evaluation process is underway to combine the Private Finance for Energy Efficiency - PF4EE European Investment Bank Product with the Bank of Cyprus Housing Loans which may include Energy Efficiency investments. In Romania, EBRD intends to develop a financial instrument / program with funds on-lending through financial institutions to eligible sub-borrowers, targeting investment in the residential sector and covering energy efficiency, building-integrated renewable energy and water efficiency measures.

II.3 Use of EPC

There is a general awareness of the existence of the EPC for buildings and the requirements for its elaboration. In some cases, the EPC data is important in checking whether the funding criteria are met, but in most cases an energy audit of the facility is required to introduce energy efficiency measures. After the implementation of energy efficiency measures, the EPC could be required to guarantee the achievement of a certain Class of energy consumption. Some tools require specific modelling of the income generation and savings from implemented measures as part of the loan assessment process, while electricity bills might be included, with an Energy Saving Assessment template (clarifying existing energy use, and proposed use - completion assisted by supplier) and modelling of return on investment calculations for renewable energy independently verified by an engineer.

II.4 Need for energy information relevant to energy renovation of existing buildings

The key data needed always seems to be the current energy consumption and potential for energy savings. If EPC data is involved, the most popular information requested is the rating, recommendations for the improvement of the energy efficiency of the building and share of renewable energy sources.

Other information required for energy renovation loans refer to property valuations, business case inputs - rents, service charge, running costs, construction costs, timeframe, programme, void periods, concessions for tenants, marketing costs, and (from the borrower) income, financial commitments and living expenses.

(2) What kind of other information would you need for risk assessment?

Risk assessment is not relevant for all instruments, but the necessary information is usually requested within the required documentation in each case. This includes property status for the building, survey/analysis of building structure and renovation needs, comfort standards and other regulations. Typically, banks lending to companies to renovate their buildings using balance sheet financing, secured against the building and/or other assets. Lower future energy costs are taken into account but represent only one (minor) factor amongst a large number of other factors used in credit scoring.

II.5 Other information relevant for energy renovation of existing buildings

There was a general recognition by most financing institutions of the relevance of ENERFUND. Questions were raised regarding how to keep the data up-to-date and how to ensure data security and how to address permissions required to use the data.

Recommended features of the tool should include: awareness raising information, property valuation datasets, and typical costs of specific renovation activities, energy consumption, grant support / tax incentive areas and information about companies which offer services for energy renovation measures.

From the banks' perspective, the information needed refers to: current energy use, savings potential, need for commercial funding (commercially viable) and creditworthiness. The criteria to assess the suitability / feasibility of financing for energy renovation are the net present value based on estimated energy savings and the creditworthiness of the potential borrower. Usually a minimum of 30% energy saving is targeted.

The most favoured 'like to see' features of ENERFUND are:

- Categories of measures being undertaken
- Expected running costs pre- and post (works to estimate impact on income).
- Split of energy/ non-energy related work)
- Clear property identification.
- Provision of data digitally
- Owner demographics
- Likely increase in rents
- What value will the renovated building have in the market

II.6 Acceptable economic indicators for energy renovation of existing buildings

Minimum requirements are not always requested in terms of the economic efficiency or financial feasibility of energy renovation projects. Requirements depend on the specific project (e.g. on the building use/category and baseline energy use) on the condition of a financial return. From the banks' perspective, the payback period to recover the investment from energy savings for an energy renovation project is relevant. While an acceptable payback period would normally range between 5 and 10 years, longer returns could be acceptable if a high level of ambition is demonstrated in the energy renovation.

Paybacks based purely financial drivers may not be relevant in cases where legislation, compliance with health and safety requirements are paramount.

II.7 Influence of international/European policy and regulation

Compliance with national policies and regulations is mandatory, while the adaptation to European policies and regulations in advance is commendable. EU rules, for example, on renovating the public sector building stock and on the energy efficiency of new buildings are making a significant difference, and this impact will grow in importance as new rules will come into force in the near future.

The EU directives transposed into the national legal frameworks are very important, as well as guideline and notes from Eurostat (e.g. regarding EnPC/ESCO) and other European organisations. The international/European directions and rules are influencing the implementation of energy renovation projects/programmes by pushing all stakeholders in the right direction.

II.8 International financing

Only a few countries consider important the information on the financial models for energy efficiency in other EU Member States, to improve and develop financial products. It is considered useful to compare funding opportunities across regions or

countries, in particular data regarding the funding needs and requirements/conditions, development of the impact on the local market (demand for energy efficiency financing and transition impact), impact on the environment, replicability of the investment on larger scale and involvement of the private sector (leverage).

II.9 ESG (Environmental, social and governance consideration) and social finance

In general, performance counts more than sustainability. However, dedicated EE or renovation funds aim to support the identification, development and financing of feasible projects to improve energy efficiency, reducing greenhouse gas emissions. They are dealing with ESG but not with social finance. Achieving high ecological quality with lower energy costs is usually an objective of these funds. Others (e.g. UK) are working with social enterprises seeking to develop community energy projects that target both climate change adaptation and local economic sustainability objectives.

Indoor air quality, increase in comfort and reduction of energy expenses and energy consumption as well as emissions could be dealt with under the umbrella of ESG.

The EPC framework can be included in the current rules and some financial institutions accept EPC as a supporting document.

II.10 Other aspects

The sharing of experience in the field of energy efficiency and applied financial models to achieve desired outcomes are an important aspect of EU activities. The establishment of horizontal links for knowledge transfer between Member States is an important tool for overcoming the delay in achieving the EU's energy efficiency targets.

Perspective of building owners, communities (summary of all countries)

There is good awareness of the EPC among building owners. Large and medium-size communities employ qualified staff and run their own energy efficiency programmes, sometimes also by means of collaboration with an ESCO, while small communities often do not have sufficiently qualified staff and knowledge to start an effective programme on deep renovation of buildings owned and used by the community. They rely on external advice and the availability of budgets to pay for external advice. In a small community, where the mayor himself can often take on the role of the building authority, the EPC can be perceived as an additional burden without value.

In community buildings, there is a backlog in maintenance and repair. Backlogs in maintenance and repair are problematic because costs of energy efficiency measures do not include expenses which are necessary to catch up with repair work before implementation of energy efficiency measures can start.

Feedback was obtained from around ten to more than 100 respondents per country representing either association of owners or managers of collective residential buildings, or private and public buildings owners/managers. The questionnaire was also circulated to housing authorities and property owners' associations, thus providing a much wider audience (beyond the number of answers received).

III.1 Use of energy performance certificate (EPC)

Overall, there is good awareness of the EPC, but not so much knowledge about the requirements for its elaboration and about the actual value in terms of energy performance improvement.

EPCs are used for building renovation concept development on the community level, but they have not widely used in the private sector because, currently, energy efficiency is not a relevant parameter in the property valuation procedure. In the residential sector energy indicators are not reliable (the quality of the EPCs does not always achieve the quality of information necessary for initiating energy renovation) and in large commercial non-residential buildings the EPC is not regarded as important compared, for example, with voluntary green building certificates such as LEED, BREEAM or DGNB.

Nevertheless, EPCs are often used in a professional context as a way to enhance the building's value and to demonstrate quality. Building' owners generally are aware that they would need to frequently intervene to improve walls, windows etc. if the building has a low EPC rating. The most frequently used information is: the EPC rating, primary energy consumption and recommendations by a qualified expert for the improvement of the energy efficiency of the building.

Some local administrations require an EPCs for buildings older than 50 years and sometimes it is used for technical documentation of construction or for rehabilitation projects and as a requirement for a public programmes or grants.

III.2 Management of EPCs for buildings in own responsibility

In many countries, less than one third of respondents store the EPC in some electronic format (PDF, excel, and even specific database). In some cases, the EPC is part of the construction record which is also submitted to the building authority.

EPCs are used to identify those buildings which should be renovated first.

A limited number of respondents use the EPC in the planning of the energy retrofit for the buildings they own or manage and in some cases EPCs are used to identify those buildings which should be renovated first. The main reason why the EPC is not often used (in the planning of the energy retrofit) is that the building administrators do not have this type of certificate or they do not know how it can be used for.

Another reason could be that the measures recommended within the EPC report do not usually give sufficient detail. As a result, a detailed energy audit is almost obligatory or at least recommended. When talking about providing their EPC data to the ENERFUND, some respondents showed lack of interest as they recognize this information as personal data. Nevertheless, it may be possible to provide data for ENERFUND in some cases. Usually, for public building owners it is much easier to provide anonymized data for research organizations and for research purposes than for commercial data utilization. Moreover, in countries where EPC data is publicly available there are no concerns with sharing.

III.3 Maintenance & repair plans and use for building renovation

Maintenance and repair plans are available and updated annually in some countries (e.g. Austria, UK), whilst in most countries only half (or less) of respondents actually have a detailed plan / programme for the maintenance and repair of the buildings they manage or they have a plan for a limited number of property assets. Usually the plan is updated annually or every 3 years or less.

There are backlogs going from a few months to a year regarding maintenance and repairs. The reasons can be varied: Most important are financial issues (delay in obtaining a loan, postponement of work because of insufficient funds etc.), but issues can also be linked to the contractor and to delays in the work implementation, lack of experts or lack of specialists with technical education in this field in small municipalities. It is important to calculate realistic payback periods from investments. The rebound effect is a positive reality that must be factored into payback periods along with difference between predicted energy use and actual energy use before and after renovations.

The main challenges for development and implementation of a building energy renovation project are a lack of technical solutions, building preservation requirements and user acceptance. Thus, a predominant challenge in older buildings is the re-insulation of facades without changing the architectural appearance. Other challenges for development and implementation of a renovation project are sometimes linked to the shabbiness of buildings and the need to engage in substantial investments. In addition, building owners can have difficulties in trusting the audit/diagnosis made and the ROI calculated, and to choose the appropriate measures to adopt.

The lack of information on all existing opportunities for energy conservation was mentioned as a roadblock, and so was the difficulty in choosing a contractor. Interviewees called for more uniformity in prices and quality of services offered. They acknowledged that a minimum level of technical knowledge is necessary to implement a project.

III.4 Information relevant for energy renovation of existing buildings

Detailed information about the technical condition of the building and the actual energy consumption, the cost of the energy renovation and the energy and economic benefits of implementing this renovation is needed. In addition to technical data (e.g. type of energy carrier, heating system, age of heating system), information about the type of building ownership and the number of occupants is also useful. Parameters for prioritizing renovation projects include number of m², number of occupants, type of ownership, age of heating system, energy indicator of building envelope.

Many tools addressing communities already exist and the ENERFUND-Tool should be integrated in currently applied tools. Communities use GIS-based tools for planning, and another map displaying energy efficiency in buildings could be easily and usefully integrated.

Discussion of renovation options and different technical concepts is extremely important in decision-making and the practical way for the ENERFUND-Tool to support discussions should be clear as well as the limitations of the tool, while business models for deep retrofits of public buildings (e.g. those dealt with in <http://iea-annex61.org/>) should be considered.

Other useful information might detail innovative financing models, available subsidies, best practice examples, qualified renovation companies, suitable products including LCA¹ and field reports, payback calculation tools, LCCA² or benchmarking with similar buildings and provide a compilation of good reasons for renovation to present to decision-makers when considering energy efficiency of community buildings in budget allocation (from national level to community level). Easy access to energy-related building information and enough information to assess the quality of data (as a basis

¹ Life Cycle Analysis

² Life Cycle Cost Analysis

for deciding whether data is sufficiently reliable and can be used for the valuation procedure or not).

The most popular ENERFUND Tool features are considered the following ones providing information about:

- Energy consumption
- Average costs of energy renovation measures
- Systems efficiency
- Thermal performance of the envelope
- EPC data
- Existence of financing programmes
- Availability of suppliers and qualified contractors
- Energy performance compared with average building stock
- Input data for property valuation
- Energy performance compared to average building stock and 2030 goals etc.
- Technical “green” solutions;
- Solutions for heritage (historical) buildings;
- Tools to evaluate the buildings for prioritizing the renovation measures;
- Legislation, financial and technical conditions.

III.5 Influence of international/European policy and regulation

EU requirements are useful. Stakeholders are aware of requirements and legal framework conditions. However, responsibilities are not clearly defined and there is a lack of compliance frameworks.

European directives and regulations (and the entire policy framework including policies, strategies, guidelines, and decisions) are considered by most respondents to have a positive influence on the implementation of a projects and programs of energy retrofitting, but harmonizing European directives and regulations with national policies and legal documents is considered to be cumbersome. The European directives and regulations act only as mere recommendations as long as the national legislation is not adjusted to the European rules.

European guidelines and rules result in the mandatory implementation of energy renovation projects. They can also be used for a comparison of good examples between countries with the same climate

III.6 Other aspects

Although several reports and studies are published which show that EPC does impact on property valuations, the respondents state that currently, the EPC and energy-related performance has hardly any impact on the property valuation result. Nevertheless, there is an indirect benefit of deep renovation because renovation as such extends the technical lifetime of a building and this parameter is considered by the valuation method.

There are extreme difficulties in convincing owners of the benefits and the lasting effect of applied energy efficiency measures.

Many energy renovation projects have been combined, and renewables like Photovoltaic systems and or thermal solar heating systems are used. However, “energy saving” potentials related to such installations are difficult to identify beforehand, especially in countries where district heating contributes as part of a combined energy supply solution (e.g. Denmark).

Awareness raising among the general public is important.

Reporting of Energy Performance Contracting into public debt is a barrier for municipalities.

The general public does not sufficiently understand the EPC and its importance, and therefore the interest is poor.

Summary of input for the development of the ENERFUND-Tool

The following compilation shows the aspects of decision making, the information needed and the sources where the requested information could come from (EPC or from other sources) by stakeholder group.

Perspective of Energy Services (ESCO) and retrofitting companies

Information needed for decision making:

Aspect of decision making	Information needed
Assessment of renovation potential in more detail – yes or no	Technical condition of the building Cost of energy efficiency measures
Advertisement of specific renovation measures / products – yes or no	Building specific data
Advertisement of specific energy efficient products / products – yes or no	Building specific data

Data useful for the ENERFUND-Tool should comprise:

Data from EPC	Additional information from other sources
EPC Rating	Quality of EPC and EPC control (EPC represent as-built conditions, EPC based on default values, EPC control system in place or not)
Energy saving potential for heating and cooling (energy demand before and after renovation) – depending on the level of detail for recommended measures	Measured energy consumption
Building specific data (U-values of wall, efficiency of heating system, age of heating system, ...)	If not provided by EPC: Building specific data (U-values of wall, efficiency of heating system, age of heating system, ...)

Perspective of banks, financial institutions, investors, property valuers

Information needed for decision making:

Aspect of decision making	Information needed
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Financing of deep renovation project – yes or no	Time to market (how long does it take to sell / rent) Amount charged for selling/renting (EUR/m ²) Information for property valuation including risk assessment: accounting for lower risk regarding the options to rent or sell the renovated property (e.g. assessment of the location, operation cost, compliance with future legislation without extra refurbishment)
If yes, which financing method and which conditions	Capacity of the consortium Quality of the renovation project Guarantees Results of risk assessment

Conclusions for the data basis the ENERFUND-Tool should comprise:

Data from EPC	Additional information from other sources
Energy saving potential for heating and cooling (energy demand before and after renovation)	Information about the economic development of the location
Compliance with 2020 targets and obligations	Information whether urban densification is allowed in the area where the building is located (another story on top)
Compliance with 2030 targets and obligations	Availability of subsidies to make the renovation more profitable

Perspective of building owners, communities

Information needed for decision making:

Aspect of decision making	Information needed
Investment in building renovation – yes or no	Comparison of own building with other similar buildings / similar conditions (benchmarking)
	Comparison of own building with future energy-related requirements (energy efficiency and share of renewables)
	Good examples about ambitious renovations
	Availability of qualified companies and suitable products
	Price range of renovation cost

Conclusions for the data basis the ENERFUND-Tool should comprise:

Data from EPC	Additional information from other sources
Energy saving potential for heating and cooling (energy demand before and after renovation)	Similar typical building «best case» and similar typical buildig «worst case» (for benchmarking own building)

Compliance with 2020 targets and obligations	Best practice databases
Compliance with 2030 targets and obligations	Databases of certified staff and certified products
	Typical renovation cost (maybe combined with best practice examples)

CONCLUSIONS

The analysis contained in this report addresses the needs of retrofitting companies and stakeholders of energy efficiency program for the development of a tool/marketplace for deep renovation, as well as the needs, barriers and general acceptance of EPC/retrofitting actions with the final user in mind.

Although specific targets were set at the beginning of the survey in terms of number of stakeholders questioned or interviewed (30 stakeholders in each country interviewed to document the status quo and needs of retrofitting companies and energy efficiency programs stakeholders, and 100 people in each country to document the needs, barriers and general acceptance of EPC/retrofitting by the public), the report contains the feedback from lower numbers (see table below). The reasons vary from the lack of specific stakeholders in some countries due to the level of market development to low awareness of building owners on energy efficiency and renovation.

Country	Number of Questionnaires / Interviews		
	Retrofitting Co. & ESCOs	Banks / Financial inst.	Building owners
Austria	8	7	15
Bulgaria	6	1	31
Cyprus	6	2	51
Denmark	2	-	4
France	30	2	43
Greece	11	1	23
Ireland	9	5	22
Romania	4	3	104
Slovakia	11	-	34
Slovenia	8	8	12
Spain	10	1	10
UK	5	5	16

Nevertheless, the feedback was received not only from individual organisations but also from umbrella associations of stakeholders and the quality of the answers was very high and they provide substantial input for the development of the ENERFUND tool. One could say that the quality of the feedback counts more than the quantity (of respondents, taking into account the fact that even the proposed targets were not to be considered statistically representative).

Regarding the building owners as final users of the ENERFUND tool, the questionnaire prepared for the current analysis was quite comprehensive and, even if the feedback is useful for this phase, it is intended to supplement findings from the current analysis by defining a short set of key questions addressing the final users / customers as the general public. This will be done by online poll tools (i.e. pollfish) to collect all the replies needed through a short questionnaire.

Summary of survey results

ESCOs and energy efficiency project managers use data gathered from their own energy audit processes in order to develop energy retrofit proposals when upgrading buildings. They do not consider the EPC outputs to be sufficiently detailed, particularly in terms of details of heating systems. Thus, the ENERFUND Tool should be focused on identifying potential opportunities for retrofit rather than on presenting it as a comprehensive data source.

Energy Efficiency programme managers advised that residential EPCs are more reliable than EPCs of non-residential buildings and can be rather used as source of data for planning energy retrofits.

Banks and investment companies are in the early stages of engaging with the energy retrofit sector and products other than energy-related subsidies and grants such as energy efficiency loans or energy efficiency mortgages are only at concept stage in most countries.

It is important to note that EPCs in European Member States are different in terms of input data quality and calculation procedure. It is also important to differentiate between existing buildings and new buildings which are reclassified as existing buildings after 10 years, when the EPC has to be reissued.

- Existing buildings: Many countries apply a simplified calculation procedure based on default input data.
- Ideally, EPCs for new buildings, calculated in the design stage, are updated during construction and represent the status of the building after completion. Ideally, actual product data is used for calculating energy performance of the completed building. Some countries already follow this procedure, meaning that detailed building specific information is available.

The following approach is suggested for the ENERFUND-Tool, because of the diverse situation regarding the types of information that can be gained from the EPC and the quality of this information on the one hand, and the diverging expectations of stakeholders on the other hand:

- When making use of available EPCs and EPC-ratings take into account factors compromising the informative value.
- Make use of the available EPCs but also make use of the information about missing EPCs: where no EPC exists, there might be renovation potential and the need to have a closer look.
- Plan for detailed and building specific technical data to be extracted from the energy performance calculation and the EPC, but also for the option to make use of default data.
- Choose a modular approach where some modules will be further developed in future, depending on data availability and reporting function (filter). Most probably it will not be possible to implement all useful functions within the ENERFUND project period.

Needs for the development of a market place for deep renovation

The following needs have been identified:

- Based on previous experience on renovation towards zero energy balance, it is recommended to allow for high consultancy costs, in order to cope with the complexity of the task (deep renovation including implementing renewable energy technologies consists of many different measures and many different companies are involved).
- The EPC can serve to prioritize renovation options and initiate discussion, but does not provide sufficiently detailed information for decision-making on renovation projects.
- Companies offering Energy Performance Contracting (EPCo) or interested in offering EPCo need, especially, information about existing heating systems. However, this information is very weak and not sufficiently available in the current EPC in many countries.
- For decision making about renovation and renovation planning, detailed information about the technical condition of a building and the actual energy consumption is needed and often not available. Building documents are outdated and do not represent the actual technical condition of a building. This is the usual situation in the case of existing buildings over 20 years old which are potential subjects for renovation. Funding must be made available to generate this information.
- Information about measured energy data must be available, and even better, information on energy expenses.
- Energy Contracting targets only technical building installations and does not include improving the energy efficiency of the building envelope due to amortization periods given by the client.
- Mechanisms for risk management are needed: There is a concern that the projected energy savings will not be achieved, the payback calculation will turn out to be wrong and the financing model based on energy savings will be rendered unrealistic. At municipal level, there are many cases in which the role of the ESCO is taken by a unit of the customer itself, e.g. the technical department of a municipality. It acts like the ESCO and the remuneration takes place through cross payments between budgets. This also means that the risk remains totally with the municipality.
- There is the need for more precise projections regarding energy savings and cost of energy efficiency measures.
- Information about framework conditions / conflicting legislation that may hinder deep renovations (e.g. condominium legislation and tenant protection legislation) is necessary.
- There is a market failure concerning energy prices. Externalized costs relating to CO₂ emissions should be considered depending on the final energy demand of the building and the type of energy carrier used. State aid (subsidies in the form of loans and grants) provided for deep renovation should balance this market failure.

Expectations for the development of the ENERFUND-Tool for deep renovation

Stakeholders expect the following features from the ENERFUND-Tool:

- In addition to technical data (e.g. type of energy carrier, heating system, age of heating system), information about the type of building ownership and the number of occupants is useful.
- The tool should display the potential for re-densification, e.g. opportunities to convert attic storeys to apartments, showing areas where it is allowed to add another storey thereby increasing the building height; or conversely highlighting areas with restrictions due to zoning plans). A new storey could be rented or sold at a high price supporting the refurbishment of the entire building.
- The tool should display areas where new spatial plans are being developed, as during this process communities might be merged, if for example there are fewer inhabitants due to rural urban migration and some buildings might be abandoned (sold, demolished or not used anymore).
- It will be useful to have a presentation of the building energy performance in a geocoded way, to be combined with other maps and GIS-based tools which are already used for community development.
- ENERFUND could be combined with other tools, e.g. with ECOPLAN and ECOCITIES:
 - The software ECOCITIES supports operators of building groups – such as municipalities, cities or property management companies – in deciding how budgets can be used most effectively to align the real estate portfolio to required political, economic and environmental objectives.
 - ECOPLAN can be used to develop neighbourhood energy strategies, review existing ones or ensure the alignment of individual initiatives with the neighbourhood overall energy strategy.
- Other useful information the tool could provide includes: innovative financing models, available subsidies, qualified renovation companies, suitable products including LCA and field reports, best practice examples, payback calculation tools, LCCA and benchmarking with similar buildings amounting to a compilation of good reasons for renovation to present to decision-makers.
 - E.g. make it possible to report regarding eligibility for financing by means of Climate Bonds: The Residential Buildings criteria leverages local building codes and energy ratings/labels as a proxy for performance of the top 15% of buildings in a city.
<https://www.climatebonds.net/standard/buildings/residential>
- Parameters for prioritizing renovation projects: number of m², number of occupants, type of ownership, age of heating system, energy indicator of building envelope.
- Parameter for comparing projects: The discount rate applied in property valuation varies according to risk and expected profit. Also, the investment and remaining useful building life are useful information.
- Discussion of renovation options and different technical concepts is extremely important in decision-making. It should be clearly presented how the ENERFUND-Tool can support discussions about what the limitations of the tool are.

- Data assessment and reporting functions are required for targeted development of subsidies / policy instruments (Example EPISCOPE – Dublin, Ireland).
- Property valuers make use of INSPIRE environmental risk maps and would probably also make use of easily accessible building energy efficiency maps provided that data quality is good (i.e. able to provide sufficient information to the valuers so that it is possible for them to assess the quality of data, e.g. by displaying information about the EPC control systems according to EPBD Article 18).
- Deep renovations are more likely to happen in areas with market development potential (i.e. scope to purchase buildings in need of renovation, upgrade them including energy efficiency, and sell or rent them for a higher price). Therefore, the Tool should be linked with transaction databases (indicating which areas exhibit stagnation or increase in prices) and market development reports (e.g. residential market in Vienna: http://residentialmarketvienna.at/epaper-EN_BUWOG-EHL_WMB_2016/index.html#/0).
- Building the tool in a modular way will allow for the inclusion of additional/different information in the future, in case the requested data / information is currently not available or cannot be published due to regulatory restrictions currently in place.
- It is desirable to build the tool in a way that it supports communities in reporting SEAP measures (http://www.covenantofmayors.eu/actions/monitoring-action-plans_en.html)
- Country specific sections in national language will be paramount for promotion and utilization on national level.
- The tool should provide a platform for benchmarking with others and showcasing best in class projects. The ENERFUND tool can contribute to awareness creation on energy efficiency in buildings.
- Companies producing material / components needed for deep renovation see a benefit in having their products feature in the ENERFUND-Tool thereby showing their products to be of quality and capable of providing a contribution to building energy efficiency to potential clients.

Regarding the format (way) in which such information are desired, the following were listed:

- in any format;
- electronic format / e-mail;
- links towards website containing (the) information;
- trustworthy information, which does not change based on the political situation (leadership);
- in a written form, accessible for people with an average technical background;
- norms (standards) based on the building types;
- regularly distributed informative bulletins (newsletters);
- informative leaflets (flyers) on the importance of energy efficiency measures;
- group counselling with the building residents, at the Town Hall or in public places;
- media coverage at acceptable hours for raising awareness.

Desired features / information usefully provided by the ENERFUND Tool (necessary for better decision-making during energy retrofit) can be summarised as follows:

- information and explanations about the sources of funding for the retrofit of public or private buildings, even if some of the buildings were previously partially or inefficiently retrofitted;
- the outcomes of the construction work, the savings (reductions) achieved in the energy consumption (kWh) and the total annual savings for the tenants (whole building), calculated relative to the energy cost at the date in which the analysis was made;
- the costs (mean value / interval) of retrofit measures;
- the time requirement;
- comparison between payback periods with or without access to EU funding;
- relevant legislation, financial and technical information;
- explanation of how an EPC is obtained and the steps to be followed;
- key data from the EPC:
 - o clear property identification,
 - o build type, e.g. masonry, timber frame,
 - o the thermal performance of the building envelope;
 - o the efficiency of the heating systems;
- the (building) energy consumption, separate monitoring of the energy consumption, the building technical data sheet;
- a tool to evaluate the potential cost for upgrade works over a wide number of units and for prioritizing the renovation measures;
- examples of comparison, before and after, regarding the thermal retrofit;
- assessment of the heat losses through a building's (external) walls, windows, terrace (roof), distribution system etc.;
- a hierarchy of most beneficial upgrades including installation type (PV, solar etc.) to provide maximum benefit;
- solutions for heritage (historical) buildings;
- information on the existence of financing routes (schemes) and a schedule for the introduction of new financing routes (schemes) for next year, to be included in the budget objectives;
- sources of consultancy in obtaining financing (funding);
- the availability of qualified companies and/or persons and quality assured contractors;
- the evaluation of the property;
- knowledge of the quality and performance of the materials used for making the thermal envelope of the building.
- knowledge of the comparative effectiveness of new versus old products;
- information about "green" solutions;
- research ideas and results;
- comparison of the (building) energy performance with the average building stock and with 2030 objectives for energy and climate;
- other relevant features or information:
 - o owner demographics,

- o sign off by qualified professional,
- o provision of data digitally,
- o likely increase in rents,
- o what value will the renovated building have in the market,
- o real pre- & post energy usage from utilities linked to average temperatures,
- o expected running costs pre- and post-works to estimate impact on income,
- o split of energy / non-energy work,
- o energy spend per metre squared, ranking of top consumers, ranking of best candidates for refurbishment.

Target groups to work with for spreading / disseminating the ENERFUND-Tool

Some stakeholders expressed strong reservations regarding a tool which compares buildings, EPC, and renovation opportunities. One could say that each building is unique. Depending on the number and importance of the stakeholders having this opinion (usually being conservative), dissemination could be made more difficult. On the other hand, actors being more open towards new developments should be sought out in order to support the development of the ENERFUND Tool.

The responses showed that there is a need for support or at least a benefit expected from the support provided by the tool, and sometimes the reaction towards the planned tool was positive, although there was also **the opinion that the role of such tools is overestimated.**

The term deep renovation, as defined in the ENERFUND project, has to be explained and could discourage potential users, thus limiting the application of the tool. It might be helpful to use the term “renovation” instead of deep renovation.

In one questionnaire, the issue was addressed as to how ENERFUND will be operated after the funded project has ended. There is the concern that the ENERFUND-Tool will not be operational after the end of the funded project (like many other tools that have been developed in projects before), and this could prevent some people from making the effort to provide data. Therefore, **it is strongly recommended to have a note on the website explaining the future ENERFUND operation model.**

It could be possible to provide data for ENERFUND relating to some respondents and interviewees. Usually it is much easier to provide anonymized data relating to public building owners for research organizations and for research purposes than for commercial purposes. **Nevertheless, a formal request for data and an agreement on data utilization will be necessary.**

Communities as stakeholders and target group for the ENERFUND-Tool

Communities are an extremely heterogeneous target group. For example, large communities have their own facility management departments, some of them even Energy Intractive models (like Energy Contracting but with an internal department acting as “ESCO”). Small communities rely on external professional advice and support. Representatives of communities participating in the Austrian e5 program (approximately 160 communities) are more educated in energy issues and more active in energy efficiency than communities not participating in the program.

Experience (e.g. the Austrian Climate Alliance) suggests that it is likely that only few communities make use of tools like ENERFUND. However, it could motivate communities to make use of the ENERFUND Tool if it could help in reporting SEAP measures (http://www.covenantofmayors.eu/actions/monitoring-action-plans_en.html).

Annex 1: Summaries of findings per country

A1.I. Perspective of Energy Services Companies (ESCO) and retrofitting companies

Austria

The tool should display the potential for re-densification, e.g. possibilities to convert attic storeys to apartments (display areas where it is allowed to add another storey and to increase the building height; or areas with restrictions due to zoning plans): the new storey can be rented or sold at a high price and will support the refurbishment of the entire building.

For decision making about renovation and renovation planning, detailed information about the technical condition of a building and the actual energy consumption is needed and often not available. Building documents are outdated and do not represent the actual technical condition of a building. This is the usual situation regarding existing buildings older than 20 years which are potential subjects to renovation. Budget has to be allocated for this task or funding must be made available.

Companies offering Energy Performance Contracting or interested in offering Energy Performance Contracting need especially information about existing heating systems. However, this information is very weak and not sufficiently available in the current Austrian EPC.

Energy Contracting focuses on technical building installations and does not include energy efficiency measures targeting the building envelope. It has been only successful in non-residential buildings owned by the central government.

Measures addressing the building envelope are carried out separately by companies collaborating closely with the companies producing the material / components. There are no Energy Contracting Models available for these measures. Usual procurement procedures are applied to purchase these products. Companies see a benefit in the ENERFUND-Tool in showing their products, the quality and their contribution to building energy efficiency to potential clients.

Interviewed stakeholders: 8 respondents

Type of Companies: Small and large companies offering Energy Contracting and refurbishment planning, companies offering products needed for refurbishment (windows, insulation, wooden building components), voluntary professional association BEUC, professional association of Austrian Chamber of Commerce

Positions: Managing director, expert, head of department

Bulgaria

Interviewed stakeholders: 6 respondents

Type of Companies: Small and large companies offering Energy Performance Contracting: Energy contracting with focus on energy savings (4) and contracts for energy audits and certification of buildings, energy audits of industry, check of energy efficiency of heating systems with boilers and air conditioning systems, conformity assessment of investment projects for energy efficiency (2).

Positions: Top management (4), Energy Consultant (1) and Energy Consultant (1).

Cyprus

Interviewed stakeholders: 6 respondents

Type of Companies: Small and Medium-Sized enterprises (SMEs) that they mainly offer: Information and energy advice, Identification of measures, Technical planning, Financing, Implementation (operation, supervision) and Optimization of technical operation

Positions: Directors (3), General Manager (1), Head of Engineering Department (1), Energy Auditor (1).

Denmark

Interviewed stakeholders: 2 respondents

France

Interviewed stakeholders: 30 respondents

Type of Companies: All types of companies responded to the questionnaire, active in the fields of energy efficiency services, energy performance contracting, regulatory energy audits, engineering companies, etc. from SME to large size enterprises. A majority was SMEs since it was easier to reach the right person.

Positions: Most of the respondees were from management or operations (buildings engineers)

Greece

Interviewed stakeholders: 11 respondents

Type of Companies: SMEs offering services comprised “Energy contracting with focus on energy savings” (8), “Energy contracting with focus on energy plants” (1) and “Energy contracting with focus on renewable energy plant” (1).

Positions: mainly energy consultants (7), top management (2), Building engineer (1), Head of new technologies (1).

Ireland

The initial focus of this questionnaire was intended for ESCOs. As the ESCO market is quite small and not well developed, and indeed given that the delivery of energy efficiency programmes by energy suppliers, municipalities and energy agencies is already well established and extremely active, the target audience for the energy sector questionnaire was widened accordingly.

The original questionnaire template received in August 2016 was revised both before and during the survey process in response to the Irish market conditions and early survey responses.

The survey responses outlined below are split between the energy contracting / ESCO market and the general retrofit market. However, some responses given in the general retrofit section relating to the use of energy performance certificates also refer to their use in the ESCO market.

Interviewed stakeholders: 9 respondents

In gathering data from the market, it proved very difficult to get answers directly from companies operating exclusively in the ESCO market. All responses summarised in this section are based on responses from energy efficiency programme managers or

consultants linked to energy suppliers who have varying degrees of involvement in energy performance contracts.

Romania

Interviewed stakeholders: 4 respondents from 3 companies

Type of Companies: SMEs offering services comprised “Energy contracting with focus on energy savings” (2), “Energy contracting with focus on energy plants” (2) and “Energy contracting with focus on renewable energy plant” (1), ESCO - residential renovations (1).

Positions: Top management (1), Head of department (1), energy consultant (1), project manager (1).

Slovakia

The questionnaire was distributed among members of Association of Energy Services Providers which represents more than 70% of the ESCO companies active in Slovakia. The answers were collected from 7 ESCOs through personal interviews.

Type of Companies: SMEs (2) Large Companies (5), National Branches of International Company (4).

Positions: Top management (3), Head of department (1), Project manager (1), Energy Consultant (2).

Services offered: Energy Performance Contracting: Energy contracting with focus on energy savings (4), Combined approach EPC+ESC (3).

Slovenia

The limited number of questionnaires reflects a small Slovenian market (2 million inhabitants) having a limited capacity for implementation of new financial mechanisms – particularly if talking about ESCO services. In Slovenia, only a few companies are capable of offering ESCO services (due to financial capabilities) and therefore larger number of questionnaires is simply not reachable.

Interviewed stakeholders: 8 respondents

Spain

Interviewed stakeholders: 10 respondents

Type of Companies: SMEs (5).

Positions: Top management (5), head of department (1), architect (4), owner and manager (1).

Services offered: Energy Performance Contracting: Energy contracting with focus on energy savings (2), Energy Performance Certificates, Energy Efficiency Refurbishment (5).

United Kingdom

Interviewed stakeholders: 5 respondents

Type of Companies: SMEs (60%), Large Company (20%), Sole Trader (20%).

I.1 Criteria for energy contracting – building focus

*What are the criteria to consider a building for energy contracting?
Please prioritise, putting the most important first.
Which information do you use for decision making?*

Austria

Energy expenses and energy consumption are most important.

There is a stepwise procedure: (1) checking energy expenses, if the amount is high enough, (2) the building is scanned, if this check is ok, (3) the building is analysed in detail.

Bulgaria

Summary A

The building to be in exploitation and to have real energy consumption.
Integrated building systems to be depreciated, relatively large energy consumption in order to confirm the potential of future energy savings.

Summary B

1. To have need for measures in heating systems incl. possibility of changing the fuel base (for solid fuel energy source).
2. The need for measures on envelope.
3. The need for measures on lighting systems.

Initial inspection and data from the applicant on the energy consumed by type and quantities.

Summary C

- To have high energy consumption;
- To possess amortized energy production system, outdated heating, ventilation and / or lighting installation;
- To be one of those types - industrial, educational, cultural, commercial, public administration buildings;
- In case of absence of energy audit, we collect information based on a specially designed questionnaire.

For selection approach in decision making we need better systematized and updated information about the energy consumption of the site in months to three years ago, previous energy audits, analyzes prepared by the responsible officials in the registered data type, features the behavior of the system, employees and / or users of the site.

Summary D

To implement the ESCO contracts we select the most appropriate of the buildings where we have enough information or those who have a report from energy efficiency audit. We perform control calculations and prepare proposals. criteria:

1. One of the positive criteria for our investment proposal is to be paid for up to 10 years.
2. The realized energy savings total package is between 50 and 60%.

Cyprus

The main criteria to consider a building for energy contracting within most of the ESCO partners were the energy savings potential, the high potential for exploitation of renewable energy sources. Significant is the net present value of the project but also the liability of the customer.

Denmark

A predominant statement of the key persons interviewed concerning the criteria for energy contracting and for initiation of energy retrofit is that key figures of the buildings heating and electricity consumption are crucial. This means that baseline of energy consumption made up in kWh/m² is exactly what the decision makers look for in order to make a first estimate of payback time etc.

Next to that, an inspection of experts of the buildings in question is necessary to make clear what kind of retrofitting that must be carried out and possibly which measures must be taken into consideration.

France

The criteria to consider for energy contracting in buildings, according to energy service companies, are vast and usually depend on the type of buildings.

In the housing sector, the most decisive factor considered is usually the shabbiness of buildings (indirectly related to their age). The willing to reduce energy bills and improve comfort is also often emphasized by clients. So the factors to consider here are the age of buildings, their level of consumption, and history of previous renovation work when relevant.

In commercial buildings, energy contracting is often seen as a way to reduce energy costs, improve productivity and increase comfort for staff. It can be also, in the tertiary sector, a way to emphasize the company's environmental policies (for example in hotels with green labels etc.).

In cultural/architectural heritage, the criteria to consider are often and only the need for conservation, knowing that certain restrictions apply to heritage buildings (for example it is often not possible to put any insulation on historical buildings and PV panels on roofs are usually forbidden).

The information used for decision making usually are the level of energy consumption, compared to benchmarks for similar buildings, the ROI (Return on Investment) period, the potential costs, the state of the envelop, the building use, as well as existing funding opportunities etc.

Greece

A. CRITERIA

- Financially reliable client 7/11
- Potential of energy savings based on energy indicators 7/11
- Return of investment 4/11
- Cost of intervention 3/11
- Building type 3/11
- Difficulty level of measurement and verification of intervention
- Building and mechanical installation age

The criteria to consider a building for energy contracting are presented below:

- (1) old non-upgraded buildings,
- (2) new buildings designed prior KENAK-EPBD,
- (3) new buildings without adjusted building services technologies.

B. INFORMATION

- Energy bills (electricity, natural gas, water etc.). Quantity (kWh, m³ etc.) and price 5/11
- Indicative figures such as number of persons, timetable etc.
- Payback period 4/11
- Cost of measures 3/11
- Technical characteristics of building and equipment 3/11
- Data from economic-technical study of interventions
- Existing Subsidies / loans 2/11
- Drawings
- Energy measurements
- Collaboration attitude of client 2/11

Ireland

When asked, “What were the main criteria leading to an Energy Performance Contracting (EPCo) financing model being adopted for a retrofit project and what information is used for decision making?”, the factors identified were mainly as follows:

- 1) risk profile of the client is low – i.e. the client has stable business
- 2) risk profile of equipment is low - technology has attractive return and short contract
- 3) adequate return on investment for the lender and the ESCO
- 4) the client can achieve guaranteed energy savings and thus can see energy costs savings being realised both during and after the EPCo period
- 5) short contract duration
- 6) assists with energy savings targets

Success of the EPCo is further assisted when:

- The client is aware that once plant is replaced, current maintenance and repair costs will disappear
- The client is encouraged to adopt improved operational procedures following installation of new equipment

A follow-on question, asked, “What information do you use for decision making on EPCos?”, the responses included:

- A full energy audit including bill analysis and assessment of all energy use
- Technology maturity
- Risk assessment (both for the client’s business and the project)
- Commercial profitability
- Guaranteed savings
- Warranties on equipment
- Availability of ESCO facility for a new project
- Comprehensive metering and monitoring

Romania

Maximizing reduction of energy costs, by feasible package of measures (payback period less than 5-7 years).

No energy supplier.

Price ratio (electricity to gas), cumulated distribution curves electric and thermal, connection to low-voltage or medium-voltage (connection to low voltage favours micro-cogeneration).

Slovakia

Project identification

- Energy consumption volume (in financial terms)
- Estimated Potential for energy savings
 - age of the equipment installed
 - level/quality of operation/maintenance
- Ownership of the building(s)
- Approach of the building owner

Information used for decision making

- Energy audit and/or own assessment of the facility
- Invoices for verification of consumption

Slovenia

The main criteria for energy contracting were within most of the ESCO partners that buildings have to have potential to reduce energy consumption with respective financial investment and payback period.

Spain

For some of them, the first thing to be considered should be the energetic situation, that means, if there is a real opportunity for improvement, then study the tenant's economic solvency. Afterwards, the amounts for energy consumption, the type of client (administration, enterprise or community of neighbours) and finally the possibility for energy improvement.

For others, the type of building, use of the building, availability of the space to integrate renewable energies and/or substitute energy systems, external building envelope, type of systems and technologies in use (energy source) and type of contract of the energy/fuel company supplier. Energy refurbishment focused on thermal envelope, the interior lighting and thermal systems, in order to minimise the demand for energy and maximize the performance of the facilities.

Other considers: Overall solutions, energy management, savings in maintenance.

For other:

- 0 - Comply with the existing legislation
- 1 - Accomplish the property/user's needs, taking cognisance of the consumer's profiles.
- 2 - Guarantee an optimal economic cost.
- 3 - Sustainability.
- 4 - Guarantee the correct functionality with the best performance.
- 5 - Avoid dependency on monopolies.

United Kingdom

(1)

- Main experience is via projects within the RE:FIT framework, where the pre-approved list of performance contractors and existing EPC contract structure helps remove procurement cost/complexity as a barrier to implementing an EPC
- 1. Fuel saving; 2. Affordable warmth; 3. Comfort
- 1. Cost saving; 2. Carbon saving' 3. Replacement of equipment at end of life

(2)

- The following factors affected the bid/no bid decision: 1. scale of project - would it support business objectives in terms of opportunity for turnover/profit; 2. how many competitors are likely to bid too, and whether the project offers any opportunities for a unique sales approach; 3. whether the client's expectations were realistic - i.e. has the local authority asked for minimum 20% savings in buildings which are already very energy efficient; 4. resource issues - skills availability.
- Suitability of the property
- Cost of contract versus savings

I.2 Usual business cases

(1) What are the most usual business cases (energy upgrading measures/solutions applied)?

Please briefly mention/explain the main reasons.

(2) Which measures / solutions would you like to carry out? What would you need and what would support you?

Austria

Companies active in planning, installing and maintaining building services systems based on renewable energy (biomass, heat pump, solar) are interested to offer Energy Contracting to public buildings and the private sector (residential and non-residential), and need support: technical information about existing heating systems is needed.

Companies already active in Energy Contracting exclusively deal with the technical building installations. Companies will offer what is requested by the client. However, usually a certain payback time is requested and as a consequence, specific measures are excluded (e.g. insulation of walls).

Bulgaria

(1)

- Installation of insulation in the building envelope - walls and roof;
- Replacement of window frames and doors;

The implementation of these measures leads to visible results and is characterized by a relatively high proportion of the achieved savings relative to investment unit.

- Energy-efficient lighting.

(2)

Case A

Non-constructional high-tech solutions to optimize production processes, management and monitoring of utility installations.

For projects operation and realization is very important to have responsible and professional attitude of the specialists performing energy audits, which determines the reliability of primary information for each site.

Case B

It would be very useful for building owners to find financing for removal of centralized heating pipes for apartments and to pass them through common areas. Then, to install the heat meter at the entrance of each apartment.

Cyprus

(1) Most usual energy solutions applied:

- Upgrade of HVAC systems
- Window replacement
- Lighting systems
- Building envelope insulation
- Renewable electricity systems

(2) Any measures with a payback time less than three years will be welcomed by the contractors. Detailed descriptions needed for the installed systems and automations, audits and people responsible for BMS.

Denmark

Transformation of the lighting systems (LED) and retrofitting of the ventilation systems (sensors and automation) are the predominant measures to save energy in most business cases. Thus, business cases of that kind are the only profitable in the short run. In some few cases retrofitting of facades and change of windows might be profitable.

Any measures with a payback time less than five years will be welcomed by the contractors. Therefore a baseline of energy consumption concerning categories of large buildings would be of support.

France

(1) Measures commonly applied are:

- Windows replacement (for double/triple glazing): This is one of the most common measures which benefit from incentives and from national/regional entities;
- Ceiling and attic insulation, as thermal losses often originate from this area;
- Boiler replacement, upgrading and insulation;
- Measures on efficient lighting;
- Heat exchangers and work on HVAC systems;
- Internal and external wall insulation;
- Solar water heating systems
- Heat pumps

This reflects that a large part of energy consumption is related to lighting, cooling and heating in France. Naturally, the measures will focus on these sources of consumption.

(2) Professionals interviewed mentioned that they generally focus on some area but can intervene on all types of measures. However, to enter a new sector they need to be better known by clients, whether these are from the housing sector or the private tertiary sector.

The lack of information delivered to the general public and to customers is often cited as a roadblock. The latter are often not aware of opportunities for renovation and related funding. Clear and pedagogical communication materials on these issues could unlock the potential for energy refurbishment.

Greece

(1) - Automation adjustments

- BMS installation 4/11
- HVAC fine-tuning 2/11
- Lighting systems measures (LED and connectors) 5/11
- Insulation of roof 3/11
- Insulation of walls 4/11
- Replacement of windows 2/11
- Adjusting of boiler rooms
- tuning of air handlers
- mixed mode ventilation
- geothermal energy supply
- free cooling, night cooling
- solar cooling, solar heating
- Variable speed drives
- Installation of Heat pumps 2/11
- RES installation 2/11

(2) All of the above of (1). We need detailed descriptions of the installed systems and automations, audits and available recorded data. Key people: Responsible for maintenance and BMS installer.

- Adjusting of boiler rooms, tuning of air handlers, mixed mode ventilation, geothermal energy supply. We would need financing and support from relay centres for the promotion of the idea of ESCOs.
- The possibility to apply third party financing. Need of Stable banking system.
- BEMS installation and remote control
- Need of support, understanding from the client and money.

Ireland

(1) When asked, "What are the most usual business cases for EPCOs, the most usual **technologies** for EPCOs are:

- Lighting
- Space and water heating system upgrades (e.g. electrification of heat production using heat pumps)

EPCOs are not currently used for building fabric upgrades, most likely possibly due to longer associated paybacks.

The most usual **building / business sectors** where EPCOs are most common are:

- Factories,
- Leisure/sports centres (e.g. swimming pools),
- Hotels.

(2) When asked, “What additional measures would you like to see carried out using EPCos”, the responses were:

- Pharmaceutical industry
- Renewable technologies (e.g. heat pumps, PV)
- EPCos could be used in any sector as each application is assessed on its merits

Romania

(1) Implementation by Energy Performance Contracting, payment by savings or at least guarantee of energy savings. Audit + turn-key services for the implementation of selected measures.

Direct approach of final customer, free consultancy, direct supply (sale) contract, commissioning and maintenance. When needed, we approach also financing option by leasing or FREE (Energy Efficiency Fund).

Business model as combination of ESCO investment in energy savings and funding by energy renovation programs using public financing: 60% from Operational Regional Program (ESIF), 15% Local administration and 25% covered by ESCO for the building owners (association). Contracted measures cover the insulation of building envelope, horizontal distribution of heating system, DHW recirculation pipes.

(2) For thermal insulation of existing buildings, it could be useful to consider also combined funding option ESCO + non-reimbursable financing.

Management of energy efficiency – engaging clients in active use of energy monitoring systems for operational measures.

Neutralising organic waste by gasification and use of supplied heat for space heating and DHW.

Slovakia

- (1) Building Technologies (Heating and hot water preparation, Lighting) upgrades/replacements including optimization of operation. Partial improvements of building envelope (windows replacement) only in selected cases.
- (2) Comprehensive reconstructions of buildings. This approach cannot be financed only from energy savings and additional financial resources are necessary.

Slovenia

When talking about most financially interesting measures for retrofitting actions the following were most interesting:

- Reconstruction of the boiler chamber,
- installation of co-generation,
- installation of heat pumps,
- reconstruction of the domestic hot water system,
- hydraulic balancing,
- installation of weather-compensated control,
- installation of thermostatic valves,
- public lighting.

Spain

(1) **Single-family homes, multi-family dwellings.** In general, improve the thermal transmittance: External thermal insulation, improvement of thermal bridges, substitution of carpentry, install double-glaze windows

Improve the energy efficiency of systems: change of domestic hot water installations, high energy efficiency boilers, air conditioning

In the residential sector, the most common improvements are the renovation of the boiler room, the installation of heat cost allocators and the lightning renovation. The main reason for these improvements is the fast investment's recovery (in regards to the boiler and lightning) and upcoming laws which, even though the Board of Directors has not taken a stand on them, would probably be mandatory to use heat cost allocators in central heating systems shortly.

Industries located at industrial sites. Savings in lighting

Energy improvement measures are focused on:

- Study, development and analysis of consumer's profiles.
- Negotiation with energy supplier companies.
- Study and analysis of building envelops. Improvement recommendations (windows, insulation...)
- Study and analysis of the main installations (HVAC, elevators, lightning)
- Improvement plan (high performance equipment, frequency converter...)
- Renewable energies usage (depending on current legislation...)

(2) More integral measures are desirable.

- A change in the society's appreciation of the need and desirability of energy rehabilitation is needed to improve its living conditions
- A clear regulatory framework is needed and permanent and unchanging real grants and funding.
- For savings in lighting they would need changes on electricity tariff.

United Kingdom

(1)

- Common ECMs implemented by my clients include: 1. lighting upgrades (usually LED now) and controls - reliable technology / respectable payback. 2. BMS - optimisation, and / or bringing additional equipment under control to avoid conflicts - good savings / payback but hard to measure cost effectively. 3. HVAC improvements - e.g. replacement of belt driven fan motors with EC plug fans or adding VSDs, addition of free cooling, heat recovery, better control. 4. Computer room air conditioning (CRAC unit upgrades, cold aisle containment etc.) - frequently see rising client costs associated with server rooms which can be tackled cost-effectively. 5. Basic housekeeping; boiler burner improvements and combustion efficiency, TRVs on radiators, draft exclusion, insulation of pipework, valves and fittings - all offer good payback and are fairly low cost. 6. Behaviour change - support of client behaviour change programmes, e.g. through data/reporting and provision of skill. 7. Boiler replacement - usually kit which is approaching end of life which can be procured within an EPC in order to guarantee the investment through the savings.
- Insulation
- Solar PV installation, low energy lighting
- The upgrading of inefficient boilers and controls

(2)

- Selection of ECMs is usually driven by: 1. Available capital budget or access to finance. 2. Payback period. 3. Need to tackle existing backlog maintenance issues / dilapidations. I would prefer to see less multi-ECM EPCs and more focus on staged implementation - starting with proper optimisation of existing services and decent evaluation of data to ensure the issues are fully understood. Too many EPC investments start with nothing more than 12 months of energy bills and a wish list. As a result, I see illogical investments - e.g. voltage optimisation, followed by upgrade of lighting from magnetic ballast to LEDs, or replacement boilers sized on previous boiler rather than on an optimised reduced demand level.
- Smart solutions - automatic switching to maximise self-use from generation. Would like more training on options.

I.3 Customer acquisition

How do you find customers? How do you generate leads? Do you have marketing department? Please briefly describe and explain the main reasons.

Austria

Customer acquisition is done by the sales department or the sales person, depending on the size of the company. Recommendations and queries are also important.

Bulgaria

Case A

For the purposes of marketing research we use partners. (2/6)

Case B

Thanks to the experience and collaborations we implement a marketing strategy that aims to attract customers to focus on the range of services - intelligent solutions, advanced technology, energy audits and thorough analysis, comprehensive energy management, implementation of smart methods of managing behavior users and others.

We provide our customers with structured, focused and well-founded analysis on the topic related to specific energy efficiency measures.

Yes, we have a marketing department and continually develop our concept of work on the Bulgarian market. (1/6)

Case C

We find our customers in four ways: 1) by our partners; 2) thanks to a recommendation from previous clients; 3) participating in public tenders; 4) randomly thanks to our site.

Cyprus

The attraction of customers is mostly done by the existing network of customers.

Denmark

The ESCOs operating in Denmark find their customers by simple marketing: informing potential customers mainly municipalities. The ESCOs are characterised by small marketing department. Most new clients arise through recommendation. Still, it is

rather difficult to convince new clients that ESCO contraction is beneficial. However, good case stories may convince new clients.

France

Customer acquisition policies vary from companies to companies:

The majority of interviewees from small and medium companies had no commercial/marketing department (for financial reasons) and usually they rely on local networks for customers. Some also have a physical “shop” to showcase and market their activity and to attract potential new customers.

Others (generally the bigger companies) have a commercial department in charge of generating leads through various marketing approaches. These often extend their activities to call for tenders and public bids, where the level of investment is usually higher than for the average projects.

It should be noted that a good share of small companies interviewed do not need to extend their activities... at local level, the network effect is often sufficient to provide companies with a full agenda.

Greece

The first criterion is that the client is financially reliable. After that clients with building portfolios and relatively large buildings are preferred.

Through personal contacts, already clients, necessary promotion and advertisement of our work through exhibitions and face to face meetings, low cost information campaigns, e-mail campaigns.

Marketing department: Yes 2, No:8.

Ireland

Customer acquisition is achieved by:

- Word of mouth and hard work!
- Profiling of clients (by energy suppliers) based on their record in energy management as well energy intensity of their building/ business.
- Not one of the respondents used the services of a marketing department.

Note: EPCOs can only be considered if the client can provide good energy billing data.

Romania

(1) Direct approach, marketing and image campaigns, online means etc.

Most customers are approaching us, other are approached by consultative sale, including potential clients for other services than already contracted.

Direct search for the segment “4*-5* hotels with swimming pool and spa”. Following economic news channels and portals where investments are announced (reason: small company, not enough resources for more).

Clients are identified by qualitative and quantitative analysis, approaching those owners’ associations which have not energy renovated their buildings yet.

(2) Direct approach, contracts prepared and signed in minimum 3-6 months. Marketing, recognised name on the market.

Detailed location analysis, adapted solution to get the shortest payback period for the investment. In fact, we “sell the investment payback period” (this has been proved as the best-selling solution).

Presentation of well thought solutions to building owners and managers.

Marketing department: Yes 3 (2 organisation), No 1.

Slovakia

Big companies generate the ESCO business mostly through other core activities (energy or technology delivery). These companies have marketing departments that actively promote the energy services.

SMEs (without marketing departments) generate business through personal contacts acquired through individual communication activities.

Slovenia

Most of the companies are quite recognizable, that so called "Door to Door" sale is no longer needed. Instead, Marketing department is seeking for new business opportunities to push sales in front and to relieve engineers so they can focus to their primal specialty.

Spain

Customers are found through their websites, customer's word of mouth, and commercial action with customer visits and contacts with other installations companies.

They generate leads mainly by their services that are related to energy efficiency improvement, improving their visibility and giving added value to the customer.

Most of them do not have a marketing department.

United Kingdom

- My business supports EPC contractors from bid stage input to M&V process through delivery to ongoing reporting, and is not a performance contractor itself. 90% of my business comes through existing client relationships / repeat business - which were formed through personal contacts. There is no specific sales/marketing budget or personnel. Apart from a simple website and LinkedIn presence, sales are derived through existing contacts from 20 years in the industry.
- Self-generation, lead fed from energy companies
- Website, referral. We do our own marketing.
- 90 percent of work comes from personal recommendations

I.4 Contract duration

*What is the usual contract duration?
Please briefly mention/explain the main reasons.*

Austria

Companies already active in Energy Contracting: Depends on the conditions given by the client; depends on the expected amortization period, usually not more than 10 years. This excludes deep renovation (comprehensive refurbishment including the insulation of the building envelope).

Measures addressing the building envelope are carried out separately by companies collaborating closely with the companies producing the material / components. There

are no Energy Contracting Models available for these measures. Usual procurement procedures are applied to purchase these products. Companies see a benefit in the ENERFUND-Tool in showing their products, the quality and their contribution to building energy efficiency to potential clients.

Bulgaria

Case A

The usual duration of the contract under certain circumstances up to 10 years.

Case B

Our company seeks to make contracts with duration of payback to 5-7 years.

Case C

Three of answers are about the energy audits duration

In most cases, the duration is 15 ÷ 30 days, in some cases - 60 days.

Cyprus

As short as possible. The usual duration of the contract is 5 years because of financial and payback reasons.

Denmark

The usual contract duration is between 5 and 10 years. In some few cases up till 20 years. The duration has very much to do with the payback time of the measures used and the energy saving strategy of the client.

France

Duration of contract for energy renovation vary depending on the measures:

- Contracts related to intervention on systems (HVAC, lighting etc.) and installation of renewable energy, as well as some types of insulation, do not last more than 3 months in general;
- For a deep renovation, this may vary from 6 months to a year or more;

The usual payback period is of 1-4 years, except for big buildings, public buildings and cultural heritage where specific processes can apply. Energy performance contracting of over 10 years can be seen in these cases.

In any cases, the interviewees claim that over a payback of 5 years and especially in the current economic situation, the investment is not attractive.

Greece

- Usually is 5 years. 6/11

Five is the favourable amount because it is long enough to pay back the initial investment while longer duration seems too binding for the client. Another possibility is to have the option to expand the contract for monitoring. The period of five years constitutes a safe period for the pay back of the investment.

- 2 years.
- 3-4 years
- The usual contract duration is 18 months. It is an appropriate duration because at the end of this period, we could have a clearer vision of the building's energy performance than a typical year's one.

- No contract yet. Small duration proposed.

Ireland

Contact durations are always short, that is less than 5 years.

Romania

Contract duration is usually 5 years (with 3 to 6 months for preparation).

From 6 months to 1 year (energy supply equipment, e.g. micro-cogeneration systems).

The duration could be 15 years if mixed funding (public-private) is selected for building renovation.

Slovakia

8 – 12 years in public sector

Up to 5 years in private sector

Slovenia

When obtaining ESCO agreement, the usual contract duration is between 5 -15 years.

Spain

Timely service: By contract of the provision of the service.

For Energy Performance Certificate, it usually takes between 7 and 15 days.

For other, between 1 and 3 months.

For other it is usually less than 1 year.

For other, it tends to be in between 3 and 10 years, being directly proportional to the investment. The higher the investment, the higher the savings. Using and establishing energy saving improvements tend to be related to the use and maintenance of the installations in order to ensure their efficiency and reach the level of savings agreed with the client.

For other, it depends on the type of contract. In energy services contracts the average period tends to be in between 8 and 10 years.

Other company says, depending on the user's needs and investments to make.

For example:

- Related to the building envelope and HVAC equipment improvement, the contract tends to take in between 5 and 12 years.
- Related to the substitution of lightning equipment, the contract tends to take in between 2 and 5 years.

United Kingdom

- Most EPCs I work on are in the realm of 5-10 years maximum. However, there is logic in ceasing reporting after fewer years if performance in early years is consistently on target, so it is unlikely that many of these EPCs will report full term. Larger multi-million £ EPCs under the CEF framework are typically 15+ years, reflecting the considerable investments in larger plant replacement.
- 2 years
- Short - one week or less (we are usually only involved in the PV installation)
- 3-5 days

I.5 Building type

Is there a preferred building type for contracting? Do you prefer large/small buildings? With one or multiple owners? Any barriers/opportunities for specific type of buildings? Please briefly describe and explain the main reasons.

Austria

Transaction cost must be as low as possible. Ideal is a large non-residential building with simple building services installations and high energy expenses.

In a non-residential building, occupancy is better known than in residential buildings (changing number of persons and changing user behaviour).

In Austria, there is the commitment that buildings owned by the central government participate in energy contracting projects. This commitment has contributed to creating an ESCO market in Austria.

However, attempts to approach residential buildings and communities have not been successful yet. Few medium-size communities active in energy efficiency have established an ESCO-like collaboration with the local energy company. Small communities tend to employ local installers.

Bulgaria

We have no preferred building type for contracting (5/6).

Two of them mentioned that they prefer building with one owner and avoid multifamily buildings.

One of them mentioned Purpose of the building not be mixed and wherever possible one owner. Preference is for large buildings.

One of them explained that in cases with more than one owner, they need to have one person in charge of the contracting side.

Cyprus

Large buildings are preferred for ESCO projects because overheads are almost the same for small or for large projects. Also, buildings with one owner are preferable because it is easier to contact.

Denmark

Concerning Danish ESCOs, schools, shopping centres, hospitals and other large buildings are the most relevant nowadays. At the latest it has been possible to find large energy saving potentials in hospitals by use of heat and cool exchange between wards and between buildings.

France

Many interviewees are specialized in the domestic sector and generally intervene in small or medium size houses only, with a single owner (intervening in bigger projects would require a different organization and more physical and technical means).

The bigger companies can generally intervene in all kinds of buildings. These generally prefer large scale projects which are often more bankable. The main barriers for exploiting all existing opportunities have been identified as follows:

- Split incentives (when relevant) between the owners and the tenants of the building;

- Shared ownership, which makes the decision process more complicated;
- Costs of contracts and long ROI period as the price of energy is too low;
- Lack of funding;
- Lack of information on energy efficiency potential.

Greece

Large buildings are preferred because they tend to have a shorter payback period. Also, buildings with one owner are preferable because it is easier to contact, to agree and to convince him in favor of an energy measure/intervention. 5/11

Private sector involved. 5/11

Industries 2/11

Hotels 2/11

The type of building is not crucial. More crucial is the size because energy cost for small buildings is too small to generate savings capable to pay off the cost of energy contracting. 2/11

BMS installed in buildings seems to be a barrier:

- The administration believes that everything is high automatized and energy saving has been so far reached.
- Nevertheless, these buildings are high energy consuming

Barriers/opportunities for specific type of buildings?

- Regulatory framework for public buildings. Need for law specifically for ES for public buildings.
- Lack of lending for the private sector. Due to recession no self-funding possibility.
- Client not able to fulfill his obligations. Possibility of no invests payment.

Ireland

The most usual **building / business sectors** where EPCos are most common are:

- factories
- leisure/sports centres (e.g. swimming pools)
- hotels

When asked, “What restrictions currently exist preventing you offering deep renovation solutions to your clients?”, the responses were:

- If more than one measure is proceeding, clients will be more cautious and will opt for a single trial project
- capital finance though options are improving
- does not deliver adequate return on investment (ROI).

Romania

(1) Business category offices. Hotels and hospitals are the most interesting ones.

Hotels 4*-5*, with/without swimming pools, spa centres with pool.

Collective residential buildings (block-of-flats) with owners’ associations.

(2) Public buildings are very hard to approach, due mainly to legal barriers. Challenges: payback periods for private buildings, lack of awareness and expertise in energy efficiency field for public buildings (leading to long preparation periods).

Collective residential buildings are usually grouped by sections (several apartments with one common building entrance) and have separate owners' association; one barrier is represented by the size of this section.

Slovakia

Public buildings are preferred for ESCO projects. The reason consists in trustworthiness of the public sector as a client, that simplifies arrangement of financing for projects.

The ESCOs always prefer buildings with single owner as the project development is simpler. In fact, no project in building with multiple owners was implemented in recent years. The multiple ownership and the split responsibility is the most important barrier for ESCO projects in residential buildings.

Hospitals are considered the most promising ESCO market segment, due to lower level of investments in recent years compared to other segments of the public sector.

Slovenia

Larger objects and buildings are more attractive since almost the same amount of paperwork is requested. Absolute savings for small size objects are too small to be able to pay off the entire investment of savings.

Spain

- Two of them prefer residential buildings. One explains that because for industrial buildings the field of action belongs to the technical industrial engineer.

- Two of them prefer small residential buildings with one owner. One of them affirms that for multifamily dwellings there are problems caused by the management of Property Administrators. And the other that there is an opportunity at touristic buildings given that they have low maintenance.

- Other prefers homeowners' associations, individual house building and commercial premises

- Other prefers building owner associations because they are usually good clients.

- Other prefers big buildings as the needed effort and management is independent from the size of the building.

- Other affirms that a priority could be:

On the one hand, buildings that can reach a higher level of energy performance are old buildings with obsolete facilities.

Moreover, buildings with a higher energy consumption (kWh/m²) like hotels, hospitals and shopping centres, are more likely to use this model because these types of buildings belong to an only client that usually externalizes its Energy Service to an Energy Service Company as it is an easier option. The externalization of these services allows the clients to focus 100% on their activity and/or business.

United Kingdom

- This hinges as much on contract structure as on building type. Small buildings offer little scope for major capex investment unless very long paybacks are allowable. Under RE:FIT, where multiple ECMs are largely expected and Option C M&V is probably the only cost-effective measurement approach, Buildings with stable demand and strong baseline data are preferred. Schools, for example, do not fit these criteria well, since they frequently have multiple metering

arrangements, can change student numbers significantly (with no decent baseline data) and generally require individual reporting which adds cost. On the other hand, buildings with 24/7 operation or high energy intensity offer quick payback opportunities. Smaller buildings should be less problematic when (a) the availability of smart meter data, instead of estimated quarterly energy bills, makes proper baseline modelling possible. (b) the ongoing reductions in cost and improvements in performance of smart tech enables cost effective deployment of energy control improvements. Generally, EPC contractors like to have remote BMS access to see what's going on and better understand how client changes could affect delivery of guaranteed savings.

- Domestic dwellings single or multiple occupant
- Multiple owners present too many complications, as do buildings on short leases. Best are buildings owned by the residents within, who see maximum benefit.
- Small to medium size buildings

I.6 Client

Client (I)

- (1) Who is your most important client type?
Please briefly describe and explain the main reasons.*
- (2) What type of clients would you like to acquire?*

Client (II)

Based on your experience, what do building owners require/ask when making a decision for energy retrofitting? Please briefly describe and explain the main reasons. Is the required information available?

Austria

(1) Answer already given above.

(2) There is not much contact with communities, and this is a sector where customer acquisition could be interesting. Information about who are the decision-makers would be useful.

Energy efficiency is important, but cost and amortization is more important.

Information must be collected; comprehensive data collection on-site is necessary as well as detailed calculations.

Bulgaria

Case A

- (1) Every customer is important.
- (2) Private owners.

If there is a grant scheme (or larger percentage of grant) the decision is made easier.

Case B

- (1) Corporate clients with buildings subject to investigation
- (2) Multi-family residential buildings with good organization of owners. Municipalities can help.

Our observations are that the decision to renovation is taken by the owners when they realize to the fullest degree the benefits - in particular financial savings in the long run. The requirements are related to the improvement of comfort, vision and thermal characteristics.

Case C

(1) The Company is concerned to each customer - small and medium enterprises, large manufacturers, individuals, municipal and state established and infrastructure. In terms of energy efficiency measures, the company is interested mainly at projects and sites related to the realization of savings aimed at technological equipment and processes and to a much lesser degree projects to improve the thermal performance of the building envelope.

(2) The company is willing to attend through the implementation of projects in all the above segments - SMEs, large manufacturers, individuals, municipal and state organizations and infrastructure.

For now, and in the near future, a leading motive of the owners will be financial. Second ranks the desire to create a comfortable living / office / production environment and meet regulatory requirements as well as requirements relating to participation in various programs.

Case D

(1) The most important customers are those who come on the recommendation of our partners and those with whom we have personally contacted because they are reliable and actively assist us at all related to their subject matters. Customers who come by themselves us are also important for us, but working with them we have to approach with more attention.

(2) Both are important to us – physical persons (owners) and companies / municipalities with projects of our competence.

Cyprus

(1) Answer already given above.

(2) Hotels, Hospitals and Commercial Buildings or Large governmental buildings, large private buildings rented by the government.

The building owners usually ask about the total cost and the payback time when planning for energy retrofitting.

Denmark

The most important clients are owners of public buildings. Thus large public buildings owned by the municipalities, the regional authorities or the state very often are lagging behind when it concerns energy retrofitting.

Also other kind of building owners like social housing companies and large offices and commercial centres are wanted.

Building owners of large buildings usually ask for significant energy savings a short payback times when making a decision for energy retrofitting. At the same time building owners very often ask for better indoor climate (mainly schools)? Some few ask for lower operating costs as well. This last requirement may be important issue for building owners of many large buildings and for property companies where low operating costs may generate a high rent.

France

(1) A good share of projects concerns the domestic sector, with individuals wanting to improve their housing for various reasons.

Clients from the tertiary sector often go to bigger companies, with bigger size projects and more important investments.

Other companies focus on public facilities, cultural heritage or the Industry.

The main reasons behind these choices often lie in the size of the company (ability to carry out bigger projects, generate leads in the commercial or industrial sector or to answer to public bid) and its domain of competencies (refurbishing a house usually being a less complex process than for example in a commercial center). Moving from one field to another can often appear as too complex and can require investments in organizational changes and marketing efforts that most small companies cannot bear.

(2) A large part of companies interviewed wish to extend their clients' portfolio especially to the tertiary sector, where a high potential for investment exist. Only few wished to extend to the public sector, as public procurement procedures can be complex and time consuming, for SMEs in particular, and as the competition with big companies is too strong. Smaller companies active in the domestic sector generally only wish to extend their client network to the same sector.

Customers' decision making process is often motivated by the willing to improve the value and comfort of buildings and reduce energy bills. Most customers also want to have a single interlocutor to speak to for all the steps of the process, from audit to refurbishment and monitoring.

The main information they need are the level of energy and financial savings associated with the measures proposed, as well as the duration of the project and investment costs. Good relation between the energy company and the client is very important. The physical proximity of the company can play a positive role and clients will often ask for references / best practices from the companies.

The certification of the energy company is appreciated and is seen as a sign of quality. Other information includes the possibility to label the buildings under relevant regulations.

The opportunity to access funding facilities is also key to the decision process. Professionals therefore often need to inform customers on this and the various mechanisms to which they could apply.

Greece

(1) Client with building portfolio because it provides opportunities for bigger profit and lower risk, such as banks, real estate owners, large retail companies etc.

Private sector 6/11

Hotels 2/11

Office buildings (with HVAC) since they have high energy consumption.

(2) The above mentioned

No preference

Buildings with high energy saving potential

We would like to acquire Hospitals

Public sector buildings 3/11

Industries

When making a decision for energy retrofitting, building owners require/ask:

- Cost reduction 4/11
- Level of disturbance
- Improvement of environment quality 2/11
- They require for a short payback period of the possible investment and for the availability of finance opportunities through commercial banks. They are not convinced that energy saving is a priority while financing is difficult. 3/11
- Convince of the right way to save energy
- Direct money saving from bills.
- Easy monitoring and management of the equipment and use of the building.
- Guarantee of no money required from client.

The information is available. Yes 3, No 5.

Ireland

When asked, “What do building owners require / ask when making a decision about energy retrofitting?”, the responses were:

- A full energy audit to establish hard facts and paybacks for the specific project / energy performance indicators
- A record of detailed energy use over 3 years if possible – though this is generally not available
- cost of investment and payback / guaranteed financial savings

Other factors mentioned included:

- Equipment warranties
- Confirmation that no increase in maintenance costs would result from the energy retrofit

When asked, “Is the required information available when making a decision for energy retrofitting?”, the responses were:

- ‘Yes’ in some cases – ‘no’ in other cases.
- Required information is available once the contractor is of a sufficient standard
- This question was not answered by 50% of respondents

Romania

(1) Most important client: Business client focused on the reduction of operational costs, industrial consumers (solutions are complex and usual payback periods are short to medium (due to intensive u\energy use), 4* and 5* hotels with swimming pool.

For the segment of residential buildings, the only client is the owners’ association in block-of-flats building category (within public funded programs).

(2) Interest for new clients: public buildings, city managers (to increase the impact at community level), small hospitals in large cities.

Reduction of operational costs. Increase of impact in attracting tenants. In most situations, the requests are more of aesthetic nature rather than related to energy; the second most important aspect is the lower price or, for the challengers, non-reimbursable funding.

In general, these requests are considered realistic, however without significant funding there are few viable energy efficiency solutions for existing buildings (thus the owners' reluctance is justified).

From the residential perspective, the key interest is 'cheap, but good; no complications, no involvement with public authorities'. Objectively, these requirements are not fully justified as the collaboration with public authorities is mandatory in the ESIF renovation scheme, but ESCO is facilitating this collaboration.

Slovakia

(1) Distribution of the clients vary among different segments of private and public sectors.

(2) The ESCOs are continually trying to broaden their activities into segments where they are not active yet.

Exact overview of related costs and benefits including arrangements for financing. Information about impacts on building operation.

Slovenia

Most interesting and desired clients are buildings of public sector as the risk is smaller.

Spain

(1) Private natural persons; home owners; owners of single-family homes; Property Administrators; building owner associations; real estate agencies (for their quick demand); a World Food Distribution Platform (It is an important energy consumer with a high degree of obsolescence in its facilities. It has contracted an Energy Service Company model and has externalized its energy production ensuring new installations with a lower energy cost); leisure centres; Public Administration; industries; shopping centres.

(2) Private and community of neighbours (multifamily buildings and from urbanizations); Property Administrators; big construction companies; enterprises from the tourism and hotel industry; Hotel chains; hospitals; shopping centres; Central State Administration Buildings.

Most of clients want a lower energy consumption bill.

Others want a quick performance in order to sell or rent, a low maintenance cost, funding,

It is difficult for private natural persons to perform energy refurbishment.

The required information is not available.

United Kingdom

(1)

- Active EPC contractors with a decent portfolio of existing and tendered work. There is no reason I could not also support EPC clients directly (subject to avoiding conflicts of interest), but do not currently have end-user EPC clients in my portfolio.
- Energy companies
- Small commercial clients local to Bristol
- The general public

(2)

- I'd like to work with clients who really innovate with energy saving technologies. This would provide additional learning opportunities and scope to share best practice in new fields; e.g. battery storage / vehicle electrification, hybrid heat pumps etc.
- Housing associations
- More of the same, also medium sized commercial and community.
- Possible local authority or housing association

Based on your experience, what do building owners require/ask when making a decision for energy retrofitting?

- Requirements (for RE:FIT participants) tend to start with: a maximum budget, a brief wish list of issues they'd like to tackle under the project, and a series of targets; minimum energy cost/CO2 savings - which together define a max payback. Client considerations often revolve around implementation programme to fit around financial periods and building operations (i.e. to minimise disruption to building users). This can be particularly sensitive in buildings which generate revenue, e.g. public leisure centres, or which deliver key services.
- Cost savings
- Advise on products and the reliability of products plus different applications and controls

1.7 Environment to enable deep renovation contracting

*What would be the enabling environment for you to offer a deep renovation?
Please briefly describe and explain the main reasons.*

Austria

It would be useful to have tool that allows for a quick check for faster decision-making (e.g. a tool calculating variants regarding energy carrier, cost, financing option; a tool providing information about the potential client) whether to deal with an area or not; a tool displaying potential clients owning buildings with potential for refurbishment.

This will also allow for targeted advertisement of products / materials / services needed for deep renovations.

Bulgaria

Case A

Minimum 40% financial contribution, which will engage the owners in the process

Case B

Financing of measures by the state / municipality. Increasing requirements for multi-family buildings for easier decision to implement the measures.

Case C

An important condition is to maintain an updated database and a good understanding of the site, its problems in depth and future development opportunities. Another important condition to be realized contracts with guaranteed results are the quantities consumed energy. They need to be significant in volume. Of importance is the presence of local / central heating system, production characteristics and anthropogenic factors.

Case D

Available financial mechanisms and instruments to attract grants and / or grant scheme.

Support and consultation if necessary to ensure financial resources.

Case E

Adequate execution time and opportunity to maintain contact with contracting entities and related parties during the project to work flow rhythmically and problems be removed promptly.

Cyprus

Deep renovation is not relevant to ESCOs in Cyprus. Since people are not energy and environmentally conscious, they seek for state incentives. Special loans are required which are over and above the normal loans for companies to use for their daily activities.

Denmark

Deep renovation has never been relevant to Energy service companies. On the contrary, the main interest for ESCOs is the enabling environment to find low-hanging fruits, i.e. energy saving measures easy to carry out with a low budget.

France

The conditions needed to offer deep renovation mainly concern access to funding and incentives to finance the project, as well as ROI period (which is in fact often too long – over 20 years). Trust and relations between the contractors and the clients are also very important, and there is a need for transparent communication, continuous support on all steps of the process etc.

Some aspects of the regulatory framework could also be improved, although the current regulations tend to already support energy renovation.

Greece

- Usually deep renovation requires high costs which may not be feasibly through a contract. Therefore, for such a case **the willingness of the client** to financially contribute and to believe in the importance and the advantages of deep renovation is important,
- Financing, fast tracking administration, fast tracking erection of works,
- Access to funding,
- Market Stability,
- Reliability and trust from client,
- Personnel availability for change and easy adaptation to energy saving spirit,
- Building potential,
- Financing situation of owner.

Ireland

When asked “What conditions would enable you provide deep renovation solutions to your clients?”, the responses were:

- access to low cost finance, competent contractors, Quality Assurances schemes for contractors

- large energy consumption with informed clients
- enabling environment is only there for large multinationals with 5+ years plans and necessary capital
- more case studies to prove deep retrofit works
- more finance options, current SEAI schemes are too restrictive
- lower costs

Romania

Enabling environment to offer a deep renovation: clear legal framework for public-private partnerships, non-reimbursable funding or higher energy and environmental costs.

These factors have a major impact for building renovation. Currently, the investments in building renovation are not attractive from economical perspective due to the transfer of environmental and risk costs to the population and State.

67% of respondents are interested in building renovation.

Slovakia

Proved possibility to combine financing from future energy savings with other additional long-term financing sources.

Slovenia

An ideal environment for the comprehensive energy reform depends on several factors. Above all, most of the ESCOs believe that it is important to maintain balance between energy costs and the level of comprehensive retrofitting investments which influence the payback period of the action. If they do not reimburse these measures in a timely manner, subsidies are needed to artificially correct the market situation

Spain

- One of the answerers would like to count on external enterprises that offer different types of Energy contracting, energy studies and Energy saving graph.
- It is very difficult as this type of renovations is very expensive and there are no real and accessible grants.
- Public and private funding is the desirable combination.
- Get out of the crisis and more information on the media regarding integral renovation of buildings to adapt it to the regulations
- Awareness raising of the population or stimulation through incentives
- Awareness raising and information
- It is needed an economic stability, a clear regulatory framework, awareness rising of the population, clear grants and adequate and real financing for each client. Tax rebates on more efficient buildings
- A client who has initiative is compromised with the environment and trusts the model. The main barrier is the lack of trust and knowledge.
- Establish a clear regulation that would be used by Properties, Public Administrations, Energy Service Companies and Supplier's Companies.

United Kingdom

- Not directly applicable to my business. However, deep renovation solutions are probably best undertaken as part of a whole building refurbishment, at which point holistic solutions including upgrades to building fabric and fundamental changes in building services can be designed in. This is fundamentally different from the work of many existing energy performance contractors in the UK whose interests are in energy services not in acting as principal contractor for major building refurbishment projects. Accordingly, this type of project would probably be accessible to them as 2nd tier suppliers through strategic alliances with construction firms. A helpful enabler would be the availability of a centre of excellence for project procurement - since these projects are not frequently undertaken by most clients and independent expertise on how to budget for and manage the procurement exercise is essential.
- Payback needs to be improved (Feed In Tariffs too low)
- Government grants or financial help

I.8 Use of Energy Performance Certificate

(1) Do you use the Energy Performance Certificate for buildings in energy contracting?

If YES, please briefly describe what information is used.

If NO, please briefly mention/explain the main reasons.

(2) How could the EPC help in narrowing down possible cases for energy contracting?

(3) Which information would be very useful for you but is not accessible / available at present?

Austria

Currently, EPCs are not used. Often, they are not available and the quality is questionable, at least for non-residential buildings.

Regarding residential buildings, the trust in the EPC of existing buildings is good, quality is considered better than the EPC quality of new energy efficient buildings (due to the calculation method), however, there is the influence of user behaviour.

For decision making about renovation and renovation planning, detailed information about the technical condition of a building and the actual energy consumption is needed and often not available. EPC does not provide sufficient information. Often, building documents are outdated and do not represent the actual technical condition of a building. This is the usual situation regarding existing buildings older than 20 years which are potential subjects to renovation.

Therefore, budget has to be allocated for data collection (or even audit) or funding must be made available.

Bulgaria

(1) Yes 6/6

Case A

Yes, the information in EPC helps to acquire initial information. It is used "specific fuel consumed energy", "total annual consumption of primary energy" distribution of annual expenditure in% "and others.

Case B

We use EPC but we check the correctness of the entries (the certificate is an integral part of the documents for the energy audit, we check).

Case C

EPC is used to obtain a general idea, but not decisive in the decision. We look energy class of the building.

(2)

Case A

It would be useful if the information can be extended with applications for monthly energy consumption and the availability of specific features - usability, residents / users and others.

Case B

EPC has mainly informative functions. He directs us what energy improvements would be possible and to what extent, simultaneously we communicate with potential clients.

(3)

Case A

The information is sufficient/ No such information

Case B

Information (register) for buildings with an integrated system for energy management and monitoring.

Case C

Information that would be useful but is currently difficult to access is the full documentary history of a building over the years in readable format from it's building to this day.

Cyprus

Some information from the Energy Performance Certificate of buildings can be used in energy contracting. Especially, building envelope and passive elements can be evaluated through this methodology applied on the other hand is not being used for analysis of heating/cooling systems because it does not give detail information.

Denmark

Since the actual energy consumption cannot be deduced from the EPC rating, the EPC rating is not that useful for screening of building potential for energy upgrading. The main reason is that knowledge of the actual energy consumption is crucial for the first estimate of a business case. Consequently, it is not that easy to see how EPCs could help narrowing down possible cases for energy contracting. Only information of the actual consumption combined with knowledge about relevant energy saving measures would be useful.

France

(1) The Energy Performance Certificate gives a global overview of the building' energy performances and is mandatory for some certification process such as BBC (Low energy buildings – *Bâtiments Basse Consommation*).

All companies interviewed used EPC within their work. The information used is the energy band, consumption per kWh and greenhouse gas emissions level, as well as benchmarks given for similar buildings.

(2) The EPC gives a general overview on the buildings' energy performance compared to benchmarks, the intrinsic level of primary energy consumption etc. As such it constitutes a basis for energy diagnosis and is an indicator of whether or not a building could benefit from refurbishment. Comparison with similar buildings at local levels could also be helpful. However, EPC could be better tailored to narrow down opportunities by giving for example indications on potential water and electricity consumption, efficiency of HVAC systems, overview on lighting systems etc.

(3) Information that could be useful could include a rapid brief on what measures could be implemented, strong aspects of the buildings' performance, weak aspects, and some details on the building envelope as well as opportunities for renewable energy systems installation.

Greece

(1) No: 7/11

No: (EPC is based on standard parameters (such as timetable, occupancy etc.) that are usually completely different from the real ones)

No. We usually apply TAB techniques (Tuning, Adjusting, Balancing) while energy savings due to these techniques are verified only with M&V (Measurement and Verification) and not by EPC (Energy Performance Certificate).

(2) EPC could easily give energy indicators for benchmarking and help quickly filter out measures with low performance

We believe that the EPC is not safe to verify energy savings so it could help in narrowing down possible cases for energy contracting

They can not. An Energy service contract requires detailed data and control from the ESCO itself.

(3) Reference values for energy consumption for each type of building 3/11.

Ireland

(1) When asked, "Do you use EPCs or Display Energy Certificates (DECs), (in the case of Public Buildings) in energy contracting or energy retrofits?", the responses were:

- About 50% of respondents did use the EPCs for this purpose and 50% did not
- Very importantly, it was commonly reported that EPCs are only used in the residential sector, but not in the non-residential sector

When asked, "Why you do not use EPCs, or DECs in the case of Public Buildings, for energy contracting or energy retrofits?", the responses were:

- EPC is not accurate – does not reflect usage
- information in the EPC is not detailed enough to scope a retrofit project
- for non-domestic buildings, iSBEM (the non-domestic EPC calculation method and software) is completely inadequate. DECs (public) are better, as they relate to actual usage.

(2) When asked, "Could the EPC data help in narrowing down possible cases for energy contracting or regular energy retrofits?", the responses were:

- only at a minor level
- it could be a pointer
- only for residential
- perhaps for building fabric upgrades
- the EPC does not have enough specific info on lighting schedules, heating systems etc , so it is not used for non-domestic retrofit project designs relating to lighting or heating system retrofits

(3) When asked, “What information would be very useful for you, but is not accessible/ available at present?”, there were fewer responses as follows, but they do provide some important indicators:

- A listing of available competent quality assured contractors
- Information from other ESCOs
- For the non-domestic sector, more info on HVAC, lighting systems (LED lighting is not an option in iSBEM).

Romania

(1) Yes 3/4 respondents (67% of companies)

There is poor useful information that could be extracted from the EPC, because of their bad performance by the experts (e.g., the energy audit and EPCs performed for a group of buildings had to be redone at design phase (feasibility study) because only EPS insulation of the façade of an historical building was proposed instead of a coherent package of energy renovation measures). Other information that could be useful: energy consumptions, building operation mode, energy simulations for space heating/cooling.

For building renovation, the invoices for the last 6 years and after the energy renovation are considered useful.

In one case, the EPC is not used because it is not appropriate for the specific applications provided.

(2) 50% of respondents appreciate that the EPC could narrow down possible cases for energy contracting.

(3) Other useful information: Average actual energy consumption over the last 3 years (space conditioning + process energy).

Slovakia

(1) No. The EPC does not provide any useful information for project development.

(2) Through providing reliable information on actual energy consumption.

(3) As per point (2)

Spain

(1) Yes: check the state of the installations and joinery; energy consumption from different devices; CE3X (a national tool for the EPC); it is used as the law dictates, but in order to contract energy services, an energy audit should be done to know the detailed consumption and inefficiencies of the building.

No: because society perceives it as a tax, public administration hasn't explained it properly; there is not always a prior audit, regardless of the kind of certificate.

(2) Including a cost study; energy consumption analysis; link short term measures to incentives with a commitment to perform long term measures; EPC could reduce the

number of contracts considering it the first step to achieve energy savings and improvement of energy efficiency in a building. Energy contracting should aim to those buildings with a lower efficiency rate;

(3) Including current energy contracting rates; using alternative energies; returns and benefit of rehabilitation already carried out; public information on EPC; what an EPC is really useful for; It could help by being rigorous and reliable.

United Kingdom

(1)

- No. This has not been a requirement on any projects I've worked on, or even mentioned.
- Yes - energy rating and measure recommendation
- Yes - recommendations very useful
- Renewable and Energy Saving Recommendations

(2)

- Update prices and more recommendations

(3) No responses

1.9 Information relevant for energy renovation of existing buildings

(1) What would you need for better decision-making in your business? Which information and data in which form?

(2) What would you expect from a tool like ENERFUND?

What kind of information would you need from the ENERFUND tool in order to plan the energy renovation of building(s) (e.g. EPC data, thermal performance of envelope, systems efficiency, energy consumption, costs (average/range) of renovation measures, existence of financing programs, availability of qualified 'suppliers', property evaluation, energy performance compared with average building stock and with 2030 energy goals, schools without mechanical ventilation system etc.)?

Austria

The construction section of the Austrian Chamber of Commerce (official professional association) has strong reservations regarding a tool which compares buildings, EPC, and renovation opportunities. It is their opinion that each building is unique and requires appropriate action.

BEUC (voluntary professional association) is open towards new developments and supports the development of the ENERFUND-Tool.

Depending on their business, companies have clear preferences which type of information the tool should make available:

Display U-values of building components, type and construction period of heating system, energy consumption, energy expenses, and cost of refurbishment measures.

Display the potential for re-densification, e.g. possibilities to convert attic storeys to apartments (display areas where it is allowed to add another storey and to increase the building height; or areas with restrictions due to zoning plans): the new storey can be rented or sold at a high price and will support the refurbishment of the entire building.

Bulgaria

Case A

- (1) Output data for the audit - detailed information about annual consumption of energy, offers equipment and bill of quantities for construction works, projects in different parts.
- (2) Database and monitoring system for the condition of the buildings and the potential for realizing energy savings

Case B

- (1) Availability of buildings project documentation and easy access to the database of the accounts of gas, energy distribution and district heating companies.
- (2) The most important is such systems as ENERFOND not only to build a database but also to inform the public about the possibilities. To make people understand what are the incentives, to build peace, that nobody will take their apartments if they apply for various programs.

Case C

- (1) The information generated by periods in tabular form is very suitable. It would also be useful to be given data on spent money for different kind of energy and consumers, also in tables and graphics. Information on current prices of materials, energy is also an important part of the analysis.
- (2) Tools like ENERFOND, except those data in brackets would, be helpful with information for geo-energy potential of the territory in terms of possibilities for renewable energy sources, availability of energy auditors in the territory, information about sources of funding for completed projects and those in progress, public buildings with an area of over 250 m² without energy audits, information about the date of the last energy audit of buildings, register of buildings with an integrated system for energy management and monitoring.

Case D

- (1) Synthesized information in tabular format on energy consumption and condition of the building.
- (2) Data from EPC, thermal performance, system efficiency, energy savings, cost (average) measures to update, the existence of financial programs, the availability of qualified suppliers, property evaluation, energy performance, compared with the average buildings and energy targets for 2030 year schools without mechanical ventilation etc.

Case E

- (1) General information about the building, year of construction, number of occupants - a constant number and guests (according to the type of building, residential, hotel, public service ...), systems for heating, hot water, lighting - types ..

Interactive energy business cards of existing buildings - previous audits - years and results, reports and documents - in the form of archive suitable for download, available projects of building drawings - complete documentation.

Cyprus

- (1) When respondents were asked what they would need for better decision-making in their business the answer was mainly a policy framework to promote energy renovations, i.e. tax incentives.

(2) From ENERFUND tool the following information would be needed:

- Systems efficiency
- Energy bills
- Energy consumption
- Presence of financing programs
- Average costs of energy renovation measures

Denmark

Besides key figures and data about actual consumption, only a serious assessment of buildings in concern can consolidate the decision-making in the energy contracting business. It was expected that the future ENERFUND tool will be able to single out buildings relevant for energy renovation. First, rather precise estimates of key figures (kWh/m²) for individual buildings must be available. Second, information about type and efficiency of the lightning and ventilation systems might be needed. Third, information about relevant energy retrofit measures might be of significance.

France

(1) The interviewees emphasized the role of trust and continuous support to customers for successful project implementation. As such, materials providing information in a pedagogical way could be useful, on systems' efficiency, on low energy buildings, on easy tools to assess savings (roughly), on standards, on benchmarks, on typical costs etc.

A better communication on financial mechanisms available would unlock some of the potential for renovation. Companies which do not have time to look for this information would benefit from updated and accessible materials that they could disseminate to their clients. Information on current regulations could also be beneficial.

Many companies also point out the fact that they would benefit from a tool showing which area presents the best opportunities for energy renovation. This could be based on EPC as well as other info such as past renovations, average prices for renting/selling properties etc.

(2) The scope of ENERFUND was very well received by professionals who claimed they would certainly benefit from more transparent information. What could be interesting for them would be a map not only showing EPC but also detailing the potential measures, value of real estates, as well as opportunities and incentives for funding in this specific area.

Greece

(1)

- Data regarding energy consumption 6/11
- Energy bills 5/11
- BMS data 2/11
- Operational data for the building 3/11
- Energy measurements 2/11
- Energy consumption per month for critical equipment

(2)

- Data regarding energy consumption for each building type as reference for benchmarking
- Energy consumption data of building 6/11

- Indicative cost of energy measures 3/11
- Funding programs 4/11
- Data from EPC
- Thermal performance of envelope 4/11
- Systems efficiency 4/11
- Availability of qualified 'suppliers'
- Organize workshops on retrofitting topics and Energy Performance Contracts

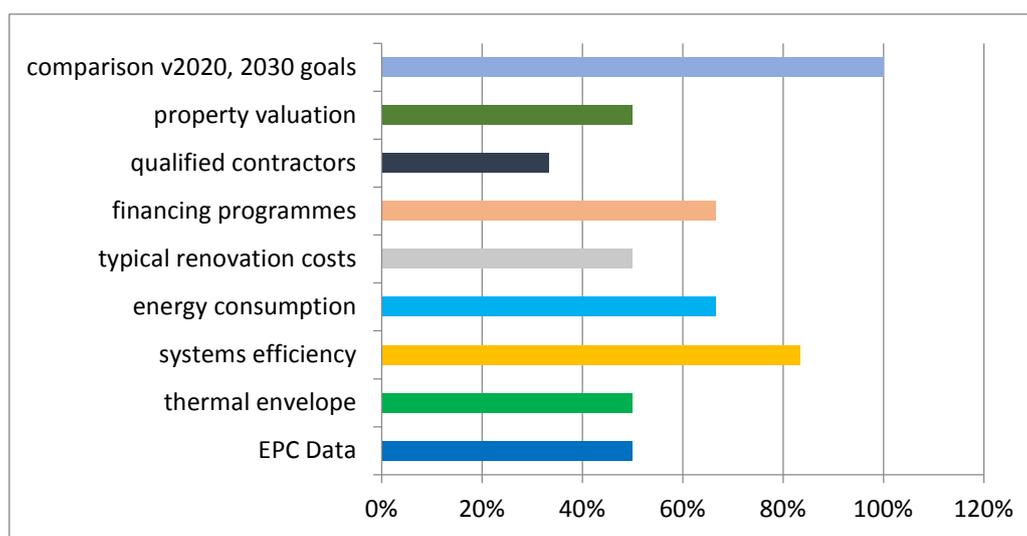
Ireland

The survey presented a suggested list ENERFUND tool features and asked, "Which of these features you consider would be of use to you in your work?"

The tool features listed were:

- EPC data
- thermal performance of envelope
- heating system efficiency
- typical costs of renovation
- existence of financing programmes
- availability of qualified contractors
- property valuation
- energy performance compared to average building stock and 2030 goals etc.
- All of the above

The summary of responses is shown in the next figure.



Preferred ENERFUND Tool Features

When asked, "Are there any other datasets or key information you would like to see included in the ENERFUND tool?", the responses were:

- Quality assured contractors
- Payback periods
- Ventilation system category
- Radon
- In all other cases, the respondent provided no suggestions.

When asked, “The ENERFUND tool plans to display all relevant information about ESCOs on a dynamic map, showcasing the best projects in a given area. Would such a tool be of use to your company?”, the responses were:

- ‘Yes’ – according to more than 50% of respondents

Comment: Getting responses from ESCO companies in Ireland has proved difficult as the financial aspects of their contracts are confidential and also because they are operating in a competitive environment and are reluctant to disclose information that might be of use to competitors. Hence, it is far from clear if any information on ESCOs in Ireland could be displayed on a dynamic map.

Romania

(1) From the energy audit report: packages of measures (not only thermal insulation proposal), life cycle analysis of energy efficiency measures evaluated, access to decision makers (owners, shareholders, managers) of companies having in their portfolio hotels (4* and 5*), swimming pools, hospitals.

Form: realistically thought through packages of measures, energy audit report, direct access.

(2) Database with public buildings, by categories and updated energy performance level.

To identify the buildings where renovation investment overcomes the reconstruction as new building (there are already existing tools at EU level which could evaluate the energy efficiency costs separately from the additional conformation costs (building shape).

Energy consumption, existing funding programs.

Slovakia

(1) As the ESCO projects are usually long-term, detailed analysis within the development stage is necessary. The used combination of energy audit and own assessment proved as sufficient.

(2) Ideally – reliable identification of buildings with highest energy saving potential would be useful. Information on age of building technologies could be useful as well.

Slovenia

data from the energy certificate, data on the thermal envelope, implemented systems, monthly energy consumption, monthly energy costs, the cost of the individual measures, the estimated potential savings, list of suppliers and contractors, comparability with similar types of buildings (benchmarking).

Spain

(1) Type of services offered and their impact; More diagnostic tools; better knowledge on products to improve thermal envelope; a database from different points of view and easy access; EPC from certified buildings that are registered by the public administration; economic stability, social awareness and change of socio-cultural paradigm; general building information given by the EPC, total energy audit of the installations and envelope of the building, including an estimated cost of the main energy improvements, present energy consumption costs: electricity, fuel, water. Type of contract with supplier companies, existence of public funds programs focused on financing energy efficiency projects; It would be useful to have a good communication

flow with the clients and general public, because most of the time we, everyone that works in this sector, are convinced of the energy rehabilitation, but it is necessary to spread the message among society; A clear regulation of building's energy renovation

(2) To offer to the technicians courses of management of the tool; energy efficiency improvement; offers the client the final savings; basic data from the building; that it is used to make technical-economic feasibility studies in order to convince clients to perform energy performance measures taking into account existing grants; to provide basic information to prioritize which buildings are more urgent to renovate, carry out different actions (through an EPC) and an energy pre-diagnostic where the main improvements would be expressed with an estimation of the investment. In the pre-diagnostic, a description and possible improvements in air conditioning and domestic hot water should be included, with the possibility to integrate renewable energies, system and type of lightning, and energy consumption cost.

United Kingdom

(1)

- Cost saving projections
- Constriction data (type of roof)
- Long term government commitment to energy savings

(2)

- EPC

All of the above listed in question

I.10 Management of buildings in own responsibility

(1) How do you store and manage/update information with regards to buildings in your responsibility?

(2) One of ENERFUNDs tools to be developed is hosting all relevant information about ESCOS on a dynamic map, showcasing the best projects in a given area. Would such a tool be useful to your company?

Austria

(1) not relevant

(2) yes

Bulgaria

(1)

Case A

In electronic format.

Case B

Store incoming design drawings and documents in digital form.

Case C

In electronic format on our server.

(2)

Case A

We support the cause of creating a dynamic map. The benefit we think will be for all companies in this field.

Case B

Yes, a similar instrument with all the information will be very useful for ESCO - companies

Case C

Yes, it will definitely be useful. Especially in view of promoting performance contracting as well as avoid potential bad practices.

Cyprus

(1) not relevant

(2) Yes it will help

Denmark

Manage and update information of buildings being part of an ESCO programme are continuously registered by sensors and energy metering. For the ESCOs, these data are stored in the company's own it cloud. Hence the impact of the renovation and the estimated energy saving can always be controlled.

A dynamic map of ESCOs showcasing the best projects in a given area would only be useful if a number of parameters representing the individual showcase made it possible to compare renovated buildings or buildings being renovated. Among these parameters, the energy performance before and after the renovation are important. Furthermore, the performance must be expressed in EPC rating and energy use converted till primary energy consumption and carbon emission.

France

(1) All of the companies interviewed store and manage information with regards to buildings in their responsibilities, through specific database and customers' management solutions. Update of these files is done on a regular basis or on a case per case basis.

Greece

Energy platforms 3/11

Not applicable for us

Through international protocol IPMVP.

Would such a tool be useful to your company?

Yes 5 through Better promotion of energy services, choice from multiple solutions for the client.

No. 3

Ireland

When asked, "How do you store and manage/ update information with regards to buildings under your responsibility?":

- This question only got a small number of responses. In one case, the respondent stores energy audit data. In a second case, the respondent manages ongoing analysis of metered data

Romania

(1) History of energy consumptions and costs. Temperatures, operation modes, number of occupants. Information is stored in electronic way, different formats – related to data received.

Invoices registered before and after the renovation; details about the building before and after the renovation (areas, % windows replacement etc.). Information is stored in database.

33% of respondent companies do not have any buildings in own responsibility.

(2) Yes - 100%.

Slovakia

(1) On-line dispatching systems are used.

(2) The ESCOs interviewed could be interested in exploiting the possibilities, but they do not see practical exploitation yet.

Spain

(1) Company computer file (accordingly to data protection law); Microsoft Office; Own management.

(2) I think so; low interest; I'm interested; It would be interesting to know those areas already renovated; Yes; it is interesting a database tool.

United Kingdom

(1)

- Mostly N/A. Energy data specifically is held mostly within AM&T systems.
- Annual survey

(2)

- No
- Yes, maybe
- Yes

I.11 Other aspects

Bulgaria

The initiative is extremely good!

Success in new undertakings! It will be useful not only for companies but also for building owners.

Denmark

Siemens, one of the Danish ESCOs is addressing only two kinds of business cases: (1) investment in energy saving with a payback time less than 2, 5 or 10 years, or (2) reducing the operational cost of large rental properties in order to increase the value of the building and thereby increase the rent.

Ireland

When asked, "Have you any additional comments you would like to make on this general topic?", there was just one response:

- Provide job aids for contractors to avoid misinterpretation of specifications

Comment: In discussion with a number of respondents, it is clear that as the energy services market matures beyond the "low hanging fruit" and moves to deeper measures, there is nervousness about the capacity of the available contractors to provide competently skilled and qualified design and installation teams.

Romania

1- ESCO companies and energy suppliers are different categories of actors in the market and the first ones are far more diverse than the last ones

2 – the existing building stock in Romania was certified mostly in A, B, C energy classes, without complying the minimum conditions of comfort regarding in particular ventilation and thus the baseline for investment efficiency is considerably altered; without compliance with the requirements any investment efficiency is almost superfluous given the long payback periods.

Without clear requirements for assessing and implementing solutions related to risks (health, fire, other potential problems) and the environment (by the way construction or renovation produce waste and affect the immediate area), including ergonomics, traffic and noise in cities.

The investments in reducing consumption are just low hanging fruits and have no impact to help reduce the global footprint. Example: transport to office by car with 5 people could exceed the annual CO₂ emissions of the entire building, so it takes an integrated view and specialists to collaborate in finding such solutions.

Excellence in each separate area does not guarantee an exceptional result - working together behind an integrated vision can impact significantly higher. This refers to the many policymaking institutions that do not work for a common vision and have more requirements that aim to support existing status quo than to change, while if the envisaged change lack vision these changes could become divergent.

Please send updates of project implementation!

Spain

It is desirable that Valencia Institute of Building performs free training courses in order to teach ENERFUND tool.

It is needed free training actions to be adapted to the regulatory framework.

It is needed tools for NZEB building renovation.

The objective of the Administration should be to get a socio-cultural change so that the energy renovation of buildings becomes a reality.

United Kingdom

Whilst ENERFUND will help rank buildings for retrofit opportunity, there will always be other factors that are more subjective - e.g. "We need to focus on the HQ building because that's the one the public see", or "That building may be closed in 3 years depending on..." These sorts of factors often override logical rankings for investment opportunity.

The green deal has been an expensive waste of time.

A1.II. Perspective of banks, financial institutions, property valuers

Austria

The EPC and energy performance measures have a role in achieving state aid (subsidies in the form of loans and grants) for improved building energy performance. Funding budgets are available on an annual basis. Conditions and amounts can differ from year to year. The available funding budget is completely used year by year. The demand for subsidies is bigger than the available budget.

Banks do not offer financing products based on energy savings. This financing model is offered by ESCOs. Energy Contracting Models: (1) Contracting based on energy savings, (2) plant contracting, (3) mixed models.

Usual project risk assessment of banks does not include energy related building information and there is no demand for the EPC.

The following aspects should be integrated into the tool: awareness raising information, information about state-aid, costs of specific renovation activities, and information about companies which offer services for energy renovation measures.

The ENERFUND-Tool could be interesting for the property valuation of buildings.

If it is useful for the ENERFUND-Tool, a co-operation seems to be possible with sBausparkasse.

Challenges identified:

- How to keep the data up-to-date?
- Data security? Which data is the Tool allowed to use?
- Data/information included to increase the awareness of the tool-users is fine, but at the moment the main barrier for the realisation of energy efficiency activities is the energy price

Interviewed stakeholders: 7 respondents

Type of Companies: National managing authority for state aid (for private persons, companies, municipalities) in the field of energy efficiency activities in buildings; local banks; national bank (sBausparkasse); research institute

Positions: Heads of department, project manager (energy experts), account officers

Bulgaria

Interviewed stakeholders: 1 respondent

Type of Company: Specialized credit institution for energy efficiency established by law

Position: Marketing and Financial Coordinator

Cyprus

Interviewed stakeholders: 2 respondents

Type of Company: Local banks

Position: Account officer (1), Officer-European Relations and Products (1)

Denmark

N/A

France

There are a few financing institutions specialised in the funding of energy efficiency project, especially those who have a social objectives beyond simple financial interests. Subsidied loans or at low rates as well as incentives are available to clients.

Commercial banks tend to invest only in concern with the financial solvability of the clients and lack knowledge, tools and skills to scale up activities in the energy efficient buildings field. To this extent a decision making tool if well designed could enhance their participation to the EE market.

Greece

Interviewed stakeholders: 1 respondent

Type of Company: Local bank

Position: middle management

Ireland

Responses were provided by five Banks in Ireland to the ENERFUND questionnaire. Irish banks have been in recovery mode following the financial crash that began in 2006. While the main banks are once again in a relatively healthy state, lending activity is bound by very tight rules and regulations. The survey results should be considered against this background.

Romania

The energy renovation of existing buildings benefits from several financing instruments in Romania and different energy efficiency funds were implemented. In the buildings sector the only successful instruments so far were the public funding programs. The loan scheme with governmental guarantee and subsidised interest rate was not successful until now. EBRD announced this year the implementation of a Green Economy Financing Facility in Romania, focusing on the residential sector, but the banks which will implement the scheme are not yet known.

An online tailored questionnaire was prepared and invitation for discussions with several banks were sent, however a general avoidance or even refuse to answer was faced. Finally, feedback was received from the local representation of an international bank (2 answers) and one financing facility (consultant who has managed a range of international development programmes to help companies and municipalities to invest in energy efficiency and renewable energy - not only in buildings).

Slovakia

N/A

Slovenia

Rather small number of questionnaire responses can be detected within banks/financial institutions. While contacting several different branches of the biggest banks, they are not keen of providing information to the third party. Our effort was put in communication with general management of certain banks, explaining ENERFUND's

aims and goals, thus more interest from local branches was initiated. To put it simply, bank's feasibility procedures which are linked to the local bank branches were often quite neglected when speaking about energy efficiency measures, which have been shown through low number of purpose loans for energy efficiency. A positive exception is SID Bank (national facilitator and development Bank) which has quite flexible services in energy efficiency relevant areas.

Despite the fact that JSI EEC provided instructions to not answer just with Yes/No or with really short answers, interviewees were quite brief with their answers and opinions on which we haven't had influence.

Interviewed stakeholders: 8 respondents.

Spain

Interviewed stakeholders: 1 respondent from one organisation

Type of Company: *Local bank*

Position: Top management

United Kingdom

Interviewed stakeholders: 5 respondents from one organisation

Type of Company: Community Development Finance Institution (CDFI), Environmental Consultancy, Not for profit social lender, Advisor

II.1 Financing of energy efficiency in buildings

- (1) *How many cases (energy renovation building projects) per year were financed by your organization/program in the past 5 years?*
- (2) *When financing energy renovation building, do you decide on a case by case scenario, or is there a need to compare projects?*
- (3) *What is the typical business case and how is the typical procedure to handle it? (Type of building, conditions of loan, application, rating of credit-worthiness and guarantees etc.)*
- (4) *In case there is no typical business case yet, how would you describe it?*

Austria

National managing authority for state aid:

(1) 16-17.000 cases in the private sector (private persons asking for funding) per year since 2009/10 (start of the initiative); 300-500 cases (companies, municipalities) per year

(2) Decision is made on a case by case scenario. Funding criteria have to be met: <https://www.umweltfoerderung.at/>

(3) Beneficiaries apply for funding and if they meet the funding criteria they get a lump sum at the end of the project. The following links give a detailed description of the funding system:

Individuals:

https://www.umweltfoerderung.at/fileadmin/user_upload/media/umweltfoerderung/Dokumente/Private/TGS_Priv_2016/infoblatt_ehf_sanierungsscheck2016.pdf

<https://www.umweltfoerderung.at/privatpersonen/sanierungsscheck-fuer-private-2016-mehrgeschossiger-wohnbau/navigator/gebaeude-3/sanierungsscheck-fuer-private-2016-mehrgeschossiger-wohnbau.html>

Only individuals (persons) are eligible to apply. Buildings must be older than 20 years, and eligible measures are insulation of the outer walls and ceilings, and renovation or exchange of windows and doors. The grant is a maximum of 3,000 Euro per apartment, if insulation material based on renewables is used, the grant will be increased to up to 4,000 Euro. The grant is limited, it can only be up to 30% of eligible cost. In addition, it is possible to receive grants for the installation of solar thermal systems, biomass heating systems, and PV systems. Grants for energy production are organized in a different funding scheme. There is no overall funding scheme for deep renovations.

Municipalities:

https://www.umweltfoerderung.at/fileadmin/user_upload/media/umweltfoerderung/Dokumente/Betriebe/SUN_Betriebe/UFI_Standardfall_Infoblatt_GEBSAN_GEMEINDEN.pdf

Companies:

https://www.umweltfoerderung.at/fileadmin/user_upload/media/umweltfoerderung/Dokumente/Betriebe/SUN_Betriebe/UFI_Standardfall_Infoblatt_GEBSAN.pdf

National bank (sBausparkasse):

No statistics available for energy renovation buildings projects.

sBausparkasse offers the following information to its clients (energy-blog):

<http://energieblog.at/author/edeltraud-mueller/>

<https://www.s-bausparkasse.at/portal/?page=pv.schritt1>

If it is useful for the ENERFUND tool, a cooperation seems to be possible. sBausparkasse thinks that awareness-raising information is important be included in the ENERFUND tool.

sBausparkasse also informs its clients about the national managing authority for state aid and its activities.

National bank/regional banks:

No statistics available for energy renovation buildings projects.

Decision is made on a case by case scenario.

Bulgaria

(1) For the period 01/01/2012 - 17/11/2016 EERSF has financed 61 projects for energy renovation of buildings

(2) In project financing for energy renovation of a building, each case presents a technical study of the project based on conducted energy audit and financial analysis of the beneficiary before the Board of EERSF who decide under what parameters to finance the project.

(3) EERSF is financing directly or through the purchase of receivables the following types of investment projects: renovation of buildings, improvements of the heat source and heat transfer network, street lighting, investments to improve energy efficiency in industrial processes and other cases of final energy consumption. The project must implement proven technology, while beneficiaries may be Municipalities, entities or

individuals.

The amount of funding is from 30 thousand Leva to 3 million Leva. The maximum repayment term of the loan is 7 years, the interest rate range is between 4% - 7%, depending of the credit ability of the customer and collateral offered. The minimum financial contribution from the borrower in the proposed lending project must be at least 10%. Funding from EERSF is without fees and commissions and also free of prepayment fee after the second year.

EERSF offers warranty products - partial credit guarantees or portfolio guarantees for ESCO companies.

After an initial assessment of the feasibility of the project shall be established initially project proposal to be presented supporting documentation, which is considered, analysed, presented to the Board of EERSF decision. Creditworthiness of customers is based on the balance sheet and profit and loss accounts for the past three years and the current period, available liabilities and receivables, draft and more. EERSF ensure its claims with liquid collateral such as mortgage, surety, bank guarantee, pledge of equipment, pledge of receivables, promissory agreement for direct debit and more.

Cyprus

One of the two respondents said that they have only 5 energy renovation building projects were financed by their organization/program in the past 5 years. However, the other respondent mentioned that they financed 10 000 Cases in the past 5 years and they estimated that 4 000 Cases/Projects per year will be eligible for Energy Efficiency Housing or Commercial Loans.

Denmark

N/A

France

There are a few financing institutions specialised in the funding of energy efficiency project, especially those who have a social objectives beyond simple financial interests. Subsidied loans or at low rates as well as incentives are available to clients.

Commercial banks tend to invest only in concern with the financial solvability of the clients and lack knowledge and skills to scale up activities in the energy efficient buildings field. The risks related to operation, work, contractual arrangements (in the case of energy performance contracting) etc. are not well apprehended by banks in general, especially as there is a strong human factor in the final performances.

Greece

(1) N/A.

(2) The assessment of buildings' energy efficiency financing is implemented:

- taking into account the energy certificate (individuals)
- installation of specific equipment, measures or techniques (individuals and businesses)
- any equipment related to the production process of businesses, requiring a business plan

(3) credit and technical assessment in parallel

Ireland

When asked “Does your organisation record statistics on the number of energy renovation projects you finance each year?”, there was a consistent reply as follows:

- ‘No’ was the reply of all of the banks.

When asked, “Do you have any particular criteria you apply when assessing loan applications for financing energy retrofits over and above standard loan applications?”, the responses included:

- We consider EPCs on projects where the market demands it
- The business has to be capable of repaying the loan from its current income as against relying on any efficiency cost savings
- No, we apply the same criteria for personal loans or mortgages

Romania

No projects were implemented directly by interviewed banks in Romania in the last 5 years. However, they were related to the energy efficiency funding instruments managed by the consultant providing the answers to the interview (EEFF, RoSEFF etc.):

(1) Most energy efficiency (EE) and renewable energy (RE) investments that we supported were not buildings related, but some were - particularly industrial and agricultural buildings, also some hotels and schools.

(2) For small-and-simple 'fast track' investments, we published an open list of best performing equipment (that met defined performance criteria) enabling creditworthy companies to use the programme without the need for an external study. For large and complex investments and for municipal investments, we provided appropriate techno-economic studies - appropriate meaning to a level of complexity tailored for the specific needs of the investment project.

(3) Typically, banks lend to companies to renovate their buildings using balance sheet financing, secured against the building and/or other assets. Lower future energy costs are taken into account and reported by the consultant but represent only one (minor) factor amongst a large number of other factors used in credit scoring.

(4) Typically, energy cost savings are not the principal driver. Modernisation is typically the business case for building renovation, with energy cost savings seen as one of multiple benefits. An interesting case could be the renovation to high energy performance level (high energy savings).

Slovakia

N/A

Slovenia

When speaking with investors/banks different numbers considering energy renovation projects were involved, usually the number was between 40 – 65 per year (varying from year to year and from partner to partner). Each and every energy efficiency project is analyzed case by case and credit granting procedure takes between 2 – 4 months. Rarely banks and investors have a special developed financial program/instrument. This is due to small market and lack of interest in energy efficiency measures (in large numbers). Most relevant information when certain person

or company is applying for credit is its financial status; every single detail is analyzed to avoid unpleasant situations for both involved parties.

Spain

(1) Many renovation loans were financed to refurbish and energy retrofit buildings in the past years, with no specific cost or quantity study.

(2) Housing and building renovation loans. We will indicate the product later.

United Kingdom

- Affordability of measures to be installed - both against the amount of the fund available (we make loans of up to £10k per measure) and the ability of the client to repay over a short loan term (36 - 60mths).
- Approx. 330 projects financed. Key considerations: credit worthiness, energy and CO2 savings of the project (we offer £1,000 per every 1.5tCO2 saved), project payback (we offer if less than 5 years)
- Appropriateness of lending re affordability etc. and support of local council whose capital we lend
- Affordability to the client. Risk and return.
- Risks

II.2 Financial tools/programs for building renovation

Do you have or plan to develop any financial instrument / program dedicated to energy renovation of buildings (e.g. grant, loan)? Please describe briefly the scheme (target group, conditions, amounts, guarantees, access conditions including supporting documents required etc.)

Austria

National managing authority for state aid: The funding programme started in 2009/10 and is annually extended.

Research institute: In the frame of the Horizon 2020 project SEFIPA (<http://www.sefipa.at/crowdinvesting>) financial instruments dedicated to “sustainability” will be developed. Therefore stakeholder-workshops will take place. So far, no concrete outcomes are available but one idea is the initiation of an energy efficiency fund. Further on a crowdfunding-platform for sustainable energy projects will be developed. The project team is searching for adequate projects related to the following two topics: 1.) “Crowd for Climate, 2.) Crowd for Energy (it is not expected to find energy renovations projects because the payback period seems to be too long).

The Swiss “Susi Fund” could be a role model for the creation of an energy efficiency fund in Austria:

(<http://www.susi-partners.ch/de/home.html>) → However, the rules and regulations (investment legislation) for the creation of a fund are very strict: https://de.wikipedia.org/wiki/Investmentfondsgesetz_2011

Therefore, it is difficult to find investors as well as projects. Regarding investors, it is probably more promising to approach investors such as insurance companies and pension pools than private investors (for them the risk is too high).

National bank (sBausparkasse): No.

Regional banks: No, responsible are national/regional state-aid authorities.

Bulgaria

EERSF was created by the Energy Efficiency Act (adopted by the Bulgarian Parliament in February 2004) as an independent state institutions entity. The Fund carries out its activities under the Energy Efficiency Act, the Law on Renewable Energy and agreements with donors. EERSF act as financier of granting loans and credit guarantees for realization of investment projects in energy efficiency. The fund provides only consideration financing, co-financing or guarantee over other financial institutions. The Fund does not have grants.

Besides direct funding EERSF offers warranty products - partial credit guarantees to commercial banks or portfolio guarantees for energy service companies (ESCO). Partial credit guarantees cover making the lending bank to 80%, with individual warranty exposure may not exceed 800 000 Leva The maximum period is up to seven years, while the annual fee ranging from 0.5% to 2%.

Cyprus

When asked “Do you have or plan to develop any financial instrument / programme dedicated to energy renovation of buildings?”, the response was: “We are in the process of evaluating the Private Finance for Energy Efficiency - PF4EE European Investment Bank Product, which may be combined with the Bank of Cyprus Housing Loans which may include Energy Efficiency Investments”.

Denmark

N/A

France

Financial tools and mechanisms have been developed to ease the financing of energy efficiency, including but not limited to subsidies, white certificates, soft loans, energy performance contracting, participative loans, grants for energy audits, etc.

The white certificates, or “certificats d'économies d'énergies” (CEE) are interesting in its concept and figures amongst the key measures to support the French government's energy management policy. This measure applies specifically to energy suppliers who are obligated by law to generate energy savings through end users. In parallel, this is a possibility for end users to finance, retroactively, energy saving operations. It is considered as end users anyone who buys energy: individuals, local authorities, companies etc.

Greece

We have already done it. Since 2007 they are available specific loans for consumers and since 2015 for small businesses.

Ireland

When asked “Do you have or plan to develop any financial instrument / programme dedicated to energy renovation of buildings?”, the response was uniform:

- ‘No’ was the reply of all of the banks.

Romania

At present, not from the EEF consultant. In the past I ran programmes with partial grant financing (in one case from GEF and in another case from the EU), but those programmes have run their course and are no longer open.

From the bank, there is strong interest to develop any financial instrument / program dedicated to energy renovation of buildings. Through the intended facility, the funds will be on-lending through financial institutions to eligible sub-borrowers, targeting investment in the residential sector and covering energy efficiency, building-integrated renewable energy and water efficiency measures. The effective scheme is not defined in detailed yet.

Slovakia

N/A

Spain

RENOVATION LOAN. BUILDING OWNER ASSOCIATION LOAN.

1. Renovation loan: refurbishment loan. maximum 5 years, interest rate TIN: 5.50%. Origination fee: 0.5%, no loan cancellation fee.
2. Communities financing: aimed at acoustic preparation, energy retrofit, accessibility... building owner association loan, maximum 8 years, interest rate TIN 4.90%. Origination fee: 1%, triennial renovation insurance (optional).

United Kingdom

- We currently run a zero-interest loan fund for domestic properties in our home county of Powys. The revenue costs of this fund are paid by the local authority, who counts the carbon savings. We are seeking to expand the reach of the ZILF in order to reach more fuel poor households, which are unlikely to be attracted to loan finance, even at 0%. We are also seeking to replicate the Zero Interest loan fund model for community organisations across Wales using capital raised off the back of previous investments in community energy generation schemes. We will seek to target measures such as insulation, LED lighting and heat - all measures that can make community organisations much more sustainable in regard to both their environmental and economic performance.
- We already have a range of affordable loan options which can be made available to support clients in need of energy efficiency improvements to their home. We work in partnership with various local authorities and agencies in the South West of England
- Raising more capital through investment bonds; more mezzanine finance products; raising loan guarantees.
- Confidential

II.3 Use of EPC

- (1) Are you aware of the existence of the energy performance certificate (EPC) for buildings and the requirements for its elaboration?*
- (2) If yes, do you use the EPC in your current lending activities for energy renovation of buildings?*
- (3) If yes, in which activities do you use the EPC and what is the information you use or*

request from the EPC?

(4) If no, do you use any energy related data from other sources to base your decision?

Austria

National managing authority for state aid:

(1) Yes. The data of the energy performance certificates are important to check if the funding criteria are met. We only prove if the data meet the criteria but we don't give any recommendations about which data/criteria should be used (→this is the Ministry's responsibility).

(2) yes

(3) size/extent of the renovation activity

(4) no

National/regional banks:

No, national/regional authorities for state aid are responsible.

No.

Bulgaria

(1) Yes

(2) When applying for credit in EERSF is required energy audit of the facility, which will introduce energy efficiency measures. After implementation of energy efficiency measures EPC received and is guaranteed achievement of certain Class of energy consumption.

(3) The presence of EPC is a mandatory component for the complete kit of approved energy audit. The data of audited object are analysed in details from the energy audit report, while from EPC we take into account its validity.

Cyprus

(1) All respondents were aware of EPCs.

(2) no (50%), yes (50%)

Denmark

N/A

France

All respondents were aware if EPCs, which are used to determine the quality of a building and also its compliance with regulations. The main information use is the bands in which the building figures in terms of energy consumption and in terms of GHG emissions.

Greece

(1) Yes

(2) Yes

(3) For buildings' renovation, we provide a reduced interest rate, if the building belongs to category B+ or higher. The reduction of the interest rate is related to building's category. More information (features) available at

<http://www.piraeusbank.gr/en/idiwtes/daneaia/stegastiko-daneio/green-stegastiko-syndedemeno-me-euribor>

Ireland

(1) All respondents were aware of EPCs.

(2) When asked, “Do you use EPCs in your current lending activities for energy renovation of buildings?”, the responses included:

- Not for lending but for investment/ refurbishment purposes and to set the brief for renovation projects
- Our bank provides free EPCs to homeowners for dwelling upgrade loans
- No - 2 cases
- 50% of respondents did use the EPCs for this purpose and 50% did not

(3) When asked, “In what way do you use the EPC and EPC information do you require?”, one respondent commented:

- We aim for A1 rating. This tracks performance and gives another measure to incorporate in the brief for the design team.
- None of the other banks offered any comments

Romania

(1) Yes, from the bank. From the consultant perspective, the option to prepare techno-studies about the building and the proposed investments is considered, based on previous experience. In these studies, a licensed energy auditor (member of the consulting team) would calculate the current rating for the building and the future rating if the measures described in our study were carried out in full. The auditor would not actually issue certificates.

(2) We would use the calculations to help describe the benefits of the investment to the investor.

(3) Energy invoices and technical information collected during site visits.

Slovakia

N/A

Spain

(1) Yes

(2) N/A

United Kingdom

(1) Everyone answered Yes

(2) 80% - No; 20% - Yes

(3) Primarily as we fund domestic renewables in which FIT and RHI payments are sometimes dependent on improvements to the EPC of properties.

(4)

- We develop our own modelling of the income generation and savings from installed measures as part of our loan assessment process.
- Electricity bills, Energy Saving Assessment template (clarifies existing energy use, and proposed use - completion assisted by supplier), independent verification by engineer
- No but some of our partner agencies may do so. We only consider the financial aspect of the lending proposition.
- With renewable energy, we will undertake separate modelling on return calculations etc.

II.4 Need for energy information relevant for energy renovation of existing buildings

(1) What kind of energy information would you need in the analysis for financing / granting of a loan of an energy renovation project?

(2) What kind of other information would you need for risk assessment?

Austria

National managing authority for state aid:

(1) Very complex technical data sheets are used (which include e.g. energy performance indicator in kWh/m²a, ...). The technical sheets can be found at www.umweltfoerderung.at (for example: https://www.umweltfoerderung.at/fileadmin/user_upload/media/umweltfoerderung/Dokumente/Private/TGS_Priv_2016/foerderungsantrag_efh_sanierungsscheck2016.pdf)

(2) Risk assessment is not relevant for us. Subsidy is paid after implementation of the project.

National/regional banks:

No kind of energy relevant information is required. Risk assessment does not include energy related building information. Checklists ("Finanzierungsprotokoll") are available (in German only).

Bulgaria

(1) In addition to mentioned balance sheet and profit and loss accounts for the past three years and the current period, available liabilities and receivables, draft etc., it is required energy audit, technical design, including specifications and bills of quantities, all documents concerning the contractual relationship between EERSF and the beneficiary of the financing, together with the approved by the Board of EERSF collateral for the transaction.

If the beneficiary is a person liable under the law on public procurement, we require the procedure for selecting a contractor to be finally closed and not subject to appeal.

(2) The necessary documents that each borrower present in EERSF gives the necessary information for risk assessment.

Cyprus

The information they use or request from the EPC is:

- Recommendations by the Qualified Expert for the improvement of the energy efficiency of the building
- Share of Renewable Energy Sources
- EPC rating

Denmark

N/A

France

Commercial banks do not go too much into details when financing energy efficiency projects and will mainly look at the loaner's solvability (that means mostly its income, current debts, warrants, guarantees, assets...). More specialised financing institution will look at the project's ROI period and will aim to mitigate the potential risks: what company is carrying out the work, is the building under a specific energy management policy, etc. In any cases the solvability of the loaner will remain critical.

The information needed, apart from the ones traditionally used by financing institutions, would be the potential in terms of energy savings due to the projects, existing benchmarks and potential guarantees of performance from an energy performance contract provider.

Greece

(1) Energy certificate, the list measures and the corresponding cost. Additionally, we could possibly ask technical sheets and for buildings belonging or rented from businesses, the relevant cash flow with indication of the simple payback period.

(2) For financial risk assessment, the usual asked information.

Ireland

One respondent advised that they use EPC, BREEAM and LEED information.

When asked, "What kind of non-energy related information is useful for the financing of energy renovation projects?", the following responses were given:

- 1) borrower income
- 2) borrower financial commitments
- 3) borrower living expenses
- 4) business case inputs - rents, service charge, running costs, construction costs, timeframe, programme, void periods, concessions for tenants, marketing costs
- 5) property valuations

Romania

(1) Current energy consumption and potential of energy savings.

In case of EE facilities: the cost of investment, impact on future energy costs. Both minimum energy performance criteria and minimum economic performance criteria were used to determine eligibility to use the programme.

(2) Property status for the building, survey/analysis of building structure and renovation needs, comfort standards and other regulations.

Typically banks lending to companies to renovate their buildings using balance sheet financing, secured against the building and/or other assets. Lower future energy costs

are taken into account but represent only one (minor) factor amongst a large number of other factors used in credit scoring.

Slovakia

N/A

Spain

It is important to know the building's energy efficiency. The higher the letter, the higher the warranty/value for the entity and more savings/less expenses for our clients.

United Kingdom

(1)

- As above - energy generation information related to FIT, RHI and export payments, and savings from existing energy usage.
- Current and projected energy use.
- See above - our work is exclusively about the lending and not the technical aspects of the work being undertaken.
- small scale domestic loans - we don't do much other than ensure it looks like it is the right product, price, ROI projection for the client (and by the way Q10 has a glitch on the answer box - we have made around 500 domestic loans and maybe 50 social enterprise loans all related to energy). Renewable energy installs - we fully assess these independently and analyse all available data.
- Consumption data in as much detail as possible

(2)

- Some sort of probability analysis in regard to energy usage assumptions - most quotes by installers use broad brush modelling and assume the 'push the best case' scenario. An independent, comprehensive scenario testing tool would be useful
- Credit Score
- Credit reference, history, employment, disposable income, job security,
- Contract type

II.5 Other information relevant for energy renovation of existing buildings

(1) What kind of information would you need from the ENERFUND tool in order to decide the financing / granting of a loan of an energy renovation project (e.g. energy consumption, social status of owners, affordability, availability of qualified 'suppliers', property valuation etc.)?

(2) Answer based on a case study (example): Renovation of a group of schools / educational buildings in a defined area/city:

(a) What information would you need to decide the implementation/development of a financial product or to grant a loan for the energy renovation of the defined target buildings?

(b) Which would be the components (criteria) of a rating tool for the targeted buildings in order to assess the suitability / feasibility of financing for energy renovation?

Austria

National managing authority for state aid:

(1) Tool is not really relevant for us. The available funding budget is completely used year by year. The demand for subsidies is bigger than the available budget. Generally, we are sceptical about the tool regarding the following aspects:

- How do you keep the data up-to-date?
- Data security? Which data are you allowed to use?
- Data/information included to increase the awareness of the tool-users is fine, but at the moment the main barrier for the realisation of energy efficiency activities is the energy price

It could be interesting to use the tool for the “valuation” of buildings.

National bank: The following aspects should be integrated into the tool: awareness raising information, information about state-aid, costs of specific renovation activities, and information about companies which offer services for energy renovation measures. Maybe it is also possible to get some support from politicians for the tool, as politicians should give more information about energy efficiency projects in the building sector.

Regional banks: ENERFUND-Tool is relevant for us.

Research institute: ENERFUND-Tool is relevant for us.

Bulgaria

(1) Energy audits and financial information about the owner of the building, which is usually the municipality, are required.

EERSF collect the necessary information to finance projects for energy retrofitting. Any additional information will be helpful decision making to finance loan for an energy retrofitting project.

(2) Achieved energy savings in kWh and the corresponding savings in leva, which allow you to redeem the investment. Assessment of overall financial condition of the customer is required. EERSF already has experience in financing package of municipal buildings.

Cyprus

(1) It is important to know the average costs of energy renovation measures, the property evaluation, the presence of financing programs, the owner(s) of the building, the energy performance compared with average building stock and the EPC data.

(2) When asked “Which would be the components (criteria) of a rating tool for the targeted buildings (renovation of a group of schools / educational buildings) in order to assess the suitability / feasibility of financing for energy renovation?”, the answer was:

“The Energy Efficiency Elements Eligible under the PF4EE EIB Product line. A relevant List of Eligible element is provided by the PF4EE EIB Product.

The main areas where Energy Efficiency (EE) is usually implemented and which are eligible for PF4EE support are:

- Energy efficiency improvement of an existing building: which could concern (i) investments related to the building’s envelope (Insulation / Windows and doors / Other building-envelope related measures with impact on thermal performance) and (ii) investments related to the building’s technical system (Space heating / Domestic hot water / Ventilation systems / Cooling / Lighting / Building automation)

- Construction of a new building: buildings designed to be a nearly zero-energy building (“NZEB”)
- Production facilities: investments which by themselves or together with other investments that may be undertaken at the same time do not increase the production capacity of the relevant production line by more than 30% and shall demonstrate capacity to generate energy savings.
- District heating or cooling: investments in the rehabilitation or extension of existing systems provided that the heat/cold is mainly produced from waste energy, high efficient cogeneration or renewable energy sources
- Public lighting infrastructure: the improvement of the energy performance of an existing public lighting infrastructure high efficiency co-generation of heat and power plants (CHP): with specific technical requirements (to be disclosed later on) energy efficient appliances: shall replace an appliance with comparable use and lower energy performance”.

Denmark

N/A

France

Financing of EE is difficult in France due to low energy prices but any information linked to EPC data, buildings energy performances (benchmarks), benchmarks for ROI per measure, property valuation, trustiness of energy contractors, etc. could be useful in their decision process.

Greece

(1) I don’t know yet. As long as we go through the website and possible have a presentation, I could probably answer.

(2) As they are financially medium or large project we don’t intend to develop a specific loan (fixed terms), as got these categories the financing conditions depends highly on the characteristics of the owner and the project itself.

Ireland

The survey presented a suggested list ENERFUND tool features and asked, “Which of these features you consider would be of use to you in your work?”

The tool features listed were:

- EPC data
- Thermal performance of envelope
- Heating system efficiency
- Typical costs of renovation
- Existence of financing programmes
- Availability of qualified contractors
- Property valuation
- Energy performance compared to average building stock and 2030 goals etc.
- All of the above

The respondents were mostly in favour of:

- property valuation datasets
- energy consumption
- typical costs of retrofit,

- grant support / tax incentive areas

When asked, “Are there any other datasets or key information you would like to see included in the ENERFUND tool in order to decide the financing/ granting loan approval of an energy renovation project loan?”, the responses were:

- 1) categories of measures being undertaken,
- 2) expected running costs pre- and post - works to estimate impact on income,
- 3) split of energy/ non-energy work,
- 4) clear property identification,
- 5) provision of data digitally,
- 6) owner demographics,
- 7) likely increase in rents,
- 8) what value will the renovated building have in the market.

Romania

(1) Renovation can many years to pay back from energy savings alone, but investors invest for many reasons - better lifestyle, warmer in winter, cooler in summer, happier and more productive workforce, health benefits, better looks, avoided maintenance costs, perceived improvements to the area, increased capital values, social welfare, job creation, political commitments.

(2) From the bank perspective, the information needed refers to: current energy use, savings potential, need for commercial funding (commercially viable), creditworthiness.

The criteria to assess the suitability / feasibility of financing for energy renovation are the net present value based on estimated energy savings, creditworthiness of the potential borrower. Usually min. 30% energy savings.

Slovakia

N/A

Spain

(a) We would need to check the EPC improvement measures' repayment.

United Kingdom

(1)

- Loan assessment in our sector is much more intuitive than the 'computer says no' approach used by some high-street lenders. We would be cautious about a tool that incorporates too much information or tries to do too much. We are quite adept at working out the affordability of loan finance based upon the information that we request from the client - what we really need is some more technical rigour around energy performance based on a suite of individual measures that can give confidence to predictions around the economic performance of the building post energy renovation.
- Any supplementary information along the lines suggested would be helpful but we have a very focussed role in assessing the viability of loan finance and would always conduct our own assessment before agreeing to lend.
- All of these are needed in an assessment, so if we were interested it would have to offer these at minimum.

(2): No responses

II.6 Acceptable economic indicators for energy renovation of existing buildings

(1) Do you request minimum requirements in terms of economic efficiency or feasibility to finance energy renovation projects? What are these minimum requirements?
(2) What could be the acceptable (range or maximum) payback period (for the recovery of investment from energy savings) for an energy renovation project? Is the payback period always relevant or could you think of cases where not?

Austria

National managing authority for state aid:

- (1) no
- (2) not relevant

National/regional banks:

- (1) no
- (2) not relevant

Bulgaria

- (1) The project has to implement a standard known technology on the market. At least 50% of the economic benefit of the project to be a verifiable energy saving. Application of renewable energy to be done jointly with energy efficiency measures
- (2) The maximum repayment term of the loan to EERSF is 7 years. The maximum term for payback would not be economically expedient to be more than 10 years.

Cyprus

- (1) Yes (respondent 1), Other: Energy Efficiency Element should belong to the PF4EE EE Eligible Elements List provided by EIB (respondent 2)
- (2) less than 8 years (respondent 1), 2 to 20 years (respondent 2)

Denmark

N/A

France

Minimum requirement vary from one financing institution to another but usually projects with payback period over 5 years will not be funded as it carries out too much uncertainty. In this case a classic loan may be contracted by the client.

Greece

- (1) It depends on the type of the project and the industry.
- (2) It depends on the type of the project and the client.

Ireland

When asked, "Do you set minimum requirements in terms of economic feasibility to finance energy renovation; if yes, what are these minimum requirements?". one respondent commented as follows:

- It depends on the project but it must have a financial return. Other criteria would include compliance with legislation, health and safety where decisions are not made purely on financial drivers
- All other banks advised they do not set minimum requirements in terms of financial feasibility.

When asked, “Is the payback period always relevant or could there be cases where not?”, the respondents commented as follows:

- One bank uses maximum payback periods for the recovery of investment from energy savings investments.
- The same respondent said paybacks may not be relevant in cases where legislative or compliance or health and safety requirements are paramount.
- All other banks advised they do not set maximum payback periods for energy retrofit loans

Romania

(1) It usually depends on the building use/category and baseline energy use.

In the most recent two projects, IRR minimum 10%, achieved from energy cost savings.

(2) There are opinions that the recovery of the investment from energy savings is not a very useful eligibility criterion for buildings (although it is a good criterion for other types of EE and RE investment). The reason is that energy cost savings are only one of multiple social, economic and environmental benefits of building renovation. The benchmark should be that even if the economics are poor, providing that the investor understands that the investment may take many, many years to repay from energy cost savings alone but is willing to invest anyway because of the other environmental reasons, social reasons and indirect economic benefits (such as increase capital value of the building) the investment should not necessarily be 'disqualified' because of the long payback.

From the bank perspective, the payback period to recover the investment from energy savings for an energy renovation project is always relevant, while an acceptable payback period would range between 5 and 10 years.

Slovakia

N/A

Spain

We do not at the moment, but it would be advisable. The acceptable payback period would be less than 8 years.

United Kingdom

(1)

- Affordability - does the cost of the measures stack up within a realistic time scale that, combined with the client's disposable income, allows payback of the finance within a short loan term of up to 60 months.
- We are only interested in checking the appropriateness of the lending decision and will gather all relevant information to ensure a fair and appropriate decision.
- Each consideration is individual - if we are not satisfied then we request further clarification or information from the client.

(2)

- As above - the scale of our loan funds prevents us from granting loans at longer terms than 60mths. Ideally, particularly in regard to fuel poor households with little disposable income - payback needs to happen within this term. However, there is no one size fits all rule of thumb in regard to length of payback and viability of loan.
- 5 years. In exceptional cases, we may consider projects with longer payback periods, but we will cap the amount lent to 5 times the annual saving
- The loan can be scheduled over a term appropriate for each client in their individual circumstances.
- We try to churn capital that we have so tend to focus on short lending periods up to 6 years. A key issue for us is assurances over refinancing so that we reduce the risk of stagnant capital.

II.7 Influence of international/European policy and regulation

How are the international/European directions (policy, strategy, recommendations) and rules (directives, decisions) influencing the implementation of an energy renovation project/program (from your perspective)?

Austria

Apart from energy related subsidies, there is no direct impact on financing energy efficiency in building renovation.

Bulgaria

Promote activities for energy retrofitting of buildings.

The Fund carries out its activities under the Energy Efficiency Act and the Law on Renewable Energy. Thus, comply with European directives transposed into national law. The Fund complies in its activities with the requirements of the Energy Efficiency Directive and the Directive on Energy Performance of Buildings.

Cyprus

The international/European directions (policy, strategy, recommendations) and rules (directives, decisions) influencing the implementation of an energy renovation project/program by pushing all stakeholders in the right direction.

Denmark

N/A

France

European directives have a strong influence on national regulations which have to be followed by all actors. They can also lead to specific incentives that can ease the funding of EE projects.

Greece

Compliance to national policies and regulations is mandatory. We try to be adapted in advance with European policies and regulations, while we try to be informed on international policies and regulations.

Ireland

When asked, “Do international/ EU drivers (policy, strategy etc.) and rules (directives, decisions) influence the implementation of energy renovation projects/ programs from your perspective?”, the responses were:

- All banks responded ‘Yes’ to the question
- The bank officials expect that they will be included in newer Directives and will be required to adhere to such regulations. Either way, “they will either encourage or compel actions”

Romania

EU rules, for example, on renovating public sector building stock and on the EE of new buildings are making a significant difference, which will grow as new rules come into force in 2018 and 2020.

The EU directives transposed in national legal framework are very important, as well as guidelines notes from Eurostat (e.g. Eurostat note from 7 August 2015 regarding EnPC/ESCO) and other European organisations.

Slovakia

N/A

Spain

In 2018, new public administration buildings would have to be zero energy buildings, and their implementation is very important for society’s energy awareness.

United Kingdom

- Clearly, they have set a broad framework and the agenda for the national environment in which we operate. However, there is an increasing worry about the commitment to this sector after recent UK government interventions, not to mention the likely direction of policy post Brexit,
- The requirement to comply with EU State Aid regulations (our loans are interest free which means they are regarded as state aid),
- None.

None at all. We are regulated by the Financial Conduct Authority.

II.8 International financing

Do you have the need to compare funding opportunities across regions or countries (i.e. finance a project in Italy or in Greece?) If yes, what data would you need?

Austria

National/regional banks: No.

Bulgaria

The information on the financial models for energy efficiency in other EU Member States is important for us to improve and develop financial products we offer in Bulgaria. Comparisons with other countries would contribute additional information on the development of financial mechanisms to support energy efficiency projects reconstructions.

Cyprus

N/A

Denmark

N/A

France

No.

Greece

No, we do that anyway.

Ireland

When asked, “Do you have a need to compare funding opportunities across regions or countries)?”, all Irish banks responded ‘No’.

Romania

It is considered useful to compare funding opportunities across regions or countries, in particular data regarding the funding need and requirements/conditions, development impact on the local market (demand for energy efficiency financing and transition impact), impact on the environment, replicability of the investment at bigger scale and involvement of private sector (leverage).

Slovakia

N/A

Spain

N/A

United Kingdom

40% Yes; 60% No

- However - we are always keen to pick up on best practice, not least in the area of engagement and behaviour change.
- In the UK, there are other funders in England and Scotland, so we have to liaise with these competitors.
- Identify funding sources in different countries

II.9 ESG (Environmental, social and governance consideration) and social finance

- (1) Does your organization deal with ESG and social finance? If yes, how?*
- (2) Would better indoor air quality, increase in comfort and reduction of energy expenses and energy consumption as well as emissions be dealt with under the umbrella of ESG?*
- (3) Would the EPC be accepted as a supporting document / proof, and if not, what other proof will be necessary?*

Austria

National bank: In general, performance counts more than sustainability. If clients want to invest in funds, usually they will ask their bank officer for the highest return on investment.

Bulgaria

(1) The main environmental objective of EERSF is to support the identification, development and financing of feasible projects to improve energy efficiency, reducing greenhouse gas emissions. EERSF does not provide social funding.

(2) Achieving high ecological quality with lower energy costs is a major objective in the activities of EERSF.

(3) EPC framework is included in the current legislation and EERSF accept it as a supporting document.

Cyprus

N/A

Denmark

N/A

France

1- Depend on the respondents but some offer social finance. All consider ESG in their activities.

2. Yes for most

3. EPC provides general information about the building intrinsic performances in terms of energy and carbon emissions but more would be needed: what policies are implemented by the building user to this extent? What monitoring process is implemented to ensure the real performances?

Greece

(1) Yes, we adapt all procedures to an Environmental and Social Management System (http://www.iic.org/sites/default/files/pdf/284175-presentation_environmental_and_social_management_systems.pdf)

(2) Yes, under conditions

(3) Already done

Ireland

(1) When asked “Does your organisation deal with ESG and social finance?”, all Irish banks responded ‘No’.

(2) When asked, “Would better air quality, increase in comfort and reduction in energy bills and energy consumption as well as emissions (due to retrofits) be included under the umbrella of ESG?”, two of the Irish banks responded ‘Yes’ to this question. Others did not respond.

Romania

The interviewed bank implemented programs which dealt with ESG but not with social finance. The involvement depends from country to country, but usually consisted in

assistance offered to public authorities to improve legal framework and assistance to pilot project implementation.

Indoor air quality, increase in comfort and reduction of energy expenses and energy consumption as well as emissions could be dealt with under the umbrella of ESG.

Slovakia

N/A

Spain

N/A

United Kingdom

(1)

- Yes - we work with social enterprises seeking to develop community energy projects that have both climate change adaptation and local economic sustainability objectives
- No
- We are providers of social finance, linked through our partnership with local authorities.
- Yes, we are a social finance company
- Yes - through investors

(2): 60% Yes; 40% No

(3)

- EPC as it stands at present is probably too broad a mechanism - a separate community standard / award would be more of an endorsement and motivation for social enterprises.
- Not applicable for our work
- No

II.10 Other aspects

Bulgaria

Sharing of experience in the field of energy efficiency and applied financial models to achieve it are important aspect of the EU activities. The construction of horizontal links for knowledge transfer between member states is an important tool for overcoming the delay in for achieving energy efficiency targets of the EU.

Ireland

One respondent commented that special treatment of financing of retrofit such as exemption from Statutory Instrument (SI) 47 rules would help retrofit activity by increasing demand. SI 47 rules currently preclude providing any loans to buildings that are in negative equity following the property market crash.

United Kingdom

Need building performance data rather than EPCs.

A1.III. Perspective of building owners, communities

The third part of this report addresses the objectives of Task 2.4, i.e. to investigate the needs, barriers and general acceptance of EPC/retrofitting actions from the final user perspective. The analysis is based on a questionnaire developed with the aim to understand what will increase the acceptance level of the public for deep renovation measures and what is needed to increase successful financing of deep renovations of buildings.

Austria

There is awareness of the EPC. Large and medium-size communities employ qualified staff and run their own energy efficiency programs, sometimes also by means of collaboration with an ESCO, while small communities often do not have sufficiently qualified staff and knowledge to start an effective program on deep renovation of buildings owned and used by the community. They rely on external advice and the availability of budget for external advice. In a small community, the mayor himself is the building authority, and it still happens that the EPC is perceived as an additional burden without value.

In community buildings, there is a backlog in maintenance and repair. Backlogs in maintenance and repair are problematic because costs of energy efficiency measures do not include expenses which are necessary to catch up with repair before implementation of energy efficiency measures can start.

It is important to know in which areas communities are merged or will be merged and where new spatial plans are developed or will be developed, as during this process some buildings might be abandoned (sold, demolished, not used anymore) and decision-making regarding refurbishment will be suspended until the new plans are valid.

Detailed data on the technical condition of the building and detailed information about the actual building energy consumption are needed for planning and carrying out energy efficiency measures.

In addition to technical data (e.g. type of energy carrier, heating system, age of heating system), also information about the type of building ownership and the number of occupants is useful.

Other useful information for energy efficient renovation: innovative financing models, available subsidies, good examples, qualified renovation companies, suitable products including LCA and field reports, payback calculation tools, LCCA, benchmarking with similar buildings, a compilation of good reasons for renovation to present to decision-makers, how to consider energy efficiency of community buildings in budget allocation (from national level to community level).

Parameters for prioritizing renovation projects: number of m², number of occupants, type of ownership, age of heating system, energy indicator of building envelope.

On community level, EPCs are used for prioritizing renovation projects and for concept development. However, not all communities make use of the EPC, because sometimes the EPC is regarded as a legal requirement only.

It will be useful to present building energy performance in a geocoded way, which can be combined with other maps and GIS-based tools which are already used for community development.

Data assessment and reporting functions will be useful for targeted development of subsidies / policy instruments (Example EPISCOPE Ireland).

The focus of the ENERFUND-Tool is not clear: Will it serve the concept development for communities or the decision-making for renovation projects? Or both? Target groups and requirements are different. A community can represent both target groups. Discussion of renovation options and different technical concepts is extremely important in decision-making. It should be clearly presented how the ENERFUND-Tool can support discussions and what the limitations of the tool are.

Consider business models for deep retrofits of public buildings dealt with in <http://iea-annex61.org/>.

There is the concern that the projected energy savings will not be achieved, payback calculation will turn out to be wrong and the financing model based on energy savings will be affected strongly. There is the need for more precise projections regarding energy savings and cost of energy efficiency measures.

Property valuers make use of INSPIRE environmental risk maps and would probably also make use of easily accessible building energy efficiency maps provided that data quality is good.

Access to all relevant data needed for property valuation, in order to lower the barrier for property valuers to take energy efficiency into account; provide sufficient information to the valuers so that it is possible for them to assess the quality of data (e.g. by displaying information about the EPC control systems according to EPBD Article 18).

Deep renovations are more likely to happen in areas with market development potential (purchase of buildings in need of renovation, upgrading them including energy efficiency, and selling or renting them for a higher price). Therefore, the Tool should be linked with transaction databases (showing in which areas there is stagnation in prices or an increase in prices) and with market development reports (e.g. residential market in Vienna: http://residentialmarketvienna.at/epaper-EN_BUWOG-EHL_WMB_2016/index.html#/0).

For a short time, there is the obligation to submit a building documentation and a maintenance documentation to the building authority in Vienna. The EPC is part of this documentation. It would be very useful to combine these data and have a reporting about the technical building condition.

The discount rate (Kapitalisierungszinssatz) influences the valuation result strongly. The discount rate applied in the valuation of projects varies according to risk and expected profit. Discount rates could be a subject of comparison. Other interesting information: investment and remaining useful building life.

Based on the experience of renovating Hotel Stadthalle <https://www.hotelstadthalle.at/en/> it is recommended to plan high cost for consulting, in order to cope with the complexity of the task (deep renovation including implementing renewable energy technologies consists of many different measures and many different companies are involved).

Linking ENERFUND with other Tools is recommended:

- ECOCITIES supports operators of building groups – such as municipalities, cities, property management companies – in deciding how budget can be used most effectively to align the real estate portfolio to required political, economic and environmental objectives.
- ECOPLAN evaluates the impact of different energy efficiency measure sets on a given neighbourhood and finds optimized scenarios in terms of environment impact (carbon footprint etc.) and financial impact (investment costs etc.). ECOPLAN can be used to develop neighbourhood energy strategies, review

existing ones or ensure the alignment of individual initiatives with the neighbourhood overall energy strategy. ECOPLAN was applied in the City of Baden as a test case.

Interviewed stakeholders: 15 respondents

Type of organisations and companies: Property valuator and real estate developer, hotel owner and manager, head of e5 community program, head of regional Climate Alliance community association, professionals in charge of buildings owned and used by the community, researcher and consultant (in the area Sustainable Buildings and Cities), representatives of province government.

Positions: Managing director, deputy head of study program, professional staff of building department/building authority of municipality, facility manager, major, senior researcher, representative of authority.

Number of inhabitants of responding communities (questionnaires and interviews):

Deutschfeistritz	4,190
Gnas	6,055
Leoben	25,341
Linz	200,841
Liezen	8,086
Selzthal	1,637
Zeltweg	7,403
Wien	1,840,226

Bulgaria

Interviewed stakeholders: 31 respondents

Positions: Public building responsible in local administration (30/31), Building manager / facility management (1/31)

Cyprus

Interviewed stakeholders: 63 respondents (48 Private Buildings, 15 Public Buildings)

Type of organisations: A. Private Buildings (residential buildings, sport facilities, offices), B. Public Buildings (offices, commercial buildings, sport facilities, municipal buildings, universities)

Positions: Building owners, Public building responsible (local administration), Building manager (facility management)

Denmark

Interviewed stakeholders: 5 respondents

Type of organisations: municipality (4) and housing association (1)

France

Interviewed stakeholders: 43 respondents

Type of organisations: All types of respondents from domestic and tertiary sectors

Positions: All types

Greece

Interviewed stakeholders: 23 respondents

Type of organisations: municipalities and prefectures

Positions: mayors (6), vice mayors (3), secretary general (1), council members (2), general manager (1), Architect – studies dept. (1), mechanical engineers (4), civil engineers (3), physicist (1)

Ireland

22 responses were received to the property manager's ENERFUND questionnaire. The questionnaire was circulated widely to Local Authority Housing and Public Building managers, Housing Association property managers, to the members of the Irish Property Owners Association and to members of the Society of Chartered Surveyors.

The breakdown of the respondents is shown in the table below. More than 50% of the responses were from those responsible for local authority / housing association residential building stocks. This sector has been actively engaged in national energy retrofit programmes over the last five years and EPCs of buildings are integral to the process.

Breakdown of Property Managers' Responses

	Number of Responses	
Apartment Buildings	13	59%
Public Buildings	4	18%
Commercial Buildings	5	23%
Total	22	100%

There is also an ongoing active energy retrofit programme of public buildings. Responses were received from key public building energy / property managers.

The greatest challenge was to engage with property managers responsible for privately owned apartment blocks and commercial buildings. Those active in this sector are not bound by energy efficiency obligations and so are less tuned in to the energy efficiency aspects of property management.

Romania

Interviewed stakeholders: 104 respondents

Type of organisations: public buildings - local administration offices and schools (44.2%), public buildings - central administration offices (3%), are collective residential buildings (15.4%) and others.

Positions: Private owner (buildings or group of buildings), building manager, professional staff of building department/building authority of municipality, facility manager, representative of authority.

Slovakia

Interviewed stakeholders: 34 respondents

Positions:

Private building owner (non-residential)	3,70%
Private building owner (group of residential buildings)	11,11%
Public building responsible (central administration)	7,41%
Public building responsible (local administration)	7,41%
Building manager (facility management)	11,11%
Other, please describe:	59,26%
Representative of flat owners	11,11%
Energy manager	18,52%
Tenant	14,81%
Administrator of private apartment blocks	14,81%

Slovenia

Interviewed stakeholders: 12 respondents

Spain

Interviewed stakeholders: 10 respondents

Type of organisations: mostly public buildings.

Positions: Public building responsible (4), building manager / facility management (1), technician in autonomic administration (1); property administrator (1).

United Kingdom

Interviewed stakeholders: 16 respondents

III.1 Use of energy performance certificate (EPC)

(1) Are you aware of the existence of the energy performance certificate (EPC) for buildings and the requirements for its elaboration?

(2) If yes, do you use the EPC in your current activities?

(3) If yes, in which activities do you use the EPC and what is the information from the EPC you use or are of interest for you?

Austria

Communities:

(1) Overall, there is awareness of the EPC. However, there is a huge difference in deeper knowledge depending on the size of the community. Smaller communities ask for advice, for example experts from the Climate Alliance or the e5 community program.

(3) EPCs are used for concept development on the community level.

Property valuator and real estate developer:

(1) Yes, there is awareness of the EPC but not so much knowledge about the requirements for its elaboration.

(3) EPC is not used in current activities, because currently, energy efficiency is not a relevant parameter in the property valuation procedure. Apart from this, in the

residential sector energy indicators are not reliable (actual energy consumption data is required) and in large commercial non-residential buildings the EPC is not important because usually, a due diligence is carried out, and voluntary green building certificates such as LEED, BREEAM or DGNB are requested.

EPC data could be useful in future.

Hotel owner and manager:

Yes, there is awareness of the EPC, but it is not used because irrelevant for the booking of rooms.

Researcher and consultant (in the area Sustainable Buildings and Cities):

Yes, there is awareness of the EPC, and specific energy information for buildings is urgently needed to be included in existing tools like ECOPLAN and ECOCITIES, but EPCs are not accessible.

Bulgaria

(1) Yes 93.5%, No 6.5%

(2) Yes 74%, No 26%

- We have used these certificates in implementing projects with European funding.
- For implementation of measures to reduce the energy costs of municipal buildings.
- When submitting a report on EE management to SEDA.

(3)

- To estimate how much savings will be achieved after implementation of energy saving measures.
OR: The information that we use from EPC is for the building envelope, performance of energy transformation systems in the building, division of the annual cost of consumed energy, baseline for energy consumption, energy saving measures.
OR: We use EPC to benchmark what energy efficiency measures need to be put into building to reach a higher grade of energy saving. We make renovation to increase the energy efficiency of public buildings. EPC helps us to determine correct EE measures in preparatory stage of building renovation. At the stage of feasibility study, we order energy audit of the building, resulting in getting EPC. Then we stake recommended measures in the project for renovation of existing building. After performance of renovation, we track the effect of the introduced energy efficiency measures and whether they achieve anticipated levels of energy savings and emissions.
- When applying and implementing the projects under the Operational and National Programs. The information that we are interested in is the class of energy consumption, levels of consumed energy and emissions savings.
OR: The most common information used from EPC is related to the energy performance of buildings and energy-saving measures
OR: When introducing energy efficiency measures in buildings. Data for entering the building in operation, built-up area and class energy consumption after the introduction of the measures, information on indicative investment in energy saving measures - hence the planning of building renovation, information on emissions saved CO₂.
- For energy audit of buildings, commissioning of new buildings.

Cyprus

Private Buildings

- (1) Yes (92%)
No (8%)
- (2) Yes (48%)
No (52%)
- (3) The most frequently used information is: EPC rating, Primary Energy Consumption, Recommendations by the Qualified Expert for the improvement of the energy efficiency of the building

Public Buildings

- (1) Yes (73%)
No (27%)
- (2) Yes (60%)
No (40%)
- (3) The most frequently used information is: EPC rating, Primary Energy Consumption, CO2 emissions, Share of Renewable Energy Sources, Recommendations by the Qualified Expert for the improvement of the energy efficiency of the building

Denmark

Since it is mandatory for building owners of large building, i.e. owner of public buildings and housing associations as well to let their buildings certify, the existence of the EPCs are well known. Nonetheless, it is not that common for large Building owners to use the EPC in their renovation activities. According the interviewees the reason for that is that the quality of the EPCs does not meet the quality of the information necessary for initiating energy renovation.

France

(1) On a general basis, interviewees were aware of the existence of EPC (in French the "*etiquette énergétique*"), what it represents and its function. They also mentioned that similarities with the bands and ratings used for appliances made it easier to understand.

However, the requirements for EPC elaboration are not very well known, except for professionals for whom it is part of their work (buildings managers, real estate agents etc.)

EPC are also known because they are mandatory in any real estate transaction (for selling or rental), in housings as well as for offices.

(2) Interviewees were well aware of the need to conserve energy and they already make efforts to reduce consumption. They recognized the value of a good EPC to save on raising energy bills, especially for heating, and as a way to enhance the building value (they often use EPC to assess the quality of a building).

(3) EPC are often used in a professional context as a way to enhance the buildings' value and demonstrate quality. Buildings' owners generally are aware that they would need to intervene regularly on walls, windows etc. if the building has a low EPC. The information they use is the estimated consumption in kWh/yr/m² as well as the energy band.

Greece

- (1) Yes 20/23

No 3/23
(2) Yes 17/23
No 5/23

(3)

In energy renovation and refurbishment studies 11/23

Energy categorization of municipality buildings in order to determine the most appropriate to realize energy renovation 2/23

In energy renovation of school buildings of the municipality

Issuing EPCs before and after the application of an energy measure 3/23

Ireland

(1) Do you use EPCs or DECAs on a regular basis as part of your job?

- 86% replied 'yes'

(2) Apart from the EPC and the energy ratings core, do you use any of the information contained in the EPC or the advisory report?

- 45% replied 'yes'

(3) Those who replied 'yes' to 2), were asked, "What information do you use or is of interest to you?", the answers included:

- Improvement measures recommended in the advisory report
- wall type
- boiler type
- floor area
- CO₂ emissions
- energy usage calculated by EPC
- insulation levels from U values
- window and door types
- DECAs - how the public building ratings compare to standard types of same
- date of construction

Romania

Of all respondents, 63.5% are aware of the existence of the energy performance certificate (EPC) and only half of them know the requirements for its development (elaboration).

Regarding the activities (actions) in which the EPC is used, 26% answered that it is used when selling the housing unit (building), 15% answered it is used for thermal retrofit (renovation), 9% answered that it is used for both activities, while 26% do not know (what it is used for) or do not use the EPC in any activity.

The most frequently used information is: the energy consumption and the energy performance of the building.

Slovakia

(1) Are you aware of the existence of the energy performance certificate (EPC) for buildings and the requirements for its elaboration?

yes 97,1%
no 2,9%

- (2) If yes, do you use the EPC in your current activities?
- yes 48,5%
- no 51,5%
- (3) If yes, in which activities do you use the EPC and what is the information from the EPC you use or are of interest for you?
- o Energy class in case of building's sell and/or rent 35,3%
 - o Various information for energy efficiency improvement 41,2%
 - o Various information for energy consumption planning 23,5%

Slovenia

The analysis of questionnaires shows that building owners/managers are quite familiar with EPC as they are obliged by law to have one when selling or renting a real estate for more than one year. But once an EPC is made, usually they are not updating it – which could be a pity in case if real estate is refurbished.

Spain

(1) Yes

(2) Yes: it is used in building owner associations; local administration requires it for buildings older than 50 years; I use it for technical documents of construction or rehabilitation projects

No: it has just been used as a requirement for a public program or grant

(3) It would be useful to have the EPC of all local public buildings

No: We do not use them since our energetic installation energy design needs and maintenance are technically superior to those provided by the EPC

United Kingdom

(1) 100% Yes

(2) 81% Yes; 19% No

(3)

- Our DEC's are available to the public in our reception for information purposes.
- Any properties that own or rent. Anything over 250m² has to have a DEC. EPC if leasing or marketing for sale any domestic or non-domestic properties. Also, need for any PV and renewable heating. More of a compliance thing rather than particularly useful but still think they are good thing to be doing. Benchmarking could do with updating - more useful to see how a building is doing against itself over time.
- DEC's mandatory. EPC when sell & lease properties. DEC & EPC reports useful for highlighting potential improvement areas
- We ensure DEC's are on display where required as part of our ISO14001 EMS.
- Comparing performance of buildings to determine priorities for energy efficiency retrofits
- We monitor the EPC ratings of council buildings and report the percentage achieving 'E' or higher in the council's annual Green Credentials Report. The target of 100% by 2018 has been achieved and will therefore be reviewed in 2017.

- Used as a point of reference when looking at energy efficiency across the estates and the AR as a first point of reference for identifying potential energy efficiency and improvement projects.
- All corporate building DEC's undertaken by in house team. Benchmarking used as part of property rationalisation programme. DEC service sold to schools as part of traded service.
- Going to be using EPC's what we need to do to upgrade buildings to comply with MEES.
- I use them for multiple purposes. From registering of FITs (EPC), to guiding Invest to Save cases (DECs advice report) and being legally compliant!
- EPC are provided as part of the Building Regulations requirements and DEC are produced annual to again meet the legal requirement and inform the potential for improvement.
- Understanding investment requirements for existing stock. Fulfilling statutory duties (e.g. EPCs for voids)
- DEC's used to publicise performance of building to its users and can prompt action by the managers
- For - Basic compliance - Broad communication of building energy performance - Broad comparison of improvement across estate - Underlying data as basis for comparison of performance in kWh/m² - Performance in kWh/m² to help inform priorities for improvement

III.2 Management of EPCs for buildings in own responsibility

If you are a property manager, please answer the following questions:

(1) What are the types of buildings you own/manage (public buildings – schools; public buildings – offices; residential buildings etc.)

(2) Do you store and manage/update the EPC for the buildings in your property/responsibility?

If yes, what are the reasons for this and in which form do you store/update the EPCs?

(3) Do you make use of the EPC in renovation planning of your own buildings? If not, please explain why?

(4) If you have your own database with EPCs for your building park, would you provide the ENERFUND tool with selected EPC information and under what conditions?

Austria

Communities:

(1) Type of buildings (group of buildings):

- *Public buildings – schools,*
- *Public buildings – offices*
- *Public buildings – other (please specify):* kindergartens, day care centres, museums, conference centres
- *Other:* hotel

(2) The EPC is part of the construction record which is also submitted to the building authority. Sometimes the EPCs are also kept in electronic format (pdf).

(3) EPCs are used to identify those buildings which should be renovated first.

(4) If EPC databases exist, they will be with the facility managers acting on behalf of the building owner. It could be possible to provide data for ENERFUND. Usually, for

public building owners it is much easier to provide anonymized data for research organizations and for research purposes than for commercial data utilization.

Hotel owner and manager: The EPC is kept with other documentations. No renovation planned, because the building was deeply renovated from 2008 to 2009.

Bulgaria

(1) Type of buildings (group of buildings):

- *Public buildings – schools, 30/31*
- *Public buildings – offices 12/31*
- *Public buildings – other (please specify):*
 - *Public buildings – Administration 24/31*
 - *Public buildings – kindergartens, 8/31*
 - *Public buildings – health care, 8/31*
 - *Public buildings – in the field of culture, 10/31*
 - *Public buildings – in the field of sport, 1/31*
 - *Public buildings – police and fire station, 1/31*
- *Private multi-unit residential building 3/31*
- *Private buildings (group of multi-unit residential buildings) 1/31*

(2) Yes 65% No 35%

Case A In our work we use constantly EPC. The certificates are used to improve the energy performance of municipal buildings. EPC of municipal buildings are prepared on the basis of energy efficiency audit.

Case B In preparation of projects for the introduction of energy efficiency measures. EPC we acquire as a result of a contract for an energy audit of existing buildings.

OR: We compulsorily always use EPC in renovation of buildings.

Case C EPC is used for applying to funds and programs financed by the EU or the national budget. The reasons for the use of EPC are the requirements for application of the various operational programs and other donor organizations.

Case D Yes, for the implementation of projects under EU programs and implementation of energy efficiency measures.

(3) Yes 90%

Case A The municipality does not have sufficient own funds necessary for to make herself renovation of buildings - public municipal property, and this is a basic requirement in applying for the various operational programs serves as financial statement

Case B EPC is prepared for repairs and renovation of buildings.

OR: Municipal buildings are renovated only after energy efficiency audit.
No 1/31

Case A Lack of funds for energy audits.

(4) Yes 74%.

Cyprus

Private Buildings

(1) residential buildings, sport facilities, offices

(2) Yes (24%) in electronic form e.g. Excel, PDF

No (47%)

n/a (29%)

- (3) Yes (52%)
No (48%), the main reason was the ignorance about the subject
- (4) Yes (39%)
Yes, under conditions (27%)
No (33%)

Public Buildings

- (1) offices, commercial buildings, sport facilities, municipal buildings, universities
- (2) Yes (33%) in electronic
No (66%)
- (3) Yes (66%)
No (33%)
- (4) Yes (53%)
Yes, under conditions (26%)
No (21%)

Denmark

Both municipalities and social housing associations are property managers. The type of buildings are schools, kinder gardens, offices and for social housing companies, group of multi-unit buildings. However, EPCs are neither used in the property management nor renovation planning.

France

(1) Type of buildings (group of buildings): mostly *Public buildings – offices* and *Private multi-unit residential buildings*. Interviewees were mostly commercial buildings managers and residential owners.

(2) EPC data is kept but not always updated for domestic buildings. Offices benefit from better monitoring and regulation of energy consumption and EPC data is usually stored and managed by the administrative unit.

Domestic buildings are regularly maintained for common parts, common heating systems, and corridors, but rarely in the framework of energy refurbishment. EPC are therefore not always used or updated following this kind of work.

(3) EPCs are often used for renovation in the cases of offices which are more regularly monitored and in which savings are more easily assessed.

For domestic buildings, refurbishments are often linked to the shabbiness of the structure (and therefore the obligation to engage renovation) and less to energy performances and EPC. This can however vary in function of available funding – more funding enabling investments for refurbishments focusing on energy matters.

(4) None of the interviewees had a personal database with EPC... for this ADEME has launched an observatory and all EPC can be retrieve using their ref #.

Greece

(1) Type of buildings (group of buildings):

- *Public buildings – schools, 18*
- *Public buildings – offices 19*
- *Private multi-unit residential building 4*
- *Private buildings (group of multi-unit residential buildings) 2*
- *Private buildings (group of individual residential buildings) 3*
- Industries 9

- Sport facilities (gyms) 12

(2) Yes 12/23, No 7/23

In a data base 4

In Excel sheets 10

To direct access public buildings data 8

To prioritize the buildings which require an energy renovation 2

Maintenance reasons 4

Statistical reasons

(3) Yes 16/23 No 6/23

(4) Yes 14/23 No 1/23

- Building use 13
- Construction year 12
- City 9
- Total floor area 12
- Energy consumption 11

Energy category 11

Ireland

(1) Do you store and manage EPC data for buildings under your responsibility?

- 73% replied 'yes'

(2) Do you use the EPC data when planning energy renovations of your buildings?

- 64% replied 'yes'

(3) If you have your own database with BERs/ DEC's for your buildings, would you provide ENERFUND with selected BER data?

- 32% replied 'yes' and 41% replied 'maybe'.

Romania

(1) Of all those surveyed, 60,3% own / manage public buildings – schools, and 19,2% manage private multi-family buildings.

(2) Of all respondents, only 19,3% store and manage / update the EPC for their own building.

(3) The EPC is most of the time used (kept, stored) in a paper printed version, the primary reasons being the legislative requirements and not for monitoring energy consumption costs.

(4) Only 28,8% of the respondents use the EPC in the planning of the energy retrofit for the building they own or manage. The main reason why the EPC is not used (in the planning of the energy retrofit) is that the building administrators do not have this type of certificate or they do not know the way it can be used.

Out of those who store information regarding the EPC, approximately one third would be willing to share this information for the developing of the ENERFUND tool.

Slovakia

- (1) What are the types of buildings you own/manage
- | | |
|---|-------|
| Public buildings – schools, | 12,2% |
| Public buildings – offices | 18,4% |
| Public buildings – health facilities | 10,2% |
| Public buildings – other | 12,2% |
| Private multi-unit residential building | 14,3% |
| Private buildings (group of multi-unit residential buildings) | 12,2% |
| Private buildings (group of individual residential buildings) | 4,1% |
| Other (please specify) | 16,3% |
| Private Commercial and administrative buildings | 10,2% |
| Industrial buildings | 4,1% |
| Various types of buildings | 2,0% |
- (2) Do you store and manage/update the EPC for the buildings in your property/responsibility?
- | | |
|-----|-------|
| yes | 66,7% |
| no | 33,3% |
- If yes, what are the reasons for this and in which form do you store/update the EPCs?
- Administrative reasons, Electronic and paper versions
Energy efficiency improvements, Electronic and paper versions
Administrative reasons, Paper version only
Energy efficiency improvements, Electronic version only
- (3) Do you make use of the EPC in renovation planning of your own buildings?
- | | |
|-----|-------|
| yes | 36,0% |
| no | 64,0% |
- If not, please explain why?
- | | |
|---|-------|
| It is not trustworthy document | 14,3% |
| Information provided are not useful for financial planning | 14,3% |
| We use energy audits as they contain proposals for energy efficiency measures | 28,6% |
| It is not necessary | 14,3% |
| We are only managers, not owners | 28,6% |
- (4) Do you have your own database with EPCs for your building park?
- | | |
|-----|-------|
| yes | 12,5% |
| no | 87,5% |
- Would you provide the ENERFUND tool with selected EPC information?
- | | |
|-----|-------|
| yes | 33,3% |
| no | 66,7% |
- Under what conditions you would provide the ENERFUND tool with selected EPC information?
- | | |
|--------------------------------------|--------|
| compliance with legislation in force | 100,0% |
|--------------------------------------|--------|

Slovenia

Building owners/managers are not making use of EPC at the procedures of renovation because measures within EPC are not usually giving complete analysis. For such needs, they are aware that detailed energy audit is almost obligatory or at least recommended. When talking with them about providing their EPC data to the

ENERFUND, they showed lack of interest as they recognize this information as personal data. On the other hand, some interviewees did not take this situation as a personal burden or braking to their privacy.

Spain

(1) Type of buildings (group of buildings):

- Public buildings – schools, 2 answers
- Public buildings – offices, 3 answers
- Public buildings – other (please specify): Public buildings to install business and R&B centres; sport centres in administrative concession; dwellings – 5 answers
- Private multi-unit residential building -3 answers
- Private buildings (group of multi-unit residential buildings) -2 answers
- Private buildings (group of individual residential buildings) -3 answers
- Other (please specify): 1 answer

(2) 20% answered yes: I store EPCs, because EPCs contains very valuable energy information

70% answered-No

(3) 40% answered yes: but it is complicated for owners to accept it

50% answered No: the company’s goal is to disinvest and apart from specific actions, we do not deal with building renovation; it is just for information; renovation hasn’t been necessary since EPC is compulsory

(4) 60% answered Yes: taking part in the results of the project; I would provide it with the authorization of the owners of the building; giving permission to EPC data from our network; with previous authorization of the city council

1% answered No

United Kingdom

(1) Type of buildings (group of buildings):

Building type	# responses
Public buildings - schools	6
Public buildings - offices	8
Public buildings - other (please specify below)	10
Private multi-unit residential building	0
Private buildings (group of multi-unit residential buildings)	2
Private buildings (group of individual residential buildings)	2

Other (please specify):

Building type	# responses
Leisure centres	4
Public toilets	3
Hospitals & health care	5
Libraries	3
Museums	2
Corporate/admin	2
Pavilions	1
Sports stadium	2

Fire stations	2
Community Centres	2
Schools	2
Care homes	3

(2) 75% Yes; 25% No

- Proof of compliance with legal requirement
- These are stored by our Housing Dept. for tenancy changes
- Current certificates are on display. All copies, current and previous are filed electronically.
- See response above we undertake our own DEC using an in-house team, manage compliance and store via our property database
- PDF, though I am aware of the central database where I can download if required.
- Historical Information, Electronic and Paper Copies
- I am not sure the question is clear - all EPCs are lodged with Govt, we hold pdf copies and import the data into our asset mgmt. system. So, no-one stores EPCs although they may have e-copies, but the relevance is in the imported data and how this integrates with your systems.
- Online database, available to demonstrate compliance with regulations and to track performance over time
- Electronic DECs - for compliance and future reference

(3) 69% Yes; 31% No

- Not sure really. Could perhaps give an idea when thinking about renovation but wouldn't be first port of call
- I think that as a council we do - but this is not something I am personally involved with.
- Yes and no, we may reference them in a business case for a project but it wouldn't be a central element of the case.
- Not useful
- Other factors are given greater weight when renovation strategy is being planned - e.g. possible rental income, political priorities

(4) 56% Yes; 44% No

- Could provide us with postcodes and we would be able to get them from the register (DEC's). EPC's with a different department but could see if they would be happy if interested.
- Possibly. DECs & EPCs are already publicly available
- Depends what info you want, all DECs are on the public website already. Any information should not be made available to competitors
- Maybe, if knew and understood more about it.
- Freedom of Information request.
- In confidence and to be only used for this exercise
- We'd need to understand the project aims first, and there would probably need to be an output for us. However, this output could be quite high level, so one of our key challenges is understanding what the route map to 2050 could look like, if it helped inform that then we would be very interested.
- None to my mind.

- 1. That information is not used in a way which might cause embarrassment to the council; 2. subject to agreement of senior management
- for discussion, but in reality, it's publicly available info so have no concerns with sharing

III.3 Maintenance & repair plans and use for building renovation

(1) Do you have a detailed plan for building maintenance and repair? If yes, how often is it updated (yearly, every X years etc.)?

(2) Do you have a database of energy consumptions of the buildings in your property/responsibility? Is this database linked to the maintenance plan (or part of it)? Would you provide the ENERFUND tool with selected consumption information and under what conditions?

Are you aware that monitoring and verification of energy savings is important for investors to finance energy efficiency in buildings?

(3) Do you experience backlogs in maintenance and repair? If yes, please differentiate by building type and briefly explain the main reasons for these.

(4) Which are the major challenges for development and implementation of a building energy renovation project?

Austria

Communities:

(1) Maintenance and repair plan is available and updated annually.

(2) There is no energy consumption database used by all communities throughout Austria. In the provinces Salzburg and Lower Austria, communities are obliged to input energy consumption data into a database managed by the regional Energy Agency. Currently, there are no quality control and no enforcement procedures implemented. Communities participating in the e5 community program are supposed to collect energy consumption data, but there is no statistics available. According to the questionnaire feedback, many of them do have an energy consumption database.

There are also data collection activities done in own buildings on a one-time basis, carried out as part of a project.

Professional staff is aware of the need for monitoring and verification of energy savings, but it is difficult to make decision makers understand the importance, as additional investment for monitoring devices is necessary at the beginning.

(3) There are backlogs in maintenance and repair due to lack of money (delay in implementing planned measures).

(4) Most important are financial issues. It is important to calculate realistic payback periods of investments. The rebound effect is a big problem.

Hotel owner and manager:

(1) Maintenance of infrastructure components according to legal obligations.

(2) Yes, there are energy consumption data available as well as M&V, but they are not linked with the maintenance plans.

Energy consumption data are completely different from other sectors because of the influence of specific user profiles.

(3) There is no backlog in maintenance and repair.

(4) Major challenges:

(a) Filling all the application forms and providing the required supporting documents to receive subsidies for improved energy efficiency and renewable energy use

(b) To cope with the different views and professional opinions of many experts; to assess them and find out which solutions are actually appropriate for the building and the building use.

Bulgaria

(1) Yes 35%, No 65%

Case A Yes. Annually updated by the Energy Efficiency Plan of the municipality.

Case B Yes every year in the investment program. OR: Yes every 5th year.

Case C Not detailed.

Case D Repair of buildings, municipal property shall be performed in accordance with planned capital funds for the year.

Case E Some buildings has prepared detailed plan for building maintenance and repairs. We are in the process of introducing plans for all buildings. Renovation plan is carried out every three years.

(2) Yes 45%, No 55%

Case A We have a database of energy consumption for municipal buildings. For all municipal buildings where it is required we prepare energy audits.

Case B We have a database on energy consumption for most of buildings for many years back and this base is supplemented every year with new data. I am fully aware that this affects monitoring plans for financial investments towards improving the energy efficiency of buildings.

Case C If you want access we will expect you to suggest conditions for negotiations. OR: Yes information about the energy consumption of buildings but not related to the maintenance plan. We would provide information under guaranteed benefits and convenience.

(3) Yes 68%, No 32%

Case A Yes maintenance and repair of schools, kindergartens and administrative buildings are made every year. – **most common comment**

Case B Yes - building of the municipality - replaced windows and installing thermal insulation

Case C All municipal buildings are maintained, in one part of them energy efficiency measures are introduced when repairs were carried out.

Case D Yes, in the last 10 years were made repairs of buildings owned by the municipality for more than 5 000 000 EUR.

Case E We would provide to project ENERFUND tool to access information on energy consumption in strict confidentiality.

Case F Projects to increase energy efficiency mainly in schools and kindergartens, i.e. high social value.

(4)

Case A Lack of sufficient funds OR: Finding of financing – **most common comment**

Case B Lack of experts

OR: Lack of specialists with technical education in this field in small municipalities

OR: Developing of the relevant energy audits and detailed design. Sources for funding.

Case C Finding a good quality contractors of the project.

OR: Key challenges are quality control during the implementation of energy efficiency measures. The collection of correct data also is a significant challenge.

Case D A constructive condition of the buildings, quality of the reconstructions, the quality of used materials, monitoring to be performed after updating to take into account the actual results achieved.

Case E Direction, where can be searched optimization, is collecting information necessary for developing and implementing a plan for the building energy renovation or said "concentration data, numbers, processes, analyzes etc.

Case F Starting with the development of a plan to the moment of its implementation sometimes pass 2-3 years, during which time there are changes of standards new materials appears and others.

Cyprus

Private Buildings

- (1) Yes (42%)
 - Every year-6%
 - Every 1 year-8%
 - Every 2 year-6%
 - Every 3 year-2%
 - Every 4 year-2%
 - Every 5 year-4%
 - Other-19%
- No (58%)
- (2) Yes (37%)
- No (63%)

Would you provide the ENERFUND tool with selected consumption information and under what conditions?

- Yes (54%)
- Yes, under conditions (29%)
- No (17%)

- (3) Yes (95%)
- No (5%)

(4) The major challenges for the development and implementation of energy efficiency upgrades of the buildings is the high cost.

Public Buildings

- (1) Yes (31%)
 - Every year-25%
 - Every 1 year-25%
 - Every 3 year-25%
 - Other-25%
- No (69%)
- (2) Yes (62%)
- No (38%)

Would you provide the ENERFUND tool with selected consumption information and under what conditions?

Yes (53%)

Yes, under conditions (31%)

No (15%)

(3) Yes (43%)

No (57%)

(4) The major challenges for the development and implementation of energy efficiency upgrades of the buildings is the high cost.

Denmark

It is crucial for municipalities and social housing associations to have detailed plan for building maintenance and repair. These plans are usually updated once a year. Most of the large building owners maintain a database of energy consumptions of the buildings on one hand distributed on electricity, natural gas, fuels and tap water and on the other hand on buildings and year. For social housings, these data are usually used to draw up a green account addressing the individual area committees. For some area committees, the green account is linked to the maintenance plan and to the maintenance budget. Mainly some public building owners experience backlogs in the maintenance and repair. The reason is usually ailing economy. The main challenges for development and implementation of a building energy renovation projects are lack of technical solutions, building preservation requirements and users acceptance. Thus, a predominant challenge in older buildings is re-insulation facades without changing the architectural appearance.

France

(1) Few building owners have a detailed plan for maintenance and repair except in the case of commercial buildings. However, plans to refurbish require time and are usually programmed 1 to 3 years in advance to unlock funding and finalize the provisional plan for implementation.

In other cases, owners plan refurbishment through several steps, on a timescale that vary widely from one project to another. For buildings used for professional purposes (offices, commercial), a detailed plan is often elaborated, and updated every 1 to 3 years for maintenance or renewal of materials and buildings' fabric.

(2) In offices and commercial buildings, facilities' managers have a database of energy consumption, but this is not systematically linked to the maintenance plan.

For domestic buildings, almost all owners monitor their energy and water consumption. This monitoring can trigger the decision to invest with the aim to reduce energy costs (benchmarks are often used in this case to assess the buildings performance). It is not linked to the maintenance plan but is used to follow up on the building's energy consumption.

The interviewees did not express interest in sharing information, and only few were aware that monitoring and verification of energy savings is important for investors to finance energy efficiency in buildings.

(3) The majority of interviewees experience backlogs going from a few months to a year regarding maintenance and repairs. The reasons can be wide: this can be linked to the contractor and to delays in the work implemented, or can be a matter of finance issues (delay to obtain a loan, postponing of work because of insufficient funds etc.)

For cases where no delays are experienced, the work was generally planned on a sufficient timescale to allow for any impair.

(4) The main challenges for development and implementation of a renovation project are sometimes linked to the shabbiness of buildings and the need to engage substantial investments. Buildings owners have besides difficulties in trusting the audit/diagnostic made and the ROI calculated, and to choose the appropriate measures to adopt.

The lack of information on all existing opportunities for energy conservation was mentioned as a roadblock, and so was the difficulty to choose the contractor. Interviewees advocated for more uniformity in prices and quality of services offered. They acknowledged that a minimum level of technical knowledge is necessary to implement a project.

Greece

(1) Yes: 15/23 No: 8/23

Every 6 months - 3

Every year - 6

Every 2 years - 4

Every 3 years

(2) Yes: 17/23 No: 6/23

Is this database linked to the maintenance plan (or part of it)?

Yes: 7/23 No: 8/23 N/A: 6

Would you provide the ENERFUND tool with selected consumption information and under what conditions?

Yes: 14/23 No:

The data would cover only energy and use of the buildings

Secrecy

The user must be reliable

Are you aware that monitoring and verification of energy savings is important for investors to finance energy efficiency in buildings?

Yes: 19/23 No: 1/23

(3) Yes: 20/23 No: 0/23

Lack of financing 10

Time consuming procedures to tender a work 2

Many maintenance works for school buildings

Typical time consuming public processes 5

Lack of experienced personnel

(4)

- The characterization of the building as heritage building
- Use of edge technologies 2
- The building age
- The experience of the energy consultants and the craftsmen
- Public collaboration in actions of preservation of the retrofit measures
- Use of certified building materials and the quality check of the energy auditor for the check of the realized energy measures

- The small payback time
- The time needed to realize the energy measures
- Project implementation process
- Installation of a BEMS

Ireland

(1) Do you have a detailed building maintenance and repair plan?

- 60% replied 'yes'

If 'yes', how often is it updated?

- Almost all replied that the plan is updated annually

(2) Do you have a database of the energy consumption of buildings under your responsibility?

- 23% replied 'yes' but it needs to be noted that these respondents were all managers of public buildings. This is logical because the DEC's for public buildings are based on measured energy use and floor area only. Hence those managing these buildings must have access to actual energy use.

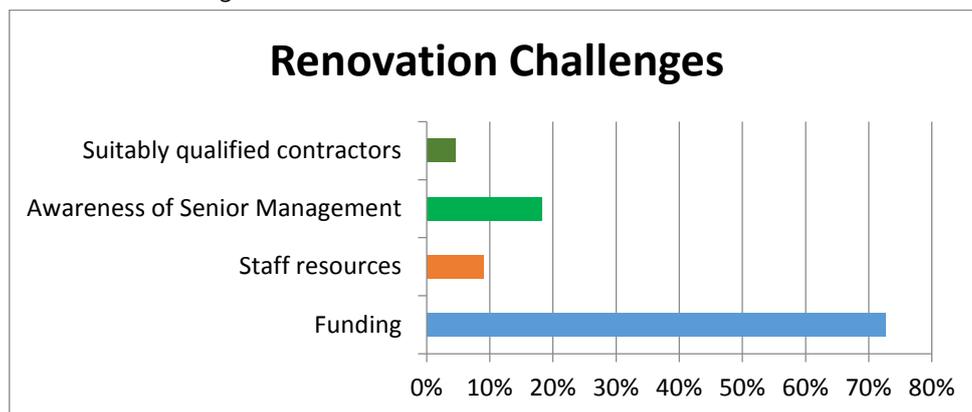
When asked, "Are you aware that monitoring and verification of energy savings is important for investors to finance energy in buildings?"

- 73% replied 'yes'.

Would you provide ENERFUND with selected consumption information and under what conditions?

- It is interesting to note that all respondents, who answered 'yes' to 3), skipped this question.

(4) When asked, "Which are the major challenges you face for the development and implementation of energy efficiency upgrades for your buildings?", the responses are shown in the chart on figure below.



- 73% responded that the main challenge is funding/ capital outlay. It was noted that this challenge is even greater where energy efficiency measures with longer paybacks such as external wall insulation are involved.
- It was interesting to note that awareness of senior management of the merits for energy efficiency investments was also a challenge for almost 20% of respondents. For example, with social housing, the tenants receive the financial benefits of reduced energy bills, which while good in itself, does not provide a specific financial return to the organisation. Such investment will reduce

maintenance costs etc. so there is a possible need for a greater education of senior managers!

Romania

(1) 61.5% of total respondents do not have a detailed plan / program for the maintenance and repair of the buildings they manage. Out of those who have it, 65% are updating it each year.

(2) 42,2% of the respondents have a database for the energy consumption of the building which they own / manage, and only half of them have this database (or part of it) correlated to the maintenance and repair plan.

Out of those who have a database for the energy consumption, 71,4% would be willing to offer certain selected information about the consumption, for the developing of the ENERFUND tool, under certain conditions:

- for research purposes;
- with the agreement of the management of the institution;
- with the condition that they receive more information about ENERFUND;
- following (the signing of) a partnership;
- if some benefits are guaranteed;
- based on a written request (application).

78% of the respondents are aware of the importance, for investors, for financing the projects of improving the energy efficiency of buildings, of the monitoring and verification of the energy savings.

(3) 45,6% of those questioned have delays in the planned works for the maintenance and repair of building, the main reason claimed being the lack of (necessary) funding. For the residential buildings, an attitude problem of the population was also found: *The owners, in general, have difficulties in understanding the idea of preventive maintenance and the creation of a repairs fund. Example: A water flooding in multiple apartments needs to take place first before taking a decision for the replacement of vertical columns (cold + hot water, sewage).*

(4) The main challenges for the development and implementation of an energy retrofit project for a building, reported by the respondents, were:

- finding a financing source;
- the owners' consent;
- the joint property of the living spaces (housing units);
- the lack of legislation in this area;
- the tender and execution of the work;
- the difficulty in accessing (finding) funding;
- the lack of involvement from local and central authorities;
- the disconnection from the energy supplier;
- the correct estimation of the building heat losses;
- the building architecture;
- the lack of specialists for carrying out the studies;
- the making of the technical-economic documentation that complies with the legal requirements and demands, and those of the funders;

- making the transition towards nearly zero energy buildings;
- climate change, energy security, resource depletion;
- reducing energy consumption (energy savings).

Slovakia

(1) Do you have a detailed plan for building maintenance and repair?

yes 54,2%
no 45,8%

If yes, how often is it updated (yearly, every X years etc.)?

yearly 53,8%
every 2 years 7,7%
every 5 years 7,7%
continuously 30,8%

(2) Do you have a database of energy consumptions of the buildings in your property/responsibility?

yes 75,0%
no 25,0%

Is this database linked to the maintenance plan (or part of it)?

yes 38,9%
no 61,1%

Would you provide the ENERFUND tool with selected consumption information

yes 23,5%
no 76,5%

Under what conditions you would provide the ENERFUND tool with selected consumption information?

according to agreement 100,0%

Are you aware that monitoring and verification of energy savings is important for investors to finance energy efficiency in buildings?

yes 95,8%
no 4,2%

(3) Do you experience backlogs in maintenance and repair?

yes 78,3%
no 21,7%

If yes, please differentiate by building type and briefly explain the main reasons for these.

Low qualification of workers 33,3%

Low quality of work 25,0%

Missing documentation for energy distribution networks in buildings 8,3%

Hydraulic balancing of heating system was not implemented after thermal insulation of building 8,3%

Missing thermal insulation of heating and HW systems distribution networks 8,3%

Inadequate thermal insulation of not heated spaces 8,3%

in-leaks 8,3%

(4) Which are the major challenges for development and implementation of a building energy renovation project?

Financial savings and energy savings 29,2%
Implementation of comprehensive refurbishments 12,5%

Financing 16,7%
Improving of quality of indoor environment and quality of use 16,7%
Utilization of BAT within implemented measures 12,5%
Preparation of high-quality concept (data collection, economic sustainability, legal requirements) 12,5%

Slovenia

When talking about database of energy consumption of the building at their property, almost all managers replied with yes. The reason is that in case when they are building managers, they are obliged by the law (to present current energy costs to building inhabitants/owners), as well as because of they want to have an overview of the case flow. In case of energy renovations, backlogs are quite frequent, and major challenges appear at the obtaining financial sources.

Spain

(1) 60% answered Yes: we have a plan for a limited number of property assets. It is updated according to the property assets' needs; Annually; the plan for building maintenance and repair is updated 10 years after its planning; annually

40% answered No

(2) 40% answered Yes: but it is not linked to the maintenance plan. I cannot answer this question; Not linked. Yes, under confidentiality conditions; We do have a database closely linked with the maintenance plan, we understand the tool will not provide anything new; though database is not linked with a maintenance plan

50% answered No

(3) 30% answered Yes: building owner associations are reluctant to execute the building maintenance plan

60% answered No

(4) 70% answered. Their comments are as follows: Economic, having the necessary resources to do it and the uncertainty of the investment amortization period; Without a doubt, the investment costs and its funding; First, owner's awareness and knowledge of the energy renovation's importance. Secondly, real aid plan.; Funding and Technical programming; awareness and economy; owners' awareness; getting resources to determine the necessary energy renovation and its funding

United Kingdom

(1) 94% Yes; 4% No

- Yearly – 9
- Every 3 years – 1
- Every 5 years – 2
- Other:
 - All housing stock is surveyed on a 7-year cycle and required works carried out.
 - It varies between colleges - usually 1 to 5 year but in one case an 18-year cycle
 - Again, this question is too vague. We have investment plans that stretch 30 years ahead, and they are constantly updated but with less regularity as you get more high level. And there are decision points for political buy-in every few years. So, when you say a detailed plan - for what buildings, at what

level? The question needs to be informed partly by the level at which you see your tool operating.

- 20% of our stock is updated annually

(2) 94% Yes; 4% No

- Linked to maintenance plan? 19% Yes; 81% No
- Provide data to ENERFUND? Few answered Yes, conditions below:
 - I don't manage this information so would not be able to confirm either way. I would however be able to put you in touch with a better placed colleague.
 - The link between the two is via the energy team inclusion in design and planning activities. Again, depends what info you want and how it will be used. Clearly it should not be made available to competitors
 - Maybe if knew a little bit more about the tool it might help.
 - What do you mean by consumption? We can tell you what our average SAP is and the EPC-derived energy consumption from that, but we recognise that the data is often flawed structurally and doesn't reflect energy use in practice. So, when you say energy consumption, what actual info are you after? Most organisations can give you the EPC based data, is this actually what you want?
 - None to my mind
 - 1. That information is not used in a way which might cause embarrassment to the council; 2. subject to agreement of senior management
 - Maintenance Plan helps inform energy plan (and vice versa) but difficult to share Maintenance. Plan
- Monitoring of energy savings important to investors: 94% Yes

(3) 81% Yes; 19% No

- Funding is biggest issue – mentioned by 50% respondents.
- Building types as above, finances
- 1. Some residential buildings cannot be repaired during term time or during periods when exams are scheduled. 2. May need to find additional accommodation to transfer residents to before works can start. 3. Unforeseen problems with buildings uncovered during the refurbishment works - e.g. asbestos, impact of old water pipe leakage, problems with the electricity supplies, problems with gas volumes, pipework etc.
- Large asset stock now managed by 3rd party F&M contractor.
- Backlog Maintenance is funded via the trusts Estates TAG and 2 year plans are submitted for approval
- Not specifically, but usual reasons around prioritisation of resources. All of the critical work - statutory, H&S, fire control, asbestos, major plant - is under control, it tends to be more aspirational programmes like kitchen replacement that will be re-phased.

(4)

- Variety of the portfolio, changes in number of portfolio every year and unpredictability of the future of those buildings represent a risk to ECM projects on a long term.
- Engagement from relevant management. Sometimes by investigating an issue they find they are opening a can of worms and so reluctant to embark on the work. Replacing old lighting with LED might then involve repair work where the old light is removed and decorating, so becomes a much bigger project than just replacing a bulb.
- Funding and quick ROI
- Funding and planning approval - much of what we need to do is EWI to our own solid-walled housing stock.
- Funding, political engagement, building specific issues e.g. listed properties etc.
- Energy projects are seen as an unnecessary additional cost, even if the payback is short. There isn't a separate budget for energy projects.
- Funding, convincing decision makers of business cases, access to decision makes to include energy changes in all renovation projects (this is improving following a restructure)
- 1. funding; 2. availability of the sites for renovation works; 3. availability of contractors and good project managers to oversee the processes; 4. poor implementation/commissioning of new facilities requiring extensive rework; 5. Poor commissioning practices and lack of coordination/integration with existing services such as BEMS; 6. Complexity of new systems and limited understanding by the maintenance teams of the new systems operating requirements; 7. Poor user interface design on controls and switches; 8. Users not understanding the purpose of new systems – e.g. residents switching off MVHR units because they consider them to be too noisy, opening windows to cool rooms down rather than lower temperatures on thermostats.
- Funding.
- Money/Time/Resources
- None at the moment however, the financial position of the trust will in the future impact on Energy Saving initiatives
- (1) focus on immediate short term pressures; (2) perception that internal targets for 2050 are too far away too worry about now (despite lead in); (3) lack of technical capability to understand and safely implement a deep retrofit programme (let alone at scale); (4) perception that business case doesn't stack up although in many cases this is a cultural barrier rather than a practical one, so is used to prevent challenge rather than critically assess evidence; (5) general sector dependence on waiting for the UK Government to mandate, then subsidising action that is needed.
- Payback period being too long
- Availability of finance; demonstration of compelling business case
- Lack of clarity on commitment to future funding Increasingly long paybacks

III.4 Information relevant for energy renovation of existing buildings

(1) What would you need for better decision-making in your business, including the energy renovation of the buildings in your property/responsibility?

(2) What would you expect from a tool like ENERFUND? What kind of information would you need from the ENERFUND tool in order to plan the energy renovation of the building(s) in your property/responsibility (e.g. EPC data, thermal performance of envelope, systems efficiency, energy consumption, costs (average/range) of renovation measures, existence of financing programs, availability of qualified 'suppliers', property evaluation, energy performance compared with average building stock and with 2030 energy goals, schools without mechanical ventilation system etc.)?

Austria

Communities:

(1) Detailed information about the technical condition of the building and the actual energy consumption is needed.

In addition to technical data (e.g. type of energy carrier, heating system, age of heating system), also information about the type of building ownership and the number of occupants is useful.

Parameters for prioritizing renovation projects: number of m², number of occupants, type of ownership, age of heating system, energy indicator of building envelope.

(2) There are already so many tools addressing communities. The ENERFUND-Tool should be integrated in existing and already applied tools. Communities use GIS-based tools for planning, and another map displaying energy efficiency in buildings could be well integrated.

The focus of the ENERFUND-Tool is not clear: Will it serve the concept development for communities or the decision-making for renovation projects? Or both? Target groups and requirements are different. A community can represent both target groups.

Discussion of renovation options and different technical concepts is extremely important in decision-making. It should be clearly presented how the ENERFUND-Tool can support discussions and what the limitations of the tool are.

Consider business models for deep retrofits of public buildings dealt with in <http://iea-annex61.org/>.

Other useful information: innovative financing models, available subsidies, good examples, qualified renovation companies, suitable products including LCA and field reports, payback calculation tools, LCCA, benchmarking with similar buildings, a compilation of good reasons for renovation to present to decision-makers, how to consider energy efficiency of community buildings in budget allocation (from national level to community level).

There is the concern that the projected energy savings will not be achieved, payback calculation will turn out to be wrong and the financing model based on energy savings will be affected strongly. There are large cities operating based on Energy Intracting, meaning that the role of the ESCO is taken by a unit of the customer itself, e.g. the technical department of a municipality. It acts like the ESCO and the remuneration takes place through cross payments of budgets. This also means that the total risk remains with the municipality.

In Linz, all data for assessing energy performance options are available. The calculation tool of Frankfurt is used to calculate payback periods of energy efficiency improvement measures.

http://www.linz.at/presse/2015/201504_78129.asp

It is important to do both, to integrate all individual measures and to visualize the whole picture, and to control the implementation of improvement measures systematically. There is the need for more precise projections regarding energy savings and cost of energy efficiency measures.

Property valuator and real estate developer:

(1) Easy access to energy-related building information and enough information to assess the quality of data (as a basis for decision-making whether data are sufficiently reliable and can be used for the valuation procedure or not).

(2) Market development potential of the region where the building to be renovated is located; energy consumption data; building transaction information (transaction prices: in which areas is increase and in which areas is stagnation) combined with EPC information.

Bulgaria

(1)

Case A Financing – most common comment

OR Basically need is of a system to finance energy renovation of buildings, which would make the start in the development of various projects.

Case B Information about possible activities for EE, anticipated savings and funds for financing.

OR Information – not specified what kind

(2)

Expectations

Case A Financing – most common comment

OR We expect to ensure access to appropriate funding.

Case B Access to a rich base of information on the topic.

OR To disseminate the information and to allow it to reach the funding organizations.

Case C Operational and adequate actions and decisions to facilitate beneficiaries and entities related to the introduction of energy efficiency measures.

Case D Reliable options for energy renovation of buildings.

OR Data from EPC, thermal performance, by how much money what savings will be achieved.

Need of information

Case A Which are running programs, the amount of financing and deadlines for implementation

Case B Examples of best practice.

OR Of full information about building problems and the best possible options to solve them.

OR Necessary information is about thermal performance of buildings, system efficiency and energy savings.

OR Information about the existence of financial programs, the availability of qualified suppliers, training of municipal employees /if applicable/.

Case C Average costs of measures renovation, the existence of financial programs, energy performance of buildings, comparison with the average buildings and energy targets for 2030.

Case D Concentrated information available electronically composed of thematic platforms - legislation, technical and technological data, European standards in the field, best practices, weather patterns etc.

Case E We need of Energy Audit

One full reply to 4.

- (1)
 - a) The need for adequate funding of all the necessary measures for the renovation of buildings;
 - b) The need for the database software update and eliminating the disadvantages associated with its use;
 - c) Carrying out targeted interviews with stakeholders in relation to their needs.
- (2) Methods for monitoring and verification. Ability to benchmark with other similar buildings in other countries. Best practices for new and innovative measures.

Cyprus

Private buildings

- (1) When asked “What would you need for better decision-making in your business, including the energy renovation of the buildings in your property/responsibility?”, most of the respondents answered that they will need a report about the cost of the energy renovation and the energy and the economic benefits of implementing this renovation.
- (2) Expectation from ENERFUND tool (in priority order):
 - Energy consumption
 - Average costs of energy renovation measures
 - Systems efficiency
 - Thermal performance of the envelope
 - EPC data
 - Presence of financing programs
 - Availability of suppliers

Public buildings

- (1) When asked “What would you need for better decision-making in your business, including the energy renovation of the buildings in your property/responsibility?”, most of the respondents answered that they would need more personnel and money to implement energy renovations. Moreover, they mentioned that mandatory seminars for decision makers could be very helpful.
- (2) Expectation from ENERFUND tool (in priority order):
 - Systems efficiency
 - Average costs of energy renovation measures
 - EPC data
 - Thermal performance of the envelope
 - Energy consumption
 - Presence of financing programs
 - Energy performance compared with average building stock

Denmark

Nothing special is needed for better decision-making in municipalities and social housing associations. The building owners have highly specialised competences and they continuously search for relevant and financially accountable renovation projects. Hence, it is not that easy to say what is expected from a tool like ENERFUND.

France

(1) Transparent and reliable information is essential for decision making process regarding energy renovation. The lack of knowledge was commonly cited as a roadblock to investment. Before implementing a project, the interviewees claimed that they would like to be guided and advised, on ROI period, on the choice of contractors, on fares commonly used, and on the administrative process that needs to be done. Currently, this knowledge is built up through the project's implementation. The interviewees were convinced that having this necessary information at hand would speed up the process and unlock more investments.

(2) The perspective of ENERFUND tool has been well received by interviewees as a way to ease the whole contracting process. A bunch of information was mentioned as useful: assessment of savings, EPC data, assessment of the buildings' value, ratings of potential contractors, simple advices to implement the project etc.

Greece

(1)

Available technologies 3

Results from systems efficiency

Energy consumption data 7

Construction type 3

Cost of measures

Existence of funding mechanisms

Tools and data that can characterize energetically school buildings

Training of personnel 2

Specified suggestions for optimized projects 8

Knowledge about local supplies 6

(2)

- *EPC data 17/23*
- *thermal performance of envelope 18*
- *systems efficiency 17*
- *energy consumption 17*
- *costs of renovation measures 18*
- *existence of financing programs 18*
- *availability of qualified 'suppliers' 13*
- *property evaluation 10*
- *energy performance compared with average building stock and with 2030 energy goals 18*
- *schools without mechanical ventilation system 12*

Ireland

The survey presented a suggested list ENERFUND tool features and asked, “Which of these features you consider would be of use to you in your work?”

The tool features listed were:

- EPC data
- Thermal performance of envelope
- Heating system efficiency
- Typical costs of renovation
- Existence of financing programmes
- Availability of qualified contractors
- Property valuation
- Energy performance compared to average building stock and 2030 goals etc.
- All of the above

There were 17 responses to this question.

- 75% of those who responded answered “All of the above”
- 25% selected individual options (EPC data, energy consumption, thermal performance of building envelope.)

When asked, “Are there any other datasets or key information you would like to see included in the ENERFUND tool?”, the responses were:

- hierarchy of most beneficial upgrades including installation type (PV, solar etc) to provide max benefit
- real pre- & post energy usage from utilities linked to average temperatures
- energy spend per metre squared, ranking of top consumers, ranking of best candidates for refurbishment
- a tool for calculating the potential cost for upgrade works over a wide number of units
- build type, e.g. masonry timber frame

Romania

(1) The information and data identified by the respondents as being necessary for taking a better decision (regarding the energy retrofit) were:

- information and explanations about the sources of funding for the retrofit of public or private buildings, even if some of the buildings were previously partially or inefficiently retrofitted;
- relevant legislation;
- a schedule for the opening of financing lines (schemes) for next year, to be included in the budget objectives;
- research ideas and results;
- the implications and costs of the construction work, the savings (reduction) achieved in the energy consumption (kWh) and the total annual savings amount for the tenants (whole building), calculated for the energy cost at the date in which the analysis was made; / the costs / execution time (comparison between: if they do it on their own or if they use (access) EU funding schemes/programs);

- knowledge of the quality of the materials used for making the thermal envelope of the building, knowledge of the contractor;
- knowledge of the comparative effectiveness of new versus old products;
- more information about “green” solutions;
- separate monitoring of the energy consumption, the building technical data sheet;
- how is an EPC obtained and which are the following steps to be made;
- data about the specific annual energy consumption.

Regarding the format (way) in which such information are desired, the following were listed:

- in any format;
- electronic format / e-mail;
- links towards website containing (the) information;
- trustworthy information, which does not change based on the political situation (leadership);
- in a written form accessible for people with an average technical background;
- norms (standards) based on the building types;
- regularly distributed informative bulletins (newsletters);
- informative leaflets (flyers) on the importance of energy efficiency measures;
- group counselling with the building residents, at the Town Hall or in public places;
- media coverage at acceptable hours for raising awareness.

(2) The following (types of) information were identified by the respondents as being useful to be provided by the ENERFUND tool:

- key data from the EPC;
- the thermal performance of the building envelope;
- the efficiency of the heating systems;
- the (building) energy consumption;
- the costs (mean value / interval) of retrofit measures;
- examples of comparison, before and after, regarding the thermal retrofit;
- assessment of the heat losses through its (external) walls, windows, terrace (roof), distribution system etc.;
- the existence of financing lines (schemes);
- the schedule of financing lines (schemes);
- the availability of qualified companies and/or persons;
- the evaluation of the property;
- the (building) energy performance in comparison with the average building stock with 2030 objectives for energy and climate;
- information about “green” solutions;
- solutions for heritage (historical) buildings;
- a tool to evaluate the buildings for prioritizing the renovation measures;
- legislation, financial and technical information;
- consultancy in obtaining financing (funding);
- (building) materials efficiency.

Slovakia

- (1) What would you need for better decision-making in your business, including the energy renovation of the buildings in your property/responsibility?

Awareness rising among general public 11,8%
Measurement of all energy carriers 5,9%
Energy audits and support for project development 11,8%
I do not know 11,8%
In-house expert 11,8%
Better legislation 11,8%
Support of owners and their investments 11,8%
overview of possible solutions including their technical and economic parameters 11,8%
Adequate financial resources 11,8%

- (2) What would you expect from a tool like ENERFUND?

nothing 20,0%
I do not know 6,7%
Financial support 33,3%
Support in development of support schemes 6,7%
Support in development of legislation 6,7%
Awareness rising among general public 20,0%
Support for installation of monitoring systems 6,7%

What kind of information would you need from the ENERFUND tool in order to plan the energy renovation of the building(s) in your property/responsibility?

Comparison of energy performance of your building with average building 28,6%
Information on available financial mechanisms 28,6%
Information on qualified contractors 14,3%
Other. Please specify: 28,6%
Nothing 9,5%
All of the above 4,8%
Reference values of energy consumption 4,8%
Different comparisons 4,8%
Relevance of energy savings towards climatic conditions 4,8%

Slovenia

When asking about their needs for better energy renovation decision almost all respondents replied that they would need information on funding opportunities for both, the partial (small) measures and for the comprehensive/complete measures. The second answer is related to detailed analysis of cost and energy savings. Most of interviewees replied that expectation towards ENERFUND tool is in the direction of benchmarking regarding energy consumption and renovation cost.

Spain

One answer: - At the moment we do not deal with retrofitting, just in some specific cases.

1) 60% answered different aspects: Relationship between cost and repayment and the amortization period.; Better knowledge of available technology; training for Service contracts for a better energy efficiency; Political awareness: owners' awareness; The aforementioned information would be very useful

2) 30% answered different aspects: Those named in the example would be OK; We don't think the named tool would be useful to us, even though the knowledge of the financing programs will; It would be expected that the tool assesses every aspect of the renovation in order to give accurate information to the building owner associations or users.

United Kingdom

(1)

- More clarity on the future of our portfolio, setting up a long-term plan for our portfolio would reduce risk in ECM investment.
- There are often so many other aspects that you need to tap into, advice and guidance on best practice, case studies. Good back up information.
- Better building performance data
- Being able to identify where residents are most in need of thermal improvements due to low income, vulnerability etc.
- Not sure - would need to speak with colleagues
- Something that would allow me to compare our building energy costs with another similar size/profile building in the same sector.
- Benchmarking to demonstrate improvements, real examples that show savings not just estimates
- more case studies showing impacts of renovation on energy use in typical residential buildings what to do when commissioned equipment is shown not to be working effectively
- More technical resources but embarking on a RE:FIT programme where a company will guarantee savings and costs
- Up to date pricing benchmarks for costs
- More specific case studies that draw together existing information and are targeted at gaps. I think this should be through an existing organisation (Retrofit Academy, ReNew, Sustainable Homes) as there is lots of info out there and there is an issue with disparate reiteration of the same issue rather than something that creates a platform for moving forward.
- More available comparisons, Sub-metered data

(2)

Expectation from ENERFUND tool:

- Whole life costs of retrofit. Payback periods.
- A standardised way to examine improvements and link it to the energy consumption over a number of years of use
- 1. some guidance on what issues may affect renovations and installation of particular types of project; 2. tips from successful projects on their process and outcomes e.g. performance: initial year, before and after project and ongoing performance; 3. advice on how to implement systems in historic buildings with restrictions due to listing or other planning requirements.
- Good benchmarking.
- Draw together existing information and plug gaps. Create a tool that can cost out what retrofit might look like financially. Provide distinction between stock types. Help identify priorities based on cost but also different options, e.g. if your priority is fuel poverty, how would that profile look? Must be connected to capability.
- Ideally, help inform whole life costing analysis for major refurb

Information needed from ENERFUND:

Answers	# responses
Existence of financing programmes	1
Thermal performance of the envelope	1
Costs (average/range) of renovation measures	4
Energy consumption	2
Energy performance compared with average building stock and 2030 energy goals	4
EPC/ DEC data	3
Systems efficiency (heating/ HVAC etc.)	1

Other:

- All of these backed up with case studies and examples of less conventional processes i.e. boiler systems additives
- All of the above items for different project scopes
- If they weren't doing RE:FIT then a number of points above would be useful including costs of renovation measures and systems efficiencies.
- Financing programmes and availability of qualified suppliers/contractors are also key

III.5 Influence of international/European policy and regulation

How are the international/European directions (policy, strategy, recommendations) and rules (directives, decisions) influencing the implementation of an energy renovation project/program (from your perspective)?

Austria

Communities:

EU requirements are useful. Stakeholders are aware of requirements and legal framework conditions. However, responsibilities are not clearly defined and there is a lack of compliance frameworks.

Bulgaria

Case A Oblige the implementation

Case B Promote and support the implementation of energy efficiency measures.

Case C Oblige the implementation of retrofitting which under lack of funds cannot be met.

Cyprus

Private Buildings

European guidelines and rules may oblige the mandatory implementation of energy renovation as and set targets that will be followed by the countries, which nurtured such projects. They can also be used as a comparison between the same climate countries as good examples.

Public Buildings

The international/European directions provide better understanding in energy - saving methods, maintain an effective and targeted energy-labelling scheme for buildings, provide better data and tools for decisions in energy renovation, promote favourable conditions for financing energy renovation.

Denmark

It has rather been the prospect of energy saving and lower operational costs than International/European policy and regulation that have been the driver of implementation of energy renovation. However, there might be an international influence on the building owners' energy renovation, when they wish to contribute to the global carbon reduction

France

Professionals working in the building sector excepted, owners and managers are only aware of European regulations to a certain extent, but their awareness usually increases as they implement a renovation program.

Greece

They make obligatory the energy renovation of buildings, and they set up the rules how to apply it. 2/23

Delay of adaptation of the European directives in the Greek legislation.

They influence the implementation of an energy renovation project to a small extent, since no accurate data exist.

They are needed to adapt the national goals for energy efficiency.

The adaptation of the national legislation gives the best implementation of such actions. But it needs legislative interventions and in-depth training at all levels to enter to everyday citizens logic of energy saving.

A national first strategy should be developed, with legislative funding from the private sector through partnerships with him. They produce specifications, uniform treatment for 325 municipalities of the country, managing a huge public building wealth.

Ireland

When asked, "Do international/ EU drivers (policy, strategy etc.) and rules (directives, decisions) influence the implementation of energy renovation projects/ programs (from your perspective)?", the responses were:

- 41% answered 'yes' to this question, but many respondents chose not to give an opinion.

Romania

European directives and regulations (policies, strategies, guidelines, directives, and decisions) are considered by most respondents to have a positive influence on the implementation of project / program of energy retrofitting, but harmonizing European directives and regulations with national documents is considered to be cumbersome. The international directives and regulations act only as mere recommendations as long as the Romanian legislation is not fitted (tailored) to the European rules.

Slovakia

In positive way 15,4%

Increase of administrative requirements 23,1%

No influence 23,1%
Complicated setup for ESIF utilization 23,1%
I do not know 15,4%

Spain

- They are influencing it through regulations.
- In a critical way, since they establish the regulatory framework so that buildings are designed and constructed correctly (it is always easier to act previously than once they are built). From the refurbishing point of view they can establish the directives to start public policies and favour this type of activity (fiscal benefits, grants...)
- They will only influence if their implantation means a significant reduction of energetic costs
- They are not influencing the implementation at all because users are not aware of these policies due to a lack of accurate information.
- Awareness and information to citizens
- Awareness is missing and is not economically affordable for most of the people
- Regarding local administration, they are not enough.
- They are determinants
- We think they try to favour this type of projects, however they don't solve the problem of financial issues for the needed investment for the renovation of existing buildings.

United Kingdom

62% Yes; 38% No

- Yes if they become national policy.
- Funding
- Aiming for compliance with EPBD and other legislation
- European legislation that affects UK legislation then yes but on the whole, no.
- Only in the context of one of the earlier questions, see response to q.21 - these directions fit into the 'tell us what to do' psychology, which I think is more unhelpful than helpful.
- Only where European law is passed on to UK law (e.g. incoming Minimum Energy Efficiency regulations)
- Need to comply with regulations currently in force and be able to comply with those likely to be introduced in foreseeable future
- Only in so far as needing to comply with regulations

III.6 Other aspects

Austria

Property valuator and real estate developer:

Currently, the EPC and energy-related performance has no impact on the property valuation result. There is an indirect benefit of deep renovation because renovation as such extends the technical lifetime of a building and this parameter is considered by the valuation method.

The discount rate (Kapitalisierungszinssatz) influences the valuation result strongly. The discount rate applied in the valuation of projects varies according to risk and expected profit. Discount rates could be a subject of comparison. Other interesting information: investment and remaining useful building life.

For a short time, there has been the obligation to submit a building documentation and maintenance documentation to the building authority in Vienna. The EPC is part of this documentation. It would be very useful to combine these data and have a reporting about the technical building condition.

Hotel owner and manager:

The hotel <https://www.hotelstadthalle.at/en/> was renovated to zero energy balance by end of 2009, and the renovation is very well documented: <http://www.mustersanierung.at/projekte/Tourismusgebaeude/Boutique-Hotel-Stadthalle/>). Based on this experience, it is recommended to plan high cost for consulting, in order to cope with the complexity of the task (deep renovation including implementing renewable energy technologies consists of many different measures and many different companies are involved).

Researcher and consultant (in the area Sustainable Buildings and Cities):

Tools ECOPLAN und ECOCITIES:

The software ECOCITIES supports operators of building groups – such as municipalities, cities, property management companies – in deciding how budget can be used most effectively to align the real estate portfolio to required political, economic and environmental objectives.

ECOPLAN evaluates the impact of different energy efficiency measure sets on a given neighbourhood and finds optimized scenarios in terms of environment impact (carbon footprint etc.) and financial impact (investment costs etc.). ECOPLAN can be used to develop neighbourhood energy strategies, review existing ones or ensure the alignment of individual initiatives with the neighbourhood overall energy strategy.

ECOPLAN was applied in the City of Baden as a test case.

<https://www.xylem-technologies.com/de/2013/09/02/project-ecoplan-started/>

<http://gis.stadtgemeinde-baden.at/>

<https://www.xylem-technologies.com/about/>

<https://www.xylem-technologies.com/portfolio/ecocities-building-portfolio-management-software-for-energy-efficiency/>

Representative of province government :

In Styria, communities have been merged (motivations are e.g. not so many inhabitants any more due to rural urban migration, saving cost for administration) and new spatial plans are under development. During this process, some buildings might be abandoned (sold, demolished, not used anymore). As long as this process is not completed, decision-making for refurbishment will be suspended in the affected communities. The decision was taken in 2014, the number of communities is being reduced from 543 to 285.

Bulgaria

There are extreme difficulties in persuading the owners of the benefits and the lasting effect of the applied energy efficiency measures.

Denmark

Many energy renovation projects have been combined with use of renewables like PVs, thermal solar heating. However, “energy saving” potentials related to such installations are difficult to identify beforehand, especially in Denmark where heating by use of district heating is a joint affair.

Greece

Use of appropriate materials which greatly support the achievement of energy efficiency in a building and not using materials which can easily deteriorate, i.e. Expanded, extruded polystyrene.

Slovakia

Quality of buildings built in previous regime was higher compared to present (8.3%)

Cooperation with the national monitoring system for energy efficiency should be discussed (8.3%)

Awareness rising among general public is important (8.3%)

It could be useful to create financial fund (with preferred interest rate) to finance energy efficiency measures (8.3%)

Reporting of Energy Performance Contracting into public debt is a barrier for municipalities (8.3%).

Spain

I would like to know the results of this questionnaire.

United Kingdom

I have a small amount of involvement in the work areas this survey has covered - apologies if my responses have not been that helpful! Please contact me if you would like to be put in touch with my energy/building management colleagues.

The Government need a clear Energy Policy/Strategy and Implementation Plan that mandates improvements.

You didn't really cover capability, which I don't get the impression is within your remit, but deep retrofit carries significant risk - get it wrong and you can damage the building, seriously damage health, and end up with massive bills for remedial work, or in court, or both. The costs alone of managing speculative legal claims are significant. There needs to be some sort of flag within your model that identifies at high-level areas of risk, because there needs to be a provision for high quality design and upskilling in the client organisation as well as the supply chain. You do not want to encourage the sort of behaviours that were seen under ECO, and cost modelling needs to reflect these lessons. This is also a case of managing investment risk; if you want to link with investors then this is key risk area and threat to the viability of their investment. Happy to talk further on this if needed.

The most effective way to encourage investment in energy efficiency improvements as part of renovation is likely to be the enforcement of minimum standards.

Annex 2: Questionnaires results received from partners

The annex is attached as zip-file containing the full version of submitted questionnaires results and an overview with the most important aspects.

PROJECT DETAILS:

Website: www.enerfund.eu

Twitter: [@enerfund](https://twitter.com/enerfund)

Facebook: [/enerfund](https://www.facebook.com/enerfund)

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