

QUESTIONNAIRE EVALUATION ON NZEB POLICY IN CENTRAL EUROPE

Deliverable D.T2.4.3 / Survey

Final version

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The eCentral project summary

Addressing poor energy performances of public buildings is at the core of EU's Energy Efficiency Directive and Energy Performance Building Directive but also one of growing financial issues in Central European countries. To address that eCentral project will support key stakeholders to realize benefits of newly implemented building standard - nearly zero energy building (nZEB). eCentral project will prove that nZEB approach, although innovative, is optimal and cost-effective solution for renovation and construction of public buildings. Project aims to capitalise on results of previous and ongoing EU initiatives. Austria has a proven track record with nZEB renovation projects and will be leading other implementing partners (CRO, SLO, HUN) by example. Transnational cooperation will be used to receive maximum international visibility of selected pilot actions. Main outputs of the project are:

- energy performance certificate (EPC) Tool for public authorities
- deployment and promotion of innovative financing schemes
- training programme and project development assistance for nZEB projects
- building renovation strategies for selected regions
- state of the art pilot nZEB public buildings in selected regions
- established cooperation with scientific institutions and other nZEB initiatives

Transnational Assessment and Support Group, formed from project experts and scientific institutions will act as a support team and provide quality checks of each output. EPC Tool will be developed and used by public sector decision makers and project developers beyond eCentral project lifetime. Trained energy efficiency teams within the regional government will serve as a backbone for conducting future nZEB projects. The European Academy of Bolzano (EURAC), one of the leading centres of expertise on energy efficiency in the Central Europe region, will focus on policy analysis and dissemination of eCentral project results.

About this document

The document gives an overview of the nZEB policy in Central Europe countries, which are Austria, Croatia, Czech Republic, Hungary, Poland, Slovakia and Slovenia, as well as part of Germany and Italy.

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A. Report Summary

This report wants to give an overview on the nZEB transition and its penetration in the building market in CE countries. In order to analyse similar features, eCentral project partners have decided to use a common survey on energy efficiency and retrofitting policy frameworks in CE countries (AT, HR, CZ, DE, HU, IT, PL, SK, SLO). The pillar of the survey was the nZEB target and its utilization in case of renovating processes of existing buildings.

B. Introduction

In EU countries the improvement of the energy efficiency is one of the main objectives defined.

As reported in the EU Communication COM (2016) 860 of 30.11.2016, the transition to clean energy use is an opportunity to modernize the EU economy and favour job creation. In the EU economy energy prices affect the competitiveness of the whole economy and represent on average 6% of annual household expenditure.¹

“Putting energy efficiency first reflects the fact that the cheapest and cleanest source of energy is the energy that does not need to be produced or used.”²

Currently, buildings account for 40% of total energy consumption and around 75% of them are energy inefficient³, with an annual renovating rate around 1%.⁴

The renovation process to high energy performance target or new nZEBs is reduced by social (lack of trustworthy information or lack of skilled worker or doubts on the possible benefits), economic (energy savings are not clear or guarantee and the investment results reduced), and financial (scarce capital or limited financing scheme available or knowledge) barriers⁵.

Achieve the nZEB (or a high energy performance) target means increasing living comfort and quality of life of tenants, reducing the use of carbon technological solutions and favouring the clean energy transition.

Energy rating systems as energy performance certificates (EPCs) for buildings play an important role when it comes to the transition to clean energy use, because EPCs summarise the energy efficiency of buildings. EPCs should be useful instruments for stakeholders (including final users), enabling to compare building energy performances within a purchasing/renting decision process.⁶ Unfortunately, EPCs may be difficult to understand for non-professionals and the general public which lead to a negative impact on their use during the renovation or selling and rental processes.

As required by EPBD, in 2019 new public buildings occupied and owned by public authorities have to achieve the nearly zero energy building target. This requirement is extended to all new buildings in 2021.

¹ COM (2016) 769

² https://eur-lex.europa.eu/resource.html?uri=cellar:fa6ea15b-b7b0-11e6-9e3c-01aa75ed71a1.0001.02/DOC_1&format=PDF

³ Impact Assessment for the amendment of the Energy Performance of Buildings Directive, SWD (2016) 414

⁴ Impact Assessment for the amendment of the Energy Performance of Buildings Directive, SWD (2016) 414

⁵ <https://zebra2020.eu/>

⁶ <https://www.sciencedirect.com/science/article/pii/S1876610217355388>



Furthermore, the Directive forces the application of minimum requirements for the energy performance of existing buildings (units or elements) in case of major renovation (art.1).

The focus of the eCentral project is mainly based on energy renovation of existing public buildings with innovative financing schemes that need to achieve the nZEB target.

The position paper on nZEB policy in Central Europe aims to understand and identify the state of the art of the nZEB target implementation in the renovation processes of existing buildings.

The survey is composed by four sections:

1. *“General information”* about the survey participants (country, background...),
2. *“NZEB”* target knowledge (from the energy requirements to its use and calculation procedures),
3. *“Energy performance certificates (EPC)”* to understand the level of utilization, its usefulness and reliability and
4. *“Economic instruments for energy renovations”* to capture opinions on used financial incentives in the CE target countries.

To involve more public authorities and building experts of central European countries the English survey was translated in PPs languages: Croatian, German, Hungarian, Italian, and Slovenian, see Annex 1. It was also shared with the nZEB letter (eCentral newsletter), PPs and disseminate by other Interreg project, as TOGETHER project.

1. General information

The survey was sent to 3730 contacts, between energy experts, public authorities and other building professionals, 48 the answers evaluated. 62% of participants come from Italy and Slovenia (31% of each country), 15% each from Hungary and Austria, and other countries like Croatia, Czech Republic, Germany and Poland, Figure 1.

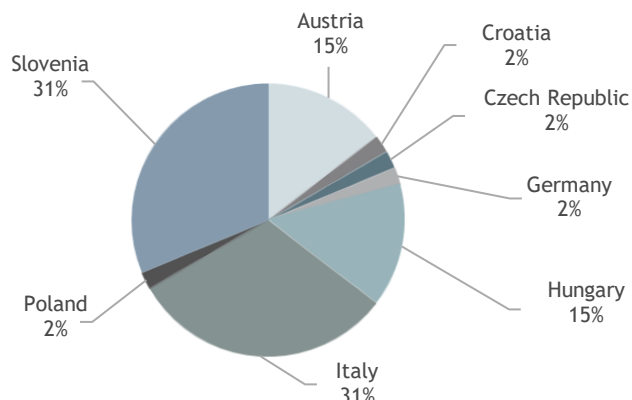


Figure 1. Percentage of participants' countries.

Which is your role and/or expertise field or background?

More than half of participants (52%) are energy experts, 27% public representatives and 13% building professionals. The share of the participants achieved is in line with the objective of this publication that aims to have an overview on the current “knowledge” of the nZEB integration and available policies and barriers in the (public) buildings markets, Figure 2. On the one hand, opinions from building experts and perceptions of the eCentral project target group of public authorities were captured.

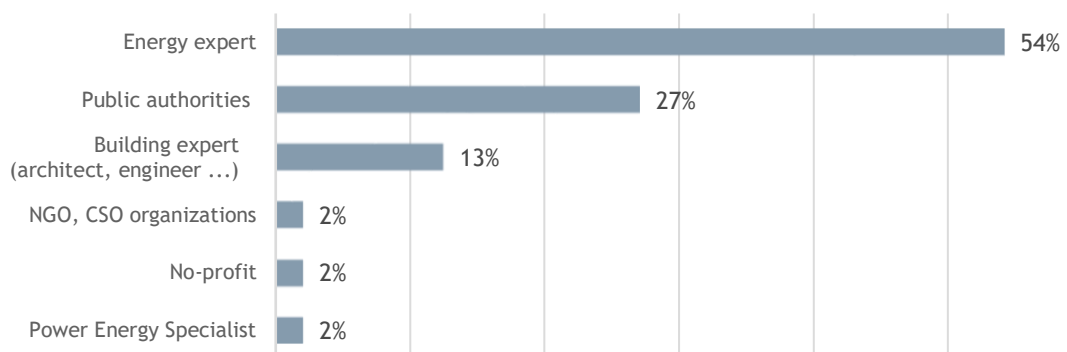


Figure 2. Percentage background of the survey participants.



Have you ever visited a nZEB? (answer possibilities “never”, “between 1-5 times”, “more than five times”)

Two third of the participants have visited at minimum one nearly zero energy building and 25% more than five times. Nevertheless, one person of three (31% of the participants) has never seen a nZEB, Figure 3. Percentage of nZEB visits. **Error! Reference source not found.**

In particular, the percentage of nZEB visits of public authorities and energy experts are reported in Figure 4.

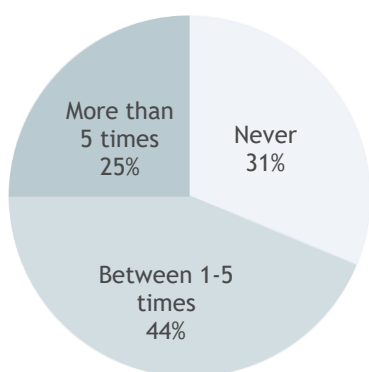


Figure 3. Percentage of nZEB visits.

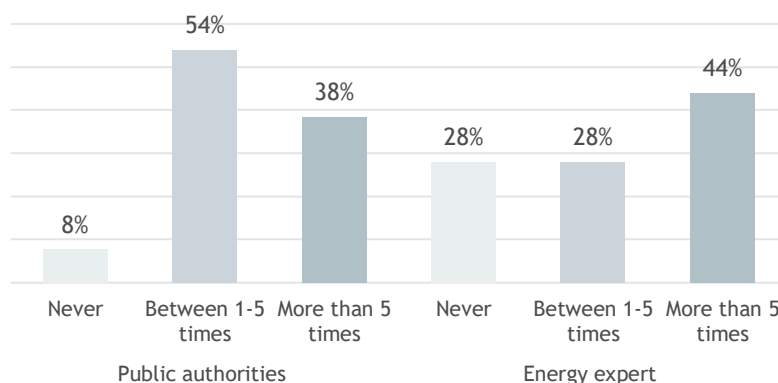


Figure 4. Percentage of nZEB visits of public authorities and energy experts.

Do you have experience in the field of nZEB or other similar field? (answer possibilities “yes” or “no”)

More than half of participants have already worked in the design or construction process of new or renovated nearly zero energy buildings (Figure 5), in particular, about one public representative of two confirms to have this experience.

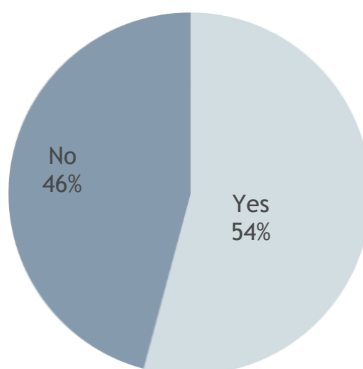


Figure 5. Percentage of experience in the field of nZEB or other similar field.



2. NZEB

The Energy Performance of Buildings Directive (EPBD) art.1, requires minimum requirements to the energy performance of existing buildings, and Art. 4 asks each member state to define minimum energy performance requirements for buildings or building units using a view to cost-optimal levels approach. The high level of missing information on nZEB definition and minimum requirements for the renovation process of existing buildings is evident. Only some countries like Austria, Italy and Slovenia already defined nZEB requirements for building renovations.

Deliverable D.T1.1.1 *“Report on nZEB initiatives from the Central Europe region”* summarizes the nZEB definitions for residential and non-residential buildings, in new or existing buildings in CE countries. Some Central European countries use absolute numerical indicators (as Czech Republic, Germany) based on the maximum primary energy demand of a reference building (as Italy).

Do you know if your country has adopted any policy or standard to achieve the nZEB target in case of renovations? (“yes or no question” 6. If yes, could you describe the main principles and requirements to achieve the nZEB target in case of renovations? Is it defined through indicators (as Primary Energy, thermal transmittance, etc.) or process (as reference buildings)? (open question)

37% participants confirm to know if there are policies adopted at national (regional) level to integrate the nZEB target in existing buildings in case of renovation. They also stated that in case of renovation of existing buildings minimum energy performance requirements are defined as primary energy, CO₂, and share of renewable energy sources (RES), only in some cases these requirements are directly connected to the building operations or should be checked through monitoring. Participants confirm that in some countries the energy performance requirements of the buildings are validated through an innovative process that use a reference building, as identified in the *“Report on nZEB initiatives from the Central Europe region”* (D.T1.1.1). Furthermore, comments highlight that the possibility to receive incentives in case of energy performance requirements’ achievement is a good strategy to boost the utilization of energy performance calculation process and to increase the investments in the renovation of existing buildings.

More than third of the participants have some information on standards or minimum energy requirements to achieve in case of renovation of existing buildings. (21%) of them have no information at all, or they don’t know (42%), Figure 6.

This result indicates that some national regulations on building efficiency are not clear or at least not distributed widely. Furthermore, it is in contrast with the European directive 2012/27/EU that from 2015 which requires public buildings *“with a total useful floor area over 500 m² (...)”* to have minimum energy performance requirements (art. 4 and 5), and define that *“3% of the total floor area of heated and/or cooled buildings is renovated each year”*.

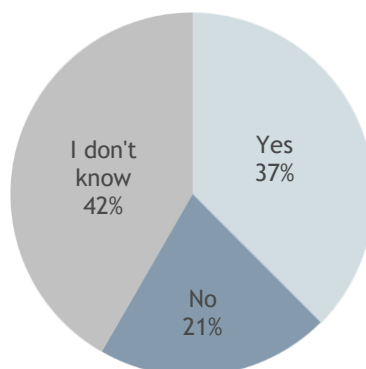


Figure 6. Percentage of knowledge of policy or standard to achieve the nZEB target in case of renovations

In your opinion, what should be improved in the nZEB implementation process for existing buildings in case of renovation and its usability? (multiple choice question with rating)

In the renovation process of existing buildings the measures considered necessary (“important” and “very important”) to boost and facilitate the nZEB implementation process with a share higher than 80% are “to increase knowledge on the benefits of the nZEB target in terms of energy savings and comfort” (90%) and “to increase and facilitate the use of public subsidies” (88%). This last measure is considered “very important” for 65% of participants.

Followed by a share of 85% “to improve the knowledge of the building workers” and “to enhance the knowledge of the building design and construction professionals (architects, engineers...)”. This last measure is the second action considered “very important” for a 58% of participants.

At least possibilities “to have more guarantee on the energy savings planned, also using specific instruments to monitor, verify and guarantee the earned savings during the lifetime of the building” and “to adopt a certification protocol: a structured process based on checks and verification actions during the building design, construction, and service life phases (e.g. PassiveHouse, LEED, CasaClima certifications process)” are considered as very important or important for most of the survey participants, Figure 7

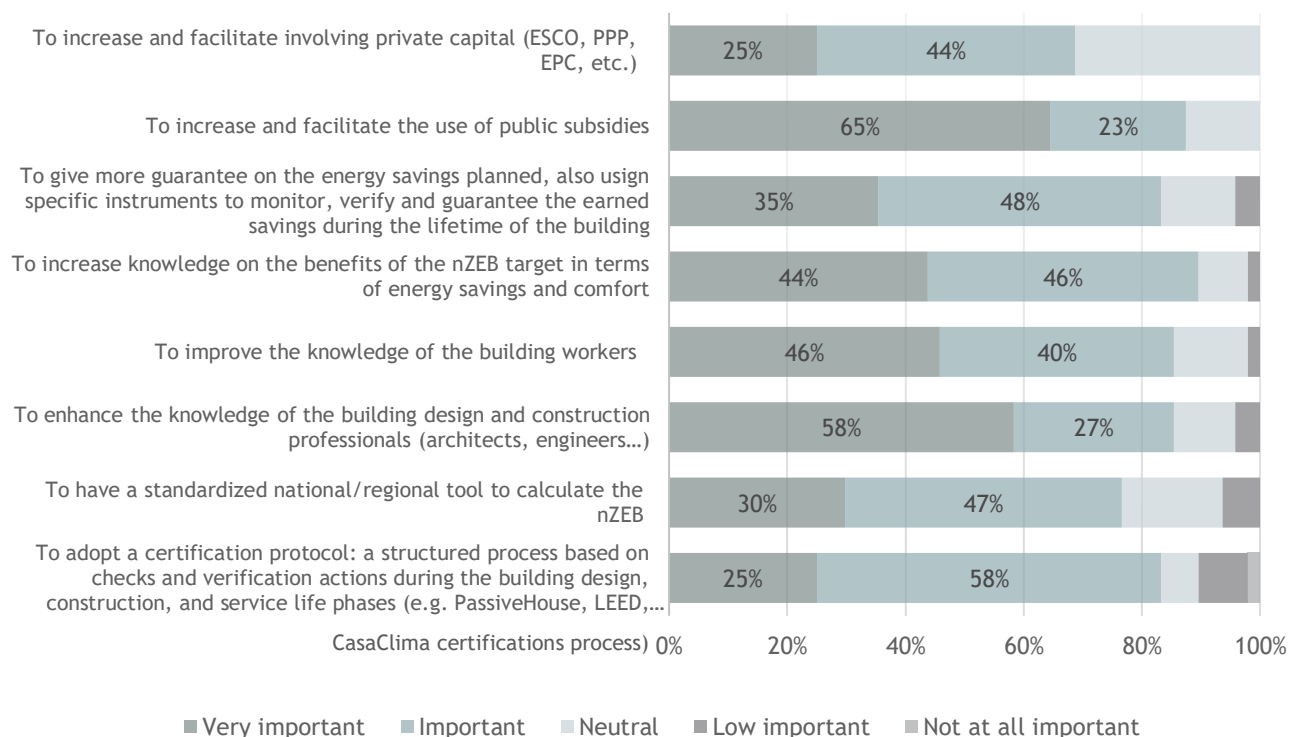


Figure 7. Measures that should be implemented in the nZEB realisation process for existing buildings in case of renovation and its usability.

In your opinion, how important are the benefits which could be delivered from the adoption of a national nZEB standard for the renovation of existing buildings? (multiple choice question with rating)

The most important benefit from the adoption of a national nZEB standard for the renovation of existing building is “to increase the rate of energy savings” considered “very important” for a 54% of the participants and “important” for a 40%, Figure 8. Other important measures with a share higher than 80% (considered as very important and important) are “to increase the environmental conscious thinking” and “to boost the knowledge of energy efficiency in the building market and construction sector”.

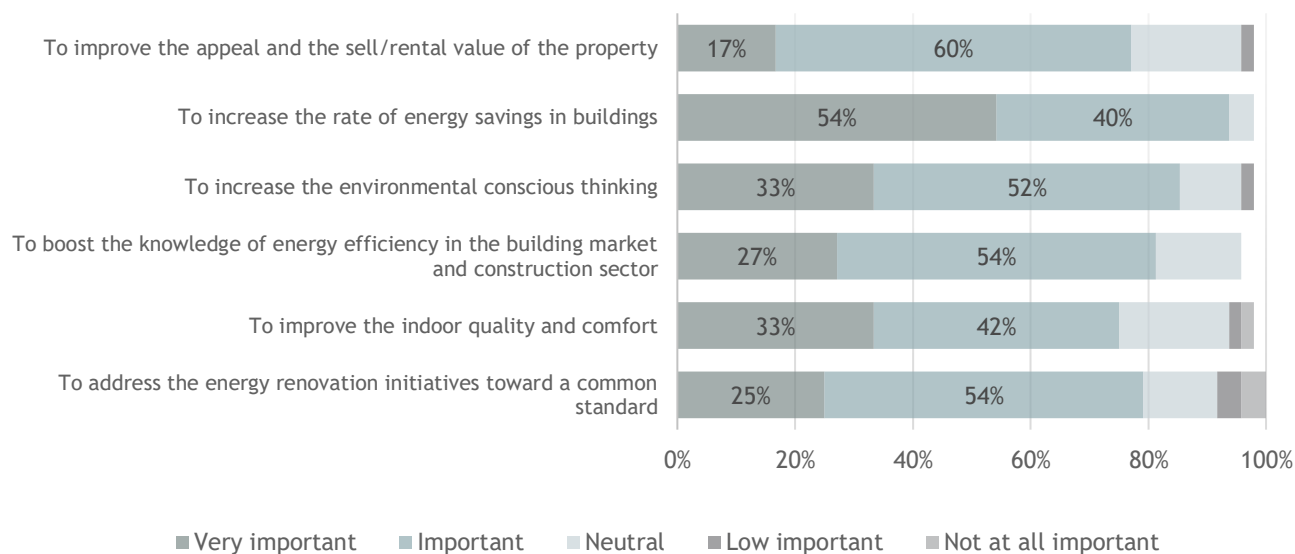


Figure 8. Percentage of importance benefits which could be delivered from the adoption of a national nZEB standard for renovation of existing buildings.

What is the probability of occurrence of some problems/issues in case of adoption of a national nZEB standard for the renovation of existing buildings? (multiple choice question with rating)

The survey participants rated the “lack of/insufficient knowledge of the building workers” (share of 78% “very important and important”), followed by “lack of/insufficient knowledge of the final tenants” and “lack of knowledge of the owners about the consistency building stock (often missed in the public sectors)” (share of 73%) as most probable occurring problems in case of adoption of national nZEB standards for building renovations, Figure 9.

The possibility “to affect negatively the building market, favouring a restricted number of technological solutions” is considered an action with limited impact in the building technologies definition (share of importance 31%). Otherwise, in the “Nearly Zero Energy Buildings: An Overview of the Main Construction Features across Europe⁷” report, an influence between energy target, boundary condition and technologies adopted is demonstrated.

Furthermore “lack of available calculation tools and/or common procedures” (share of importance 48%), is another important problem that reduces a fast building market transition to nZEB objective. To have a common calculation procedure supports and facilitates the decisions during the building design and construction phases, because it permits to confront technical solutions and results, also coming from different buildings, becoming a replicable process, as energy performance certificates aim to be.

⁷ <https://www.mdpi.com/2075-5309/7/2/43>

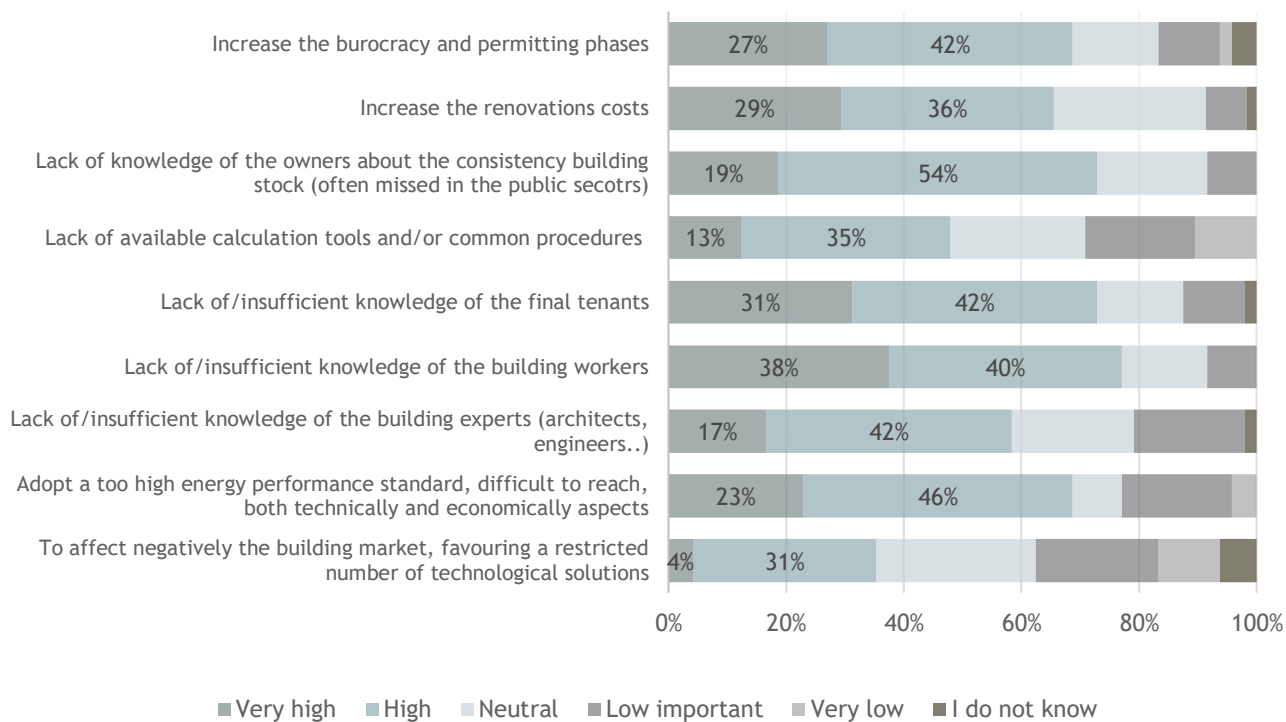


Figure 9 Problems occurrence probabilities in case of adoption of a national nZEB standard for the renovation of existing buildings.



3. Energy performance certificates (EPC)

Energy efficiency improvements of the buildings are considered as one of the most important objectives of the European Union, driven by the EPBD directive, that requires (art. 11-13 of Directive 2010/31/EU) EPCs of buildings or building units which are constructed, sold or rented out to a new tenant; and buildings where a total useful floor area over 250 m² is occupied by a public authority and frequently visited by the public. Energy savings of the building sector is considered as a fruitful potential investments⁸, and EPCs are the most important instrument to enhance the energy performance of the buildings. Starting from these considerations the survey aimed to define the current utilization of these instruments, positive and negative aspects, barriers or limits.

96% of the participants know what an EPC is.

At the question if EPCs are mandatory in their countries, the picture is not so clear. Some participants of the same countries have given different answers: with a share of 61% “yes, it is mandatory” and with a share a 39% “yes, but not always mandatory”. Probably the question was not so clear, and EPCs are mandatory only in cases of new rent/buying contract or often in case of renovation buildings.

75% of the participants consider EPC a useful and easy-to-use instrument to understand the energy efficiency of a building. Furthermore, half of participants (46%) considered EPC an effective tool that can be used by non-professional users to understand an energy efficiency of buildings.

In Central European countries, EPC is considered as reliable only by 37% of the participants, 40% neutral, and 22% consider EPC as low or not reliable.

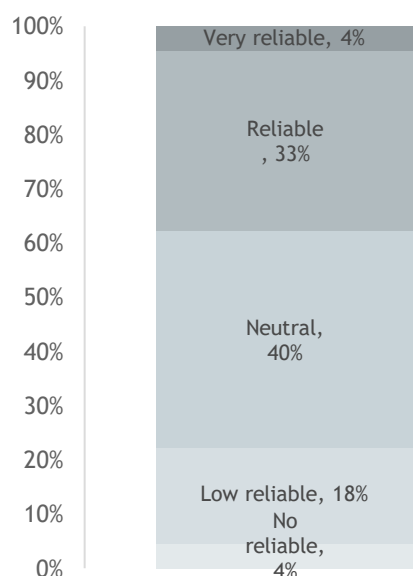


Figure 10. EPC reliable percentage in central Europe countries.

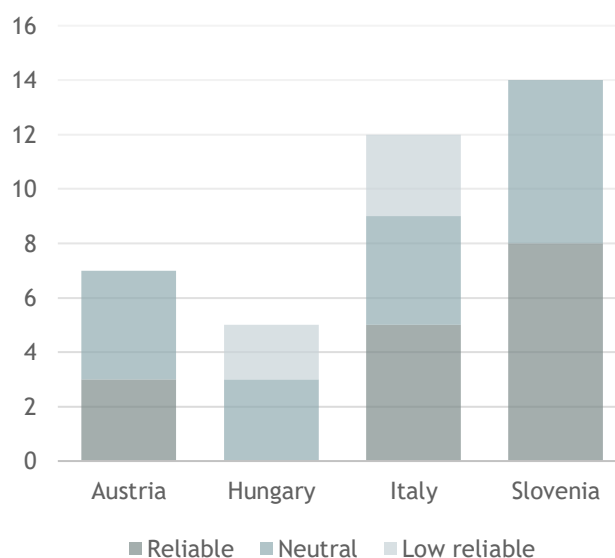


Figure 11. EPC reliable valuation in some central Europe countries.

⁸ “Energy efficiency in buildings - improved energy efficiency will reduce dependence on energy imports, lower emissions, and drive jobs and growth” <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/building-energy-union>



In your experience, how do you rate the usefulness of data provided by EPCs in your country?

In Central European countries, EPC is considered useful for 56% of the participants, low useful for 11%, and neutral for 33% of the survey participants.

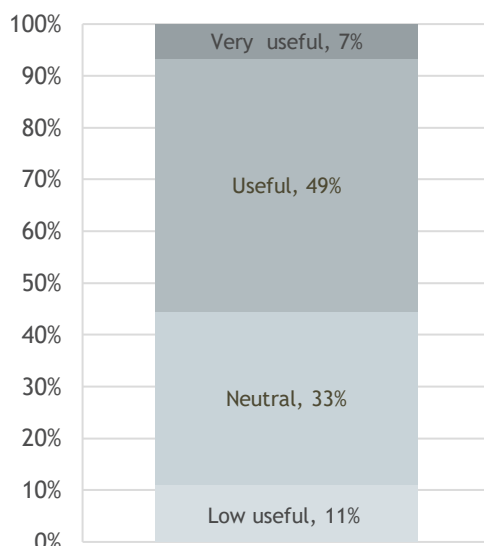


Figure 12. Usefulness of data provided by EPCs (percentage).

76% of the participants think that the use of EPCs improves the “knowledge on the potential energy costs of a building” and supports the “comparability process of energy performance of buildings” activating building investments market when driven by energy efficiency improvements. Unfortunately, the “knowledge of indoor quality” is considered for 36% of participants as an unnecessary benefit, Figure 13.

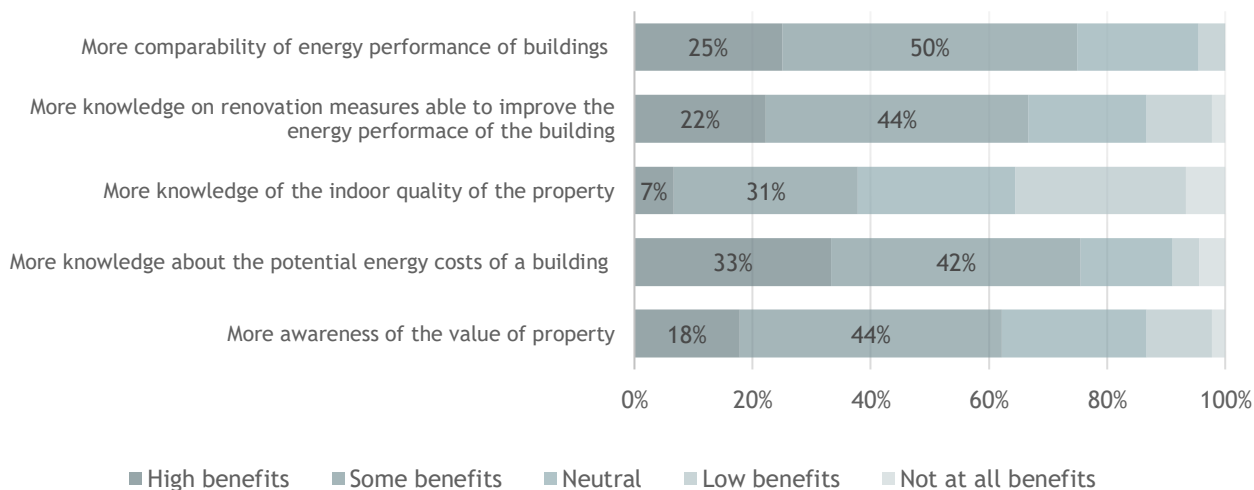


Figure 13. EPCs benefit evaluation.



The survey participants think that most important reason which limits the use of EPCs is the “*lack and insufficient knowledge of the tenants*” (80%). At this deficit the EPC results in a useless instrument able to produce “*additional paperwork and excessive bureaucracy*” (62%) and increases “*costs for owners/investors*” (64%).

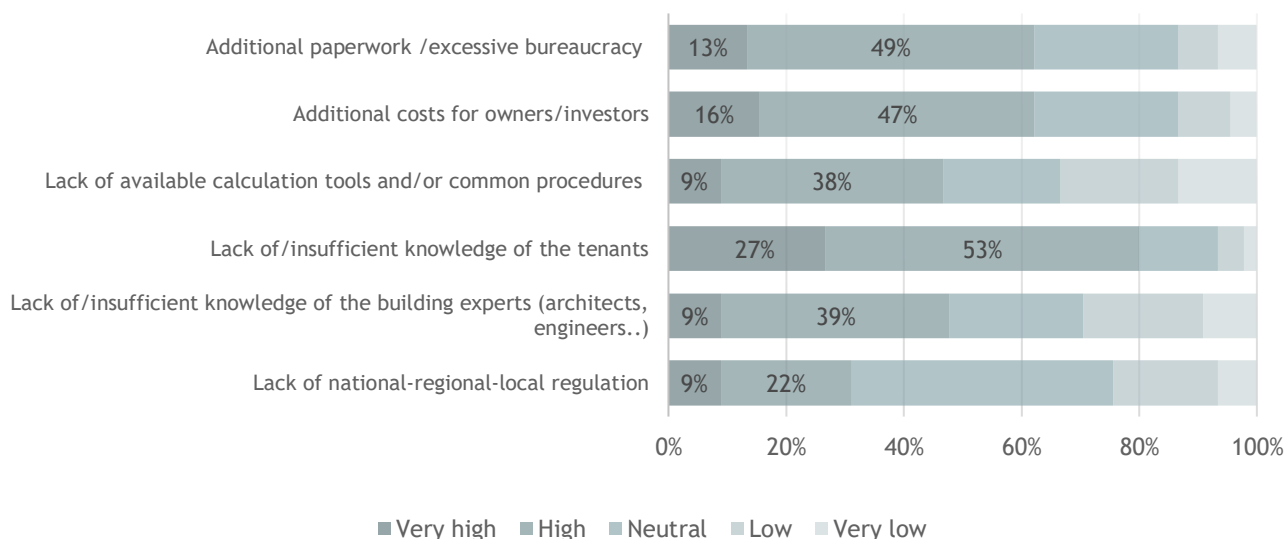


Figure 14. Percentage of reasons that limit the use of EPCs.

4. Economic instruments for energy renovations

Economic instruments for energy renovations are manifold and can be divided between (i) financial instruments such as loans, grants and subsidies, (ii) fiscal instruments such as tax credits or (iii) VAT reductions and market-based instruments such as energy saving obligations or white certificates.

Table 1. Types of conventional economic instruments.

Source: <https://e3p.jrc.ec.europa.eu/articles/financing-energy-renovations-european-building-stock>

Financial incentives	Fiscal instruments	Market-based instruments
Loans, Grants, Subsidies	Income tax credit or deduction; Accelerated depreciation; VAT reduction; Property taxation; Tax rebates	Energy saving obligations; White certificates;

In Table 2 an overview of the economic instrument on energy efficiency investments in existing buildings operating in the year 2013 is shown. Most of the economic instruments targeted in the residential sectors are grants/subsidies, followed by loans. Only in Italy Tax incentives or Energy Efficiency Obligation (EEO) and White Certificate (WC) are used. EEO/WC are set up only in a handful of Member States, but this is likely to change with the implementation of the Energy Efficiency Directive (2012/27/EU) and introduction of article 7 on energy efficiency obligations.

Table 2. Economic instruments on energy efficiency investments in existing buildings operating in the year 2013.

Source: <https://e3p.jrc.ec.europa.eu/articles/financing-energy-renovations-european-building-stock>

	AT	CZ	DE	HU	HR	IT	PL	SI	SK
Grants/subsidies	x	x	x	x	x	x	x	x	x
Loans		x	x	x	x		x		x
Tax incentives						x			
EEO/WC						x			

All participants considered “the improvement of the economic instruments (grants/subsidies, loans, tax incentives, energy efficiency obligations and white certificates) for investors/owners/tenants” as most important action, followed by “simplification of the procedure for obtaining economic instruments for energy renovations”.

The other two actions as “improve the national framework, with easy, accessible and appropriate indicators” and the possibility to “share the risks between investor and tenant in case of energy savings are lower than expected” are also considered as very important or important, with a respectively share of 82% and 73%.

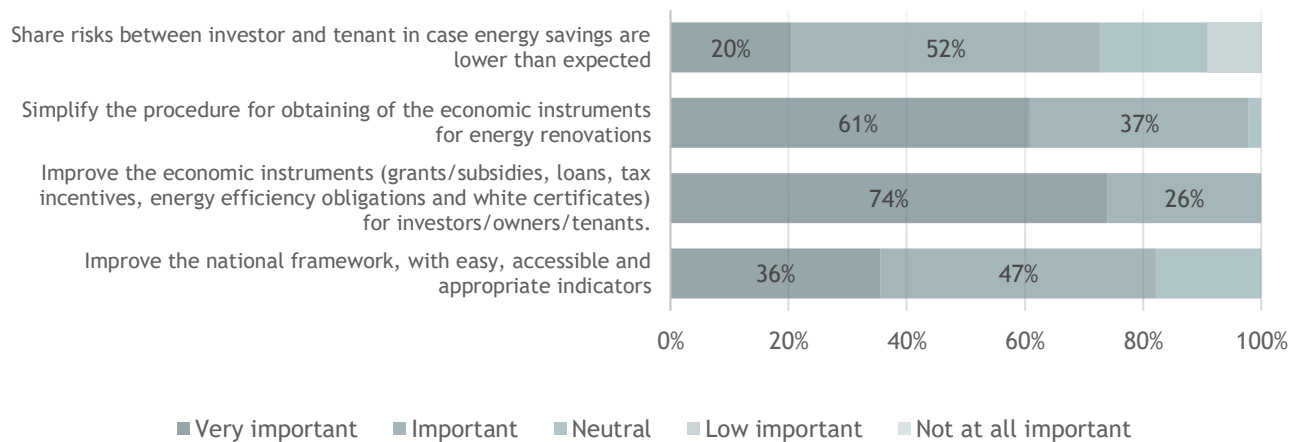


Figure 15. Percentage of effective actions to boost the renovation of existing buildings to nZEB target.

C. Conclusions and final remarks

This report wants to give an overview on the nZEB transition and its penetration in the building market in CE countries. In order to analyse similar features, eCentral PPs have decided to use a common survey on energy efficiency and retrofitting policy frameworks in CE countries (AT, HR, CZ, DE, HU, IT, PL, SK, SLO). The pillar of the survey was the nZEB building standard, its utilization in case of renovated processes of existing buildings and EPCs.

As required by EPBD, nZEB objective was adopted by all Central European countries, for residential and non-residential buildings, in new or existing buildings⁹. 37% of the survey participants confirm to know national policies, energy performance requirements and minimum standards adopted to achieve the nZEB target in existing building in case of renovation, but more than half of the participants have no information (21%) or they don't know (42%) nothing on this regard.

A large part of the survey participants works in the building sector like energy experts, public representatives and building professionals, with experience in design or construction of new or renovated nZEBs. At European level there are two different methods to evaluate the energy performance of the buildings; through a comparison between pre-defined absolute numerical values of indicators (e.g. primary energy..) and calculated ones (as in Czech Republic, Germany) or through an innovative process that compares the energy performance calculated with the energy performance of a reference building (as Italy)¹⁰.

Participants indicate and confirm some benefits delivered from the adoption of a national nZEB standard for the renovation of existing building. The most important ones are *“an increased rate of energy savings”* or the opportunity *“to increase the environmental conscious thinking”* together with *“to boost the knowledge of energy efficiency in the building market and construction sector”*. For these reasons the actions considered most important to boost and facilitate the nZEB implementation process of existing buildings are *“to increase knowledge on the benefits of the nZEB target in terms of energy savings and comfort”*, *“to increase and facilitate the use of public subsidies”*, and *“to improve the knowledge of the building workers, designers and construction professionals (architects, engineers...)”*.

Other important topics are “to have more guarantee on the energy savings planned, also using specific instruments to monitor, verify and guarantee the earned savings during the lifetime of the building” and “to adopt a certification protocol: a structured process based on checks and verification actions during the building design, construction, and service life phases (e.g. PassiveHouse, LEED, CasaClima certifications process)”.

Starting from these necessities and the EPBD request, the Energy Performance Certificate is one of the most important instruments at European level able to enhance the energy performance of the buildings. In fact, 96% of the participants know what an EPC is, and that it is mandatory in Central European countries. Nevertheless, participants of the same countries gave different answers at the question if EPC is mandatory. Maybe the problem was the “question” itself which was not so clear and without possibility to answer *“EPCs are mandatory only in some cases”*.

EPC is considered by 75% of participants as useful and easy-to-use instrument to understand the energy efficiency of a building, and half of participants admit that it is an effective tool that can be used by non-

⁹ Deliverable D.T1.1.1 “Report on nZEB initiatives from the Central Europe region” <https://www.interreg-central.eu/Content.Node/DT111.pdf>

¹⁰ Deliverable D.T1.1.1 “Report on nZEB initiatives from the Central Europe region” <https://www.interreg-central.eu/Content.Node/DT111.pdf>



professional users (46%). Additionally, 56% consider the data (information) provided by EPC as useful. On the other side the EPC's reliability is experienced as quite low, with a share of 37%.

EPCs can also influence positively the increase of *“knowledge on the potential energy costs of a building”* and support the *“comparability process of energy performance of buildings”* stimulating the renovation of the existing building when driven by energy efficiency improvements. *“indoor quality”* is a secondary benefit, although it satisfies tenants and increases positive behaviour. Increasing the knowledge of final tenants is necessary, both to increase the energy savings and to increase the EPCs utilization (80% of the participants think that the use of EPCs is limited by the *“lack and insufficient knowledge of the tenants”*). On this regard, EPCs can be considered *“additional paperwork and excessive bureaucracy”* able to increase *“costs for owners/investors”*.

Furthermore, comments highlight that the possibility to receive incentives in case of achieving energy performance requirements is a good strategy to boost the utilization of energy performance calculation process and to increase the investments in the renovation of existing buildings. Most of the economic instruments targeted in the residential sectors are grants/subsidies, followed by loans. Only in Italy Tax incentives or Energy Efficiency Obligation (EEO) and White Certificate (WC) are used.

The action considered more effective to boost the renovation of existing buildings to nZEB target by all the participants is *“the improvement of the economic instruments (grants/subsidies, loans, tax incentives, energy efficiency obligations and white certificates) for investors/owners/tenants”*, followed by *“simplification of the procedure for obtaining of the economic instruments for energy renovations”*. The other two actions as *“improve the national framework, with easy, accessible and appropriate indicators”* and the possibility to *“share the risks between investor and tenant in case of energy savings are lower than expected”* are also considered important, with a respectively share of 82% and 73%.

Annex I

nZEB policy in Central Europe and related topics

“WELCOME to the Evaluation Survey elaborated by eCentral project (<https://www.interreg-central.eu/Content.Node/eCentral.html>). The survey is voluntary based and the data will be handled preserving confidentiality and protecting your identity. EURAC research, partner of eCentral project consortium, is the responsible for the data processing. If you have any questions, please do not hesitate to contact the following e-mail address: giulia.paoletti@eurac.edu

This survey aims to understand the level of integration of nZEB, especially within the public sector. Also, since energy performance certificates (EPC) should represent 'a most detailed' look into the existing building- the survey will briefly investigate general opinion on EPCs. In the end the survey will try to address the biggest economic barriers in projects of renovation and construction.

Thanks for your contribution!”

General Information

1. Please select the country where you work
2. Which is your role and/or expertise field or background?
3. Have you ever visited a nZEB building?
4. Do you have experience in the field of nZEB or other similar field? (have you ever worked in the design or construction process of new or renovated nearly zero building?)

nZEB

5. Do you know if your country has adopted any policy or standard to achieve the nZEB target in case of renovations? If yes, could you describe the main principles and requirements to achieve the nZEB target in case of renovations? Is it defined through indicators (as Primary Energy, thermal transmittance, etc.) or process (as reference buildings)?
6. In your opinion, what should be improved in the nZEB implementation process for existing buildings in case of renovation and its usability? (very important, important, neutral, less important, not at all important)
 - To adopt a certification protocol: a structured process based on checks and verification actions during the building design, construction, and service life phases (e.g. PassiveHouse, LEED, CasaClima certifications process).
 - To have a standardized national/regional tool to calculate the nZEB
 - To enhance the knowledge of the building design and construction professionals (architects, engineers...)
 - To improve the knowledge of the building workers
 - To increase knowledge on the benefits of the nZEB target in terms of energy savings and comfort
 - To give more guarantee on the energy savings planned, also using specific instruments to monitor, verify and guarantee the earned savings during the lifetime of the building



- To increase and facilitate the use of public subsidies and/or involving private capital (ESCO, PPP, EPC, etc.)
 - To increase and facilitate the use of public subsidies
 - To increase and facilitate involving private capital (ESCO, PPP, EPC, etc.)
 - Other
7. In your opinion, how important are the benefits which could be delivered from the adoption of a national nZEB standard for the renovation of existing buildings? (a lot of benefits, quite a lot of benefit, neutral, low benefits, not at all benefits, I do not know)
- To address the energy renovation initiatives toward a common standard
 - To improve the indoor quality and comfort
 - To boost the knowledge of energy efficiency in the building market and construction sector
 - To increase the environmental conscious thinking
 - To increase the rate of energy savings in buildings
 - To improve the appeal and the sell/rental value of the property
 - Other
8. The adoption of a national nZEB standard for the renovation of existing buildings could deliver some problems/issues as well. In your opinion, what is the probability of occurrence for following: (very high, high neutral, low, very low, I do not know)
- To affect negatively the building market, favouring a restricted number of technological solutions
 - Adopt a too high energy performance standard, difficult to reach, both technically and economically aspects
 - Lack of/insufficient knowledge of the building experts (architects, engineers...)
 - Lack of/insufficient knowledge of the building workers
 - Lack of/insufficient knowledge of the final tenants
 - Lack of available calculation tools and/or common procedures
 - Lack of knowledge of the owners about the consistency building stock (often missed in the public sectors)
 - Increase the renovations costs
 - Increase the bureaucracy and permitting phases
 - Other
9. Energy performance certificates - EPC
10. Do you know what an EPC (Energy Performance Certificate) is?
11. Please indicate if EPC is mandatory in your country
12. In your opinion, is the EPC a useful and easy-to-use instrument to indicate the energy efficiency of a building?



13. In your opinion, is the EPC an effective tool that can be used by non-professional users?
14. In your experience, how do you rate the reliability of data provided by EPCs in your country?
15. In your experience, how do you rate the usefulness of data provided by EPCs in your country?
16. In your experience, which benefits could be delivered with the use of EPCs? (a lot of benefits, quite a lot of benefit, neutral, low benefits, not at all benefits, I do not know)
 - More awareness of the value of property
 - More knowledge about the potential energy costs of a building
 - More knowledge of the indoor quality of the property
 - More knowledge on renovation measures able to improve the energy performance of the building
 - More comparability of energy performance of buildings
 - Free text is too long.
 - Others
17. In your experience, how much the different aspects affect negatively the use of EPC in your country, therefore limiting its use? (very high, high neutral, low, very low, I do not know)
 - Lack of national-regional-local regulation
 - Lack of/insufficient knowledge of the building experts (architects, engineers...)
 - Lack of/insufficient knowledge of the tenants
 - Lack of available calculation tools and/or common procedures
 - Additional costs for owners/investors
 - Additional paperwork /excessive bureaucracy
 - Others

Economic barriers

18. Which actions do you think are more effective to boost the renovation of the existing buildings to nZEB target? (very important, important, neutral, less important, not at all important)
 - Improve the national framework, with easy, accessible and appropriate indicators
 - Improve the economic instruments (grants/subsidies, loans, tax incentives, energy efficiency obligations and white certificates) for investors/owners/tenants.
 - Simplify the procedure for obtaining of the economic instruments for energy renovations
 - Share risks between investor and tenant in case energy savings are lower than expected
 - Other

Final consideration

19. Do you have any other recommendations for actions needed in order to boost the renovation of existing public buildings to nZEB target?