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Assessment of second long-term renovation strategies under the Energy Efficiency Directive

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Contents

Abstract

The report assesses the Second Long-term Renovation Strategies (LTRS) submitted by Member States in 2017 (LTRS 2017) in compliance with Article 4 of the Energy Efficiency Directive (Directive 2012/27/EU). The Energy Efficiency Directive introduced the requirement for Member States to establish a long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings, both public and private. The report provides an updated overview of the assessment of the LTRS and evaluation of the strategies' compliance with the Directive and checks if all the requirements were adequately addressed in each national strategy.

Acknowledgements

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Executive summary

Policy context

The Energy Efficiency Directive (Directive 2012/27/EU, EED), adopted in 2012, in its Article 4, requires EU Member States (MS) to establish a long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings, both public and private.

This strategy shall include:

(a) an overview of the national building stock based, as appropriate, on statistical sampling;

(b) identification of cost-effective approaches to renovations relevant to the building type and climatic zone;

(c) policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations;

(d) a forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions;

(e) an evidence-based estimate of expected energy savings and wider benefits.

As required by the EED, the first version of the strategy was published by each Member State in 2014 and this has to be updated every three years and submitted to the Commission as part of the National Energy Efficiency Action Plans (NEEAPs). Therefore Member States have submitted their updates on their long-term building renovation strategies in 2017.

This report is a follow-up of the assessment of the first building renovation strategies, published by the JRC in 2016 (Castellazzi et al. 2016).

Main findings

As a result of the assessment of the 2017 update of the Member States long term building renovation strategies, required under EED Art 4, 3 strategy updates were considered non-compliant and 27 compliant (fully or almost-fully). In general this represents an improvement with respect to the previous assessment of the renovation strategies submitted in 2014.

Overall, the majority of the updated strategies satisfactorily address the main elements of the Energy Efficiency Directive (27 out of 30). The highest-scored renovation strategies as regards compliance are the one from France and Spain (21/25 – 84% of total possible points), Belgium Wallonia, Croatia, Czech Republic, Greece and Sweden (20/25 - 80%) and Cyprus (19/25 – 76%).

a) Compliance

Non-compliant strategies

According to our analysis, only three building renovation strategies out of thirty do not meet the basic requirements of EED Article 4. This means that at least two requirements of Article 4 have been evaluated to be insufficiently covered in these strategies. This is the case of the strategies provided by the following Member States: Germany, Portugal and Poland.

Not fully compliant strategies

In this evaluation round, no strategies have been assessed as 'Not fully compliant' (i.e. as not compliant in only one requirement of Article 4).

Almost fully compliant strategies (OR Acceptable strategies)

Eight strategies have been evaluated as 'Almost fully compliant'; it means that they have been assessed to be partially compliant (i.e. score=2) for maximum two requirements: Austria, Brussels Capital Region, Belgium Flanders, Estonia, Italy, Luxemburg, Netherlands and UK.

Fully compliant strategies

Nineteen strategies were 'Fully compliant' to the requirements of Article 4 (almost the double in comparison to 2014 evaluation round): Belgium Wallonia, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, Romania, Slovakia, Slovenia, Spain and Sweden.

b) Improvements and challenges

Two areas where improvements in relation to the 2014 strategies are especially evident and worth mentioning are the following:

Data on National Building Stock

It was found that data collection and description of the national building stock improved. This is especially the case for non-residential building stock, which was highlighted as the less covered segment in 2014 strategies.

Scenario Analysis

Member States' strategies now include more robust analyses. More Member States provided a scenario analysis on the intervention options. As already indicated in the previous evaluation exercise, it is very important to have alternative scenarios for building stock and to evaluate the cost-effectiveness of different options under each scenario. This should in turn offer a tool to decide the most appropriate (cost-effective) level of intervention.

On the other hand, a weak part of the strategies remains the evaluation and monitoring of implemented policies. This should be addressed with the development of specific monitoring indicators.

c) Other considerations and recommendations

Our analysis revealed that energy poverty received increasing attention: it is well covered and addressed in the majority of the strategies as the majority of Member States included in their reports one or more measures specifically addressing energy poverty issues.

One of the key elements of an effective building renovation roadmap is to set clear and ambitious targets including intermediate milestones. This was well understood by Member States and the majority of updated strategies include a long-term vision towards a 2050 goal to decarbonise their building stock, with specific intermediate targets.

The 2017 assessment identified different interpretations of "strategy update" with some Member States providing almost the same text of the 2014 strategy, with minor changes, others providing a document updating only some of the sections without necessarily providing a link to the 2014 strategy; while all the others submitted a fully revised document. However, almost all Member States with weak strategies in 2014 improved them significantly in 2017.

It is recommended to deliver in the future a single document including all the legislative requirements that now are sometimes dispersed in several different documents or to always make explicit references to information contained in other sources in order to make any building renovation strategy update a self-standing document.

Quick guide

The EED, in its Article 4, requires Member States to establish a long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings, both public and private. These strategies contain impotant information and data on the national building stock, but also on policy measures that Member States put in place to stimulate cost-effective deep renovations of buildings and they provide estimates of expected energy savings.

The review and assessment of the renovation strategies offer an overview of the state of the art in one of the most important and challenging area for energy efficiency policy: building renovations. The assessment sheds light on the efforts of each Member State in this field and allows sharing good practices and identifying gaps and challenges to meet.

The structure of the report is as follows. Chapter 2 presents the methodology followed for the evaluation of the 30 Member States updated renovation strategies. The results of the general assessment of the 30 renovation strategies are presented in Chapter 3. In Chapters 4 to 8 the compliance of the strategies against the five requirements of Article 4 are analysed with more detail. In Chapter 9 conclusions and recommendations are provided.

The Annexes appended to the report present the summaries of the 30 renovation strategy evaluations, the official Commission guidance for National Energy Efficiency Action Plans (NEEAPs) and the evaluation template used for this assessment.

1 Introduction

The European Commission has put in place a broad set of legisation aimed at improving energy efficiency in Europe, notably the Energy Efficiency Directive, the Energy Performance of Buildings Directive, Ecodesign Directive, and the Energy Labelling Directive. The "Clean Energy for All Europeans" package indicates that energy efficiency should be the first priority. In this framework, specific attention is given to the building sector, which is of pivotal importance to achieve the ambitious energy efficiency goals and targets.

As one of the key measures mentioned above, the Energy Efficiency Directive (Directive 2012/27/EU, the EED), adopted in 2012, laid down the foundation for actions to be taken in order to put the EU on track. The Directive, in its Article 4, requires EU Member States (MS) to establish a long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings, both public and private. This strategy shall include:

(a) an overview of the national building stock based, as appropriate, on statistical sampling;

(b) identification of cost-effective approaches to renovations relevant to the building type and climatic zone;

(c) policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations;

(d) a forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions;

(e) an evidence-based estimate of expected energy savings and wider benefits.

As required by the EED, the first version of the strategy was published by each Member State in 2014 and this has to be updated every three years and submitted to the Commission as part of the National Energy Efficiency Action Plans (NEEAPs). Therefore Member States have submitted their updates on their long-term building renovation strategies in 2017.

With the entry into force of revisions to the Energy Performance of Buildings Directive (EPBD) in 2018[1] the provisions on long-term renovation strategies in Article 4 of the EED are moved to a new Article 2a in the revised EPBD and the Article has been strengthened with a number of provisions. Long-term strategies are intended to support the transformation towards a national building stock that is highly-efficient and decarbonised by 2050. Long-term strategies must be underpinned by a roadmap which sets out measures and domestically established measurable progress indicators. The measures must facilitate the cost-effective transformation of existing buildings into nearly zero-energy buildings. The indicators will help measure progress towards the long-term 2050 goal of reducing greenhouse gas emissions in the Union by 80-95% compared to 1990. Member States must also define indicative milestones for 2030, 2040 and 2050 and must specify how they contribute to achieving the Union's energy efficiency targets set out in the Energy Efficiency Directive (Directive 2012/27/EU). Finally, to support the mobilisation of investment, renovation which is necessary to achieve these objectives, Member States must facilitate access to mechanisms for the aggregation of projects, the reducing of the perceived risk of energy efficiency operations for investors, the use of public funding to leverage additional private-sector investment, guiding investments into an energy efficient public building stock, and accessible and transparent advisory tools.. These provisions in the revised EPBD on long-term strategies are also supported by the Commission's Smart Finance for Smart Buildings initiative. It is also explicitly stated that long-term renovation strategies must include national actions which contribute to the alleviation of energy poverty. Long-term

[1] Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency was published in the EU Official Journal (L156) and entered into force on 9 July 2018. Member States will have to transpose the directive into national law by 10 March 2020.

strategies will also be subject to public consultation before submission to the European Commission and this consultation must be as inclusive as possible.

Nonetheless, these latest changes are not always reflected in this second round (updates) of Member States' strategies, as the strategies follow the provision of EED Article 4.

This report is a follow-up of the assessment of the first building renovation strategies, published by the JRC in 2016 (Castellazzi et al. 2016).

Similarly to the previous report, this study provides an overview of the EU's national building stocks (e.g. energy performance, etc.), highlighting the availability of data and data gaps. It also assesses the ambition of the planned strategies as well as the appropriateness of the policies and measures to achieve them. The study also identifies good practice examples.

Beyond the assessment of the updated strategies, this report also considers how some of the new elements, which will be required in the future as part of the long-term renovation strategies under the new Article 2a of the EPBD, namely the long-term vision of a decarbonised buildings stock by 2050, the domestically established measurable progress indicators, the indicative milestones for 2030, 2040 and 2050, the alleviation of energy poverty and the mobilisation of investments, are already present and addressed in the current strategies.

The structure of the report is as follows. Chapter 2 presents the methodology followed for the evaluation of the 30 updated renovation strategies. The results of the general assessment of the 30 renovation strategies are presented in Chapter 3. In Chapters 4 to 8 the compliance of the strategies against the five requirements of Article 4 are analysed in detail. In Chapter 9 conclusions and recommendations are provided.

The Annexes appended to the report present the summaries of the 30 renovation strategy evaluations, the official Commission guidance for National Energy Efficiency Action Plans (NEEAPs) and the evaluation template used for this assessment.

2 Methodology

As in the assessment of the first Member States' renovation strategies (Castellazzi et al., 2016), the evaluation follows the structure suggested in the Commission's guidance for National Energy Efficiency Action Plans (NEEAPs)[2]. In particular, Annex B of the guidance specifies the areas that Member States are requested to address under each of the five sub-paragraphs in Article 4.

In some sections of the review template, numerical information is collected and showed, while other sections report more qualitative information gathered in the review of the national strategies. For some sections, information on the presence/absence of a specific element in the strategy is recorded (with comments, when necessary).

As a follow-up to the 2014 assessment exercise, the individual Member States' renovation strategy review used a partly different template: simplified and adapted in order to better capture and highlight the new elements in the 2017 strategies in comparison to the 2014 ones. The evaluation template is included as Annex C to the present report.

It is important to stress that this report presents the result of the assessment of Member States' 2017 "EED Article 4 notifications" only: the evaluation and discussion of Member States' building renovation policies are beyond the scope of this study. Therefore, only the information provided by Member States in their submitted renovation strategy documents, complemented, when necessary by information retrieved in the National Energy Efficiency Action Plans (NEEAP), has been reviewed and evaluated and is presented in this synthesis report: third party information, as well as information retrieved from other official and unofficial sources has not been taken into account unless when explicitly indicated by Member States in their strategy documents.

For the evaluation of the policy measures' section (Article 4(c)), a more detailed distinction of the measures has been elaborated as described in chapter 6.

The evaluation assessed the consistency of each strategy to EED Article 4 provisions in the five relevant areas (Article 4 sub-paragraphs). The level of details and accuracy of the information provided in each section was evaluated.

Since 2017, required documents are updates of the Member States strategies submitted in 2014, a variety of different approaches and cases are identified. In particular, in many cases Member States did not report any change but they may have explicitly indicated this in their update or they may have omitted one or more sections.

We identified four different cases:

1. Member States providing the same document provided in 2014, updating some data/sections (i.e. Brussel Capital Region, EE, SK,);
2. Strategies with only some sections updated in comparison to the 2014 one, with an adequate justification[3] (ES, HU, IE, NL, SI);
3. Strategies with only some sections updated, without an adequate justification (DE);
4. Member States providing a new document including full revised strategies (all the others).

In the second case (i.e. ES, HU, IE, NL, SI) Member States clearly state that the previous 2014 strategy applies for the missing sections and we make reference to the information contained in the 2014 JRC assessment and evaluation, applying the same scores of 2014.

In the third case, (i.e. DE), some sections are missing without a proper justification. In this case the missing sections have been scored = 0

[2] SWD(2013)180 final (http://ec.europa.eu/energy/sites/ener/files/documents/20131106_swd_guidance_neeaps.pdf). Other guidance documents have been published, for example by BPIE (BPIE 2014) and by the EED Concerted Action working group (http://www.esd-ca.eu/reports/art-4-guidance-document).

[3] For instance, no updated data available on the building stock because a new census has not be implemented.

Nonetheless, to avoid possible misunderstandings and ambiguity, for future strategies, it is recommended that Member States make explicit reference to their previous strategy, stating that no changes or updates need to be reported.

In order to be consistent with previous studies (BPIE, 2014; Castellazzi et al., 2016), in the appraisal of the strategies each section was scored on a 0-5 scale, where:

0 = MISSING – the item is not covered at all, or only described in another source

1 = UNSATISFACTORY – only the most cursory coverage of the item

2 = INADEQUATE or PARTIALLY COMPLIANT– item addressed poorly, with insufficient detail, or with important aspects missing

3 = ADEQUATE – meets the basic minimum requirements

4 = GOOD – topic is described in some detail

5 = EXCELLENT – exemplary coverage of the topic.

In addition to compliance with the requirements of Article 4 of the EED and level of detail, the assessment considered other criteria:

- Level of ambition: ambitions of the renovation targets and goals of the strategy
- Appropriateness: to what extent are the measures indicated contribute to the objectives of the strategy? Are they sufficient / appropriate to reach them?
- Comprehensiveness of policy packages covering all key sectors/actors.

The assessment exercise also identified strengths and weaknesses of each strategy and formulates recommendations.

Four different categories are set up to indicate the level of the overall compliance of the strategies; these have been determined based on the criteria reported below:

NON-COMPLIANT: two requirements or more of Article 4 are either MISSING or UNSATISFACTORY covered (i.e. scores 0 or 1)

NOT FULLY COMPLIANT: if the strategy is not compliant with only one requirement of Article 4 failed (i.e. 0 or 1), OR at least three requirements assessed to be INADEQUATE/PARTIALLY COMPLIANT (i.e. score = 2)

ALMOST FULLY COMPLIANT: if it has been assessed to be INADEQUATE/PARTIALLY COMPLIANT (i.e. score = 2) for maximum two requirements;

FULLY COMPLIANT; if the strategy meets all the basic requirements (all the scores ≥ 3) for all the requirements.

3 Assessment of the compliance with EED Article 4 mandatory elements

According to the methodology and the scoring system described in Chapter 1, each strategy has been evaluated against the five requirements of EED Article 4, namely:

(a) An overview of the national building stock based, as appropriate, on statistical sampling;

(b) Identification of cost-effective approaches to renovations relevant to the building type and climatic zone;

(c) Policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations;

(d) A forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions; and

(e) An evidence-based estimate of expected energy savings and wider benefits.

Table 1 presents the results of the evaluation of each long-term renovation strategy against the five requirements of the Energy Efficiency Directive, Article 4.

The colour coding of the first column of table 1 reflects the assessment as follows:

RED = Non-compliant strategy; two requirements or more of Article 4 are either MISSING or UNSATISFACTORY covered (i.e. scores 0 or 1)

YELLOW = Strategy not fully compliant; the strategy is not compliant with only one requirement of Article 4 failed (i.e. 0 or 1), OR at least three requirements assessed to be INADEQUATE/PARTIALLY COMPLIANT (i.e. score = 2)

LIGHT GREEN = Strategy almost fully compliant; it has been assessed to be INADEQUATE/PARTIALLY COMPLIANT (i.e. score = 2) for maximum two requirements;

GREEN= Strategy fully compliant; the strategy meets all the basic requirements (all the scores ≥ 3) for all the requirements.

Table 1. Compliance with EED Article 4 requirements 2017[4].

Member State	Overview of building stock - 4(a)	Identification of cost-effective approach - 4(b)	Policies to stimulate cost-effective renovation - 4(c)	Forward-looking perspective to guide investment 4(d)	Expected energy savings and wider benefits - 4(e)
Austria	3	3	3	2	3
Brussels Capital R.	4.5	4	4	3	2
Belgium Flanders	4	3	3	2	2
Belgium Wallonia	5	4	4	4	3
Bulgaria	4	4	3	3.5	3
Croatia	4	4	4	4	4
Cyprus	4.5	3	4	4	4
Czech Republic	3	4	4	4	5
Denmark	3	3	4	3	3
Estonia	2	3	3	2.5	3
Finland	4	3	4	3	4
France	5	4	5	3.5	3.5
Germany	4	1	4	0[5]	3
Greece	4	3	4	3	4
Hungary	4	3	3	3	3
Ireland	3	3	3	3	3
Italy	4	3	3	2	3
Latvia	4	3	3.5	3	3
Lithuania	3	3	3	3	4
Luxembourg	3	2	4	3	2
Malta	4	3	3	3	3
Netherlands	4	3	3.5	2.5	3.5
Poland	3	1	3	1	2.5
Portugal	3.5	0	3	2.5	0
Romania	4	3	4	4	4
Slovakia	4	3	3	3	3
Slovenia	4	3	4	3	4
Spain	5	4	4	4	4
Sweden	4	4	4	4	4
United Kingdom	5	2	3	2	3

Figure 1 presents a comparison of the scores of 2017 evaluations, against each of the five requirements of EED Article 4.

Overall, the highest-scored renovation strategies as regards compliance are the one from France and Spain (21/25 – 84% of total possible points), Belgium Wallonia, Czech Republic, Greece and Sweden (20/25 - 80%) and Cyprus (19/25 – 76%).

[4] The grey cells indicate that the scores are transferred from the 2014 strategy assessment as no changes or new elements are reported in the 2017 document and this has been adequately justified/explained.
[5] Score "0" indicated that no information provided on this item in the updated strategy.

Figure 1. Comparison of the scores of the 30 evaluations of Member States updated notifications.

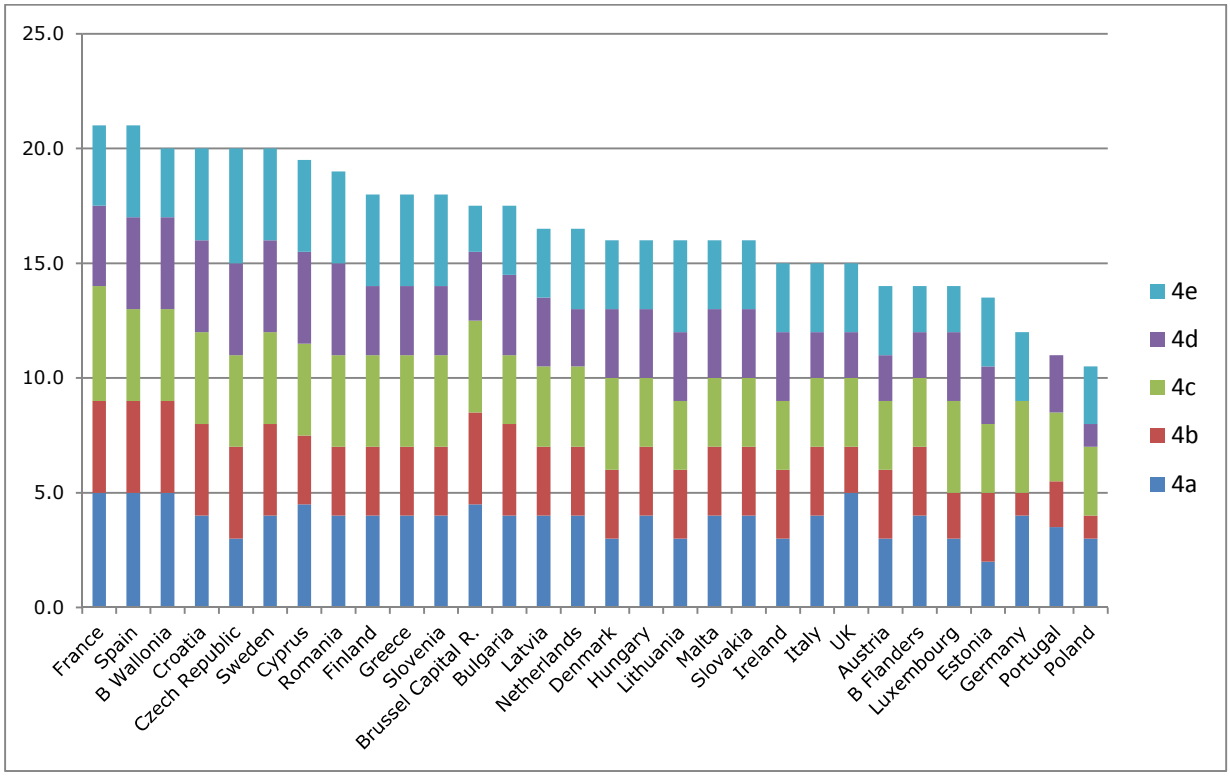


Figure 2 presents a comparison of 2014 scores versus 2017 ones. It is interesting to notice how some of Member States strategies have improved substantially. This is the case of Wallonia, Sweden, Cyprus and Bulgaria. On the other hand some Member States submitted a weaker update in 2017.

Figure 2. Comparison of the scores of 2014 vs 2017 evaluations.

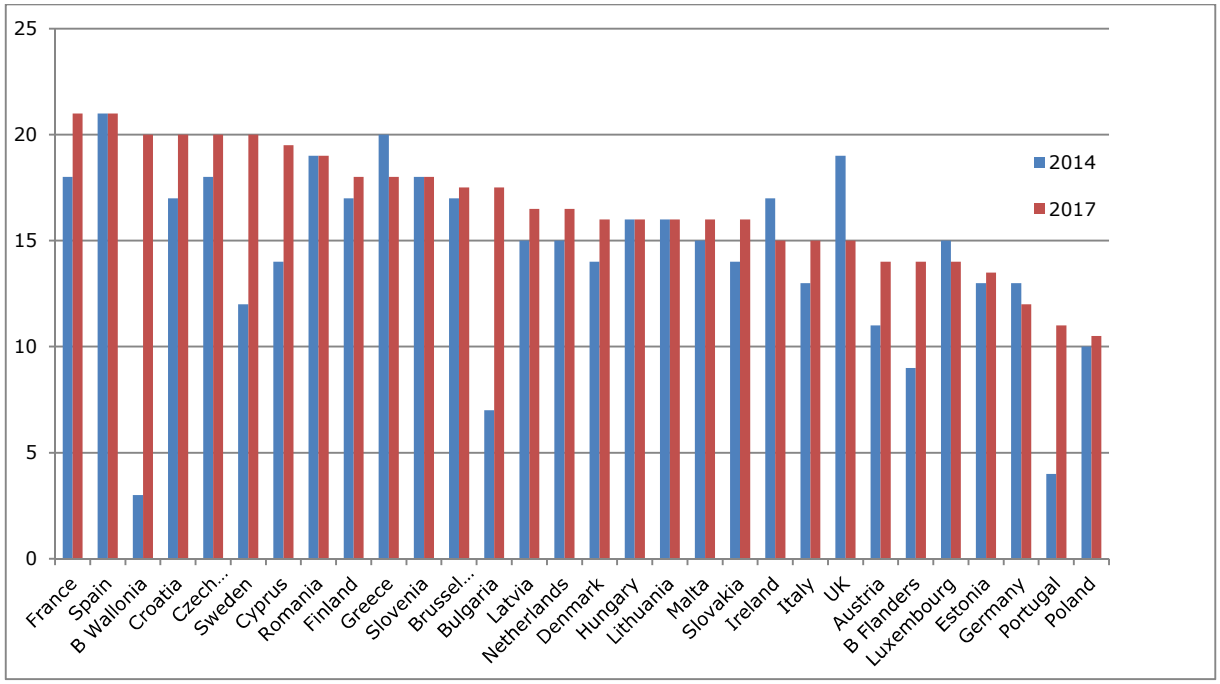


Figure 3 presents a comparison of the evaluation average scores of 2014 and 2017.

As in 2014, on average, the strategies cover better Article 4(a) and Article 4(c) sub-paragraphs (average rating 3.9 and 3.6 respectively), while the other requirements are not addressed with the same level of detail, even if the average scores improved. In particular,

Articles 4(b) and 4(e) requirements ("Cost-effectiveness approaches" and "evidence-based estimate of expected energy savings and wider benefits"), are on average, sufficiently addressed by Member States in the updated strategies (i.e. score ≥3). The "forward-looking perspective" (Article 4(d)) and the "identification of cost-effective approaches to renovations" remains the weakest sections of the updated strategies analysed.

However, for Article 4(d), we highlight an improvement, with more Member States having interpreted this requirement correctly, providing in the strategy updates different scenarios of renovation options and a clear roadmap for their implementation (e.g. Greece, Spain, Czech Republic, Romania, Belgium Wallonia, Cyprus and Sweden).

Figure 3. Comparison of the evaluations average scores of 2017 vs 2014.

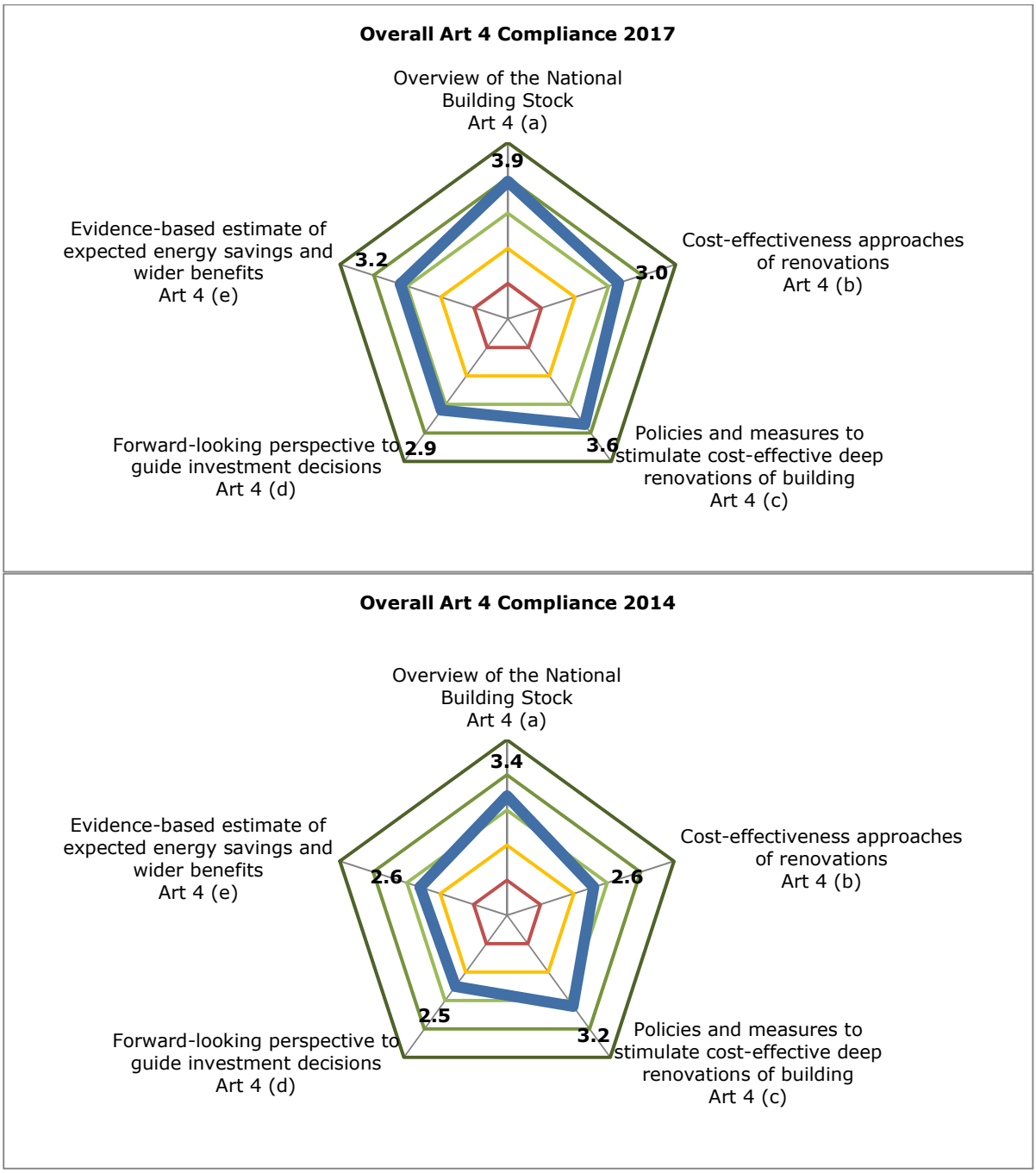
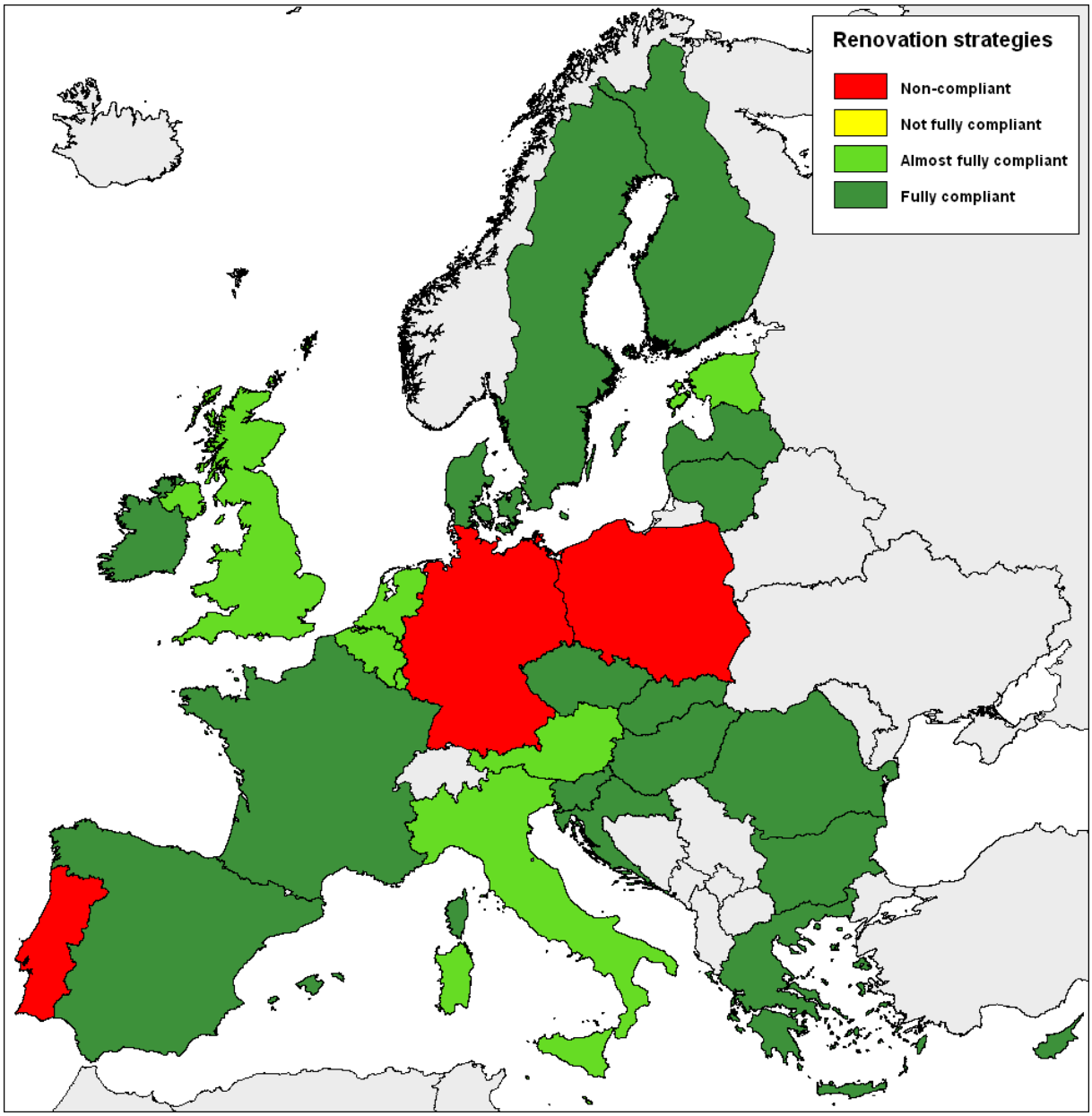


Figure 4 shows the results of the overall EED Article 4 compliance. In comparison with the 2014 evaluation round, the situation has improved, with only 3 non-compliant strategies (as compared to 6 in 2014), 8 almost-fully compliant and 19 fully compliant strategies (as compared to 10 in 2014), (see Figure 4 and Table 2).

Figure 4. Map illustrating the result of the evaluation of the 2017 renovation strategies.



Some Member States' renovation strategies, which resulted as compliant in 2014, have not been sufficiently/correctly updated in 2017 (e.g. UK). This does not necessarily translate in a negative evaluation of the overall strategy.

Non-compliant strategies

According to our analysis, only three building renovation strategies out of thirty do not meet the basic requirements of EED Article 4. This means that at least two requirements of Article 4 have been evaluated to be insufficiently covered in these strategies. This is the case of the strategies provided by the following Member States: Germany, Portugal and Poland.

Not fully compliant strategies

In this evaluation round, no strategies have been assessed as 'Not fully compliant' (i.e. as not compliant in only one requirement of Article 4).

Almost fully compliant strategies (OR Acceptable strategies)

Eight strategies have been evaluated as 'Almost fully compliant'; it means that they have been assessed to be partially compliant (i.e. score=2) for maximum two requirements: Austria, Brussels Capital Region, Belgium Flanders, Estonia, Italy, Luxemburg, Netherlands and UK.

Fully compliant strategies

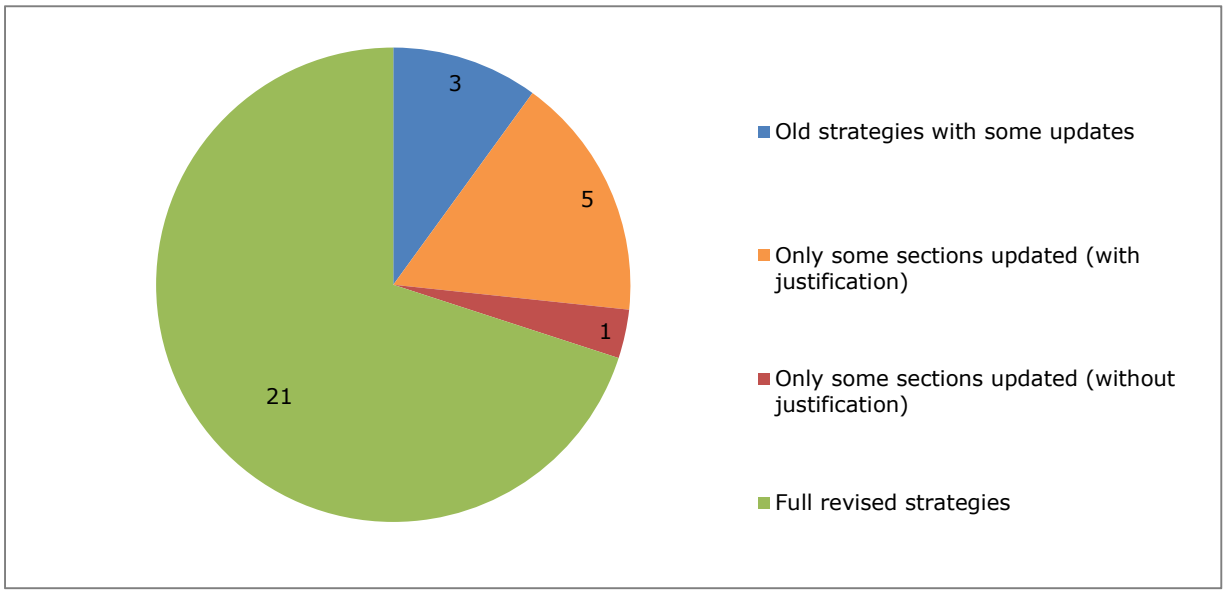
19 strategies were 'Fully compliant' to requirements of Article 4 (almost the double in comparison to 2014 evaluation round): Belgium Wallonia, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, Romania, Slovakia, Slovenia, Spain and Sweden.

Table 2. Summary of strategies compliance with EED Article 4 requirements 2017.

Non-compliant strategies Germany, Portugal, Poland
Not fully compliant strategies -
Almost compliant strategies Austria, Brussels Capital Region, Belgium Flanders, Estonia, Italy, Luxemburg, Netherlands and UK
Fully compliant strategies Belgium Wallonia, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, Romania, Slovakia, Slovenia, Spain and Sweden

As a general consideration, the 2017 assessment identified different interpretations of "strategy update" with some Member States providing almost the same text of the 2014 strategy, with minor changes, others providing a document updating only some of the sections without necessarily providing a link to the 2014 strategy; while all the others submitted a fully revised document (Figure 5).

Figure 5. Type of document provided.



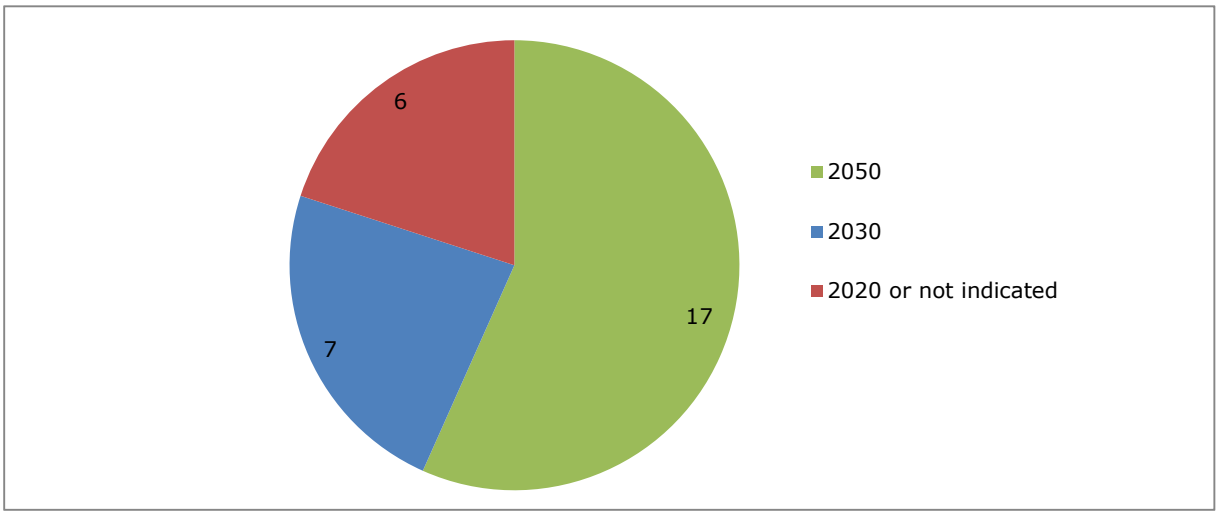
One of the key elements of an effective building renovation roadmap is to set clear and long-term targets including intermediate milestones.

This was not always the case of the assessed building 2014 renovation strategies, where a clear renovation target with intermediate milestones, was often not provided.

In the assessment of the updated strategies we found that a majority of them now includes a long-term vision towards a 2050 goal to decarbonise their building stock, with a specific milestone for 2030 (Figure 6).

Nevertheless, these targets are not uniform across different strategies, both in term of type of target (e.g. annual/cumulative energy savings, number of buildings to be renovated, etc.) and metrics (e.g. final or primary energy); see table 12 in chapter 8 for more details on the targets of the building renovation strategies.

Figure 6. Long term-target in the included in the strategies.



Concerning the coverage of each of the requirements of EED Article 4, the following updated strategies have been selected as good examples for each section, to combine a "Best of" building renovation strategy (Table 3).

Table 3. A "Best Of" building renovation strategy.

Section	**Good practice example**
Overview of building stock - 4(a)	Belgium Wallonia, France, Malta
Identification of cost-effective approach to renovation - 4(b)	Belgium Wallonia, Bulgaria
Policies to stimulate cost-effective renovation - 4(c)	France, Brussel Capital Region
Forward-looking perspective to guide investment decisions - 4(d)	Belgium Wallonia, Sweden
Estimate of expected energy savings and wider benefits - 4(e)	Cyprus, Czech Republic, Finland, Lithuania, Romania, Sweden

4 Information on the National building stock – Article 4(a)

The EED requires Member States to provide in their renovation strategies an overview of the national building stock. A good knowledge of the existing building stock is a prerequisite for the development of an effective building renovation strategy. This has been well understood and implemented and on average Member States provided a reasonably detailed description of their building stock. This section has the highest average score (3.9 out of 5).

With reference to Article 4(a), all the updated strategies were fully compliant (score ≥3), with the exception of Estonia (score=2).

In the following tables, the information on the building stock provided by each renovation strategy for the residential (Table 4) and the non-residential sector (Table 5) is shown, following the information collected in the evaluation template (see ANNEX B).

The following aspects have been considered for the evaluation of the requirement of Article 4(a):

A. Identification of main building types.
B. Number of dwellings and area.
C. Identification of age bands.
D. Identification of energy use and performance characteristics of each building combination.
E. Distribution of Energy Performance Certificate ratings by building sector/type.
F. Type of heating system.

In the next Tables (Tables 4, 5, 6, 10, 11) the following colour code has been used to report the level of detail of the information provided in the renovation strategies:

GREY = information non provided.

LIGHT BLUE = information provided with a medium level of detail.

BLUE = information provided with a good level of detail.

Table 4. Information provided in the renovation strategies on the residential building stock.

Member State/Item	A	B	C	D	E	F
Austria						
Brussels Capital Region						
Belgium Flanders						
Belgium Wallonia						
Bulgaria						
Croatia						
Cyprus						
Czech Republic						
Denmark						
Estonia						
Finland						
France						
Germany						
Greece						
Hungary						
Ireland						
Italy						
Latvia						
Lithuania						
Luxembourg						
Malta						
Netherlands						
Poland						
Portugal						
Romania						
Slovakia						
Slovenia						
Spain						
Sweden						
United Kingdom						

Table 5. Information provided in the renovation strategies on the non-residential building stock.

Member state/Item	A	B	C	D	E	F
Austria						
Brussels Capital Region						
Belgium Flanders						
Belgium Wallonia						
Bulgaria						
Croatia						
Cyprus						
Czech Republic						
Denmark						
Estonia						
Finland						
France						
Germany						
Greece						
Hungary						
Ireland						
Italy						
Latvia						
Lithuania						
Luxembourg						
Malta						
Netherlands						
Poland						
Portugal						
Romania						
Slovakia						
Slovenia						
Spain						
Sweden						
United Kingdom						

We found that data collection and description of the national building stock improved in almost all the updated strategies. This is especially the case for non-residential building stock, which was highlighted as the less covered segment in the 2014 strategies. Non-residential building stock is now better covered and described, however its data profile remains on average still less complete than for the residential building stock.

5 Cost-effectiveness approaches of renovation - Article 4(b)

The second sub-paragraph of EED Article 4 requires the identification of a cost-effective approach to renovations relevant to the building type and climatic zone. The "Commission's guidance for NEEAP" translates this point in the following key questions:

A. Have specific renovation packages that can be applied to reference buildings been identified?
B. Which technical opportunities for retrofit of energy efficiency measures have been identified?
C. Have technical opportunities for retrofit of renewable energy measures been identified?
D. Has the opportunity to connect to a district heating system been considered?
E. Has it been determined whether deep renovations should be undertaken as a single package, or staged over a period of time?
F. Have you considered the exemplary role of the public sector (at all tiers of government, as well as public services such as public housing, defence, health and education) in leading the drive towards deep renovation, and in exerting influence of citizens and businesses?
G. Different scenarios as to the rate of changes of key calculation parameters have been considered?

In agreement with this formulation, the following table (Table 6) provides an evaluation of the information included in this sub-chapter of the renovation strategies.

In a large number of cases Member States referred also in their update strategies to the cost-optimal analysis already developed in 2013 to transpose the EPBD requirements, but this point, in some cases, resulted in a non-exhaustive summary of those calculations and not fully integrated with the rest of the renovation strategy. Moreover, the fact that the update of cost-optimal calculations was planned for 2018 (after the deadline for the update of 2017 long term strategies) meant there was no substantial update of this aspect in the strategies.

A majority of the strategies (25) was compliant with Article 4(b), with only 2 not fully compliant (LU and UK) and 3 non complaints (DE, PL and PT). However, on the whole Member States have not considered whether deep renovations should be undertaken as a single package or over a period of time.

The following Member States presented a very satisfactory approach and can be considered as good practices examples for this EED Art.4 requirement: Belgium Wallonia and Finland. In both cases the description of the methodology used is very detailed and clear and included considerations on staged deep renovations, which is missing in the majority of the Member States strategies and updates.

Table 6. Information provided in the strategies on Cost-effectiveness approaches of renovation.

Member state / Item	A	B	C	D	E	F	G
Austria							
Brussels Capital Region							
Belgium Flanders							
Belgium Wallonia							
Bulgaria							
Croatia							
Cyprus							
Czech Republic							
Denmark							
Estonia							
Finland							
France							
Germany							
Greece							
Hungary							
Ireland							
Italy							
Latvia							
Lithuania							
Luxembourg							
Malta							
Netherlands							
Poland							
Portugal[11]							
Romania							
Slovakia							
Slovenia							
Spain							
Sweden							
United Kingdom							

6 Policies and measures to stimulate cost-effective deep renovations of buildings - Article 4(c)

This section is still the core part in the majority of the 2017 renovation strategies. Together with the description of the building stock, it obtained the highest marks in the evaluation with an average score of 3.6 out of 5 (see Figure 3).

According to the Guidance, Member States were requested to provide an overview of the policy measures to stimulate cost-effective deep renovation of buildings, including staged deep renovations and in particular to:

A. Give an appraisal of existing measures/policies in the Member States.
B. Provide an analysis of existing barriers to deep building renovation.
C. Give an appraisal of relevance of policies used in other territories.
D. Provide a design of new policy landscape that addresses barriers and enables the delivery of the required ramp up in deep renovation activity, with a particular focus on those measures which need to be introduced within the next 3 years.

Moreover, according to the "Commission's guidance for NEEAPs" (see Annex B, point 3) for the evaluation of the strategies, the policy measures were divided in the following categories: Regulatory, Financial and fiscal, Information campaigns, Labelling, Voluntary agreements, and other measures. Table 7 provides a detailed breakdown of the types of policy measures considered.

Table 7. Categorisation of policy measures.

Regulatory	Building codes; Minimum Energy Performance Standards (MEPS) for new and existing buildings; refurbishment obligations.
Financial and fiscal	Grants; subsidies; preferential loans; tax incentives; energy taxation, Energy Efficiency Obligation Schemes (EEOSs).
Information campaigns	Awareness raising and information campaigns.
Labelling	Energy Performance certification; energy labelling schemes.
Voluntary agreements	Voluntary certification and labelling programs; voluntary and negotiated agreements.
Others	Energy audits; skills development and capacity building programme; demonstration programmes; research and Innovation programmes; quality standards; smart meter roll-out.

Overall, Member States addressed exhaustively Article 4(c) requirements, providing a comprehensive set of policy designed to address the identified barriers, with all the 30 strategies that were fully compliant (average scores increased from 3.2 to 3.6 in comparison with 2014), while in 2014 6 strategies were not fully compliant in relation to this EED Art.4 requirement.

Table 8 presents the number of measures targeting building renovation included in the 30 analysed strategies, divided by country, type and status of the implementation (i.e. old/new).

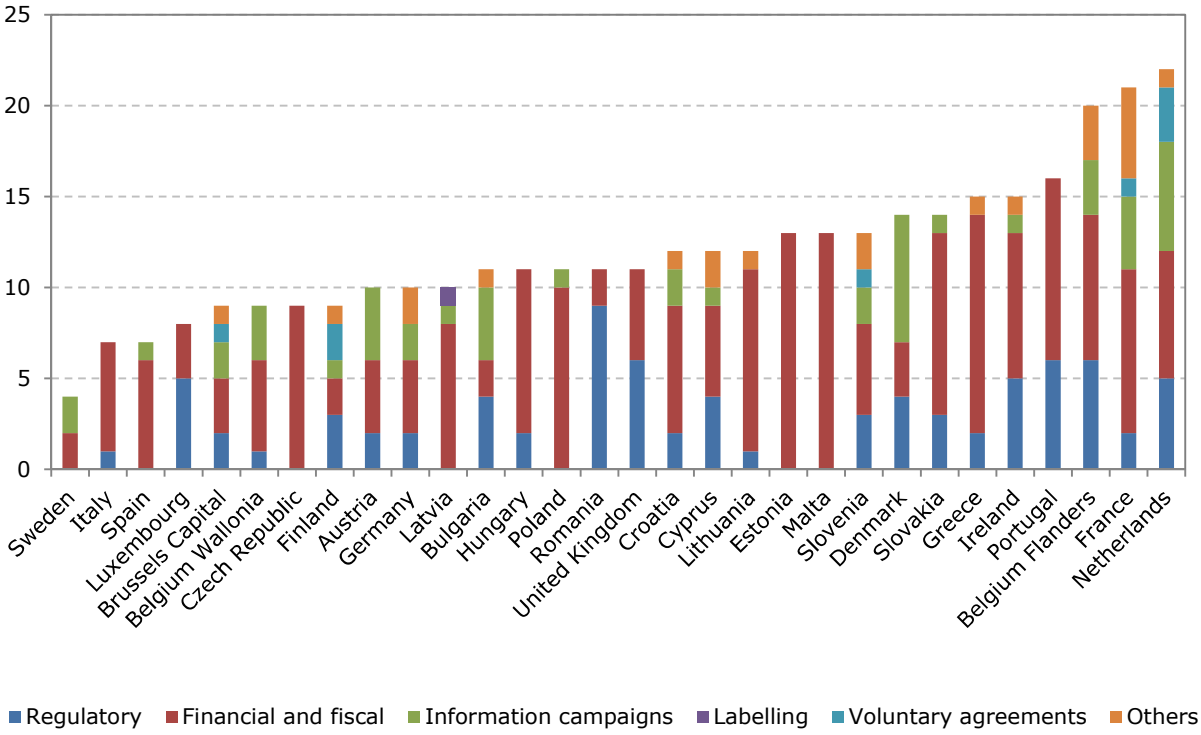
Table 8. Measures included in the strategies by country and type.

Country	Regulatory	Financial and fiscal	Info. campaigns	Labelling	Voluntary agreem.	Others	Sub Tot		Tot
							old	new	
Austria	2	4	4	0	0	0	8	2	**10**
BRC[6]	2	3	2	0	1	1	4	5	**9**
B. Flanders	6	8	3	0	0	3	17	3	**20**
B. Wallonia	1	5	3	0	0	0	6	3	**9**
Bulgaria	4	2	4	0	0	1	5	6	**11**
Croatia	2	7	2	0	0	1	10	2	**12**
Cyprus	4	5	1	0	0	2	10	2	**12**
Czech Rep.	0	9	0	0	0	0	8	1	**9**
Denmark	4	3	7	0	0	0	14	0	**14**
Estonia	0	13	0	0	0	0	5	8	**13**
Finland	3	2	1	0	2	1	9	0	**9**
France	2	9	4	0	1	5	14	7	**21**
Germany	2	4	2	0	0	2	3	7	**10**
Greece	2	12	0	0	0	1	9	6	**15**
Hungary	2	9	0	0	0	0	6	5	**11**
Ireland	5	8	1	0	0	1	11	4	**15**
Italy	1	6	0	0	0	0	7	0	**7**
Latvia	0	8	1	1	0	0	10	0	**10**
Lithuania	1	10	0	0	0	1	12	0	**12**
Luxembourg	5	3	0	0	0	0	8	0	**8**
Malta	0	13	0	0	0	0	10	3	**13**
Netherlands	5	7	6	0	3	1	7	15	**22**
Poland	0	10	1	0	0	0	9	2	**11**
Portugal	6	10	0	0	0	0	16	0	**16**
Romania	9	2	0	0	0	0	7	4	**11**
Slovakia	3	10	1	0	0	0	11	3	**14**
Slovenia	3	5	2	0	1	2	13	0	**13**
Spain	0	6	1	0	0	0	7	0	**7**
Sweden	0	2	2	0	0	0	2	2	**4**
UK	6	5	0	0	0	0	11	0	**11**
Total	**80**	**200**	**48**	**1**	**8**	**22**	**269**	**90**	**359**

There is a great heterogeneity of policy packages in different Member States, both in terms of absolute number and in terms of policy type. In general financial/fiscal and regulatory measures are the most common ones in almost all countries (see Figure 7), and both the residential and service sectors benefit from a wide range of policy measures.

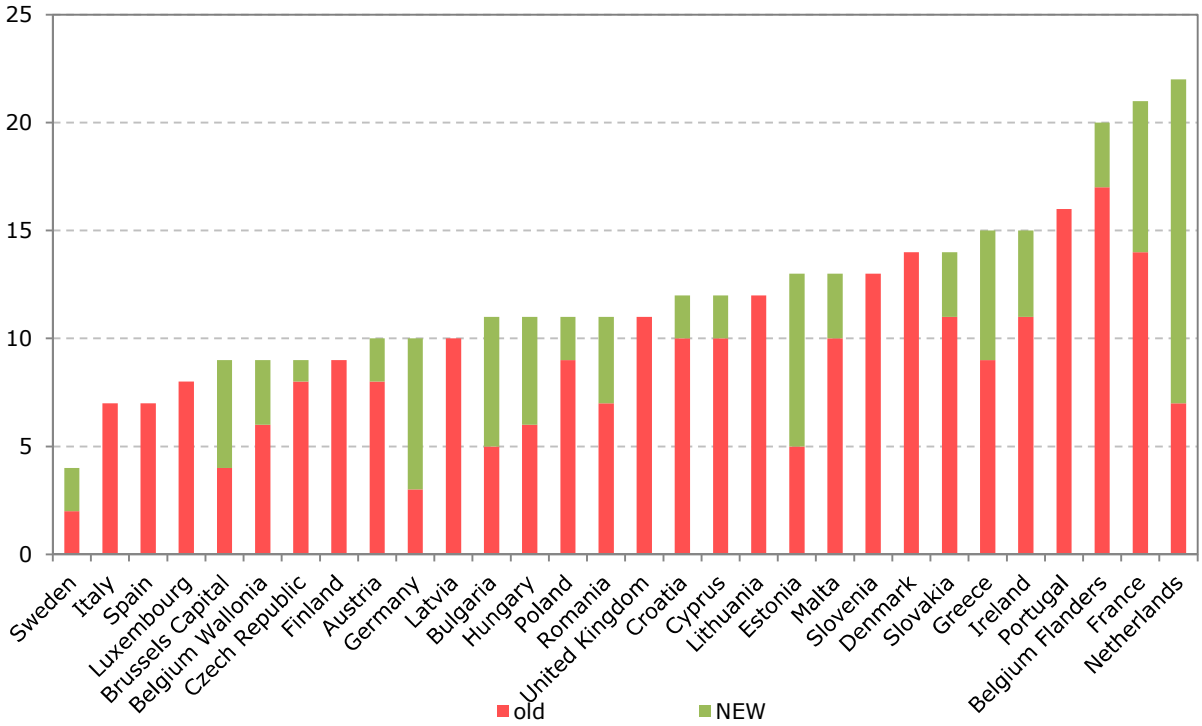
[6] Brussel Capital Region

Figure 7. Number of all the measures in the building sector (implemented and planned) by country and type.



While in all of the strategies the existing policy framework is clearly described, the vast majority of Member States reported only existing policies and only a few Member States reported new and/or updated measures for energy efficiency in buildings (see Figure 8).

Figure 8. Number of old vs new/updated measures by country.



The main categories of measure reported in the strategies are presented and discussed below.

Regulatory measures were mostly composed of requirements related to Energy Performance of Buildings Directive and Eco-design and Energy Labelling Directives. Examples include minimum energy performance requirements for new/existing buildings, inspections of water boilers and air conditioning systems and energy efficiency standards for appliances & equipment. Such measures were mentioned by Denmark, Ireland, France, Cyprus, Luxembourg, Hungary, the Netherlands, Slovakia and Finland.

A few regulatory measures enacted with the aim to address the issue of split incentives were also mentioned: the Housing Valuation System in the Netherlands now appraises energy performance – on the basis of the energy label – to promote energy efficiency investments, while a new bill was adopted on 17 May 2016 stipulating that landlords renovating their properties at nearly zero-energy or zero-energy levels can charge an energy performance surcharge to their tenants so as to earn back part of their investment costs.

France also removed some legal barriers in relation to split incentives by amending the rules on decisions on work in the Construction and Housing Code and enabling financial contribution by tenants after owners carry out energy efficiency upgrades. In France, Law No 2015-992 of 17 August 2015 on the energy transition in support of green growth (LTECV) sets ambitious objectives for the building sector, including the requirement that all buildings are renovated at 'low consumption standards' by 2050, the performance of energy efficiency upgrades of 500,000 homes per year starting in 2017 – at least half of which must be low-income households – the requirement of all private residential buildings with primary energy consumption of more than 330 kWh/m^2 to undergo energy efficiency upgrades by 2025 and the imposing of more stringent obligations regarding upgrading work in the non-residential sector every 10 years.

Specific regulatory measures for the services sector include the Luxembourgish scheme on improvement of lighting in non-residential buildings, introducing specific energy efficiency requirements for lighting in new non-residential buildings and the Dutch Environmental Management Act for non-residential buildings which places a legal obligation to take energy efficiency measures with a payback time of less than 5 years in large or medium-sized companies with energy consumption of more than 50,000 kWh and 25,000 m3 gas as well as offices, healthcare institutions and schools.

All Member States have reported **financial and fiscal measures** supporting energy efficiency improvements in the residential and service sectors. These included grants, low-interest loans and fiscal incentives. Some new measures are reported below.

- The national programme for energy efficiency of multi-family buildings in Bulgaria, providing both financial and organisational support to homeowner associations registered under the Condominium Management Act for energy efficiency upgrades of the buildings they live in.
- Two new measures in Germany: the Heating Optimisation Funding Programme, which provides funding for low-investment measures to optimise existing heating systems and the initiative 'EnEff.Building.2050' which provides funding for model projects demonstrating ambitious energy concepts for buildings/districts with the aim to encourage their widespread adoption.
- Two pilot schemes recently launched in Ireland: the expansion of the Warmer Homes scheme to homes of private tenants who are in receipt of the Housing Assistance Payment and the Deep Retrofit Pilot Scheme, a new scheme to provide financial support (50% funding of the total capital costs and project management (including design) costs) for substantial upgrades in buildings that achieve an BER level of A3 (<50 kWh/m^2) or a minimum uplift of 150 kWh/m^2 yearly, equivalent to zero energy requirements or a significant reduction in the energy required within a building. The rate of funding is up to 95% for voluntary housing association homes and energy poverty households.
- With the Federal Act, Austria brought about the establishment of a housing construction investment bank (WBIB). The housing construction investment bank is intended to provide commercial and non-profit property developers with long-term and inexpensive loans to be used for financing affordable living space. The WBIB

passes on the funds, on market terms, to non-profit and commercial property developers for the construction of housing. The funds allow rental and owner-occupied properties to be built. The main focus is on new-builds but the creation of new housing by way of renovations is also made possible.

- As of 1 January 2016, several new subsidy schemes were opened in the Netherlands ranging from support for renewable energy and energy saving in sports facilities to the acquisition of solar water heaters, heat pumps, biomass boilers and pellet stoves for households and commercial users.
- Other measures include the new Slovakian Single-family Building Insulation Support Programme announced in 2016, with an allocated budget EUR 30 million and I save I upgrade Scheme in Cyprus.

Various measures on **information and awareness-raising** have been mentioned for residential and service sectors.

- In France, 450 Renovation Information Service Points (PRIS) have been set in the country with the aim to help owners make decisions through the implementation of a national one-stop approach and a local network for the energy renovation of private dwellings. This is a genuine local public service, which provides independent technical, financial, fiscal and regulatory information and gives advice, free of charge and objectively, to the enquiring home-owner on the design of the energy renovation project.
- Since 2016, the 'Deutschland macht's effizient [Germany Makes It Efficient]' campaign has provided information on energy efficiency potentials and sources of funding to those involved in the energy transition, with a particular focus on the buildings sector.
- In Ireland, the Technical Bureau was set up in 2017, with the objective to provide tailored advice and support to schools and the Department of Education and Science and identify/take advantage of opportunities to reduce energy use and improve energy performance in school building fabric.
- The Netherlands launched the Energy Saving Expertise Centre in 2015 and its new 'Save energy now' campaign in October 2016. The latter focuses on homeowners of a label C or lower residence who are considering energy-saving measures but have not yet implemented them because of, for example, the expense, the investigation required or the mess created.

6.1 Energy poverty

Energy poverty is recognised as an increasing socio-economic issue with severe consequences in terms of health, well-being, economy and the environment. Various definitions are given in the literature and no single agreed EU-wide definition exists for energy poverty. However they all make reference to an unaffordable minimum level of energy consumption. Energy poor households experience inadequate levels of essential energy services (adequate warmth, cooling, lighting and the energy to power appliances) due to a combination of high energy expenditure, low household incomes, inefficient buildings and appliances, and specific household energy needs. It is estimated that more than 50 million households in the European Union are experiencing energy poverty.

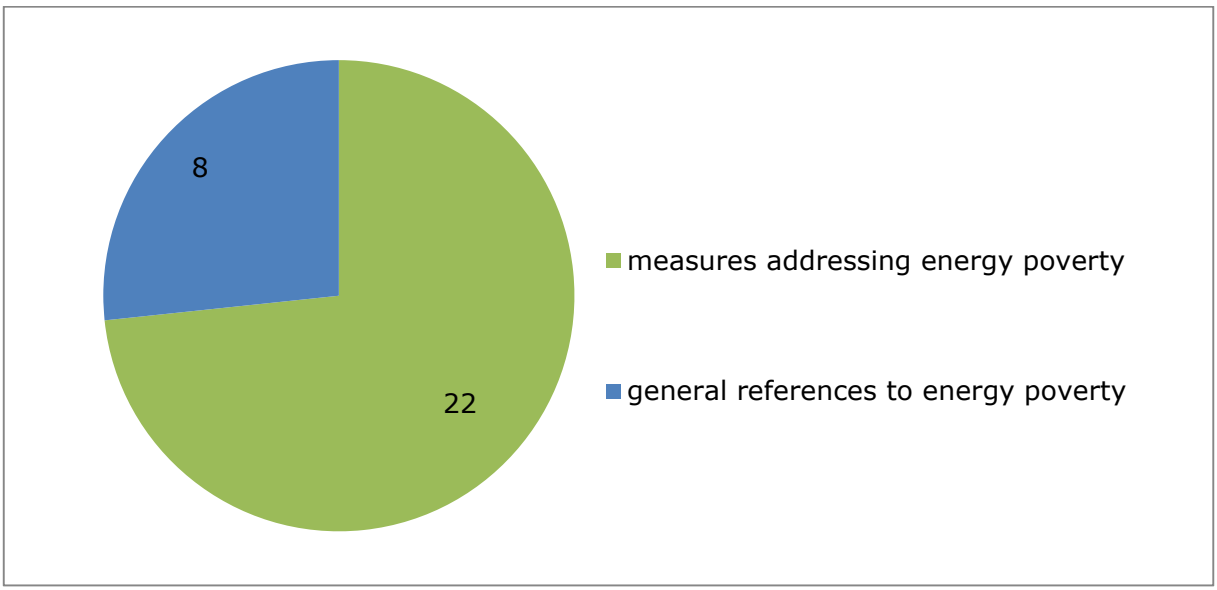
Awareness of energy poverty is growing rapidly across Europe, and the issue is being increasingly integrated within the activities of the European Union, as evidenced by the European Commission's flagship legislative proposal "Clean Energy for All Europeans" announced on 30th November 2016, where also a number of good practice examples were outlined. The launch of the EU Energy Poverty Observatory (EPOV)[7] also goes in the direction of improving the measuring, monitoring and sharing of knowledge and best practice on energy poverty. However, different views still exist across Member States on this

[7] https://www.energypoverty.eu/

topic: no uniform metrics are used to measure energy poverty or to define *vulnerable groups* in their respective legislations.

In our analysis, we found that the majority of Member States included one or more measures addressing energy poverty in their strategies. Others included some references to the NEEAP, where the topic has been addressed..

Figure 9. Energy poverty measures.



Various Member States have mentioned on-going or planned efforts related to alleviation of energy poverty. Table 9 summarises direct and indirect references identified in relation to actions addressing energy poverty issues at national level. Direct references include specific policies and measures targeting low-income households, while indirect references may refer to general strategies or initiatives which may also concern the social housing sector; however no specific measures are enacted through these latter strategies/initiatives. Many of the measures concern financial incentives targeting segments of the population considered under the energy poverty line, low-income households or social housing units. Some countries introduced specific actions targeting energy poverty under their energy efficiency obligation schemes, while other set up dedicated awareness raising and advisory services.

France and Ireland have numerous measures aimed at alleviating energy poverty. In France, fuel poverty is addressed through actions of the national housing agency and its 'Habiter mieux' (Living better) programme. France has also created a new obligation under its energy savings certificates scheme specifically aimed at combating fuel poverty. Actions funded by this scheme will be implemented among low-income households. A "Fuel poverty observatory" was also set up in France with the aim to better measure fuel poverty situations and monitor public and private financial aid granted to disadvantaged households together with actions under local or national initiatives.

Under the Government's Strategy to Combat Energy Poverty and the Healthy Ireland Framework, the Irish authorities have set up the Warmth and Wellbeing scheme, a pilot initiative with the objective to validate, in an Irish context, the international evidence that suggests making homes warmer and more energy efficient can have a positive effect on the health and wellbeing of people in energy poverty who are also living with a chronic respiratory condition such as COPD & Asthma. Ireland has also the Social Housing Investment Programme, local authorities are allocated capital funding each year in respect of a range of measures to improve the standard and overall quality of their social housing stock including retrofit measures aimed at improving energy efficiency.

In Austria, a bonus factor is included in the energy efficiency obligation scheme (EEOS) whereby savings achieved in low-income households are weighted with a factor of 1.5. In

addition, energy suppliers must make an information and advice centre available, including the provision of energy advice related to energy poverty. Other examples of dedicated regional/local programmes in Austria include the energy advice scheme in Vienna, and electricity-saving project for low-income households in the districts of Braunau, Freistadt & Linz-Land.

The Netherlands has put in place the Energy Saving Agreement for the Social Rental Sector, setting the objective for the housing association sector to achieve an energy label B (equivalent to energy index 1.25) on average by 2020.

Other examples include the PLAGE SISP programme in the Brussels Capital Region, Subsidies for implementation of individual energy efficiency measures in vulnerable households in Croatia, JESSICA programmes in Lithuania and Czech Republic, personalised advisory services for EE for households with low income in Luxembourg, etc. Italy and France have in place social bonus or discounts on energy bills for low income families.

Table 9. References to energy poverty identified in the 2017 strategies.

MS	Ref. type	Details on measures for addressing energy poverty
Austria	Indirect	Energy poverty is not directly mentioned in the LTRS, apart from the fact that part of the decrease in heating consumption could be due to "non-affordability of energy costs". In parallel, several measures presented in the NEEAP include provisions for, or are focused on low income households. From the NEEAP: - In the EEO scheme, savings achieved in low-income households are weighted with a factor of 1.5 (The eligibility criteria for the bonus in the EEO scheme is based on the eligibility to social tariff for electricity) - Energy advice (+ financial support for EE actions) by the City of Vienna for low-income households; - Scheme in Upper Austria (Braunau, Freistadt and Linz) to provide low income households with energy-efficient appliances (grants up to €250) and free energy advice (+ an "emergency assistance package");
Brussels Capital Region	Direct	Creation of the support centre SocialEnergie; Financial instrument to improve energy efficiency of social houses (PLAGE SISP); PLAGE SISP programme, coordinated by the Housing Company of the Brussels Capital Region, with the aim of continuing the momentum launched within the social housing sector by Bruxelles-Environnement in 2011
Belgium Flanders	Direct	Free of charge energy scans available for houses of vulnerable families since 2007, guidance scheme whereby vulnerable families inhabiting rental homes and related landlords receive financing and guidance from a series of promoters of energy efficiency actions implementation, 0% interest loans financed through public funds for energy efficiency investments by vulnerable families, action plan for the improvement of the energy performances of the social housing stock and pilot projects and policy measures for vulnerable families described under the section dedicated to Article 19, additional premiums distributed by electricity network operators for actions targeting social housing.
Belgium Wallonia	Direct	- PAPE programme (Subventions for public centres for social action - CPAS- to finance EE at low income households). - PIVERT programme for social housing (Financing of social houses retrofit) - Provision of energy supply at social tariffs and enlargement of the categories of protected clients (described under EEAP section dedicated to EED Article 15) - Package of measures targeting low income households (Mesures sociales).
Bulgaria	Direct	- Improving the energy performance of multifamily residential buildings will help improve living standards of vast groups of the national population (grant from Bulgarian Development Bank) - Strengthen support polices and measures targeting households affected by energy poverty - Develop and apply a socially-driven business model of entrepreneurship aimed at the construction and offering of social housing for the needy, branded as Social Enterprise Products; The mechanism supports start up enterprises and/or organisations in the construction sector established especially for the social purpose to build social housing.
Croatia	Direct	- Subsidies for implementation of individual energy efficiency measures in vulnerable households. The measure shall also establish a system for following social and demographic and energy indicators describing energy poverty at a national level, through the existing system for compiling data on the consumption and habits of households (the Croatian Bureau of Statistics). The Programme shall also develop possible extension of criteria for gaining the status of vulnerable energy buyers.

MS	Ref. type	Details on measures for addressing energy poverty
		- Capacity building for combating energy poverty: The objective of the measure is capacity building for combating energy poverty within local self-government units and in to providing information on energy efficiency measures contributing to the combating of energy poverty, and the possibilities of co-financing in this area.
Cyprus	Direct	- Ministerial Decree includes energy poverty measures for vulnerable groups such as (a) reduced prices on electricity tariffs, (b) financial incentives for participating in a scheme for installing a the net-metering Photovoltaic system with a capacity of up to 3kW, (c) financial incentives for upgrading the energy efficiency of their houses, and (d) uninterrupted supply of electricity, during critical periods for those vulnerable consumers that continuous power supply is essential for reasons related to their health. - Energy Efficiency in Low Income Housing in the Mediterranean' (ELI-MED).
Czech Republic	Indirect	Long-term low-interest loans for the reconstruction and upgrading of multi-family buildings in deprived zones provided under JESSICA programme (cited in the NEEAP)
Denmark	Direct	- Reduce the financial uncertainty for residents of existing social housing when major energy renovations are carried out by developing a special model whereby the housing organisations' special reserve funds can be used to provide a guarantee for energy savings, in addition to a guarantee from a technical adviser or any other party to the building project. - Promote energy renovation work in existing social housing by developing a flexible digital energy-renovation platform with a coordinated collection of instructions and planning and calculation tools that can be used to plan, project-manage, implement and operate major energy-saving exercises. The platform will be developed together with the social housing sector and will be continuously expanded on the basis of experience from e.g. trials and demonstration projects.
Estonia	Direct	- Measure "providing maintenance allowances to people with low incomes"; - The loan guarantees offered by KredEx makes possible for owners who would not have access to credit (due to too low creditworthiness according to private bank criteria) to be able to beneficiate from a loan in case of a renovation of a multi-apartment building. Moreover KredEx can also offer solutions to owners who would face temporary difficulties to pay the loan reimbursements.
Finland	Direct	- Energy subsidies for detached houses addressing low-income private householders; - Social housing (interest subsidy loans for the renovation of rental and right-of-occupancy dwellings).
France	Direct	- Creation of a new energy-saving obligation for households in fuel poverty: fuel poverty energy savings certificates; - Support for low-income households in paying their energy bills with the creation of the 'energy cheque'; - From 2017 at least 250 000 occupied by low-income households must be renovated to improve energy efficiency each year; - 'Habiter mieux' (Living better) renovation programme: subsidies for expenses (capped at EUR 20,000) linked to refurbishment, the amount of which depends on household income (35% for low-income households, 50% for very low-income households); - For low-income households, the Anah's digitisation programme will also enable better monitoring of renovations with the support of Anah operators; - Establishment of the Fuel Poverty Observatory ONPE.
Germany	Indirect	Electricity-saving checks for low-income households (caritas).
Greece	Direct	The 'Saving at home II' programme and the scheme to replace oil boilers with gas boilers are focused on providing financial incentives to "low-income owners".
Hungary	Direct	- Some sub-programmes were explicitly announced for low-income social groups where energy efficiency investments often do not have enough resources", in particular programmes to replace appliances focused on retired persons and large families; - A targeted energy savings information programme is under planning, with a particular focus on "households subject to energy deprivation in disadvantaged areas".
Ireland	Direct	- Warmer Homes Programme and Wellbeing Pilot Scheme: free energy efficiency upgrades for people in or at risk of energy poverty, providing attic and cavity wall insulation, ventilation, draught proofing, lagging jackets, energy efficiency light bulbs and energy advice (Grant schema under Better Energy Programme); - Adaptation of the Strategy to Combat Energy Poverty in 2016; - Social Housing Investment Programme; - Housing Aid for Older People; - Design Guidelines for Social Housing; - Social Housing Upgrades (DHPCLG).

MS	Ref. type	Details on measures for addressing energy poverty
Italy	Direct	- The Law 11 December 2016 has extended the 65% tax deduction on energy efficiency measures improving the energy class of buildings to December 2017 also allowing social housing buildings owners to take part to the scheme; - "Bonus sociale" Discounted energy bills for low income families.
Latvia	Direct	- Improvement of heat insulation of social residential buildings: 75% of total cost incentives if consumption reduced by 20% (activity 3.4.4.2.0, a European Structural Funds programme).
Lithuania	Direct	- Reducing disparities in living conditions between major cities and other towns. Improving energy efficiency of buildings in low income households through EU funds and co-financing; - 'JESSICA Holding Fund' of Operational Programme for Promoting Cohesion administrated by the Ministry of the Environment (2007-2013) supporting renovations of public sector buildings and social housing in multi-apartment buildings.
Luxemburg	Direct	- Personalised advisory services for EE for households with low income and subsidies (EE equipment) provided by Myenergy/KLIMABANK facility; - Interest free loans to households with low income; - "Klimawohngeld‟ Financial aid for low income households as compensation for incrase of rent.
Malta	Direct	- Energy Efficiency for vulnerable households, a measure contributing towards Article 7, aims to replace appliances in a number of vulnerable households annually (Energy & Water Agency visits vulnerable households to raise awareness on energy usage and provide energy saving tips); - Technical personnel from the Energy & Water Agency visit vulnerable households to raise awareness on energy usage and provide energy saving tips. The visit shall determine whether key appliances are in need of replacement with more energy-efficient appliances; - Energy Efficiency in Low Income Houses in MED Grant Scheme.
NL	Indirect	No reference to energy or fuel poverty, low income or vulnerable households in LTRS, but specific objectives for social housing and some measures listed in the 2017 NEEAP: - Energy Saving Agreement for the Social Rental Sector with the objective for the housing association sector to achieve an energy label B by 2020; - Revised Housing Valuation System to include energy label; - Government subsidy (€ 400 million) for investments in energy-efficiency for social housing landlords.
Poland	Indirect	- "Thermomodernisation" actions contribute to reducing the risk of energy poverty and improve the building use conditions; - Some regional Operational Programmes support projects that combat energy poverty.
Portugal	Indirect	It is mentioned that PT is one of the countries with greater energy poverty levels.
Romania	Indirect	From the NEEAP: - Establishment of an objective to eradicate fuel poverty through enhancing energy performance of the building stock (Addressing the poor energy performance in the housing sector for many disadvantaged Romanian citizens would be a major boost to their quality of life); - Supporting the economic and social regeneration of disadvantaged communities in the urban area; - Facilitating the upgrade of all social housing to high energy performance levels.
Spain	Direct	Introduction of "bono-social", discount that acts as a mechanism to protect consumers who belong to certain groups defined as this type of vulnerable consumer. People have the right to apply to bono-social in their main residence if: -- Having contracted power lower than 3 kW in their main residence; -- Being 60 years old or over and being a Social Security system pensioner due to retirement, permanent disability and widowhood, thereby receiving the minimum amount in force at any time for these types of pension with respect to pensioners with a dependent spouse or pensioners without a spouse living as single-person financial unit; -- Being 60 years old or over and being a beneficiary of pensions from the defunct Required Ageing and Invalidity Insurance and of non-contributory retirement and disability pensions; -- Being a large family; -- Being part of a family unit in which all the members are unemployed; The 'bono social' works by applying the relevant last-resort tariff (with or without time-of-day differentiation), calculated as a 25 % discount on the Voluntary Price for the Small Consumer.

MS	Ref. type	Details on measures for addressing energy poverty
Slovenia	Direct	- Assistance scheme for energy renovation for vulnerable population groups; - New financing model (100% grant) for co-financing energy building renovations. Total value of 5 million EUR of subsidising measures on efficient use of energy for approximately 500 households with lower income in a single and two-apartment building.
Slovakia	Direct/ Indirect	- Measures against poverty are in place under the National Framework Strategy Promoting Social Inclusion and Combating Poverty (2015) and its subsequent Update (2017); legislation that specifically addresses energy poverty. is Act NNo. 321/2014 and Act 417/2013 (on tariff structures and assistance in covering the cost of housing and energy services). In 2014 the Authority for the regulation of network industries published the strategic document: "Concept for Protecting Customers Eligible for the Measures of Energy Poverty", approved and adopted by the government.
Sweden	Direct	- Financial support was established in 2016 for renovation of rental accommodation in socio-economically vulnerable areas and to make that accommodation more energy-efficient; - Aid for improvement and increases in energy efficiency of rental accommodation. The aid for energy efficiency measures is calculated on the basis of the energy saving achieved after the renovation. That part of the aid goes to the property owner. To obtain that part of the aid, the renovation must lead to an improvement in the energy performance of ≥ 20 %; - Subsidies for improvement of energy efficiency in buildings containing residential apartments that are let with a right of tenancy and that are located in residential areas where more than 50 % of households have low purchasing power.
UK	Direct	- Government's commitment to insulate one million more homes between 2015 and 2020 in support of its commitment to tackle fuel poverty through the Energy Company Obligation; - Home Energy Efficiency Programmes for Scotland: Area Based Schemes designed to target fuel poor areas to provide energy efficiency measures to a large number of Scottish households and help reduce fuel poverty.

7 Forward-looking perspective to guide investment decisions - Article 4(d)

In this section Member States are asked to indicate their projections, including a solid methodology, to simulate the development of the national building stock up to the 2050 horizon. It is essential to provide key actors with sufficient time and certainty to prepare and plan for changes in a sustainable way. In this context, policies should be designed to provide appropriate long-term signals to the market, and communicated so that consumers and all stakeholders understand the overall objective and can plan their investment strategies with confidence.

Based on the building stock segmentation data and consumption data, and after having defined the investment costs needed to reduce the energy consumption at building level (by the cost-effective analysis), this section should evaluate different intervention scenarios which correspond to different impacts of the strategy. The assumptions should be well discussed and the final results properly presented.

In comparison to the 2014 evaluation round, when only a few Member States (i.e. Croatia, Czech Republic, Greece, Romania and Spain) interpreted the Article 4(d) requirements correctly, the updated strategies cover this EED provision better, with an increased number of Member States that provided a scenario analysis on the renovation intervention options.

In line with Commission guidance, the following aspects have been considered for the evaluation of Article 4(d):

A. Have been a scenario analysis included?
B. Quantification of the total annual investment requirements, mapped out over the period to 2050, in order to deliver the identified renovation opportunities;
C. Identification of existing sources of funding for building energy renovation: i) owners' private equity; ii) public purse (including EU Structural and Innovation Funds); iii) banks and other sources of private investment (e.g. pension funds);
D. Analysis of the barriers to investment
E. Identification of possible funding sources and mechanisms to meet the identified investment profile / Identification of possible funding sources and mechanisms to meet the identified investment profile.

As indicated in Table 3, for this section Belgium Wallonia, Cyprus, Bulgaria and Greece can be highlighted as good examples, as they provide complete and detailed information updates on all the sub-sections of Article 4(d).

Table 10. Information provided in the strategies on Article 4(d) prescriptions.

Member state / Item	A	B	C	D	E
Austria					
Brussels Capital Region					
Belgium Flanders					
Belgium Wallonia					
Bulgaria					
Croatia					
Cyprus					
Czech Republic					
Denmark					
Estonia					
Finland					
France					
Germany[8]					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Luxembourg					
Malta					
Netherlands					
Poland					
Portugal					
Romania					
Slovakia					
Slovenia					
Spain					
Sweden					
United Kingdom					

[8] No elements on Art.4(d) are reported in the 2017 document.

8 Evidence-based estimate of expected savings and wider benefits – Article 4(e)

The last sub-clause of Article 4 requires providing an evidence-based estimate of expected energy savings and wider benefits. According to the Commission's guidelines, the strategies have to address the following questions:

A. Has the attractiveness to building owners of their direct benefits been identified?
B. Have the societal benefits arising from deep renovation been identified?
C. Have ways in which externalities (e.g. societal benefits from reduced CO_2 emissions, increased energy security, etc.) can be internalised for the benefit of the investor been identified?

In addition to these aspects, it has been assessed whether the benefits (e.g. energy savings, employment, CO_2 reduction, social/health, energy security) have been clearly quantified in the strategy (see column D of Table 11).

Table 11 provides an evaluation of the level of detail of the information included in the strategies on EED Article 4(e) requirements.

The least covered issues are still those related to the "internalisation of externalities" (i.e. societal benefits translated into benefits for the investor) and the numerical quantification of the benefits, although this latter aspect has improved in comparison to the 2014 strategies.

Overall, as in 2014, the strategies performed quite well on this Article 4 notification sub-chapter (i.e. 25 strategies were assessed as fully compliant with scores ≥3, and only 1 non-compliant), with the ones provided by Croatia, Cyprus, Czech Republic, Finland, Greece, Lithuania, Romania and Sweden that scored the best marks.

Among these, the Czech Republic strategy has been evaluated as best practice. It provides a very detailed estimation of the benefits arising from building renovation activities. In the provided Article 4 notification, five renovation scenarios have been analysed in terms of energy savings, induced employment generated, energy cost savings, total induced GDP and carbon emission reduction by 2020, 2030 and 2050.

Table 11. Information provided in the strategies on Article 4(e) sub-paragraph.

Member state / Item	A	B	C	D
Austria				
Brussels Capital Region				
Belgium Flanders				
Belgium Wallonia				
Bulgaria				
Croatia				
Cyprus				
Czech Republic				
Denmark				
Estonia				
Finland				
France				
Germany				
Greece				
Hungary				
Ireland				
Italy				
Latvia				
Lithuania				
Luxembourg				
Malta				
Netherlands				
Poland				
Portugal[9]				
Romania				
Slovakia				
Slovenia				
Spain				
Sweden				
United Kingdom				

One of the key elements of an effective building renovation roadmap is to set clear and ambitious targets including intermediate milestones.

It was found that the majority of the updated strategies include a long-term vision towards a 2050 goal to decarbonise their building stock, with specific intermediate building stock milestones (see Table 12).

It can be noted that these targets are not uniform among different strategies, both in term of temporal horizon (e.g. 2016, 2020, 2050), type of target (e.g. annual/cumulative energy savings, number of buildings to be renovated, etc.) and metrics (e.g. final or primary energy).

[9] No elements on Art.4(e) provisions are reported in the 2017 document.

Table 12 Strategies Building renovation targets and/or expected energy savings.

Member state	Building renovation strategies energy saving targets and expected energy savings
Austria	2020: 3% estimated building sector energy use reduction in the in 2020, compared to 2013.
B. BCR	2020: 5% of total renovations are supposed to allow achieving a NZEB standard by 2020.
Belgium Flanders	2020: 4288 GWh energy saving of final energy and 4581 GWh for primary energy and 20% of total renovations are supposed to allow achieving a NZEB standard; 2050: All existing residential buildings must reach same or comparable energy performances as newly constructed residences for which permit applications were submitted in 2015.
Belgium Wallonia	2050: - overall 77% building sector energy consumption reduction by 2050, in comparison to 2013 values - for the residential sector, overall average energy consumption of 85,5 kWh/m2/y at 2050 - for the service sector, on average energy neutral by 2050.
Bulgaria	n/a
Croatia	2050: 80% reduction of GHG emissions in the building sector; All buildings are almost zero energy buildings or with a high level of energy efficiency; 2040: 65% of buildings are nearly zero-energy buildings or with a high level of energy efficiency; Around 3.5% of the buildings is renovated annually; 4% of historical buildings or buildings of cultural significance are renovated annually; 2030: 30% of the building has been renovated to the level of nearly zero-energy and high energy efficiency properties; Around 3.5% of the buildings is renovated annually; 2025: 15% of the building has been renovated to the level of nearly zero-energy and with high energy efficiency properties; Around 3% of the buildings is renovated annually; 2020: 5% of the building has been renovated to the level of nearly zero-energy and high energy efficiency properties; About 1% of the building is renovated annually to the level of zero-energy buildings
Cyprus	2030: only scenario analysis estimates are provided (not defined targets): 10% reduction of final energy consumption increase in the BAU scenario; stabilisation of final energy consumption to 2015 levels in the alternative scenario.
Czech Republic	2050: 349 PJ Energy savings generated through implementation of Scenario 4 (most appropriate) and compared to initial situation.
Denmark	2050: The expected benefits from the strategy are 35% reduction in net energy consumption for heating and hot water in the building stock by 2050 compared to 2011.
Estonia	2030: renovating about 42% of the housing areas between 2017 and 2030.
Finland	Estimated impact of renovation on energy consumption: -8% by 2020, -37% by 2050 (-8115GWh by 2020, -36889 GWh by 2050); 2050: 80-95% CO2 emission reduction
France	2020: Energy consumption of existing buildings should be reduced by 38% by 2020 and 400,000 dwellings should be energy renovated every year starting from 2013[10]; 2010-2035: energy saving in building renovations 22.5 Mtep; 2050: building stocks entirely renovated in line with the 'low-consumption building' standards.
Germany	2020: energy savings 337 PJ/year for period 2008-2020[11]; 2050: an almost climate-neutral building stock by 2050, meaning a reduction of around 80 % in non-renewable primary energy consumption compared to 2008.
Greece	2030: Transition to a sustainable building stock by 2030, i.e. gradual and coordinated improvements to the building stock so that 7 % of existing residential buildings will have been renovated to improve their energy performance by 2030[12];

[10] French Grenelle law (2009) - article 5. In 2013 an Energy Renovation Plan for Housing was adopted; the aim is to have, by 2017, 500.000 dwellings renovated each year. The plan includes all the policies and measures adopted by the government to reach its 38% reduction of energy consumption of existing buildings by 2020.

[11] This estimate savings from building related measures set in the second NEEAP; most of the energy savings in buildings should be resulted from implementation of EE Ordinance for residential and non-residential buildings. The rest should be resulted from different KfW programmes for buildings including 70PJ/year from the KfW EE renovation programme.

[12] In the previous strategy (2014) a 2050 target (i.e. "Renovation of at least 80% of the existing building stock by 2050" was indicated. We assume that the official LTRS target is the one indicated in the 2017 strategy.

Member state	Building renovation strategies energy saving targets and expected energy savings
Hungary	2020-2030: Primary energy saving target for the building sector: 49PJ/y at 2020 and 111 PJ/year by 2030; A scenario analysis on building stock consumption and possible energy saving up to 2050 is also provided.
Ireland	2050: Target to deliver a near-zero emissions building sector by 2050[13]; Additional target to reduce energy usage in the public sector by 33% by 2020[14] .
Italy	2020: - Building sector energy saving target: 4.9 Mtoe/y final energy savings by 2020 (3.67 Mtoe/y in the residential sector, 1.23 Mtoe/y in service sector); - A reduction of 24% primary energy consumption is foreseen in comparison with the business as usual scenario by 2020
Latvia	By 2030 the average consumption of thermal energy for heating will be reduced by 50 % against the current indicator[15]. Latvia committed to renovate 3% of State owned and used building areas each year, so that energy savings of 186 GWh over the 2014–2020 period will be achieved.
Lithuania	2020: at least 500 GWh of thermal energy to be saved (i.e. for space heating); 2030: 4,000 residential buildings renovated.
Luxembourg	n/a
Malta	2030: total cumulative savings 4,591 toe (53.4 GWh) of delivered energy saved, and over 11,000 dwellings renovated[16].
Netherlands	2020: The Dutch Energy Agreement[17] set the following goals for existing buildings: 300,000 existing buildings per year to improve by at least two energy label steps, and an average social rental property to achieve label B, while 80% of private rental to achieve minimum label C in 2020; 2030: At least an average energy label A for all buildings in 2030; 2050: CO_2-neutral low temperature heating by 2050.
Poland	2020: nearly-zero energy buildings by 2021.
Portugal	Only a general target is indicated: *"The general target for the coming ten years include an investment amount which could reach 1.4 billion euros to rehabilitate more than one million square metres (800,000 square metres for housing and 200,000 for commerce)".*
Romania	2030: 27% energy savings in the building sector by 2030.
Slovakia	2020: 70.8 % of multi-apartment buildings and 45.5 % of single-family buildings should have been renovated; 2030: all multifamily buildings renovated. Projected energy savings: 6928.6 GWh up to 2030; 2043: all single family buildings renovated by 2043.
Slovenia	2020 and 2030: Final e energy consumption in building decreased by at least 16% by 2020 and 30% by 2030 (compared to 2005); 2050: almost carbon-free energy use in the building sector.
Spain	2020: 16% energy saving in the building sector; 2030: 37% energy savings; 2050: 67% energy savings.
Sweden	2050: 18091 GWh net heat savings in entire building stock by 2050
United Kingdom	No info in the updated strategy. While the United Kingdom set a very clear and ambitious overall sectors legally binding target (i.e. cutting carbon emissions by 80% by 2050), specific targets for the building sector are not clearly indicated, except for new buildings (i.e. the introduction of zero carbon homes standards for new homes in England by 2016).

[13] These targets were in the previous strategy and in the 2017 NEEAP, not in the 2017 LTRS.

[14] Modelling undertaken by SEAI predicts that current efficiency measures will lead to a decrease in overall residential energy demand of 16% by 2020.

[15] Which is approximately 200 kWh/m^2/year with climate correction (in 2009 – 202 kWh/m^2).

[16] Based on the current renovation trends, and assuming that as legally required, buildings undergoing renovation will be renovated to the level required by new buildings.

[17] The Dutch building renovation strategy is developed in the framework of the Energy Agreement for Sustainable Growth, published in September 2013, aimed at achieving 80-95% reduction in CO_2 emissions by 2050, and at least a 40% CO_2 reduction in 2030.

9 Summary and conclusions

As a result of the assessment of the 2017 update of the long term building renovation strategies of Member States, required under EED Art 4, 3 strategy updates were considered non-compliant, and 27 compliant (fully or almost-fully). Even if it is difficult to compare the evaluation of two different documents, we can observe an important improvement, with respect to the previous assessment of the renovation strategies submitted in 2014.

Overall, the majority of the updated strategies satisfactorily address the main elements of the Energy Efficiency Directive (27 out of 30). The highest-scored renovation strategies as regards compliance are the one from France and Spain (21/25 – 84% of total possible points), Belgium Wallonia, Croatia, Czech Republic, Greece and Sweden (20/25 - 80%) and Cyprus (19/25 – 76%).

On average, the updated strategies cover better Article 4(a) ("overview of the building stock") and Article 4(c) ("measures and policies") sub-paragraphs with average rating 3.9 and 3.6 respectively. Instead the other requirements are not addressed at the same level of detail. In particular, Article 4(e) requirements ("evidence-based estimate of expected energy savings and wider benefits"), are on average, sufficiently addressed by Member States in the updated strategies (i.e. score ≥3). The "forward-looking perspective" (Article 4(d)) and the "identification of cost-effective approaches to renovations" (Article 4(b)) remain the weakest sections of the updated strategies analysed.

However, for Article 4(d), we highlight an improvement (with respect to 2014 submitted strategies) with more Member States that interpreted correctly this requirement, providing in the strategy updates different scenarios of renovation options and a clear roadmap for their implementation (e.g. Greece, Spain, Czech Republic, Romania, Belgium Wallonia, Cyprus and Sweden). As already indicated in the previous evaluation exercise, it is important to have alternative scenarios for building stock and to evaluate the cost-effectiveness of different options under each scenario. This should in turn offer a tool to decide the most appropriate (cost-effective) level of intervention.

On average the Member States provided a reasonably detailed description of their building stock. This section has the highest average score (3.7 out of 5). With reference to Article 4(a), all the updated strategies were fully compliant (score ≥3). Data collection and description of the national building stock improved substantially, compared to the weaknesses highlighted in the 2014 strategy assessment. This is especially the case for non-residential building stock, which was indicated as the less covered segment in 2014 strategies.

Member States addressed exhaustively Article 4(c) requirements, providing a comprehensive set of policy designed to address the identified barriers, with all the strategies that were fully compliant (average scores increased from 3.2 to 3.6), while in 2014 6 strategies were not fully compliant in relation to this EED Art.4 requirement. Financial, fiscal and regulatory measures continue to dominate in terms of the type of policy measure implemented by Member States to stimulate cost-effective deep renovation. On the other hand a weak part of the strategies remains the evaluation and monitoring of implemented policies. This should be addressed also with the development of specific monitoring indicators.

One of the key elements of an effective building renovation roadmap is to set clear and ambitious targets including intermediated milestones. This was well understood by Member States and a majority of updated strategies, included a long-term vision towards the 2050 goal to decarbonise their building stock, with specific intermediate targets.

In terms of documenting wider benefits of energy efficiency measures, the "internalisation of externalities" (i.e. societal benefits translated into benefits for the investor) and the numerical quantification of the benefits remain weak.

Our analysis revealed that energy poverty issues are well covered and addressed in the majority of the strategies, which include one or more measures addressing this important issue.

The 2017 assessment identified different interpretations of "strategy update" with some Member States providing almost the same text of the 2014 strategy with minor changes, others providing a document updating only some of the sections without necessarily providing a link to the 2014 strategy, and the others submitting a fully revised document.

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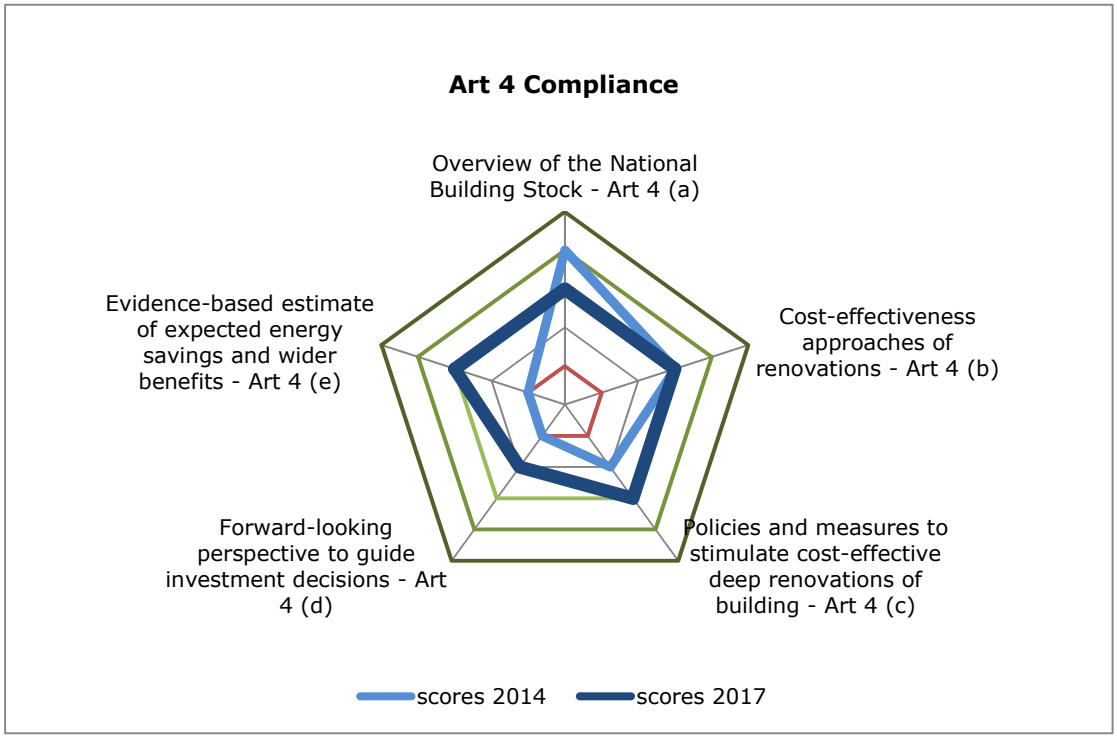
Annex A - Summary of the detailed assessment of the 2017 Long-term renovation strategies

AUSTRIA

Document Information	As in 2014, the Austrian long-term renovation strategy (LTRS) was provided as an annex (Annex B) of the NEEAP. The document is available in English.		
National Building Renovation Strategy (Art 4 EED) Introduction	The content of the annex is structured following the requirements of EED article 4 (points (a) to (e)), which differs from the 2014 report. The main part is the description of the regional and Federal financial incentives, with information very similar to 2014 (no major change). Some clarifications are brought about the interpretation of "cost-effective approach". And national statistics about space heating and domestic hot water consumption are used to analyse the trend between 2002 and 2014 and estimate future savings if this trend would continue.		
Overview of the National Building Stock - Art 4 (a)	yes	No update of the data compared to the 2014 report. Data are still based on the national statistics for the year 2011, from Statistical Yearbook 2014; no data about non-residential buildings are provided. It seems that the information provided in the 2017 document should be seen as a complement to the information provided in the 2014 (but this is not explicit): the 2014 report provided a detailed description of the building stock in a disaggregated way, to show the data used to estimate the energy savings from a scenario taking into account the renovation rate based on policy measures in place at that time. No data were given about the changes in number of building or housing units over time; the 2017 report provides the evolution of the number of building and housing units from 1869 up to 2011 (+the population development over 2002-2012 with the trend expected until 2020).These new data are likely from the national census, therefore with no	3
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	The 2017 report presents different ways to consider/define a "cost-effective approach to renovation", according to the type of policy instrument: regulation for major renovations, regulation for "individual renovations" (= per component), requirements set for the regional incentive schemes, requirements set for the Federal incentive scheme (renovation cheque) + the case of cost-optimality (report for EPBD). AT objective is to promote major/deep renovations, but it is acknowledged that this may not necessarily achieved at once (cf. "open timescale"). Therefore, the selected approach is to set cost-optimal levels per component that do not preclude achieving deep renovation in a step-wise way. The report gives estimates of energy savings gains for "average" buildings built before the 1st energy regulation: -10% for top-floor ceiling; -20% for external wall; -10% for windows; -10% for heating system (or -50% for a deep renovation as a whole).	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	No major change compared to 2014. Indeed most of the text about the policy measures is very similar and has only been slightly updated. Therefore the comments made in 2014 are still applicable. Like in 2014, the 2017 report does not include an analysis of the barriers to energy renovation. For example, it is not clear whether Austria has enough skilled professionals, or if efforts would be needed to train and qualify more professionals. The 2017 report does not show clearly the progress achieved compared to 2014. Only two quantitative results are given: - around 10400 renovation projects were supported by the Federal incentive (renovation cheque) in 2016, for total investments of 370 million euros (for 43.5 million euros of Federal budget; not clear if regional incentives could be cumulated with the renovation cheque); - renovation of about 30000 houses and apartments supported in Lower Austria over 2012-2016 (5 years), which would represent about 6000 renovations/y. Assuming no double counting between both, this would mean about 16400 renovations/year, i.e. close to 0.7% of the residential building stock. This result is a lower bound of the total results for Austria, as no result is given about the regions other than Lower Austria. So despite the lack of details provided in the report, it seems likely that the Austrian achievements are significant.	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	no	No assessment of the funding that would be needed to renovate the building stock is provided. Federal and above all regional programmes provide financial incentives. However the details provided in the report do not make possible to know what would remain to be paid by the building owners, and whether they can easily access to complementary financing solutions (e.g. own savings, bank loans). No roadmap in terms of intermediate targets and/or milestones. Most regional incentives have been in place for many years, so this support seems to be stable. And the report mentions for many of them that their conditions are regularly updated. However it is not clear whether the information available to building owners would create long term signals (e.g. with announcements about progressive strengthening of the regulations and conditions of the financial incentives).	2
Evidence-based estimate of expected energy	no	When looking at existing buildings, their energy consumption for space heating and DHW have decreased on average by 0.66%/y (about 400 GWh/a). When modelling the changes in the building stock and taking into account climate change, the estimated decrease would be 0.5%/y. This suggests that in addition to the energy performance improvements, the observed decrease may also be due to "non-	3

savings and wider benefits - Art 4 (e)		affordability of the energy costs". But this would need to be investigated further, as the uncertainties in the stock modelling are probably large. For example, it seems that the inputs for the changes in the building stock are based on assumption, and not on monitored data. If the same trend would continue up to 2020 then further 1.6 TWh/y could be saved (which corresponds to the estimate for article 4(e)), and that a long-term continuation of this trend would make it possible for residential buildings to be heated without fossil fuels. It is not clear how this result compares to the savings of 2.2 TWh/a between 2013 and 2020 estimated in 2014.	
Summary		The 2017 report does not provide all the information required (e.g. financial assessment, long term roadmap). The Austrian strategy is mainly based on the federal and above all regional financial incentives, together with an offer of energy advice. Links with regulations and measures on the supply-side are not shown. No quantitative objective is mentioned, but the Austrian strategy is guided by two main principles to achieve "deep" renovations on the long term: 1) deep renovations are often too difficult to finance if done at once, so the strategy should make possible step-wise renovations; 2) the strategy aims first at making "natural" renovation works more energy efficient, as cost-effectiveness of renovations is easier to meet if the costs to achieve energy savings are not the full cost of renovation works, but the part related to energy performance improvement. Despite the missing points in the description of the strategy, the results reported and the national statistics show a decreasing trend in heating consumption that could be in line with long term objectives of a low carbon building stock, and that may be at least partly attributed to renovations thanks to the regulation and the financial incentives that lead to higher energy performance of "natural" renovations.	
Level of details		Overall, the level of details provided in the report remains low. Fewer details are provided in the 2017 report about the building stock as compared to the 2014 report. The main additions compared to the 2014 report are the clarifications about how "cost-effective approach" is interpreted, the national statistics about space heating and DHW consumption over 2002-2014 and the related explanations to assess the expected savings towards 2020.	
Level of ambitions		The Austrian renovation aims at promoting "deep" renovations, but does not specify what this means in terms of energy performance or energy savings. Only one regional programme includes such a definition (Styria). Moreover, the part about cost-effective approach mentions that the priority is to make "natural" renovations energy efficient. So there does not seem to be a particular ambition in terms of higher renovation rate. The current renovation rate would be about 1%/year (mentioned in the NEEAP, as in 2014), but there is no detail about the performance level of the corresponding renovations.	
Appropriateness		No major change compared to 2014. Indeed most of the text about the policy measures is very similar and has only been slightly updated. All regions implement programmes including financial incentives (grants and/or loans) for renovations. A Federal regulation makes that the incentive rates are higher when higher energy performance is achieved. Then the types and rates of incentives, as well as the eligibility conditions, vary from one region to the other. In addition, two Federal programmes provide financial incentives (one being focused on non-residential buildings). In addition, all regions have all put in place energy advice services that are most often free of charge for households.	
Comprehensiveness		No statistics about non-residential buildings. The policy measures (Federal and regional) are mostly focused on residential buildings, but some of them also cover non-residential buildings. And one of the main alternative measures for art.7 (Domestic Environmental Support scheme) is focused on industry and services (but not only for EE in buildings). Overall, it seems that all building types, sectors, tenures are covered. However, the report does not show how the specificities of each segment would be taken into account.	
Strengths		A Federal regulation set requirements for the regional incentives, which ensures that all incentives for energy renovation include a part that is proportional to the energy performance achieved. Several regional initiatives include interesting approaches (see below "innovate approach"), that show the added value of taking into account local specificities and/or to stimulate local networks. Most regional programmes also include dedicated or bonus incentive for renewable energy technologies and for ecological materials.	
Weaknesses		The overall strategy is not defined explicitly. Information are provided as an kind of list, which does not show how all the elements are supposed to work together in a consistent way. Likewise, no clear objective is mentioned, and very few quantitative data are provided. For example, the number of renovations supported is given for only one region (Lower Austria). The 2017 report does not make possible to see the progress achieved compared to 2014.	
Innovative approach		Most of the regional + the Federal incentives include a bonus or dedicated incentives for ecological materials. Federal regulation to ensure that all regional incentives include at least a part that is proportional to the energy performance achieved.	

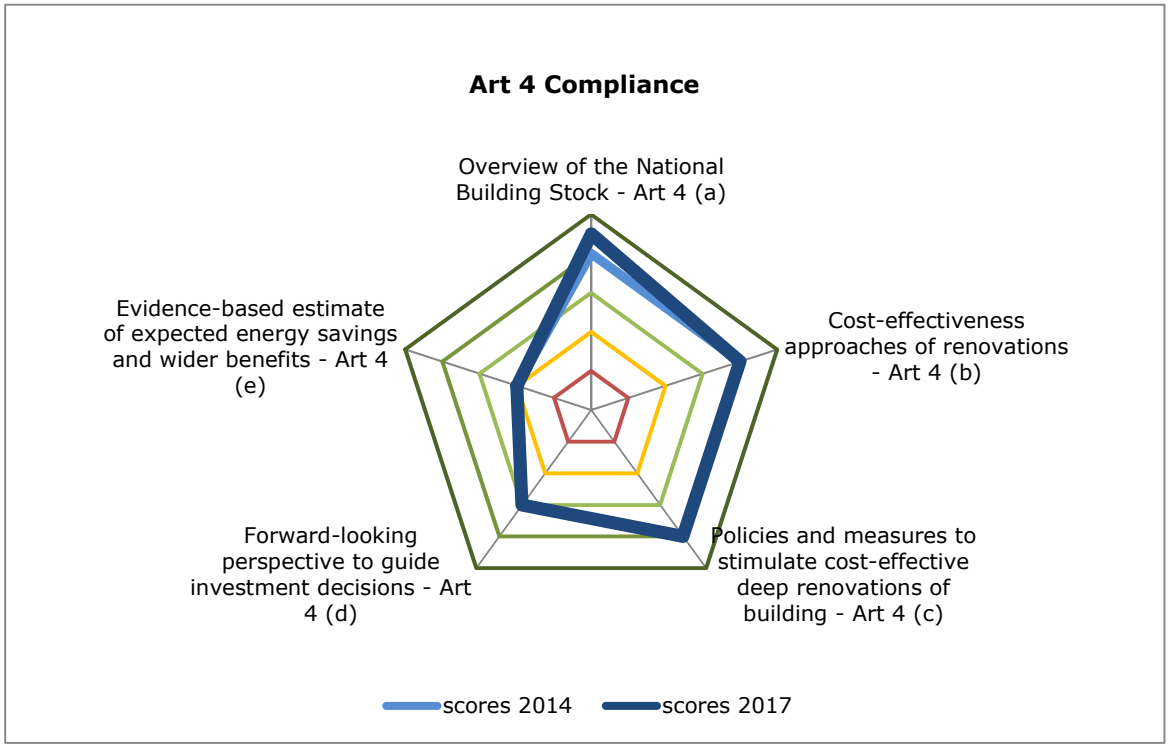
Recommendations	It would be useful to clarify how the different measures are meant to form a consistent strategy, covering all building types/sectors/tenures, taking into account specificities of each segment, stimulating both demand and supply of renovation works. Including more quantitative elements would also be helpful to show the level of ambition and the achievements/progress since 2014. The fact that each region has its own programme could offer an interesting opportunity to make an evaluation, or at least a comparison, of the different approaches implemented, to see if some of these approaches would be more effective.



BELGIUM – Brussels Capital Region

Document Information	The Brussels Capital Region long-term renovation strategy was provided as an annex (Annex B) of the NEEAP. The document was available in French when assessed. The structure of the report follows the 5 points of EED art.4. Parts (b), (d) and (e) are identical to the 2014 report.		
National Building Renovation Strategy (Art 4 EED) Introduction	Brussels Capital Region (BCR) provided a 2017 document very similar to the 2014 one, updating only some sections of the text. The strategy is the result of matching different set of data including the energy balance, the energy monitoring of districts, national statistics, energy consumption survey for Belgian households, the cost-optimum study and the economic data.		
Overview of the National Building Stock - Art 4 (a)	yes	Information concerning the distribution of total final energy consumption over the different economic sectors has been updated based on 2013 data. Information concerning residential buildings has been enriched by including 2014 data on buildings surface distribution. Other updated information relate to the characteristics of the tertiary buildings stock and offices in particular. Descriptions and statistics concerning buildings age, buildings occupiers and used energy vectors in the different sectors are dedicated about 10 pages of the 2017 NEEAP which are identical to corresponding pages included in the 2014 NEEAP.	4.5
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	BCR provided the same information included in the 2014 strategy (same text). The cost-effective approaches described in the renovation strategy are a summary of what is provided in the cost-optimality study (according to the Commission's guidelines related to the EPBD Directive). This section provides a detailed discussion of the method (based on 6 reference building types) and general conclusions about the applicability of certain renovation measures (architectural/structural and technical). The methodology appears reliable and the identified cost-optimal levels are quite ambitious.	4
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	The strategy refers to the creation of a regional ESCO targeting public sector buildings in the framework of Regional Plan for Climate, Air and Energy (PACE) and to the extension of existing loans (Prêt Vert Bruxellois) and subsidies (Primes Energie) for energy efficiency. It describes then a pilot project to be implemented between 2015 and 2017 whereby a mechanism is being tested to allow buildings owners renting their properties to recover part of their energy efficiency investments through energy bills and to overcome in this way the so-called landlord/tenant dilemma. Another new policy measure is then represented by a large information campaign on energy and climate partly addressing building renovations and supposed to start in 2017. The NEEAP does not however clarify whether and to which extent all the above mentioned initiatives will focus on deep renovations. In relation to nearly zero energy buildings, the renovation strategy just reports a link to the national plan for nearly zero energy buildings already submitted in 2012	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	BCR provided the same information included in the 2014 strategy (same text). The BCR renovation strategy includes an estimate for the annual investment needs as well as the investment needs over the period 2014-2030. Two options are proposed, one considering only energy renovation and the second one considering broader environmental renovation. On the other hand, detailed information on timing and sources of funding should be provided.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	partly	BCR provided the same information included in the 2014 strategy (same text). The impact of energy renovation is not quantified in terms of energy cost savings for the owners and the tenant, or in terms of jobs, health and environmental impacts. However, the strategy mentions that energy renovation will have societal benefits.	2
Summary	The 2017 BCR renovation strategy is very similar to the 2014 one (sections 4 (b), (d) and (e) are identical to the 2014 document) providing a comprehensive overview of the building stock, the renovation options for different types of buildings. It also includes a package of policies and measure ranging from regulatory instruments to financial schemes, information tools targeting owners but also professionals. The strategy also considers demonstration projects and trainings to build capacity. The overall strategy will benefit from further analysis of additional impacts (i.e. job creation) of the renovation.		

Level of details	The building stock is well detailed. The cost-effective approaches refer to the cost optimum study for more details. Policies and measures are more detailed in the NEEAP than in the strategy itself. Overall, the level of details provided in the different sections of the strategy is satisfactory.
Level of ambitions	Not clear whether the level of ambition identified in the 2014 strategy is being pursued and which progresses have been made in this respect.
Appropriateness	The measures and policies designed for the strategy are appropriate. However, it is difficult to assess if the capacity building programme will allow for an effective implementation of the passive house requirements.
Comprehensiveness	Not clear to what extent the proposed policy measures will focus on deep renovations The BCR renovation strategy is comprehensive from a policy point of view. It includes all the known policy instruments used for EEB.
Strengths	The adoption of the passive house requirements in 2013 is an important signal for market actors.
Weaknesses	Not clear to what extent the proposed policy measures will focus on deep renovations. No concrete timeline for interventions provided.
Innovative approach	Matching different sources of datasets including energy, land use and economic data to design the strategy
Recommendations	Consider including cost-benefits analysis in terms of jobs, energy cost savings, health and emission reduction

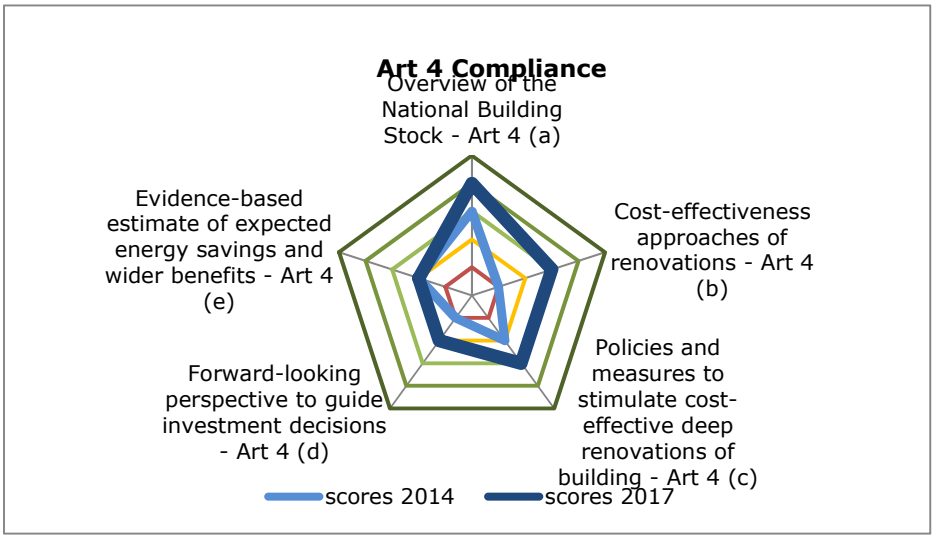


BELGIUM – Flemish Region

Document Information	The Flemish renovation strategy is provided as an annex (Annex B) of the NEEAP. The document is available in English.		
National Building Renovation Strategy (Art 4 EED) Introduction	Compared to the first version of the renovation strategy described in the third NEEAP, new studies have made new data available whereby a more detailed analysis of the existing building stock has been performed. On the policy side, the Flemish government has defined in July 2015 the main points of a renovation pact whereby the renovation rate of the building stock is to be substantially increased. On March 2016 this same government has approved a memorandum named "Vision 2050: a long term strategy for Flanders" that sketches, among others, the main priorities of the Flemish long-term policy in the energy field. On July of the same year, an energy efficiency action plan for the Flemish administration has been approved. This plan has led to implement an obligation to annually reduce by 2.09% the primary energy consumption of each entity of the Flemish administration.		
Overview of the National Building Stock - Art 4 (a)	yes	The description of the Flemish building stock appears much more detailed compared to the previous NEEAP. The data source used in the last NEEAP for residential buildings is still an energy performance certificate (EPC) database for new buildings and buildings which have been rent or sold as of 2008. Data available for certified existing buildings have been extrapolated to all existing residential buildings in order to represent the whole stock. The data source used for public buildings is still an EPC database created by transposing EPBD requirements and available since 2009. Data used for non-residential buildings have been instead collected through various studies tendered in recent years. Building categories considered are residential buildings (single-family homes, apartments, collective residential buildings), public buildings (federal government, Flemish government, provincial and municipal authorities, public companies, education, welfare, health), non-residential buildings (offices, commercial buildings, utility buildings). The level of detail achieved seems to be sufficient. This analysis has allowed concluding that most of the consumption is concentrate in a small percentage of buildings and that policy measures must focus on large buildings in the trade sector and offices.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	Cost-optimal levels have been assessed for residential buildings in 2015 and are assessed for non-residential buildings every two years. These assessments have been considered as a starting point to set minimum energy performance requirements. In case of residential buildings, these requirements are anyhow below cost-optimal levels. They are applied as of 2015 and concern building permit applications for new buildings, major energy renovations and renovations where plants are completely replaced and "75% of existing and new partition structures that are adjacent to the outside environment is insulated". In case of non-residential buildings, the Flemish Government has decided in 2015 to set minimum energy performance requirements for building permits applications submitted as of 2017 and cost optimal levels seem to have been somehow used as term of reference. In the EEAP it is stated that requirements set for new schools and offices are "somewhat lower than the cost-optimum", whilst cost-optimal levels will be considered only for progressively tighter requirements expected to be established in 2018 and 2012. In case of non-residential building renovations, minimum performance requirements are set by referring to the same definition of renovation used for residential buildings. It is however unclear how these requirements compare with assessed cost-optima levels.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	Policy measures described for residential buildings consist in the implementation of minimum energy performance requirements (see above), stimulation in the implementation of pilot projects fostering the large scale implementation of major energy renovations through exemplary projects and creation of platforms for good practices exchange among involved stakeholders, implementation of energy performance certificates, premiums for energy efficiency improvements distributed by energy network operators under public service obligations, low interest loans for vulnerable families and additional premiums for actions targeting social housing, VAT discounts for energy renovations of old houses, discounts on property taxes applied both to new energy efficient houses and to existing buildings undergoing major energy renovations, lower gift tax on properties in case of future energy renovations, tax deductions for those who lend money for renovations, reductions in the tax for the attribution of property rights of vacant or inhabited buildings. Policy measures described for non-residential buildings relate instead to financial measures (e.g. tax deductions, premiums from energy network operators and reductions in property taxes in case of energy efficiency improvement actions implementation), energy performance certificates for public buildings, energy performance requirements in force for all non-residential buildings as of 2017, awareness raising measures, obligations to annually reduce own primary energy consumption by at least 2.09% for each entity of the Flemish Central Government. Future policy measures to be implemented for non-residential buildings in the education and health care sector have been then agreed by the Flemish	3

		Government within an energy and climate pact signed in 2016. It is not clear to what extent measures described for the residential and non-residential sector will or can relate to deep renovations.	
Forward-looking perspective to guide investment decisions - Art 4 (d)	partly	By 2050 existing residential buildings will have to reach the same energy performance as new buildings for which a construction permit was issued as of 2015. According to the EEAP this energy performance could correspond to an energy rating of 100 kWh/m2 per building. A tracking system based on digital files created for each property will be applied as of 2018 to monitor the evolution of the residential building stock toward this target. Improved renovation advice is then supposed to be provided within the energy performance certificates (EPC+) to be issued as of 2019. A long-term strategy to 2050 for non-residential buildings is generally described and its definition seems to be in the proposal phase.	2
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	partly	The strategy just mentions that a reduction by 80% of the greenhouse gases emitted in 1990 to be achieved in 2050 will averagely reduce residential buildings performances by 75%. In case of non-residential buildings saving potentials of 20%-30% (presumably achievable by 2050) are instead generally mentioned. It is however not possible to understand how these estimates are connected to planned measures and which are the assumptions whereby they have been produced.	2

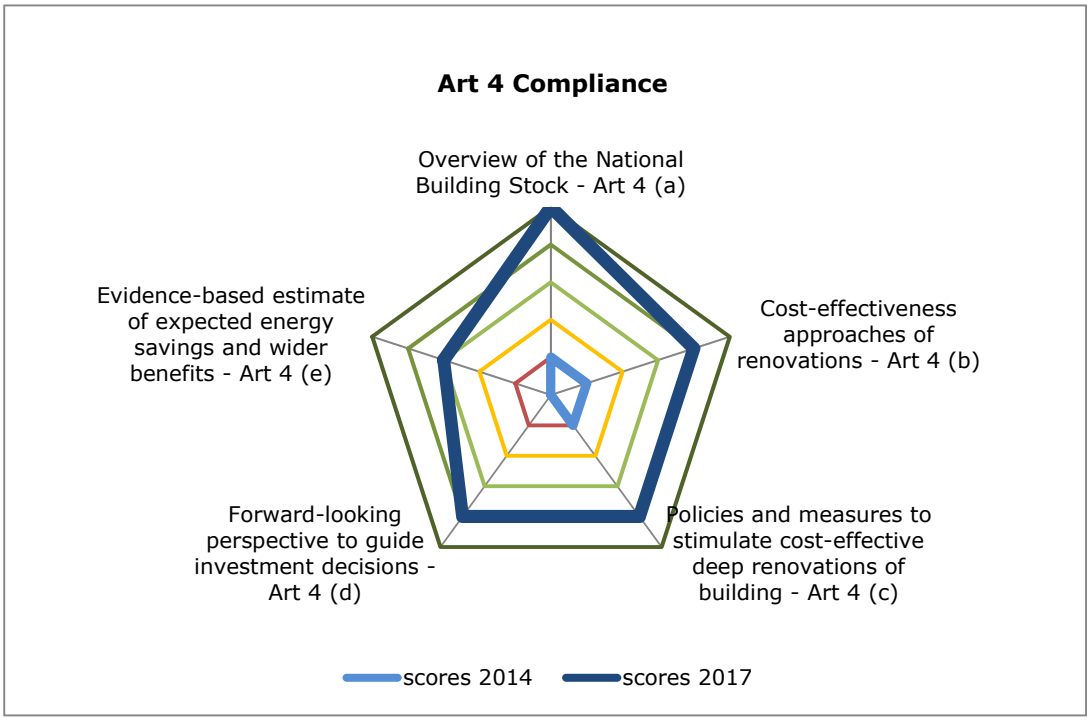
Summary	The new version of the long-term renovation strategy has been markedly improved in relation to the analysis of the existing building stock (Article 4(a)) and of the cost-effectiveness of existing renovation approaches (Article 4(b)).
Level of details	The level of detail achieved has increased in the last version of the strategy. Nevertheless descriptions provided in relation to how requirements of Articles 4(d) and 4(e) are being fulfilled are not yet sufficiently detailed most probably due to the fact that further elaborations and actions would be needed to fully fulfil them.
Level of ambitions	The level of ambition seems reasonable in the non-residential sector. The fact that the long-term strategy to 2050 may aim to achieve an energy level equivalent to an energy rating of 100 kWh/m2 in the residential sector raises some doubt concerning how ambitious this strategy can be in this sector.
Appropriateness	Although a long series of policy measures is described, it is not clear to what extent these measures can actually allow achieving the established targets, notably the 2050 targets.
Comprehensiveness	The strategy seems quite comprehensive in relation to actions implemented to fulfil requirements of Articles 4(a) and 4(b). It is instead not very comprehensive in relation to Articles 4(d) and 4(e).
Strengths	The main strength of the Flemish renovation strategy is the fact a target has been set with a clear timeline for its achievement.
Weaknesses	Strategy parts related to Articles 4(d) and 4(e) are weak.
Innovative approach	Several policy measures to provide guidance to main market stakeholders seem to have been implemented.
Recommendations	The strategy needs to be further developed in relation to the development of a forward looking perspective and to the estimate of expected energy savings and wider benefits.



BELGIUM – Wallonia Region

Document Information	The long-term renovation strategy of Wallonia is outlined in the NEEAP Annex B. The document is in French.		
National Building Renovation Strategy (Art 4 EED) Introduction	The strategy is structured according to Article 4 five requirements and has been elaborated by a consortium of companies (CLIMACT, 3E, BPIE) selected through a public call for tender. This consortium has been also asked to produce a financing strategy for the proposed measures to be finalised by 2017. The strategy is aligned with short, medium and long term objectives (2020, 2030 and 2050) set by Belgium and Wallonia in relation to energy efficiency, greenhouse gas emissions and renewables.		
Overview of the National Building Stock - Art 4 (a)	yes	Wallonia provided a comprehensive and detailed statistical overview of the building stock (information are provided in chapter 1 and in Annex 2). This includes a detailed analysis of building types, ages, tenures, level of insulation, energy performances, type of heating systems etc for residential and non-residential buildings. The overview is based on recent data from different sources. A link to the detailed description of the building types (and their U values) used for the cost optimal analysis is also provided.	5
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	The cost-effective approaches described in the renovation strategy is a summary of the preliminary result of the current cost-optimality study (not yet concluded).The methodology is described in the strategy and in an Annex (e.g. time horizon 30y for residential buildings, 20y for tertiary), together with the building types considered (a link to the description of all building types considered – 5 offices, 4 schools, 24 residential buildings - is provided). Preliminary results of the study, indicating the cost optimal retrofit level per building type are provided. The methodology appears reliable and the identified cost-optimal levels are quite ambitious.	4
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	A comprehensive set of policies and measures (42 in total) to achieve the renovation targets have been designed along three different directions respectively aiming to a) create a transparent framework fostering energy efficiency investments; b) reinforce the offer of building renovation services; c) reinforce the demand for buildings with higher energy performances. The package includes regulatory instruments, several financial instruments, information tools, trainings as well as voluntary agreements. Three specific tools enabling the implementation of the renovation strategy represented by 1) the building passport describing the energy status of the building; 2) the renovation roadmap included in the passport to quantify the investments needed to achieve long term targets and to describe associated benefits for building owners; 3) a central helpdesk guiding households in the renovation activities, ensuring that these are implemented according to what reported in the building passport and supporting in the identification of financing instruments for the renovations. A detailed analysis of the barriers to energy efficiency take up is also provided.	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	The financial framework is well addressed: the overall investment amount to reach the renovation target is estimated (63 billion € for the residential sector and 4,5 billion € by the end of 2050). Existing programmes and source of funding, divided by categories, i.e. residential and not-residential Owners' private equity, public expenditure (federal, regional and municipal), EU structural and BEI funds and Banks/private investment) have been described with a good level of details. A clear forward-looking perspective to guide investment decisions, including a roadmap with key dates (2017, 2020, 2025, 2030, 2035, 2040, 2045 and 2050), needed resources (divided in public and private) is provided.	4
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	Wider benefits have been identified, e.g. , reduction of energy bills Environmental benefits, positive impact on the Wallonian economy (possible improvement of the Wallonian energy balance by 2% of the GDP), health benefits, improved comfort, employment impact (i.e. created 13.5 jobs created/million € invested), etc. Nevertheless, a detailed analysis to quantify the additional benefits of energy savings neither an evidence-based estimates of energy savings for each of the policies described in the strategy have been provided.	3
Summary		The 2017 Walloon building renovation strategy addresses all the EED Art. 4 requirements. It provides a comprehensive and detailed description of the building stock and lists the most cost effective measures to achieve the 2050 renovation targets (e.g. -77% building sector energy consumption by 2050, in comparison to 2013 values). A detailed analysis of the barriers to building renovation is also provided, together with the description of a comprehensive package of measures supporting the renovation of residential and non-residential buildings. The financial framework is well addressed, with clear forward-looking perspective to guide investment decisions, including a roadmap with key dates up to 2050	

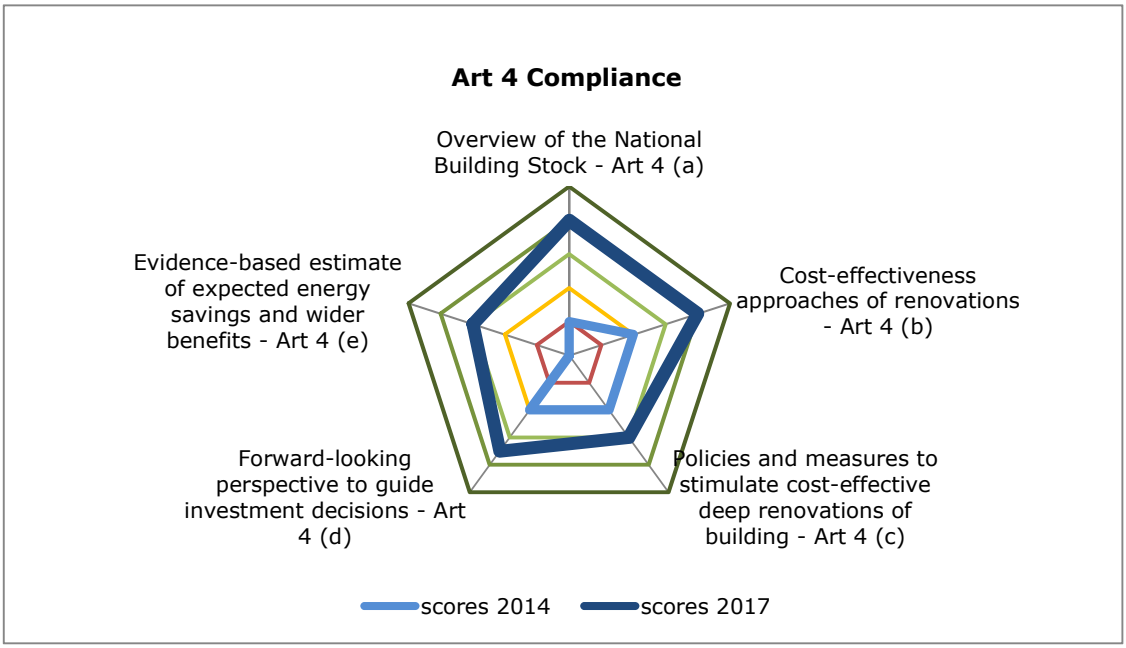
Level of details	The building stock is very well detailed, together with policies and measures. Overall, the level of details provided in the strategy sections is good.
Level of ambitions	The set 2050 building renovation targets are quite ambitious:- overall 77% building sector energy consumption reduction by 2050, in comparison to 2013 values; - for the residential sector, overall average energy consumption of 85,5 kWh/m2/y at 2050; - for the service sector, on average energy neutral.
Appropriateness	The measures and policies designed for the strategy are deemed appropriate and suitable to reach the goals established, even if more specific policies targeting deep renovation could be put in place.
Comprehensiveness	Wallonia has put in place a comprehensive set of measures.
Strengths	Clear and ambitious target and detailed overview of the building stock
Weaknesses	A scenario analysis is missing
Innovative approach	"Le passport du batiment" concept and the "guichet Unique" (renovation "one stop shop")
Recommendations	To better quantify the additional benefits of energy savings and provide the expected energy savings for each of the policies described in the strategy



BULGARIA

Document Information	The second Bulgarian long-term renovation strategy was provided in May 2017 as Annex 6 to the Bulgarian NEEAP. The document is available in English and was developed by a team of scientists at the Technical University of Sofia under a contract awarded by the Ministry of Regional Development and Public Works.		
National Building Renovation Strategy (Art 4 EED) Introduction	The main focus of the strategy is its contribution to the implementation of the "National Programme for Development: Bulgaria 2020", a document which is fundamental to Bulgaria's development. This Programme will contribute to the 2020 national energy efficiency target through the improvements of energy performance of existing residential and non-residential buildings. In addition Bulgaria will investigate and identify key aspects of long-term development by 2050, which ensure the achievement of Union and national energy efficiency targets in the building sector by 2050 including estimation of needed investments.		
Overview of the National Building Stock - Art 4 (a)	yes	This section provides an analysis of the residential and tertiary building stock. Assessment of non-residential buildings is based on data provided by the AUER (Sustainable Energy Development Agency) , while assessment of residential buildings is based on statistical data provided by Project No BG161PO001/5-01/2008/076 'Analysis, assessment and update of regulatory acts in support of OPRD 2014–2020' completed in 2013. For the non-residential sector a detailed overview of buildings is given, including: purpose of use, age of putting into service, source of heating, gross floor area etc. The residential sector is analysed by: structural type (type of construction), age of construction, heat-supply system and by social welfare indicators. In addition for both sectors an energy performance analyse of the building types is provided, including: heat transmission coefficient and expected energy savings after renovation.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	The assessment is based on the methodology framework defined in Commission Delegated Regulation (EU) No 244/2012). The economic analysis of the scenarios was made using the indicator "present value of global costs" over a 30 years calculation period. Six different scenarios (with 3 different renovation rates 5,7 and 10%) were developed for public buildings owned by state and municipalities as well as 6 different scenarios (with 3 renovation rates of 1, 1.5 and 2 %) for residential sector. For each scenario was given overview of investment volume, saving of energy and saving in terms of CO2 emission.	4
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	In the strategy is provided a table with all ongoing, planned or completed by 2017, policy measures in the residential and public sector. In total 16 policy measures are reported. Most of the policy measures in the public sector buildings owned by central or local government have objectives laid down in the Energy Efficiency Act and belongs to regulatory or administrative type of measures. National programme for renovation of multifamily buildings, which has been in implementation since 2015/2016 is the most important measure in the residential sector. In addition in the strategy an analysis and assessment of existing barriers to the improvement of EE in buildings is provided	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	In this section of the BRS was given a detailed overview of financial and fiscal instruments for enforcement of programmes and projects for implementation of EE measures in buildings including the EE funds. Development and applying of a socially-driven business model of entrepreneurship with focus on the construction sector and offering of social housing for the needy, branded as Social Enterprise Products has been foreseen. This mechanism is closely linked to the National Social Economy Concept of the Ministry of Labour and Social Policy (MTSP).	3.5
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	The three reported tables provide a consolidated view of the impacts of the scenarios considered by 2020 for State-owned, municipal and residential buildings, respectively. The contribution of projected savings in State owned and municipal buildings is determined against the national target excluding the obligated parties referred EE Act, while the contribution of residential buildings is determined on the basis of the overall national target. Other indirect benefit of implementation of BRS is only listed, but no details are mentioned.	3

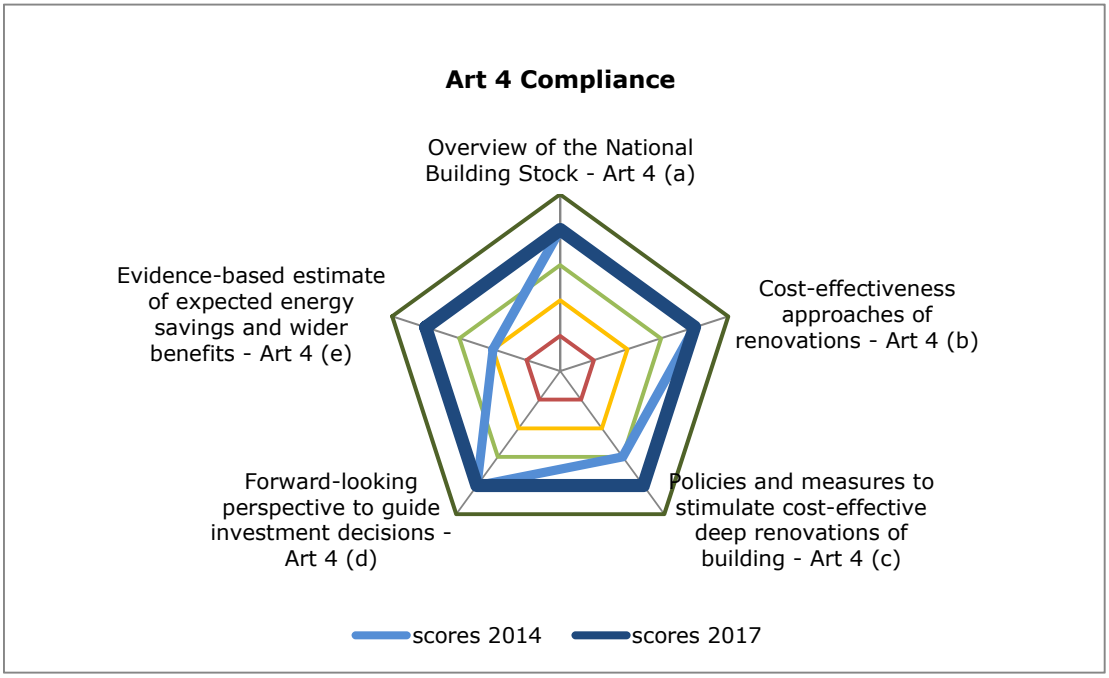
Summary	This version of Bulgarian building renovation strategy is much more complex and much better structured than the previous version submitted with the previous NEEAP. It was prepared using scientific approach and includes analyses of current building stock and different scenarios for renovation of public and residential buildings. In addition was carried out an analysis of social welfare factors of the residential building stock. Implementation of the National programme for energy renovation of multifamily houses, which started in 2015 as a financial measure, showed positive results and motivated households to undertake renovation of their apartments in multi-apartment buildings. In implementation of this programmes have been involved national and local administrations, Development Banks and building owner associations.
Level of details	The strategy offers a very good level of details in the description of residential and non-residential buildings stock. The cost-optimum calculations are provided for residential buildings as well as for state and municipality owned building stock. The commercial sector was not analysed. Different Renovation rates were considered for each of the 6 analysed scenarios. The calculations cover two climatic zones. A set of policies and measures is described in the strategy. However, the interactions between all these measures and their complementarities are bit difficult to assess.
Level of ambitions	Pursuant to the strategy the most appropriate scenario for renovation of the residential building sector is A2, which is not very ambitioned scenario compare to the other reported scenarios as B1, B2, C1 and C2.
Appropriateness	The measures and policies designed for the strategy are appropriate. However, it is difficult to assess if they will allow to reach the target scenario (A2).
Comprehensiveness	The second Bulgarian Building renovation strategy is much more comprehensive than the previous one. It includes good overview of the national building stock, analysis of different renovation scenarios and barriers for implementation.
Strengths	Variety of funding opportunities including financing from the established Energy Efficiency and Renewable Sources Fund (FEEVI). Well analysis by welfare indicators. Well analysis of existing barriers for energy renovation.
Weaknesses	Lack of analysis of building data and renovation scenarios for buildings in the commercial sector. Lack of data, information and expected energy savings for policy measures. Lack of data for Gross annual consumption per square metre of energy for heating, cooling, ventilation, DHW and appliances (kWh/m2)
Innovative approach	Introduce an innovative approach to develop, maintain and update an efficient central database of the energy performance of buildings in Bulgaria to inform the development of national plans and programmes and the reporting on such plans and programmes.
Recommendations	More data and information about implemented programmes and projects in period 2014-2017 covered by previous BRS. Estimate of wider benefits of the energy renovation programmes.



CROATIA

Document Information	The update of the HR building renovation strategy was provided in October 2018 as a stand-alone document separated from the NEEAP.		
National Building Renovation Strategy (Art 4 EED) Introduction	Croatia provided a build 2017 renovation strategy very similar to the 2014 one, updating some data and including some new sections. In particular, the section related to Art.4c and Art.4e (the weakest of the previous strategy) have been improved.		
Overview of the National Building Stock - Art 4 (a)	Yes	The Croatian overview of national building stock is based on the data provided by the Ministry of Construction and Physical Planning and Croatian Bureau of Statistics. The building stock, both residential and non-residential is described with a good level of detail, covering almost all the requirements of the Commission guidance (e.g. an overview by building types, construction period, climatic zones, ownership and rural/urban areas differentiation), with the exception of an analysis of the distribution of energy classes.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	Yes	The comprehensive Croatian "cost-effectiveness" renovation analysis includes several renovation packages for the four building categories identified (public buildings, commercial buildings, multi-residential buildings and family houses). A group of buildings built up to 1987 was selected as the target group (because of the greatest savings potential and its significant share in the total floor area of all buildings) with regard to their total floor area, state of the heated space envelope and energy requirements. In order to select the optimal renovation method for each building category, with regard to the applicable technical and financial parameters, five possible models of sustainable building renovation, including renovation of the envelope and replacement and/or installation of efficient technical systems with the utmost level of RES, have been considered.	4
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	A set of well-designed measures, addressing both residential and non-residential buildings, is described in details, including information on the funds and source of financing, the monitoring methods and the expected energy savings (Cumulative savings of alternative policy measures realized from 2014 to 2016 have been provided). Almost all the measures were already active in 2014, but they have been improved, increasing the budget and/or the target (for the period 2017-2020 it is planned to increase the target of renovation of multifamily housing, from 1% to 2%).	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	Yes	In the strategy the available sources of funding and possible ways to motivate investors are identified. The projection of the renovation budget needed is provided for the period from 2014 to 2049 on annual basis. An analysis of possible funding sources is included (EU Structural and Investment Funds will be the primary source), but a clear indication of investment roadmap with key dates, targets, milestones, is not included. Considering that the currently available sources of funding are insufficient to achieve the set objectives, the introduction of new, innovative funding mechanisms which combine public and market instruments adjusted to a wide range of investors is proposed.	4
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	Yes	The Strategy includes an estimate of potential energy savings (about 67.0 PJ by 2030 and 131.5 PJ by 2050) and CO2 emission reduction (about 3,197 kt by 2030 and 6,277 kt by 2050). Wider social benefits are shown in terms of: (a) direct and multiplier effects on GDP growth, employment and tax revenues in construction and the wider economy, (b) effects on real estate prices, (c) reduction in energy poverty and (d) other benefits, such as effects on human health, energy security and positive side effects on other important economic activities, such as tourism. In particular, the expected impact on employment could produce 56 thousand new jobs in a scenario involving conservatively estimated multiplier effects, or as many as 93 thousand in a scenario involving strong multiplication; the expected impact on employment by the year 2020 would be between 25 and 43 thousand new jobs, depending on the estimated multiplier effects, and an additional 5 to 9 thousand more are expected by 2030; the estimated impact of the integrated renovation programme on GDP growth by 2030 ranges between 5.0% and 8.4% and, by 2050, it ranges between 10% and 17%, depending on the estimated multiplier effects.	4

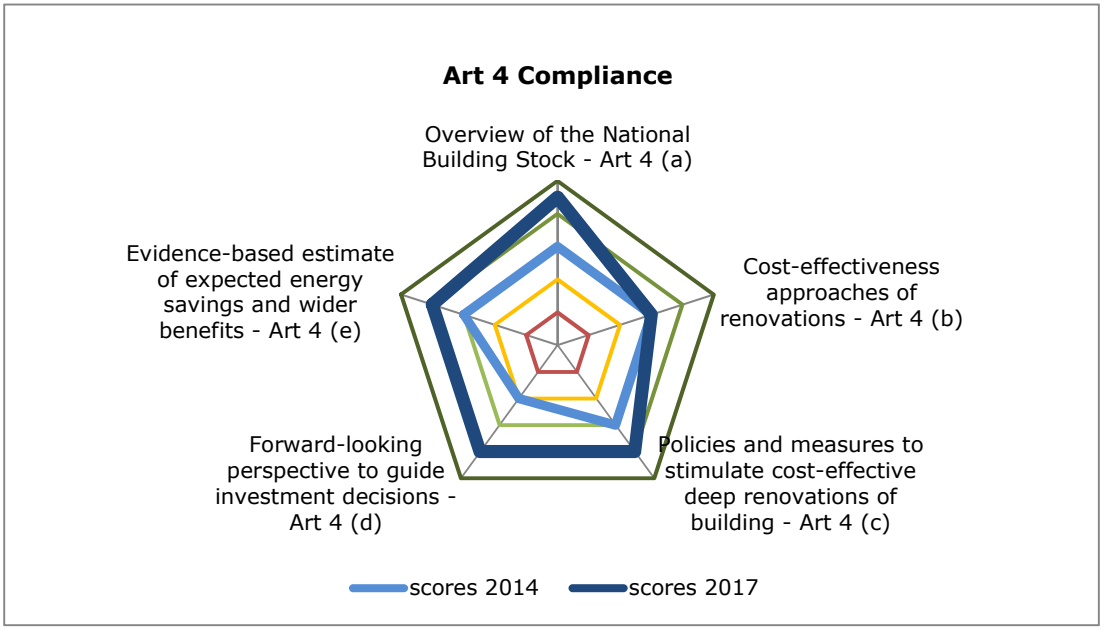
Summary	The Croatian updated strategy is similar to the 2014 one, but including more information and analysis (e.g. estimate of wider benefits). The level of detail is deemed appropriate, as the set of measures put in place to reach the ambitious set renovation targets. Overall, the updated document is improved in comparison with the previous one and is compliant with all the Art.4 requirements.
Level of details	The level of detail of the description is improved in comparison to the 1014 document
Level of ambitions	The level of ambition of the updated measure set is high (higher targets, higher budget).
Appropriateness	The budget of the described measures is deemed appropriate.
Comprehensiveness	A comprehensive set of measures, addressing both residential and non-residential buildings, is included in the strategy.
Strengths	Very detailed description of the measures and good use of EU funds (e.g. ERDF)
Weaknesses	In the strategy a clear indication of investment roadmap with key dates, targets, milestones, is not included.
Innovative approach	n/a
Recommendations	Provide a clear indication of investment roadmap with key dates, targets, milestones, is not included.



CYPRUS

Document Information	The update of the Cypriot long-term renovation strategy of included in Annex F of 2017 NEEAP and it is available in English.		
National Building Renovation Strategy (Art 4 EED) Introduction	In this second version of the strategy, the overview of national building stock now includes additional data on the non-residential building stock as well as new estimates on how the building stock is expected to evolve until 2030. The results of various studies carried out by the Joint Research Centre (JRC) examining the status and potential of the Cypriot building stock are included in the revised strategy.		
Overview of the National Building Stock - Art 4 (a)	yes	The overview developed by the Statistical Service of Cyprus on the 2011 data is complemented with data from the 2016 JRC technical report "Building Stock in Cyprus and Trends to 2030", that includes more details on the residential sector (i.e. energy demand per type and year of construction, type of air conditioning system per type of home and location) and a good overview of non-residential buildings stock (that was missing in the 2014 version of the strategy). Also more information on public buildings have been added (i.e. energy demand per type and year of construction). Moreover, a scenario analysis of the development of the building stock in Cyprus in term of type of renovation (moderate/minor/Deep) up 2030 is provided.	4.5
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	In this section, the strategy refers to the calculation of cost-optimal levels of minimum energy performance requirements for existing buildings, identifying 7 reference buildings (4 residential, 2 offices and 1 retail sales facility). Three example of cost-optimal calculations related to renovation packages (heating, lighting, hot water and heating/cooling systems, insulation) are presented (2 houses and 1 office). Results of a programme (Energy Efficiency in Low Income Housing in the Mediterranean) aiming to identify cost-optimal approaches to building renovations are presented (i.e. 25 pilot projects implemented in Cyprus).	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	In the revised strategy a comprehensive set of measures is described with a good level of detail, including new measures implemented after the year 2014 (i.e. 2016 decree on tighten minimum energy performants requirements). Measures are broken down in legislative measures (e.g. EPBD-related provisions such as EPC, minimum Energy Performance levels, inspection of conditioning/heating systems), financial incentives (e.g. grant scheme for RES and EE interventions), information/training measures. Research programmes in the field of energy renovation of buildings are also presented. An analysis of the existing barriers to renovation is also presented, including also "split incentive" issue (EED art. 19) and possible solutions to overcome these barriers (i.e. "Save&Upgrade" programme).	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	In this new version of the strategy, in addition to a qualitative assessment of the main financial barriers to investment, a scenario analysis of renovation investment prospects up to 2030 is provided (baseline vs alternative scenario), with an investment 2015-2030 roadmap. In the case of the baseline scenario (with current policies) €250million will be spent on renovation work in 2015-2020. In case of the alternative scenario the investment will be doubled.	4
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	Expected energy savings (according to 2 different scenarios) and broader benefits have been assessed qualitatively and quantitatively and very well supported, i.e. economic (+2.7% GDP additional increase by 2020), social (reducing energy poverty and improving the health of the occupants), environmental benefits (reduction of CO2 emissions) and benefit for the Cypriot energy system (improving energy security).	4
Summary		The revised Cypriot 'Strategy for mobilising investment in the field of building renovation" provides a good overview of the existing building stock, including also detailed data on non-residential building stock, and identifies energy saving opportunities, considering their cost-effectiveness. It includes a comprehensive set of measures, broken down in legislative, financial, information and training initiatives, considering also the importance of research programmes in the field of energy renovation. A scenario analysis of the energy performance evolution of the building stock up to 2030 is presented, including an analysis of the renovation investment prospect (baseline vs alternative scenario), and. In term of Article 4 requirements, the revised Cypriot strategy is assessed as fully compliant.	
Level of details		The strategy provides a good level of details. In comparison to the previous version, the 2017 document includes more data on the non/residential sector and a well-supported scenario analysis.	

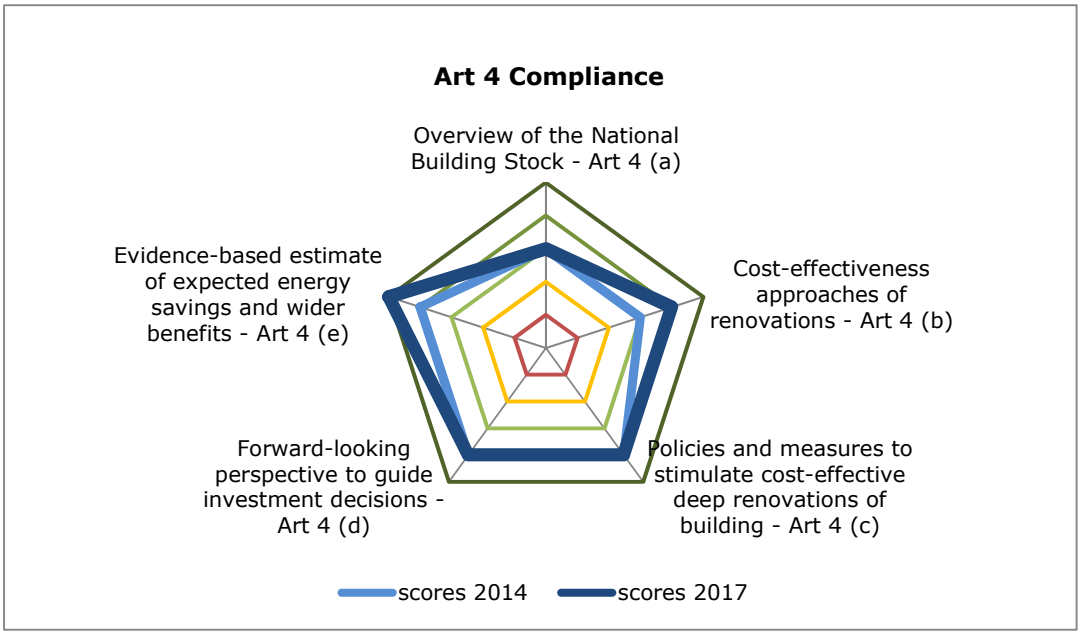
Level of ambitions	A clear building renovation target is not provided. According to the provided scenario analysis, in the base-line scenario (BAU, €250 million investment) the increase in total building sector final consumption will be reduced by 10%, in the "alternative-scenario" (doubling the investment) final energy consumption is stabilised to 2015 levels.
Appropriateness	The measures and policies put in place and planned are deemed appropriate.
Comprehensiveness	Cyprus has in place a comprehensive set of measures for the building sector, including research and development programmes.
Strengths	Good overview of the building stock, including data on non-residential sector; Good scenario analysis including an estimate of the cost of renovation; Good assessment of expected energy savings and broader benefits.
Weaknesses	A clear building renovation target is missing; The section on cost-effectiveness approaches of renovations can be improved.
Innovative approach	n/a
Recommendations	Set a clear building renovation target.



CZECH REPUBLIC

Document Information	The updated version of the Czech Building long-term renovation strategy was presented in December 2016 and it is attached as Annex 4 to the NEEAP issued by the Ministry of Industry and Trade in April 2017. The document is also in English language.		
National Building Renovation Strategy (Art 4 EED) Introduction	The strategy provides an overview of the building stock discloses out a savings potential and investment costs and defines individual renovation scenarios. The renovation strategy outlines five scenarios for the renovation of the building stock, costs and benefits and proposes measures to implement such scenarios. Important data sources for the preparation of this strategy were an updated survey of the residential building stock and a newly drawn up survey of the residential building stock.		
Overview of the National Building Stock - Art 4 (a)	yes	As in the first strategy, the same overview of the residential building stock, based on the 2011 Population and Housing Census was provided also in the second strategy. The second strategy gives a clearer overview of the non-residential building stock. The characterisation of the building types of non-residential building is prepared according to commonly described categories in the reference literature (e.g. administrative buildings, offices, schools, etc). The mentioned 72 building categories used for the scenario modelling are not described in detail and information about the climatic aspect is missing.	3
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	As in the first strategy, in the second updated version, for the residential sector, were reported data for expected energy consumption and energy savings for heating, hot water and lighting after renovation taking into account three refurbishment level (shallow, moderate and deep renovation) .The second (up dated) version of the strategy contains data about the energy consumption and expected energy saving after renovation of the non-residential buildings. Analysis and Calculation of possible energy savings and their investment demand for non-residential buildings were made on a sample of 100 well-described buildings of varying size, age and type of use. 4 variants of energy savings measures concerning the building envelope and 4 savings measures concerning energy sources were analysed on the sample.	4
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	The updated version of the Czech Building Renovation Strategy reported almost the same policy measures already described in the First Strategy. Few new measures are included under the section: Measures for adapting buildings for climate change (as e.g. Prevention of overheating and cooling of the buildings).	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	In the updated strategy were provided recalculated annual renovation rate and share (percentage) of the renovated residential buildings for each of the 3 refurbishment level of the 5 defined (by BPIE) scenarios already described in the First strategy. The new data seems to be more appropriate and realistic. The Evaluation and comparison of individual scenarios were prepared for three selected years (2020, 2030 and 2050) instead for one year (2020) in the first strategy and for three categories of buildings (single family buildings, multi-apartment buildings and non-residential buildings). From modelling, scenario 4 (quick and deep) may seem the most appropriate. If its funding could be secured, this scenario would make a major contribution to overall savings on final energy consumption by 2030.	4
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	The potential energy savings for the three buildings categories (single-family houses, multi-family buildings and public and commercial buildings) by 2020, 2030 and 2050 are presented in the table 15. This table includes also Investment costs in the given years, Cumulative energy cost savings, Total induced GDP and Average induced employment generated through the implementation of each scenario. It is expected that through realization of the most appropriate scenario 4 will be generated energy savings amount to 72 PJ (compare to base line consumption of 349 PJ in 2016) as well as cumulative investment costs in amount of EUR 27,807 million by 2030 . The average induced employments will amount to 39,303 and the total induced GDP will be EUR 28,732 million by 2030. In addition, in the strategy was presented Modelling outputs with the inclusion of climate scenarios. It is expected that the energy consumption for cooling in buildings until 2050 will increase as a results of climate change.	5
Summary	The second building renovation strategy is an update version of the first renovation strategy and therefore can be considered as compliant with EED Art.4 requirements. In addition to the first strategy it provides more data and information for the non-residential building stock. Almost all policy measures described in the first strategy will be implemented by 2020.		

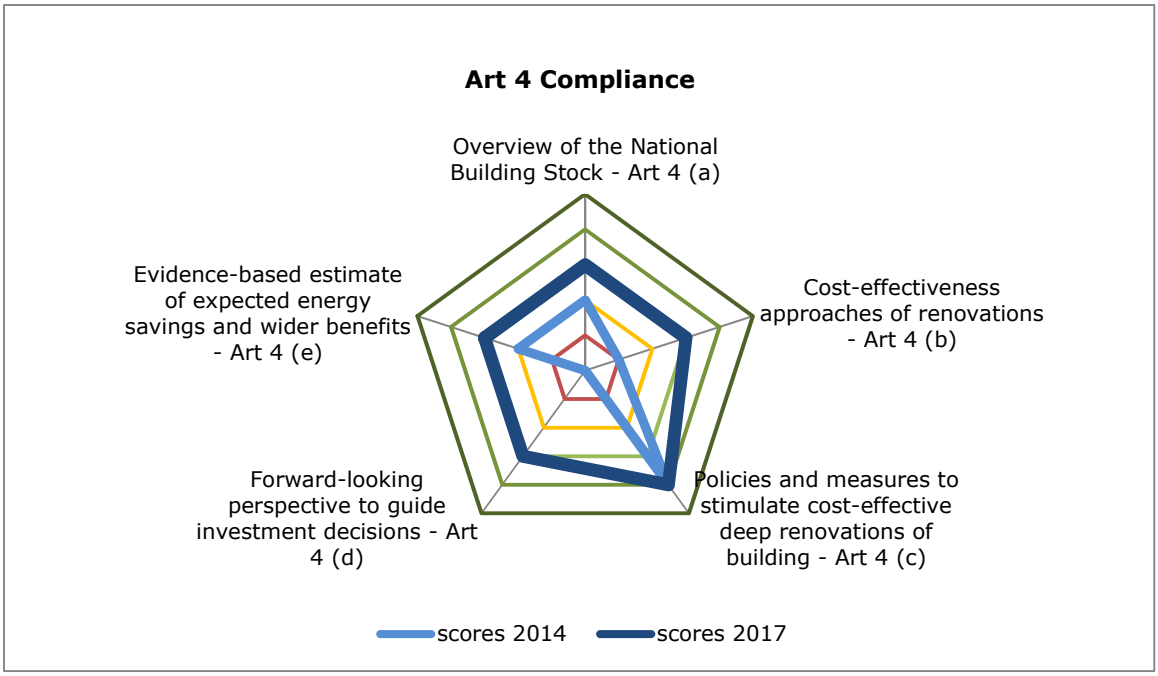
Level of details	The level of details in the second renovation strategy is satisfactory. In this strategy was given good overview of the residential building stock (number of buildings, floor area, and age band). For the non-residential building stock, year of construction is missing. More detailed overview of the energy consumption by year of construction and type of buildings (single-family, multi-family and mom-residential buildings) is needed. The calculation methods for energy consumption and potential energy savings for non-residential buildings were described in details. More information and details for 72 evaluated residential buildings types also missed.
Level of ambitions	The level of ambition for the most appropriate scenario (scenario 4 - fast and deep renovation of the building stock) for the period 2016-2025 is satisfactory (3% renovation rate, 5% deep renovated buildings and 85% share of moderate energy renovated buildings with 7 PJ energy savings). The renovation targets for the period 2025-2035 and 2035-2050 are more ambitious (3% renovation rate, 85% share of deep renovated buildings with 72 PJ energy savings and 155 PJ accordingly.
Appropriateness	The identified policy measures covered many policy area (administrative, financial, legislative, fiscal, market based, educational) and appear appropriate for implementation of the strategy.
Comprehensiveness	The second building renovation strategy is comprehensive policy document. It includes detailed analyse of 5 renovation scenarios and wide spectrum of policy measures that cover many policy area.
Strengths	Modelling (adopting) of renovation scenarios taking into account climate change in Czech Republic by 2060. Economic Impact of different scenarios in terms of created jobs and induced GDB. Calculation of energy consumption for cooling of the buildings. Detailed analyse of energy savings opportunities.
Weaknesses	Lack of analyse of existing barriers that hamper deep energy renovation of the building stock. Lack of a clear commitment that the selected scenario will be followed. Absence of measures targeting social housing and vulnerable households. Not clear system for monitoring and evaluation of generated energy savings. Absence of analyse of policy measures that include renewable energies.
Innovative approach	n/a
Recommendations	Analyse of the barriers that hamper energy renovation. To provide detailed indication about time framework and expected impact (energy savings, decrease in energy consumption, investment volume, etc) for identified policy measures. Elaboration of individual measures in specific steps with specific responsibilities of all designated entities. Identification of measure focused on improvement of social housing buildings in terms of energy efficiency.



DENMARK

Document Information	Denmark submitted the updated long-term renovation strategy as an Annex (Annex B) of the 2017 NEEAP. The strategy, published by the Danish Energy Agency (in 2014 it was published by the Ministry of Climate, Energy and Building), includes an Annex describing the status of all the initiatives under the 2014 Energy Renovation of Building strategy.		
National Building Renovation Strategy (Art 4 EED) Introduction	The new strategy is more complete and comprehensive of the previous one, including the majority of the information that in the previous report were dispersed in different documents. Nevertheless, in the introduction is stated that, following the parliamentary election in 2015, the previous government was replaced by a new one with a different party colour. The new government is not bound by the previous government's energy renovation strategy. However, as the overwhelming majority of the initiatives in the strategy were established through broad political agreements, which also cover the current government, the strategy's initiatives either have been or are in the process of being implemented.		
Overview of the National Building Stock - Art 4 (a)	yes	The building stock is described in a specific report "Potential heat savings due to ongoing building renovations through to 2050" (enclosed as a link to a website) dated march 2014. The underlying data consists of the BBR (Bygnings- og Boligregistret - the Danish National Building & Dwelling Register), which contains detailed information concerning all buildings in Denmark (e.g. building type and use, year of construction, area, heating system and construction). This information has been merged with background data for energy labelling acquired in Denmark since 2006, around 250,000 buildings, and includes data on floor area, the area of walls, floors and roofs, window areas and U values for all elements of the building envelope and windows.	3
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	The document does not refers to the report of the Danish Building Research Institute, which included a detailed assessment of cost effectiveness of different renovation options, cited in the 2014 strategy. There is a reference to the Danish Energy Agency's website SparEnergi.dk that contains detailed information concerning 15 frequently occurring building types, with information on the building, its structure and how energy savings can be carried out most effectively.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	Specific policy measures to stimulate energy efficiency improvements are mentioned in the strategy, divided in Economic instruments (e.g. energy taxes, tax deduction, EEOS), normative instruments (e.g. building regulations), informative instruments (e.g. energy labelling, better home program, specific website, energy adviser scheme "Better Home", Knowledge Centre for Energy Savings in Building). An important role is played by the Energy Efficiency Obligation Scheme, with 45% of the annual target (e.g. 12.2 PJ in 2015) realised within households. In December 2015 the "Energy Efficient and Intelligent building" initiative has been launched (2016 – 2019) to stimulate energy efficient improvements using data-driven decision-making tools to identify buildings with the greatest energy saving potential. The current building regulations were adopted in 2015, and new regulations are scheduled to be introduced with effect after 2020.	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	The result of 17 scenario analysis for different normative options (e.g. stricter requirements) and rates of implementation (rapid/slower implementation) are reported, with an estimate of the investments necessary for each option. A clear roadmap to guide investment decision is still missing.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	The expected benefit from the strategy is 35% reduction in net energy consumption for heating and hot water in the building stock by 2050 compared to 2011. Other wider benefits are listed, e.g. reduction of energy bill, increase in property values (i.e. DKK 500/m2 for each step on the energy scale), better occupant comfort and occurrence of diseases.	3

Summary	The 2017 strategy, drafted by the Danish Energy Agency, is more complete than the previous one, including the information that in the previous one was dispersed in different documents. A well designed comprehensive set of measures is mentioned in the strategy, divided in Economic instruments, normative instruments and informative instruments. The expected benefits from the strategy are 35% reduction in net energy consumption for heating and hot water in the building stock by 2050, compared to 2011. A sufficient level of details is generally provided, with the exception of the forward-looking perspective section, which should be better described. It should be noted that in the document is stated that "the present government is not bound by the strategy, and no stance has been taken as regards the possible introduction of new and stricter requirements in the building regulations in 2020 and thereafter".
Level of details	The level of detail of the provided document is medium (complemented by the information included in the referenced/linked documents)
Level of ambitions	The overall energy consumption target is moderate (min. 35% less in 2050), however, it should be noted that Denmark has already reduced significantly energy consumption in buildings during the last 30 years, and now it has less margins for further reduction compared to other countries. In 2008 it was decided that the energy requirements for new (buildings) in 2010, 2015 and 2020 should be established so that the energy consumption of new buildings was reduced by 25% every 5 years. Two voluntary low energy classes anticipated the requirements that would have entered into force in 2015 and 2020.
Appropriateness	The package of policy measures described in the strategy appears appropriate to meet the goals of the strategy itself.
Comprehensiveness	The package of policy measures described in the strategy appears appropriate to meet the goals of the strategy
Strengths	The comprehensive policy package and the introduction of a well working Energy Efficiency Obligation Scheme
Weaknesses	the forward-looking perspective to guide investment decision section
Innovative approach	There is an interesting requirement for energy efficiency improvements. They must be be implemented if the marginal investment for such improvements is profitable for the building owner. If the repayment period for the marginal investment for energy saving is less than three quarters of the lifetime of the energy saving measure, the saving is defined as profitable and must then be carried out.
Recommendations	The forward-looking perspective section should be completed and possible funding sources and mechanisms to meet the identified target should be described

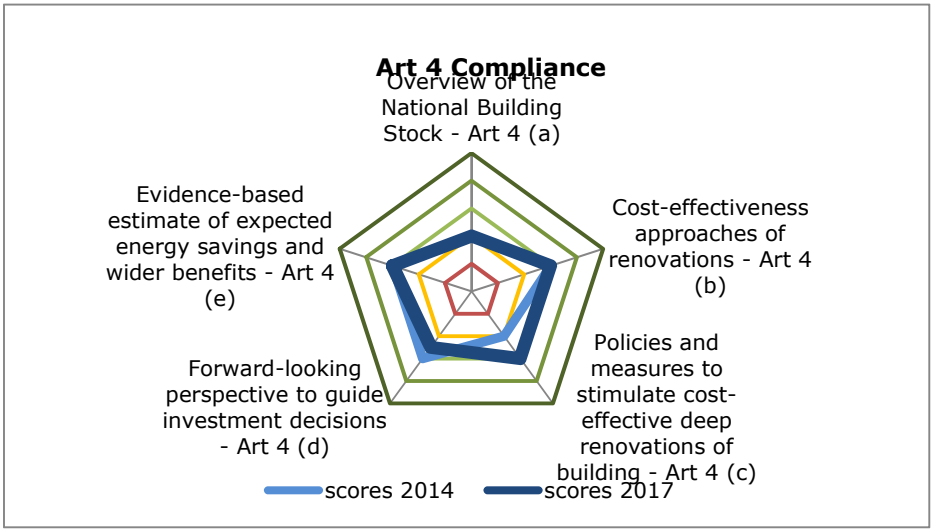


ESTONIA

Document Information	The Estonian long-term renovation strategy was provided in October 2017 as a separate notification (not included in the NEEAP 2017 that was reported in June 2017). The document is available in English. The structure of the report follows the 5 points of EED art.4 (points (a) to (e)). Sections (a), (b) and (e) are identical to the 2014 report.		
National Building Renovation Strategy (Art 4 EED) Introduction	The report first mentions that the general framework for strategic planning in Estonia is the State Budget Act, which means that the renovation strategy needs to be linked to the other development plans, and particularly the one for the energy sector. Therefore, the analyses for the renovation strategy are mostly based on the work done to prepare the draft 'Estonian Development Plan for the Energy Sector until 2030' (ENMAK 2030, published on 29/9/2017), complemented by studies done by the Ministry of Economic Affairs and Communications. The general emphasis is on developing "cost-effective, practicable and reasonable measures". The draft of ENMAK 2030 includes two general objectives for buildings: - renovating about 42% of the housing areas by 2030 (vs. only about 3.5% renovated by 2014), and achieving about 40-50% savings in each renovated buildings. This would be done with grant/loan schemes and training schemes for building professionals. - Exemplary role of the public sector: 37% of the net area of central public buildings should meet the minimum energy efficiency requirements defined in 2013.		
Overview of the National Building Stock - Art 4 (a)	partly	No update about the data on the building stock. Information presented are exactly the same as in the 2014 report. The only addition is table 2 presenting the number of buildings and related area for building with indoor climate control (= with space heating). There is still no data about energy consumption (e.g., distribution of the stock per energy classes). Also the distribution per age is only made according to 2 periods (before/after 2013) and for the whole stock (without providing statistics per main types of building). The lack of details about the different architectural categories could be a barrier to the adaptation of policy and technical measures to the different segments of the stock. However the analyses presented about cost-effective approaches show that standard types of buildings were defined. This means that the composition of the building stock in terms of architectural types is known to some extent.	2
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	This part is identical to the 2014 report. The further research needed (as mentioned in 2014) is not presented. The strength of the methodology is to use as much as possible monitored data (e.g. KredEx data). But some methodological choices are unclear. Particularly, the cost-effectiveness was assessed by comparing the renovation packages with a reference situation where no work would be done. Whereas the report highlights that "numerous buildings" would require repair works anyway. Assessments based on marginal cost calculations would thus be relevant as well. This could significantly change what can fit in a "cost-effective package", and what efficiency level can be considered "economically feasible". It is also not clear why the net present value is calculated over 20 years. Renovation of walls has usually a longer lifetime. It is not explained either if different discount rates are used depending on the tenure (e.g. higher discount rates for households, and lower discount rates for public buildings). No information either about assumptions on future energy prices. The use of the results to conclude about what financial aids would be needed is interesting. This conclusion should make more explicit that, to be efficient, the grants would need to be linked to energy efficiency criteria. The technical focus on ventilation is very relevant to take into account that air renewal rate is deemed insufficient in most existing buildings. A new study is mentioned "Strategy for Adaptation to Climate Change in the Infrastructure and Energy Sector", August 2015). But it brings nothing new for this part of the report.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	The reporting of policies was significantly updated (most of the policies newly mentioned are already implemented for many years, but were not mentioned in the 2014 report). The support scheme for apartment buildings (managed by KredEx) has been revised in 2015. The energy efficiency requirements for the different levels of grants seem to have been simplified. The former separate grant for energy audits is now presented as a part of the support scheme and it is now explained that this 50% grant can also be used for supervision service (since 2010). The former soft loan scheme is no longer mentioned. But now the report mentioned the loan guarantees offered since 2009 by KredEx to buildings whose renovation would be considered as financially too risky by private banks (e.g., due to low creditworthiness of owners or too complex buildings). New support scheme for individual houses (also managed by KredEx), with grants up to 30% of investment costs of energy efficiency actions (list of eligible actions but no overall energy performance requirements). Tax incentive for households (since 2002): interests of loans used to insulate their dwellings can be deducted from their income (for income tax calculations). This was used in 18% of the income tax returns in 2015 (but this is not restricted to energy efficiency	3

		works). Use of auction revenues from emission allowances to renovate local and central government buildings (in addition to the use of European Cohesion Funds). And more generally the presentation of the measures for public buildings is much better structured.	
Forward-looking perspective to guide investment decisions - Art 4 (d)	partly	The report highlights that the policy framework provides a long-term perspective, particularly due to the State Budget Act, the "General Principles of Climate Policy until 2050" approved in April 2017, and the "Development Plan for Climate Change Adaptation until 2030" approved in March 2017. The current policies to eliminate market failures are the ones mentioned in the part C of the report. Further measures could be decided in line with the strategic documents mentioned above. However it is not clear 1) if the policy measures currently implemented will be continued up to 2030; 2) what would be the indicators or criteria used to monitor if additional policies are needed. It should be noted that no linkage is made between the 3 long term scenarios (now presented only in part E of the report) and the current policy package. It is therefore difficult to know where the current situation would be compared to the 3 scenarios.	2.5
Evidence-based estimate of expected energy savings and wider benefits	yes	This part is identical to the 2014 report. The scenarios are the same and the values have not been updated. No linkage is made with the developments made in the policy package, nor with the results achieved between 2014 and 2017. The scenarios prepared in 2014 still provide a good basis to discuss the policies in a long term perspective. But this discussion is still missing in the report.	3
Summary		Only parts (c) and (d) have been updated compared to 2014. The reporting about the policy measures has been updated mostly to include policies implemented for many years (but not mentioned in the 2014 report). The really new measures are the new support scheme for renovation of individual houses and the various sub-programmes for different types of public buildings. As analysed in 2014, the information reported in 2014 were already complying with art.4 requirements (except for the low level of details about the building stock), and providing a good basis to define the policy framework and monitor the achievements. However the update done in 2017 does not make any link between the long term scenarios presented in part (e) (and already presented in 2014) and the update of the policy package presented in part (c). It is therefore not clear how the analyses done for the renovation strategy would be used in concrete terms when revising the policies. Moreover the 2017 report presents only very few data about outputs and results achieved between 2014 and 2017 (but they might be presented in the NEEAP?)	
Level of details		Still not enough details about the building stock. Some clarifications about the assessment of the cost-effective packages would also be needed. No further detail is provided about the long term scenarios compared to the 2014 report, but the information presented in the report are a good synthesis about these scenarios, and the reference of the corresponding study was already included in the 2014 report (but only available in Estonian).	
Level of ambitions		The new objective presented in terms of share of the housing area to be renovated by 2030 is quite ambitious: renovating about 42% of the housing areas by 2030 vs. only about 3.5% renovated by 2014. The ambition is also high in terms of result per renovation: achieving 40 to 50% savings.	
Appropriateness		The reporting about the policy measures has been updated to better reflect the policy measures already in place or planned. Even if there are only few new policies (see cell below), the current policy package tackles the financial barriers mentioned in the analysis of the cost-effective package (part (b)) with grant schemes available for apartment buildings, individual houses (since November 2016) and public buildings. However the report mentions also in the long term scenarios some of the non-financial barriers. The related measures are briefly mentioned (p.21) but not described in this report because they are considered to have "indirect impacts" on the renovation rate. Maybe these measures (training, awareness raising, etc.) are better described in the NEEAP? They are definitely important components to ensure the success of a national renovation strategy. Therefore it would be useful to have more insights about their current development in Estonia, to be able to assess if the current policy package is sufficient/appropriate. Based on the conclusion on cost-effective packages for private non-residential buildings, this would also be useful to analyse the opportunities for the development of ESCo market (for example for retrofitting lighting or replacing ventilation systems).	

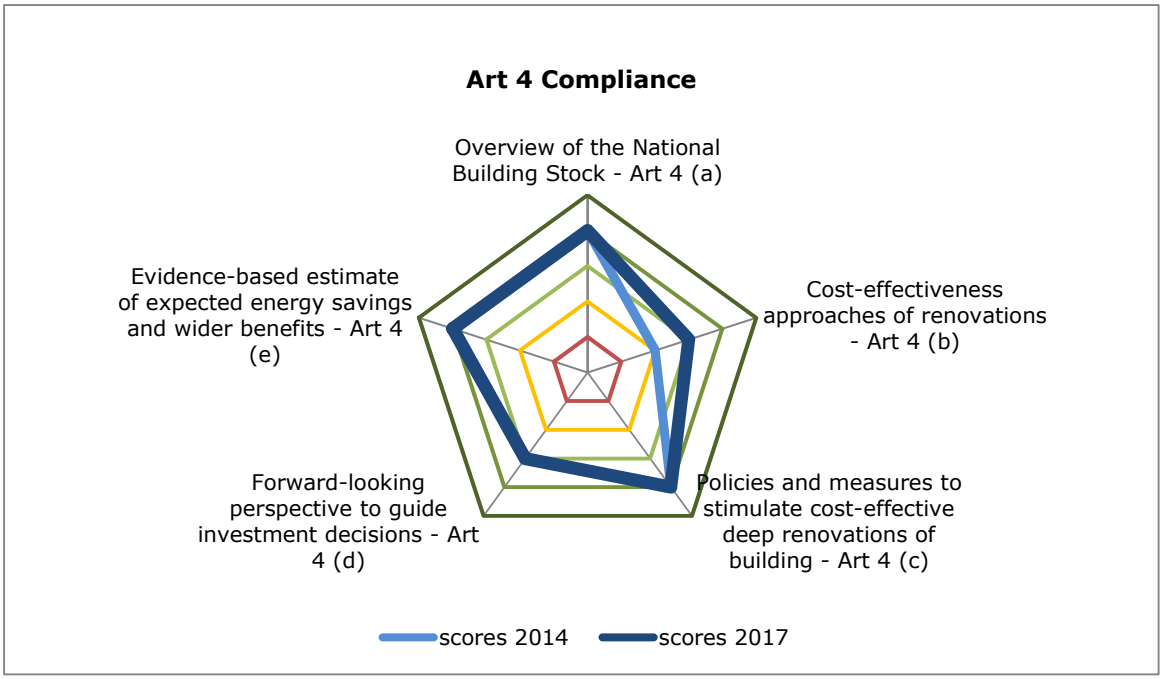
Comprehensiveness	The policy package presented in the 2017 report provides a better coverage. It is still mostly made of policies implemented for many years, but several of them were not mentioned in the 2014 report (e.g. loan guarantees). A new support scheme has been launched in November 2016 to cover renovation of individual houses. And several sub-programmes have been started and planned to cover different types of public buildings. Moreover, the report mentions that there are other measures having "indirect impacts" for renovation and that are not presented in this report (e.g., training of professionals involved in the renovation process, raising awareness of the owners). This would help to form a comprehensive policy package. However it is not possible to know from this report to what extent these other measures are developed.
Strengths	The main strengths are similar to the ones identified in the 2014 report: - pragmatic approach to define the cost-effective packages, and technical focus on the key issue of ventilation; - interesting long term scenarios discussing the impacts of issues such as lack of trained professionals, and making rough assessments of socio-economic impacts; - loan guarantees that tackle the financial risks that are frequent for multi-apartment buildings (e.g. when some of the owners cannot meet the creditworthiness criteria of private bank, or when the bank assesses that the renovation project is too complex).
Weaknesses	Part of the weaknesses are the same as in 2014: too few details about the building stock, some methodological choices made for the analysis of the cost-effective packages that would require further analysis/explanations, an overall approach that seems to consider that all owners would be fully rational from an economic point of view (not enough importance given to non-financial barriers, even if they are sometimes briefly discussed). Then a new weakness is the lack of linkage between the presentation of the policy measures and the other parts, and particularly the long term scenarios. And the lack of data about outputs and results achieved between 2014 and 2017 (however more data are maybe available in the NEEAP?).
Innovative approach	Even if they are not new measures, the following can be seen as good practices: - the grants for energy audit are also available for supervision of the whole renovation project (which is very relevant for large buildings); - loan guarantees for buildings whose renovation is deemed financially too risky by private banks (e.g., due to low creditworthiness of owners or too complex buildings) (and KredEx can also arrange specific reimbursement plans for owners facing temporary financial difficulties) - Use of auction revenues from emission allowances to renovate local and central government buildings
Recommendations	The same recommendations as in 2014 still apply, particularly the need to clarify the consistency between the update of the policy package and the long term scenarios. More details would also be needed about the monitoring and evaluation of current policies (as almost no result is presented in this report). Also it could be very helpful to assess more in details the likely importance of non-financial barriers, and to provide more details about how they are tackled (e.g., measures about training, development of attractive renovation offers, etc.). The current renovation strategy is almost only focused on stimulating the demand for renovation works (e.g., with grant schemes). It could be useful as well to analyse the opportunities for the development of ESCo markets for the improvement of private non-residential buildings (for example for retrofitting lighting or replacing ventilation systems), and how ESCo development could be supported (for example by analysing business cases/models, or by making research to show the competitiveness gains that can be achieved thanks to better indoor environment, etc.).



FINLAND

Document Information	The Finnish Long-term strategy for mobilising investment in the renovation of buildings pursuant to Article 4 is described in Annex 3 of the 2017 NEEAP. The document is available in English.		
National Building Renovation Strategy (Art 4 EED) Introduction	The main data sources of the Finnish strategy are: Statistics Finland, 2015 and 2016 and Finnish Meteorological Institute. The document provides an overview of the strategy chosen by the country and covers well all the elements required by EED Art. 4		
Overview of the National Building Stock - Art 4 (a)	yes	Finland's building stock is comprehensive and coherent with the structure and information provided in the previous Renovation Strategy in 2014. The overview of the national building stock provides details on the gross floor area, type of ownership and tenure status on residential, commercial and public buildings. A clear graphic representation of the energy class distribution in the above building sectors is provided. Energy end-use and primary energy consumption is also provided for different types of buildings and the climatic issue is discussed.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	Cost-effective approaches to renovation relevant to the building type have been described in the NEEAP. The cost-optimal levels of measures to improve the energy performance of one and multiple dwellings buildings have been assessed in accordance with Commission Delegated Regulation (EU) No 244/2012, the methodology is explained and is based on the basis of life cycle costs for a calculation period of 30 years, while taking account of initial investment costs and maintenance costs, replacement investments, the residual value of investments, the discount rate and the projected increase in the energy price.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	The Finnish renovation strategy presents a list of cost-effective renovation approaches including a list of applicable measures to improve the energy performance of the different type of buildings. A more accurate description of the policies and measures prompting renovation of the building stock is provided in the Annex 1. of the NEEAP.	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	Most of the programmes related to the renovation of the building stock are only limited to 2025. Financing sources and renovation investment are mainly represented by tax credit (covering 50% of the work performed) supported by the government or by self-financing or market based loans. Other financial instrument options include financing from the sale of real estate property (e.g. the parcelling out of land) and financing arranged by product suppliers.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	The benefits and positive impact of the renovation strategy on the economy and employment (in terms of job created) are described in the document.	4
Summary		The Finnish strategy is structured according to the element listed in Art. 4 of the EED. The policy measures and the level of information provided in the report are of a good quality and described in details.	
Level of details		The level of details related to policy measures included in the NEEAP and in the renovation strategy is good however more focus should be on the financial sources.	
Level of ambitions		Considering the young age of the Finnish building stock, the deep renovation requirements, as well as the benefits of the strategy appear quite ambitious.	
Appropriateness		Both the strategy and the policy measures seem suitable and appropriate for Finland.	
Comprehensiveness		The good mix of policy measures described in the document that promote renovation are comprehensive.	

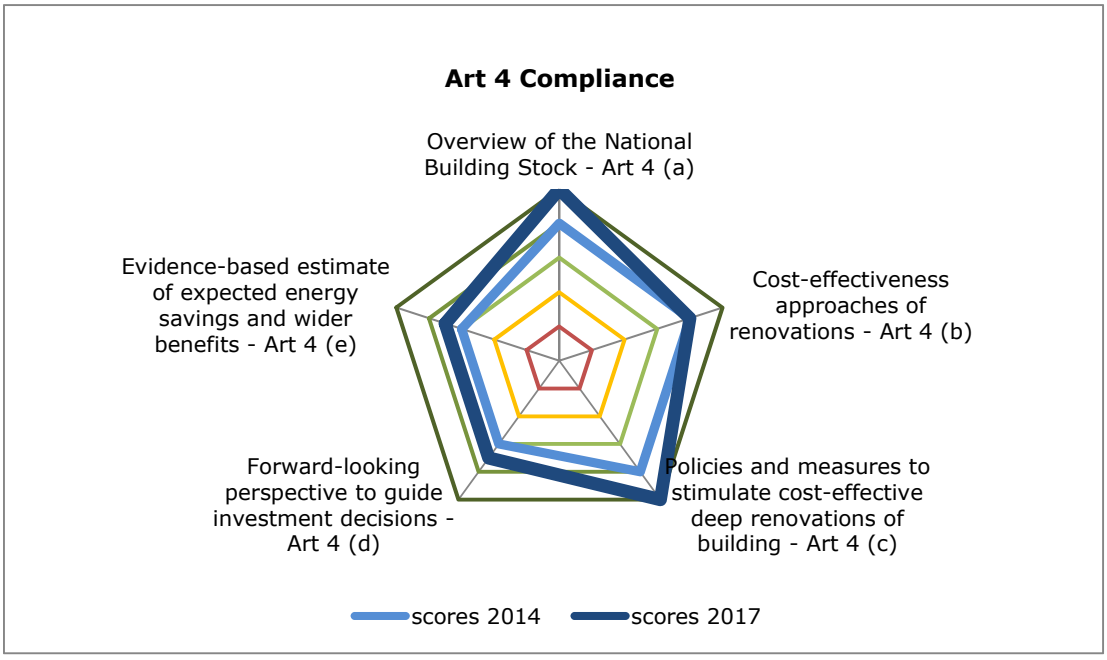
Strengths	The document is well structured and comprehensive. The strategy and the policy measures described are appropriate for the renovation of the building stock in Finland. 5 Scenarios including the increase of costs linked to measures to improve energy efficiency in buildings are presented to achieve the 2050 target.
Weaknesses	The public financial sources should be better presented.
Innovative approach	n/a
Recommendations	The public financial sources should be better presented.



FRANCE

Document Information	The second French long-term renovation strategy was provided in May 2017 as a separate stand-alone document, not included in the NEEAP, available also in English.		
National Building Renovation Strategy (Art 4 EED) Introduction	The follow-up of the French strategy is mainly focused on the new Energy Transition for Green Growth Law of 17 August 2015, which affirms and realises the government's commitment to making France a low-carbon economy and society.		
Overview of the National Building Stock - Art 4 (a)	yes	This section provides an analysis of the residential and tertiary building stock. For the residential sector, statistics are used for five main construction periods. These statistics enable separate estimates to be made for one-dwelling homes and apartment blocks of: the share of main residences and the nature of their occupants (owner or tenant), the most common energy systems, and the energy performance recorded (energy performance analysis labels and level of consumption). For the tertiary sector, a detailed analysis provides: details on the broad categories of buildings (schools, offices, etc.), estimated energy performance and renovation requirements. The databases used to produce these statistics are listed in Annex I. They include outputs from Census, survey results (e.g. PHEBUS, ENL) and technical data depositories.	5
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	The applied methodology is in line with the cost-optimal framework defined by the EPBD. Profitable approaches to renovation were identified for 5 example buildings (one-dwelling building with gas, one-dwelling building with joule heating, apartment with gas, apartment with gas and lots of glass and a large office) built before 1975 and in the period 1975–1988. For each of these example buildings, 3 renovation scenarios (not very ambitious, efficient and very efficient renovation) have been simulated, also taking into account the national public financial aid available for the initial investment. RES solutions have not still included in the calculations.	4
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	This section provides a detailed description of the regulatory framework, including the objectives and provisions of the new Law No 2015-992 of 17 August 2015 (Energy Transition for Green Growth Law). 8 main objectives are discussed (including possible areas of improvement): support for households suffering from energy insecurity; effective regulatory measures; support households by providing useful, neutral, free advice; financial support programmes; guidance to professionals; initiatives tailored to individual regions; specific actions for publicly managed buildings; monitoring tools. Long-term and priority-based objectives were set as follows: i) by 2025, all private residential buildings whose PEC is above 330 kWh/m2 must be renovated; ii) from 2017, 500 000 homes must be renovated each year, at least half of which must be occupied by low-income households; iii) by 2050, France must have building stocks that have been entirely renovated in line with the 'low-consumption building' standards.	5
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	In 2014 a forecasting exercise was launched to extend the policy scope to 2035 and incorporating analyses of energy consumption, greenhouse gas emissions and pollutant emissions. This modelling exercise has allowed France to establish a 'National Low Carbon Strategy' (SNBC), which sets out the general framework to reduce emissions by a factor of 4 by the year 2050. Modelling has been entrusted to a group of service providers and forecasting in relation to energy, greenhouse gas emissions and atmospheric pollutants is carried out simultaneously on the basis of a holistic approach.	3.5
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	The modelling exercise has made it possible to forecast the impact of the various measures that make up the general framework of the SNBC, in terms of reducing both energy consumption and greenhouse gas emissions. Other sectoral indicators include: public and private investment; number of private houses upgraded; number of individuals having received advice; life-cycle assessment of greenhouse gas emissions from construction activities. A summary of these indicators will be drawn up and disseminated in connection with the updating of the national low carbon strategy, which is expected to be published in mid-2019.	3.5

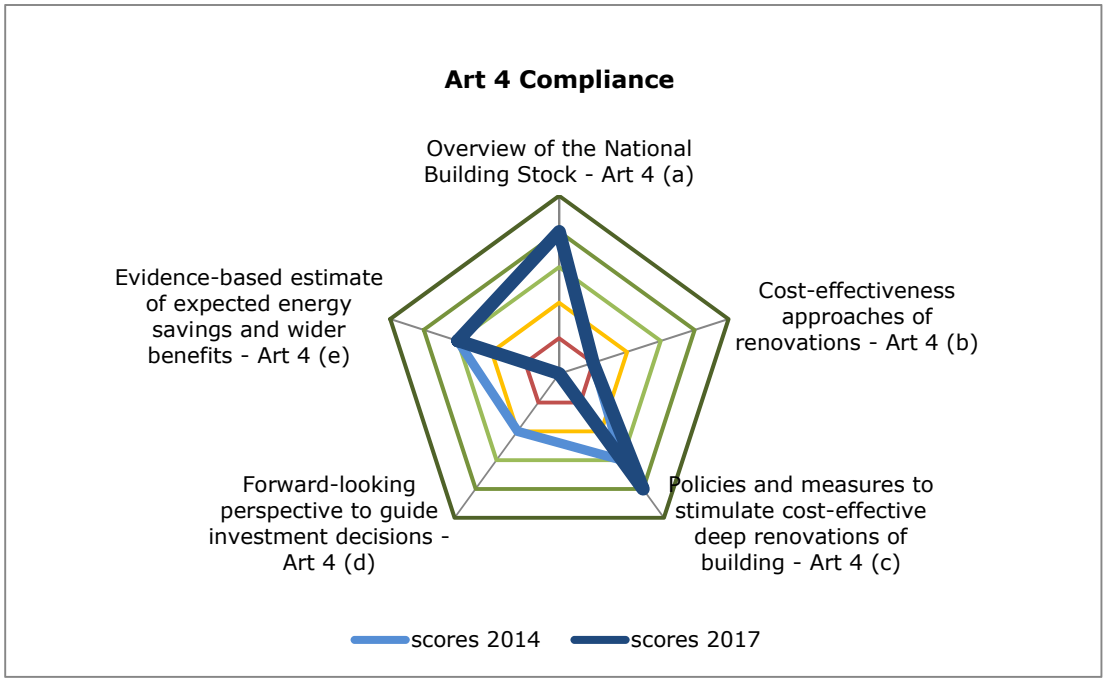
Summary	France, with its environmental ambitions and desire to be exemplary, paved the way for the application of the Paris Agreement by adopting the Energy Transition for Green Growth Law of 17 August 2015, which affirms and realises the government's commitment to making France a low-carbon economy and society. This new Law provides the opportunity to develop energy and environmental excellence in the building sector, to which a large saving potential is still attributed. Long-term and priority-based objectives were set as follows: i) by 2025, all private residential buildings whose PEC is above 330 kWh/m2 must be renovated; ii) from 2017, 500 000 homes must be renovated each year, at least half of which must be occupied by low-income households; iii) by 2050, France must have building stocks that have been entirely renovated in line with the 'low-consumption building' standards.
Level of details	The level of detail (already good in the previous report) has been further increased, both about the building stock description and the estimation of expected benefits.
Level of ambitions	The French strategy is very ambitious, since it sets the goal to reduce emissions by a factor of 4 by the year 2050.
Appropriateness	The general framework provided by the new Energy Transition for Green Growth Law is appropriate.
Comprehensiveness	The second French renovation strategy is comprehensive, especially for residential and public buildings.
Strengths	The strategy aims to strengthen the state actions to drastically reduce fuel poverty, promoting the financial drivers. Issues related to the monitoring of upgrading activities are discussed.
Weaknesses	The contribution of RES technologies should be better discussed and addressed.
Innovative approach	New forms of obligation are introduced as the ban on sales of energy-intensive social housing, or the energy efficiency criteria as a condition for rental of a property by its owner.
Recommendations	More details on the expected results (energy savings) for each policy measure/tool should be provided. Also estimations of wider economic benefits of the strategy would be useful.



GERMANY

Document Information	The German long-term renovation strategy forms part of Germany's NEEAP 2017 (see NEEAP chapter 3.5).		
National Building Renovation Strategy (Art 4 EED) Introduction	The German renovation strategy details the main plans of the Federal Government to reach its goal of long-term goal of achieving an almost climate-neutral building stock by 2050. Alongside the information provided to comply with the EED Article 4 requirements, the strategy mentions the adoption of the Federal government's Energy Efficiency Strategy for Buildings in 2015 and the launch of the Tailored Renovation Roadmap for Buildings in 2017.		
Overview of the National Building Stock - Art 4 (a)	yes	The breakdown of the final energy consumption of buildings according to sector (industry, services, households) and according to end use for the year 2015 is provided. Updated housing stock statistics by building type and age group for the years 2015 and 2014, respectively are also given. The strategy also includes building permits and living floor space per dwelling for the period 2011-2015. For the non-residential stock, estimates of the net floor area and number of buildings are given, as well as new construction rates. As in the previous BRS, no detailed non-residential building data are covered in the overview, while data according to climatic zones or data on energy performance quality of external walls and windows are also missing.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	no	Cost-effective approaches of renovations are not defined in 2017 strategy. Instead, some main considerations with regards to cost effective renovation approaches are identified such as the potential of 1400-1800 PJ of renewable energy in buildings by 2050 and reduction of final energy consumption by 1600 PJ as a result of efficiency measures. It is also mentioned that in 2017 the Federal Government launched (or will launched) the Tailored Renovation Roadmap for buildings in order to provide building owners with harmonised cost-effective renovation concepts. The results are not shared in the strategy.	1
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	Several new measures launched by the Federal Government since the last report in 2014 are announced in the BRS. This include the Germany Makes It Efficient campaign launched in 2016, the 'Heating Optimisation Funding Programme' which provides funding for low-investment measures to optimise existing heating systems, the initiative 'EnEff.Building.2050' ensuring funds for model projects which demonstrate ambitious energy concepts for buildings and districts and the initiative 'Solar Construction/Energy-Efficient City', which provides funding for research and development into energy-efficient and climate-friendly buildings and districts. Under the National Action Plan on Energy Efficiency (NAPE), increase in funding for the CO2 Building Renovation Programme to EUR 2 billion per year is foreseen, the market incentive programme is amended and the originally planned tax incentives are replaced by the Energy Efficiency Incentive Programme.	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	Not updated	No information provided by MS on Art. 4(d).	0
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	The strategy includes a table listing the top-down energy savings in 2010, 2013 and 2016. It is noted that not all measures are quantifiable and it is likely that unquantifiable measures have a significant contribution to the targets. The report does not include estimation or calculation of wider benefits resulted from the implementation of the renovation strategy.	3
Summary		The German building sector is expected to play a key role in the success of the energy transition in Germany. In October 2015 the Federal Cabinet adopted an Energy Efficiency Strategy for Buildings with a view to achieving the long-term goal of achieving an almost climate-neutral building stock by 2050. In addition, the Tailored Renovation Roadmap for Buildings will be launched in 2017, initially for residential buildings and subsequently for other buildings as well.	
Level of details		The Art 4 (a) section, i.e. overview of the National Building Stock, is the most detailed section of the strategy with detailed breakdown of the building stock and energy consumption data. New/updated measures since 2014 are also listed in the policy measure section.	

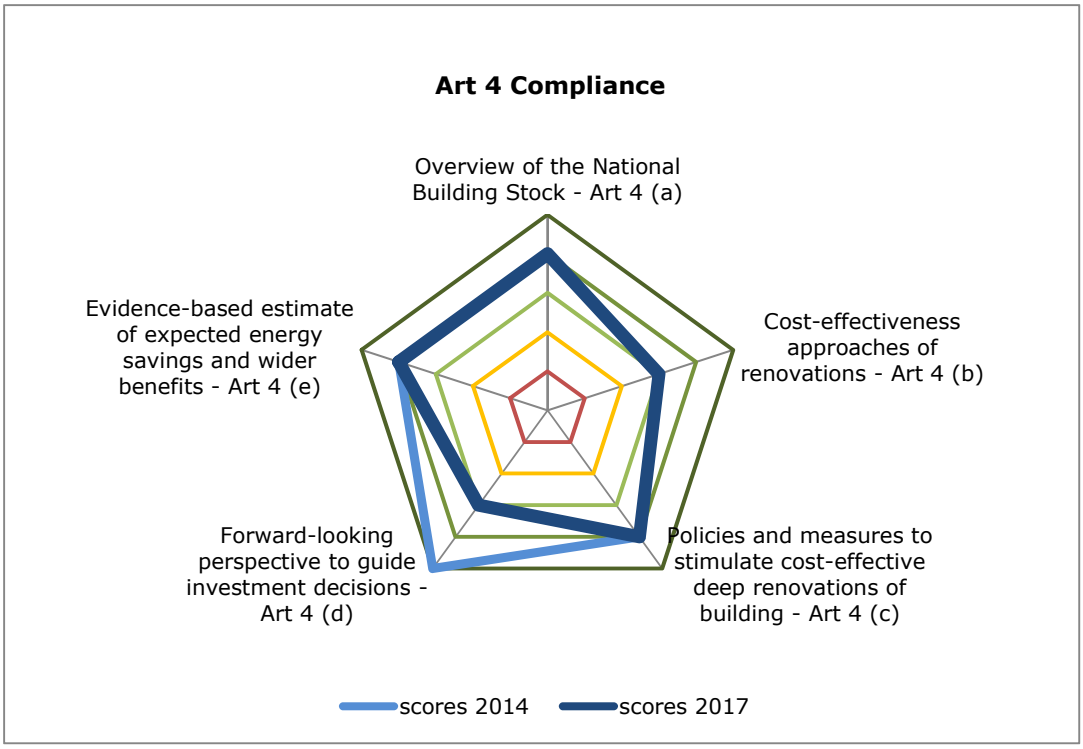
Level of ambitions	Germany has an ambitious 2050 goal of reaching an almost climate-neutral building stock by 2050, and it plans to do so by adopting its own Energy Efficiency Strategy for Buildings and launching a Tailored Renovation Roadmap for Buildings, initially for residential buildings and subsequently for other buildings as well..
Appropriateness	The measures and policies designed for the strategy are appropriate and suitable to reach the goals established.
Comprehensiveness	Germany has in place a good set of legislative measures for EE in buildings. The Tenancy Law provides for effective incentives for energy modernisation of the rental housing stock. There are lot of financing and research programmes supporting EE and RE in the building sector. However, a more articulated approach for renovation of building stock is needed.
Strengths	Ambitious efforts by the Federal government to substantially reduce the energy consumption of the building sector.
Weaknesses	The report does not provide information of cost effectiveness of the building renovation as well as about forward looking perspective for investment decisions.
Innovative approach	n/a
Recommendations	The strategy will be significantly improved if building stock modelling is considered with the aim to define cost effective renovation approaches and determine forward-looking perspective to guide investment decisions.



GREECE

Document Information	Also the second edition of the Greek long-term renovation strategy has been provided as a separate stand-alone document, dated April 2018		
National Building Renovation Strategy (Art 4 EED) Introduction	The revised report addresses all the EED Art. 4 requirements; it was prepared in collaboration with the Ministry of the Environment and Energy (YPEN) and of the University of West Attica. The structure of the revised document, shorted than the previous one, follows the main section headings in EED Art. 4.		
Overview of the National Building Stock - Art 4 (a)	yes	In this second strategy edition, the 2014 comprehensive and detailed statistical overview of the building stock is provided, with some new analysis and charts, using the same data sources (i.e. 2011 Census, Tabula 2011) complemented by EUROSTAT data (i.e. January 2018 edition). This includes an analysis of building types, ages, tenures, energy performances per climatic zones, fuel carrier used, providing more details on residential than on non-residential buildings. The approach is correct and the segmentation appropriate.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	The results of the recent study (still not available in 2014) to determine the cost-optimal levels of minimum energy performance requirements of buildings and structural components are presented; several building types, for the different buildings categories (i.e. 'detached dwellings', 'apartment blocks' and 'offices') have been considered. The estimation of the energy saving potential related to cost-effective retrofit opportunities, for each climatic zone and building types is provided, together with 2 building renovation scenarios, combining the type of renovation and renovation rate (in the previous strategies the scenarios considered were 5). The main envelope technologies and system opportunities are well covered.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	In the revised strategy, a detailed analysis of the barriers to the improvement of energy efficiency in buildings is provided (e.g. immature market, technical barriers, institutional and economic barriers, lack of information, economic crisis etc). To overcome the existing barriers a long term policy framework have been put in place, including a comprehensive package of implemented and planned measures both for residential and non-residential building, together with an estimation of the related energy savings per year and 2017-2020 cumulative (e.g. Regulation of Energy Performance of Buildings-KENAK, mandatory installation of solar thermal systems in new residential and tertiary sector buildings, financial incentives for EE improvements in households).	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	In the revised strategy, the 2014 very well developed analysis per scenarios is neither reported nor cited (5 scenarios were defined for residential buildings and 2 scenarios for non-residential ones, combining different types and paces of renovation). A list of recommended actions needed to improve the energy performance of at least 7 % of the current building stock by 2030 is provided, together with several funding mechanism (e.g. private, EU cohesion funds, EU Energy Programme for Recovery, Horizon 2020 for R&D etc.). The annual 2018-2030 investment needs for 2 residential renovation scenario (moderate and deep) are presented. Overall this strategy section was more detailed and comprehensive in the 2014 report version.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	This Art. 4(e) EED requirement, very well covered in 2014, is almost not addressed in this new version of the strategy. Additional benefits (health, employment, economy, environmental etc) are only listed and is stated that the benefits generated by energy savings in buildings and the corresponding multipliers may exceed double the cost of the energy savings.	4

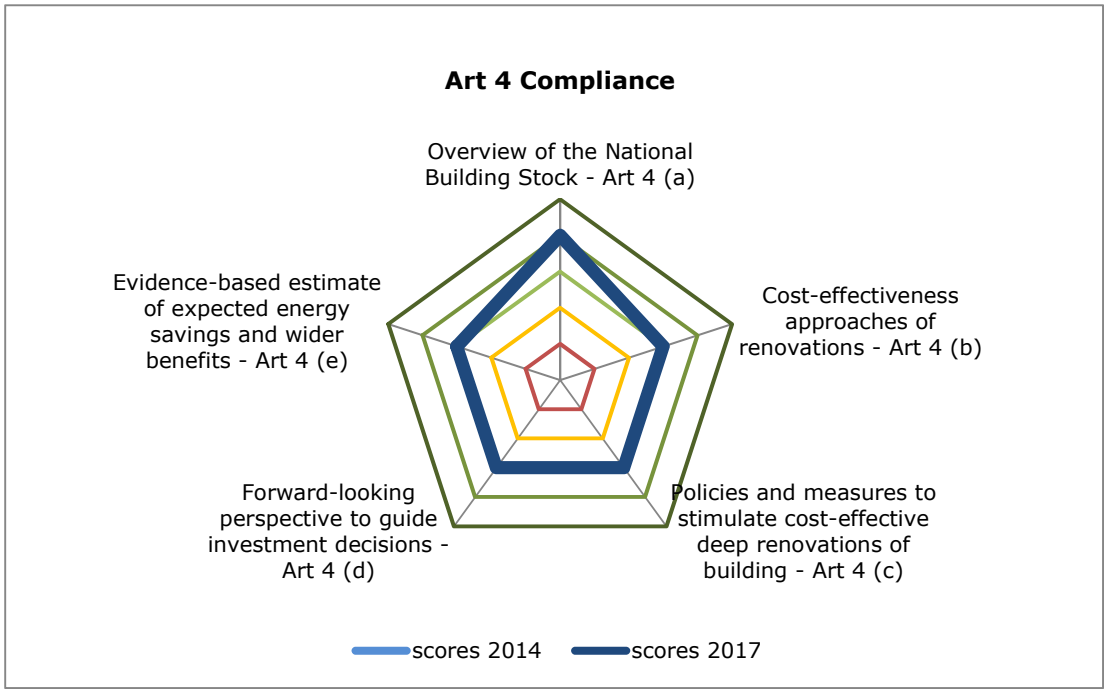
Summary	The revised Greek long term renovation strategy, addresses all the EED Art. 4 requirements. It provides a very good and detailed description of the building stock, a detailed analysis of the barriers to energy efficiency take, together with the description of a comprehensive package of measures supporting the renovation of residential and non-residential buildings and a cost-effective approaches section, more comprehensive than the one provided in 2014. The strategy includes two scenarios for residential buildings obtained by combining a constant renovation rate with various types of renovation (moderate and deep). The overall target, gradual coordinated action to improve the energy performance of at least 7 % of the current building stock by 2030, appear to be less ambitious (but not in contrast) with the 2014 strategy one, i.e. to renovate at least 80% of the existing building stock by 2050.
Level of details	The strategy provides an overall good level of details, with the exception of the Art. 4(c) section
Level of ambitions	The level of ambitions appear to be lower (but not necessary in contradiction with the 2014 strategy one), I.e. improve the energy performance of at least 7 % of the current building stock by 2030
Appropriateness	The measures and policies designed for the strategy are appropriate and suitable to reach the goals established,
Comprehensiveness	Greece has in place a good set of measures for the building sector. It includes governance, infrastructural and practical measures, differentiated by priority and period of implementation.
Strengths	Very good "Cost-effective approaches to renovations" and "policy and measures" sections, including a detailed estimate of monitored and forecasted measures energy savings.
Weaknesses	Some sections of the revised strategy are weaker than the 2014 one (e.g. Art.4(d) and Art. 4(e).
Innovative approach	n/a
Recommendations	Improve the EED Art. 4(d) and Art. 4(e) sections including the analysis presented in 2014



HUNGARY

Document Information	The building renovation strategy for Hungary has been included in the NEEAP which was submitted in November 2017. The document is rather an update of the previous strategy submitted in 2015 and it is based on a study entitled 'Revision of National Building Energy and preparation of a strategic intervention proposal for building energy', Trenecon Kft. January 2017		
National Building Renovation Strategy (Art 4 EED) Introduction	The strategy included in the NEEAP submitted in 2017 is not structured according to the elements listed in Art. 4. The level of details provided to describe the building stock has not changed since the previous strategy; however in this document the description of measures and financial mechanisms in support of the building renovation is not reported.		
Overview of the National Building Stock - Art 4 (a)	yes	Overall, the level of details on the building stock presented in this document remains the same compared to the previous renovation strategy. The document states "The National building stock is based on based on a survey of 20,842 buildings provided by Építésügyi Minőségellenőrző Innovációs Nonprofit Kft. The basis of the building stock projections up to 2050 is represented by the building typology data of 2012 in NBES as well as the statistical data for the building stock for subsequent years as well as demographic indicators." The annual stock data have been determined from the relationship of the existing stock, the number of new constructions and buildings to be eliminated - after separation of uninhabited buildings in case of residential buildings. In the case of public buildings, no stock increase has been considered on the basis of statistical data. Different building types for both residential and public buildings are described in the document including age, heated floor space, no. of buildings, per unit renovation cost in billion HUF/PJ and efficiency ranking.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	A reference to the 2014 is made. This included a detailed analysis of the cost-effective approaches to the main type of buildings of Hungarian building stock The calculation of energy savings and costs was based on the report of cost optimal levels in 2013. The 2017 revision of cost optimal requirements (submitted to the Commission in 2018 as part of EPBD obligations) shows that the cost optimal level doesn't need any modification and therefore the 2014 figures are confirmed.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	A list of measures and their forecast energy savings for both residential and public buildings are indicated in table 33 and 34 p. 69-70. The main policy measures are represented by: 1. regulatory measures (Energy efficiency regulations for buildings); 2. Financial measures (fiscal incentives, funding schemes, financing mechanism, programmes implemented using operational programmes (KEOP, ROP, KMOP, KEHOP, TOP, VEKOP, GINOP)); 3. Horizontal measures: Operation of the National Energy Network and Modern Cities Programme, measures to improve energy efficiency with budget support. No analysis of the existing barriers is provided.	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	Investment requirements have been quantified and possible funding sources listed, but the forward-looking perspective lacks clarity on how to make the best use of the limited resources available.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	The information included in the NEEAP 2017 under the renovation strategy, show expected primary energy savings for public and residential building according to two scenario: version 1 and 2. Wider social benefit and financial impacts (i.e.: tax, climate) have been forecasted up to 2023 according to the proposed intervention priority.	3
Summary		The document, included in the 2017 NEEAP, is rather an update of the previous renovation strategy document submitted in 2015. The strategy (i.e. "National Building Energy Strategy") adopted in 2015 is presented in the document and it indicates the energy savings target for both 2020 and 2030. The building stock is presented with a list of measures contributing to energy savings both, for the residential and the public sector. The information on the cost effective approach to renovation remains unchanged, after a revision of cost optimal requirements. Cost optimality approach and forward looking perspective to guide investment decisions could be improved, but overall they show an update of the 2015 strategy.	

Level of details	The level of details regarding the building stock has not changed since the previous document but more information on the forward looking perspective and the barriers should have been be provided
Level of ambitions	With the information provided, it is no possible to assess whether the financial sources required will be sufficient to successfully support the implementation of energy efficiency policy measures in the building sector.
Appropriateness	The document only includes a list of measures indicating the expected energy savings in 2020, 2030, 2050. No description of the measures and corresponding financial burden is included.
Comprehensiveness	The description of the building stock is sufficient but overall, next strategy should be further improved in the content too. Stakeholders group perspectives; forward looking perspective to guide investment decisions together with an appropriate analysis on the cost effectiveness to building renovation are missing.
Strengths	Regulatory measures such as energy efficiency regulations for buildings and the new energy advisory network in 2017 introduced in Hungary to assist local governments to prepare energy efficiency strategies.
Weaknesses	Unclear whether available funds will be sufficient for the implementing the building renovation strategy in households.
Innovative approach	n/a
Recommendations	The next renovation strategy update should not be limited to provide just an update of the previous strategy but should really include all the relevant information required by Art. 4 EED so that an accurate assessment on how Hungary meet the Art. 4 provisions can be performed. Next strategy should also include a dedicated section on the forward looking perspective to guide investment decisions

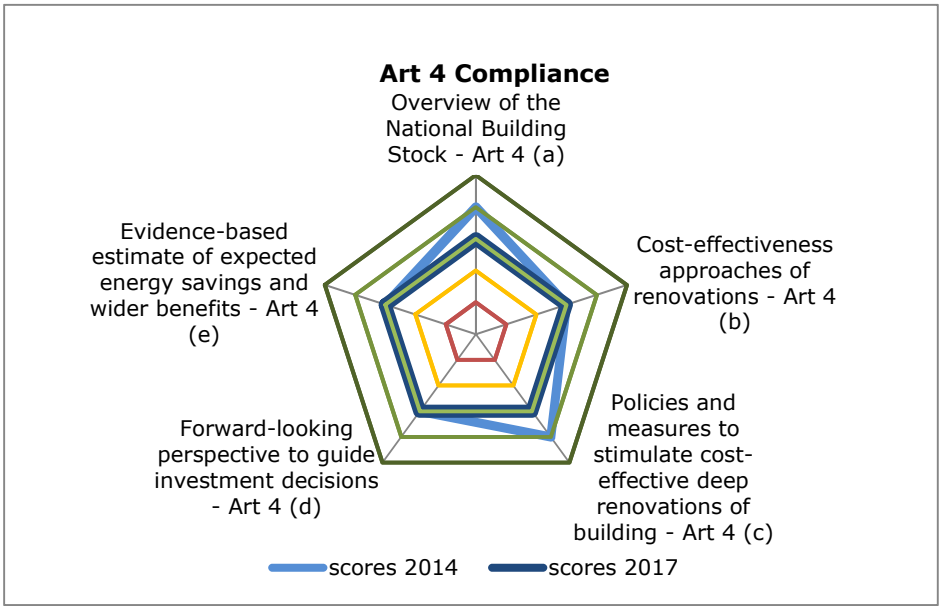


IRELAND

Document Information	The Irish long-term renovation strategy 2017-2020 was provided as a separate document issued by the Department of Communication, Climate Action and Environment in 2017 taking into account recommendations arising from the stakeholders consultation process organized by the Irish Green Building Council and their report published in February 2017. The document does not include all the data already provided in the first renovation strategy (e.g. residential building stock). However, where necessary, the statistical data provided in the first LTRS is updated.		
National Building Renovation Strategy (Art 4 EED) Introduction	The long-term renovation strategy is a policy paper prepared in line with the Ireland's energy policy defined by the White Energy Policy Paper - Ireland's Transition to a Low Carbon Energy Future. Measures set out in this LTRS are included into the 4th NEEAP and the 1st National Mitigation Plan, both published in 2017. This LTRS was not prepared according the structure of EED Art.4 key elements. It consists of chapters on each of the three sectors: residential, commercial and public. The main focus of the strategy is on demonstrating progress towards the achievement of the energy efficiency objectives and to indicate future energy saving potential resulted from energy renovation in three sectors (residential, commercial and public). Aim of this strategy is to ensure that Ireland take into account the contribution that building renovation makes to setting Ireland on the path to decarburizing its building stock.		
Overview of the National Building Stock - Art 4 (a)	yes	The Irish building stock overview refers to the data provided in strategy 2014, based on data from 2011 census and from the European Housing review (2007). In addition, an overview of the commercial building stock (number of buildings by archetype with age profile of buildings) and for the residential building stock was reported final energy consumption split by fuel type.	3
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	Sufficient explanation is provided for the fact that this section does not need any update. The data provided in LTRS 2014, in relation to Article 4 (b), was already for Ireland's strategy beyond 2020 and Ireland's strategic position to beyond 2020 has not changed. The previous MACC curves assessing the relative cost effectiveness of different renovation measures and packages from 2014 strategy carry forward. Further updating of that analysis was done in 2015. This information was published in the Report entitled "Unlocking the Energy Efficiency Opportunity". This report was referenced and a link to it was provided in the 2017 LTRS. Its analysis has informed the 2017 update of the LTRS as well as Irish 4th NEEAP (2017). The analysis on cost effective approaches is also being progressed in a number of pilot measures which have been mentioned in the (2017) LTRS – specifically the Deep Renovation Pilot & Warmth & Wellbeing Pilot..	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	The strategy recognizes that there is a need to progressively move to more ambitious medium and larger scale upgrades and renovation. Future savings will have to come from larger scale projects, such as deep renovation of buildings, Nearly Zero Energy new builds, lighting and boiler replacement and upgrades to utility networks. In the document, an analysis of the barriers for implementation of energy efficiency measures is provided. Policy and measures to support implementation of the Strategy were reported for all specified sectors. In addition to the existing measures that have been in place several new measures in the residential sector were reported: Warmth and Wellbeing Programme, Deep Retrofit Programme and Enhanced Building Energy Rating documentation. Rental sector – consultation in 2018 and enhance of new Building Regulations for major renovations are the planned measures in the residential mentioned in this strategy.	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	A clear forward-looking perspective to guide investment decisions, including a roadmap with key dates, targets, milestones, needed resources, is not included in the strategy. Potential implementation scenarios have been not observed. In the strategy was mention that in the public the focus will be set on deep renovation of the buildings. Since the public sector has made a 20% improvement (compared to 2009 baseline) meaning that the sector's gap to target is 13% as of year-end 2016. Taking into account this, Department of Communications, Climate Action & Environment (DCCAE) worked with stakeholders during 2016 to produce Irelands first the Public Sector Energy Efficiency Strategy which will drive and facilitate the further effort required to achieve the 2020. This strategy includes provisions to promote action and reduce barriers for energy efficiency in the public sector buildings with focus on larger scale retrofit projects.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	Research by Sustainable Energy Authority of Ireland (SEAI) indicates that there is the technical potential to save a further 16,000GWh in entire building stock in the period 2021-30 as well as for a further 9,400GWh of energy saving potential in the residential sector in the period 2021-30. Ireland's first National Energy Efficiency Action Plan (NEEAP) of 2009 put an obligation on the public sector to take a leadership role on climate action by improving its energy efficiency by 33% by 2020. This commitment was further reiterated in Ireland's Fourth NEEAP (April 2017).Only wider benefit of the building renovation was mentioned in the LTRS. In the residential sector, improvement	3

		of the air quality in households is one of the crucial issue, since use of oil for heating with in household still have large share.	

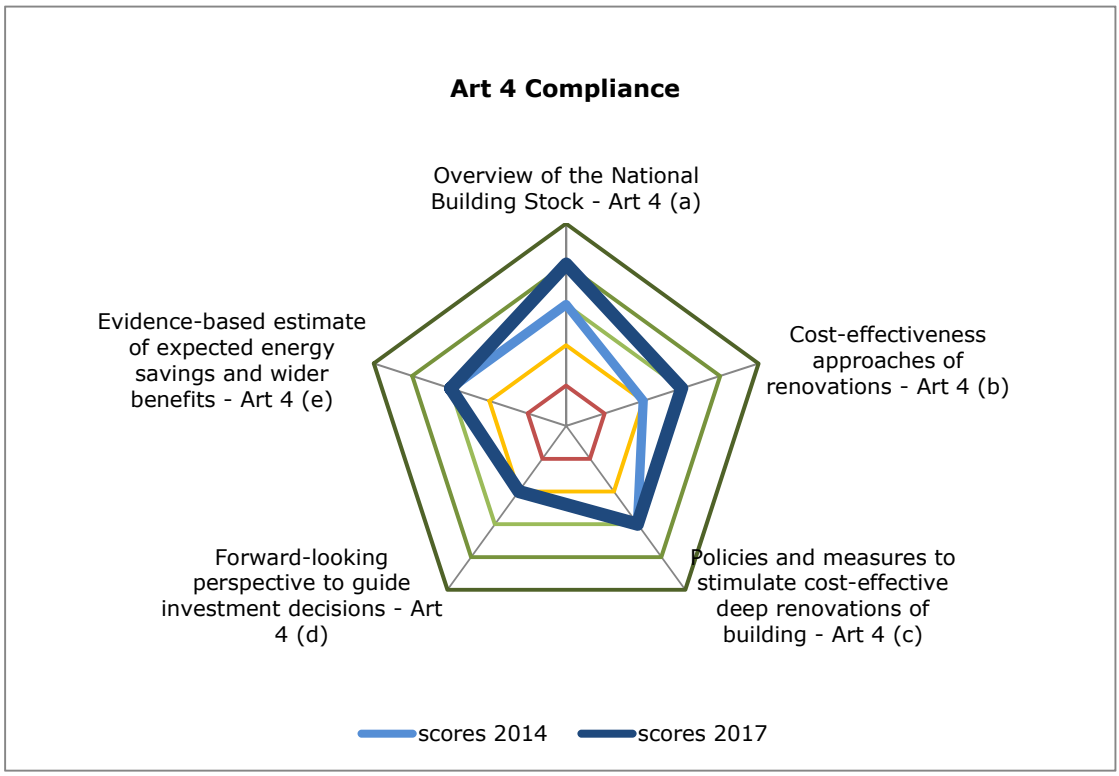
Summary	Ireland's building renovation strategy for the residential sector focuses on the Better Energy Program, implemented on behalf of DCCAE by the SEAI. The key objective of this LTRS for the residential sector buildings is to motivate uptake of deeper energy efficiency measures in support of the greater deployment of low carbon heating technologies (switch from oil to other type of heating), while gathering data on the multiple benefits, particularly for health impacts. This LTRS provides a strategic approach adopted for the commercial sector, which includes building greater awareness of the multiple benefits of energy efficiency , consolidation and building of existing effective initiatives to increase renovation rate in this sector and to promote research and engagement to get more decision makers to renovate. For the public sector, the LTRS took over the provisions, policy and measures to promote action and reduce barriers from the Public Sector Energy Efficiency Strategy adopted in 2016.
Level of details	The level of details cannot be estimated for the entire building stock since the strategy does not include an overview of the residential and public building stock (but it was included in the first version). The policy measures were reported not in details (without time line, funding sources, investment volume and expected savings).
Level of ambitions	Ireland set out with the First NEEAP (National Energy Efficiency Plan) a very ambitious target to improve energy efficiency in the public sector by 33%. This commitment was further reiterated in Ireland's Fourth NEEAP (April 2017). This LTRS trace the path for achievement of this target.
Appropriateness	The policy and measures identified in the LTRS appear appropriate to achieve objectives set out by Ireland's strategic papers on energy efficiency.
Comprehensiveness	The energy efficiency policy and measures outlined in this LTRS covers entire IE building sector.
Strengths	LTRS reflects Ireland's strong political commitment towards improvement of energy efficiency in the building sector. Focus set on deep renovation of the entire public building stock including buildings owned by the central and local government. Clear defined strategic objectives of Ireland's policy on renovation in the residential sector as: switching from fossil fuel to renewable heating technologies, building the case for low cost financing, gathering the data to make a robust business case for investment. Introduction of two new measures (Deep Retrofit Program and Warmth and Wellbeing) to support deep retrofit and fuel switching in residential buildings.
Weaknesses	Absence of an update of data for the residential and public building stock. Lack of data for needed investment for implementation of the reported policy measures.
Innovative approach	Creation of the EXEED programme (Excellence in Energy Efficiency Design) to influence and deliver new best practices in energy efficient design management.
Recommendations	Update of the cost effectiveness analysis for pre-defined renovation packages. An update of data for residential and public building stock shall be provided. To investigate possibility for third part financing and implementation of measures through ESCO concept.



ITALY

Document Information	The second Italian long-term building renovation strategy was provided as a separate document from the NEEAP. At the time of assessment, the document was available only in Italian.		
National Building Renovation Strategy (Art 4 EED) Introduction	The updated renovation strategy almost entirely complies with the provisions of Art. 4 and it is structured according to the elements listed in such article.		
Overview of the National Building Stock - Art 4 (a)	yes	The Italian overview is based on the official data of the latest ISTAT census of 2011 and on the data collected by other bodies (ENEA, ANCE, CRESME, etc.). The national building stock is presented with fair details and seems to be improved since the last NEEAP. The building stock is presented by climatic zones, size, inhabitants, residential and non-residential. The non-residential building stock is also break down into: schools, offices, hotels, banks, supermarkets. Thermal and electricity Energy consumption indicators are provided for residential one-dwelling apartment and residential multi dwellings apartment, schools, offices and hotels.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	Chapter 3 of the Italian renovation strategy describes the methodology applied for the cost-optimal analysis of the building stock as required by Art. 5.2 EPBD Recast. The National building stock is presented by different climatic zones, no. of inhabitants, population distribution according to the climatic zones and a split between residential and non-residential buildings is provided. An analysis of the cost-effectiveness of the renovation is presented and a comparative methodology is applied in order to identify primary energy savings achievable in residential and non-residential buildings, considering the climatic zone, the cost of investment, running costs. The methodology allows to forecast the potential reduction of energy consumption for different type of building namely for climatic zone C: one-dwelling, small apartment block, large apartment block, offices	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	Existing policies and measures to support and promote building renovation are described in the renovation strategy. A list of existing measures with their achieved and forecasted energy savings to 2020 is provided. The main policy measures mentioned in the strategy are represented by: regulatory measures such as the implementation of Ecodesign Directive and the application of EPBD standards, the tax credit scheme applicable for energy efficiency building renovations, the "Conto Termico" and the White Certificate Scheme (Certificati Bianchi). Since the last renovation strategy there are no new measures included in the document. The National Energy Efficiency Fund, the Kyoto Fund for energy efficiency renovations in public schools and universities, the Plafond casa to support the purchase or the retrofitting works for certain categories of people and funds made available to Regions to carry out energy efficiency interventions, are supporting the energy efficiency policy framework in Italy.	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	partly	A specific guide to drive investment decision for individuals is not provided in the document however, a few more measures such as the entitlement to the tax credit scheme for energy renovation intervention in common parts of multiple apartment block and allowing social housing buildings owners to perform energy efficiency renovation works using the tax incentives have been included in the renovation strategy. A dedicated section of the financial barriers to energy efficiency investments is provided. According to the NEEAP technical, administrative and financial barriers are still be overcome in order to fully benefit from the building renovation investments' potentials.	2
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	Estimated energy savings in 2020 are reported in the document. Expected energy savings are split between Residential and non-residential sector. Energy savings equivalent to 5.69 Mtoe are reported in the document as the total potential savings forecasted in 2020. The implementation of building renovation measures in the residential and non-residential sector would mobilize over 290 billion € for the period 2014-2020. Wider benefits are not mentioned but the NEEAP refers to the positive impact of energy efficiency in the creation of jobs and in reducing expenses in public administrations.	3

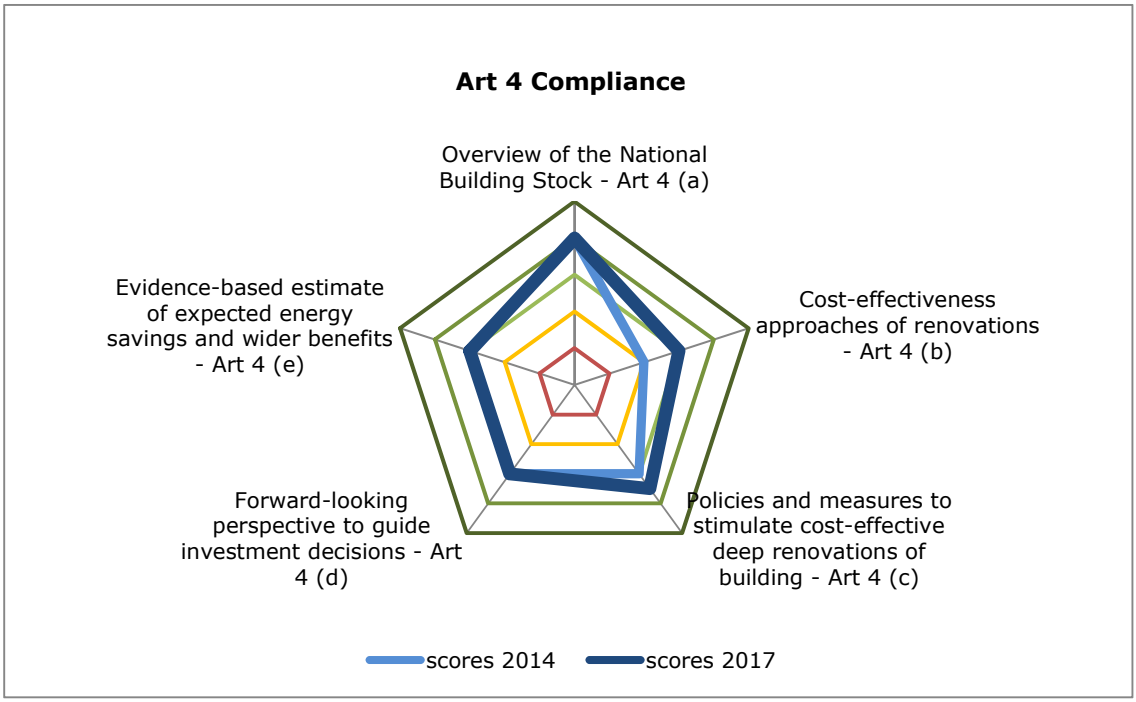
Summary	The strategy almost entirely complies with the provisions of Art. 4. The document was structured according to the elements listed in Art. 4. An explanation of the methodology applied to calculate the energy savings potential in the residential and non-residential buildings sector is provided. Although a dedicated section outlining the available financing for both, the purchase and renovation of buildings is included, further details on the forward-looking perspective to guide investment decisions should be added to the next renovation strategy.
Level of details	The level of details provided in the document seems to be improved since the last renovation strategy. The national building stock is described in details however, the cost effective calculation can be further improved.
Level of ambitions	The target set for the renovation of public government buildings 3% retrofit rate as required by Art. 5 EED seems sufficiently ambitious. In what concerns Art. 10 EPBD a list of tools and measures to support energy efficiency in buildings as well as the transition towards NZEBs is included in the NEEAP.
Appropriateness	The existing policy measures described in the document seems to be appropriate to support and improve the implementation of energy efficiency however, further details on the strategy should be added.
Comprehensiveness	The overall comprehensiveness of the renovation strategy seems to be improved since the previous one, a description of the financial barriers is included however, the cost-effective calculation as well as the forward-looking perspective to guide investment decisions should be further improved.
Strengths	The continuation of successful policy measures (i.e. tax deduction, "contotermico", white certificates) is in place to support the building renovation strategy.
Weaknesses	Although the structure of the document seems to be improved compared to the previous renovation strategy, a more coherent approach should be followed to describe the different type of buildings that form the national building stock, also a dedicated section on forward looking perspective to guide investment decisions of individuals, industry and financial institutions is still missing. Furthermore the cost-effectiveness approach should be improved.
Innovative approach	n/a
Recommendations	Further improve the details of the building stock per building type and energy consumption data. Provide a description of the monitoring and verification of the energy savings. Expand the analysis and description of the cost-effectiveness of the renovation strategy. Forward looking perspective to guide investment decision should be further developed.



LATVIA

Document Information	The second version of the Latvian long-term renovation strategy was provided in a stand-alone document, not included in the NEEAP. The document is available in English.		
National Building Renovation Strategy (Art 4 EED) Introduction	The document is very similar to the 2014 strategy and is structured according to EED Art.4 elements. It provides an update on the building stock data, the policy measures planned and implemented and the results of the EU fund programme 2007-2014. According to EU funds programming documents 2014-2020 an indicative amount of € 320 million will be allocated for the improvement of the energy performance of buildings. In 2015 new minimum level of energy performance of buildings were introduced.		
Overview of the National Building Stock - Art 4 (a)	yes	In the new version of the strategy the 2014 comprehensive and detailed statistical overview of the building stock has been updated and complemented with new data both on the residential and non-residential sector. Since 2016 the Construction Information System (CIS) has been introduced, including a register of building energy certificates.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	In the new strategy is stated that the cost-effective approach to building renovation is addressed in the report "on energy performance requirements in Latvia for new buildings and buildings to be reconstructed in compliance with cost-optimal level pursuant to Article 5 of Directive 2010/31/EU on the energy performance of buildings", available on the Ministry of Economics' website. The provided web-link is working but, unfortunately this key document is in Latvian language only and would need a translation to be assessed in details. A summary in the strategy of the main assumptions, building types and renovation packages considered and calculation results is missing. Calculation included in this report showed that minimum energy performance requirements in force before 2014 were not meeting cost optimal minimum energy performance and thus they have been revised in 2015 with a revision of the "regulation on Latvian Construction standard LBN 002-15". At the end of 2015 a regulation setting new minimum energy requirements for renovated and new buildings has been published. It is not specified if this new requirements were set according to cost optimal calculations.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	Latvia set a comprehensive set of policy measures to stimulate building renovations, financed almost entirely by EU structural funds. Old and new measures (e.g. revision of building minimum requirements, participation in the BUILD UPON EU project) are described in details including all the new actions related to the 2014-2020 planning period of the EU funds. The results of the actions of the 2007-2014 period are also presented (e.g. projects funded, energy savings, number of building renovated). Some new measures, that can be useful to achieve the Latvian energy efficiency goals (that will be set in the next update of the LTRS) are described (e.g. a new financial instrument for multi-dwelling residential building, facilitation of the development of the ESCO market, update of energy minimum requirements etc), but when these will be implemented is not clearly specified.	3.5
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	In the strategy a detailed analysis of the barriers, in relation to different renovation measures is presented (i.e. financial, lack of qualified workforce, low quality of construction works). Moreover a comprehensive analysis of the financial sources available for renovation of building is presented (e.g. from private capital owners, EU funds, Banks, ESCO etc). Nevertheless, a clear forward-looking perspective to guide investment decisions, including a roadmap with key dates, targets, milestones and a scenario analysis is not included.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	No scenario analysis have been provided and "wider benefits" are only listed (i.e. improved health condition, Increased work productiveness, Improved of social conditions, Reduced load on the energy supply system).	3
Summary		The updated Latvian building renovation strategy is very similar to the 2014 ones and provides a comprehensive and detailed overview of the building stock data, including non-residential sector, the policy measures implemented and planned and the results of existing measures (e.g. EU fund programmes). Various policy measures, mainly financed by European Regional Development Funds are mentioned, such as building renovation grant schemes (i.e. Improvement of heat insulation of multi-dwelling buildings and of social residential buildings), tax relief	

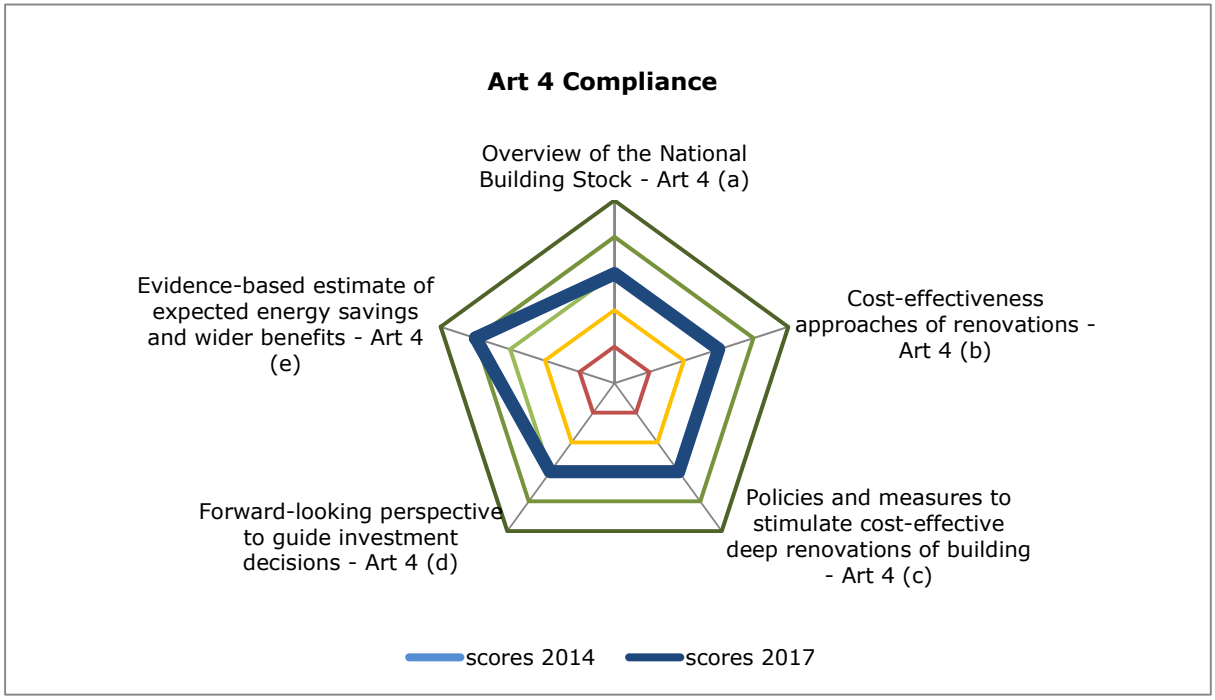
	and awareness raising campaigns. Despite the progress made, the impact of the implemented measures is still relatively small compared to the total amount of energy consumed in multi-apartment buildings (only about 6% of LV multi dwelling buildings comply with the legal energy performance requirements a thus additional efforts are needed to achieve the Latvian 2030 target of an average national heating thermal energy consumption of 100 kWh/m2/year (set in "Latvian Strategy 20130").
Level of details	In the updated strategy the level of detail has been improved
Level of ambitions	In the updated strategy is stated that Latvia should set quantitative, achievable targets that would be included in the next updated long-term strategy for renovation of buildings. Nevertheless, it would appear that the 2030 target (i.e. energy for heating will be reduced by 50 %) indicated in the 2014 strategy (and in the 2017 NEEAP) is still valid. This target is deemed ambitious
Appropriateness	The set of identified measures is deemed appropriate, but it is unclear when the identified new policies will be put in place. A scenario analysis to guide investment decisions is still missing
Comprehensiveness	Latvia put in place a comprehensive set of measures to stimulate the energy efficiency improvement of the building stock. When the new planned measure policies will be implemented need to be clarified
Strengths	In depth analysis of the building stock and very detailed analysis of building renovation barriers
Weaknesses	A scenario analysis is missing
Innovative approach	n/a
Recommendations	A cost-effective analysis for the renovation of the existing building stock in Latvia shall be included in the strategy, together with a scenario analysis



LITHUANIA

Document Information	The Lithuanian long-term renovation strategy was provided in July 2017 as a separate notification. It is also available in English.		
National Building Renovation Strategy (Art 4 EED) Introduction	The strategy is structured according to EED Art.4 main elements including most of the information required, i.e. it presents an overview of the national stock, information on the most cost-effective approaches to renovation and policy measures for the renovation of buildings and an estimate of expected energy savings and wider benefits based on a forward-looking perspective.		
Overview of the National Building Stock - Art 4 (a)	yes	The overview of the national stock and the most cost-effective approaches to renovation, have not changed since the last renovation strategy. The building stock is described and presented by the total number/surface of buildings and by construction period. The annual heat demand is provided for all the building energy classes. For these, building structures and thermal systems are evaluated taking into account the purpose and the year of construction of the building (in a graphical form). Buildings are attributed to energy Classes A, B, C, D, E, F and G according their energy consumption.	3
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	A set of measures is described in the document as the optimum measures suitable for major renovation of buildings. These include: lighting upgrading, insulation of facade walls and the plinth wall, the roof or attic, basement ceiling and floor, replacement of entrance doors and windows, glazing of balconies and loggias, refitting of the heating system and modernisation of the ventilation system. Based on the outcomes of the buildings renovated between 2007 and 2013, the implementation of energy efficiency improvements within this set of measures usually achieves energy performance class C. This set of measures is the optimal investment set of saving measures as its implementation requires a minimum amount of investments, which makes it possible to renovate a larger number of buildings. To increase the ambition of the strategy, other renovation options (e.g. heat recovery strategies, RES) could be considered.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	The document mentions that financing sources for deep renovation of buildings are represented by citizen funds, low interest loan, funds and State subsidies. EU structural funds have supported the financing renovation of residential buildings and during the period 2014-2020 will continue to favour the implementation of renovation projects in public buildings. Regulatory measures to ensure the implementation and transposition of EED are in place. Also, the document states "the energy service companies ('ESCO') model should become an important model for the renovation of buildings".	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	A description of the available financing sources for the building renovation strategy is provided in the document. The strategy plans to renovate both residential and public sector buildings and a short analysis including forecasted investments up to 2020 and between 2020 and 2030 is presented. EU structural funds also support the renovation of public sector buildings and social housing in multi-apartment buildings. A forward looking perspective to guide investment decision is not described but the document states that private investment funds to support building renovations in the country are expected to grow.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	Benefits of building renovation are separated in direct and long term indirect benefits. An analysis based on the 2007-2013 period which accounts for 30-40% of multi apartment and public buildings in Lithuania, forecasts respectively 700-800 GWh and 85 GWh energy savings in each type of buildings by 2020. Wider benefits such as improved health conditions, increase employment in the building sector, improve energy security and reduce energy import from third countries, reduce energy poverty and improve social conditions are also mentioned.	4
Summary	The Lithuanian building renovation strategy is structured according to the element listed in Art. 4 of the EED. The policy measures and the level of information provided in the report are fair and clearly described. The document sets out a long-term approach for building renovation to guide investment decisions; an overview of the national building stock; effective approaches to building renovation and priority groups of buildings; the financing sources available; long-term benefits of building renovation.		
Level of details	The national building stock is presented with the same level of details since the last report however, the heat demand of buildings is only provided for 8% of the total number of buildings which are categorized by energy performance class.		

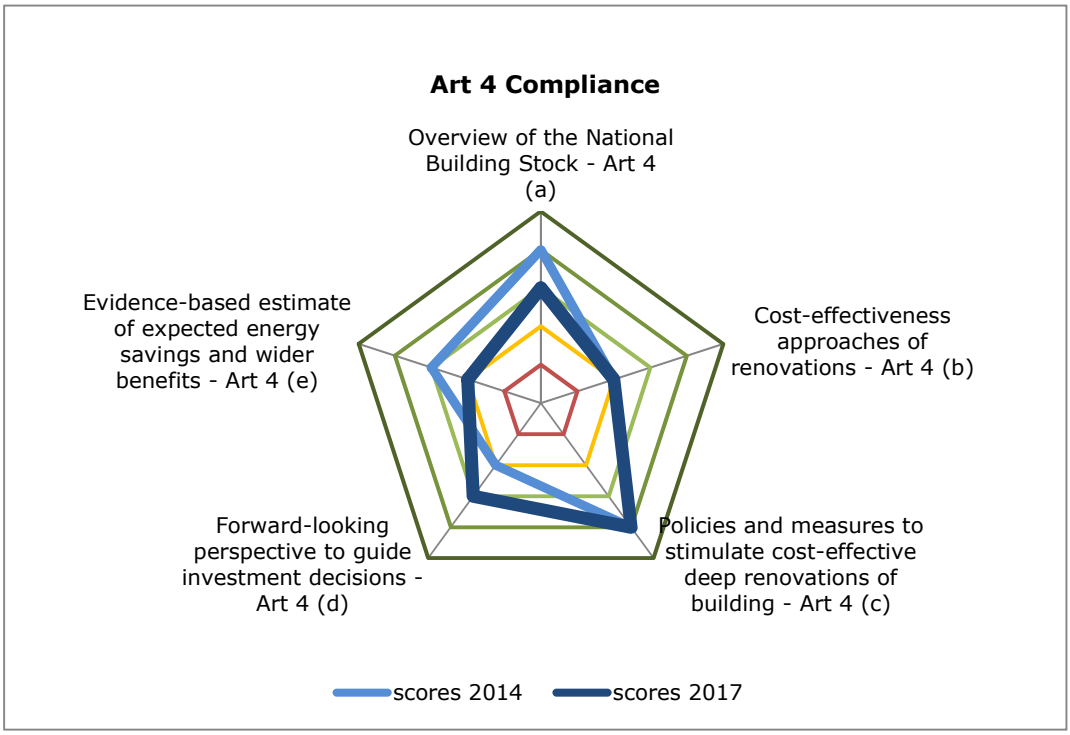
Level of ambitions	The renovation strategy suggests that by 2020, 785-885 Gwh energy savings will be achieved. Lithuania's long-term goal for the national building stock renovation to 2030, is to continue and further develop the building renovation policy launched in 2015-2020 and to renovate more than 4 000 residential multi-apartment buildings representing 10-11% of the total for this type of building and reducing 228000 CO2 tonnes by 2030.
Appropriateness	Although any methods of energy savings calculation are missing from the renovation strategy, the policy measures seem to be in line with the strategy.
Comprehensiveness	The energy efficiency policy framework described in the document is comprehensive and covers a mixture of policy measures: (regulatory, financial, information/training and labelling).
Strengths	A scenario based on the renovation of priority groups is described. Energy Efficiency Fund set up to finance the yearly renovation of 3% total floor area of heated and/or cooled buildings owned and occupied by central government.
Weaknesses	The analysis of the building stock is still based on the evaluation of 45000 buildings which represents only 8% of the total building stock [p.6] No reference to energy savings calculation methods or assumptions used. Unclear what are the main policies and measures to support the building renovation strategy.
Innovative approach	n/a
Recommendations	Provide more details on the cost-effectiveness approach relevant to the building type and climatic zone. Highlight and describe the main policies and measures to stimulate cost-effective deep renovations of buildings. Provide a more detailed description of the methods and assumptions used for the calculation of the energy savings. Also a forward looking perspective to guide investment decisions of individuals and the construction industry should be included in the next renovation strategy together with an analysis of the barriers to investment.



LUXEMBOURG

Document Information	The second long-term building renovation strategy of Luxembourg is a follow up (supplement) of the first 2014 renovation strategy and was published by the Ministry of Economy in July 2017. The document was prepared by Myenergy - Luxembourg's national structure for promoting a sustainable energy transition. The document was drafted up on basis of the finding and conclusions from 6 thematic workshops and two surveys. The strategy is a stand-alone document provided in German language.		
National Building Renovation Strategy (Art 4 EED) Introduction	The document describing the updated building renovation strategy of Luxemburg mostly provides the main information and data needed to further define the strategy itself. It also includes a draft of guidelines to develop a strategic approach to building renovation while compiling a plan of measures to overcome existing barriers. In summary, this document is mainly focused on analysing the existing situation of the national building stock (status quo analysis) and on analysing and identifying the barriers to the implementation of a future renovation strategy.		
Overview of the National Building Stock - Art 4 (a)	yes	The follow up of the strategy provides an overview of the current residential building stock of Luxembourg. The residential buildings are classified by age bands and types (one family houses, terraced houses, multifamily houses). In the strategy is mentioned that the presented tables and graphic are only a compilation of the most important results obtained from a working report prepared May 2015. In addition was given a summary of finding of an analysis of the residential building stock taking into account energy renovation. Data for the building stock of the service sector (public, commercial) are not provided.	3
Cost-effectiveness approaches of renovations - Art 4 (b)	partly	The follow up of the strategy does not include a cost-effective analysis for the renovation of the existing building stock in Luxembourg. In the summary of the Status Quo Analyse (point 1.2) and in the point 2.1 (Priority of high efficiency renovation) were mentioned some aspects of the cost effective renovation based on findings from Cost Effective Study published by Ministry of Economy in April 2014.	2
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	The strategy provides information about the new financial instrument so called Klimabank, a new state facility for financing energy renovation of residential buildings. Klimabank offers to households loans with low interest rate. Low incomes households can obtain from KLIMABANK interest free loans. In the strategy was mentioned that aspects connected to sustainable construction and recycling have to be taken into account if energy renovation is undertaken. Therefore was introduced the Certification of Sustainability of buildings (LENOZ). In regards to the energy renovation of historical building In the framework of this strategy, were identified actions which implementation should result with an increasing the number of renovated historical buildings. Preparation of a new scenarios study with perspectives until 2070 was commissioned by the Ministry of economy. In addition the state will support research and development activities and implementation of pilot projects to stimulate deep renovation of buildings.	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	This document contents an analysis of the existing barriers to implementation of deep energy renovation of buildings and a list of measures how to overcome the identified barriers. They can be used by potential investors as a guideline document.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	partly	The strategy does not include any estimation or information about the expected energy savings generated by energy renovation of buildings. In the document is only mentioned that energy renovation of buildings will have significant economic impact on the construction sector and will create new jobs in this sector (i.e. 8,000 by 2020).	2
Summary		The second building renovation strategy of Luxembourg is a follow up of the first one, and is focused on identifying and analysing the existing barriers for energy renovation of buildings and possible solution to overcome them. In the framework of the activities for drawing up of this document was prepared a list of planned measures including amendments on legislation which realisation will enable implementation of the renovation strategy. Luxembourg is willing to implement deep energy renovation of buildings taking into account sustainability and environmental impacts of the measures. Luxembourg through the deep energy renovation will stimulate investment in the construction sector and will create additional jobs in the country.	

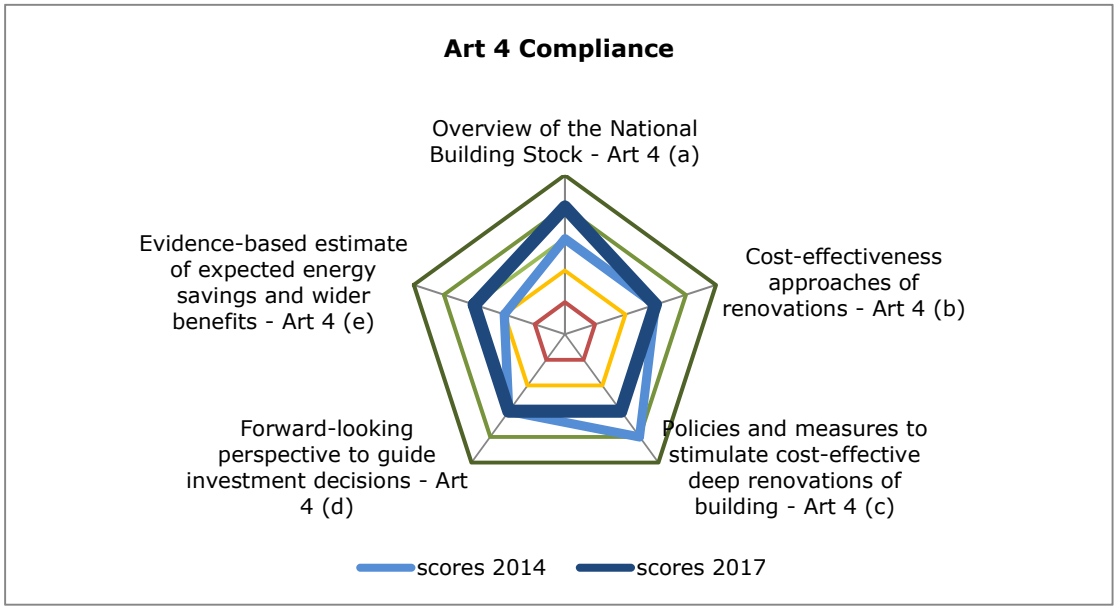
Level of details	Since the second strategy is only a supplement to the first one, it does not include detailed overview of the building stock. Regarding policy and measures to stimulate cost effective building renovation, this document provides detailed description of the measures not mentioned in the first one. The document includes a very detailed description of the barriers to implementation of energy renovation.
Level of ambitions	This new document, as the 2014 one, does not include any clear target for the renovation of the existing building stock.
Appropriateness	The measures and policies designed for the strategy are appropriate and suitable to improve the efficiency of the national building stock.
Comprehensiveness	The 2017 documents is mainly focused on analysing of the residential building stock. Non-residential buildings have not been taken into account with the exception of public municipalities' buildings.
Strengths	A very detailed analysis of the barriers to deep energy renovation of residential buildings is provided together with a detailed plan of measures to overcome identified barriers, with a focus set on deep renovation and sustainability and environmental aspects of renovation. Social aspects of renovation were also taken into account e.g. Creation of so called Klimabank to offer interest free loans to the low income households.
Weaknesses	Lack of information for non-residential building stock. Absence of clear targets in terms of planed energy savings and/or improvement of the energy performance of the buildings. The document does not provide overview of cost effective analyse of different renovation scenarios. List of policy measures for the building sector is missing.
Innovative approach	n/a
Recommendations	As in the first renovation strategy, its 2017 update does not include the results of the "cost effective analysis", although in the 2014 document it was mentioned that the Ministry of Economy published a report on the "Calculation of cost optimal level for minimal requirements for residential and non-residential buildings". Moreover, Luxembourg should set clear targets for energy renovation (e.g. expected energy savings, number of energy renovated buildings)



MALTA

Document Information	The Maltese long-term renovation strategy was provided under the title "Malta's Long-Term Strategy for Mobilizing Investment in the Renovation of the National Stock of Residential and Commercial Buildings" as a separate notification in November 2017. The document is available in English language.		
National Building Renovation Strategy (Art 4 EED) Introduction	This strategy is mainly focus on providing an update of the First Renovation strategy for the three building categories: single family houses of different types, apartment/block multifamily buildings and office buildings. In addition this report presents the initial results of the data obtained for a number of building categories other than the three mentioned above, together with an account of policy measures and specific projects which have been carried out within the 3-year period time since the 1st strategy.		
Overview of the National Building Stock - Art 4 (a)	yes	The strategy provides an updated overview of the Maltese residential building stock and its distribution by building types (single family and multifamily/apartment buildings), age band and ownership structure. In addition, this report includes a clear overview of the non-residential building stock including analyses of the different building categories: hotels, offices, educational buildings, hospitals, retirement houses and sport facilities. The strategy also gives a historic description of the construction methods and styles as well as construction trends, life span of buildings and refurbishment trends which have been used for the construction of buildings in Malta. The Strategy provides calculated energy consumption by building typology for the existing and new residential building and by building categories for the existing and new non-residential building sector.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	This strategy provides a short description of the renovation potential & identification of strengths, weaknesses and threats for the residential and non-residential sectors. The cost-optimal levels were calculated in 'Cost-optimal energy performance levels in new and existing residential buildings in Malta' and 'Cost-optimal energy performance levels in new and existing office buildings in Malta' (both issued in 2014) and the calculations have been performed as per methodologies established in Malta for energy performance rating/certification of buildings. The strategy reports briefly about the findings of both studies. The energy renovation targets of existing and new residential buildings are being modified to reflect more realistic values, consistent with the possibilities and opportunities inherent to the type of building typology. However, the strategy does not include an analysis of needed investment for implementation of the energy renovation.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	This document gives an overview of existing and planned policy measures for deployment of energy renovation of residential and non-residential buildings. Malta set focus on providing state financial incentives and grants to promote energy efficiency and renewable energy sources in residential buildings. In non-residential sector, existing policy measures have been distributed by sub-sectors: enterprises, tourism sector-hotels and public buildings. In the strategy was pointed out, that the existing policies and measures targeting the quality of the building Industry plays an important role.	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	In the strategy was provided a short guide to investments and financing of energy efficiency in residential and non-residential buildings. In residential sector, use of solar water heating systems can reduce significant electricity consumption in dwellings. In offices, hotels and hospitals improving the energy efficiency of the air conditioning system results in significant energy savings. Government supporting schemas and domestic private banks products are the main source for financing of EE measures in residential buildings. European Regional development Fund (ERDF) and domestic banks provides financing of EE measures in non-residential sector.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	Estimation of the potential of energy savings for residential and non-residential (public and other) buildings was reported in the strategy. In addition, wider benefit of the energy renovation of buildings as: improvement in thermal comfort and health , reduction of CO2 emission, social dimension , re-sale attractiveness of renovated buildings, new avenues for employment and reduction in infrastructural costs were evaluated, but not quantified.	3

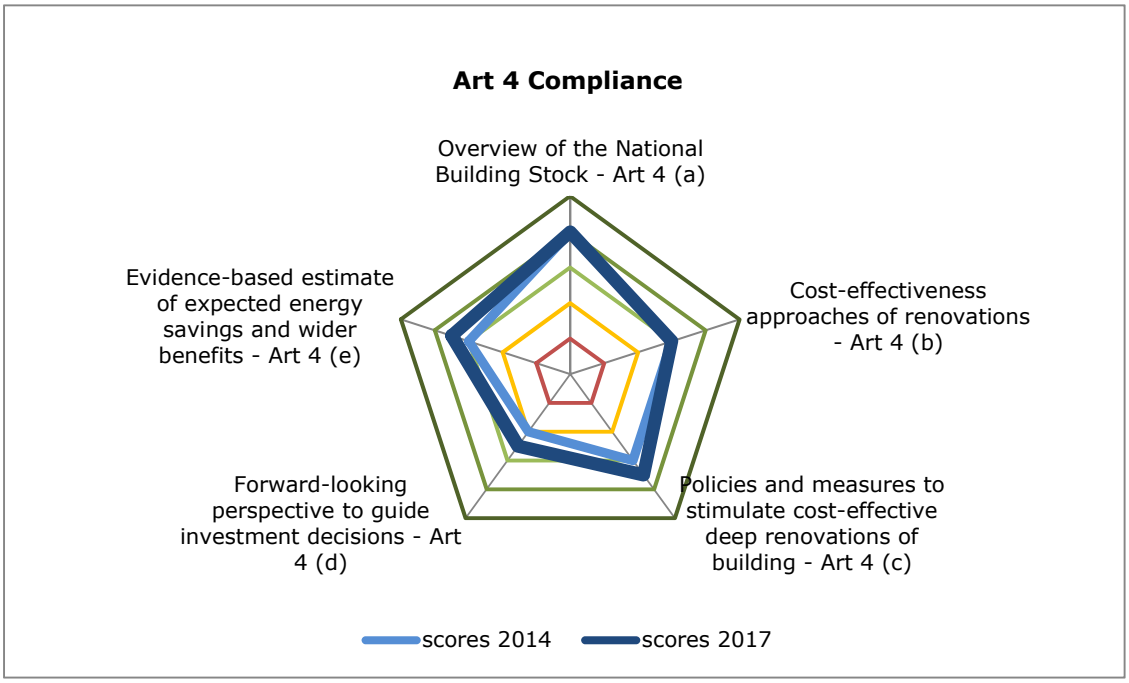
Summary	Maltese building renovation strategy covers all EED Art. 4 elements. It is being considered as an interim report which will form the basis for a complete report due 2020, which should include most if not all building categories. Implementation of this policy paper shall mobilize investment in the renovation of residential, commercial, public and private buildings.
Level of details	The level of details for building stock is satisfactory. This report includes an update of the data for residential buildings and a detailed overview of the non-residential building stock distributed by building categories: offices, hotels, educational buildings, sport facilities. The level of details for cost effective approaches and policy measures should be improved.
Level of ambitions	The level of ambition seem coherent with national context, assuming the current renovation trend, around 11,600 dwellings, equal to 7.6% of the total 152,770 dwellings, will be refurbished by 2030, resulting in an overall energy savings of 4,591 toe (53.4 GWh) over the period 2017-2030.
Appropriateness	The identified policy and measures have been designed to mobilize investment in the renovation of the national building stock of residential, commercial and public buildings.
Comprehensiveness	The policy and measures cover a spectrum of policy area: financial, informative, legislative, educational and training.
Strengths	Detailed overview of the non-residential building stock distributed by different building categories: offices, hotels, hospitals, educational buildings, sport facilities, retirement buildings and good description of overall energy performance of non-residential buildings was provided. Appraisal of renovation potential & identification of strengths, weaknesses and threats for the non-residential building sector was given.
Weaknesses	Lack of quantitative assessment of energy savings generated from defined policy and measures. Lack of data for investments needed for implementation of defined policy and measures.
Innovative approach	BEST (Benchmarking Energy Sustainability Targets) - a programme aimed at establishing the local hotel sector as a leader in energy efficiency in the Mediterranean. The project will set off with a study to establish benchmarking categories for like hotels and to establish the KPI criteria. A software will be created to allow the hotels to upload and monitor their performance which will also be normalized to take into account environmental parameters such that year on year analysis will be relevant. A software technology tool will be included that will assist hotels to analyse the return on investment of applying different energy efficiency technology projects.
Recommendations	Define potential energy savings generated from identified policy and measures. Quantification of needed investment for implementation of defined policy and measures. Estimate the benefits in a evidence-based way.



NETHERLANDS

Document Information	The update of the long-term renovation strategy was provided in the Annex II of the NEEAP 2017, and provides mostly information about new policy measures (no update of the analysis of the building stock and on the cost-effectiveness approach).		
National Building Renovation Strategy (Art 4 EED) Introduction	The main general basis for the renovation strategy remains the 2013 Energy Agreement, with the same goals being reconfirmed. In addition, a new Energy Agenda was presented by the Cabinet at the end of 2016, setting the long term perspective until 2050. For buildings, this means achieving a CO2-neutral low temperature heating by 2050. This implies a strong reduction in the heating demand and more specifically in gas consumption. More specific objectives and measures should be defined in a "near future" (e.g., minimum energy label for housing corporation and offices). In practice, the renovation strategy is based on a combination of information and awareness, facilitation and financial support. A Guarantee Committee is monitoring the implementation and outcomes of the Energy Agreement. In addition, a National Energy Outlook is prepared each year since 2014.		
Overview of the National Building Stock - Art 4 (a)	yes	The document provides aggregate updated figures on the total number of residential and non-residential buildings; the number of dwellings in each energy class. In general the figures provided in the strategy have been updated up to 2016. The update provided refers to other documents, which includes the information requested.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	The documents on cost optimal are provided (DGMR 2012 and the latest updated 2018 study) and, in addition, the update make a reference to three tools developed by the government and addressed to building owners to calculate the cost and benefits of energy savings measures (https://energiebesparingsverkenner.rvo.nl/#)	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	Based on the annual National Energy Outlook, needs for new measures are regularly considered. An "intensification package" was thus decided in 2016. The most important new measures for existing buildings has been so far the "label C obligation" for offices that was to be published on 01 January 2018 with an enforcement date by 01 January 2023, and a phase out of rental housing with a label lower than C (under consideration). The revolving fund providing loans have been complemented by subsidy schemes, particularly the Energy-saving at Home Subsidy Scheme, available for owner-occupiers and owners' associations. This scheme includes a bonus grant for deep retrofits (zero energy level). However most of the subsidy schemes are announced up to 2018. It is not clear what financial support will be available from 2019 on (back to loans only? or introduction of an obligation on energy suppliers?) Reasons for introducing subsidies are not explicitly explained in the NEEAP. But it is likely that this comes from the observation that the results were not in line with the targets of the voluntary agreements. The results of Energiesprong were also far from being as high as expected (only 700 dwellings renovated by the end of 2016). As a conclusion, the good point is that the policy package has been updated. But it is too early to know if this reached better results. Uncertainties about what will happen from 2019. General elections in March 2017, could explain why decisions were not taken early 2017 about the future schemes.	3.5
Forward-looking perspective to guide investment decisions - Art 4 (d)	partly	Same reference mentioned as in 2014. In addition, a new Energy Agenda was presented by the Cabinet at the end of 2016, setting the long term perspective until 2050. For buildings, this means achieving a CO2-neutral low temperature heating by 2050. This implies a strong reduction in the heating demand and more specifically in gas consumption. More specific objectives and measures should be defined in a "near future" (e.g., minimum energy label for housing corporation and offices). See also above the new measures implemented over 2016-2018. However, the long term target is not supplemented by explanations about possible scenarios or long term policy framework. So the way to achieve the 2050 target remains partly unclear. The main perspective (in terms of guiding information for owners' decisions) is the consideration of minimum energy performance requirements for rented housing and offices.	2.5
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	The expected final energy savings in buildings from already established or concretely proposed policies related to the Energy Agreement were estimated by ECN in 2016 to about 4 PJ/year in 2016 (range: 2-8 PJ/year) and 27 PJ/year in 2020 (range: 13-43 PJ/year). The estimate is detailed by sub-sector or measure, however the names of the measures in table II.1 are not the same as the names used for the descriptions of the measures in the NEEAP (so it is not easy to make the link). It should be noted that for 2020 more savings are expected from services than from housing (mostly due the Enforcement of the Environmental Management Act). Additional measures have been planned since this estimate: obligation to phase out rental housing with a label lower than C (additional savings of 5 PJ/year) and agreement with the energy suppliers, installers and network operators (10 PJ in 2020). The objective in terms of job creation is reminded (same as the one stated in 2014). However this is the objective for the whole Energy Agreement (not only for measures for buildings).	3.5

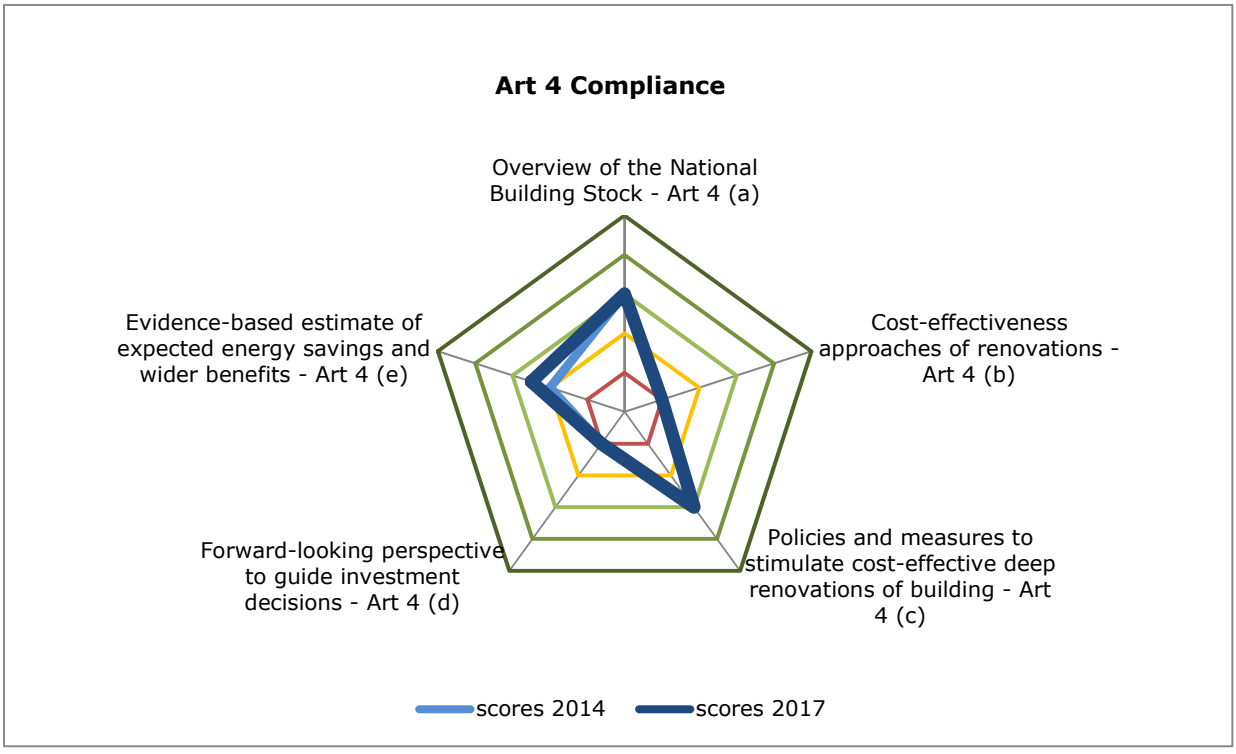
Summary	The update of the renovation strategy is short (10 pages), but the NEEAP includes many new measures (see "Policy measures" tab). There is an update of the background analysis (building stock, cost-effectiveness approach), and an update of the policy package ("intensification package"), a new assessment of the corresponding expected energy savings, and a new Energy Agenda adopted at the end of 2016 setting a long term perspective (CO2-neutral heating by 2050). The intensification package includes new subsidy schemes set up for 2016-2018. The policy package from 2019 on is uncertain. It could rely on the adoption of minimum energy performance requirements (label C) with enforcement from 2023. The financial support could become again limited to the revolving fund providing low interest rate loans.
Level of details	The background analysis is updated in detail. Most of the descriptions of the policy measures include details about the type of support and budget available. However there are fewer details about past achievements (whereas a regular monitoring is in place). Moreover, it is sometimes difficult to link the estimates of energy savings presented in table II.1 with the list of the measures included in the NEEAP (names sometimes different).
Level of ambitions	The strategy has still ambitious goals. Progress is tracked on an annual basis for the social housing sector (more than one third of the dwelling stock). Intermediate milestones are not presented for other segments of the building stock.
Appropriateness	The policy package has been reinforced, particularly in terms of financial incentives and planned regulations. However it is not clear how this policy package will evolve from 2019 on.
Comprehensiveness	Comprehensive policy package that was complemented for the part of financial incentives (that was mostly relying on soft loans until 2016).
Strengths	Regular monitoring and a Committee in charge of checking if results are on track or if changes are needed. It should be noted that the strategy to rely mostly on the market (e.g., with the EnergieSprong initiative) and on soft loans provided by a revolving fund did not bring the expected results. It was therefore decided to use a stimulus plan, mostly based on subsidy schemes.
Weaknesses	Few details about achievements in recent years. Uncertainties about the policy package from 2019 on. Moreover the estimate about the expected savings from the Environmental Management Act seems surprising compared to the estimate for the other measures.
Innovative approach	Label "Sustainable Contractor" based on a energy performance guarantee. Energy performance surcharge bill (making possible a special surcharge on rents after "nearly zero energy" retrofits, to overcome split incentives and encourage deep retrofits).
Recommendations	It would be useful to provide more explanations about how the policy package will evolve from 2019 on, as well as about the estimates presented in table II.1, particularly the savings expected from the Environmental Management Act. The NEEAP indeed mentions difficulties in the enforcement of the obligation to adopt energy-saving measures with a payback time of less than 5 years. This led to an "intensification" of the regulation, by defining Recognised List of Measures per sub-sector (to clarify what types of actions are mandatory) and by reinforcing the monitoring. However the NEEAP does not present the results of this reinforced monitoring.



POLAND

Document Information	The Polish long-term renovation strategy was provided in December 2017 as Annex 3 of NEEAP 2017, with the title "Supporting investments in the refurbishment of buildings". The document is available also in English.		
National Building Renovation Strategy (Art 4 EED) Introduction	The strategy is coherent with the requirements of Art. 4 of Directive 2012/27/EU and includes: an overview of the building stock, based as appropriate on statistical sampling; a section on the identification of cost-effective approaches to renovations relevant to the building type and climatic zone; policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations; a forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions and an evidence-based estimate of expected energy savings and wider benefits.		
Overview of the National Building Stock - Art 4 (a)	yes	The Overview of the building stock is presented taking into account the: function of the building (i.e. intended use), age structure, and the form of ownership. Also the thermal properties and the heat supply method were used as indicators. Finally the climatic zones were taken into consideration. The statistics and data applied were provided by National General Population and Housing Census carried out in 2011, two publications and own research. However the split between the age and no. of Residential and non-Residential buildings is still unclear. Analysis on the type of tenure of buildings/dwellings is included.	3
Cost-effectiveness approaches of renovations - Art 4 (b)	no	The document includes a dedicated section on the most cost-effective ways to renovate buildings based on actual data, however the information provided is not sufficient and only confirms that in Poland auditing together with building regulations currently in place, are the processes applied to select solutions offering the highest cost efficiency of the investment relative to the anticipated gains. In 2015, the results of a study entitled "study of the energy efficiency of buildings of the public administration (central and local government) in 2007-2013", were published but no cost optimal analysis was carried out.	1
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	A list of measures related to newly constructed and existing buildings is described in the document covering: 1. the regulatory framework, 2. Funding sources available for different type of beneficiaries, 3. Information and education programmes. A short section on the current barriers to achieve good energy performance of buildings is described. However it is not easy to identify which are the most cost-effective measures for deep renovations.	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	no	A section entitled "Perspective for the future" is included in the strategy however, only a summary of the main barriers to investments in building renovation is provided. An estimate on the real investment demand is missing and it is unclear what drives the investment decision for the building renovation strategy in Poland	1
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	partly	The wider benefits of building renovation are accurately described in the report and separated in direct and indirect benefits. For direct benefits, the estimated energy consumption reduction for different energy carriers and different building types is provided. Also an analysis in the 2000-2015 period on the anticipated energy savings produced by the support of investments under the termomodernisation and Repair Funds shows that energy savings will accumulate over time and will soon exceed the level of expenditure incurred for completed refurbishments. Thermomodernisation is key not only to reduce the energy consumption but also to increase the value of the building in the residential sector. For indirect benefits: thermomodernisation actions also create jobs reducing the level of unemployment, can lead to an improvement of the health of population, increase the life expectancy; can lead to higher productivity of the professionally active population; lower costs for enterprises caused by employee absences due to illness; higher earnings due to lower level of employee absence; increased GDP. No scenario has been provided.	2.5
Summary		The renovation strategy has improved its contents compared to the previous submitted in 2014. The document now covers most of the requirement of Art. 4 (a), (d), (e) however still missing the description of the cost effective approaches to renovations relevant to the building type and climatic zone Art. 4 (b) and only partially covers the Art. 4 (c) policies and measures to stimulate cost effective deep renovations of buildings, including staged deep renovations.	

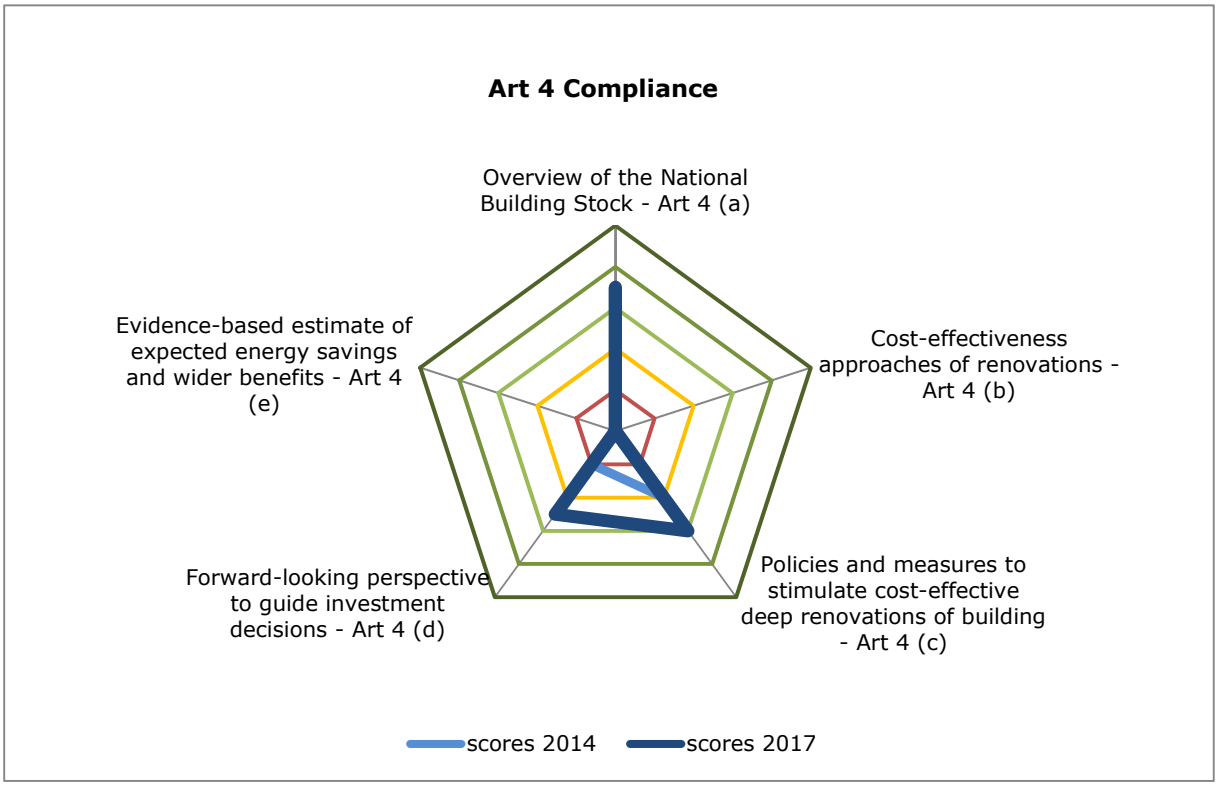
Level of details	The overview of the national building stock is fairly described and it includes: the intended use of the building, the age, the shape and climatic zone parameters and the thermal properties of the building envelope and heat supply method, are taking into account as additional indicators. Lack of data related to the non-residential sector.
Level of ambitions	The level of ambitions of the building renovation strategy is not very clear. According to the document, Art. 5(1) energy savings target associated to the central government buildings 4 344 MWh/year pursued through the alternative will be achieved. Poland set 2021 as a target for achieving nearly zero-energy requirements for buildings but it is unclear whether this target will be accomplished.
Appropriateness	Although the detail of the building stock is clearly described and the measures included (mainly financial) do seem appropriate and significant, there is a lack of new policy measures that address and fully exploit the potential of building renovation in Poland.
Comprehensiveness	Overall, the energy efficiency policy framework described in the document is comprehensive and covers a mixture of policy measures: (regulatory, financial). Further analysis on the technical opportunities of different building type and on the cost effectiveness of the building strategy is needed.
Strengths	Strong focus on securing access to finance or co-finance, (grant or loans) in order to substantially increase energy efficiency investments. The Operational Programme Infrastructure & Environment 2014 2020, strategically supports the allocation and use of EU funds in the Residential, Public sectors.
Weaknesses	An accurate cost-effective analysis for the building renovation based on different scenarios and a cost optimal analysis is missing
Innovative approach	n/a
Recommendations	Improve the analysis of the non-residential stock; Include a cost-effectiveness analysis; Include a scenario analysis of different policy options;



PORTUGAL

Document Information	The Portuguese strategy was delivered as a stand-alone document in the Portuguese language and has been translated since.		
National Building Renovation Strategy (Art 4 EED) Introduction	The Portuguese strategy follows the proposed structure by the EED, in a general way. Firstly it gives an overview of the buildings sector, with statistical analysis of the demographic data and the number of households and dwellings. A growth of the dynamics in civil construction is given with a comparison between the numbers of new buildings and renovations, with renovation work increasing in the last years, going from 16% in 2002 to 33% in 2015. An overview of the residential sector is given, with it being characterized, divided by construction period. Information about the state of conservation is also given, type of building, tenure status and useful floor area. A brief introduction on social housing is given. Regarding energy consumption, a whole chapter is dedicated to the energy performance of the building stock, divided by residential and shops and services sectors. Regarding measures, the Portuguese assessment outlines some Regulatory measures (5 measures within) and Tax measures (3 measures) and Funding programmes (7 measures) and other types of measures.		
Overview of the National Building Stock - Art 4 (a)	yes	The Portuguese strategy has produced a good overview of the national building stock, giving out statistical information on the residential and commercial sectors in terms of numbers, age of buildings and energy consumption indicators, namely energy classes.	3.5
Cost-effectiveness approaches of renovations - Art 4 (b)	no	As for the previous assessment, Portugal has not presented a cost-effectiveness study on the approaches for renovation. Only legislative and regulatory measures are outlined.	0
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	The Portuguese assessment gives out several measures in order to stimulate the cost-effective deep renovation of buildings. The measures are divided into three main areas: Regulatory measures, Tax measures and Funding Programmes. 1. Regulatory measures: Regulations on the Energy Performance of Housing, Regulations on the Energy Performance of Buildings for Commerce and Services, National Energy Certification System for Buildings, Exceptional Regulations on Urban Rehabilitation, Legal Regime for Urbanisation and Construction 2. Tax measures: Tax relief directly related to the energy class, Value Added Tax; 3. Funding Programmes: 'Renovate to Rent' Programme; Portugal 2020, Financial Instrument for Urban Rehabilitation and Revitalisation 2020, National Fund for Building Rehabilitation, Efficient House Programme,	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	partly	The Portuguese strategy gives a brief quantification on the investment being allocated within the funding programmes, both at National and Regional level, down to NUTS II.	2.5
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	no	The Portuguese building renovation strategy does not refer to an evidence-based estimate of expected energy savings and wider benefits.	0
Summary		The 2017 Portuguese building renovation strategy presents a clear improvement from the previous assessment that did not address the majority of the prerequisites outlined in the EED. This new strategy has now provided a good overview of the building stock inventory with the data now being presented in a disaggregated way. Also in comparison with the previous 2014 assessment, the new long term strategy provides a simple description of the proposed measures to be implemented in the following years. Some more detail could be presented so it would be possible to understand the extension and impact of such measures presented, since no cost effectiveness study or energy savings expected are presented. Other elements missing relate to energy poverty, with just a small mention, and NZEBs.	

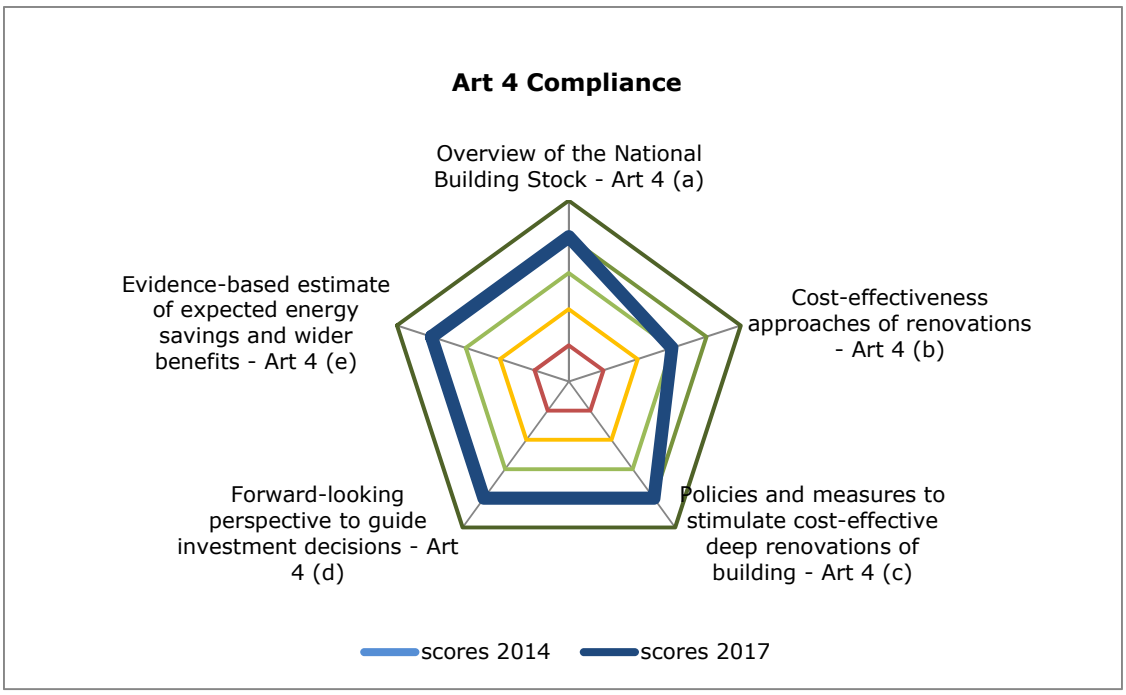
Level of details	Average level of detail regarding building stock statistics and measures presentation.
Level of ambitions	The 2017 strategy does not present a great level of ambition. It is hard to foresee the impact of the proposed measures.
Appropriateness	The proposed measures are in theory, appropriate for the achievement of effective energy savings in the future. Nevertheless, the only way to fully assess the appropriateness of the measures would be with access to an impact assessment of such measures in terms of expected energy savings.
Comprehensiveness	The measures outlined in the 2017 strategy are divided into two main types of measures: Regulatory and Tax measures. Throughout the presentation of the measures, some level of detail is given and these are somehow horizontal measures, covering all types of buildings.
Strengths	The Building stock analysis that was missing from the previous analysis and the presentation of dedicated building measures.
Weaknesses	Assessment of energy savings and cost-benefit is still missing.
Innovative approach	The measures being proposed in the Portuguese assessment do not represent any noticeable innovation.
Recommendations	A description of the measures with potential energy savings would be recommended. Also a comprehensive analysis of the cost-benefit of the development of the strategy. It would be interesting to have information on NZEBs and how Portugal expects to tackle Energy Poverty. A coherent forward thinking perspective of the Portuguese building strategy would be very interesting.



ROMANIA

Document Information	The Romanian long-term renovation strategy (i.e. Strategy for mobilising investments in the renovation of residential and commercial buildings existing at national level, both public and private) was provided in October 2017 as a stand-alone document not included in the NEEAP.		
National Building Renovation Strategy (Art 4 EED) Introduction	The strategy has been developed by the Ministry of Regional Development, the Ministry of Energy (ME), the Ministry of Public Finance (MFP), the Ministry of the Environment (MM), the National Energy Regulatory Authority (ANRE) and other stakeholders		
Overview of the National Building Stock - Art 4 (a)	yes	The National Building Stock is presented with good level of detail. The total building floor area share of residential buildings, the classification of energy performance characteristics (final energy consumption m2) and thermal characteristics of the buildings (residential and non-residential) based on the age; the breakdown of the building stock according to the building category; the split of energy system of buildings using the three main heating sources (biomass, gas, electricity, district heating) both in the residential and non-residential sector. No climatic zones have been identified and there is no analysis on the tenure of the building stock. An analysis is provided on the use of district heating networks in Romania. The structure of the document seems better structured compared to the previous one.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	The Romanian strategy presents the results of the forecasted 2050 energy savings compared to 2010, carbon emissions saved, societal benefits (jobs created) based on four different scenarios of the existing building stock (Baseline, Modest, Intermediate, Ambitious). Another analysis shows the % energy savings based on four renovation types (Minor 15%, Moderate 45%, Deep 75%, nZEB 95%). The document states that all the scenarios are cost effective but it does not include any cost/effective analysis. The cost effective approach of renovation should be included in the next building renovation strategy.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	A number of policy measures to stimulate deep renovation of building are presented in the document both financial and regulatory. Three main types of barriers have been identified as being of most relevance to the building sector these are: Legal/strategic, Economic, Skills, employment and education. An interesting Table summarising the policy actions that underpin the renovation strategy and their level of applicability is included in the document and is presented using the following categories: Legislative and regulatory, Technical, fiscal/financial, Communication & capacity building, R&D.	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	A dedicated section 4.1. Forecast perspectives for the guidance of investment decisions are included in the document. This section also describes the most relevant measures that can improve the regulatory framework for building renovation and at the same time, can mobilising the investments. E.g.: the establishment of an Energy Efficiency Investment Fund to tap into private funds, structural funds, revenues under EU ETS scheme, State budget. Developing attractive financing products for building renovations through Green mortgages, Green loans.	4
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	The same renovation scenario presented in the previous strategy has been applied reporting the forecasted energy savings in 2050, carbon emissions abatement in 2050, the societal benefits (employment creation). The analysis and results are based on the reference year 2010. By applying multipliers to savings in energy costs, the societal benefits are quantified as 4.6	4
Summary		The Romanian building renovation strategy is not entirely structured according to the element listed in Art. 4 of the EED however, the policy measures and the level of information provided in the report are fair and clearly described. The national building stock is presented with sufficient details though the EE and RES opportunities are still missing for each building category. A good analysis on the district heating networks in 2011 is also included. A list of financing sources is available and barriers to building renovation investments are clearly identified. The establishment of priority groups for the different type of buildings an analysis of the cost effectiveness of the measures is needed. Difficult to evaluate how ambitious is the long term strategy.	

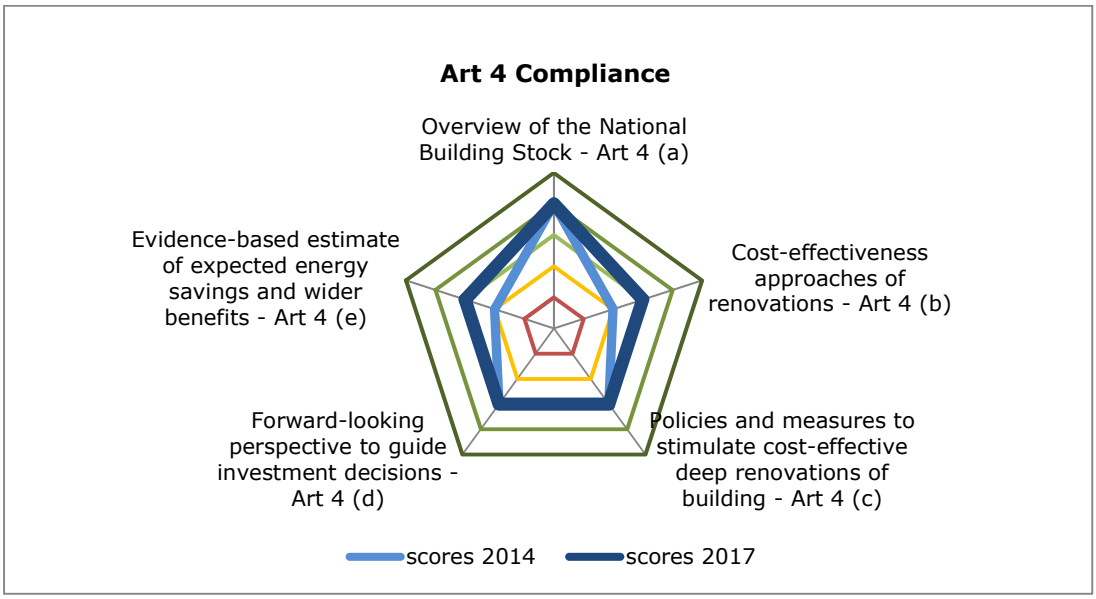
Level of details	The existing building stock is presented with a fair amount of detail. The report can be further improved by adding the analysis of the energy performance for different type of buildings based on the different climatic zones. Exhaustive list of financing sources for energy efficiency renovation of buildings, data sources used, nevertheless more details are required on Phase 2 Technical and Economical appraisal on the identification of solutions and on Phase 3 Policy appraisal on the Forecast perspectives for the guidance of investment decisions
Level of ambitions	The planning is not discussed in detail in the strategy. It is unclear what it ambitious for the national building renovation strategy. The document mentions an approach in phases to mobilising investments in the long-term renovation of existing residential and commercial buildings but no targets are set therefore impossible to judge the level of ambition.
Appropriateness	The policy measures proposed appears appropriate to overcome the barriers to the building renovation described in the strategy
Comprehensiveness	Overall, the energy efficiency policy framework described in the document is comprehensive and covers a mixture of policy measures: (regulatory, financial). Further analysis on the technical opportunities of different building type and on the cost effectiveness of the building strategy is needed.
Strengths	Good sources of information. Availability of significant financing sources including EU funds for energy efficiency renovation of buildings. Identification of the barriers to building renovation investments. National programme 'Heating 2006-2015: heat and comfort' for the rehabilitation of the district heating systems and thermal rehabilitation of buildings.
Weaknesses	Missing the analysis on the cost effectiveness of the measures to be implemented. Lack of further analysis of the EE and RES technical opportunities in the building sector. Missing information on the planning of the strategy to evaluate how ambitious it is. The explanation of the methodology applied to calculate the energy savings potential in the residential and non-residential buildings sector is missing.
Innovative approach	n/a
Recommendations	Include a description of the methodology applied to calculate the savings potentials. Describe in more details the long term renovation strategy approach. Identify a priority group for the renovation of different type of buildings. Provide more details on the cost-effectiveness approach relevant to the building type and climatic zone. Combining the financing sources available for the building renovation strategy with various funds into "Multi-Fund" Operational Programmes to maximise the projects' impact.



SLOVAKIA

Document Information	The Slovakian long-term renovation strategy was reported as a stand-alone document in April 2017, available in English.		
National Building Renovation Strategy (Art 4 EED) Introduction	The document is mostly based on the content reported in 2014, with slight updates of the data about number of dwellings renovated and use of funding sources. Efforts are mostly demonstrated for multifamily buildings and in a lesser extent for public buildings. The priority has been to modernize the dwelling stock. The renovation rates have been rather high (about 3%/year for dwellings of multifamily buildings), however the main challenge is to ensure high energy efficiency improvements along these renovations (see data about energy performance certificates after renovation that still include a share of buildings with G, F or E labels, even since 2014 most of the renovated dwellings seem to meet at least the B class). Difficulties have been encountered in supporting renovations of single family buildings (but these are occurring anyway, however probably with less energy efficiency improvements than possible). No measure is focused on private non-residential buildings (and no data are provided about them).		
Overview of the National Building Stock - Art 4 (a)	yes	Information provided are identical to the 2014 report. Detailed data about multifamily and public buildings, less detailed about single family buildings (particularly about energy consumption). And almost no details about private non-residential buildings. Few data about energy classes (only about dwellings that get an energy performance certificates after renovation works)	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	A new guidance ("Draft methodology and input data for the determination of the cost-effectiveness of the construction and renovation of buildings in terms of energy performance") has been published in 2015 on the ministry's website to help determine the cost-effectiveness of renovation options. In line with the cost-optimal calculations done in 2013 for the EPBD, the minimum energy performance requirements were strengthened in 2016, as announced in 2014, and will be again strengthened in 2021; above all for windows (data presented for the component approach). Annex 5 presents the types of proposed measures per main building type and building component, then the cost-optimal EE requirements are detailed in annex 7 (requirements adopted in the 2013 and 2016 update of the building code)	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	Most information similar to the 2014 report (with updated data about related energy savings and funding amounts and sources): - about regulations, the strengthening of building requirements done in 2013 and 2016 (NEW) (and planned for 2019-2021) also apply for major renovations "where technically, functionally and economically feasible" (when not feasible, then the renovation shall meet "minimum requirements for energy-efficient buildings", but these requirements are not further detailed in the report); - main financial incentives: 1) direct subsidies from the ministry for the modernisation/repair of multifamily buildings ; 2) loans from the State Housing Development Fund (also including EE requirements); and 3) the NEW direct subsidies for individual houses (from 2016, but very slow start, so the scheme is to be revised). Annexes 1 and 2 of the NEEAP provides detailed data about related energy savings and funding amounts and sources; - complementary financial instruments: bank guarantee scheme (Housing Stock Renovation State Support Scheme, ended in 2013), State support to mortgage financing, As pointed in the NEEAP, the achievement of part of the objectives will depend on the effectiveness of the use of EU structural funds (effectiveness of the operational programmes). This also applies to the measures for public buildings. - NEW change in 2015 in the education system to promote dual education (vocational education and training); - NEW StavEdu project for the qualification and training of construction craftsmen and workers	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	The targets in terms of number of dwellings renovated per year and year of completion of renovating the whole dwelling stock have not been changed, while the data reported for 2014-2016 show that the renovation rates have slowed down. In fact, table 7 shows that the number of dwellings to be renovated after 2020 increased compared to the projection reported in 2014. Moreover, the 2017 report newly points the issue that "The tightening of requirements for the energy performance of buildings will require the re-renovation of buildings already renovated in the past." No information is provided about non-residential buildings (except public buildings for art.5: 329 public buildings were subject to an energy audit to improve the estimation of energy savings potential in public buildings, as well as of the feasibility of guaranteed energy services).	3

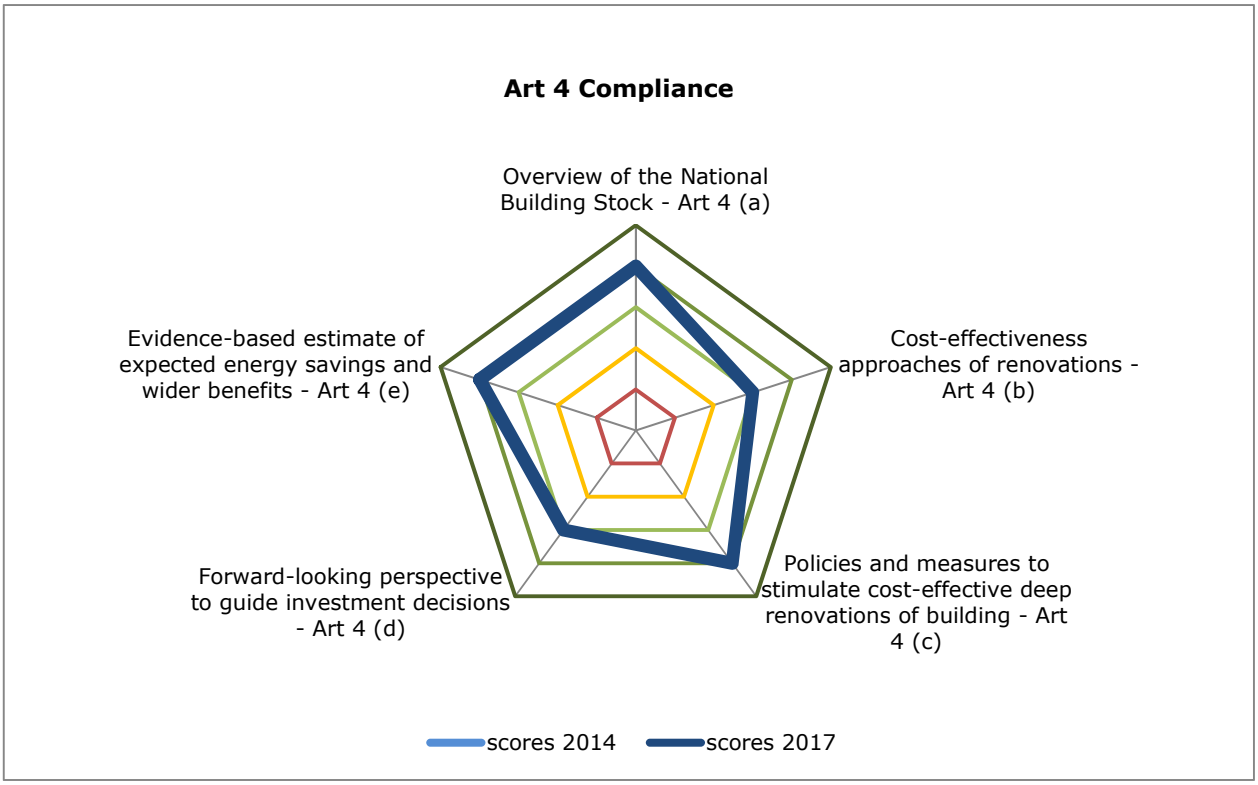
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	Slovakia provided the same information included in the 2014 strategy (identical text) for this EED item. The benefit estimates are solely based on the energy savings. Neither the societal, nor the employment, health and energy security benefits are calculated. The energy saving calculations are not discussed with sufficient detail.	3
Summary		Few additions or updates compared to the 2014 report. Most of the updates are about the number of renovated dwellings and funding amounts. New measures: - new financial incentive for single-family houses from 2016 (but very slow start, so scheme already to be revised); - promotion of the dual education (vocational education + training) from 2015 to increase the number of skilled workers; - StavEdu and ingREeS projects (qualification and training programmes, started in July 2017).	
Level of details		The level of details is the same as in 2014. Some data have been updated (number of dwellings renovated, use of funding sources). But no new technical data.	
Level of ambitions		The level of ambition is high, with still the same objective to have all multifamily buildings renovated by 2029 and single family buildings by 2043. The objective for multifamily buildings seems to be achievable, due to the high renovation rate observed (about 3%/year). However, it does not mean that these renovations will lead to a high enough energy performance. Indeed, the document already mentions that some buildings will need to be renovated again. In parallel, more difficulties are encountered for the renovation of single family buildings.	
Appropriateness		More details would be needed about the energy efficiency requirements linked to the financial incentive schemes (and how they meet the cost-optimal levels). Moreover, experience feedback seems to show that a major barrier (particularly for single family houses) would be the lack of skilled professionals and/or offers for energy renovations. The new training programmes started in 2017 (StavEdu and ingREeS) may tackle this issue.	
Comprehensiveness		Multifamily buildings seem to be well addressed. The new incentive scheme for single family buildings has a very slow start, and does not seem to overcome the barriers specific to this segment. Private non-residential buildings are not covered by the strategy. The only "measure" is the hope that the example of the public sector will lead to renovations in private service buildings. So far the strategy was mostly focused on regulations (minimum requirements) and financial incentives. But the document does not give any detail about provisions for compliance (to ensure the enforcement of the regulations). Then two new projects have been started in 2017 to provide training programmes to the various categories of professionals involved in renovation projects. No measure was explicitly tackling this issue so far. This could be a significant improvement.	
Strengths		Detailed knowledge of the stock of multifamily dwellings and public buildings. Use of EU structural funds to increase the magnitude of the programmes supporting renovations. Clear roadmap and monitoring of the achievements, in terms of buildings/dwellings renovated, as well as in terms of measures to put in place.	
Weaknesses		It is unclear to what extent the renovations monitored are including energy efficiency improvements (even if tables of energy performance certificates are provided in Annex 4: what share of renovated buildings do they cover? what were the initial energy classes of these buildings (or other baseline indicator)? There seems to be a lack of ex-post verification of energy savings. If it is clear that a detailed verification may not be possible for all projects, it would be important to have an ex-post verification on a sample of projects. This would provide concrete evidence that would be helpful either to convince other owners, or to adapt the measures if performance gaps were found.	
Innovative approach		n/a	
Recommendations		It could be useful to review what offers exist on the market about energy renovations, and particularly to identify whether there are already stakeholders able to offer the coordination of deep/comprehensive renovations. In parallel, it would be useful to ensure that staged renovations are possible (as it seems that some of the buildings already renovated will have to undergo further renovations to meet sufficient energy performance levels). It is not clear if provisions or measures are in place to do so.	


Art 4 Compliance
Overview of the National Building Stock - Art 4 (a)
Cost-effectiveness approaches of renovations - Art 4 (b)
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)
Forward-looking perspective to guide investment decisions - Art 4 (d)
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)
scores 2014
scores 2017

SLOVENIA

Document Information	The document entitled "Long-term strategy for stimulating investment into energy renovation of buildings" was provided as a supplement of the 2014 strategy document.		
National Building Renovation Strategy (Art 4 EED) Introduction	Slovenia provided a short document stating that a decision was adopted to retain the initial form of the 2014 long-term renovation strategy and to upgrade individual areas in a supplement to the existing document. The supplement emphasises recommendations made by JRC in the previous strategy assessment.		
Overview of the National Building Stock - Art 4 (a)	yes	No updated information provided by MS on Art. 4(a), with proper justification and the updated document explicitly refers to the previous document. Hereunder the 2014 Art.4a assessment text is provided. The same score has been confirmed. Slovenia provided a comprehensive and detailed statistical overview of the building stock. This includes an analysis of building types, ages, energy performances per climatic zones, providing more details on residential than on non-residential buildings. The approach is correct and the segmentation appropriate. The overview is based on data from different sources (i.e. 2012 Intitut Josef Stefan Centre for Energy Efficiency, Surveying and Mapping Authority, National Statistical Office).	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	No updated information provided by MS on Art. 4(b), with proper justification and the updated document explicitly refers to the previous document. No further information compared to the previous long-term renovation strategy provided in 2014. Hereunder the 2014 Art.4(b) assessment text is provided. The same score has been confirmed. The strategy starts from the results obtained with the cost-optimal calculation (EPBD) to calculate the energy saving potential related to the implementation of cost-effective measures in different building types (and depending on the building age). The estimation of technical potential of different retrofit opportunities is provided up to 2050. The non-residential sector might be better analysed (including schools, hospitals, stores, etc.) and the packages of measures that can achieve at significant energy saving should be more clearly reported.	3
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	In the supplement document, a list of (regulatory, financial, supporting) measures stimulating investments for the comprehensive energy renovation of buildings is included: 1. Managing quality energy renovation 2. Regulations on Energy Efficiency of buildings 3. Modifying criteria for awarding grants for investment into cultural heritage buildings 4. Financial instruments 5. Upgrading Eco fund activities 6. Monitoring the implementation of energy renovation of buildings 7. Setting up systems for stimulating comprehensive sustainable renovation. Among the financial instruments, developing long-term loans and financing schemes that allow for risk sharing (guarantee scheme), refinancing of investments would be beneficial for the establishment of new ESCOs. Re: the Eco Fund it is necessary to determine barriers on increasing the implementation of measures in households due to the decline in drawing of ECO Funds resources by residents.	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	No updated information provided by MS on Art. 4(d), with proper justification and the updated document explicitly refers to the previous document. Hereunder the 2014 Art.4(d) assessment text is provided. The same score has been confirmed. The investment amount for the renovation of the existing building stock has been estimated for the period 2016-2030 (6.3 Billion €). The investment sources are detailed for residential, public and private service sector, but alternative scenarios are not provided.	3
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	No updated information provided by MS on Art. 4(e), with proper justification and the updated document explicitly refers to the previous document. Hereunder the 2014 Art.4e assessment text is provided. The same score has been confirmed. A detailed analysis to quantify the additional benefits of energy savings has been provided. Wider benefits have been identified and quantified, e.g. economic benefits, energy security, social benefits (7000 new jobs per year), reducing energy poverty, reduction of greenhouse gas and particulate emissions.	4

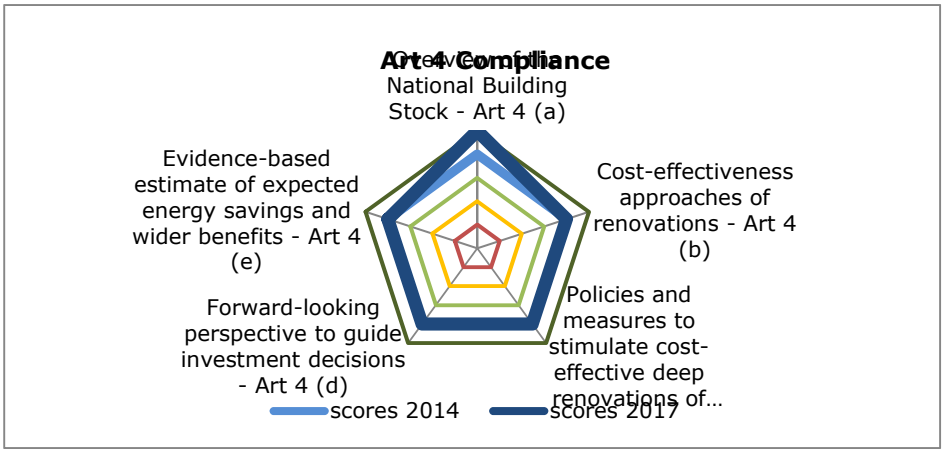
Summary	The document submitted by Slovenia is a supplement to the existing long-term renovation strategy provided in 2014. Due to the recent adoption of the LTRS in 2014, Slovenia did not draw a new 2017 strategy, also because there had not been any significant changes to the building stock nor to the policies and measures in force. However, the areas identified as critical were identified as: quality management, creating financial instruments, and issue of the moderately developed EPC.
Level of details	The combination of the 2017 amendment and the 2014 strategy document provides an overall good level of details
Level of ambitions	No further information compared to the previous Building Renovation strategy provided in 2014.
Appropriateness	A few existing measures have been upgraded in the supplement and the policy measures seem appropriate and suitable for the strategy in order to reach the goals.
Comprehensiveness	Slovenia has in place a good set of measures for the building sector, covering the main areas of intervention: regulatory, financial, information, etc.
Strengths	The possible funding sources and mechanisms to meet the identified investment profile (up to 2023) are identified in detail.
Weaknesses	In the forward-looking perspective to guide investment decisions should be included a scenario analysis and the total investment amount should be defined over the period to 2050.
Innovative approach	n/a
Recommendations	The next long-term renovation strategy should be a completely new strategy addressing all the provision of Art. 4 (a)(b)(c)(d) in a single document



SPAIN

Document Information	The Spanish 2017 long-term renovation strategy has been delivered as a separate document from the NEEAP. At the moment of the analysis, the document was available both in the original language and translated into English.		
National Building Renovation Strategy (Art 4 EED) Introduction	Following the already very complete 2014 assessment, the 2017 Article 4 strategy presents a comprehensive analysis of Spain's energy consumption buildings' sector evolution and measures to be implemented up to 2020. This strategy presents an analysis of the impact of the measures established to promote energy efficiency in the building sector in Spain, regarding measures approved before 2014 and those that have been adopted between 2014 and 2017. Due to the inexistence of a statistical update, a quantitative approach is not considered, thus being a qualitative analysis, focused on evaluating the public policies and policies on the instruments used in Spain to achieve the fundamental targets in the Strategy. The assessment makes an analysis of the evolution of the energy consumption in the buildings sector after 2014, a follow-up of the measures promoting energy renovation that have been implemented, including a follow-up on the measures proposed before the 2014 strategy still in force, as well as those established in the 2014 ERESEE itself and others that have been implemented later in time. An analysis is included on the outstanding main challenges, with a view to identifying any structural barriers, so as to take them into account in designing new measures.		
Overview of the National Building Stock - Art 4 (a)	yes	No updated information provided by MS on Art. 4(a), with proper justification and the updated document explicitly refers to the previous document. Due to not having updated statistical elements on its building stock, Spain has not presented again the data outlined in the earlier assessment (no recent census data available). Although, if there are changes in the statistical information, Spain admits to redo its strategy. Hereunder is reported the assessment of the 2014 strategy. The previous evaluation score is confirmed. Spain provided a good detailed and comprehensive overview of the national building stock. It uses official data from two sources (2011 building census and cadastre). The data presented in the report are a small selection of the data available. The residential and non-residential buildings are treated separately for conceptual and data reasons. The approach is correct and the segmentation appropriate. More details on climatic zones would are reported in an Annex. Moreover, in the report the building stock is divided in clusters with common combination of features (typologies; age; use), this enables to identify specific groups of buildings for targeted interventions and to set priorities	5
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	No updated information provided by MS on Art. 4(b), with proper justification and the updated document explicitly refers to the previous document. The Spanish 2017 strategy is mainly a qualitative assessment, referring to the previous strategy for the quantitative evaluation of cost-effectiveness. The cost-effectiveness study present in the previous strategy is not shown in the 2017 document. Hereunder is reported the assessment of the 2014 strategy. The previous evaluation score is confirmed. The strategy identified different set of measures for different clusters of buildings defined in the previous section. For each of the clusters, relevant energy saving measures (insulation, window replacement, solar protection, ventilation, heating/cooling system) are provided. The costs and savings potential for a typical property in each cluster are provided. Savings range between 60% to over 90% depending on building type and main energy carrier. For the non-residential sectors, "menus" of typical interventions are provided for four sectors: Offices, Health, Hotels & Leisure, and Retail. The methodology is correctly applied, however not all costs are accounted (e.g. transaction costs). Prioritization and planning for the renovation measures are not defined in details	4
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	Similarly to the previous strategy, Spain provides a comprehensive description of the measures regarding the renovation of the building sector. With mainly financial and legislative measures already implemented and to be implemented in the following years, Spain has identified the main points on where to act in order to make sure that its strategy is the most effective possible. The measures are divided into measures that were put forward before the 2014 strategy and are still valid, measures new to the 2014 strategy, other measures not included in the 2014 strategy but still have been carried out in the last three years, and new measures and areas of action for this 2017 strategy update. Some of the most noteworthy measures include subsidies for building renovation, urban regeneration, the PAREER programme promoting the improvement of energy efficiency and installing renewables in existing buildings, credit access, access to EU funds, awareness raising and training campaigns, building assessment reports, simplification of administration, etc. The Spanish strategy also provides an analysis of the main structural challenges, as in 2014 like the complex residential stock, climatology related factors, availability of financing, energy poverty or even cultural barriers.	4

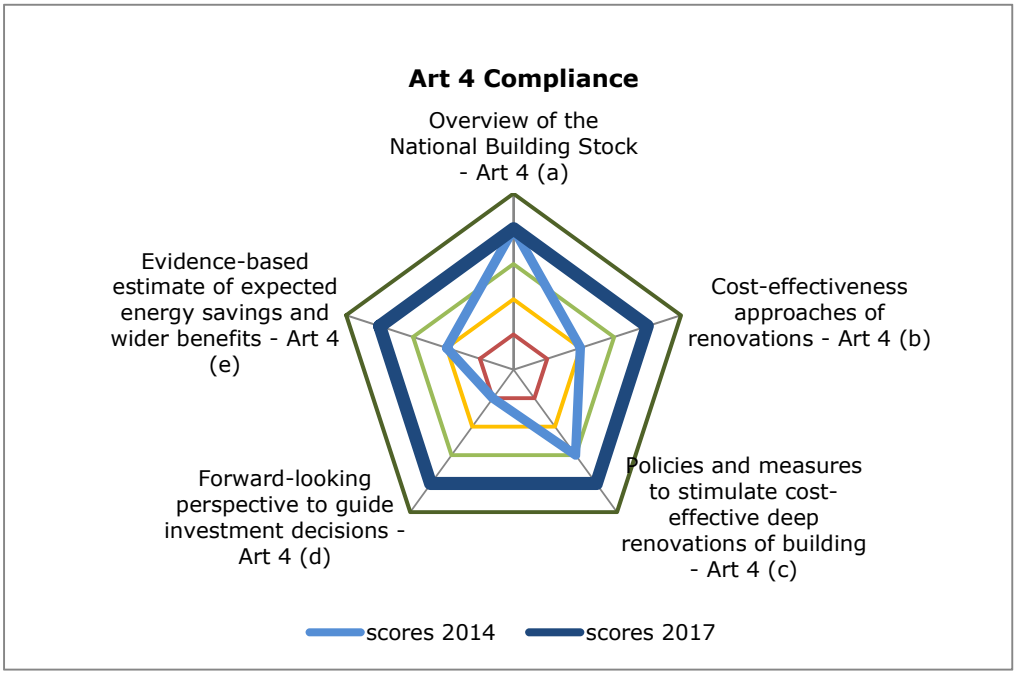
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	No updated information provided by MS on Art. 4(d), with proper justification and the updated document explicitly refers to the previous document. The Spanish strategy did not update its long-term scenarios from the last strategy (2020-2030-2050) and does not present them again. Hereunder is reported the assessment of the 2014 strategy. The previous evaluation score is confirmed. The report identifies and describes five scenarios: three for the residential sector and two for the non-residential one. A baseline is provided for each group. The assumptions are explicitly stated: the results are expressed in terms of number of properties renovated, investment (including public subsidy level), energy saving, carbon emission reduction and renovated, investment (including public subsidy level), energy saving, carbon emission reduction and jobs created.	4
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	No updated information provided by MS on Art. 4(e), with proper justification and the updated document explicitly refers to the previous document. Although the main benefits of the different scenarios were presented in the 2014 renovation strategy, the same does not occur in the 2017 strategy. Hereunder is reported the assessment of the 2014 strategy. The previous evaluation score is confirmed. Spain provides clear pictures of the main benefits (energy savings and CO2 emission reduction) for the considered renovation scenarios. Moreover investing in building renovation is seen as a strategically important action, especially in terms of employment: the report estimates 55 additional jobs created for every million euros of public spending in the sector. Other benefits are listed: improved public finances, reduced energy bills, revitalisation of the construction sector, increasing property values, reduction of noise transmission due to insulation, and increased energy security.	4
Summary		The 2017 building renovation strategy builds upon the previous one from 2014 and gives an update on the measures in place and adds new measures that were implemented in the meantime. The fact that there are no further developments in terms of statistical information led to an absence of the mandatory elements that were present in the previous assessment which lead to an excellent score in terms of compliance. The 2017 strategy is, as mentioned by the Spanish authorities, a qualitative instead of a quantitative one. A novelty regarding the previous strategy is the introduction of energy poverty with a dedicated chapter on this subject.	
Level of details		The level of detail in the description of the measures is noteworthy, especially in what concerns the financing tools available to the different interested parties.	
Level of ambitions		The ambition of the Spanish strategy is still notable since it maintains the goals from the last evaluation.	
Appropriateness		The measures and policies are considered to be appropriate to reach the defined goals.	
Comprehensiveness		Overall, Spain has a very complete set of measures already in place. These measures are very well described in terms of the objectives of the measures, financial information and governance. It would be interesting to have the impact in terms of energy savings be developed. This is however possible by cross-checking with the main NEEAP 2017 document.	
Strengths		Good evaluation on the energy consumption in the building sector. Thorough description of numerous building related measures. Energy poverty is taken into consideration.	
Weaknesses		The main strengths of the previous strategy are missing, namely the building stock statistics, impact of scenarios and cost-effectiveness of clusters measures.	
Innovative approach		n/a	
Recommendations		Recover some of the information described in the 2014 strategy. Timeline of the implementation still absent. Impact of ongoing measures should be presented also in this document, not just in the NEEAP.	



SWEDEN

Document Information	The second Swedish long-term renovation strategy (i.e. Second National strategy for renovation to improve energy efficiency) was provided in Annex 5 of the 2017 NEEAP. The document is available in Swedish and English language.		
National Building Renovation Strategy (Art 4 EED) Introduction	The 2017 strategy tries to seize the conclusions drawn in 2014 by the increase of renovations to be carried out and the need to implement initiatives for energy efficiency measures. Some barriers for the improvements in energy efficiency were identified and new instruments (financial, informative and fiscal) have been proposed. In comparison with the 2014 strategy, the present document is more focused on the analysing cost effectiveness of EE measures and evaluation of two scenarios for energy renovation and expected reduction in heat consumption. Special focus was set on apartment and non-residential buildings.		
Overview of the National Building Stock - Art 4 (a)	yes	The Second building renovation strategy gives an detailed overview of the Swedish building stock. The presented data of the building stock was provided from the official energy statistics for houses, apartment buildings and non-residential premises, the Swedish National Board of Housing, Building and Planning database for energy declarations (Gripen) and from the real estate assessment register. The official energy statistics are taken from the Swedish Energy Agency and are based on sample surveys. The entire building stock was divided into three main categories: houses, apartment buildings and non-residential buildings. In the annex 1 of the Strategy was given an overview of the energy consumption (electricity and energy for heating and hot water preparation) in the entire building stock by building category and by year of construction. Heat area and type of energy sources were been also provided.	4
Cost-effectiveness approaches of renovations - Art 4 (b)	yes	This document compare to the first renovation strategy provides more comprehensive cost effectiveness analyse of various energy renovation measures including investment costs for their realisation. The results are based on preliminary studies in the Swedish Energy Agency and BeBo project Halvera Mera from 2012, as well as on the Swedish National Board of Housing, Building and Planning BETSI study from 2010.The objective of Halvera Mera was to carry out preliminary studies that would contain proposals for possible energy efficiency measures in apartment buildings. Profitability calculation, the average investment cost for various measures and potential energy savings obtained from Halvera Mera has been presented in the strategy. BETSI was a comprehensive statistical survey of the building stock's energy consumption, technical status and indoor environment. The partial study on energy consumption in housing and non-residential premises contained an estimate of the costs of reducing energy consumption in buildings to achieve the existing national energy-efficiency targets for buildings. A total of 21 types of measures were studied for the buildings in BETSI. Calculation of the cost-effectiveness of measures in houses, apartment buildings and non-residential buildings were carried out in framework of the BETSI project.	4
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	More than 20 instruments are in place in Sweden to support energy renovation of the building stock. An overview of all existing instruments (financial, fiscal, administrative and informative) is provided in the Annex 3 of the strategy. A number of new economic instruments for renovation and energy efficiency were introduced in 2016: economic aid for renovation and energy efficiency improvements aimed at rental accommodation in socio-economically vulnerable areas and an initiative for training in low energy building, Energilyftet. The Swedish government has also adopted an initiative for a State investigation into the possibility of designing an energy-saving loan. Descriptions of these instruments are given in the Annex 3 of the strategy. Establishment of a Information Centre for renovation to improve energy efficiency and Credit guarantees for renovation and energy efficiency measures are among these measures. Additional measures have been discussed during reference group meetings. The strategy provides also a table with the main barriers for renovation, possible causes and instruments that can overcome them.	4
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes	Building renovation is in line with Sweden national overall objective - improvement of living environment from a social perspective in which satisfactory long-term conservation of natural resources and energy is promoted. The strategy analyses the buildings' role in the future sustainable energy system, need for investment in building renovation and remaining renovation costs. A snapshot of both the renovations that have been carried out and those that remain up to 2050 is given in the strategy (figure 26).Since in the strategy a lack of profitability was perceived to be the biggest barrier, profitability assessments and financing of renovation projects become important questions which have been analysed from investors (building owned in most of the cases) perspective. In addition in the strategy was provided an overview of SE credit market including private and public funding.	4

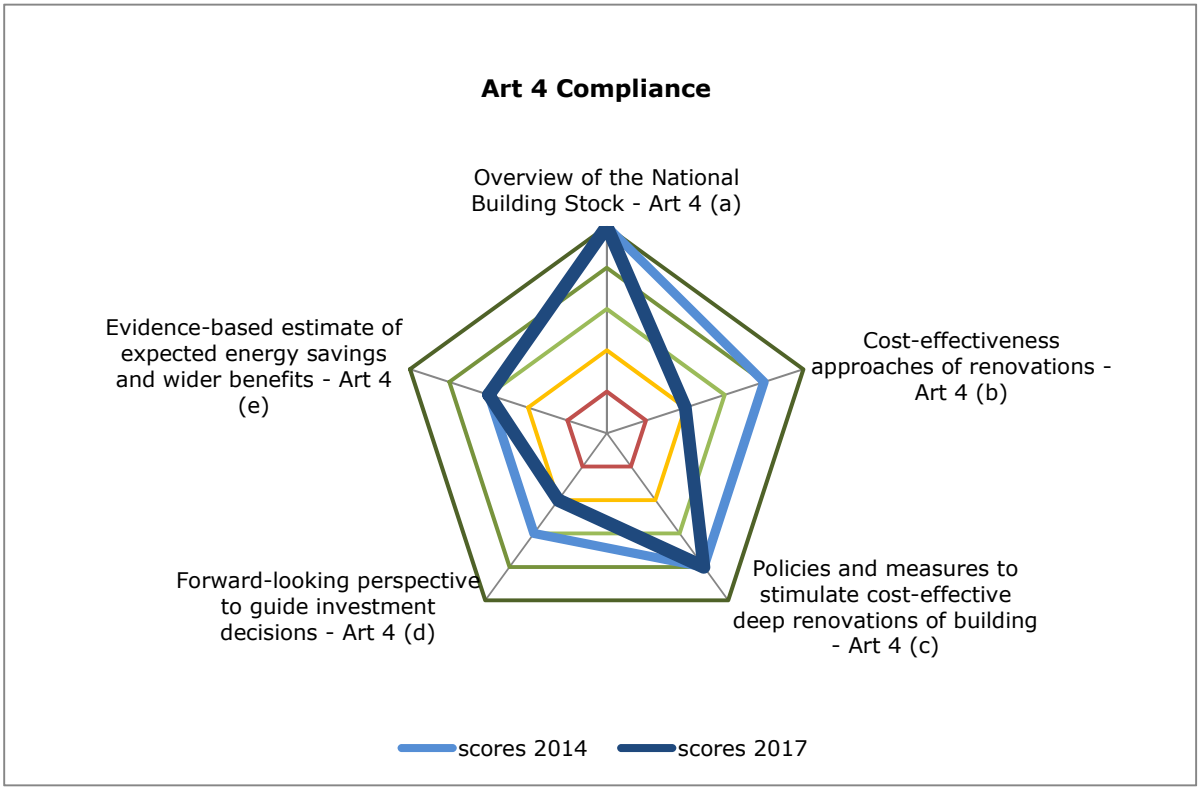
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	Two scenarios (reference alternative and alternative 1) have been developed in order to describe possible progress in the energy performance of buildings by 2050. A third scenario has been also developed – an extra ambitious energy efficiency scenario. In the strategy for each scenario was given expected reduction in average heat consumption in buildings by 2050. Estimation of savings and energy efficiency in terms of net heat for period 2014-2050 was also provided for entire building stock. In addition, was given overview of energy savings divided into the building categories of apartment buildings, offices, schools, other non-residential premises and houses. Wider benefits of building renovation as: improvement of indoor and outdoor air quality (health effects) in the buildings, improvement of productivity and changing in other economic parameters have been evaluated in the strategy.	4
Summary		The second building renovation strategy of Sweden is a comprehensive document which covers all points required by EED Article 4. Focus in this strategy is set on evaluation of needs for renovation of buildings, analyse of existing barriers, cost effectiveness calculation of existing and planned measures for energy renovation of buildings, analyse of saving potential and other benefits for the Swedish society.	
Level of details		The strategy provides satisfactory level of details for the building stock covering average heat consumption by building type (houses, apartment buildings and non-residential buildings) and year of construction, degree of renovation and climate zone. Cost effectiveness analyse of the measures and volume of investments for their realization prepared in the framework of the Halvera Mera and BASTI projects were also presented in detail.	
Level of ambitions		In the strategy was mentioned that Sweden with the agreement on Long-term energy policy adopted by Government and political parties in June 2016, set an ambitious target for energy efficiency and residential buildings. However, the agreements states that an objective for increasing energy efficiency between 2020 and 2030 must be developed and adopted no later than 2017.	
Appropriateness		The policy measures (existing and planned) reported in the strategy are appropriate for realization of the objective set by the strategy.	
Comprehensiveness		Reported policy measures cover a wide spectrum of areas: administrative, regulatory, financial, fiscal, research, informative and market driven.	
Strengths		The strategy contains a detailed overview of heat consumption of the building stock, evaluation of need for renovation of the building stock taking into account all parameters, detailed analyse of cost effectiveness of different energy efficiency measures, costs for implementation of selected measures, expected energy saving and decreasing of average heat consumption, expected financial savings as well as impact and benefit of implementation of the energy renovation onto social, economic and environmental aspects of society.	
Weaknesses		Cost effectiveness calculation of the energy efficiency measures based on results from BESTI projects has been based on price level from 2009 and has to be recalculated with actual prices for material and labour costs. More data in terms of energy savings are needed for the existing and planned policy measures.	
Innovative approach		Creation of innovation clusters as: LÅGAN for buildings with very low energy consumption; BELOK for non-residential premises; BeBo for owners and managers of apartment buildings; BeLivs is an innovation cluster of grocery premises; to promote the development of new solutions and applying and demonstrating new knowledge and technology for energy efficiency with focus on buildings.	
Recommendations		Recalculation of costs for reported energy efficiency measures obtained from the BESTI project with actual prices (2016/2017) of material and labour. Setting of clear national targets for the building renovation in terms of energy savings, number of energy renovated buildings ect.	


Art 4 Compliance
Overview of the National Building Stock - Art 4 (a)
Cost-effectiveness approaches of renovations - Art 4 (b)
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)
Forward-looking perspective to guide investment decisions - Art 4 (d)
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)
scores 2014
scores 2017

UNITED KINGDOM

Document Information	The UK updated long-term renovation strategy has been provided in the 2017 NEEAP ANNEX C. Additional information are included as links to other documents in an annex.		
National Building Renovation Strategy (Art 4 EED) Introduction	In the UK NEEAP 2017, in ANNEX C, only information related to Art. 4.a (building stock) is provided. It is stated that "information related to requirements b), c), d) and e) will be contained in the Government's plan to reduce emission in the 2020s". A further annex to ANNEX C, provides additional links were the updated information are provided, but not always coherently and with sufficient details, especially for section (b) and (d). Most of the links refers to the UK Clean Growth Strategy.		
Overview of the National Building Stock - Art 4 (a)	yes	Un update of some of the building stock data, both for residential and nor-residential buildings, based on new sources (e.g. 2015 DCLG English Housing Survey, BEIS Building Energy Efficiency Survey 2014-15) is provided.	5
Cost-effectiveness approaches of renovations - Art 4 (b)	partly	UK provided a list of links and reference that are partially related to the content required under Art 4b. Some relevant and updated information exists and are correctly referenced, however a coherent and complete update is missing. Some of the references provided are weakly related to an update of the LTRS for Art 4b (e.g. Clean Growth Strategy sections).	2
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes	Information on policy measures have been updated. Notably, in addition to the measures quoted in the 2014 document, (i.e. the Green Deal and the Energy Company Obligation, Building Regulations, the Energy Saving Advice Service, The Climate Change Agreements, the CRC Energy Efficiency Scheme and the Energy Saving Opportunity Scheme), the Clean Growth Strategy is reported as a key policy and an updated list of policies and measures are provided. The information provided however still lacks estimates of energy savings for all the mentioned measures.	3
Forward-looking perspective to guide investment decisions - Art 4 (d)	partly	Only links to existing programmes and source of funding, divided by categories have been provided. A clear forward-looking perspective to guide investment decisions, including a roadmap with key dates, targets, milestones, needed resources, is not included.	2
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes	UK provided links to the sections of the National Clean Growth Strategy related to the reduction of GHG emissions and energy consumption reduction projections.	3
Summary	In 2017 UK provided an update of the building stock (Art. 4.a), sufficiently good update of 4c and 4e sections. However it fails to provide a satisfactory update on sections 4b and 4d, as the information provided are fragmented and not always specifically related to the content of the LTRS in those specific sessions.		
Level of details	The 2017 updated strategy provides a good level of detail for the description of the building stock. The other sections are not covered with the same level of details.		
Level of ambitions	While UK set a very clear and ambitious overall sectors legally binding target (i.e. cutting carbon emissions by 80% by 2050), specific targets for the building sector are not clearly indicated, except for new buildings (i.e. the introduction of zero carbon homes standards for new homes in England by 2016). Specific target on building renovations, and in particular on deep renovations are not provided.		
Appropriateness	The measures and policies designed for the strategy are appropriate and suitable to reach the goals established, even if more specific policies targeting deep renovation should be put in place		
Comprehensiveness	UK has in place a good set of measures for the building sector		
Strengths	Very detailed and comprehensive description of the building stock.		

Weaknesses	no specific new measures targeting deep renovations have put in place
Innovative approach	n/a
Recommendations	More information on evidence-based estimates of energy savings expected from each of the policies put in place should be included in the strategy



Annex B - Official Commission's guidance for NEEAPs on EED Art.4

1. Provide an overview of the national building stock based, as appropriate, on statistical sampling (EED Article 4(a))

a) What main building categories have been identified as part of the overview?

i) Single-family houses

ii) Apartments/multi-residential dwellings

iii) Offices

iv) Educational buildings

v) Hospitals/health establishments

vi) Hotels

vii) Sports facilities

viii) Warehouses/data centres, etc.

ix) Retail premises (including restaurants)

x) Other types of energy-consuming buildings

b) What age bands having a material bearing on building energy performance have been identified?

i) Traditional construction types, including historic/heritage buildings(typically pre-1900)

ii) Buildings constructed prior to regulations on energy performance (e.g. 1901-1960)

iii) Early phase building regulations (1961-1990)

iv) Mid-phase building regulations (1981-2000)

v) New (2001-2012)

c) What main climatic zones which have a material bearing on building energy performance have been identified?

d) How many combination of building type, age and climatic zone have been identified?

e) What ownership and tenure have been identified in terms of the two elements specified below?

i) The split by owner – public, private or mixed

ii) The split by tenure – owner occupied, rented, (mixed?)

f) If appropriate, provide a split by location as follows:

i) Urban

ii) Suburban

iii) Rural

g) What energy use and performance characteristics of each building combination have been identified?

i) Construction type and U-value of main building elements:

- Floor
- Walls
- Windows and External Doors
- Roof

ii) Air infiltration rate

iii) Energy systems (In all cases, please identify typical replacement lifecycles):

- HVAC system type/performance level/controls
- Hot water provision
- Lighting systems/controls

iv) Maintenance regimes (e.g. mandatory annual safety checks/servicing)

v) Energy use for:

- Heating
- Cooling
- Hot water
- Lighting
- Appliances

vi) Energy carriers:

- Gas (natural gas or LPG)
- Liquid fuels (oil, etc.)
- Solid fuels (coal, etc.)
- Renewable fuels (specify)
- District heating (identify energy carriers)

2. Identify cost-effective approaches to renovations relevant to the building type and climatic zone (EED Article 4(b)).

a) What technical opportunities for retrofit of energy efficiency measures for each building category have been identified?

i) Fabric measures

ii) Windows

iii) HVAC plant - heating/cooling/hot water

iv) Air infiltration

v) Lighting

vi) Appliances

b) What technical opportunities for retrofit of renewable energy measures have been identified?

i) Solar hot water

ii) Solar PV

iii) Passive solar

iv) Shading

v) Wind

vi) Heat pumps

vii) Biomass

viii) Biogas

c) Has the opportunity to connect to a district heating system been considered?

d) What packages of measures that can achieve at significant energy saving, at least up to the prevailing energy performance requirements for new buildings of the same category, have been identified?

e) Has it been determined whether deep renovations should be undertaken as a single package, or staged over a period of time?

f) Has the cost effectiveness of the different packages of measures been determined using cost optimality methodology?

i) Costs – the total installed cost of renovation measures, less any avoided cost due to end-of-life replacement or by undertaking renovation alongside other building maintenance, new construction or modernisation measures

ii) Consider the transaction costs, including costs of temporary relocation of occupants

iii) Have the following benefits (and identify the beneficiary – building owner, building occupier, society at large) been quantified?

- Energy cost savings
- Reduction in Fuel Poverty
- Health benefits
- Increased property value (rental and/or sale value)
- Reduced energy imports/increased energy security
- Employment impact
- Environmental impact (externality value of carbon saving)
- Air quality improvement
- Other social, economic or environmental benefits

g) From the above cost appraisal, have you determined a prioritised set of renovation packages for each building category, and a timeline for implementation?

i) Have you considered the exemplary role of the public sector (at all tiers of government, as well as public services such as public housing, defence, health and education) in leading the drive towards deep renovation, and in exerting influence of citizens and businesses?

ii) Have you considered the appropriateness of targeting the least energy efficient building stock as a priority?

iii) Have you considered different scenarios as to the rate of change of key parameters?

3. Provide information on policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations (EED Article 4(c)).

a) Give an appraisal of existing measures/policies in the Member State:

i) Regulatory (EU, national, regional and local)

ii) Fiscal (tax incentives, grants, subsidies, loans, etc.)

iii) Information campaigns

iv) Labelling (EPCs, etc.)

v) Voluntary agreements

vi) Other

b) Provide an analysis of barriers.

c) Give an appraisal of relevance of policies used in other territories.

d) Provide a design of new policy landscape that addresses barriers and enables the delivery of the required ramp up in deep renovation activity, with a particular focus on those measures which need to be introduced within the next 3 years.

4. Demonstrate a forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions (EED Article 4(d)).

a) Quantify total annual investment requirements, mapped out over the period to 2050, in order to deliver the identified renovation opportunities.

b) Identify existing sources of funding for building energy renovation:

i) Owners' private equity

ii) Public purse (including EU Structural and Innovation Funds)

iii) Banks and other sources of private investment (e.g. pension funds)

c) Analyse barriers to investment.

d) Identify possible funding sources and mechanisms to meet the identified investment profile.

5. Provide an evidence-based estimate of expected energy savings and wider benefits (EED Article 4(e)).

a) Has the attractiveness to building owners of their direct benefits been identified?

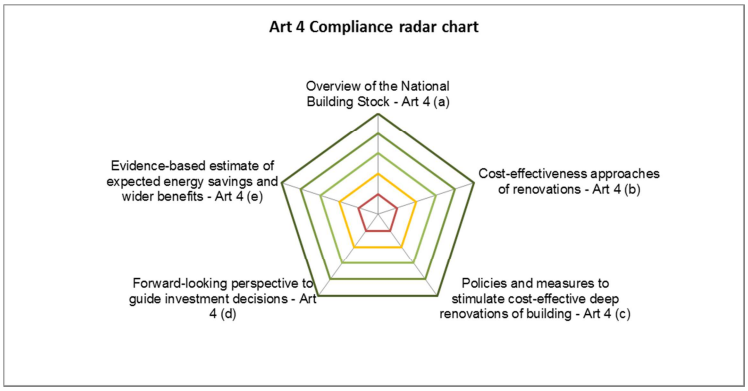
b) Have the societal benefits arising from deep renovation been identified?

c) Have ways in which externalities (e.g. societal benefits from reduced CO2 emissions, increased energy security, etc.) can be internalised for the benefit of the investor been identified?

Annex C – Updated Art. 4 notifications' evaluation template

Assessment Synthesis & Overview

	Previous assessment (2014)			Previous assessment (2014)		
Country						
Document Information						
Introduction						
	Art.4 Complian	Comment	core (0-5)		Score (0-5)	
Overview of the National Building Stock - Art 4 (a)	yes/no			yes/no		
Cost-effectiveness approaches of renovations - Art 4 (b)	yes/no			yes/no		
Policies and measures to stimulate cost-effective deep renovations of building - Art 4 (c)	yes/no			yes/no		
Forward-looking perspective to guide investment decisions - Art 4 (d)	yes/no			yes/no		
Evidence-based estimate of expected energy savings and wider benefits - Art 4 (e)	yes/no			yes/no		
Summary						
Level of details						
Level of ambitions						
Appropriateness						
Comprehensiveness						
Strengths						
Weaknesses						
Innovative approach						
Recomendations						



Article4 (a), (b), (d)

Overview of the National Building Stock (EED article 4a)

Indicate the information provided in the document (copy/paste any relevant chart, table, figure on building stock)

Sector	Category	Number of buildings	Number of dwellings	Area	Energy consumptions	Energy performance (kWh/m2 year,	Average U-values of envelope	Type of heating system
Residential	per building type							
	per age bands							
	per energy class							
Non-residential	per building type							
	per age bands							
	per energy class							

Cost-effectiveness approaches to renovations (EED article 4b)

Does this second strategy provide an update of the cost-effectiveness calculations? If yes, provide a brief summary under the proper topic.

Topic		Summary
Specific renovation packages that can be applied to reference buildigns		
Technical opportunities for retrofit of energy efficiency measur		
Technical opportunities for retrofit of renewable energy measu		
Opportunity to connect to a district heating system		
Staged renovation options		
Exemplary role of the public sector		
Different scenarios as to the rate of changes of key calculation p		
Other:	what?	

Forward-looking perspective to guide investment decisions (EED article 4d)

What is the time horizon considered (e.g. 2030, 2040, 2050)?

2020	2030	2040	2050
Is there a building renovation target (e.g. energy saving, n. of building retrofitted etc)?				

Does this second strategy provide an update of the forward-looking perspective? If yes, provide a brief summary under the proper topic.

Topic		Summary
Total annual investment requirements to deliver the identified renovation opportunities		
Existing sources of funding for building energy renovation		
Analysis of the barriers to investment		
Possible funding sources and mechanisms to meet the identified investment profile		
Other:	what?	

Is there any reference to the Smart Finance for Smart Building Initiative (SFSB)? yes/no more info on SFSB: https://ec.europa.eu/energy/sites/ener/files/documents/1_en_annexe_autre

Search for terms related to the key pillars of the smart finance for smart building initiaitve:

look for key words such as: better use of public funds, aggregation, de-risking, SFSB initiative

Topic	Summary
Mesures for more effective use of public funding	
Mesures for the aggragation and assistance for project development	
Mesures for the De-risking of building renovation projects	

Article4 (e) and Energy poverty

Evidence-based estimate of expected energy savings and wider benefits (EED article 4e)

Does this second strategy provide an update about the benefits' calculation?

If yes, provide a brief summary under the proper topic.

Topic		Summary
Attractiveness to building owners of their direct benefits		
Societal benefits arising from deep renovation		
Internalisation of externalities (i.e. societal benefits translated into benefits for the investor)		
Quantification of benefits		
Other:	what?	

Quantification and of monitoring of implementation of the strategy 2014-2017

Sector	Category	Number of buildings renovated	Number of dwellings renovated	Floor Area	Type of Energy performance	New Energy performance
Residential	per building type					
	per age bands					
	per energy class					
Non-residential	per building type					
	per age bands					
	per energy class					

Instrument to monitor the implementation of the strategy (in line with the Governance proposal)

Energy poverty

Is there a definition of Energy poverty? (or fuel po | yes/no

If yes, report the definition of Energy poverty

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