



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Integrated Solutions for Positive
Energy and Resilient Cities

D11.7

Roadmap on standardization, certification and regulatory activities – V1



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement n° 957751. The document represents the view of the author only and is his/her sole responsibility: it cannot be considered to reflect the views of the European Commission and/or the European Climate, Infrastructure and Environment Executive Agency (CINEA). The European Commission and the Agency do not accept responsibility for the use that may be made of the information it contains.

Document Control Sheet

Project Title	integRatEd Solutions for POsitive eNergy and resilient CitiEs - RESPONSE
Deliverable	D11.7 - Roadmap on standardization, certification and regulatory activities – V1
Work package	WP 11
Task	T11.7
Number of pages	34
Dissemination level	PU
Main authors	Emilio de Gaetani, Lorenzo Dall’Oro (RINA-C)
Contributors	Federica Fuligni (RINA-C)

Reviewers

Partner	Name	Contact information
EIFER	Monjur Murshed	monjur.murshed@eifer.org
	David Goujon	david.goujon@eifer.org
Sociedade Portuguesa de Inovação (SPI)	Alessandro Colombo	alessandrocolombo@spi.pt
	Inês Guerra Alves	Inesalves@spi.pt
	Douglas Thompson	douglasthompson@spi.pt
SOLAR FINLAND OY (SF)	Miikka Frantti	miikka.frantti@solarfinland.fi

Dissemination level codes

PU = Public, fully open, e.g., web

CO =Confidential, restricted under conditions set out in Model Grant Agreement

CI =Classified, information as referred to in Commission Decision 2001/844/EC.

Versioning and Contribution History

Version	Date	Author/Editor	Contributors	Description/Comments
V0	20.08.2021	Emilio De Gaetani (RINA-C) Lorenzo Dall'Oro (RINA-C)	David Goujon (EIFER)	General comments
V1	30.08.2021	Emilio De Gaetani (RINA-C) Lorenzo Dall'Oro (RINA-C)	Alessandro Colombo (SPI) Inês Guerra Alves (SPI) Douglas Thompson (SPI)	Work Package leader review and general comments
V2	06.09.2021	Emilio De Gaetani (RINA-C) Lorenzo Dall'Oro (RINA-C)	David Goujon (EIFER)	Coordinator Review and general comments
V3	14.09.2021	Emilio De Gaetani (RINA-C) Lorenzo Dall'Oro (RINA-C)	Miikka Frantti (SF)	Formatting comment
V4	22.09.2021	Emilio De Gaetani (RINA-C) Lorenzo Dall'Oro (RINA-C)	Monjur Murshed (EIFER)	Quality Manager review and comments about format and content

V5	27.09.2021	Emilio De Gaetani (RINA-C)	Federica Fuligni (RINA-C)	Final version
-----------	------------	-------------------------------	------------------------------	---------------

Index

Executive Summary	7
Chapter 1 - Introduction	9
1.1 Scope and objectives	9
1.2 Relation to other RESPONSE activities and WP's.....	10
1.3 Structure of the deliverable.....	11
2. Methodology	13
3. Standards and Standardization	17
4. Preliminary overview of regulation and policies framework	23
5. Key Exploitable Results – Innovative Elements (IE)	27
6. Next Steps	31
Bibliography	33

Index of Tables

Table 1 Example of information table for periodic monitoring of RESPONSE KERs	9
Table 2 Exemplary Output - Identification of relevant Standardization bodies for RESPONSE and actions proposals.....	15
Table 3 Publicly available standards – Geographical coverage.....	17
Table 4 Bodies responsible for standards – Geographical coverage.....	18
Table 5 Types of Standards	20
Table 6 Transformation Axis (TA) and Integrated Solutions (IS) of RESPONSE Project.....	23
Table 7 IE potentially relevant for standardization and certification activities, grouped per LH city	27

Index of Figures

Figure 1 Task 11.7 – Proposed Methodological Approach.....	13
--	----

Glossary

Abbreviation	Full form
ACER	Agency for the Cooperation of Energy Regulators
AFNOR	Association française de normalisation
BSI	British Standards Institution
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CEP	Clean European Package

DIN	Deutsches Institut für Normung
EC	European Commission
EFTA	European Fair Trade Association
ESO	European Standards Organization
ETSI	European Telecommunications Standards Institute
hEN	Harmonized Standards
ICT	Information and Communication Technologies
IE	Innovative Elements
IEC	International Electrotechnical Commission
IS	Integrated Solutions
ISO	International Organization for Standardization
KER	Key Exploitable Results
NWI	New Work Item
RES	Renewable Energy Source
SFS	Finnish Standards Association
TC	Technical Committee
UNE	Asociación Española de Normalización y Certificación
UNI	Ente Nazionale Italiano di Unificazione
WG	Working Group

Executive Summary

The document is the first version of D11.7 “Roadmap on standardization, certification and regulatory activities – V1”, due at M12. It reports about the first activities carried out in the framework of Task 11.7 “Contribution to standardization, certification and regulatory activities”.

The main objective of T11.7 is to ensure that RESPONSE results are aligned with current standardization, certification and regulations by disseminating, communicating and promoting them to relevant parties (for example standards and standardization bodies). The objective will be achieved thanks to the definition of a roadmap encompassing the identification of relevant standardization bodies (Technical Committees, Working Groups; standards promoting organizations, etc.) and initiatives that can be proposed through them.

The main outcome of the present Deliverable has been the definition of a methodological approach that has been shared and agreed among the involved partners.



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Chapter 1

Introduction

Chapter 1 - Introduction

1.1 Scope and objectives

The scope of the activities of Task 11.7 (T11.7) “Contribution to standardization, certification and regulatory activities” is to **define a guideline for communicating, disseminating and promoting RESPONSE results to relevant standardization, certification and regulatory bodies**, aiming to ensure that the results are aligned with current relevant legislative scenario, as well as to consider possible gaps.

The first objective is the **definition of a methodology** that will be used as a reference to carry out the activities of the Task. The methodology has been sketched during the first months of the Project through dedicated conference calls among the Partners involved in this first phase (RINA-C, CERTH and SPI) and then the main outcome has been reported in the current Deliverable, D11.7 “Roadmap on standardization, certification and regulatory activities – V1”, due on M12.

An analysis has been started and will be further conducted during the next months in order to **map which are the expected contributions from the Project related (or that can be related) with standardization, certification and/or regulatory activities**. The analysis is based on a detailed investigation of the results of relevant linked activities (Task 1.2 and Task 9.1) and the continuous monitoring of the expected results during the entire duration of the Project. At the beginning, the information on Key Exploitable Results (KER) and Integrated Solutions (IS) – Innovative Elements (IE) reported on the Grant Agreement will be used as a reference, while during the next months the effective final implementation of the expected results will be monitored, through dedicated information tables that will be sent to the Partners to be periodically filled and reviewed. An example of such a table is reported in the Table 1; the details of the table and information requested can be modified if needed, in order to optimize collecting information.

A table has been prepared to support retrieving the information about the solutions (KERs) and relate such information with the standardization scenario. For this analysis, it will be needed to **identify the key words** for each KER . For this reason, the table requests information about Service Description, Competitive Advantage, Legal requirements and TRL level. Based on this information, **the technical normative related to each KER will be identified**.

Table 1: Example of information table for periodic monitoring of RESPONSE KERs

Project Result General description	Project Result # / Title	Exploitable Result #
------------------------------------	--------------------------	----------------------

	Project Result Short description/Service Description		
	Innovation content/ Competitive advantage /Benefits		
	Legal, normative or ethical requirements connected to the development		
	Technology Readiness Level (TRL)	Before RESPONSE	After RESPONSE

The results of the analysis that will be performed during Task 11.7 will serve, first, to the **identification, mapping and clustering of relevant normative documents**, and then to identify the **interested parties** (both inside and outside Project consortium) involving standardization, certification and regulatory bodies.

The objectives of T11.7 can be summarized in the following points:

- To raise awareness on the role of standardization and a deeper comprehension about it amongst the stakeholders of RESPONSE.
- To find suitable standards and technical bodies developing them that should be considered during the Project and for the definition of the roadmap for dissemination and communication activities related to standardization and certification.

1.2 Relation to other RESPONSE activities and WPs

The activities of T11.7 will take into account both the results from **T1.2** “Regulatory environment assessment for adopting smart city innovations in practice” and **T9.1** “Technical, Regulatory and Governance impact assessment”.

The T1.2, completed at M9 of the Project and Deliverable D1.2 “Assessment of Smart Cities Regulatory and Legal Environment”, was available and taken into account already for the preliminary results reported in the current D11.7 version. The outcomes of the T1.2 will be further analysed and used as input for the subsequent activities foreseen in the framework of T11.7, contributing to the development of the following D11.7 versions¹.

¹ T11.7 deliverables are currently under AMD approval. D11.7 will be updated at M30 (probably D11.8) and at M60 (probably D11.14).

The T9.1 will start at M37, and the main outcomes will be considered in the last version of D11.7 that is due at the end of the Project (M60). The developing results emerging from the activities of T11.7 (described in the current version and the subsequent version due at M30) will constitute the input for the activities of T9.1.

1.3 Structure of the deliverable

The current document represents the first version of D11.7 “Roadmap on standardization, certification and regulatory activities – V1”, (due at M12) and describes the first activities carried out in the framework of T11.7.

In **Chapter 2**, the methodological approach, as defined together with the Partners involved in T11.7, is described.

In **Chapter 3**, a description of normative documents, their typologies, finalities, typical geographical areas of intervention, related standardization bodies and benefits to research and innovation projects are briefly outlined.

In **Chapter 4**, a preliminary overview of regulation and policies framework,

In **Chapter 5** there is a preliminary investigation of Key Exploitable Results (KER) and Integrated Solutions (IS) – Innovative Elements (IE) as reported in the Grant Agreement.

Chapter 6 gives a brief description of activities that will be conducted during next months. A first regulatory environmental scenario has been depicted. Together with the consolidation of key concepts deriving from the definition of KER (or IE), it will serve as a basis for the structured normative documents search that will be conducted during next months.



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Chapter 2

Methodology

2. Methodology

The first months of the Task have been dedicated to the definition of a methodological approach to carry out the activity. The proposed methodology has been drafted by RINA-C and shared for review and optimization with other partners involved in T11.7 (CERTH and SPI). The below reported steps (1 to 4) will be developed during Task 11.7 activities, after the release of the present deliverable.

The overall approach can be summarized in the graph reported in the following Figure 1:



Figure 1 - Proposed Methodological Approach

The methodological approach develops through four steps that will not necessarily be conducted in strict subsequent time intervals, but continuous feedbacks will be present between them during the entire duration of the Task.

Step 1: “Setting the ground”

In the first step, a list of **key concepts and keywords** as a starting point for a **structured normative documents search** will be consolidated. The list is defined starting from an analysis of the preliminary results of RESPONSE Project (with reference to T1.2 and the information reported in the Grant Agreement) and, in its final form, it will be agreed with RESPONSE Partners.

The results of T1.2 are useful for a first picture of the legislative framework (EU Directives, Regulations, policies,...), the identification of regulatory topics and, together with the information provided in the Grant Agreement, for a first categorization of results that can be related to standardization, certification and regulatory activities (list of KER and Integrated Solutions/Innovative Elements).

It is obvious that not all the proposed KER and IS (or IE) can be directly related to the objectives of this Task. Moreover, there will be a continuous monitoring (see Table 1) during the entire duration of the Project, in order to confirm the adoption of KER (or IE) as defined at the beginning of activities or to verify if changes have been implemented that can influence the outcomes of T11.7.

Step 2: “Normative Documents Scenario Analysis”

First of all, a review on normative documents, their typologies, relations with legislative documents, typical development paths will be reported, aiming to provide partners some training and basic knowledge on standardization, raise awareness for the importance of standards and the participation in standardization technical bodies.

Starting from the results of Step 1, a thorough research of relevant normative documents will be activated. The research will cover mainly European standards developed by the European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC), considering the objectives and main geographical area of intervention of RESPONSE. Also, international standards, developed by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) and/or other non-EU standardization organizations, will be considered, if relevant for RESPONSE results.

Step 3: “Standards and standardization bodies clustering and mapping”

After and through the identification of relevant normative documents in the previous step, the relevant standardization and legislative bodies (technical committees TC, subcommittees SC and working groups WG) will be identified. The identified bodies will be mapped and grouped according to the key concepts and KER as defined in Step 1.

Step 4: “Cross-linking of identified normative documents and standardization bodies with Key Exploitable Results (KERs)”

Starting from the results of the previous step, the identified list of standards and standardization bodies will be matched with RESPONSE project results. This outcome will be the basis to depict, together with other RESPONSE Partners, a series of proposals of actions for each of the Key Exploitable Results (KERs) or identified topics regarding standardization and certification actual status and future perspectives (roadmap). An example can be represented by the following table:

Table 2: Exemplary Output - Identification of relevant Standardization bodies for RESPONSE and actions proposals

Identification of relevant Standardization bodies for RESPONSE and actions proposals			
KER/Topics/IE	Standardization Organism	Technical Committee/Working Group	Proposal of actions
1.2.5 Indoors air quality management system using smart probes 1.2.8 Novel high-performance ventilation system	CEN	CEN/TC 156 “Ventilation for buildings” WG21 “ Energy performance calculation of ventilation and cooling systems”	Follow. Relevant standards on the topic (for example EN 16798-13:2017 “Energy performance of buildings - Ventilation for buildings - Part 13: Calculation of cooling systems (Module M4-8) - Generation”)
-	-	-	-
-	-	-	-
-	-	-	-



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Chapter 3

Standards and Standardization

3. Standards and Standardization^{2,3,4}

In this Chapter (as indicated in Step 2 of the methodological approach defined in Figure 1), a brief overview on standards and standardization is reported.

A standard is a **normative document** that sets out requirements for a specific item, material, component, system or service, or describes in detail a particular method or procedure. A **normative document** is a “document that provides rules, guidelines or characteristics for activities or their results”. It is used as a general term encompassing several documents such as **standards, technical specifications, codes of practice and regulations**. The formal definition of a standard (a specific normative document) is a “document, established by **consensus** and approved by a **recognized body**, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context”.

According to [4], consensus is defined as a “*general agreement, characterized by the absence of sustained opposition to substantial issues by any important part of the concerned interests and by a process that involves seeking to take into account the views of all parties concerned and to reconcile any conflicting arguments*”.

In terms of geographical coverage, a publicly available standard document can be classified as:

Table 3: Publicly available standards – Geographical coverage

Publicly available standards – Geographical coverage	
International Standard	Standard that is adopted by an international standardizing/standards organization and made available to the public
Regional Standard	Standard that is adopted by a regional standardizing/standards organization and made available to the public
National Standard	Standard that is adopted by a national standards body and made available to the public
Provincial Standard	Standard that is adopted at the level of a territorial division of a country and made available to the public

²<https://www.cencenelec.eu/>

³<https://www.standards.org.au/standards-development/what-is-standard>

⁴ ISO/IEC GUIDE 2:2004(E/F/R)

The recognized body in the formal definition of standard is a “*standardizing body recognized at national, regional or international level, that has as a principal function, by virtue of its statutes, the preparation, approval or adoption of standards that are made available to the public*”. Standard bodies can have different geographical coverage:

Table 4: Bodies responsible for standards – Geographical coverage

Bodies responsible for standards – Geographical coverage		Examples
National Standards Body	Standards body recognized at the national level, that is eligible to be the national member of the corresponding international and regional standards organizations.	UNI (Ente Nazionale Italiano di Unificazione), UNE (Asociación Española de Normalización y Certificación), BSI (British Standards Institution), DIN (Deutsches Institut für Normung), AFNOR (Association française de normalisation), SFS (Finnish Standards Association), <i>et al</i>
Regional Standards Organization	Standards organization whose membership is open to the relevant national body from each country within one geographical, political or economic area only.	CEN (European Committee for Standardization), CENELEC (European Committee for Electrotechnical Standardization), ETSI (European Telecommunications Standards Institute) for Europe, that is the region of interest for RESPONSE Project
International Standards Organization	Standards organization whose membership is open to the relevant national body from every country.	ISO, IEC, ITU, IEEE, ASTM, ASME, <i>et al</i>

The main area of interest for the objectives of T11.7 are the **European Standards (ENs⁵)**. These normative documents have been ratified by one of the three European Standardization Organizations (see Table above), which are recognized as competent in the area of voluntary technical standardization as for the EU Regulation 1025/2012⁶. Although they deal with different fields of activity, CEN, CENELEC, and ETSI cooperate in a number of areas of common interest, such as the machinery sector or information and communication technologies

⁵ EN, from the German name Europäische Norm ("European Norm")

⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02012R1025-20151007>

(ICTs). They also share common policies on issues where there is mutual agreement. An EN (European Standard) *“carries with it the obligation to be implemented at national level by being given the status of a national standard and by withdrawal of any conflicting national standard”*⁷. Therefore, a European Standard (EN) automatically becomes a national standard in each of the 34 CEN-CENELEC member countries. Standards are voluntary, which means that there is no automatic legal obligation to apply them. However, laws and regulations may refer to standards and even make compliance with them compulsory.

European and International Standardization Organizations have signed formal agreements in order to avoid duplication of efforts and promote global relevance of standards.

CEN/ISO and CENELEC/IEC cooperation agreements⁸

CEN has an agreement for technical co-operation with the International Organization for Standardization (ISO). The **Vienna Agreement**, signed in 1991, was drawn up with the aim of preventing duplication of effort and reducing time when preparing standards. As a result, new standards projects are jointly planned between CEN and ISO. Wherever appropriate priority is given to ISO standard development, provided that international standards meet European legislative and market requirements and that non-European global players also implement these standards. The Vienna Agreement is completed by jointly developed Guidelines supporting the practical implementation of the Vienna Agreement.

CENELEC and IEC formalized the framework of their cooperation through the signature, in 1996, of an 'agreement on common planning of new work and parallel voting', known as the **Dresden Agreement**. The main purpose of the CENELEC-IEC cooperation is to avoid the duplication of work and to reduce time when preparing standards. As a result, new electrical standards projects are jointly planned between CENELEC and IEC, and, when possible, most are carried out at international level (IEC). This means that CENELEC will first offer a New Work Item (NWI) to its international counterpart. If accepted, CENELEC will cease working on the NWI. If IEC refuses, CENELEC will work on the standards content development, keeping IEC closely informed and giving IEC the opportunity to comment at the public enquiry stage. CENELEC and IEC vote in parallel (both organizations are voting at the same time) during the standardization process. If the outcome of the parallel voting is positive, CENELEC will ratify the European standard and the IEC will publish the international standard. CENELEC and IEC have reconfirmed their longstanding cooperation on October 17, 2016, by signing the **Frankfurt Agreement**.

⁷ CEN-CENELEC Internal Regulations Part 2 - Common Rules For Standardization Work July 2020

⁸ <https://www.cenelec.eu/european-standardization/international-cooperation/>

Standards can be classified according to their typology (Table 5), even if the classification it is not intended to be rigid; standards related to products can be also classified as testing method standards if the normative document describes the testing procedures to verify the compliance to the specified minimum requirements.

Table 5: Types of Standards and thier description

Types of Standards	
Basic Standard	Standard that has a wide-ranging coverage or contains general provisions for one field
Terminology Standard	Standard that is concerned with terms, usually accompanied by their definitions, and sometimes by explanatory notes, illustrations, examples, <i>et al.</i>
Testing Standard	Standard that is concerned with test methods, sometimes supplemented with other provisions related to testing, such as sampling, use of statistical methods, sequence of tests
Product Standard	Standard that specifies requirements to be fulfilled by a product, or a group of products, to establish its fitness for purpose
Process Standard	Standard that specifies requirements to be fulfilled by a process, to establish its fitness for purpose
Service Standard	Standard that specifies requirements to be fulfilled by a service, to establish its fitness for purpose
Interface Standard	Standard that specifies requirements concerned with the compatibility of products or systems at their points of interconnection
Standard on data to be provided	Standard that contains a list of characteristics for which values or other data are to be stated for specifying the product, process or service

The key benefits that standards introduce are:

- **Increase confidence:** manufacturers, service providers and consumers can feel confident that the products, services or components they develop and/or use are safe, reliable and fit-for-purpose;
- **Enhance innovation:** new standards are often developed to reflect the latest technologies and innovations. Scientific literature already exists that relate the development of new standards and emerging technologies;

- **Increase product competitiveness:** a product/service that is compliant with a standard has more appeal towards the customers;
- **Reduce barriers to international trade:** setting out a common framework of minimum requirements and performances gives assurance that a specific product or service can be fit-for-purpose independently of where it has been developed.

Summarizing, their implementation helps both consumers and businesses by reducing costs, improving safety and enhancing performances. Moreover, they facilitate the international trade ensuring that products, services and components are comparable in terms of compatibility and interoperability.

The interrelation between standards and the regulatory environment is particularly strong in the EU, where it can take place according to two main modalities. Standards can be directly cited by a Directive, as a reference document for evaluation of requirements. In this case, standards are called “Harmonized Standards” (hEN) and fulfilling them guarantees compliance with the essential requirements defined by the Directive. The most relevant Directives for RESPONSE Project are briefly summarized in the following Chapter (starting from the analysis of results of T1.2) and will be further developed in the following versions of the D11.7.

Another way to link standard document development with legislation in EU is “Mandates”, also called “standardization requests”, a mechanism by which the European Commission (EC) and the EFTA Secretariat request the European Standards Organizations (ESOs) to develop and adopt European standards in support of European policies and legislation. Together with already published hEN, Mandates will be used as a search field in order to identify other relevant standards (developed and in progress) for RESPONSE Project.



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Chapter 4

Preliminary overview of regulation and
policies framework

4. Preliminary overview of regulation and policies framework

In this Chapter (Step 1 of the methodology approach defined in Figure 1), starting from the results described in Deliverable D1.2, a preliminary review of the ISs (Table 6) and related regulatory topics are reported. Subsequently, relevant EU Directives and/or Rules are extracted, with the aim to define a first search source for the identification of standards that are relevant for the objectives of RESPONSE Project and that will be carried out during the next months.

Table 6: Transformation Axis (TA) and Integrated Solutions (IS) of RESPONSE Project

Transformation Axis TA	Integrated Solutions IS
TA#1 Positive Energy Building Systems	IS-1.1: Increased RES Generation on a Building Level IS-1.2: Energy-Efficient and Smart-Ready Building Construction/Retrofitting
TA#2 Local Energy Supply – Low Carbon & High Share of Renewables	IS-2.1: Decarbonization and Smartification of Electricity Grid Networks IS-2.2: Decarbonization and Smartification of District Heating/Cooling Networks
TA#3 Sustainable Energy Storage	IS-3.1: Novel Electricity Storage providing Flexibility to the energy system IS-3.2: Novel Heat Storage providing flexibility to the energy system
TA#4 Integrated and Interconnected City Ecosystem	IS-4.1: City Information Platform-enabled Innovations IS-4.2: E-mobility Grid Integration and City Planning
TA#5 Citizen-Centric, Resilient and Safe Cities	IS 5.1: Enhanced Citizen Participation, Empowerment, and Awareness-Rising IS-5.2: Enhanced City Resilience, Air Quality monitoring, Social Justice and Safety

The most important regulatory framework reference in EU, that has relevance with respect to the defined ISs, is the Clean Energy for all Europeans Package, often referred to as the Clean European Package (CEP)⁹.

CEP is a set of eight legislative acts on the **energy performance of buildings** (relevant for ISs 1.1 and 1.2), **renewable energy** (relevant for ISs 1.1, 1.2, 2.1 and 2.2), **energy efficiency** (relevant for ISs 1.1, 1.2, 2.1 and 2.2), **governance** and **electricity market design**. The European Commission published its initial proposal for the package in November 2016. The package was completed by the publication of its final texts in the Official Journal of the European Union, in June 2019, paving the way for a gradual transition away from fossil fuels and towards a carbon-neutral economy. The package consists of 8 new rules that are referred to main topics according to the following list:

- **Energy performance in buildings:** the legislative reference is the **Energy Performance of Buildings Directive**¹⁰ (Directive (EU) 2018/844 of the European Parliament and of the Council on May 30, 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency);
- **Renewable energy:** the legislative reference is the **Renewable Energy Directive (EU) 2018/2001**¹¹ of the European Parliament and of the Council on December 11, 2018 on the promotion of the use of energy from renewable sources. It contains the binding target of at least 30% of renewable sources in the energy mix to be reached by 2030;
- **Energy efficiency:** the legislative reference is the **Directive (EU) 2018/2002**¹² of the European Parliament and of the Council on December 11, 2018 amending Directive 2012/27/EU on energy efficiency. Through this Directive the EU has set binding targets of increasing energy efficiency of at least 32.5% by 2030;
- **Governance regulation:** the legislative reference is the **Regulation (EU) 2018/1999**¹³ of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council. Each EU country is required to establish integrated 10-year national energy and climate

⁹ https://ec.europa.eu/energy/topics/energy-strategy/clean-energy-all-europeans_en

¹⁰ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L.2018.156.01.0075.01.ENG>

¹¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02018L2001-20181221>

¹² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L.2018.328.01.0210.01.ENG>

¹³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L.2018.328.01.0001.01.ENG>

plans (NECPs) for 2021-30 where EU countries will demonstrate how to achieve their respective targets on all five dimensions of the clean energy package;

- **Electricity market design:** The electricity market design has four legislative references (two new laws on electricity, one on risk preparedness and one outlining a stronger role for the Agency for the Cooperation of Energy Regulators (ACER)):
 - **Regulation (EU) 2019/943**¹⁴ of the European Parliament and of the Council on June 5, 2019 on the internal market for electricity;
 - **Directive (EU) 2019/944**¹⁵ of the European Parliament and of the Council on June 5, 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU;
 - **Regulation (EU) 2019/941**¹⁶ of the European Parliament and of the Council on June 5, 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC;
 - **Regulation (EU) 2019/942**¹⁷ of the European Parliament and of the Council on June 5, 2019 establishing a European Union Agency for the Cooperation of Energy Regulators.

¹⁴ <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32019R0943>

¹⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0944>

¹⁶ https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.158.01.0001.01.ENG

¹⁷ <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32019R0942>



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Chapter 5

**Key Exploitable Results – Innovative
Elements (IE)**

5. Key Exploitable Results – Innovative Elements (IE)

Together with the regulatory Framework, another source of information that will be used to define topics for the identification of relevant standards, is represented by the lists of **Key Exploitable Results (KER)** and **Innovative Elements (IE)** that will be implemented to demonstrate ten Integrated Solutions (IS) of RESPONSE Project.

According to the results of T12.3 “Technical and Innovation Management” and in particular from D12.4, five main KER have been defined (Table 7).

Table 7: RESPONSE KER

# KER	Name of KER	Short description
KER #1	Novel solutions transforming the building stock into energy efficient and resilient	All the innovative hardware which will be demonstrated during the project period for the built environment. This KER is divided into many subKERS which are the technologies and services demonstrated in the LH cities.
KER #2	Novel solutions (city level) for electro-mobility integration into the grid and appropriate city planning measures facilitating grid flexibility	All the innovative elements which will be demonstrated during the project period for the electro mobility integration.
KER #3	Monitoring of performance and modelling for future decision making	The required information for the functions and services in order to monitor performance, model for replication activities and future decision making.
KER #4	Services for system and local flexibility	The services which enhance system - local flexibility and system’s stability.
KER #5	Business Models, Socio-economical impacts and outreach	Design and test business models that are viable and financeable and develop robust investment concepts and also to foster the replication of the RESPONSE solutions, and increase performance of joint activities by engaging multi-disciplinary stakeholders.

The list of Innovative Elements (IE) as reported in the Grant Agreement and elaborated in D1.2 has been analysed and limited to the IEs related to the first three Transformation Axis, because they seem to be more directly related to the intervention areas targeted by the CEP (Chapter 5). The list, as defined in Deliverable D1.2, is reported in the following Table:

Table 8: IE potentially relevant for standardization and certification activities, grouped per LH city

Dijon	Turku
1.1.1 Click&Go façade system coupled with coloured vertical PVs 1.1.2 Pergola with bifacial PVs with albedo boost 1.1.3 BIPV Balustrades	1.1.5 DC-coupled smart bifacial PV system with optimized racking system for maximum bifacial yield

<p>1.1.4 Urban canopies protruding from roofs</p>	
<p>1.2.1 Ready2Services (R2S) Digital architecture 1.2.2 Building Operating System (BOS) 1.2.3 Artificial Intelligence (AI) enabled dynamic management of energy (ECO-TOUCH tool) 1.2.4 Predictive home thermostats 1.2.5 Indoors air quality management system using smart probes 1.2.6 Intelligent energy management system (PANGA tool)</p>	<p>1.2.7 Nano coating 4-glazing panels windows 1.2.8 Novel high-performance ventilation system 1.2.9 Novel human thermal sensation control 1.2.10 Self-sufficient IoT thermostats 1.2.11 Upcycling of the nearby city district cooling energy flows 1.2.12 Conventional Retrofitting (incl. insulation, replacement of radiators, repairs, LED lighting, polyurethane sealing, sensors and tracking systems, etc.) (own funding)</p>
<p>2.1.1 Collective self-consumption 2.1.2 “Super EMS” 2.1.3 Semi-transparent PV canopies (own funding) 2.1.4 Parking PV shades (own funding) 2.1.5 District smart public lighting (own funding)</p>	<p>2.1.6 LVDC microgrid 2.1.7 DC coupled heat pump 2.1.8 Cloud-based Smart Energy Management System 2.1.9 Building level RES generation 2.1.10 DC coupled Battery Storage System for demand flexibility 2.1.11 Light EV charging hub (V2G) 2.1.12 Energy meters (own funding)</p>
<p>2.2.1 Heat exchanger substations 2.2.2 Biomethane injection produced from sewage sludge 2.2.3 Green Certificates Contracts</p>	<p>2.2.4 Upcycling of the nearby city district cooling energy flows with high COP (>5) heat pumps 2.2.5 District heating flexibility optimizing network control and management 2.2.6 Two-way consumer 2.2.7 District heating network control and management with dynamic district heating tariffs 2.2.8 Smart district heating substation for end-user heat demand flexibility 2.2.9 PCM-heat storage for district heating flexibility</p>
<p>3.1.1 Zn-Air battery 3.1.2 2nd life Battery Storage System (BESS) 3.1.3 V2G</p>	<p>3.1.3 V2G 3.1.4 DC-coupled Battery Storage System (BESS)</p>
<p>3.2.1 PCM tanks 3.2.2 Industrial hot water buffer tanks 3.2.3 Collective hot water tank with dedicated BEMS</p>	<p>3.2.4 Novel PCM Heat storage for DHW 3.2.5 District heating PCM heat storage-as-a-service 3.2.6 Low enthalpy geothermal boreholes</p>



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Chapter 6

Next Steps

6. Next Steps

As shown in the definition of the methodological approach (Chapter 2), the first months have been dedicated to the analysis of main outcomes from linked activities (T1.2) and a general review on the standardization scenario; next steps will be focused on **retrieving the RESPONSE project KER list and develop for each of them a tailored normative framework and standardization scenario documents.**

A **questionnaire** will be sent to RESPONSE Partners in order to consolidate a list of key concepts and topics relevant for the retrieving of normative documents (for example standards or certification schemes).

The normative documents research will be conducted with the access to main European and International standard documents databases (CEN, CENELEC, ISO, IEC). The documents will be clustered according to the defined cluster topics and main standardization/certification bodies will be identified.

The outcomes of the analysis will be reported in the next version of D11.7, D11.8¹⁸ due at M30 of the Project.

This will allow to draft a roadmap in terms of a series of proposals for standardization and regulation initiatives that RESPONSE Partners could activate during and after the end of the Project to facilitate the replication of KER even out of the RESPONSE specific application areas. In fact, Article 28 of the Grant Agreement (“Exploitation of Results”) and in particular comma 28.1 “Obligation to exploit the results” inform that each beneficiary must - **up to four years after the period set out in Article 3** - take measures, aiming to ensure ‘exploitation’ of its results (either directly or indirectly, in particular through transfer or licensing; see Article 30) by:

- using them in further research activities (outside the action);
- developing, creating or marketing a product or process;
- creating and providing a service; or
- **using them in standardisation activities.**

This roadmap (together with the description of the overall activities conducted in Task 11.7) will be the main outcome of the final Deliverable version, D11.14¹⁹ due at M60.

¹⁸ Still in AMD approval phase

¹⁹ Still in AMD approval phase



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities

Bibliography

Bibliography

<https://www.cencenelec.eu/>

<https://www.standards.org.au/>

ISO/IEC GUIDE 2:2004 - Standardization and related activities — General vocabulary

CEN-CENELEC Internal Regulations Part 2 - Common Rules for Standardization Work July 2020

<https://ec.europa.eu/>

<https://eur-lex.europa.eu/>



RESPONSE

Integrated Solutions for Positive Energy
and Resilient Cities



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement n° 957751. The document represents the view of the author only and is his/her sole responsibility: it cannot be considered to reflect the views of the European Commission and/or the European Climate, Infrastructure and Environment Executive Agency (CINEA). The European Commission and the Agency do not accept responsibility for the use that may be made of the information it contains.