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Overview of activities performed in the heating and cooling initiative of the smart specialisation platform for energy

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Foreword

This JRC Technical report represents deliverable (D10) of the Administrative Arrangement between the European Commission's Directorate-General for Energy (DG ENER) and the Joint Research Centre (JRC) with reference ENER/C2/2016-519/SI2.760213. It provides an overview of the activities performed in this project.

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Abstract

This report presents the activities performed in the heating and cooling initiative of the Smart Specialisation Platform for Energy. The objective of the initiative was to support regions to improve their heating and cooling strategies and to enhance their chances to access EU funds for their projects. Three workshops brought together regional representatives and experts in the field of heating and cooling. At the workshops information about available heating and cooling technologies, best-practise examples of implementation of heating and cooling strategies and financial options were discussed. Four public reports were prepared: (1) workshop summaries; (2) available EU funding sources; (3) case studies on EU funding strategies for four heating and cooling projects from this initiative, and (4) this report. The project lasted from September 2017 until February 2019.

1 Introduction

It is crucial to address heating and cooling (H&C) in order to decarbonise the European energy sector, since it accounts for half of the EU's energy consumption. Yet, 75% of the fuel used comes from fossil fuels [1]. The sector encompasses a large variety of technologies and services, involving buildings and industries among others. A holistic approach is needed to identify synergies with other sectors, e.g. electricity or transport. Nevertheless, due to its local nature, regions and local authorities play a central role in the implementation of energy policies relating to the heating and cooling sector.

There are multiple funding sources available to decarbonise the heating and cooling sector. The European Structural Investment funds (ESI funds) are currently the largest funding source. It allocated about EUR 40 billion in the low-carbon economy theme for the period 2014-2020. Other funding sources, such as competitive EU funds or innovative financial mechanisms, can complement the ESI funds. However, regions have had difficulties in absorbing ESI funds. In some cases, it is due to lack of in-house expertise about access and management funds, and in others lack of regional energy strategies for the heating and cooling sector.

The existence of a regional Smart Specialisation Strategy is a pre-condition for using ESI funds for research and innovation in the programming period 2014-2020. Therefore a Smart Specialisation Strategies Platform for Energy (S3PE) has been created which aims at assisting regions in defining long term innovation strategies and to assist countries in the uptake of Cohesion Policy funding opportunities for energy [2].

In this context, the Heating and Cooling initiative of the S3PE brought together eight European regions from Spain, Greece, Poland, Romania, Slovenia, Italy, and Bulgaria [3]. It aimed to create synergies with existing regional partnerships under the framework of the S3PE, share knowledge, and exchange experiences between regions. The initiative had particular focus on improving regional heating and cooling strategies and enhancing the uptake of EU funds.

This report provides a summary of the activities, reports produced, and the most important conclusions reached in the S3PE heating and cooling initiative (S3PE H&C). It is organised as follows: section 2 presents the webpage of the S3PE heating and cooling initiative, section 3 presents the regions that took part in the initiative, section 4 summarizes the workshops organised, while section 5 deals with the communication activities carried out. Conclusions and recommendation are presented in Chapter 6.

2 Webpage of S3PE heating and cooling initiative

A webpage was set up for S3PE H&C[1] on the Smart Specialisation Platform's website. It contains general information about S3PE H&C, as well as outputs produced for the public domain. Examples of outputs published are the workshop summary, studies on suitable EU funding instruments and how to mix them for heating and cooling and energy efficiency projects, as well as examples successful implementation of projects in the H&C sector[2].

[1] http://s3platform.jrc.ec.europa.eu/heating-and-cooling

[2] http://s3platform.jrc.ec.europa.eu/-/workshop-on-regional-heating-and-cooling-priorities-and-financing-in-the-framework-of-the-smart-specialisation-platform-s3p-e-h-c-?inheritRedirect=true , presentations 9, 11, 12, 13, 14, 24, and 26

3 Regions in the heating and cooling initiative

About 40 EU regions were invited to participate in the Heating and Cooling initiative of the Smart Specialisation Strategy Platform for Energy (S3PE H&C). They were selected based on economic development, current energy system mix, and interest in improving their H&C sector. Indicators such as the GDP/capita or the CO_2 emissions from heat production were used to rank regions. The eight EU territorial entities (hereinafter referred to as to regions) accepting the invitation are shown in Table 1 and Figure 1.

Table 1 List of regions participating in the H&C initiative

Region/City/Country	Country
Nord-Est	Romania
Puglia	Italy
Western Macedonia	Greece
Sofia municipality	Bulgaria
Bulgaria	Bulgaria
Dél-Alföld	Hungary
Andalucía	Spain
Lubelskie	Poland
Slovenia	Slovenia
Castilla y León	Spain

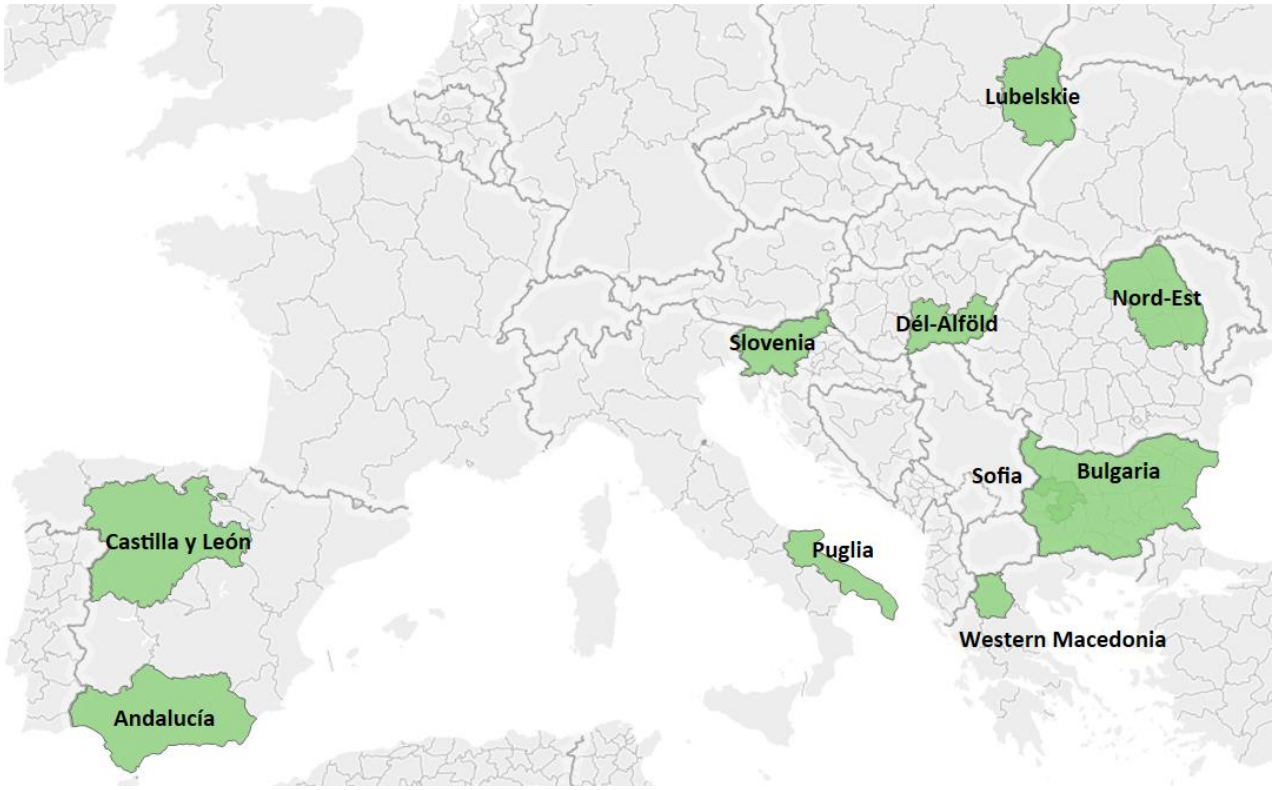

Figure 1. Map of regions participating in H&C initiative.

4 Collaborations with regions

The main exchanges with regions participating in S3PE H&C are listed in chronological order below.

4.1 Questionnaire

The participating regions received a questionnaire with queries about for example their regional energy targets, existing heating and cooling sector composition, building stock, regional research and innovation network. They were also asked about ongoing or planned projects in the heating and cooling sector and their sources of funding. Finally, the regions were asked to indicate which their main issues were and topics they want to learn more about. A helpdesk activity was offered to support the filling in of questionnaires.

All the above aspects were taken into account when designing the workshops present below.

4.2 Workshops on regional heating and cooling strategies and funding opportunities

The first two workshops were held in Brussels between 30 May and 1 June 2018. They focused on: (1) regional heating and cooling priorities from technology and energy planning perspectives, and (2) sustainable buildings, and heating and cooling financing.

In addition to the regional representatives, 15 experts were invited to present about H&C technologies, strategies, and on funding sources. The aim was to update regions on the current state-of-play and the expected future of the heating and cooling (H&C) sector across EU regions. There were also presentations by the participating regions about successful regional heating and cooling projects and strategies.

The second workshop covered the existing funding opportunities to either implement energy initiatives in their territories, or to stimulate the local economy by reinforcing a competitive edge in regions through new R&I projects.

Significant amount of time was allocated to discussions, in order to allow both regions and experts to share knowledge and find solutions to common issues.

Some of the conclusions from the workshops are summarized in section 3.2.1-3.2.6. A summary report [4] (Figure 2), the agenda and presentations from the workshop are available on the webpage of S3PE H&C [5].

4.2.1 Challenges and barriers

A challenge regions experience is that they should create heating and cooling strategies. They should be aligned with national strategies, however, these do not always match the local situation, available potentials and capacities.

Some challenges identified, which have an impact on the wider distribution of efficient H&C technologies or an impact on the strategies, were identified:

- diverging trends of decentralisation/autonomy versus centralisation (e.g. district heating), which compete and are difficult to consolidate in a local strategy;
- many technology options are available, which makes it demanding for regions to prioritise among them, since there might not be sufficient knowledge about them at the administrative level;
- H&C systems often imply long-term lock-in due to large infrastructure investments. This can make it difficult to attract private investors;

Figure 2. Workshop summary report.

4.2.2 Policy directions

The recast of the Renewable Energy Directive (RED) requires 1% yearly increase of renewable energy sources (RES) in the heating and cooling supply from 2020 to 2030. This will be achieved through e.g., modernising district heating systems and by increased use of heat pumps. It is imperative for regions that energy efficiency and RES are addressed jointly to take advantage of their potential synergies, for instance heat pumps are often not suitable in poorly insulated houses.

4.2.3 Data availability

It is difficult to collect data on energy efficiency projects. This is due to that investors are reluctant to share them since they are perceived as commercially sensitive (e.g. costs and savings). More data availability would inspire further investments in energy efficiency and H&C improvements.

4.2.4 Examples of local H&C experiences

The workshop allowed regions to share experiences. A few of the key lessons learnt at regional level are presented below:

- Urban development was initiated by two DHC system developments in Barcelona, and then the DHC network was gradually expanded, see Figure 3. This is an example of successful long-term policy commitment and cooperation between different administrations (local and regional).
- Complex refurbishment projects of large multifamily buildings were demonstrated in Dunaujvaros (Hungary) and in Sofia (Bulgaria), see Figure 4. They showcase that deep renovation and the integration of energy efficiency improvements and RES were possible and well accepted by the residents. It was possible due to close work with the local stakeholders and by involving them in all phases of the renovation project.
- Small and medium sized cities, such as Querfurt (Germany), Graz (Austria), and Gram (Denmark) provide large parts of the DH supply from renewable sources (geothermal, solar, heat pump, etc.). New comprehensive DHC systems featuring a combination of technological solutions proved to be more sustainable and reliable.

4.2.5 Funding schemes

A number of loan and grant programmes were reviewed during the workshop, e.g. ELENA, Jaspers, EIB and EBRD funds. These have improved in terms of accessibility and reduced administrative burden over, but could still be further simplified and need adaptations in order to respond to market needs.

Technical assistance is available and useful in many stages of H&C projects, including feasibility studies, grant preparation, communication activities, capacity building etc. Technical assistance sources can be combined successfully.

Figure 3. District heating network in Barcelona.

Figure 4. Examples of renovations in Sofia, Bulgaria.

4.2.6 Perceived risk

Mitigation of perceived risk is important when talking about funding for energy efficiency and RES investments in H&C. A lot has been tried to mitigate the high risk perceived by owners and financiers, and new ideas are being developed, e.g.:

- a "Technical Guideline" was prepared within the ACE project[3] providing a description of cost-effective deep-energy renovation measure bundles for different climate zones;
- the EFSI of EIB has funds to provide guarantees to cover a first loss protection, in order to establish financing to higher-risk projects than the market would normally take up;
- de-risking through transposing the risk from the building owner to a dedicated entity, such as the ESCO or one-stop-shops.

4.3 Workshop on barriers to receive EU funding for heating and cooling projects

A workshop on barriers experienced by regions to receive EU funding for heating and cooling projects was held on 10 October 2018 at the European Week of Regions and Cities. About 80 people attended a 90-minute session.

Some of the barriers identified were:

- Lack of effective coordination between different levels of authorities, i.e. from EU to regional. The objectives across those levels should be better aligned;
- Funding programs are sometimes too prescriptive with regard to the type of projects that can be financed. It can be difficult to match a particular project to a call;
- Problems to mobilise private funding for large capital intensive projects, e.g. district heating networks. This can be due to a lack of long term certainty.
- Lack of expert skills at local authorities and enterprises at regional level, which hinder identification of best technology solutions, and efficient and correct installations and maintenance.

[3] https://www.ace-projekt.org/

4.4 Report on available EU funding sources for the heating and cooling sector

This report provides an overview of relevant EU funding sources for projects aimed at improving energy efficiency and sustainable heating and cooling technologies. [6]

The report covers EU grants like ESI funds (e.g. Cohesion Fund), Horizon 2020 and Horizon Europe, INTERREG, NER 300 etc. It also incorporates innovative financial instruments like PF4EE (Private Finance for Energy Efficiency), EFSI, Smart Finance for Smart Buildings etc. It also describes where technical assistance can be found.

It also discusses how these EU funding sources can be combined, e.g. different instruments for the various phases of project development (e.g. research, pilot, demonstration), to cover activities with different instruments.

Figure 5. Report on EU funding sources.

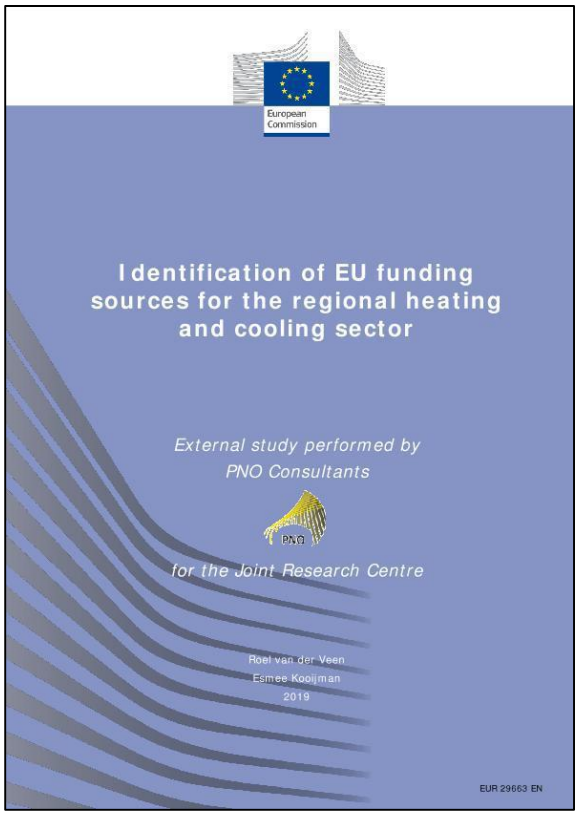

Figure 6. Workshop on barriers at EWRC.

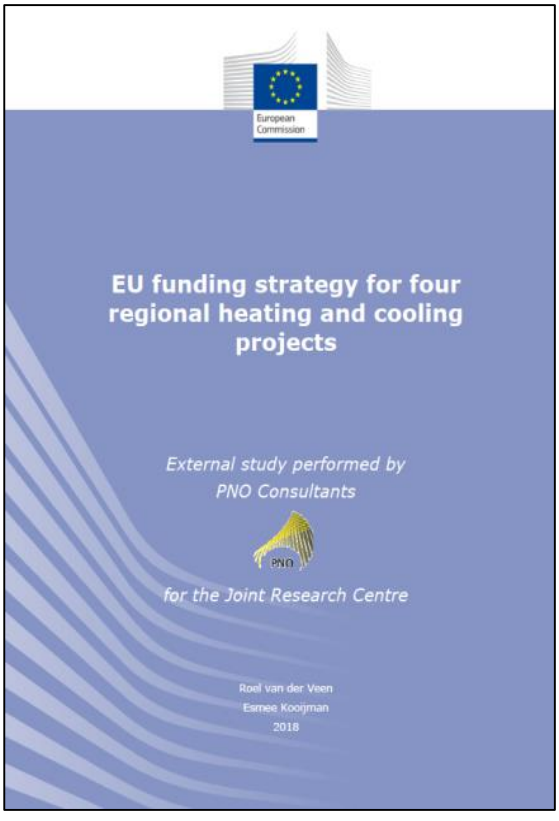

Figure 7. Report on funding strategies for four projects.

4.5 Report on Funding strategy for four regional heating and cooling projects

All regions participating in S3PE H&C were invited to submit a project proposal, which could receive help from a consultant to identify the best mix of EU funding sources for their projects. [7] Four diverse project proposals were selected, in order to highlight how the mix of EU funds changes with project types.

The heating and cooling projects included in this study were:

- Development of smart thermal grids for thermal energy in ports (Andalucía).
- Installation of (co-firing) biomass boilers in the existing district heating network and autonomous high-efficient biomass boilers in households (Western Macedonia).
- Development of an online platform for knowledge, reviews and matchmaking to promote renewable energy installations under different types of consumers (Castilla y León).
- Development an energy-efficient heat exchanger to recover heat from used water in buildings (North East Romania).

The study identified the most suitable EU funds, and an EU funding strategy for each project.

5 Other communications

In addition to the workshops and reports described in Chapter 3, information was shared on a webpage of the Smart Specialisation Platform [3]. Here all reports, as well as presentations from the workshops are publicly available.

The S3PE H&C also presented an overview of its activities at the European Network of Energy Authorities and Managing Authorities of Cohesion Policy 2014-2020 (EMA) meeting[4] in Brussels on 4 December 2018.

The progress of S3PE H&C was presented at the Thematic S3 Platform Days[5] in Bilbao on 28 November 2018.

Information about workshops and release of reports was shared on social media.

Figure 8 European Network of Energy & Managing Authorities (EMA).

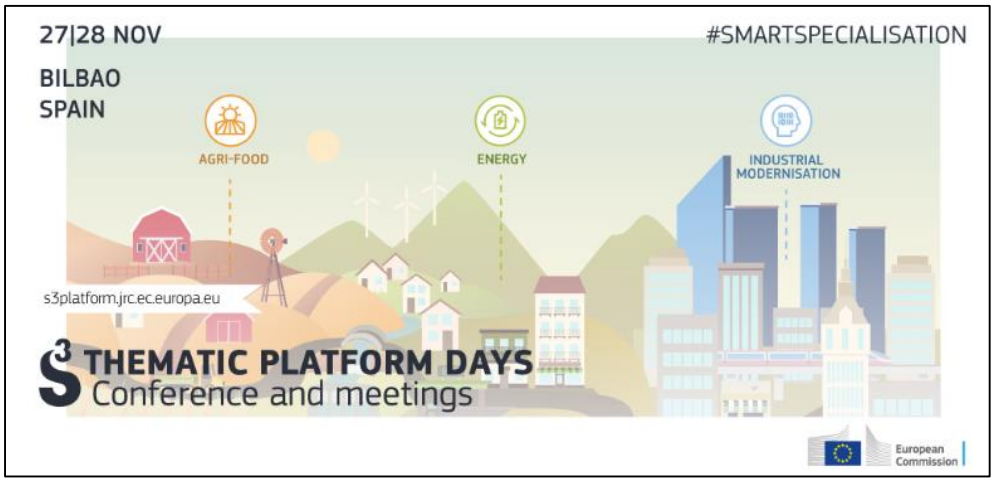

Figure 9 Thematic S3 Platform days in Bilbao.

[4] https://ec.europa.eu/info/events/energy-events/meeting-energy-and-managing-authorities-network-2018-dec-03-04_en

[5] http://s3platform.jrc.ec.europa.eu/-/s3-thematic-platforms-conference-and-meetings-bilbao-27-28-november-2018?inheritRedirect=true

6 Conclusions and recommendations

This report presented the activities performed in the heating and cooling initiative of the Smart Specialisation Platform for Energy (S3PE). The project lasted from September 2017 until February 2019. Its objective was to support regions to improve their heating and cooling strategies and to enhance the uptake of EU funds for sustainable heating and cooling.

Three workshops brought together regional representatives and experts in the field of heating and cooling. At the workshops information about available heating and cooling technologies, best-practise examples of implementation of heating and cooling strategies and, financial options was exchanged. The regions participating in the project were satisfied with the content of the workshops, and the support to find suitable EU funding sources for their projects. Several participating regions[6] expressed interest in a creating a S3PE Partnership on heating and cooling.

Main barriers

A few of the barriers to heating and cooling projects identified at the workshops were:

- The regional heating and cooling strategies have to be embedded in national strategies. It is important that the framing of the general policy directions is made with a strong knowledge and acknowledgement of the local situation, potentials and capacities;
- Many technology options are available, which makes it demanding for regions to prioritise among them;
- It is important that energy efficiency and renewable heating and cooling are addressed jointly in order to take advantage of synergies;
- A simplification of EU funding schemes has been pursued for some time. However, further simplification like reduced administrative burden and more flexibility with different projects types would be beneficial.

Some recommendations for EU and national level

- Strengthen partnerships between regions in order to create enabling strategies that benefit both national and regional levels;
- Promote dissemination of experiences, demonstration projects among regions;
- Further simplification of administrative procedures for applying to and administer EU funds;
- A single EC website where up-to-date information about *all* EU funds are presented is desirable;
- More help needed with fund mining (assistance, tools, training);

Messages for regions

Planning and strategies

Heating and cooling strategies should be developed at regional level and take into account in their overall energy system planning. Those strategies should take into account the particularities of a region (potential renewable resources, competencies available etc.). Technical and financial support should be designed to facilitate reaching those objectives.

The regional strategies may have different objectives or priorities than at national level. The strategies should preferably be developed in close consultation between local and national administrations.

[6] As well as non-participating regions

Technologies

There is no silver bullet. A portfolio of energy efficiency measures and technologies will be required to decarbonise the heating and cooling sector, e.g. more thermal insulation of buildings, heat pumps, renewable heat sources for district heating.

The future energy system has to be prepared to deal with flexibility and varying loads. This should also be kept in mind when identifying new portfolio of heating and cooling technology solutions.

Financing

The Lithuanian and Latvian experience in launching wide-scale and multi-sectorial energy efficiency programmes provides valuable insights into how to prepare successfully for an energy transition, using EU and private funding.

Four public reports have been prepared: (1) workshop summaries; (2) available EU funding sources; (3) case studies on EU funding strategies for four heating and cooling projects from this initiative, and (4) this report. The reports can be downloaded here http://s3platform.jrc.ec.europa.eu/s3p-energy

7 References

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[4] B. Boza-Kiss, J. Carlsson, J. P. Jimenez Navarro, and P. Bertoldi, *Workshop on regional heating and cooling priorities and financing in the framework of the Smart Specialisation Platform*. Publications Office of the European Union, 2018.

[5] "Presentations from workshop on regional heating and cooling priorities and financing in the framework of the Smart Specialisation Platform (S3P-E H&C)," 2018. [Online]. Available: http://s3platform.jrc.ec.europa.eu/events/-/asset_publisher/assets3peventscalendar/content/workshop-on-regional-heating-and-cooling-priorities-and-financing-in-the-framework-of-the-smart-specialisation-platform-s3p-e-h-c-.

[6] R. Van Der Veen and E. Kooijman, *Identification of EU funding sources for the regional heating and cooling sector External study performed by PNO Consultants for the Joint Research Centre*. Luxembourg: Publications Office of the European Union, 2019.

[7] R. Van Der Veen and E. Kooijman, "EU funding strategy for four regional heating and cooling projects," Luxembourg, 2019.

8 List of abbreviations and definitions

MS	Member States
EE	Energy Efficiency
DH	District Heating
ESI	European Structural Investment
H&C	Heating and Cooling
S3	Smart Specialisation Strategy
S3PE	Smart Specialisation Platform on Energy
GDP	Gross Domestic Product
R&I	Research & Innovation
RES	Renewable energy sources
DHC	District Heating and Cooling
TA	Technical Assistance
EIB	European Investment Bank
EBRD	European Bank for Reconstruction and Development

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