POLICY BRIEF SERIES

"Potential Obstacles to the Use of Cooperation Mechanisms for CSP in the Future"

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Summary

Renewable energy cooperation is expected to play an important role as a way to ensure an effective and affordable low-carbon energy transition in the EU. One of the renewable energy technologies which may benefit from the use of the cooperation mechanisms is concentrated solar power (CSP). MUSTEC has provided an integrated analytical framework to identify the drivers and barriers to the use of cooperation mechanisms for CSP deployment, empirically identify them and rank them according to the views of different types of stakeholders.

The most relevant drivers to the use of the cooperation mechanisms for CSP in the future – in descending order of importance- include: the dispatchability nature of CSP, new domestic jobs and industrial opportunities, complementarity with PV and policy ambition (renewable energy targets). Most relevant barriers, also in descending order of importance, are the higher costs of CSP compared to other renewables (on an LCOE basis), heterogeneous regulated energy prices and support schemes, resistance to lose sovereignty over energy market and existing interconnections capacities.

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MUSTEC, Market Uptake of Solar Thermal Electricity through Cooperation

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1. Introduction

Renewable energy cooperation is expected to play an important role as a way to ensure an effective and affordable low-carbon energy transition in the EU, taking advantage of trade within the internal market, safeguarding security of energy supply, coordinating climate adaptation measures and optimizing the cost-effectiveness of actions (Caldés et al 2018). It is for these reasons that Europe wants to promote a cooperative RES deployment where the resources are most abundant, where the overall system costs would be minimized (e.g., reduced need for backup, avoided grid investments, etc) or where overall social benefits would be maximized (e.g. increased security of supply, GHG savings, avoided local air pollution, employment effects, innovation effects, etc) (European Commission 2018).

In order to provide MS with more flexibility and achieve the EU RES target in a more cost-effective way, the Renewable Energy Directive (RED) set the legal framework for the use of cooperation mechanisms. While the Directive specified the general accounting rules of these mechanisms, their design and implementation was left to the cooperating MS (Caldés and Díaz-Vázquez 2018). As described in articles 6, 7, 8, 9 and 11 of the Directive 28/2009/EC, MS could, depending on their needs and priorities, choose from the four possible cooperation mechanisms (Caldés et al 2018, 2019).

However, despite several expected benefits of those mechanisms, barriers of heterogeneous nature have prevented a wide use of the cooperation mechanisms among MS, as demonstrated by their limited use since 2009 (see Caldés et al 2018 for further details).

One of the renewable energy technologies which may benefit from the use of the cooperation mechanisms is concentrated solar power (CSP). Compared to intermittent RETs, CSP has a main distinguishing feature: it can be equipped with low-cost thermal energy storage, which allows it to provide dispatchable renewable power. Generation can thus be shifted to times when the sun is not shining or to maximizing generation at peak demand times. It can then be a cost-effective, flexible option in different places, especially with increasing shares of variable renewable electricity (Mehos et al. 2015; IRENA and REN21 2018). However, there are several drivers and barriers to the deployment of this technology, which were analysed in task 4.2 of the MUSTEC project (see del Río and Kiefer 2018 for details).

Therefore, taking into account this background, and integrating the aforementioned two issues, a relevant research question is then: what are the most relevant drivers and barriers to the use of the cooperation mechanisms specifically for CSP?

Only a few contributions in the past have paid attention to the use of the cooperation mechanisms for CSP. For example and as part of the research conducted within the EU funded project BETTER (Bringing Europe and Third countries together through renewable energies), Lilliestam et al (2016) analyzed the reasons for the absence of renewable electricity (and in particular CSP) imports to the European Union using the so-called "cooperation mechanism with third countries" or Article 9 of the RED 28/2009/EC. For this purpose, the authors developed a multi-level heuristic framework that covered three sequential acceptance levels: political attractiveness (macro-level), the "business case" (micro-level) and civil society perspectives (public discourse level). Later on, under the auspices of the Smart Specialization platform, Caldés and Díaz-Vázquez (2018) have presented the value proposition of cross-border solar electricity trade in Europe. Next, a pre-feasibility assessment of a first of a kind (FOAK) CSP plant in Extremadura (Spain) was conducted in order to demonstrate the possibility to combine EU financing support mechanisms and the cooperation mechanisms of the RES Directive.

Report D4.4 of the MUSTEC project (del Río et al 2018), which is summarized in this document, provides an integrated analytical framework to identify the drivers and barriers to the use of cooperation mechanisms for CSP deployment, empirically identifies those drivers and barriers to the use of those mechanisms in the future with the help of a literature review and ranks those drivers and barriers according to the views of different types of stakeholders.

2. Analytical Framework and Method

Our analytical framework entails the integration of two analytical frameworks designed in previous tasks of work package 4 of the MUSTEC project (http://www.mustec.eu/) which are published in two deliverables of this project (D4.1 on the drivers and barriers to the use of the cooperation mechanisms, see Caldés et al 2018 and D4.3 on the drivers and barriers to the deployment of CSP in the EU, see del Río and Kiefer 2018). In both tasks, in-depth literature reviews of the specific drivers and barriers were carried out and different types of stakeholders (representatives of MS, investors in CSP, energy experts and other actors) were surveyed in order to rank the importance of different drivers and barriers.

Those drivers and barriers which came out as relevant in those tasks (on the drivers and barriers to the use of the cooperation mechanisms on the one hand, on the drivers and barriers to the deployment of CSP in the EU on the other), were considered. Then, we identified 19 drivers and barriers which could be potentially relevant factors influencing the use of the cooperation mechanisms for CSP deployment in the future (Box 1).

Box 1: Drivers and barriers which could be potentially relevant factors influencing the use of the cooperation mechanisms for CSP deployment in the EU in the future.

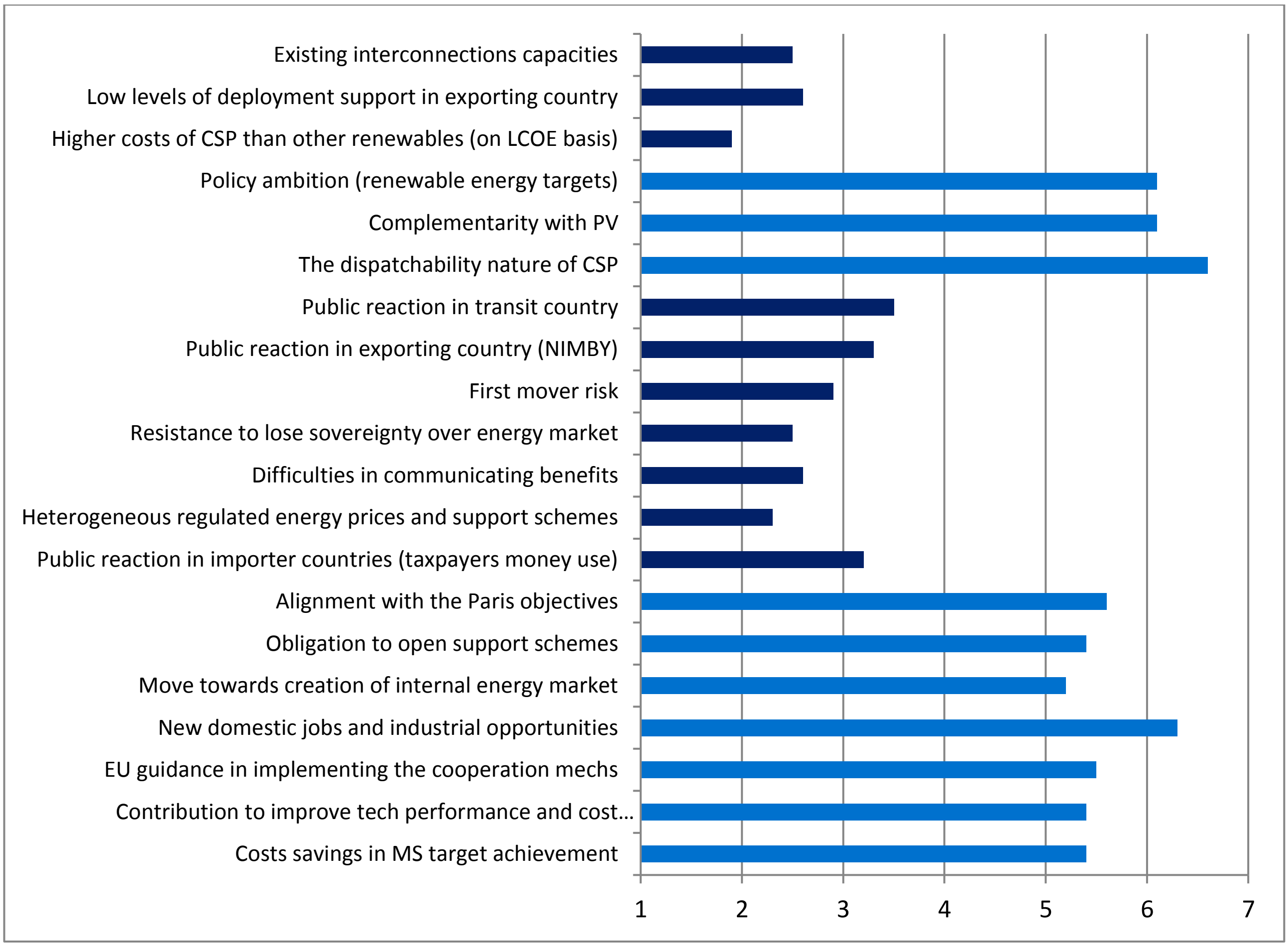
- Costs savings in MS target achievement
- Contribution to improve tech performance and cost reduction in CSP
- EU guidance in implementing the cooperation mechanisms
- New domestic jobs and industrial opportunities
- Move towards creation of internal energy market
- Obligation to open support schemes
- Alignment with the Paris objectives
- Public reaction in importer countries (taxpayers money use)
- Heterogeneous regulated energy prices and support schemes
- Difficulties in communicating benefits
- Resistance to lose sovereignty over energy market
- First mover risk
- Public reaction in exporting country (NIMBY)
- Public reaction in transit country
- The dispatchability nature of CSP
- Complementarity with PV
- Policy ambition (renewable energy targets)
- Higher costs of CSP than other renewables (on LCOE basis)
- Low levels of deployment support in exporting country.

Source: Own elaboration.

A survey was launched asking directly various types of stakeholders in different types of countries (a potential host and a potential off-taker) to fill a short on-line questionnaire. The two countries chosen were Spain as a potential exporting country (host) and Germany as a potential importing country (off-taker). 24 stakeholders completed the survey, which was launched between the months of October and December.

3. Results

Figure 1 shows the results of our survey on the drivers and barriers to the use of cooperation mechanisms for CSP in the EU in the future. Respondents to the questionnaire could answer on a 1 to 7 scale, where 1 indicates "very important barrier" and 7 indicates "very important driver". The red bars indicate that the respondents have (on average) regarded this factor as a driver, whereas the blue ones indicate that this is a driver.



Source: Own elaboration. Note: Scale of 1 to 7, where 1 indicates very important barrier and 7 indicates very important driver.

Figure 1: Most relevant drivers and barrier to the use of the cooperation mechanisms for CSP in the future.

Interestingly, neither drivers nor barriers dominate the picture. 10 factors appear as drivers (Costs savings in MS target achievement, Contribution to improve tech performance and cost reduction in CSP, EU guidance in implementing the cooperation mechanisms, new domestic jobs and industrial opportunities, move towards creation of internal energy market, obligation to open support schemes, alignment with the Paris objectives, the dispatchability nature of CSP, complementarity with PV, policy ambition (renewable energy targets)) and another 10 appear as barriers (Public acceptance issues in importer countries (taxpayers money use), heterogeneous regulated energy prices and support schemes, difficulties in communicating benefits, resistance to lose sovereignty over energy market, first mover risk, public reaction in exporting country (NIMBY), public reaction in transit country, higher costs of CSP than other renewables (on LCOE basis), low levels of deployment support in exporting country, existing interconnections capacities).

Note that an average of the scores provided per factor has been calculated, without the respondent being forced to respond to a list of factors which was predefined as being either "driver" or "barrier". Therefore, whether the factors are seen as either a driver or a barrier is contingent upon the (average) answers provided by the respondents. In fact, in some cases, a factor has been regarded as a driver by some respondents and as a barrier by others.

According to the responses to our questionnaire, the most relevant drivers to the use of the cooperation mechanisms for CSP in the future – in descending order of importance- include: the dispatchability nature of CSP, new domestic jobs and industrial opportunities, complementarity with PV and policy ambition (renewable energy targets). The least relevant drivers are contribution to improve tech performance and cost reduction in CSP, costs savings in MS target achievement, obligation to open support schemes and move towards creation of internal energy market (also in descending order of importance). Regarding barriers, also in descending order of importance, the higher costs of CSP compared to other renewables (on an LCOE basis), heterogeneous regulated energy prices and support schemes, resistance to lose sovereignty over energy market and existing interconnections capacities are regarded as the most relevant barriers.

Public reaction in the different countries (transit, exporting (NIMBY) and importer countries (taxpayers money use)) are regarded as the least relevant barriers.

Finally, the comparative results show that large differences cannot be observed between the three groups of respondents answering the questionnaire according to its language (Spanish, German and English), which is taken as a proxy of the type of countries (host or off-taker) that they represent.

Unfortunately, our results cannot be compared to previous contributions in the literature, given the lack of studies on the topic.

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