

# MUSTE

POLICY BRIEF SERIES

## “Geopolitics and energy security of CSP deployment for domestic use and intra-European trade in the time of COVID-19”

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Concentrated solar power (CSP) is one of the few renewable power technologies capable of generating dispatchable electricity on demand. As such, it could play a key role in the transition of the European power system, both to supply bulk renewable power and to balance fluctuating wind power and solar PV. Despite this, CSP’s presence in most European policy agendas is largely missing. To some extent, this is because CSP is still a small and relatively immature technology, and no European country except Spain has deployed CSP at a commercial scale.

This absence of CSP, with or without cooperation mechanisms, can lead to Europe missing an opportunity to improve its energy security. For this purpose, CSP has a vital role to play, as it is one of the few, if not the only, dispatchable renewable power technology that can be scaled up in Europe: CSP can thus be used to stabilise the system as the shares of fluctuating renewables increase. As these fluctuations are the biggest threat to a renewables-based power system, and especially as CSP would not add any further significant threats or vulnerabilities, CSP would increase the energy security of the European power system compared with any other climate-neutral configuration without CSP.





## MUSTEC, Market Uptake of Solar Thermal Electricity through Cooperation

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## 1. INTRODUCTION

The geopolitics of energy has historically been a driver of energy policy as countries have sought to control of resources and expand their energy industries. Consequentially, it has also been a source of conflict, within and between countries. Renewables are entirely different from fossil energy regarding their geopolitical implications, as a renewable power system does not rely on energy imports from potentially unreliable states. With the rise of renewables, the geopolitics of energy will change, and instead of resource-endowed countries, technological leaders will be the geopolitical centres of the future energy world – and currently, Europe is a technology leader, although others, especially China, have caught up quickly.

In a renewable future, Europe may produce the technology it needs domestically, reducing its dependence on other countries, and possibly creating substantial growth and jobs in new, future-proof green industries. Geopolitically, CSP may have an important role to play for Europe, both by enabling stable operation of the power system also with very high shares of renewables and by contributing to European integration through renewable power cooperation.

The present MUSTEC Policy Brief Issue summarises the main findings of the MUSTEC report by Escribano et al. (2020). It focuses on the hard politics of CSP and CSP cooperation: on geopolitics and on energy security, outlining both the (geo)political reasons for CSP and reasons for the absence of CSP on the European and national geopolitical agendas, and the effects of CSP deployment and CSP cooperation on European energy security. Finally, the implications of the findings regarding geopolitics and energy security on the possibility to include CSP in European COVID 19 recovery

plans and the Green Deal are discussed. The conclusion is that mainstreaming and fast-tracking of CSP cooperation mechanisms will benefit southern Member States and constitutes a consistent EU geopolitical response to the COVID-19 crisis.

## 2. CSP GEOPOLITICAL ROLE IN A FULL RES POWER SYSTEM

A summary of key insights from the MUSTEC work on geopolitics for CSP and cooperation mechanisms is presented, based on both a literature review, as well as by drawing further conclusions from elite interviews carried out within MUSTEC.

The literature review showed that CSP is almost absent from both the academic and the policy-oriented geopolitical energy landscape. Admittedly, several papers were devoted to Desertec and some of its criticalities, before and after its failure. Some others address institutional and political de-risking in Africa, which are not truly applicable to intra-EU cooperation (Papapostolou et al., 2016; Carafa et al., 2016; Labordena et al., 2017). The results of Escribano et al. (2020) highlight for the first time CSP's geopolitical externalities, like adding to the EU's "soft power", its storage capacities potentially contributing to articulate grid communities, and the associated geographic and technology portfolio diversification.

In the context of the geopolitical analysis of MUSTEC, 11 elite interviews were carried out (3 in Germany, 4 in Italy and Spain, with think tankers and policy planners from the Ministries of Foreign Affairs and Defence). The purpose of these interviews was not to obtain answers from a representative population sample, but rather to analyse the views of well-informed and influential individuals in the energy and geopolitical landscape of the three selected EU Member States.

The interviews clearly show that neither EU's nor the Member States' energy security strategies include any structured strategic thinking regarding the geopolitical externalities of grid communities or their potential to enhance the EU's renewable soft power –and even less so as regards cooperation mechanisms and CSP. The interviews did not focus exclusively on CSP and cooperation mechanisms, rather framing both issues within the broader context of energy geopolitics. In fact, most interviewees found the specific questions on the geopolitics of CSP deployment and cooperation mechanisms difficult to answer, due to their lack of knowledge about this technology and its potential geopolitical externalities. The interviews show that CSP is largely absent from Member State's energy policy and security agenda (Box 1).

*Box 1: Drivers and barriers of CSP and renewables cooperation. Elite interviews*

<p><b>Drivers</b></p> <ul style="list-style-type: none"><li>▪ Europeanisation is perceived as key to promote renewables cooperation.</li><li>▪ Interest in the issue, recognizing that fossil geopolitics overshadows renewables, especially CSP.</li></ul> <p><b>Barriers</b></p> <ul style="list-style-type: none"><li>▪ No strategic vision regarding the geopolitics of renewables cooperation.</li><li>▪ CSP does not even appear in energy security strategies.</li><li>▪ Focus on gas, pipelines and hub competition (even among Member States).</li><li>▪ Renewable mercantilism: reducing renewables imports and increasing exports, as well as promoting national industries/ companies.</li><li>▪ Renewables have entered the EU geopolitical landscape, but no strategic role assigned to CSP.</li><li>▪ General lack of knowledge of renewables cooperation mechanisms and CSP.</li></ul>
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Given the results shown in box 1 it is hardly surprising that the geopolitical implications of CSP have gone almost unnoticed.

### 3. ENERGY SECURITY

MUSTEC investigates how CSP can be deployed in Europe and assesses CSP deployment policy and strategies both for domestic use in the southern European countries that have suitable conditions for CSP deployment, and for use in other European countries through cooperation with southern European exporters.

MUSTEC evaluates the energy security impacts of new CSP projects in a fully or almost fully renewable electricity future, broadly following the scenarios of Schöniger et al. (2020). In these scenarios, CSP provides 2-5% of the electricity, mainly or exclusively as balancing power to stabilize the system and compensate for fluctuations of wind power and solar PV. In these scenarios, some 25-80 GW of CSP is installed in Europe; about half of this capacity is located in Spain and used both domestically and exported to other countries using cooperation mechanisms.

The investigated CSP projects are, as in the integrated system scenarios of MUSTEC, large-storage (11 hours) stations of 200 MW (Schöniger and Resch 2019, Schöniger et al. 2020). Whereas this will not allow each station to provide continuous baseload power – which is not needed in a renewables-based system (Schill 2014) – such a storage size will allow a national fleet of CSP stations to provide fully dispatchable power to balance fluctuations of PV and wind power generation and to help cover night-time electricity demand even if gas power is completely phased out (Pfenninger et al. 2014a, Schöniger and Resch 2019).

As in most, or all, energy system scenarios, the modelled futures in MUSTEC are reliable in the sense that they have sufficient generation

capacity available to satisfy demand in each hour of the year. Hence, these systems are secure under all expected and knowable conditions. Detailed numerical analysis of the energy security of such scenarios has already been undertaken in the model runs of MUSTEC (Schöniger and Resch 2019, Schöniger et al. 2020). Instead, the emphasis here is on a qualitative assessment of energy security in future scenarios where Europe's power systems will be fully or almost fully renewable, focusing on how the energy security is affected by the addition of CSP as an additional dispatchable renewable technology, if expected or unknowable threats materialise.

The main energy security effect of CSP is positive, both when CSP is traded in cooperation between countries and when it is used domestically: CSP offers precisely the flexible generation renewable power systems need, by being able to generate solar electricity also after sundown or during adverse weather conditions (with the MUSTEC station configuration, up to 11 hours at full load). Even with the relatively small capacities installed – the MUSTEC scenarios foresee 20-80 GW, Europe-wide – CSP offers a vital function to the system – multi-hour balancing, such as night-time solar power, that no other technology can provide at the same low cost as CSP. Without CSP, the system would thus be less reliable, or equally reliable but more expensive.

The generation concentration risk is similar to wind power options but is larger than the concentration risk for typical PV systems; supply disruptions from this threat are however unlikely. The chokepoint risk exists for CSP, especially in cooperation cases, as they rely on long-distance transmission, at a similar level as for offshore wind, which however – other than CSP – *necessarily* depends on long-distance transmission lines. The geopolitical threat to CSP is extremely small and comparable to that

of wind power, and is likely to be even smaller than for solar PV.

Compared to alternative supply options, CSP is more secure and adding it increases the reliability of the power system. The intermittency risk is the by far dominant threat to reliability in renewable scenarios compared to other futures, and this is much less important for CSP than for other technologies. Indeed, the main rationale for adding CSP in Europe is to mitigate the threat of intermittency. Our main finding applies to CSP additions both for domestic use and for export: from an energy security perspective, adding CSP is a robust choice.

## 4. FOSTERING CSP AND COOPERATION MECHANISMS IN THE POST COVID ERA

COVID 19 is having a large impact on European economies: the projected losses in GDP exceed those of the Financial and Euro crises around 2010. In most European countries, the most severe recession ever recorded outside wartimes was observed in 2020. Energy consumption has collapsed accordingly, especially fossil fuels, but electricity markets have also been severely affected by reduced industrial and business consumption.

The European energy and climate policy debate initially revolved around whether the EU's and Member States' response to the crisis could help align economic recovery plans with energy transition and climate policy; or whether said response could result in stagnation and even reversal of the unfolding European low-carbon transition pathways towards carbon neutrality by 2050 (Escribano and Lázaro, 2020).

It is extremely unlikely that the economic policy response to COVID-19 will be climate-neutral, and history shows that in times of economic

crisis, it is not easy to direct investments to both solve the economic downturn while simultaneously greening the economy.

Nevertheless, the context in 2020, was different to that of 2008. Since 2015 the Paris Agreement is in place, providing a consistent (if insufficient) global climate governance framework. The cost of renewable technologies has decreased sharply in the last decade, with renewables being the cheapest way of producing electricity in most locations worldwide (IRENA, 2019).

The calls for a green and just recovery plan for COVID-19 are increasingly loud. In Europe, the adoption of the European Green Deal and the so-called European Climate Law, Member States' framework Climate Change and Energy Transition Laws (existing or upcoming), Integrated National Energy and Climate Change Plans (NECPs) and Long-Term Strategies (LTS) can provide the regulatory certainty the private sector needs for embracing the low carbon transition (Campiglio, 2014). In response to the Corona crisis, the Commission has presented, among other, a temporary recovery mechanism, Next Generation EU (NGEU), a stimulus package of 750 billion Euro to be raised and spent 2021-2024 (EC 2020).

Despite the overall positive environment for a green exit to COVID-19 in the EU, the post-corona recovery devil will be in the 'colour' of the stimulus packages and in the conditionality details. Given the current context, we think it is likely that the political "2020 green recovery battle", at least in Europe, will be fought not on the margins of stimulus packages, as was the case in the aftermath of the 2008 financial crisis, greenness could be at the core of recovery programs. In fact, both Europe's multiannual financial framework (MFF 2021-2027) and NGEU will allocate 30% of their joint amount (circa €1.8 trillion) to climate change. Additionally, MS' recovery and resilience plan will devote 37% of their expenditure to climate

change and will abide by the Do No Significant Harm principle (DNSH).

Currently, CSP and renewable electricity cooperation are not on the political agenda in Europe: only Spain considers a CSP expansion, but has no policy for this beyond a 5 GW target for 2030 as enshrined in its INECP, and no country plans to import substantial amounts of renewables in the next 10 years (Lilliestam et al. 2019, Lilliestam et al. 2020). Evidently, both CSP and renewables cooperation face political barriers. We believe that these barriers are surmountable and that recovery policies in the current context may help overcome them.

Sometimes, hard political reasons stand in the way of a development; this especially refers to geopolitics or security, such as energy security: if a policy is perceived as a threat to national security, it has a low probability of being implemented. As this analysis shows, this is not the case for CSP: it does not introduce exposure to any new security threats, but it helps solve the largest problem in a renewables-based electricity future by far, the balancing of fluctuating wind power and PV. This was also confirmed in the interviews and the general geopolitical work in MUSTEC, in which we found no significant geopolitical or geo-economic risks. This also includes a possible limited dependence on foreign technology, material knowhow or engineers.

Southern Member States such as Spain and Italy have been significantly affected by COVID-19, resulting in worsening economic and social conditions. The socioeconomic hardship can also lead to exacerbating populist and nationalist movements and political parties. Anti-EU feelings and a North-South division can re-emerge and intensify, re-opening the wounds of the 2008 financial crisis. This is why, from an internal EU geopolitical and geo-economic perspective, promoting renewable cooperation mechanisms and exchanges becomes more

important as part of the Green Deal acceleration that is being proposed. Such acceleration is especially relevant for CSP cooperation mechanisms, which will allow Member States severely affected by the COVID-19 pandemics like Spain to benefit from green recovery plans.

## 5. CONCLUSIONS

In sum, it is shown that although CSP does not play a big role in European energy and geopolitics at the moment, it can play a key role in securing the European power supply in a renewables-based future, thereby contributing to green growth and job-creation in southern Europe and across the continent. While no significant intra-EU geopolitical shifts are at stake regarding CSP cooperation mechanisms, it concludes that the geopolitical barriers that prevent the integration of CSP and cooperation mechanisms into European electricity markets and regional energy integration can no longer be justified under the COVID-19 crisis.

If geo-economic considerations based on energy and economic nationalism and mercantilist attitudes are to lose weight in favour of more cooperative and cohesive approaches, it is concluded that EU's CSP cooperation mechanisms are fully consistent with EU's energy transition and energy integration policy pathways. Furthermore, they offer significant positive intra-EU geopolitical externalities by providing a counter-narrative to national-populist and anti-European discourses exploiting EU's North-South cleavages. This report argues in favour of mainstreaming and fast-tracking CSP cooperation mechanisms as an internally consistent geopolitical response to the COVID-19 crisis by the EU.

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