



**Market Uptake of Solar Thermal
Electricity through Cooperation**

MUSTEC Outcomes & Results

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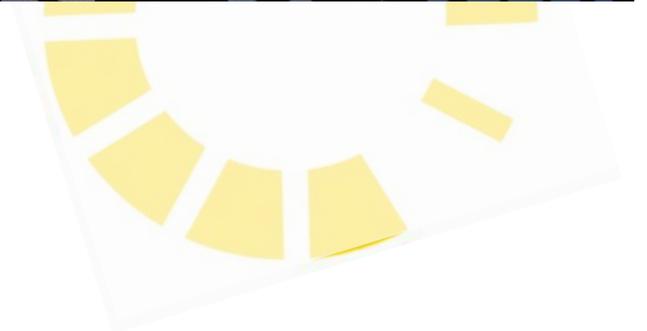


WHY? Background / Motivation



Trading electricity generated by CSP from South to Central/Northern Europe potential benefits:

- ❖ **Dispatchable power** to compensate high shares of intermittent renewable sources.
- ❖ Possibility to further **reduce costs & improve technical performance**.
- ❖ Meet the RES target in a **cost-effective way**
- ❖ **Regulatory framework** for RES cooperation exists.
- ❖ **Maintain EU industrial and R&D leadership in this technology**.
- ❖ **Decarbonize the energy system while creating new jobs and economic activity**
- ❖ **Untapped enormous solar potential**.
- ❖ Increase **energy security**



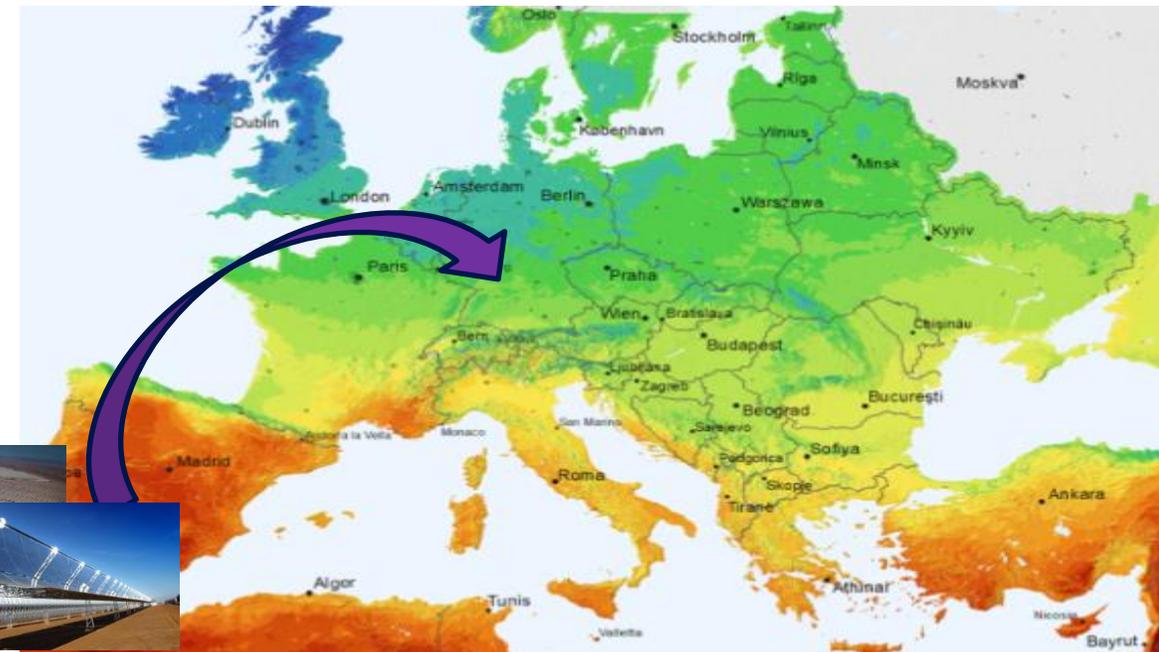
What? MUSTEC Objectives



The **overall goal** of MUSTEC is to assess the existing barriers and opportunities for CSP market uptake through renewable cooperation in Europe and develop and propose concrete policy recommendations and action plans

We have 3 specific objectives:

- #1. Identification of **barriers and opportunities** (technological, regulatory, economic, geopolitical, social, financial) for CSP exports in Europe.
- #2. Identification of a set of **opportunities/niches** (cooperating countries, concrete CSP projects and associated enabling framework conditions)
- #3. **Policy recommendations and action plan** for relevant stakeholders



Roadmap and Action Plan as complementary strategy components



Roadmap: Long-term vision

- Visualizing relevant framework conditions for the development of CSP cooperation projects in Europe until 2030

- Highlighting crucial steps (milestones) and timing of actions required to allow for this transition



Action Plan: Actions and instruments

- Providing detailed recommendations on policy actions on Member State and EU level
- Suggesting policy instruments and design elements to address the identified barriers and drivers to enable CSP cooperation



Roadmap: Long-term vision

Action Plan: Actions and instruments



Read the [Roadmap](#)

Read the [Action Plan](#)

Roadmap for CSP cooperation - Overview



Inputs:

Key barriers and drivers for cooperative CSP deployment → Identified throughout the MUSTEC project

Feedback on **relevance of suggested measures** → Consultation of CSP stakeholders (online survey)

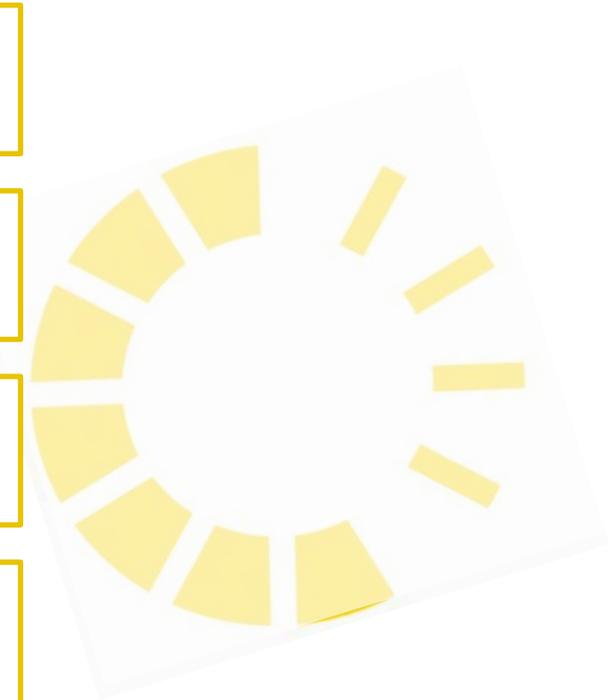
Structure:

Key issues grouped thematically into **three layers: Major fields of action with respective policy measures detailed in the Action Plan**

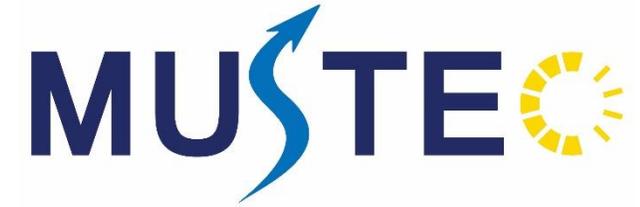
Timeframe: Steps and milestones in the **short (until 2022), medium (until 2025) and long term (until 2030)**

Relevance: Particularly crucial, **key milestones** are highlighted 

Level of responsibility: MS vs EU  

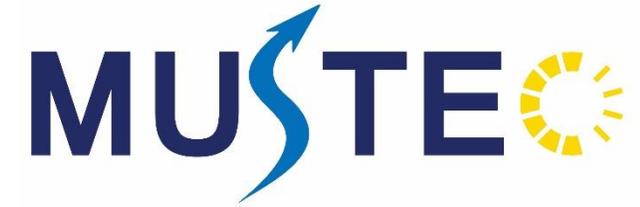


Layers of the roadmap – Three main fields of action to support CSP cooperation projects



- ✓ **Political and regulatory framework:** Definition of ambitious and technology-specific goals, provision of targeted support and creation of a suitable market design that recognizes the value of CSP as a dispatchable renewable energy technology
- ✓ **Techno-economic framework:** Enhancing the competitiveness of CSP by further reducing the LCOE, effectively hedging project implementation risks and facilitating project financing
- ✓ **Socio-political framework:** Creating a broad public acceptance and awareness for the benefits of CSP and the importance of collaborative European approaches for renewable energy support and establishment of the respective political narratives

Action Plan for CSP cooperation - Overview



- Linked to CSP roadmap
- Detailing recommendations how policy makers on European and national level could address the identified key issues preventing CSP cooperation
- Differentiation between policy blocks:

Framework conditions

- Elements of RES support independent from the RES support scheme

Instruments

- Specific types of interventions or support to address specific drivers or barriers

Design elements

- Detailed design options of individual support instruments

Description of specific measures – Structure



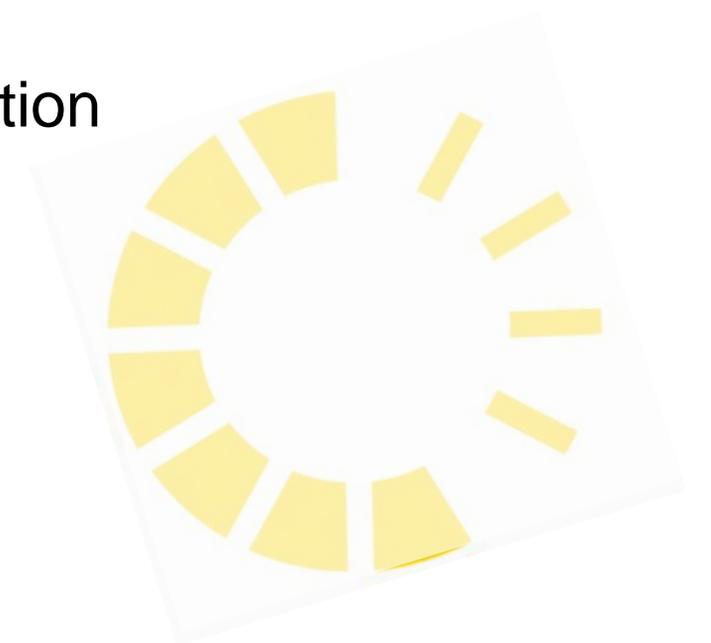
SPECIFIC MEASURE			
Policy block	Framework conditions		
Policy area	• Cooperation mechanisms	• Technology	
Instrument type	Support for the cooperation mechanisms, deployment of CSP		
Possible design elements	✓ A ✓ B ✓ C		
Drivers and barriers addressed			
Timing	Short term	Medium term	Long term
Priority	<div style="display: flex; justify-content: space-between; align-items: center;"> Low Medium High </div>		
Administrative level	★ EU: 🏠 MS:		
Potential interactions (synergies or conflicts)			

- Policy area: Measures can address deployment of CSP and/or the use of RES cooperation mechanisms
- Details on design elements
- Identified barriers and drivers addressed by the measure
- Timing: Suggested timing (in line with roadmap)
- Priority: Particularly crucial measures should be targeted with a high level of priority
- Administrative level of measures
- Synergies or conflicts with other measures can be relevant for policy planning

Specific measures – Overview of topics covered in the Action Plan



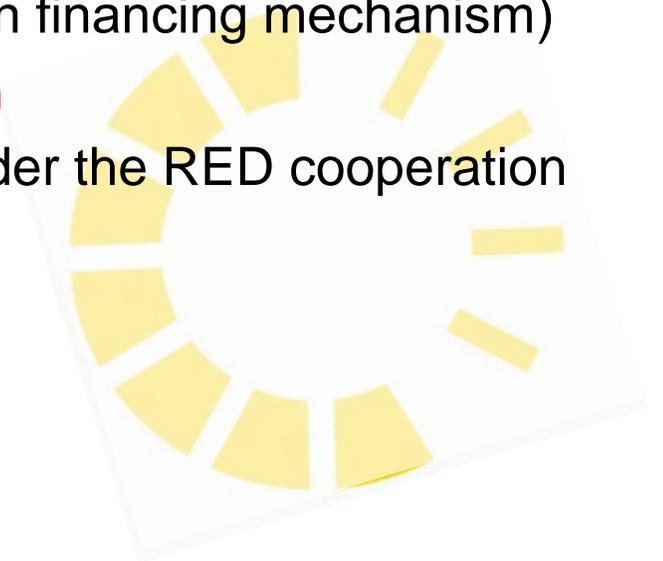
- Framework conditions (RES targets and stability)
- **Auctions**
- Support for RD&D
- Support for engaging in cooperation mechanisms (collaborative CSP projects)
- Measures to enhance social acceptability to the cooperation mechanisms
- Improving grid interconnections
- Mitigate administrative and grid-access barriers
- **Opening of support schemes**
- Support for the costs of financing



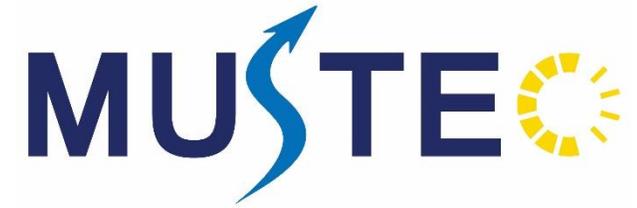
Focus on auctions – Auctions will be highly relevant for CSP cooperation



- Auctions are the key instrument to support RES deployment in the EU
- Art. 4.4 of RES Directive 2018/2001 states that “Member States shall ensure that support for electricity from renewable sources is granted in an open, transparent, competitive, non-discriminatory and cost-effective manner”
- Auctions are also defined as requirement for state aid in the EU Commission Guidelines on State Aid for environmental protection and energy 2014-2020 (2014/C 200/01)
- Auctions will be the key instrument for the “gap filler” (European Union financing mechanism)
 - **EU-wide auctions organized by the European Commission**
- Cross-border auctions for RES support could be a key instrument under the RED cooperation mechanisms
 - **Open auctions between two MS**
 - **Joint auctions between MS**



Focus on auctions – Key auction design elements to enable CSP cooperation



✓ FAVOURABLE FOR CSP

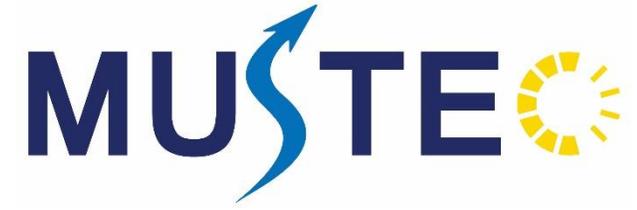
- Technology-specific auctions
 - facilitate the deployment of the technology
- Design elements which allow the valuation of dispatchability:
 - time-diverse generation profile
 - offering higher remuneration at times of higher demand
 - requiring a minimum number of hours of storage as a pre-qualification
- Energy strategies of the EU MS currently do not sufficiently reflect the value of dispatchable RES technologies such as CSP
- Other: auction schedule, long realization periods...

× POTENTIALLY DETRIMENTAL FOR CSP:

- Requirements for maximum size and seller concentration rules



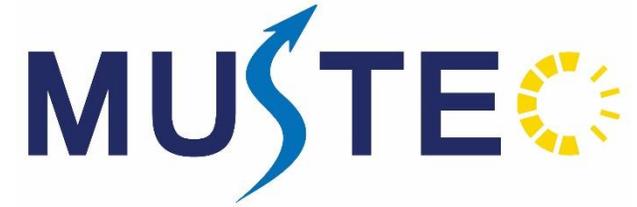
Specific measure: Auctions for CSP



SPECIFIC MEASURE	AUCTIONS		
Policy block	Instruments, design elements		
Policy area	• Cooperation mechanisms	• Technology	
Instrument type	Support for the cooperation mechanisms, deployment of CSP		
Possible design elements	Various possibilities (see text). Three alternatives of auctions: ✓ MS auctions (MS responsible for design) ✓ Cross-border auctions (involved MS responsible for design) ✓ EU-wide auctions under the EU Financing Mechanism (EU responsible for design)		
Drivers and barriers addressed	High LCOE, value of dispatchability, costs of engaging in the cooperation mechanisms		
Timing	Short term	Medium term	Long term
	MS auctions (very short term) Cross-border auctions (short term). EU-wide auctions under the EU Financing Mechanism (short/medium term)		
Priority			
	MS auctions (very high) Cross-border auctions (medium) EU-wide auctions under the EU Financing Mechanism (low)		

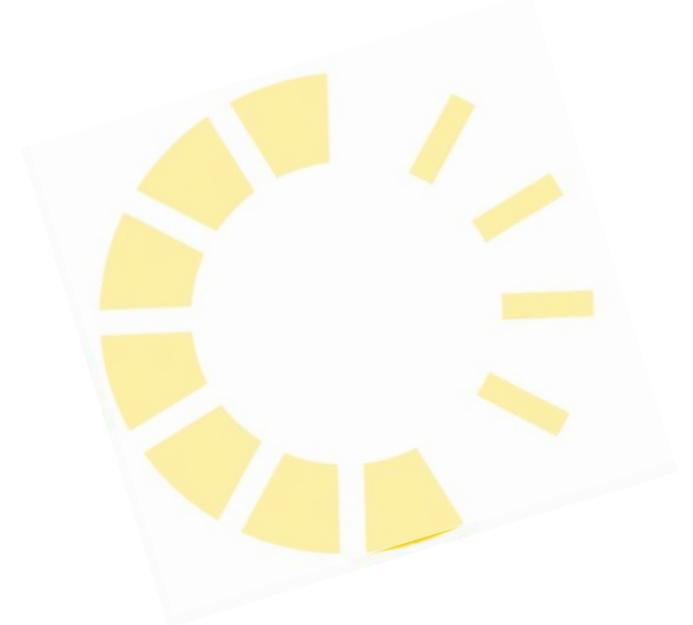
Administrative level	★ EU: EU-wide auctions under the EU Financing Mechanism 📄 MS: MS auctions, Cross-border auctions (with support by the EU)
Potential interactions (synergies or conflicts)	Synergies with RD&D support, support for engaging in the cooperation mechanisms (see text)

Specific measure: Opening of support schemes



SPECIFIC MEASURE	OPENING OF SUPPORT SCHEMES		
Policy block	Instruments		
Policy area	<ul style="list-style-type: none"> Cooperation mechanisms 		
Instrument type	Support for the cooperation mechanisms (indirectly)		
Possible design elements	<ul style="list-style-type: none"> ✓ Push for collaborative RES deployment through mandatory share for opening of Member States' RES support schemes defined in RED (Art. 5) from 2023 on. ✓ Gradual increase of the mandatory share for opening of Member States' RES support schemes based on RED (Art. 5). 		
Drivers and barriers addressed	Closed support schemes (national focus in RES support)		
Timing	Short term	Medium term	Long term
Priority	<p>Low Medium High</p>		
Administrative level	★ EU: Obligation for MS to open national support schemes		
Potential interactions (synergies or conflicts)	Support for engaging in the cooperation mechanisms, improving interconnections		

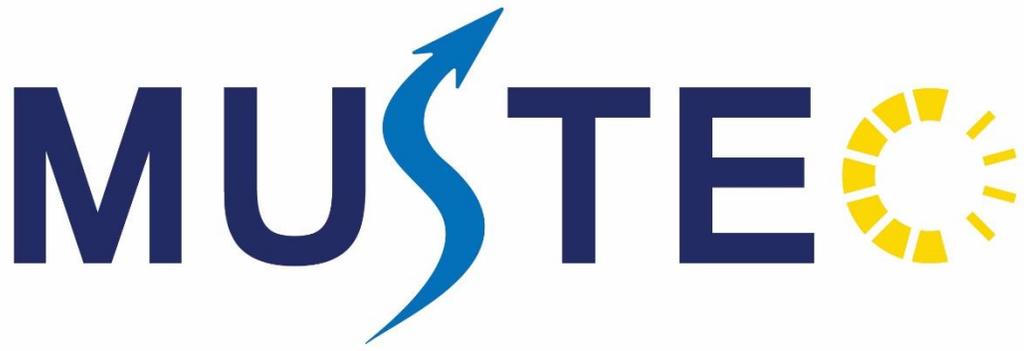
- Mandatory opening of support schemes (after 2023) would create a strong impetus for RES cooperation, as it would force the Member States to integrate collaborative RES deployment into their national energy and climate strategies



Key conclusions



- The political and regulatory, techno-economic and socio-political frameworks need to be addressed in parallel in order to create a favourable environment for CSP cooperation projects in the future.
- This implies first and foremost the creation of a clear mission statement for the deployment of CSP and the implementation of RES cooperation mechanisms in the EU.
- RES support schemes and market design must recognize the value of CSP as a dispatchable RE technology that can support system flexibility and stability.
- Enhancing the competitiveness of CSP by further reducing the LCOE, providing financing tools and effectively hedging project implementation risks is key for the survival of the European CSP industry.
- Social acceptance is crucial to ensure sustainability and success of RES cooperation policies in the long term and should thus be addressed by policy makers immediately.



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Thank you!

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