

# Sfera-III

## Final event



## CLUSTER 5 – HORIZONTE EUROPE ENERGY

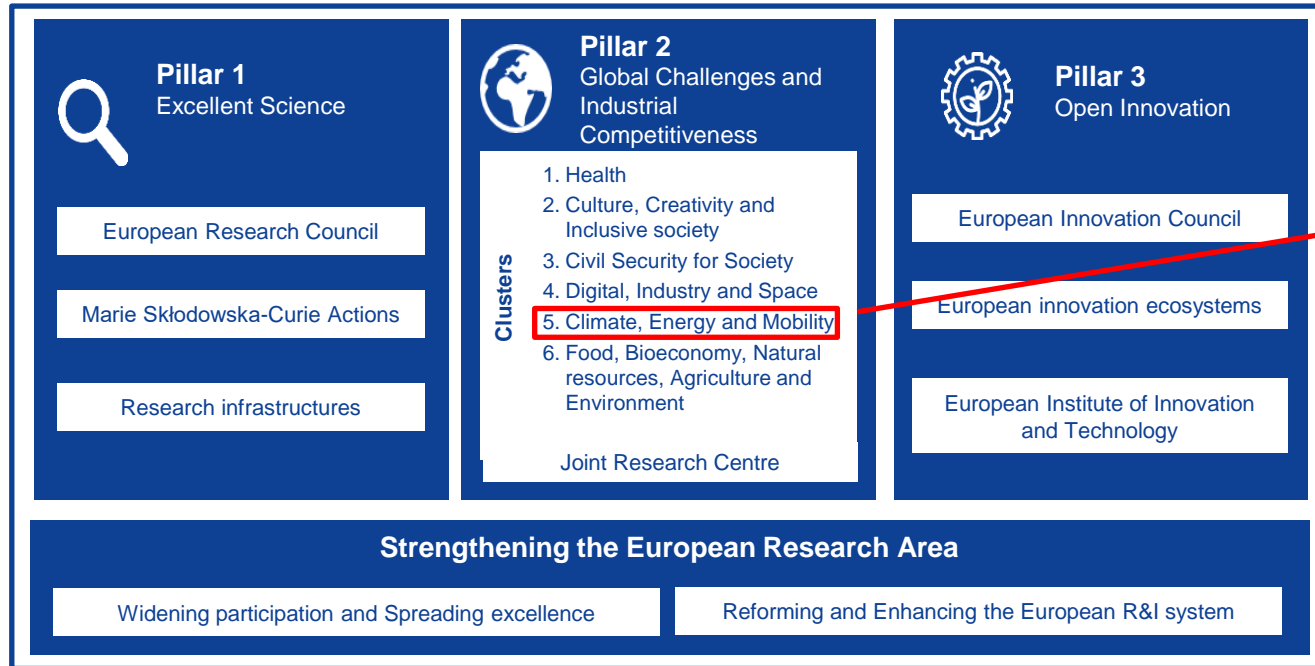
Luisa Revilla  
Delegada nacional – Energía- Clúster 5 – Horizonte Europa

[Luisa.revilla@cdti.es](mailto:Luisa.revilla@cdti.es)

13 de diciembre de 2023

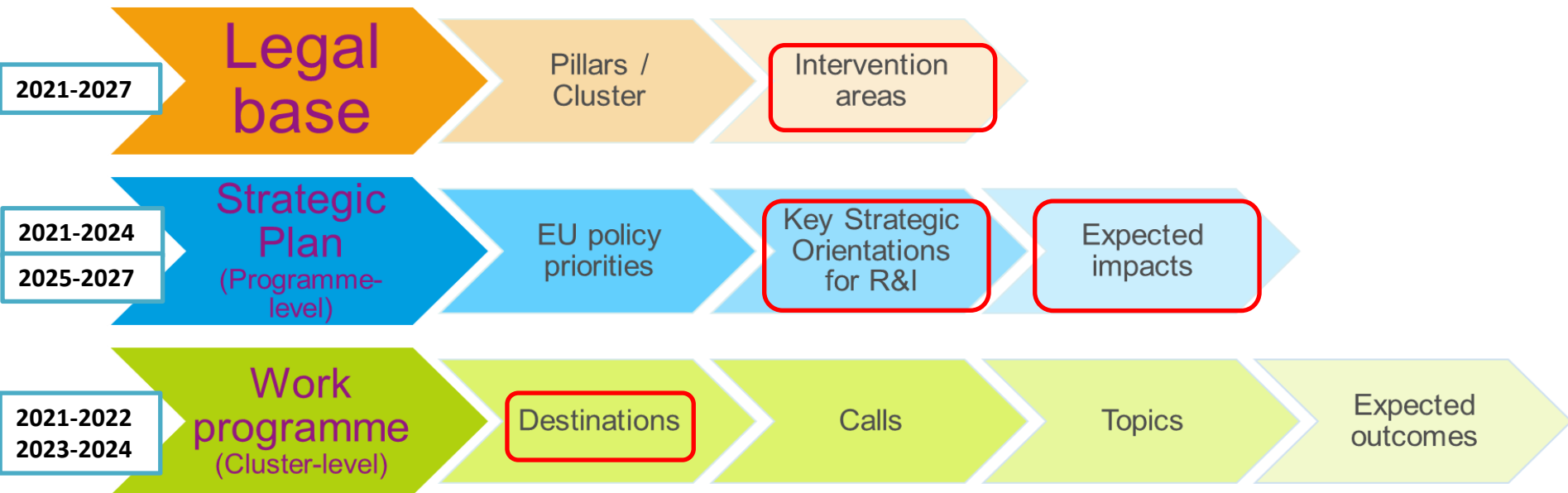
# Horizon Europe (2021-2027)

## Structure



~ 15.000 M€

# Programme intervention logic



Source: European Commission

# Overview

Legal base

Implementation

Climate Science and Solutions

Energy Supply

Energy Systems and Grids

Buildings and Industrial Facilities  
in Energy Transition

Communities and Cities

Industrial Competitiveness in  
Transport

Clean, Safe and Accessible  
Transport and Mobility

Smart Mobility

Energy Storage

Cluster 5  
“Climate,  
Energy and  
Mobility”

€15.1 bn  
(2021-2027)

Cluster 5 work  
programme

(including co-funded and  
co-programmed European  
Partnerships)

Institutional  
Partnerships

(Clean Hydrogen; Rail;  
Clean Aviation; Air Traffic  
Management)

EU Missions

(e.g. on Cities;  
Climate Adaptation;  
Oceans)

HORIZONTE

@HorizonteEuropa

# 6 Expected impacts (Cluster 5- 2021-2024)

Transition to a climate-neutral and resilient society and economy

Clean and sustainable transition of the energy and transport sectors towards climate neutrality

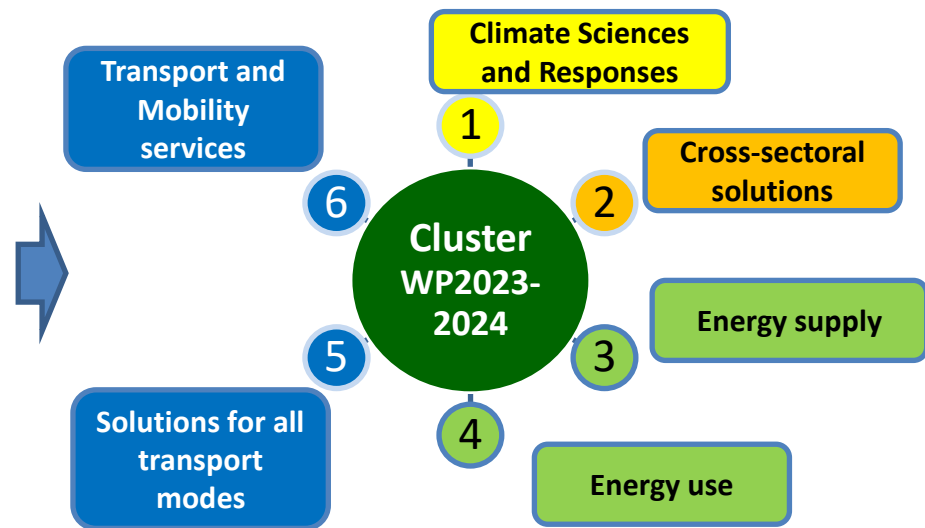
More efficient, clean, sustainable, secure and competitive energy supply

Efficient and sustainable use of energy, accessible for all

Towards climate-neutral and environmental friendly mobility

Safe, seamless, smart, inclusive, resilient, climate neutral and sustainable mobility systems for people and goods

# WP: 6 Destinations



# European Green Deal – Policy Priorities

2020

8 Jul



- A more **efficient** and “**circular**” system
- A cleaner **power system**
- A cleaner **fuel system**

14 Oct



- Tackling **energy poverty** and **worst-performing buildings**
- **Renovation of public buildings**
- Decarbonisation of **Heating & Cooling**

19 Nov



- Ambitious targets for:  
**Offshore Wind Energy** – 60 GW by 2030,  
300 GW by 2050  
**Ocean Energy** – 1 GW by 2030, 40 GW by 2050

# Further energy policy priorities

2021



Reducing emissions by at least 55% by the end of 2030

2022



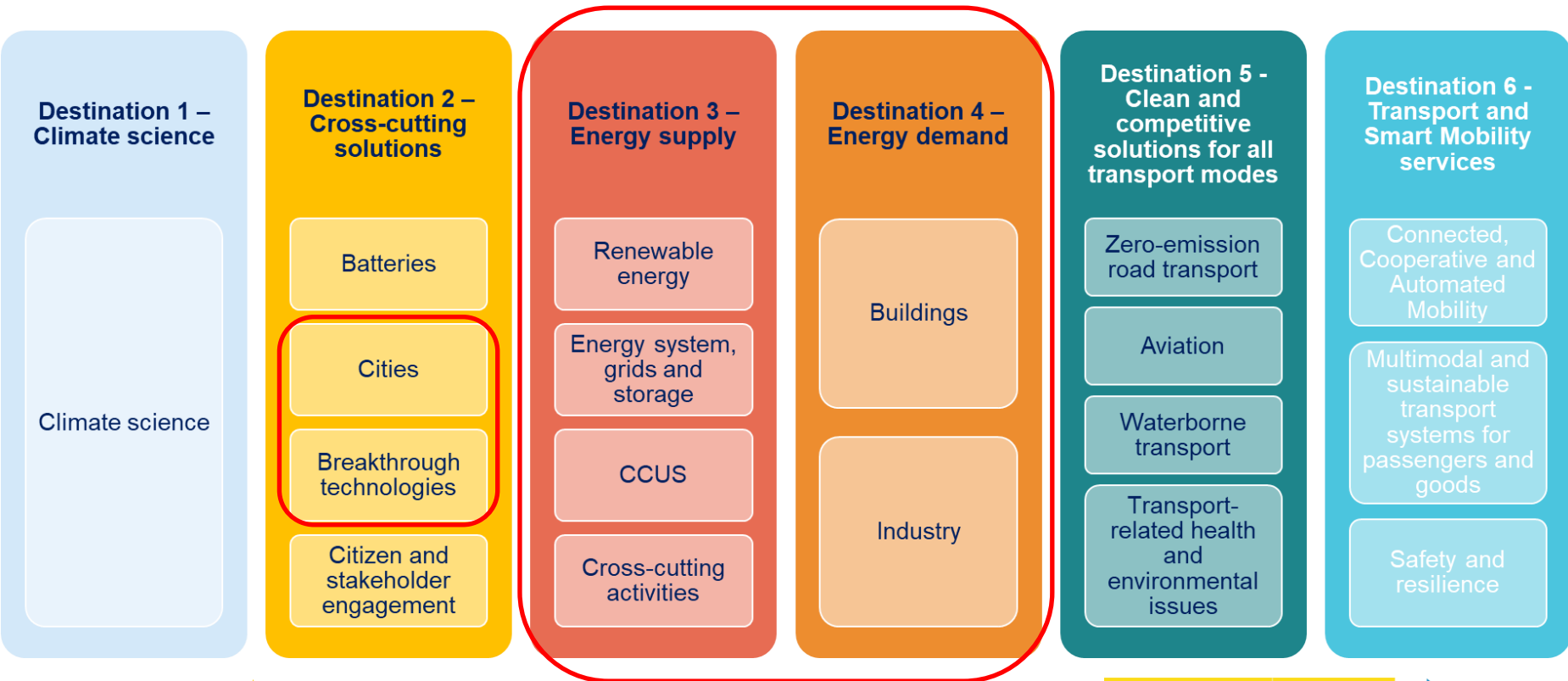
Reducing Europe's dependency on Russian fossil fuels imports

2023



Increasing the EU's manufacturing capacity of net-zero technologies

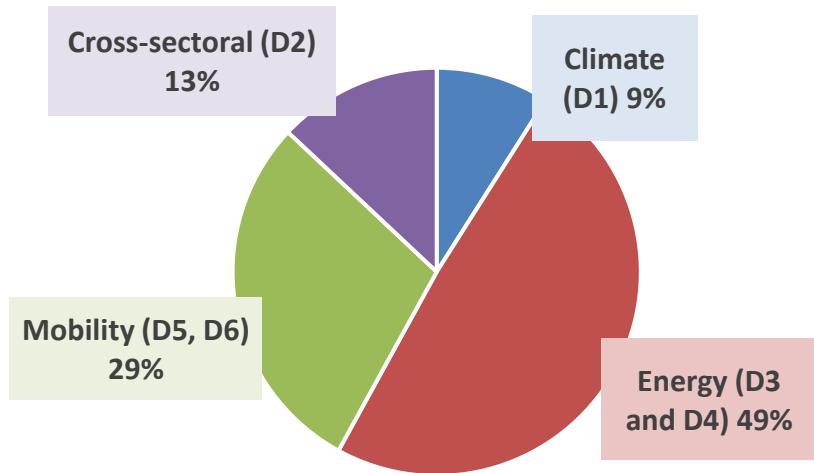
# Cluster 5 – Climate, Energy y Mobility- Destinations-Areas





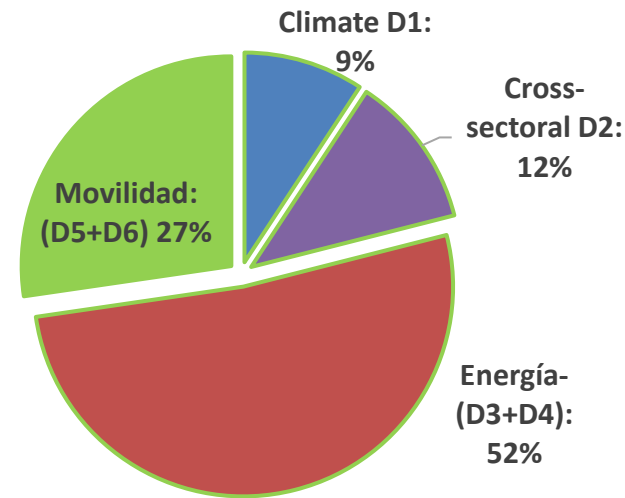
# Cluster 5 - Budget allocation

Budget allocation per Destination  
(2021 and 2022)



Budget 2021-2022: **3.000 M€**

Budget allocation per Destination  
(2023 and 2024)



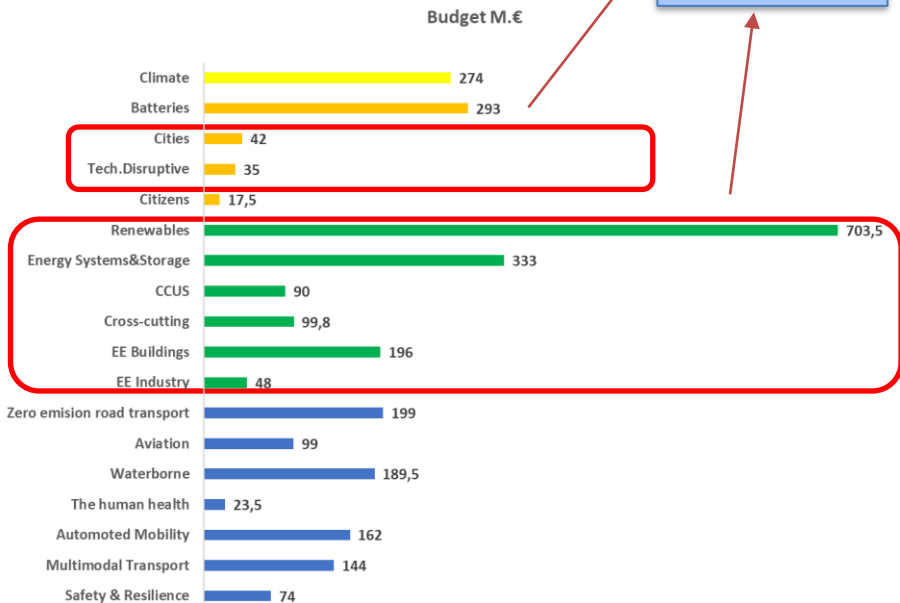
Budget 2023-2024: **2.386 M€**

 **20%**

# Cluster 5 - Budget allocation

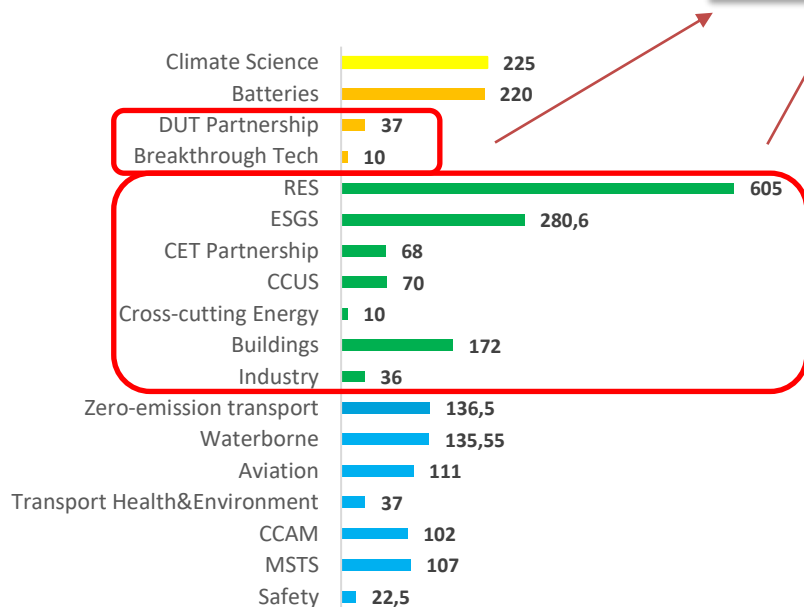
Budget allocation per thematic heading  
(2021 and 2022)

1.547,3 M.€  
(51%)



Budget allocation per thematic heading  
(2023 and 2024)

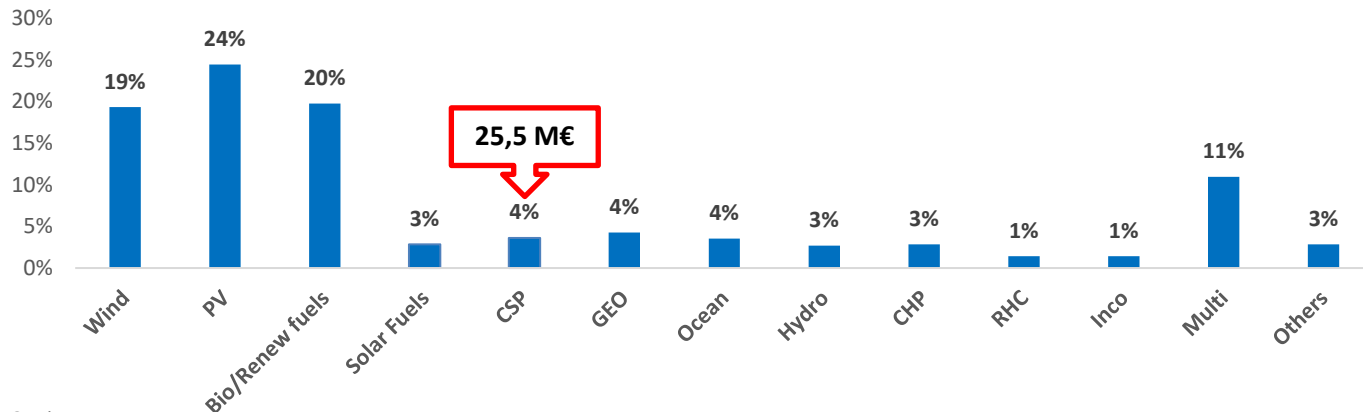
1.290 M.€  
(54%)



# Budget allocation– Renewables

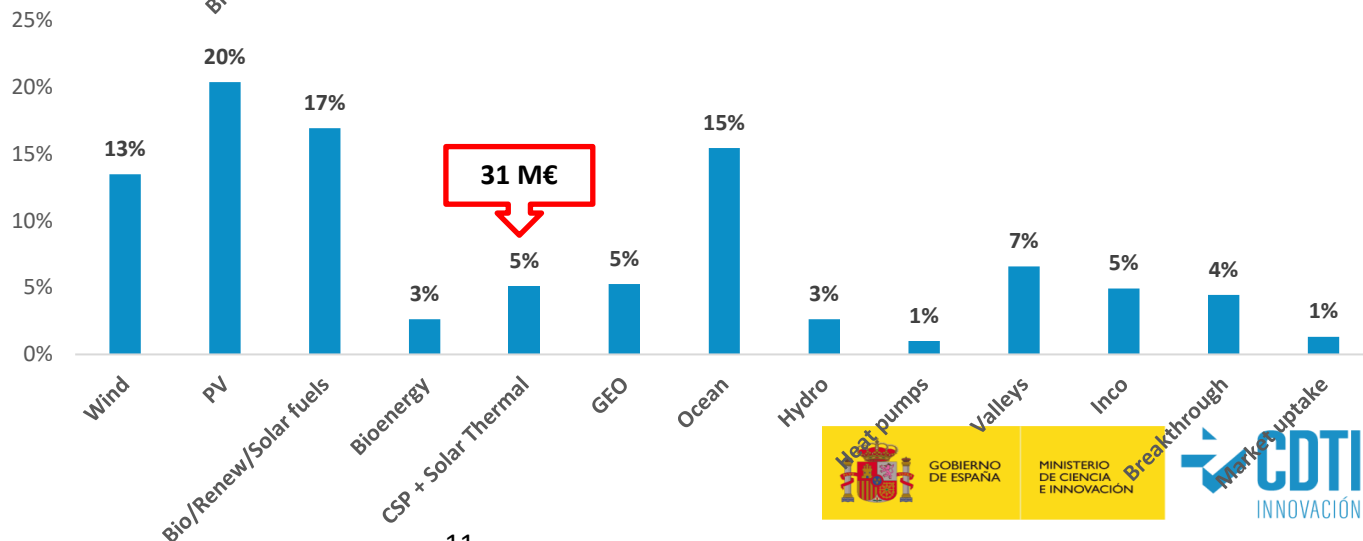
Budget allocation within renewable energy area, per technology (WP 2021-2022)

Total budget: 703,5 M€ - 46 topics (25 RIAs, 19 IAs)



Budget allocation within renewable energy, per technology (WP 2023-2024)

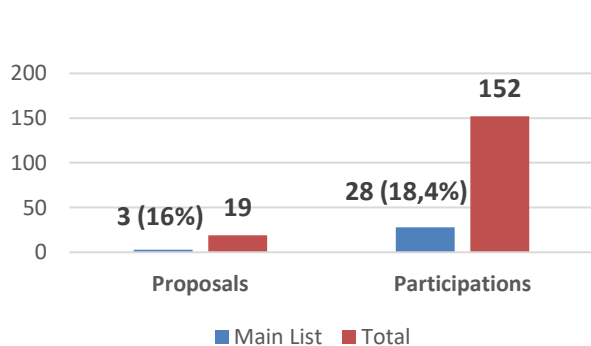
Total budget: 605 M€ - 44 topics (21 RIA, 20 IA)



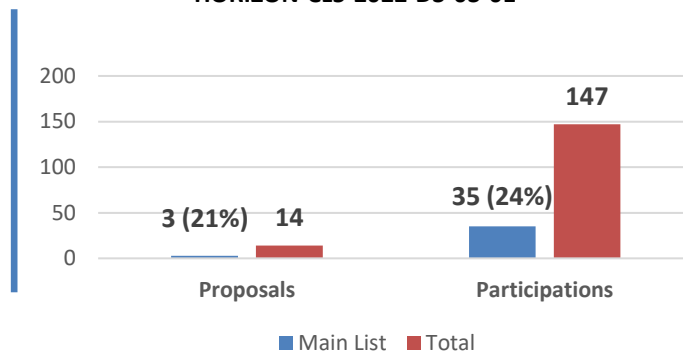
# WP 2021-2022 Topics on CSP

Area	Subarea	Topic	Topic title	Type of action	Indicative Budget	Nº funded projects
Renewable Energy	Concentrated Solar Power	HORIZON-CL5-2021-D3-03-06	Novel approaches to concentrated solar power (CSP)	RIA	9,0	3
		HORIZON-CL5-2022-D3-03-01	Innovative components and/or sub-systems for CSP plants and/or concentrating solar thermal installations	IA	16,5	3
					25,5	

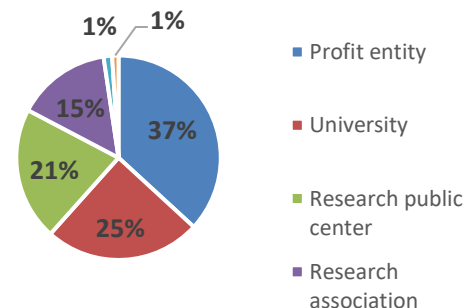
HORIZON-CL5-2021-D3-03-06



HORIZON-CL5-2022-D3-03-01



% Grant per type of entity



# WP 2021-2022 – Projects funded on CSP

<b>HORIZON-CL5-2021-D3-03-06: Novel approaches to concentrated solar power (CSP)</b>				
TITLE	Acronym	LEADER	Nº Partners	Grants M.€
Air-Brayton cycle concentrated solar power future plants via redox oxides-based structured thermochemical heat exchangers/thermal boosters	<b>ABraytCSPfuture</b>	DLR (DE)	10	3,00
Solar Hybrid Air-sCO2 Power Plants	<b>SHARP-sCO2</b>	KTH-Univ (NL)	10	3,00
Advanced HYBRID solar plant with PCM storage solutions in sCO2 cycles.	<b>HYBRIDplus</b>	Univ.Sevilla (ES)	8	3,00
				<b>9,00</b>

<b>HORIZON-CL5-2022-D3-03-01: Innovative components and/or sub-systems for CSP plants and/or concentrating solar thermal installations</b>				
TITLE	Acronym	LEADER	Nº Partners	Grants M.€
Development of a parabolic Trough concentrator system for Molten Salt Application	<b>MSA-Trough</b>	Universidad Evora (PT)	7	5,4
Air-based Solar Thermal Electricity for efficient renewable energy integration&compressed air energy storage	<b>ASTERIx-CAESar</b>	Fundación CENER (ES)	17	5,5
MW-scale fluidized particle-driven CSP prototype demonstration	<b>POWDER2POWER</b>	CNRS (FR)	11	5,3
				<b>16,2</b>

# WP 2021-2022 – Projects funded on CSP

## EUROPEAN ENTITIES in CSP FUNDED PROJECTS (Listed by grant received)

**CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS (FR)**  
**DEUTSCHES ZENTRUM FUER LUFT UND RAUMFAHRT EV (DE)**  
**UNIVERSIDAD DE SEVILLA (ES)**  
**FUNDACION CENER-CIEMAT (ES)**  
**KUNGLIGA TEKNISKA HOEGSKOLAN (SE)**  
FERRUM TECNOINDUSTRIAL SL (ES)  
SEICO HEIZUNGEN GMBH (DE)  
CIEMAT (ES)  
SOLARLITE CSP TECHNOLOGY GMBH (DE)  
FUNDACION INSTITUTO MADRILEÑO DE ESTUDIOS AVANZADOS SOBRE LA ENERGIA (IMDEA ENERGIA) (ES)  
**UNIVERSIDADE DE EVORA (PT)**  
CERTH (EL)  
FRAUNHOFER (DE)  
BUILD TO ZERO ENERGY SL (ES)  
RODAMA MAQUINARIA SL (ES)  
ODQA RENEWABLE ENERGY TECHNOLOGIES LIMITED (UK)  
UNIVERSITA DEGLI STUDI ROMA TRE (IT)  
LONDON EMISSION TECHNOLOGIES AS (DK)  
KATHOLIEKE UNIVERSITEIT LEUVEN (BE)  
ENEA (IT)  
TECHNISCHE UNIVERSITAET DRESDEN (DE)  
POLITECNICO DI MILANO (IT)  
OBSERVATOIRE MEDITERRANEEN DE L'ENERGIE (FR)  
UNIVERSIDAD DE LERIDA (UNIVERSITAT DE LLEIDA) (ES)  
FUNDACION TEKNIKER (ES)  
CSP-BOOST (FR)  
RINA CONSULTING SPA (IT)

AALBORG CSP AS (DK)  
JOHN COCKERILL RENEWABLES (BE)  
ELECTRICITE DE FRANCE (FR)  
EUROPEAN TURBINE NETWORK (BE)  
UNIVERSITEIT TWENTE (NL)  
EUROPEAN POWDER AND PROCESS TECHNOLOGY BVBA (BE)  
BLUEBOX ENERGY LTD (UK)  
NEBUMA GMBH (DE)  
DOOSAN SKODA POWER SRO (CZ)  
SAS 2IA CONSULTING (DE)  
DEUTSCHES METALLFASERWERK DR SCHWABBAUER GMBH & CO KG (DE)  
ENGIONIC FEMTO GRATINGS GMBH (DE)  
KYOTO GROUP AS (NO)  
DIACHEIRISTIS ELLINIKOU DIKTYOU DIANOMIS ELEKTRIKIS ENERGEIAS AE (EL)  
INNOVATION THERM TECHNOLOGIES SL (ES)  
CLANCY HAUSSLER RITA (AT)  
COBRA INSTALACIONES Y SERVICIOS S.A. (ES)  
PRITZKOW WALTER ERICH CHRISTIAN (DE)  
APRIA SYSTEMS SL (ES)  
MOROCCAN AGENCY FOR SOLAR ENERGY SA (MO)  
UNIVERSITA DEGLI STUDI DI GENOVA (IT)  
UNIVERSITE DE PERPIGNAN (FR)  
THE CHANCELLOR MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD (UK)  
OPRA ENGINEERING SOLUTIONS BV (NL)  
SOFTINWAY SWITZERLAND LLC (CH)

# WP 2023-2024 Topics on CSP

**HORIZON-CL5-2023-D3-02-02:**

**Novel thermal energy storage for CSP**

**TRL 4-5**

**Deadline:**  
**05/09/2023**

**CLOSED / No  
results yet**

Support will be given to novel thermal energy storage solutions for CSP plants. The thermal energy storage solutions proposed will have to be **more efficient, cost effective and reliable than current commercial solutions** and **achieve similar performance in terms of cycles**.

The applicants should convincingly present that the storage solution that is developed has the potential to be applied at commercial level

**HORIZON-CL5-2024-D3-02-01:**

**Digital tools for CSP and solar thermal plants**

**TRL 7-8**

**Deadline:**  
**21/01/2025**

**OPEN**

Support will be given to the innovative application of digital tools (or to the application of innovative digital tools, or both) in CSP and/or concentrated solar thermal heat and/or cold and/or non-concentrated solar thermal heat and/or cold plants. Any type of application of the digital tools is in the scope (e.g., component control, performance measurement, self-diagnostic, ancillary services to the power system, digital twins, etc.). Artificial intelligence techniques are also in the scope.

Proposals are expected to bring and demonstrate **measurable benefits of the proposed digital tools in terms of operation, maintenance, and flexibility of the plant**.

Where applicable, the digital tools should support night baseload generation from thermal energy storage.

Where applicable, the demonstration should span a continuous interval of at least six months covering all possible incidence angles of the direct solar radiation

# WP 2023-2024 - SOLAR THERMAL Topics

**HORIZON-CL5-2023-D3-01-04:**

**Solar Systems for Industrial Process Heat and Power (IA)**

**TRL 6-7**

**Deadline:**  
**30/03/2023**

**CLOSED**

Industrial processes need considerable amounts of **heat and power**. Much of the demand for process heat, roughly 50% among the most energy-intensive manufacturing industries, including food and beverages and pulp and paper, occurs at temperatures of 400 °C or less. The Solar Thermal (ST) medium-temperature process heat or cogeneration with electricity can be an effective way to transition to clean energy sources and displace conventional fossil fuel use in industry. On the other side, Photovoltaic (PV) systems convert sun-light to direct current (DC) electricity and the electricity can be used to power or heat industrial processes directly (or via the grid) with electric heating technologies.

TITLE	Acronym	LEADER	Nº Partners	Grants M.€
Optimal Solar Systems for Industrial Heat and Power	INDHEAP	CEA (FR)	14	7,0
SOLar-driven INDUstrial power And heat upgRaded with high-temperature heat pumps for enhanced integrated process efficiency	SOLINDARITY	CERTH (EL)	18	7,0
				<b>14,0</b>

**HORIZON-CL5-2023-D3-02-03:**

**Industrial manufacturing for lower-cost solar thermal components and systems (IA)**

**TRL 7-8**

**Deadline:**  
**05/09/2023**

**CLOSED /No  
results yet**

Support will be given to innovative solutions to manufacture components and/or sub-systems and/or systems for solar thermal applications. The manufacturing solutions should increase the production output and reduce the cost vis-à-vis current production lines. The solutions should integrate quality controls and be flexible enough to adapt to various solar thermal applications.



# SOLAR FUELS Topics

Topic 2021-2022	Year	ToA	Total Budget	Deadline	Final TRL	Acronym	Title	Leader	Total Grant M€
HORIZON-CL5-2022-D3-02-04: Technological interfaces between <b>solar fuel technologies</b> and other renewables	2022	RIA	10,0	27/10/2022	To TRL 4	Circular Fuels	Production of sustainable aviation fuels from waste biomass by coupling of fast pyrolysis with solar energy	AALTO Korkeakoulu aatio SR (FI)	5,0
						PYSOLO	PYROlysis of biomass by concentrated SOLar pOwer	Politecnico de Milano (IT)	5,0
HORIZON-CL5-2022-D3-03-03: Efficient and circular <b>artificial photosynthesis</b>	2022	RIA	10,0	10/01/2023	To TRL 5	SUNGATE	SUNlight-driven Next Generation Artificial photosynthesis bio-hybrid TEchnology platform for highly efficient carbon neutral production of solar fuels	Fraunhofer Gesellschaft (DE)	4,9
						REFINE	From solar energy to fuel: A holistic artificial photosynthesis platform for the production of viable solar fuels	Universitet I Oslo (NO)	5,2

Topic 2023-2024	Year	ToA	Total Budget	Deadline	Final TRL	
HORIZON-CL5-2023-D3-02-08: Development of microalgae and/or <b>direct solar fuel production and purification technologies</b> for advanced aviation and /or shipping fuels	2023	RIA	8,0	05/09/2023	To TRL 4-5	CLOSED
HORIZON-CL5-2024-D3-01-04: Improvement of light harvesting and carbon fixation with synthetic biology and/or bio-inspired//biomimetic pathways for <b>renewable direct solar fuels production</b>	2024	RIA	8,0	16/01/2024	To TRL 3-4	OPEN

# Thank you for your attention