Energy transition in the fisheries sector

Waterborne Transport R&I
Horizon Europe

INTER-ADVISORY COUNCILS (INTER-ACS) MEETING. 29 April 2022

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POLICY OFFICER WATERBORNE TRANSPORT R&I

DG RTD UNIT C3 LOW EMISSION FUTURE INDUSTRIES

Agenda

- Place of Waterborne Transport R&I in Horizon Europe
- Objectives and basic principles of EU R&I on Waterborne Transport for 2021-2027
- Zero-Emission Waterborne Transport co-programmed Partnership
- Strategic R&I Agenda – R&I Areas
- R&I challenges
- Work program 2021-22
- Synergies

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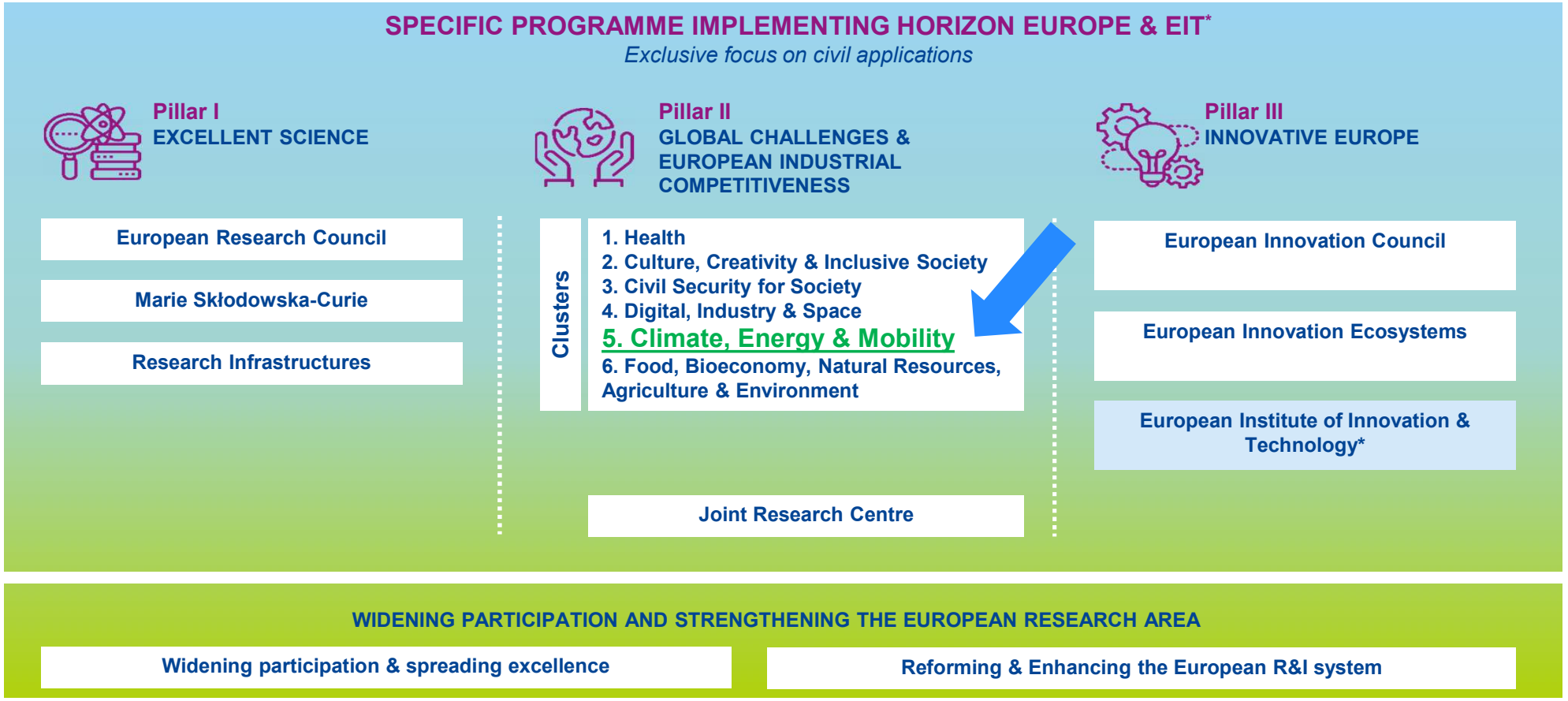
Horizon Europe – main structure



** The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme*

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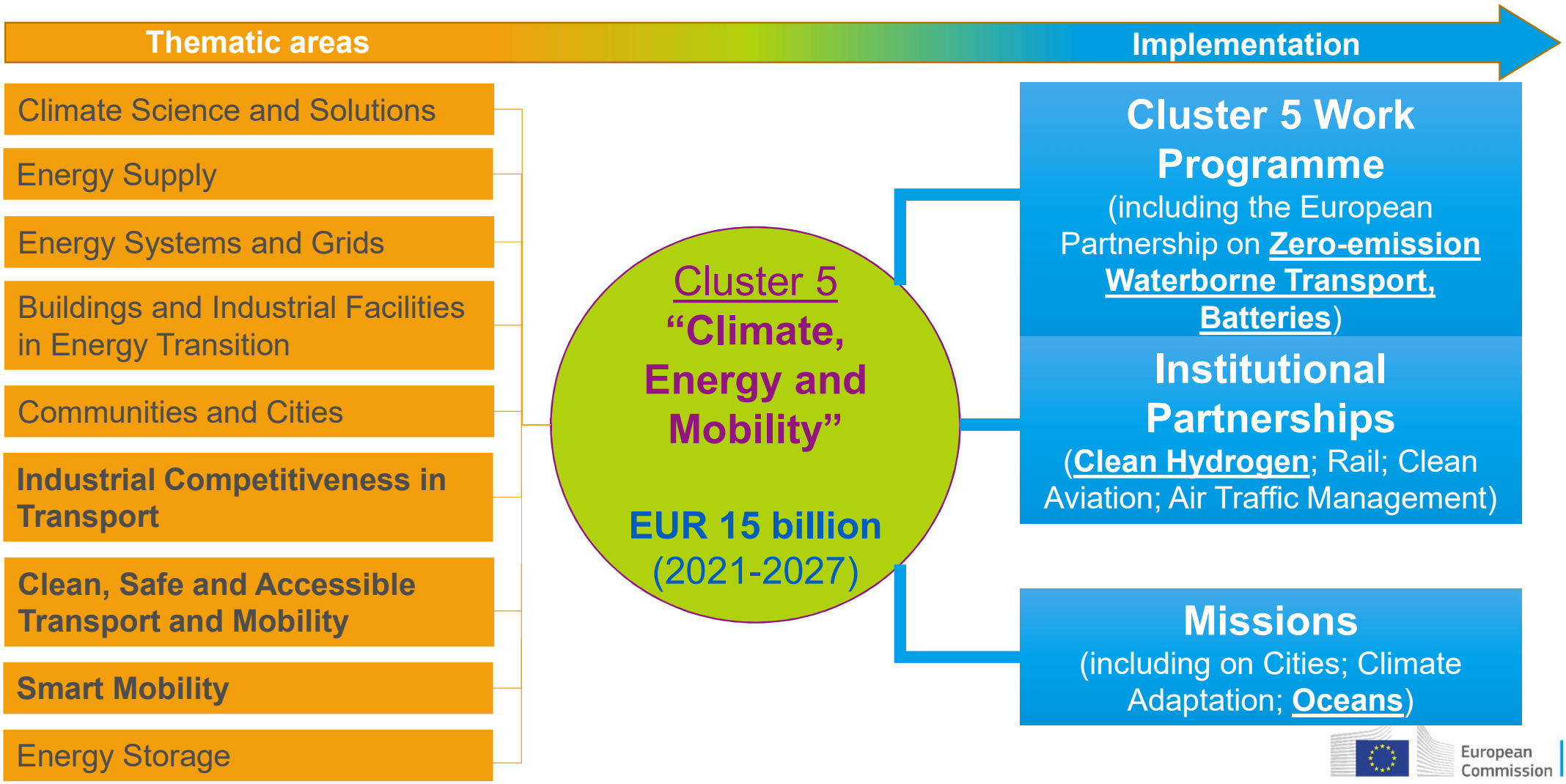
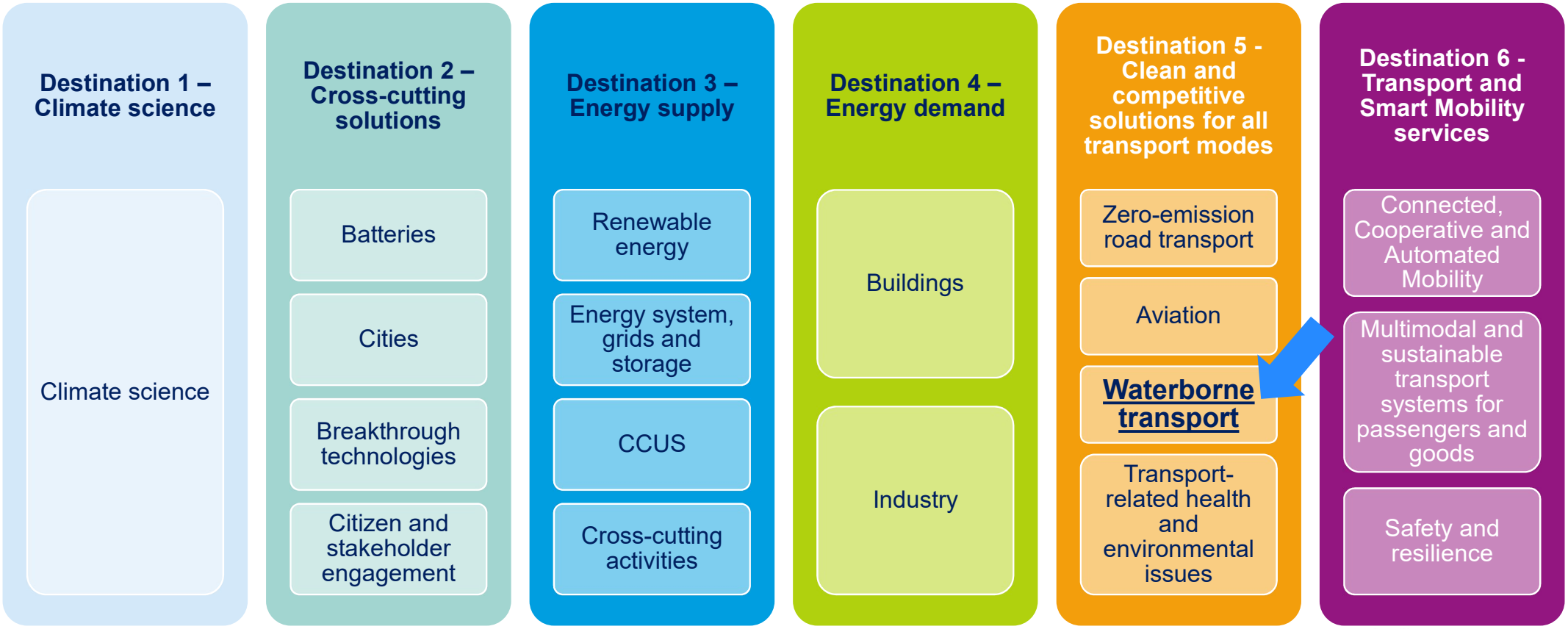
Cluster 5 – overview



Cluster 5 Work programme – overview



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Horizon Europe – Waterborne Transport

Zero-Emission Waterborne Transport

Commitments:

- **Horizon Europe: €530 million**
- **Partners other than EU: €3,300 million**

Collaborative R&I €100 M

Aligned with :

European Green Deal,

The European Smart and Sustainable Mobility Strategy

Fit for 55 package

To:

- *Accelerate the transition towards zero emission waterborne transport whilst exploiting opportunities from digitalisation and increasing the competitiveness of the European Waterborne transport sector within global markets.*
- *Implementing the **Strategic Research and Innovation Agenda** of the **Zero Emission Waterborne Transport partnership***

https://www.waterborne.eu/partnership/partnership

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Zero-emission waterborne transport (ZEWT) partnership

Using R&I to develop and demonstrate zero-emission solutions for all main ship types and services by 2030, which will enable zero-emission waterborne transport by 2050.

Eliminating **GHG emissions** from new ships and retrofitted existing ships by means of sustainable alternative climate-neutral fuels, renewable energies, electrification and energy efficiency.

Cutting **coastal and inland pollution** to air by at least 50% compared to current levels

Elimination of **pollution to water** (including harmful underwater noise) from ships

Zero-Emission Waterborne Transport

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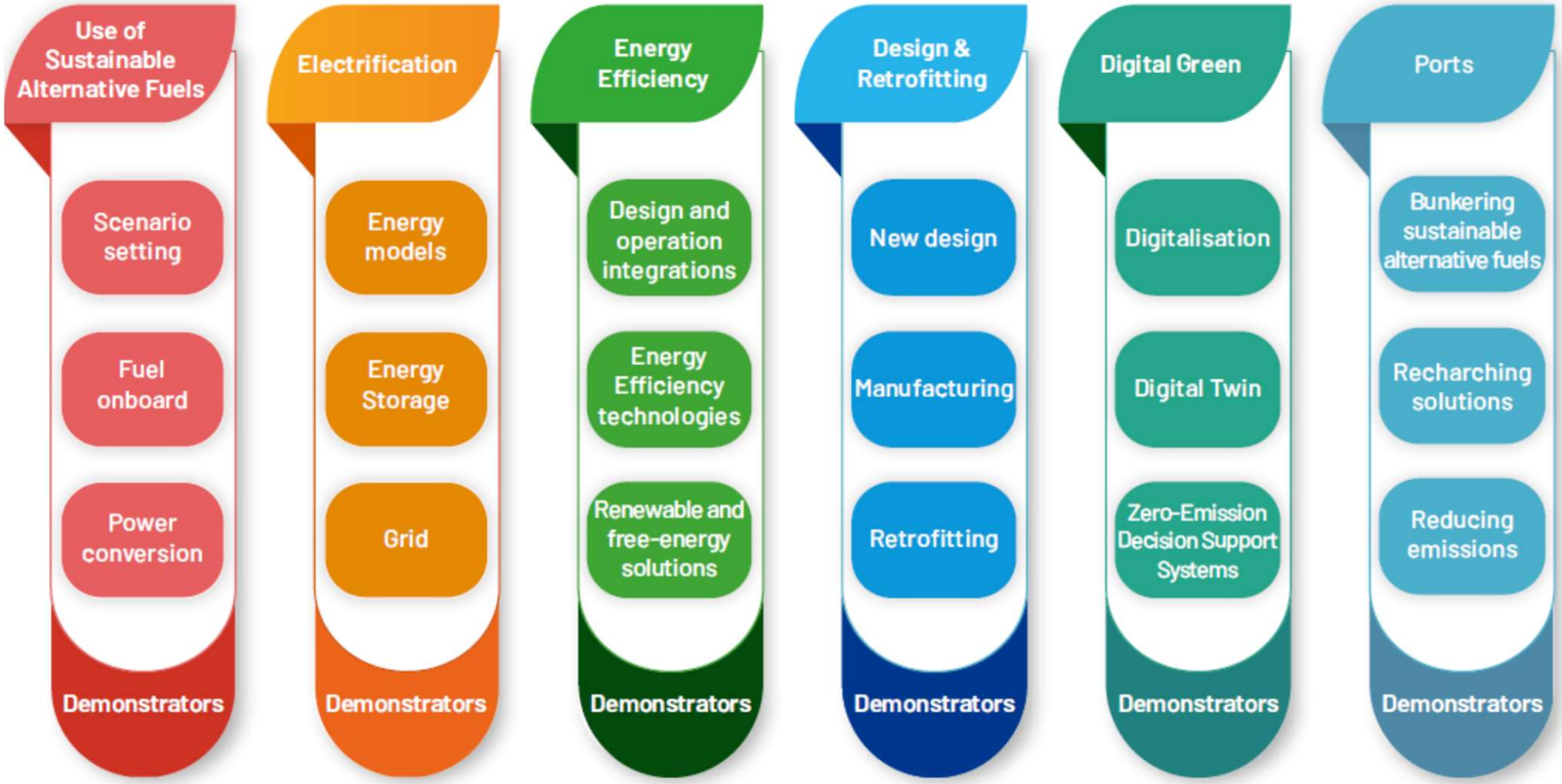
R&I areas (Strategic Research and Innovation Agenda)

https://www.waterborne.eu/images/210601_SRIA_Zero_Emission_Waterborne_Transport_1.2_final_web_low.pdf



Zero-Emission Waterborne Transport

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Challenges

Medium Term Measures

Measure	Challenges ?
Zero Emission port entry (battery hybrid)	Cost of charging. Charging infrastructure and capacity
No auxiliary engines in port	Standardised connectors for all ships? Capacity and availability of infrastructure. Regulation/Incentive.
Electrification of shipping, combining multiple power sources and energy storage	New ship design and energy management, battery cost, skills concerning new technology. Reluctant first movers.
Battery Electric ferries	Cost/payback. Driven by public policy. High power electricity infrastructure for charging. Standards and safety.
Renewable energy assistance- Wind Solar	Scale. Route optimisation. Reliability. Cost. Non optimal conditions. Head wind.
Zero Carbon Fuel Blend. Eg: LNG+H2 Ammonia+LSF, LSF+Bio Diesel	Some fuels cant be mixed in tank eg LNG +H2, some may cause toxic products, some not avilable at scale. Bunkering
LNG Fuel Cells	Technology development 10’s of MW scale in marine environment. Total efficiency substantially more than 50%. Certification.

Challenges

Long Term Measures

Measure	Challenges ?
Zero Carbon H2	Carbon neutral production capacity. Cost. Storage. Roll out of bunkering. Transition. Certification. Combust or Fuel cell. 10's MW fuel cell.
Zero Carbon Ammonia	**Safety**. Carbon neutral production capacity. Direct air & water synthesis. Certification. Possibility to retrofit to exising engines ? No experience. Combust or Fuel cell. Pollutants. Cost
Zero Carbon Methanol	Carbon neutral production capacity (less energy efficient). Cost, certification. Bunkering. Retrofit, Carbon source.
BioFuel	Sustainable scaling (lack of Biomass). Competition from sectors with fewer fuel choices. Environmental impact.
E diesel	Carbon neutral production capacity (least energy efficient). Cost, Carbon source. Verifying fuel.
48 hour sailings (SS + ferry) are battery	Battery cost. Multi MW port charging infrastructure. Certification and safety

Horizon Europe WP **2021**-2022

- 2021 Call Cluster 5 - Destination 5 (ZEWT Partnership topics: 93.5 M€)

  Close: 14/09/2021. Start of project Summer 2022

Topic HORIZON-CL5-2021-D5-01-	Topic description	+/- n. projects	Action	EU M€
07	Enabling the **safe and efficient** on-board **storage and integration** within ships of **large** quantities of **ammonia and hydrogen fuels**	2	IA	20.0
08	Enabling the full **integration of very high power fuel cells** in ship design using **co-generation and combined cycle** solutions for increased **efficiency** with **multiple fuels**	1	RIA	15.0
09	CSA identifying **waterborne sustainable fuel deployment** scenarios	1	CSA	0.5
10	Innovative on-board **energy saving** solutions	4	RIA	20.0
11	Hyper powered vessel **battery charging** system	2	IA	14.0
12	Assessing and **preventing methane slip from LNG engines** in all conditions within both existing and new vessels	1	IA	7.0
13	**Digital Twin** models to enable **green ship operations**	1	RIA	7.0
14	Proving the feasibility of a **large clean ammonia marine engine**	1	IA	10.0

Horizon Europe WP 2021-**2022**

- 2022 Call Cluster 5 - Destination 5 (ZEWT topics + 2 topics: 96 M€)

  Close: 26/04/2022

Topic HORIZON-CL5-2022-D5-01-	**Topic description**	**+/- n. projects**	**Action**	**EU M€**
01	Exploiting electrical energy **storage** systems and better optimising large battery electric power within **fully battery** electric and **hybrid** ships (ZEWT Partnership)	2	IA	16.0
02	Innovative **energy storage** systems on-board vessels (ZEWT Partnership)	3	RIA	15.0
03	Exploiting **renewable energy for shipping**, in particular potential of **wind** energy (ZEWT Partnership)	2	RIA	18.0
04	Transformation of the existing **fleet** towards greener operations through **retrofitting** (ZEWT Partnership)	5	IA	25.0
05	Seamless safe **logistics** through an **autonomous** waterborne freight feeder loop service	1	RIA	15.0
06	**Computational tools** for **shipbuilding**	1	IA	7.0

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Synergies – Horizon Europe Partnerships

Clean Hydrogen Joint Undertaking

- Large scale demonstration of hydrogen fuel cell propelled inland waterway vessels Development of large scale LH2 containment for shipping
- Development and optimisation of reliable and versatile Proton Exchange Membrane Fuel Cells stacks for high power range applications (incl. for waterborne transport)
- + 5 linked topic (concerning clean hydrogen production for use of shipping and other high power transport modes)

Co-programmed partnership on Batteries

- Topics concerning battery technologies for various applications

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Synergies – Horizon Europe Missions

HORIZON-MISS-2023-OCEAN-01-05: Lighthouse in the Baltic and the North Sea basins - Green, energy-efficient and sustainable small-scale fishing fleets

Expected outcomes:

- Enhanced implementation European Green Deal objectives;
- Reduced fuel consumption and emissions from small fishing vessels and improved energy efficiency in related operations;
- Accelerated renewal of fleets of small fishing vessels;
- Increased users' choices and responsible user behaviors

Ref. 'Where appropriate, activities may take into account synergies with activities aimed to reduce waterborne transport emissions, for example projects arising from Horizon Europe calls' HORIZON-CL5-2021-D5-01, HORIZON-CL5-2022-D5-01, HORIZON-CL5-2023-D5-xx, HORIZON-CL5-2024-D5-xx

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CONCLUSIONS:

- We are looking for game changers – there is an urgency
- Synergies with other partnerships (Hydrogen, Batteries), missions (Oceans), funds (deployment: CEF, Innovation Fund)
- We aim at the higher TRLs
- Demonstrators are very welcome and mandatory for some topics
- Relevance to Inland Waterway Transport and Maritime.
- Green topics builds on Horizon Europe Co-Programmed Partnership "*Zero Emission Waterborne Transport*" regarding topics marked as contributing to ZEWT. Consult the SRIA:

https://www.waterborne.eu/images/210601_SRIA_Zero_Emission_Waterborne_Transport_1.2_final_web_low.pdf

European Commission

Thank you

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