



Advanced MEMBranes and membrane assisted procEsses for pre- and post- combustion CO₂ capture (MEMBER)

<https://member-co2.com/>

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Duration: 4.5 years.

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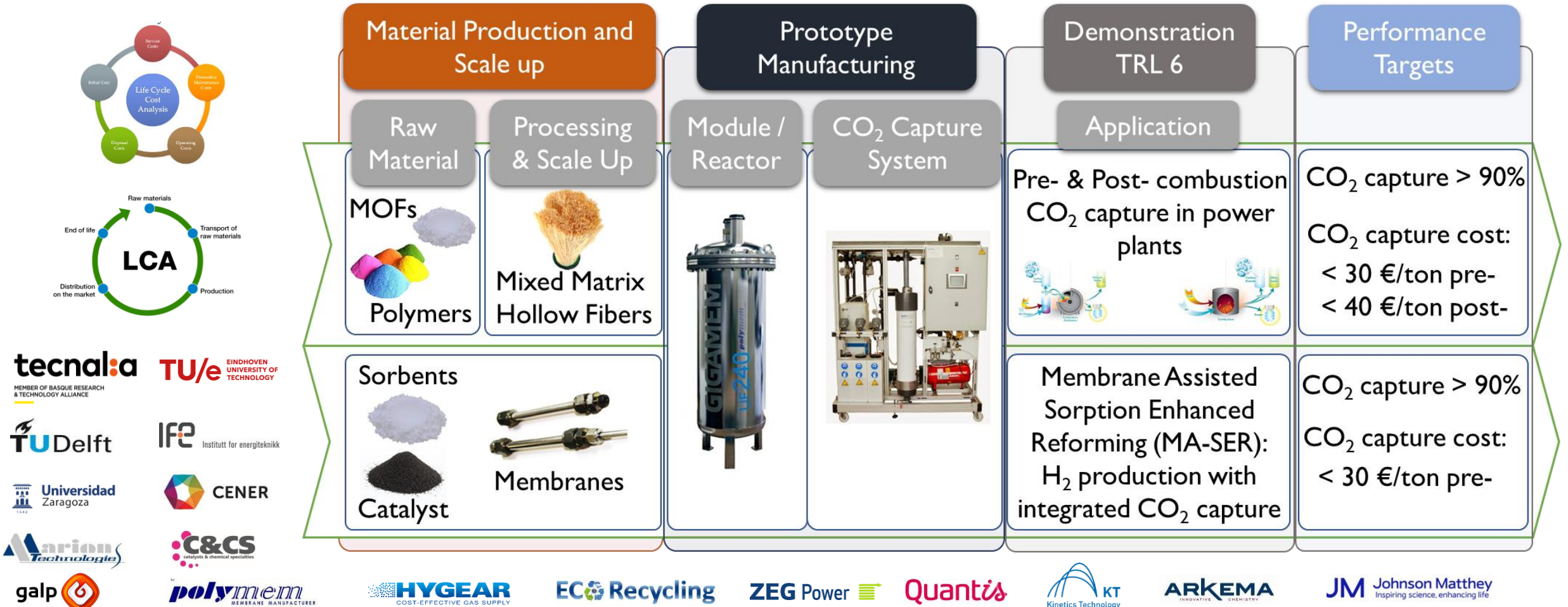
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WEBINAR::
Toward 2030: New pathways to CO₂ capture

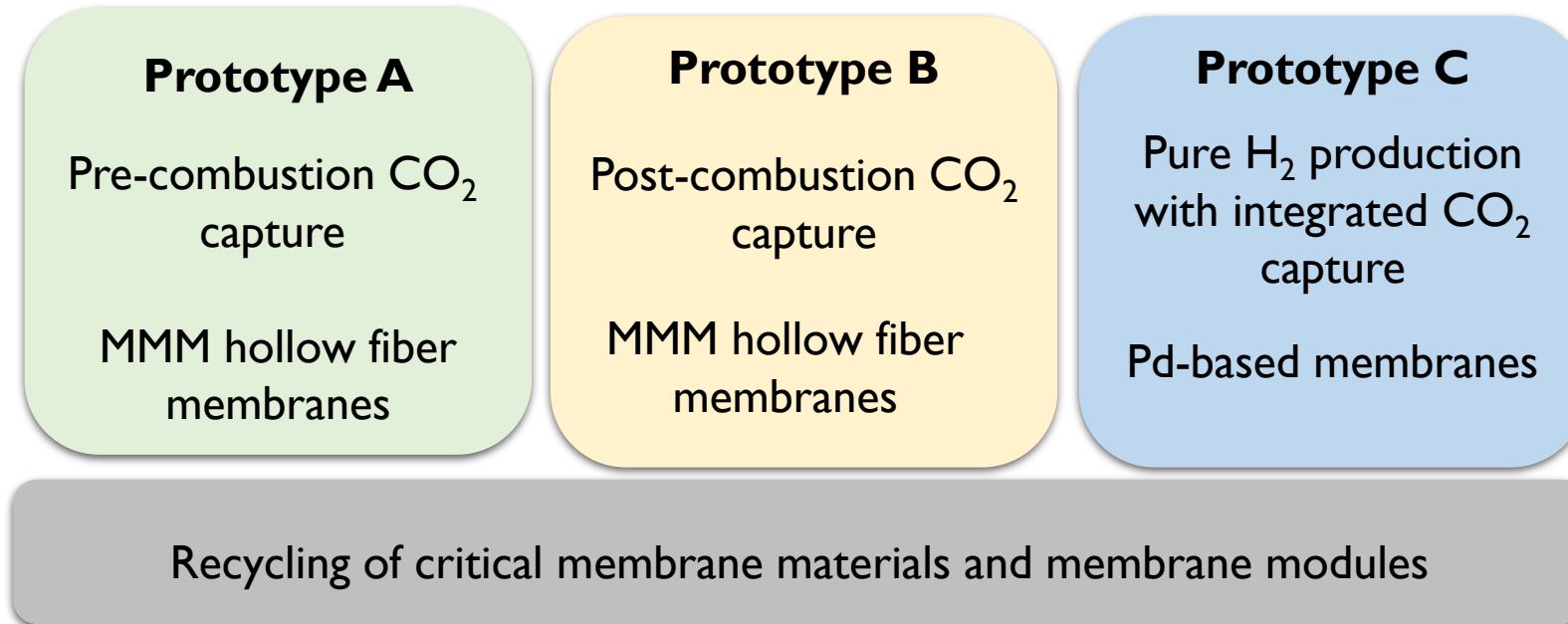
I. General approach

MEMBER project aims to reduce the cost of the Carbon Dioxide capture technologies by scaling-up and manufacturing advance materials (membranes, catalysts and sorbents) to develop membrane-based technologies that outperform current technology for pre- and post-combustion CO₂ capture in power plants as well as H₂ generation with integrated CO₂ capture.



2. Industrial upscaling

Scale-up the manufacturing processes of materials and membranes for the CO₂ capture prototypes

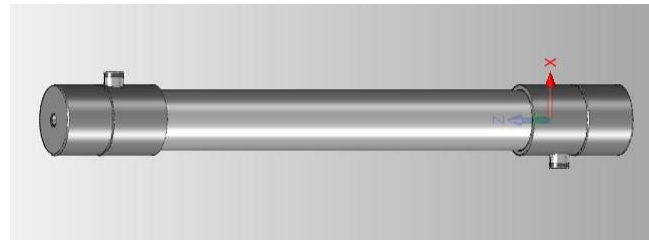


Increase the manufacturing development stage (from MRL 4-5 to MRL 6) a portfolio of materials & membranes

MMMs for Pre- and Post combustion CO₂ capture

Material / product	Starting TRL/MRL	Targeted / Achieved TRL / MRL	Industrial scale production for cost estimation
MOF: ZIF-8 & ZIF-94	MRL4: 100 gr scale	MRL6 :1 kg each MOF for prototype	10-20 tonnes
Polymers	Commercial		
MMMs for Pre- and Post-combustion CO ₂ capture	Up to 100 HF(1 m long) Membrane area: 0.1 m ²	> 10,000 HF (1 m long); Membrane area: 10 m ²	Industrial process production

Pre-combustion CO₂ capture



Post-combustion CO₂ capture



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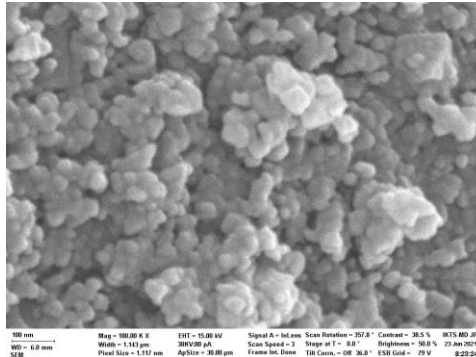
Increase the manufacturing development stage (from MRL 4-5 to MRL 6) a portfolio of materials & membranes

MA-SER: Pure H₂ production with integrated CO₂ capture

Material / product	Starting TRL/MRL	Targeted / Achieved TRL / MRL	Industrial scale production for cost estimation
Sorbent	MRL4: < 1 kg/day	MRL6: 50 kg/day (250 kg for prototype)	500 kg/day
Catalyst	MRL4: gr scale	MRL6: 5 kg per batch (78 kg for prototype)	2 tonnes per day
Pd-based membranes	Single membrane per batch Membrane area: ~ 5 m ²	8 membranes (50 cm long); Membrane area: >55 m ²	Semi-industrial process production



Sorbent

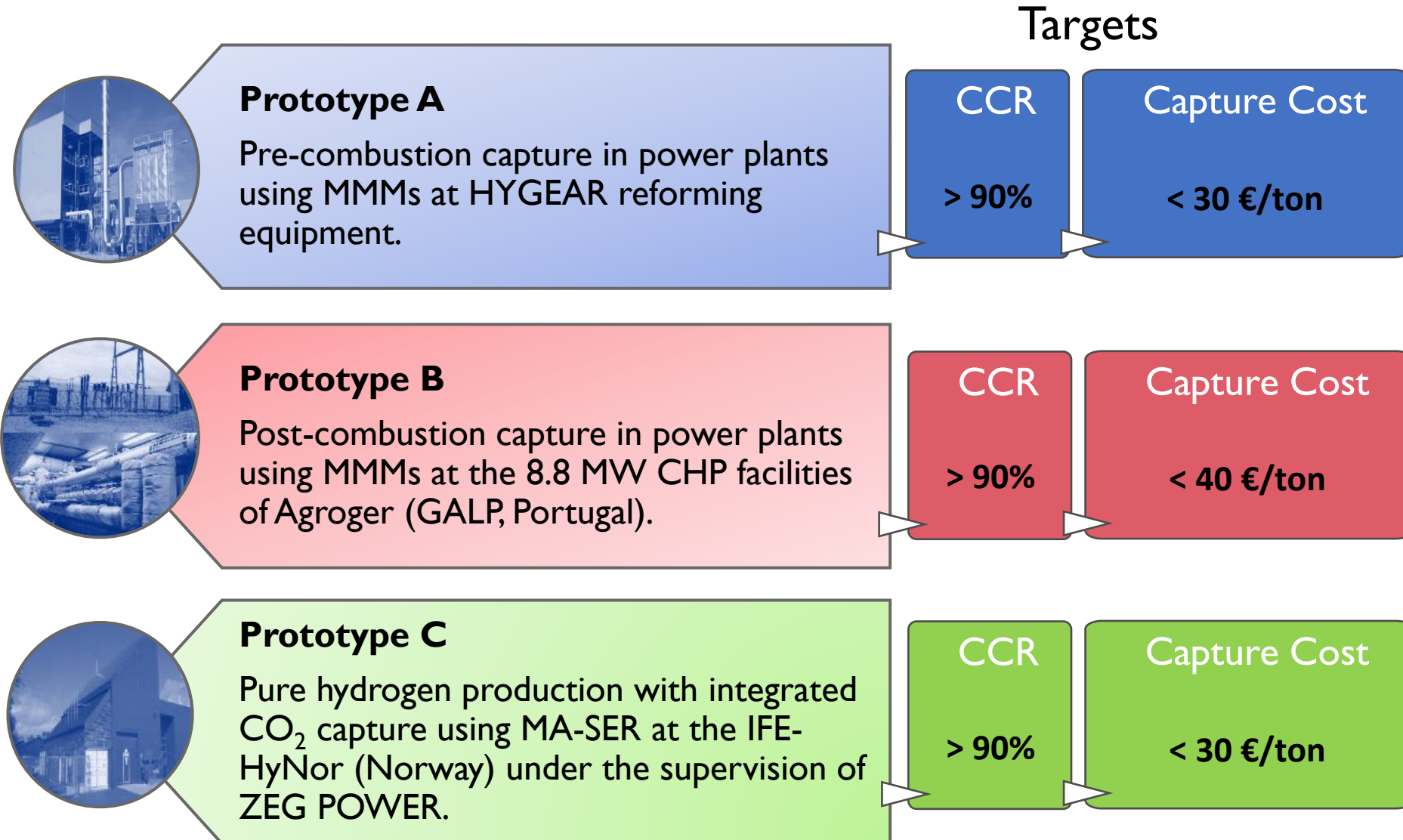


Catalyst



Pd-based membranes

3. Demonstration



4. Expected impact

		#	Main exploitation product/ technologies/ others
PROCESS		1	MMM based system for pre-combustion CO ₂ capture
		2	MMM based system for post-combustion CO ₂ capture
		3	MA-SER system for pure H ₂ production with integrated CO ₂ capture
MATERIALS		4	Advanced polymers for post-combustion MMMs
		5	Advanced MOFs for pre- and post-combustion MMMs
		6	Advanced MMMs for pre- and post-combustion
		7	Advanced sorbents for MA-SER
		8	Advanced catalysts for MA-SER
		9	Advanced Pd-based H ₂ membranes for MA-SER
SERVICE TOOLS		10	Software tool for Membrane reactor and SER design. Membrane separation modules
		11	Consulting services on LCA of CO ₂ capture



Thank you for your attention



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Acknowledgement: For the CO₂ molecule used in the logo: The original uploader was Frederic Marbach at French Wikipedia [GFDL (<http://www.gnu.org/copyleft/fdl.html>)]