



# Turning CO<sub>2</sub> + H<sub>2</sub> Into Valuable Zero Carbon Chemicals, Intermediates and Fuel

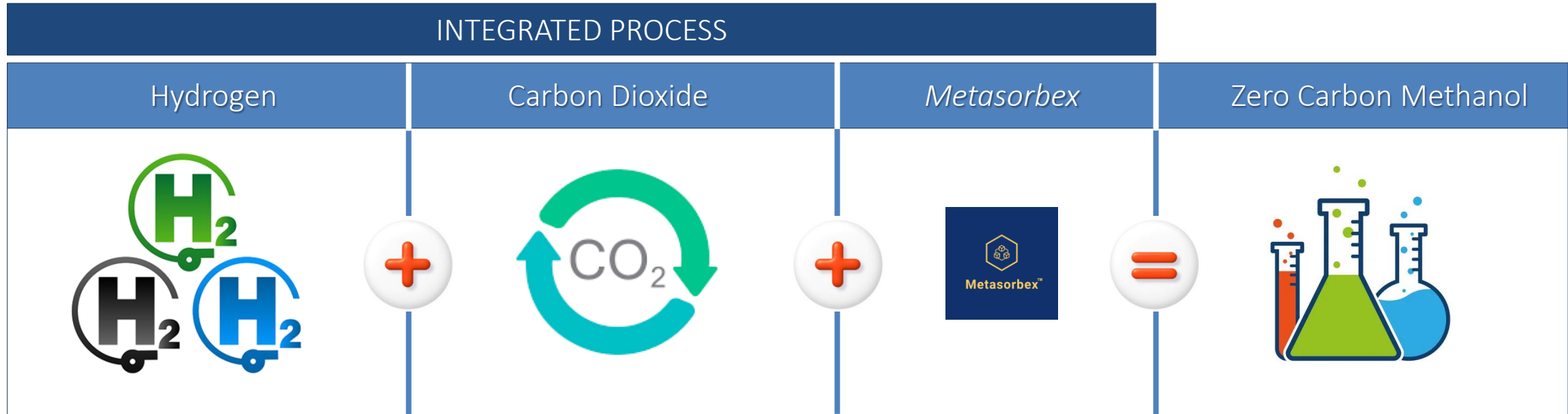
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# Metasorbex Technology Fundamentals



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- Combining H<sub>2</sub> with CO<sub>2</sub> using Metasorbex's patented sorbent/catalyst technology to create zero carbon Methanol.
- Zero carbon Methanol can be used as a fuel/feedstock that can also be derivatized into a whole range of zero/low carbon intermediates.
- The shipping industry desperately wants Zero Carbon fuel to power their global fleets.
- The derivative market is asking for low carbon Methanol to achieve CO<sub>2</sub> reduction goals.
- Turn undesired CO<sub>2</sub> into a valuable feedstock for financial and earthly gain.

# Metasorbex Sorbent/Catalyst Fundamentals



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- The Metasorbex technology is a new kind of **sorbent catalyst** technology developed from knowledge from the graphene industry
- The unique solid sorbent/catalyst technology is made from commonly used materials – how they are put together is what differentiates
- The inventor comes from the graphene industry and has leveraged his knowledge to develop the Metasorbex technology for the Methanol market

## Solid Sorbent:

- 10x adsorptive capacity – 100x regenerative cycles (we've seen over 5,000+) – these features of the technology drive down the cost to produce
- 8x less heat to regenerate – this lowers the operational expense
- The combination creates a much lower COGs to carbon capture
- The result of the Metasorbex technology will produce Methanol at a lower cost than the current high CO2 Methanol
- Patents filed and being expanded

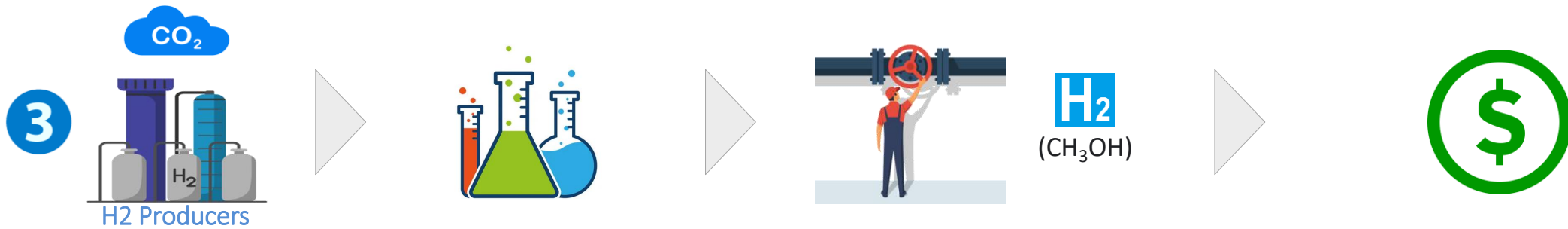
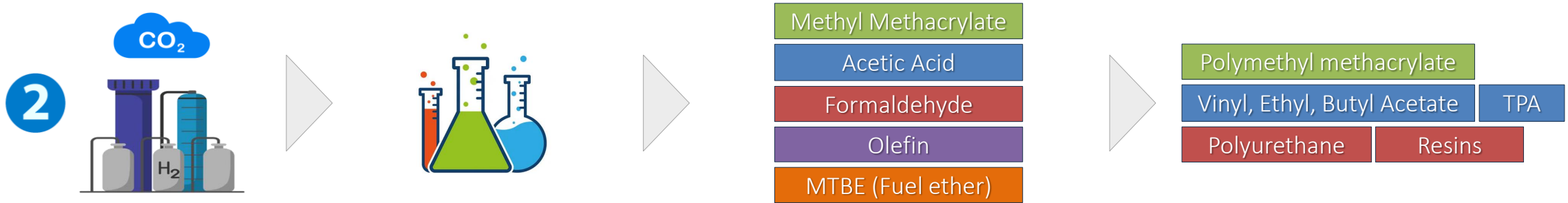
## Catalyst:

- Provides a higher yield
- Improved performance over existing catalysts
- Engineered for higher yield efficiency, not the entire catalyst system
- Patents filed and being expanded
- Metasorbex is innovating by controlling risks in the system for faster scaling

# Metasorbex Path To Market Options



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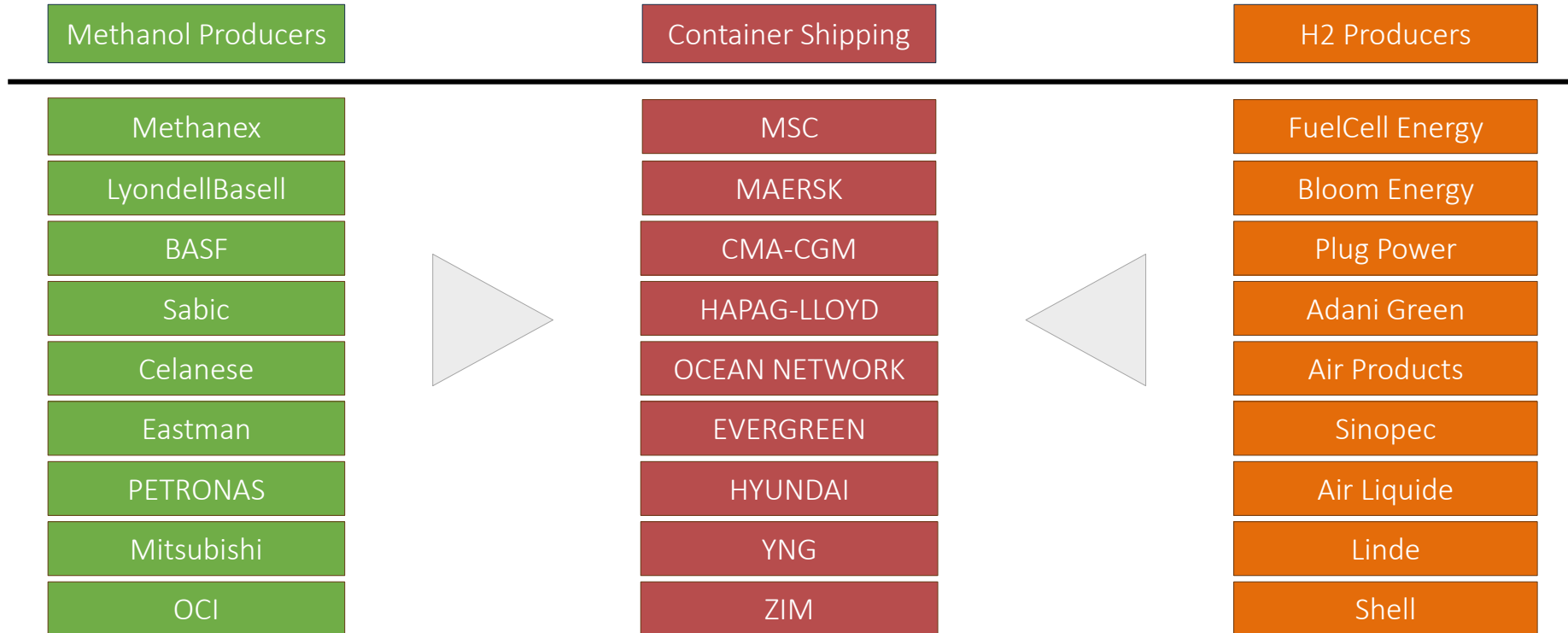


# Metasorbex Potential Fuel Partners



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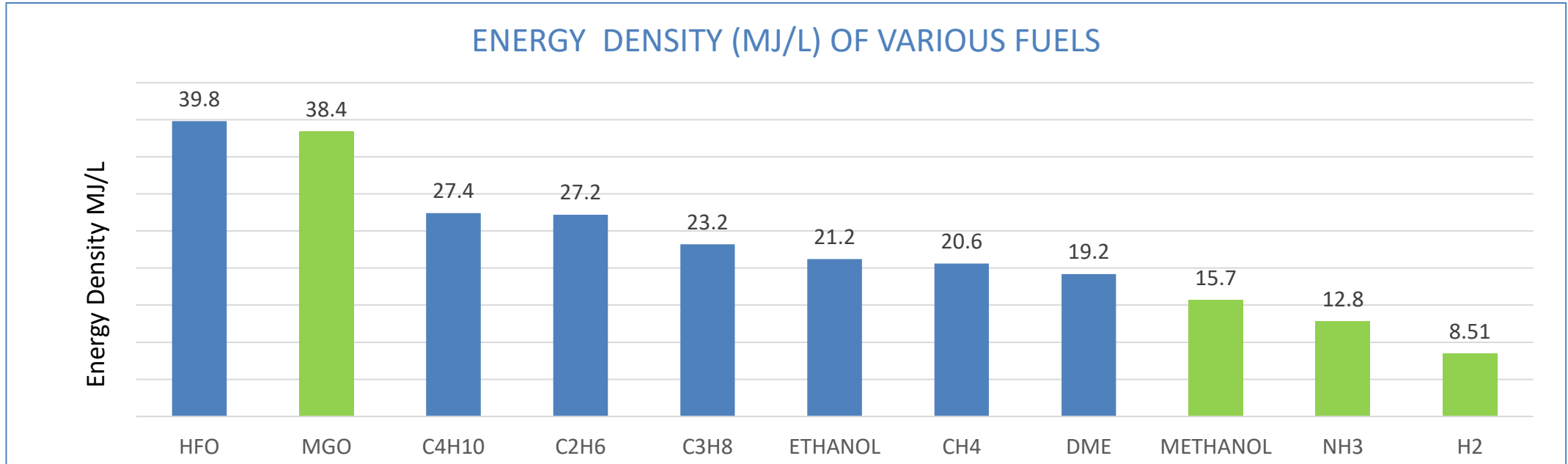
- Methanol producers and H2 producers could become competitors to supply Zero Carbon Methanol to the Fuel market
- Metasorbex is a disruptive enabling technology to bring low cost Zero Carbon fuel to the market

# E-Methanol for Maritime



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## Assumption:

- Constant fuel tank volume
- Constant energy per driven mile

## MGO vs e-Fuel:

- Methanol – 2.45x (less than MGO)
- Ammonia – 3.00x
- H2 – 4.51x



# Metasorbex Potential Chemical Partners



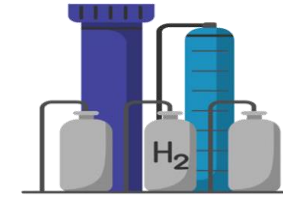
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Methanol CH <sub>3</sub> OH	Acetic Acid CH <sub>3</sub> COOH	Formaldehyde CH <sub>2</sub> O	Methyl Methacrylate C <sub>5</sub> H <sub>8</sub> O <sub>2</sub>	Olefin C <sub>n</sub> H <sub>2n</sub> F	Silicone R <sub>2</sub> SiO
Methanex	Lyondell	BASF	Arkema	Arkema	Dow
LyondellBasell	Eastman	Celanese	Dow	BASF	Evonik
BASF	Celanese	DuPont	Evonik	Braskem	
Sabic	Dow	Evonik		Chevron	
Celanese		Georgia Pacific		Dow	
Mitsubishi		Hexion		Exxon	
				INEOS	
				Shell	

- Methanol is the feedstock that gets sold or made by all the companies that derivatize Methanol into downstream intermediates
- Every company on this chart has an interest in a lower cost zero carbon Methanol
- Lower feedstock cost + better CO<sub>2</sub> footprint = win for industry and planet

# Metasorbex Potential Hydrogen Partners



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H2 Producers	Methanol	Shipping	Acetic Acid	Formaldehyde	Methyl Methacrylate	Olefin	Silicone
FuelCell Energy	Methanex	MSC	Lyondell	BASF	Arkema	Arkema	Dow
Bloom Energy	LyondellBasell	MAERSK	Eastman	Celanese	Dow	BASF	Evonik
Plug Power	BASF	CMA-CGM	Celanese	DuPont	Evonik	Braskem	
Adani Green	Sabic	HAPAG-LLOYD	Dow	Evonik		Chevron	
Air Products	Celanese	OCEAN NETWORK		Georgia Pacific		Dow	
Sinopec	Mitsubishi	EVERGREEN		Hexion		Exxon	
Air Liquide		HYUNDAI				INEOS	
Linde		YNG				Shell	
Shell		ZIM					

- Hydrogen Producers can take the generated CO2 from making H2 and loop in around with the H2 and quickly be in the Methanol market
- They can supply the Methanol producers, or they can compete against the Methanol producers
- The revenue generation from producing Methanol is far more beneficial than any tax credits or the cost to sequester it



# The Ask



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- Metasorbex Technology has been demonstrated at lab scale
- IP filed and being expanded
- Looking for industry investors to scale technology Metasorbex technology to next level with in-kind or cash
- Seeking industry partners who understand the chemical industry and the value of a Zero Carbon Methanol for fuel and chemical markets
- Received small investment from VC community
- The primary value is using the waste stream of CO<sub>2</sub> +H<sub>2</sub> as feedstocks to create a lower cost Zero Carbon Methanol
- Low CAPEX bolt on options for high volume production for the H<sub>2</sub> industry
- Shipping container industry now has an option to dramatically lower CO<sub>2</sub> footprint while lowering fuel expense
- Chemical companies buying Methanol can reduce their annual spend on Methanol by producing their needs at a lower cost than buying
- The added benefit will be a lower CO<sub>2</sub> footprint with a lower cost
- The go-to-market strategy will be a licensing model of the sorbent/catalyst technology

