

HYDROGEN – A VERSATILE CLEAN ENERGY CARRIER

19th Annual Renewable Energy Law Institute
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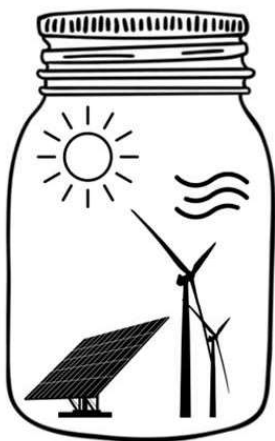
Michael Lewis

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Sunlight and Wind in a Jar

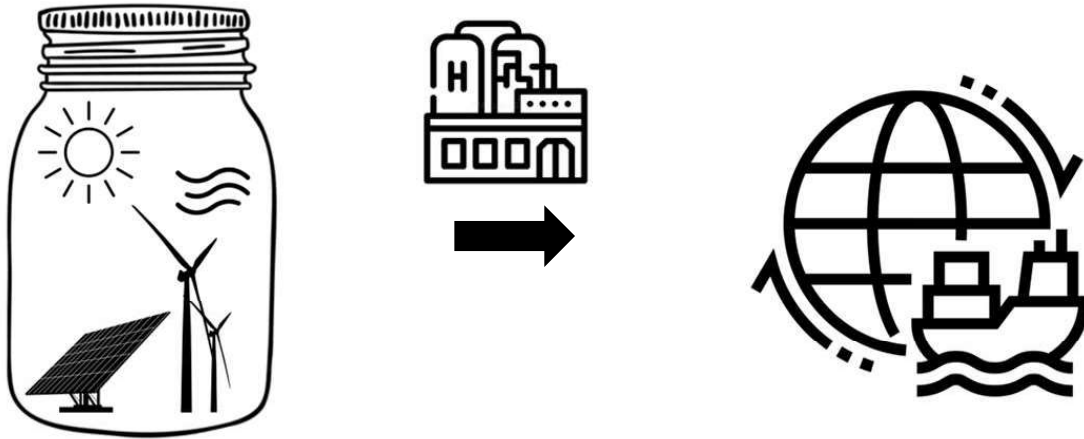
How can we capture sunlight and wind at large scale and ship it around the world?



2

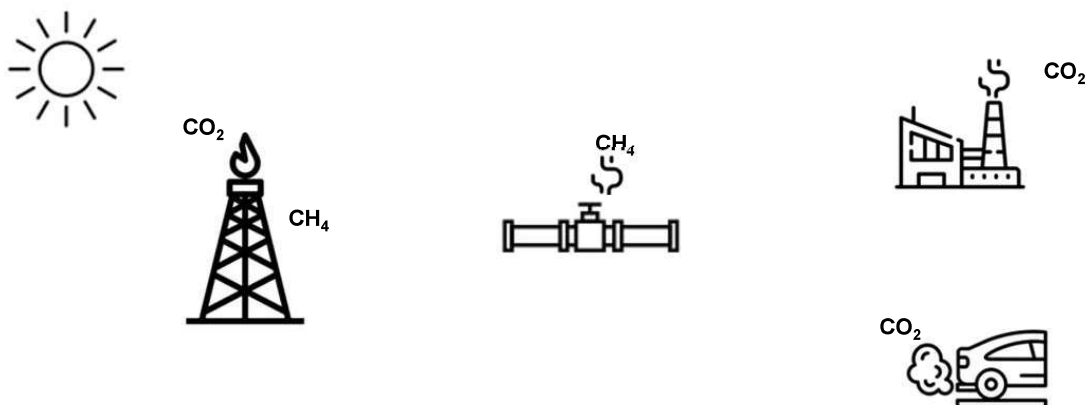
Hydrogen is a versatile clean energy carrier

Hydrogen can allow us to “bottle” wind and solar power and move it around the world?



3

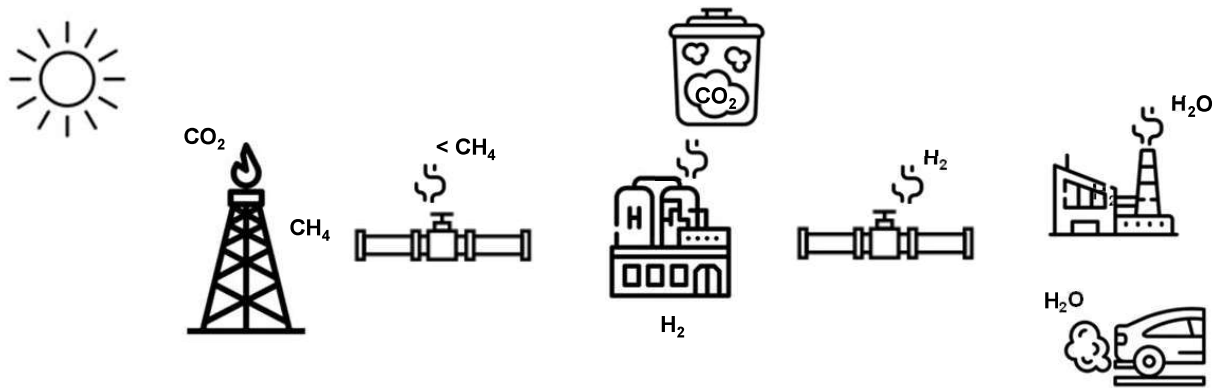
Hydrogen from Fossil Fuels



The Sun and Earth worked long and hard to provide to effectively store hydrogen in fossil fuels. How can we use this valuable energy resource while capturing and managing the carbon responsibly?

4

Hydrogen is a versatile clean energy carrier



We can capture carbon with hydrogen production, and then clean hydrogen can then be transported and used in numerous applications, thereby reducing emissions at many tailpipes and smokestacks around the world.

5

Hydrogen 1.01

1	H
Hydrogen	
1.008	

- Most abundant element in the universe
- Present in common substances (water, sugar, methane)
- Very high energy by weight (3X more than gasoline)
- A versatile clean energy carrier with a wide range of applications

Challenges

- Rarely found naturally, typically make from water or hydrocarbon sources
- Production, storage, and transport are all energy intensive due to poor gravimetric density

How we will use and produce hydrogen is not without controversy

- Today costs are relatively high and infrastructure is limited
- Hydrogen emissions can prolong GHG in the atmosphere
- Water use is a local community issue

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"Hydrogen as an Emerging Low-Carbon Energy Solution: What's Old is New Again"