

# Sourcing Green Methanol

DNV Nordic Roadmap Workshop

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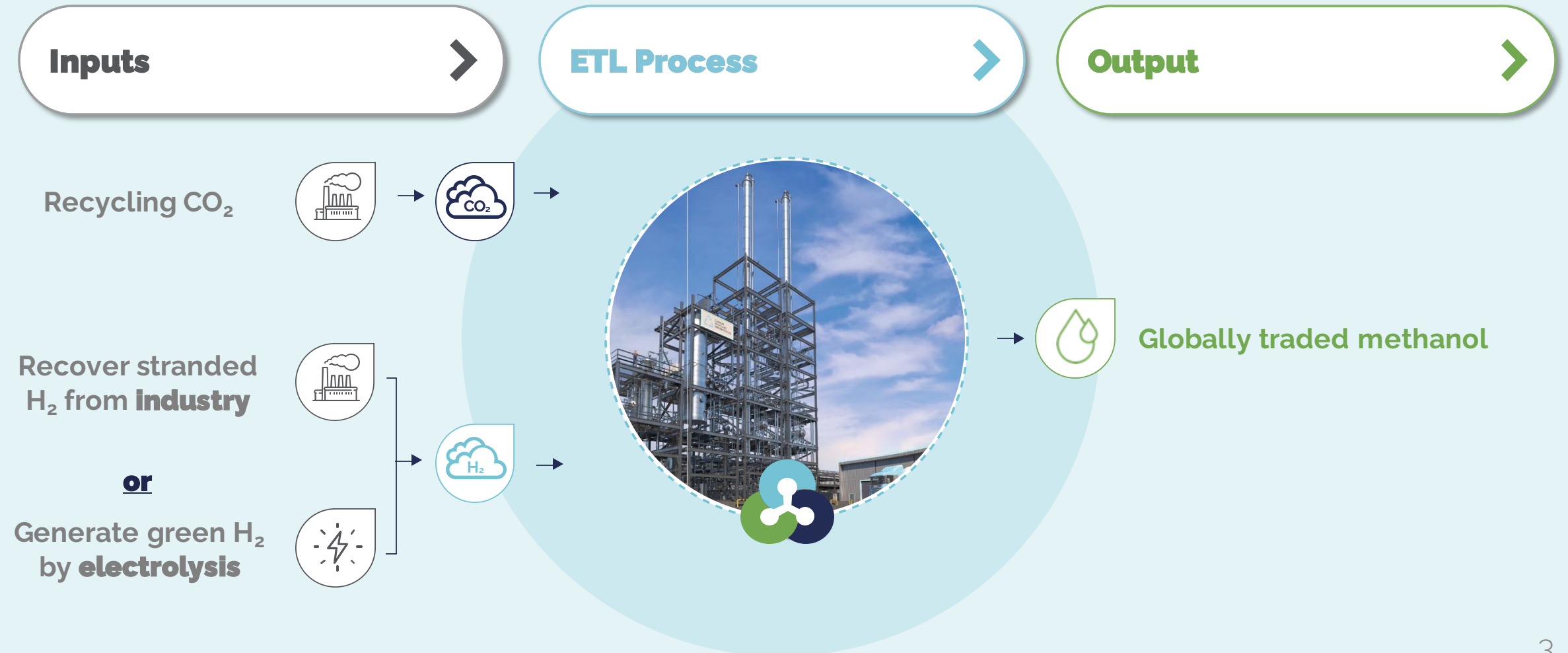


# **CRI transforms captured carbon into sustainable methanol**





# CRI has a patented process converting waste CO<sub>2</sub> into sustainable methanol





**CARBON  
RECYCLING  
INTERNATIONAL**  
carbonrecycling.is

# CRI industry leader with the first e-methanol plant



**George Olah Plant, Svartsengi, Iceland**

**Client:** Carbon Recycling International  
**Capacity:** 4000 tons/year (5,040,000 litres)

#### **Innovations**

- ✓ Emissions-to-Liquids industrial demonstration
- ✓ First CO<sub>2</sub> hydrogenation plant
- ✓ Megawatt-scale electrolysis
- ✓ Kiloton-scale CO<sub>2</sub> utilization
- ✓ Low-turndown synthesis
- ✓ First sales of e-methanol branded as Vulcanol®





# Pioneering e-methanol in marine applications



World's first e-methanol bunkering in Gothenburg, June 2021. Part of the EU funded FReSMe project.



Stena Germanica



MS Innogy



# Successful launch of 100kt CO<sub>2</sub> to Methanol plants



**Shunli plant – Henan province - 2022**



**Sailboat plant – Jiangsu province - 2023**

# Maritime industry demand for sustainable methanol predicted to soar

>200 methanol-equipped ships were ordered/constructed since 2016

**ESVAGT Orsted**

 **MAERSK**

**danans**

 **OCEAN YIELD**

**Van Oord**   
Marine ingenuity

  
**Stena Bulk**  
INNOVATION & PERFORMANCE

 **VALE**

**ONE**  
OCEAN NETWORK EXPRESS

 **CMA CGM**

 **AAL**



EU Fit for 55 package introduces binding CO2 targets for ships from 2023



Readily available technology and available engines



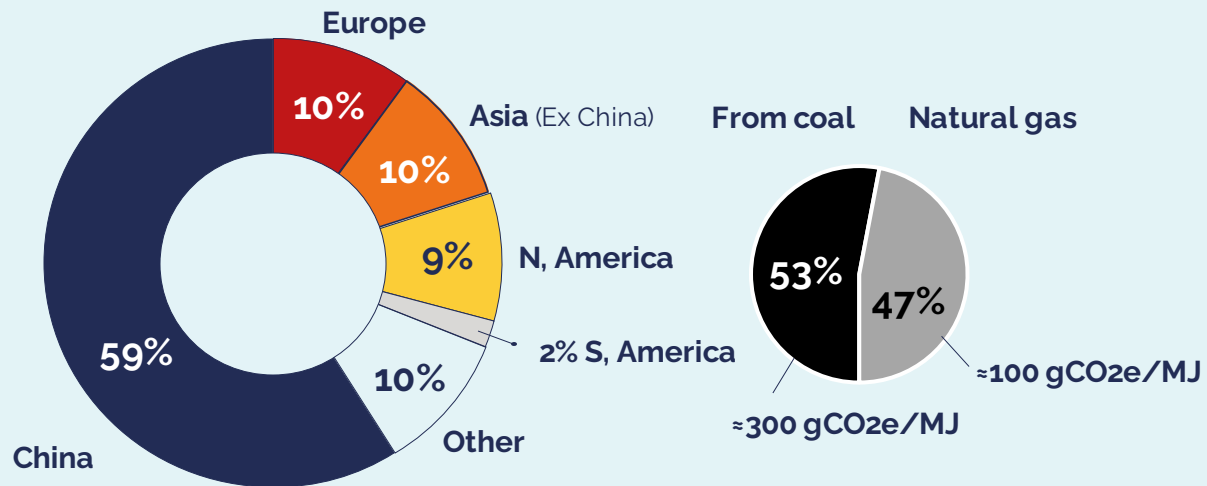
Methanol is available in multiple ports with known distribution systems



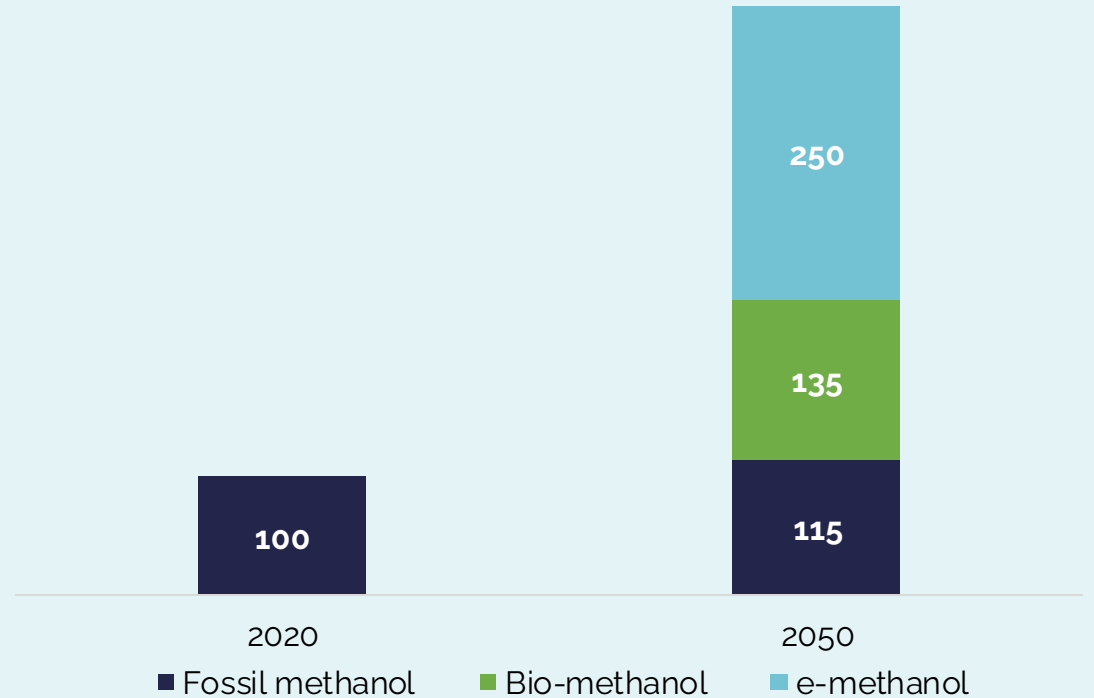
Easy to store and to reuse current oil infrastructure

# Demand for methanol increasing annually

## Demand by region and source of supply



## Estimated methanol production by source (mt)

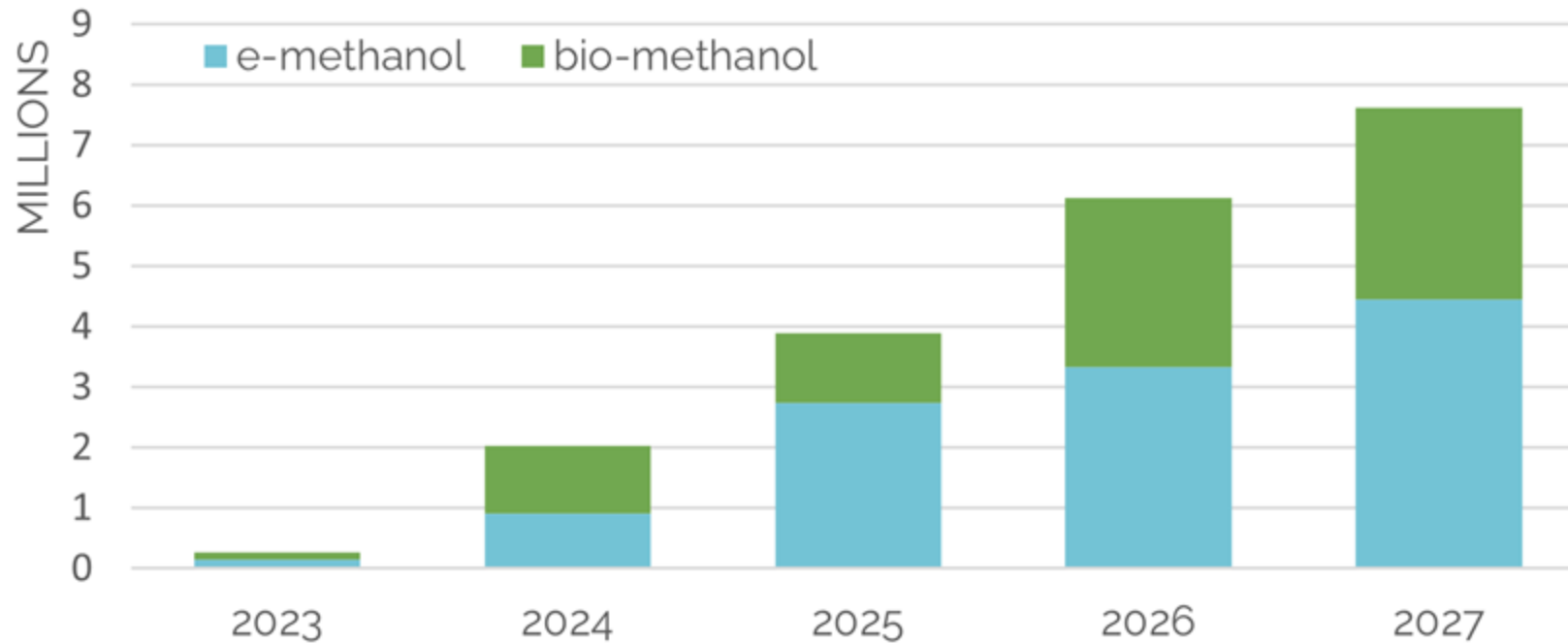




# Capacity for Renewable Methanol to grow rapidly

## Renewable Methanol

Cumulative production capacity, metric tons



Source: Methanol Institute database of announced/planned renewable methanol projects

# Competing demand for Sustainable methanol



Chemical Feedstock

Buildings, clothes,  
pharmaceuticals, cars

Maritime fuel

Direct fossil fuel  
replacement


Sustainable Aviation Fuel (SAF)

Alternative route for  
methanol-to-jet



# What will determine the ramp up in production?

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-  Economics -> Levelized cost of green Hydrogen
-  Access to energy and infrastructure
-  Access to acceptable carbon sources
-  Supporting policy framework
-  Demand and consumer willingness to pay
-  Willingness to invest in projects and long-term offtake



# A lesson from history

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**The marine sector needs to take the lead to secure its supply of sustainable fuels**

1911 – Churchill decides to switch the Royal Navy from coal to oil.

Strategic decision that required securing new supply lines.

The world is at another energy transition crossroads.  
Who will lead the way?







**CARBON  
RECYCLING  
INTERNATIONAL**

Carbon Recycling International

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**THANK YOU.**

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