

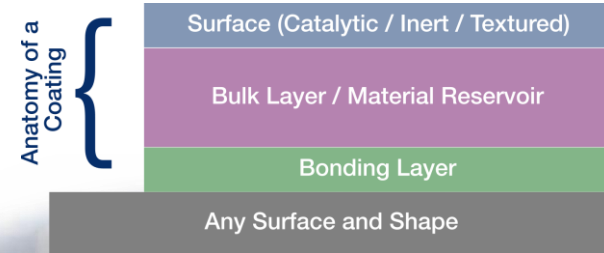
Carbon-Negative Methanol and eFuels Production from Captured Carbon Dioxide and Green Hydrogen

Project Completion Report

October-2026

About Quantiam

- Over 26 years in operation in Alberta.
- We are a **catalysts** and **coatings** company.
- We **develop** solutions for extreme process conditions:
 - Energy and Emissions-intensive processes
 - Alternative Energy/eFuels
 - Temperature-driven degradation
 - Wear and Corrosion Mitigation
- We **deliver** research-driven solutions to partners' pain points.
- We **partner** globally.



Quantiam and the Circular Economy to Low-Carbon Energy

Green Hydrogen and Clean Methanol are critical for low carbon fuels and the circular economy.

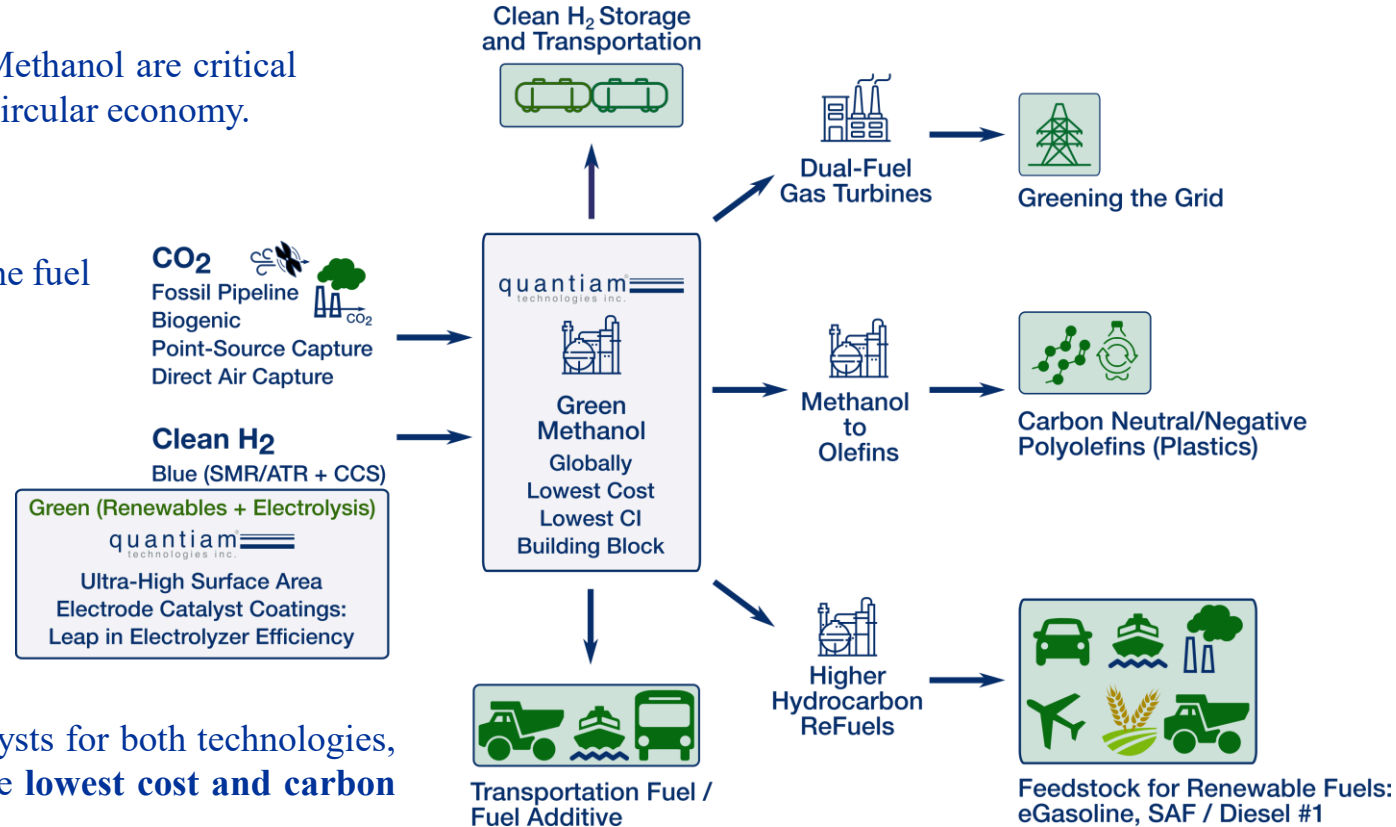
Green Methanol:

- Marine fuel
- Internal combustion engine fuel
- Blending additive
- Hydrogen carrier
- Chemical feedstock

Green Hydrogen:

- Methanol feedstock
- Zero carbon energy
- Fertilizer production
- Chemical feedstock

Quantiam is developing catalysts for both technologies, enabling Clean Fuels with the **lowest cost and carbon intensity on the market.**



Green Methanol Production Overview



Incumbent methanol from natural gas or coal.

- Mature, efficient but high GHG.
- CCUS can reduce GHG but increases cost.



Biomethanol from MSW or biomass gasification.

- Requires extra H_2 , increasing cost.



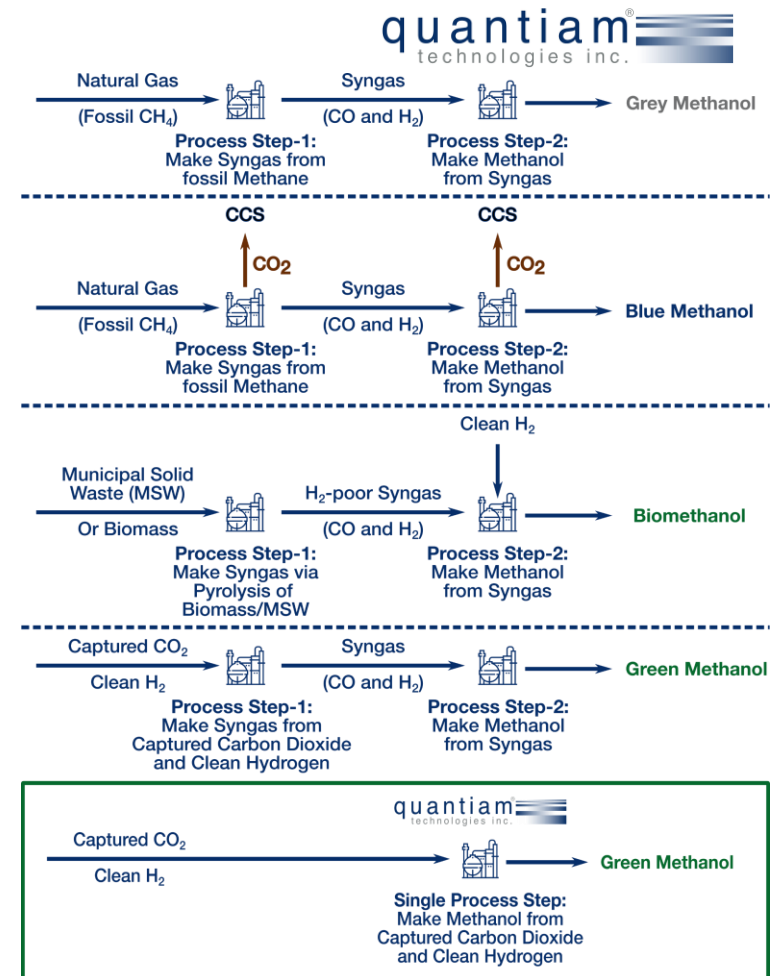
Incumbent Methanol from CO_2 and H_2

- Indirect, via syngas – reduced process efficiency and higher cost.



quantiam[®] technologies inc. - Green Methanol

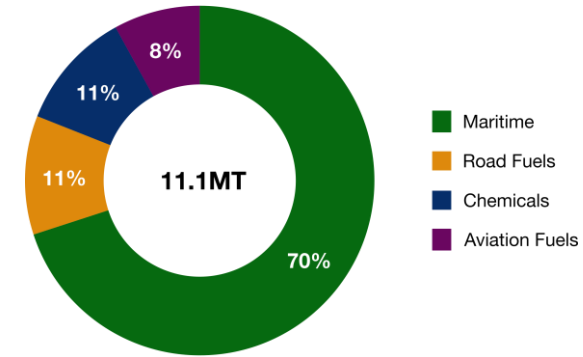
- Direct – lowest cost, most efficient.



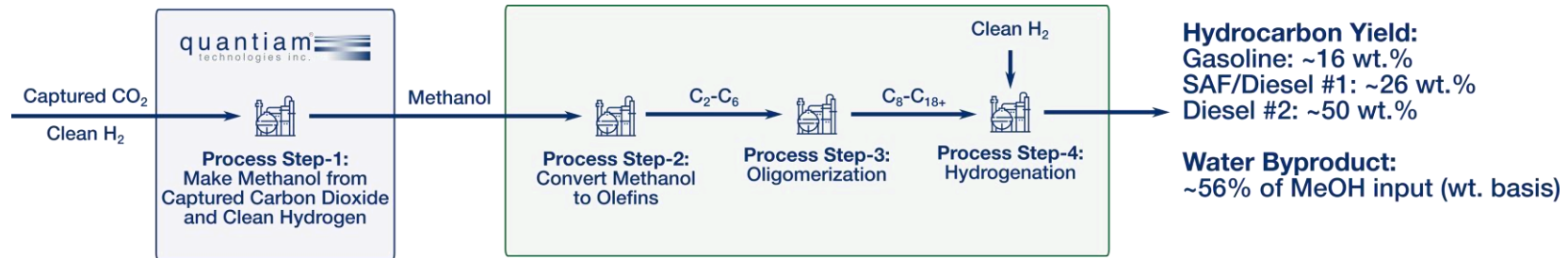
Quantiam's Clean Methanol to Higher Low-carbon Fuels

- The global clean-fuel markets are expanding rapidly, with notable growth in both land and maritime transport, as well as increasing demand for sustainable aviation fuels (SAFs).
- Clean Methanol is the perfect precursor for technologically mature Methanol-to-Fuel pathways to make SAFs, synthetic gasoline and diesel with some of the lowest carbon intensities on the planet.
- Commercial third-party technology can be licensed to produce synthetic diesel from our clean methanol.

Renewable Methanol Demand 2030



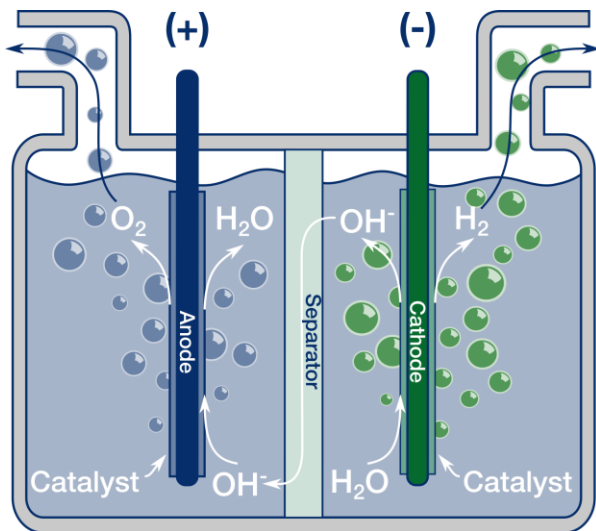
Source: Gena Solutions



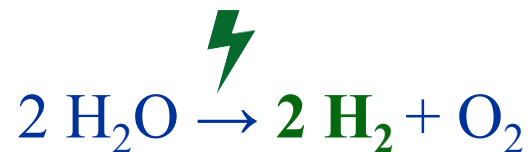
Green Methanol Enabled by Quantiam's Green Hydrogen

Hydrogen feedstock prices drive the cost of the production of Clean Methanol. Quantiam has developed world-class catalytic coatings for the anodes and cathodes used in alkaline water electrolysis (AWE) stacks that greatly increase electrolyzer performance enabling cost-effective Green Hydrogen production at scale.

Traditional Water Electrolysis

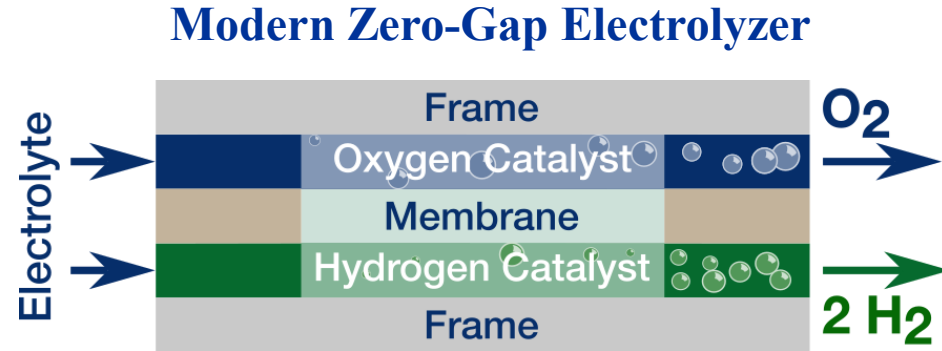


- **Green hydrogen** is produced using renewable electricity and water electrolysis.
- Electrolysis splits water into hydrogen and oxygen inside an electrolyzer.



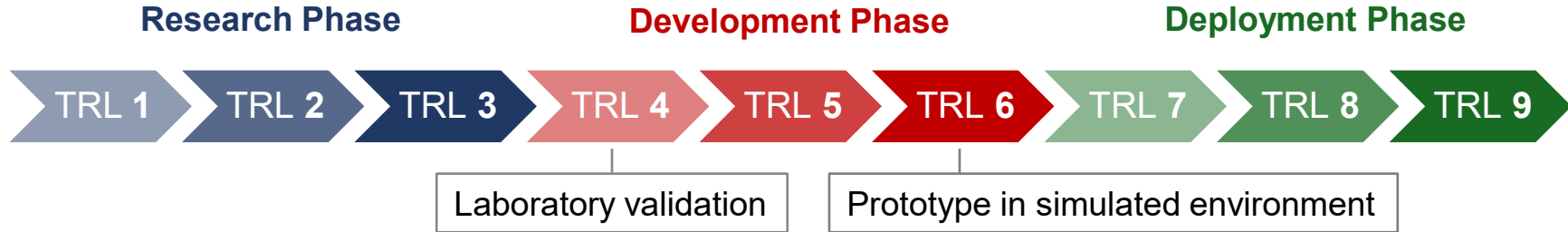
Quantiam's Green Hydrogen Advantage - Catalysts

- Alkaline Water Electrolysis (AWE) is a mature technology, in use since the 1900s.
- It is well suited for large scale Green Hydrogen production.
- It is lower cost than other electrolysis technologies such as PEM or SOEC - AWE electrolyzers are made from cheap, robust construction materials.
- Previously, AWE was limited in current density and on/off time. New advances in electrolyzer technology have
 - removed these limitations.
- Currently, electrolyzer efficiency is a major driver of the high cost of green hydrogen.
- Quantiam's disruptive catalysts greatly increase electrolyzer efficiency** – reducing the energy costs of Green Hydrogen Production.
 - Our catalysts will allow AWE to reach cost parity with fossil fuel hydrogen production methods.



NRCan Project: Scaling Green Methanol and Green Hydrogen Catalyst Production

With partial funding from Natural Resources Canada, Quantiam progressed through Technology Readiness Levels (TRL) 4–6.

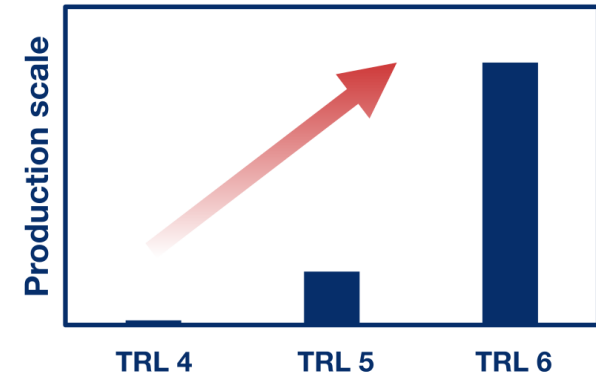


Scale-up:

- The Methanol and Hydrogen catalyst production was **scaled 50x** from TRL 4 to 6.
- Our ability to coat larger electrode surfaces with the Green Hydrogen catalyst simultaneous increased.

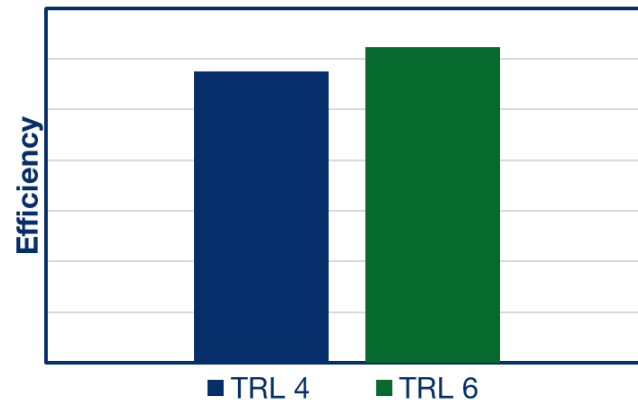
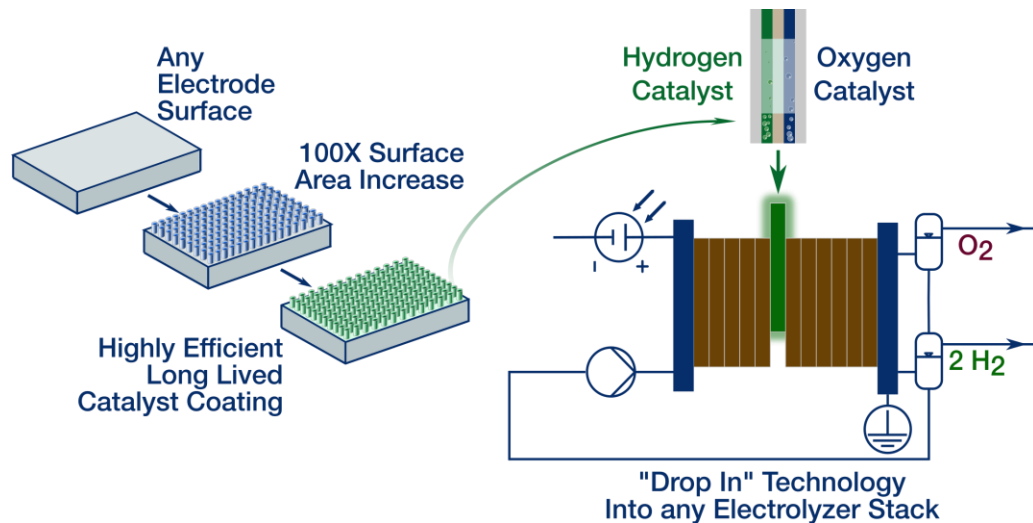
Superior Performance:

- Quantiam's catalyst performance was maintained or improved while scaling the production processes.



Quantiam's Green Hydrogen Technology and Scaling

Quantiam's alkaline water electrolysis (AWE) catalysts use earth abundant, supply chain risk-free materials, offering the performance of typical noble-metal catalysts at a fraction of the cost. Our proprietary catalysts can be coated onto any electrode enabling easy drop-in installation into any electrolyzer stack design.

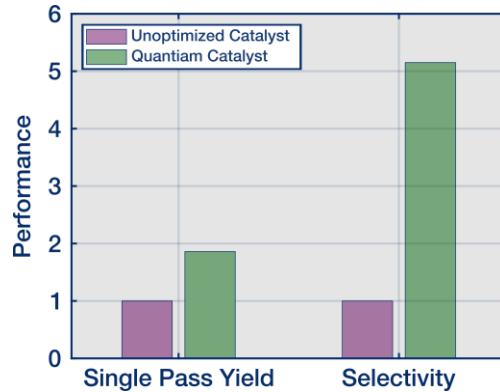


Through continued R&D, the performance of our Green Hydrogen catalysts was **further improved**. Third party testing (NRC Vancouver) confirmed a **16% improvement** in electrolyzer performance vs simple electrodes.

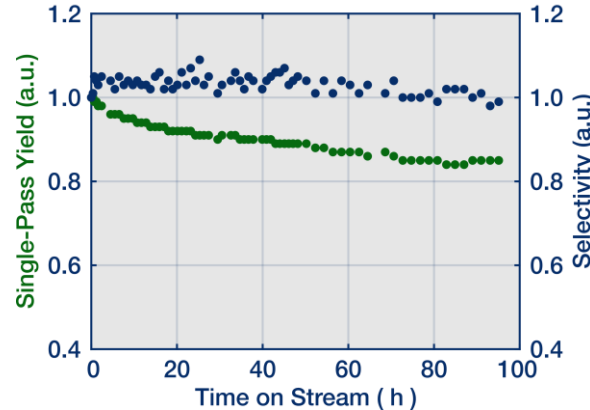
Quantiam's Green Methanol Technology and Scaling

Quantiam's catalysts for Clean Methanol production are designed specifically for **Carbon Dioxide-only feeds**, enabling high yield, high conversion and excellent robustness.

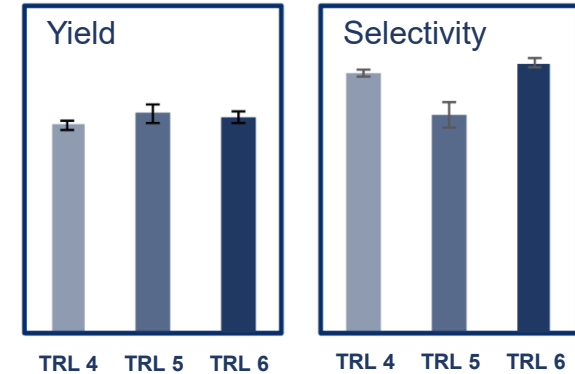
Yield and selectivity:



Stability:



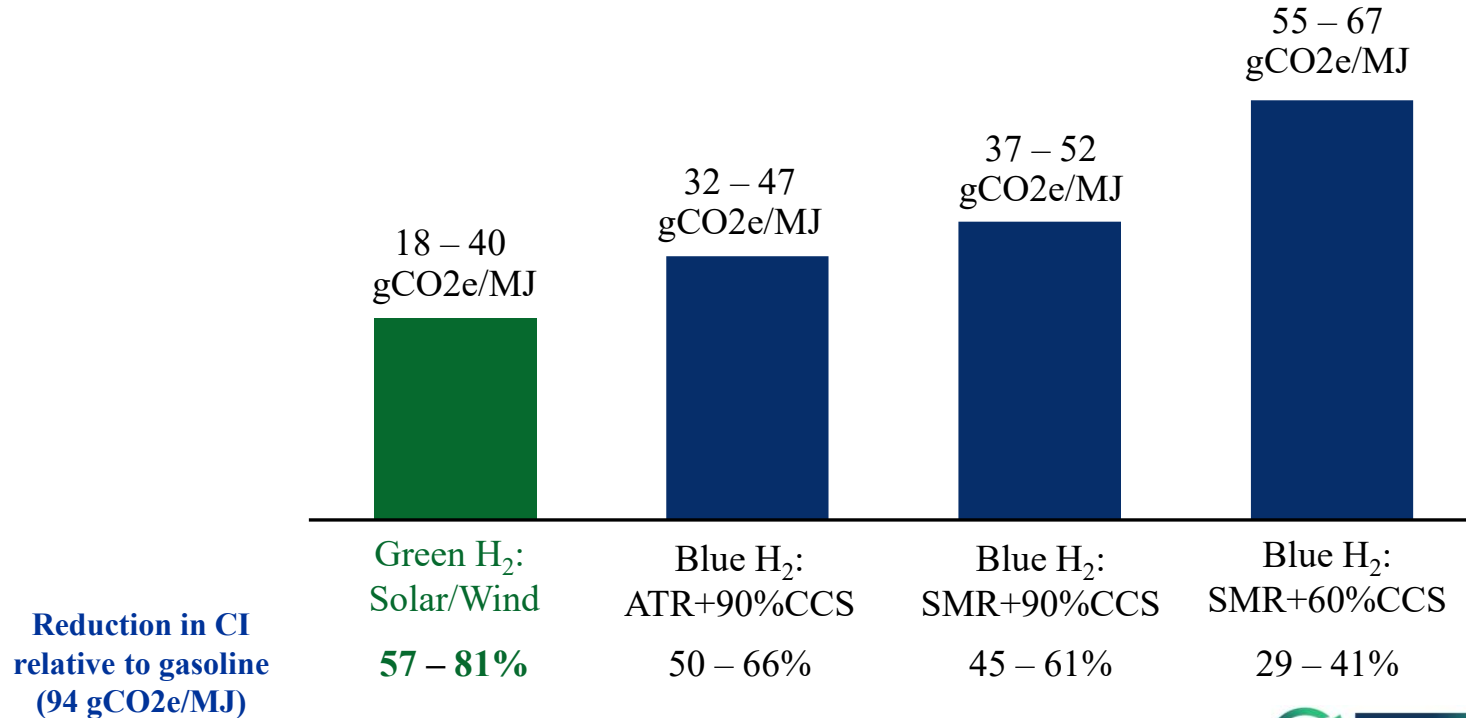
Scaling:



- The superior selectivity and yield reduces CAPEX and OPEX.
- **Minimizes H₂ needs** – H₂ is 95% of OPEX.
- Designed for **maximum resistance** and reliability.
- Resistant to **mechanical, thermal** and **chemical** attack.
- Performance maintained despite an **50x increase** in production scale.
- This progress positions Quantiam towards technology deployment.

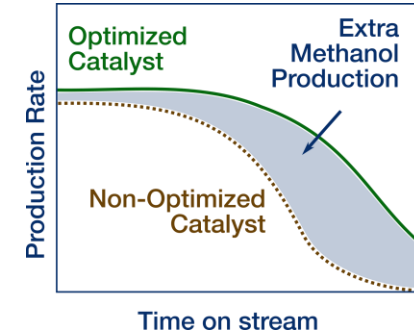
GHG Benefits: Quantiam Clean Methanol Production and Use

At commercial scale, **Quantiam's low cost, low CI Clean Methanol** is projected to have a Well-to-Wheel carbon intensity that is 30% to 80% less than fossil gasoline as verified by a third-party European global expert:



Economic Benefits: Quantiam Clean Methanol Production and Use

- Quantiam Green Methanol using Green H₂ from Quantiam-enabled AWE is projected to be cost-competitive with natural gas-to-methanol *even in the absence of carbon credits*.
- Quantiam Clean Methanol utilizing Clean H₂ from ATR with 90% CCS is projected to *cost less to produce than conventional Grey Methanol*.



Methanol Production Method	Estimated Well-to-Gate CI (t CO ₂ e/t MeOH)	Estimated Well-to-Gate CI (gCO ₂ e/MJ)	Estimated Cost-to-Produce (\$CAD/L)
Grey Methanol (incumbent)	0.77	+31	\$0.25
Blue Methanol	0.02 to 0.34	+1 to +15	>\$0.30
Biomethanol	-1.1 to 0.76	-50 to +33	\$0.32 - 1.10
Green Methanol (indirect)	< -0.7	<-30	\$0.62
Green Methanol (direct)	< -0.9	<-40	\$0.31 - 0.67
Quantiam Green Methanol with Quantiam-enabled Green Hydrogen	-1.1	-51	\$0.28 - 0.35
Quantiam Clean Methanol using ATR- CCS Clean Hydrogen	-0.8	-37	\$0.16 - 0.21

Quantiam's Post-Project Technology Roadmap

- Project success has allowed Quantiam to move to the next stage of technology development: a Facility Pilot Plant with three trains:
 - A principal train to produce methanol from carbon dioxide and hydrogen using Quantiam's Green Methanol catalysts.
 - An AWE train equipped with Quantiam's Green Hydrogen catalysts to produce the hydrogen feedstock.
 - A third train utilizing licensed technology to produce synthetic gasoline or synthetic diesel from methanol.
- The \$16.2M project has secured both public and private funding and is now proceeding for a 2030 completion.

