



JOINING FORCES

On Waste-to-Sustainable Fuels
Technology Deployment

JANUARY 24, 2024



Enerkem

ENERKEM: LEADER IN LOW-CI SOLUTIONS

For hard-to-abate sectors



285+

Highly skilled and
professional employees



120+

Patents



Multiple

Projects in construction
and development

World-Class Strategic Partners

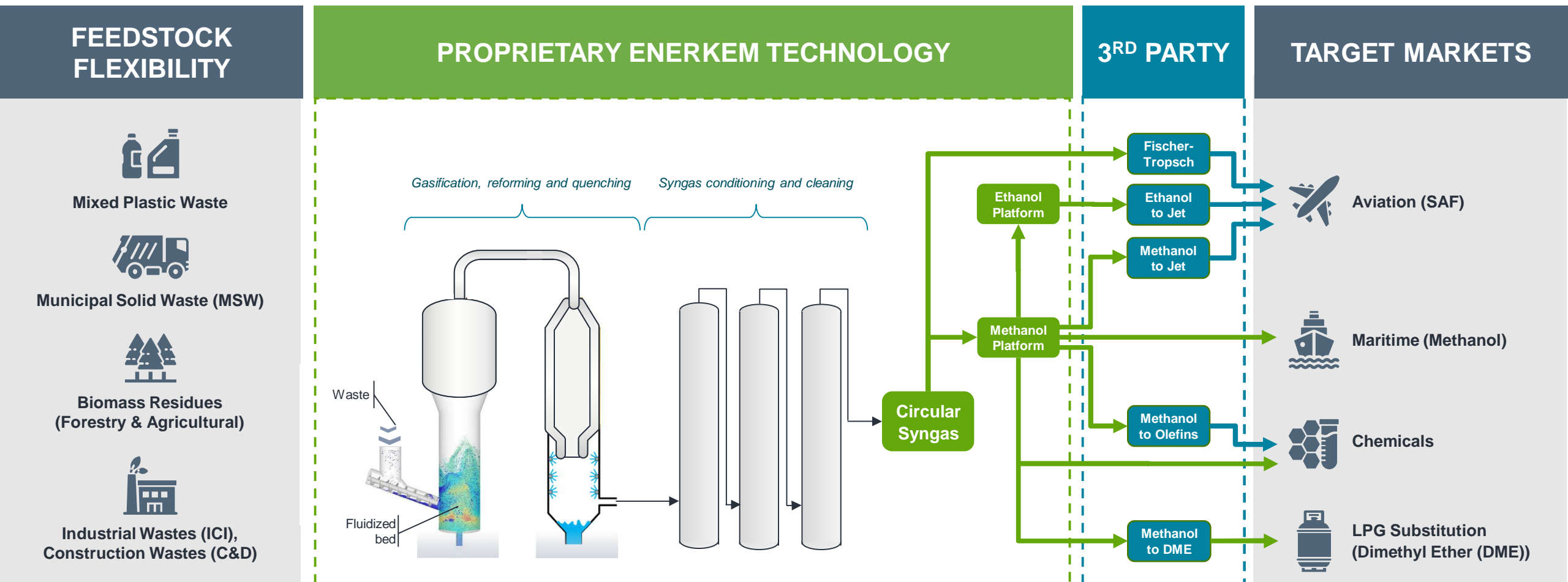




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KEY ENABLING TECHNOLOGY

From non-recyclable waste materials to sustainable fuels and chemicals





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OUR COMPETITIVE ADVANTAGE

Five reasons to choose Enerkem

MATURITY



In commercial roll-out



FEEDSTOCK FLEXIBILITY



Handling
the widest breadth
of feedstock

PRODUCT DIVERSITY



Multiple
low-Cl end-products
pathways

SCALABILITY



Large volumes,
in and out

VERSATILITY



Adaptable to feedstock
and regulations
changes

LEADING TECHNOLOGY ENABLING LOW-Cl HYDROGEN ECONOMY



Enerkem

OUR BUSINESS MODEL

A flexible and structured business model to accelerate deployment

WHO ARE OUR CLIENTS?

What are their needs?

TRADITIONAL CLIENTS

Desire to operate, owners of the facilities, need for adaptation, developers

OFFTAKERS CLIENTS

Those interested solely in the product, partners who have land or raw materials, etc.

OUR OFFER

Enerkem Technologies

- **Engineering services:** support for pre-feasibility / feasibility, PDP, support for feed, etc.
- **Proprietary equipment**
- **Support services:** marketing, feedstock evaluation, training, pre-commissioning and commissioning, operations, etc.

DevCo

- Project development: sites, permits, feedstock & H2 sourcing, financing, replicability (MeOH)
- Feed via 3rd party EP (Core Process & BOP)
- **Product purchase agreement offtake required to obtain AssetCo financing**
- Project execution via AssetCo or traditional client

Technology License

Commercial collaboration with Technip

Development with technological partnerships (e.g. SAF, DME, ..)

COMMERCIAL ROLL-OUT



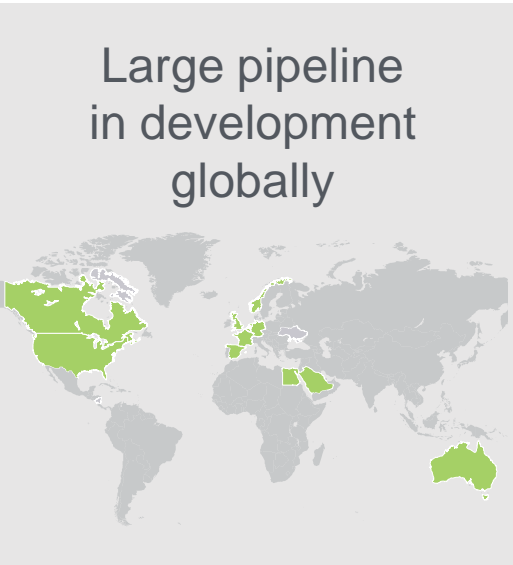
Partners



Sustainable methanol



Renewable and recycled carbon dimethyl ether (DME)



Focused on methanol for marine fuel and SAF



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LEVERAGING OUR PARTNERSHIP



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- Technology License
- Proprietary Equipment
- Support Services



**TECHNIP
ENERGIES**

- Concept / Feasibility Studies
- Front End Engineering Design (FEED)
- Detailed Engineering
- Procurement
- Fabrication / Construction management

A leading Engineering & Technology company for the Energy Transition



Technip Energies at a glance

Listed on Euronext Paris Stock Exchange	Headquartered in Paris	65 Years of operations
€6.4B Full year 2022 adjusted revenue	A leading Engineering & Technology company for the Energy Transition	~€18B Backlog at end September 2023
~15,000 Employees in 35 countries	25+ Leading proprietary technologies	450 projects Under execution

Talented global workforce across 35 countries

Providing flexible execution and proximity to customers

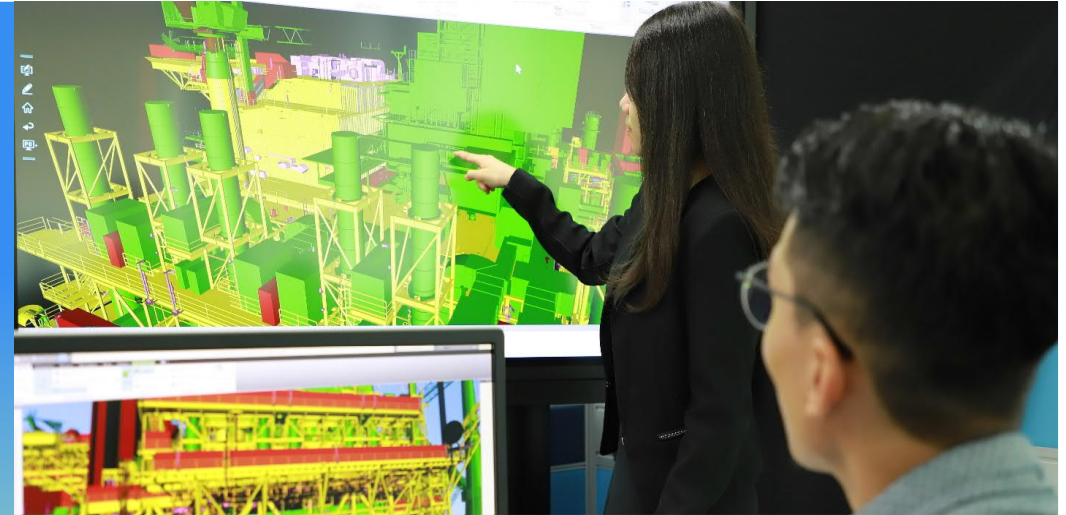


A diversified provider of projects, technologies, products and services



Projects Delivery

- Engineering and project management expertise
- Technology integration on complex projects
- Balanced portfolio. Diversified contract models and commercial selectivity.



Technology, Products & Services

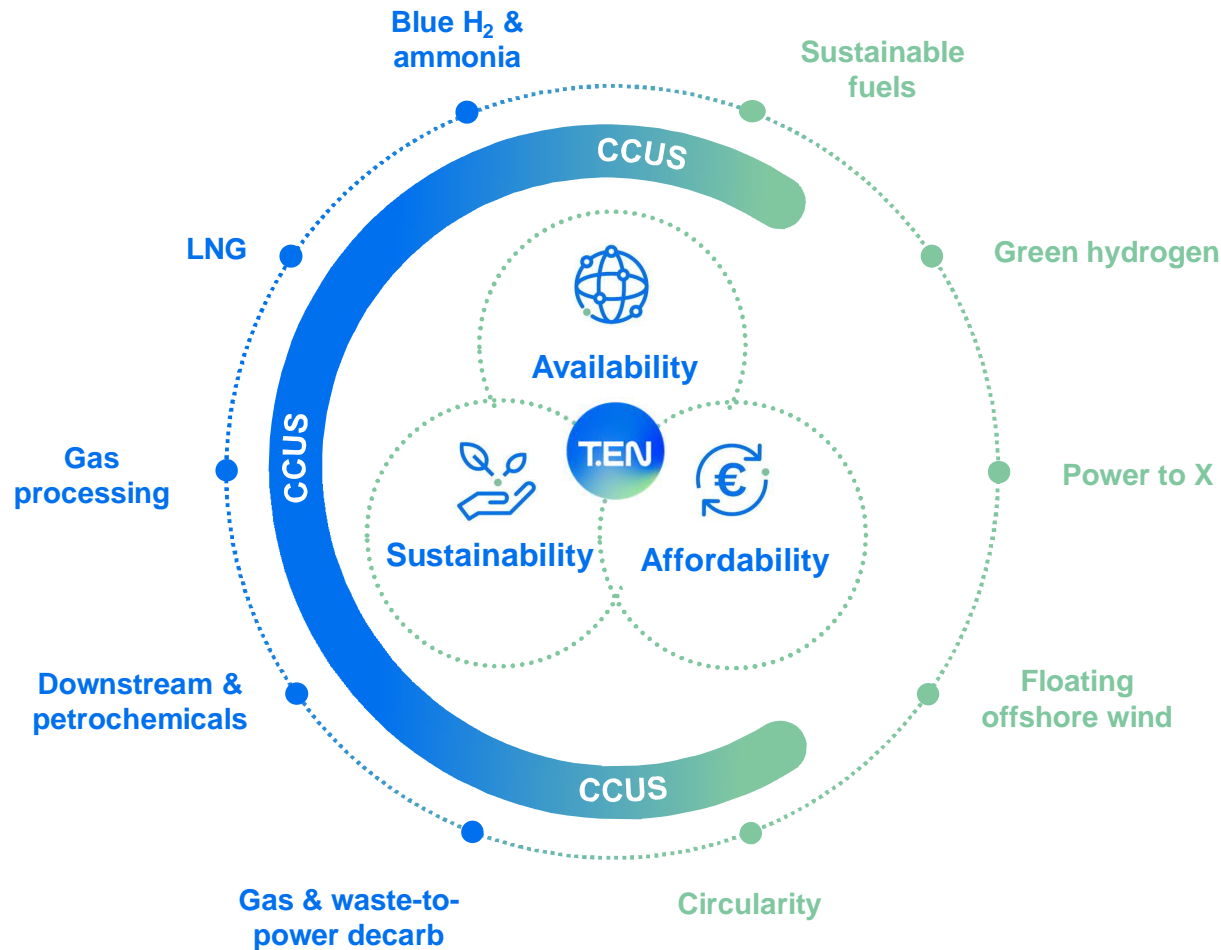
- Technology and proprietary products
- Concept, feasibility, FEED, studies and licensing
- Advisory and consultancy accelerated by digital

Macro outlook: more energy, less carbon

T.EN's solutions for tackling the energy trilemma

Investment in traditional energies

- Energy security drives urgent agenda
- Multi-year expansion phase required
- Decarbonization: CCUS, circularity, electrification



Accelerating low-carbon energies

- Market evolution supported by Government policy
- Corporate commitments to reach net zero targets
- Creating conditions for structural long-term growth

T.EN's Energy Transition journey



CCUS



>30Mtpa

T.EN portfolio from study, FEED, follow-up activities



Clean H₂ / Power-to-X



>3GW

T.EN portfolio in study through to execution phase



Sustainable Fuels



>3Mtpa

T.EN portfolio in Licensing, Studies, FEED, Execute phase projects



FOW



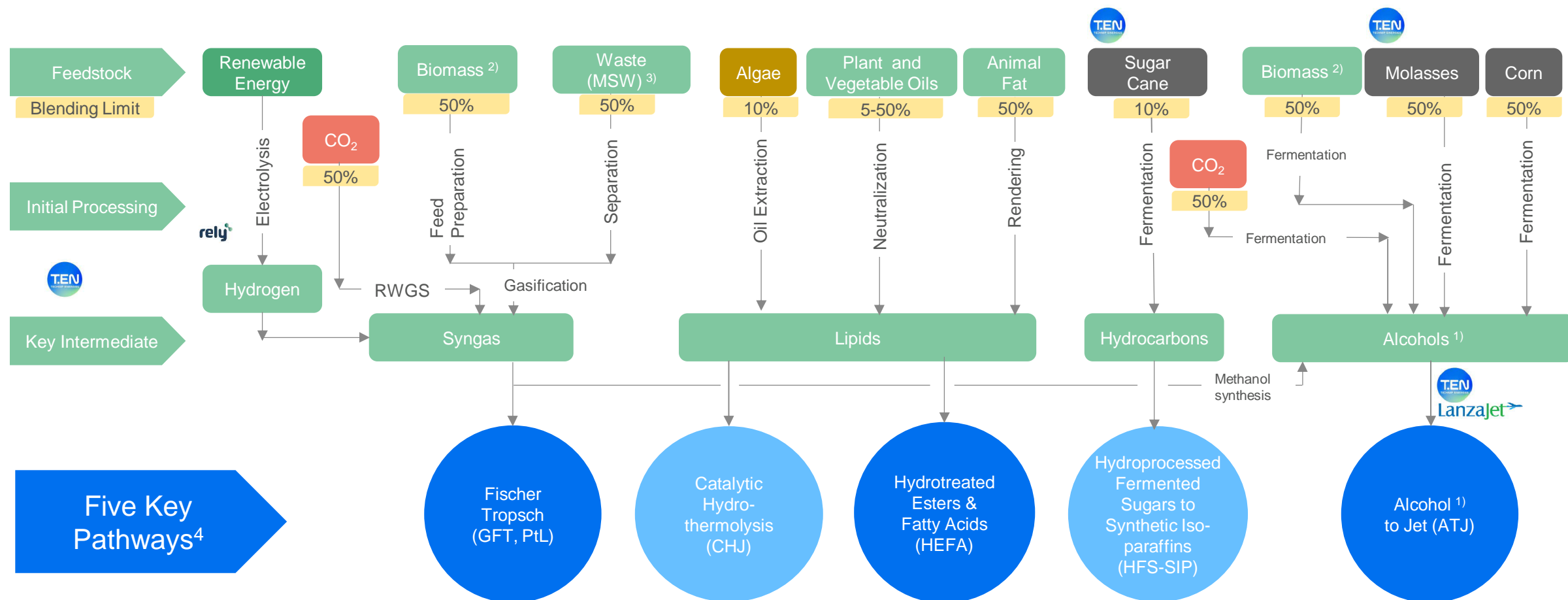
>4GW

Activities in FEED stage utilizing INO15™ by T.EN

Five Key Process Pathways for SAF



Innovation driven by access to novel feedstocks

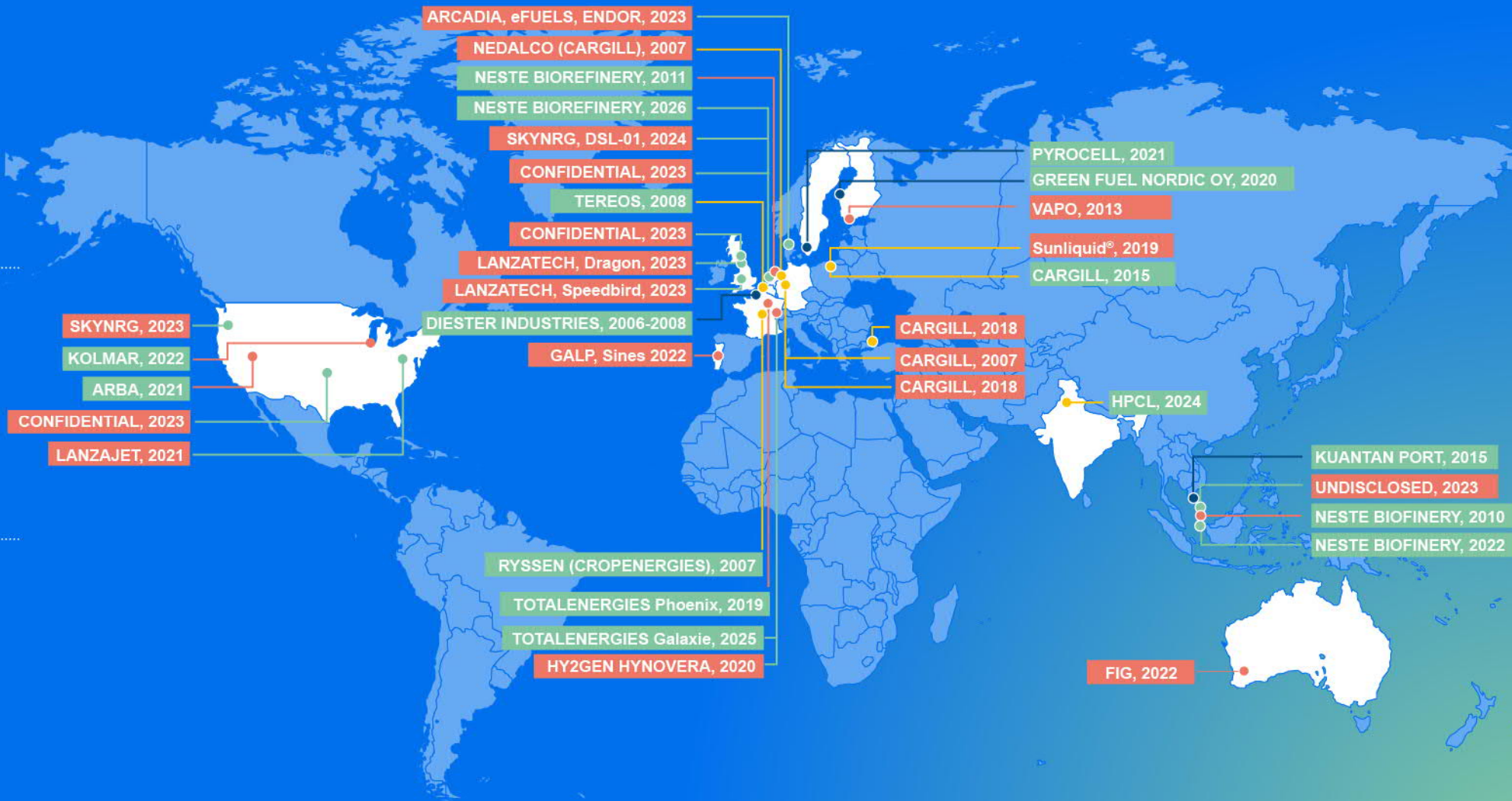


T.EN Sustainable fuels project references



Our global
experience
across
the globe

- EPsCm/EPC
- FS/PDP/FEED
- Ethanol
- Renewable Diesel
- Sustainable Aviation Fuel
- Others





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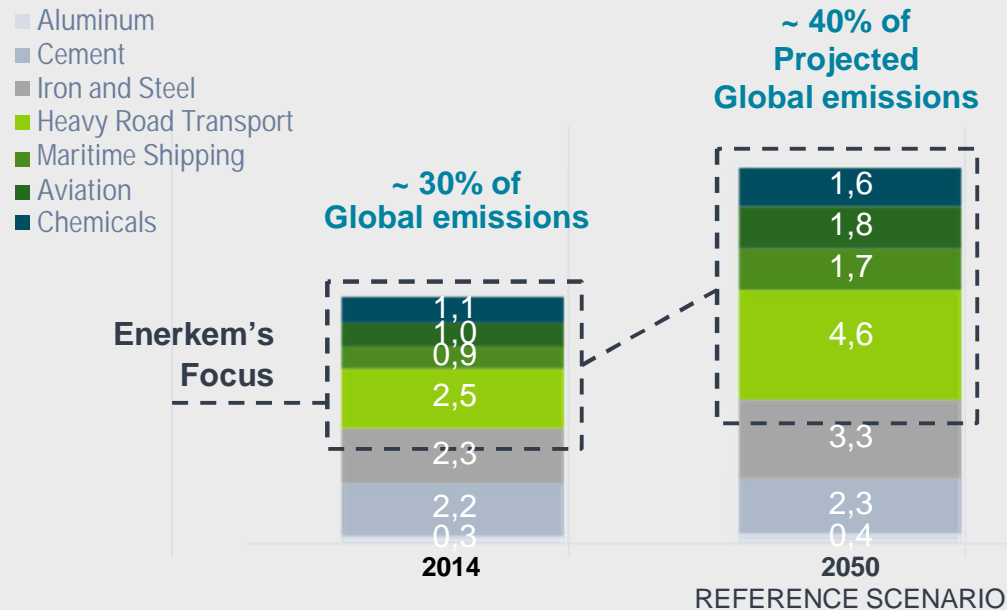
ENERKEM SOLUTION

SAF 2nd Generation

Target Markets: Hard-to-Abate Sectors

Hard-to-abate sectors are responsible for more than ~30% of CO₂ emissions

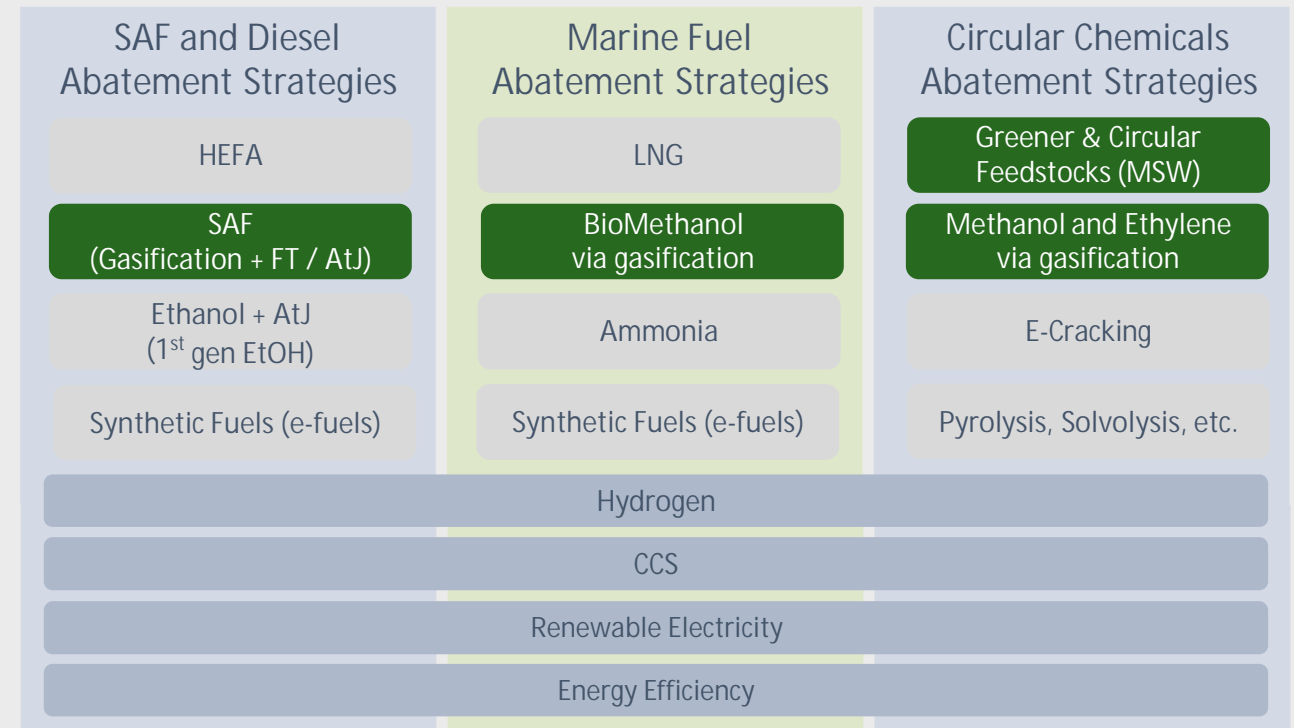
Direct Emissions from Hard-to-Abate Sectors (GT CO₂)



Source: IEA

Gasification at Core of Decarbonisation Strategy

Versatile technology that can be used for energy, fuels, chemicals, hydrogen and reach negative CO₂ emissions





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THE WORLD IS EVOLVING IN THE RIGHT DIRECTION

For a sustainable future



GHG
Abatement

Net-Zero emissions
economy by 2050



Key
Regulations

Fostering
robust demand for
sustainable products



Financial
Support

Grants, Funds, Tax Credits
and other financial instruments
in key jurisdictions



Expanding
Markets

Customer demand
follows government action
for the energy transition

Waste and residues
are a global strategic feedstock



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POWERFUL FEEDSTOCK STRATEGY

SUSTAINABLE



- Alternative to landfill and incineration
- Reducing demand for virgin raw materials

FLEXIBLE



- Processing a wide-range of waste materials
- Responding to changing waste composition and availability as well as market conditions

SCALABLE



- Ability to process large quantities of feedstock
- Addressing the global waste management challenge

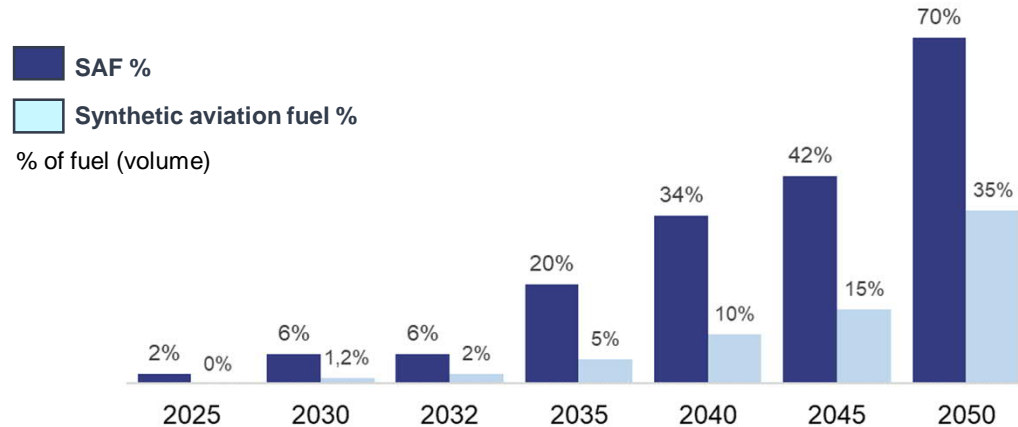


REGULATORY CHANGES DRIVING SUSTAINABILITY

In the Aviation Sector

ReFuel EU Aviation Regulation

- Under this new regulation, **aviation fuel suppliers** must ensure that all aviation fuel made available to aircraft operators at each airport in the European Union contains the mandated minimum shares of SAF and synthetic aviation fuel (see below).
- Biofuels, RCF and RFNBO are eligible. Food and feed crop-based fuels are excluded.
- Non-compliance results in a fine on aviation fuel suppliers (twice the difference between avg. SAF price and avg. fossil kerosene price).



EU ETS and RED III

EU ETS

- Airlines will gradually need to cover their emissions under the European Emissions Trading Scheme (ETS): 25% in 2024, 50% in 2025 and 100% from 2026.
- The emissions cap will gradually decrease every year by a factor of 4.3% from 2024-2027 and 4.4% from 2028-2030.
- This applies to intra-European flights, including departing flights to the UK and Switzerland. Emissions from extra-European flights will be covered under the International Civil Aviation Organization's carbon offset system (CORSIA).

RED III

- Under the Renewable Energy Directive III, Member States must increase their targets of renewable energy or GHG emissions reduction in the transport sector.
- To encourage uptake in sustainable fuels, RED III allows Member States to use **multipliers** on the energy content of certain fuels:
 - **2.4x** Multiplier for Annex IX Part A in Aviation
 - **3x** Multiplier for RFNBOs in Aviation
- **This translates into extra credits & incentives for sustainable fuels in the aviation sector.**



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LIMITED SOLUTIONS AND MANDATORY OFFSETS TO DRIVE EXPONENTIAL SAF DEMAND

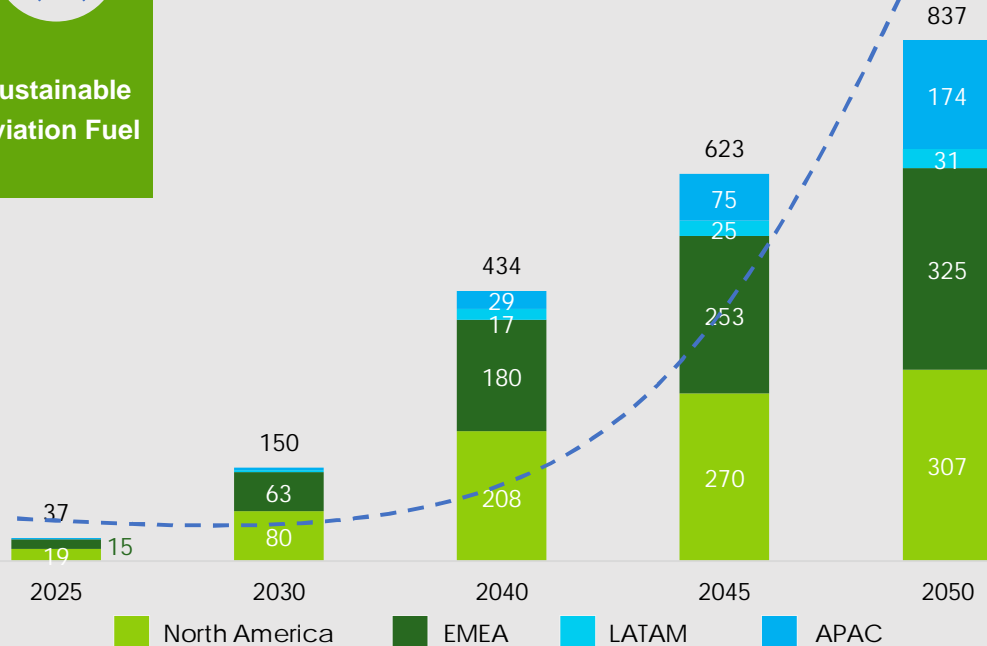
Projected Global SAF Demand Outlook

Barrels/day, thousands



Sustainable Aviation Fuel

2025 – 2050
CAGR: ~13%



Market Opportunity

- Total SAF demand expected to increase by CAGR of ~13% through 2050
- Stronger aviation outlook supportive of higher jet fuel consumption
- Industry likely turns to SAF to meet decarbonization goals as other measures (e.g., energy efficiency) are exhausted



Potential for SAF

- SAF is a leading solution for the aviation industry with numerous airlines supporting its development through offtake and equity investments
- Existing infrastructure further supports SAF as a “drop-in” fuel; with certain pathways allowed to blend up to 50%



Regulatory Support

- EU will impose a blending mandate for SAF on airlines, and aviation will be included in the EU carbon market
- In the US, 40B (2023-24) 45Z PTC credit applicable to SAF is between \$1.25 -1.75/gallon
- In British-Columbia (Canada), aviation will be included in the LCFS, with a dual mandate for jet fuel (CI based + volume)

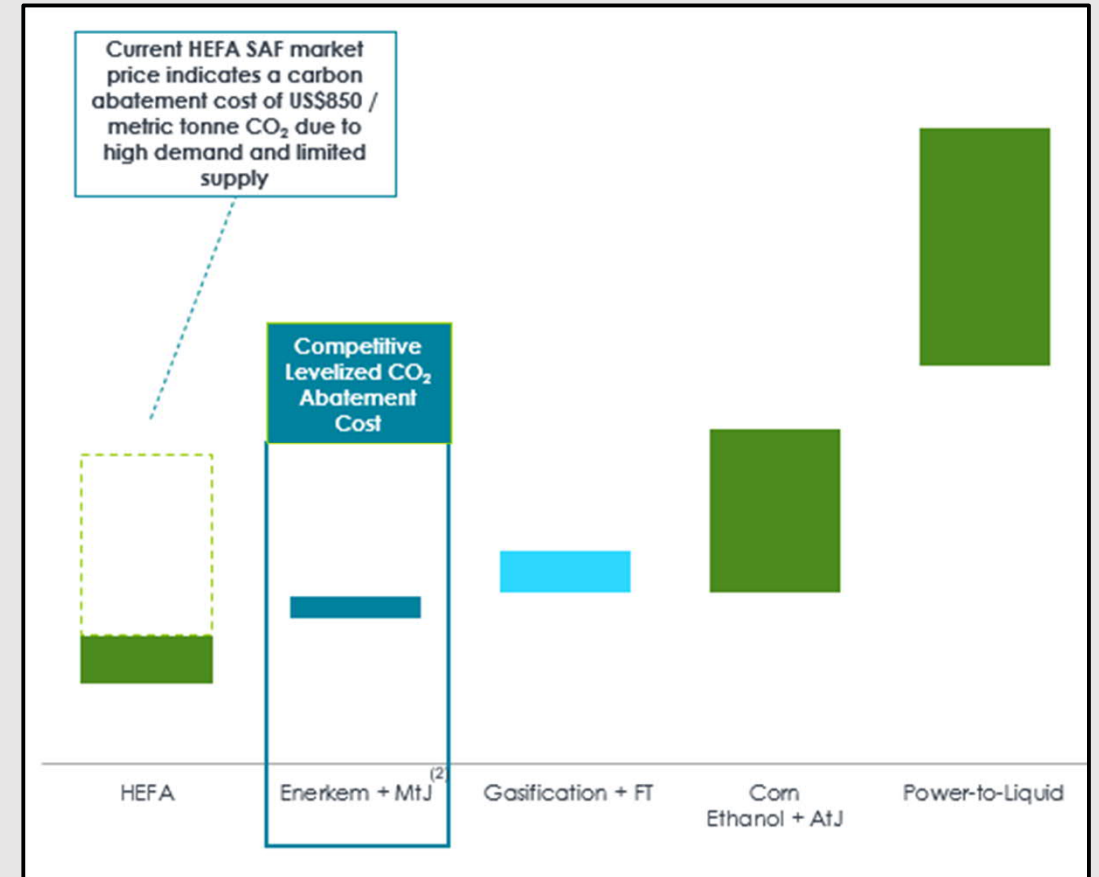


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SAF CO₂ ABATEMENT COST

Enerkem Competitive Position

Enerkem's cost structure and scale provides best-in-class CO₂ abatement cost relative to existing and future alternatives



- Carbon Abatement Cost | (\$US / metric tonne CO₂)

Key takeaways

Breaking boundaries together to engineer a sustainable future



- HEFA, AtJ & FT pathway SAF projects implemented/ under implementation/ development by T.EN, work on-going on other pathways
- Strong T.EN track record for project delivery incl. modular design, often embedded with innovative technologies
- Enerkem's groundbreaking waste gasification technology is successfully producing sustainable methanol
- Enerkem-T.EN joining forces to deploy Enerkem's technology to convert waste into sustainable and valuable products (SAF in future)
- Collaborative approach among various stake holders is key success factor for decarbonization of the transport sector

Thank you