



The role of sustainable fuels in hard-to-abate decarbonization

Overview and key recommendations

www.catavento.biz

The challenge of hard-to-abate sectors

Sustainable fuels can play a complementary role to direct electrification

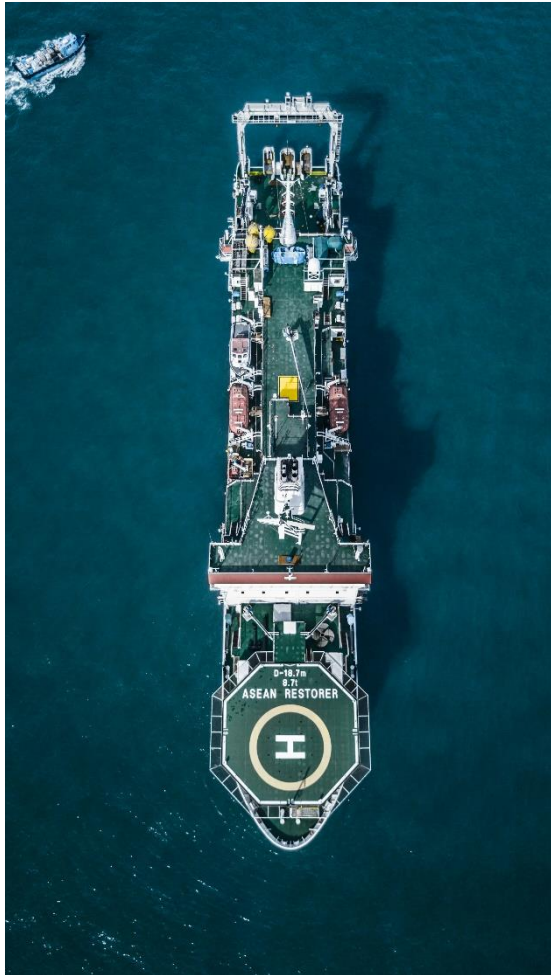
Relevance of selected hard-to-abate sectors and the share of biofuels, H₂ and e-fuels in energy consumption
 US\$ bn, % (IEA NZE)

		% of global energy consumption, 2022	% of global energy-related CO ₂ emissions, 2022	Biofuels		H ₂ and e-fuels	
				8%	19%	10%	63%
				2030	2050	2030	2050
	Shipping	2.5% - 11.2 EJ	2% - 0.855 GtCO ₂				
	Aviation	2.5% - 11 EJ	2% - 0.792 GtCO ₂	10%	33%	1%	45%
	Heavy-duty trucks	6% - 26.8 EJ	5% - 1.8 GtCO ₂	12%	6%	1%	27%
	Iron and steel	8% - 35 EJ	7% - 2.6 GtCO ₂	-	-	5%*	44%*
				2030	2050	2030	2050

Biofuels could respond for 8-12% of energy consumption in hard-to-abate sectors in 2030 in a net zero scenario, with their share in 2050 depending on the decarbonization route of each sector – up to 33% in aviation, while only 6% in heavy-duty trucks. H₂ and e-fuels shall play a limited role in 2030 due to competitiveness and technical barriers, although a robust ramp up is needed to reach net-zero targets by 2050

Key takeaways from the roundtable (1/3)

Sustainable fuels will play a significant role in decarbonizing hard-to-abate sectors



Consensus

-  Sustainable fuels are an important component of a **broader mix of decarbonization initiatives** for these sectors, in particular being **drop-in solutions** and minimizing **infrastructure adaptation**
-  There is still a common perception among potential customers of **scalability challenges** due to **feedstock limitations** aligned with required **sustainability criteria**
-  Heavy transport and industry also face the challenge of managing **assets with long lifespans**. Fast-tracking existing assets adaptation and renewal, as well as infrastructure development is urgent
-  **Hardware producers** (e.g., airplane and ship manufacturers) have a crucial role in demonstrating the technological maturity and applicability of sustainable fuels in safe and efficient operations

No consensus

Sustainable fuels could potentially serve as a **final decarbonization solution** to some sectors and companies, while others see them as having a **transitional role** until direct hydrogen and electrification become commercially viable

Key takeaways from the roundtable (2/3)

“Expensive to abate”: cost is the main challenge as technological hurdles were addressed



Consensus



Clients have set voluntary commitments, but there is a **lack of customer willingness to pay for green premiums**, highlighting the critical role of **regulation and public policies** (e.g.: carbon pricing)



Scaling the supply of emerging technologies requires **long-term offtake agreements** and demand visibility to secure financing, even if it means committing to a higher price



It should not be expected for sustainable fuels to achieve **parity with fossil alternatives**, as the latter can have different properties and may require CAPEX for adaptation, along with increased OPEX



The impacts of decarbonization costs on a **just transition** need to be carefully considered as to avoid losing societal support, including addressing the green premium throughout the value chain

No consensus

Incentives are essential for **kick-starting and scaling up** the adoption of sustainable fuels in heavy industry, while policymakers should also encourage the development of **new long-term business models**. Existing fossil fuel subsidies should be gradually reallocated to support sustainable low-carbon fuels

Key takeaways from the roundtable (3/3)

Demand and supply commitments require regulatory certainty, clear policies and standards



Consensus



There is a need for a universally-agreed **taxonomy** of what constitutes ‘**sustainable fuels**,’ with a focus on life cycle emissions for **carbon accounting**, land use considerations, traceability, and sustainability throughout the value chain. Sustainability must be ensured in a pragmatic way



A **global book-and-claim system** for sustainable fuels could significantly drive market development by bypassing physical infrastructure and availability barriers. It could also help direct clean energy investments towards emerging and developing economies



Producers and consumers of sustainable fuels still face barriers related to **financing mechanisms** that hinder adoption, particularly due to land use criteria for biofuels and higher capital costs for new projects, especially in emerging and developing markets

No consensus

Public policies and taxonomies should be **technology-neutral**, ensuring a level playing field and allowing technologies to compete freely with one another. A **portfolio approach** should be adopted, considering not only costs but also other criteria, and using **targeted interventions** to promote solutions that are considered preferable

Recommendations for the G20

The role of sustainable fuels in hard-to-abate decarbonization



1. Acknowledge the importance of sustainable fuels as a key component of a decarbonized energy system

- Recognize that G20 countries have **diverse energy, climate, and socioeconomic contexts** that require different low-carbon solutions
- Highlight the significant role of biofuels and e-fuels in decarbonizing heavy industry and transport, especially as **drop-in alternatives**
- Understand that sustainable fuels may not follow the same **cost trajectories** as other technologies nor achieve parity with fossil options



2. Build consensus to address the challenges impeding the scale-up of the sustainable fuel market

- Promote a common global **definition of sustainable fuels** based on carbon accounting for lifecycle emissions
- Accept **all types of feedstocks** that demonstrate proven lifecycle emission reductions, while avoiding **green protectionism**
- Ensure **traceability** measures and **transparency** regarding the sustainability credentials of sustainable fuels, including land use
- Engage with **relevant forums** (e.g., IMO, CORSIA) to advance the adoption of sustainable fuels in heavy industry and transport



3. Develop regulations and market mechanisms to efficiently promote sustainable fuels

- Incentivize **demand-side commitments** and implement robust **public policies** (e.g.: mandates, CfDs) to mitigate cost impacts
- Adopt a **technology-agnostic approach** to feedstocks and production pathways, while recognizing the co-benefits of different options
- Promote a global **book-and-claim system** for sustainable fuels to address physical barriers and encourage investments in EMDEs
- Mitigate the exposure of **low-income communities** to inflationary pressures associated with the adoption of sustainable fuels

Sustainable fuels in hard-to-abate decarbonization

Concept note



Download the concept note by scanning
the QR code above



Clarissa Lins

clarissa.lins@catavento.biz

Bruna Mascotte

bruna.mascotte@catavento.biz

Tamara Fain

tamara.fain@catavento.biz

www.catavento.biz



Julia Dias Leite

julia.diasleite@cebri.org.br

Luciana Muniz

luciana.muniz@cebri.org.br

Rafaela Guedes

rafaelammonnerat@gmail.com

www.cebri.org