



Leveraging Ethiopia's Biogenic CO₂ for eMethanol to Defossilise Aviation & Shipping

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Ethiopia's Energy Transition Landscape

Ethiopia's Renewable Transport Fuel Opportunity

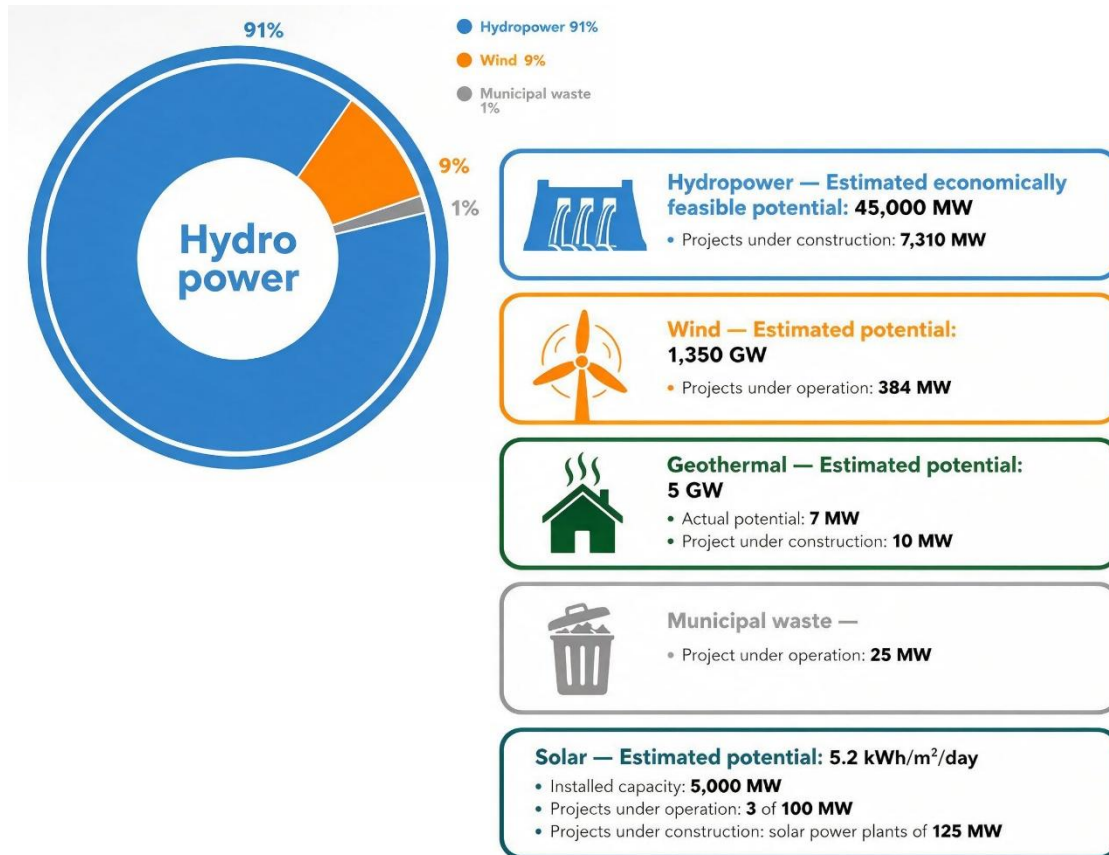
Energy security, decarbonization ambitions and a strategic aviation sector are driving the transition

- **Africa's Second-Largest Population**
→ Over 130 million provides significant domestic market and industrial growth potential
- **Fuel Import Dependence**
→ Ethiopia imports essentially all petroleum fuels, with demand growing.
- **Ambitious Decarbonization Agenda**
→ National strategies target major emissions reductions and expansion of renewable electricity, including up to 120 GW of installed capacity by 2050.
- **Strategic Aviation Sector**
→ Ethiopia has one of Africa's largest aviation sectors, anchored by Ethiopian Airlines and growing demand for lower-carbon aviation fuels.



Ethiopia's Renewable Energy & Fuel Foundation

Building on renewable power and established biofuels



- **Established Biofuel Policy**

→ Ethiopia adopted its first biofuel strategy in 2007, establishing a framework for development and blending.

- **Existing Bioethanol Industry**

→ Domestic ethanol production and operating experience provide an established foundation for renewable fuels.

- **Progressing Toward SAF**

→ Ethiopia's 2021 SAF Roadmap identified domestic feedstocks and pathways for developing a SAF industry.

- **eFuels Entering The National Dialogue**

→ eMethanol offers a near-term PtX pathway and transition step toward future eSAF and maritime fuel (Port of Djibouti).

ETHIOPIA eMETHANOL PROJECT CONCEPT

Image: Finchaa Sugar Mill, Ethiopia

Image: Solarbelt eFuel Plant, Germany



Unlocking Strategic Value from Ethiopia's Biomass

From underutilized biogenic CO₂ to a national export resource

Sugar Cane



Ethiopian Sugar Mill
(biogenic CO₂ emission source)



- Ethiopia's sugar sector produces large volumes of **biogenic CO₂** from bagasse combustion and ethanol fermentation
→ Identified as a **key CO₂ opportunity under the 2026 PtX Scoping Study** (Ethiopia-German Energy Cooperation, MoWE & International PtX Hub)
- Today CO₂ is largely **underutilized or vented in Ethiopia**
→ limited local market, minimal value capture
- Ethiopia's sugar sector CO₂ is a **strategic national resource**
→ New export revenues & foreign currency generation
→ Additional value capture/resilience from sugar assets
→ Renewable and new industrial sector development
→ Attraction of international capital into the country

Why eMethanol → The Preferred Starter eFuel

A scalable, market-ready fuel with diversified demand

Marine Fuel



Future SAF (Methanol-to-Jet)



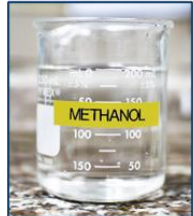
Fuels and Additives



Clean Cooking Fuel



Chemicals & Other Products

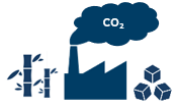


- Produced from **biogenic CO₂ + green hydrogen**
→ chemically identical to fossil methanol but 100% renewable
- Global commodity: established demand (**100 Mio. tpa**)
→ **a key enabler of industrialization**
- **Immediate multi-sector offtake potential:**
 - Industry and chemicals
 - Maritime fuel
 - Future eSAF via Methanol-to-Jet
 - Fuels and additives & clean cooking
- Diversified offtake markets = **reduced risk**
→ eMethanol provides a **scalable first step** toward broader Power-to-X and eFuel development like **eSAF**.



Solarbelt Has Identified an eMethanol Opportunity in Ethiopia

The project and opportunity at a glance



3 to 4 Mio. tpa Biogenic CO₂ Resource

The estimated total CO₂ resource currently emitted at existing sugar mill and ethanol plants across Ethiopia.



2 to 3 Mio. tpa eMethanol Potential

The production potential at theoretical full CO₂ utilization, equivalent to 2% - 3% current global methanol demand.



Project Mission: a FOAK eMethanol Plant

Integrate a commercial scale, modular eMethanol plant into an existing sugar and ethanol plant.



- 16,000 tpa installed plant capacity
- €65 Mio. grid connected investment
- Commercial platform for national scale-up
- Fossil-competitive opex based production cost
- East Africa & EU target markets support premium price

About Solarbelt:

- PtL and biofuels developer active in Africa, LATAM & Asia
- Sister to 'atmosfair' – a leading German climate organization
- Developed a world's first Power-to-Liquid eKerosene plant

Project Team Members:



Clayton Mathias | Solarbelt | Berlin, Germany

Project Development Director & Commercial Lead

- +20 yr Oil & Gas operations, clean fuels & project development
- B.Sc. Civil Engineering & MBA



Yitatek Yitbarek | Solarbelt | Addis, Ethiopia

Ethiopia Project Development Advisor

- +20 yr African energy & biofuels development
- M.Sc. Development Studies



Tadesse Shiferaw | GIZ | Addis, Ethiopia

Energy Advisor

- 17 yr renewables, energy efficiency, marine engineering
- M.Sc. Thermal Engineering



Samson Tolessa | GIZ | Addis, Ethiopia

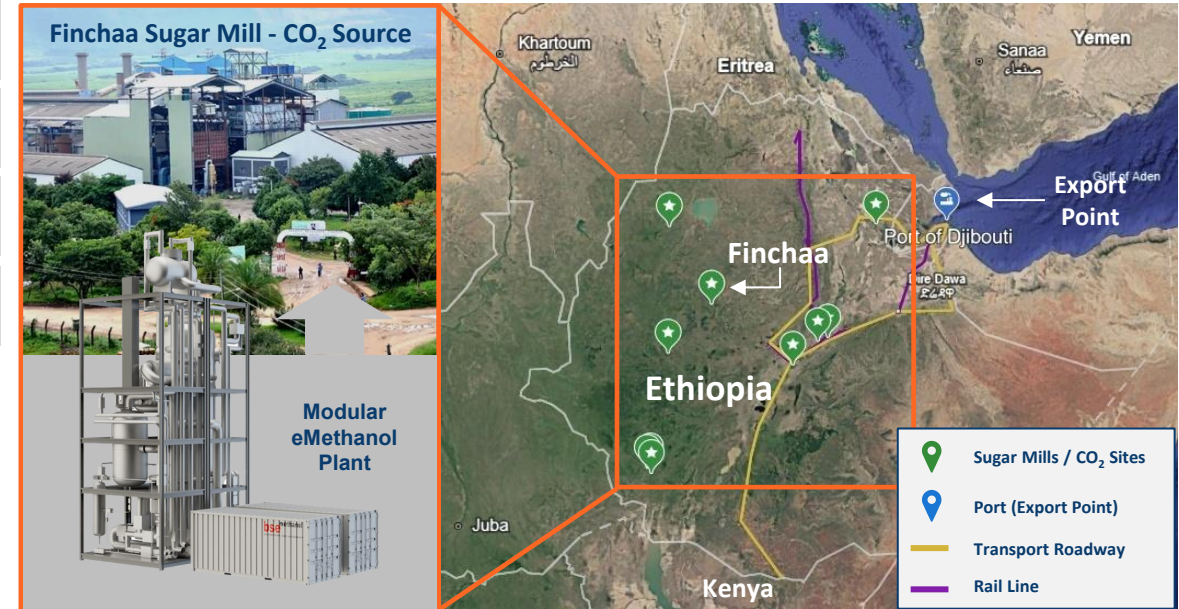
Head of Secretariat, Ethiopian German Energy Cooperation

- +20 yr East Africa energy & state projects facilitation
- M.Sc. Renewable Energy

FOAK Ethiopian eMethanol Project

Project overview for initial plant deployment

Proposed Project Site	Finchaa Sugar Mill
Project Type	eMethanol
Indicative Project CAPEX	Up to €60 to €70 Million
eMethanol Plant Capacity	Up to 16,000 tpa
Electrolysis Capacity	Up to ~20 MW
Biogenic CO ₂ Supply	1. Fermentation CO ₂ (from ethanol) 2. Bagasse post-combustion FG capture
Premium Methanol Markets	Kenya & Europe

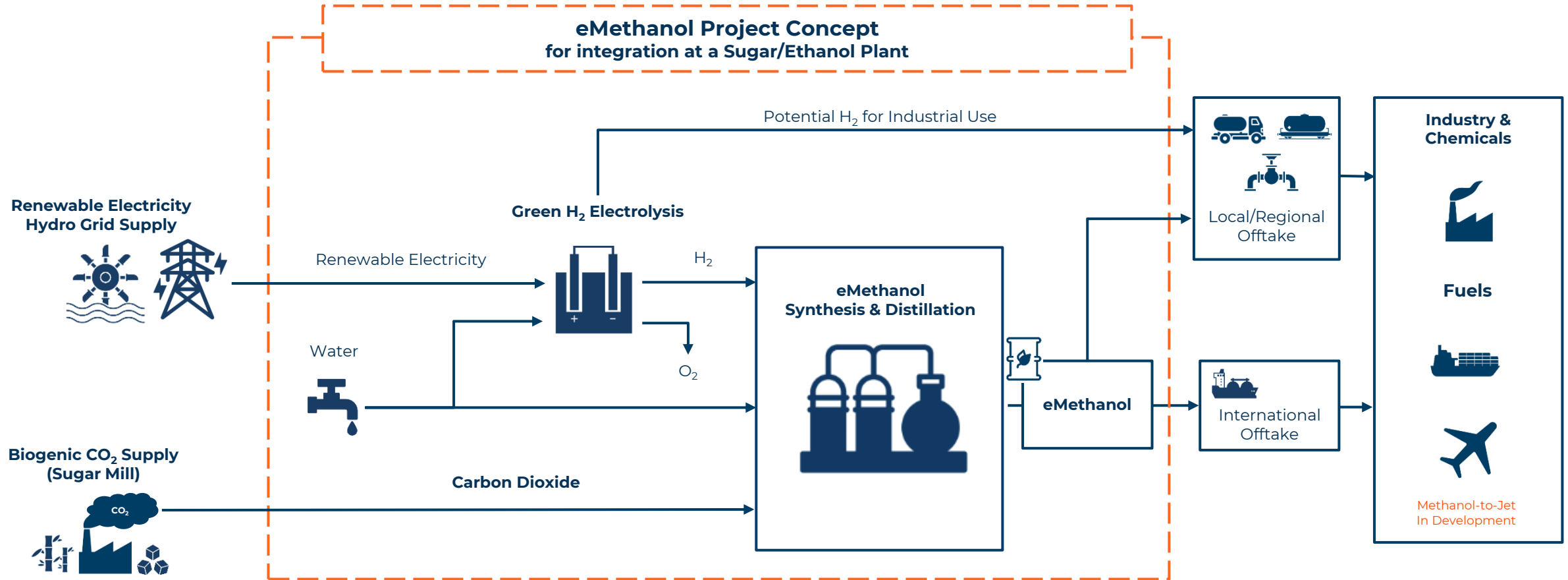


Plausible First Project Timeline



eMethanol Production Process

From renewable power and captured biogenic CO₂ to export markets



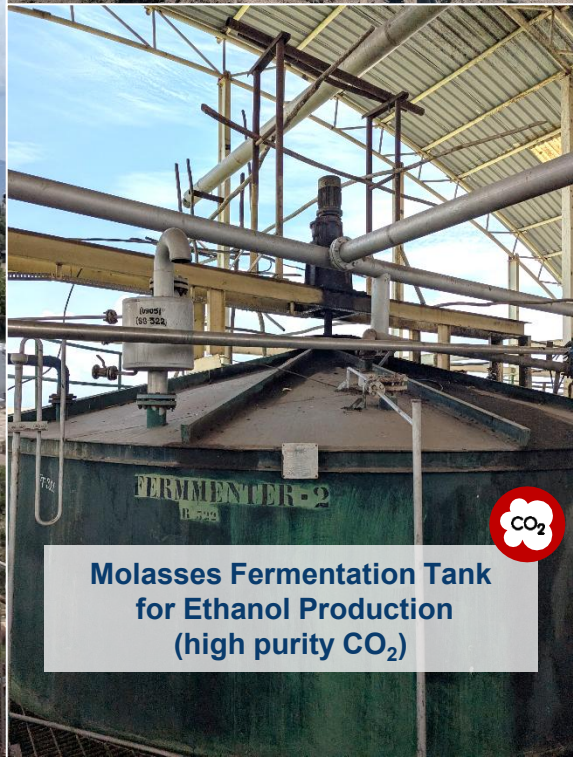
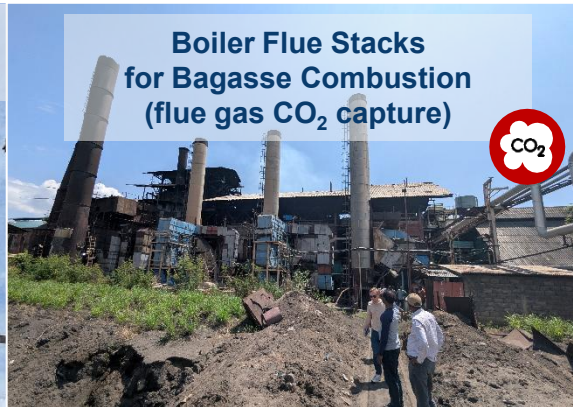
Candidate Ethiopia Project Site Visit & CO₂ Source Assessment

Onsite visit confirming dual biogenic CO₂ streams from sugar and ethanol operations

Finchaa & Metehara Sugar Mills Produce
Dual Biogenic CO₂ Streams



Integrated Ethanol Plant



Why a Modular Approach Fits Ethiopia's Distributed CO₂ Resources

Lower absolute capital exposure enables phased deployment and faster rollout

Example Modular Pre-Fabricated Systems Less than 20,000 tpa



- Pre-engineered / pre-fabricated
- Small total plant footprint
- Suited for distributed feedstock
- Phased, repeatable deployment
- Variable turndown flexibility

Example Large Centralized Methanol Complex (~900,000 tpa Netherlands Example)



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Thank you.

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