

From Science to Scale: How Strategic Partnerships Accelerate Sustainable Fuel Technologies

Dr. Denzil Moodley, Sasol & Helmholtz Zentrum Berlin (HZB)

The 8th RD20 Conference 2026, CSIR ICC, Pretoria, South Africa 20 October 2026

Copyright ©, 2026, Sasol

Sasol Limited at a Glance

- International integrated chemicals and energy company, headquartered in SA
- Pioneer in synthetic fuels production and related technologies with 75 years' experience
- Partner with organizations to develop, pilot, and implement new technologies
- Strong intellectual property portfolio >2 200 patents held worldwide



SOUTHERN AFRICAN ENERGY & CHEMICALS BUSINESS



INTERGRATED SOUTHERN AFRICAN VALUE CHAIN

INTERNATIONAL CHEMICALS



GROWING WITH OUR UNIQUE CHEMISTRY

CARBON INTENSITY



38 MTONNE COAL PER YEAR
ENERGY OUTPUT ~9.8 GW

Copyright ©, 2026, Sasol

To decarbonize we need multiple solutions



Renewable Energy (RE)
Wind, solar, hydro, geothermal, grid integration and storage

Renewable Feedstocks
Bio-based inputs, green hydrogen, CO_2-derived chemicals

Process Efficiency
Smart factories, heat integration, AI-driven optimization

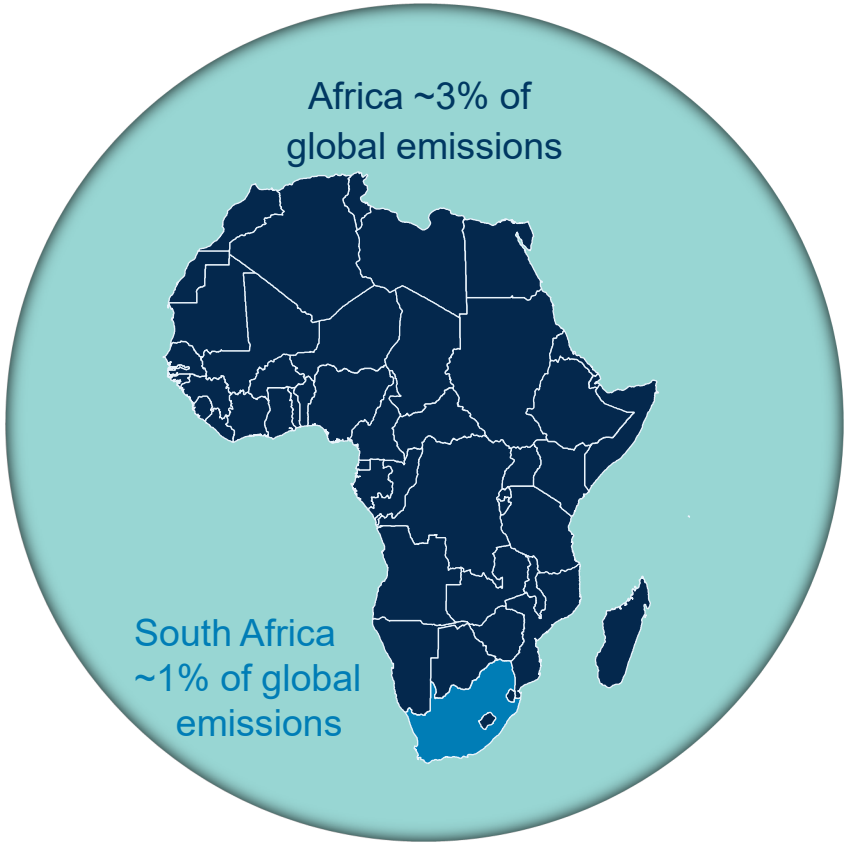
CCS (Carbon Capture & Storage)
Geological storage, industrial scrubbers

Circularity & CCU
CO_2 reuse, closed-loop systems, material recovery

Copyright ©, 2026, Sasol

Sasol's commitment to decarbonise our operations

Sasol's GHG emissions in context



With our optimised ERR we will decarbonise through

- Achieve **air quality compliance**
- Reduce operational cost and **environmental footprint**
- Create the foundation for a **new power business**
- Expand product portfolio to include **sustainable fuels and chemicals**
- Employ high-integrity, real and independently assured **market-based instruments**

International Energy Agency (IEA), Africa Energy Outlook 2022; Worldometers.info; Sasol Emission Reduction Roadmap (ERR), www.sasol.com (2025)

Copyright ©, 2026, Sasol

Partnership ecosystem is key for the decarbonization journey

Universities

UFS
University of the Free State
Universiteit van die Vrystaat
Yunivesithi ya Freistata

University of Cape Town
Kaapstad • Yunivesithi yaseKapa • Universiteit van

KIT
Karlsruher Institut für Technologie

Stellenbosch
University
IYunivesithi
Universiteit

Universiteit van Pretoria
University of Pretoria
Yunibesithi ya Pretoria

NWU

Research Institutes

HZB Helmholtz Zentrum Berlin

Fraunhofer IKTS

Council for Geoscience

CSIR
Touching lives through innovation

DLR

Industry

TOPSOE

I-Catalyst
Innovative Quality Catalysts

Discovery

Eskom

Air Liquide

INERATEC

Funding & Strategic Support Partners

NRF National Research Foundation

sanedi
South African National Energy Development Institute

eUDP

science, technology & innovation
Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA

Bundesministerium für Forschung, Technologie und Raumfahrt

Why partnerships matter?

- Accelerate innovation and technology deployment
- Access to word-class infrastructure and expertise
- Strengthen local capability and human capital development
- Support certification, commercialization and scale-up
- Create a global ecosystem

Copyright ©, 2025, Sasol

The case for sustainable aviation fuel

Leverages existing assets

Large, growing market



High-value licensing

Supports decarbonisation strategy

Supports SA industrial growth

Building on a track record of supporting global aviation fuel certification and testing for synthetic fuel technologies

Copyright ©, 2026, Sasol

Biomass integration to produce SAF

Feedstock	Conversion pathway	Product
Biolipids Waste oil, animal fats, algae oils	**HEFA** **Hydroprocessing** Distillate hydrocracking + blending	
Woody biomass Forestry and agricultural residues	**Fischer-Tropsch** **Gasification + FT** Solid biomass to syncrude	
Biogas Landfill gas, organic waste, wastewater treatment	**Fischer-Tropsch** **Reforming + FT** Biogas to synthetic fuels	
Bioethanol Cellulosic ethanol, fermentation-driven ethanol	**Alcohol-to-jet** Catalytic conversion + refining	



Sustainable aviation fuel

ASTM certified

Drop-in fuel

Compatible with existing aviation infrastructure

Copyright ©, 2026, Sasol

UCO blending at Natref refinery in Sasolburg

First crude oil refinery in Africa to achieve ISCC PLUS certification in April 2026

KEY FACTS

Certification
ISCC Plus, verified by independent auditors

Covered products
Sustainable aviation fuel and renewable diesel

Feedstock
Co-processed used cooking oil and vegetable oil

Lower emissions
>75% lower GHG intensity vs. standard fuel from crude

WHY IT MATTERS

Global access
Opens access to strict low-carbon markets like EU

Production Goals
Millions of liters of SAF to scale by 2030

Local value
Keeps green industrial processing and value on African soil



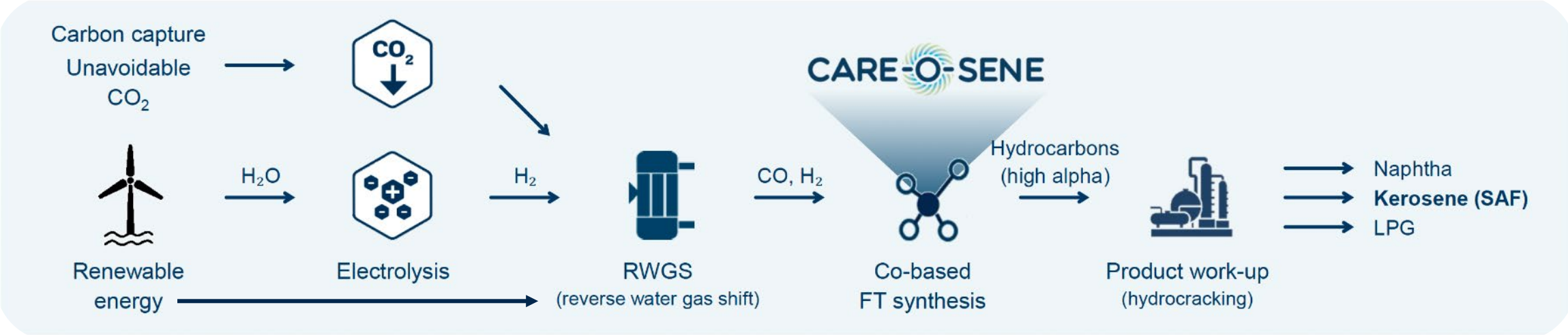


Positioning for the Global low-carbon fuels market. First offtake signed with White Desert for Cape Town to Antarctica flights

Copyright ©, 2026, Sasol

Power-to-Liquids (PtL): Fischer-Tropsch for sustainable aviation fuel

Integration of RE, renewable feedstocks and green H_2



Advantages of the FT-route

- Feedstock agnostic
- ASTM approved, drop-in up to 50%
- Contrail reduction
- Commercially proven technology
- High GHG elimination

Areas of improvement

- Better catalysts
- High conversion
- High jet fuel yields
- Integrated demonstration
- Materials circularity

Copyright ©, 2026, Sasol

Catalyst Development is a long arduous road

CARE-O-SENE accelerates catalyst development and scale-up

- Catalyst Innovation
- Scale-up science
- Synchrotron analytics
- Talent development

Moodley, et al. *App. Cat. A: Gen* (2026): 121048.

	Lab scale	Pilot scale	Semi-commercial	Commercial
Preparation	Laboratory equipment 100g 	Conical/ 6” fluid bed 10-25kg 	24” Fluid bed >300kg 	Catalyst Plant Multiple tonnes 
Testing	Micro reactor 20g 	2-inch pilot reactor 2-3kg 	FTDR reactor 1-2 tonnes 	ORYX GTL Multiple tonnes 

10-15 years

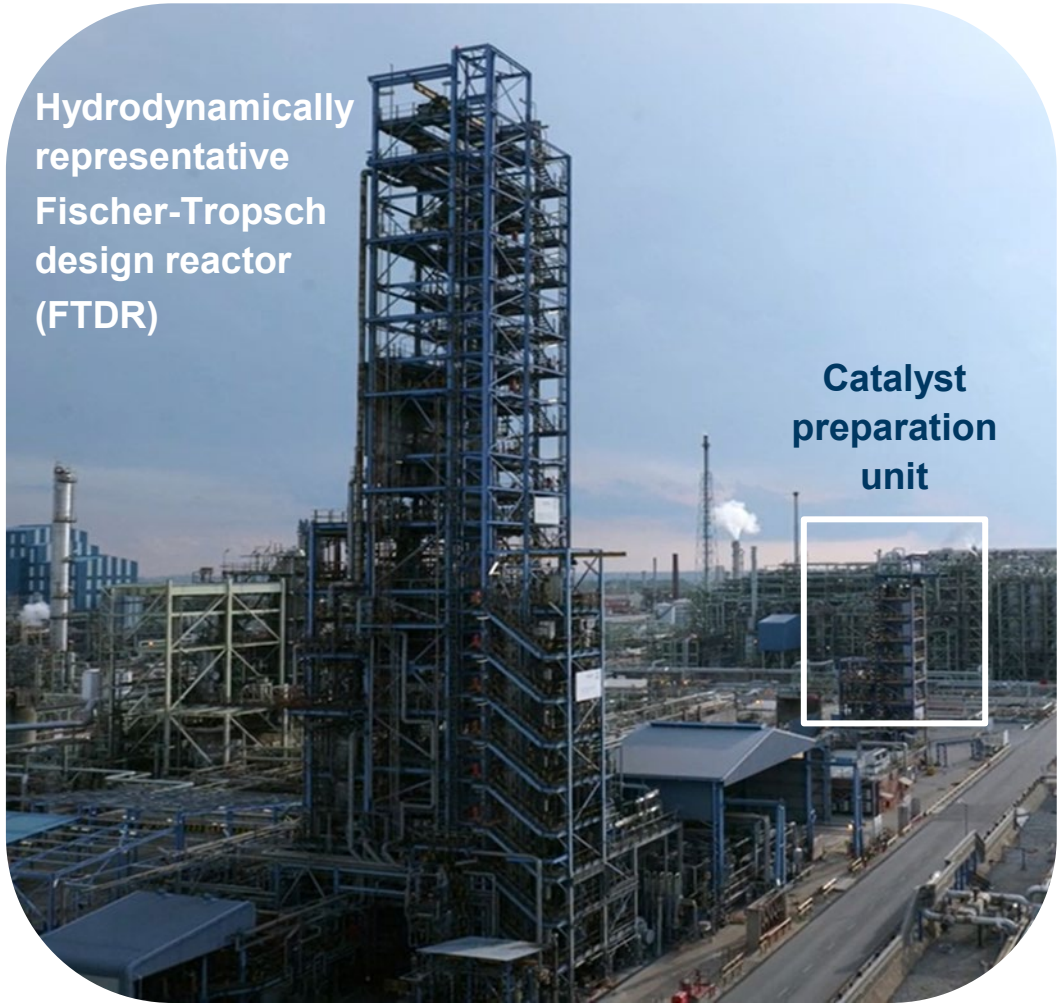


CARE-O-SENE launch 2022:

Strengthening South Africa-Germany collaboration in catalyst research for sustainable aviation fuel production

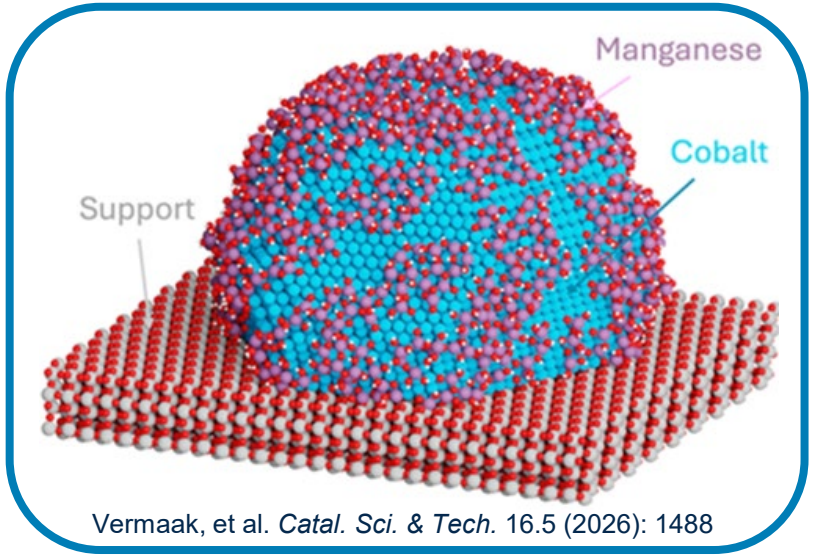
Copyright ©, 2026, Sasol

CARE-O-SENE achievements- Catalyst 1 to semi-commercial scale



Demonstration of CARE-O-SENE catalyst (300b/d unit)

- Unlocking understanding of catalyst behavior
- 1.8 tons catalyst produced, multiple batches
- 1.5 tons run in semi-commercial unit (>100 days)
- FT products collected for work-up to jet fuel meeting ASTM standards
- Lab and pilot reactors demonstrated long term performance (>600 days)
- **Next step is commercial production**



Vermaak, et al. *Catal. Sci. & Tech.* 16.5 (2026): 1488

Fundamental Catalyst Studies



Jet-A1 blend

Copyright ©, 2026, Sasol

CARE-O-SENE is building human capital for the energy transition



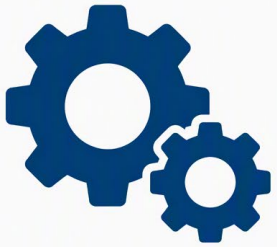
60% from Global South



40% Female



Dynamic exchange



30 early career scientists



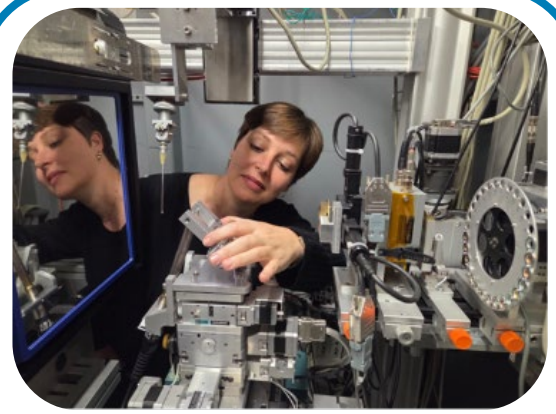
Dedicated mentorship



Scientific visibility



Conference attendance



Synchrotron training



Industrial site visit

Copyright ©, 2026, Sasol

Partnership with leading industrial players: Topsoe

- Long **history of collaboration**
- Expertise in **renewable syngas production** (e-RWGS and e-Reforming)
- Competitive **hydrocracking technology** to **maximize jet fuel yield** of syncrude from Sasol's **high-performance FT catalyst**
- **Single point licensing** of **joint technology** offering



EUDP Frontfuels demonstration of Topsoe's eRWGS and Sasol FT catalyst



DLR TPP plant using Sasol and Topsoe technology to be commissioned in 2027



Arcadia eFuels (Endor), 2 000 bbl/day PtL, Vordingborg, Denmark

Copyright ©, 2026, Sasol

Concluding remarks

- **No single technology** will deliver the low carbon future. **Integrated solutions will**.
- SAF represents a compelling intersection of **sustainability, growth and technology** leadership.
- Sasol's **existing assets** and **Fischer-Tropsch platform provides** an advantage in future sustainable fuel markets.
- **Partnerships are the fastest route** from **laboratory breakthroughs to commercial deployment**.
- **CARE-O-SENE** proves that **science, scale-up and talent development** must advance together.
- The **future of sustainable** fuels will be built through **collaboration**.





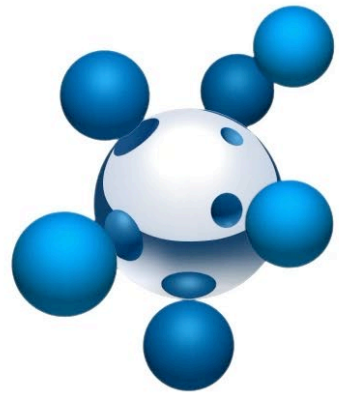


Copyright ©, 2026, Sasol

Acknowledgements

- Sasol Research and Technology colleagues (Riccardo Swanepoel; Biomass-to-SAF)
- Sasol's collaborators across universities, research institutions, industry and funding bodies
- CARE-O-SENE consortium partners (Sasol SA & DE, HZB, KIT, UCT, IKTS, INERATEC)
- BMFTR (German Federal Ministry of Research, Technology and Space)

Copyright ©, 2026, Sasol



SASOL