

Hydrogen

The Dutch expertise and skills can support South Africa in decarbonising the energy sector, advancing mobility, and exploring the role of hydrogen in a power sector dominated by renewable energy.

Green Hydrogen Enablers

These enablers focus on building the necessary skills and capacity, raising stakeholder awareness, and providing technical assistance to local and provincial governments. Immediate opportunities exist in establishing training programmes and workshops, enhancing current educational initiatives, and facilitating knowledge transfer through partnerships.

Hydrogen common infrastructure

Developing common infrastructure for hydrogen, such as desalination plants, pipelines, storage facilities, and port infrastructure, is essential for supporting large-scale hydrogen production and distribution.

Project Development Focused on Hydrogen Production, Derivatives Production, and Hydrogen Use

This area focuses on the development of specific hydrogen projects, including production facilities, derivative products like ammonia and methanol, and various hydrogen use cases.

AREAS FOR DUTCH SUPPORT

Skills and Capacity Building

Stakeholder Engagement and Awareness

Technical Assistance to Provincial and Local Government

R&D Collaboration on Hydrogen Value Chain

Manufacture of Hydrogen Value Chain elements

**INVESTMENT
NEED**

EUR 15,31bn

Until 2027

*Significant
area of
opportunity.*

Project Pipeline

GH2 Sector Investment needs:

GH ₂ Sector investment needs 2023-2027	ZAR billion	EUR billion
Project Feasibility costs		
Aviation Fuel	0.10	0.004
e-methanol	0.12	0.005
Fuel Cell	0.16	0.007
GH and Green Ammonia	3.70	0.177
Green Steel	0.20	0.009
Hydrogen Mobility	0.10	0.004
Infrastructure	0.13	0.006
Subtotal	4.51	0.216
Capital costs (for the above projects)		
Aviation Fuel	8.00	0.384
e-methanol	12.00	0.576
Fuel Cell	1.40	0.067
GH and Green Ammonia	109.30	5.246
Green Steel	13.20	0.633
Hydrogen Mobility	6.60	0.316
Infrastructure	13.00	0.624
Subtotal	163.50	7.84
Port project development	1	0.048
Port infrastructure capital	150	7.2
TOTAL	319.01	15.31

Opportunities

- The JET-IP aims to position South Africa as a global leader in GH₂ exports through strategic investments.
- Creating a hydrogen export industry is an opportunity to replace coal exports and to make domestic use of hydrogen more sustainable.
- Although initially driven mainly by the government, several industrial players have embraced green hydrogen to decarbonise their operations and as a business opportunity serving domestic and export markets.

Challenges

- South Africa still needs to develop its standards and regulations defining the attributes of green hydrogen and establish a domestic certification scheme.
- Project Feasibility: such as long-term off-take concerns and limited domestic demand.
- Public Sector Gaps such as inadequate incentives, financial capacity constraints and bureaucratic procurement.
- Market Failures such as Capital Shortage, Disinterest in Small Projects, availability of Smaller-scale projects, and Limited Banking Support.
- Socio-Political Bottlenecks: Strong Coal Sector, Influential Workers' Unions and Stakeholder Resistance.

Significant Projects

- The **Boegoebaai Port and Green Hydrogen Cluster** project.
- The **HyShiFT Consortium**, including Linde, Sasol, Enertrag, and HydRegen, aims to produce Sustainable Aviation Fuel (SAF).
- **Sasol and ArcelorMittal South Africa** have teamed up to pioneer carbon capture technology and green hydrogen initiatives for sustainable fuel, chemical, and steel production.
- The **Hive Hydrogen £5 billion Giga-Scale Project** in Nelson Mandela Bay, South Africa led by Hive Hydrogen with co-developer BuiltAfrica aims to develop a capacity of 900,000 tonnes of ammonia per year utilising 3,000 MW renewable energy.
- The **Sasolburg Green Hydrogen Project** in Sasolburg, Free State, South Africa, led by Sasol, aims to repurpose a 60 MW electrolyser for green hydrogen production using renewable energy.
- **Anglo American**, a leading mining company, is developing hydrogen-powered trucks.

Renewable energy

The opportunities for renewable energy are plentiful but at the same time, there are significant challenges including ensuring a just implementation.

**INVESTMENT
NEED**

US\$ 20bn

Until 2030

Bio-Energy

There are more immediate opportunities for concrete investment in the bio-energy sector for municipal projects, as well as for domestic industry and export. There are potential interventions needed at a government-to-government level, particularly around project development, and for private sector development, in project development and financing.

Transmission & Battery Storage

Immediate transmission and battery storage opportunities are limited and largely dependent on public sector policies driving energy sector reform. Key interventions will involve government support to develop project pipelines and restructure the sector. While South Africa is piloting some battery storage projects, they are unlikely to attract Dutch interest, given the availability of larger opportunities in the Netherlands.

AREAS FOR DUTCH SUPPORT

Municipal PPP Development Support

Private Sector Technical Assistance for Bio-Energy Projects

Private-Sector Technical Assistance Grants

Project Development Fund and Credit Facility for Bio-Energy Projects

Smaller scale opportunities in biogas.

Off-Shore Wind

While the Netherlands could significantly contribute to the sector, the reality is that in South Africa, the opportunities for offshore are less immediate. However, in the long term, some early support could unlock these opportunities for the Dutch industry later.

Project Pipeline

Eskom renewable energy project pipeline:

Project Name	Technology	Duration	Total Estimated Project Cost ZAR Million (~EUR billion)	Capacity (MW)
Sere Phase 1A PV	Solar	2022-2023	293 (14,6)	19,5
Majuba PV	Solar	2022-2023	1,048 (52,48)	65
Arnot PV	Solar	2022-2023	278 (13,9)	17
Duvha PV	Solar	2022-2023	380 (19,03)	23,5
Tutuka PV	Solar	2022-2023	1,062 (53,18)	65,9
Lethabo PV	Solar	2022-2023	1,210 (60,59)	75
Kleinsee Wind	Solar	2022-2024	6,334 (317,2)	300
Sere Phase 1B PV	Solar	2023-2024	844 (42,27)	50
Olyvenhoutsdrift PV	Solar	2023-2025	9,625 (482)	550
Aberdeen Wind	Wind	2023-2025	4,476 (224)	200
Komati Power Station Renewables Solar PV	Solar	2024-2024	2,500 (125)	100
Hendrina Power Station Renewables Solar PV	Solar	2024-2026	2,500 (125)	100
Camden Power Station Renewables Solar PV	Solar	2024-2026	2,500 (125)	185
Sere Phase 2 PV	Solar	2024-2026	9,268 (464)	530
Other wind (100MW)	Wind	2024-2026	2,372 (118)	100
Gamma Sub Station PV	Solar	2025-2026	625 (31)	35
Matimba PV	Solar	2025-2026	625 (31)	35
Grootvlei Power Station Renewables Solar PV	Solar	2026-2027	2,500 (125)	100

Opportunities

- Utility-scale renewable energy projects are the largest opportunity.
- For utility-scale projects in the solar and wind sector, the RE IPP programme has created an ecosystem where local developers and financiers now have significant experience to undertake such projects.

Challenges

- Ensuring just implementation of renewable energy opportunities
- Bringing renewable energy from the Northern and Western Cape (where it is concentrated) to other parts of the country requires significant investment in transmission assets.
- The public sector primarily drives utility-scale renewable energy projects and transmission and battery storage, relying on the capacity of Eskom and the RE IPP office.
- **Biomass projects** rely on subnational government involvement or the private sector.
- South African financiers while used to funding wind and solar projects don't have experience with bio-fuels based projects and are concerned about feedstock guarantees over the lifetime of the project.
- Transaction costs are higher due to the small scale.
- Municipal capacity may be a challenge, as these projects require multi-year commitments.
- Better promotion and communication of the bio-energy potential and technologies is also key to promotion projects in the bio-energy sector, which is still undeveloped in South Africa.

New Energy Vehicles

For transport decarbonisation, there are more immediate opportunities in the following areas:

Public Transport

Public transport electrification is driven by low operational margins and the need to save fuel costs, as well as policy targets. The public transport industry, comprised of around 356,485 minibus taxis and 65,329 buses and midi-buses, thus is highlighted as a promising market investment opportunity for the medium to long term.

Charging network

There are significant capacity constraints in terms of charging infrastructure throughout the country, which is limiting the growth of the EV market. Interventions are thus required through the provision of technical assistance and technology transfer to support the roll-out of EV charging stations network. There is also a need for the improvement of battery capacity and storage technology (through technology transfer), which is currently limited, as well as the supply of charging equipment to individuals and charging point operators (CPOs).

Logistics decarbonisation

The use of electric micro-mobility for last-mile delivery in South Africa has been rising, due to its affordability, minimal import duties, ease of local assembly, and quick deployment on a large scale for fleets. Opportunities for Dutch support include the provision of technical assistance and technology transfer to delivery companies and supermarkets/retailers to support them with the electrification of their last-mile delivery fleet (specifically 2-wheelers).

AREAS FOR DUTCH SUPPORT

Municipal Public Transport PPP development support

Public Sector Technical Assistance for Public Transport EV

Private Sector Funding Support (Early-Stage Project Development Support Through Grants and Niche Financing Solutions)

INVESTMENT NEED

EUR 6,4bn

Until 2030

Dutch know-how required.

NEV Investments

Areas for priority investment opportunities in transport decarbonisation:

Priority Investments	ZAR billion (~EUR billion)	Proposed Instrument					
		Concessional	Commercial	Budget	Grant	Guarantee	Venture Capital
NEVs							
Value chain investments	41 (2,05)	–	PVT	–	–	–	VC
Fleets, chargers, storage, and local assembly	6 (0,3)	CF	DFI	Govt.	–	–	–
Goods and service logistics assembly	7 (0,35)	–	PVT	–	–	–	VC
Local supply chain and knowledge sharing	2 (0,1)	–	PVT	–	CF,DFI	–	VC
R & D market integration	2 (0,1)	–	–	Govt.	CF,DFI	–	–
Reduction of NEV purchase price and development of charging infrastructure	70 (3,5)						
NEVs Subtotal	128 (6,4)						

Opportunities

- Transfer of Dutch Technology & Know-how
- Electrification of public transport & last-mile logistics
- Reduce the reliance on internal combustion engine-based technology
- Support in developing the EV charging network
- Guide market incentives to promote EV sector growth

Challenges

- Nascent industry with many uncertainties
- Currently insufficient incentives to further this sector
- The requirement for a robust charging network

Road-to-Rail

The JET-IP identified that a major contributor to GHG emissions is the use of fossil-derived liquid fuels for road transport. Shifting from road to rail (especially the main corridors which are electrified) was one of the mitigation options identified.

- On the supply side government is developing an industrial policy to manufacture hybrid and electric vehicles for the domestic market and export.
- On the demand side, the government has developed a Green Transport Strategy (GTS) which includes shifting to zero-emissions vehicles and modal shifts in the freight and passenger sectors.

The Presidency has established a National Logistics Crisis Committee (NLCC) to address the economic impact of the poorly performing ports and freight rail. Reform measures emanating from the NLCC include rail economic regulation and the introduction of private operators on the freight rail network. If successful, these reforms could result in greater use of rail for rail-friendly cargo.