South Africa: Taaibosch Puts Green Industrial Cluster

Overcoming grid and transport constraints for PtX project development in the Northern Cape

The challenge

Enertrag South Africa is developing a Green Industrial Cluster named the Taaibosch Puts Energy Cluster in the Northern Cape Province of South Africa. The project is seeking to leverage the region's excellent solar and wind resources, as well as land availability, for the development of GW-scale renewable energy (RE) assets to generate electricity and to produce green hydrogen (and derivatives) in a phased manner.

The project area, while optimal for its RE conditions, is in a remote location that is grid-constrained and has limited logistical connectivity. According to the 2023 South African Renewable Energy Grid Survey, there are over 9000 MW of RE projects under development in the Northern Cape Province that will struggle to secure grid connection under the current prevalent grid availability and connection practices. Even if island mode is an option for the initial phase of PtX development, this will likely result in a significantly more expensive product than if the PtX component is based on a wider system optimization approach based on a collector network.

On the logistical side, roads are in poor conditions or overused, and where rail links exist, they are often privately owned by other industries that may or may not be able or willing to accommodate the movement of PtX products on their infrastructure.

The solution

Gaining clarity on options for grid connection and transport are particularly important for any existing or future PtX projects in the region to design the optimal project configuration and suitable PtX product choice. Enertrag's Taaibosch project is currently permitted for the production of e-ammonia and further derivative choices remain options to be explored.

Section of the project site

This public-private collaboration seeks to address open questions around grid connection and transport options:

(1) Development of grid access in grid constrained regions – Grid access has the potential to significantly improve project economics as compared to island mode. The PPP will look at how to optimize utilization of limited grid capacity through the introduction of so-called collector grids.

(2) Limited options for transportation of product – Considering the lack of an obvious logistical choice, a comprehensive multi-criteria assessment on how to move different PtX products from a production point in the Northern Cape to ports or domestic demand centres is an important step in enhancing the project's feasibility.

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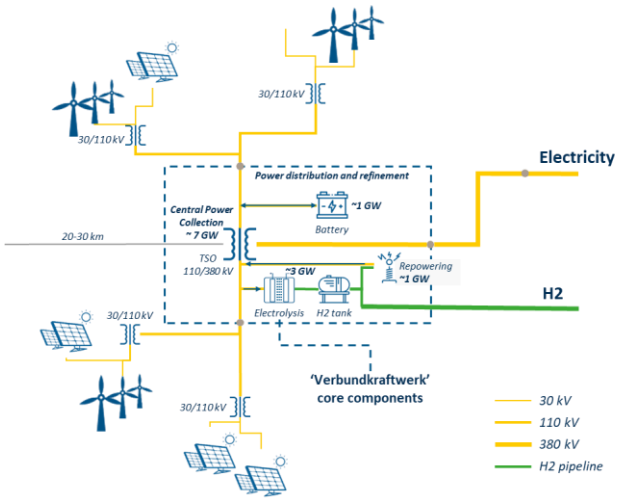
Our services

Two analyses will form the core of the PPP collaboration:

(1) Conceptual collector grid planning – A collector grid, or combined hydrogen and power plant, is an independent ecosystem of generators and power users with a single connection point to the national transmission grid. By consolidating several generation and utilization points behind a single connection point to the national transmission grid, it is possible to both lower the costs of the grid build-out and increase the efficiency of the (limited) remaining grid capacity. An analysis will be undertaken to determine the potential and conditions for the development of such a collector grid in the region around the Taaibosch green energy cluster.

(2) Logistical solutions for PtX products from the Northern Cape – A second assessment will examine the options to transport selected PtX chemical products from a production point in the Northern Cape to domestic demand centres and export ports.



Graphic: Schematic representation of a collector

At a glance	
Duration	May 2025 – September 2026
Country	South Africa
Objective	Enhancing clarity for the development of PtX projects in Northern Cape Province on transport and grid access
Partners	Enertrag SE, Enertrag South Africa and GIZ
Expected results	• An analysis of the potential and conditions for the development of a collector grid/combined hydrogen and power plant in the Northern Cape • An assessment of transport options for PtX products from the Northern Cape

Expected impact

Using the Taaibosch cluster as a case study, the PPP could offer valuable learnings for other current and future RE/GH2/PtX projects in the Northern Cape or in geographical areas facing similar constraints.

The International Hydrogen Ramp-up Programme (H2Uppp) of the German Federal Ministry for Economic Affairs and Energy (BMWE) promotes projects and market development for green hydrogen in selected developing and emerging countries as part of the National Hydrogen Strategy.

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