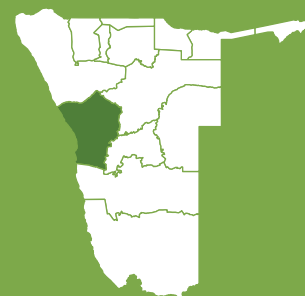


# Project 2

<b>Project Name</b>	<b>Hydrogen-Diesel Dual Fuel Locomotive Project Proposal for Namibia with Supporting Research Projects</b>
<b>Location</b>	Walvis Bay to Kranzberg corridor in Namibia, through TransNamib
<b>Project Size</b>	50 locomotive fleet conversion to GH2 dual fuel
<b>Project Value</b>	7.63 million EURO
<b>Project Partners</b>	CMB.TECH, UNAM, Hyphen Technical, TransNamib, NGHRI, Nicholas Holding



## Project Overview

The railways are a major consumer of energy in Namibia. Almost 11 million litres of diesel are consumed annually in this industry. With the TransNamib fleet due for an upgrade and upgrade funding being more readily at hand, an opportunity has arisen to combine the efforts in the Green Hydrogen Namibia drive by government with the railway sector in Namibia and implement a hydrogen off-take development project in one of the key industry sectors in the country. Thus, the idea of a hydrogen powered locomotive, using Namibian produced Green Hydrogen, took shape, and was proposed here.

This project aims to develop the first H2 Dual Fuel Locomotive (diesel-H2) in Africa. It builds on existing Green Hydrogen production and supply projects in Namibia, to create local off-take for the Green Hydrogen to be produced in the Western part of Namibia. This will be done through the utilization of Green Hydrogen in locomotives. Therefore, the project will consist of two converted locomotives (one retrofitted and the other re-powered) and their accompanying hydrogen fuel tender wagon and accessories.

The following major components to be developed, implemented during the course of the project to achieve the project goal:

1. 1x Locomotive converted for the use of H2 as fuel, using supervisory control methodology on the existing engine.
2. 1x Locomotive converted for the use of H2 as fuel, through repowering of the locomotive with a new rail engine that is H2-ready.

3. 2x H2 Valve Bank close to each locomotive engine with control valves, actuators, gauges, sensors, relief valves and cut off valves
4. 1x H2 fuel tender car, a modified flat-bed container wagon for transporting the 40ft, half height H2 fuel skids.
5. 2x 40ft half-height tube skids, with 8x Type 1 steel cylinder searchable to store H2 as compressed gas at > 200 bar.
6. Inter-vehicular connection for H2 fuel tender wagon

### The project activities would include:

- Design and engineering, systems engineering
- Installation, modification, and assembly of components to vehicles
- Testing and commissioning of systems individually and on vehicles
- Homologation of locomotive consist
- In-service operation of the consist

Once these components have been designed, built, and assembled and tested individually, they will be combined as a system and tested collectively before being used as a unit to pull a train in-service. The planned location of the building and assembly of the locomotive and the consist will be Traxtion Rail Hub, Rosslyn, South Africa. The planned location of operational service of the locomotive will be the Walvis Bay to Kranzberg corridor in Namibia, through TransNamib.

## Current Stage

- Concept

## Development Timeline

Task / Activity	Duration	Timeline
Feasibility and Concept	1 Month	1 June 2022* - 1 July 2022
Mobilisation	1 Month	1 July 2022 - 1 August 2022
Design	3 Months	1 August 2022 - 1 November 2022
Building and Integrate Locomotive	3 Months	1 November 2022 - 1 February 2023
Test and Commission Locomotive	2 Months	1 February 2023 - 1 April 2023
Assemble Consist and Integrate to Locomotives	3 Months	1 April 2023 - 1 May 2023
Test and Commission Consist	1 Month	1 May 2023 - 1 June 2023
Dynamic Test and Commission of Consist	3 Months	1 June 2023 - 1 September 2023
In-Service Operation of Consist	3 Months	1 September 2023 - 1 Dec 2023
<b>Total Consecutive time</b>	<b>18 Months</b>	<b>1 June 2022 - 1 December 2023</b>

\*Projected start date

## Impact

Estimate no. Of jobs	Estimate no. of jobs: 10 – 15 direct jobs. For a 50 locomotive fleet conversion to GH2 dual fuel operation, the total future that this project can create in its roll-out phase is estimated to be 36 direct jobs and 160 indirect jobs, a total of almost 200 skilled jobs.
Unique Value	Hydrogen locomotives

## Sustainable Development Goals (SDGs)



## Contact Details

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## Project Pictures



Figure 3: Locomotive consist concept for the H2 DF Locomotive project

