

Project Summary

H₂Singa Hydrogen Valley at Jurong Island, Singapore – the Kicker Project
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Singapore has committed to achieving net zero emissions by 2050. Its national hydrogen strategy (2022, Oct) states that hydrogen is the preferred energy vector if technology advances, and international efforts remain strong. Singapore has assessed that hydrogen could contribute to 50% of Singapore's projected electricity demand by 2050. For a city-state like Singapore with minimal access to in-situ renewable energy, importing green electricity from the neighborhood and producing green hydrogen provides a “boot-up strategy” towards hydrogen adaptation since it presents a scalable way to participate in the emerging worldwide hydrogen economy and be in step with international efforts.

An excellent place to foster a hydrogen economy is Jurong Island. The island has more than 100 world-class energy and chemical companies that have invested more than \$100b of investment, making it the 8th largest exporter of chemicals globally, generating 24,000 direct jobs and 3% of Singapore's GDP. While the economic importance of Jurong Island to Singapore and the world's energy and chemical sectors is evident, the island will have to transform by weaning itself away from its current fossil fuel dependency as feedstock. Its already established sectoral couplings and concentration of off-takers perfectly positions Jurong Island to capture hydrogen economy opportunities, leveraging its world-class infrastructure (storage, pipelines etc.) to transform to a hydrogen valley and a new energy trading hub of the future. The risk of not transforming Jurong Island would be having stranded assets of declining economic value to the nation as economies worldwide decarbonize. Since the Singapore government has a long-term low emissions strategy, a calibrated approach can be formulated to transform Jurong Island into Hydrogen Valley.

The proposed **H2Singa masterplan project** takes a phased approach to transform the existing fossil fuel-based Jurong Island cluster into a hydrogen-based chemical cluster. H2Singa masterplan proposes starting with the "**kicker project**" to kick start the hydrogen valley: Hydrogen FCEVs for the port's yard trucks for the new and futuristic Tuas mega port. The project is based on generating onsite hydrogen from imported renewable electricity (Laos/Sarawak etc.) to produce hydrogen for yard truck operations to haul containers between the various ports in Singapore and within the ports. This concept would offer higher asset utilization and productivity compared to battery operated trucks, improves port productivity, enables green port positioning, and kick-starts hydrogen economy in Jurong Island for larger regional and international play.



H₂Singa Hydrogen Valley
Kicker Project : FCEV Port Yard Truck from Onsite Hydrogen

Project Basis Key Details

- 15 FCEV HDV trucks
- 60 km/hr. while covering 800 km covered in 24 hrs.
- Average emissions per truck 1.8 ton/day
- Refueling time 3 to 8 min (vs 60 min electric fast charger)
- Hydrogen FCEV trucks will provide higher asset utilization due to 24 hrs. duty before refueling.
- Electrolyzer USD 1000 per KW and Trucks 329,000 each
- Charter Rate USD 260 per truck per day for Period 10 years
- WACC 10% and Inflation of 3%
- Revenue model there is no escalation
- Payback 9th Year, this metric has been kept less aggressive as market penetration strategy
- Project is Financially Feasible



Source: Truck scheduling, Houming Fan et al.