

REPORT SERIES

CLEAN HYDROGEN PROJECTS IN THE GLOBAL SOUTH

Renewable Ammonia: Kenya's Business Case

Report Launch Event

April 2025

 **H2Global**



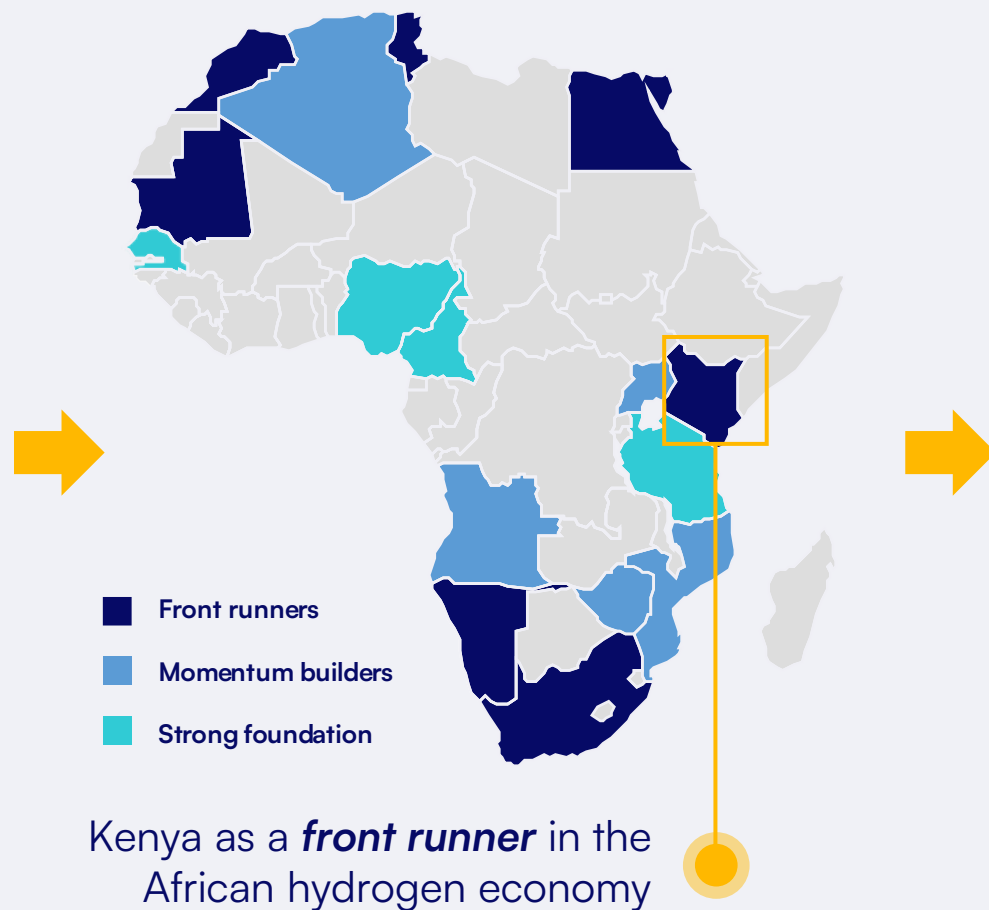
Hydrogen opportunity



Kenya's hydrogen opportunity

Opportunities

- Local value creation and economic development.
- Increased independence from global fertilizer markets.
- Industrial decarbonization across key sectors, including fertilizer production, mining operations, and steel manufacturing.
- Enhanced energy infrastructure and improved access to energy.



Kenya's hydrogen strategy



2023 — 2027

- Domestic market development
- Renewable fertilizer production target: 100,000 tons per year



2028 — 2032

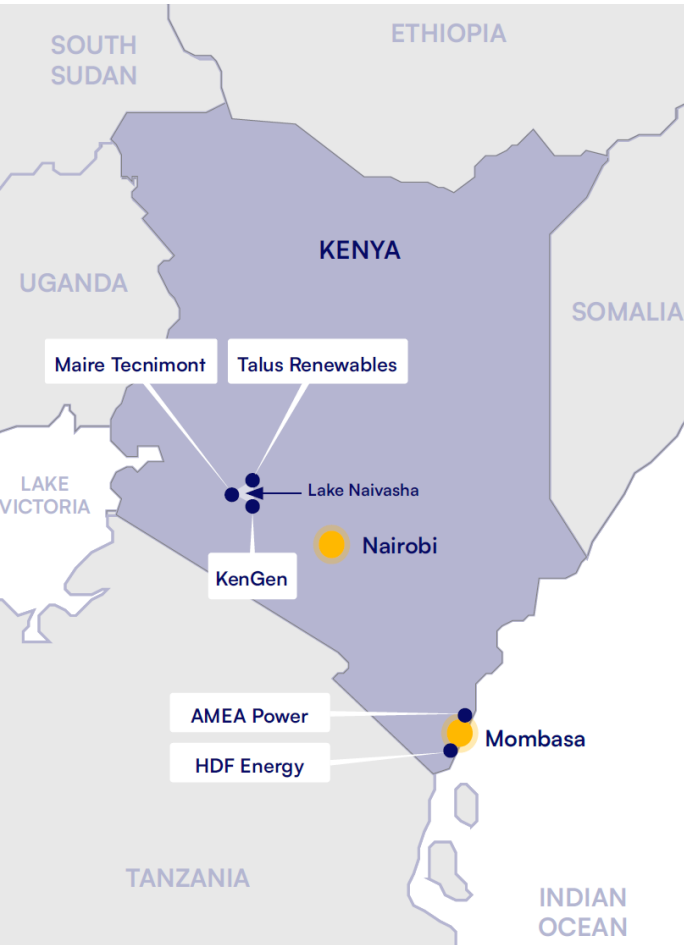
- Domestic market growth
- Renewable fertilizer production target: >300,000 tons per year



2032 and beyond

- Domestic and export market growth

Building viable business cases for renewable hydrogen in Kenya



Current hydrogen projects in Kenya

- Current projects focus on renewable fertilizer production.
- 4/5 projects are still in the feasibility stage.
- Talus Renewables is the only operational project, producing renewable fertilizer at a small scale.
- Planned projects are centered around Lake Naivasha and Mombasa.



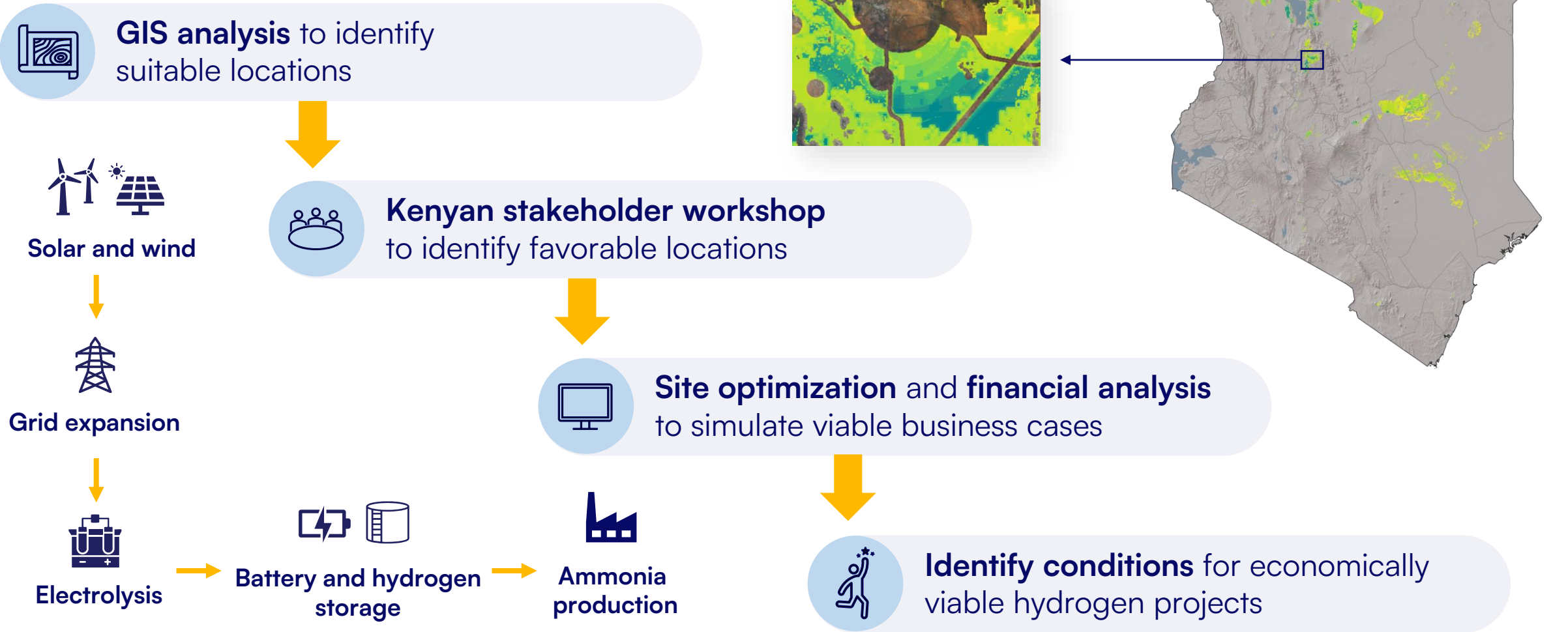
Advancing Kenya's hydrogen economy

- What do **viable business cases** for renewable hydrogen in Kenya look like?
- Where should new renewable hydrogen **projects be located**?
- What are **success factors** for new hydrogen projects?

Our research



Methodology



RE potential
open-source
webtool



Analysis



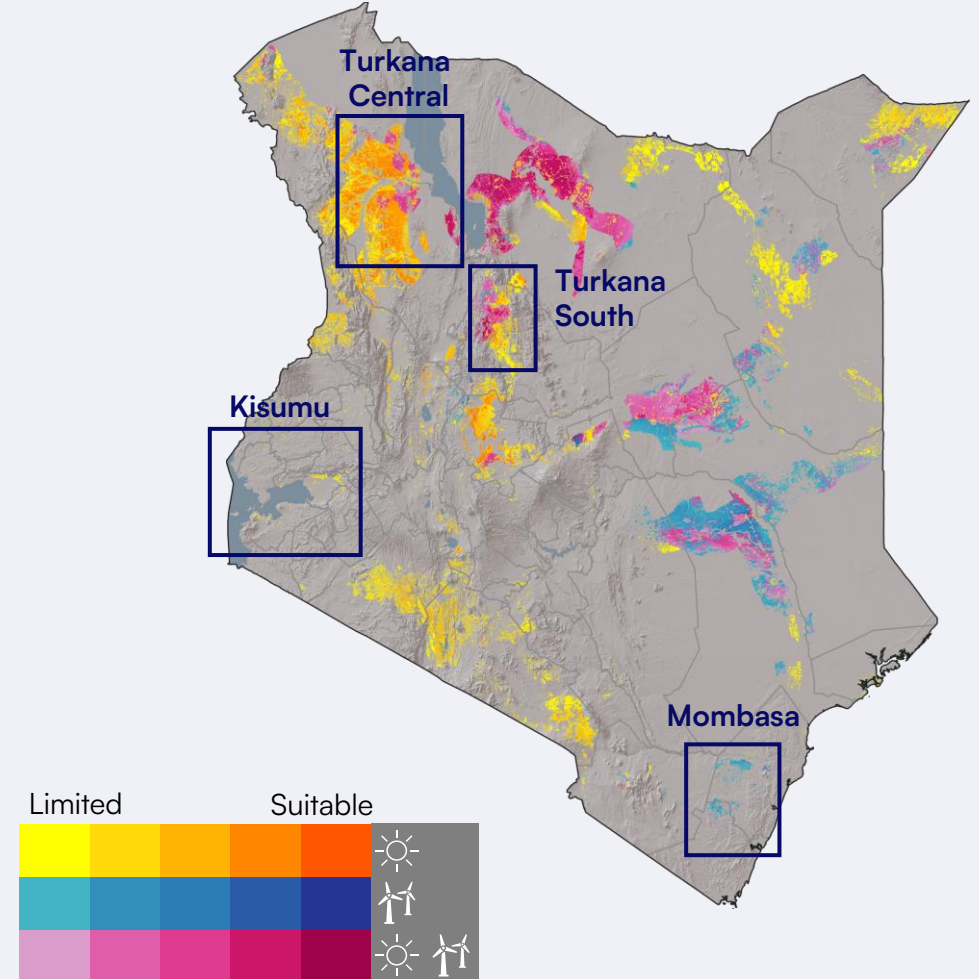
Four Kenyan regions highly suitable for anchoring renewable ammonia projects

Characteristics of **selected** regions

- Sufficient renewable energy potential to operate a 500 MW electrolyzer
- Sufficient water availability from open-water sources
- Non-conflicting land use
- Transport and electric infrastructure in proximity
- Offtake opportunities for renewable hydrogen-based products

Characteristics of **excluded** regions

- Insufficient renewable energy potential or water availability
- Land-use conflicts
- Remote location with no infrastructure or offtake opportunities for renewable hydrogen-based products



Turkana Central



Located in northern Kenya, to the western side of Lake Turkana.



Extensive potential for solar and hybrid (wind and solar) energy around the city of Lodwar.



The region itself does not have significant offtake potential for renewable hydrogen-based goods such as ammonia or fertilizer.



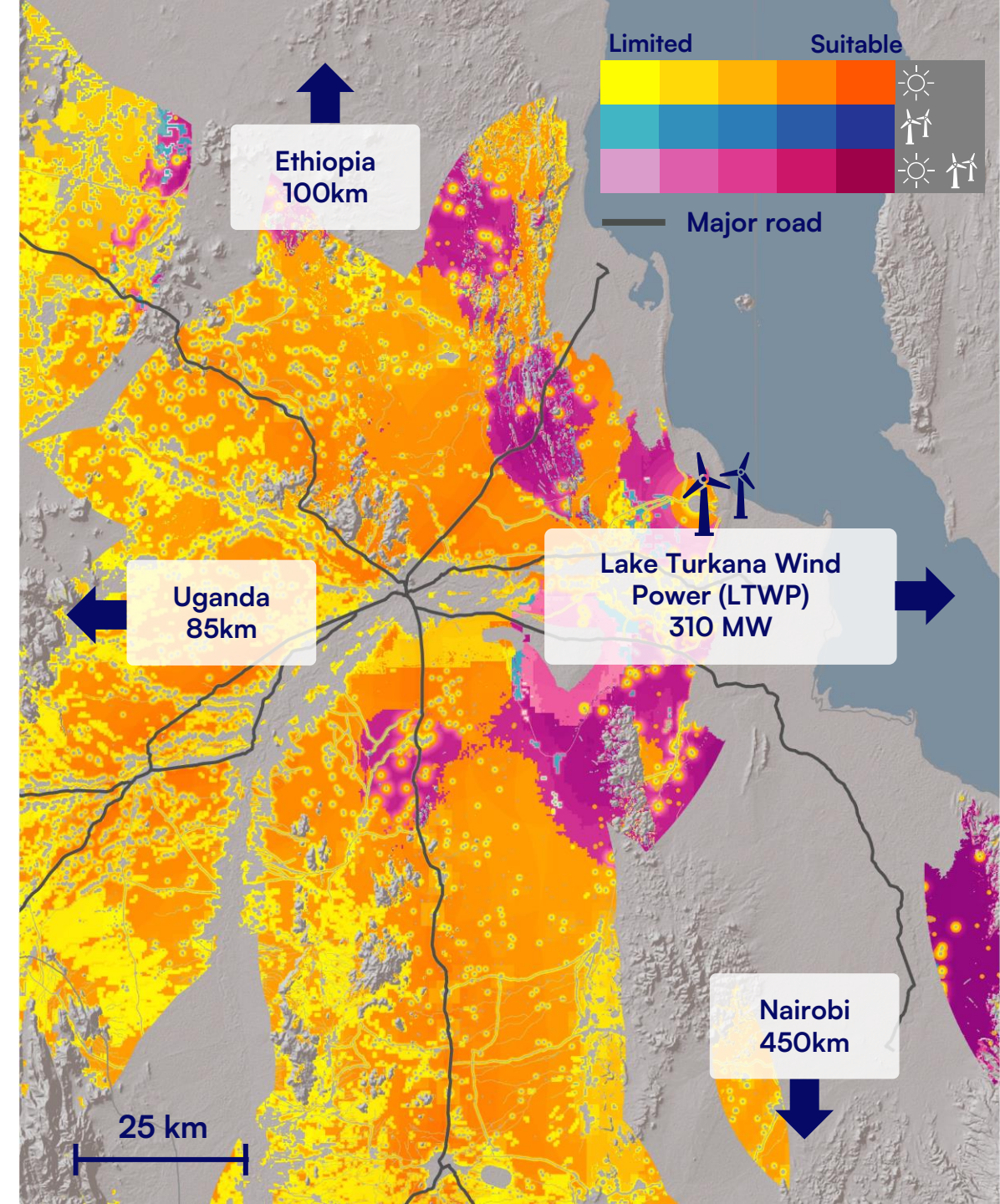
Proximity to the city of Lodwar provides access to transport infrastructure and everyday goods for workers.



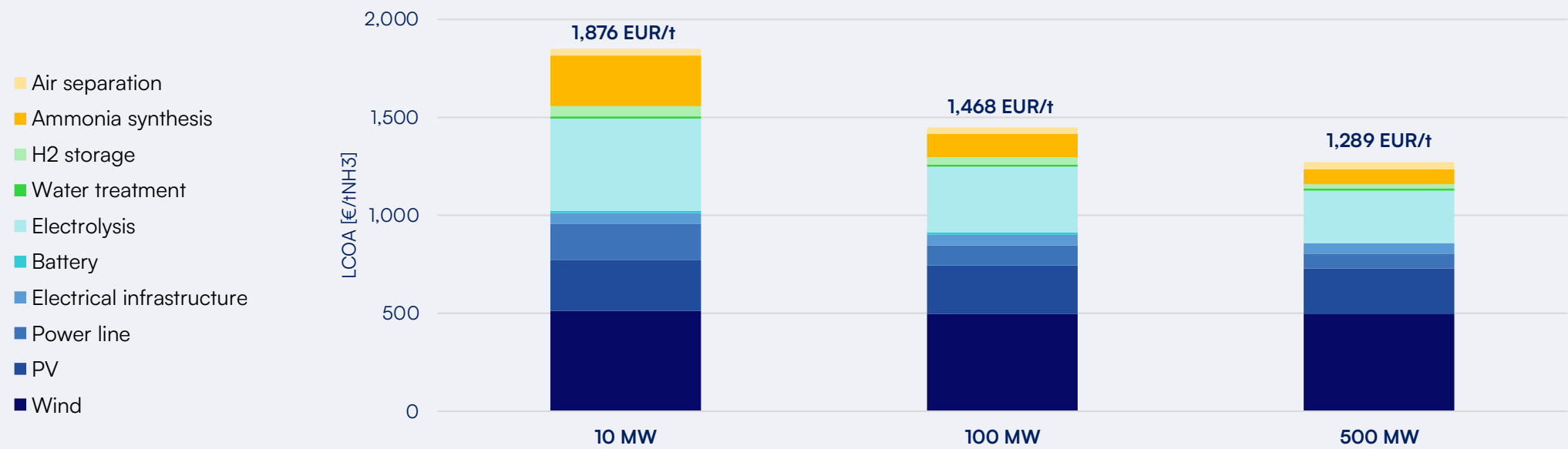
Electric grid infrastructure is accessible to the south of Lake Turkana in 170km distance, offering sufficient capacity to supply electrolyzers of up to 100 MW.



Sufficient water for hydrogen production is available through Lake Turkana or the Turkwell River.



Turkana Central



Total investment costs	EUR 66 Mio.	EUR 489 Mio.	EUR 2,107 Mio.
Annual ammonia production	6,500 t-NH3/year	62,800 t-NH3/year	303,000 t-NH3/year

Turkana South



Located in northern Kenya, to the south of Lake Turkana and within the geothermally active Rift Valley.



Extensive potential for solar, wind and hybrid (wind and solar) energy. Presumably also geothermal energy potential, which would have to be confirmed by on-site test drills.



The region itself does not have significant offtake potential for renewable hydrogen-based goods such as ammonia or fertilizer.



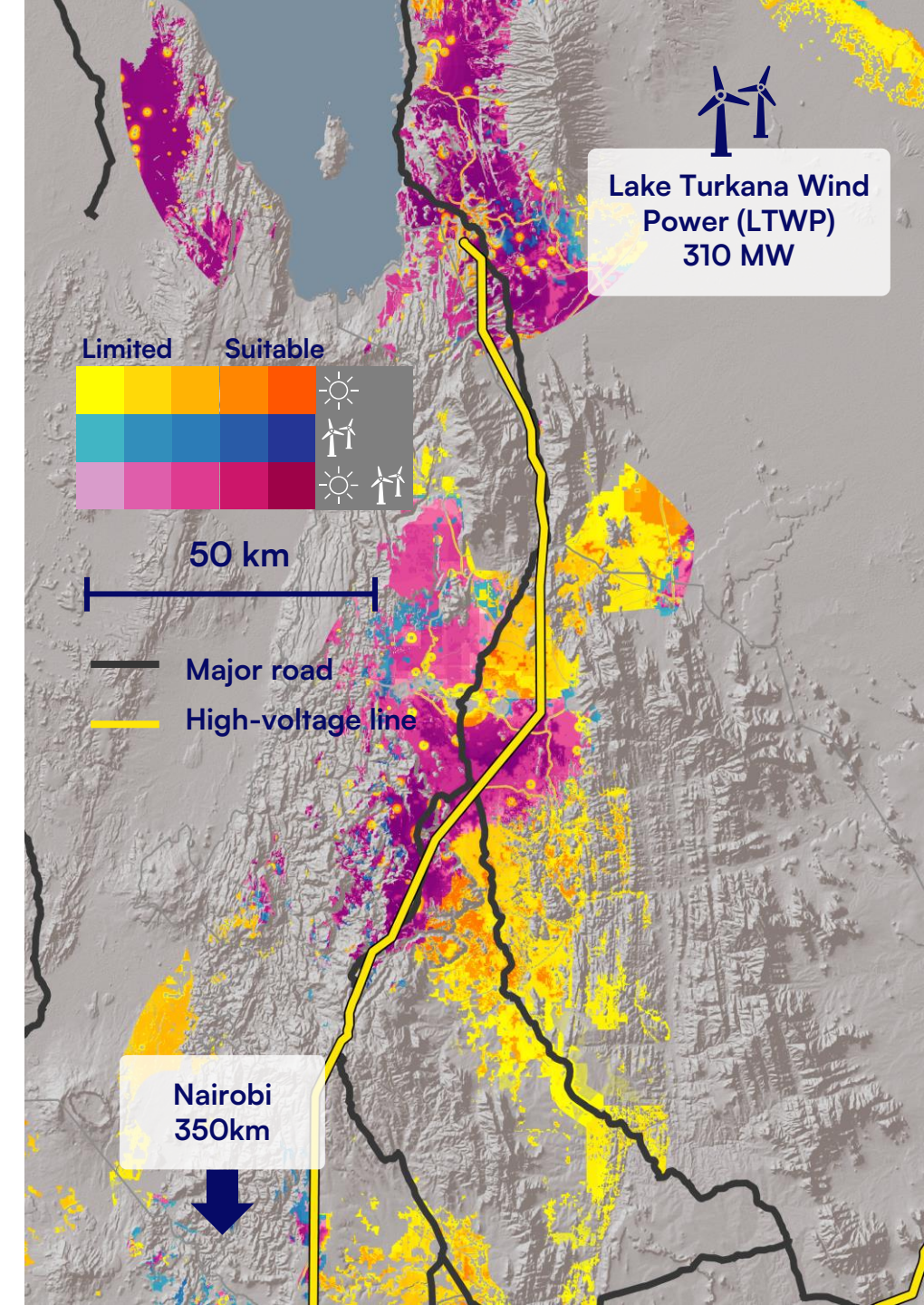
Major roads run through the identified region, providing the required transport infrastructure.



Connection to the national electricity grid could be enabled via a transmission line running through the region, offering sufficient capacity to supply electrolyzers of up to 100 MW.



Sufficient water for hydrogen production is available through Lake Turkana.



Turkana South



Kisumu



The region bears significant potential for the offtake of renewable hydrogen-based ammonia and fertilizer to local industries and agriculture. Furthermore, export opportunities exist through Lake Victoria to neighboring countries.



Proximity to Kenya's 3rd largest city provides access to transport infrastructure and everyday goods for workers.



Although an electric grid infrastructure exists in the region, its capacity and reliability is too low to facilitate reliable transmission of renewable electricity to electrolyzers.



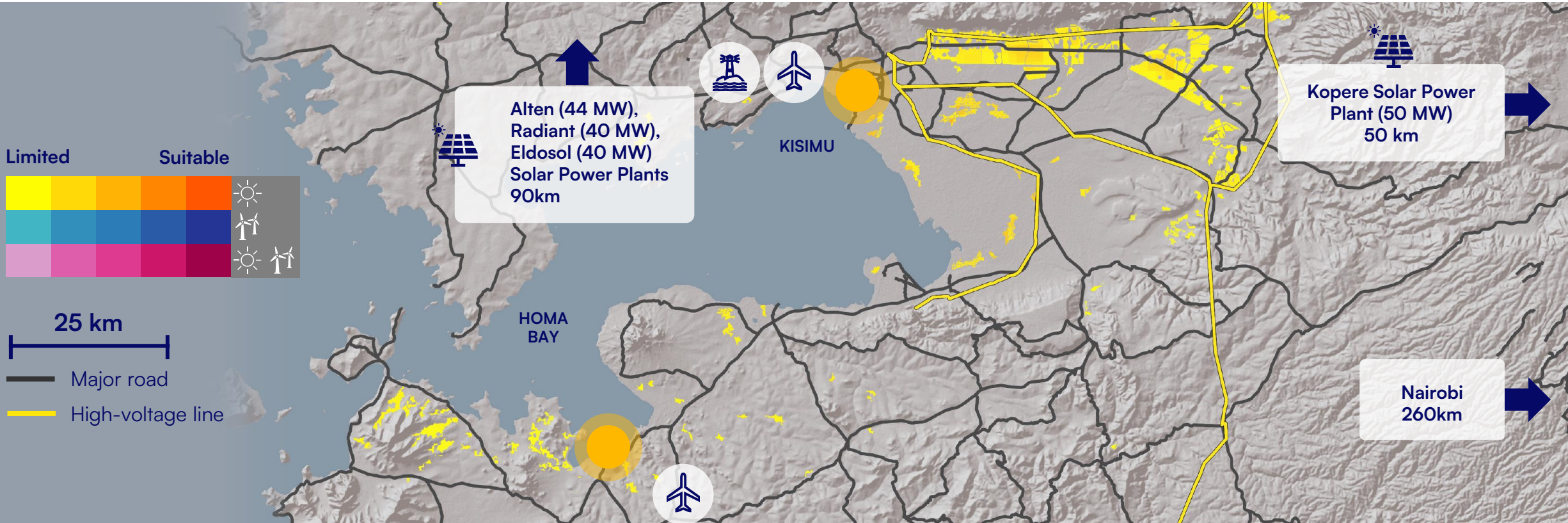
Located in western Kenya, at the shoreline of Lake Victoria.



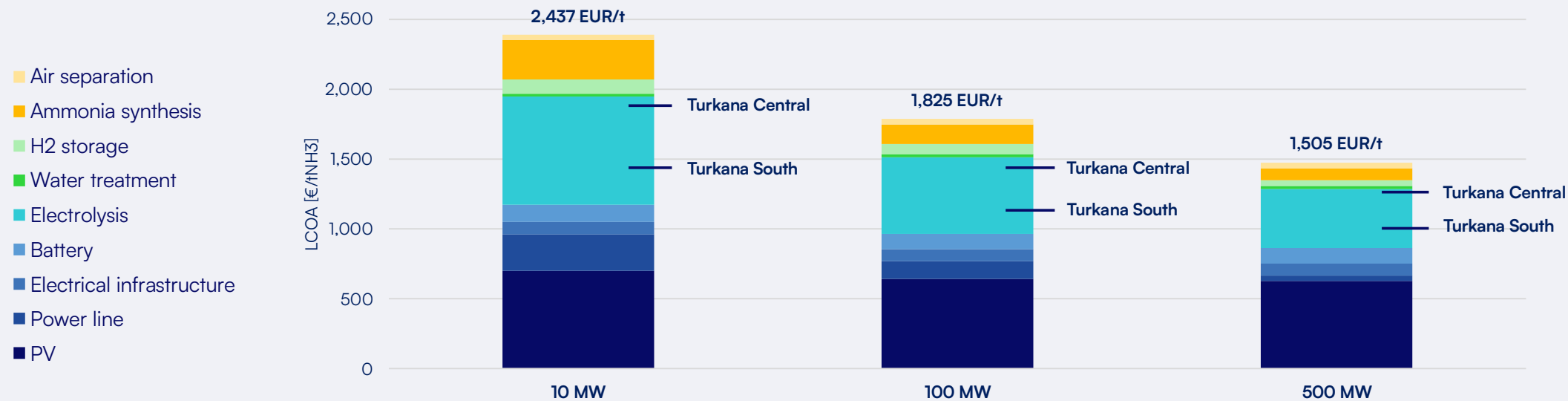
Extensive potential for solar energy only.



Sufficient water for hydrogen production is available through Lake Victoria.



Kisumu



Total investment costs	EUR 47 Mio.	EUR 340 Mio.	EUR 1,357 Mio.
Annual ammonia production	3,400 t-NH3/year	32,400 t-NH3/year	157,900 t-NH3/year

Mombasa



Located in southeastern Kenya, along the country's Indian Ocean coast.



Extensive potential for wind energy and — in a few locations — for hybrid renewable energy (wind and solar).



The region bears significant potential for the offtake of renewable hydrogen-based ammonia and fertilizer to local industries and agriculture. Furthermore, export opportunities to international markets exist through the port of Mombasa.



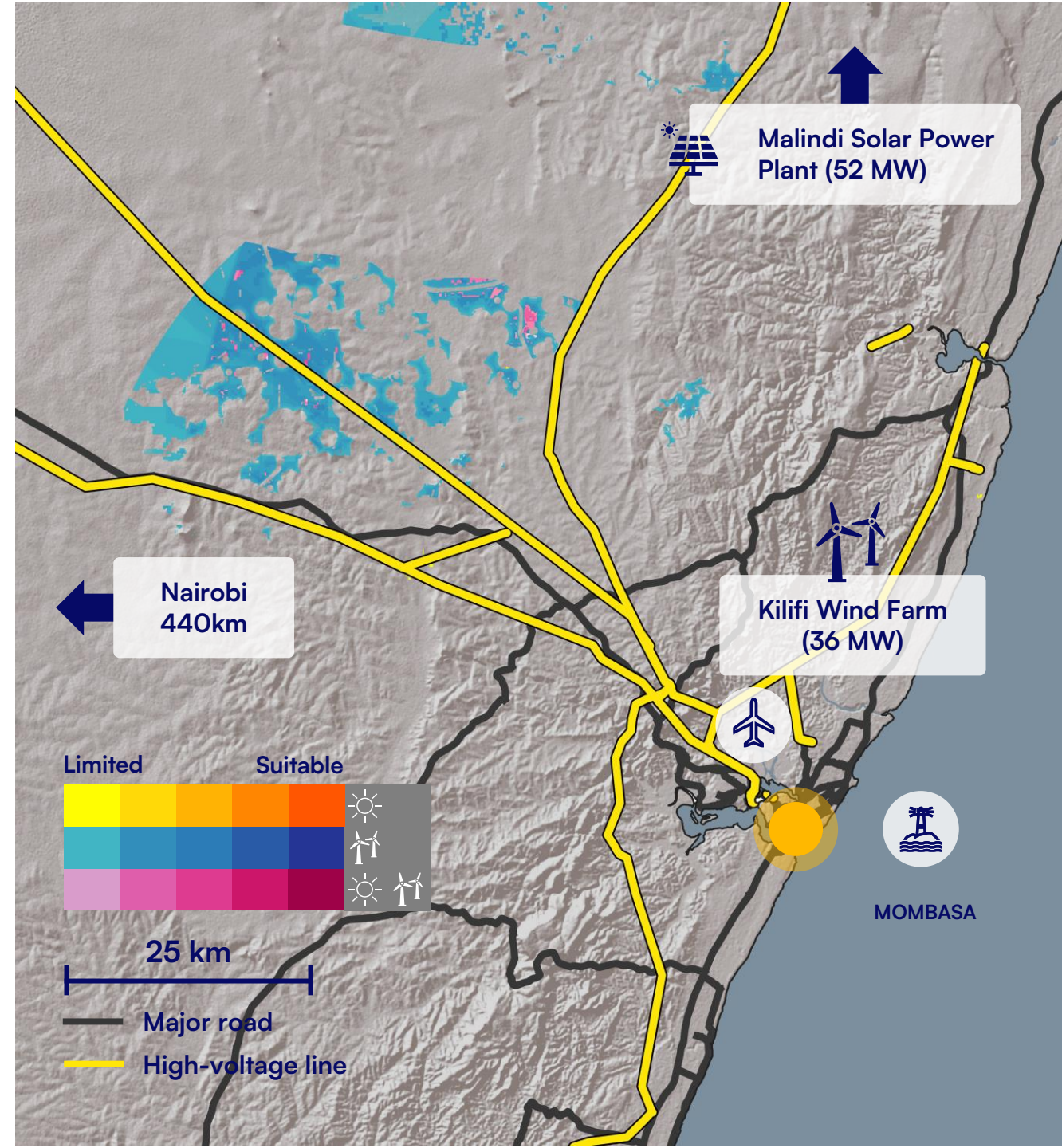
Proximity to Kenya's 2nd largest city provides access to transport infrastructure and everyday goods for workers.



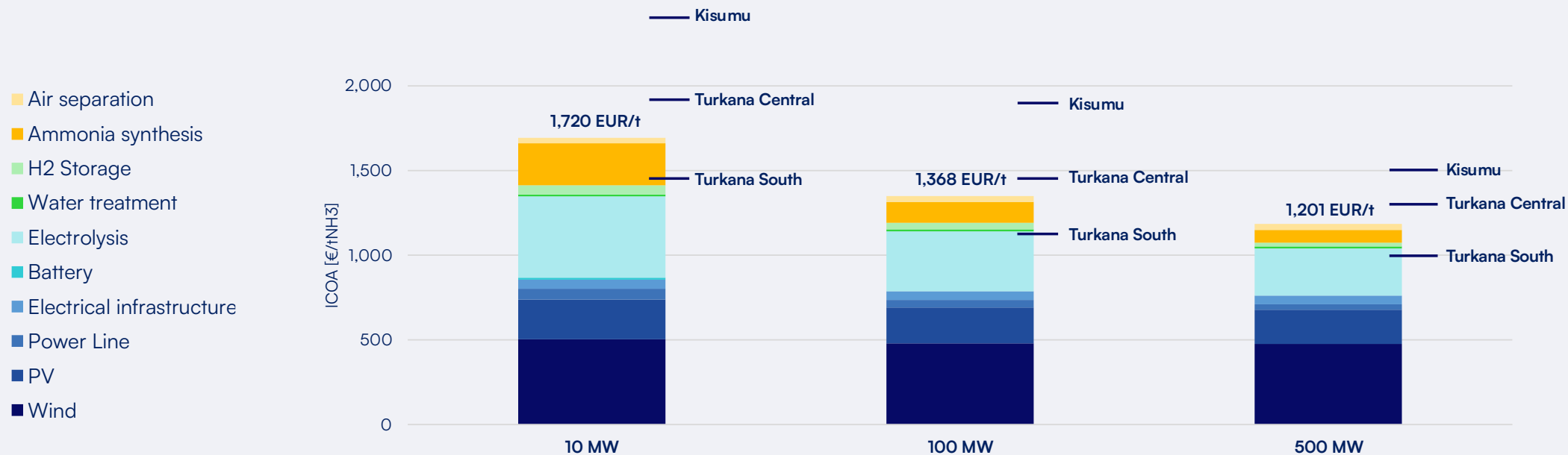
The existing electric grid offers sufficient capacity to supply electrolyzers of up to 500 MW.



Sufficient water for hydrogen production is available through desalination of Indian Ocean sea water.



Mombasa



Total investment costs	EUR 58 Mio.	EUR 430 Mio.	EUR 1,813 Mio.
Annual ammonia production	6,400 t-NH3/year	60,200 t-NH3/year	291,300 t-NH3/year

Domestic fertilizer market offtake opportunities

- Domestic retail fertilizer prices in Kenya significantly exceed global market levels.
- During the global energy crisis in 2022, domestic fertilizer prices rose by 20 — 60% compared to preceding and subsequent years.
- The estimated production cost of renewable fertilizers — based on locally produced hydrogen — is lower than the domestic retail prices recorded in 2022 across all fertilizer types.
- Renewable hydrogen-based fertilizers also demonstrate potential to undercut recent retail prices (as of 2024) for DAP, NPK, and CAN.

Renewable hydrogen-based fertilizers have the potential to be cost-competitive in Kenya's domestic market, offering a more **stable and secure supply at reduced and less volatile prices.**



Recommendations



Recommendations



Locations

Mombasa and **Turkana South** are most favorable, combining potential for low-cost hydrogen production with infrastructure availability and offtake opportunities.



Fertilizer opportunity

Renewable hydrogen-based fertilizers have the potential to be **cost-competitive** in Kenya's domestic market.



Financial support instruments

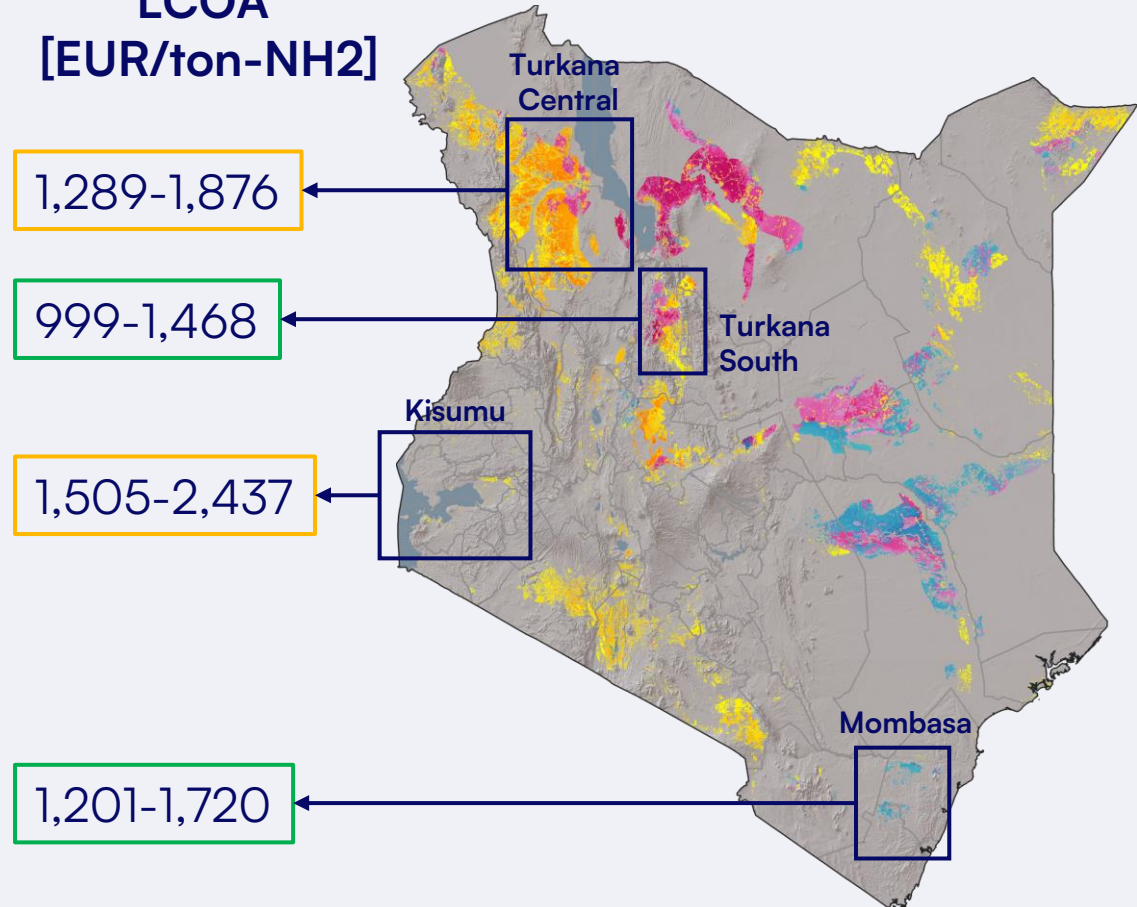
Renewable ammonia projects need to address **green premium** and long-term **offtake certainty**, while renewable fertilizer projects seek to mitigate **market price risks**.



Enablers

High **cost of capital** and lack of **infrastructure** constitute key project development barriers.

LCOA [EUR/ton-NH₂]





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