

Green Hydrogen Infrastructure Mapping & Optimization

Building Smarter Clean Energy Systems

Discover how smart planning can accelerate our clean energy future.



Abstract

- Green Hydrogen Infrastructure Mapping & Optimization is a data-driven approach to strategically plan clean hydrogen infrastructure.
- It addresses the problem of fragmented and inefficient investments.
- This is achieved by visualizing existing assets, renewable energy sources, and demand centers on an interactive map.



Why Green Hydrogen?



- Hydrogen is a super clean fuel, burning only water vapor.
- Green hydrogen is special: it's made using 100% renewable energy.
- Think of it like an electric car – no smoky exhaust, just clean water. It's a key to a truly zero-emission future.



The Challenge: Building Smart, Not Just Building

"It's like building a hospital far away from where people live."

Today, hydrogen infrastructure sometimes gets built far from where it's produced (like renewable energy sites) or where it's needed (like factories or transportation hubs). This leads to:

- Inefficiency: More energy lost in transport.
- Wasted Costs: Higher expenses for pipelines or trucking.
- Slow Progress: Delays in adopting clean energy.

Our Solution: An Intelligent Hydrogen Map

Imagine a "Google Maps" for green hydrogen! Our approach uses a user-friendly, interactive web map with a recommendation engine. It's designed to help everyone from city planners to energy companies make smart decisions.



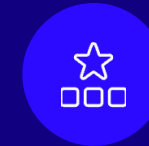
Interactive Web Map

A dynamic, visual tool to explore potential sites.



Smart Data Integration

Combines various data points on one screen.



Scoring for Success

Ranks sites based on important criteria, like a shopping site with ratings.

The Ingredients: What Goes Into the Map?

Just like Google Maps has layers for traffic or restaurants, our hydrogen map has key data layers:



Existing Assets

Current hydrogen production plants, storage facilities, and pipelines.



Renewable Energy Sources

Locations of solar farms, wind farms, and potential sites for more.



Demand Centers

Areas with high energy needs: industrial zones, ports, major cities, and transportation hubs.

How We Build: The Step-by-Step Process

Our thought process is much like planning new metro stations in a city – systematic and data-driven.



1. Collect All Data

Gather information on energy, demand, existing infrastructure, and more.



2. Map It Out

Visualize all data layers on the interactive map.



3. Optimize & Score

Run our algorithms to find the most efficient and impactful locations.



4. Suggest Best Sites

Present clear recommendations for new green hydrogen infrastructure.

The Prototype: Building Our Demo

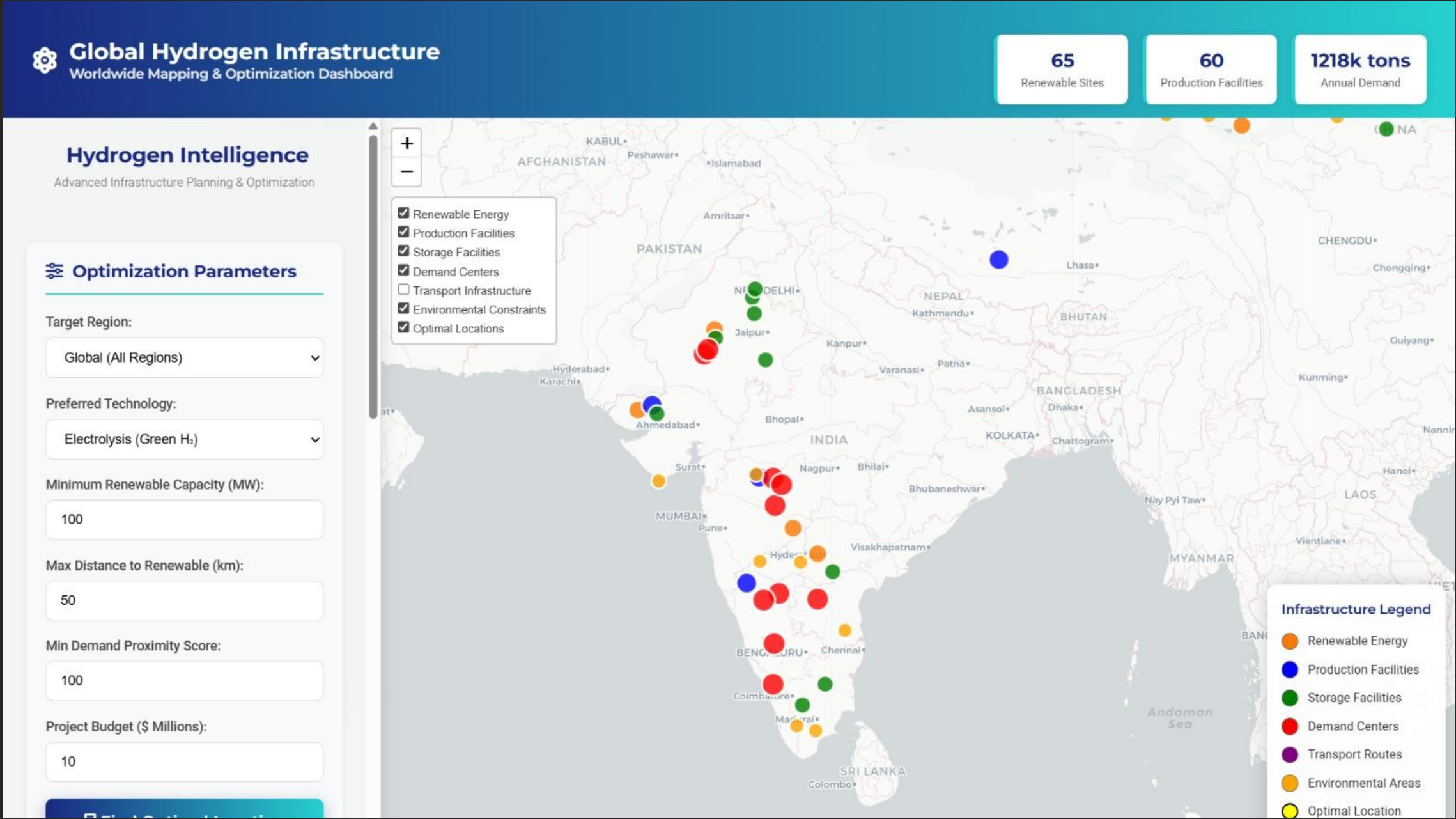
For our initial version (Hackathon MVP), we're focusing on a working prototype to prove the concept, just like building a demo car to show the idea works.

Focus on a **synthetic dataset**.

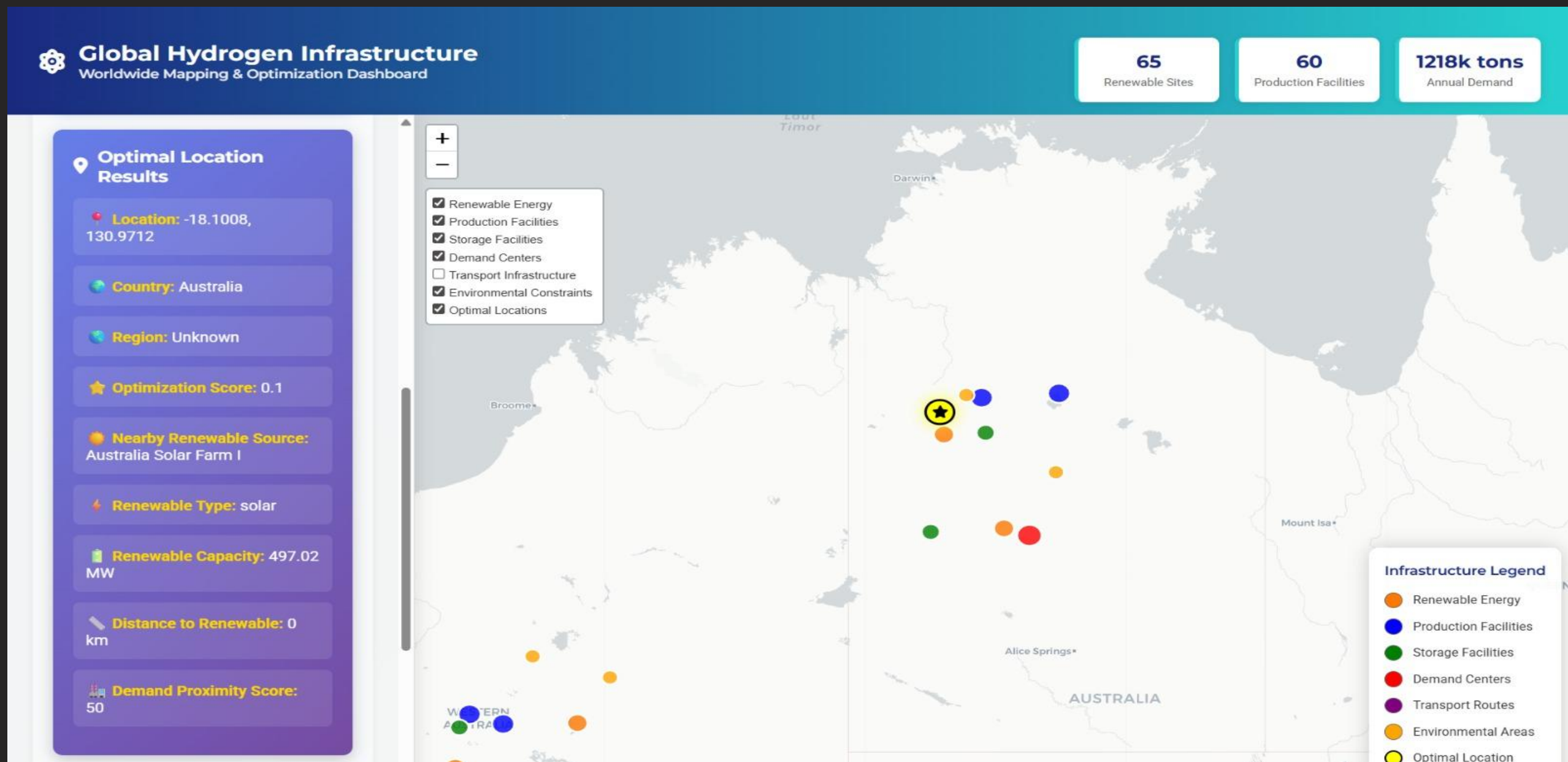
- Frontend: A simple web page with an interactive map and a sidebar for controls.
- Backend: A lightweight scoring model for quick recommendations.
- Goal: Prove the core idea works effectively and visually.



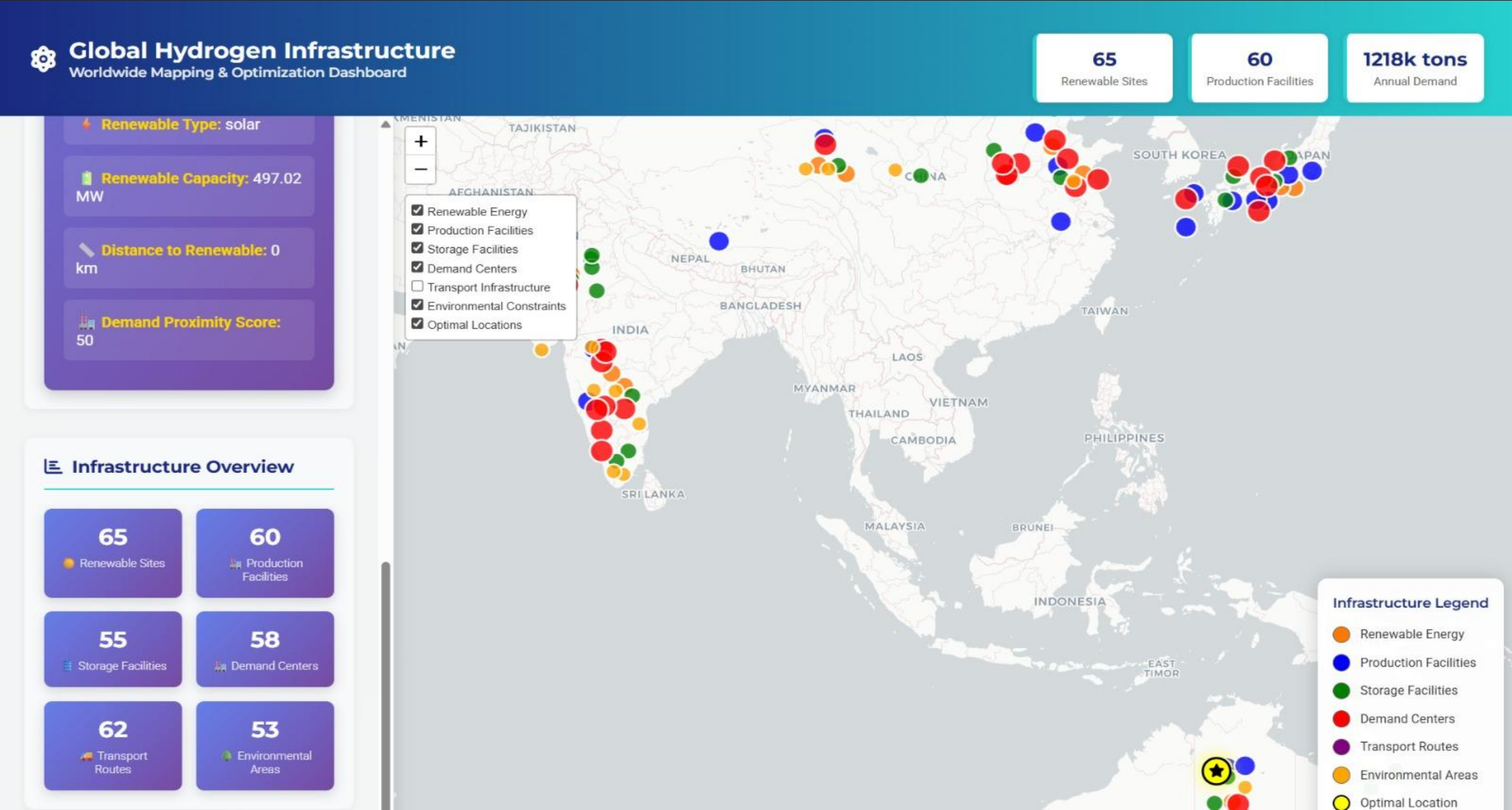
Output



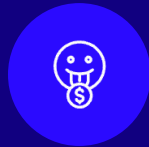
Output



Output



The Impact: Why This Tool is Game-Changing



Save Billions

Avoid costly mistakes and wasted investments in infrastructure.



Reduce Carbon Emissions

Efficient networks mean less energy waste and faster adoption of clean hydrogen.



Accelerate Clean Energy

Speed up the transition to a sustainable future, like proper city planning avoids traffic jams.

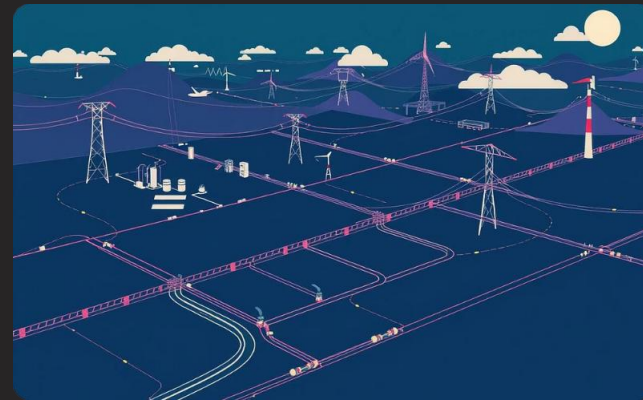
Mapping + Data + Optimization = Smarter Hydrogen Systems.

Our Future Scope



AI Optimization

Integrate AI/ML for dynamic pricing and real-time optimization based on fluctuating demand.



Integrated Energy Planning

Expand to seamlessly integrate hydrogen with existing electric grids and transportation networks.



Advanced Simulation

Provide robust simulation for future scenarios, analyzing CAPEX, OPEX, and CO2 reductions.



Global Hydrogen Marketplace

Establish an AI-powered marketplace to optimize supply chains and facilitate transparent trading.

Thank you 😊