

Digital drives Hydrogen

Digital solutions enabling hydrogen ecosystems

PREPARED FOR
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PREPARED BY
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Driving an electric vehicle?

When's been the last time you've had range anxiety?

Contact



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Add me on **LinkedIn** :



Mobile App

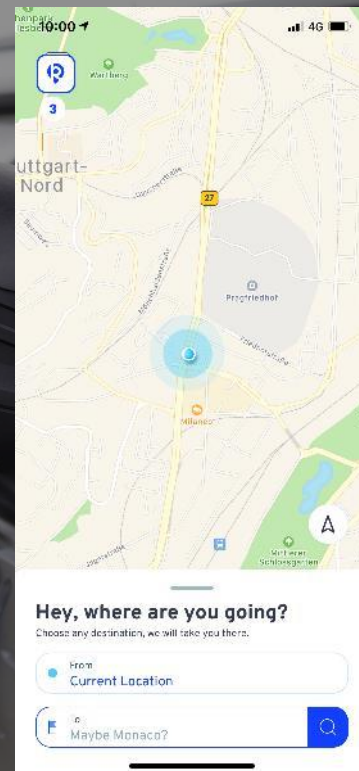
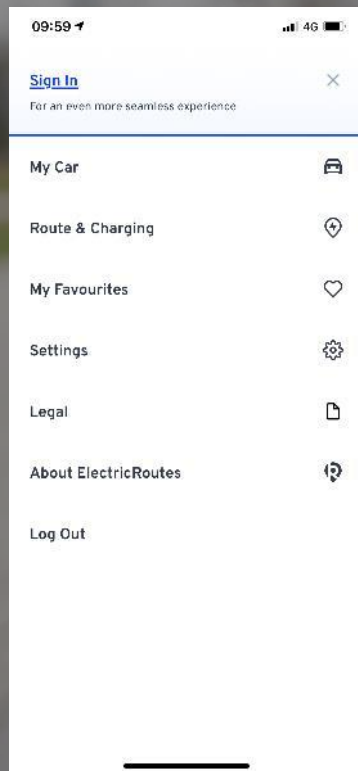
H2 Routes App helps H2 vehicle drivers to plan and navigate their road trip and easily make decisions about fueling their trucks.

The goal of this app is to make evolve the H2 market with a customer centric solution which benefits from Electric Routes technology and experience.



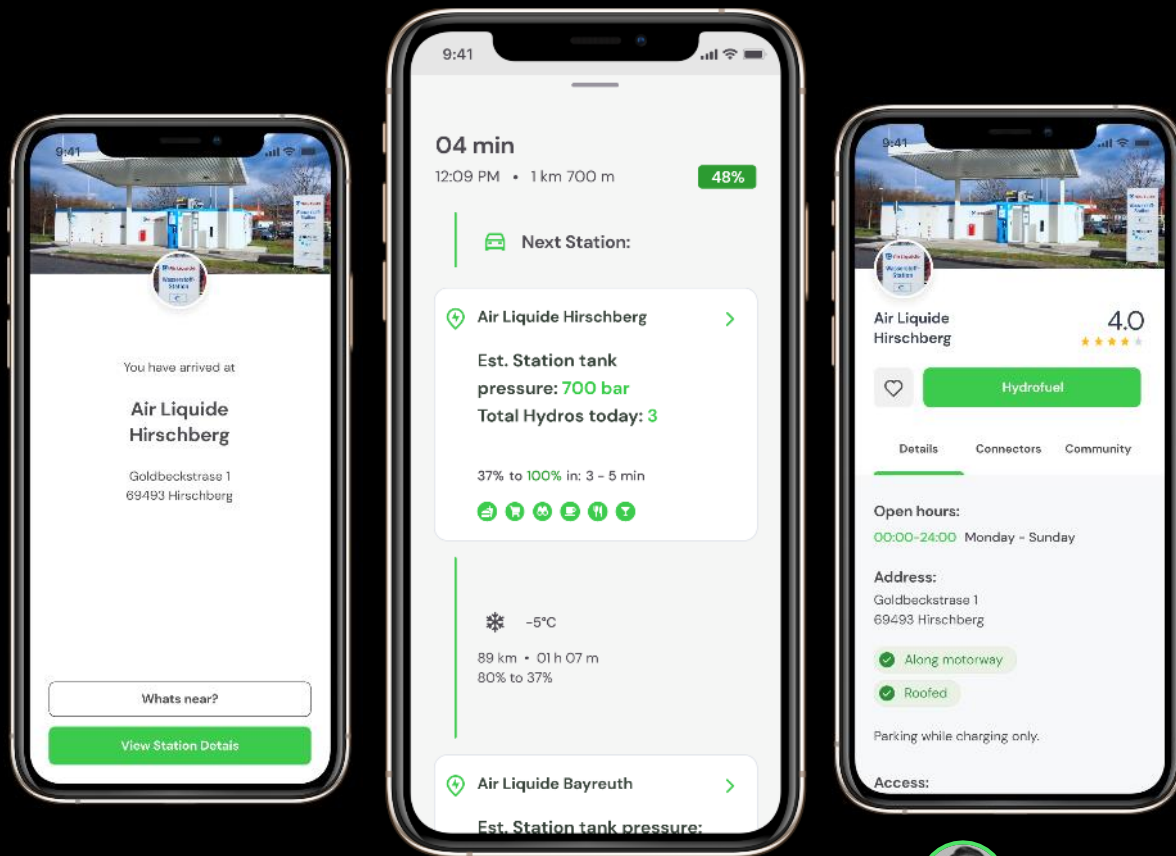
Reach out for
a live demo!

Where do we come from



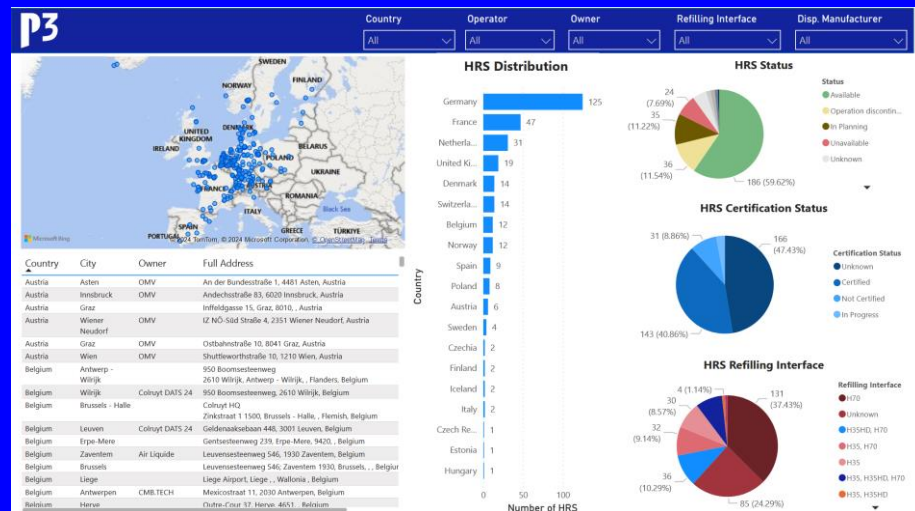
Hydrogen Refueling Stations

HydroRoutes uses P3's own database for fueling stations, which are regularly maintained and updated. Thus we guarantee high quality. Furthermore, own databases can be used.

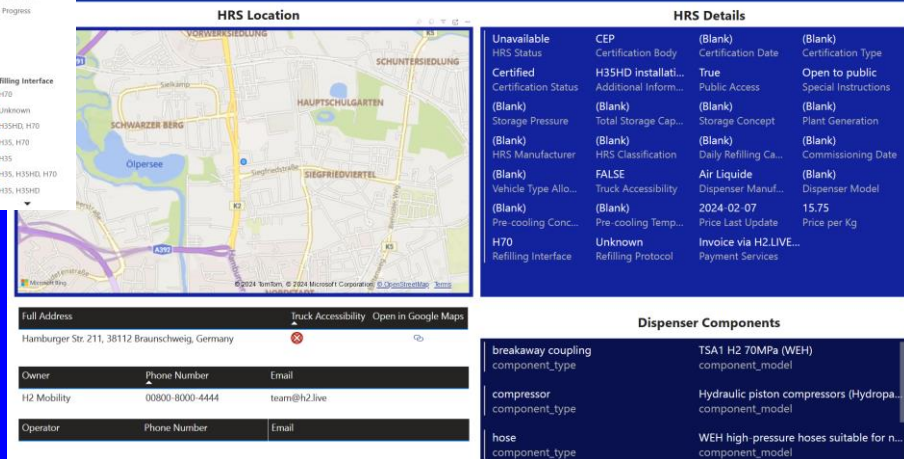


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P3 has built up an own, EU-wide database of H2 refueling stations



Comprehensive, independent and up-to-date database of hydrogen refueling stations ALL over Europe



Truck accessibility & equipment details



Reach out for more detail

P3 energy solutions unifies cross-disciplinary expertise, robust strategic thinking and process knowledge for energy systems and hydrogen environment.

Our experience in the energy sector

100+

Years of experience
in hydrogen economy
& energy transition

60+

Years of experience
in traditional
O&G business

250+

Industrials* in
hydrogen business
we worked with

90+

Deals closed/
projects
supported

4

Board seats & Business Angel
mandates in H2 industry

30+

Electrolyzers
operated worldwide

* OEMs, project developers, EPCs



Prof. Dr. Armin Schnettler
Managing Director



Markus Hackmann
Managing Director

Ready for global projects of every size

1850+

Employees from
70 nations

27

Years of experience
In Europe, Asia and
the Americas

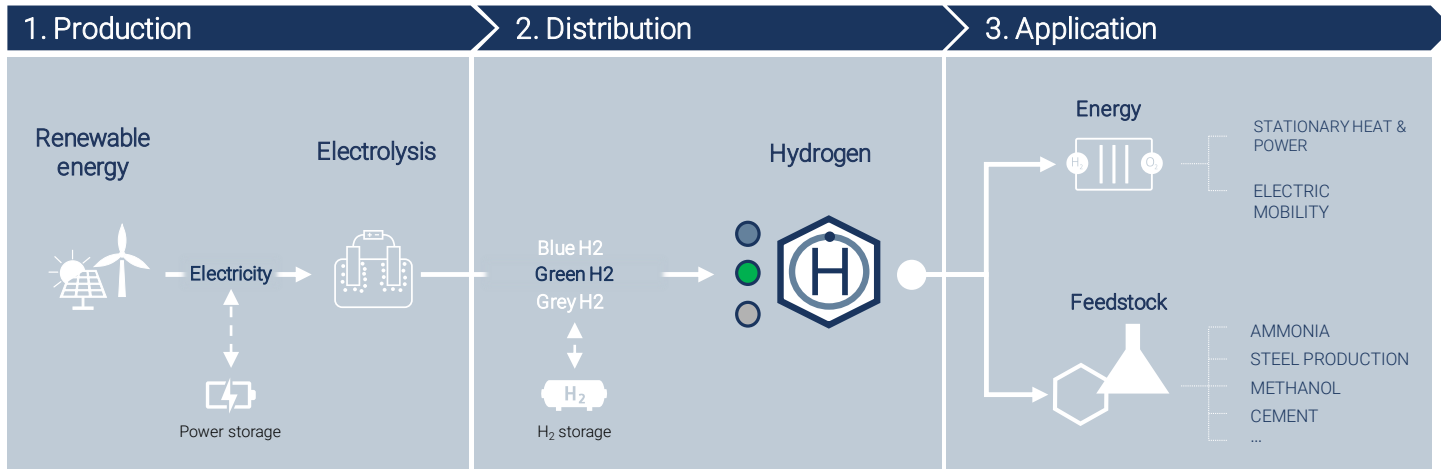
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Locations
Globally on 4 continents

75

% of our employees are
engineers, scientists &
software developers

Hydrogen ecosystems are facing multiple challenges from the sheer complexity and variability of projects.



- Technical feasibility
- Cost of hydrogen

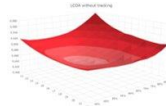
- Guarantees of origin
- Means of transport
- Trading platforms

- H2 availability & fleet planning
- Total Cost of Ownership

Digital tools are absolutely essential to master the high complexity of Hydrogen ecosystem projects in all project phases.

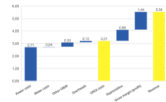


We apply our digital simulation suite at to an appropriate level of detail at each phase of the project to ensure efficient decision making.



Relative sizing model

Relative sizing of electrolyzers, PV, wind turbines, batteries, hydrogen storage, grid connection or PPA to match hydrogen off-take agreements, and LCOH targets.



Electrolyzer TCO and Availability model

Simulate business plan and availability of an electrolysis plant. Combines financials, technical performance, and operational strategies to identify optimal electrolysis plant setups.



Plexos

World's most powerful energy market simulation engine - used by our teams as integrated model to find the overall cost-optimal solution for a complex PtX project.



Project cash flow management model

Tailored project cash management tools, engineered at the relevant level of detail, to save project managers time and effort to improve focus on the project.



Operations optimizer

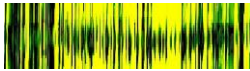
Operation and maintenance strategy up to 'digital twin' level. Expert selected level of detail for a suitable tool to optimize your asset operation strategy.

Modeling and optimizing each component across the entire P2X value chain with a broad set of very detailed inputs can deliver comprehensive results.

INPUT

- Generation profiles
- Considered technologies:
 - Generation
 - Storage
 - Transport
 - Conversion
- Technology specifics such as
 - Technical parameters
 - Efficiency & degradation
 - CAPEX and OPEX
- Price projections

Solar/Wind



Volatile electricity prices



MODEL

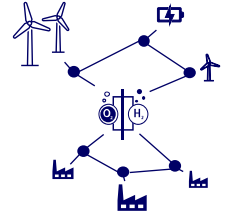
Our set of tools allow us to generate a **Digital Twin** of each project that considers in detail the complex interdependencies between variables



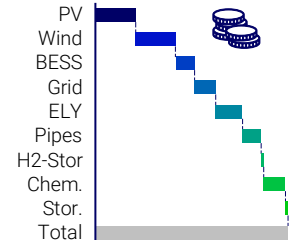
*Integrated model
to find the overall
cost-optimal solution*

OUTPUT

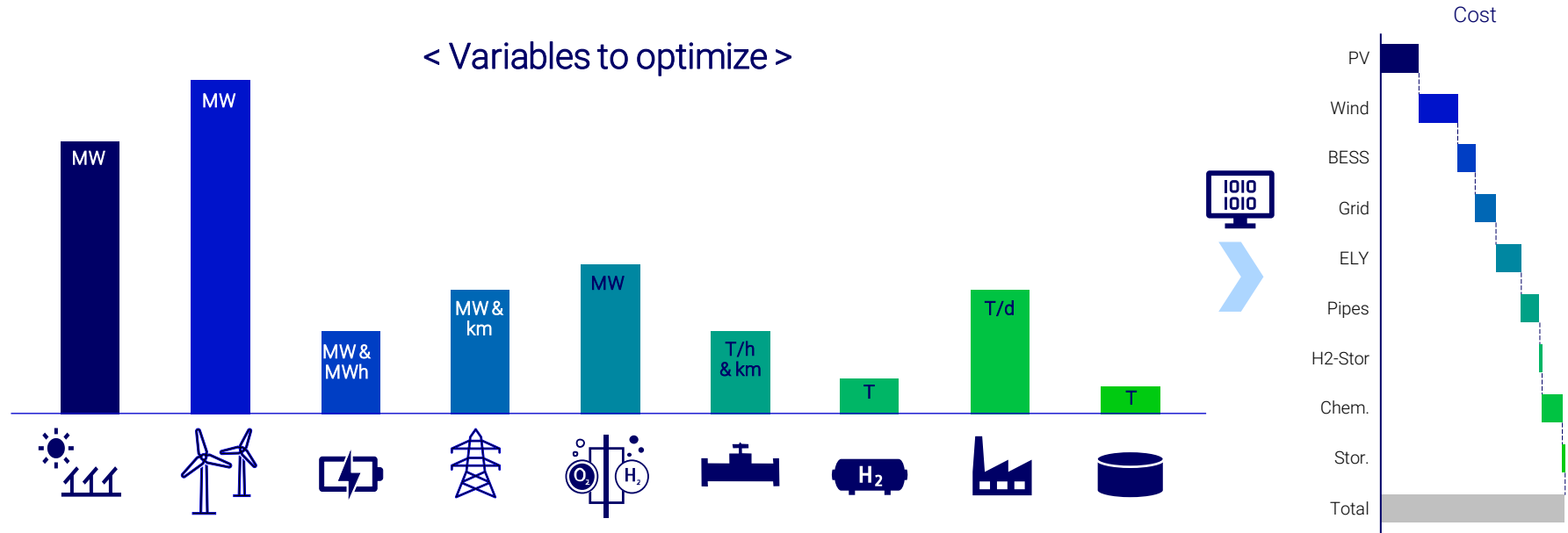
- Technology choice
 - Which technology
 - Location
 - Dimensions
- Plant operation
- Financial KPIs
 - Cost breakdown
 - CAPEX & OPEX
 - LCOH
 - LCOE



Electrolysis power

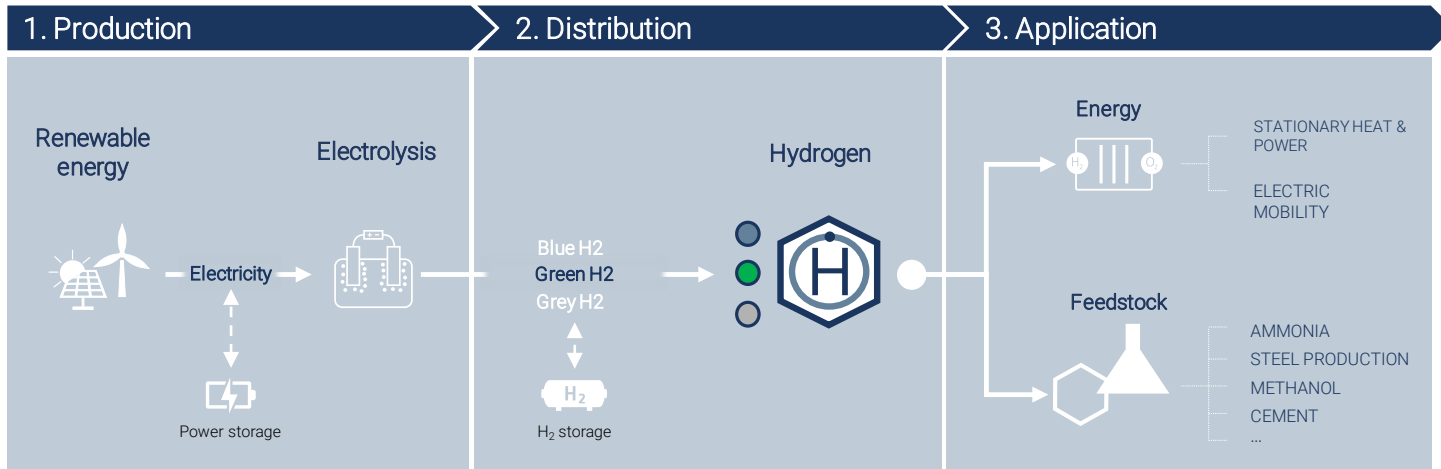


The task of dimensioning each element has the highest reduction in overall project cost – and only an *integrated* optimization can provide maximal savings.



The **dimensioning** decision (“how much of what”) must consider the **interdependencies** between all components and thus requires a comprehensive, yet detailed modelling into one **end-to-end digital twin** of the entire system

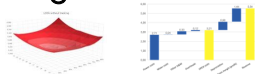
Digital solutions are inevitable as enablers for hydrogen ecosystems and real-time aggregation and interlinkage of hydrogen networks are key to success.



- Technical feasibility
- Cost of hydrogen



- Smart sizing
- Digital twins



- Guarantee of origin
- Means of transport

- Green hydrogen certificates

- H₂ availability & fleet planning
- Total Cost of Ownership

- Smart interconnection of offtake & production
- Aggregation in larger ecosystems



Your contacts for this document



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