

# A flexible approach to GIS based modelling of a global hydrogen transport system

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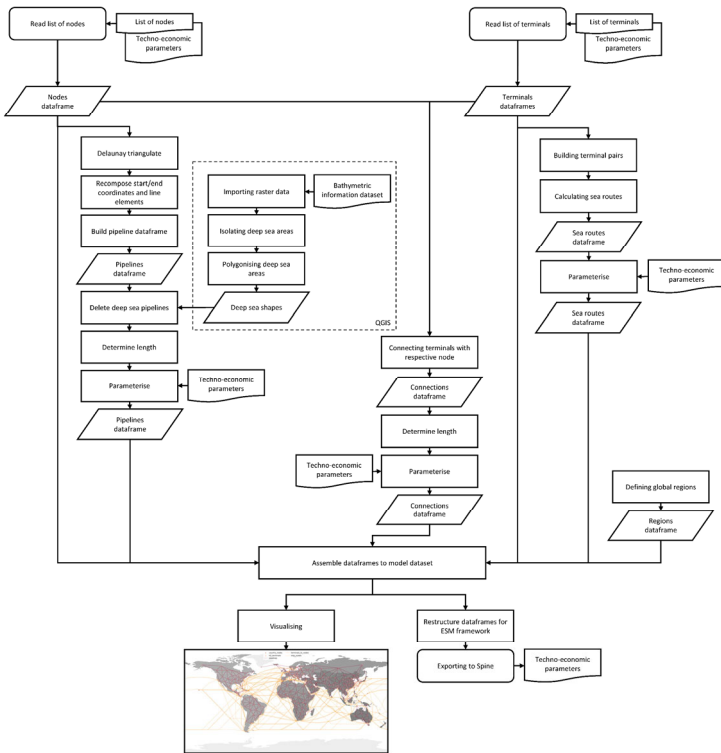


on the basis of a decision by the German Bundestag

## Highlights

- GIS based method to automate hydrogen transport system development.
- Created an accessible and adaptable tool for implementing the method.

- Integrated tool with existing energy model, allowing flexible spatial adjustment.
- Ensured seamless handover between the tool and energy system modelling framework.

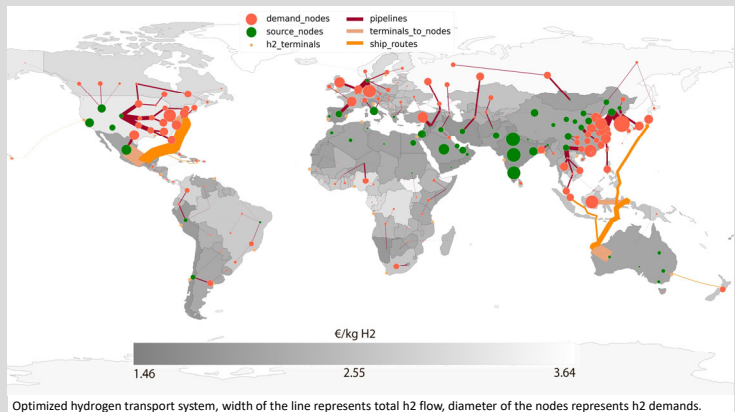


Flow diagram of python algorithm.

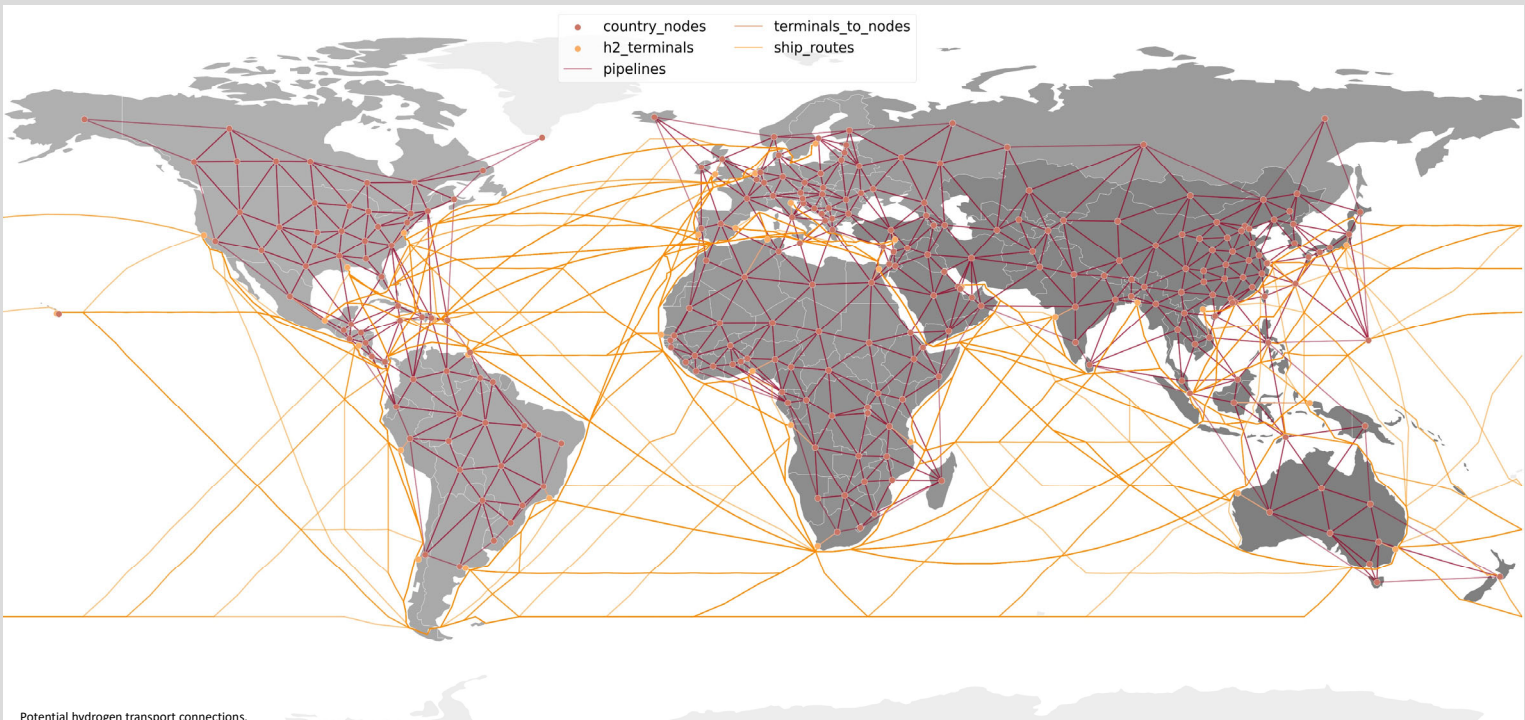
## Abstract

Beside the production of hydrogen, the transport is a key component to a successful development of a decarbonized global hydrogen economy. To answer the question, where the required amounts of hydrogen will be produced and along which routes and in which form they will be transported, a sector integrated global hydrogen transport system model needs to be established. This paper provides a flexible method and tool for geographical structuring of sector integrated energy transport systems. It enables the adaptability to existing energy system models and allow for flexible adjustment of the geographical scope. Combined with the integration of pipeline and ship transport it is a novelty, that enables the setup of energy transport systems to perform structured investigation of origin and transport in a future hydrogen economy. The model is validated by comparison with similar studies regarding the directions of hydrogen transport flows.

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Optimized hydrogen transport system, width of the line represents total h2 flow, diameter of the nodes represents h2 demands.



Potential hydrogen transport connections.