

Modelling hydrogen production and use in a renewable power system

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Project description

Green hydrogen – produced by splitting water with renewable power in electrolyzers – is seen as an important energy carrier for our future energy system. First, it is expected to be used in many industries, and in some transportation sectors. Second, hydrogen can be used as a back-up fuel for electricity generation. Hydrogen thus acts as an energy store, effectively creating a route to making our power system fully sustainable.

In this project you will assess how fulfillment of both these purposes for hydrogen production can be combined in the best way, i.e. how production of hydrogen for industry and transport can best be integrated with decarbonization of our power system. How many renewables (wind and solar power) are needed for this? How many electrolyzers? This is crucial information to know when shaping the energy transition.

The answers to these questions are context specific: they will depend on the geography and choice of electricity mix (i.e. how much solar compared to wind power). We have built a computational model in Python to address the research questions, starting with the Netherlands. You will improve this model and will build a dynamic website where users can upload their renewable power profile based on their assumptions. This tooling will allow us, and anyone else, to carry out this analysis not just for the Netherlands, but for any country of choice.

Job requirements

- Programming experience in Python
- Background in physics, energy science or related quantitative field
- Experience in dynamic website development is a bonus