Haskoning
Enhancing Society Together

White paper:

Too early for hydrogen investments?

On the contrary. The right time is now.

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Parametric design: The accelerator for energy transition

CO_2 reduction through sustainable hydrogen

Hydrogen has a role to play in the energy transition, that much is certain, especially now that hydrogen occupies a central position in the European Union's energy strategy.

However, the hydrogen transition is progressing slowly. This is mainly due to its strong linear character: a new step is not taken until the previous one has been completed. Working in parallel speeds up progress but also comes with risks: how can you trust that an unlicensed permit will allows for a future design modification? This makes investors reluctant. The upfront costs for hydrogen are steep while there is still a lot of uncertainty about its yields. Many potential players are therefore hesitant to step in. At Haskoning we provide an answer: through parametric design, you can have speed whilst maintaining flexibility.

Anticipating on the starting shot

This reluctance is understandable, but not insurmountable. Investors can prepare themselves at an acceptable cost so that they can quickly advance once the Final Investment Decision (FID) has been taken. Working in parallel with a parametric design process ensures easier future adjustments all made within a central platform. For example, FIDs can be taken faster, forecasts for stakeholders become clearer, and development opportunities within existing dynamic environments become possible (brownfield designs). This even allows starting projects with an uncertain future or at the very least be fully prepared to start.





Parametric design as a single source of truth

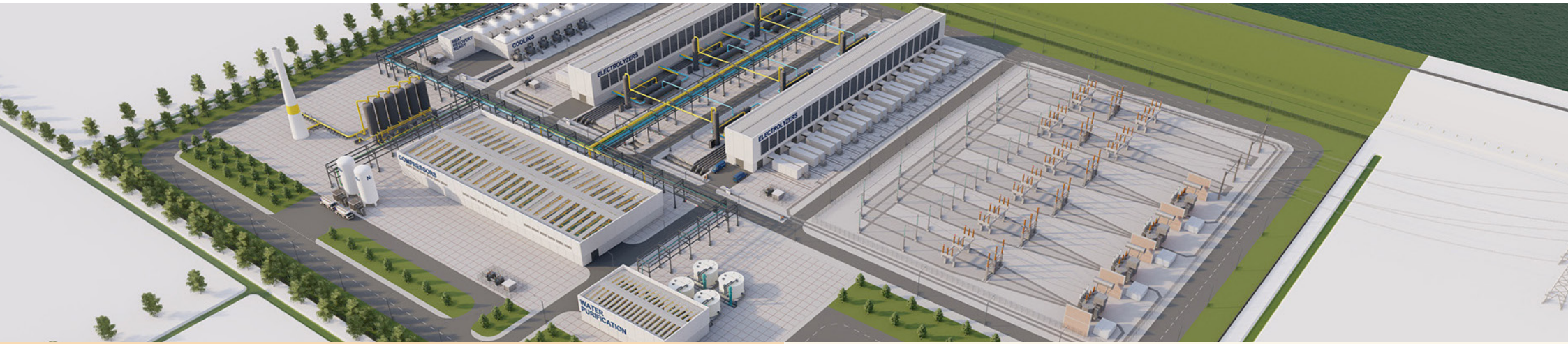
By having all data and parameters located in a Single Source of Truth, a linear process becomes a parallel process and you can make progress on several tracks simultaneously. A permit application can be based on a "worst case" scenario, which means that it can still be sent out without sacrificing flexibility in the future. In addition, more synergy is created if insights from the permitting process are implemented at an early stage in the conceptual design. Parametric design makes both possible.

Flexible and fast design

Haskoning already applies parametric design for the design of data centers and energy islands. We believe that parametric design can also make a difference in the energy transition. Parametric design offers many advantages, especially in (hydrogen) projects in which technological developments and legislation and regulations are constantly changing. In a parametric design, physical design parameters such as the (required) power of an electrolyser or safety distances between storage tanks are decisive for the design. All design drawings are derived from these parameters. When one of the parameters changes in the meantime, this affects the entire design. If a power per electrolyser stack is higher due to innovation, the design normally has to be done again. With a parametric design, only the parameter 'power per stack' needs to be adjusted to the new number of stacks. It is even possible to automatically recalculate the building size, construction and foundation. The results then become ready-made input for any new business case.

Parametric design in practice:

ISPT Hydrohub



The challenge:

Together with the Institute Process Technology (ISPT) and other partners, we contribute to the future of green hydrogen. Green hydrogen can be made with electrolysis using solar or wind energy. In order to really meet the demand for green hydrogen it is important that production is scaled up. But how do we make an optimal layout of a GW electrolyser installation?

Our approach and results:

With our knowledge of the different techniques required for this project, we looked at the potential for the possible locations of the Gigawatt electrolyser. It was decided that it could be realised in one of the five important industrial clusters in the Netherlands: Chemelot, North Sea Port, North Sea Canal, Port of Rotterdam and the Groningen Seaport region. Using a parametric model, the basic layout of the hydrohub is visualised in 3D and changes to the requirements of the hub can be quickly incorporated. For example, a specific design was made based on the requirements in the five industrial clusters.

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Parametric design in practice:

PoR Import Terminal



The challenge:

How do we prepare our import terminals for a future scenario in which hydrogen imports will sharply increase?

Our approach and results:

A simple parametric design gives us the space required for import terminals for liquid hydrogen, ammonia or liquid organic hydrogen carriers. The annual throughput of hydrogen is the most important parameter here. But safety distances and tank volumes are also easy to adjust. On the basis of this design, the safety and environmental space was subsequently determined by means of a quantitative risk analysis and various environmental studies. This gives our customers quick insight into space requirements and possible locations leading to faster and better decision making.

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Your partner in accelerating the energy transition

A parametric approach provides solutions for a flexible, fast and parallel development process. We would like to challenge you to make an impact with us in this rapidly changing world by realising energy transition projects faster. If you see opportunities yourself or if you would like to see where your opportunities lie with us, please do not hesitate to contact us.

Contact us:

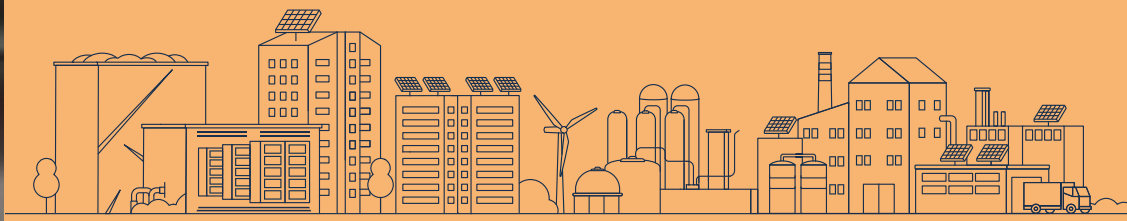


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