

Nuclear Cogeneration of Heat, Electricity and Hydrogen

ULC
Energy

SMR: flexible solution to deliver heat, power and hydrogen on-site, 24/7

Illustrative Purpose Only

Energy Flexibility at an Industrial Scale

Society depends on a continuous energy supply to power homes, government services, transportation, hospitals and especially our companies and industry.

The share of variable renewable electricity sources, like wind and solar, has grown rapidly and will continue to expand. This shift is increasing electricity market volatility, with periods of abundant clean energy followed by frequent shortages.

Hydrogen, a key chemical energy carrier, plays a crucial role in the Netherlands, where over one million tons are consumed annually—almost all produced from natural gas. In the future, hydrogen will be essential for decarbonizing energy systems, particularly for sectors reliant on molecules rather than electrons. However, producing green hydrogen remains a challenge due to, among other reasons, high costs and low utilization rates for electrolyzers.

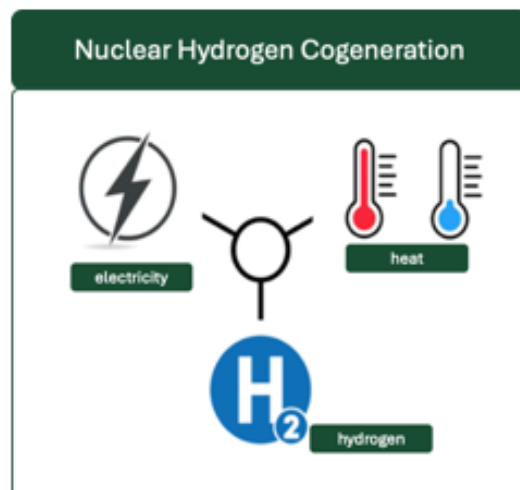
Heat is another significant energy demand and is currently met largely by fossil fuels. As electrification advances, the availability of residual heat will decrease, even as the need for reliable, affordable, and clean heat services rises.

Benefits	
Energy System Balancing	Baseload H ₂ , heat and power at industrial scale
Private Development Model	Savings on Energy Infrastructure Costs

*SMR: Small Modular Reactor

Cogeneration of Heat, Electricity and Hydrogen

Combining a Small Modular Reactor (SMR) with an electrolyser enables on-site production of heat, power, and hydrogen. This system dynamically switches outputs, offering a highly efficient cogeneration solution. The flexibility to adjust production based on real-time energy market conditions ensures energy is delivered in the form or mix where it is most needed.



Grid and Cost Optimisation

On-site production of power, heat and hydrogen minimizes the need to transport significant amounts of energy across the country, cutting associated costs. Deploying combined heat, power and hydrogen systems at strategic locations in the Dutch energy system can significantly reduce the need for costly investments in TenneT and Gasunie's public energy distribution networks.

Moreover, using an SMR to produce hydrogen—leveraging both electricity and heat—offers a highly cost-competitive alternative to green hydrogen produced via electrolysis powered by renewable sources.

Complementary to Wind and Solar

When renewable electricity production is abundant (the sun is shining and/or the wind is blowing), the SMR will prioritize producing heat and/or hydrogen instead of supplying electricity to the public grid.

Conversely, during periods of low renewable production, the SMR will shift to providing electricity to the public grid as needed, ensuring a reliable energy supply.

ULC-Energy: Developer of the Rolls-Royce SMR in the Netherlands

ULC-Energy is a nuclear project developer that focuses on the development of clean energy hubs powered by small modular reactors in the Netherlands. ULC-Energy selected Rolls-Royce SMR in 2022 for deployment in the Netherlands and has entered strategic partnerships with several leading companies to support the delivery of these projects.



SMR



© ULC-Energy B.V.

2026

Weesperstraat 107

1018 VN Amsterdam

The Netherlands

www.ulc-energy.com