

RenewaFLEXNL – Integrating Renewable Energy and Offtakers with Long-Duration Energy Storage (LDES) for a Smarter Grid

Publieke samenvatting / Public summary

Aanleiding

The Dutch energy transition faces growing challenges from grid congestion, variable renewable generation, and immaturity of long-duration energy storage (LDES). Solar and wind energy are not always available when needed, short term storage and grid expansion alone cannot resolve supply demand mismatches. These issues threaten decarbonization targets and energy reliability for key sectors needing to electrify. LDES offers essential multi-hour to multi-day flexibility and has the potential to serve as a fossil-free alternative to traditional baseload generation. RenewaFLEXNL therefore focuses on tackling the underdevelopment and integration of LDES in the Dutch energy landscape. RenewaFLEXNL will close this gap by accelerating innovative Dutch LDES technologies and advancing system integration strategies to support a resilient and future-proof energy infrastructure.

Doelstelling

RenewaFLEXNL accelerates and de-risks LDES technologies to support the integration of renewables and energy offtakers in key sectors. The project directly contributes to the MOOI mission on 'System integration' by focusing on the innovation theme of 'storage and conversion'. It develops three Dutch LDES solutions (electrical and thermal) and an open Energy Management System (EMS) blueprint to optimize co-location and operation.

Projectinformatie / Project information

Projectnummer / Project number
MOOI25001

Subsidiebedrag / Grant amount
€ 3.717.545,00

Algemene informatie / General information

Penvoerder / Secretariat
Nederlandse Organisatie voor
Toegepast-Natuurwetenschappelijk
Onderzoek TNO

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Through technical validation, economic modelling, and regulatory and environmental assessment, it enables scalable, sustainable LDES deployment. The project connects key actors across the energy system to create shared value, reduce curtailment, alleviate congestion, and enhance the reliability and affordability of renewable energy.

Korte omschrijving

The project spans four main objectives: (1) maturing three Dutch LDES technologies through testing and validation; (2) developing and implementing a modular EMS blueprint to three real-world use cases (Rotterdam Port, De Kwakel, Altena) – focusing on industrial, horticulture and transport sectors as high impact areas for near-term LDES deployment; (3) assessing business models, societal value, regulatory needs, and environmental impact; (4) engaging stakeholders and disseminating results via a dedicated knowledge platform. Key partners include storage developers, energy suppliers, grid operators, industrial users, and research institutions. The consortium spans the entire value chain, from technology to policy. The project will deliver 10 concrete outputs, including technical designs, integration tools, and strategic guidance for scaling up LDES across the Netherlands.

Resultaat

The project will support the delivery of validated LDES technologies and integration methods that are ready for large-scale deployment in the Dutch energy system. The results are expected to be implemented within 10 years. It supports grid operators, renewable developers, and industrial users by reducing curtailment, deferring grid expansion, and enabling clean, continuous power and heat supply. Key outputs include techno-economic assessments, validated EMS modules, regulatory recommendations, and a national LDES deployment strategy. By strengthening investors' and policymakers' confidence, the project lays the groundwork for commercial roll-out and replication. Beneficiaries include system operators, energy suppliers, industry clusters, technology providers, and ultimately Dutch citizens through a more

reliable, cost-effective, and sustainable energy system.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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