Integrated circular energy system for capacity expansion without grid impact

Publieke samenvatting / Public summary

Aanleiding

Revyve produces texturising yeast-protein ingredients at its Dinteloord production facility, replacing animal-based proteins and additives in food applications with circular, fermentation-derived alternatives. Growing demand in this segment requires capacity expansion through additional spray-drying, wastewater-treatment and utility installations. The added electricity load cannot be served by the local grid because of grid congestion, a constraint that increasingly affects industrial expansions across the Netherlands. Combined with the current natural-gas-based energy supply and the tightening NOxemission requirements for industrial combustion installations, the expansion as planned would lock in substantial CO2 emissions and require complex emission-control measures within a constrained permitting context. A different energy approach is therefore required.

Doelstelling

The study prepares a demonstration investment in an integrated circular microgrid energy system at Revyve's Dinteloord facility. The system combines a combined heat and power (CHP) unit with NOxabatement, biogas production from Revyve's own wastewater, a high-temperature heat pump for spraydrying, heat recovery, and a microgrid configuration with energy-management buffering. Together these components allow capacity expansion without additional grid load, while reducing fossil-fuel dependence and meeting the air-emission requirements. The study confirms the

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engineering basis at Class-3 definition, the environmental performance, the permitting feasibility and the investment case for the demonstration. The component technologies are commercially available; the innovation lies in their integration and in their application in the yeast-protein production context. The study supports STUDI's objective of cost-effective CO2 reduction in Dutch industrial processes within ten years of study completion.

Korte omschrijving

The study is organised in four work streams that run in parallel over twelve months. Revyve executes the study with three essential outsourcing relations. Work stream 1 (Engineering & Integration) delivers the integrated engineering package at Class-3 definition for the microgrid (CHP with DeNOx, biogas production, high-temperature heat pump, heat recovery to spray-drying, energy-management buffering), together with the WWTP and utilities expansion. Work stream 2 (Permitting & Implementation) covers the permitting route including air-emission requirements, the HAZID/HAZOP safety review and the implementation planning. Work stream 3 (CO2 Analysis & Environmental Performance) quantifies the avoided CO2 emissions and the air-quality impact relative to the fossil baseline. Work stream 4 (Investment Case) prepares the Class-3 investment estimate, the financing roadmap and the payback verification.

Resultaat

The study delivers an integrated environmental-study dossier supporting Revyve's go-decision on the demonstration investment. The deliverables include the Class-3 engineering package for the integrated microgrid (CHP with DeNOx, biogas production, high-temperature heat pump, heat recovery to spraydrying, energy-management buffering); the Class-3 engineering package for the WWTP and utilities expansion; the permitting study covering the air-emission permit pathway and the HAZID/HAZOP review; the quantified CO2-reduction and air-quality analysis against the fossil baseline; the Class-3 investment estimate and business case

with payback verification; and the financing roadmap for the demonstration. The dossier gives Revyve and prospective co-financiers the documented basis for the demonstration investment decision.

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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