

Electrification C3 Compressor Olefins 4

Publieke samenvatting / Public summary

Aanleiding

SABIC is committed to the decarbonization of the plastic production and aligned with the Dutch governmental goal of reducing the CO2 emissions by 2030. Within SABIC, Geleen is seen as a priority site to showcase the potential of decarbonization of their cracker fleet through technology development. For SABIC one of the biggest challenges to reach the described sustainability goals is the electrification of the crackers. To tackle this challenge, SABIC will start the electrification process of Geleen cracker by replacing the steam turbine driven compressor with an electrical drive using renewable electricity rather than the currently fossil fuel powered steam turbine. Such steam-electricity transition will significantly reduce SABIC's greenhouse gas emissions, both by energy efficiency gains as well as through to the switch from fossil to renewable power. This replacement is highly challenging, due to requiring a large electromotor and complex integration into an existing cracker and the associated heat network.

Doelstelling

The goal of this engineering and environmental study is to gain more insights regarding the technical and structural feasibility and efficiency of the implementation of an electromotor in the compressor section of the cracker, as replacement of the steam-powered turbine. Additionally, this study will allow to implement this technology without negatively impacting the production of polymers and without upsetting the site balance of steam. All technical bottlenecks that could threaten successful implementation will be identified and

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Algemene informatie / General information

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SABIC Petrochemicals B.V.

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solved. Finding an alternative use for the steam currently produced is essential to maximize the environmental benefits. Finally, the study described in this application will allow SABIC to understand the real costs and the environmental benefits, as well as supply a proper implementation plan for the environmental investment into the electrification of the compressor drive. Through the implementation of the electric motor, the emissions from the cracker can be reduced by 9%, reducing emissions by up to 99kt CO₂ per year based on a preliminary study. This is achieved through both energy efficiency gains and the switch to renewable power.

Korte omschrijving

The environmental study will involve performing a Front-End Engineering and Design (FEED) and a civil engineering study, which will give a precise overview of the necessary procedures and materials with enough detail to estimate the structural impact and cost of replacing the steam-powered turbine, located in the compressor section of the cracker, with an electromotor. Additional work will be performed on assessing the impact on the rest of the compression sector and cracker to ensure stable operations. By developing a customized design specific to the goal of the project, an accurate assessment of the capital expenditure (CAPEX) and operational expenditure (OPEX) can be made, enabling the calculation of crucial financial indicators for making investment decisions. Finding an alternative outlet for the steam generated by the cracker, and no longer used by the compressor drive, is one of the major challenges to achieve the maximal positive environmental impact.

Resultaat

The intended result of the project is to provide insight into the technical feasibility and costs of the implementation of large electromotors in the compression section of SABICs OLE4 cracker at Geleen, through providing an extensive FEED study, as well as an implementation plan. The study will further provide insight into the feasibility of rerouting the steam balance on site to maximize the environmental benefits. Final goal of the study is to

enable a sound decision to be made to start the electrification transition of the cracker from steam to renewable electricity with a focus on solving the technical bottlenecks that could prevent a positive investment decision. An implementation plan integrating the work on the compressor drive into a foreseen cracker turn-around is essential for SABIC to take this decision and is therefore part of the study. Once this innovative application of a large-scale electromotor has been demonstrated in Geleen, the solution can be replicated in SABICs complete cracker fleet as well as in crackers operated by others.

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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