ISPT Institute for Sustainable Process Technology	***Project Final Report*** CASPer *Compact Ambient Sour Gas Processing*	Date: 03-09-'18

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Approved by		Date and signature
Project board	☐	Date:
Program committee or Cluster Committee	☐	Date:
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1 Management summary

Public part

The majority of natural gas fields in the world require some form of acid gas processing before the natural gas can be fed to pipeline infrastructure. The CASPer project aims to reduce by at least 30% the associated costs and energy use, using a novel supported amine based technology for bulk and deep removal of the acid gas contaminants CO_2 and H_2S. Sorbents have been developed (ECN) and tested at ECN and Shell under cyclic conditions and for longer time and show good durability, fast kinetics and no co-adsorption of methane and higher hydrocarbons.
In the targeted process, the sorbent circulates between a pressurized multistage fluid bed (MSFB) adsorber and a low pressure, higher temperature MSFB desorber. At the University of Twente, in consultation with FRAMES, a 7 meter high pilot unit has been designed, built and installed at the High Pressure Laboratory for demonstration and further development of the technology. It was demonstrated that acid gas could be removed down to ppm-level in a very compact contactor, requiring only 3% (!) of the volume of a conventional solvent contactor. Energy savings are also significant. Using a dual cycle sorbent system (for bulk removal and for deep removal, to ppm-level) a primary energy consumption of 3 GJ / ton acid gas was obtained for the benchmark case (6% CO_2, 2% H_2S), which is 50% lower than that of the solvent case. Deep removal in combination with bulk removal is also possible in a single cycle loop, but at considerable lower energy savings (13%).
Technology challenges for sorbent production and process development (including heat integration and recovery of interstitial gas) have been identified and directions for future developments are provided.

Confidential part

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