

Energy efficient selective reforming of hydro carbons

Partners:

- Chalmers University of Technology (SE, coordinator)
- Scandinavian Energy Project AB (SE)
- Göteborg Energi (SE)
- Danish Technical University (DK)

Abstract from the report

The research project "Energy efficient selective reforming of hydrocarbons", funded by the Swedish and the Danish Energy Agency has now reached its end, and we hereby present the final report. The report is an overview of the work. Details of the work within the different areas can be found in the reports from each part.

In this project, an innovative method for tar removal and reformation of hydrocarbons was investigated: Chemical Looping Reforming (CLR). This gas treatment has the potential to be economically competitive, reliable and environmentally friendly (due to higher energy efficiency, amongst others).

The aim of the CLR is to

- eliminate downstream problems with tar
- simplify the energy recovery from the hot product gas
- selectively save lighter hydrocarbons for the production of synthetic natural gas (SNG)

A guarantor for the outcome of the project is the engagement of Göteborg Energi, which has a commitment to build a 20 MW output SNG plant by 2012.

DTU (Danish Technical University) is responsible for carrying out the laboratorial part, where different oxygen carriers for the CLR have been considering their capability of selectively reforming hydrocarbons. The conclusion was that, of the four carriers tested, the Mn and Ni40 was the most promising.

CUT (Chalmers University of Technology) has installed a 600 W CLR unit connected to a slipstream from the gasifier. During the firing season 2010 the CLR has been tested with raw gas for 36 hours and the results so far show that the equipment works as intended and that it can reduce the amount of tars substantially.

GE (Göteborg Energi AB) together with SEP (Scandinavian Energy Project AB) and CUT have studied the integration of a methane production plant to an existing boiler. The main focus of the study has been the gasifier and the CLR. The integration of a 100 MW methane production plant is estimated to cost 1.3-2.4 billion SEK.

The different work packages have altogether shown that a CLR is a possible solution to the tar problem, both technically and economically.