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CCS chain element parameters and performance variations due to the impact of impurities in the CO₂ stream

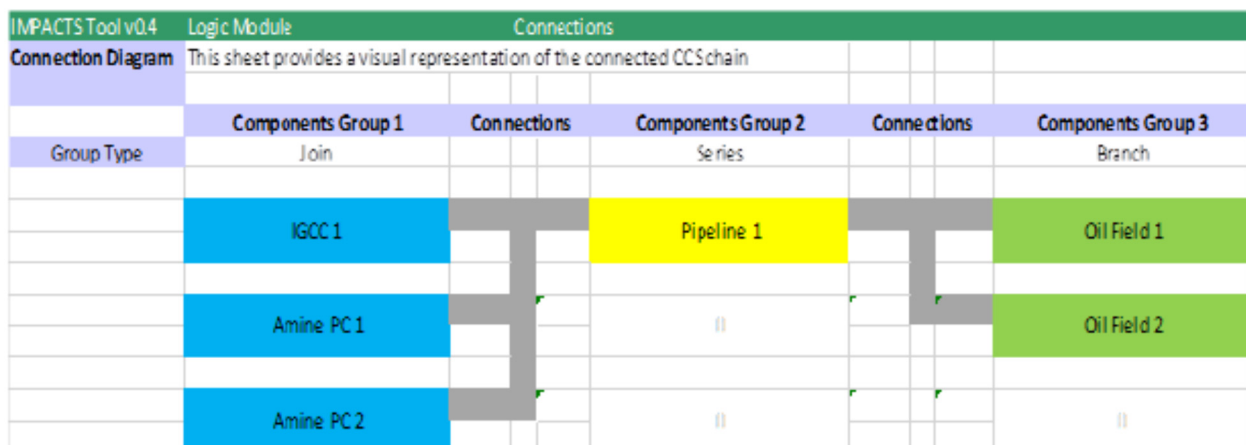
The IMPACTS project is looking at the way various levels of impurity in the CO₂ stream within a Carbon Capture and Storage (CCS) process affect the operation and cost of the whole system. Other reports from IMPACTS provide details of these fundamental effects.

The purpose of this report is to collect these effects together and look at their impact on the economics of the whole CCS process or chain. The chain consists of three basic elements: a capture process associated either with a power station or an industrial unit, a transport element to get the CO₂ to where it will be stored – this may be a pipeline or ship transport or both - and a geological storage location where the CO₂ is ultimately stored underground.

In order to look at the economics of the CCS chain, the report puts together costs associated with each of the CCS chain elements. Also, importantly, detailed costs are gathered relating to the effects that the various impurities have on various parts of the chain elements and their efficiencies and energy consumption. This is in order to allow an investigation of the change in costs associated with the impurities.

To establish economic effects on a CCS project a financial model is also required which can look for changes to the economics of a complete project over its full lifetime. This report provides an outline of the model used in IMPACTS and how it uses cost functions and flexes the impurity levels to look at the way the overall project costs vary with impurity level.

Below is a graphical representation of a complex CCS chain in the IMPACTS Economic Model. Cost functions related to the effects of impurities in each part of the chain can be defined by the user and are accumulated in the Model to arrive at overall CCS project costs



This work is then the basis for looking at economic trade-offs to optimise the CCS chain operation. The results of this are contained in a further report.