D4.2 Pilot Case Scenarios

Abstract

The GATEWAY project has proposed a number of candidate pilot cases for initial development of a carbon dioxide pipeline network in Europe. A comprehensive impartial selection process was then carried out to choose the pilot case best suited for future development, as described in deliverable "D4.1: Pilot Case Definitions".

Inevitably the level of detail in which it is sensible to describe the pilot cases is limited. Equally, simplifying assumptions must be made with respect to the nature of the pipeline network connecting sources of carbon dioxide, in order to keep the decision making process tractable. The work described in this report represents a series of studies that explore how different approaches to constructing pipeline networks in three case study areas might produce contrasting outcomes and benefits. In order that a wide range of possibilities may be rapidly considered, (semi-) automated, optimising approaches to modelling the design of potential CO_2 pipeline networks have been employed, and the key elements of these approaches are summarized. The case study areas selected are comparable to, but not identical to, the GATEWAY Pilot Case areas, and located in Germany, the Netherlands and UK.

The generated results allow inter-comparison of four contrasting network design strategies in the three case study areas with respect to both the network topologies and their economic performance. Results indicate that, in general, networks that rely on a greater degree of co- ordination and co-operation between the connecting sources (e.g. through pipeline sharing and oversizing) offer more attractive economics. The benefits of such co-operation over alternative network approaches were found to increase with the alignment of the sources collaborating in the network and to a lesser extent, the distances to be covered. These conclusions support the selection of the Netherlands Pilot case for further development within GATEWAY.