

CCS: Infrastructure Re-use Opportunities

As oil and gas fields come to the end of their lives and infrastructure is no longer required for its original use, they are set for decommissioning. The reuse of legacy assets such as topsides, wells and pipelines can offer significant cost savings and an efficient approach to facilitating wider CCS deployment, considering the initial cost hurdles faced by many CCS projects to-date. Failure to preserve this infrastructure and leave it to be decommissioned could result both in a waste of public and private funds as well as further delay in the deployment of CCS in Europe.

Pipeline Re-use

Re-using an existing oil and gas pipeline for CO₂ transportation in a CCS project may cost 1-10% of the cost of building and installing a new pipeline.

In light of the renewed momentum for CCS, there is now a significant opportunity to not only deliver additional value to these existing assets which would otherwise be decommissioned, but also to help overcome the initial cost hurdle faced by many CCS projects to date, by reducing the initial capital requirement and project's risk.

Pipeline decommissioning risks losing larger future value arising from infrastructure reuse.

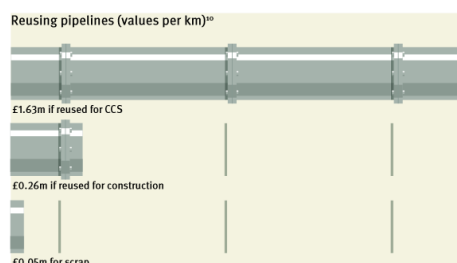


Figure 1: Reusing pipelines (values per km): (Benton, 2015).

Currently, three most suited pipelines for reuse in the North Sea include: the Atlantic pipeline, the Goldeneye pipeline, and the MGS pipeline. All three pipelines have been preserved in-situ under Interim Pipeline Regime (IPR) and are awaiting decommissioning.

If decommissioning is deferred, the operational costs of monitoring and maintenance are low, at approximately £100k (€113.5k) per year. These costs depend on the length and condition of each pipeline.

In addition, repurposing costs of an existing pipeline generally only includes various commissioning type duties, such as drying the pipeline or running an intelligent pig, which could cost in ranges of £2m-3m (€2.3m-€3.4m).

The age, condition and pressure rating of the pipeline are key factors in assessing its suitability. Older pipelines, or those that have experienced harsh production environments may have issues with corrosion or other integrity concerns.

Platform Re-use

Offshore oil and gas facilities no longer required for production, could be repurposed for CO₂ injection, but there are significant technical, commercial and regulatory factors which need to be considered when assessing the potential for re-use. This needs to be done on a case by case basis.

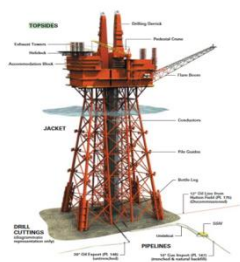


Figure 2: Typical large platform (BP, 2016).

The main issue with re-purposing platforms and their topsides for CO₂ storage use, however, are the capital and operating costs. Large complex facilities, often used for oil processing, in deeper water may be unsuitable for CO₂ storage due to very high operating cost and capital cost of 'brownfield' modifications.

These modifications may involve removal of any unwanted facilities and the addition of any CO₂ processing and injection facilities, such as filters, heaters etc.

Operating costs for a Southern North Sea platform, with about five wells, are estimated to be around £2million per year, for platforms in the Northern North Sea, costs could be £30-40million per year.

On a cost basis, economics may determine that a new platform, or a subsea solution, is more cost effective than facilities re-use.

Well Re-use

In theory, redundant oil and gas wells could be repurposed for CO₂ injection, however, given the technical difficulties, risks and economic realities, new wells are most likely to be required for CCS.

Many redundant oil and gas wells will be unsuitable for re-use based on design issues. Those that could be considered suitable may carry a level of risk, which given the potential consequences may not be considered acceptable. In addition, the condition of redundant wells is often uncertain and would require considerable assessment and/or remedial intervention to enable re-use, which could be at a significant cost.

The costs associated with the reuse of wells are highly dependent on the specificities of each well. The cost of reuse would include costs for assessment of wellbore, casing and completion integrity, as well as some remedial and conversion work. Repurposing an existing well may take 7-21 days; drilling a new well could take between 30-90 days, depending on the depth and complex

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