Matching Sources to Stores

The aim of this information sheet is to look at one of the constraints on CO_2 capture and storage (CCS). In theory it sounds simple; capture CO_2 from power plants, store it in underground storage formations. But what if there aren't any nearby? Is there enough storage in the world? This sheet will answer these points.

What if There Are No Storage Options Nearby?

If there are no suitable storage formations nearby, then the captured CO_2 can be transported (albeit at a cost) and has been extensively for other purposes. Information Sheet 6 deals with transport in more detail, but for now we will simply state that captured CO_2 can be transported to suitable storage sites.

Is There Enough Storage?

In simple terms; yes. There is a lot of uncertainty of the actual amount of storage available, as many reservoirs and formations have not been thoroughly characterised and explored, but best estimations suggest they would operate satisfactorily. There are wildly varying estimates, from extremely conservative to extremely optimistic, but as more exploration continues, the range is reducing, and even at the lower end of the potential storage available it is sufficient to store emissions for long enough to enable other clean energy technology to develop to a stage where fossil fuels would not need to be relied upon. Many areas of intensive activity would be suited to networks where numerous capture facilities link up and the combined CO_2 is then stored as a single operation.

Some studies have shown that just one storage option, storage in saline formations, has great potential; in the USA, this option alone could store the equivalent of 100 years of CO_2 emissions at current levels. Oil and gas field storage would add yet more to this. Some regions in the world would struggle; others would have a surplus of storage potential, so the issue of transport is a key one, and one that will be dealt with in more detail in the Information Sheet on Transportation of CO_2.

Matching CO_2 Sources and Storage

So we know that there is enough storage around the world, but how does that match up to the locations where the emissions are produced?

Broadly speaking, all regions of the world have potential for storage. Estimates range from the USA having 77% of its subsurface showing a good chance of storage potential, through Europe with 57% and India with 43% so some regions will have more options available than others, and some regions may struggle to store their emissions for longer periods of time. Again, this is closely linked with transport – the cost of transport obviously goes up with the increased distance, and also regulations will come into play as there are strict rules governing the transport of CO_2, especially over national borders. This is addressed more in Information Sheet 12.

Summary

All regions have the potential to conduct large scale CCS, although some countries may struggle to find sufficient storage sooner than others. These are the situations where trans-boundary transport of CO_2 will be vital, and this is something that will need to be clarified by legislation sooner rather than later. Climate change is a global problem, and countries will need to cooperate over storage resources to overcome the problem.