Geosequestration

Geosequestration technologies can remove carbon dioxide (CO_2) directly from the atmosphere and store it in soils, building materials, rocks or other parts of the geochemical system. In 2013 these were new and emerging techniques which did not exist at commercial scale.

Technologies that capture carbon dioxide in power stations and industrial facilities, rather than from the atmosphere are described separately in the Carbon Capture and Storage (CCS) and industry sections.

Trajectory 1

Level 1 assumes that Ireland does not implement any geosequestration by 2050.

Trajectory 2

Level 2 assumes that by 2050 about 0.3 $MtCO_2$ a year is removed from the atmosphere by optimising some processes such as chalk and cement production, to maximise their capture of CO_2; and by burying biochar in soils.

Trajectory 3

Level 3 assumes that by 2050 carbon sequestration by chemical processes outlined in Trajectory 2 removes about 0.4 $MtCO_2$ a year and electrically powered mechanical air capture removes 2 Mt CO_2 a year.

Trajectory 4

Level 4 assumes that, in addition to 0.4 $MtCO_2$ removed by chemical processes, carbon sequestration machines remove 5 $MtCO_2$ a year (roughly 1% of Ireland's CO_2 emissions in 1990). Up to 16 TWh of electricity is required to power the sequestration machines in Trajectory 4, comparable to the total electricity produced by gas and peat generation in Ireland in 2013. If the options chosen for the supply sectors mean greenhouse gases are released in the production of this electricity, then the net sequestration will be lower.

Interaction with other choices

There is significant demand for CO_2 transport infrastructure and storage capacity under three sectors: industry, carbon capture and storage, and geosequestration. Calculator users may wish to consider these options together to take a view on whether the total demand for CO_2 transport and storage infrastructure is feasible.

Figure 42. Energy required for mechanical geosequestration in trajectory 4 (TWh/yr)