

Understanding CO₂ Capture Technology

Capturing CO₂

Avoiding climate change is arguably one of the toughest challenges facing human kind and curbing our CO₂ emissions is one of the main focuses of that challenge. The “capture” portion of CCS projects is often the most costly portion, but researchers worldwide are coming together to make these processes more efficient and less costly.

It is estimated that 77 per cent of our global energy needs are currently being met with fossil fuels, while 40 to 60 per cent of all global CO₂ emissions are coming from stationary sources, such as power plants, refineries and other industrial facilities. Capturing these emissions at their source is a practical approach, until other energy options have matured or can be put in place.

Types of Capture Technologies

Capturing CO₂ from industrial sources is currently underway in several demonstration and industrial-scale projects across the globe and the capture processes most commonly used are:

- Pre-combustion
- Post-combustion
- Oxy-fuel

Once separated out and captured, CO₂ is compressed into a liquid state and transported via pipeline, truck or ship to a suitable storage location. There are other environmental benefits to capturing and separating out CO₂, including the capture of other elements in the emissions such as hydrogen, nitrogen and sulphur, all of which have potential markets in industry.

Capture units are built using one of the three technologies listed above, and can be used to reduce CO₂ emissions from industrial plants and fossil fuel-fired power plants by 85 to 95%. The units can be retrofitted to existing plants or designed into the creation of new ones.

Of all the technologies used in CCS projects, capture technology development is still on-going with various research institutions and companies developing and fine-tuning these processes globally. The price of capture is expected to fall as more technologies are developed and implemented.



Source: Images © University of Regina, 2009

Industrial Processes and Capture Technologies

Some “industrial processes” produce CO₂ that is very near to being ready for compression and transport. Such processes as upstream natural gas processing, and hydrogen and fertilizer manufacturing, produce CO₂ streams that can be upwards of 90% pure. At present, most of these processes vent their carbon dioxide into the atmosphere, but there is potential (where markets exist) to compress and ship this gas for storage or for enhanced oil recovery.

While these processes do not necessarily require pre- or post-combustion capture facilities, the development of new technologies and applications to create more pure concentrations of CO₂, as well as research into process integration at these plants, would help CCS projects go forward.

For more information on how the CO₂ is captured using post-combustion, pre-combustion or oxy-fuel methods, please visit www.ccs101.ca

