

THE DIFFERENCE BETWEEN UNDERGROUND COAL GASIFICATION AND COAL SEAM GAS

Underground Coal Gasification (UCG) and Coal Seam Gas (CSG) are often compared or confused as they both have reference to "gas" in their names and both are done underground. Some of the key differences between the two processes include:

- UCG delivers 20 times more energy from the same coal resource than what's possible from CSG
- UCG does not reduce the natural groundwater pressure
- UCG does not pump groundwater to the surface
- UCG does not involve "fracking"

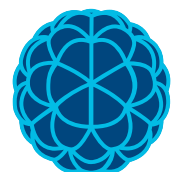
Underground Coal Gasification - defined

Underground Coal Gasification (UCG) is an alternative method of converting deep coal into gas underground using a series of boreholes operated remotely from the surface. Air or a combination of oxygen and steam are injected into the gasification panel within the coal seam. The coal is then heated and controlled reactions convert solid coal into product gas, known as "syngas", which is extracted at the surface...more

Coal Seam Gas & Fracking - defined

Coal Seam Gas, also known as Coal Bed Methane (CBM), recovers gas from coal seams without utilising the energy within the coal itself. As the gas is held in fractures of underground coal seams by water and ground pressure, drilling into the coal seam and pumping groundwater to the land surface is necessary for gas to be extracted using CSG techniques. This process artificially lowers groundwater pressure in order to promote gas flow.

Fracture Stimulation, known as "fracking" or "fracking", is a process used to fracture underground coal seams in order to increase the flow of gas and water. A fluid called "fracking fluid" or "frac fluid" is pumped down well bores at high pressure to fracture the coal seam. The fractures create a pathway for the gas and water from underground to be extracted through the gas well.



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THE DIFFERENCE BETWEEN UNDERGROUND COAL GASIFICATION AND COAL SEAM GAS CONT...

Distinctions between the two processes include:

Underground Coal Gasification (UCG)	Coal Seam Gas (CSG)/ Coal Bed Methane (CBM)
<p>Carbon Energy's UCG technology protects natural groundwater reserves.</p> <p>Groundwater quality is preserved by operating the gasification process below the hydrostatic pressure. The UCG process does not need to pump groundwater to the surface and does not use any kind of "fracking" process.</p> <p>Maintaining the surrounding groundwater pressure acts as containment for the gasification process and ensures that the product gas, "syngas", flows to the surface under pressure via the Production Well.</p> <p>UCG is able to produce 20 times more energy from the same coal resource than what's possible from CSG.</p> <p>Not only does UCG have a much smaller environmental footprint than CSG - UCG also delivers maximum value from Australia's natural resources.</p> <p>Carbon Energy's Queensland Project does not occupy any Strategic Cropping Land.</p>	<p>Pumping groundwater to the land surface is necessary for gas to be extracted using CSG techniques which may include "fracking".</p> <p>CSG requires lowering groundwater pressure in order to promote gas flow.</p> <p>Because the gas is trapped beneath rock and overlying groundwater, this process relies on releasing the water pressure to release the gas (methane).</p> <p>It has been publicly reported that in the Surat Basin, the CSG process extracts around 260 Megalitres of water (enough to fill about 100 Olympic swimming pools) for every PJ of gas.</p> <p>These significant quantities of saline water are extracted from underground and brought to the surface for treatment.</p> <p>CSG recovers gas out of the coal seam without utilising the energy in the coal itself.</p> <p>Following CSG production the energy contained within the coal itself cannot be harnessed using UCG technology until natural groundwater pressure is restored.</p>



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