

EGEE-497: Dispatch - CBM/CSG in New Zealand

Dr. Derek Elsworth

C. G. Lopez (cgl5091)

What are CBM/CGS?

Coal Bed Methane (CBM) or Coal Seam Gas (CGS) are common names used to designate the gas, 95-98% pure Methane, occurring naturally among the underground coal beds, or between shale seams. A large of the methane in the world is generated by thermal process (compression and increased temperatures), some of New Zealand's methane comes from sub-bituminous coal, yet a large fraction of the CBM/CSG found in New Zealand is 'biogenic Methane', meaning it is generated microbially. The process to extract this gas is the traditional for extracting oil: drilling a well and extracting the water out to release the gas from the seams, yet, if hydraulic fracturing or 'fracking' has been known to be used to increase their flow. CBM/CSG can be used for a quite large range of needs, and it is currently used for industrial energy, electricity generation and as transportation fuels. Methane is a cleaner fuel than coal or gasoline.

CBM/CGS in New Zealand

Coal seam exploration for CBM/CSG has been aimed to a range of 175 [m] to 1,100 [m]. Currently there are 13 active exploration permits in New Zealand, with 5 in process, and only 1 active mining license. The 'most advance company' in New Zealand are state-owned Solid Energy, and they have been producing methane in the Waikato since 2009. Their plants are to focus their upcoming activities in Taranaki (≈ 900 [PJ] energy from CBM/CSG in this area were estimated). L& M Group (a.k.a.: L& M Energy and L& M Coal Seal Gas) are the largest exploration permit holders in New Zealand, with 4 permits active and 2 in process, focused on the Southland and Canterbury. The only mining permit holder is Comet Ridge, an overseas Australian Securities and Investment Commission (ASIC) company, on the West Coast of the South Island, but they also hold exploration permits on the West Coast and Waikato.

CBM/CSG Problems

When extracting the methane, the water you are left with is extremely saline, as well as potentially containing high levels of ammonium, boron, sodium, chloride, aluminum, and other compounds, and the correct disposal of this isn't exactly easy, the smarter solution seems to be when some decide to re-inject it into the ground. Also, the land suffers as it is deteriorated around the area where these wells are located. Furthermore, there is the concern of climate change and how the use of these gases might further hurt our ecosystem.

Travel

After we were all together at the Auckland Airport, we set off in two separate vehicles towards Huntly Power Station, owned by Genesis Energy. In this power station, we met with Huntly's Predictive Maintenance Engineer, Simon Hurricks. He gave us a background on the story of coal power plants in New Zealand, especially those Genesis owns, used to own, or is planning on. He explained how Huntly isn't used as it was used before, since most of the load from it was taken off by renewable energy (mostly hydroelectric), yet, it has been required to kept on use (only around a quarter of it) to meet small needs. Simon proceeded to give us a tour of the whole facility, explaining as much as he could as we went along. Once we were done in Huntly, we proceeded on our way to our first hostel in Raglan, yet on our way, we stopped along the Rotowaro Mine, where we were able to witness from afar some of the activities going on related to coal mining in New Zealand. This mine has been used since 1915, yet the presently used has been there since 1958. This coal is moved by a conveyor to Huntly Power Station and by rail to Glenbrook Steel Mill.