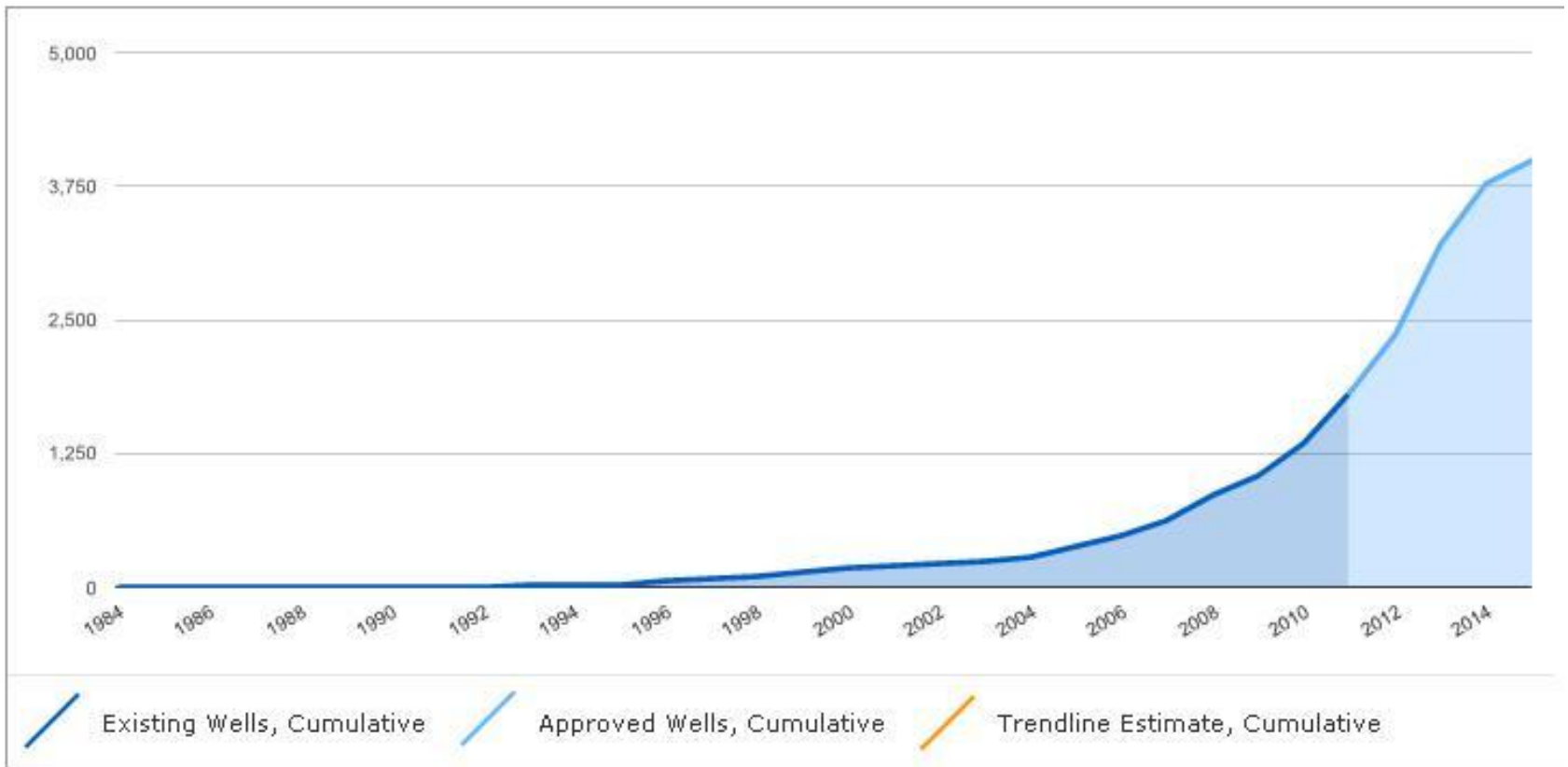


Coal seam gas, water and refrigeration. Why all three?



Wells to be operational



<http://www.abc.net.au/news/specials/coal-seam-gas-by-the-numbers/>

EWSB



The cleaner fuel

- Gas driven electricity generation produces 50% less greenhouse gas emissions than the average coal fired plant.
- Gas has an important role to play in transitioning to a low carbon economy
- Coal seam gas is the newest big resource market for Australia
- Gas consumption is set to increase to 33% by 2029/2030

Where did the gas come from

- Because coal has many fractures and large internal surface area it can potentially hold large volumes of gas
- During the earliest stages of coal making biogenic methane is generated as a by-product of microbial action on plant matter.
- In coal seam gas, the gas is adsorbed in coal in water. When the seam is de-watered by physical means the pressure drops and the gas desorbs from the coal and travels into the fractures of the coal.
- By injecting liquid into the bed of rock a process known as fracking increases the geological fracturing within the layer.
- At the source the gas is dehydrated to dry it to transmission pipeline dew point standards,



Water from the Coal seam gas

- Gas is obtained by de-watering the coal seam,
- Analysis suggests 110ML of water will be mined for each petajoule of gas,
- Typically the water is half the salinity of seawater and requires treatment by reverse osmosis to use,
- What do you do with the treated water? Put it into aquifers or distribute to ovals and farms,
- Trials of coal seam gas watered irrigation at Fairview and Springwater stations in legumes and white gum are underway. The first for 1500 head of cattle and the second for native timber milling in 25 years.



Contaminants to be removed

Contaminants to be extracted

- Salt
- Silver
- Boron
- Cadmium
- Chlorine



Gas transported to the coast and then refrigerated

- Separated gas (from the water) is compressed to 15.3MPa fed into gas transmission line to a power station or port.
- At a port the gas is liquefied which is energy intensive to get it to minus -161 degrees Celsius
- It takes between 25 -100 Megawatts to power the refrigeration process
- Santos for examples uses three refrigerant gases propane, ethylene and methane circuits in cascade .
- Why liquefaction? If your shipping overseas: Liquid is 1/600 th of the volume of gas



Postscript

- The world of Gas involves electricity generation, water and water treatment, and gas transmission and gas liquidation by refrigeration. Occupations in mining, water treatment, refrigeration and transmission of Gas are going to be required for this industry,
- Coal seam gas is then next big resource venture,
- Gas is the fuel of the future to reduce greenhouse gasses in electricity generation and use in homes and factories. (and vehicles),
- Cutting edge refrigeration technologies are needed to convert gas to liquid.

