

## Introduction

I read the very narrow Terms of Reference (TOR) with some amazement. It is certainly made clear that the goal is to remove Victoria's Nuclear Activities (Prohibitions) Act 1983 (1)

The very first TOR makes the mining of uranium and thorium as the prime concern. After all, Victoria could presumably have nuclear power with these minerals sourced from elsewhere. I conclude that the underlying goal of this Inquiry is, under the relentless pressure of thorium lobbyists such as John White, indeed to remove that legislation, which effectively prohibits the exploration and mining of thorium and uranium in Victoria. John White has a long history of promotion of the nuclear industry (2), and has the massive 3,700 sq km mining exploration lease EL4416 right across Southern Gippsland's prime coastal and tourism region, and runs the entire length of the spectacular 90 Mile Beach.(3) Clearly, the Victorian legislation was brought in to protect this State's precious agricultural land, and iconic ocean coast from polluting mining industries.

The Terms of Reference are clearly biased: with no qualification they promote the nuclear industry as undoubtedly beneficial to Victoria. This is ludicrous, as the global nuclear industry is in a state of decline (4)

Meanwhile, renewable energy technologies, wind, solar and storage are now recognised by CSIRO and the Australian Energy Market Operator as by far the cheapest form of low carbon options for Australia, and are likely to dominate the global energy mix in coming decades. (5)

1 [http://www.legislation.vic.gov.au/domino/Web\\_Notes/LDMS/LTObject\\_Store/LTObjSt7.nsf/DDE300B846EED9C7CA257616000A3571/7EBF53B3FDB4DA34CA257A89007A7B0A/\\$FILE/83-9923aa026%20authorised.pdf](http://www.legislation.vic.gov.au/domino/Web_Notes/LDMS/LTObject_Store/LTObjSt7.nsf/DDE300B846EED9C7CA257616000A3571/7EBF53B3FDB4DA34CA257A89007A7B0A/$FILE/83-9923aa026%20authorised.pdf)

2. [https://en.wikipedia.org/wiki/Uranium\\_Council](https://en.wikipedia.org/wiki/Uranium_Council)

3. <https://independentaustralia.net/environment/environment-display/ia-investigation-victoria-goes-dirty-brown,3788>

4. <https://finance.yahoo.com/news/death-knell-nuclear-200000585.html>

5. <https://reneweconomy.com.au/new-csiro-aemo-study-confirms-wind-solar-and-storage-beat-coal-gas-and-nuclear-57530/>

### ***on potential benefits to Victoria in removing prohibitions enacted by the Nuclear Activities (Prohibitions) Act 1983***

#### **Now, turning to each TOR**

(1) investigate the potential for Victoria to **contribute to global low carbon dioxide** energy production enabling exploration and production of uranium and thorium; through enabling exploration and production of uranium and thorium.

**Nuclear power is no solution to climate change.** This Term of Reference assumes that the "exploration and production" will result in nuclear power plants for Victoria, otherwise why do it? It also assumes that nuclear power will be effective in lowering CO2 emissions.

But there is no point in this "exploration and production" as it has been repeatedly demonstrated that nuclear power is no solution to climate change.

*Even if nuclear power really could combat climate change, it would take decades to get enough reactors in operation. It would be too late, whereas renewable energy, solar and wind, and also energy efficiency strategies, can be set up quickly. This means that to establish nuclear power would be counter-productive, as time, energy, and money would be diverted away from those genuine solutions. [Dr Paul Dorfman, et al](#) (6)*

**Nuclear power is vulnerable to climate change.** Increasing temperatures can result in reduced nuclear reactor efficiency by directly [impacting nuclear equipment](#) or warming the plant's source of cooling water. (7) Nuclear power is uniquely vulnerable to increasing temperatures because of its reliance on cooling water to [ensure operational safety within the core and spent fuel storage](#). As the most [water-intensive](#) energy generation technology, (8) nuclear reactors are located near a river or the ocean to accommodate hefty water usage, which averages between [1,101 gallons per megawatt of electricity produced to 44,350 gal/MWh](#) depending on the cooling technology.

Inland reactors that use rivers as a source for cooling water are the most at risk during heat waves, which according to the [Intergovernmental Panel on Climate Change \(IPCC\)](#) are "very likely" to occur more often and last longer in the coming decades. (9)

**Especially Australian climate impacts on nuclear technology.** In view of Australia's bushfire crisis, it just seems ludicrous that anyone would contemplate introducing nuclear power technology of any type to this country. The Lucas Heights research nuclear reactor is already enough of a worry. Bushfires have occurred in its vicinity.(10) The transport of nuclear wastes would be threatened by bushfires (11)

**Nuclear power would place an intolerable burden on Australia's precious, but limited water supply.** Nuclear power plants require huge amounts of water to prevent fission products in the core and spent nuclear fuel from overheating (incidentally making nuclear the [most water intensive](#) energy source in terms of consumption and withdrawal per unit of energy delivered).

Uranium mining and nuclear facilities are highly water intensive, while [solar and wind power can alleviate](#) water stress. (12)

**Why thorium exploration and production?** Thorium nuclear reactors do not exist yet, and quite possibly never will. Thorium itself is not a fissile material. It can only be transformed into fissile uranium-233 using breeder and reprocessing technology. Its development entails a complex processes, bringing risks of weapons proliferation and smaller but highly toxic, amounts of long-lasting radioactive wastes. After reaction, the thorium blend leaves dangerous wastes like U-232, a potent high-energy gamma emitter that can penetrate one meter of concrete and will have to be kept safely out of our air, food, and water forever. (13)

In January, the Climate Council – comprising Australia's leading climate scientists and other policy experts – issued a policy statement, noting that nuclear power

plants “are not appropriate for Australia – and probably never will be” as they are “a more expensive source of power than renewable energy, and present significant challenges in terms of the storage and transport of nuclear waste, and use of water”.(14)

6. <https://medium.com/@albertbates/john-wayne-squares-off-against-jim-hansen-42a258b2260d>

7. The Effect of Rising Ambient Temperature on Nuclear Power Plants <http://large.stanford.edu/courses/2018/ph241/duboc1/>

8. [https://theatlas.com/charts/H1scYH\\_H7](https://theatlas.com/charts/H1scYH_H7)

9. Future Climate Changes, Risks and Impacts [https://ar5-syr.ipcc.ch/topic\\_futurechanges.php](https://ar5-syr.ipcc.ch/topic_futurechanges.php)

10. <https://www.smh.com.au/national/nsw/residents-warned-not-to-leave-sydney-fire-worsens-20180415-p4z9os.html>

11. <https://independentaustralia.net/environment/environment-display/transporting-nuclear-wastes-across-australia-in-the-age-of-bushfires,13465>

12. <https://www.businesstimes.com.sg/energy-commodities/solar-wind-power-can-alleviate-water-stress>

13. **Thorium – a better fuel for nuclear technology? *Nuclear Monitor*, by Dr. Rainer Moormann**

14. <https://www.climatecouncil.org.au/resources/godfather-of-australian-science-warns-government/>

**(2) identify economic, environmental and social benefits for Victoria, including those related to medicine, scientific research, exploration and mining;**

**Economic benefits?** Victoria is right now on the cusp of a renewable energy revolution, with all sorts of exciting developments, for example, Melbourne's iconic tram network to be powered by solar energy. (15) Victoria has a renewable energy target of 50% by 2030. (16) Why imperil that progressive transition to clean energy, by the distraction of the expensive and dirty industry, with its connection to nuclear weapons development?

In 2017–18, the state's temperate climate, high quality soil and clean water helped the industry produce \$14.9 billion worth of agricultural product from 11 million hectares. This makes Victoria Australia's largest agriculture producer.(17). In Gippsland, John White's Ignite Energy Resources holds a huge mining license, in an area with exceptional resources of monazite, a source of thorium.(18) the same area that is renowned for both its tourist attractions and its agriculture. Gippsland farms account for at least one quarter of Victoria's milk, vegetable and beef

production with a number of Gippsland's businesses exporting food across the world (19)

Why would anyone in their right mind imperil Victoria's successful and continuing agricultural and tourism industries for a gamble on a fantasy about thorium nuclear reactors? Those reactors are currently nonexistent, and likely to remain so.

The Australian nuclear hype focusses on "Generation IV" technologies, especially Small Modular Nuclear Reactors (SMRs - they leave out the unpopular word "nuclear")

### **No-one wants to pay for SMRS**

No company, utility, consortium or national government is seriously considering building the massive supply chain that is at the very essence of the concept of SMRs – mass, modular factory construction. Yet without that supply chain, SMRs will be expensive curiosities.

*Small nuclear reactors are not economically viable. The main priority preventing safe deployment [of small nuclear reactors] is economics. Most commercial proposals for SMRs involve cost-cutting measures, such as siting multiple reactors in close proximity. This increases the risk of accidents, or the impact of potential accidents on people nearby. (20)*

The world wide effort by the nuclear industry to hype up small nuclear reactors is not resulting in any sign of success, given their disastrous economics, among other problems. (21)

**Thorium and uranium mining?** Given the decline in the nuclear power industry, and the glut in uranium, the uranium market is in permanent doldrums. (22)

Thorium nuclear reactors - there are many sources that detail the problems that make these reactors unlikely ever to become a commercial reality. They are in essence really uranium fuelled, as they require plutonium or enriched uranium to start the process. Their major problem is of course their very high cost. Other disadvantages, safety risks, toxic long-lasting wastes, weapons proliferation risks. (23)

**Environmental benefits?** Are they kidding? The environmental consequences of using thorium-based nuclear power will result in the same problems the world faces today with uranium bases reactors. (24)

**Uranium mining** has widespread **effects**, contaminating the environment with radioactive dust, radon gas, water-borne toxins, and increased levels of background radiation. (25) The industry's use of water is huge, making it a very unwise industry for for water -scarce Australia.

**Social benefits?** What social benefits? The introduction of any part of the nuclear fuel chain into clean, green Victoria would bring conflict, division and distress especially to rural Victorians. All for the faint hope of riches for a few mining

entrepreneurs, and the promise of jobs, jobs jobs in mining, an industry that is becoming increasingly and rapidly automated. The effect on the tourism and farming industry would be loss of jobs, whereas solar and wind technologies can be developed alongside agriculture, bringing many more jobs.

- 24, <https://bellona.org/news/nuclear-issues/2008-10-thorium-is-not-an-environmentally-safe-alternative-type-of-nuclear-energy-norwegian-report-says>  
25. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3653646/>

**(3) identify opportunities for Victoria to participate in the nuclear fuel cycle; and**

If the well-being of the farming and tourist communities is ignored, well, some enthusiastic nuclear entrepreneurs might be able to get hold of tax-payers' money , and get their almost certainly futile dream started.

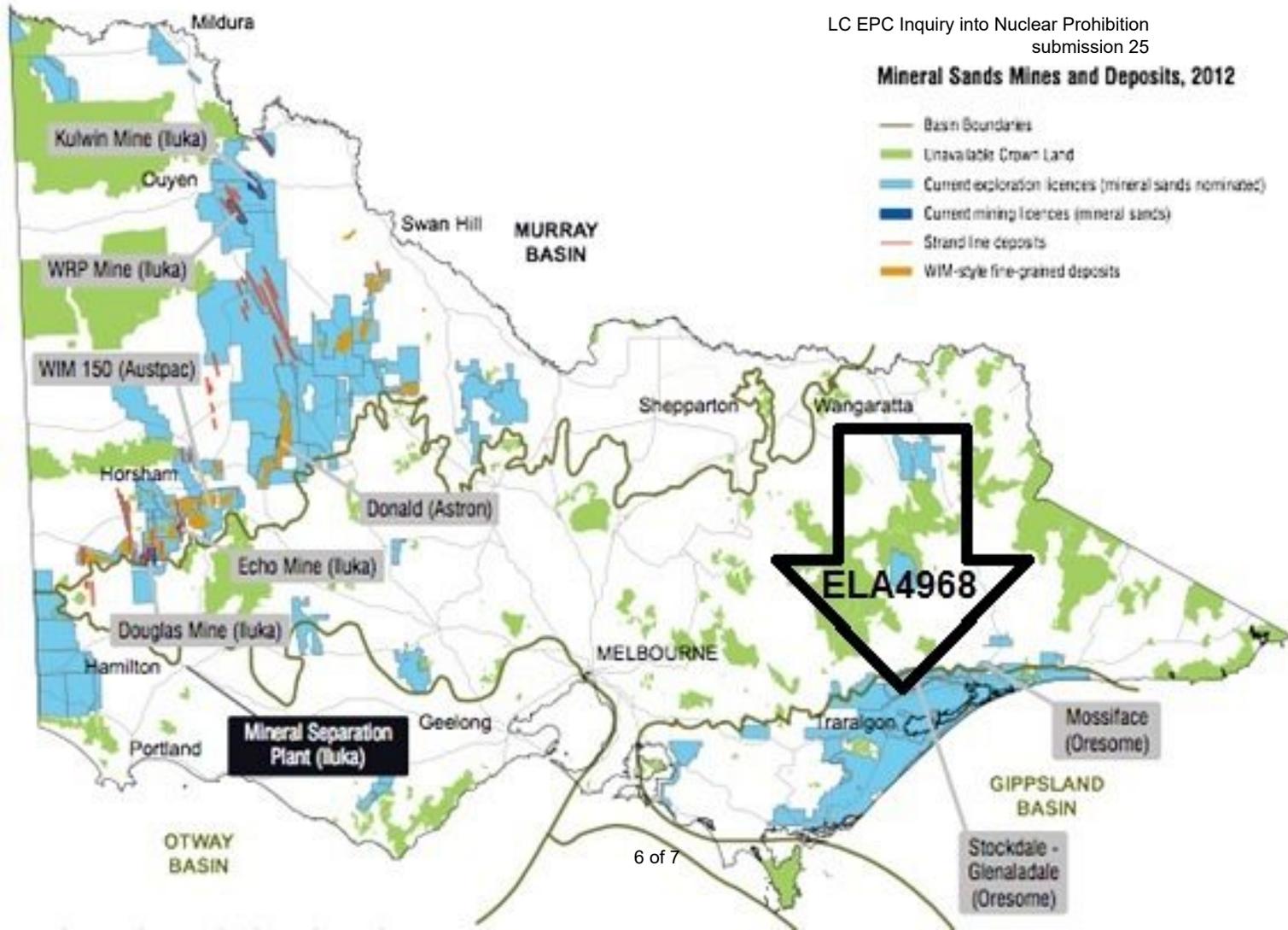
**(4) identify any barriers to participation, including limitations caused by federal or local laws and regulations.**

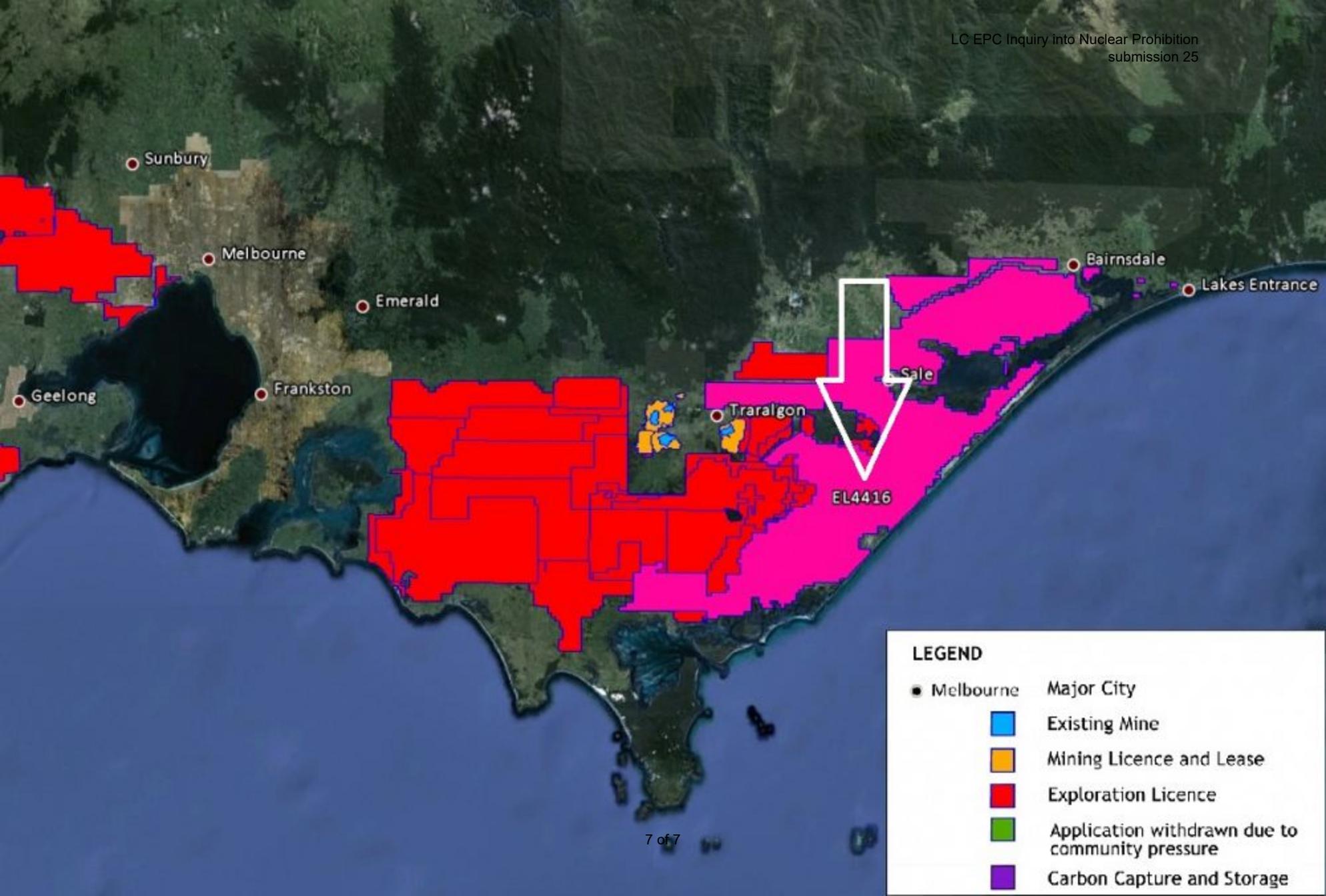
Apart from the barriers of extremely bad economic outlook for nuclear activities in Australia, apart from the environmental, health and safety risks, apart from damage to agriculture and tourism, -yes there are legal and regulatory hurdles for the nuclear lobby to overcome.

Victoria's laws are not haphazard whims of a few latte-drinking tree huggers. They have been developed to protect the public from the very sorts of dirty nuclear industries that are now being touted by the nuclear lobby

**Mineral Sands Mines and Deposits, 2012**

- Basin Boundaries
- Unavailable Crown Land
- Current exploration licences (mineral sands nominated)
- Current mining licences (mineral sands)
- Strand line deposits
- WIM-style fine-grained deposits





**LEGEND**

- Melbourne Major City
- Existing Mine
- Mining Licence and Lease
- Exploration Licence
- Application withdrawn due to community pressure
- Carbon Capture and Storage