

Submission to Senate Select Committee on Fuel & Energy

1. This is a private submission. The author is a member of the Nuclear Panel of a Professional body. The Nuclear Panel of Engineers Australia was established over 40 years ago with the object of providing the established Divisions with knowledge and information on the emerging Nuclear Science and Engineering Technology. This field cuts across all the traditional disciplines, engineering applications and their social interactions. The Panel conducts regular meetings and discussions and works closely with the Australian Nuclear Association Inc. The Panel is also concerned with the development of knowledge and the perception of nuclear matters by the general public.

2. Power and Energy. Energy Security and Cost

* Power and energy supply is the driving force of all societies, affecting all aspects of industry, commerce, manufacture, infrastructure, services, agriculture and primary production, and Government services.

* Power is supplied by a number of sources in various countries, the power mix being determined in part by historical and geographic location and in part by political and economic intervention.

* Nuclear Power is an important component of the source mix throughout the world, producing 15% - 16% of global electricity. The more highly developed countries currently have the highest reliance, notably the OECD countries, but penetration is spreading as emerging nations move forward economically (Finland, Egypt, South Africa).

* France is a special case, being both a large economy and highly reliant, up to 80% nuclear. It notably also serves as a low cost base load standby supplier to all the

countries of Europe, directly and indirectly. One can be quite sure that such supply is profitable and not driven by altruism.

* Australia has traditionally been favoured with cheap power, mostly sourced from coal. This cost relativity is changing as costing is updated (new plants and old plant modifications) and extended to include previously hidden or ignored costs (carbon capture and storage, ash and waste storage and disposal, land and drainage damage and rectification, water costs). This will be further “in fact” amplified by carbon credit trading, even if hidden by subsidy.

* Australia’s previously favoured power costs, compared with other world nations, will be eroded as they move to increase the lower cost nuclear power component of their power source mix. We have no such recourse.

* Currently Australia is making up a supply shortfall, particularly in remote areas, by sourcing power from oil and gas. This power is more costly than base load coal sourced power and nuclear power is likely now a lower cost option. This trend will extend in the future as coal, oil and gas costs rise while nuclear sourced power is more stable, and will even tend to fall as world nuclear construction enters an expanding phase.

3. Nuclear raw material supply.

* Australia is one of the world’s major sources and suppliers of uranium semi processed ore, yellowcake, with approximately 23% of known “low cost” ore. If we move to develop nuclear power in Australia we would be one of the few countries to be self sufficient, although we currently would rely on overseas enrichment, fuel manufacture and related technologies. This could change with the development of nuclear related industries in Australia, which could be either independent or in tandem with the construction and operation of nuclear power plants.

* Reference is frequently made to the short life, 50-60 years, of nuclear power due to the depletion of the worlds “low cost” resources of uranium. This is erroneous on several counts:

1. After a 30 year pause in nuclear development further discoveries will occur as demand increases.
2. Nuclear power cost is not sensitive to ore cost. Less attractive ores, effectively costing more, have only a small effect on the power costs.
3. The stated life of the “low cost” ores is based on “once through” fuel use, a politically expedient constraint in some countries approximately 35 years ago. With fuel reprocessing, now frequently used, approximately 5 times more energy is available than previously extracted. The resource life then extends to approximately 250 – 300 years.
4. All the above energy availability refers only to U235, which is less than 1% of the ore. The byproduct U238 is also able to be exploited, yielding a further major energy component, perhaps 20 times more (conservatively 20% not 99%). This potential is made possible in the next generation of Reactor design, the so called Generation IV Fast Breeder Reactors.

* In exporting our only part-processed yellowcake we are making available a huge energy resource to the purchasers, for their energy security now and into the future. In a world of international trading the overseas buyers earn carbon trading credits while Australia earns none by making the saving of emissions possible. By developing our own nuclear industry and nuclear power we would also benefit.

4. Nuclear Technology and Society

* The nuclear industry has been operating for nearly 70 years and is a mature industry. While the early driving forces were military, peaceful applications have predominated for 50 years.

* Applications of nuclear technology extend into all areas of society, notably in health and medicine, engineering construction and manufacture, agriculture, environmental monitoring, geographic and geological studies etc.

* Australia has positioned itself to be a significant force in the world through long participation in nuclear research, driven by the Research Reactors. We have been losing our influence and input by not having any other nuclear industry activities, in nuclear material processing, manufacture, etc, or nuclear power experience.

* We must overcome this drift in our education, knowledge and skill base by actively entering into the nuclear industry rather than remaining a “quarry operator” for the benefit of much of the world.

* Because of the time lags involved the matter is already urgent so Australia will be part of the developed industrial world in 20 years and beyond and not bystanders.

* Nuclear technology was not part of society until approx 1940, except in research. Very likely the adverse perception of nuclear technology results from the military actions. The public remains ignorant of much important information concerning the technology because discussion has been restricted, and in some cases curtailed by law. This has resulted in out-of-date information and misinformation becoming entrenched, and sometimes not even open for discussion.

* The modern applications of nuclear technology and the consideration of nuclear solutions must be taken into account. Their adoption or rejection will then be based on merit, considering all alternatives without recourse to censorship or legal

restraint.

5. Radioactive Waste

* Much of the so called waste is a recoverable, valuable raw material resource for the future.

* True high level waste is of comparatively small volume and can be safely disposed of in safe geological formations. Australia is fortunate in having a large area, geological stability, and a comparatively small population. High level waste, and mid and low level waste in large quantities, can be easily and safely handled. Such materials are no different from the other toxic and undesirable byproducts of civilization, or even uncivilized population clusters.

6. Recommendations

1. That Federal Laws and Regulations be amended so that nuclear power can be considered as one of the options in the future energy mix. As far as is possible, the same amendments to be encouraged in State Legislation.
2. That nuclear activities supporting nuclear power be encouraged and developed. These include mining, ore refining, enrichment, fuel manufacture and related technologies.
3. That the education process from Schools to specific Technologies, Universities and Private and Public Research Development be encouraged to keep pace with Australia's and the World's demands.
4. That the value of uranium yellowcake through carbon credits be recognized internationally in addition to the normal trading value.

ROBERT B. TURTLE
BE DIC PhD FIE(Aust) CPEng

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