Australian Oil & Energy – Some History and Developments 1920-2020.

A personal view.

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Over the decades, there have been changes in the ways that countries recognise and exploit major advances in technology. This can be shown with examples from my home country Australia, which is isolated, has a fairly homogenous population and a simpler history than many larger nations. It has grown better than most from pre-industrial to industrialised but has been on the decline since about year 2000.

The sector for discussion here is energy, especially that from fossil fuels.

The era around 1920 is compared to 2020. The aim is to examine which Government and industry action was closest to optimum, leading to learning about how to design better future policies.

AN OPTIONAL DETOUR.

First, there is a detour to the Mt Morgan gold and copper mine, located on the Tropic of Capricorn, not far from Queensland’s east coast. See a Google Earth Pro search of 23.6406 S, 150.3783 E. The mine operated from 1882 to 1991. Mt Morgan is often said to have been the world’s richest gold mine of its early times.

My employer company Peko-Wallsend operated the mine in the 1970-1990 era. We lived there with 2 small children in 1974. On other visits there, I would read books in the Directors’ Quarters library, particularly about what was done with the wealth.

Part of the wealth funded the establishment of the [Walter and Eliza Hall Institute for Medical Research](https://en.wikipedia.org/wiki/WEHI), starting in 1915. Today, it is a world-renowned institute for molecular biology.

Another part of the profit was taken by William Knox D’Arcy to Persia to follow his dream that there would be large quantities of oil to be discovered there. There was no significant global oil industry before D’Arcy started spending; he realised his dream and changed the course of history with a gusher in 1908. He had spent many millions of his own dollars in today’s terms. This oil discovery resulted in the birth of the Anglo-Persian Oil Company in 1909.  It eventually became [British Petroleum Company, now BP,](https://www.bp.com/en/global/corporate/who-we-are/our-history.html) still one of the global major oil companies. (End of detour).

AUSTRALIA 1900 to 1925. Birth of large oil and gas industry.

Obviously, in the period 1900-1925, there were several events and technology advances that grew to global importance.

1. World War I (1914-19) introduced trucks, tanks and aeroplanes, which needed oil products.
2. From the 1860s, lighting and heating transitioned from whale and vegetable oil to kerosene-type products from coal and oil whose supply increased after 1920.
3. The home and industrial electricity sector grew. In 1900, less than two percent of natural gas, oil, and coal were used to make electricity. Soon, reticulated electricity powered by fossil fuels became the expectation rather than the exception. [Prices dropped then steadied](https://www.instituteforenergyresearch.org/history-electricity/) in 1920 as volume increased, shown here for the USA.
4. The automobile, invented 1886, became widespread in the early 20th century. One of the first affordable cars was the 1908 [Model T](https://en.wikipedia.org/wiki/Ford_Model_T) Ford.  Most cars were powered by oil derivatives, whose demand increased rapidly. Internal combustion engine cars displaced electric cars with batteries.
5. The [plastics industry using oil feedstocks began](https://www.sciencehistory.org/the-history-and-future-of-plastics), with cellophane in 1913, polyvinyl chloride in 1927, polystyrene and nylon in 1938, and polyethylene in 1942.
6. Synthetic nitrogenous fertiliser production was commenced in Britain by [Imperial Chemical Industries](https://en.wikipedia.org/wiki/Imperial_Chemical_Industries) [ICI, who developed synthetic ammonium sulphate in 1923,](https://en.wikipedia.org/wiki/History_of_fertilizer) first using coke oven by-products, then natural gas feedstock.

There were more developments, but these suffice to make the point that there was growing interest in the fossil fuel industry and how to benefit from its growth. It was an era when major national decisions had to be made if countries wished to be economically competitive for many coming decades.

AUSTRALIA 1901 to 1925. States join into a Commonwealth.

C.O.R. commenced.

In 1901 the several States of the Colony of Australia united to form a Commonwealth with a Constitution to define the Commonwealth actions permitted by the States. The chosen system of Federal Government was democracy, a Constitutional Monarchy under the King of England. The States chose to retain management of their mineral resources, but the Commonwealth had some indirect powers to manage, control and over-ride certain aspects. Overall, royalties were paid to the States based on production, while the general taxation of profits from the mineral resources sector was by the Commonwealth, as was control of international trade, diplomacy, defence and some shipping.

Against this (brief) background, the Commonwealth acted on fossil fuels, particularly oil, as described in [an elegant publication dated 1938](http://www.geoffstuff.com/cor_history.pdf), just before World War II. It was named “Forward! A Great national Institution. The Romance of the C.O.R.”

It is recommended that you read this 16-page booklet, because it is at the core of several points about differences in national philosophies in 1920 versus 2020.

Here are some key quotes from it.

*“In presenting this booklet it is hoped to convey some indication of the progress and development of the Commonwealth Oil Refineries Limited., and to make available interesting information relating to the world-wide resources of the Anglo-Iranian Oil Co. Ltd., a partner with the Commonwealth Government in the great enterprise popularly known throughout Australia as The C.O.R.*

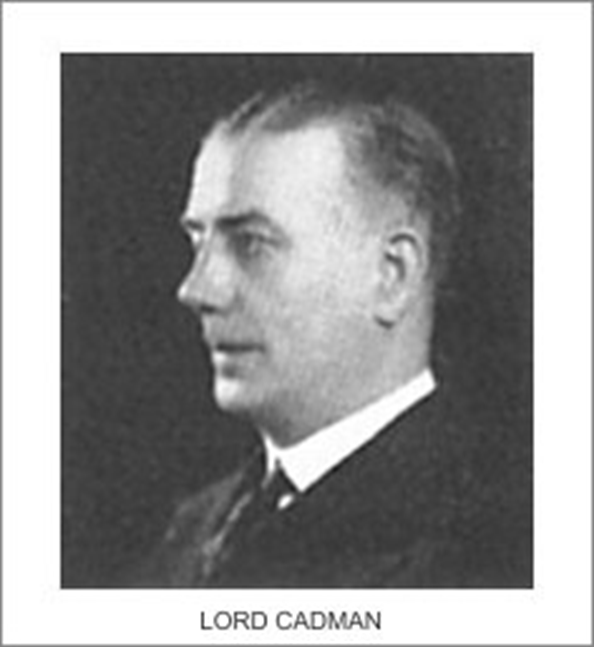
*“The C.O.R. represents an important national institution, servicing Australia’s industries, of which Australians may justly be proud, and the brief outline of its history and activities presents a picture of remarkable progress achieved in a comparatively short period.”*

….

“In 1909 the Anglo-Persian Oil Company, now known as Anglo-Iranian Oil Co. Ltd., was formed to develop the field and prior to the outbreak of war in 1914 the British Government became a partner in the great enterprise.” (Note: Winston Churchill was a driving force behind this move in 1914).

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“The Rt. Hon. Lord Cadman of Silverdale, G.C.M.G., D.Sc., who is Chairman of the Anglo-Iranian Oil Co. Ltd. And the Iraq Petroleum Co. Ltd., is one of the world’s leading Oil Technologists … Lord Cadman is also a Doctor of Science from Melbourne University.”



[See a longer biography of Lord Cadman](https://royalsocietypublishing.org/doi/pdf/10.1098/rsbm.1941.0042), his industrial and wartime work before 1921.

British and Australian specialists recognised the future importance of oil (and other fossil fuels) early in its global development and deployment. The critical British action to secure land rights and investment in Persia provided advantage to Britain for many more decades.

The British, in particular, have a historical record of being at the forefront with highly-qualified people including scientists put into high positions of trust.

AUSTRALIA & BRITAIN. Critical: A national pool of reliable top talent.

Incentives for scientific excellence have long been available, particularly in the British Commonwealth. Examples include the 1906 start of the [Rhodes Scholarships to Oxford](https://www.britannica.com/topic/Rhodes-Scholarship). [The first scientific Nobel Prizes](https://www.nobelprize.org/prizes/themes/the-very-first-nobel-prizes/) were awarded in 1901: Physics to Wilhelm Conrad Röntgen; Chemistry to Jacobus H. van ‘t Hoff; and Physiology & Medicine to Emil von Behring. [Fellowships of the Royal Society of London](https://royalsocietypublishing.org/doi/10.1098/rsnr.1950.0014) began with ninety-four Fellows admitted on 20 May 1663 and four more on 22 June 1663; these ninety-eight are known as ‘Original Fellows.’

The British system of Honours allows deserving people to become adequately titled and so help the course of Government by sitting in the House of Lords. Australia has not had this type of House. It has the Senate, whose members are elected by popular vote.

For excellence in science we can look to Fellows of the Royal Society of London. There were 15 Fellows honoured in 1921, to choose a random year. For brevity, the achievements of but 5 of them are linked here:

[Francis William Aston](https://en.wikipedia.org/wiki/Francis_William_Aston) Nobel Prize in chemistry, mass spectrograph.

Sir [William Lawrence Bragg](https://en.wikipedia.org/wiki/William_Lawrence_Bragg) Australian Nobel Prize winner X-ray crystallography.

[William Henry Eccles](https://en.wikipedia.org/wiki/William_Henry_Eccles) British [physicist](https://en.wikipedia.org/wiki/Physicist), development of radio communication.

[Sir Eustace Tennyson d’Eyncourt, 1st Baronet](https://en.wikipedia.org/wiki/Sir_Eustace_Tennyson_d%27Eyncourt,_1st_Baronet) design and construction of some of the most famous British warships.

[Udny Yule](https://en.wikipedia.org/wiki/Udny_Yule) British statistician, particularly known for the [Yule distribution](https://en.wikipedia.org/wiki/Yule_distribution).

Some achievements of these scientists surpass academic excellence and enter the realm of brilliance. Some are now household names for scientists, some were Nobel Laureates. Most of these scientists studied to Ph.D. level, many at Oxford or Cambridge.

Logically, Governments considering national participation in new endeavours must stand to benefit from having such pools of eminent people qualified to identify the opportunity and to lead the task. There is an art in selecting ‘the right stuff’.

Sometimes there is system failure. Leaping ahead in time, Australia has an example around 2005 of an important scientific advance initially unrecognised by Government and rejected by peers. It involved [doctors Barry Marshall and Robin Warren](https://www.nobelprize.org/prizes/medicine/2005/marshall/lecture/) showing that human gastric ulcers were caused by a bacterium rather than by stress – and that antibiotics were a treatment.

Logically, a better system would have been more efficient. Would this advance have (nearly) slipped through the net back in 1920? One is tempted to think not, because systems were better then.

There is one other short article that I urge you to read because of its relevance to the way that the petroleum industry has developed to its present state. The article by lawyer John M. Flower describes the formation of [the Petroleum Information Bureau (Australia) in 1951](https://www.pria.com.au/public/38/files/Asia%20Pacific%20PR%20Journal/Volume%208/flower.pdf). The growing part played by employed outsiders such as journalists and public relations specialists is central to his theme and criticism. Selected excerpts follow.

*“The Bureau saw its role as ‘to disseminate in Australia accurate and authoritative information about oil.’ Back in the 1950s print was the dominant communication medium. The Bureau’s first staff members included former newspaper journalists. They focused on writing and supplying stories to metropolitan and country newspapers, to the various press agencies, to motorists’ organisations and to relevant magazines.”*

*“In the late 1960s concern for environmental quality grew rapidly in the community. Governments in Australia, as in the USA, the UK and elsewhere, came under pressure to regulate for cleaner air, cleaner water and the conservation of natural resources, especially forests and endangered species of fauna and flora. The oil industry was among industries cited as offenders. It seemed to senior staff of the Bureau that a new oil industry committee was needed to deal professionally with environmental matters … To quite a few people in the oil industry, from company directors to tanker drivers, it seemed incongruous that there were committees working for the industry in the fields of marketing technology/engineering, packaging, public relations, environmental affairs and industrial relations—but they operated independently and had no common office.”*

AUSTRALIA. Summary of the 1920s era.

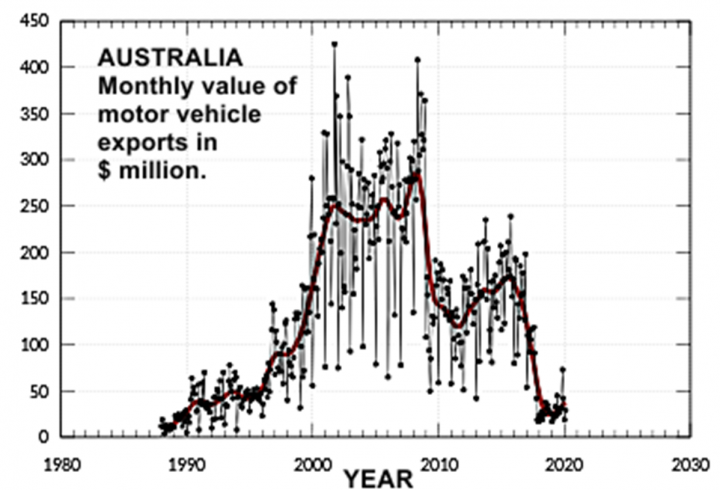
The advance of technology was assisted materially by, at least –

1. An existing pool of the better scientists and mechanisms for them to report major emerging technologies, then lead these development plans (example Lord Cadman)
2. Creation of managerial bodies to execute development plans (example C.O.R.)
3. Money from original wealth such as mining to fund the plans (example Mt Morgan gold mine)
4. A social environment that encourages and rewards thinking outside the mainstream (example, William D’Arcy)
5. Governments with ideals to grow wealth and opportunity (example, Britain and Australia in that era)
6. An awareness of activities that can hinder the plans (example, Flower’s concerns about advertising industry growth)

Under these circumstances and with cooperation from Britain, Australia was early to establish an efficient fossil fuel industry. By the year 2000, Australia was producing electricity with high reliability and about the lowest global cost and so was poised to attract more industry.

Also by 2000, heavy industries like alumina refining and aluminium smelting had been attracted to Australia by low cost and reliable electricity. Oil refineries supplied much of Australian demand and allowed the creation of a strategic reserve. Natural gas was found in large deposits and was being exported in competition with the rest of the world.

[In 2000, the motor car industry was adequate](https://en.wikipedia.org/wiki/Automotive_industry_in_Australia), with Australia being one of a few countries able to create a new model from design through to mass production. Since then, the major car makers Ford and GMH (Holden) have departed the country. Australia did design and produce military aircraft around WWII, but subsequently this declined to the stage of making spare aircraft parts for others. The local market was simply too small to compete with countries like USA and the European Union.



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**AUSTRALIA – COMPARISON EARLY 1900s TO EARLY 2000s.**

From this point, we compare what went wrong about year 2000, with what was working so well in the decades after the 1920s, to show the gross errors. It is reasonably assumed that a scientifically educated nation with low-cost, reliable energy supply should perform well economically. Today, Australia is not. Why?

The Nobel laureates 100 years on.

The Nobel laureates for year 1901 are listed above: Physics to Wilhelm Conrad Röntgen; Chemistry to Jacobus H. van ‘t Hoff; and Physiology & Medicine to Emil von Behring.

Here, for comparison, are the Nobel laureates of year 2005, with Marshall and Warren discussed above in more detail. Physiology or Medicine, Barry Marshall & J Robin Warren, “for their discovery of the bacterium *Helicobacter pylori* and its role in gastritis and peptic ulcer disease”. Chemistry, Yves Chauvin, Robert Grubbs & Richard Schrock, all for “the development of the metathesis method in organic synthesis.” Physics, Roy Glauber “for his contribution to the quantum theory of optical coherence” and John Hall and Theodore [Hänsch](https://www.nobelprize.org/prizes/physics/2005/hansch/) jointly “for their contributions to the development of laser-based precision spectroscopy, including the optical frequency comb technique.”

Although various years can show different comparisons, it is safe to note a general trend from early recipients being individually brilliant with original discoveries, to later awards more to groups with skills in derivatives of earlier discoveries. If there have been brilliant examples in recent years (apart from Warren and Marshall), they seem to have escaped fame as seen by a wide range of society. Maybe the passage of a longer time is needed for brilliant individual achievement to emerge and be recognised for its greatness.

BRITAIN. The Royal Society 100 years on.

It is noted above that 15 people were elected as Fellows of the Royal Society of London in 1921, with emphasis on a selected 5 Fellows whose names remain well-known in science. For comparison, in 2015, there were 59 new Fellows. Some ‘names’ are well-known depending on the reader’s interests, but include – Sir James Dyson, a British inventor and engineer, best known as the inventor of the Dual Cyclone bagless [vacuum cleaner](https://en.wikipedia.org/wiki/Vacuum_cleaner); Dame Julia Slingo, British [meteorologist](https://en.wikipedia.org/wiki/Meteorologist) and [climate scientist](https://en.wikipedia.org/wiki/Climatology), Chief Scientist at the British [Met Office](https://en.wikipedia.org/wiki/Met_Office) since 2009; and Sir Robin Saxby, British engineer, who was chief executive and then chairman of [ARM Holdings](https://en.wikipedia.org/wiki/ARM_Holdings), which he built into a dominant supplier of [embedded systems](https://en.wikipedia.org/wiki/Embedded_system). Many of the new Fellows studied molecular biology. All but 10 of the 59 Fellows are Professors, reminiscent of an academic stew in which some pieces float to the top of a pot stoked by the practical input of energy and money from industry.

One is free to surmise that the situation is akin to that in music. Where are the Beethoven, Mozart, Mendelssohn equivalents among composers of recent times? Are there modern composers who even have the technical mastery required to write the music score for a symphony for piano and orchestra?

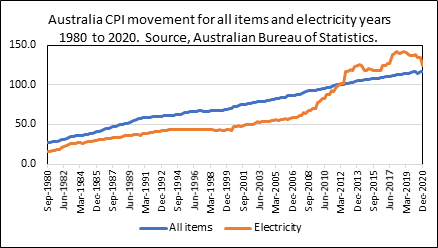
AUSTRALIA. The energy scene 100 years on.

[Australia in 2021 has but two oil refineries](https://www.abc.net.au/news/2021-02-11/australia-loses-another-oil-refinery-risking-fuel-supply/13139648), down from 8 in year 2000.

From a [2017 report on Australia’s failure to stockpile](https://www.aip.com.au/resources/liquid-fuels-stockholdings-australia-and-iea-obligation) agreed petroleum stockpile, “A decline in domestic crude oil and condensate production and increased demand largely accounts for the decline in Australia’s IEA compliance position.”

[Petrol and diesel prices have moved](https://www.bitre.gov.au/sites/default/files/is_082.pdf) since 1925 as shown for dollars of the day and dollar values adjusted by the consumer price index CPI.

The consumer price index for retail electricity costs has moved in relation to the cpi for all goods as graphed since 1980. (The 2020 dip for electricity coincides with Covid-19 sharp reduction of electricity demand. The harm started about year 2006, related to ‘renewable energy’ growth).



AUSTRALIA. Mass advertising in the 2000s.

There is some material above that deals with advertising at the start of the fossil fuel expansion in the 1920s in Australia. It seemed to earnestly want to inform the public, but reservations started to emerge in the cited paper by J.M. Flower.

Modern mass advertising, on the other hand, has mostly existed to make horrible products and services seem much better than they are. There are so many horrible products that the average person is exposed, largely unaware, to a torrent of advertising from newspapers to radio to TV to social media. Recent social media are a concern, because unskilled amateurs are taking over advertising from skilled professionals. These professionals have become really highly skilled. There are [schools at many universities pumping out advertising propaganda](https://theconversation.com/this-is-how-universities-can-lead-climate-action-147191), taking surveys, being paid large money amounts for ‘polishing the turd’.

The average person is buying a large range of ideas and products without even realising the advertising influence. There are whole industry sectors promoted, like female cosmetics made from mud, alternative medicines, fertilizers made from nearly-inert seaweed, alternative medical treatments like homeopathy and acupuncture that have no valid basis in science, but a lot of superstition.

There is not enough room here to develop this theme, except to note that advertising by skilled professionals has been instrumental in the ‘global climate crisis’ theme that many now worship, despite the failure if its many predictions when put to hard scientific tests.

To illustrate the extreme silliness of recent advertising, in Australia there is near-saturation advertising by the gambling sector, entreating viewers to ‘Gamble responsibly’. Given that gambling is not a responsible act by definition, the catch phrase is a stupid conflict of words. But, they would not continue with it unless their surveys showed that it made people more relaxed and free-spending about their gambling problem. There are dozens of images on the Internet from a search of ‘Gamble responsibly’.



GLOBAL. Post-normal Science PNS.

Starting 1990s, [Jerome Ravetz and Silvio Funtowicz](http://www.andreasaltelli.eu/file/repository/Editorials1.pdf) became popular developers and authors of [post-normal science, PNS](https://doi.org/10.1016/0016-3287(93)90022-L), a challenge to classical science that was easily malleable and therefore popular. As they wrote, “Post-Normal Science has become a liberating insight for many. It has given a name to their feeling that the terms of policy debate had been biased by the presumption that anything ‘scientific’ must be free of uncertainty, independent of values, and the exclusive possession of a technocratic elite.” Four dominant properties define PNS, “facts uncertain, values in dispute, stakes high and decisions urgent.”

These properties assume that earlier science had established facts, little dispute, low stakes and few needs for urgent decisions.  The aforementioned science Lords, Nobel laureates, FRS people and Rhodes scholars might not incline to this view. It has led to scientists being side-tracked into spending scarce dollars and valuable research time to demonstrate that their own work will solve uncertainty, lessen disputes, lower the stakes and reduce tensions, thus qualifying them to report to the lower standards of PNS and avoid the difficult mental rigour of classical science. It has led to multitudinous absurd 21st Century claims that the invented bogey man named ‘Climate Change’ is an urgent, existential, global danger that will end the Earth.

In this PNS environment, several issues were developed including climate change, some science behind the Covid-19 pandemic and renewed abuse of genetically modified organisms typified by Monsanto seeds. These issues are too complicated for brief analysis, but a common failing has been the suppression of views that criticise PNS publications and methods, leading to extreme and dangerous new devices like the trial of science by social media and the ‘cancel culture’ punishment for deviates. Objective truth has been partially replaced by subjective truth, where truth is defined as whatever the author chooses to believe is true.

Interested parties searching the literature for PNS truth can find many accusations of how bad, sceptical scientists paid by the oil industry are trying to combat the commendable, righteous scientific truth of climate change when it is well known and published that there is no credible basis for most claims of past and future damage from the change in climate. See books by [Bjorn Lomberg](https://www.google.com.au/books/edition/False_Alarm/n3nBDwAAQBAJ?hl=en&gbpv=1&dq=there+are+no+proven+harms+from+climate+change&printsec=frontcover) 2020, [Ian Plimer](https://www.google.com.au/books/edition/False_Alarm/n3nBDwAAQBAJ?hl=en&gbpv=1&dq=there+are+no+proven+harms+from+climate+change&printsec=frontcover) 2017, [Michael Shellenberger](https://www.amazon.com.au/Apocalypse-Never-Environmental-Alarmism-Hurts/dp/0063074761/ref=asc_df_0063074761/?tag=googleshopdsk-) 2020, [Steven Koonin](https://www.amazon.com/Unsettled-Climate-Science-Doesnt-Matters/dp/1950665798) 2021.

GLOBAL. Hard science must dominate.

Hard science, like Chemistry and Physics, and mathematics with its absolutism, need to regain its proper place after the assault of PNS. Rather than reading polemics, we can learn from events where hard science corrected the problems produced by soft science and weak administration. There is an excellent case history involving [physicist Richard Feynman](https://www.britannica.com/biography/Richard-Feynman) 1918-1988. The fatal Challenger space launch in 1986 failed because of poor management of known engineering about flexible seals on the rocket tanks. There is an account of Feynman’s involvement written by [Ken Haapala, President, Science and Environmental Policy Project (SEPP)](https://wattsupwiththat.com/2021/04/05/weekly-climate-and-energy-news-roundup-449/). Some Feynman words follow.

“Let us make recommendations to ensure that NASA officials deal in a world of reality in understanding technological weaknesses and imperfections well enough to be actively trying to eliminate them. They must live in reality in comparing the costs and utility of the Shuttle to other methods of entering space. And they must be realistic in making contracts, in estimating costs, and the difficulty of the projects. Only realistic flight schedules should be proposed, schedules that have a reasonable chance of being met. If in this way the government would not support them, then so be it. NASA owes it to the citizens from whom it asks support to be frank, honest, and informative, so that these citizens can make the wisest decisions for the use of their limited resources.

“For a successful technology, reality must take precedence over public relations, for nature cannot be fooled.”

Some SEPP words as well:

“The late Harold Doiron, a distinguished scientist and engineer of the Apollo missions, included Ken Haapala in his communications with senior NASA Headquarters administrators objecting to claims that CO2 is a primary cause of climate change. Using procedures so successful in the Apollo missions, Doiron was the leader of The Right Climate Stuff Team which investigated the claims of that CO2 was causing dangerous global warming. They found no evidence supporting the claim that humans adding CO2 into the atmosphere is dangerous. There is no climate crisis. The senior administrators of NASA Headquarters responded that they cannot control what other entities in NASA claim. This type of response forces one to conclude that the worst of what Feynman speculated may be true.”

UNITED STATES. Words from Professor Emeritus Richard Lindzen.

Here is a [recorded talk from 31st March 2021](https://www.youtube.com/watch?v=GD8SXP02h4c) by Prof Lindzen, a climate scientist with high qualifications, experience and respect. Some extracts follow.

“In punching away at the clear shortcomings of the narrative of climate alarm, we have, perhaps, missed the most serious shortcoming: namely, that the whole narrative is pretty absurd. Of course, many people (though by no means all) have great difficulty entertaining this possibility. They can’t believe that something so absurd could gain such universal acceptance. Consider the following situation. Your physician declares that your complete physical will consist in simply taking your temperature. This would immediately suggest something wrong with your physician. He further claims that if your temperature is 37.3C rather than between 36.1C and 37.2C you must be put on life support. Now you know he is certifiably insane. The same situation for climate (a comparably complex system with a much more poorly defined index, globally averaged temperature anomaly) is considered ‘settled science.’”

“***After your physical, your physician tells you that you may have a fatal disease. He’s not really sure, but he proposes a treatment that will be expensive and painful while offering no prospect of preventing the disease. When you ask why you would ever agree to such a thing, he says he just feels obligated to “do something”.***That is precisely what the Paris Accord amounts to. However, the ‘something’ also gives governments the power to control the energy sector and this is something many governments cannot resist.”

“It is likely that we have to capitalize on the insecurity of the educated elite and make them look silly instead of superior and virtuous. We must remember that they are impervious to real science unless it is reduced to their level. When it is reduced to their level, it is imperative that we, at least, retain veracity.”

Summary.

Recommendations:

1. Nationally, structure policy bodies to enable action on scientific recommendations coming from recognised scientists of excellence.
2. Structure scientific competence so that scientists of excellence can be identified for management of important emerging policy issues.
3. Structure industry and academia to better identify and to give more weight to centres of actual excellence as opposed to self-advertised excellence.
4. Encourage more scientific research from integrated industry/academic joint ventures.
5. Conduct a hard science, deep review of the topics of ‘global warming’ and ‘climate change’ to eliminate past assertions that are no longer valid.
6. Conduct neutral economic analyses of the Australian costs of electricity generation accounting for the real costs with no distorting assumptions induced by various government policies of the day.
7. Review current subsidies and incentives for energy generation methods with a view to ceasing those that are no longer beneficial.
8. Conduct a realistic Australian estimate of ‘social cost of carbon’ with inputs of benefits as well as harms.
9. Foster the establishment of several Australian-owned scientific publishing houses for scientists wishing to avoid the drawbacks of current German dominance and control.
10. Review the benefits and harms of the peer review process for scientific publication.
11. Review the various classes of industry for their ability to generate new wealth for the nation and promote those most positive, especially in the Covid industrial recovery period.

(End).

By Geoffrey H Sherrington.

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Scientist, retired.

Melbourne.  19th April 2021.