

Submission to Australia's Technology Investment Roadmap Discussion Paper

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Suite 3, Ground Floor
60 Leicester Street
Carlton VIC 3053
0422 974 857
admin@dea.org.au
www.dea.org.au

ABN: 80 178 870 373

Healthy planet, healthy people

DEA Scientific Committee

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Doctors for the Environment Australia (DEA) is an independent, self-funded, non-government organisation of medical doctors and students in all Australian States and Territories. Our members work across all specialties in community, hospital and private practices. We work to prevent and address the health risks - local, national and global - caused by damage to our natural environment. We are a public health voice in the sphere of environmental health with a primary focus on the health harms from pollution, environmental degradation, and climate change.

SUMMARY

While DEA welcomes efforts by government to promote a Technology Investment Roadmap, there are several paradigm shifts that need to occur for this Roadmap to be effective. Government needs to appreciate the science of climate change and its implications for human health within a threatened biosphere. In doing so it would recognize that Australia's greenhouse gas (GHG) reduction policies have been inadequate over the last 3 decades. Unless ambitious emissions reduction is the focus of the Roadmap, little will be achieved. For this reason, "technological neutrality" is somewhat misleading as many of the technologies discussed have progressed beyond the point of neutrality and have been found to be wanting.

A Roadmap without reference to meaningful "targets" is aimless and will not incentivise business, industry, the community or government to pursue the options described in the necessary time-frame.

While Australia is one of the most vulnerable of developed nations to effects of climate change, we have unique geographic attributes to enable stronger pursuit of emissions-free energy technologies. Renewables perform better than fossil-fuelled stationary power in emissions, costs and employment opportunities. Many renewable technologies are available now or in the wings to ensure reliability and security of supply. Energy efficiency in the built environment needs strengthening and improved supervision.

DEA urges for stronger and more immediate uptake of known solutions to initiate meaningful emissions reductions. Investing in measures across all fields for longer term outcomes will safeguard the future of human and planetary health.

INTRODUCTION

Low emissions technology is of keen interest to DEA for it encompasses several important health imperatives demanded of limiting global warming and climate change. The effects of climate change have been recognised as one of the greatest health threats of this century and will progressively affect us all.¹ Atmospheric GHGs are increasing.² Australia has not reduced its emissions over the last 3 decades,³ and might only meet its comparatively weak 2030 emissions reduction target (ERT) by using Kyoto credits, an adjustment which has been condemned by United Nations and globally. The Paris Agreement is very explicit in its purpose: "..... to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change".^{4,5}

Australia's natural environment is one of the most vulnerable of developed nations to the effects of climate change.⁶

If the Australian government truly understood and accepted the science of climate change, just as it accepted the scientific modelling for the COVID19 pandemic, it would not claim that efforts to reduce emissions are meaningless in the global context. Instead it would urgently and ambitiously drive to reduce its own emissions while urging the international community to do likewise. How many reminders such as catastrophic bushfires, record high temperatures, water scarcity and species extinctions do we need before decisive action is taken?

The Australian community has learned lessons from the disastrous bushfires and the COVID19 pandemic; that the place of humans in the ecological framework is precarious; that we must respect the natural world; and that we must consider environmental and health impacts alongside economic considerations.⁷

Comments on Discussion Paper

Purpose of a Technologies Roadmap:

A Roadmap is an extremely important strategy to help frame policy. But it is only of value in reaching outcomes if destinations are identified. Otherwise the roadmap is aimless and while outcomes could be achieved eventually through market mechanisms, the process is unlikely to keep pace with the need. The purpose of this Technologies Roadmap is to identify strategies to reduce GHG emissions. Therefore, DEA suggests that **emissions reduction** should be the fundamental driver of energy transformation and that specific time-frames or **targets** be pronounced in order that the Roadmap is effective.

While DEA agrees with the general notion that multiple technologies and standards need to be assessed for their place in reducing greenhouse gas emissions in the long-term, the concept of "technological neutrality" seems questionable. Technologies are not equivalent in their potential to reduce greenhouse gases, and they cover a range of practical plausibility and costs. Some are already proven (wind and solar) while others (eg carbon capture and storage⁸) have struggled in spite of massive funding. Some have problems of waste disposal or are polluting. All these differences should be considered at the outset and classified accordingly before entering the mix as "technologically neutral".

DEA also recognizes that recent disasters have accentuated the social injustice of income disparity and lost employment, both of which will take years to reverse. Therefore, projects which are labour intensive, local and bring long-lasting benefit should be prioritised.⁹

Specifically addressing issues listed in the Discussion Paper with respect to

a) Challenges, global trends and competitive advantages.

As described in the Discussion Paper, Australia has geographical and topographical challenges, being vast in area and having many living in remote areas at long distances from regional centres. However, these challenges are well suited to the expansion of the cheapest and cleanest forms of energy available, **solar and wind**. Australia is the envy of the world with our access to these resources which are forming the basis of most countries' progression to a renewable economy. It must gall other nations that even with our competitive

advantage, we are not utilizing our full potential. There is no shortage of land and roof area for solar panels.¹⁰

Australia is also regarded as having one of the best wind resources in the world. Early barriers to their deployment have largely been overcome.¹¹ Coastlines are particularly windy areas and since 80% of the population lives within the coast zone, there is huge potential for turbines to expand into local sea-space.^{12,13,14}

Ironically, bushfires and extreme weather events (EWEs), the very outcomes of climate change, can threaten the viability of rural renewable facilities.

Security and reliability of supply are the key potential limiting factors to rapid uptake of wind and solar. But with support from microgrids¹⁵, enhanced major grid networks, interstate connectors¹⁶, batteries, synchronous condensers¹⁷ pumped hydro and storage, and demand management, security and reliability are closer than generally realized.^{18, 19}

A second link to Tasmania²⁰ and another between SA, Vic and NSW will enhance interstate transfer and utilize regional differences in supply. Demand management has been used to cover excess requirements during heat-waves.²¹

Costs and employment should not be issues. Renewable energy is now cheaper than coal- and gas-fired power in spite of subsidies to the fossil-fuel industry.²² There are widespread opportunities for employment in the array of renewable technologies, whereas fossil-fuel industries are moving steadily towards automation.^{23,24,25}

So is there a role for gas?

Natural gas and liquefied natural gas (LNG), when considering the full energy life-cycle from extraction to use, including flaring, liquefaction and transport, plus fugitive emissions of methane, achieve equivalent GHG emissions to coal-fired power generation.^{26,27}

Natural gas, (predominantly methane), will likely be required for specialized heavy industry and as feed stock for many industrial processes but better management of current supplies should be sufficient. Gas may be required for small peaking plants as coal-fired power is withdrawn, but the demand would not be high²⁸ and it would be uneconomic to embark on further gas exploration and extraction.^{29,30}

Expanding exploration of **unconventional** gas creates additional health, environmental and social problems, all of which have financial costs borne by the community and which are not included in gas prices.³¹

Developments in the recycling of plastics are on the verge of replacing ethane (a by-product of gas and oil extraction).³² Overall, investment in new gas will not be cost-effective.³³

Short-list of technologies Australia could prioritise (Figure 7) in Discussion Paper

Electricity: The list of 14 approaches demonstrates the multiple opportunities available, eleven of which can be prioritised without hesitation. Of the others, so-called high efficiency – low emissions generation (HELE) has been tried

extensively and fails on emissions intensity (efficiency), cost and emissions reduction.³⁴

More gas is not the answer to stationary energy production.³⁵

Gas is also not an ideal agent for residential heating and cooking.³⁶

Small modular nuclear reactors (SMRs) are still essentially in design and developmental stages and have the same cost and safety limitations as larger reactors. Being modular and able to be established in multiple areas, SMRs may even create more security risk than large units which have well established procedures for containment.³⁷

Electrolysis of water using renewable energy deserves priority as an emissions-free process to create “green” hydrogen as a source of energy for multiple applications in future.³⁸

Transport: DEA strongly prioritises all forms of electric vehicles (EVs). EVs create fewer emissions than conventional vehicles even if the electricity source for recharging is derived from coal-fired power.³⁹

Vehicular transport contributes nearly 20% of Australia’s total GHG emissions.⁴⁰ Not only is there a need to reduce GHG emissions, but continued use of the internal combustion engine (ICE) is choking cities with toxic particulate matter and gaseous oxides, which contribute to asthma and other respiratory disorders, and heart disease.⁴¹

Adverse health effects and contributions to GHG emissions from ICEs are well described in the Discussion Papers supplied with at least 3 Federal Inquiries in the last 4 years into vehicular emissions standards and fuel quality. DEA had responded to these Inquiries calling for Australia to bring our standards closer to those of Europe, Japan and USA but to little effect.^{42,43}

It is difficult to understand federal government’s resistance to encouraging and incentivising EV uptake. Savings in health costs from reduction in pollution and the well-being experienced by living in cleaner cities could balance reduction in tariffs, duties and deficit in fuel taxes. Improved batteries and Australian designed charging infrastructure can negate “range anxiety”.⁴⁴

Built environment: Technological developments in the built environment enable huge potential for energy savings, and ultimately, reduction in GHGs. Recent studies have shown that the National House Energy Rating Scheme (NatHERS)⁴⁵ standard of 6 stars is not sufficiently demanding, and in many cases, the standards in practice do not meet stated specifications. As a result, there is a push for a more stringent standard in Australian homes of 7.5 stars, which should not be difficult to achieve given the availability of new materials. Increased costs of higher standards are estimated to be readily absorbed by energy savings.⁴⁶

The Discussion Paper (Pg32) lists a number of energy-saving methods. Heat pump technology is rapidly establishing an energy-saving role for both heating and cooling.⁴⁷

In USA, solar researchers have reported developing panels capable of 47% efficiency under concentrated illumination⁴⁸ while in Australia, an efficiency of 28% has been achieved for unconcentrated illumination.⁴⁹

Because the payback period for residential solar technologies can be up to 5 years, would it not be unreasonable for the federal government (via states) to offer loans with repayments staggered to match the anticipated savings at that time.

It is essential that these burgeoning technologies should not suffer from lack of funding through the highly successful ARENA and CEFC.

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