Climate Action Moreland's submission, August 2019, in relation to the Climate Change Authority's review of advice to the Federal government necessary to achieve Australia's emission reduction commitments under the 2015 Paris Agreement.

"*Change is coming, whether you like it or not."*

Greta Thunberg.

[the Executive Summary and sections on Agriculture and Transport have been redacted from this extract, allowing readers interested primarily in electricity issues to focus on these specifics. The Climate Change Authority has now put the full submission online here.]

Energy and Electricity Sector recommendations:

- Development of energy market competition "behind the meter" including energy efficiency
- Impose mandatory Conservation Voltage Reduction (CVR)
- Radical tariff reform of retail consumer tariffs
- Develop and construct off-river pumped hydroelectric energy storage (STORES) nationally for effective energy storage, recharged from renewables
- Building community energy independence and resilience
- Review and update NEM's wholesale price setting mechanism

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Energy - Electricity Supply.

Electricity is but a subset of energy supply, with its only useful function being to deliver *energy services* at the customer's premises. Australia can exploit its abundant solar, wind, (recycled) water and skilled labour resources to fast-track to a zero carbon national electricity grid: *"no coal, no gas, no nukes, no worries"* well before 2050 provided visionary leadership sets the agenda and forces the dysfunctional market to deliver real CO2 reductions.

Australia also has the potential to develop extensive wave, and tidal energy resources to tap

the power of the oceans that surround our continent. Geo-thermal energy also shows potential for exploitation in some locations, noting that exploration and development of geothermal energy would provide a valuable use for mining sector infrastructure and labour. *"Power Towers"* i.e. Concentrated Solar Thermal (CST) preferably with molten salt energy storage may also be feasible in outback areas with abundant year-round sunshine. e.g. Alice Springs.

Climate Action Moreland's electricity market blueprint fit for a Climate Emergency: A "bottom up" integrated suite of evidence-based and rapidly achievable measures to **catapult Australia from laggard to world leader** in respect of the rate and depth of actual CO_2 emissions cuts to zero by 2030, without the use of any dubious emissions offsets:

1. **Energy market competition *"behind the meter"*:** Zero-carbon energy services must be vigorously fast-tracked by the zealous use of *economically efficient market bypass* of monopoly/duopoly energy supply conduits, many of which are privatized. Because we are in a climate crisis and face an existential threat, governments demonstrating strong responsible leadership will put the people before corporate profits, and declare ***#ForceMajeure*** to ban certain activities and mandate others. A simple potent example is clothes drying: a ban to be placed on mains electric powered clothes dryers until such time that the mains power day and night is 100% renewable (via storage). Gas powered clothes dryers get banned immediately. In the meantime, it will be the ultimate virtue signalling to hang out the washing on an apartment balcony, an activity no longer able to be forbidden by any body corporate, landlord, or local government aesthetics police.

   The term **#Negawatts** was coined by Amory Lovins decades ago. The concept was then adopted by the Sacramento Municipal Utility District (SMUD)|[1]|. It must come to the fore again. **Energy efficiency** is another effective tool in the #Negawatts toolbox. Any fair and balanced inquiry by the **Productivity Commission** would find that much stronger enforceable energy efficiency standards for buildings|[2]| and appliances are good medicine for an Australian economy in the doldrums.

1 Not unlike the Victorian situation now with unreliable ageing lignite-fired power stations, in 1989 SMUD closed an unreliable nuclear power station and suddenly had to find creative ways to cut the "baseload" electricity demand of their customers by about 900 megwatts.
https://www.washingtonpost.com/archive/politics/1993/03/21/sacramento-finds-nuclear-free-power-saves-money-worry/b12844ee-1875-447a-ab42-6950ea329bd2/

2 Buildings new *and old:, i.e. mandate energy efficiency retrofits to 8-Star standard in the entire Australian residential housing fleet.*

2. Mandatory **Conservation Voltage Reduction (CVR)**, not only for the electricity industry's occasional operational convenience, but in the public interest everywhere and at all times throughout the NEM, targeting DNSPs at the suburban (and rural city or town) level, namely at the local zone substations where customer voltage is set. Suburban supply voltage is under full control of the local monopoly service provider at all times. Traditional utility operational behaviour is to allow voltages to drift higher at night, as customers switch off most loads, and then sleep. High voltage settings are a way to maximize the wattage drawn by any remaining loads, and so are of particular commercial and operational benefit to "baseload" generators i.e. inflexible generators like coal and nuclear power plants. High off-peak voltage is of most commercial benefit to Australia's vertically integrated "gentailers" who try to keep their inflexible generation units idling inefficiently each night rather than shutting them down. However, any DNSP's upper limit supply voltage set at 250-253 volts, though very helpful for extending the commercial life of coal power, is of demonstrable detriment to customers because these higher default voltages reduce the product life of light globes and appliances, increase power bills, and increase the carbon footprint of every customer. Conversely, lower supply voltages, say around 220 volts at all off-peak times, will instantaneously and safely cut power consumption for all customers in every suburb being so treated.|[3]|

Throughout the NEM, mains supply voltages measured randomly at multiple urban locations over decades suggest cabal-type behaviour, namely DNSPs *appear* to act as if they have no qualms about doing huge favours for other market players: the retailers, especially the coal-fired gentailers, and even appliance manufacturers & sellers. Industry spin over decades has vehemently contradicted the scientific evidence, the facts, regarding CVR's ability to quickly reduce off-peak energy sales|[4]|, reduce customers' energy bills, and hence the market share of baseload coal. The lights will stay on, provided that many more GW of renewables in tandem with many more GWh of

3 Some DNSPs are already implementing CVR during peak times, and have publicly admitted that reduced voltage in a typical suburban network will instantly cut power consumption in that suburb. If they can do it safely during peak times for the very reasonable operational objective of avoiding a total blackout, then they can and must be made to deliver lower voltage say 220 volts every night so that we can quickly cut coal's market share, thus helping Australia deliver on our Paris commitments: Ref: https://www.ecogeneration.com.au/demand-response-voltage-solution-keeps-the-power-on/

4 The Bathurst CVR study report is one of hundreds similar reports online attesting to the clear, easily repeatable, empirical evidence that lower voltage is a customer-friendly market intervention.

storage are built in a planned way as coal units are phased out fast, in our coordinated, common-sense response to the climate imperative.

3. **Radical tariff reform of retail consumer tariffs**: At night the sun does not shine. At night in SE Australia, the wind speed and hence the wind power available to terrestrial wind turbines is reduced. Given these demonstrable facts, night-time electricity is, on average, significantly more carbon-intensive than daytime electric energy, with its large clean solar, and enhanced clean wind power inputs. **Cheap night tariffs are, in effect, the utterly perverse marketing of coal power, given our dire climate predicament.** They must be abolished immediately. The calculated infiltration of misleading concepts such as “zero net emissions” by vested interests has tended to greenwash dirty electricity to appear clean e.g. Melbourne’s Yarra Trams on a windless evening claims to run its fleet on “zero net emissions” electricity when the demonstrable fact is that the trams would stop dead in their tracks if coal power were withheld from the market. On most winter evenings 95% of tram megawatt-hours are sourced from the combustion of lignite in the Latrobe Valley. Similarly EV owners love to proclaim their car as “zero net” either by virtue of offsets they assert come from their “net zero” residential rooftop photovoltaics|[5]|, or from a retailer, e.g. Powershop using net zero carbon accounting, but offering a cheap night tariff knowing full well that the customers’ EVs will in reality be charging predominantly on coal power every night.|[6]|

4. **Pick Winners,** demonstrating strong leadership. During an existential crisis it is incumbent upon our political leaders to study the scientific, technical, engineering facts, by consulting with genuinely *independent* experts, and pick winner technologies. A national electricity grid requires security and reliability benchmarks being consistently met. A number of studies have clearly demonstrated by detailed technical modelling that 100% renewables can *keep the lights on for years* by adding sufficient storage. In the

5 Any home owner who has had solar PVs installed and has taken advantage of a solar rebate, has effectively sold their system's lifetime estimate of emissions reduction into the carbon trading market, by surrendering their RECS, so **to additionally claim zero net emissions for their EV recharging appears to be double dipping, counting the emissions reduction benefit twice.**

6 Powershop’s FAQ page explains that they use UNCERs, United Nations Certified Emissions Reduction (certificates!), traded internationally. CAM’s view is that the effect of such offsets by any electricity retailer is a misleading marketing ploy to disguise the proportion of coal power in the retailer’s electricity sales, especially after sunset each evening.

case of affordable despatchable bulk electric energy delivered via **off-river Pumped Hydroelectric Energy Storage (or "STORES" = Short Trm Off River Energy Storage)**, Bureau of Meteorology historical data for eastern Australia, time-synched with actual NEM half-hourly electricity usage data, elegantly demonstrated that -- with about 400GWh|[7]| of widely disributed STORES as proposed in Blakers ANU renewables-with-storage physical reality model -- *the NEM would not run out of electric energy during any hour over a five year period.* Unless other off-the-shelf, proven technologies can be deliverable fast for under $100/MWh (LCOE+LCOB) then STORES may well be the leading benchmark for other less proven technologies to beat on the criteria of fiscal certainty, price and speed-of-build. In CAM's considered view, given the rapidly closing window of opportunity to avoid a climate tipping point, it is vital that quick-build timelines for two hundred STORES installations averaging 2,000 MWh each (e.g. 200MW for ten hours) are set and contracts let. Buildiing 40GWh per year for 10 years starting in 2020 is an enormous engineering undertaking, bigger than the post-war Snowy Mountains Scheme. **Climate imperatives dictate** that we should give it our best shot. They also dictate that all the **"STORES" sites will be immediately forbidden from ever using coal power to recharge at night,** instead drawing exclusively from PV and wind resources as ageing coal plants are decommissioned in an orderly transition carefully orchestrated by Parliament.

5. A significant proportion of customers achieving independence, resilience and reliability by choosing to implement "islanding" or full off-grid capability can proportionally reduce the total number of GWh storage needed by a zero-carbon, fossil-free NEM. Most residential and commercial customers will stay grid-connected without batteries, the majority without any solar panels at all. For this majority, the total build of energy storage by NEM participants necessary to service these customers' off-peak, night-time and seasonal requirements, whether by utility batteries or hydroelectricity or compressed air energy storage, can be reduced even further by effective implementation of items 1, 2 and 3 above, namely monopoly market bypass, CVR and tariff reform, focussing specifically on this large cohort, i.e. the energy users without practical access to rooftop solar, be it photovoltaic or solar hot water.

7 Four hundred gigawatt-hours is 400,000 megawatt-hours, enough electric energy to run a 1000-watt bar radiator for four hundred million hours, or 45,631 years.

6. A robust declaration of **#ForceMajeure**, based upon the clear existential climate threat, must give federal politicians|[8]| real teeth: authority over ACCC, AER, AEMC and AEMO, forcing them to conduct radical surgery on **NEM's wholesale price setting algorithm,** which is at the core of what is rotten in the privatised marketplace, more closely resembling a high-rollers' gambling den at times. Generators should get paid a boring fixed price which is cost-reflective plus a regulated profit margin, and get despatched when they are told to by AEMO. A detailed critique of how the Kennett-era Victorian Government managed to force this utterly discredited market model on all the other states in NEM, is in the late Robert Booth's talk to the SA Press Club,|[9]| winter 2001: Highly recommended, still a very relevant critique of NEM's abject failure over the past two decades.

   Q. What is the relevance so many years later of Robert Booth's analysis?
   A. In the context of Australia's need to slash emissions to meet, and **go well beyond the Paris targets**, it is only by restoring boring old cost-reflective wholesale pricing that the right mix of clean generation, cheap bulk energy storage, energy efficiency and market bypass #negawatts can achieve a least cost balance of investment signals, without the gross distortions of the greedy gambling den.

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[this excerpt of Climate Action Moreland's submission to the Climate Change Authority has been authorised by CAM's Convenor 29/8/2019. Some subediting has been done to correct formatting and spelling errors. The prose in a couple of paragraphs has also been similarly adjusted solely for clarity and grammatical improvement. A few extra hyperlinks have also been added. MG]

8..perhaps even a bi/tri-partite *"governance of national unity regime"* in a Senate Standing Committee or in the COAG Energy Council, with this "national unity regime's" powers limited specifically to the electricity industry, to at last agree urgent bi/tri-partite science-based actions to fully decarbonise NEM with maximum haste, picking winners free of the distorting influence of vested corporate interests.

9 http://sapressclub.com.au/project/dr-robert-booth/