Draft 2021 Inputs, Assumptions and Scenarios Report
Joint submission to AEMO

Total Environment Centre and Renew are pleased to make a submission to this consultation process. Because this is our first input into the latest IASR and we have limited resources, we have chosen to focus briefly on one particular issue which in our view requires significantly more detailed consideration: climate change.

While the IASR goes into considerable detail about the modelling implications of different climate change *mitigation* scenarios, there is little or no apparent focus on the implications for the electricity system and consumers of different climate change *impacts* and adaptation needs and options, especially in regard to the increasing frequency, intensity and duration of various types of individual and compound severe weather events.

Climate change is already impacting in a variety of ways on generator reliability, transmission and distribution network performance and consumer demand. Recent examples include:

- The tornadoes which triggered the SA black system event in September 2016.
- The unprecedented bushfires in south eastern Australia over spring and summer of 2020–21.
- The storms in the Ausgrid area in summer 2020-21.

The latter two events resulted in network pass-through applications to the AER of around $230 million, which costs will ultimately (after scrutiny by the AER) be borne by consumers.

But the only climate impact directly acknowledged in the draft report is "expected temperature impacts on transmission line ratings, and the provision of factors for bushfire and wind impacts on transmission failure rates." The Electricity Sector Climate Information (ESCI) project referred to in the report models a number of other impacts including reduced rainfall, bushfires and severe winds. It is not clear why these impacts have not been included. It is also unclear how the IASR will deal with compound severe weather events, which are inherently more difficult to assign a probability to.

The net result of the absence of climate impacts in the report is that it effectively fails to take into account the already serious implications of different emissions pathways on the electricity system and consumers.

The difference between the two extreme emissions pathways, RCP1.9 and 8.5 (which are reflected in the IASR scenarios), is a massive and undoubtably catastrophic 2.8 degrees by 2100.[1] Assuming that's a difference of ~1.2 degrees by 2050, whether we achieve the low or the high end of that range would have enormous ramifications for the electricity system.

[1] For instance, according to the IPCC's 2014 fifth assessment report, "By 2100 for RCP8.5, the combination of high temperature and humidity in some areas for parts of the year is expected to compromise common human activities, including growing food and working outdoors (*high confidence*)."

To be more specific, the Central scenario in the IASR (which AEMO regards as the most likely outcome and the baseline for system planning) implies a global temperature rise of around 2.7° by 2100 (consistent with the IEA's STEPS scenario). As numerous reports by the IPCC and other bodies have explained, this would lead to a catastrophic outcome for human civilisation and other species well before 2100.

In our view as small consumer representatives, AEMO has a responsibility to clearly articulate the implications for the energy system of such an outcome, rather than portraying it as even potentially acceptable. Even the naming of the scenario inherently implies its acceptability (it might more realistically be called the Doomsday scenario).

The anticipated temperature rise implied by the Central scenario will be accompanied by radical changes in weather and consequent social, economic and technological upheaval. These changes will affect macro-level forecasts of energy demand such as:

- Shifting populations and loads in response to temperature, sea level rise, sustained heightened bushfire risk or other changes to the liveability or arability of particular areas.
- Changing loads (both reductions in existing loads and the entrance of new loads) as the Australian economy shifts in response to the urgent need to act on climate change including global emissions reduction targets.
- Changing average temperatures and diurnal heating and cooling patterns affecting energy consumption both on typical and extreme days.
- Increasingly severe and regular extreme weather days.

The Central scenario will also have major impacts on the operation of the energy system, such as:

- An increased proportion of distributed energy resources (DER) closer to load and less susceptible to extreme weather than centralised energy sources.
- Increased risk of interruptions to transmission flow paths due to bushfires, floods or storms damaging network infrastructure, or parts of the network having to be de-rated or de-energised for safety and security concerns.
- Decreased availability of large, thermal generation as extreme weather forces generators to de-rate their output to maintain equipment within thermal limits or due to limited availability of cooling water.
- Early retirement of thermal generation due to decreased generation ability or weather-related damage – for instance if high temperatures damage equipment and the high cost of repair means it is more economically rational to instead close the plant early.

We also note in respect of the Central scenario that it is impossible to model a scenario which is deliberately vague as to the year or even the decade by which net zero emissions will be reached.

As the Slow Growth and Diversified Technology scenarios imply even worse heating, more needs to be done to explain the impacts of the implicit temperature rises on the energy system under each scenario.

Only the Sustainable Growth and Export Superpower scenarios come anywhere near resulting in a relatively safe climate outcome, but even they assume only a minimal 26 per cent reduction in emissions by 2030, when again, numerous bodies have warned that cuts of somewhere between 45% and 66% will be required by 2030 to avoid crossing the 2°

threshold by 2100. For instance, a new report by the Climate Targets Panel, released last week, found that

> To be consistent with the Paris Agreement goal of limiting global warming to well below 2°C, Australia's 2030 emissions reduction target must be 50% below 2005 levels. A 2035 target would need to be 67% below 2005 levels. Net-zero emissions would need to be reached by 2045.
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> To be consistent with the Paris Agreement goal of limiting global warming to 1.5°C, Australia's 2030 emissions reduction target must be 74% below 2005 levels, with net-zero emissions reached by 2035.

As acknowledged in the draft IASR, the current federal government's weak 26 per cent by 2030 target is inconsistent with some legislated jurisdictional government targets for 2030 and all jurisdictional targets for 2050. AEMO should only adopt the current federal government target as a baseline if there is a reason for thinking that jurisdictional targets will not be met. We see no reason to reach such a conclusion.

We remind AEMO that Australia is a signatory to the 2015 Paris agreement, which commits the federal government to

> Holding 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.

This agreement, which has bipartisan support in federal parliament, should be the baseline outcome driving the Central scenario modelling.

Finally, we concur with PIAC's critique of the Diversified Technology scenario, and note in particular the apparent incongruity of applying RCP2.6 to it when the report goes on to say that Australia's contribution will be equivalent to RCP4.5.

We therefore recommend that:

1. *Each scenario include implications for the electricity sector and consumers of the relevant emissions outcome for 2050.*
2. *The Central scenario be renamed to reflect its likely catastrophic outcome.*
3. *The Sustainable Growth scenario become the Central scenario because it and the Export Superpower scenario are the only ones consistent with a relatively safe climate outcome.*
4. *The Diversified Technology scenario be deleted, or at a minimum, recognised as consistent with RCP4.5 (~2.6°C) rather than RCP2.6 (~1.8°C).*