Recent trends in and preparedness for extreme weather events

These three [3] points are made as personal observations.

Terms of Reference [ToR]

[a] (a) recent trends on the frequency of extreme weather events, including but not limited to drought, bushfires, heatwaves, floods and storm surges;

Sea Level and Planning

The latest work profiles the last 40 million years of behaviour of the polar ice under a regime of 400ppmv of atmospheric CO2(-e). It flags, within a margin of error, a 9 metre rise in sea levels over time.

The last Interglacial maximum, 125,000 years before present, saw the sea level remain above todays by between 4 and 6 metres for 7,000 years.

Such changes may follow a rate of 1 metre per century, but they are inexorable.

One advantage is this change occurs over a period allowing for a programmed response.

The other is that the same study shows some stability follows the rise until CO2 reaches levels above 650ppmv. If those levels are reached such as if the release of GHG from natural sinks escalates due to warming caused by lower values.

Such changes are indicated by the behaviour of the tundra and other polar lands and seas.

All land use planning needs to take account of this projection. No new permanent infrastructure should be constructed on land vulnerable to this inundation.

Measure should be taken to establish alternative infrastructure secure from such impacts, for example a second airport for Sydney.

I would suggest that at the extremes of possibility following runaway climate instability scenarios based on the higher end of CO2 concentrations following the failure of the international community to enact comprehensive adequate and timely mitigation measures the degree of dislocation and change cannot be planned for.

Those measures are reasonably well understood and should need no iteration. If a binding international agreement to restrain GHG below 450ppmv cannot be reached in this period of negotiation the national response to future changes in climate stability and the concomitant impacts on national life should be reviewed to allow Australian the opportunity of making informed decisions about the future.

Reference; Dr Gavin Foster et al. **The relationship between sea level and climate forcing by CO_2 on geological timescales**. *Proceedings of the National Academy of Sciences*, 2013

Natural Relationship Between Carbon Dioxide Concentrations and Sea Level Documented

Jan. 2, 2013 — By comparing reconstructions of atmospheric carbon dioxide (CO_2) concentrations and sea level over the past 40 million years, researchers based at the National Oceanography Centre, Southampton have found that greenhouse gas concentrations similar to the present (almost 400 parts per million) were systematically associated with sea levels at least nine metres above current levels.

The study determined the 'natural equilibrium' sea level for CO_2 concentrations ranging between ice-age values of 180 parts per million and ice-free values of more than 1,000 parts per million.

It takes many centuries for such an equilibrium to be reached, therefore whilst the study does not predict any sea level value for the coming century, it does illustrate what sea level might be expected if climate were stabilized at a certain CO_2 level for several centuries.

Lead author Dr Gavin Foster, from Ocean and Earth Science at the University of Southampton which is based at the centre, said, "A specific case of interest is one in which CO_2 levels are kept at 400 to 450 parts per million, because that is the requirement for the often mentioned target of a maximum of two degrees global warming."

The researchers compiled more than two thousand pairs of CO_2 and sea level data points, spanning critical periods within the last 40 million years. Some of these had climates warmer than present, some similar, and some colder. They also included periods during which global temperatures were increasing, as well as periods during which temperatures were decreasing.

"This way, we cover a wide variety of climate states, which puts us in the best position to detect systematic relationships and to have the potential for looking at future climate developments," said co-author Professor Eelco Rohling, also from Ocean and Earth Science at the University of Southampton.

The researchers found that the natural relationship displays a strong rise in sea level for CO_2 increase from 180 to 400 parts per million, peaking at CO_2 levels close to present-day values, with sea level at 24 +7/-15 metres above the present, at 68 per cent confidence limits.

"This strong relationship reflects the climatic sensitivity of the great ice sheets of the ice ages," said Dr Foster. "It continues above the present level because of the apparently similar sensitivity of the Greenland and West Antarctic ice sheets, plus possibly some coastal parts of East Antarctica."

According to the study, sea level stays more or less constant for CO_2 changes between 400 and 650 parts per million and it is only for CO_2 levels above 650 parts per million that the researchers again saw a strong sea level response for a given CO_2 change.

"This trend reflects the behaviour of the large East Antarctic ice sheet in response to climate changes at these very high CO_2 levels. An ice-free planet, with sea level 65 metres above the present, occurred in the past when CO_2 levels were around 1200 parts per million."

Professor Rohling said, "Sea level rises to these high values will take many centuries, or even millennia, but the implications from the geological record are clear – for a future climate with maximum warming of about two degrees Centigrade, that is with CO_2 stabilized at 400 to 450 parts per million, sea level is set to steadily rise for many centuries, towards its natural equilibrium position at around 24 +7/-15 metres, at 68 per cent confidence. In Intergovernmental Panel on Climate Change terms, this is a likely rise of at least nine metres above the present. Previous research indicates that such rises above present sea level may occur at rates of roughly one metre per century."

Based on these results, which document how the Earth system has operated in the past, future stabilization of CO_2 at 400-450 parts per million is unlikely to be sufficient to avoid a significant steady long-term sea level rise.

Story Source:

The above story is reprinted from materials provided by **National Oceanography Centre**, via AlphaGalileo.

Note: Materials may be edited for content and length. For further information, please contact the source cited above.

Journal Reference:

1. Dr Gavin Foster et al. **The relationship between sea level and climate forcing by CO_2 on geological timescales**. *Proceedings of the National Academy of Sciences*, 2013

ToR [c] an assessment of the preparedness of key sectors for extreme weather events, including major infrastructure (electricity, water, transport, telecommunications), health, construction and property, and agriculture and forestry;

Natural Disaster Planning - Power Supply

The States seem unable to address the hardening of the power supply infrastructure, even under the NEM pricing benefits to gold plating distribution networks.

Although recommended in the Victorian Royal Commission into the 2009 Black Saturday fires, the idea was dismissed as too expensive.

It would seem therefore that Federal intervention is necessary to ensure that at least identified areas of importance as evacuation nodes in times of natural disaster have their electricity supply hardened or an alternative generation system in place.

The recent [04JAN13] fires on the Tasman Peninsular serve as an example.

A major global tourist attraction is located almost at the end of a long above ground power supply. Normal access to the area is limited to one road, although an alternative by sea can be arranged to deal with an emergency. It was an Evacuation Centre.

The population of the Forrestier and Tasman Peninsular are always vulnerable to interruption to supply and may thus be better prepared than visitors.

It is these communities, where evacuation routes are limited and there is a danger, that should receive priority in ensuring a hardened supply to local evacuation nodes.

ToR

[f]) progress in developing effective national coordination of climate change response and risk management, including legislative and regulatory reform, standards and codes, taxation arrangements and economic instruments;

Local planning schemes should phase out the wooden and other fences vulnerable to fire for homes adjacent to bush or farmland.

As was demonstrated in the Canberra fires wooden fences only act as fuses for fires reaching into the suburban landscape. Other fences such as glass screens may fail under extreme heat conditions and rural fencing offers no barrier

Urban planning is governed by many regulations in place in the interests of the whole community.

Protection of adjoining properties by setback distances and firewalls is common practice for built up areas so why not protect the whole by requiring those who benefit from the proximity of nature and a lack of neighbours to assist the community.

Over time such a change should reduce risk to the community by creating a barrier to non urban fires penetrating the built up areas.

Phill Parsons