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West Antarctic Ice Sheet (WAIS) Collapse Tipping Point Defined... This work out of the German National Science Institute describes marine ice sheet collapse mechanisms, and how there is a very distinct tipping point with the West Antarctic Ice Sheet where collapse becomes irreversible in about 2050. The very important take-away from this work is that to prevent ice sheet collapse the “perturbation” that creates the warming that is responsible for ice sheet collapse, which is mostly ocean warming, must end by at the latest 2050. This means that we must return ocean temperature to its preindustrial stable temperature by 2050. The challenge here is that it is much more difficult to cool the oceans than it is the atmosphere. Figure 3 shows the model runs that define the stable state in blue.
Feldmann and Levermann, Collapse of the West Antarctic Ice Sheet after local destabilization of the Amundsen Basin, PNAS, November 17, 2015.
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If upper ocean warming around Antarctica is not returned to zero...
Dynamical Ice Sheet Collapse Modeling Arrives: The abstract from DeConto and Pollard states: “model coupling ice sheet and climate dynamics—including previously underappreciated processes linking atmospheric warming with hydrofracturing of buttressing ice shelves and structural collapse of marine-terminating ice cliffs—that is calibrated against Pliocene and Last Interglacial sea-level estimates and applied to future greenhouse gas emission scenarios. Antarctica has the potential to contribute more than a metre of sea-level rise by 2100 and more than 13 metres by 2500, if emissions continue unabated.”
Abstract:

Full: http://www.documentcloud.org/documents/2823837-DeConto-Pollard-2016- Contribution-of-Antarctica.html

9. Benign atmospheric carbon dioxide cleanup technologies...

Continuing Research on CDR in 2016... Climate Change Now has been working with the Healthy Climate Alliance to further carbon dioxide capture science and describe successful industrial scale field trials that are perform according to previous research estimates. There has been a significant theoretical controversy over the cost feasibility of these technologies because of "infeasible" suggesting theoretical publication from researchers at the American Physical Society and MIT. This controversy is over as the new field trials in Menlo Park California by Global Thermostat, and Squamish, British Columbia by Carbon Engineering, are removing carbon dioxide from the atmosphere for $75 and $250 per ton using $0.06 to $0.07 kWh electricity. Of importance to dramatically reduced costs in the near future, ENGIE France has projected that because of the extremely strong performance of solar photovoltaic manufacturing and generation installation globally, by 2025 new solar generation will be at $0.01 kWh. The latest 300+ Megawatt installation in Abu Dahbi was at $0.0242 kWh.

ENGIE France...
SOLAR ENERGY AT $0.01 kWh IN 2025
ENGIE France, Europe’s natural gas giant, says that by 2025, oil will be at $10 per barrel and solar energy at $0.01 kWh. Aubu Dabi set the last record for new solar at $0.0242 kWh in the fall of 2016.

Bloomberg, December 20, 2016:

Abu Dahbi...
Bloomberg, September 19, 2016: