

Commercialisation of biofuels in Asia-Pacific

Biofuels & Bioenergy - A Changing Climate
August, 2009
Vancouver, Canada

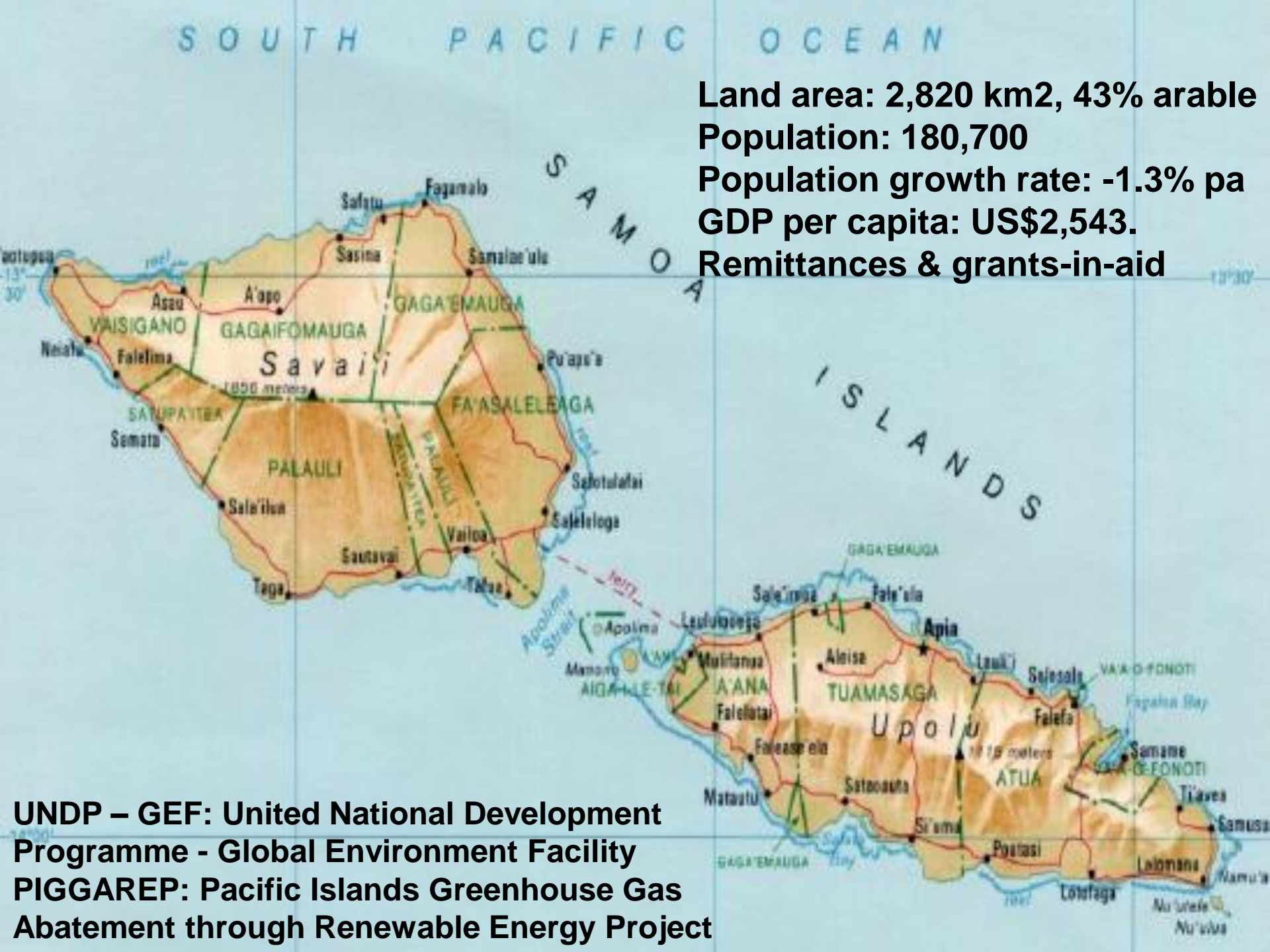
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OUTLINE - SNAPSHOTS

- SAMOA – *Paradise & white elephants*
 - Energy independence
- AUSTRALIA – *Coal is king*
 - Events that shape Australia's future
- CHINA – *Just do it*
 - Biobutanol production at Guangxi Jinyuan Biochemical Industrial Co Ltd
 - Tom Granström's presentation on butanol



Land area: 2,820 km², 43% arable

Population: 180,700

Population growth rate: -1.3% pa

GDP per capita: US\$2,543.

Remittances & grants-in-aid

**UNDP – GEF: United National Development
Programme - Global Environment Facility
PIGGAREP: Pacific Islands Greenhouse Gas
Abatement through Renewable Energy Project**







Events that shape Australia's future

- Federal election Nov 2007 - New Government
 - Election promises
 - 20% renewable energy by 2020
 - 60% reduction in CO2 emissions (2000 levels) by 2050
 - Australian Prime Minister, Kevin Rudd, ratified Kyoto in December, 2007
 - Commissioned Garnaut to report on economic impact of climate change & emissions reductions
- Dec 2007 - Al Gore and IPCC share the Nobel peace Prize
 - “I salute Europe and Japan for the steps they've taken in recent years to meet the challenge, and the new government in Australia, which has made solving the climate crisis its first priority.”



Garnaut - Climate change review

“Australia would be hurt more than other developed countries by unmitigated climate change, and we therefore have an interest in encouraging the strongest feasible global effort.”

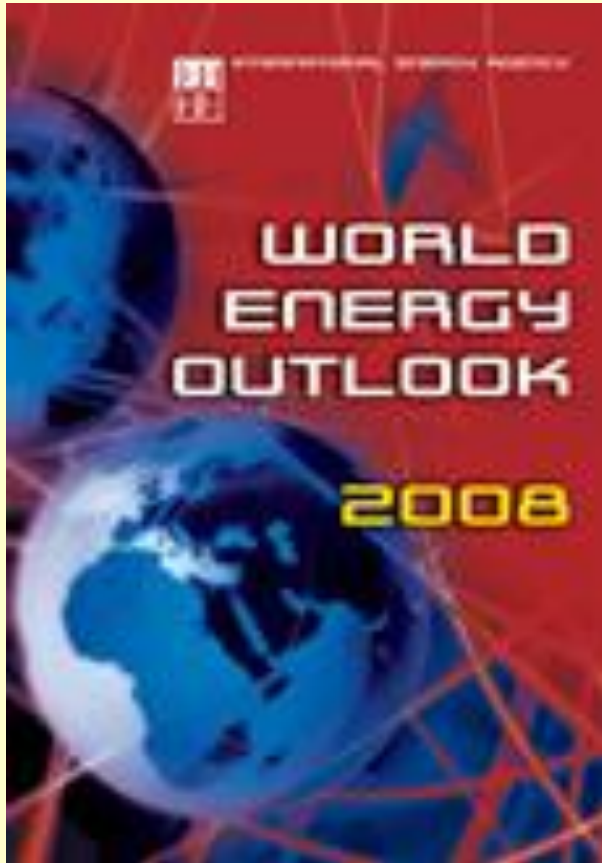
“In Australia’s interest to find out as soon as possible whether there can be a low-emissions future for coal, and to support rapid deployment of commercially promising technologies. This follows from Australia’s role as the world’s largest exporter of coal and the central place of coal in growth in emissions from Asian developing countries.”

<http://www.garnautreview.org.au>

Events that shape Australia's future

- Sept 2008 – Garnaut Climate Change Review
 - Australia's full part for 2020 in a 450 ppm scenario would be a reduction of 25% in emissions from 2000 levels.
 - In the absence of a global agreement at Copenhagen, Australia should commit to reduce its emissions by 5% from 2000 levels by 2020.
 - Recommendations on the design features of the emissions trading scheme.
 - full auctioning of emissions permits and the return of all revenue to households (50%), business (30%) and RD&C (20% - reaching \$3 billion pa).
- August 2009 – CPRS bill
 - Free emissions permits to trade exposed emitters and gen cos - worth \$billions
 - ETS linked to a RET of 20% (currently at 8%)
 - 25% below 2000 levels by 2020 if the world agrees to stabilise levels of greenhouse gases at 450 ppm or lower by mid century, otherwise 5%
 - Failed in Senate on first attempt, then 'RET only' passed but only after agreement that coal-fired power stations emissions be considered a renewable resource
 - RET is 'non-negotiable symbolism in the politics of climate change'
- IEA 2008 World Energy Outlook report
 - Covered by Ralph Sims yesterday

IEA 2008 World Energy Outlook



- Reference Scenario – doubling of atmospheric CO₂ by end of century.
 - 385 ppm to 770 ppm by mid century
 - ¾ of projected increase comes from China, but still lower on a per capita basis than OECD nations
 - Oil price prediction – Highly volatile but averaging US\$100 per barrel to 2015, then rises to US\$120 per barrel by 2030 (2007\$)
 - US\$26 x 10¹² investment for supply to match demand by 2030
- 550 Policy Scenario – slower demand growth, increased share of renewables and rapid growth of CCS
 - World ETS - \$90/tonne CO₂e by 2030
- 450 Policy Scenario – stronger and broader policy action
 - OECD countries reduce emissions to 60% of 2006 levels by 2030
 - Normal cycles of capital replacement too slow => disproportionate high cost
 - World ETS - \$180/tonne CO₂e by 2030

“The OECD countries alone cannot put the world onto a path to 450 ppm, even if they were to reduce their emissions to zero....it is uncertain whether the scale of the transformation envisaged is even technically achievable.”

2nd Generation Biofuels R&D Program

- \$15 million fund
 - 32 applicants
 - total requested \$90
- U Melbourne (\$1.24 million) - algal oil
- SARDI/CSIRO (\$2.724 million) – algal oil
- Curtin U (\$2.5 million) – mallee pyrolysis
- BSES (1.326 million) – biomass production systems
- Monash U (\$1.383 million) forest residues pyrolysis
- Microbiogen (\$2.539 million) – pentose fermenting yeast
- Licella (\$2.288 million) – hemicellulose extraction & pyrolysis of residue

Carbon capture & storage

“Sweeping it under the rug”

“Australia's first trial of geosequestration in the Otways reached its first milestone last week — 10,000 tonnes of carbon dioxide was successfully stored two kilometres underground in a depleted natural gas field.

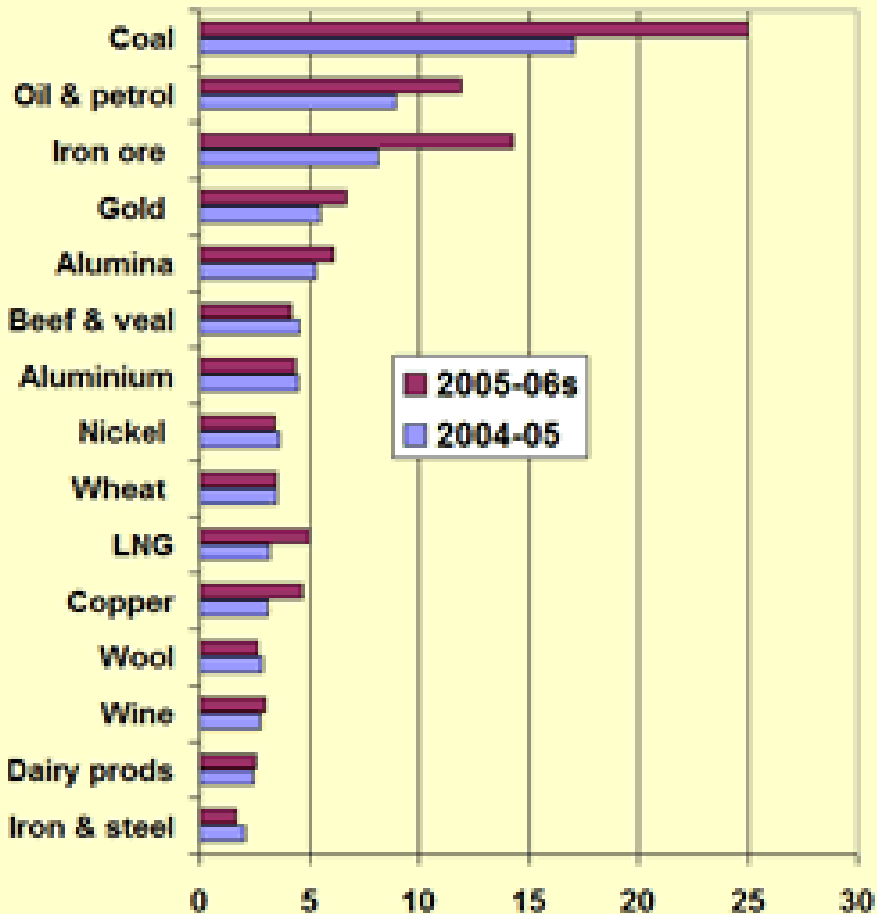
Scientists from the Co-operative Research Centre for Greenhouse Gas Technologies hope to increase that to 100,000 tonnes next year, while continuing to monitor the local geology.

The centre's chief executive, Dr Peter Cook, who is overseeing the \$40 million project, is confident that the day will come when much of the carbon dioxide produced from large industrial sources can be buried. He is hopeful that large-scale capture and storage, with at least one major power station using the technology, can be achieved within 10 years.”

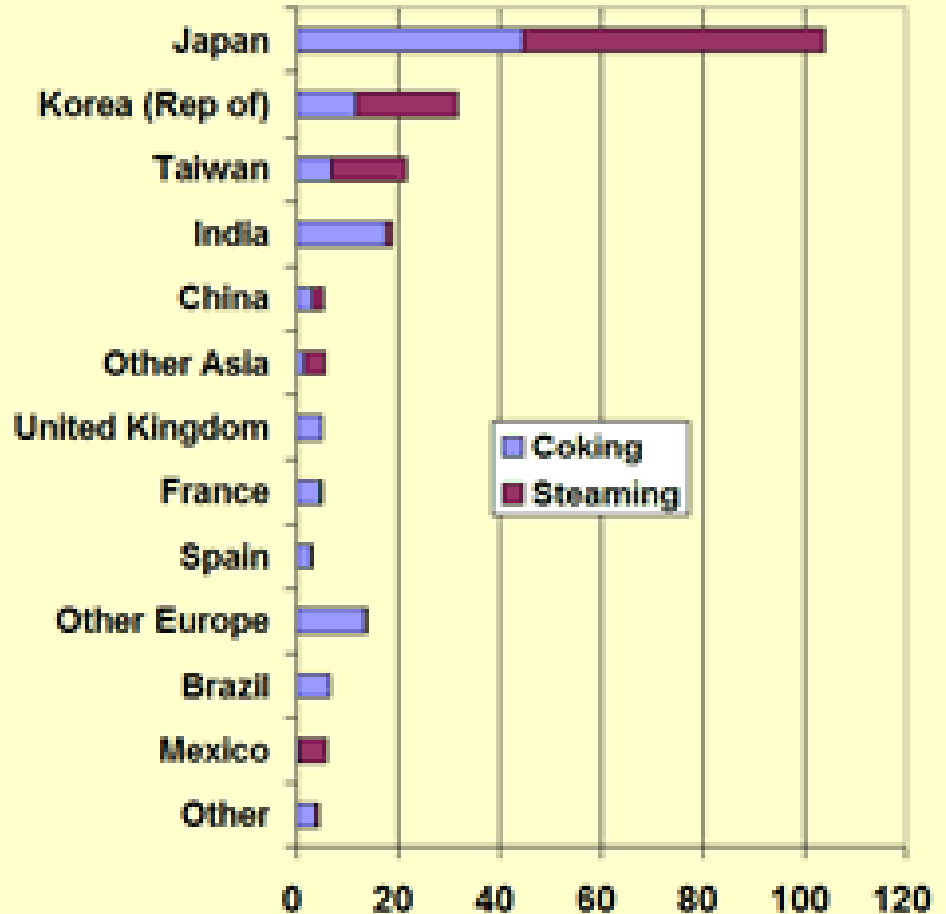
The Age, July 7, 2008

Coal is king

Australia's Major Commodity Exports
(SA Billion)



Australian Coal Exports by Destination 2005
(Million tonnes)



2005-06: 233 Mt – AU\$24.5 billion – 30% of world trade

Australian economy built on coal – one of the world's lowest prices for electricity



Guangxi Jinyuan Biochemical Industrial Co Ltd

- Built in 2006
- 400,000 tonnes of dry cassava chips pa
- 50,000 tonnes of butanol and 150,000 tonnes of ethanol
- Anaerobic digestion plant accounts for 20% of the facilities energy needs + on-site coal fired power plan (15,000 tonnes of coal per year) and the electricity grid
- Solid waste sold as animal feed and some is provided as a fertiliser to the farmers that supply cassava.









- 66 x 50,000 L butanol fermenters sitting idle
- Currently producing ethanol only from cassava chips
- Capable of producing ethyl acetate
- Plans to produce methyl isobutyl ketone & dimethyl carbonate (requires CO₂ capture)
- Private company – Jinyuan biobutanol, a sugar mill in Pingnan and a cassava starch plant in Wumking.
- Currently building another plant in Vietnam (400,000 tpa cassava chips to be completed by the end of 2009) and plans to expand into other Asian countries.



注意安全
禁止
烟火



Acknowledgements



Australian Government

**Rural Industries Research and
Development Corporation**



Australian Government

**Sugar Research and
Development Corporation**



CRC Sugar Industry Innovation through Biotechnology



An Australian Government Initiative
**National Collaborative Research
Infrastructure Strategy**



Queensland Government
State Development

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