



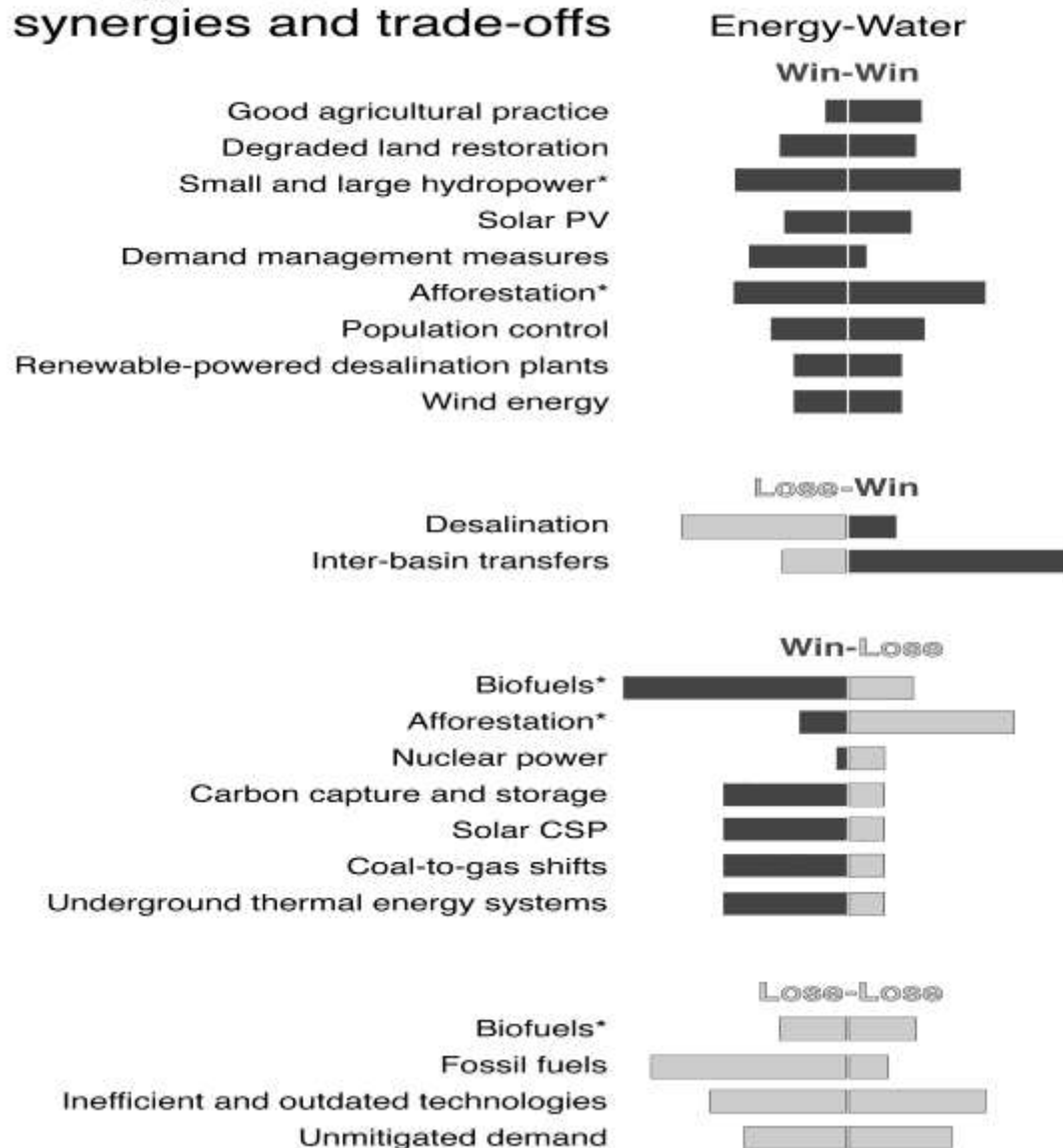
Australian  
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# Frameworks for managing the water, food and energy nexus in a changing climate

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## Energy-Water synergies and trade-offs



# Typology of Energy -Water interactions

## Sustains energy supplies

### Sustains water supplies

- **Sustains water and energy.** Eg. reduced domestic hot water demand

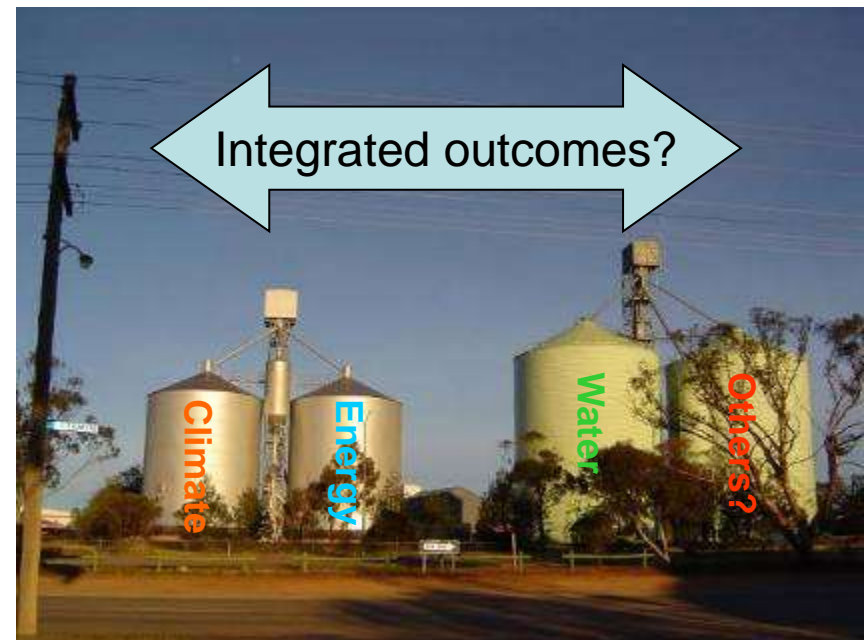
- **Sustains energy but uses more water.** Eg. more hydropower

- **Sustains water but uses more energy.** Eg. more desalination

- **Uses much water and energy.** Eg. Unconventional natural gas, 1st gen. biofuels

# How best to integrate sectoral silos?

1. Better knowledge to inform decisions
2. Technological advances
3. Markets that internalize externalities
4. More integrated governance institutions

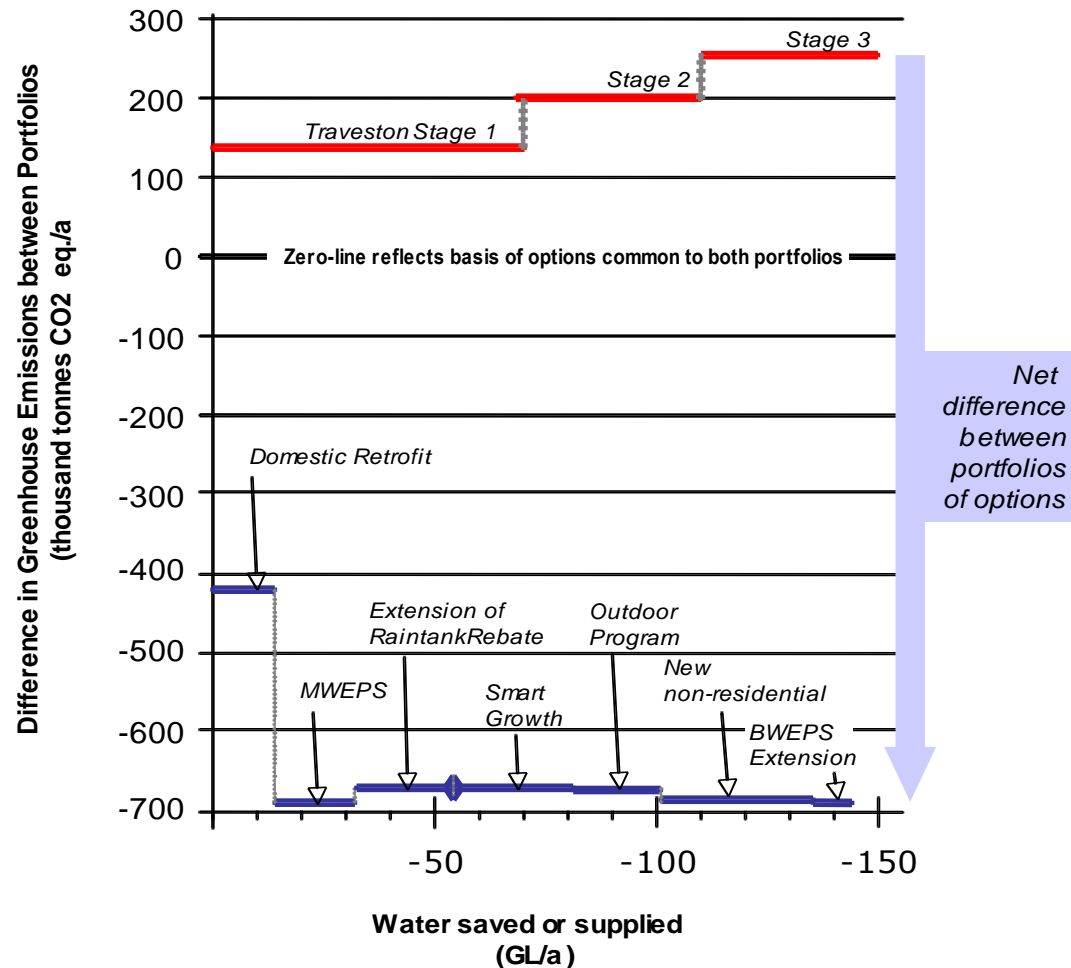


Silos, Robinvale, VIC, September 2009. (c) J Pittock.

# Energy – water solutions 1: Better Information

**Better knowledge could inform societal choices, eg:**

- GIS based decision making tools
- McKinsey style assessments of cost per unit benefit
- Example. SE Queensland water supply augmentation



(From M. Retamal, UTS, 2010)

# Energy – water solutions 2: Technology

Technology choices can reduce water or energy consumption per unit, eg:

- Dry cooling
- Renewable generators linked to well-designed pumped storage hydro



Photo: © J Pittock



**Tumut 3 1500 MW pumped hydro storage system in the Snowy Mountains**

# Energy – water solutions 3: Market-based measures

**Integrated water and energy and carbon markets internalise costs**

**Often easier policies to implement: least cost solutions, level playing field**

**Eg. Australia's 2004 National Water Initiative requires all water uses to have entitlements that are tradeable (including between states)**

<http://www.nwc.gov.au/resources/documents/Intergovernmental-Agreement-on-a-national-water-initiative2.pdf>



Hydropower (c) J Pittock



# Energy – water solutions 4: Improved decision making

A range of decision making reforms could help, eg:

Strategic environmental assessments

Consistent federal-provincial water and energy laws

Independent agency assessments

Many others ...



**Palm oil, a biofuel crop, on a peat swamp in Thailand (C) J Pittock**



# Discussion

- 1. Globally there is a need to provide services to growing populations, reduce carbon pollution, and secure energy and water supplies**
- 2. Climate change policies are driving conflicts and synergies**
- 3. A classic cross-sectoral and cross-scale integration challenge**
- 4. Can decision makers manage the nexus through purposeful application of:**
  - Better knowledge**
  - New technologies**
  - Market-based measures**
  - Improved decision making?**
- 5. Leadership and political will to do so?**