Energy Management

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Covering

- Australian trends
- Melbourne trends
- CWW energy use
- Impacts of water supply mix
- Impacts of customer usage
- Customer initiatives
- CWW initiatives
- Future challenges

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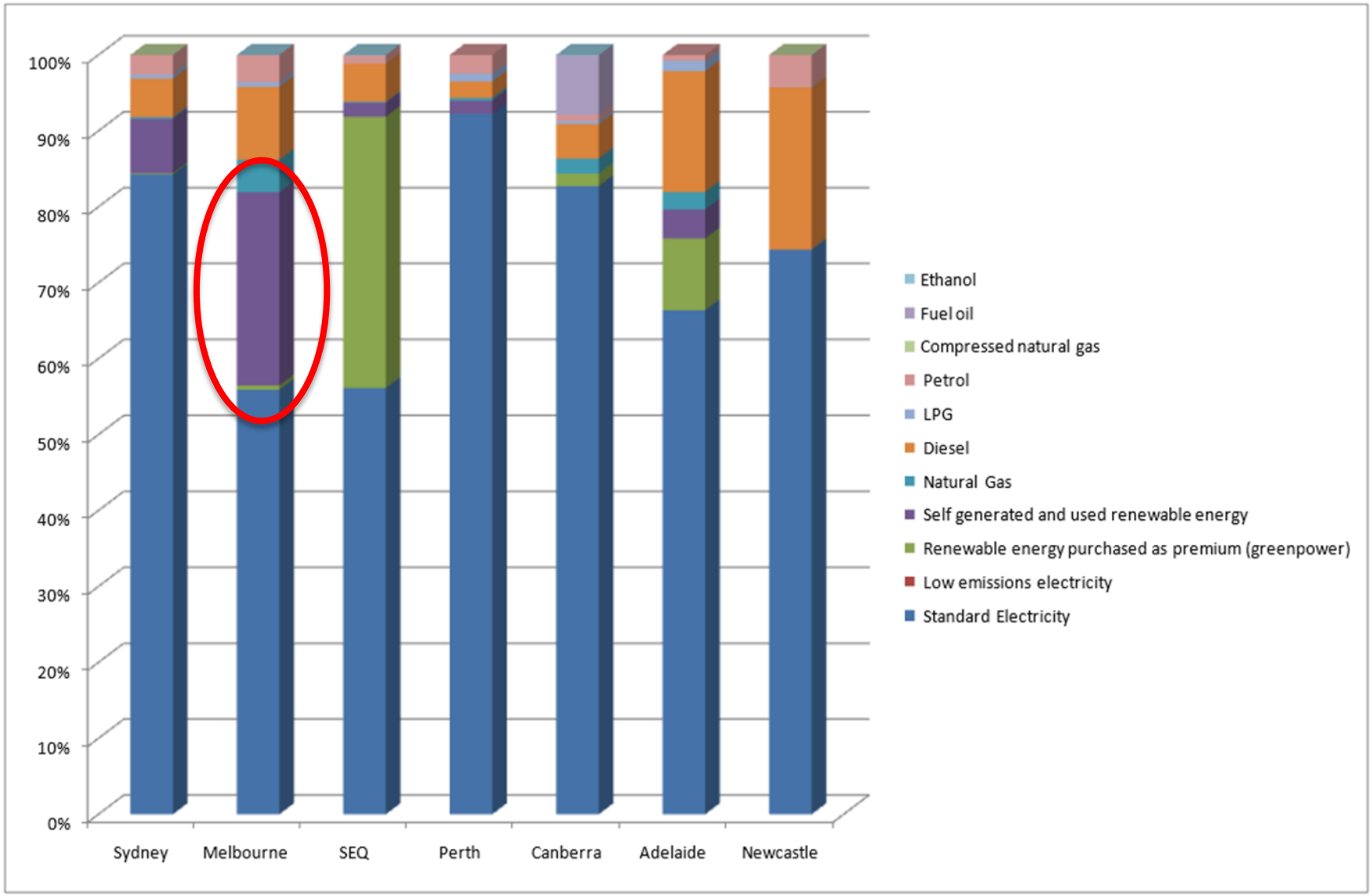
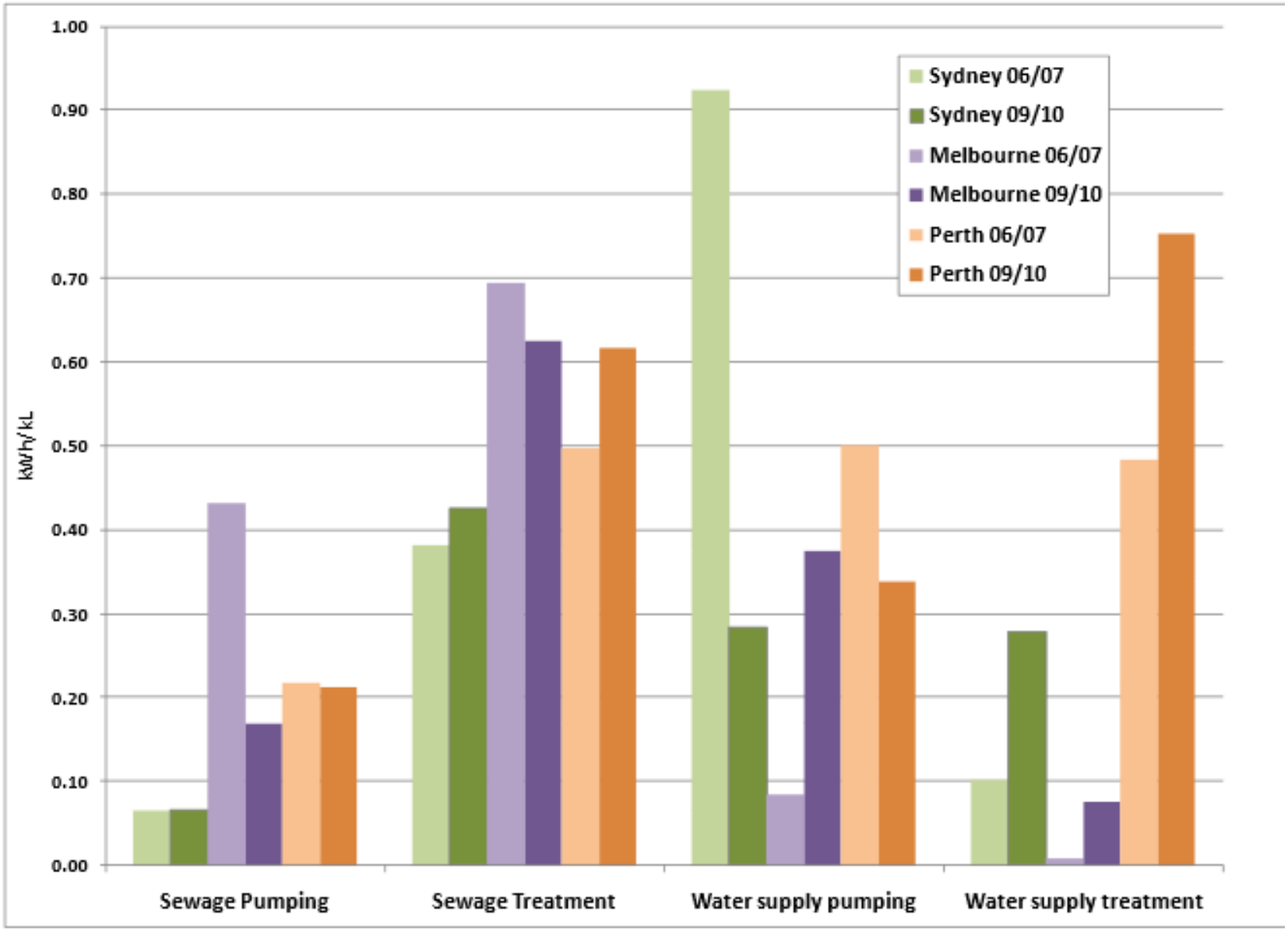
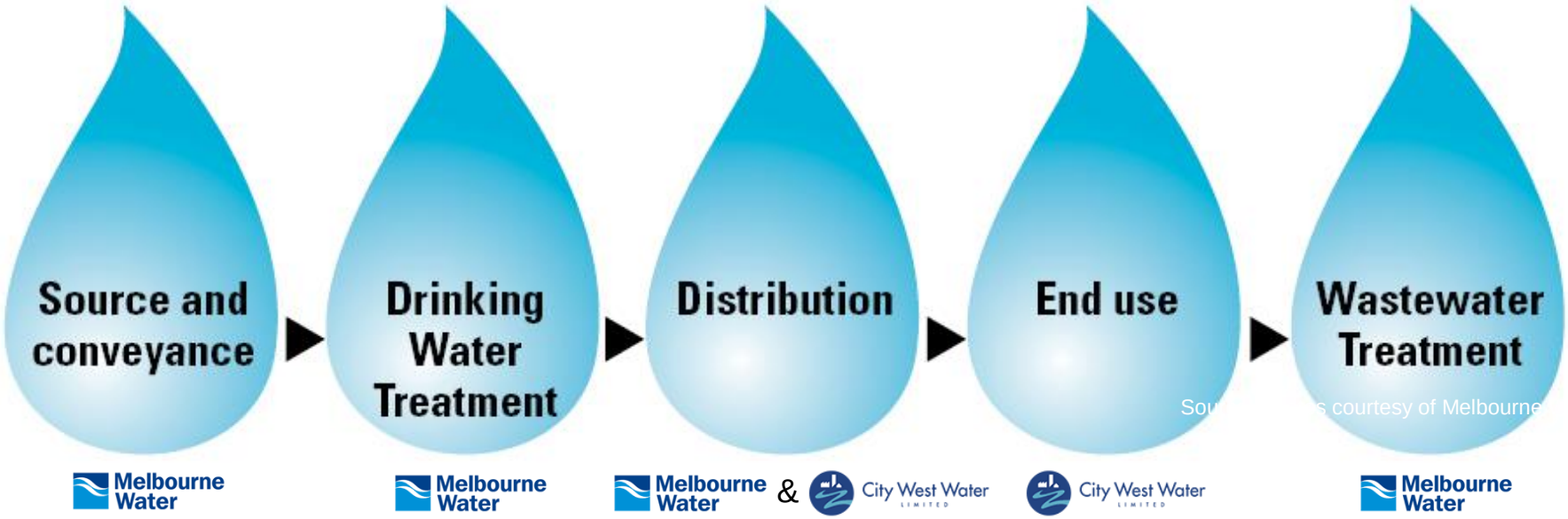
Energy used for water services by source



Trends in Australian water related energy use



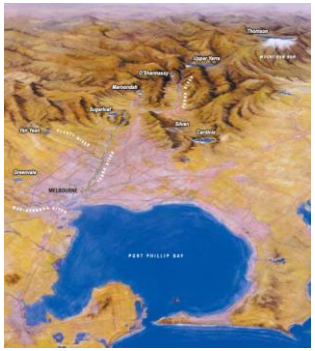
Energy use in Melbourne's water cycle



Source: Adapted from Natural Resources Defense Council March 2009

Minimal treatment

- Disinfection
- Fluoridation
- pH correction
- Sea water desal



Thermodynamic processes:

- Heating
- Cooling

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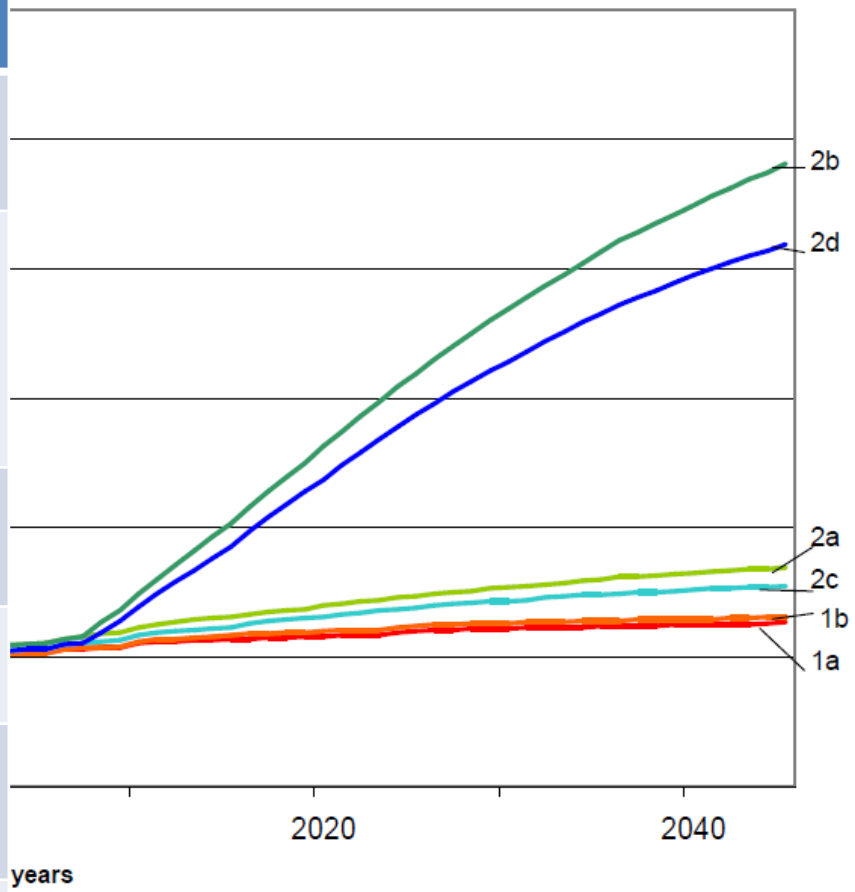
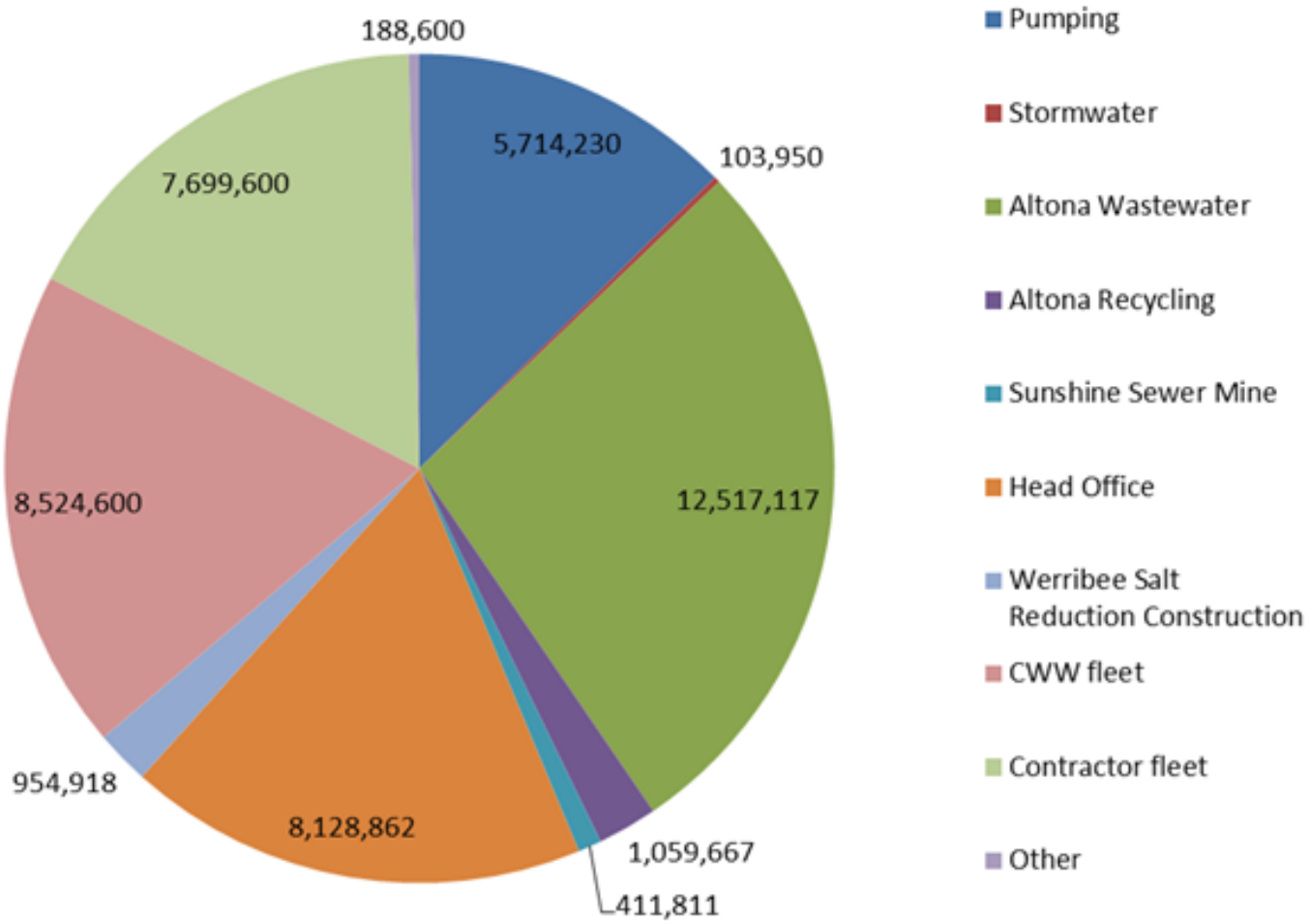
The effect of water strategies, water use and urban form on energy use for Melbourne (PJ)

	Urban Form	Water end use	Water supplies
1a	High density development	Demand management and solar hot water	Protected catchments
1b			Rainwater tanks and wastewater reuse
2a	Urban sprawl	No demand management and solar hot water	Protected catchments
2b			Desalination
2c		Demand management and solar hot water	Protected catchments
2d			Desalination



Energy use at City West Water



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Monitoring and Reporting

- Electricity company meters
- Meter reads for billing provided to CWW
- Meter and waste water sample data collated
- Greenhouse emissions determined for annual reports

Australian Government
Department of the Environment

NATIONAL GREENHOUSE ACCOUNTS FACTORS

Australian National Greenhouse Accounts

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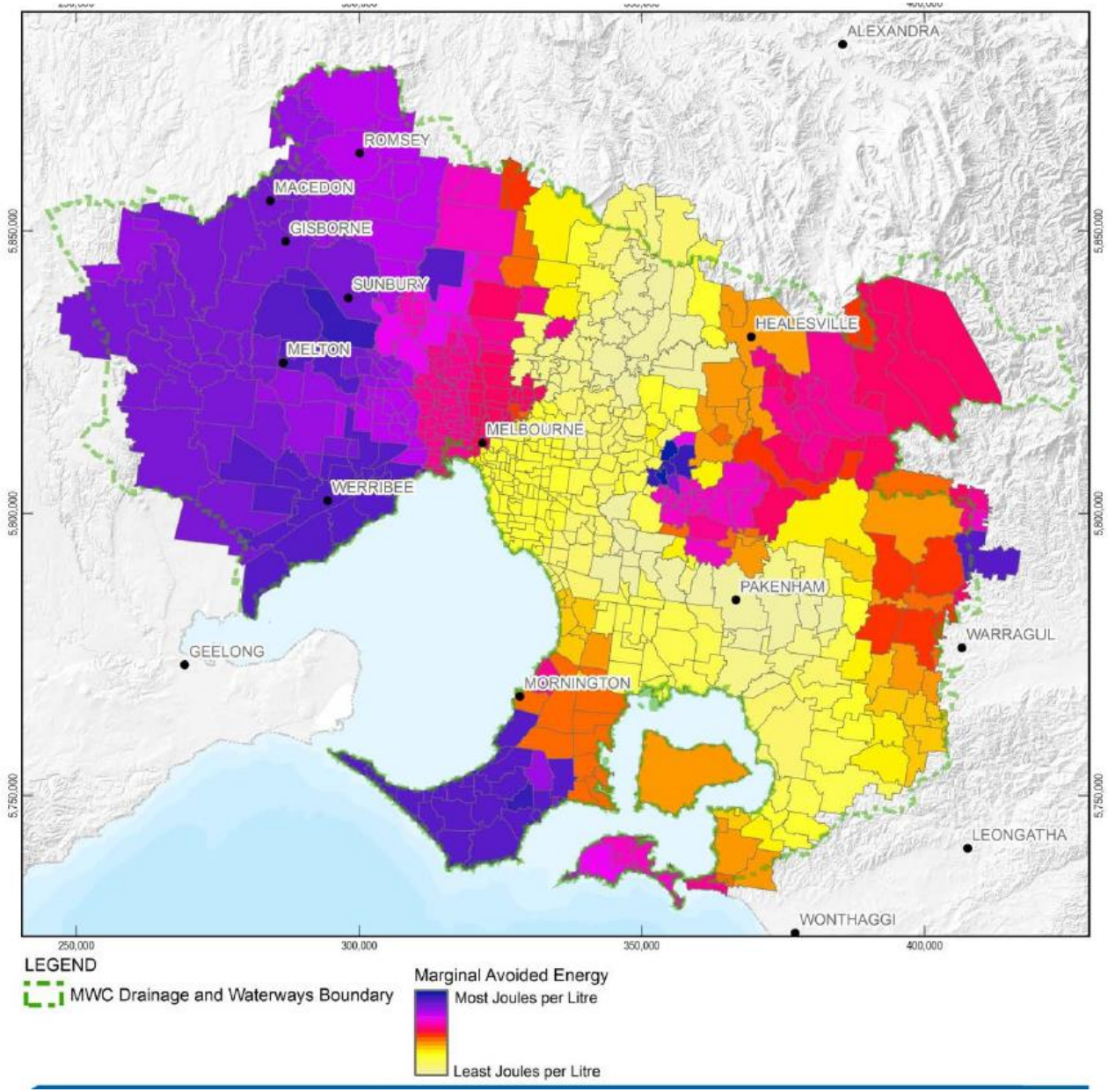
Avoided potable water supply energy



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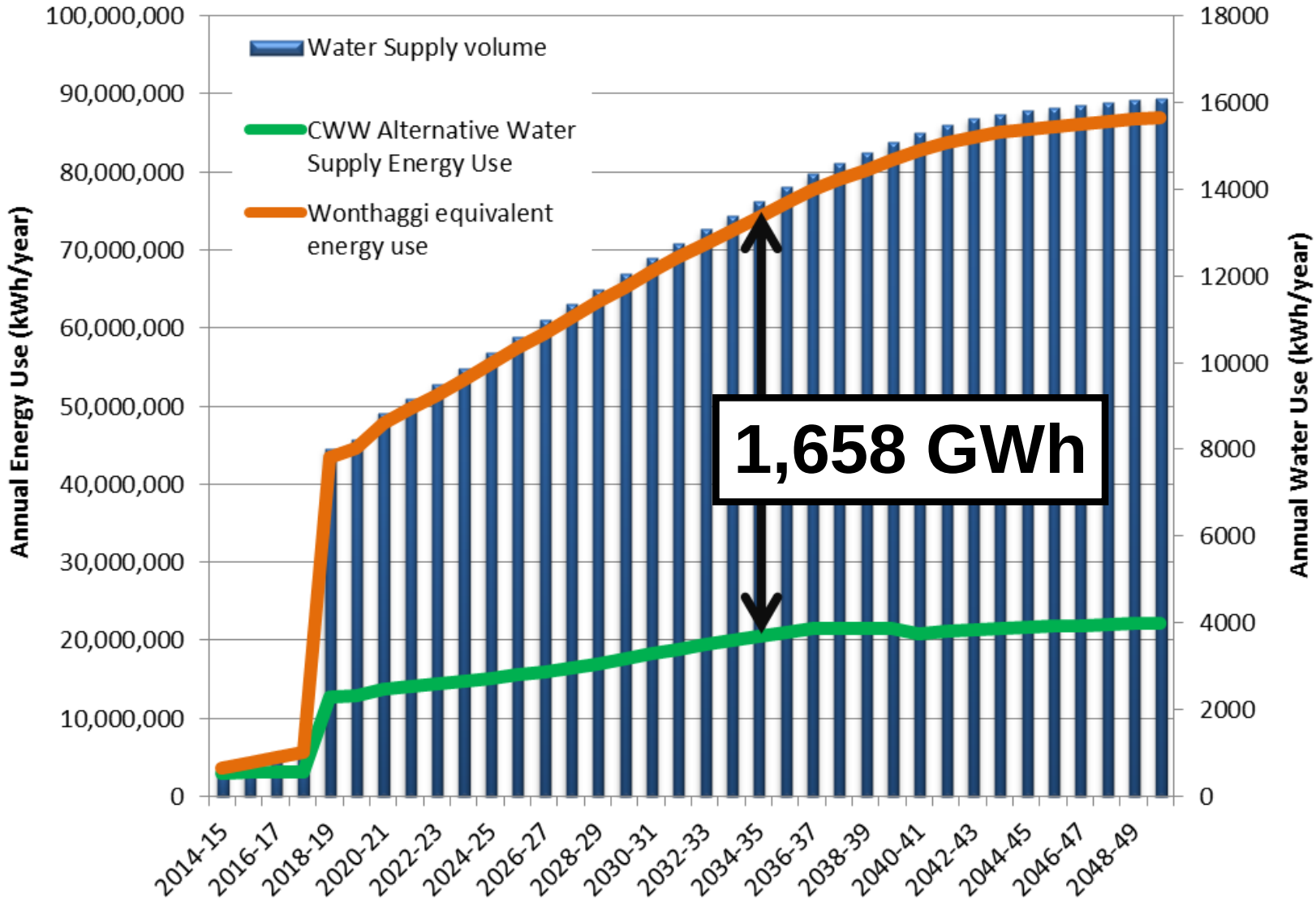
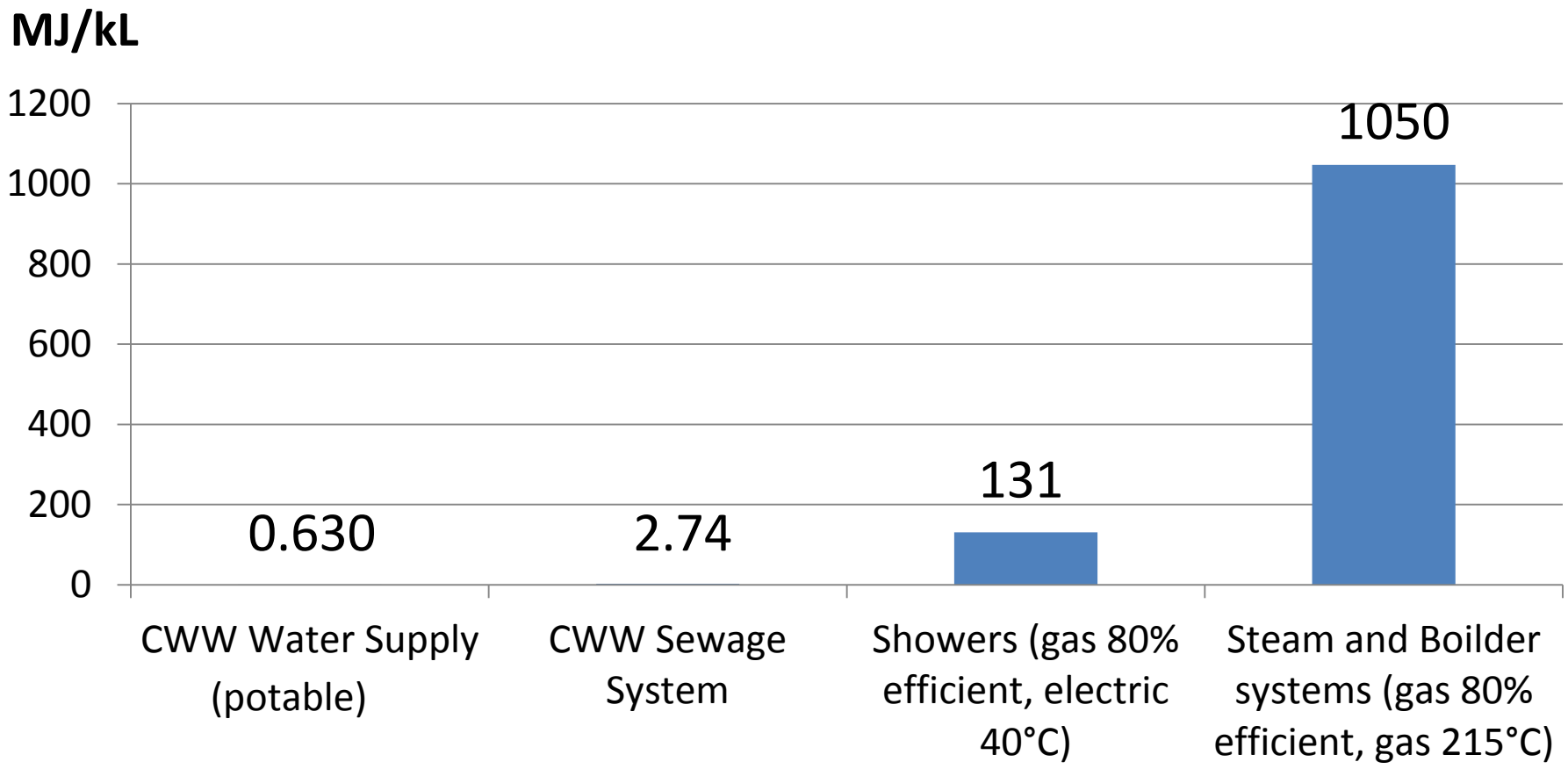
Energy use of local vs desal supplies



Energy intensity through the water cycle



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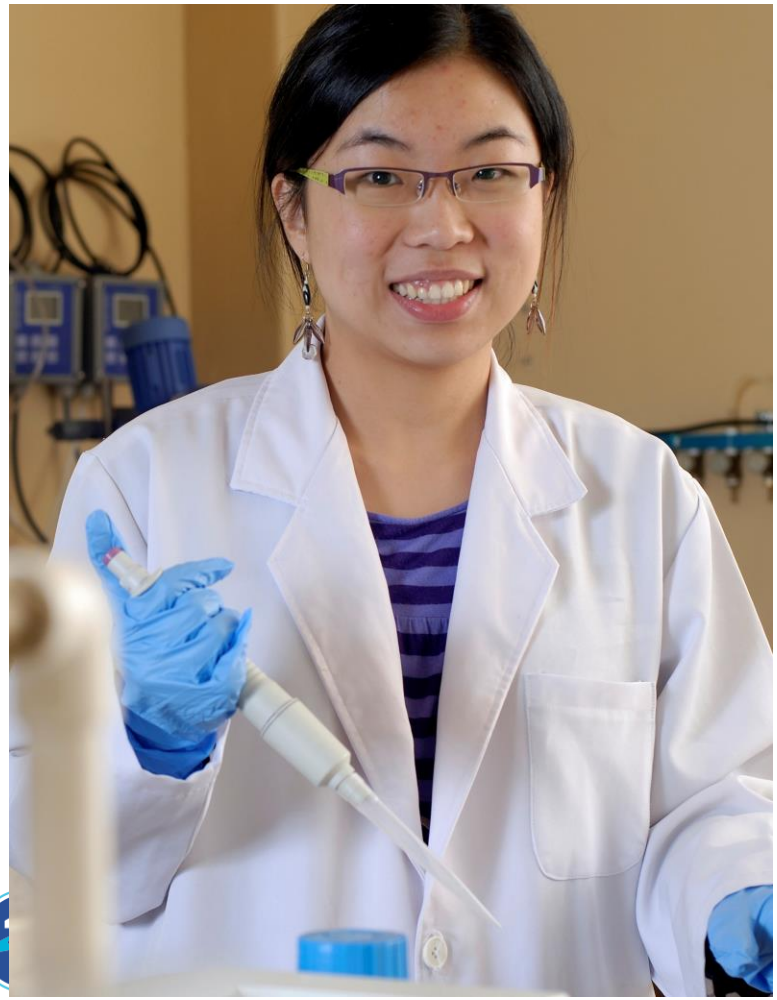
Energy savings through water efficiency

- Steam Efficiency program
- Shower head exchange program
- Pre-rinse spray valve exchange
- Hot and cold water meters
- Process specific co-funding
- Clean in place program

Current CWW Initiatives



- Waste to energy research and feasibility assessment
- Pump station efficiency benchmarking
- Pumping optimisation software (MABAL)
- Blower efficiency upgrade
- Solar panel trial
- RO Energy recovery devices

Solar panel trial

- 6 KW pilot solar array installed at the ATP in 2013
- Performance logged over 12 months
- A payback period of 10 years calculated using the recorded data.
- Payback period differs from residential setups due bulk electricity agreements
- Further expansion of renewable energy generation at the site to be assessed in the future.

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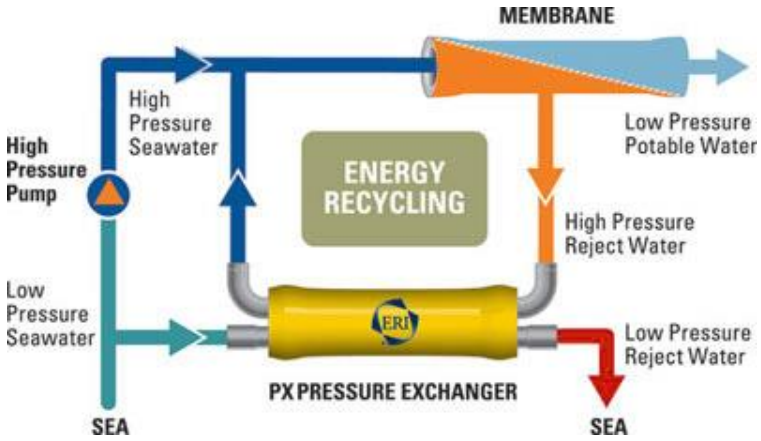
RO Energy recovery devices



- Altona Salt Reduction Plant uses an Energy Recovery Device (or ERI) to “harness waste energy” before it is lost
- The Reverse Osmosis System requires feedwater to be supplied at a high pressure to remove salt.
- This is a significant operational cost for salt reduction plants (particularly seawater desalination plants).
- ERIs are not commonly used on small scale brackish water RO facilities – Altona is unique due to salinity of feedwater.

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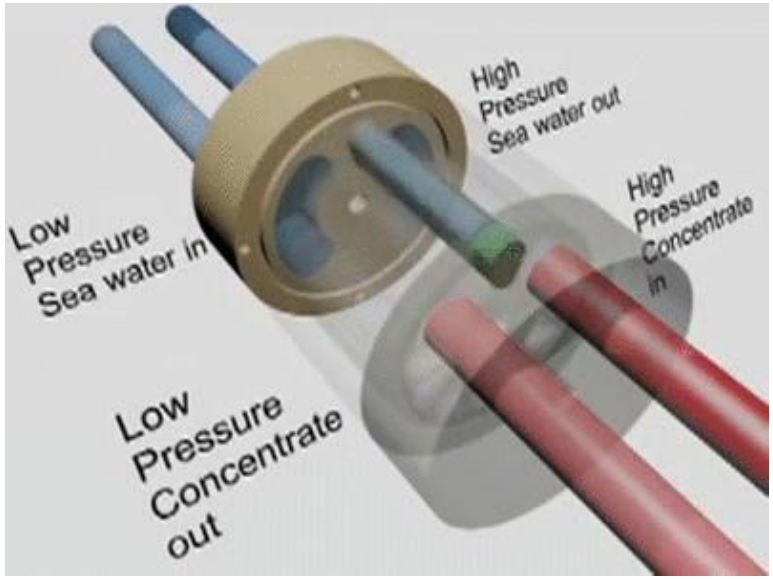
RO Energy recovery devices



- Energy savings are achieved by recovery of kinetic energy from waste stream using the Energy Recovery Inc. system
- The waste stream pressure is transferred to the feedwater through a rotating ceramic exchanger

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Future Challenges

- Using new data to manage our system in real time and efficiently
- Balancing diversified alternative water supplies with increased emissions
- Developing indicators to understand efficiency
- Rapidly changing climate change legislation

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References

- Challenges at Energy-Water-Carbon Intersections [online] *Prime Minister's Science, Engineering and Innovation Council*
- Energy use in the provision and consumption of urban water in Australia: an update [online] *CSIRO*
- Water-energy futures for Melbourne: the effect of water strategies, water use and urban form *CSIRO*
- WSAA Energy and Wastewater treatment plant energy efficiency benchmarking studies (on request at a cost)

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