INSTITUTE FOR SUSTAINABLE FUTURES

UNIVERSITY OF TECHNOLOGY SYDNEY

Sustainable water futures: integrated supply demand planning

THINK.
CHANGE.
DO

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Master Class – Global Trends in Water Efficiency

Thursday 27 June 2014

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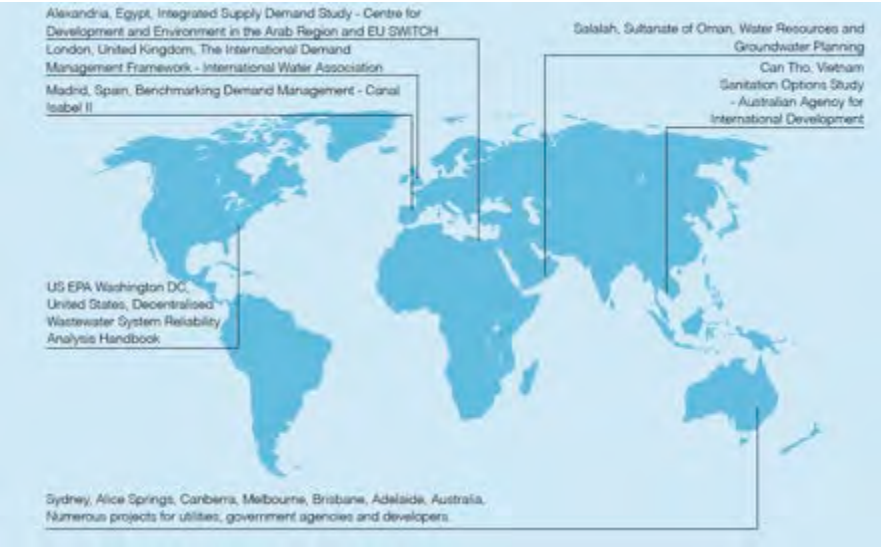
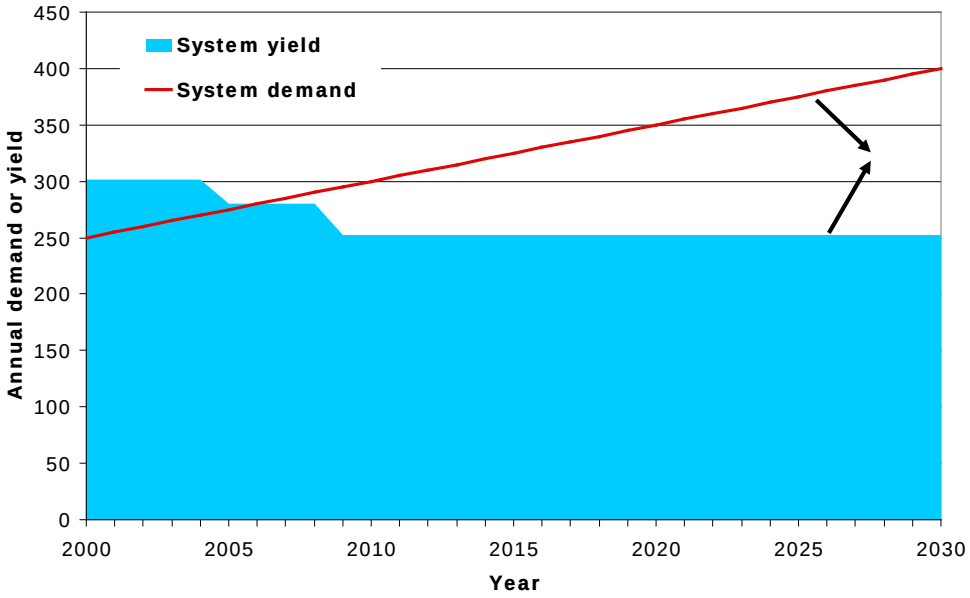
Introduction

Presentation overview

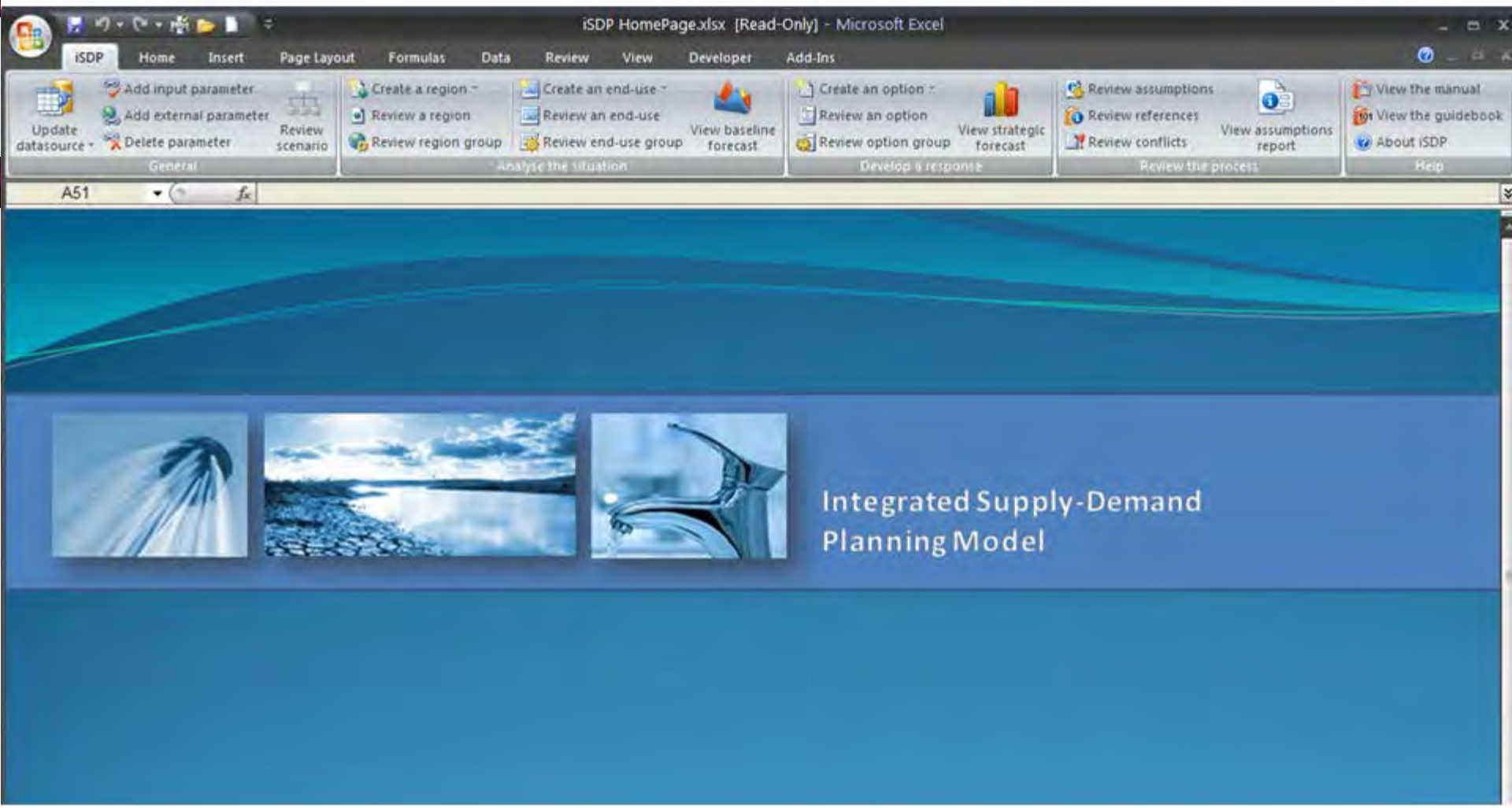
- > Integrated resource planning (supply demand planning)
- > Example: Sydney, Australia
- > Examples: Alexandria, Egypt
- > Example: Salalah, Oman
- > The future of water infrastructure



Urban water supply-demand planning



- Detailed demand forecast
- Long-term supply estimate
- Consideration of the full range of supply & demand options
  - Large-scale source of supply
  - Demand management & decentralised supply (stormwater, reuse)
- Assessment of supply & demand options on an equal basis
- Develop a plan to balance supply & demand taking account of costs, uncertainties, sustainability impacts & other policy goals


iSDP HomePage.xlsx [Read-Only] - Microsoft Excel
iSDP
Home
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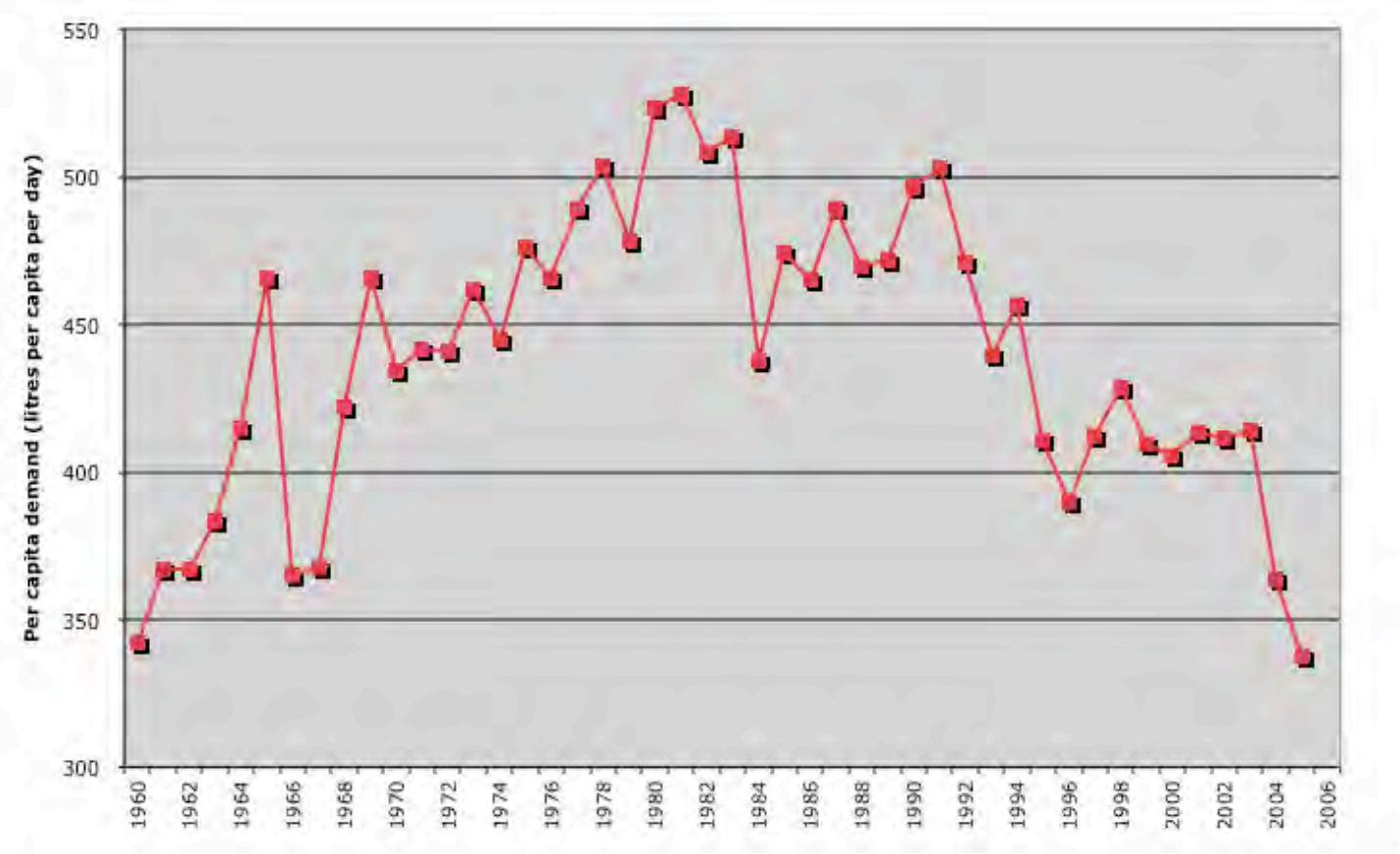
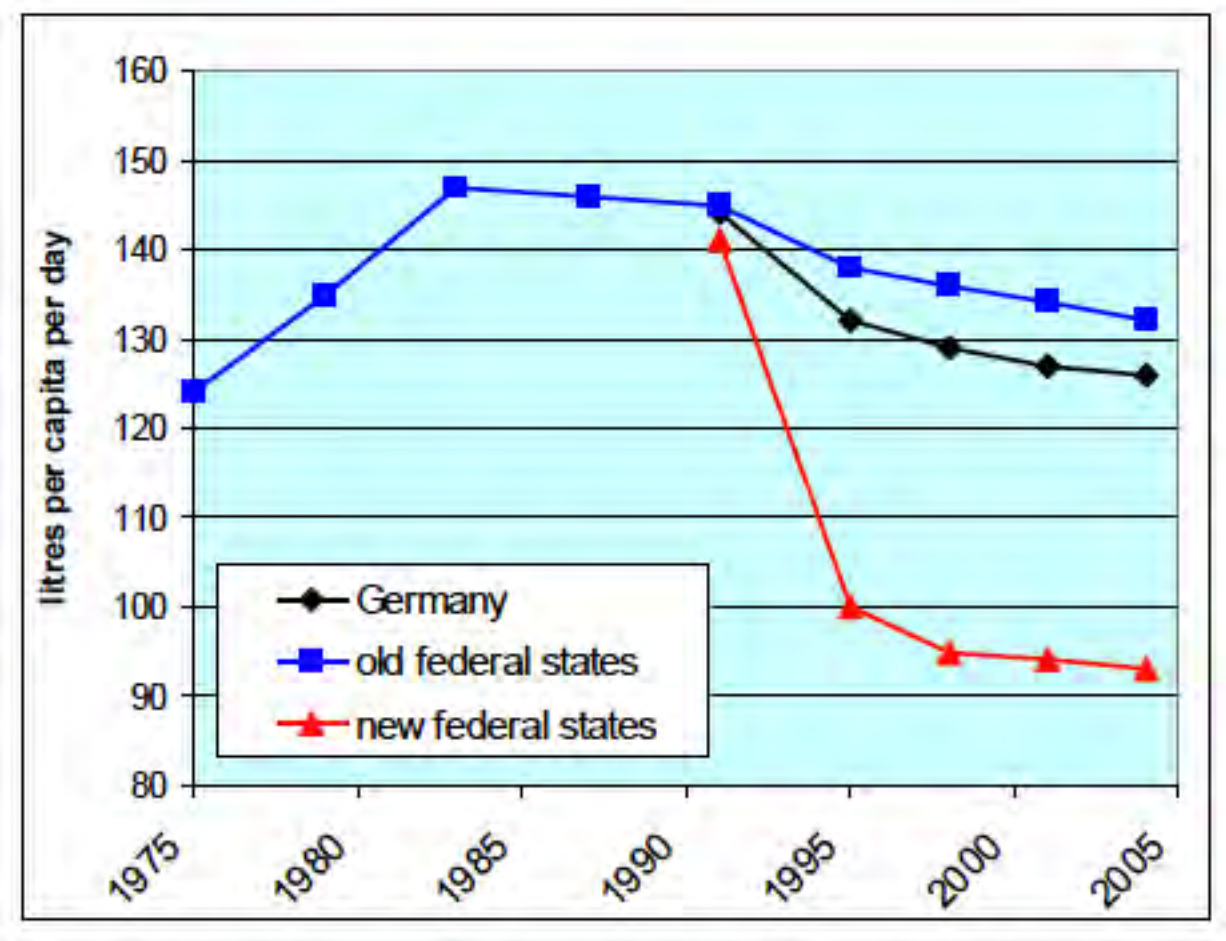
Page Layout
Formulas
Data
Review
View
Developer
Add-Ins
Update datasource
Add input parameter
Add external parameter
Delete parameter
Review scenario
General
Create a region
Review a region
Review region group
Create an end-use
Review an end-use
Review end-use group
View baseline forecast
Analyse the situation
Create an option
Review an option
Review option group
View strategic forecast
Develop a response
Review assumptions
Review references
Review conflicts
View assumptions report
Review the process
View the manual
View the guidebook
About iSDP
Help
A51
Integrated Supply-Demand
Planning Model

Sydney water demand

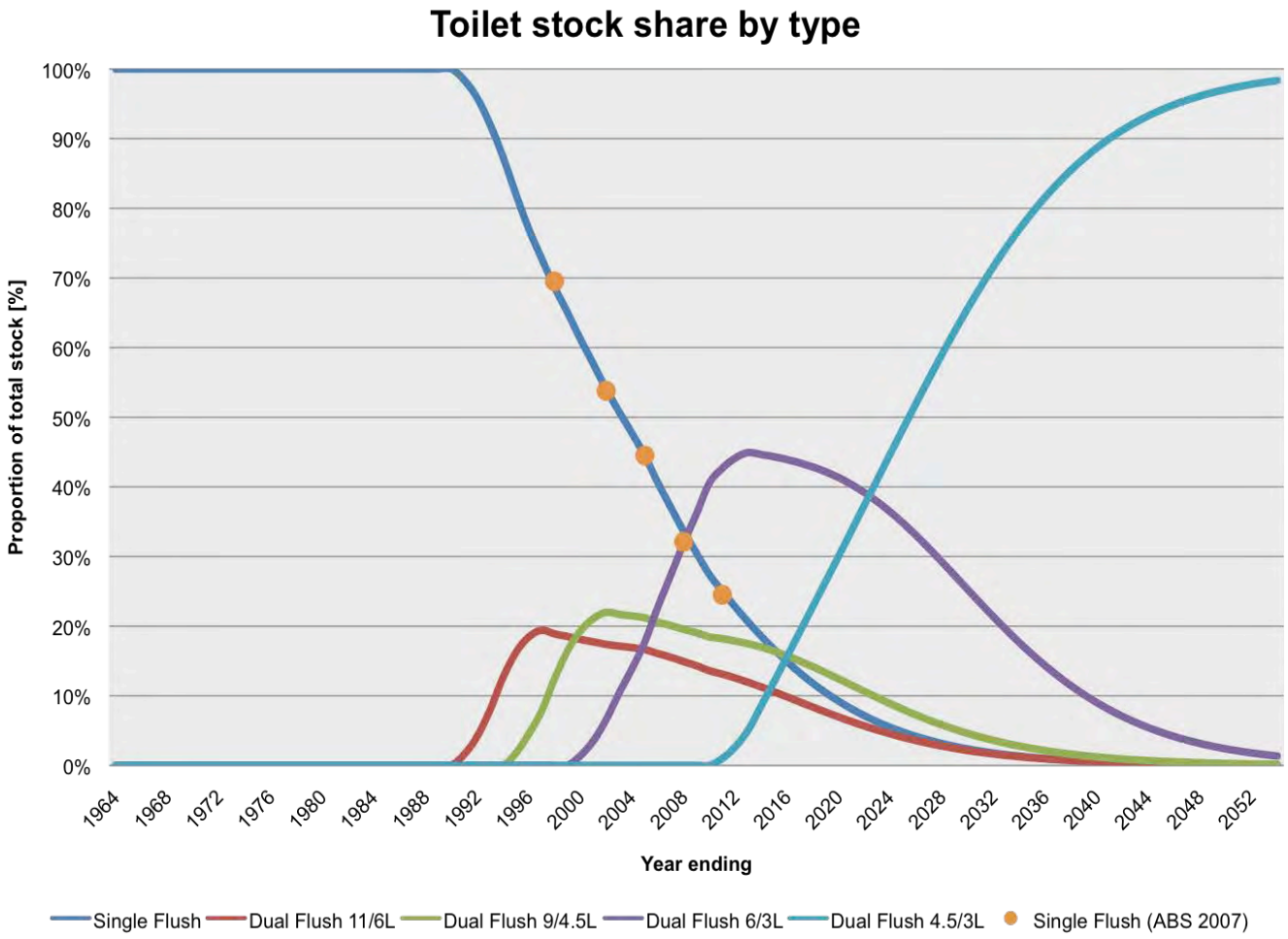


Germany water demand

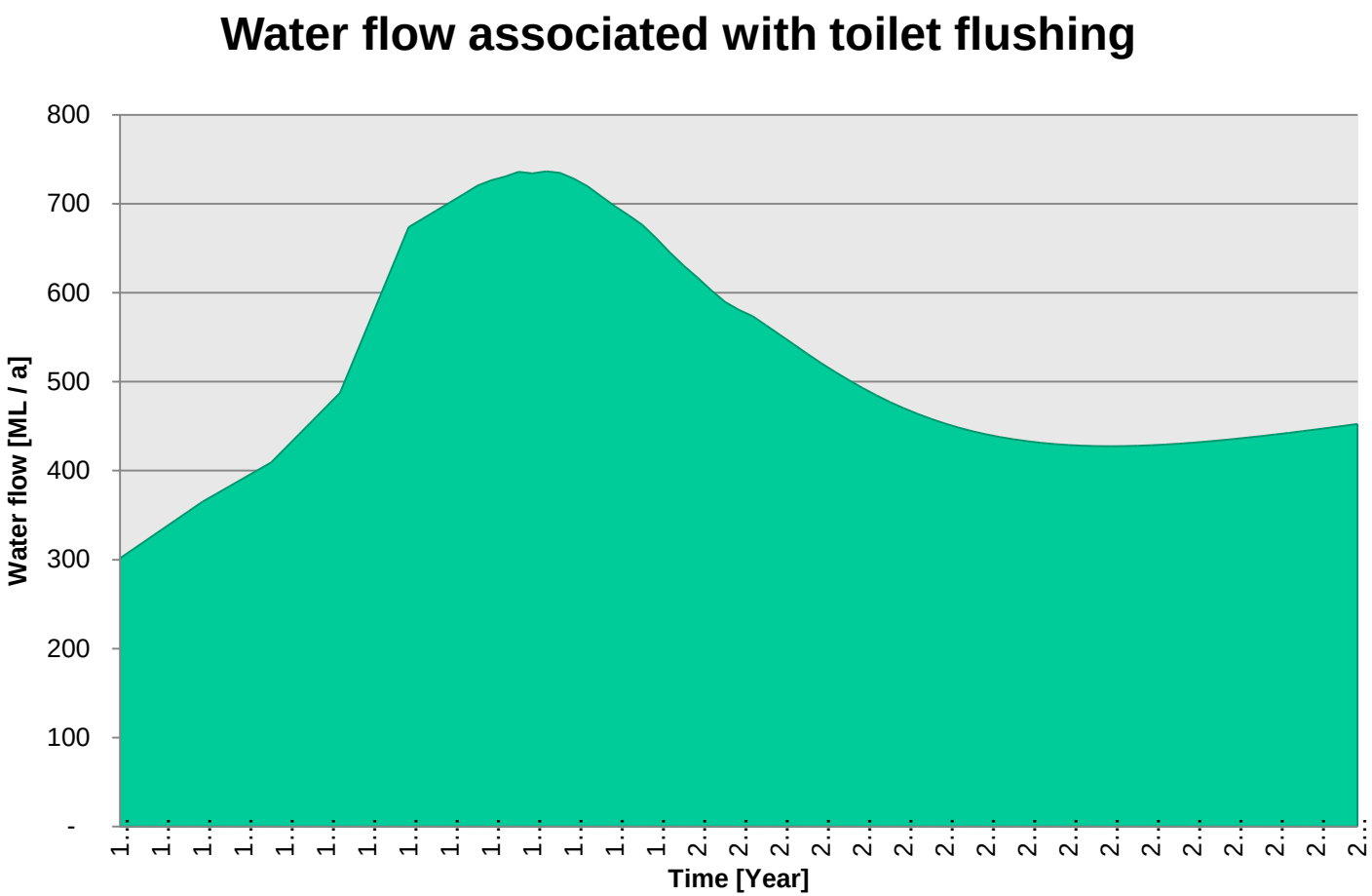


Schleich and Hillenbrand, Fraunhofer Institute, 2007

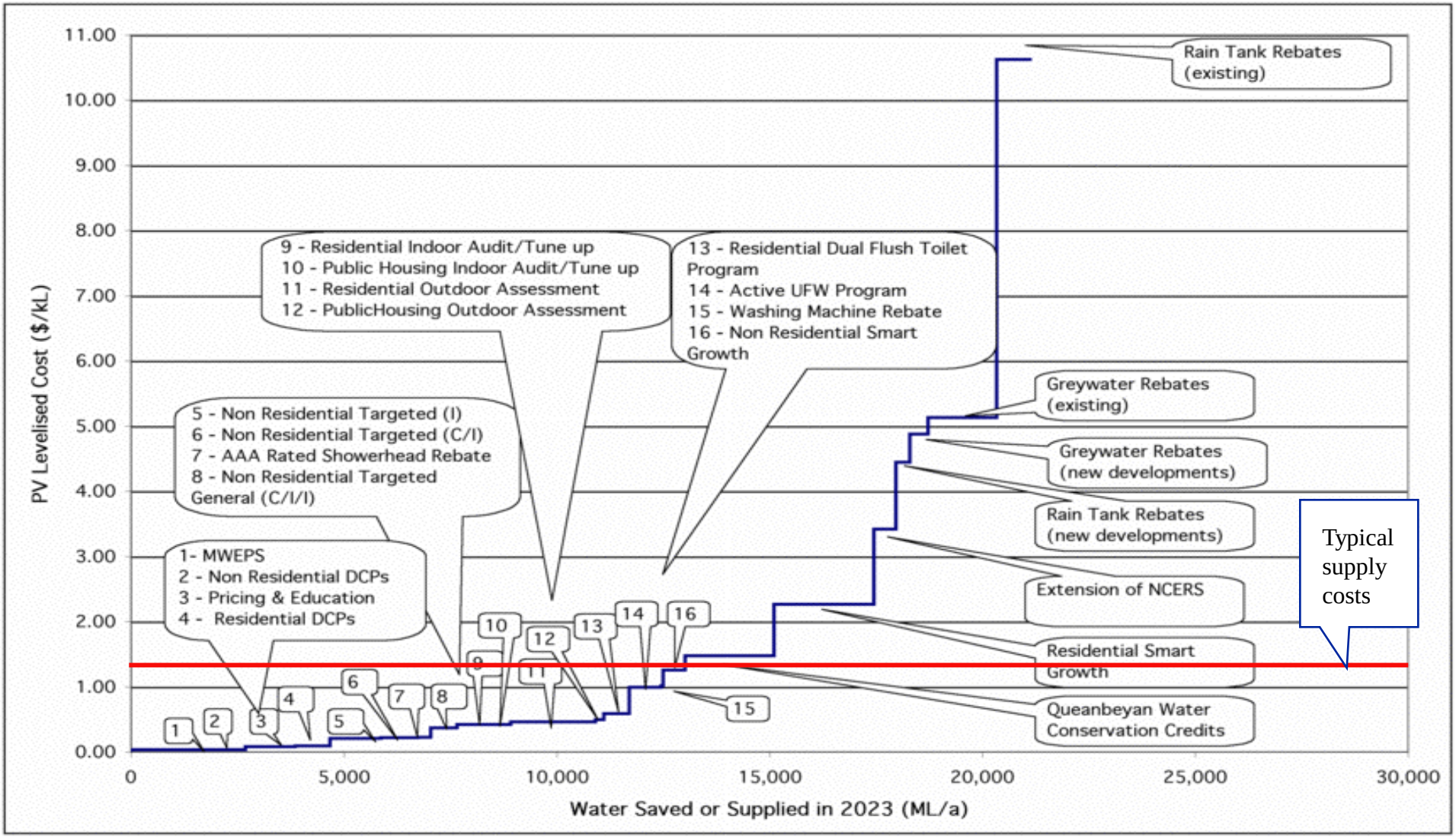
Stock models - *toilets*



Stock models - *toilets*



Example supply curve - relative unit cost of options

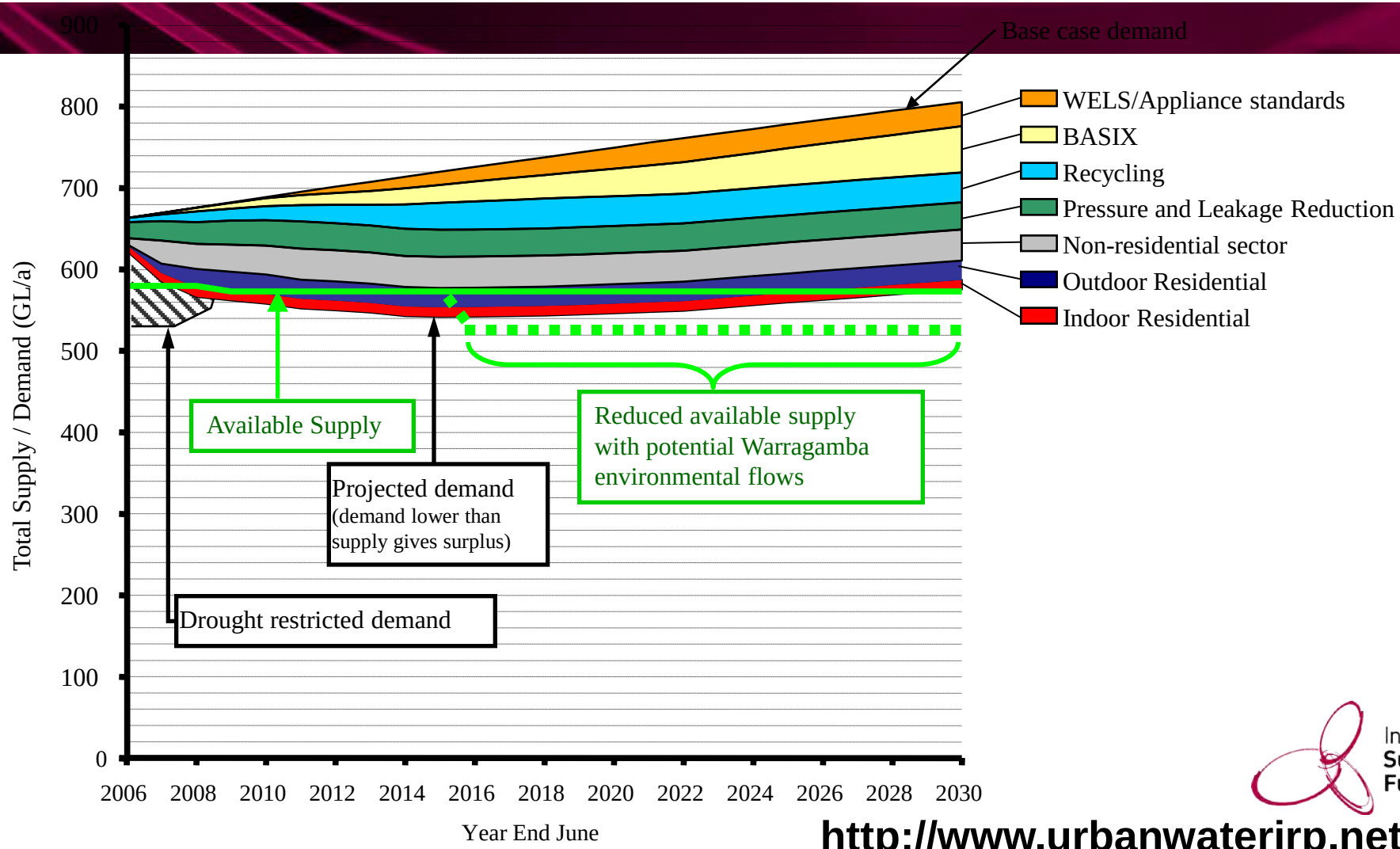


Typical costs - Perth

Source or option	Yield (GL/year)	Capital cost ($m)	Operating cost ($m/a)	Unit cost (¢/kL)
Typical water efficiency options	30-50	80-100	2-5	15-40
Eglinton groundwater	17	47	3.2	37
Wellington Dam (no treatment)	15	25	3.8	36
Wellington Dam (with treatment)	15	55	6.2	66
Southern Perth Basin Stage 1	41	325	7.7	71
Gingin groundwater option	60	300	24	73
Kwinana Waterlink Reuse	5	20	2.5	100
Desalination	30	205	20	112

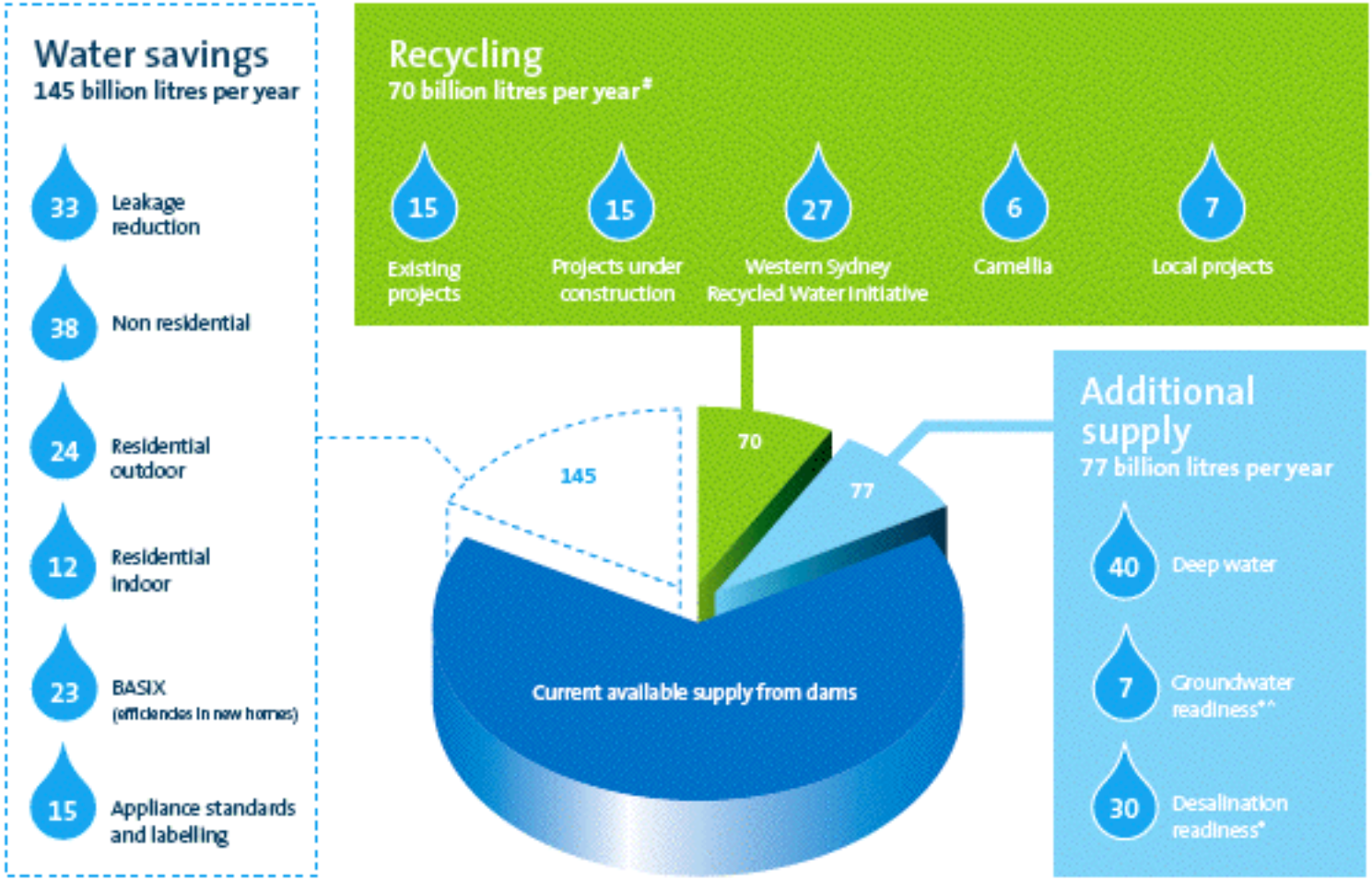
Case study: Sydney

Supply demand balance - Sydney

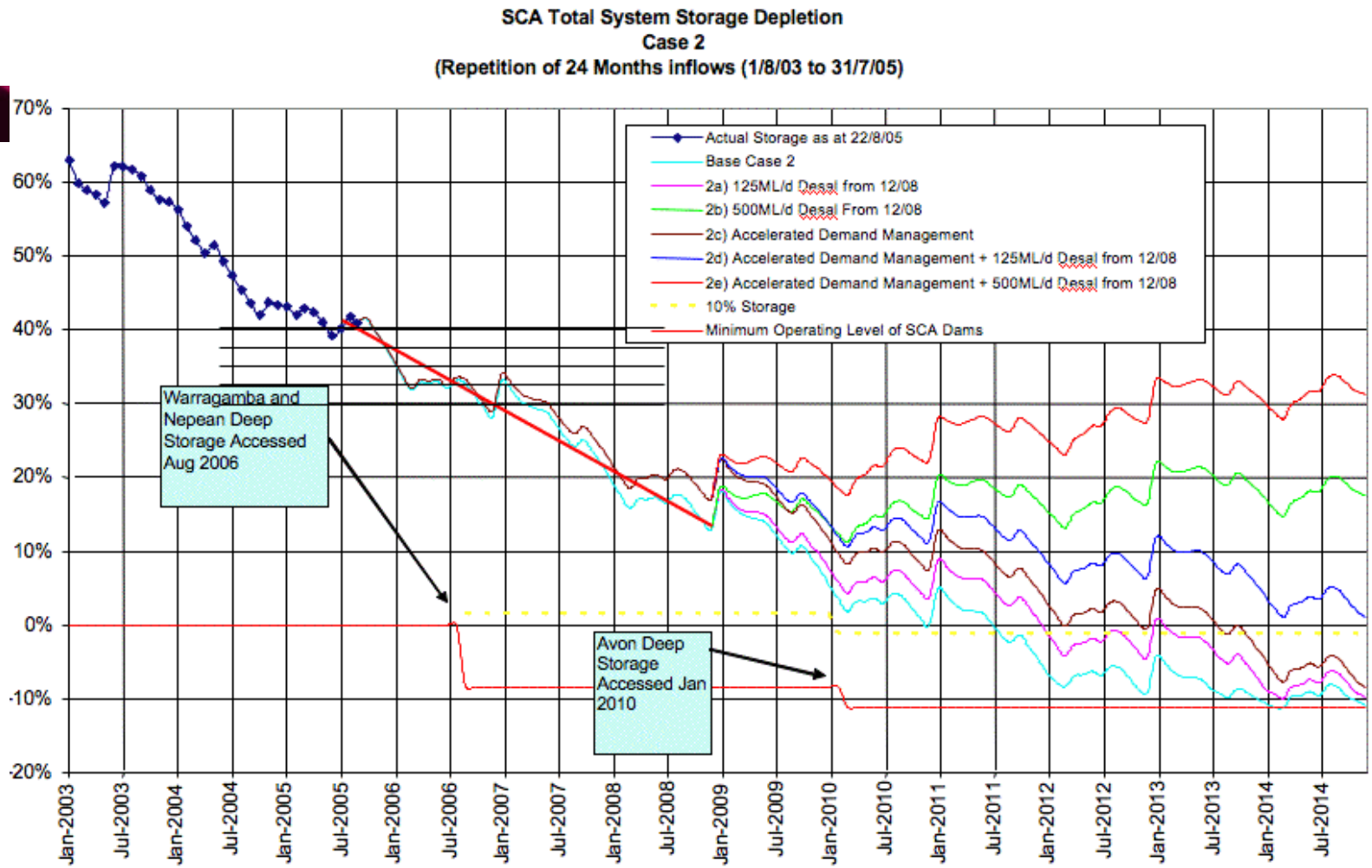


http://www.urbanwaterirp.net.au/

Relative contribution to supply and demand



Real options analysis



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Case study: Alexandria

Integrated supply-demand planning for Alexandria, Egypt, 2011

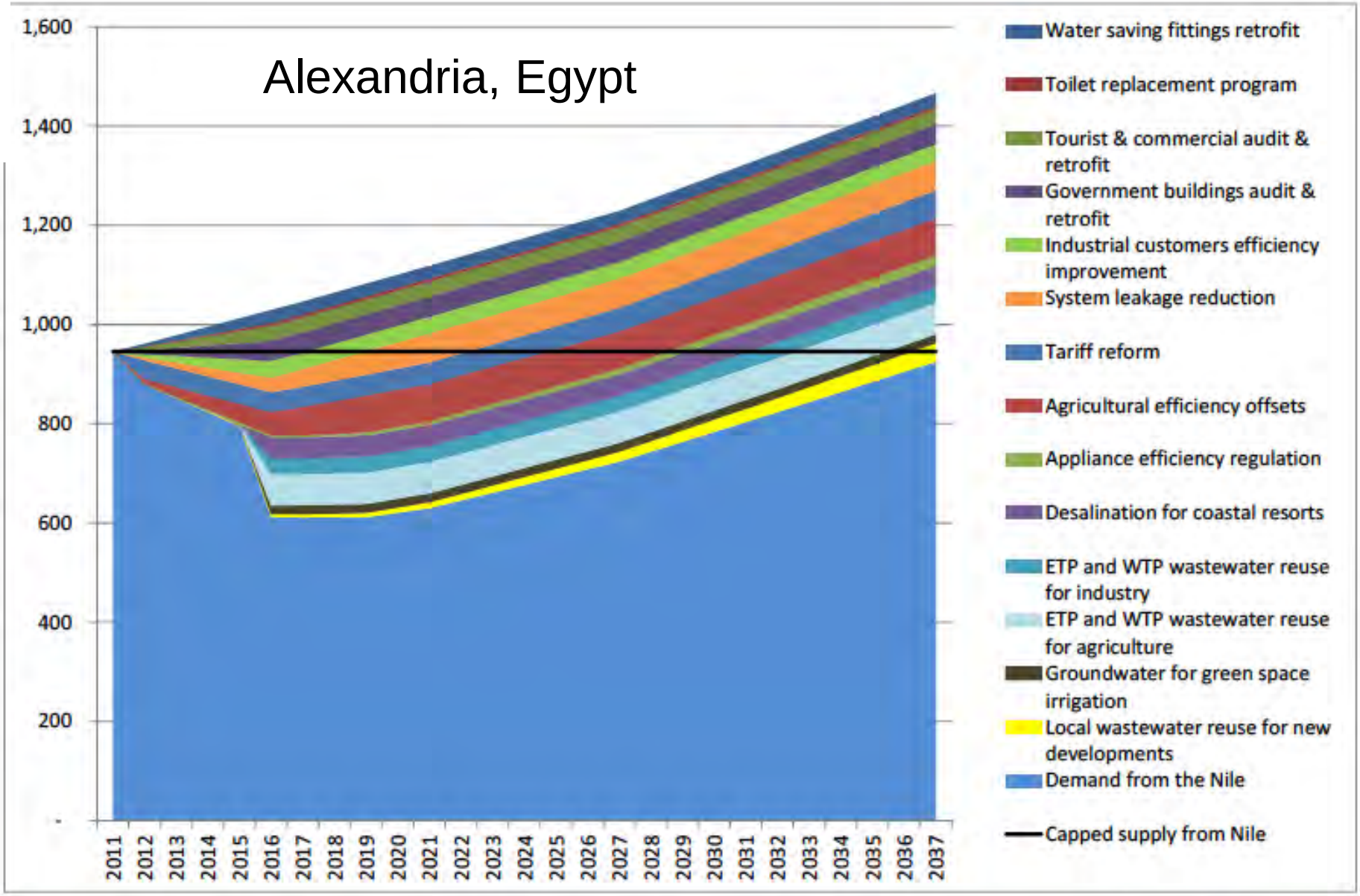

Figure 8 Projected water demand in Alexandria to 2037 with water savings from a portfolio of demand management and supply options – Scenario 1

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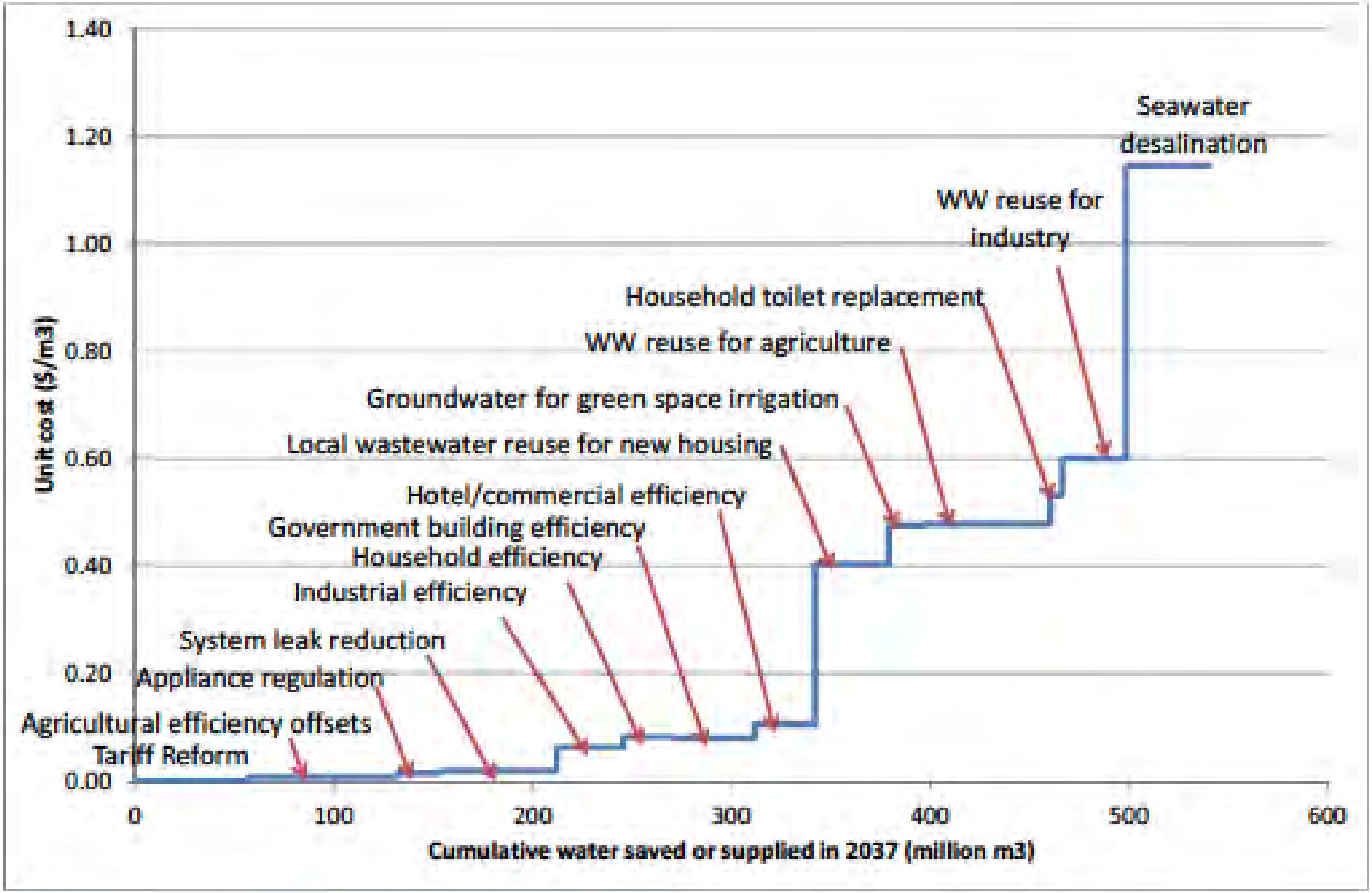

Figure 10 Supply curve for options in scenario 1

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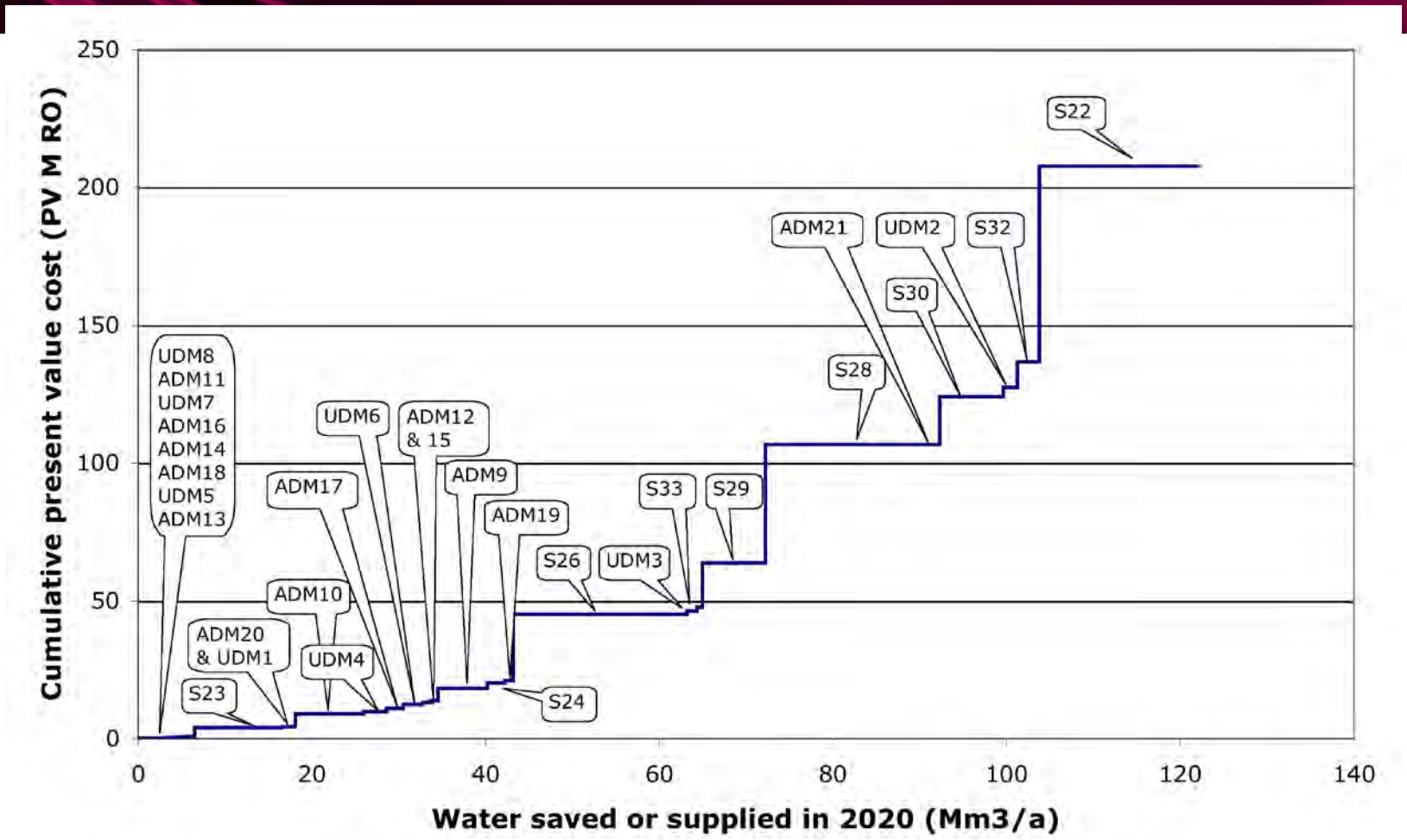
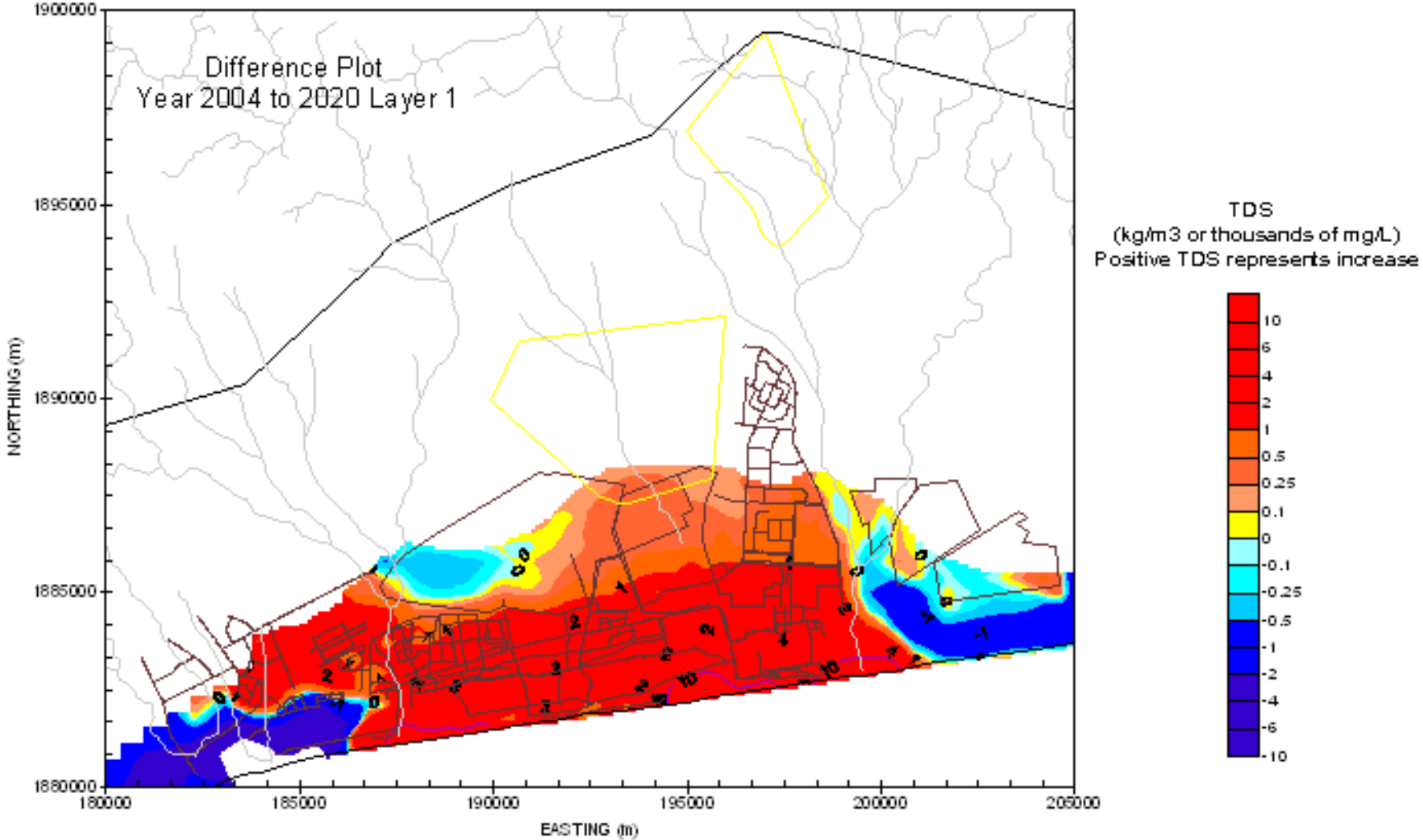
Case study: Salalah

Cumulative savings/ supply and cumulative cost



Groundwater modelling results



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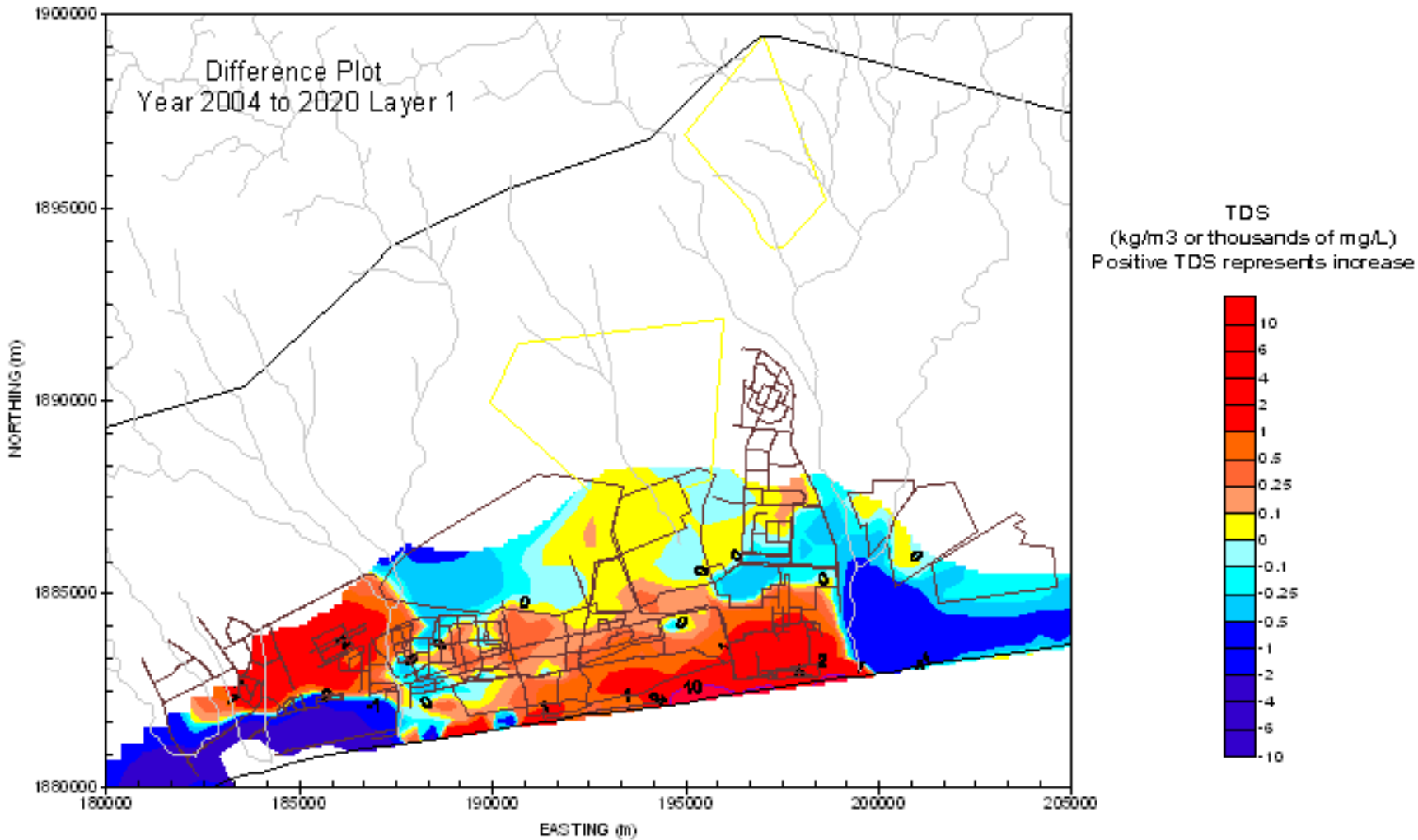

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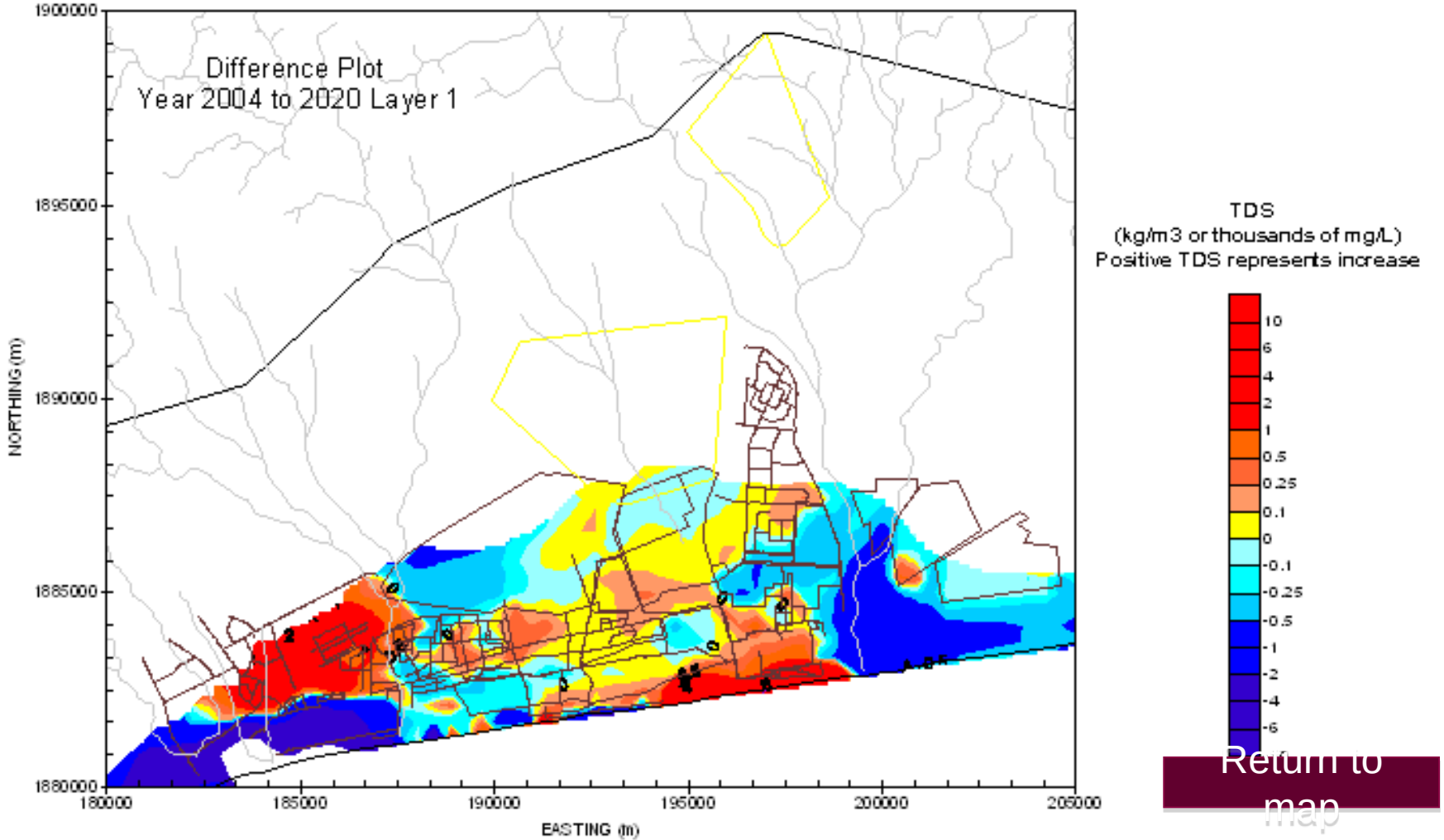
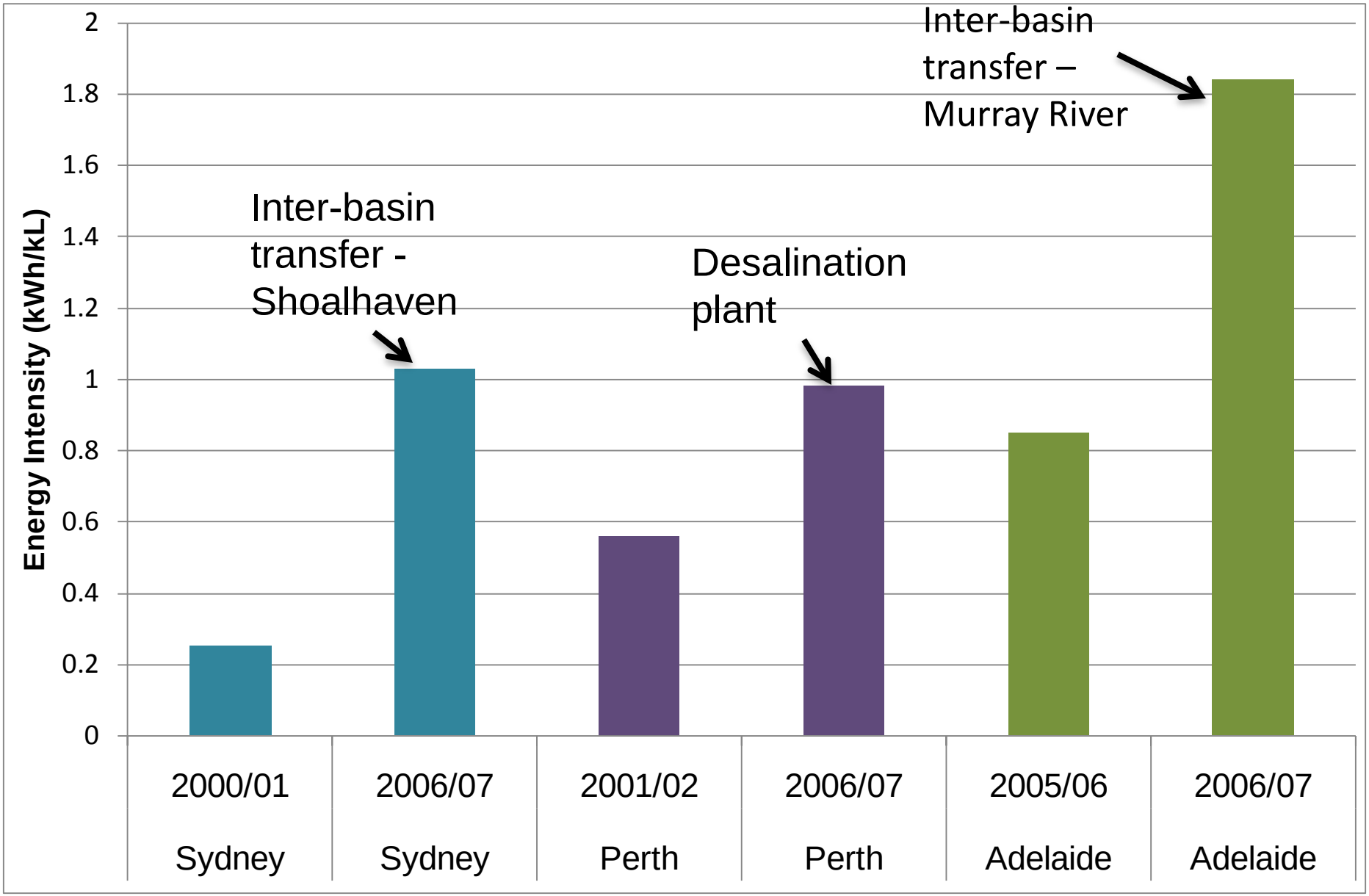


Return to map

Impact of large scale augmentation



Four generations of water infrastructure

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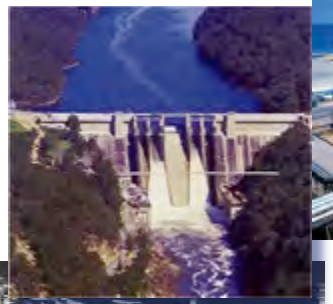
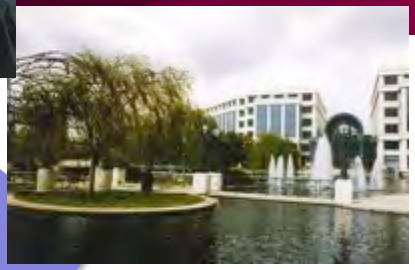
1. Unmanaged



2. Centralised

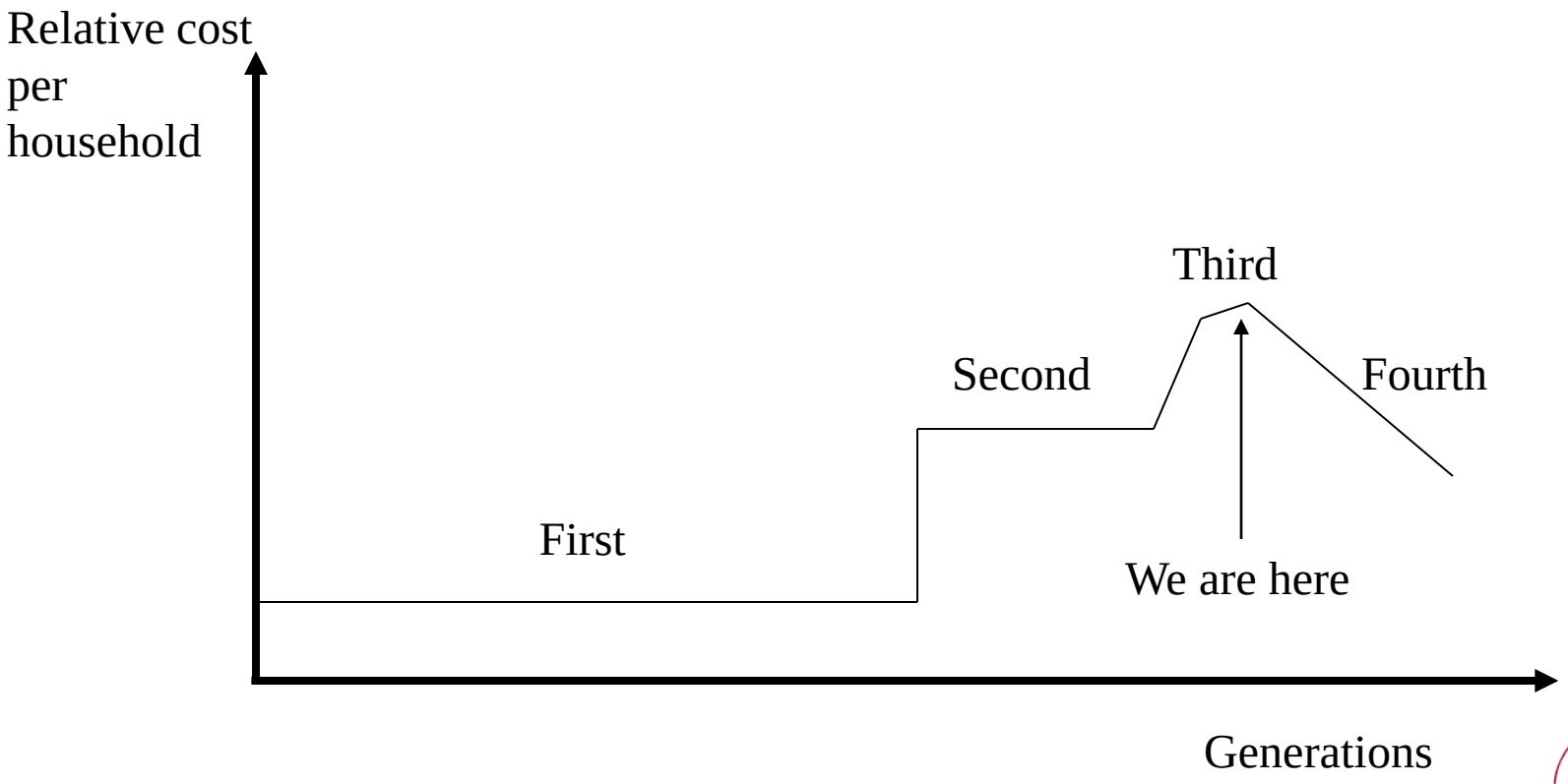
3. Transitional (neo-centralised)



4. Emerging …

(Efficient, decentralised), integrated, fit-for-purpose)

The economics of generational change




UTS

ONE CENTRAL PARK

623 apartments
5 level retail/lifestyle centre
Cantilever and heliostat

Ateliers Jean Nouvel/PTW Architects
Lighting by Yann Kersale
Living walls by Patrick Blanc

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Nutrients - phosphorus

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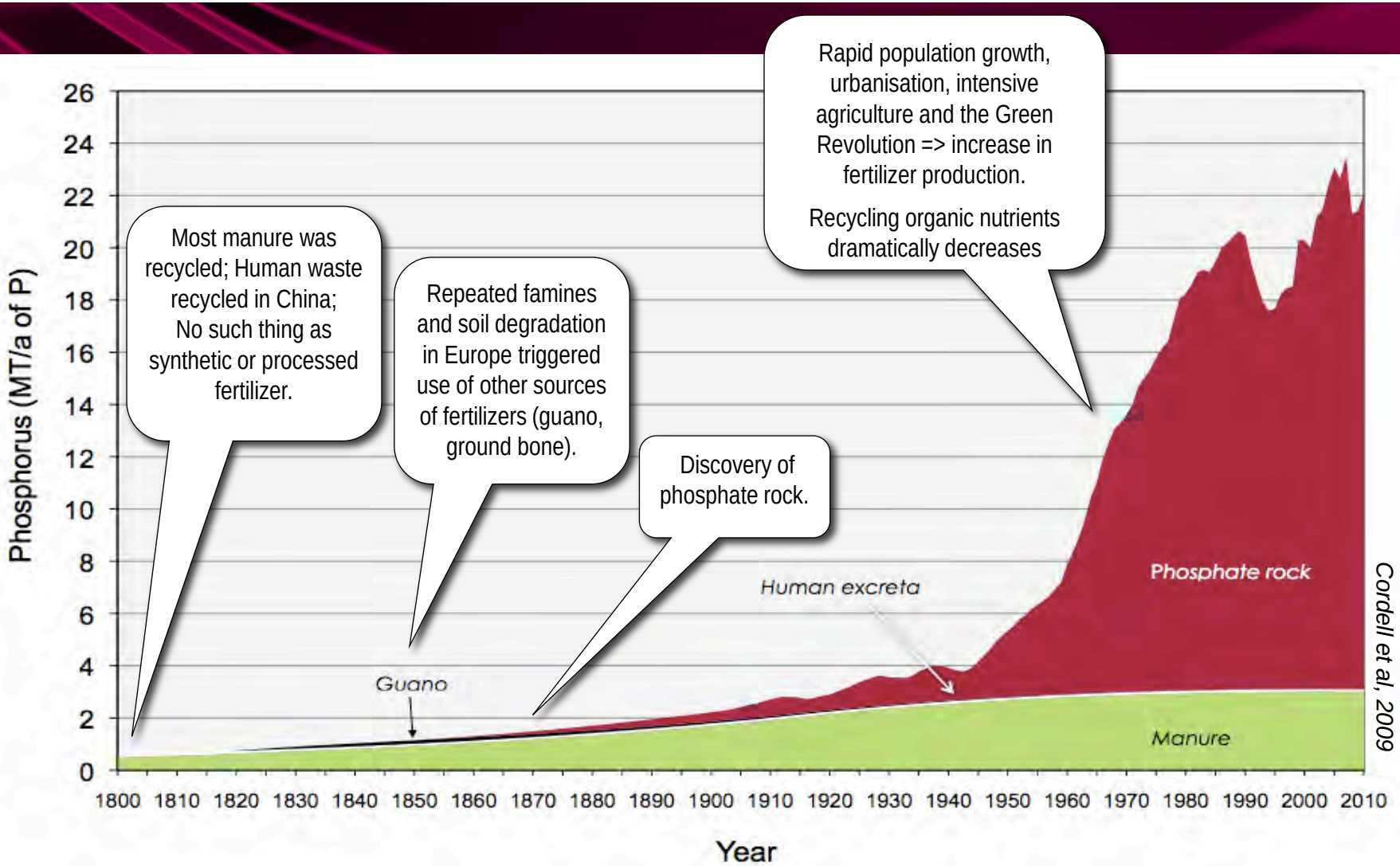
HISTORICAL GLOBAL SOURCES OF P FERTILIZERS



Cordell et al, 2009

Looking to the future…

- Widespread application of Integrated Resource Planning
- ‘Fourth Generation’ distributed water infrastructure
- Best practice drought response strategies – ‘real options’
- Recognition of water-energy nexus
- Smart metering, with Smart Feedback
- Nutrient recovery
- Community engagement in decision-making

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www.isf.uts.edu.au

www.urbanwaterirp.net.au
www.phosphorusfutures.net

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