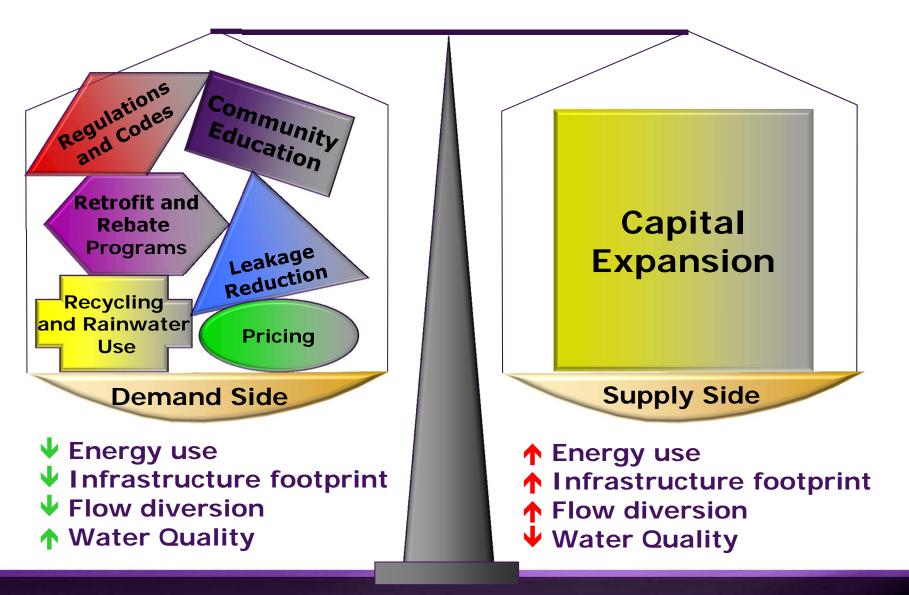


Integrated Water Resources Planning Current Approaches

# **Integrated Water Resources Planning**





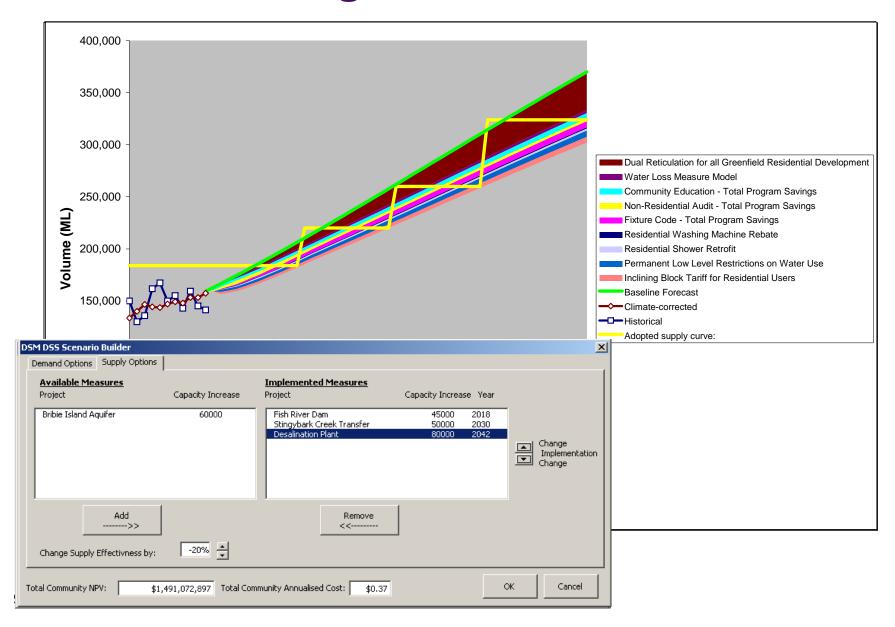
# Integrated Planning Approaches

A number of terms are commonly used to describe integrated planning:

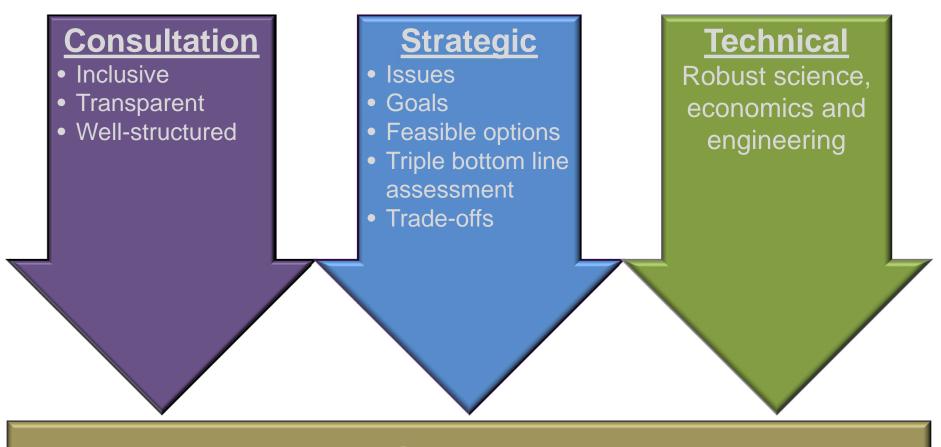
- Least Cost Planning \$/kL ranking of supply and demand options - simplistic and can bias results
- Integrated Water Resources Planning total system  $\rightarrow$ analysis of supply and demand options
- Integrated Water Cycle Management examination of TBL impacts of different water cycle management options in a whole of catchment context
- Total Water Management (term applied to almost any of the above)



# **Scenario Planning**



# **Key Strands in Integrated Planning**







# **Typical IWRP Framework**

#### Stakeholder Engagement

#### Goals, Issues and Options Workshop

- Identification of environmental management issues
- Development of Long-List of potential management options

#### **Scenario Building Workshop**

 Stakeholders given opportunity to build different scenarios

#### Scenario Selection Workshop Stakeholders assess scenarios

Stakeholders assess scenarios against assessment criteria

#### **Master Planning Process**

#### **Site/Catchment Issues/Context**

 Ecology, Water Cycle, Soils, Heritage, Urban design

#### **Long List of Possible Management Options**

Addressing each water cycle issue outlined above

#### **Preliminary Ranking/Short Listing of Options**

#### Scenario Building/Bundling of Options

Scenarios including different supply and demand options

#### Impact of Scenarios on Outcomes & Infrastructure

#### **Triple Bottom Line Assessment**

#### **Environmental Assessment**

Impact on water demands, site water balance, receiving water quality, soil, ecology and heritage

#### Social Assessment

Impact on human health, life-styles and costs to households

#### **Economic Assessment**

Development costs, costs to customer, ongoing costs to government

#### **Selection of Preferred Scenario**

- Examination of trade-offs
- Revision of goals

#### **Technical Assessments**

#### **Environmental**

- Soils
- Surface water
- Groundwater

#### **Water Forecasts**

- Demand:
- Wastewater
- Stormwater

#### Environmental Management Infrastructure

Landscaping, engineering, urban design

#### Water Cycle Analysis

Impact of scenarios on infrastructure:

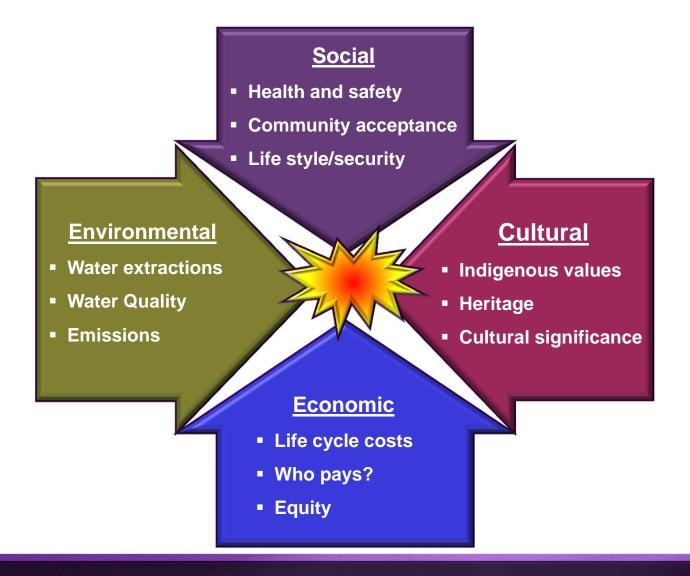
- Potable supply (dams/desalination)
- Wastewater (incl. recycling)
- Stormwater

#### **Economic/Financial Modelling**

Capital and recurrent costs of proposed management scenarios to all parties:

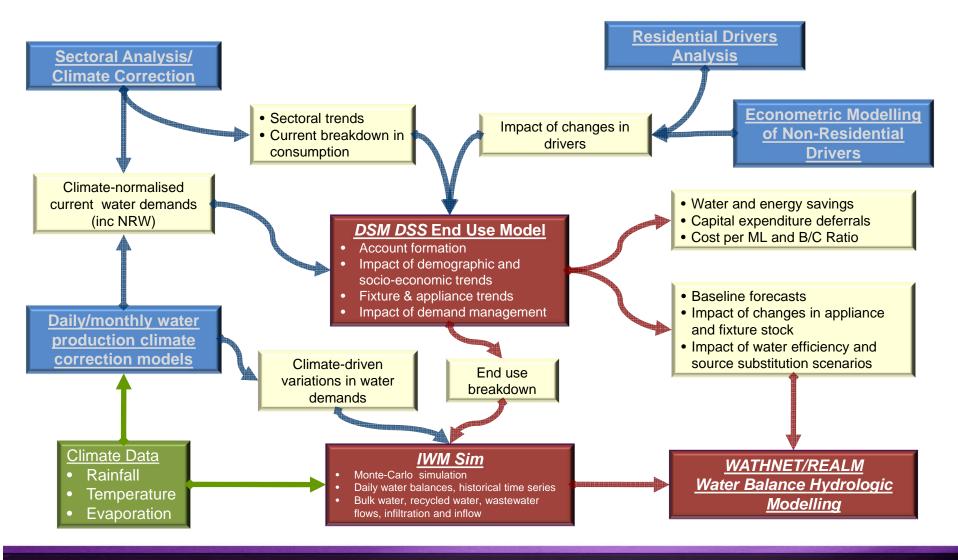
- Developer;
- Government:
- Landholder

### **The Focal Point**



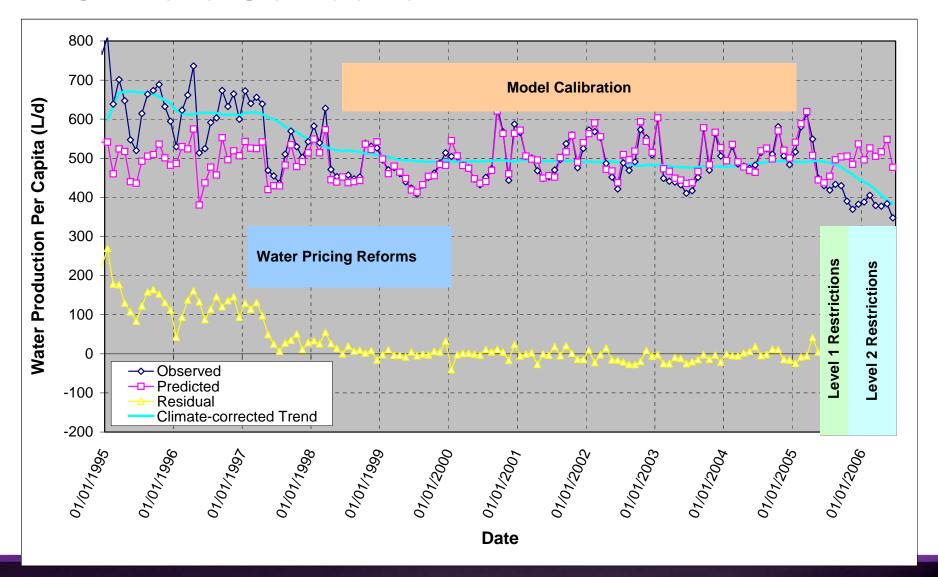


### **Modelling Framework**



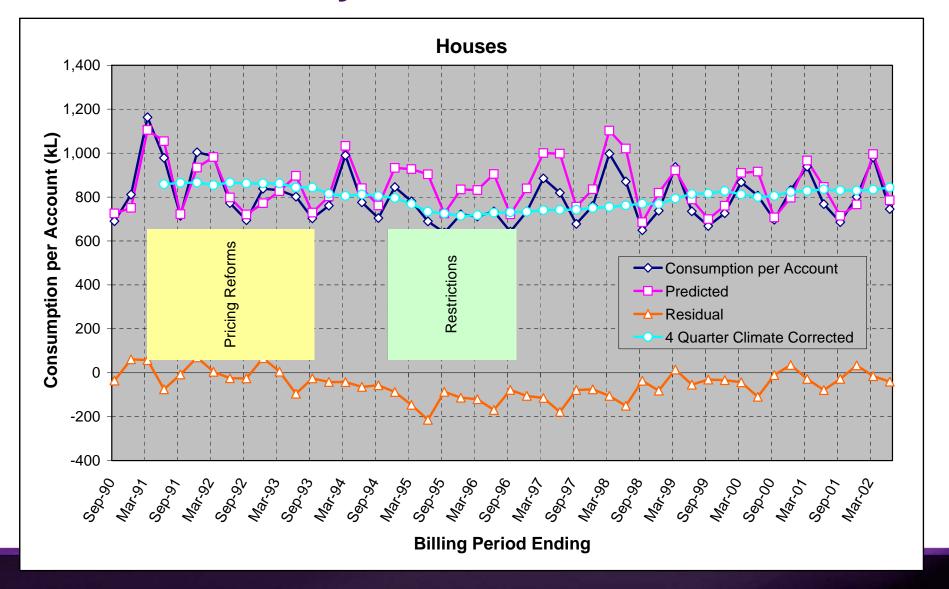


### **Climate Correction**



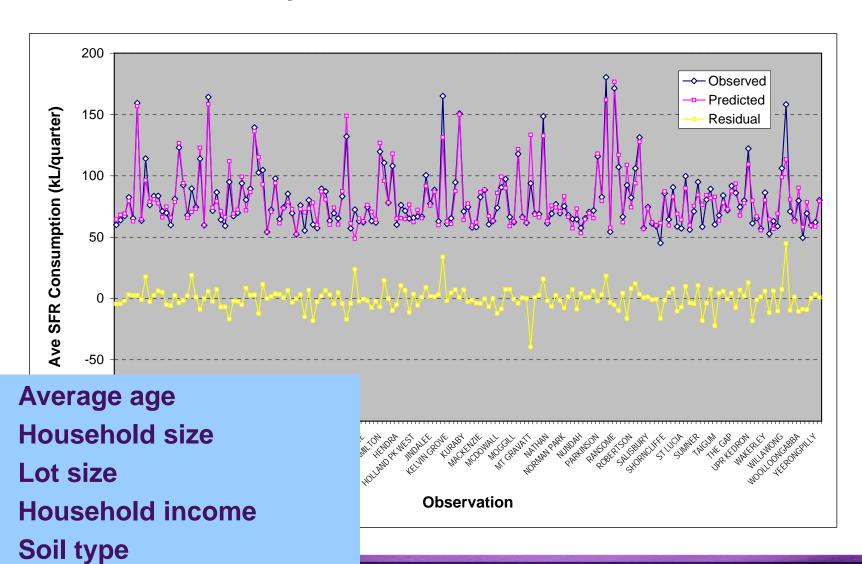


### **Sectoral Analysis**



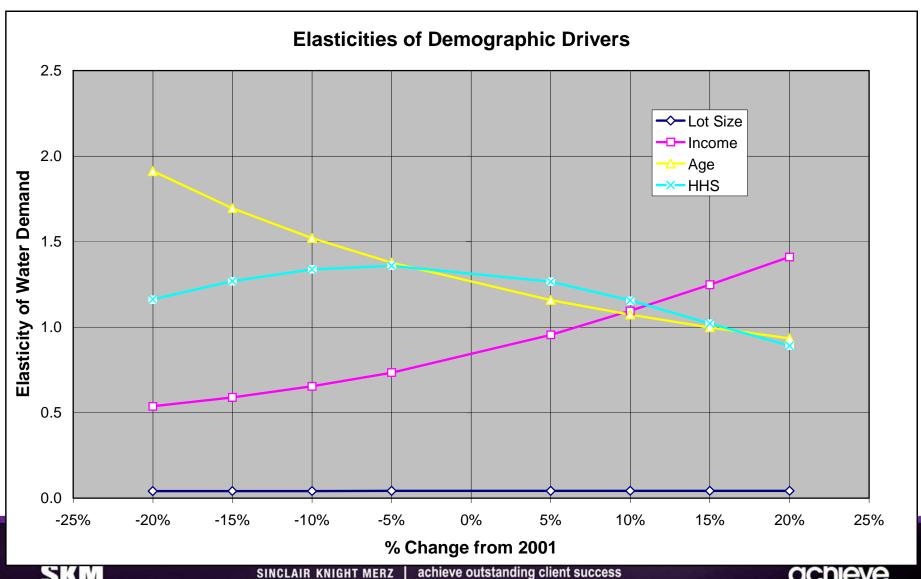


### **Econometric Analysis – Demand Drivers**

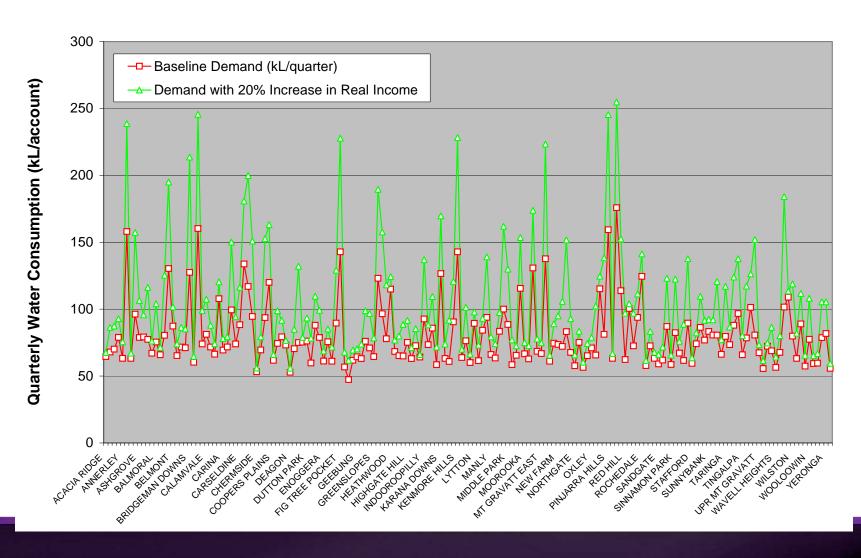




# **Better Understanding Drivers**



### **Scenarios – Upward Demand Pressure**





### A New Environmental Awareness?





### **Essential Luxury?**

#### Luxurious Hand Held and Dual Shower Heads with or without Tub & Shower Faucet Systems

These Shower Heads elevate the act of showering to a luxurious experience that can be customized to accommodate individual preferences. With innovative products that are inspired by the power of water, including single-function and multifunction shower heads with large diameters, as well as hand held showers that offer unique water delivery, it's easy to create an wonderful showering environment. You choose the package. We'll wrap you in water.



Captain's Quarters Shower



Nautilus II Shower Head



Polaris II Shower Systems



Brass Shower Heads



Dolphin Shower Head



Sea Horse Shower System



Sea Horse II Shower Systems



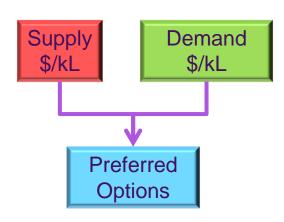


Polaris Shower Heads



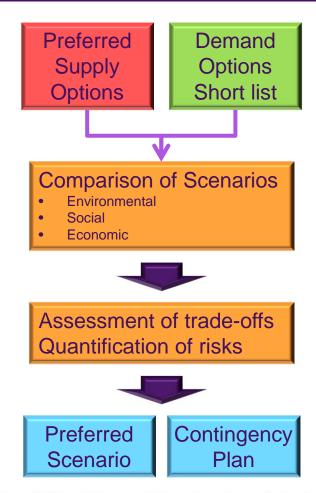
### Lack of Integration/Simplistic Economics

#### **Least Cost Planning**



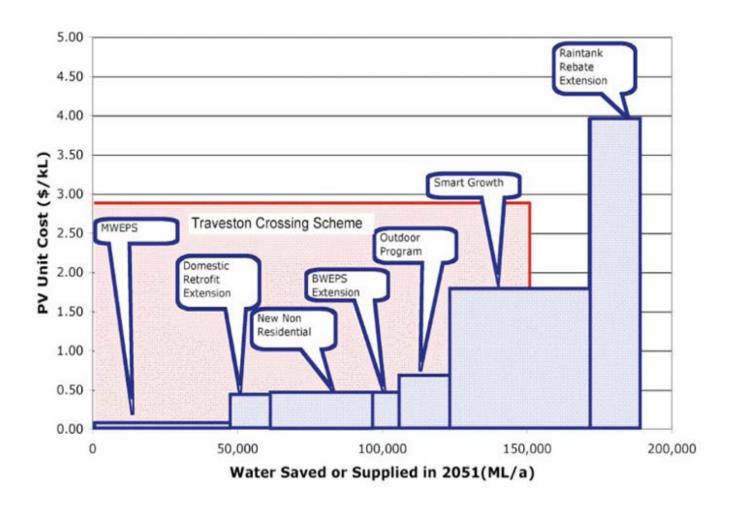
- → Supply and demand options compared on the basis of \$/kL
- → No scenario planning or examination of trade-offs

#### **Integrated Water Resources Planning**



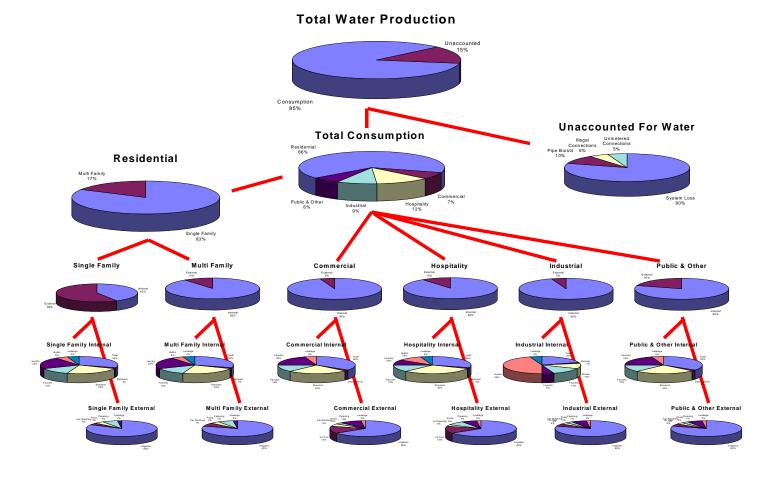


# What IWRP is Not





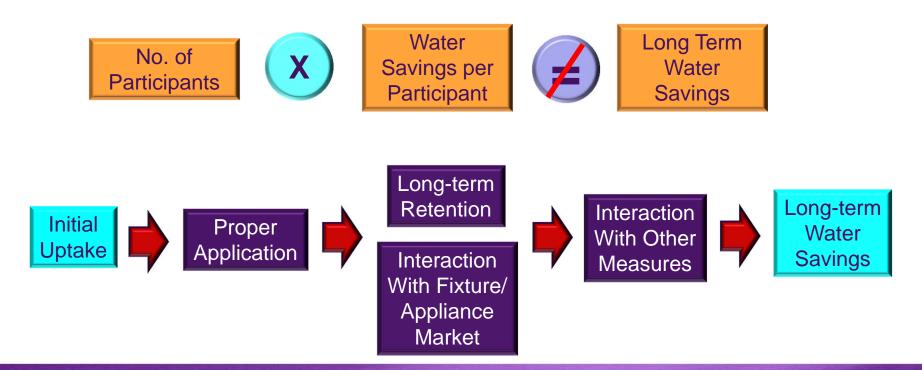
# End Use Modelling – Forecasting on the Basis of Each Use of Water





# **Limited End Use Modelling**

- → Not seen as important or worthy or long-term resourcing
- → Most end use models reflect that sentiment
- → Should have equal status to design of supply-side options



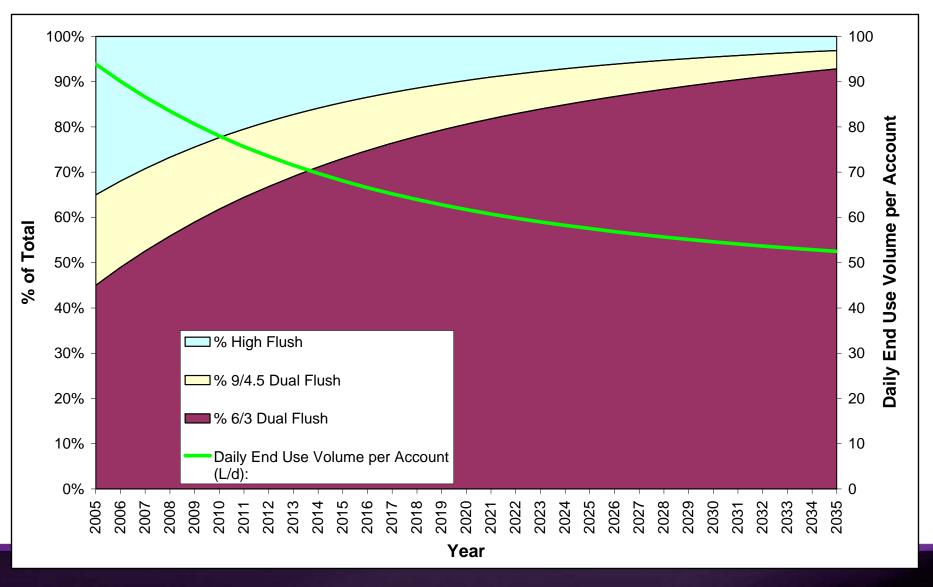


### **DSM DSS Model Structure**

#### **Baseline Forecasts Demand Impact Modules** • Demographic Forecasts Water Pricing End Use Breakdown Fixture Modelling/Retrofit Program Hot Water Use General Conservation/Recycling Fixture/appliance trends Peak Demand Profiles Water Loss Reduction **Savings Module** I/I Reduction Operational Costs **Avoided Environmental Costs** Market Values **Measure Evaluation Module Energy Use** Stand-alone measure summary Greenhouse Emissions Capital Works Schedule **Program Evaluation Module Measure Interaction Bundled** measures evaluation **Output Summaries**

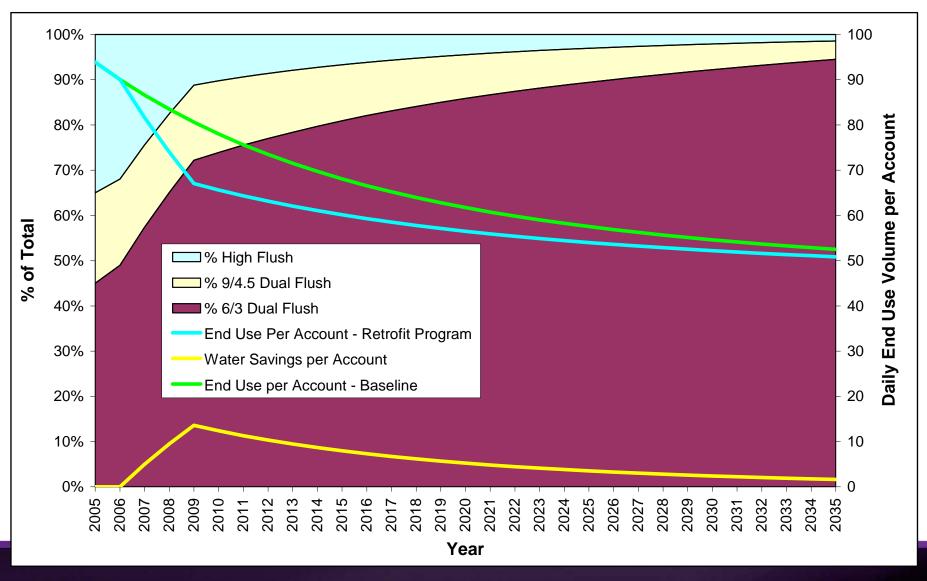


### Savings Clawback - Baseline Case





# **Savings Clawback - Retrofit**

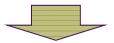




### Silk Purse?



2.95 Litres, 86 kW @ 4,000 rpm



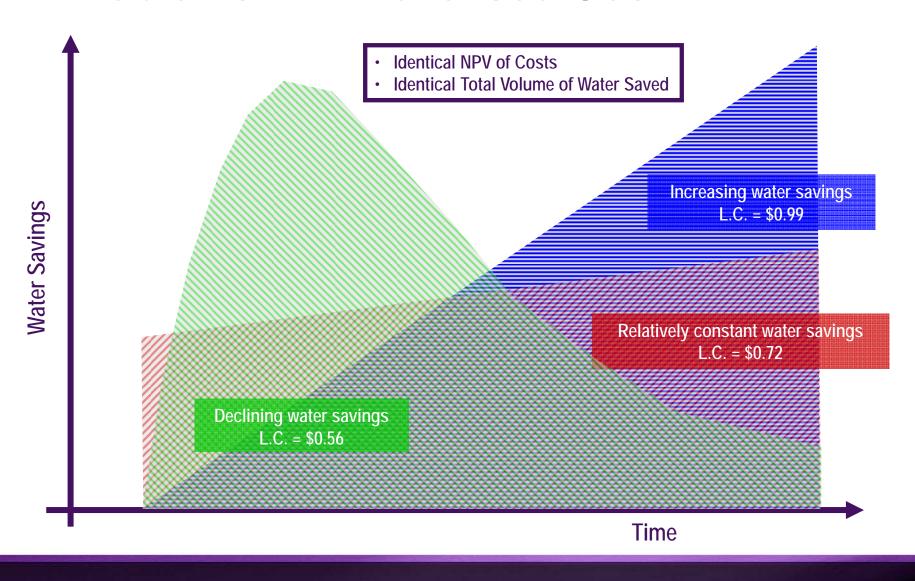
- Extractors (+10%)
- Double valve springs (+5%)
- Engine blueprinting (+10%)
- 350 Holley carburettor (+10%)
- Turbocharger (+20%)





3.0 Litres, 152 kW @ 5,900 rpm

### **Problems with Levelised Cost**





### **Available End Use Models**

Model	Platform	Hard-coded Architecture	Fixture and Appliance Stock Modelling	Benefit- Cost Analysis (avoided costs)	Continuity of End Uses	Interaction of Measures	User Friendly?
iSDP	Excel/Access	√/ <b>x</b>	✓	×	×	✓	×
DSM DSS	Excel	✓	✓	✓	<b>✓</b>	✓	√/ <b>x</b>

- → The above table is <u>not</u> intended to highlight the benefits of one model over the other
- → It should highlight that such an important focus area in water planning still does not have a workable software package



# What we are Getting Wrong

- Falling per capita baselines used in planning
  - Rightly recognises impact of appliances and household size trends
  - Fails to recognise the impact of income, lifestyle aspirations, lost economies of scale in smaller households
- Climate influences not well understood
- → Optimism in "conservation only" outcomes
  - Optimistic rates of uptakes and water savings
  - Failure to recognise interactions of conservation measures with fixture and appliance markets
  - Failure cater for interactions of multiple measures targeting the same end uses
- Failure to integrate demand and supply modelling
- → Inappropriate use of Average Incremental Cost (AIC) in comparison of supply and demand options



# Thank you.

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