Decentralised Water Master Plan

LG Water Conference
September 2013
City Of Sydney

26 km²

25% of NSW GDP
8% of National GDP
200,000 businesses
390,000 workers
1M visitors a day
4M tourists a year
Sydney’s 2030 Vision

Target 2: The City will have the capacity to meet up to 100 per cent of electricity demand by local energy generation, 30 per cent of water supply by local water capture and increased canopy cover of 50% by 2030.

Reduce gross pollutant loads to the catchment [as per the MP]…
A globally competitive and innovative city

A leading environmental performer

Integrated transport for a connected city

Housing for a diverse population

A lively, engaging city centre

A cultural and creative city

Vibrant local communities and economies

Sustainable development, renewal and design

A city for walking and cycling

Implementation through effective governance and partnership
Decentralised Water Master Plan 2012–2030
2010 water demand

City Wide  33.7GL

Sydney Harbour  26.7GL (79%)
Cooks River    6.5 GL  (19%)
Centennial Park 0.5 GL  (2%)

Makes up 7% of greater Sydney demand
Water Use Profile

End Uses Split by Potable & Non-potable in 2030

- Potable: 20.1 GL/y
- Non-potable: 23.7 GL/y

- Trigen: 2.1 GL/y (5%)
- Toilet: 9.1 GL/y (21%)
- Cooling Tower: 5.8 GL/y (13%)
- Laundry: 2.9 GL/y (6%)
- Irrigation: 0.9 GL/y (2%)
- Other Non-potable: 2.9 GL/y (7%)

30% increase in water demand
By 2030
Water Use Profile

2010 and 2030 Water Consumption by Sector (GL/y)

- Single Residential
- Multi Residential
- Food and Beverage
- Commercial Other
- Office
- Government
- Hotel
- Other
- Parks and Open Space
- Industrial
- Public Hospital
- Education
- CoS Properties
- Trigen

2010 Consumption
2030 Consumption
Sub Plan 1 of 3
Water Efficiency
LGA - Water Efficiency Target

• **Max Potential**  - 24% reduction on 2006

• **Target, Cost & Rationale**
  – 10% reduction on 2006 levels
  – Best practice comparison
  – Portfolio approach - range of programs
  – $0.8/kL to deliver
  – $24 M over 10 years
  – City, State and Feds to fund
  – Sustainability Programs & industry to deliver
Program Overview

Aim
To assist Small to Medium non-office businesses in the City of Sydney LGA to improve environmental performance

Achievements to date

- 366 Businesses
- Over 470 Mega litres p.a.
- Over $1,400,000 cost savings p.a.

Program Costs

- Societal cost: $0.45 per kilolitre water saved
- Sydney Water benchmark cost: $0.65 cents per kilolitre water saved
Council Water Target

“By 2030, achieve a 10% reduction in mains use for Council operations through water efficiency and connection to recycled water supplies. All Council facilities will achieve Australian best practice water efficiency regardless of the water source being used.”

Based on 2006:

**BAU in 2030 is a 31% increase** - acquisitions, more parks watered etc.

Savings achieved via:

- **Efficiency (19%)** – 77 ML @ $0.5/kL over 20yrs = $770,000 (only $200K new)
- **Recycled water use (22%)** – 95 ML – cost incorporated in to City wide schemes
Council Water Targets

- 2006 MAINS WATER USE: 543 Million Litres per annum
- 2030 BUSINESS AS USUAL MAINS WATER DEMAND: 413 Million Litres per annum
- 2030 MAINS WATER USE: 372 Million Litres per annum

WATER EFFICIENCY: Retrofitting Existing Properties
WATER EFFICIENCY: Improving Irrigation Efficiency of Parks
WATER EFFICIENCY: Retrofitting of Park Amenities
WATER EFFICIENCY: Retrofitting Future Acquired Properties
RECYCLED WATER: Current Projects Connecting Parks to Recycled Water
RECYCLED WATER: Connecting Existing Park's to Recycled Water Schemes
RECYCLED WATER: Connecting Future Parks to Recycled Water Schemes

10% Reduction

*Percentages reductions are with reference to 2006 Baseline
From 2006:

- 28% gain in efficiency
- Expected 58% ↑ in irrigated area by 2030
More hot days
More frequent drought
More frequent flooding

Sub Plan 2 of 3
Recycled Water
2030 potential recycled water demand

City Wide 23.5 GL

Existing end uses 17.0GL
Growth 4.4 GL
Tri-gen plants 2.1GL

54% of 2030 BAU Water Demand
More hot days
More frequent drought
More frequent flooding

Sub Plan 1 of 3
Water Efficiency

Sub Plan 2 of 3
Recycled Water
Alternative Supply Options

Sewer Mining

Stormwater Harvesting

Thermal Desalination

Groundwater
Recycled Water Precincts
## Recycled Water: Supply & Demand Match

### Local Water Resources

<table>
<thead>
<tr>
<th>RECYCLED WATER DEMAND</th>
<th>MAX Potential Recycled Water Demand</th>
<th>Groundwater (Dewatering)</th>
<th>Groundwater (Water Storing Ponds)</th>
<th>Groundwater (Aquifer)</th>
<th>Roof Water</th>
<th>Stormwater</th>
<th>Sewer Mining</th>
<th>Black Water (Growth Only)</th>
<th>Grey Water (Growth Only)</th>
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Legend:
- ![Maximum Potential Recycled Water Demand (GL/y)](dot)
- ![Potential Supply (GL/y)](dot)
- ![Potential Supply (Uncertain)](dot)
Water Recycling Target

Target: 30% of 2030 BAU demand (12GL/yr)
- 10% council and 20% by partnering with State & Australian Governments

Rationale:
- Max potential – 54% of 2030 demand;
- Australian Water Commission – 30% target for cities
- 30% = 12.2 GL
  - 2GL existing in LGA
  - 10.2 new – 4GL Council & 8.2 State and Feds
  - Council – mixed portfolio of cheapest solution:
    - Stormwater reuse – 3 GL potential
    - Thermal desalination – 13GL potential
    - Sewer mining – 12 GL potential

Cost:
- Levelised costs in Master Plan
- Council contribution in the order of $65M - $90M
Source Availability vs Demand

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<th>Source Type</th>
<th>Baseline 2010 Demand</th>
<th>BAU 2030 Demand</th>
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City of Sydney Water Demand (GL/year)
2010 POTABLE WATER CONSUMPTION
2030 POTABLE WATER CONSUMPTION WITH DECENTRALISED WATER NETWORK
CONNECTION GUIDELINES
to prepare a building for a recycled water source
Sub Plan 3 of 3
Stormwater Pollution Reduction
Ownership
- Sydney Water – 88km (51%)
- City of Sydney – 84km (49%)

Stormwater Quality Improvement Devices (SQIDs)
- 26 existing

Sewer overflows
- 1.2 GL into stormwater system over 10 years in wet weather events
Opportunities

- Source control
- Stormwater harvesting & reuse
- Water Sensitive Urban Design (WSUD)
- Attenuation of nuisance flooding
- Stream daylighting

Triggers

- Redevelopment (mandatory)
- Renewal (opportunistic)
  - Stormwater system
  - Streetscape
- Retrofit programs
  - Private domain
  - Public domain
Stormwater Pollution Reduction Targets

• Local Government Area:
  – 50% on 2006 total suspended solids
  – 15% on 2006 nutrients

• MUSIC model
• Catchment plans under development
• Comparison to Botany Bay WQ Improvement plan
Stormwater Pollution Reduction Targets

Of the 50% pollution target:

25% from redevelopment:
  – Meeting planning conditions

25% from Council:
  – 15% gross pollutant traps ($2M)
  – 10% roads & footway ($3M)
Treatment Approaches

- Breaking impervious area to pipe connection
- Natural water cycle
- Infiltrate where opportunities arise
- Reduce impervious areas

Treatment Tools

- GPT’s
- Infiltration Systems
- Permeable Paving
- Raingardens
Raingarden Deployment

- Since 2008 the City has constructed 106 raingardens
- Covering over 2300 m²
- Multiple benefits such as water quality improvement, increased greenery, traffic calming and increased amenity