

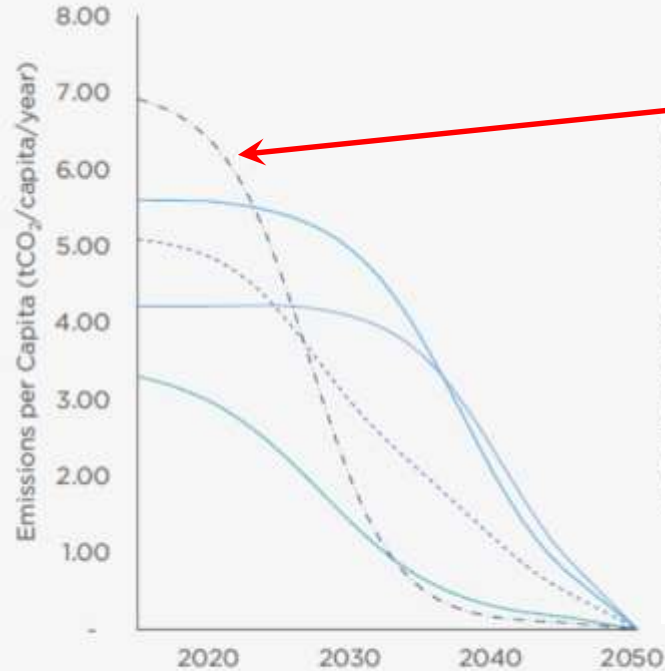
Twice as much in half the time

Accelerating implementation

May 2017

Chris Derksema

Lord Mayor Minute – C40 summit



- Next four years are crucial to meet Paris (1.5C)
- Action by high carbon wealthy cities need to be accelerated

The Lord Mayor requested that:

“The Chief Executive Officer bring the Strategy and Action Plan to the February 2017 Council meeting for final endorsement, noting any re-allocation or re-prioritising of funding necessary to accelerate its implementation”



Sustainable Sydney 2030



Environmental Strategy

Our vision:



Low-carbon city



Zero waste city



Water sensitive city



Green and cool city



Climate resilient city



Active and connected city

City (organisation)

Local Government Area

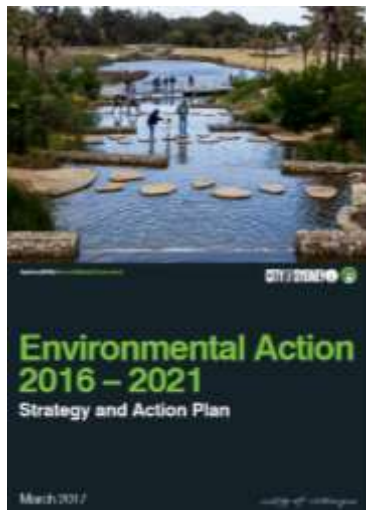


Local Government Area Actions

*Sustainable
Sydney 2030*



*Environmental Action
2016-2021 Strategy &
Action Plan*
March 2017



*Residential Apartment
Sustainability Plan*
August 2015



*Making Sydney a
Sustainable Destination*

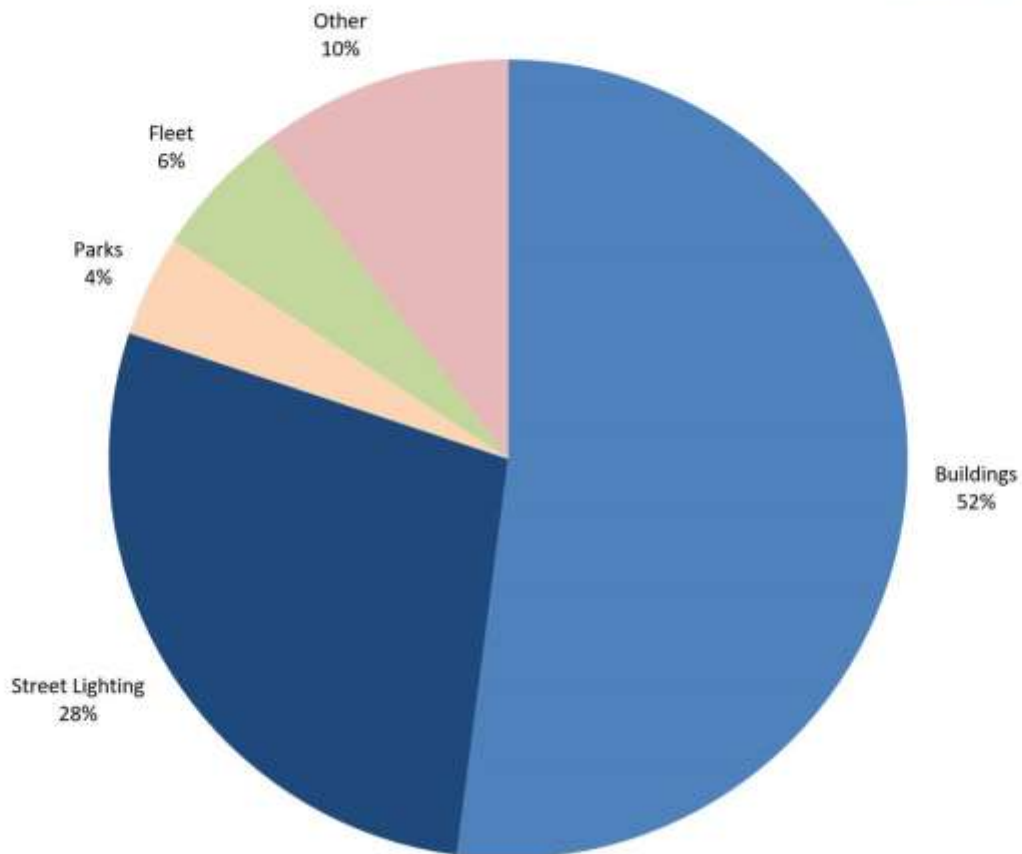


*Sydney's Sustainable
Office Buildings Plan*

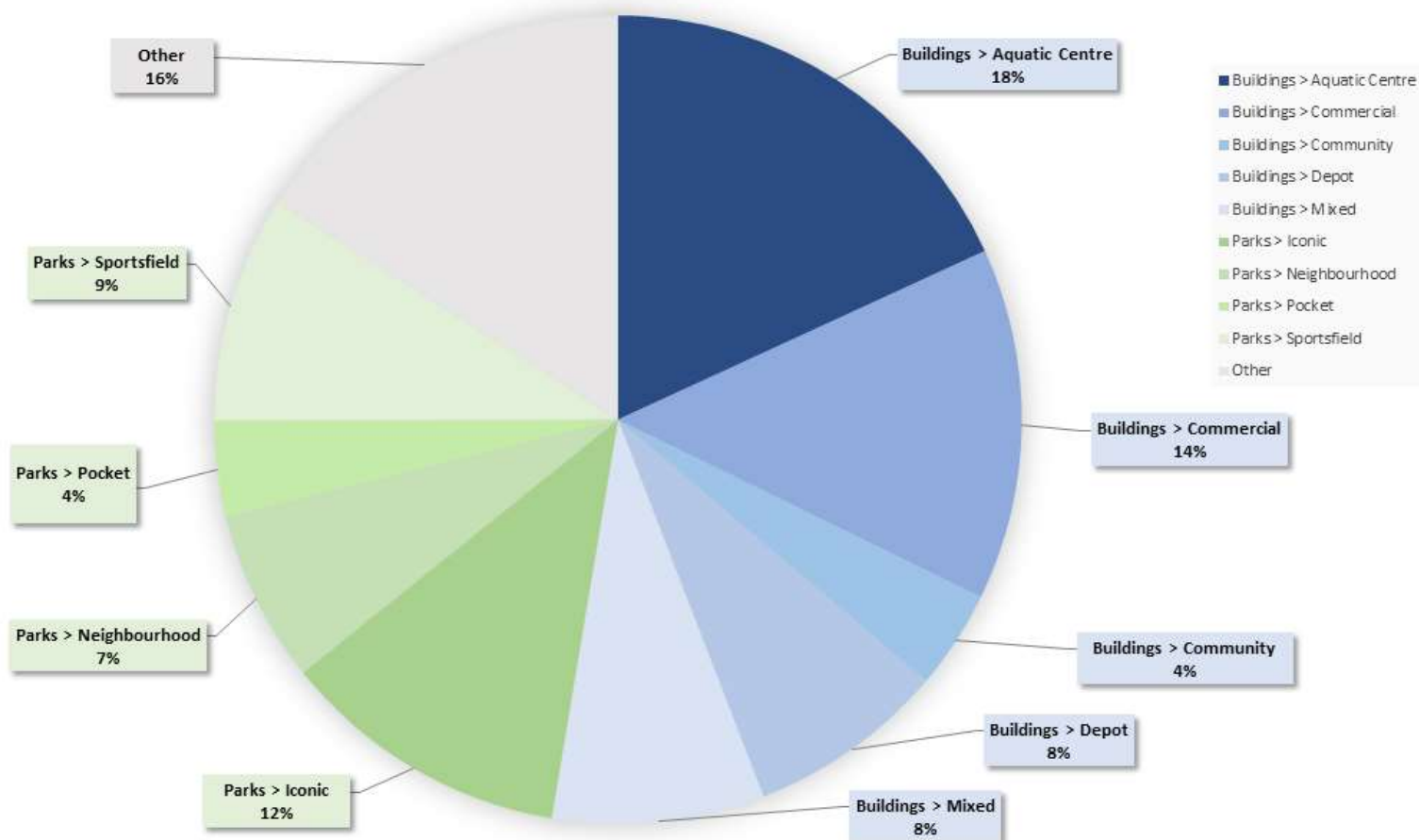


Greenhouse gas emissions - 2016/17

Council Operations

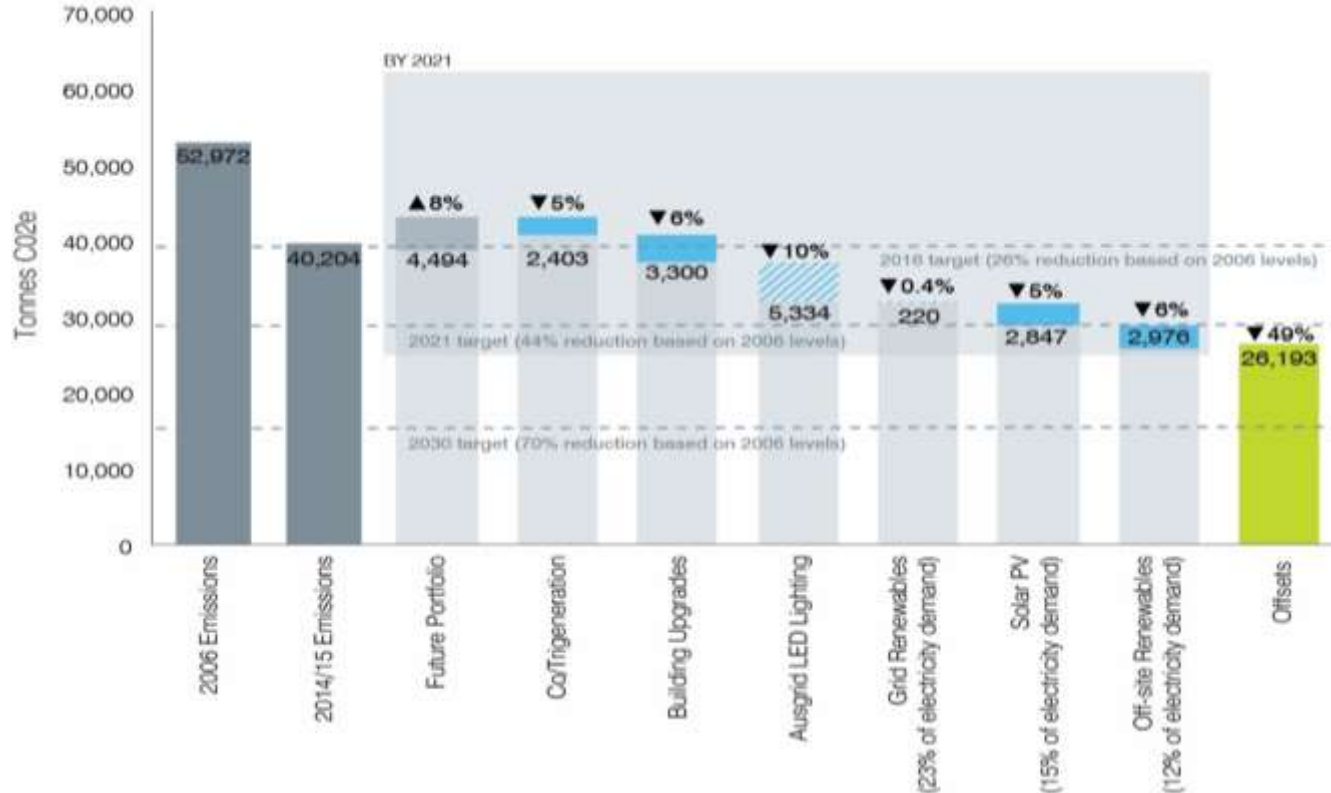


City of Sydney operations potable water usage (%) 2016-17



Low-carbon City

From 26 to 44% reduction by 2021



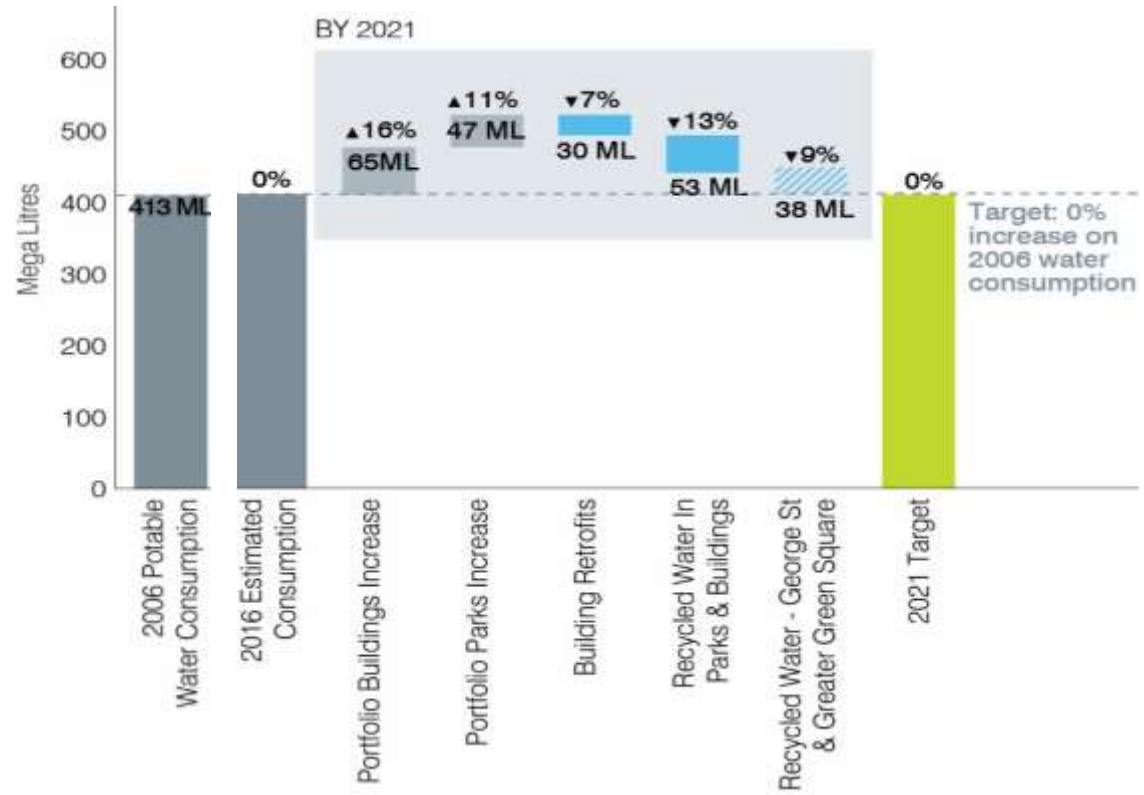
Water Sensitive City Targets

City Organisation

Zero increase by 2021

Zero increase by 2030

Open space irrigation
180L/m²



Now, 2021, 2030: Landfill diversion targets

CONTROL

MANAGE

INFLUENCE



Sydney 2030 Green Ticketh Connected

City buildings



City construction
and demolition



Public domain



City residents



Commercial
and industrial



Construction
and demolition



NOW

35%

85%

18%

69%

50%

69%

28% KERBSIDE RECYCLING

2021

70%

80%

50%

70%

70%

80%

35% KERBSIDE RECYCLING

2030

90%

90%

90%

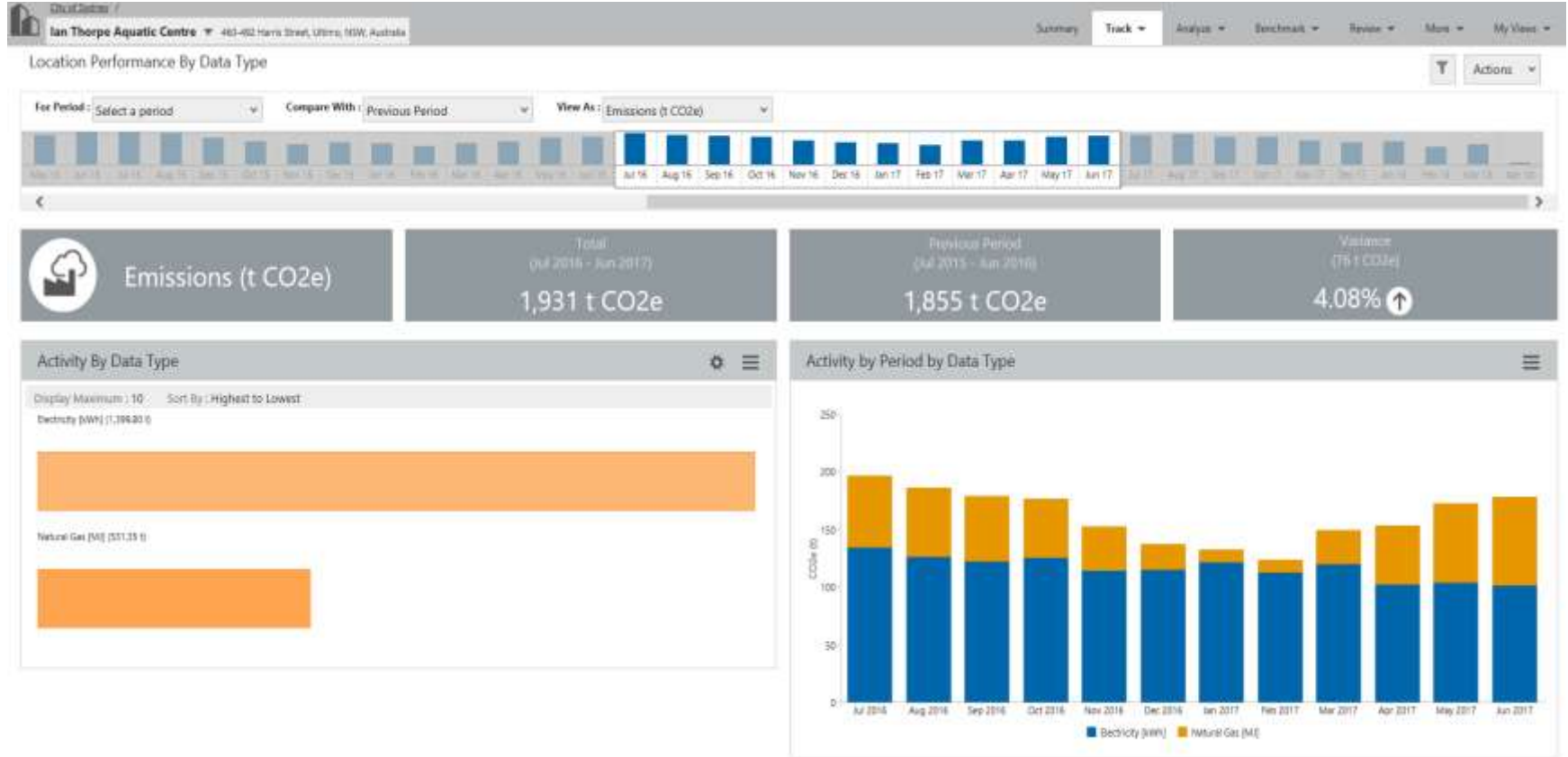
90%

90%

90%

city of villages

Tracking to our targets - SMART



Asset Environmental Footprint Influence

1. Operation and maintenance
2. Major plant and asset replacement
3. Major works
4. New asset creation
5. Investment / divestment decision

Resources and Governance

Action sources

Environmental
Action 2016-2021

Operational Plan
2017/18

Waste Strategy

Sector
Sustainability
Plans

Coordination Groups

Asset
management &
capital works

Energy & water efficiency in parks & properties, aquatic centre, co/trigen, solar roll-out, LED

Planning
controls

Net zero planning pathway, DCP & LEP amendments, Improved compliance, VPAs

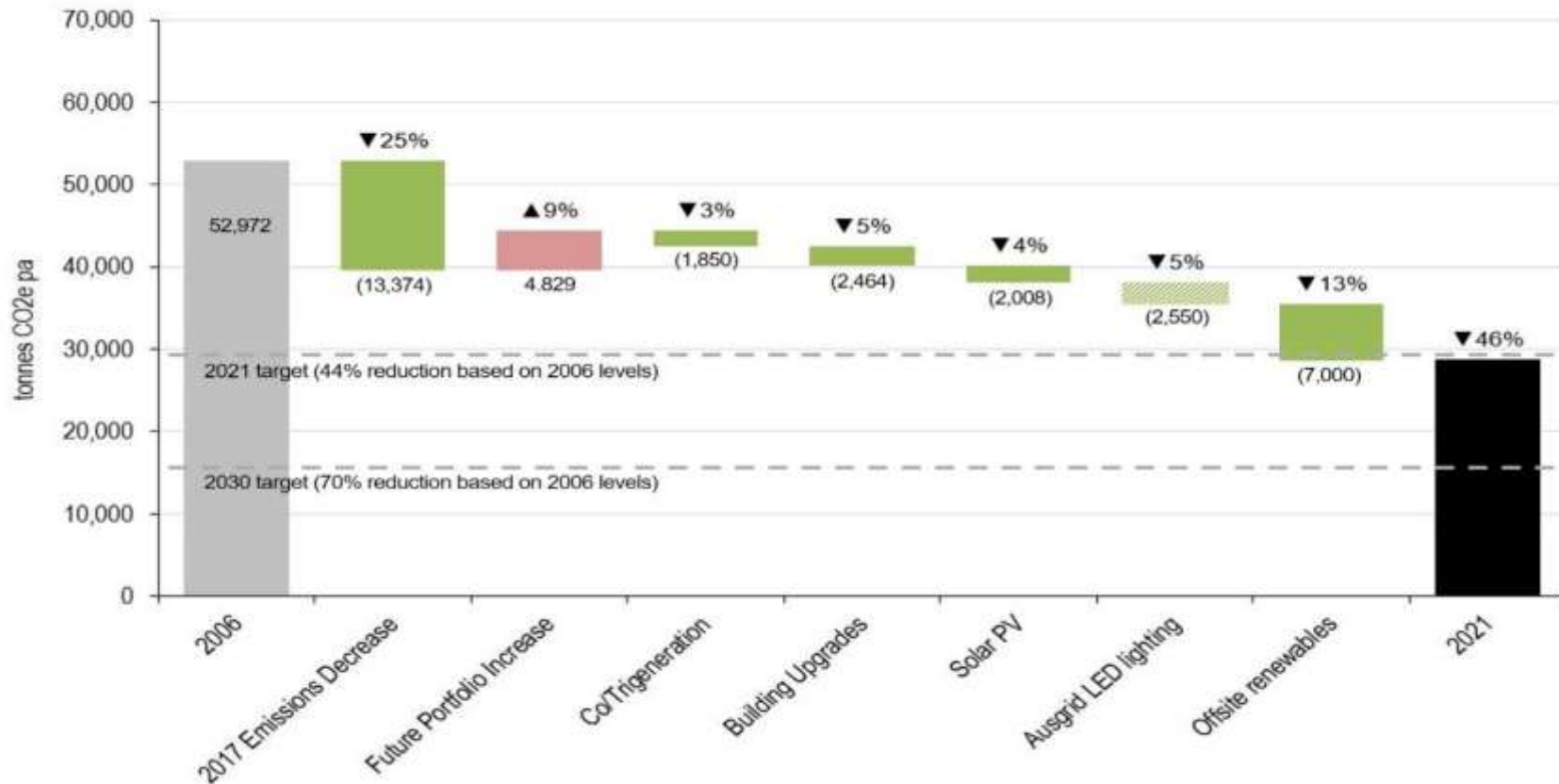
Advocacy,
Programs &
Services

Sustainability programs, advocacy, grants, market-delivered recycled water/renewable energy, LGA waste management services

Executive Oversight

Environmental
Steering
Committee

GHG Waterfall Chart March 2018



- Incorporated into Directors Performance Plans
- GHG FY19
- Water and Waste in FY20

Asset Environmental Budget

How we will get there

As at end-June 2017, the City has a verified emissions reduction of 26 per cent from the 2006 baseline. The chart below shows the initiatives that the City has undertaken and the estimated contributions of the initiatives we will implement across our operational portfolio to reach the target of reducing our emissions by at least 44 per cent by 2021. We will maintain our certified carbon neutral status each year through the purchase of verified offsets for those emissions we cannot eliminate, as we have since 2007. However the reduction target is absolute and does not allow for offsets.

Chart 1 City of Sydney operations greenhouse gas emissions target to 2021. Estimated contribution of initiatives.



Completed Initiatives - 20% reduction achieved

Portfolio change (+3 per cent) includes removal of some assets e.g. Lennon Square and Domain Parking Station and addition of others including: Ian Thorpe Aquatic Centre, 343 George Street, Mountain Street, Sunny Hills Community Centre.

Management improvements includes emissions reductions achieved outside of the major efficiency initiatives. This includes solar installed to date, improved energy measurement and monitoring, behaviour changes and small **reductions**. Other influences on emissions include annual weather changes.

Initiatives to be completed by 2021

The emissions target remains at 44% reduction from the 2006 baseline to 2021. The budget estimates a 46% reduction.

- Future portfolio (+4 per cent) increase assumes the construction of new childcare centres, Green Square sites, pedestrian lighting and other projects.
- Increases: Alexandra Canal Depot, **Woolloomooloo** Early Education Centre, Green Square Community and Cultural Precinct, Green Square Library and Plaza, **Curragh** Park Aquatics and Recreation Centre, Perry Park Recreation Centre, Green Square Water Reserve.
- Increases through Developer Contributions to the City: Greenland Tower Creative Hub, Darling Library, Land Lease 173-180 George Street.

Proposed Divestments: Epsom Road Depot, Gerard Street (Alexandra) Depot, Marian Street Depot.

- Co/Thermoplastic (+3 per cent) - reductions will be accomplished through the operation of co/thermoplastic facilities at Town Hall House, Cook and Philip Park Aquatic Centre, Ian Thorpe Aquatic Centre and **Curragh** Park Aquatic and Recreation Centre.
- Building upgrades (-5 per cent) reflects estimated savings from efficiency upgrades in the most resource intensive properties via the Major Properties Efficiency Project (MPEP).
- Solar PV (-4 per cent) on our own properties can deliver 10 per cent of electricity demand if battery storage provides a cost effective solution and the City can take advantage of virtual net metering between our sites.
- **Ausgrid** LED lighting (-5 per cent) - The City pays for the **Ausgrid** used by all street lighting in the local government area, however some of these lights are owned by **Ausgrid**. We will advocate for **Ausgrid** to upgrade all its street lighting to more efficient LED bulbs. This element is striped to indicate it is not within the City's control.
- On-site renewables (-13 per cent) can be purchased by the City through the **GreenPower** scheme or directly from a renewable project such as Power Purchase Agreement (PPA) and integrated into the City's retail contract renewal in 2019.



Curragh Park Aquatics and Recreation Centre, aerial impression

Operational Emissions Budget

Chart 2 Asset environmental budget data for estimated contributions of initiatives per the preceding waterfall chart.

Property Emissions Portfolio	2006/07	2016/17	2017/18	2018/19	2019/20
Current Emissions Portfolio Balance	22,507	22,507	21,558	18,888	22,207
Add:					
New Portfolio Changes	187	520	946	5,281	4,594
Reduction Initiatives Projects					
Co/Thermoplastic Installations	3000	1450	1450	1450	1,450
Building Upgrades	0	110	1,163	1,166	1,464
Solar PV Installations	171	891	1,653	2,058	2,008
Total Property Emissions at End of Period	22,865	24,578	26,813	29,763	30,723
Street and Parks Lighting Emissions					
Current Emissions Portfolio Balance	22,706	22,706	22,706	22,706	22,706
Add:					
New Street Lights	30	30	30	0	245
Reduction of Emissions					
Ausgrid LED Street Lighting Program	0	0	385	1,700	2,140
Total Street and Parks Lighting Emissions at End of Period	22,736	22,736	23,021	24,406	25,091
Other Emissions					
Construction Fuel	1,254	1,254	1,254	1,254	1,254
Organisations Fleet	2,417	2,417	2,417	2,417	2,417
Corporate Emissions (Events, Business Travel, Paper)	844	844	844	844	844
Total Other Emissions	4,525	4,525	4,525	4,525	4,525
Reduction of Emissions					
Office Renewables	0	0	0	17,000	17,000
Total Office Emissions	0	0	0	17,000	17,000
Total Emissions at End of Period	22,865	29,099	30,338	38,811	38,811

Baseline June 2006 Emissions GHS Tonnes CO2e 22,872 Emissions Production June 2021 24%



Alexandra Canal Depot PV Solar Installation

Portfolio Increases



**Waranara Early
Education Centre**
June 2018



**Green Square
Community and
Cultural Precinct**
Jun 2018



**Green Square
Library and Plaza**
Operational: Jun
2018



**Perry Park
Recreation Centre**
2018-2021



**Gunyama Park Aquatic
and Recreation Centre**
Dec 2019



**Green Square:
water reuse**
Dec 2019



**Greenland Centre
Creative Hub.**
2020



**Darling Exchange
Library**
2020

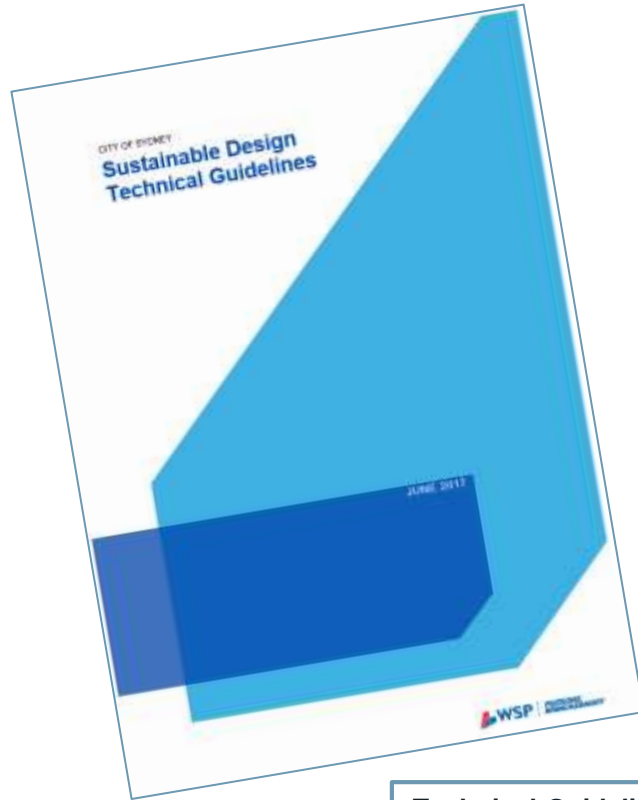


**505-523 George
St. 2020**



**Lend Lease 178-186
George St**
Post 2021

Sustainable Design Technical Guidelines



Technical Guidelines

The screenshot shows the 'Environmental Management System' web interface. It features a header with the 'City of Sydney' logo and the tagline 'For the greener good'. The main content area is titled 'Sustainability Aspects' and contains a list of 11 categories, each with a checkbox and a 'Generate' button. The categories are: Energy and Emissions, Water, Climate Resilience, Waste, Materials, Indoor Environmental Quality, Ecology, Transport, Management, Construction Environment, and Aquatic Centres. To the right of the list is a box containing 'Instructions' for using the system. Below the instructions are two input fields for 'Project Name' and 'Project Number', each with a 'Generate' button.

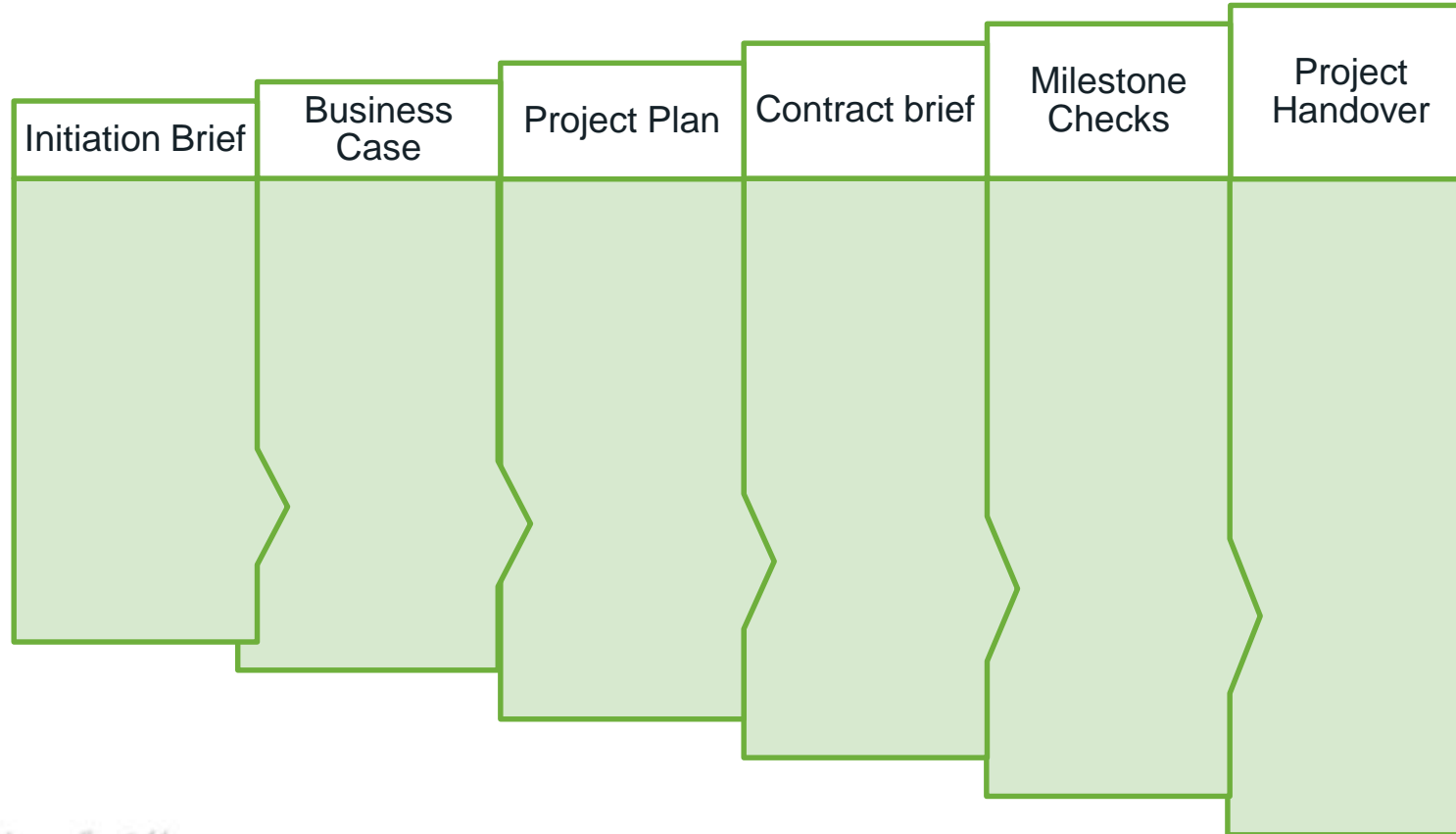
Excel Tool

Benchmarks?

External: NABERS, Green Star, Aquatic Centres

Internal: % reduction, deemed via design

FYI: Draft Sustainable Design Guidelines



Major Properties Efficiency Project

- **Top 14 sites** with highest use of resources (80% of City's building emissions)

Corporate & Investment

Town Hall House, Sydney Town Hall, Wilcox Mofflin Bldg (Mountain St), Customs House, 343 George St.

Aquatic Centres & Pools

Cook & Phillip, Ian Thorpe, Andrew Boy Charlton, Prince Alfred Park, Victoria Park.

Community Centres

Kings Cross Neighbourhood Service Centre & Library, Ultimo Community Centre, Redfern Community Centre.

Depots

Sydney Park Nursery, Bay Street Depot.



City Solar

Example: Alexandra Depot

480KW solar power



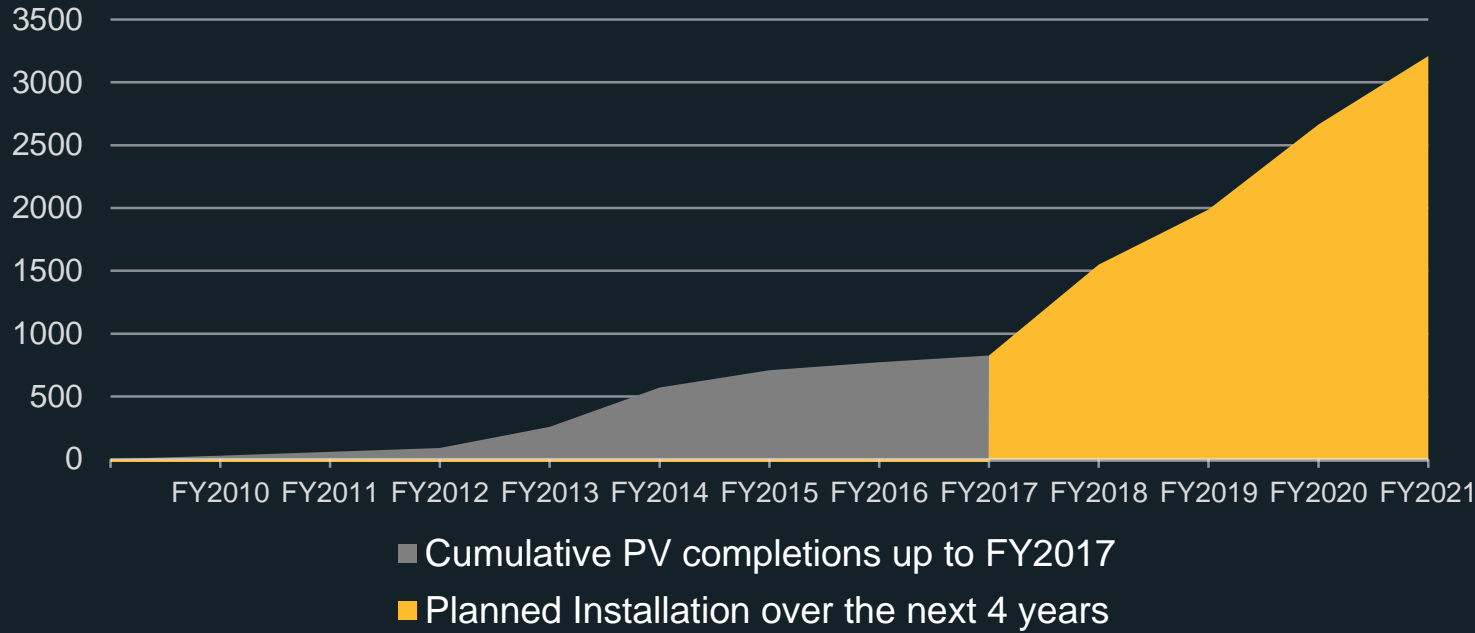
Tesla batteries



Solar PV Program

Planned Growth in PV Capacity

Cumulative PV Completions (kWp)



There are currently 36 generating sites.
Another 38 sites are planned over the next 4 years.

Meeting our commitments

Electricity supply via on-site trigeneration



- Overall program:
 - 1.4 MW at Town Hall House
 - 200 kW+ at Ian Thorpe Aquatic Centre , mid 2018
 - 200 kW+ at Cook and Phillip Park, mid 2019
 - ~ 250 kW to supply Green Square Town Centre, 2020
- By 2021
 - Net emissions cut by 2700 t

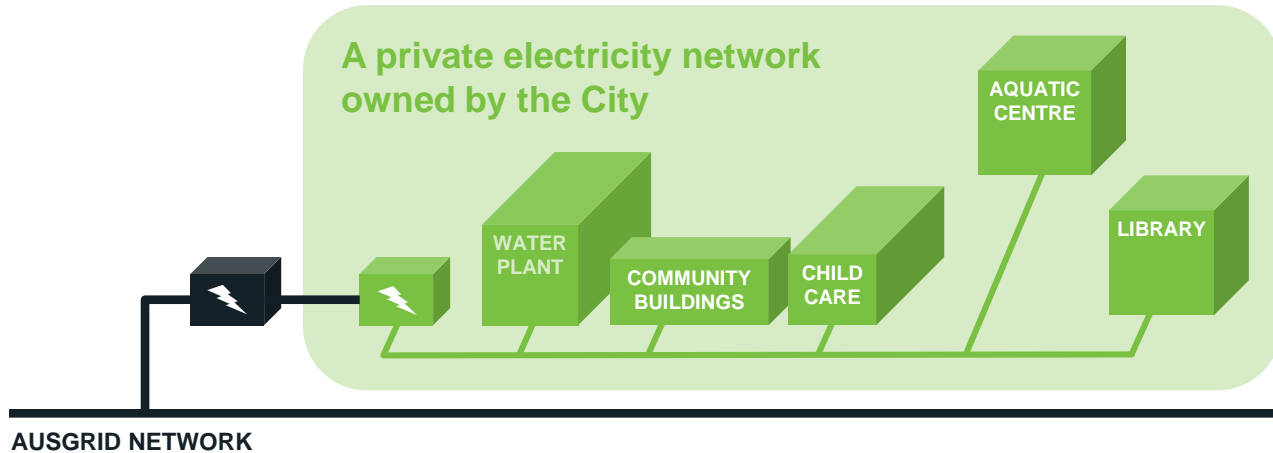
LED Lighting – City Owned 100% LED Ausgrid – on replacement



Green Square

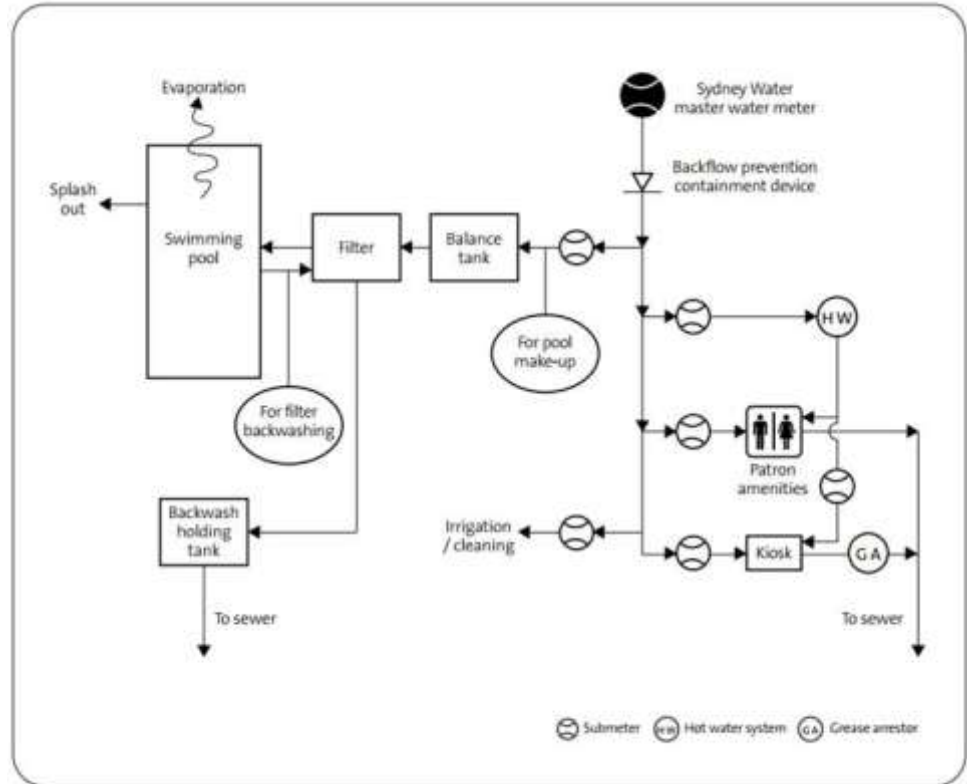
Private electricity network

- Cost savings over life of project due to lower charges
- Ability to “plug in” and share renewable and low carbon energy

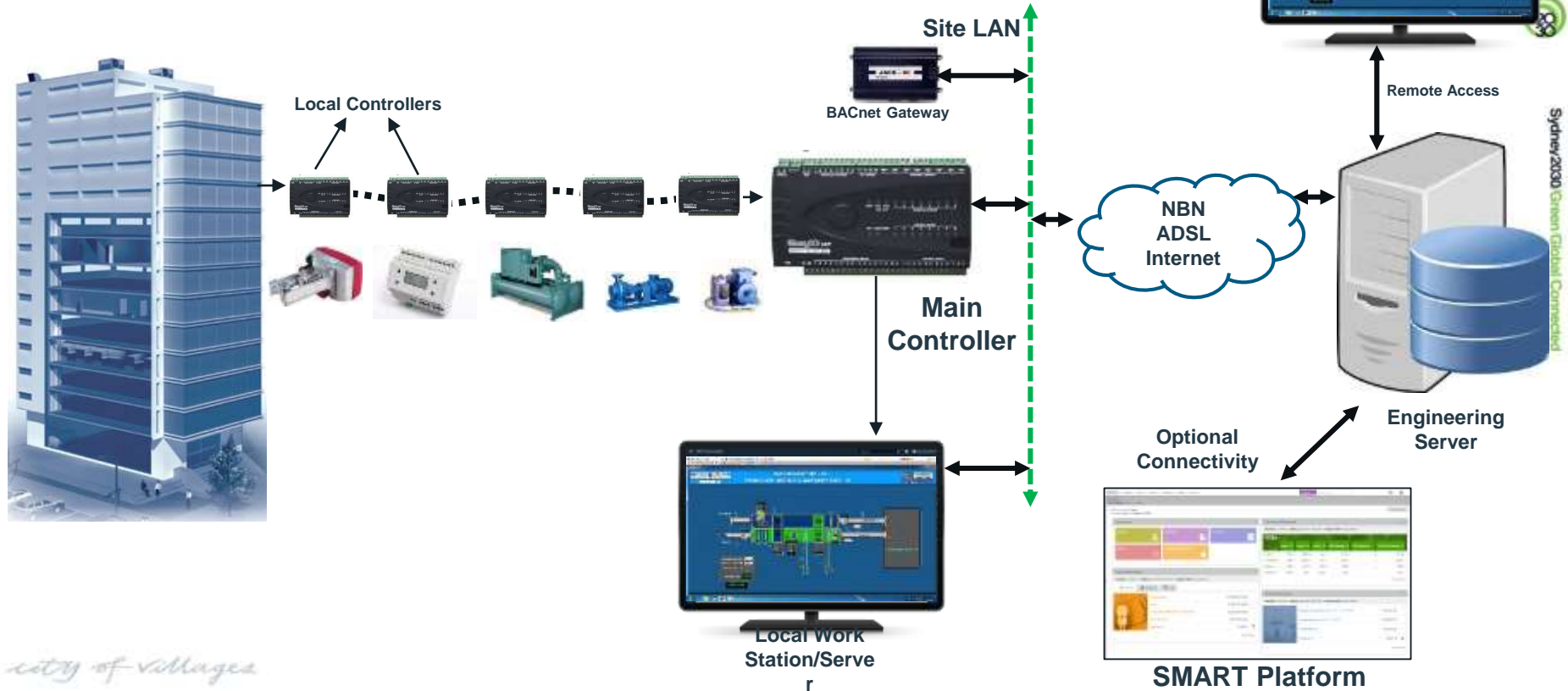


Improved Metering


- Better data
- Better decisions
- Save \$, resources and utilities



Desirable setup - All City of Sydney Buildings








climate
friendly

City of Sydney



This certificate is in recognition that 50,014 tonnes of greenhouse gas emissions have been offset for the period:

1/07/2009 - 30/06/2010


Climate Friendly have retired the following:

The equivalent in VCS verified carbon credits from the Zhong Jieqing Waste Heat Recovery Project in China to offset emissions from the City's use of grid electricity, natural gas, fuel, contractor fuel usage, flights, taxis, events, paper usage and other minor sources.

Thank you for taking meaningful action on climate change and supporting clean energy.

Total Greenhouse Gas Savings
50,014 tonnes

Joel Fleming
Joel Fleming Providing Cleanest
CERT #00011721-2



climate
friendly

www.climatefriendly.com



Financial Tests Criteria

- Basic test is simple payback.

Typical benchmarks are:

Project lifetime	Payback period
<10 years	5 years
>15 years	10 years

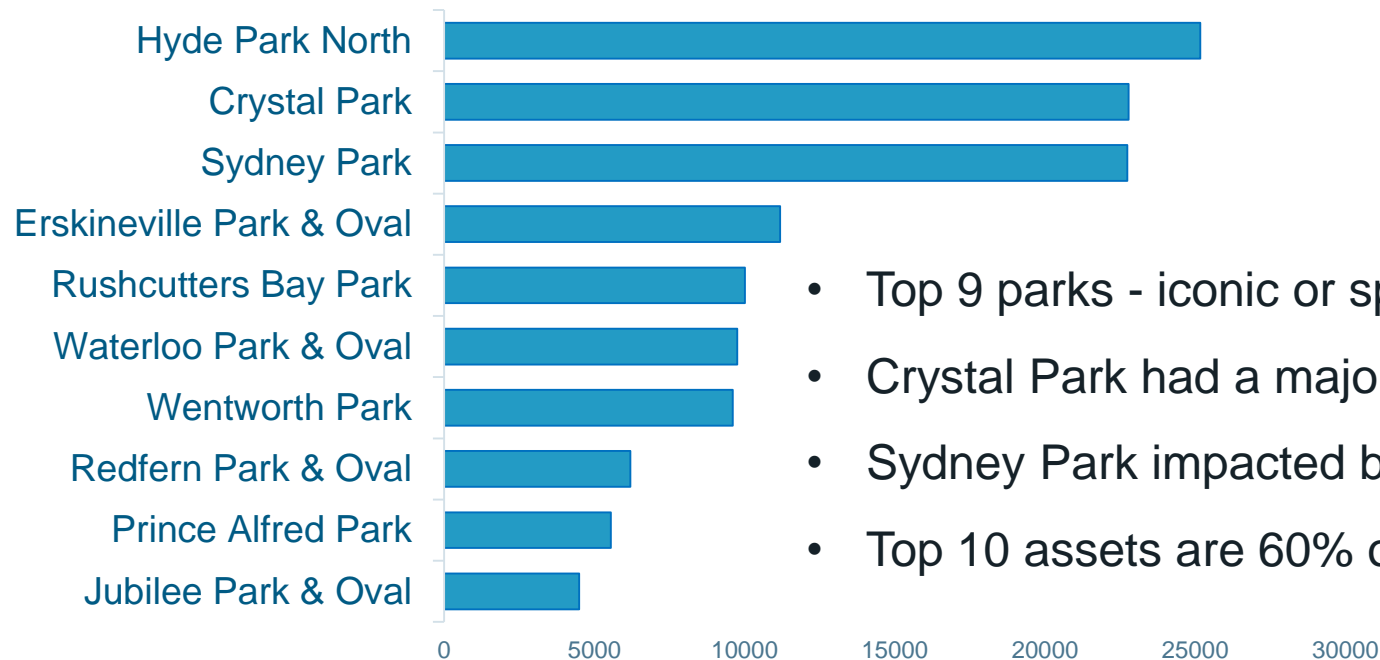
- Sometimes, cost of carbon is more applicable (NPV) – Cost of carbon < \$40/tonne
- Adopted discount rate 6%, Inflation rate 3% - typical for low risk project
- Typical benchmarks are:

Technology	Cost
Established e.g. PV, pool cogen	\$0 to \$40
Demonstration e.g. office trigon	\$40 to \$60



Parks water use

Top 10 assets by potable water consumption



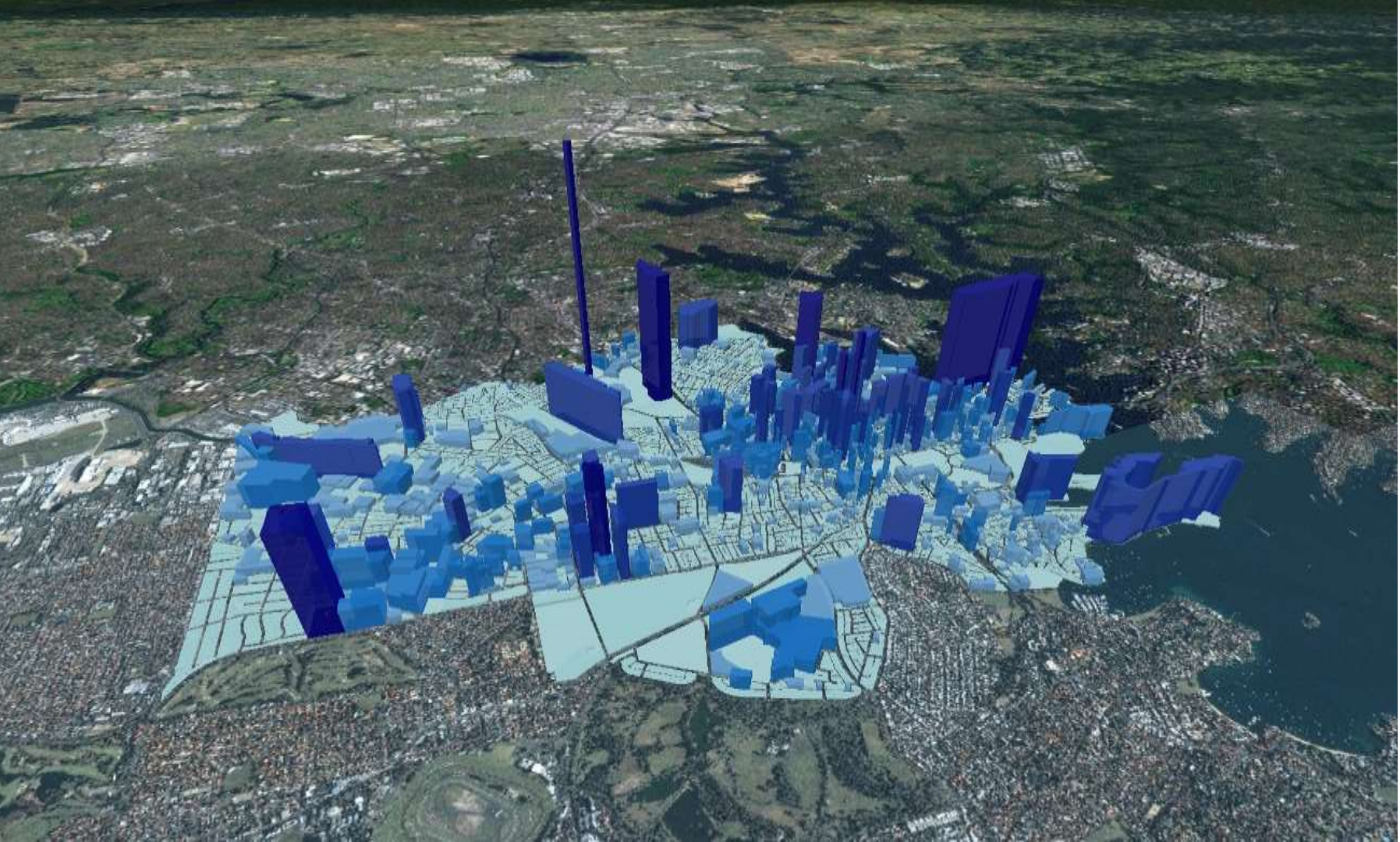
- Top 9 parks - iconic or sportsfield
- Crystal Park had a major leak, now rectified
- Sydney Park impacted by WCX (25ML)
- Top 10 assets are 60% of total consumption

2021 water target

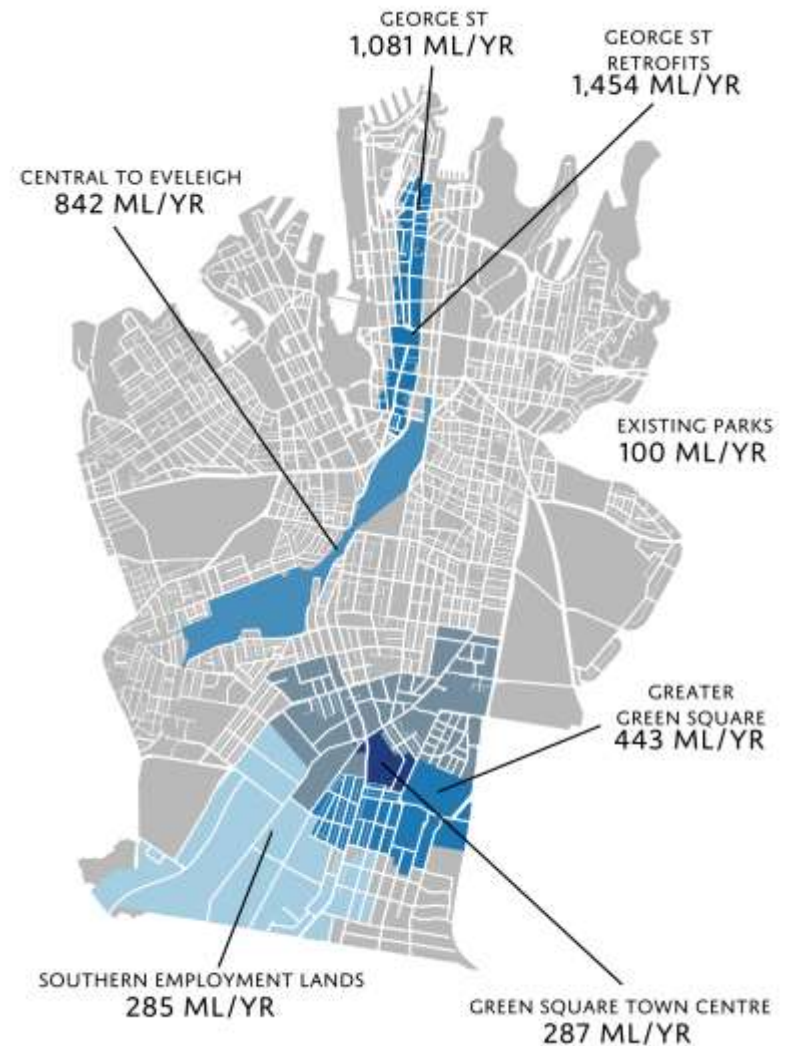
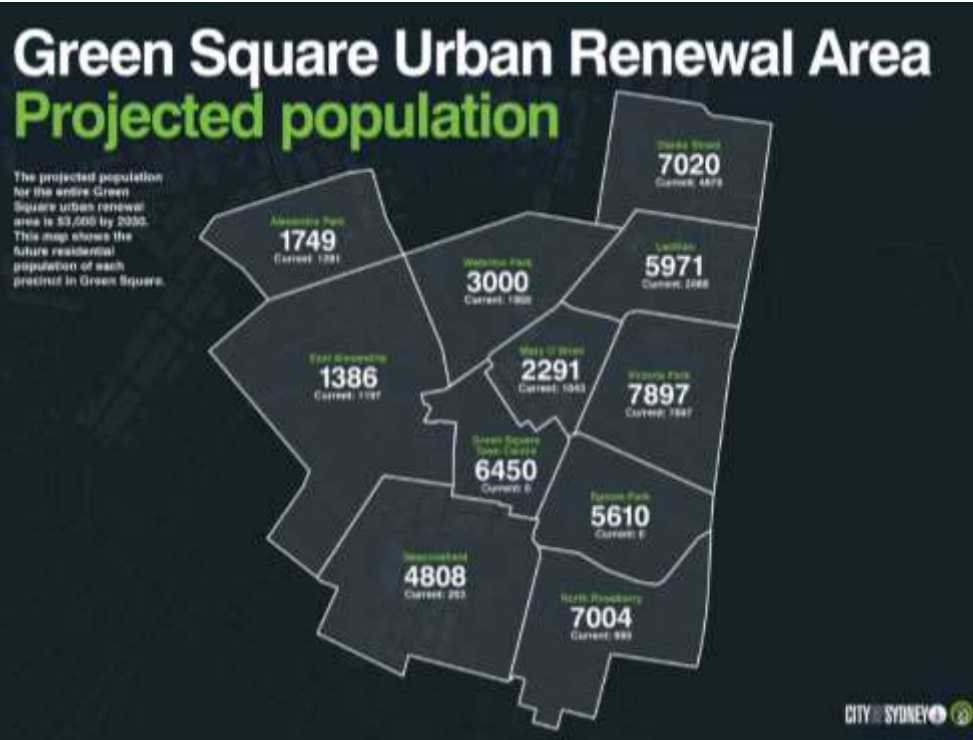
Major projects:

- Properties retrofit
- Parks water re-use
- Synthetic playing surfaces
- George St recycled water
- Sydney Park recycled water utilisation





Potential demand in urban renewal areas



New actions for our own organisation and public domain



**Food
collection**
from City
buildings



**Digital
reporting
platform**
for waste
data



**Operational
changes at
depots** to
improve
recovery



**Investigate
options for
public place
recycling**

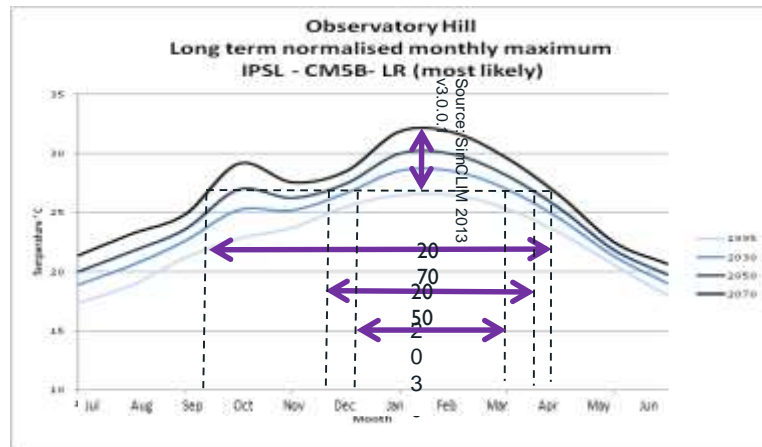
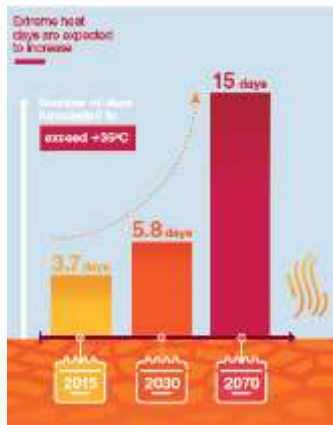


**Investigate
plastic
packaging**
removal at
City events
and venues

Sydney's changing climate: temperature



<http://www.bom.gov.au/state-of-the-climate/>
Accessed 04-11-2014



- Av. temp up 0.9°C since 1910 to 18°C
- Projected increase by 2070:
 - 19.6°C to 21.1°C

- Extremes - heatwaves will be:
 - hotter
 - longer
 - more often

Climate Resilient City



11,000 new street trees
Floodplain management
Emergency services collaboration

City of Sydney Urban Forest

50%
increase in canopy
cover by 2030

15.5% canopy cover

31,000 street trees

14,000 park trees

60,000 private trees (est.)

Canopy Cover

2008 - 2013

15.5%
Canopy Cover

2008

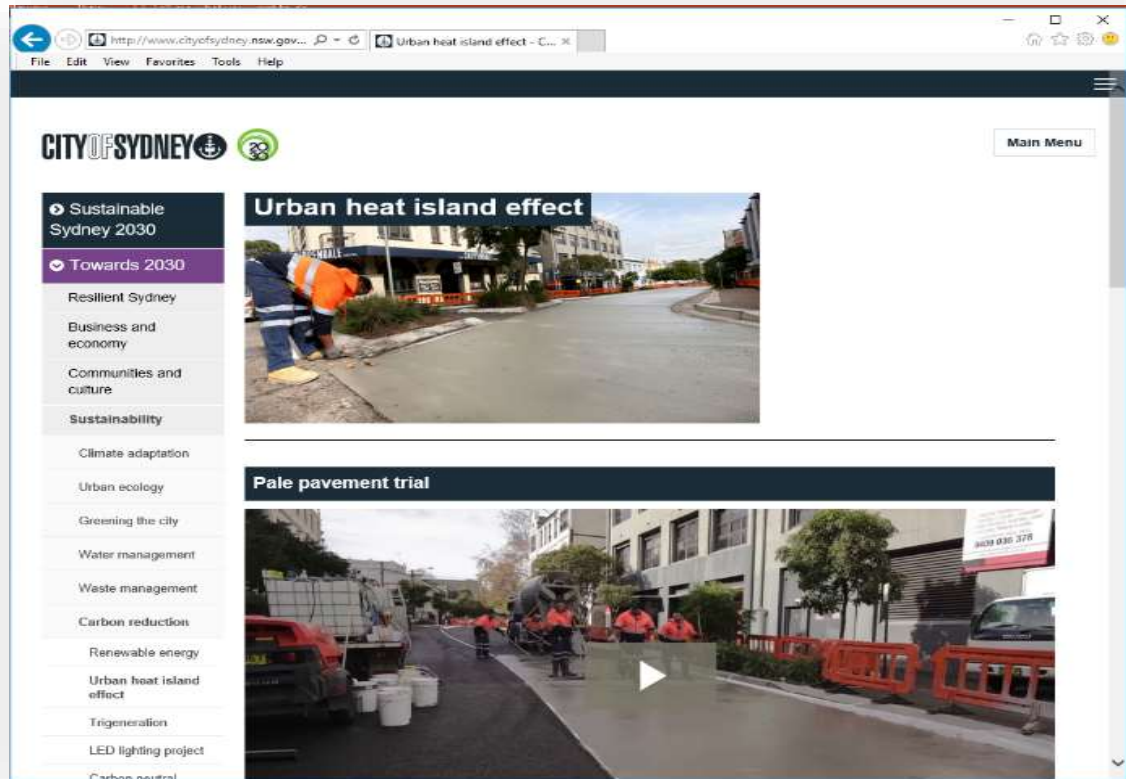
1.6%
increase

17.1%
Canopy Cover

2013

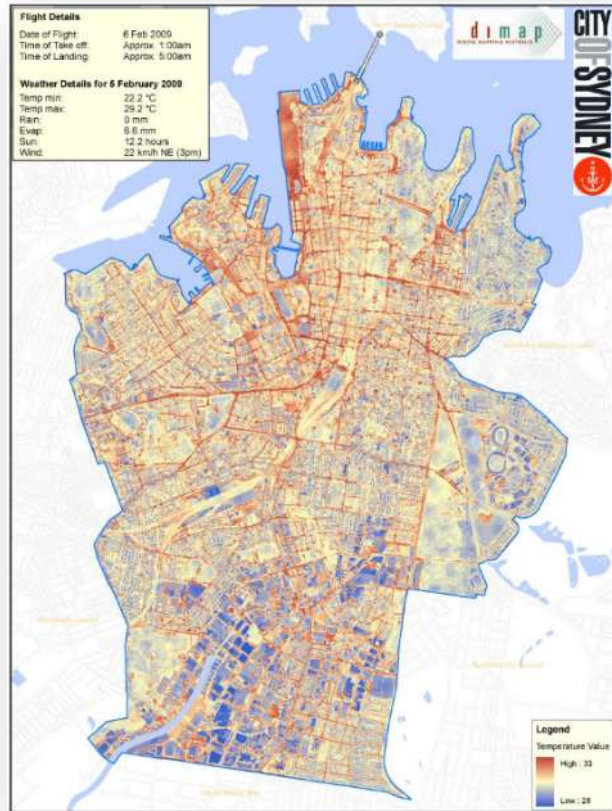
city of villages

Pale pavement trial



- Myrtle Street, Chippendale
- Lighter-coloured surfaces vs dark surfaces.
- Cost is high
- Shading via Street trees preferred

Thermal image



- Feb 2009 1-5am
- Surface temps:
 - Hottest areas ($> 40^{\circ}\text{C}$)
 - Roads ($31\text{-}33^{\circ}\text{C}$)
 - All areas (30.6°C)
 - Buildings (30.3°C)
 - Green roofs (**30.5°C**)
 - Redfern oval (29.4°C)
 - Coolest areas ($< 27^{\circ}\text{C}$)



Active and Connected City

12.5km cycleways
Light rail in construction
30,000 car share members

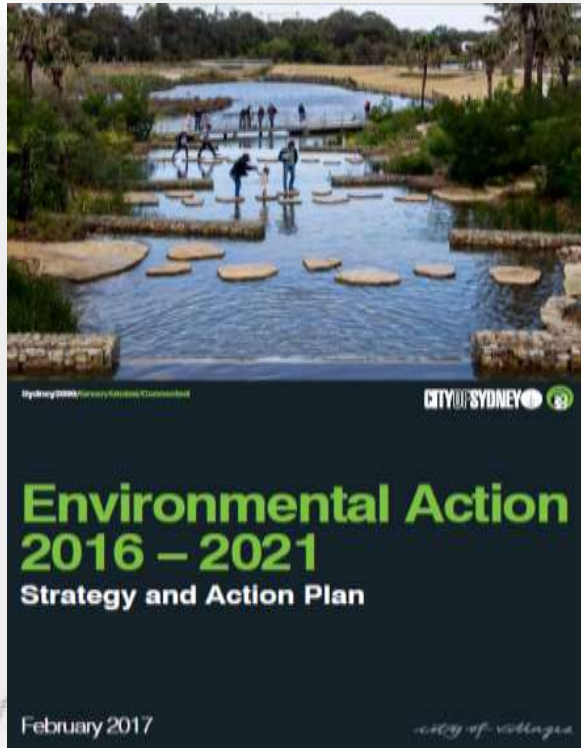


Twice as much?

Well on the way...

Want to know more?

City of Sydney web site:
Search “Environment”



City of Sydney web site:
Search “Green Report”

New residential community actions



Education to
reduce
contamination
and increase
recycling



**Weekly e-
waste**
collections



**Textiles
collections** for
multi-unit
dwellings



**Opt in food
organics**
recycling trial



**Community
drop-off**
recycling
centre

Implementation status - snapshot

Raingardens

- 133 raingardens approx. 3,000m²

GPTs

- 30 GPTs removed 170 T sediment, litter and organics annually



Green & Cool City



100 parks since 2004
154 raingardens
11,000 street trees

