

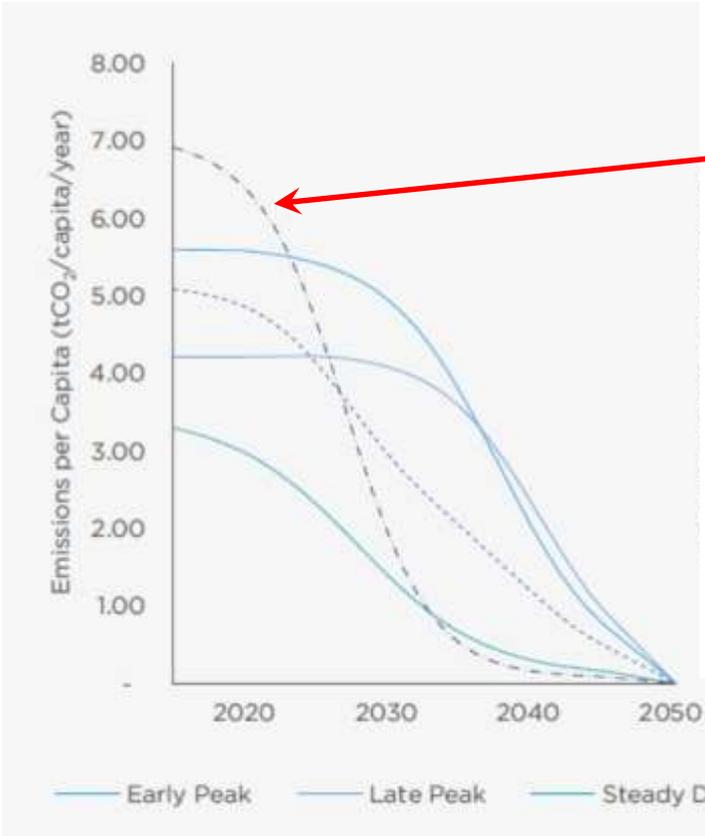
Twice as much in half the time

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



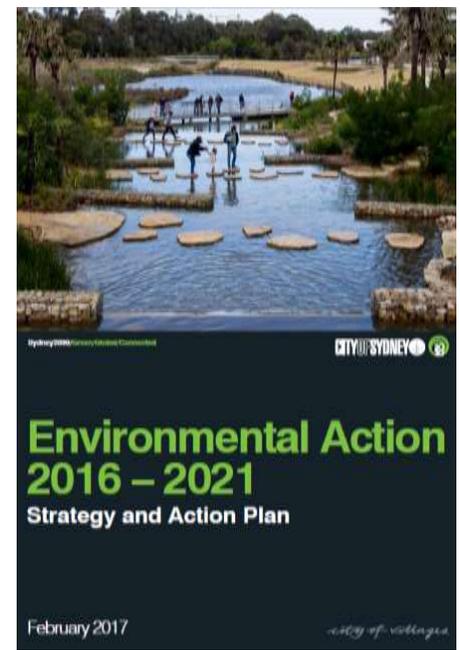
Climate resilient city



Active and connected city

City (organisation)

Local Government Area

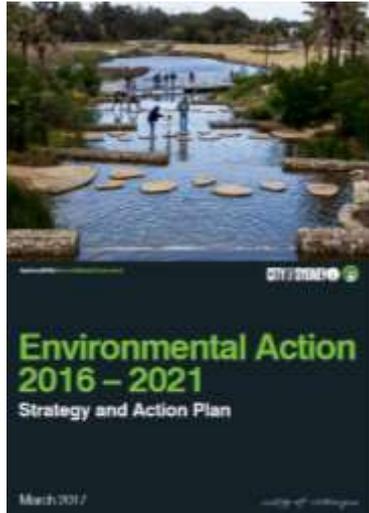


Local Government Area Actions

Sustainable Sydney 2030



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



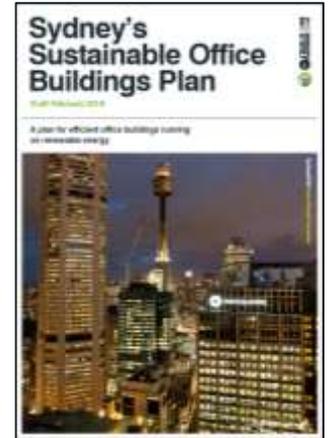
*Residential Apartment
Sustainability Plan*
August 2015



*Making Sydney a
Sustainable Destination*



*Sydney's Sustainable
Office Buildings Plan*

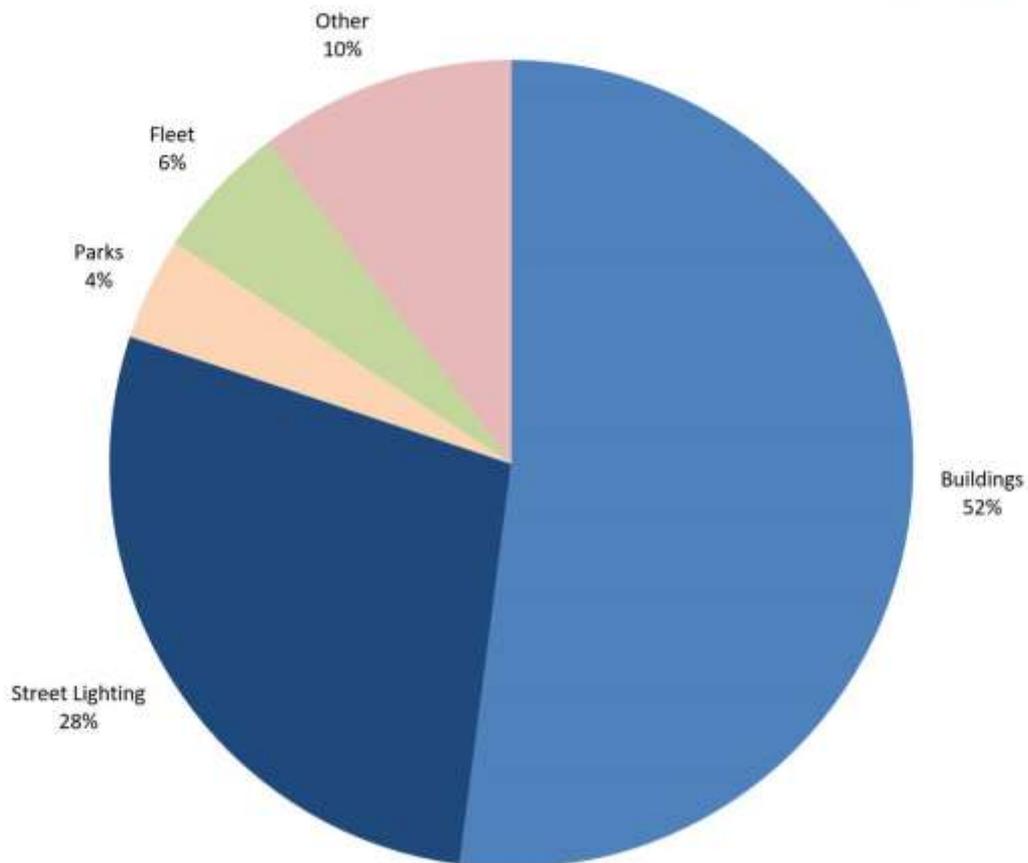


Greenhouse gas emissions - 2016/17

Council Operations

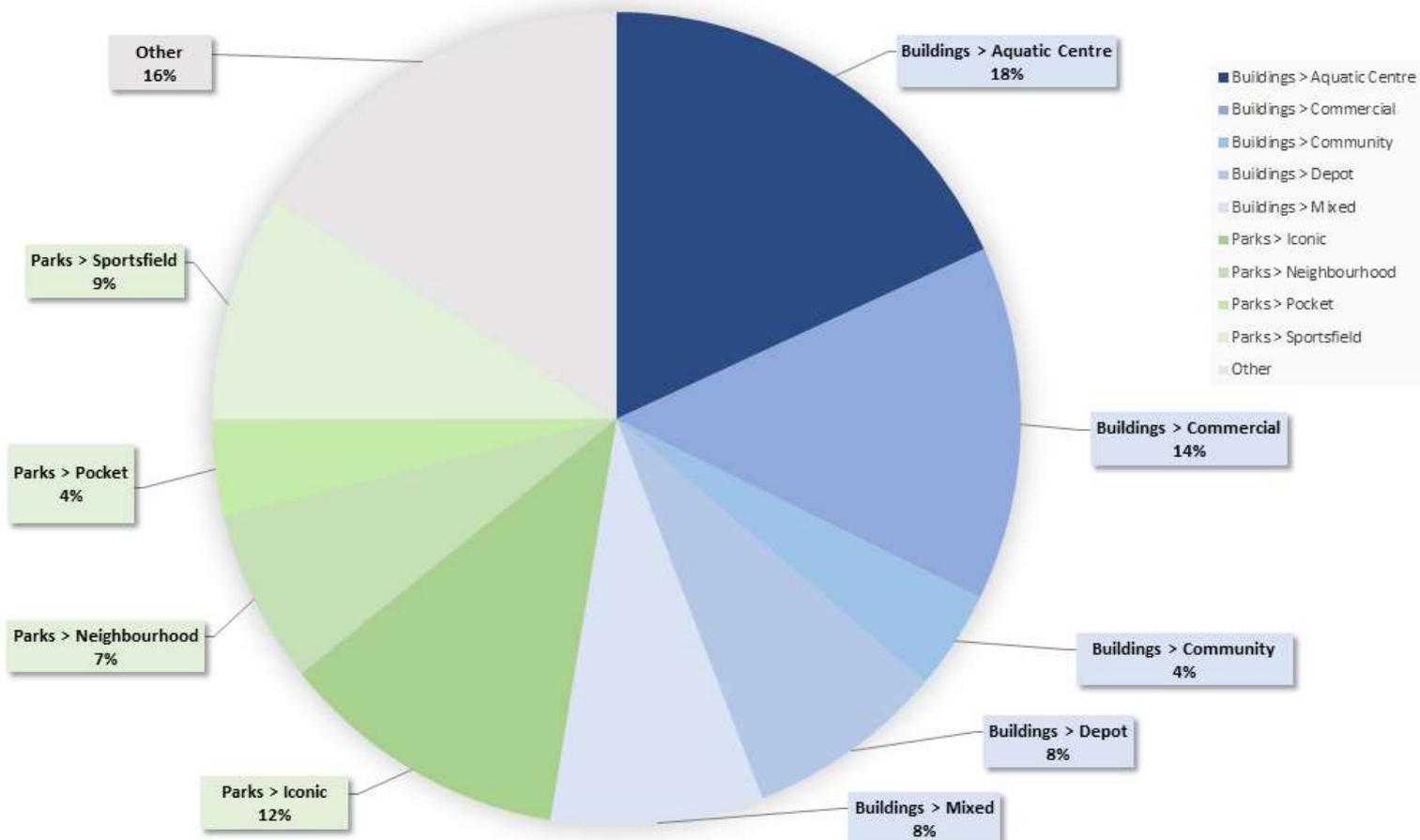


Sydney 2030 Green Tickler Connected



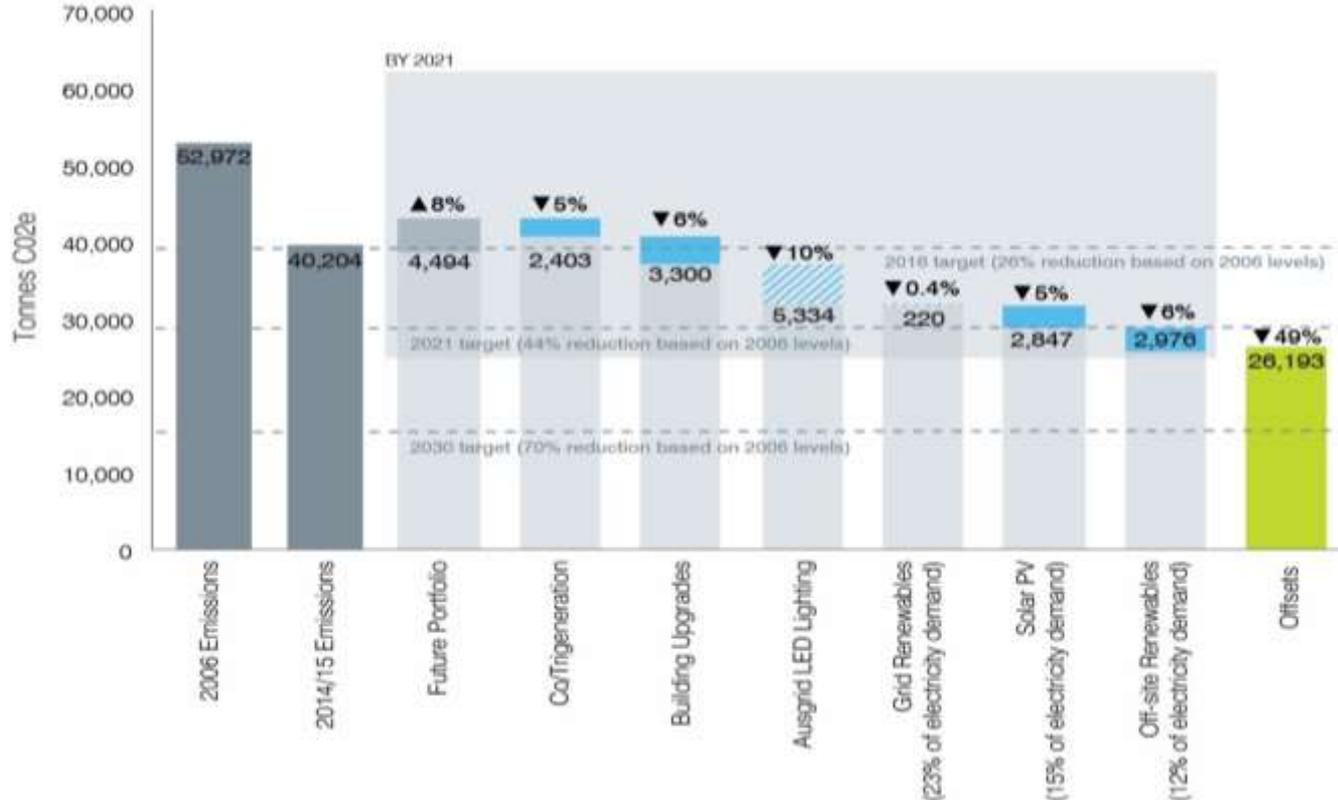
Reference to Green

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



Low-carbon City

From 26 to 44% reduction by 2021



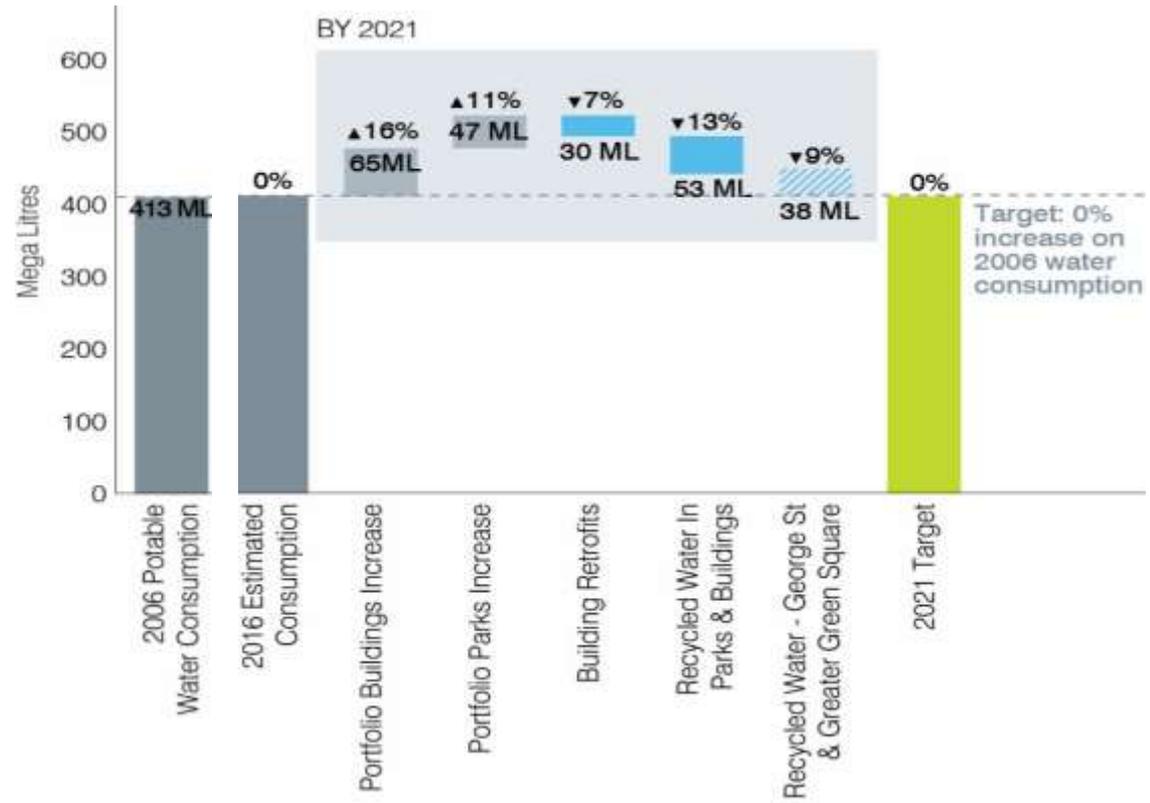
Water Sensitive City Targets

City Organisation

Zero increase by 2021

Zero increase by 2030

Open space irrigation
180L/m²



Now, 2021, 2030: Landfill diversion targets

CONTROL

MANAGE

INFLUENCE



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%

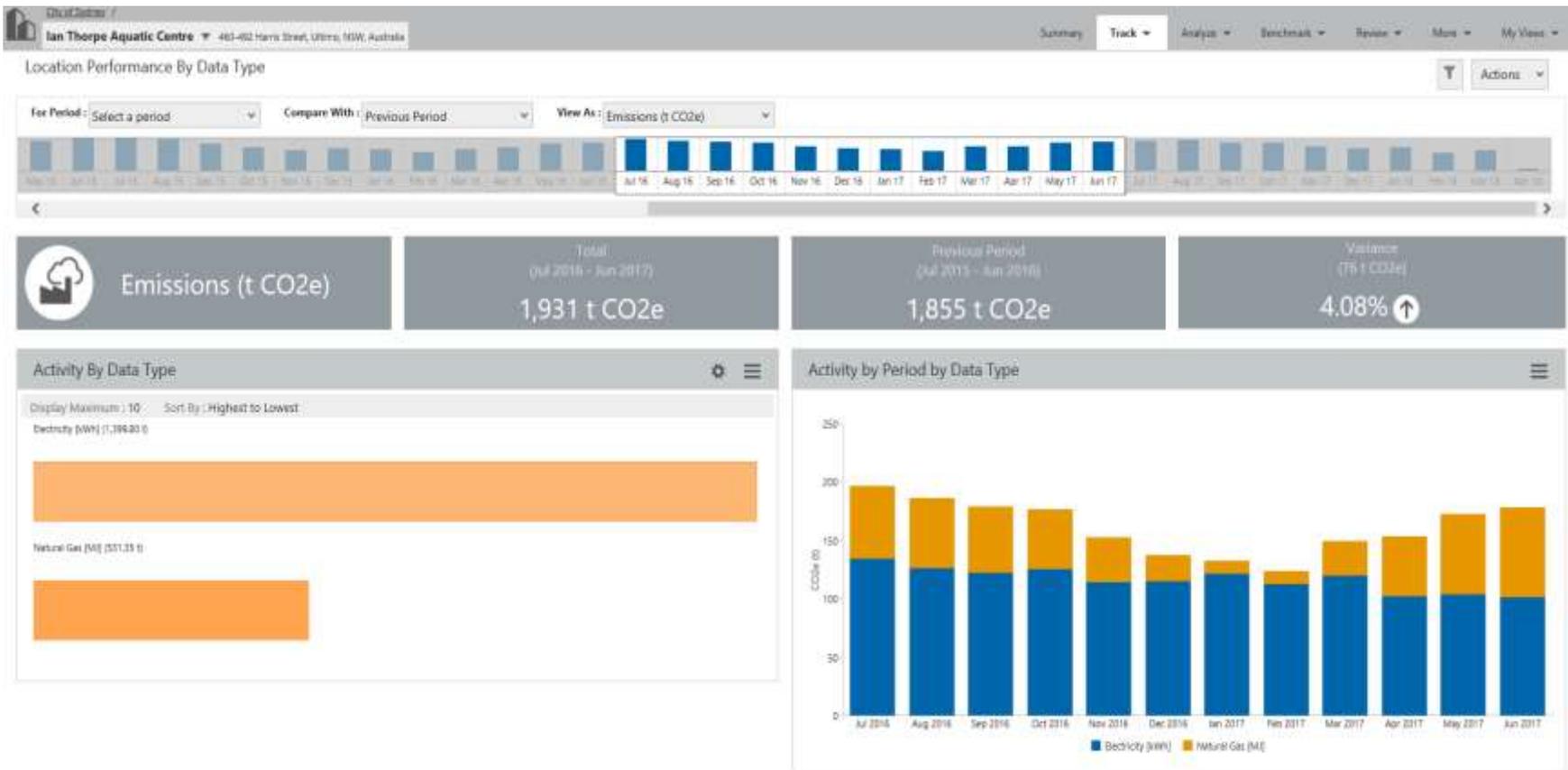
90%

90%

90%

90%

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



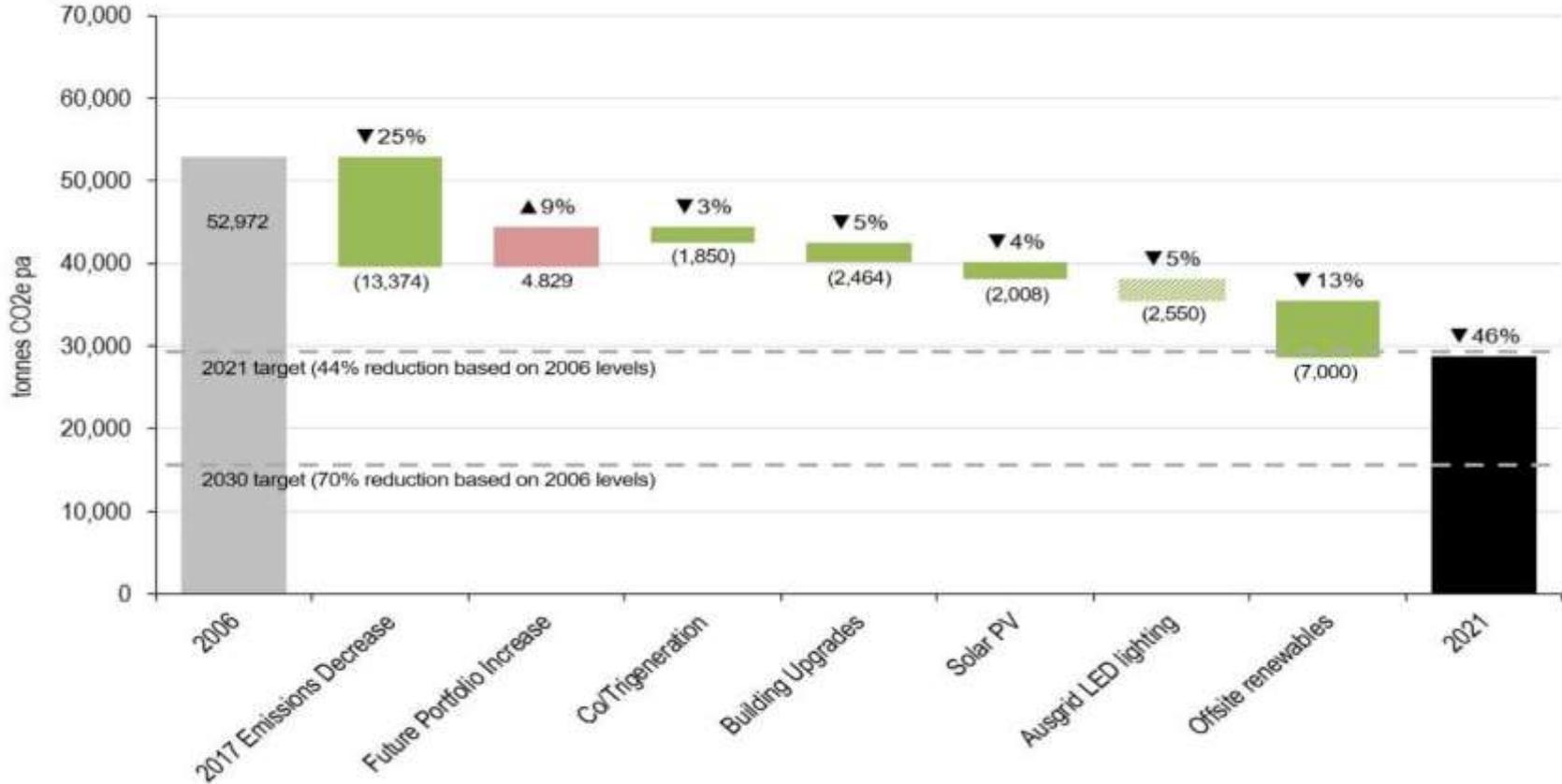
Coordination Groups

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



GHG Waterfall Chart March 2018



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

Asset Environmental Budget

March 2018

How we will get there

As at end-June 2017, the City has a verified emissions reduction of 25 per cent from the 2008 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 this 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 eg Lennon Square and Domain Parking Station and addition of others including Ian Thurgoo Aquatic Centre, 243 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 **LEDs**. **Other** influences on emissions include annual weather changes.

Initiatives to be completed by 2021

The emissions target remains at 44% reduction from the 2008 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, **Wagons** Party Education Centre, Green Square Community and Cultural Precinct, Green Square Library and Plaza, **Curragh** Park Aquatic and Recreation Centre, Perry Park Recreation Centre, Green Square Water Reserve
- Increases through Developer Contributions to the City: Oreadstead Tower Creative Hub, Darling Library, Land Lease 173-180 George Street.

Proposed Investments, Eppon Road Depot, Gerard Street (Piercing) Depot, Macan Street Depot

- **Co-Operation** (-3 per cent) - reductions will be accomplished through the operation of co-operative facilities at Town Hall House, Cook and Philip Park Aquatic Centre, Ian Thurgoo 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 annual net metering between our sites.
- **Auxiliary LED lighting** (-6 per cent) - The City pays for the **glazing** 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** (-11 per cent) can be purchased by the City through the **GreenPower** scheme or directly from a renewable project such as a Power Purchase Agreement (PPA) and integrates into the City's retail contract renewal in 2019.

1

City of Sydney Green Gridhub Connected

Operational Emissions Budget

March 2018



Curragh Park Aquatic and Recreation Centre, aerial impression

Operational Emissions Budget

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

	2008/08	2015/15	2016/16	2017/17	2018/18
Property Emissions Portfolio					
Current Annual Portfolio Balance	22,507	22,507	21,838	18,882	22,287
Add					
New Portfolio Changes	187	820	946	8,281	4,564
Reduction Emissions Projects					
Co/Operation Installations	3000	1450	1450	1450	1,800
Building Upgrades	0	(130)	(1,163)	(1,166)	(2,462)
Solar PV Installations	(72)	(831)	(863)	(858)	(2,008)
Total Property Emissions at End of Period	21,887	21,316	20,664	16,768	20,181
Street and Parks Lighting Emissions					
Current Annual Portfolio Balance	22,736	22,816	22,299	22,281	22,736
Add					
New Street Lights	80	80	80	0	245
Reduction of Emissions					
Ausgrid LED Street Lighting Program	0	0	380	(1,700)	(2,145)
Total Street and Parks Lighting Emissions at End of Period	22,816	22,896	22,659	20,581	20,836
Other Emissions					
Contractor Fuel	1,256	1,256	1,256	1,256	1,256
Organisation Fleet	2,417	2,417	2,417	2,417	2,417
Emergency Emissions (Events, Business Travel, Paper)	844	844	844	844	844
Total Other Emissions	4,517	4,517	4,517	4,517	4,517
Reduction of Emissions					
Office Renewables	0	0	0	(1,000)	(1,000)
Total Other Emissions	4,517	4,517	4,517	3,517	3,517
Total Emissions at End of Period	28,220	28,729	27,840	24,866	28,034
Baseline June 2008 Emissions (GHG Tonnes CO2e)	62,872	Emissions Reduction since 2008		44%	



Alexandra Canal Depot PV solar installation

2

City of Sydney Green Gridhub Connected

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

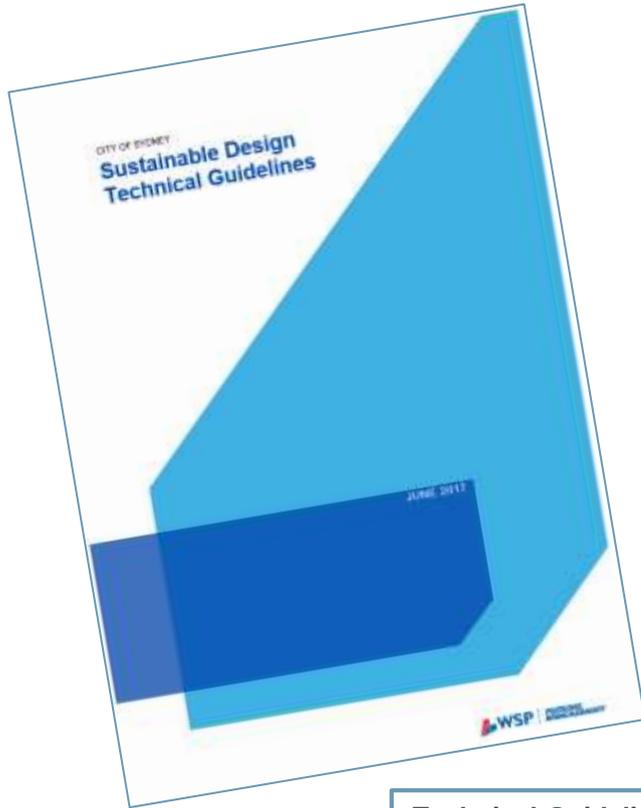


505-523 George St. 2020



Lend Lease 178-186 George St
Post 2021

Sustainable Design Technical Guidelines



Technical Guidelines

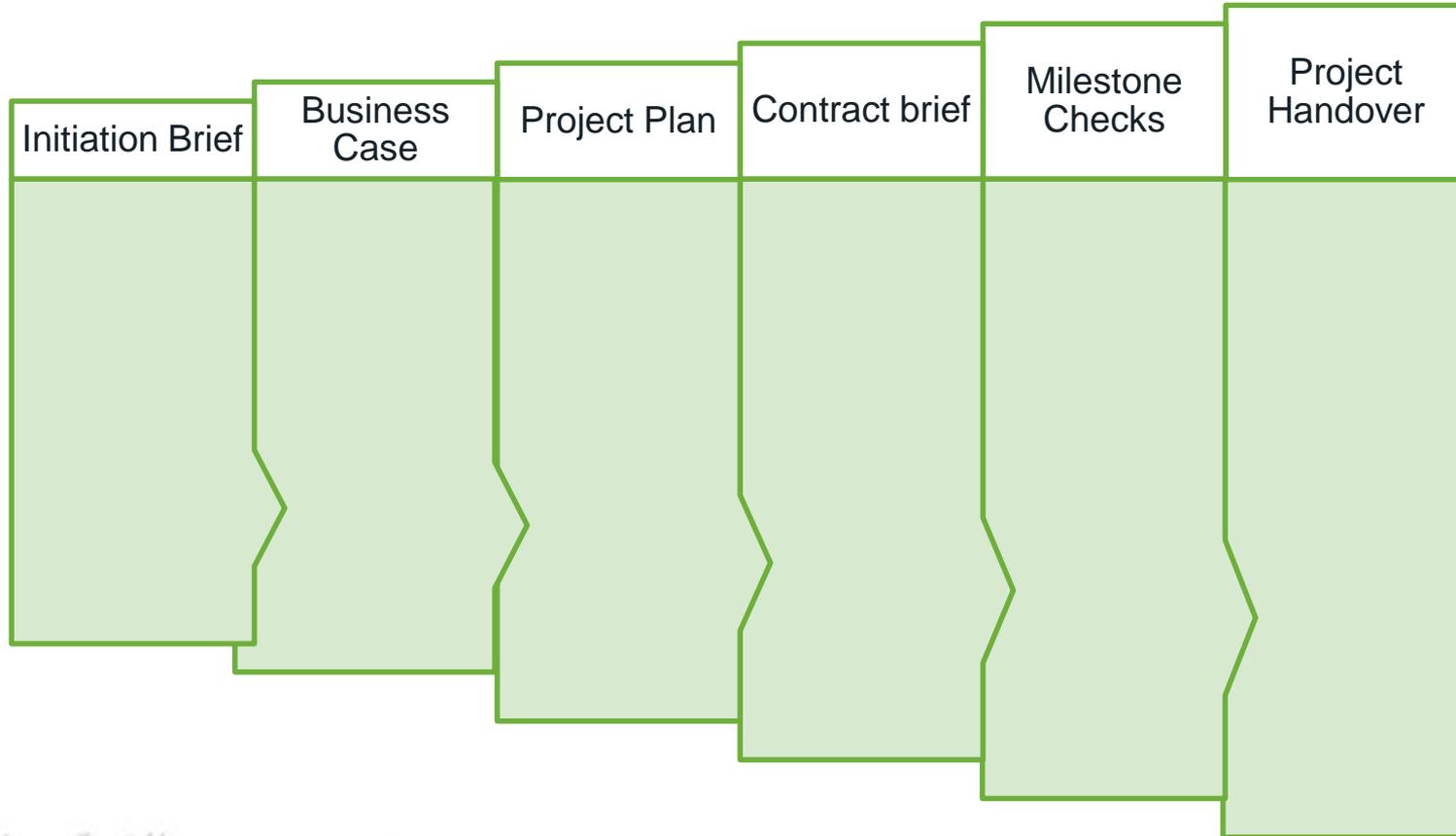
Excel Tool

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



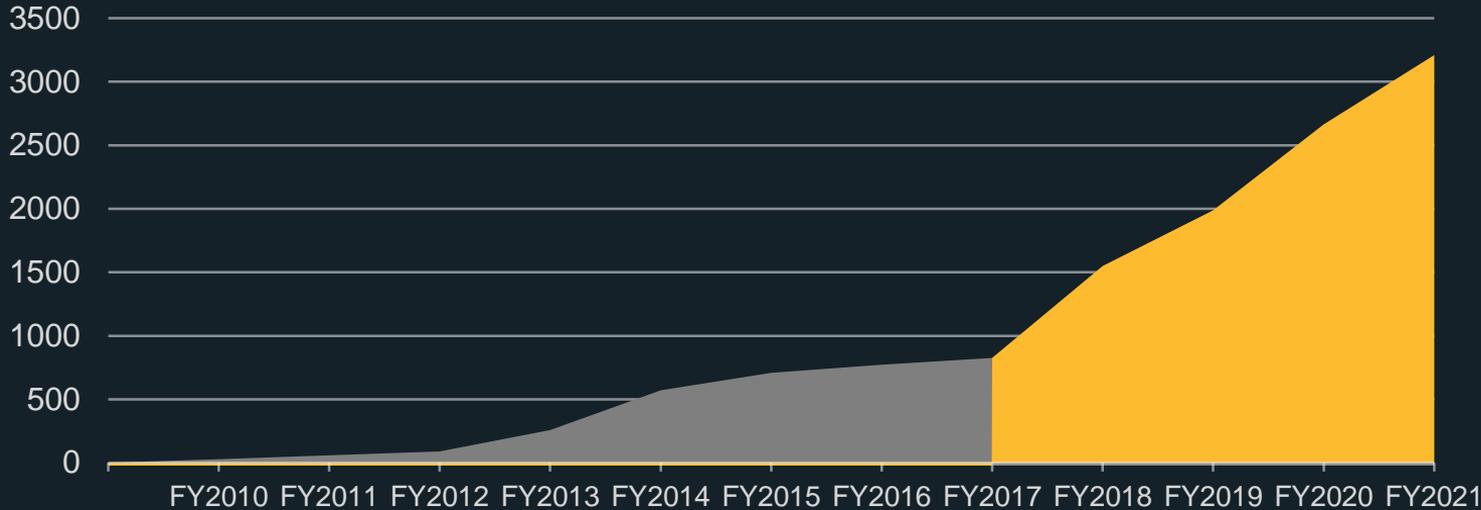
Tesla batteries



Solar PV Program

Planned Growth in PV Capacity

Cumulative PV Completions (kWp)



- Cumulative PV completions up to FY2017
- Planned Installation over the next 4 years

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

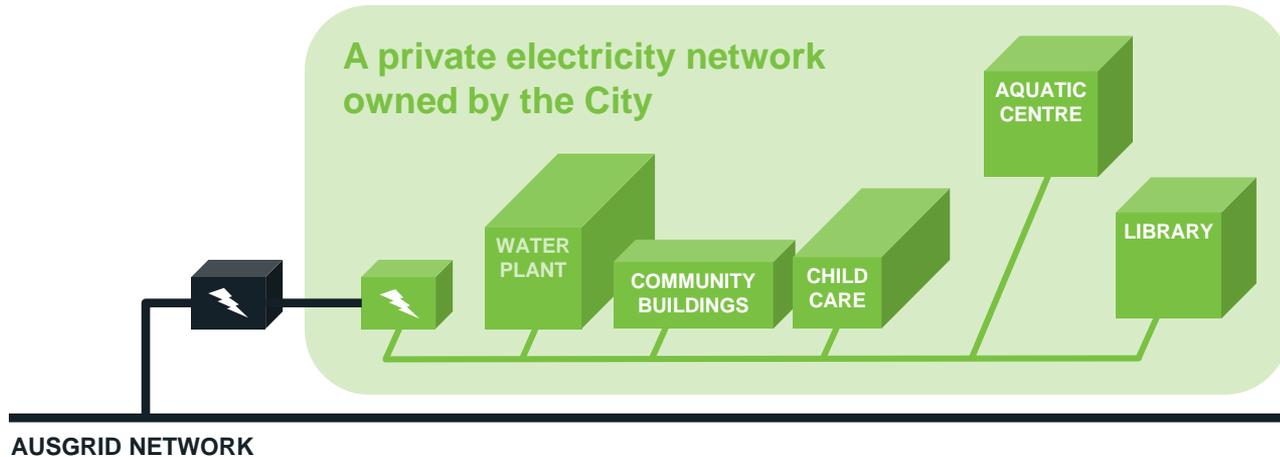
LED Lighting – City Owned 100% LED Ausgrid – on replacement



Green Square

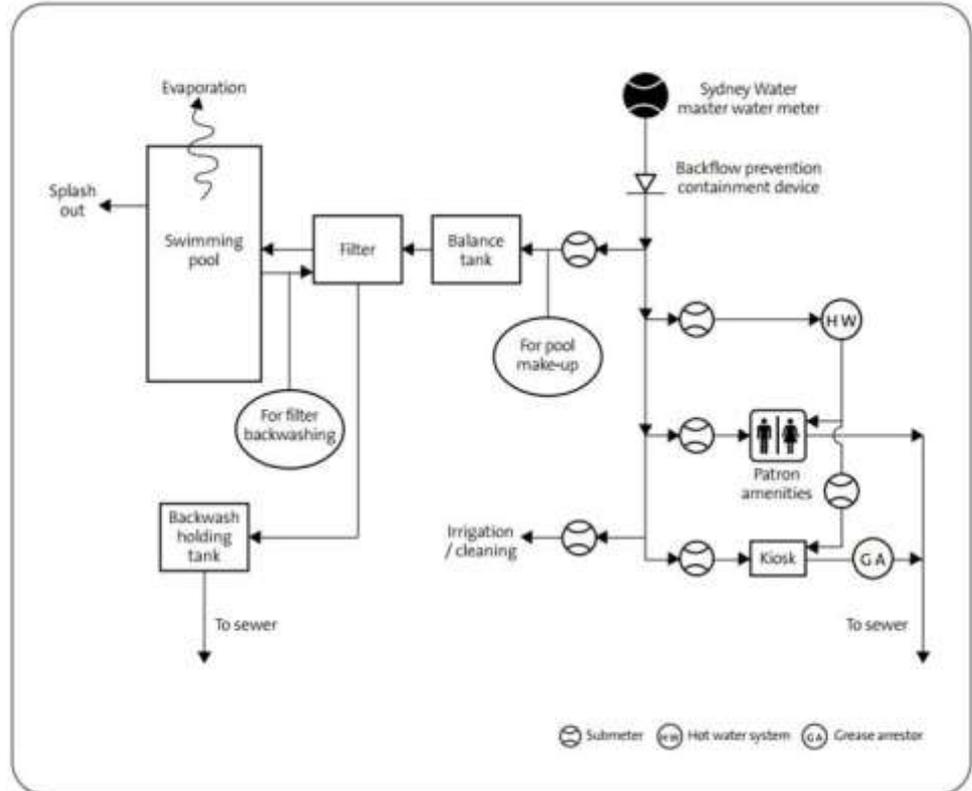
Private electricity network

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



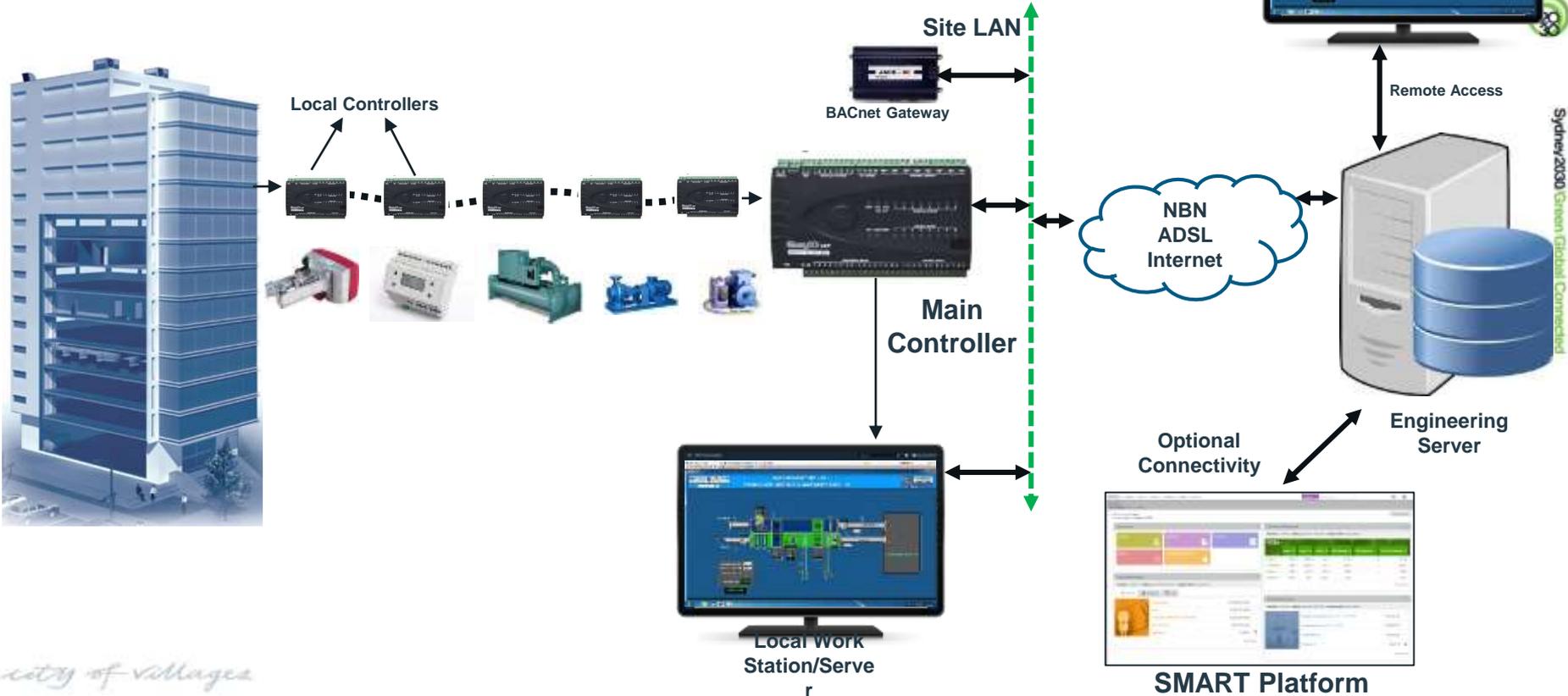
Improved Metering

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



Integrated BMS Network

Desirable setup - All City of Sydney Buildings







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 Zhang Jiajiao Waste Heat Recovery Project in China to offset emissions from the City's use of grid electricity, natural gas, heat, 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 Flarding
Joel Flarding, Funding Chairman
CERT #00011721-2



Financial Tests Criteria

- Basic test is simple payback.
Typical benchmarks are:

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

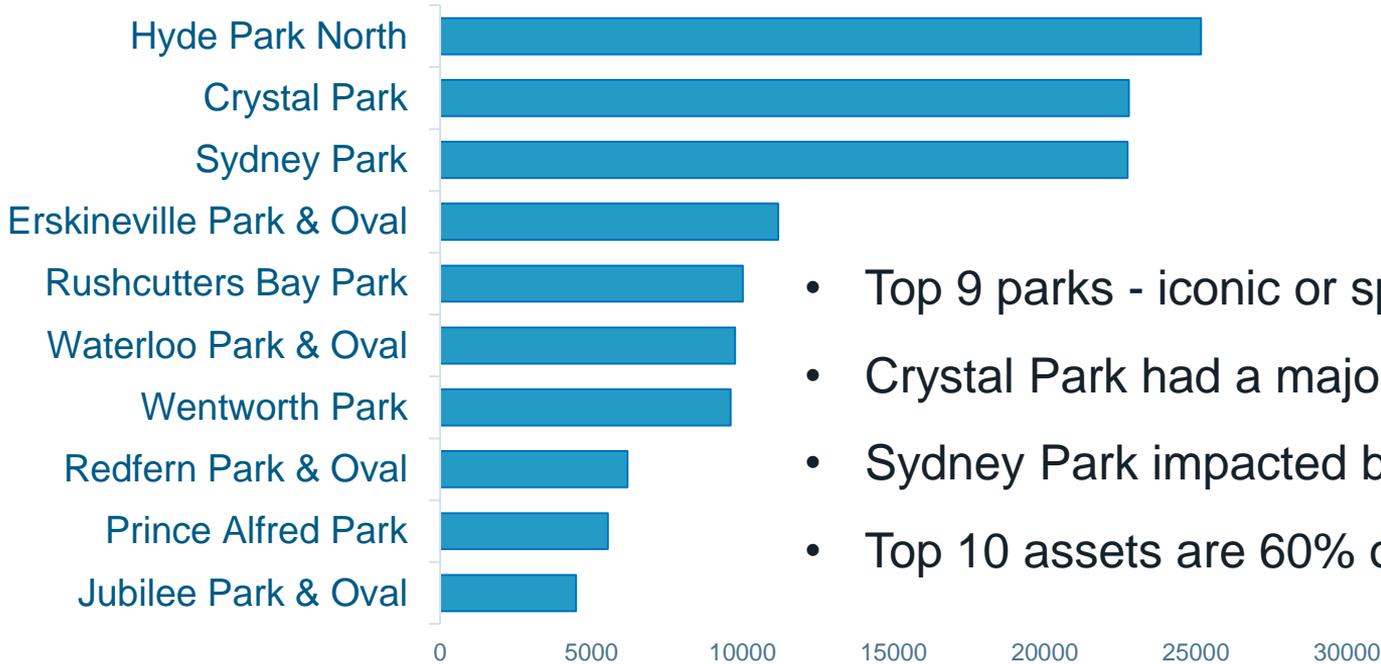
- Sometimes, cost of carbon is more applicable (NPV) – Cost of carbon < \$40/tonne
- Adopted discount rate 6%, Inflation rate 3% - typical for low risk project
- Typical benchmarks are:

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



Parks water use

Top 10 assets by potable water consumption



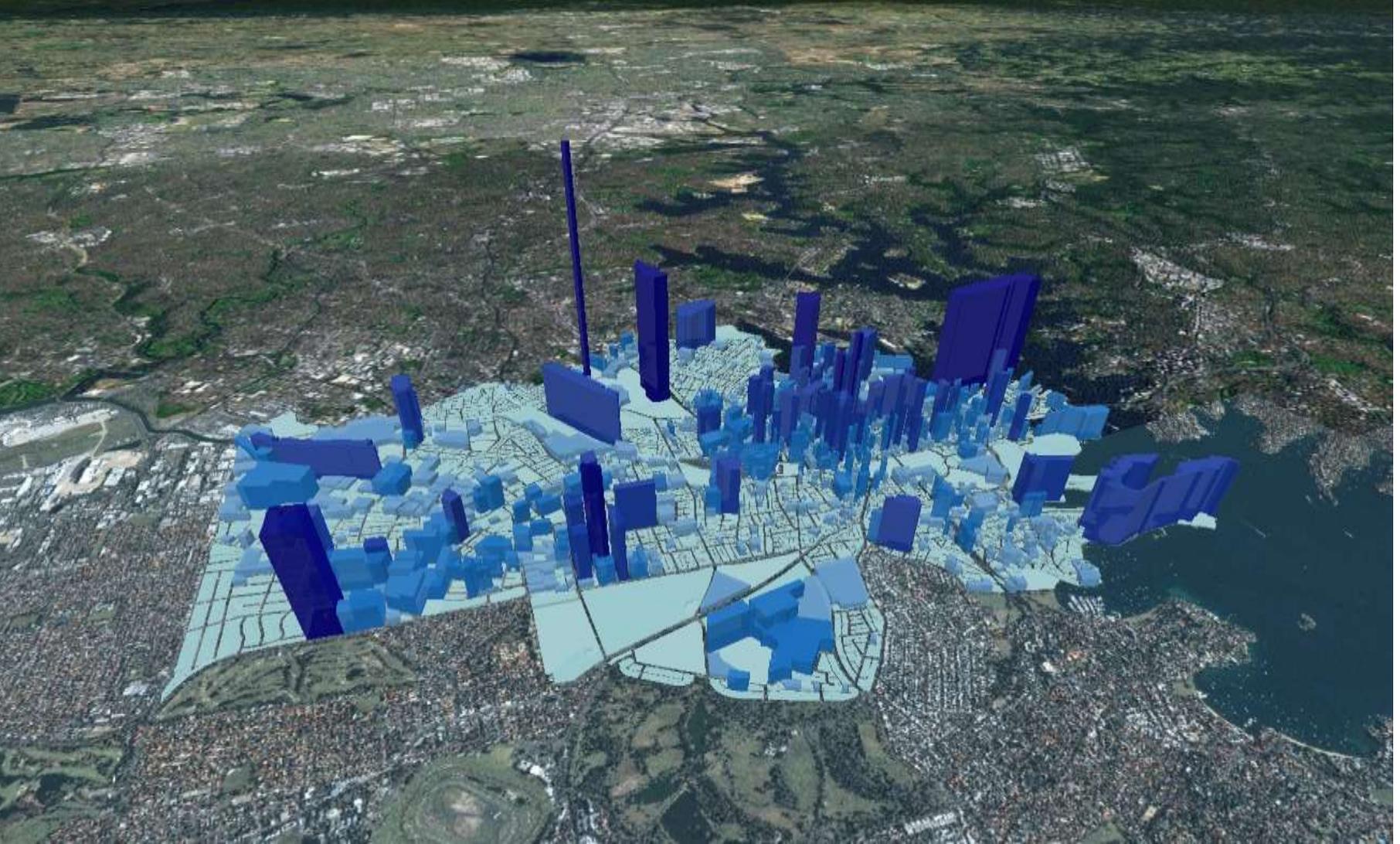
- Top 9 parks - iconic or sportsfield
- Crystal Park had a major leak, now rectified
- Sydney Park impacted by WCX (25ML)
- Top 10 assets are 60% of total consumption

2021 water target

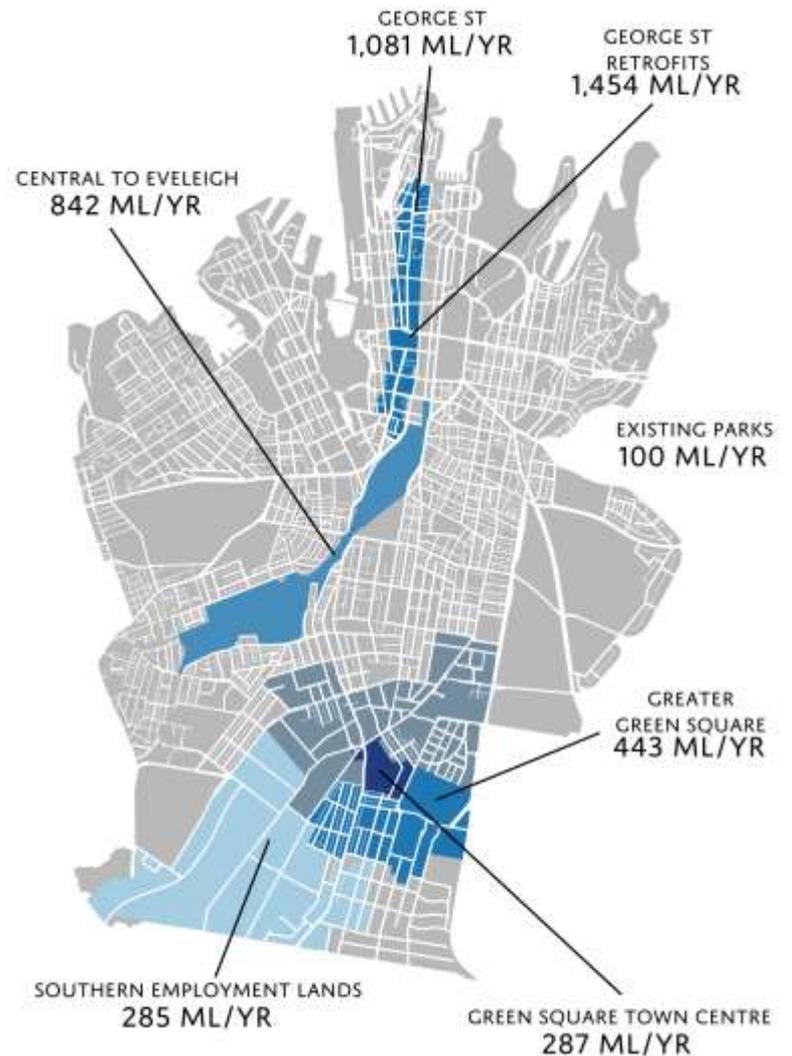
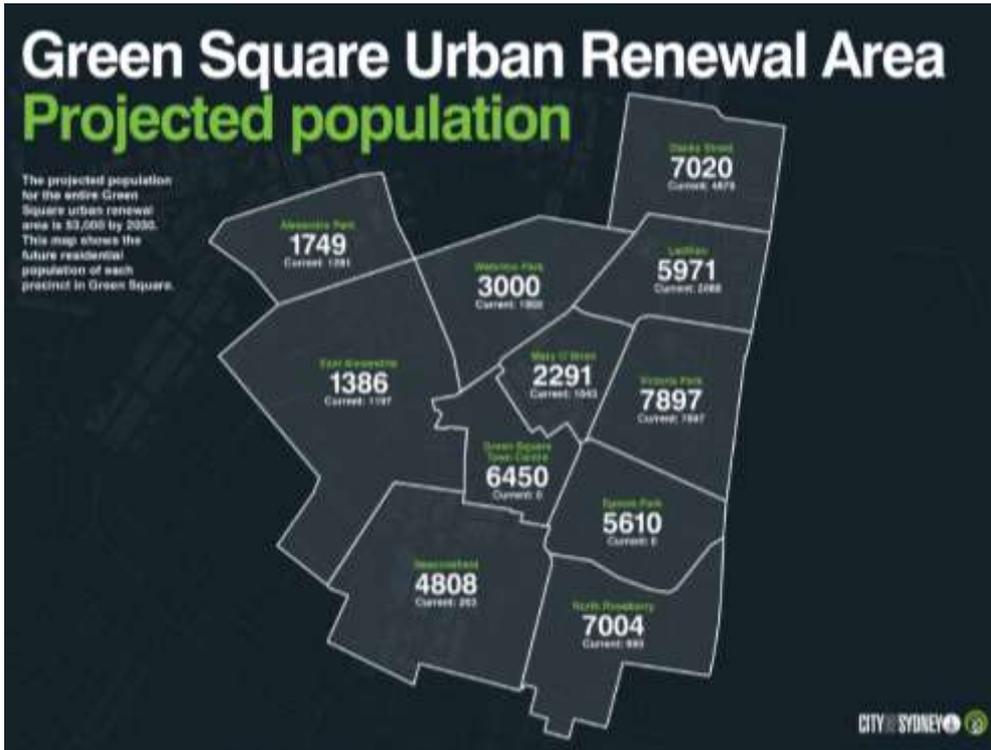
Major projects:

- 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



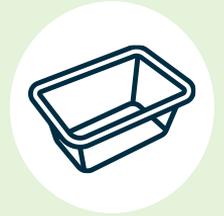
Digital reporting platform
for waste data



Operational changes at depots to improve recovery



Investigate options for public place recycling

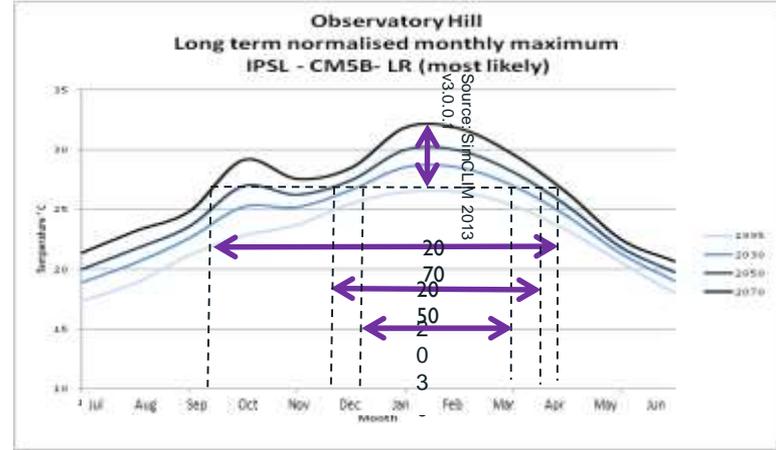
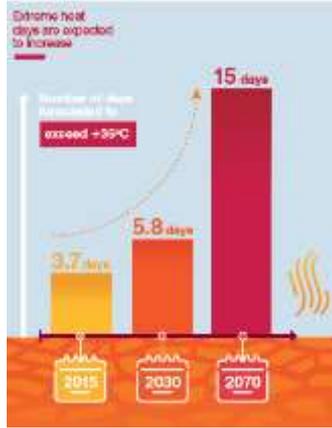


Investigate plastic packaging removal at City events and venues

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

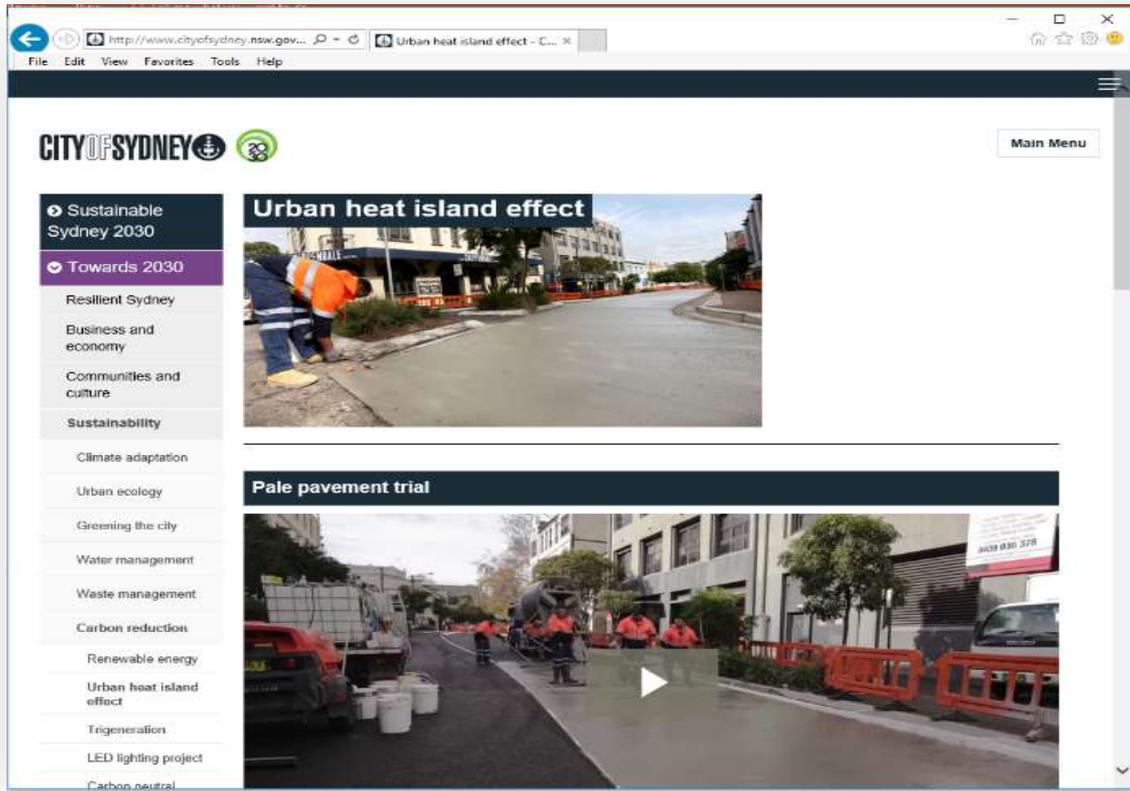
1.6%
increase

17.1%
Canopy Cover

2013

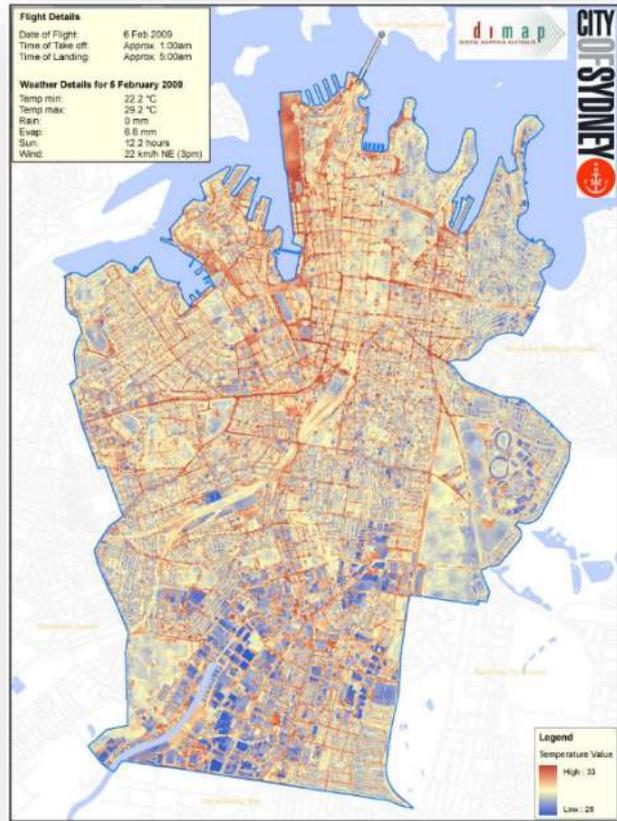
city of villages

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

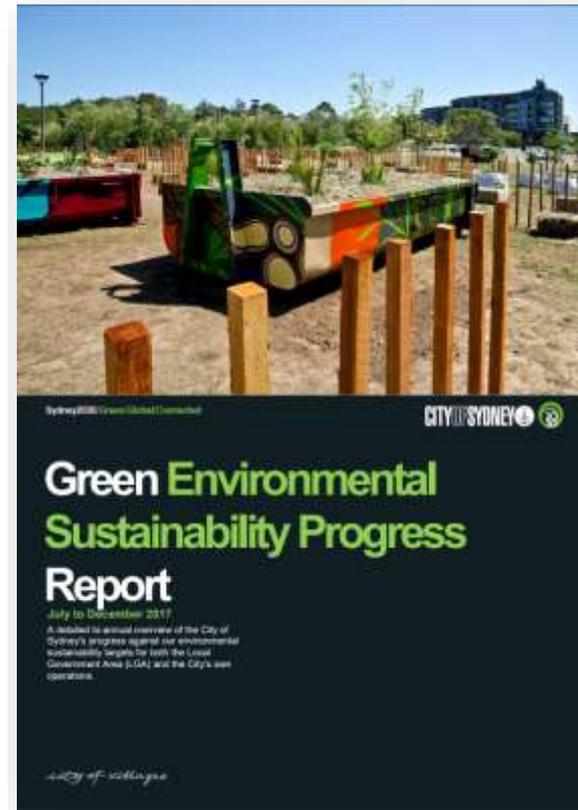
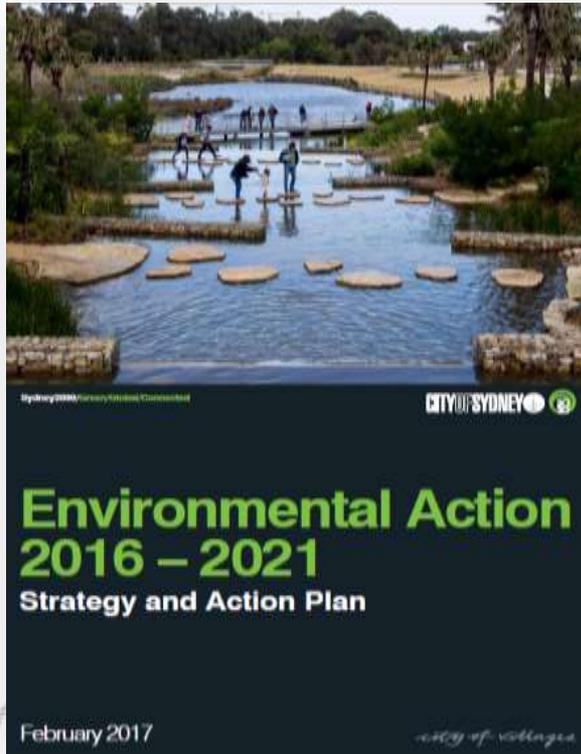


Twice as much?

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