

ARE YOUR URBAN TREES IN THE CLIMATE CHANGE AND SUSTAINABILITY SPOTLIGHT?

Lyndal Plant
Brisbane City Council

INTRODUCTION:

At the 8th Treenet Symposium in 2007 the recommendations and targets of the Brisbane Climate Change and Energy Action Plan were outlined. The Plan combines responses to the impacts of climate change for Brisbane with broader sustainability actions. The Lord Mayor is passionately committed to the Green Heart CitySmart Program which, in partnership with the community, is now implementing the Plan by investing significantly in actions across the themes of water, energy, and waste management, reducing emissions, greening Brisbane and active travel.

“Green Heart CitySmart is about working with our community to achieve house by house, street by street and suburb by suburb climate action that will help our city become the most ecologically diverse and sustainable city in Australia” – Brisbane Lord Mayor, Campbell Newman.

This has provided the opportunity to promote the positive role that urban trees play in mitigating the impacts of climate change, and the integration of urban tree outcomes across all of the action themes. This paper outlines:

- some of the common elements of climate change and sustainability action plans in local government,
- the difference between adaptation actions and mitigation actions,
- where urban trees currently and potentially fit in those actions, and
- uses examples from Brisbane, Melbourne and overseas cities, to show the opportunities and benefits that the climate change and sustainability spotlight is bringing to urban tree management.

ELEMENTS OF CLIMATE CHANGE AND SUSTAINABILITY ACTION PLANS

Climate changes in Australian cities, such as increasing temperatures, sea level rise, changing rainfall patterns, and more frequent and intense climatic events such as storms, cyclones and heat waves, have been identified. Federal, State and Local governments have responsibilities to the community to manage the risks climate change presents to the environment, society and the economy. The Australian Government’s Department of Climate Change has recently updated its guidance on “Climate Change adaptation actions for Local Government” (2009). It identifies the strong connection between climate change actions and fundamental risk management, good planning, design, efficient services and resource management. Therefore, most local government action planning simply reviews existing tools, both regulatory and non-regulatory, in the context of the new climate change risks. Given the additional connections with environmental, social and economic sustainability, climate change action plans often refer to, or are combined with, sustainability action plans. The climate change issue has therefore hastened many local authorities towards water, waste and energy efficiency, land use planning revision and many other environmentally responsible actions. Table 1 lists the common elements and topic areas of climate change and sustainability action plans. Insurers of local authorities are also beginning to scrutinise climate change action plans, given the greater exposure to public class actions, and informing councils with no plans that they may not be insurable (Donovan Burton- Climate Change Risk Pty Ltd).

Table 1: Elements of local government climate change and sustainability action plans

Functions	Actions
Greenhouse gas emission reduction/offset	<ul style="list-style-type: none"> • Emission reduction targets • Purchasing offsets for Council emission producing activities • Support for active and public transport infrastructure

Energy, Water, Waste Management	<ul style="list-style-type: none"> • Energy and water consumption reduction targets, rebates, incentives • Landfill waste reduction targets • Energy production from landfill gas • Purchasing green energy for Council infrastructure
Land use & buildings	<ul style="list-style-type: none"> • Reviews of coastal and flood prone land use controls • Support for compact/denser development and transit orientated development • Sustainable “green” building regulations, ratings, incentives, demonstrations
Public health & safety	<ul style="list-style-type: none"> • Reviews of disaster management plans - fire, flood, storm, wastewater overflow, disease, etc • Support shade provision/sun smart programs
Biodiversity protection	<ul style="list-style-type: none"> • Open space and vulnerable natural area protection • Habitat rehabilitation offsets • Revision of weed management plans
Community engagement	<ul style="list-style-type: none"> • Community, business partnerships, education, awareness • Expert advisory panels, auditing, reviewing implementation

ADAPTATION ACTIONS VERSUS MITIGATION ACTIONS

Except for the actions that help reduce greenhouse gas emissions which cause climate change, all of the actions listed in Table 1 are termed *adaptations*. Adaptations are adjustments to existing activities and practices to reduce vulnerability to the impacts of climate change. Whereas actions which lead to moderating the severity of climatic conditions themselves, or the causes of climate change, are termed *mitigations*. Mitigation may seem far more proactive and direct. However, the current Federal Government debates about emission trading and emission reduction targets are because of the perception of high economic costs of such policies versus measurable climatic moderations. Far from being a ‘cop-out’, adaptation actions, especially those that can provide a net benefit or multiple benefits to the environment, society and/or the economy, are more easily justified. For example, the City of Salisbury has required the installation of wetlands, to contain stormwater on site, as much as possible, in all new subdivisions. This initiative provides both greater flood control and reduction of peak flow rates of up to 80%, and an alternative source of water for irrigation. These are adaptations to both flood and drought events that may be more frequent in a changing climate. However, the wetlands initiative provides many other benefits such as reductions in traditional stormwater infrastructure provision and maintenance, water quality improvements, opportunities for recreation and biodiversity enhancement (Department of Climate Change).

WHERE URBAN TREES FIT IN CLIMATE CHANGE AND SUSTAINABILITY ACTIONS

When climate change impacts were first being considered by local authorities, urban trees were often treated as the victims or part of the problem. Responses included calls to stop planting trees because they use water or remove more trees because of subsidence risks during prolonged drought. Tree plantings that were permitted were expected to be drought, pollution and storm tolerant tree species and excluded from near waterways where greater flood flows may be needed.

Next, tree planting, not necessarily urban trees, exploded into the emission offset spotlight. Tree planting offsets could be purchased for every emission producing activity and product, providing ‘green absolution’ for everything from motor car use, air travel, plastic water bottles, to mobile phone batteries. Some of those tree plantings were offering co-benefits such as habitat enhancement, and saline land regeneration.

Urban tree planting and tree cover protection fit as both climate change mitigation and adaptation actions, with potential to deliver multiple benefits supporting sustainable urban form and function. They mitigate climate change impacts not only by sequestering greenhouse gas emissions, but also by helping to indirectly avoid and reduce emissions through the cooling effects of their shade and evapotranspiration. They are also integral to many adaptation actions including land use change, sustainable infrastructure, social resilience, active and public transport uptake, water cycle

management, public health, and community engagement. Coutts et al (2009), for example, suggests that the form and intensity of the urban heat island (UHI) in Melbourne can be mitigated by retaining and re-integrating urban stormwater to provide greater evaporation and transpiration. Urban stormwater, in turn, supports urban tree cover and its shade provides even more UHI mitigation. Most climate change and sustainability action plans have been slow to recognise the roles of urban trees, and have limited the focus to natural areas, biodiversity threats, fire risks, some reforestation or offsets.

EXAMPLES OF URBAN TREES IN CLIMATE CHANGE AND SUSTAINABILITY SPOTLIGHT

Some of the multiple benefits of urban trees are beginning to move into the climate change and sustainability action planning spotlight. This, in turn, is providing new opportunities for investment and innovative partnerships in better urban tree management. After all, the mitigation and adaptation potential of urban trees can only be optimised when they are well-maintained, healthy, and low risk to the communities they live amongst.

Examples of where urban trees have been moving into the climate change and sustainability action spotlight in Brisbane, Sacramento, New York City and Toronto are provided below.

Neighbourhood Shadeways and Subtropical Boulevards – Brisbane City Council

In 2008-09, 11,430 new street trees were planted in Brisbane, bringing the estimated street tree population to 550,000. Almost three quarters were planted by local residents at Saturday morning community planting events, and 10% of those plantings were funded by project partners. The Neighbourhood Shadeways program is aiming to increase tree shade/canopy cover to 50% along footpaths and bikeways. City Planning branch partners are providing more shady, comfortable and attractive pathways in areas of the city where more compact urban form and higher residential dwelling targets are being sought. Their support also helps make active and public transport options more attractive, and supplements open space provision and connections. **If shady pathways helped to reduce the number of kilometres of private car travel by just 1/100th annually, the greenhouse gas emissions avoided is estimated to be around an additional 25% of what is sequestered directly by the trees themselves.**

All major transport upgrade projects in Brisbane are required to design for maximum tree retention and where tree removal is unavoidable, new plantings must be provided to achieve **no net canopy area loss within 3 years of the project completion**. This supports Subtropical Boulevard outcomes on major city entry roads, which in turn support sustainability actions including multi-modal transport and shaded pavements, especially in retail and residential precincts.

Sacramento Regional Greenprint- Sacramento Tree Foundation (STF)

In 1990 the Sacramento Municipal Utility District (SMUD) (electricity generator and distributor) sponsored the planting of 500,000 shade trees as the cornerstone project of their investment in energy efficiency. The Sacramento Tree Foundation provided the technical expertise and hands-on advice to ensure tree plantings near homes, schools and other buildings were chosen and positioned for maximum summer cooling benefit and minimum ongoing maintenance and risk. Achieving up to 30% reductions in summer cooling demand at a cost of around \$3m, SMUD quoted the project as one of its most reliable and cost effective energy efficiency programs.

In 2005 the STF broadened its goals of maximising the multiple benefits of shade trees to the whole Sacramento region. The Regional Greenprint aims to improve air quality, energy conservation, business vitality, roadway surface lifespan, water quality, stormwater mitigation, skin cancer prevention and property values worth an estimated \$105.5 million dollars in benefits per year, by doubling the regions tree canopy to an average of 35%. **“The Greenprint invites our region’s cities and counties to develop livable and sustainable communities by building the best urban forests” (2005).**

Million Trees NYC- New York City

By adding 1 million more trees to the five boroughs, New York City plans to build upon the climate change and sustainability benefits of their urban forest already quantified in 2007 at:

- \$24.9m in carbon storage
- \$35m/yr stormwater interception by street trees
- \$27m/yr in energy savings, and
- 2,200 tonnes per year of dust and air pollution removal

In the 2008 Journal of Epidemiology and Community Health, researchers also reported that the incidence of asthma in 4-5 year old children in New York City was a quantum of 25% lower for every increase of 343 trees per square kilometre.

“Time to Tackle Toronto’s warming”

The City of Toronto plans to double the extent of urban tree canopy to 34% by 2020. Preliminary results from an urban heat island study, found tree lined residential areas among the coolest locations in the city. The following actions have been identified as climate change adaptation options to deal with extreme heat events like their 2005 summer.

- **Maintain healthy green spaces**, including practicing integrated plant health care to increase the health and survival of over 500,000 street trees and 2.5million trees in parks
- **Plant more trees, particularly in deficient areas** to reduce summer ambient air temperatures around buildings and entire neighbourhoods. Toronto is keen to focus on local hotspots, especially in low-income neighbourhoods where people are less likely to afford air-conditioning
- **Encourage use of cool (high albedo) roof materials** which reflect, rather than absorb, a greater amount solar radiation
- **Plant green roofs**
- **Plant green walls**
- **Use more lighter-coloured materials, porous paving and reduce hard surfaces-** Toronto Green Development Standard recommends using light-coloured materials for 50% of the hardscape around buildings.

CONCLUSION:

Urban tree planting and tree cover protection fit as both climate change mitigation and adaptation actions, with potential to deliver multiple benefits supporting sustainable urban form and function. Some of the multiple benefits of urban trees are beginning to move into the climate change and sustainability action planning spotlight. This, in turn, is providing new opportunities for investment and innovative partnerships in better urban tree management.

Lessons learned from cities such as Brisbane, Sacramento, New York City and Toronto may help other local and regional authorities move urban trees and their proper management into the climate change and sustainability action spotlight.

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