Lochiel Park, Adelaide

Overview

Lochiel Park is a 'green village' residential development in Adelaide, South Australia. The master planned community has been built on a former TAFE college and Metropolitan Fire Service training centre approximately eight kilometres north east of the CBD on the River Torrens.

The project consists of 106 dwellings which includes a mix of dwelling types with affordable housing options and 'mews dwellings' over rear garages. With all but a handful of lots still to be sold all essential infrastructure is now on-site.

Just over 4 hectares of the 15 hectare site has been allocated for the residential component, which means that more than 10 hectares has been incorporated as parklands. These parkland areas are protected by legislation against future development.

The project was developed by the Land Management Corporation (now the Urban Renewal Authority) to be a showcase for other urban development projects. The project was formed out of a Rann Government objective for Lochiel Park to become the "nation's model green village".

In recognition that Lochiel Park was going to push the boundaries of Ecologically Sustainable Development (ESD) additional funding was provided to the project through rebates or subsidies for sustainability features. Most house and land packages in Lochiel Park sell for between $500,000 and $600,000.

The new Lochiel Park community is well connected via bicycle paths to the CBD along the River Torrens linear park. Transport connections are more limited with private vehicle the predominant means of transport (although the O-bahn passes the site there is no station within 2km).

Sustainability features

The Lochiel Park development aims to reduce household potable water use and greenhouse gas emissions to around a quarter of the state's average and energy use to around a third of that average. To achieve this a number of overall design initiatives are incorporated into the development both at the precinct and dwelling levels.

Design Guidelines

In order to guide development at the site 'urban design guidelines' were drafted to specify a number of mandatory requirements, including specific requirements in relation to sustainability features of individual dwellings. Whilst much of the sustainability initiatives were implemented at the precinct scale (see below) the urban design guidelines were the preferred mechanism for ensuring environmental performance at the dwelling scale.

These guidelines set "a new benchmark for sustainable development in South Australia". Under the guidelines some design elements are requirements (meaning that they must be complied with) and others are advisory only.

The guidelines cover the key elements of residential sustainability and allow prospective residents to use a Lochiel Park Sustainability Rating Tool in place of more prescriptive sustainable design requirements. This allows greater flexibility in design whilst ensuring environmental performance.

Energy Efficiency

A number of energy efficiency and renewable energy initiatives have been incorporated into the development as outlined below:

- Photo-voltaic cells on each dwelling (minimum 1kW per 100sqm of dwelling area)
- Mandated NatHers energy rating of 7.5 stars (1.5 above minimum compliance)
- Load limiting (which helps minimise peak load by non-essential appliances being phased off during peak load times)
- Gas-boosted solar hot water (minimum 70% solar contribution)
- Minimum energy efficiency ratings for heating and cooling appliances

Water

Lochiel Park has also invested heavily in water efficiency and stormwater management, including a 'third pipe' strategy which supplies water for toilet flushing, washing machines and private and public open space irrigation. The water is collected from a 190 hectare adjacent site before being treated through a wetland system and stored in aquifers on site. Other water initiatives include WSUD treatments, mandatory rainwater tanks and minimum standards for fixtures and appliances.

Materials and waste

The project has also incorporated some innovative approaches to materials selection and waste. For example an initiative which sought to limit the 'embodied energy' of materials was the manufacture of bricks and pavers on-site, which was able to turn waste soil from the development into high quality pavers for use in the development, avoiding wastage and transport related greenhouse gas emissions.

Energy demand management

One of the key features of the project was to test designs against real life data, with an extended monitoring phase to 2018. Individual dwellings were fitted with monitors that allow external monitoring of household energy and water consumption and facilitate householders to monitor energy and water use, to guide reduced consumption.

This initiative allows for much needed further research into demand management behaviours to guide the development of other projects.

Implications for planners

Leadership

Lochiel Park demonstrates the importance of showcase projects. State government investment through the then Land Development Corporation was instrumental in bridging the gap between the upfront capital cost of the development and the preparedness of the market (at that time) to pay for sustainability initiatives.

Many of the features of the development have now been incorporated into other developments across Australia, signifying the importance of leadership at the government level to break down barriers such as split incentives and help develop the market for high energy and water efficiency. Importantly, the demand management data collection will provide ongoing support for this changing dynamic by demonstrating that the design initiatives translated into 'on-the-ground' results. A sustainability centre was created as part of the project to assist in communicating this message.

Design Guidelines as the tool...

This project illustrates the value of urban design guidelines as a tool to safeguard design outcomes of all types, in this case with a key focus on sustainability.

Many other developers already create Design Guidelines for their subdivisions or estates in order to protect the amenity of the estate and give future residents some control over what their neighbourhood is going to look like. The opportunity exists as demonstrated in the Lochiel Park case, to include ESD considerations as a component of these Design Guidelines documents. There is an opportunity for planners both in the public and private sector to work with development proponents to use this tool to re-enforce basic good building design principles, with emphasis placed on the 'low hanging fruit' of improved environmental performance; eg. eaves, shading, orientation of living spaces, materials and rainwater harvesting.

Connection to Clean Energy Future package

The project pre-dated the Clean Energy Future (CEF) package, but reinforces the role of the package in both energy efficiency and renewable energy.

Carbon price mechanism (CPM)

Because of the investment into energy efficiency and renewable energy, residents at Lochiel Park are largely shielded from increases in the cost of energy, be they from network upgrades or the introduction of the carbon price mechanism (CPM) in July 2012. The energy demand data continues to demonstrate significant energy savings for residents meaning their economic resilience to climate change impacts is enhanced.

Renewable and low carbon energy (RLCE)

The project illustrates the value in dwelling scale renewable energy to augment the energy supply. By mandating solar PV cells on each dwelling, significant overall greenhouse gas savings have been achieved.

In particular, the project demonstrates clearly the relationship between rooftop solar and peak demand, with early data showing that summer peak loads were considerably reduced due to high solar energy production co-inciding with peak air conditioner usage.

Energy efficiency (EE)

The project sets energy efficiency benchmarks which are at the leading edge of sustainable design in medium density residential projects. The target set for Lochiel Park was to reduce energy use by 66% or two-thirds against the South Australian 2004 benchmark. Preliminary data suggests that significant savings (above 50%) are being made when compared with the state benchmark. An in depth analysis of energy and greenhouse gas savings was undertaken by the University of South Australia (see data reference below).

Future projects with similarly significant investments in user monitoring of energy usage may be able to access energy efficiency information grants through the CEF package.

Further reading

Lochiel Park website – http://www.lochielpark.com.au/

Data reference

Saman, W.Y., Whaley, D., Mudge, L., Halawa, E., and Edwards, J. (2011) “The Intelligent Grid in a New Housing Development” Final Report, Project P6, CSIRO Intelligent Grid Research Cluster, University of South Australia.