Global warming represents a massive challenge which Sydney must face in its future planning.

The Target set by the Vision aims for a 70 per cent reduction of greenhouse gas emissions against the City's current performance by 2030.

The Target is the same as a 50 per cent reduction in green house gas emissions compared to the level in 1990. This base year is sometimes used to be consistent with the language of the Kyoto Protocol, the international framework to reduce greenhouse gases.

The data used to estimate greenhouse gas emissions for the City for the year 1990 is not as reliable as information currently available, and underestimates emissions. The Vision used accurate data from 2006. This figure was then used to determine a more realistic 1990 baseline.

The target for emissions in 2030 is 1.6 mega tonnes of carbon dioxide compared to 5.4 mega tonnes in 2006 and 3.2 mega tonnes in 1990.

1 Green Transformers

The 2030 Sustainable Sydney Consortium teams and the City of Sydney, developed the Green Transformer concept and analytical framework used to assess its effectiveness as part of the 2030 Vision.

The 2030 Vision calls for the City to re-imagine the way society and industry produce and use our energy. It proposes to build a network of 'Green Transformers' that would cut the carbon content of electricity, provide low greenhouse hot water, heating, and cooling for both new and existing buildings.

Green Transformers will also be configured to use the waste heat to transform sewage into recycled water. Within the next two decades it is also possible that half of the City's waste could be digested and returned as electricity into the local distribution network.

Green Transformers will be integrated into urban renewal projects, installed into existing buildings, or possibly stand alone as their own sustainability showpiece. The benefits of low carbon electricity and low greenhouse heating and cooling provided by the Green Transformers will be distributed throughout large parts of the City through a new underground green reticulation network facilitated by the City of Sydney.

Importantly, existing development will get the opportunity to connect to a low-cost, low-carbon solution.

The main technological component of Green Transformers is cogeneration, the simultaneous generation of electricity and harvesting of waste heat. Natural gas, a much cleaner fuel than coal, is used to generate electricity, emitting less carbon dioxide for the same amount of electricity. Also, rather than wasting two thirds of the energy by blowing it into the atmosphere through large cooling towers at coal-fired power stations, Green Transformers will use that waste heat to provide low greenhouse heating and cooling homes and workplaces.

This will lead to an overall energy efficiency of approximately 85 per cent—at least twice as efficient as the best coal fired power station.

Combined with other supply and demand side policies in renewables, energy efficiency, and transport, Green Transformers will bring about 50 per cent less greenhouse gas emissions.

At the same time a Green Transformer network will work towards securing 100% of the City's electricity supply by 2030 compared to current levels.
A major achievement of 2030 is that the individual greenhouse footprint of City residents will shrink from over 35 tonnes to under 12 tonnes of carbon dioxide per year—a 66 per cent reduction.

While Green Transformers are based on robust and well tested and established technology, the innovative approach adopted by Sustainable Sydney 2030 is a radical departure from the current approach to energy provision within New South Wales and will not come without its challenges.

Under an optimistic growth scenario, the use of Green Transformers means the City would not be reliant on any coal fired electricity. If all major urban centres followed suit, NSW would not need any new base-load power stations and could plan for the decommissioning of existing coal-fired power stations.

2 Electricity

Renewable electricity will also be essential to any meaningful emissions reduction plan, and is expected to comprise 25 per cent of the City's electricity supply in 2030.

A fully renewable future is a desirable goal—however, this cannot happen overnight. The Vision offers a transition technology and fuel that will significantly reduce emissions and that is available for large-scale use at an acceptable cost. Cogeneration and gas is such a combination.

3 Transport

Some 50 per cent of trips in the City are made by walking and cycling and the use of public transport is high. However, more needs to be done.

Over 70 per cent of City Centre workers travel to work by public transport, the highest proportion of any Australian City. The City has a high share of residents (59 per cent) who live and work in the City, travel shorter distances and are less likely to drive.

However, in the last five years the City's energy demand increased by almost 20 per cent.

4 Water

Although water consumption has been reduced in the last five years through restrictions, the general trends have been increasing consumption.

Based on current trends, the City's water use will increase by 22 per cent by 2030, green house gas emissions increase by 41 per cent and waste by 50 per cent.

Preventing this means setting new targets. It means innovation and investment in new ways of approaching the infrastructure of City planning and the infrastructure encompassing transport, water, energy and waste management.

5 Waste

The relatively clean and separated waste stream of the City is ideal for re-use. The Vision recommends a Green Infrastructure Plan. The City and adjoining Councils could work together to identify a potential waste transfer station and conversion site with a view to creating energy from waste.

The City could also seek partnerships with waste services companies and research institutions to assist in the development of waste-to-energy technology.

This could result in the collection and conversion by 2030 of 50 per cent of the waste stream to electricity or green gas through the Green Transformer Network.

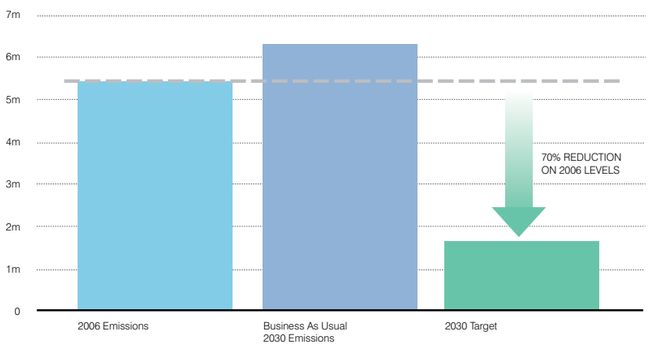
The Green Infrastructure Plan has a central focus on developing sustainable technologies, infrastructure and transport.

6 Lighting

A 10 per cent overall reduction in emissions is possible by phasing out incandescent light bulbs with progressively more efficient lighting technologies. This can be achieved through a reduction across all building types (six to nine per cent in dwellings and 12 per cent for non-residential buildings).

The City of Sydney's LGA Emissions. Reduction targets.

Source: Kinesis, 2008 based on Environmental Management Plan.



7 Appliances

A drop of 10 per cent in electricity consumption is projected through a meaningful commitment to lowering the power use of major and minor appliances in the home and office, including standby electricity consumption. The introduction of a policy of minimum energy performance standards would eventually affect all buildings.

8 Car parking strategies

Though current City planning controls do not require any parking to be provided, in new developments, on current trends, all new multi-unit residential buildings will have 1.1 car park spaces per dwelling. Under the 2030 Vision, effective alternative transport options will enable a 40 per cent reduction on this allocation would lower energy consumption for lighting and ventilation in car parks.

9 Housing strategies

Savings will flow from an increased inner-city population. Based on transport patterns remaining the same, for each person living in the City instead of the wider Sydney metropolitan area produces savings of 1.5 tonnes of carbon dioxide from lower transport emissions, especially private car use.

THE KYOTO PROTOCOL

The Protocol, established in 1997, is a legally binding international plan to:

⇛ Reduce greenhouse gas emissions

⇛ Set targets for industrialised countries to reduce their pollution, and

⇛ Establish an international emissions trading system

The Protocol includes a major program, the Clean Development Mechanism, to allow developed countries to invest in clean energy and emissions reduction projects in the developing world, and use the emissions reductions to help meet their domestic targets.

The first commitment period for emissions cuts runs from 2008 to 2012, and targets for post 2012 are currently being negotiated.

The graph below shows how the proposed strategic actions will individually and collectively achieve emission reductions by 2030.

Source: Kinesis, 2008 based on Environmental Management Plan.