

How Newcastle, Australia, might respond to climate change

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Summary

Surveyors are at the forefront of land development and play an essential role in how our cities and towns develop and change over time. Further, surveyors are practical and receptive to new ideas and technology. Climate change, possibly the biggest challenge for our generation, will change the face of land development in ways we can only imagine. Every town and city will be affected in one way or other.

So what changes should my town, Newcastle, Australia, anticipate to accommodate the effects of rising sea levels, increasing demand for renewable energy and Peak Oil? These could include new dwellings in potentially flood prone areas designed to be raised if necessary. Urban renewal along transport corridors which may see multi story residential development along our rail and high frequency bus corridors. The revival of public transport with emphasis on integrated public transport particularly bus, rail and light rail. All new residential, commercial and industrial development will have solar collectors and water tanks as a standard requirement while wind farms throughout our rural areas and along our coastlines will challenge our notions of scenic and visual impact.

These development options could change the face of our city, in ways we may not like, but might need to accept, as the price of responding to climate change.

Finally Novocastrians will face some difficult, yet essential, decisions such as;

Should we build another coal fired power station?

Should we build another export coal loader?

Should we build wind farms along Nine Mile Beach?

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Background

We cannot keep developing our cities and towns the same way we have for the last 100 years or more. The impacts of climate change and the shortage of oil will force us to adopt more sustainable lifestyles and adapt our cities to use less resources.

The next generation of Australians will not be able to live the way the baby boomers – my generation – have lived. Our children will not be able to expect to live in a detached house on a ‘quarter acre block’ the way we did. The next generation will live in apartments well served by public transport powered by renewable energy.

Change is always difficult but the Newcastle community, Novocastrians, like most other communities, have experienced a lot of change in recent years with more to come.

Honeysuckle, the government led re-development of inner Newcastle, has been a step in the right direction – not perfect of course as you can always improve a project in retrospect, but the re-development has spurred a significant revival of the Newcastle CBD increasing the inner city population by thousands with the construction of hundreds of new apartments in the last 20 years.

The 10 storey Alto, mixed use development, at Charlestown, a regional centre about 10 kms south of Newcastle, represents a dramatic and welcomed change in urban form along with apartments at Swansea, Warners Bay, Belmont and Toronto, with more in the pipeline.

The popularity of the Fernleigh cycle track, an excellent example of a ‘rail-trail’ and the Warners Bay to Speers Point lakeside cycle ways, are proof that people will get out of their cars if opportunity and encouragement are there. These all represent significant changes to our city landscape helping to re-focus our development pattern from car dependent, low density urban sprawl, on the city edge to higher density housing close to public transport and shopping centres.

So what sort of changes should we expect in the future if we are to effectively respond to the threat of climate change?

Climate change represents possibly the biggest threat to modern society and consequently it demands the biggest response. But climate change alone is not the only problem we face.

Peak Oil

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'Peak Oil' is the term used to describe the point at which world-wide oil supply ceases to increase and begins to decline. It is speculated that the world-wide oil peak is likely to occur between 5 to 30 years time. Some argue that Peak Oil is with us already – at the very least we can expect oil prices to rise, perhaps dramatically, once the current global financial crisis is over. Oil supplies are currently on the decline in politically 'stable' countries such as the USA, while oil rich regions such as West Africa and the Middle East often face political instability.

While the amount of oil available now and into the future is uncertain, so is the accessibility of this oil. Oil accessibility is a major factor determining the price of oil. Oil that is more difficult to extract is generally more expensive than oil that is readily accessible. Once all the easily accessible oil has been spent, a time will come when oil is so difficult to access, that it will no longer be worthwhile extracting. In 2008, oil prices have continued to meet all-time record highs. The implications of peak oil, political uncertainty and unpredictable commodity markets are likely to ensure that these prices will continue to rise unless demand which continues to explode worldwide can be dramatically scaled back.

There is mounting concern that global oil production is nearing or past its peak and that world oil reserves are inadequate to satisfy increasing world demand. Peak Oil is the term used to describe this phenomenon.

When coupled with the impact of Peak Oil it is clear that a city like Newcastle with a population of 400,000 people and a surrounding population of thousands more will have to make dramatic changes to accommodate the combined threats of Peak oil and climate change.

Given all this there are a number of changes that a city like Newcastle will need to undertake to respond to the dual threats of Peak Oil and climate change.

1) Sea level rise

Large parts of Newcastle and Lake Macquarie are low lying including the suburbs of Stockton, Swansea and Blacksmiths which are all coastal localities only a metre or so above sea level. They will all be susceptible to sea level rise which is predicted to be about a metre over the next 50 to 100 years. As sea levels slowly rise we will experience increased coastal flooding particularly when heavy rain storms coincide with high tides just as happened in Newcastle in June 2007 in what we call the Pasha storm after the coal carrier which was washed onto Newcastle Beach. That is considered a 1 in 100 year event but unfortunately such events are likely to become more common.

This issue will particularly impact on surveyors who help maintain the national tide datum and determine mean sea level, as coastal councils grapple with the impact of rising sea levels.

We will need different strategies to deal with rising sea levels which could include;

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- Building houses in low lying areas of lightweight materials so they can be raised or moved as required.
- Construct sea walls in critical locations to protect essential infrastructure
- Accept some flooding as the price to pay for living in that location.
- Demolish some houses that cannot be protected.

Much of the housing stock in these areas is old and ready for renewal but Councils will need to develop appropriate guidelines to ensure the new development can cope with the increased risk of flooding. Many of the existing houses cannot be raised and their value will decline with the owners having to face all the social consequences that this will entail.

Lightweight house design which is traditionally popular in Newcastle given the relatively mild climate has the added bonus of being more affordable than brick and tile construction.

Having said this it is important not to overstate the issue. The sea level rise will be gradual and almost imperceptible and we will have time to adapt our building design in low lying areas to suit. Its interesting to note that Lake Macquarie City Council have adopted a policy that residential development should plan for a 1 metre over 100 years while commercial and industrial development should plan for half a metre over 50 years on the basis that houses will last much longer than commercial buildings.

Nevertheless we must expect more frequent extreme flooding events in our coastal suburbs such as we had in 2007 when a high rainfall storm coincided with a high tide event. Such events will become more common as the sea level rises.

2) Urban renewal along transport corridors

We must plan to accommodate more people within the existing urban area and at the same time emphasise the use of public transport. To achieve this we must raise the residential densities along our main transport corridors while limiting new housing on the urban fringe which usually results in higher car use. In a typical medium density suburb the density might be 60 persons/ha. This could double in key locations such as around town centres and along well serviced public transport corridors. We will see well designed high density housing, including vertical retirement villages, within walking distance of every town centre served by efficient public transport – bus or rail. We could see 10 storey mixed use apartment buildings clustered around Cardiff and Broadmeadow railway stations, in particular, designed and built as affordable housing within walking distance of the local railway stations. Similarly we could see 5 to 7 storey apartments along the Charlestown to Swansea bus corridor. This would stimulate a significant improvement in bus frequency so reducing car dependency as oil prices rise.

Such development may require tradeoff of a dramatically altered residential character in these areas to achieve a more sustainable city overall. It will change the appearance

of our major transport corridors but may be part of the price for the impact of climate change.

3) Development of tram trains to spearhead the rejuvenation of Newcastle CBD

The Newcastle CBD has declined with a significant number of vacant and under utilised shops and offices evidence that the city is in need of renewal. The redevelopment of the harbour foreshore from port and rail uses to mixed use commercial and residential uses with extensive parks and walkways called the Honeysuckle project has been a great success. However it contrasts dramatically with the neglected Hunter Street precinct on the other side of the railway. Like many cities the rise of the mega suburban shopping centres with the convenience of air-conditioned one-stop-shopping has enticed people away from the traditional shopping precincts.

Newcastle CBD has to reinvent itself to compete with the suburban shopping malls. The CBD needs a catalyst project to kick start the rejuvenation of the city. In the last 10 year hundreds of new apartments have sprung up in the CBD but this alone is not enough. The city branch railway should be re-configured into a light rail or tram train corridor to allow easy connectivity between the harbour foreshore precinct and the rest of the CBD. Such a tram train system could be gradually expanded throughout the city as demand requires. In particular it will provide an essential link between the CBD and suburban University campuses as the university presence in the city increases.

A tram train linking Maitland, Newcastle and Fassifern using the existing heavy rail network is a much preferred and more sustainable alternative to the short sighted proposal to cut the rail as advocated by some pressure groups.

As oil prices increase the imperative to expand our public transport systems will grow significantly. Newcastle will learn from the experience of other cities who have introduced and expanded light rail in the face of increasing car congestion and rising oil prices.

4) Wind farms along our coastlines

All cities will need to focus on expanding the generation of renewal energy in all its forms. The NSW wind atlas shows that most of the NSW coastline is a high wind location yet there is a general reluctance to pursue wind turbine projects along our coastlines.

I envisage a line of magnificent, sculptured, wind turbines along Nine Mile Beach, from Redhead to Swansea, south of Newcastle and Stockton Beach north of Newcastle, churning out power day and night. Some will be horrified at the idea of 'spoiling' a beautiful beach while others will marvel at the creation of renewable energy in a magnificent location (the doubters should experience the stunning Albany

wind farm located right on the coastline overlooking the ocean in Western Australia). I hope we will also be generating power from the sea, in some form of wave or tidal energy, as well.

The issue of protecting the scenic and visual impact versus generating wind power close to the consumer demands the consideration of trade-offs. Do we value the scenic qualities of our coastlines so highly that they must be protected against wind turbines even if it means that the impacts of climate change will be more significant.

The Newcastle and Hunter community knows the cost of the mining and burning of coal to generate electricity. This must change. Every community should take some responsibility for its own power generation so every community – city or town - should generate renewal energy – wind in particular.

5) Maximise the generation of solar energy

According to Federal Government data, water heating is the single biggest source of greenhouse gas emissions from the average Australian home.

Australia has a huge amount of average sunshine yet less than 5% of our houses have solar hot water which is a national embarrassment.

Most homes still use the old highly inefficient continuous electric hot water systems which originally used off peak electricity when there was spare, cheap and un-used electricity at night. There is no such thing as un-wanted electricity now and when we start paying the real price for electricity off peak electricity will disappear.

Every new roof, be it residential, commercial or industrial, should have solar generation capacity installed and solar hot water should be mandated for every dwelling.

Fortunately the Australian Governments are planning to phase out the old continuous electric hot water systems which should be banned, just as the old incandescent light globe technology is to be phased out in 2010.

Australia's State and Federal Governments are now working together to phase out electric hot water systems in favour of gas and other more eco-friendly systems. The phasing out of electric hot water systems will be implemented on a state by state basis. South Australia has a program in place already while Queensland has just begun its program. There is no word yet when NSW will start to phase out electric hot water systems.

6) Plan for zero emission housing

By 2016 all new houses in Britain will be zero emission homes and by 2020 the same will be true across the European Union. Australia has no such targets but given our

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more mild climate and ample opportunities for renewable energy this could, and should, be a priority.

I envisage the Hunter's first zero carbon emission community centred around the Wyee railway station, south of Newcastle, with every low emission dwelling having the latest water and energy efficient technology within easy access of fast commuter trains to Sydney and Newcastle. We know how to build carbon neutral housing but we don't - why not?

7) No new coal fired power stations

Here is a brave call by a Novocastrian - there will be no new coal fired power stations, ever! Instead we will have a number of gas fired power stations designed to provide peak electricity on demand, backed up with wind farms scattered around the valley. Australia is well endowed with natural gas and we are now making plans to export it overseas. NSW in particular could and should make more use of natural gas which while still a fossil fuel will be a very useful interim fuel, as we plan for the post oil/gas/coal age.

Personally I doubt that carbon sequestration will prove effective or efficient for years, if ever. We cannot rely on un-proven technology to solve our energy problems.

8) More sensible transport

Australia is a very transport dependent society and rising energy costs will have significant social and economic consequences. As oil prices rise Novocastrians will turn to more sensible transport options. Not only will we see a rejuvenation of our public transport systems with the introduction of integrated ticketing to encourage more bus/rail/ferry journeys we will see the development of other more sustainable forms of transport including hybrid and electric cars, natural gas powered buses and trucks and bicycles.

Conclusion

Significant tradeoffs will be required if we are to climate change proof Newcastle.

Do we maintain the local character and streetscapes of our major transport corridors – Pacific Highway, Brunner, Newcastle, Glebe, Maitland and Lambton roads by restricting development in certain locations by height and floor space, or do we allow 3 to 5 story residential development right along the corridors to ensure the increased densities promote the use of public transport and reduce car dependency?

Do we sacrifice our Newcastle railway to ensure that there is good connectivity between the CBD and Honeysuckle even though this will degrade public transport in the Lower Hunter or do we build upon the existing infrastructure and create a public transport network based on tram trains that will benefit the whole lower hunter community?

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Do we protect the scenic and visual qualities of our coastlines – 9 mile beach and Stockton beach – and prominent rural locations in the Hunter Valley - from wind farms even though this may mean that a new coal fired power station will be required to meet rising power demand?

Do we mandate that every roof – residential, industrial and commercial – has solar panels and solar hot water and ban continuous electric hot water systems even though it will mean higher building costs in order to ensure that no more coal fired power stations are built?

These are the issues that we have to consider if we are to prepare Newcastle for the impact of climate change.

Finally some big questions for Newcastle and the Hunter:

Should we build another coal fired power station? – probably no

Should we build another coal loader? – definitely not

Should we plan to phase out the export of coal? – probably yes

Should we build wind farms along Nine Mile Beach and the northern end of Stockton Beach and elsewhere in the Hunter Valley? – definitely yes

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Biographical notes

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