

ITEM 2. FINAL DECENTRALISED ENERGY MASTER PLAN – RENEWABLE ENERGY: ADOPTION**FILE NO: S072290****SUMMARY**

This report recommends that the final version of the Decentralised Energy Master Plan – Renewable Energy and associated Technical Appendices be adopted by Council, with the amendments to the Master Plan detailed in this report.

In 2008, the City of Sydney launched Sustainable Sydney 2030 and committed Sydney to becoming a green, global and connected city. Central to this vision was the commitment to be internationally recognised as an environmental leader of outstanding performance, and with green industries driving economic growth.

The City of Sydney set targets of reducing greenhouse gas emissions across the entire Local Government Area by 70 per cent below 2006 levels, and for the city to have capacity to meet up to 100 per cent of electricity demand by local electricity generation, both by 2030. The 100 per cent local electricity demand to be met by 70 per cent from trigeneration and 30 per cent from renewable electricity generation.

On 18 June 2012, Council resolved that, by 2030, renewable gases from waste and other renewable energy sources, such as solar and geothermal, could replace fossil fuel natural gas in the proposed trigeneration systems enabling them to provide carbon free electricity as well as carbon free thermal energy for heating and cooling. This Council Resolution also effectively means that the City of Sydney has a 100 per cent renewable energy policy since renewable electricity and renewable gas can provide 100 per cent of the city's electricity, heating and cooling requirements by 2030.

Sustainable Sydney 2030 set out a clear path for reaching these targets by improving energy efficiency, encouraging people to cycle and walk, utilising waste as a resource, converting non-recyclable waste to energy, recycling water, renewable energy and a decentralised energy network, powered by trigeneration. Key to this plan were 'Green Transformers' – the co-location of trigeneration, waste collection/treatment and recycled water treatment that would deliver the greatest reduction in greenhouse gas emissions. Central to achieving this was the objective to develop a Green Infrastructure Plan comprising five Master Plans as follows:

- Decentralised Energy Master Plan – Trigeneration;
- Decentralised Energy Master Plan – Renewable Energy;
- Decentralised Energy Master Plan – Advanced Waste Treatment;
- Decentralised Water Master Plan; and
- Energy Efficiency Master Plan.

In addition, a Climate Change Adaptation Plan would support and take into account the Green Infrastructure Plan as climate change mitigation and adaptation should be integrated holistically since the green infrastructure that a city needs to function must also be resilient and adaptable to climate change.

On 24 June 2013, Council approved placing the draft Decentralised Energy Master Plan – Renewable Energy and associated Technical Appendices undertaken by the Allen Consulting Group, Talent with Energy, and Arup on public exhibition. The Renewable Energy Master Plan together with the three Technical Appendices comprises the 'Master Plan'.

Key stakeholders were consulted as part of the public exhibition process including two public focus groups, a stakeholder briefing, a City Conversation, media and other communication. In addition, 420 key stakeholders comprising organisations, individuals and government departments were notified of the public exhibition and 'one to one' meetings/presentations were held with 36 key stakeholder organisations, both seeking comment on the draft Master Plan.

In response to the public exhibition held between 26 June and 3 September 2013, the City received 15 submissions or other feedback, which are summarised in Attachment A. The submissions have been reviewed and, where appropriate, the Master Plan has been amended in response to the issues raised. A number of amendments are proposed to be incorporated in the Master Plan for adoption as outlined in Attachment B, and in the final Master Plan at Attachment C.

The proposed amendments improve, but do not substantially change, the overall strategic directions outlined in the exhibited draft Master Plan documents, and do not warrant re-exhibition.

The final Master Plan provides a blueprint that could be achieved over time with appropriate implementation plans and regulatory change. The implementation of the Master Plan cannot be delivered by the City alone and without regulatory change, nor can the outcomes be realised in a short time frame.

The City will need to cooperatively work with its residents and businesses, as well as appropriate delivery organisations in the private sector and other levels of government to deliver the full potential of the Master Plan, and the success of this will depend on how well the City gets its message across and convinces others to work with the City.

The Master Plan outlines 17 enabling actions needed to bring about positive change as set out in the Final Renewable Energy Master Plan, including one additional enabling action as set out elsewhere in this report.

As a condition of public exhibition of the draft Master Plan, Council required the Chief Executive Officer to delegate a minimum of four community consultation workshops/forums to enable the community to make informed submissions. These consultations took place and are outlined in the report.

RECOMMENDATION

It is resolved that:

- (A) Council note the Summary of Submissions Received during Public Exhibition and Schedule of Proposed Amendments to the Final Decentralised Energy Master Plan – Renewable Energy, as detailed in Attachments A and B respectively to the subject report;
- (B) Council approve the proposed amendments to the Final Decentralised Energy Master Plan – Renewable Energy, as shown in the Schedule of Proposed Amendments to the Final Master Plan in Attachment B to the subject report and as set out elsewhere in the subject report;
- (C) Council adopt the Final Decentralised Energy Master Plan – Renewable Energy as shown in Attachment C to the subject report;
- (D) Council note that no amendments have been made to the three Technical Appendices to the Final Decentralised Energy Master Plan – Renewable Energy, and the documents remain the same as those endorsed by Council for public exhibition on 24 June 2013;
- (E) Council adopt the Technical Appendices as part of the Decentralised Energy Master Plan – Renewable Energy, being the Financial and Economic Analysis of Renewable Energy Opportunities report, Renewable Gases Supply Infrastructure - Technologies, Resources, Economics and GHG Emissions technical report and the Renewable Energy Master Plan Study, at Attachments B, C and D, respectively, to the report to the Environment Committee on 17 June 2013 as previously circulated separately to Councillors and subsequently approved for public exhibition by Council on 24 June 2013; and
- (F) authority be delegated to the Chief Executive Officer to add further case studies to the Master Plan, to include community renewable energy and a further “power to gas” case studies.

ATTACHMENTS

(Note – Attachment C will be circulated separately from the agenda paper and to Councillors and relevant senior staff only. A copy will be available for viewing on Council’s website and at the One Stop Shop and Neighbourhood Service Centres.)

Attachment A: Summary of Submissions Received during the Public Exhibition Period

Attachment B: Schedule of Proposed Amendments to the Final Master Plan

Attachment C: Final Decentralised Energy Master Plan – Renewable Energy

BACKGROUND

1. The Trigeneration Master Plan was adopted by Council on 24 June 2013 and this report seeks the adoption of the Renewable Energy Master Plan to coordinate with the Trigeneration Master Plan.
2. In 2009, the City engaged Arup to develop the Renewable Energy Master Plan study. However, this study did not address the financial and economic analysis of renewable gases. In 2012, the City engaged Talent with Energy to develop the renewable gases supply infrastructure, technologies, resources, economics and greenhouse gas emissions (GHG) technical report and the Allen Consulting Group to develop the financial and economic analysis of renewable energy opportunities report, both of which are included in the Technical Appendices to the Master Plan.
3. The Decentralised Energy Master Plan – Renewable Energy itself was drafted by the City’s Chief Development Officer, Energy and Climate Change with the City’s Sustainability Unit.
4. The Renewable Energy Master Plan not only sets out renewable energy resources to deliver the City’s 30 per cent renewable electricity target, but also to deliver the displacement of natural gas initially supplying the trigeneration network, with renewable gases derived from waste and biomass by 2030. The combination of renewable electricity, renewable thermal energy and trigeneration fuelled by renewable gas, could deliver a 100 per cent renewable energy city by 2030 and reduce greenhouse gas emissions by 69.5 per cent. The Renewable Energy and Trigeneration Master Plans come close to achieving the overall target to reduce 2006 greenhouse gas emissions by 70 per cent by 2030.
5. In response to the overwhelming message from the public focus groups, City Conversation public forum and elsewhere on how can the City’s community help the City of Sydney deliver the Renewable Energy Master Plan, further details on community renewable energy schemes have been added to the Master Plan. Such schemes have had a major impact on renewable energy delivery in advanced economies in Europe and the USA. Indeed, renewable energy generation owned by individuals and the community form the majority of renewable energy generation in some regions in other countries.

RENEWABLE ENERGY MASTER PLAN

6. The Decentralised Energy Master Plan – Renewable Energy comprises:
 - (a) Renewable Energy Resources;
 - (b) Re-Thinking Renewable Energy;
 - (c) Renewable Energy for the City of Sydney;
 - (d) Performance Measures;
 - (e) Enabling the Master Plan;
 - (f) Case Studies; and
 - (g) Technical Appendices.

7. The content of the final Renewable Energy Master Plan is substantially the same as the draft Renewable Energy Master Plan as summarised in the report resolved by Council on 24 June 2013. Additional paragraphs or sections of note included in the final Master Plan in response to the submissions arising from the public exhibition are summarised in this report.

RENEWABLE GASES FROM WASTE AND BIOMASS

8. Energy crops and native woodlands have been excluded from this Master Plan to avoid any potential land use conflicts with food crops and destruction of native woodlands. However, some forms of energy crops may be supported in this Master Plan where it can be shown that there are other beneficial environmental uses, such as oil Mallee crops playing a role in long-term sustainable farming in low rainfall areas to decrease the salinity levels of the land.
9. Another biomass feedstock opportunity could be the use of bushland fire hazard reduction materials, particularly where near to renewable gas feedstock collection points or generation plants. Utilising these combustible materials for renewable gas production could significantly reduce the current fire hazard reduction burn-offs, with their consequential air pollution and adverse health impacts, as well as the risk of accidental bushfires.

RENEWABLE ENERGY JOBS, EDUCATION AND TRAINING

10. Global demand for renewable energy continued to rise during 2011 and 2012, supplying an estimated 19 per cent of global final energy consumption. Total renewable electricity capacity worldwide exceeded 1,470GW in 2012, up by 8.5 per cent from 2011. Renewables made up just over 50 per cent of net additions to electricity generating capacity from all sources in 2012. Top countries for renewable electricity capacity were China, USA, Germany, Japan, Spain, Italy and India.
11. In the European Union, renewables accounted for almost 70 per cent of additions to electricity generation capacity in 2012. Renewable gas has also grown significantly, especially in Europe where almost 12,000 renewable gas plants operated in 12 countries, mainly supplying cogeneration/trigeneration networks. In addition, 2,250 sewage treatment plants are also operating in Europe with a growing proportion of renewable gas grid injection for cogeneration/trigeneration and transport.
12. An estimated 5.7 million people worldwide work directly or indirectly in the renewable energy sector. China is the world leader, with 1.75 million people employed in the renewable energy sector, followed by the European Union (1.2 million), Brazil (0.8 million), USA (0.6 million), India (0.4 million) and Germany (0.4 million).
13. In Australia, there are 1,340 companies currently operating in the renewable and clean energy sector, employing 53,000 people. In NSW, 427 companies are operating in the renewable and clean energy sector, employing 20,600 people. However, the potential for the renewable energy sector and associated jobs in both Australia and NSW is vast, and the sector is currently nowhere near its potential if Australia was to tap into its immense renewable energy resources.

14. In order to capitalise on the growing renewable energy industry in Australia and NSW, it is important that universities and TAFEs provide the courses for Australians to skill themselves for renewable energy technologies and installations, particularly with emerging new renewable energy technologies such as renewable gas grid injection, 'power to gas', geothermal and ocean renewable energy. Sydney, in particular, could become a centre of renewable energy excellence, with sister cities such as Newcastle and Wollongong also taking advantage of this.

COMMUNITY RENEWABLE ENERGY

15. A clear message or question emerged from the public focus groups 'what can the community do to support the City's Renewable Energy Master Plan and help the City move toward a 100 per cent renewable energy system by 2030?'. Much of the City's renewable energy target inside the City's LGA is solar, some 478MW out of the 534.5MW of the required installed capacity, primarily from solar photovoltaic and solar thermal hot water displacing grid electricity. The City's renewable electricity target beyond the City's LGA is 170MW, projected primarily to be onshore wind energy, but could also be other forms of renewable energy. In addition to that is the City's renewable gas target to replace 100 per cent of projected natural gas consumption in the city by 2030. How can the community help the City to deliver these targets?
16. The community can help the City by advocating to governments to remove regulatory barriers to decentralised renewable energy and by installing their own renewable energy installations where they are able to do so. Over 1-million households in Australia now have solar energy systems installed, investing more than \$6 billion of their own money in renewable energy, indicating a strong community interest in directly installing renewable energy. However, many residents and businesses in the city who want to contribute toward making Sydney a 100 per cent renewable energy city are currently not able to do so because they do not own the buildings that they occupy, they do not have unshaded roofs or own the roofs in multi-occupied buildings, or they do not have the finance to install renewable energy generation. How can the City help its community to help the City in delivering this Renewable Energy Master Plan?
17. A key factor underpinning the success of some of the leading countries delivering a large proportion of renewable energy generation has been the development of community renewable energy. In Denmark, nearly 50 per cent of domestic electricity demand and 80 per cent of thermal energy demand (heating and cooling) is owned by the customers themselves in one form or the other. In Copenhagen, the Middlegrunden wind farm in Copenhagen Harbour is 50 per cent owned by a community cooperative, with 8,650 residential members living within 2 kilometres of the wind farm.
18. In Germany, 65 per cent of renewable energy generation, some 35,000MW, is owned by the customers themselves either as individuals or as cooperatives. The rapid roll out of renewable energy in Germany is now nearly three times the installed nuclear capacity in 2010 and five times installed nuclear capacity in 2011 (after Germany's nuclear phase-out decision). Even in the UK, there has been a rapid growth in community owned self-generation from 6 per cent in 2011 to 15 per cent in 2013.

19. Community Renewable Energy refers to renewable energy (electricity and/or heat and/or gas) projects that are typically owned and developed by and for the community. Projects may vary from large-scale to small-scale and include a range of technologies. Generally, community renewable energy projects result from various drivers including desire for low carbon energy, energy security, return on investment, and community development. Accordingly there is great diversity in community renewable energy projects operating around the world in response to the diverse needs and resources of local communities.
20. The Master Plan outlines six (6) models for community renewable energy however there are many forms of community renewable energy and this list is not exhaustive. The models in the Master Plan include:
 - (a) Community Owned Renewable Energy;
 - (b) Third Party Ownership;
 - (c) Energy Services Model;
 - (d) Landowner Pools;
 - (e) Municipal Owned Renewable Energy; and
 - (f) State Shared Renewable Energy Programs.
21. Community renewable energy generally includes the engagement or participation by the community that reaches beyond a simple investment or shareholding relationship. There are diverse models for community renewable energy which are outlined in the Master Plan. Community renewable energy may also include some form of control by community owners of the project, through a cooperative or as a landowner or groups of landowners, as small and medium enterprises, or as residents and homeowners who live and work with the installation.
22. Community renewable energy projects provide economic, environmental and social benefits increasing the local economy, creating local jobs, reducing dependency on fossil fuels and high grid network charges, reducing greenhouse gas emissions and climate change impacts, reducing fossil fuel pollutant emissions and associated pollutant related illnesses. Community ownership provides opportunities for local participation, greater involvement in decision-making (e.g. siting and/or energy pricing) and capacity building in local communities, building greater acceptance and interest in renewable energy, giving voice to people's enthusiasm and interest in renewable energy and providing a symbol of the community as a source of pride and identity.
23. The largest and most established form of community owned renewable energy projects are financed by the community purchasing shares in the project as members of a cooperative, for which they receive dividends for the shareholding investments. Members are normally required to be active consumers, which means that they must also purchase and consume the renewable energy generated directly or indirectly by the cooperative to make the project financially viable to lenders.

24. In Denmark, renewable energy developers must sell 50 per cent of the shareholding in the project to residents living within 2 kilometres of the project by law. It is this legislation and community owned model that has led to Denmark being a world leader in renewable energy - not because Danes are any 'greener' than anyone else. More than 150,000 households are co-owners of local wind farm co-operatives, which have installed 86 per cent of all wind turbines in Denmark.
25. In Germany, hundreds of thousands of people have invested in citizen's wind farms across the country representing 90 per cent of wind farms in some states such as North Frisia. The sector employs more than 90,000 people and generates 8 per cent of Germany's electricity.
26. The first community owned renewable energy scheme in the UK was the Baywind wind farm in Cumbria owned by 1,300 members, which became operational in 1997. Today there are 43 community owned renewable energy schemes operating in the UK. The first community owned solar farm in the UK was the Westmill solar park adjoining the community owned Westmill wind farm on the Wiltshire/Oxfordshire border. The solar farm became operational in 2011 after raising £6 million from 1,650 members. The share issue was 50 per cent over subscribed.
27. Community wind farms are one of the fastest growing markets in the USA, with 27 states having legislation that allows community renewable energy schemes. Today, there are more than 1,500 wind farms owned by farmers, ranchers, landowners, consumer-owned utilities, school districts, universities and native tribes. The largest concentration of community owned wind farms are in Minnesota (469), Washington (440), California (238), Nebraska (153), Iowa (81) and Texas (51).
28. The first community owned renewable energy scheme in Australia was the Hepburn wind farm in Victoria owned by 2,300 members, which became operational in 2011.

RENEWABLE ENERGY IMPLEMENTATION PLAN

29. Based on world renewable energy best practice and community interest within the City of Sydney, it seems clear that any Renewable Energy Implementation Plan that follows the adoption of this Master Plan must include community renewable energy. It is also worth noting that both the Federal and NSW Governments provide funding for community renewable energy projects.
30. The City cannot finance the investment needed to deliver the Renewable Energy Master Plan. Consequently, the City's finance and resources should be concentrated on incentivising and assisting the community to develop and implement community renewable energy schemes, and addressing or overcoming market and regulatory failures to private sector investment (e.g. continue to lobby for the removal of regulatory barriers to decentralised renewable energy, education, information and advice.)

CARBON PRICING MECHANISM

31. From 1 July 2012, a price on carbon was introduced, initially at \$23 per tonne of carbon on Australia's largest polluters. A price on carbon is favourable to renewable energy due to the increase in the price of fossil fuel electricity. This improves the relative business case for renewable energy investment.

32. Should the carbon pricing mechanism be repealed by Parliament, the City's renewable energy target will only be met by 2030 with higher subsidies, unless an alternative climate change mitigation policy framework provides similar benefits and incentives. This or the low scenario is covered in Technical Appendix 1. With the election of the Coalition Government, it is uncertain what impact the repeal of the carbon pricing mechanism will have on electricity prices.
33. However, it should be noted that advanced economies such as Germany, UK, Denmark, California and others have achieved far higher levels of renewable energy penetration than Australia on the back of energy policy, not carbon pricing or emissions trading. Further, the primary driver for renewable energy is the Renewable Energy Target, which the Coalition Government will review.

ENABLING THE MASTER PLAN

34. The necessary enabling actions needed to bring about positive change and to deliver the full potential of the Master Plan were summarised in the report to the Environment Committee on 17 June 2013. In view of the importance of community renewable energy one additional enabling action has been added to the Master Plan, as follows:
 - (a) develop and implement Community Renewable Energy and other associated appropriate actions to enable the City's community to help the City of Sydney deliver the Renewable Energy Master Plan.

CASE STUDIES

35. The Master Plan includes best practice case studies from around the world, covering each and every type of renewable energy resource and technology referred to in this Master Plan, to deliver a 100 per cent renewable energy future for the City's LGA.
36. Further case studies will be added to the Master Plan to include community renewable energy and further "power to gas" case studies.

NSW RENEWABLE ENERGY ACTION PLAN

37. NSW Government has developed the Renewable Energy Action Plan to guide NSW's renewable energy development and to support the national target of 20 per cent renewable energy by 2020. The Plan positions NSW to increase energy from renewable sources at least cost to the energy consumer and with maximum benefits to NSW. The Plan's three key goals (comprising 24 actions) are:
 - (a) attract renewable energy investment and projects;
 - (b) build community support for renewable energy; and
 - (c) attract and grow expertise in renewable energy technology.
38. Key targets include facilitating five community renewable energy projects, promoting NSW as a leader of research and innovation in renewable energy, establishing a working group to develop an advanced bioenergy initiative and supporting research and development in advanced bioenergy applications and wave and tidal technologies.

39. On 30 May 2013, NSW Environment Minister Robyn Parker announced that nine community groups across NSW had been awarded a total of \$411,000 under NSW's Community Renewable Energy Grants Program (seven solar and two wind farm projects).
40. The NSW Government recognises that in order to grow renewable energy generation in NSW, it needs to address the higher cost of renewable energy, the current barriers to investment and community concerns. This is consistent with the City's Renewable Energy Master Plan, and the City could assist the NSW Government in achieving its objectives, particularly on inward investment and in addressing regulatory barriers to decentralised renewable energy, overcoming the intermittency of renewable electricity technologies and the differences in approach that will be needed for cities and rural areas.

RENEWABLE ENERGY MINING AND EXPORTS

41. Australia's renewable energy resources are many times greater than Australia's energy needs. The annual solar radiation falling on Australia is approximately 58 million petajoules (PJ), about 10,000 times Australia's annual energy consumption. This compares with the 8,053PJ of black coal and the 1,086PJ of natural gas that Australia exported in 2010/11 at an economic value of \$31 billion. The Master Plan has been updated to reflect Australia's increased fossil fuel exports and another 'power to gas' case study of strategic importance will be added to the final Master Plan.
42. The potential for renewable energy mining in Australia is beyond the scope of the Master Plan but, if such a potential could be realised, Australia could be exporting renewable energy and contributing towards global emission reductions instead of exporting carbon fuels and increasing global emissions.

KEY IMPLICATIONS

Strategic Alignment - Sustainable Sydney 2030

43. Sustainable Sydney 2030 is Council's plan to make Sydney green, global and connected by 2030, reflecting our resident's aspirations for the City's LGA. It includes 10 strategic directions to guide the future of the city, as well as 10 targets against which to measure progress. This Master Plan is aligned with the following strategic directions and objectives:
 - (a) Direction 1 - A Globally Competitive and Innovative City – the Master Plan establishes renewable electricity and renewable gas opportunities for the City's LGA with financial and economic modelling to demonstrate some renewable energy technologies may be lower cost than continued reliance on existing polluting fossil fuel energy sources, improving the city's competitive advantage through the transition to a low carbon economy. The combination of technology solutions, such as the utilisation of renewable gas derived from waste and delivered to the city via existing gas networks, will drive innovation.

- (b) Direction 2 - A Leading Environmental Performer – Council has taken a leadership position by setting city-wide targets for decentralised energy (trigeneration and renewable electricity) in addition to setting targets for Council's own buildings and operations. The Master Plan provides a sound evidence base for facilitating decentralised energy solutions within the objectives.
- (c) Direction 9 - Sustainable Development, Renewal and Design – major redevelopment areas will be key for the City to meet its renewable energy and greenhouse gas emissions reduction targets in accordance with the Master Plan.
- (d) Direction 10 - Implementation through Effective Governance and Partnerships – the implementation of the Master Plan cannot be delivered by the City alone and without regulatory change, nor can the outcomes be realised in a short time frame. The City will need to cooperatively work with its residential and business community, as well as appropriate delivery organisations in the private sector and other levels of government, to deliver the full potential of the Master Plan, and the success of this will depend on how well the City gets its message across and convinces others to work with the City.

Strategic Alignment – Trigeneration Master Plan

- 44. On 24 June 2013, Council resolved to adopt the Trigeneration Master Plan. A key component of the Trigeneration Master Plan was to replace fossil fuel natural gas supplying the proposed trigeneration network with renewable gases from waste and other renewable energy resources, such as solar and geothermal thermal energy, by 2030.
- 45. The Master Plan aligns with the adopted Trigeneration Master Plan to replace 100 per cent of the fossil fuel natural gas with renewable gases derived from waste to supply the proposed trigeneration network

Strategic Alignment – Renewable Gas Council Resolution

- 46. On 18 June 2012, Council resolved that, by 2030, renewable gases from waste and other renewable energy sources, such as solar and geothermal, will replace fossil fuel natural gas in the proposed trigeneration systems enabling them to provide carbon free electricity as well as carbon free thermal energy for heating and cooling. This Council resolution also effectively means that the City of Sydney has a 100 per cent renewable energy policy since renewable electricity and renewable gas can provide 100 per cent of the city's electricity, heating and cooling requirements by 2030.
- 47. The Master Plan aligns with Council's Resolution to replace 100 per cent of the natural gas with renewable gases derived from waste to supply the proposed trigeneration network.

Strategic Alignment – Green Power and Renewable Energy for the City of Sydney Organisation

48. On 31 May 2010, Council resolved that the City's Green Power contract be replaced by a Renewable Energy Fund of \$2 million per annum that will be used for renewable energy projects on the City's own property and operations, and that all of the City's remaining emissions be offset by more cost effective alternative accredited carbon offsets.
49. The Master Plan aligns with Council's Resolution of abating carbon to deliver the Sustainable Sydney 2030 targets and only using carbon offsets for the residual carbon not abated by carbon reducing projects, to remain carbon neutral. With this policy, carbon abatement will increase and carbon offsets will decrease year on year until the 70 per cent reduction in greenhouse gas emissions target is reached.

Organisational Impact

50. Organisational capacity is already established and committed to within the City of Sydney to develop and implement green infrastructure as proposed by this and other Green Infrastructure Master Plans.

Risks

51. The implementation of the Master Plan cannot be delivered by the City alone, nor can the outcomes be realised in a short time frame. The City will need to cooperatively work with its residential and business community, as well as appropriate delivery organisations in the private sector and other levels of government, to deliver the full potential of the Master Plan, and the success of this will depend on how well the City gets its message across and convinces others to work with the City to deliver the Master Plan.
52. There may be concerns about energy crops and the use of native woodland waste. The Master Plan is based on neither. Energy crops may reduce other forms of agricultural production and, therefore, do not form part of the Master Plan. The renewable gas resources in the Master Plan are based on waste arising, and where biomass waste has been identified, this has been based on non-native woodland waste only.
53. Some forms of energy crops may be supported in this Master Plan where it can be shown that there are other beneficial environmental uses, such as oil Mallee crops playing a role in long-term sustainable farming in low rainfall areas to decrease the salinity levels of the land. However, this is unlikely to be opposed by environmentalists due to the environmentally beneficial nature of this type of crop and its use in reducing the salinity of groundwater.
54. Another biomass feedstock opportunity could be the use of bushland fire hazard reduction materials, particularly where near to renewable gas collection or generation plants. Utilising these combustible materials for renewable gas production could significantly reduce the current fire hazard reduction burn-offs, with consequential air pollution and adverse health impacts, and the risk of accidental bushfires. Again, this is unlikely to be opposed due to reducing the potential fire risk of fire hazard reduction burn-offs.

55. The availability and capture of renewable feed stocks (e.g. manures) may be a perceived risk. The details of where the renewable feedstock exists, the assumptions made (in terms of minimum resource requirements) and their proximity to the gas grid are included in Appendix 2 of the Master Plan. However, except for the City's own waste, the provision of the renewable feedstock waste is dependent on the owners of that waste (e.g. farmers and agriculturalists). The case study on Germany's biogas grid injection program not only shows how the project was delivered in such a short period of time, but also the incentives for the owners of the waste to participate in a government market led approach to delivering the program. Such an approach is likely to deliver significant inward investment opportunities for NSW as well as additional income for farmers.

Social / Cultural / Community

56. As part of the public exhibition, the City held two community panel meetings, which identified a need for the Master Plan to identify ways that the community may help and become involved with its implementation. Accordingly, a new section on Community Renewable Energy has been added to the Master Plan outlining some of the many ways in which renewable energy is being taken up by the community, both locally and internationally.
57. By generating energy locally and matching local generation supply with local demand as well as storing and utilising surplus renewable electricity as renewable gas in the gas grid, the Master Plan should help reduce high electricity network investment and ongoing network charges, as well as eliminating the need for new and long term existing fossil fuelled power stations to the benefit of NSW as a whole.

Environmental

58. The Master Plan identifies a way to meet 100 per cent of the City of Sydney LGA's electricity, heating and cooling demands from renewable energy by 2030. The Renewable Energy Master Plan, if implemented, would reduce greenhouse gas emissions by 37.5 per cent and, taken together with the Trigeneration Master Plan, reduce greenhouse gas emissions by 69.5 per cent, nearly the whole of the Sustainable Sydney 2030 target, by 2030.
59. There is a misunderstanding by some that anaerobic digestion renewable gases derived from waste somehow destroys the organic material and its potential to be used as a fertiliser. This is not the case. The only difference between aerobic digestion (composting) and anaerobic digestion is that the former produces carbon dioxide (CO₂) and compost and the latter produces methane (CH₄) biogas and a clean fertiliser, where pathogens are killed by thermal treatment. Similarly for gasification using biomass, syngas is produced along with pathogen-free biochar, which is a clean soil conditioner. This has been explained in more detail in the Master Plan.

Economic

60. The Master Plan proposes more efficient, reliable, sustainable and economic ways to produce and distribute renewable energy, which, if implemented, should result in cost savings to users through reduced costs of renewable energy, avoided network charges and reduced exposure to any direct or indirect price on carbon.

61. The Master Plan also provides for significant inward investment opportunities and, subject to a further study, the potential for renewable energy mining and exports that could replace or exceed existing fossil fuel exports.

BUDGET IMPLICATIONS

62. Other than costs incurred for the public exhibition of the Master Plan, there are no further budget implications with the Master Plan. However, there are a number of enabling actions outlined in the Master Plan, which could have future financial implications for the City. In order for the City to implement these particular actions, approval from Council would be sought where required in accordance with existing financial delegation and approval processes.

RELEVANT LEGISLATION

63. Renewable energy is covered by various Electricity, Gas and Renewable Energy Acts and the Clean Energy Act 2011. However, regulatory barriers to decentralised energy and energy from waste as well as the need for a new regulatory regime for renewable gas would have to be enabled for the full potential of the Master Plan to be delivered by 2030.

PUBLIC CONSULTATION

64. The Renewable Energy Master Plan was developed in direct response to the local energy generation and reduction in greenhouse gas emissions targets within Council boundaries as part of the Green Infrastructure Plan in Sustainable Sydney 2030, which was subject to the most extensive consultation ever undertaken by Council.
65. Early findings of the Master Plan were presented in a City Talk to the public at Sydney Town Hall on 25 October 2010, and in other public and industry presentations since then.
66. The draft Decentralised Energy Master Plan – Renewable Energy and Technical Appendices was placed on public exhibition from 26 June to 3 September 2013 as outlined in the timeline below:

| | |
|------------------------------|--|
| 24 June 2013 | Council approved public exhibition of draft Master Plan. |
| 26 June 2013 | Public exhibition of draft Master Plan commenced |
| 27 June to 19 September 2013 | 'One to one' consultations/presentations with 36 key stakeholder organisations. |
| 2 July 2013 | Advertised in Sydney Morning Herald |
| 3 July 2013 | Advertised in Central Sydney Magazine |
| 4 July 2013 | Advertised in Australian Financial Review |
| 16/17 July 2013 | CEO notification letters sent to 420 contacts |
| 18 July 2013 | Community panel session 1 - Surry Hills Library |
| 31 July 2013 | Community panel session 2 - Adina on Crown |
| 5 August 2013 | Key stakeholder briefing session - Lord Mayor's Reception Room. |
| 5 August 2013 | City Conversations – <i>Renewable cities: sun, soil, wind and waste – a master plan for change</i> . Lower Sydney Town Hall. |
| 3 September 2013 | Submissions closed |

67. The documents were made available on the City's website and hard copies were also exhibited and available at the Town Hall House One Stop Shop and all Neighbourhood Service Centres.
68. The exhibition of the draft Final Master Plan was advertised in The Sydney Morning Herald, Central Sydney Magazine and The Australian Financial Review, with 420 letters notifying of the exhibition and inviting comments sent to the key stakeholders in Government, peak environmental groups, industry groups and associations, private corporations in the City and members of the Better Buildings Partnership.
69. Ongoing consultation and approvals will be required when implementing actions identified in the Master Plan.
70. Council approved the public exhibition of the draft Renewable Energy Master Plan and Technical Appendices at its meeting on 24 June 2013, with a requirement for four community consultation workshops/forums for information sessions during the public exhibition period to enable the community to make informed submissions on this significant plan.
71. Key stakeholders were consulted as part of the public exhibition process including two public focus groups, two events, briefings, media and other communications as outlined below.

Community Panel Meetings

72. The City undertook two community panel meetings in July as part of the exhibition of the Renewable Energy Master Plan with residents from the City of Sydney LGA and neighbouring Marrickville Council LGA.
73. The meetings provided an opportunity for randomly selected and self-nominated participants to understand the issues and research, hear from the City's experts, ask questions and provide feedback for consideration by the City.
74. Twelve community members participated in the meetings in Surry Hills, which allowed for in depth deliberation and discussion.
75. Overwhelmingly, the participants said they thought it was important for the City to show leadership in renewable energy and for society to reduce its reliance on fossil fuels. They were inspired and supportive of proposals for more solar energy, as well as generating energy from waste.
76. Feedback and questions included how the targets compared to other national and international targets; how the plan would be funded (and any associated impacts on residents and ratepayers); and that the plan needed to outline the important role of the community in enabling the plan to be implemented. They encouraged ongoing and increased efforts to promote the City's plans for renewable energy and inspire more residents in the LGA about the need for change and how it could be achieved. Feedback indicates the panel was a successful way to increase community understanding about issues and research as well as get informed feedback about the technical solutions proposed in the Master Plan.

Key Stakeholder Briefings

77. A range of government and industry stakeholders were invited to receive briefings on the Master Plan during the exhibition period. Briefings were mostly delivered by the City's Chief Development Officer, Energy and Climate Change with briefings also delivered by the Sustainability Director and Manager of Carbon Strategy. The majority of briefings were individual and 'face-to-face'. Organisations which received briefings are listed in chronological order:
- (a) Green Building Council of Australia;
 - (b) Frasers Property Group;
 - (c) Energy Efficiency Council;
 - (d) Better Buildings Partnership Energy Working Group;
 - (e) Property Council of Australia NSW Sustainable Development Committee;
 - (f) The Hon. Rob Stokes MP, NSW Government;
 - (g) SSROC Renewable Energy Project Group;
 - (h) Australian PV Association;
 - (i) Bioenergy Australia;
 - (j) AGL;
 - (k) Australian Government, Department of Resources, Energy and Tourism;
 - (l) Ausgrid;
 - (m) The Property Council of Australia;
 - (n) Origin Energy;
 - (o) Renewable Cities Forum and City Conversations panel:
 - (i) Clean Energy Finance Corporation;
 - (ii) NSW Renewable Energy Advocate;
 - (iii) Embark;
 - (iv) NSW Farmers' Association;
 - (v) 100% Renewables Campaign;
 - (vi) Sungevity;
 - (vii) ARENA;
 - (p) Lend Lease;
 - (q) Barangaroo Authority;

- (r) Fluxco;
- (s) Clean Energy Council;
- (t) World Hydrogen Technology and World Wind Energy Conferences 2015 Steering Committee;
- (u) Siemens;
- (v) E.ON;
- (w) Austrade;
- (x) GE;
- (y) Jemena;
- (z) NSW Minister for the Environment Chief of Staff;
- (aa) Trade Council of Denmark;
- (bb) TransGrid;
- (cc) Australian Energy Market Operator;
- (dd) Australian Energy Market Commission; and
- (ee) Australian Energy Regulator.

Renewable Cities Forum

78. A key stakeholder group briefing session was held from 2.00pm to 4.00pm on 5 August 2013 in the Lord Mayor's Reception Room, Sydney Town Hall. RSVP's to the briefing were full capacity, with a total of 103 people (87 external) in attendance based on invitations sent to representatives from:
- (a) Better Buildings Partnership / CitySwitch members;
 - (b) renewable energy advocacy groups;
 - (c) community groups / NGOs;
 - (d) energy sector / utilities;
 - (e) government;
 - (f) industry bodies;
 - (g) media;
 - (h) regulators;
 - (i) universities; and
 - (j) waste industry.

79. The City's Chief Development Officer, Energy and Climate Change presented key elements of the Master Plan, followed by a panel discussion and questions from key industry and government stakeholders. Adam Spencer was MC of the event and the panellists included:
- (a) Allan Jones MBE – City of Sydney;
 - (b) Russell Marsh – Policy Director, Clean Energy Council;
 - (c) Amy Kean – Renewable Energy Advocate, Division of Resources and Energy, Department of Trade and Investment, Regional Infrastructure and Services, NSW Government;
 - (d) Ivor Frischknecht- CEO Australian Renewable Energy Agency;
 - (e) Lindsay Souter, National Director, 100% Renewables Community Campaign;
 - (f) Oliver Yates, CEO Clean Energy Finance Corporation;
 - (g) Danny Kennedy – Co Founder, Sungevity; and
 - (h) Tim Duddy – Executive Councillor, NSW Farmers' Association.

Renewable Cities City Conversation

80. The City Conversation - Renewable Cities: Sun, Soil, Wind and Waste - A Master Plan for Change was held 5 August 2013 in lower Sydney Town Hall. RSVP's to the City Conversation were full capacity, with 539 total attendees on the night including VIPs.
81. At this event, renewable energy experts explained ways to move towards 100 per cent renewable energy for Sydney:
- (a) Welcome and introduction – Clover Moore – Lord Mayor of Sydney;
 - (b) Presentation – Allan Jones MBE, City of Sydney; and
 - (c) Keynote – Danny Kennedy, Co-Founder, Sungevity.
82. This was followed by a lively panel discussion. Adam Spencer was MC of the event. The panellists included:
- (a) Allan Jones MBE – City of Sydney;
 - (b) Amy Kean – Renewable Energy Advocate, Division of Resources and Energy, NSW Government;
 - (c) Department of Trade and Investment, Regional Infrastructure and Services;
 - (d) Ivor Frischknecht – CEO Australian Renewable Energy Agency;
 - (e) Danny Kennedy – Co Founder, Sungevity;
 - (f) Tim Duddy – Executive Councillor, NSW Farmers' Association;

- (g) Lindsay Souter – National Director, 100% Renewables Community Campaign;
- (h) Oliver Yates – CEO, Clean Energy Finance Corporation; and
- (i) Andy Cavanagh-Downes – Executive Director, Embark.

Sydneyyoursay.com.au

83. The dedicated green infrastructure page at SydneyYourSay.com.au/green-infrastructure recorded the following activity for the period 26 June to 3 September 2013:

- (a) 1,070 site visits;
- (b) 1,614 page views;
- (c) 649 unique visitors;
- (d) 19 video plays – Renewable Energy Video;
- (e) 161 downloads of Master Plan;
- (f) 84 downloads of Technical Appendix 1;
- (g) 62 downloads of Technical Appendix 2;
- (h) 41 downloads of Technical Appendix 3; and
- (i) 348 total downloads.

SUBMISSIONS

84. Council received 15 submissions or other feedback from the organisations listed below in response to public exhibition of the draft Master Plan:

- (a) Ausgrid;
- (b) BASIX (NSW Department of Planning & Infrastructure);
- (c) Bioenergy Australia;
- (d) Green Building Council of Australia;
- (e) KATRU ECO-INVENTIONS;
- (f) New Energy;
- (g) Property Council of Australia;
- (h) Royal Botanic Gardens and Domain Trust;
- (i) Sydney Opera House;
- (j) TAFE NSW – Sydney Institute;

- (k) Transgrid;
 - (l) University of Technology, Sydney;
 - (m) Dr Chris Tuckfield (individual);
 - (n) Kevin Armstrong (individual);
 - (o) Carolyn (individual); and
 - (p) Community Panel Meetings feedback.
85. A summary of the submissions received and responses to the issues raised are set out in Attachment A. Issues raised relate to:
- (a) potential benefits of large scale deployment of renewable energy;
 - (b) robust urban networks, such as the City of Sydney area, are able to accept high levels of solar photovoltaic without causing significant technical problems;
 - (c) ongoing communication between organisations and the City of Sydney during design and implementation;
 - (d) examples of environmental leadership shown by responding organisations;
 - (e) setting of BASIX targets;
 - (f) consultation with other key stakeholders;
 - (g) role of the community in supporting the uptake of renewable energy;
 - (h) use of energy crops where broader benefits may be demonstrated;
 - (i) potential for emerging new and improved renewable energy technologies;
 - (j) removing regulatory barriers;
 - (k) funding and incentives to promote the uptake of renewable energy;
 - (l) disapproval of fossil fuel natural and/or coal seam gas; and
 - (m) soil carbon and traffic.
86. The following statements in support of the Master Plan were made in submissions received:
- (a) "Sydney Opera House supports the City of Sydney's Renewable Energy Master Plan";
 - (b) "TransGrid has reviewed the Master Plan with interest and found it to be forward thinking and challenging";
 - (c) "Ausgrid supports the objectives of enabling reductions in carbon emissions and recognises that there are potential benefits from the wider use of renewable energy generation";

- (d) The Royal Botanic Gardens and Domain Trust “congratulates the City on initiating a strategy focusing on reducing net carbon emissions by 70% by 2030”;
- (e) “KATRU is highly supportive of the Draft City of Sydney Decentralised Energy Master Plan: Renewable Energy 2012 – 2030”;
- (f) “The Property Council commends the leadership and vision that the City of Sydney has shown in developing the Renewable Energy Master Plan”;
- (g) “New Energy acknowledges the far reaching scope and vision of the Plan and is very supportive of the overarching goal of reducing greenhouse gases by utilising renewable energy resources”;
- (h) The Sydney Institute “commends the Council’s plan to seek to provide 100% of Sydney City’s energy by renewable sources by 2030 – 30% from solar and wind sources and 70% from carbon free renewable energy from waste gas”;
- (i) Bioenergy Australia congratulated the City “on developing this important plan to utilize only renewable gas for future trigeneration and to use 100% renewable energy for electricity, heating and cooling”;
- (j) The Green Building Council of Australia “commend the City of Sydney for demonstrating its commitment to reduce greenhouse gas emissions within the City of Sydney’s Local Government Area through the use of renewable energy technology”; and
- (k) The University of Technology, Sydney “commend the City of Sydney on its commitment to action to address Climate Change and the vision contained in the Master Plan document”.

PROPOSED AMENDMENTS TO THE MASTER PLAN

- 87. The proposed amendments to the Master Plan are set out in Attachment B and elsewhere in this report.
- 88. The final Decentralised Energy Master Plan – Renewable Energy, is provided in Attachment C.
- 89. No amendments have been made to the three Technical Appendices to the Final Decentralised Energy Master Plan – Renewable Energy, being the Financial and Economic Analysis of Renewable Energy Opportunities report, Renewable Gases Supply Infrastructure - Technologies, Resources, Economics and GHG Emissions technical report and the Renewable Energy Master Plan Study.
- 90. The Technical Appendices to the Decentralised Energy Master Plan – Renewable Energy, remain the same as those endorsed by Council for public exhibition on 24 June 2013, and it is recommended that Council adopt these Appendices in the form previously published at Attachments B, C and D, respectively, to the report to the Environment Committee on 17 June 2013.

91. The proposed amendments improve, but do not substantially change the strategic directions of the exhibited draft Master Plan, and not warrant re-exhibition.

ALLAN JONES MBE

Chief Development Officer, Energy and Climate Change

KIM WOODBURY

Chief Operating Officer

Chris Derksema, Sustainability Director

Nik Midlam, Manager, Carbon Strategy