

**ITEM 2. DRAFT ADVANCED WASTE TREATMENT MASTER PLAN – PUBLIC EXHIBITION****FILE NO: S101017****SUMMARY**

The Advanced Waste Treatment Master Plan is part of a suite of master plans focussing on energy efficiency, renewable energy, trigeneration and decentralised water. The Trigeneration and Renewable Energy Master Plans were adopted by Council on 24 June 2013 and 9 December 2013, respectively.

On 2 April 2012, Council resolved to adopt the Interim Waste Strategy and also to note that the final Waste Strategy could not be finalised until the Advanced Waste Treatment Master Plan had been completed.

It is recommended that the draft Advanced Waste Treatment (the Master Plan) and its appendix be endorsed by Council for public exhibition.

The Draft Advanced Waste Treatment Master Plan provides a blueprint for:

- an advanced waste treatment system avoiding up to 95 per cent of the City of Sydney Local Government Area's (LGA) domestic, commercial and industrial waste from going to landfill through a combination of recycling materials and converting non-recyclable waste into renewable gas by 2030;
- replacing 100 per cent of the City's own fossil fuel natural gas consumption;
- reducing greenhouse gas emissions across the City's LGA by 6.9 per cent from avoided landfill gas emissions and conversion of non-recyclable waste into renewable gas;
- together with the Renewable Energy and Trigeneration Master Plans, reducing greenhouse gas emissions by 55 per cent across the City's entire LGA by 2030 if all were implemented; and
- avoiding the costs associated with final disposal to landfill of domestic and commercial waste, including avoided NSW waste levy costs of \$3.9M per year by 2030 for domestic waste disposal.

**RECOMMENDATION**

It is resolved that Council approve:

- (A) the draft Advanced Waste Treatment Master Plan, and the draft Technical Appendix, the Gasification Technologies Review, as shown at Attachments A and B, respectively, to the subject report, for public exhibition for a minimum period of six weeks; and
- (B) the draft Advanced Waste Treatment Master Plan and any recommended changes be reported back to Council following the exhibition period.

**ATTACHMENTS**

**(Note – Attachments A and B 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:** Draft Advanced Waste Treatment Master Plan

**Attachment B:** Technical Appendix: Gasification Technologies Review

## BACKGROUND

1. In 2008, the City of Sydney launched Sustainable Sydney 2030 and committed Sydney to becoming a green, global and connected city. Key to delivering the climate change, energy, water and waste targets in Sustainable Sydney 2030 is the development and implementation of a Green Infrastructure Plan.
2. Sustainable Sydney 2030 set a target of reducing greenhouse gas emissions across the entire City of Sydney Local Government Area (LGA) by 70 per cent below 2006 levels. Around 80 per cent of the City's LGA greenhouse gas emissions are from centralised power generation, primarily coal-fired power stations.
3. On 26 March 2012, Council resolved to adopt the Interim Waste Strategy. A key component of the Strategy was a requirement for advanced waste treatment options to divert over 90 per cent of waste from landfill. The Advanced Waste Treatment Master Plan aligns with the Interim Waste Strategy in listing preferred options that are able to deliver or exceed the level of waste diversion.
4. On 9 December 2013, Council resolved to adopt the Renewable Energy Master Plan. A key component of the Master Plan was to replace fossil fuel natural gas supplying the proposed trigeneration networks and other gas demands in the city with renewable gases from waste and other renewable energy sources by 2030. The Advanced Waste Treatment Master Plan aligns with the Renewable Energy Master Plan by contributing towards the renewable gas capacity to displace fossil fuel natural gas in the City's LGA.
5. The Advanced Waste Treatment Master Plan sets out the reduction in levels of domestic, commercial and industrial waste going to landfill as non-recycled waste, and the portion of renewable gas that could be produced by the City's LGA domestic, commercial and industrial waste to replace fossil fuel natural gas.
6. The Renewable Energy Master Plan included a quantum for reduction in greenhouse gas emissions for the renewable energy content of gas derived from waste. However, the reduction in greenhouse gas emissions brought about by avoided landfill gas emissions resulting from advanced waste treatment were not included. Therefore, these avoided emissions represent an additional reduction in greenhouse gas emissions to the Trigenation and Renewable Energy Master Plans.

## DOMESTIC WASTE

7. Collection of domestic or municipal solid waste is the responsibility of the City. In 2006, the City collected 53,990 tonnes of domestic waste, of which 25 per cent was recycled. In 2012, the City collected 62,598 tonnes of domestic waste, of which 66 per cent was recycled or diverted from landfill, two years ahead of the City's target set in the Environment Management Plan 2007. By 2030, domestic waste is forecast to grow to nearly 80,000 tonnes a year, of which about 27,000 tonnes of non-recyclable waste would otherwise be expected to go to landfill on a 'business as usual' basis.

8. Since 2011, the City has sent all domestic waste from “red lid” bins to waste processing as an alternative to landfill. This type of waste processing recovers some of the organic material in the bin. The recovered material is restricted by regulations to uses such as mine site rehabilitation.

### **COMMERCIAL AND INDUSTRIAL WASTE**

9. Collection of commercial and industrial waste is the responsibility of the businesses that generate the waste. In 2006, it is estimated that 247,654 tonnes of commercial and industrial waste was collected, of which 35 per cent was recycled. In 2012, it is estimated that 266,529 tonnes of commercial and industrial waste was collected, of which 51 per cent was recycled. By 2030, commercial and industrial waste is forecast to grow to 307,000 tonnes a year, of which 150,000 tonnes of non-recyclable waste would otherwise be expected to go to landfill on a ‘business as usual’ basis.

### **LANDFILL: FALLING CAPACITY AND RISING COSTS**

10. Landfill remains the default solution for most waste in NSW, with almost half the waste generated from households in the Sydney Metropolitan Area ending up in landfill, despite recycling and existing waste treatment.
11. City waste treatment relies on recycling, followed by waste sorting and treatment, to minimise the levels of waste that go to landfill. Even with significant recovery, around one-third of the waste from households will eventually be disposed to landfill.
12. Together with the larger Sydney Metropolitan region, the City is currently dependent on four landfill sites for the final disposal of waste. Current projections foresee local region landfill sites at capacity by 2021. After that, landfill availability will be located at Woodlawn near Goulburn, with waste delivered via transfer station and rail link.
13. Existing waste sorting and treatment facilities in the Sydney area are limited to just over 300,000 tonnes capacity. This compares with the Sydney Metropolitan Area annual waste streams of more than 2,500,000 tonnes, or eight times this waste processing capacity.
14. Underlying costs in the past 10 years for operating landfill passed through to councils have risen by more than 300 per cent, with headline costs for waste disposal now at \$269 to \$300 per tonne of waste. Projections are that landfill costs will continue to rise, and will conservatively exceed \$400 per tonne of waste by 2030.
15. The NSW Government imposes a waste levy on material disposed to landfill. This waste levy has risen by nearly 500 per cent since 2001, to \$107.80 per tonne of waste in 2013/14, with further rises legislated until 2016, thereafter adjusted annually in line with the Consumer Price Index. The City’s use of a waste sorting and treatment facility means that the City has reduced exposure to the impact of the levy, but it still forms an underlying part of charges for waste treatment. In 2012, the NSW waste levy cost the City and the City’s LGA businesses \$2.2M and \$14.1M, respectively. This will rise by 2030 to at least \$3.9M a year and \$18.7M a year for the City and the City’s LGA businesses, respectively, on current levy costs alone.

16. The carbon pricing mechanism currently represents about 3.25 per cent of the total cost of disposal, so, should the carbon pricing mechanism be repealed by Parliament, it will have little impact on the cost of waste disposal compared to the NSW waste levy, which currently represents 36 per cent of the total cost of waste disposal.

### **ALTERNATIVE WASTE TREATMENT TECHNOLOGY OPTIONS**

17. In order to maximise the diversion of waste to landfill and reduction in greenhouse gas emissions, as well as contributing towards the City's Green Infrastructure Plan and associated Master Plans, the City is seeking a technical solution for waste treatment that can:
  - (a) generate a long-term sustainable waste solution;
  - (b) significantly divert waste from landfill;
  - (c) significantly reduce greenhouse gas emissions arising from waste;
  - (d) handle the complexity and changing levels of city-generated waste over time;
  - (e) provide a renewable energy positive alternative energy resource for the city that integrates with the Trigenation and Renewable Energy Master Plans;
  - (f) encourage improved outcomes for the local commercial sector and the surrounding region;
  - (g) deliver value for money in meeting the City's waste obligations at the highest environmental benefit; and
  - (h) identify the suitability of sites in close proximity to the City of Sydney with optimal transport and energy delivery connections.
18. There is a range of advanced waste treatments that can achieve all of these objectives in use internationally.

### **EVALUATING THE WASTE TREATMENT OPTIONS**

19. The treatment technologies considered in the Advanced Waste Treatment Master Plan were subject to successive levels of analysis to evaluate their suitability to meet the City's key requirements. The evaluations included:
  - (a) high level risk analysis;
  - (b) multi-criteria analysis;
  - (c) Life Cycle Assessment; and
  - (d) gasification technologies review.

#### **High Level Risk Analysis**

20. The high level risk analysis applied a simple pass-fail approach against the following key requirements:
  - (a) divert waste from landfill;

- (b) reduce greenhouse gas emissions; and
- (c) deliver a renewable/non-fossil fuel gas suitable for renewable gas grid injection for end use in the city.

High Level Risk Analysis of Waste Treatment Processes								
Initial Assessment	Mechanical Biological Treatment	Bioreactor Landfill	Anaerobic Digestion	Grate Incineration	Fluidised Bed Incineration	Gasification (two stage)	Pyrolysis	Plasma Arc Gasification
Significantly reduces GHG emissions	✓	✗	✓	?	?	✓	✓	✓
Generates renewable/non-fossil fuel gas for end use energy supply	✓	✓	✓	✗	✗	✓	✓	✓
Waste diversion target	✓	✗	✓	✗	✓	✓	✓	✓

21. The incineration approaches were eliminated at this initial stage, as they could not deliver all the key criteria. The remaining waste treatment options were then evaluated using multi-criteria analysis. While failing the risk analysis, a bioreactor landfill was continued in the analyses as a base case against which other options were assessed, as it represents the best practice landfill management.

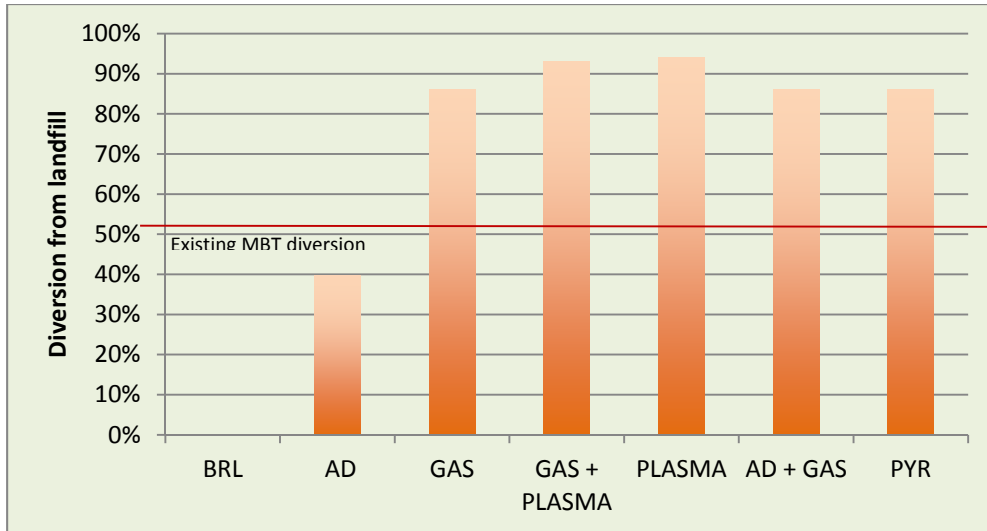
**Multi-Criteria Analysis**

22. The multi-criteria analysis concluded that all of the technologies assessed could meet the key objective areas sought by the City, subject to performing in accordance with expectations of available research. The gasification technologies ranked first in evaluation for highest weighted technical and environmental performance categories. As part of this analysis, the waste treatment options were then evaluated by a life cycle assessment.

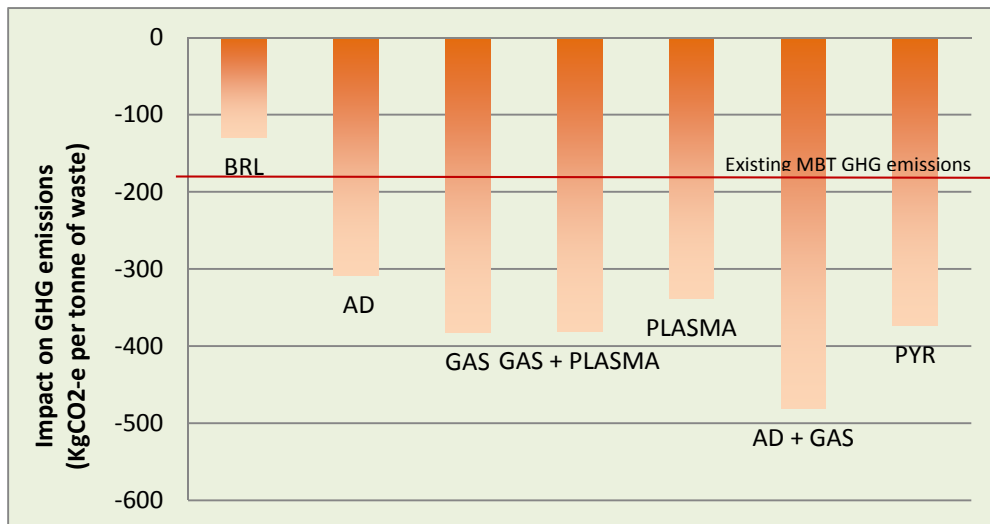
**Life Cycle Assessment**

23. A Life Cycle Assessment (LCA) is an industry standard assessment tool to predict values for environmental impacts likely over a period of 100 years. The results presented in the Master Plan are based on the City’s existing waste management system, which offers kerbside recycling and waste separately. The total tonnages assessed using the tool is made up of the residential and commercial/industrial loads combined, modelled on projected 2030 waste levels.

24. The LCA process reviewed a number of waste processing options including mechanical biological treatment (MBT), bioreactor landfill (BRL), anaerobic digestion (AD), gasification (GAS), gasification plus plasma treatment (GAS+PLASMA), plasma treatment (PLASMA), anaerobic digestion and gasification (AD+GAS) and pyrolysis (PYR). MBT is the City’s current waste treatment method. The following figure summarises the modelled outcomes for key measures of diverting waste from landfill and reducing greenhouse gases.



25. In terms of reducing the City’s dependence on landfill, the thermal conversion (GAS, GAS+PLASMA) processes offer the greatest diversion rates, eliminating over 90 per cent of non-recycled waste input to the technology. This is diversion rate sought by the City’s Interim Waste Strategy.



26. The reduction in greenhouse gas emissions for each major process shows that the thermal conversion processes perform significantly above the other available advanced waste treatment options. The higher the negative number the greater the greenhouse gas emission reduction.

27. The AD process is sensitive to the quality of source separated organics, as it requires homogeneous organic material feedstock to operate optimally. This requirement is difficult to implement and has been the cause of operational issues in an existing advanced waste treatment plant within Sydney. Therefore, the AD+GAS process has not been included in the preferred solution list for treating the non-recyclable waste.

### **Review of Gasification Technologies**

28. Gasification uses heat to break waste down into a gas, but restricts the oxygen available to prevent combustion. This gas generated is known as synthesis gas, or syngas. It has a number of industrial energy applications, including being used as a fuel for electricity generation, conversion to transport fuels, or, by further processing, can be made into a gas equivalent to natural gas termed “substitute natural gas”. Because it is derived from the mixture of materials present in typical waste loads, it will have a renewable energy content based on the inclusion of organic materials within the waste.
29. Both the multi-criteria analysis and Life Cycle Assessment relied on theoretical modelling of the processes evaluated. The City then commissioned a Gasification Technologies Review of international reference facilities, which forms the Technical Appendix to the Advanced Waste Treatment Master Plan.
30. Five key selection criteria were needed to be met for inclusion of suitable reference technologies to assess the likely performance, costs and benefits of gasification:
  - (a) commercial maturity;
  - (b) plant throughput;
  - (c) feedstock;
  - (d) Syngas generation; and
  - (e) best available emissions performance.
31. A shortlist of 16 gasification technologies met the selection criteria, which are detailed in Chapter 2 of the Advanced Waste Treatment Master Plan. The technologies can be organised into three broad categories, or classes of gasification, depending on their thermal conversion temperatures:
  - (a) Low Temperature Conversion – based on technologies with standard operation up to 750 degrees;
  - (b) High Temperature Conversion – based on technologies with standard operation over 750 degrees; and
  - (c) High Temperature Conversion + Ash Melting – based on technologies with standard operation over 750 degrees that include a very high temperature zone over 1500 degrees.
32. The high temperature + ash melting plasma gasification technologies had the highest waste diversion levels and highest delivered renewable energy content as detailed in the Master Plan.



**WHAT IS THE MASTER PLAN PROPOSING?**

33. This Master Plan identifies the conversion of the city's non-recyclable waste into a renewable content gas as the optimal long-term waste solution for the City. This gas offers a flexible energy recovery solution providing multiple possible products from that gas, including electricity generation, transport fuels and the opportunity to deliver a substitute natural gas via the existing gas pipeline to the City for energy usage. This gas is calculated to have two-thirds renewable energy content. The options are integrated with the targets of the Renewable Energy and Trigeneration Master Plans.
34. Any of the high temperature plus ash melting gasification technologies would meet the City's objectives for waste diversion and energy recovery.
35. In addition, indicative financial analysis undertaken by the City assessed that this solution should be cost effective when compared to business as usual solutions for the processing and disposal of the city's non-recyclable waste.
36. The delivery of substitute natural gas provides the pathway for the City's own contribution of renewable gas to supply all of the City's gas demands, including the City's own planned trigeneration systems, as well as a portion of the existing trigeneration network and domestic gas demands in the City's LGA.
37. Trigeneration so far installed in the City's LGA amounts to 12.9MWe of trigeneration capacity over 12 sites. Renewable gas excess to the City's needs could go some way to providing these with a renewable fuel source option.

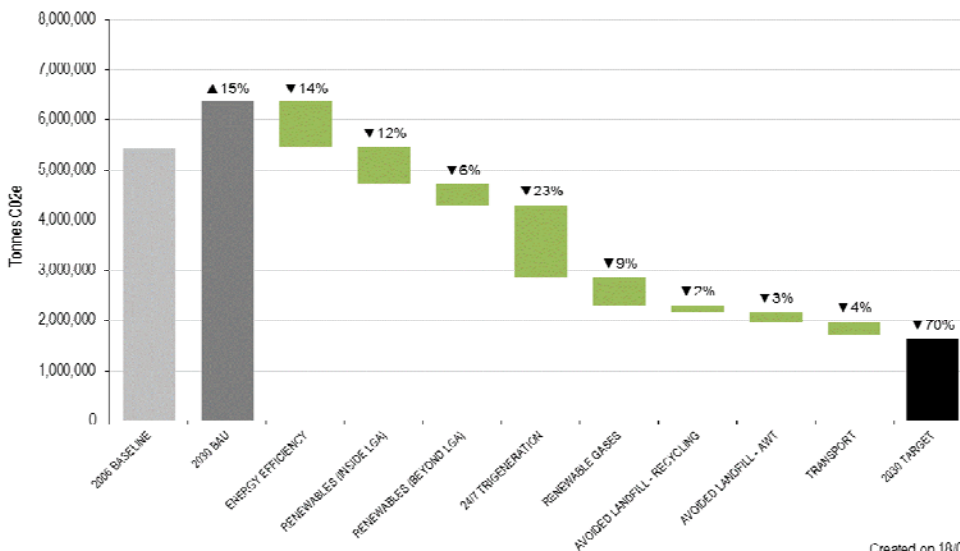
**TRACKING 2030 TARGETS**

38. The Advanced Waste Treatment Master Plan shows that the City can achieve a landfill diversion requirement of 90 per cent or more from advanced waste treatment based on world waste management best practice by 2030 by continuing source separation of recyclables and adding advanced gasification of non-recyclable waste. International reference facility data suggests diversion rates for the City of over 95 per cent may be achievable.
39. Greenhouse gas emissions are reduced by avoiding the emissions that arise from landfilling even a portion of the city's waste, and by reducing the emissions load arising from using fossil fuel generated energy to power the city.
40. The levels of greenhouse gas emissions avoided by diverting non-recyclable waste from landfill by advanced waste treatment and gas grid injection include:
  - (a) if all the residual domestic waste within the City's LGA was diverted from landfill, this could avoid greenhouse gas emissions of 0.043 MTCO<sub>2</sub>-e a year and avoid around \$3.9 million a year in NSW waste levy payments by 2030 (based on 2013/14 levy cost);
  - (b) overall, if all of the residual domestic, commercial and industrial waste within the City's LGA was diverted from landfill, this could avoid greenhouse gas emissions of 0.173 MTCO<sub>2</sub>-e a year and avoid around \$18.7 million a year in NSW waste levy payments by 2030 (based on 2013/14 levy cost); and

- (c) these levels of greenhouse gas reductions resulting from recovering energy from waste significantly exceed the objective of 3 per cent reduction set in Sustainable Sydney 2030.
41. An estimated 0.38PJ/year of renewable gas could be delivered from converting the City’s municipal solid waste into a substitute natural gas. This is approximately twice the City’s own gas demands, including the City’s own planned trigeneration systems, estimated to be 0.2PJ/year.
  42. Therefore, in total the three Master Plans could reduce greenhouse gas emissions by a total of 55 per cent against 2030 business as usual emissions as follows:
    - (a) 23 per cent carbon saving from trigeneration;
    - (b) 12 per cent carbon saving from renewable electricity within the City’s LGA;
    - (c) six per cent carbon saving from renewable electricity beyond the City’s LGA;
    - (d) nine per cent carbon saving from renewable gases from waste;
    - (e) two per cent carbon saving from avoided landfill greenhouse gas emissions for recycling of waste; and
    - (f) three per cent carbon saving from avoided landfill greenhouse gas emissions from advanced waste treatment of residual waste.

**Tracking 2030 - Greenhouse gas emissions**

Local Government Area 15/5 Trigeneneration



Created on 18/02/2014

**RENEWABLE GAS FROM WASTE RESOURCES BEYOND CITY OF SYDNEY**

43. Analysis of the different advanced waste treatment technologies available shows that commercial level plants scaled to utilise a substitute natural gas upgrading process will likely be in the order of 100,000 to 150,000 tonnes per year. The non-recyclable waste from city residents is approximately 40,000 tonnes per year. If this Master Plan moves to implementation, market testing will be required. However work to date suggests that a commercial scale plant will require feedstock, not only from the city's residential waste, but also commercial and industrial waste within the City's LGA or other councils within the Sydney Metropolitan Area.

**KEY IMPLICATIONS****Strategic Alignment - Sustainable Sydney 2030**

44. *Sustainable Sydney 2030* is a vision for the sustainable development of the City to 2030 and beyond. 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 SS2030 strategic directions and objectives:
- (a) Direction 1 - A Globally Competitive and Innovative City – the Master Plan demonstrates that advanced waste treatment and renewable gas grid injection may be competitive in cost for the City and businesses in the City's LGA compared to reliance on the existing unsustainable, costly, and polluting disposal of waste to landfill, improving the city's competitive advantage through the transition to a low carbon economy. The combination of technology solutions, such as advanced gasification and the utilisation of renewable gas derived from the gasification of waste and delivered to the city via the existing gas network, will drive innovation.
  - (b) Direction 2 - A Leading Environmental Performer – Council has taken a leadership position by setting city-wide targets for decentralised energy (renewable energy and trigeneration,) and utilising the City's own collected domestic waste as the catalyst for businesses to take advantage of by diverting their commercial and industrial waste from landfill to advanced waste treatment.
  - (c) Direction 9 - Sustainable Development, Renewal and Design – major redevelopment areas can be designed to take advantage of advanced waste treatment and renewable gas grid injection by providing a closed-loop waste to energy solution for developments.
  - (d) Direction 10 - Implementation through Effective Governance and Partnerships – the full implementation of the Master Plan cannot be delivered by the City alone. The City will need to cooperatively work with its residential and business community to deliver the full potential of the Master Plan, and this will depend, in part, on how well the City leverages its business community partnerships.

**Organisational Impact**

45. Organisation 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**

46. To mitigate the risk of misinterpreting or misrepresenting highly technical studies of gasification technologies, the City commissioned a consultancy to independently review the major technological findings of the Master Plan in relation to the interpretation of the Gasification Technologies Review. The review determined that “the choice of a gasification based – synthetic natural gas output process is clearly the most suitable solution” and one that will “future-proof the City”.
47. The implementation of the Master Plan can be delivered by the City for domestic waste. However, there is a risk of the environmental and economic benefits of the Master Plan being challenged by some environmental or vested interest groups. The City will need to communicate the disbenefits of maintaining business as usual against the benefits set out in the Master Plan, and the success of this depends on engaging the residential community to support delivery of the Master Plan.
48. The implementation of the Master Plan may not be fully delivered for commercial and industrial waste without the participation of the business community. The City will need to work cooperatively with the City’s business community via the Better Buildings Partnership and CitySwitch, and the success of this will depend on engaging its business community to work with the City to deliver the Master Plan.
49. An advanced waste treatment facility as proposed in the Master Plan would require identifying a location with the appropriate transport, zoning and gas grid connections. The implementation of the Master Plan will only identify potential sites that are suitably located and where an advanced waste treatment facility is consistent with land use.
50. An advanced waste treatment project would offer significant infrastructure and environment benefits and impacts, and is of importance to both State and regional waste strategies. The project is therefore consistent with assessment guidelines for a determination as a State significant development, which would make it subject to State approval.

**Social / Cultural / Community**

51. The selection of the preferred option to gasify waste and then upgrade for injection into the natural gas grid will significantly reduce any air pollution associated with the facility.

52. As part of the research into gasification technologies, the City reviewed the pollutant emissions levels available from the reference facilities across each of three scenario classes. The pollutant emissions were compared to the European Waste Incineration Directive pollutant limits, currently the most stringent international standard. Published data established that technologies in each class were already able to meet or exceed the pollutant emissions limits set in the European Waste Incineration Directive. The process to derive gas from waste set out in the Master Plan will improve on those results even further. Under the City's proposal, once the gas generated by a technology is cleaned and upgraded to substitute natural gas quality, the pollutant emissions will be equivalent to those from natural gas, at very low to below measurement thresholds.
53. Diversion of waste to the level set out in the Master Plan will defer the requirement for development of a new landfill site for an extended period.
54. The Master Plan does not specify individual sites where a facility could be located, as this will form part of a separate procurement process. The "Enabling Actions" section of the Master Plan does, however, outline some suggested criteria for locating a waste processing facility. While the zoning of the land will help to minimise any social impacts, further more refined criteria, including avoiding urban encroachment, buffer zones, amenity impacts and minimising traffic impacts, have been included as draft in the Master Plan. The City is seeking community feedback on their appropriateness and completeness.

### **Environmental**

55. The Master Plan identifies a path to near zero waste to landfill and to utilise the residual or non-recyclable waste as a renewable energy resource in the form of renewable gas to contribute towards the City LGA's electricity, heating and cooling demands being met solely by renewable energy resources. The Advanced Waste Treatment Master Plan, if implemented, would reduce greenhouse gas emissions by 5.2 per cent and, taken together with the Trigeneration and Renewable Energy Master Plans, reduce greenhouse gas emissions by 55 per cent, exceeding the *Sustainable Sydney 2030* target, by 2030.
56. On 18 June 2012, Council resolved that, by 2030, renewable gases from waste and other renewable energy sources 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. The Advanced Waste Treatment Master Plan aligns with Council's resolution by replacing 100 per cent of fossil fuel natural gas, including within the planned trigeneration systems supplying the City's own buildings, and contributing towards the renewable gas capacity to displace fossil fuel natural gas in the City's LGA.

### **Economic**

57. The Master Plan identifies more efficient, sustainable and economic ways to treat the City LGA's waste, which, if implemented, should result in cost savings or competitive advantage, both for the City and businesses in the City's LGA.

**BUDGET IMPLICATIONS**

58. 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. Approval from Council would be sought to implement these particular actions where required in accordance with existing financial delegation and approval processes.
59. Although not directly part of the budget implications for the Master Plan, the adoption of the Master Plan could lead to the City progressing an advanced waste treatment facility for treating its own domestic residual waste, and possibly a waste treatment opportunity for the City's LGA commercial and industrial residual waste. Whilst it is expected that the majority of finance to develop the facility will come from the private sector, the City has allocated some funds towards potential capital or land cost associated with the project. Any action to progress an advanced waste treatment facility will be the subject of a separate report and approval from Council.
60. The indicative financial analysis included in the Draft Master Plan shows that a facility processing either 100,000 or 150,000 tonnes of waste per year can potentially achieve a net present value of \$0 (or "break-even") over a 35 year period, whilst offering a competitive gate fee for commercial users, if projected wholesale gas prices are received for synthetic natural gas outputs produced.
61. The first stage in implementing an advanced waste treatment facility for the city's waste would be likely to require the identification of a suitable site, and then seeking development approval prior to procurement of any facility. This action is likely to provide the best outcome in terms of securing the City's objectives while delivering value for money, and would be the subject of a separate report and approval from Council.

**RELEVANT LEGISLATION**

62. The City is required by the Local Government Act 1993 to raise a charge for the reasonable cost of waste services provided. This includes collection, disposal or treatment systems.
63. The Protection of the Environment Operations Act 1997 also requires licenced waste facilities in NSW to pay a contribution for each tonne of waste received for disposal at the facility. The details and calculation of the levy payable by licenced waste facilities is set out in the Protection of the Environment Operations (Waste) Regulations 2005. An advanced waste treatment of the type set out in the Master Plan would provide for near zero waste to landfill and significantly reduce the exposure of the City and businesses within the City's LGA to the NSW waste levy.
64. The NSW Environment Protection Authority released an Energy from Waste Policy in March 2014. This policy replaces the existing Guidelines for Non-standard Fuels with a set of criteria that allows for expanded opportunities for introducing energy from waste solutions. The Policy criteria permits the use of municipal solid waste and commercial waste as feedstock for energy from waste facilities, subject to emission limits and limits determined by associated waste collection and recycling practices.

65. Review of this Energy from Waste Policy shows that the City's proposed advanced waste treatment option can meet or address each of these criteria. Restrictions on feedstock permitted may require the City to adjust its waste collection practices or broaden the sources for waste input to include more commercial waste or waste from adjacent councils. These options have been included in the Master Plan.
66. Renewable energy is covered by the various Electricity, Gas and Renewable Energy Acts and the Clean Energy Act 2011. However, a new regulatory regime for renewable gas would enable the renewable gas to be tagged and a gas purchase agreement entered into between the renewable gas generator and consumers in the same way as currently for renewable electricity.

## **PUBLIC CONSULTATION**

67. The fundamental energy from waste approach of the proposed Advanced Waste Treatment Master Plan was outlined in the Renewable Energy Master Plan. This included the use of city household and business waste as feedstock for energy recovery, the proposal to convert the waste to renewable gas, and upgrading of that gas to a pipeline quality to close the energy recovery loop.
68. The consultation of the Renewable Energy Master Plan included 37 'face-to-face' key stakeholder briefings, a Renewable Cities Forum attended by 103 people from business and other organisations, Renewable Cities Conversation attended by 537 members of the public, 1,070 site visits to the dedicated Master Plan public exhibition website and 15 formal submissions. All responses and submissions to the Master Plan were in support of the plan.
69. Two community panel meetings were also held on the proposed Advanced Waste Treatment Master Plan, as a sub-section of the Renewable Energy Master Plan, in July 2013. Feedback indicates the panels were a successful way to increase community understanding and feedback about the issues and technical solutions proposed in both Master Plans. Two further community panel meetings with City staff assisted by a facilitator will be held during the public exhibition period for the Advanced Waste Treatment Master Plan.
70. It is proposed that an industry and business forum be held, specifically on the Advanced Waste Treatment Master Plan, during the public exhibition period.
71. The City's Interim Waste Strategy is due for review in the 2014/15 financial year. This will also require community consultation on the City's holistic approach to waste management. This will outline the waste hierarchy and the importance of waste minimisation, re-use and recycling, before any remaining waste is sent to an advanced waste treatment facility.
72. If Council endorse the Advanced Waste Treatment Master Plan to proceed to implementation, further more detailed community engagement and consultation will be required. Details of this engagement will be included in any future reports on the plan.

## **KIM WOODBURY**

Chief Operating Officer

Chris Derksema, Sustainability Director

Mark McKenzie, Waste Strategy Manager