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| **TO:** | **GENERAL COMMITTEE** |
| **SUBJECT:** | **WASTEWATER TREATMENT FACILITY (WwTF) RECOMMENDATIONS FOR BIOGAS UTILIZATION UPGRADES** |
| **PREPARED BY AND KEY CONTACT:** | **G. KING, P. Eng., PMP SENIOR PROJECT ENGINEER - ENVIRONMENTAL (Ext. 4532)** |
| **SUBMITTED BY:** | **R. S. KAHLE, M. Eng., P. Eng. DIRECTOR OF ENGINEERING** |
| **GENERAL MANAGER APPROVAL:** | **R. W. MCARTHUR, P. Eng. GENERAL MANAGER OF INFRASTRUCTURE, DEVELOPMENT & CULTURE** |
| **CHIEF ADMINISTRATIVE OFFICER APPROVAL:** | **C. LADD CHIEF ADMINISTRATIVE OFFICER** |

## RECOMMENDED MOTION

1. That the recommendations for the Wastewater Treatment Facility Biogas Utilization Upgrades, be endorsed as follows:

   a) Configure the two (2) existing co-generators to optimize the use of biogas for the WwTF electrical load displacement and/or feed power back to the distribution grid.
   b) Continue the use of biogas for WwTF hydronic heating and process improvement and expand within the WwTF where possible.
   c) Construct horizontal medium pressurized steel biogas storage vessel(s) and auxiliary buildings with enhanced security.

## PREAMBLE

2. The Barrie Biogas Utilization project is a "Category A" project defined in O.Reg. 116/01 and therefore does not require approval under the Environmental Assessment (EA) Act based on the section 2(1) (b) of O.Reg. 116/01. However, even with this exemption, the EA Act may have still applied if there were to be significant environmental effects associated with the project. Since the solution was not known at the time of project initiation and several of the alternatives could have had a major impact on the way the City does business with its residents (e.g. sell biogas to public), it was believed that the best approach to effectively communicate to the public was through the Municipal Class EA process.

3. After evaluation and public consultation, the proposed works that are recommended in the above Motion have minimal effects on the physical, natural, social, cultural and economic environmental matters.

4. As such, subject to Council approval, the Barrie Biogas Utilization recommendations will proceed to implementation, including detail design and construction as identified in the 2012-2021 Capital Plan.

5. A Memorandum to General Committee, dated September 17, 2012 contained a letter that was sent to those members of the public that showed an interest in the project by completion of the surveys and/or attended the Public Information Centre.

**PURPOSE & BACKGROUND**

6. The purpose of this Staff Report is to seek the endorsement of Council for the recommendations to optimize the utilization of excess biogas, including storage at the Wastewater Treatment Facility.

7. The Wastewater Treatment Facility (WwTF) located at 249 Bradford St., Barrie, generates biogas as a product of the anaerobic digestion process. Biogas is currently used internally to: heat water for building hydronic heating; heat activated sludge to assist in the treatment process; and to generate electricity in a cogeneration process. At this time, the remaining excess biogas that is not used for the aforementioned three uses has to be burned-off (e.g. the waste flare that can be seen from Lakeshore Drive).

8. Prior to the newly completed Expansion to 76MLD, the WwTF had offset its electricity costs by approximately $220,000 per year through its utilization of biogas by current methods. These savings will continue with the current equipment in place.

9. However, without the appropriate equipment and controls in place, the savings that are available due to the increase in biogas associated with population growth will not be realized as identified in the financial section of this Staff Report.

10. Under Motion 10-G-001, staff submitted an application for the Transition FIT program in December 2010, and is now waiting for Ontario Power Authority's approval to sign the contract.

11. In 2010, the Purchasing Branch, in conjunction with the Engineering Department, issued RFP 2010-145P for Consulting Engineering Services to investigate the best use of the anticipated increased biogas production. After an evaluation, based on Company Experience, Employee Experience, Project Understanding, Schedule and Proposed Fees, the bid opportunity was awarded to CH2M Hill Canada Ltd (CH2M).

12. The following eight biogas usage alternatives were developed.

| ALTERNATIVE | DESCRIPTION |
|---|---|
| 1 | Offset additional plant power use with the electricity produced with biogas |
| 2 | Participate in the Transition Feed-In-Tariff (FIT) Program to feed power to the local grid |
| 3 | A combination of both (1) and (2) |
| 4 | Transport gas off-site for use at the historic Allandale Train Station |
| 5 | Sell biogas or heated water to nearby apartment buildings |
| 6 | Produce hot water for internal WwTF heating |
| 7 | Clean biogas and sell to natural gas supplier (ie: Enbridge) |
| 8 | Do nothing |

13. It was recognized early in the process that for several of the Alternatives for biogas usage, that on-site storage of biogas would be necessary. As such, a component of this overall study was to investigate what could be done to temporarily store biogas until it is needed.

14. The following four biogas storage alternatives were developed.

| ALTERNATIVE | DESCRIPTION |
|---|---|
| 1 | Pressurized steel vessel(s) |
| 2 | Concrete tank with a steel gas cover |
| 3 | Double Membrane Storage |
| 4 | No storage |

15. An Inventory of the effects of the Natural, Social, and Economic environment was undertaken. The scope of the Inventory is as follows:

    a) Natural and Physical Environment
        i) Physiography
        ii) Aquatic Features and Watercourses
        iii) Aquatic Habitat and Communities
        iv) Vegetation and Vegetation Communities
        v) Wildlife Habitat and Communities
        vi) Archaeological Review

    b) Social Environment
        i) Location and Surrounding Land Uses
        ii) Official Plan
        iii) Other Applicable Policies and Legislation

    c) Economic Environment
        i) Existing Cogeneration Usage

16. In addition, the Project Screening Report contains a summary of the potential effects and the proposed mitigation strategies for during construction and during operations. A summary is included in Appendix "A".

17. The Agencies were also contacted, and those that responded included: Technical Safety and Standards Authority; Ministry of the Environment; and Lake Simcoe Region Conservation Authority. The concerns that they have identified will be addressed and are also summarized in Appendix "A".

18. A Public Information Centre (PIC) was held on April 3, 2012, at City Hall in the Rotunda from 4:00 p.m. to 7:00 p.m. The public and review agencies were notified of the project and were invited to attend the PIC to provide their input. The PIC was advertised twice in the local newspaper. Notification was provided to Council on March 21, 2012.

19. An Information Bulletin dated March 21, 2012, was circulated to the property owners/residents in the area of the proposed works and at the April 3, 2012 PIC. The Information Bulletin outlined the process, identified the Usage Alternatives, identified the Storage Alternatives and proposed Preliminary Preferred Alternatives based on evaluations. A comment sheet was also attached.

20. The public and agencies were requested to complete and submit the comment sheet to the Engineering Department. To improve the public's opportunity to comment, an on-line questionnaire was also available via the City website. Respondents were asked to comment on all the Alternatives and to list their concerns. These concerns are contained in the Project Screening Report.

21. The Public Information Centre was attended by eight members of the public. The on-line survey was responded to by two persons. It is not uncommon to have a low turn-out for this type of project; however the comments that were received were highly technical in nature and well researched. This reflects that there is an interest by certain members of the public.

22. A hard copy of the Project Screening Report is available in the Councillors' Lounge.

## ANALYSIS

### BIOGAS USAGE ALTERNATIVES

23. An evaluation was undertaken of the Biogas Usage Alternatives with the following factors:

    a) Costs (Capital and Operating);
    b) Technical Feasibility;
    c) Effects on Social and Cultural Factors; and,
    d) Effects on the Natural Environment.

24. The evaluation details can be found in the Project Screening Report. The evaluation concluded that the Preliminary Preferred Usage Alternative (No. 3) is to configure the two (2) existing co-generators to feed power back to the distribution grid and/or for WwTF electrical load displacement.

25. In addition, it concludes that the City should continue with the production of hot water for internal WwTF hydronic heating and process water heating.

26. Subsequent to the PIC, a total of eight (8) written and electronic responses were received from the public. It is difficult to draw any conclusions however the quality of the comments that were received proved to be beneficial. Detailed comments and the associated City responses are provided in this Staff Report's Appendix "B".

27. The following highlights the pertinent comments from the public and specific reasons that the alternatives suggested were not carried forward:

    a) Biogas Usage Alternative No. 3
    50% of respondents supported Alternative No. 3, however it was the most preferred of all the other alternatives presented.

    b) Biogas/Hot Water to heat apartment buildings
    One comment favoured the use of Biogas/Hot Water to heat neighbouring high density residential buildings, but this type of scenario is currently not considered as a core function to be provided by the City. However, it is more cost effective for the City to produce its own electricity for the WwTF, noting that the WwTF is the City facility that is the largest user of electricity.

    c) FIT program
    One comment indicated that the FIT program does not make sense as a long-term solution and suggested that load displacement (Biogas Usage Alternative No. 1) was the ideal solution while any excess hot water for heating should be offered to nearby public or private facilities. However, it is noted that the recommended Biogas Usage Alternative is viable even without participation in the FIT program.

    d) Non-Biogas Energy Sources
    Several comments suggested other alternatives for the WwTF. However they are beyond the scope of the project such as wind and solar power as well as a Community Heat and Power operation.

    e) Increasing Biogas by Additives and Green Bin Diversion
    Several comments suggested increasing biogas production through use of additives and diversion of green bin materials. However the City has investigated the diversion of green bin recently and has concluded that the advantages appear to be limited compared with the disadvantages of adding more digesters to accommodate the solids increase.

28. Noteworthy are the following Alternatives that were not carried forward:

    a) Transport Biogas Off-site for Use at the Historic Allandale Train Station (Biogas Usage Alternative No. 4)
    The transporting of biogas off-site for use at the Historic Allandale Train Station is not recommended however, hot water conveyance is a better option. In anticipation, the Historic Allandale Train Station's heating system has been designed to accommodate supplemental hot water usage. At the time of determining the use of the Historic Train Station, a feasibility study should be undertaken, including a hot water main from the WwTF; and,

    b) On-site Purification of Biogas and Sell to a Natural Gas Company (Biogas Usage Alternative No. 7)
    On-site purification of biogas was evaluated and found to be less lucrative than FIT program benefits in terms of energy savings because gas prices are relatively low compared to electricity prices. The City of Hamilton produces pipeline-grade gas by using gas cleanup technology. The same economy of scale may not apply to the City of Barrie due to the relative sizes of the plants and the volumes of biogas produced.

29. Staff have confirmed that this project is viable whether FIT funding is received or not.

30. All factors considered, it is recommended that to address the Biogas Usage need, the two (2) existing co-generators should feed power back to the distribution grid and/or for WwTF electrical load displacement. In addition, there is also a need for biogas storage including auxiliary buildings.

BIOGAS STORAGE ALTERNATIVES

31. An evaluation was undertaken of the Biogas Storage Alternatives with the following factors:

    a) Net Present Value (over 20 years) includes capital and operating costs;
    b) Technology Maturity;
    c) Public Safety;
    d) Code compliance;
    e) System Reliability;
    f) Maintenance;
    g) Footprint (Land Area Requirement); and,
    h) Expandability.

32. The evaluation details can be found in the Project Screening Report. The evaluation concluded that the Preliminary Preferred Biogas Storage Alternative (No. 1) is to construct a pressurized steel vessel(s).

33. After Consultation with the public, three responses objected to any storage on-site either due to visibility or on the basis of perceived danger. Two responses preferred geo-membrane technology; one of whom disliked the idea of a concrete tank but felt that a steel tank was an alternative. The same response indicated that the safety of storing biogas was their key concern and that maximum safety standards must be used in light of the recent explosion in Toronto. Some responses did not comment on storage. Safety concerns have been addressed in the Project Screening Report and as indicated in Appendix "B".

34. All factors considered, it is recommended that to address the Biogas Storage needs that a Pressurized Steel Vessel(s) be constructed.

RECOMMENDATION

35. The recommendation for the Biogas Usage component of the project is to configure the two (2) existing co-generators to feed power back to the distribution grid and/or for WwTF electrical load displacement. This alternative scored the highest using the evaluation criteria presented above. The preferred alternative has the following advantages over other alternatives:

a) The continued use of existing infrastructure (i.e. no costly building expansion required);
b) The ability to phase in new equipment as needed if City is successful in obtaining a FIT agreement;
c) It is not required to be accepted into the FIT program for the project to be viable;
d) Low capital cost; and,
e) The City is adhering to its core business and is concentrating its resources for the treatment of wastewater to protect the bay and the environment.

36. In addition, the City will continue the use of biogas for WwTF hydronic heating and process improvement and expand within the WwTF where possible.

37. The recommendation for the Biogas Storage component of the project is to construct a Pressurized Steel Vessel(s) to maximize the use and minimize wastage of the valuable biogas resource. This alternative scored the highest using the evaluation criteria presented above. Natural Gas, Propane and Biogas storage in pressurized steel vessels is a widespread, safe and proven technology and was chosen for those attributes.

38. In summary, the various recommendations for the Biogas Utilization Upgrades project have been merged and details added and hence staff is seeking Council's endorsement of the following recommendation:

a) Configure the two (2) existing co-generators to optimize the use of biogas for WwTF electrical load displacement and/or feed power back to the distribution grid;
b) Optimize collection and use of biogas through strategic operations;
c) Continue the use of biogas for WwTF hydronic heating and process improvement and expand within the WwTF where possible; and,
d) Construct horizontal medium pressurized steel biogas storage vessel(s) and auxiliary buildings, with enhanced security.

39. Staff have reviewed and confirmed that the mitigating measures are achievable (see Appendix "A") and will have minimal effects on the physical, natural, social, cultural and economic environmental matters.

**ENVIRONMENTAL MATTERS**

40. This project has investigated the physical, natural, social, cultural and economic environmental matters which have been considered in the development of the recommendations. The Project Screening Report discusses how environmental matters have been considered in the development of the recommendations. The scoring process considered all natural, social and economic environmental matters.

## ALTERNATIVES

41. The following alternative is available for consideration by General Committee:

**Alternative #1** General Committee could refer back to staff to further evaluate the merits of the other alternatives for biogas usage and storage.

This is not recommended because the recommendations provide maximum flexibility and maximum opportunity for offsetting energy costs at the Wastewater Treatment Facility.

## FINANCIAL

42. If implemented without the FIT program the recommendations are expected to save the City an additional $170,000 in the first year of operation (2016), and increasing to $280,000 per year by 2023 by utilizing the biogas to generate the WwTF electricity. This implies that the total cost of the project could be recovered as early as approximately 12 years.

43. If implemented with the FIT program the recommendations are expected to generate a net revenue for the City of $260,000 (FIT revenue minus WwTF electrical costs) in the first year of operation (2016), and increasing to $350,000 per year by 2023. This implies that the total cost of the project could be recovered in as early as approximately 10 years. This assumes there are no time-of-use strategies implemented, such as:

a) When electricity costs are low at night, utilize the power grid and store biogas or;
b) When electricity costs are high during the day then utilize biogas generated electricity at the WwTF

44. Proceeds from the FIT program will be reflected in the Wastewater Rate Operating Budget as a revenue line item.

45. The operating cost effects on staff, will be minimal as the system will be automated. Additional daily duties are not foreseen to require a full additional operator and/or maintenance persons however this new facility will affect the time requirements and will have to be considered during the operating budget preparation for the year 2016.

46. The cost of the recommendations, including capital costs, engineering, non-refundable HST, project costs and contingencies is as follows:

| RECOMMENDATION | ESTIMATE |
|---|---|
| Configure the two (2) existing co-generators to feed power back to the distribution grid and/or for WwTF electrical load displacement. | $450,000 |
| Continue the use of biogas for WwTF hydronic heating and process improvement and expand within the WwTF where possible. | To be determined on a project-by-project basis |
| Construct a horizontal medium pressurized steel vessel and auxiliary buildings. | $2,200,000 |
| Contingencies (10%) | $300,000 |
| **TOTAL** | **$2,950,000** |

47. The Detail Design of the Biogas Utilization Upgrades (including Cogen electrical reconfiguration and steel vessel(s)) is included in the 2012 Capital Plan, subject to Council adopting the recommendations. The construction component of the project is included in the 2013-2022 Capital Plan that is currently being prepared with the forecasted construction funding as follows:

| YEAR | PHASE | EXISTING ($^{EX}$)/ FORECASTED FUNDING |
|---|---|---|
| 2012 | D – Complete Pre-Design/ Approvals | $600,000$^{EX}$ |
| 2013 | D2 – Detail Design | 2012 Carry-over |
| 2014 | C1 - Construction Start | $2,100,000 |
| 2015 | C2 – Construction Complete | $200,000 |
| 2016 | C3 – Warranty Period | $50,000 |
| | **TOTAL** | **$2,950,000** |
| Note that as per the Capital Project Funding Policy, the construction value may be adjusted prior to the Construction Year 1 | | |

48. Subject to Council approval of the 2013 Capital Plan, the Biogas Utilization Upgrades project will be funded from the Wastewater Reserve Fund (12-05-0575).

**LINKAGE TO 2010 – 2014 COUNCIL STRATEGIC PLAN**

49. The recommendations included in this Staff Report support the following goals identified in the 2010-2014 City Council Strategic Plan:

☒ Manage Growth and Protect the Environment

☒ Strengthen Barrie's Financial Condition

☒ Improve and Expand Community Involvement and City Interactions

50. Manage Growth and Protect the Environment – The recommendations protect the environment by optimizing the biogas resource.

51. Strengthen Barrie's Financial Condition – The recommendations enable the City to expand its current usage of the naturally occurring biogas resource. There are significant cost savings available as stated in the financial section of this Staff Report.

52. Improve and Expand Community Involvement and City Interactions – Community involvement has been promoted throughout the public consultation process, including the use of an on-line survey. The recommendations are also to be endorsed by Council, thus allowing the public opportunity to comment through Deputations. To improve access to the documentation, the Project Screening Report can be viewed by the public at the following locations:

a) City Hall, 70 Collier Street, Engineering Department, 4th and 6th floors;
b) Main Library, 60 Worsley Street;
c) Branch Library, 48 Dean Avenue; and,
d) On-line, a PDF version of the is available online by doing a keyword search on the City of Barrie web page (www.barrie.ca) for "Biogas Screening Report" and clicking on the first check marked result then scrolling down to the Wastewater Treatment Facility- Biogas Utilization.

## APPENDIX "A"

## SUMMARY OF POTENTIAL EFFECTS AND PROPOSED MITIGATION

| POTENTIAL EFFECTS AND PROPOSED MITIGATION DURING CONSTRUCTION | | |
|---|---|---|
| **POTENTIAL EFFECTS** | **COMMENTS** | **COMMITMENTS** |
| Construction Effects | - Construction is on the south-east side of the WwTF property, away from the residential areas<br>- Proposed location is not in close proximity to Dyment's and Hotchkiss Creeks | - Design requirement<br>- Design requirement |
| Trucks and Traffic Effects | - Large construction vehicles will be directed to established truck routes | - Contract requirement |
| Noise | - Friction pile driving likely not required<br>- Construction noise to be minimal during normal work hours<br>- Normal working hours to be restricted to 7am to 7pm and no work on Sundays unless otherwise approved by the City<br>- Contractor to comply with the City's Noise By-law | - Design requirement<br>- Contract requirement<br>- Contract requirement<br>- Contract requirement |
| Air Quality | - Construction vehicles to be properly maintained<br>- Due to the nature of this construction activity, minimal effects and odours are expected. | - Contract requirement<br>- Design requirement |
| Dewatering | - Minimal dewatering is expected.<br>- Any dewatering discharge is to comply with the City's Site Alteration Permit and Sewer Use Bylaw | - Design requirement<br>- Contract requirement |
| **POTENTIAL EFFECTS AND PROPOSED MITIGATION DURING OPERATIONS** | | |
| **POTENTIAL EFFECTS** | **COMMENTS** | **COMMITMENTS** |
| Human Health and Safety | - Strong enclosure to protect biogas storage tank | - Design requirement |
| Noise | - Type of compressors causes little noise and vibration.<br>- A review of the existing Cogen room was carried out to determine if upgrades are needed due to parallel operation of the two Cogenerators.<br>- A Noise Study was conducted | - Design requirement<br>- Design requirement<br>- Update WwTF Noise Study once construction is completed |
| Visual Aesthetics | - Reduced waste flaring<br>- Type of biogas storage tank | - Design requirement<br>- Design requirement |
| Additional Hydro Infrastructure | - If FIT proceeds, then additional wires will be added to the existing overhead power lines | - Design requirement |
| **POTENTIAL EFFECTS AND PROPOSED MITIGATION IDENTIFIED BY THE AGENCIES** | | |
| **AGENCY** | **AGENCY COMMENTS** | **COMMITMENTS** |
| TSSA | - TSSA recommends to consult with them during Detail Design | - Concur |
| MOE | - Existing Environmental Compliance Approval to be amended to include proposed changes | - Concur |
| LSRCA | - Locate main electrical above regulatory flood elevation.<br>- Electrical equipment not above the regulatory flood elevation shall be flood proofed. | - Concur<br>- Concur |

## APPENDIX "B"

## SUMMARY OF MAJOR COMMENTS AND ASSOCIATED RESPONSES

| | PUBLIC COMMENT | CITY RESPONSE |
|---|---|---|
| 1 | - Displace additional plant power load & participate in the Provincial Feed-In-Tariff program are good ideas. FIT program is more profitable.<br>- Would like the project team to consider adding more organic material to increase the amount of biogas produced. Details emailed to the City of Barrie. | - Noted<br>- See response for comment #7 |
| 2 | - Do something.<br>- Do not waste any more biogas<br>- Build a windmill at the site.<br>- Sell gas for mixing with natural gas at 75 Ellen St (33-40%) to eliminate supply problems.<br>- The Public Information Centre did not help the member of the public better understand the need for the project. However the project makes sense and should go ahead to stop wasting biogas.<br>- Start a solar or wind project.<br>- Cool buildings using lake water.<br>- If the hydro grid goes down in Ontario or North America it would be good to have a local independent power generating plant. | - Noted<br>- Noted<br>- The City of Barrie is exploring alternative renewable energy systems where appropriate to support the establishment of a green economy as outlined in the Official Plan.<br>- Although this has been done elsewhere, the City would prefer to utilize the biogas internal to the WwTF<br>- Noted<br>- Beyond the scope of this project however the City has entered into an agreement with PowerStream to place solar panels on various City facilities<br>- Beyond the scope of this project<br>- The WwTF will be the first priority if the hydro grid goes down, however any extra power will likely be supplied to the grid. |
| 3 | - Feels that Option #3 is the best – use power to feed the power plant & feed the local grid.<br>- Does not want to store any biogas on the site close to his/her residence. | - Noted<br>- The biogas storage vessel will be relatively small in size and situated away from residences, on the east side of the WPCC. The proposed medium gas pressure vessel is a conventional technology that complies with Technical Standards and Safety Authority requirements |
| 4 | - A combination of both options (Displace additional plant power load & participate in the Provincial Feed-In-Tariff program) is the best suggestion as long as the Barrie WPCC is producing enough biogas to make both options viable.<br>- Agree that the preliminary preferred solution is the best option. It gives flexibility where needed yet still addresses all concerns. This combination of options seems feasible with little if any negative side effects.<br>- If the City goes with the FIT Program, how will they get the excess electricity to the grid? Will extra power poles/lines have to be added to the area? | - Noted<br>- Noted<br>- To enable electricity to be fed to the power grid, electrical work to be done would include installing: a step-up transformer from 600V to 4.16kV; a secondary metering unit rated at 600V; and installing cables from the cogen switchgear to the 4.16kV feeder on Bradford/ Brock Street. |
| 5 | - The storage of the gas is the key concern. Maximum safety standards should be used especially recalling the major gas explosion a few years ago in Toronto. Such an explosion could wipe out blocks of homes.<br>- The burn-off must be scent free. Mr. Tate used to live next to the plant and states that on some days the smell was horrid. | - The biogas storage vessel will be relatively small in size and situated away from residences. The proposed medium gas pressure vessel is a conventional technology that complies with Technical Standards and Safety Authority requirements. From our research, the accident was a result of a historic trend of unsafe practices by the firm with a much higher fuel content.<br>- Odours are related to different process areas in the plant. The cogeneration of biogas itself does not generate odour. |

| | | |
|---|---|---|
| 6 | - Pressure gas vessel can be considered as an alternative. Concrete tank with steel gas cover would be expensive and ugly (not a good option). Double membrane storage would be ideal if cost and approvals are acceptable. | - Noted. |
| | - Displacing additional plant power load is ideal as eventually the FIT funds would be less than the cost of energy. The FIT program does not make sense as a long-term solution. There is also an option where you can provide excess energy to the OPA grid in exchange for credits for electricity purchased at a later date. | - The WwTF Operators will be given the opportunity to supply to the WwTF as first priority thus reducing the need to buy the higher priced electricity. Costs will be minimized and revenues will be maximized. |
| | - The WPCC is better off to maximize electrical production on the site to fill its own requirements while offering to pipe heated (and chilled) water, not required by the WPCC, to nearby private and public facilities. Pricing established for this service in the community is sustainable and can be locked in for extended periods to ensure full recovery of the investment involved. In some cases, the recipient of the water from the WPCC would be willing to pay for the piping requirements. | - The City is investigating the feasibility of piping hot water from the WPCC to the Allandale Historic Train Station which will remain in public domain. |
| | - The study team needs to look at Community Heat and Power (CHP) operations such as in Markham, Ontario to see how the facilities can be useful in the community. The system in place does not seem to be taking the opportunity to produce hot or chilled water that can be of use on site as well as throughout the community. To offer the piped water from the facility is not only excellent public relations but it justifies the vital location of the WPCC. | - Beyond the scope of this project |
| | - Respondent offered his consulting services to help explain the value of what the WPCC offers the community. | - Noted |
| 7 | - If the Barrie sewage processing facility can adjust the carbon/nitrogen ratio (by adding small quantities of shredded paper, straw or similarly low protein organic waste to the digester to optimize CH4 production), it could result in a 1% increase in methane, which could translate to a large amount of electricity and heat over a year's operation. | - The methane to carbon dioxide ratio of the biogas can be tweaked by changing the feedstock in theory; however, in practice, even with high quantities of external sources, it only changes marginally, to the point where the real benefit is not the change in CH4:CO2 ratio, but the overall volume of biogas produced. |
| | - If the incoming waste can be (cost effectively) warmed through indirect contact with finished digestate, this would leave more heat available for sale to nearby facilities like the Allandale Station or the neighbouring condo towers. | - Future studies are being considered as to the viability of utilizing the warmer wastewater and finished digestate |
| | - The amount of CH4 produced by the sewage treatment plant can be substantially increased by increasing the organic load the plant receives with organics that would otherwise be shipped to Arthur for composting. A Citywide program to encourage people to install garburators for kitchen waste could increase income from energy generation and reduce expenditures on curbside reduction and transportation. | - Adding external carbon (fats, oils, greases, etc.) directly to a digester is indeed an area of growing interest globally. While the addition of such material is not in the current project (and the digesters are not currently configured to allow such an input), it could be considered in the future. |
| | - Does the Waukesha Gas Engines used to spin the generators incorporate heat recovery from the exhaust? It is hoped that this is incorporated into the sewage plant installation. | - The Waukesha engines already incorporate heat recovery. |
| 8 | - Sent a report suggesting the City to consider incenting garburators to reduce green bin costs and increase gas production at the sewage treatment plant. | - The treatment process at the Barrie WPCC would have to be designed to be able to treat more organic material and there would be costs for increasing the WPCC's ability to handle more gas. A cost evaluation has not yet been done to estimate the benefit of garburators in gas production at the plant per household per year to be able to provide incentives for their installation. If a $400 per household incentive were implemented it the cost for this program would be approximately $16,800,000 if every household participated. |