



# **Issues & Questions for Follow-Up**

**Resource Recovery Market Sounding**

**Core Area and West Shore Wastewater Treatment**

**AUGUST 17, 2009**

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## Part 2 Issues & Questions

### WASTE HEAT ENERGY

Based on the following set of questions, during the interview stage, Respondents will be requested to provide more specific information on the relevant projects that were identified in response to PART 1

#### Waste Heat Energy - Technology

1. What is the waste heat energy recovery source?
  - a) Raw wastewater
  - b) Treated effluent
2. What was the rationale for the selection of the waste heat energy recovery source?
3. What percentage of waste heat energy generated is utilized within the wastewater treatment plant? Where is the balance of the heat energy being utilized?
4. If the source is raw wastewater:
  - a) Is the waste heat energy recovery technology situated within the boundaries of the wastewater treatment plant or the transmission system?
  - b) What was the rationale for the siting of the waste heat energy recovery technology?
5. If the source is treated effluent:
  - a) Is the waste heat energy recovery technology situated within the boundaries of the wastewater treatment plant or the effluent discharge pipeline?
  - b) What was the rationale for the siting of the waste heat energy recovery technology?
6. What was the rationale for selecting this wastewater heat energy recovery technology?
7. What technical and/or operational methodologies are utilized to address changes in flow rates during different times of the day and seasonally?
8. How far can the waste heat energy be transported before temperature drops to an uneconomic level?

9. What is the design average flow rate and how much waste heat energy is being generated?
10. In your experience, at what local ambient temperature does heat energy recovery from wastewater become economic? The CRD region has a year-round moderate climate.

## Waste Heat Energy – Revenues and Costs

1. Describe the partnership relationship, if any, between the municipality and the owner/end user of the generated heat energy
2. Does the municipal owner of the wastewater system derive any revenue from the waste heat energy generated? If so:
  - a) Is this energy sold at wholesale or retail rates?
  - b) Are the rates regulated? If not on what basis were the rates to be charged to the customers determined?
  - c) Provide a breakdown of customers, by percentage utilization, into the following categories:
    - Single family residences
    - Multiple family residences
    - Institutional
    - Commercial
    - Industrial
  - d) Are any subsidies provided to customers?
  - e) How many dedicated resources are employed for waste heat energy measurement and waste heat energy billing?
  - f) Is the rate structure designed to enable the recovery of actual capital and full operation and maintenance costs for the installed waste heat energy recovery system and associated measurement and billing activities?
  - g) Does the rate structure enable a return to be made and if so what is this level?
3. What guarantees, if any, are provided to waste heat energy customers? Do they address:
  - a. Quantity of heat to be supplied
  - b. Time of day or seasonal variations
4. What arrangements or guarantees are in place to protect against buyers of resources going out of business or renegeing on the arrangement? Is there a back up plan?

5. How was the cost of supporting infrastructure (delivery and integration outside the wastewater treatment plant) shared by end-users, operators and the municipality?
6. What are the annual maintenance costs of heat capture technologies?

### Waste Heat Energy - Integration

1. What are the key factors that the CRD should consider in planning the integration of waste heat energy recovery technologies in its pipelines and/or treatment plants?
2. Does your facility recover heat before flows enter the treatment plant (in-pipe heat recovery) or after treatment? Or does your facility integrate such technology into the treatment plant on-site?
3. What design/layout configurations should be considered when planning the integration of wastewater heat energy technologies on-site at each plant?
4. How much land was required to accommodate the wastewater heat energy technologies at your locations?

### Waste Heat Energy - Other

1. In your experience, how far can heat energy be transported before temperature drops to an uneconomic level? That is, if heat exchangers transfer heat energy to water then how far can such water reasonably be piped before its temperature drops to an uneconomic level?
2. What is the life-expectancy of heat energy capture technologies?

# WATER REUSE

Based on the following set of questions, during the interview stage, Respondents will be requested to provide more specific information on the relevant projects that were identified in response to PART 1

## Water Reuse – Technology

1. What are the key issues/factors that the CRD should consider in making a determination on whether or not to incorporate water reuse technology in one or more of the facilities within the overall Project?
2. Do you own, operate and maintain the water reuse distribution system to each customers' property line? If not where does your responsibility terminate?
3. Is the water for reuse stored? If so, what type of storage facility is used and what was the rationale for its selection?
4. Is the demand for the reuse water seasonal? If so, what is the strategy towards the generation and/or disposal of reuse water during the period of low or no demand?
5. What is the customary level of treatment for recovered water in your operations?
6. How do you manage changes in seasonal supply and demand for reused water? CRD has substantial rainfall during winter months and scarcity during summer months.
7. Have you successfully stored recovered water? What has your experience with storage of reusable water? How many days can such water typically be stored before turning unusable/toxic to humans?
8. Has your municipality reviewed rainwater capture and storage as an alternative to wastewater reuse? What has been your experience with this alternative strategy?

## Water Reuse – Revenues and Costs

1. Are any revenues received from the reuse water generated? If so:
  - a) Is this reuse water sold at wholesale or retail rates?

- b) Are the rates regulated? If not on what basis are the rates to be charged to the customers determined?
  - c) Provide a breakdown of customers, by percentage utilization, into the following categories:
    - Residential
    - Municipal (parks, golf courses, flower beds etc.)
    - Private Recreational (golf courses)
    - Commercial (garden centres, greenhouses etc.)
    - Agriculture (farming, wineries etc.)
    - Industrial - identify
    - Other - identify
  - d) Are any subsidies provided to customers?
  - e) How many dedicated resources are employed for reuse water consumption measurement and billing?
  - f) Is the rate structure designed to enable the recovery of actual capital and full operation and maintenance costs for the installed reuse water systems and associated measurement and billing activities?
  - g) Does the rate structure enable a return to be made and if so what is this level?
2. Have you conducted a comparison of the costs of delivering potable water to customers, rainwater capture, and to reclaimed water to customers? What conclusions and recommendations did you observe?
3. How much energy is consumed to produce and deliver potable water compared to reclaimed water?
4. What guarantees, if any, are provided to the reuse water customers regarding quality, quantity, availability etc.?
5. Briefly describe any incentive programs to encourage customers to utilize reuse water. Identify those that were successful/unsuccessful and why.
6. What arrangements or guarantees are in place to protect against buyers of resources going out of business or renegeing on the arrangement? Is there a back up plan?
7. How was the cost of supporting infrastructure (delivery and integration outside the wastewater treatment plant) shared by end-users, operators and the municipality?
8. What are the annual maintenance costs of water reuse technologies?

9. Is there a positive rate of return for this?
  - a. If so, can you provide a range?

### Water Reuse - Integration

1. What are the key factors that the CRD should consider in planning the integration of on-site water reuse/recovery technologies?
2. What design/layout configurations should be considered when planning to integration of water reuse/recovery technologies on-site at each plant?

### Water Reuse - Other

1. In your experience, what are the key issues/factors that the CRD should consider in making a determination on whether or not to incorporate water reuse technology in one or more of the facilities within the overall Project?
2. How many days does it take recovered water to turn to unusable/non-potable water (and be toxic to humans)?
3. Is any water used for toilet flushing? If so, was it put in new developments or retrofitted?

# ENERGY FROM ORGANICS, BIOSOLIDS TREATMENT AND END USE

Based on the following set of questions, during the interview stage, Respondents will be requested to provide more specific information on the relevant projects that were identified in response to PART 1

## Energy from Organics – General

1. What are the key issues/factors that the CRD should consider in making a determination on whether or not to incorporate energy from organics technology in one or more of its treatment plants within the overall Project or off site?
2. Do you digest your biosolids to develop biogas?
3. How is the resultant biogas utilized?
  - a) As a fuel for cogeneration to produce heat and/or electricity
  - b) As a fuel for vehicles
  - c) Other – please identify
4. Is the energy that you generate:-
  - a) Used by yourselves and if so for what application(s)
  - b) Sold to a third party
5. What additional technologies were you required to install, in order to sell your energy to a third party?
6. What was your rationale for incorporating energy from organics technology in your wastewater treatment plant?

## Biosolids Treatment and End Use – Technology

1. What are the key issues/factors that the CRD should consider in making a determination on whether or not to incorporate biosolids treatment technology or end-use in one or more of its treatment plants within the overall Project?
2. What are the key factors CRD should consider in making a determination whether to treat biosolids at a treatment plant or off-site?

3. Is the operator of the wastewater treatment plant responsible for the operation and maintenance of the biosolids treatment technology? If not, what was the rationale for having another party assume this responsibility?
4. What are the end use applications for the generated biosolids?
  - a) Composting
  - b) Fuel substitution – identify
  - c) Other – identify
5. Do you have any experience associated with the integration of kitchen wastes into the biosolids treatment process and if so identify the key benefits/costs/issues?
6. Do you have any experience associated with the integration of FOG (fats, oils, greases) into the biosolids treatment process and if so identify the key benefits/costs/issues?
7. Do you have any experience associated with the integration of other organics into the biosolids treatment process and if so identify the type of organics as well as key benefits/costs/issues?
8. What end-uses for biosolids do you consider to be viable? Provide a brief rationale.
9. What were the key issues raised by the public associated with biosolids treatment and disposal (vehicle noise, odour, quality of end-product, cost of end-product etc.) and how were they managed?

### Energy from Organics/Biosolids – Revenue

1. What percentage of the energy generated is used:
  - a) In house
  - b) by a third party
2. Do you receive any revenue from the energy generated?
3. If you sell your generated energy to a third party, is the pricing designed to fully recover your capital and associated O&M costs?
4. If you sell your generated energy to a third party, what guarantees are you required to provide? e.g. quantity, quality, availability etc.

5. What arrangements or guarantees are in place to protect against buyers of resources going out of business or renegeing on the arrangement? Is there a back up plan?
6. Do you use the resultant end-use products? E.g. compost for municipal application? If so, are the offset savings taken into account in determining the rates for wastewater treatment to your customers?
7. If you are responsible for the treatment of your own biosolids, do you receive any revenue from the resultant end-use products? If so:
  - a. Are your prices regulated? If not on what basis did you determine the prices to be charged to your customers?
  - b. Is your pricing structure designed to enable you to recover your actual capital and full operation and maintenance costs for the biosolids treatment as well as the marketing and sales of end-use products?
  - c. Does your pricing structure enable you to make a return and if so what is this level?
8. Do you guarantee a supply of generated biosolids for treatment by another party and what does your guarantee cover e.g. quantity, quality, availability etc.?
9. What arrangements or guarantees are in place to protect against buyers of resources going out of business or renegeing on the arrangement? Is there a back up plan?

## Energy from Organics/Biosolids – Integration

1. What are the key factors that the CRD should consider in planning the integration of energy from organics technologies in its overall Project?
2. What are the key factors that the CRD should consider in planning the integration of biosolids treatment technologies and end-use in its treatment plants or off site
3. What design/layout configurations should be considered when planning to integration of energy generation technologies on-site at each plant? How much land was required by your facility?
4. In your experience, was it more economic and efficient to install such technologies at the wastewater treatment facility, or should it be installed at a centralized biosolids facility?

## Energy from Organics/Biosolids – Other

1. What level of cleaning/scrubbing is required before syngas may be injected into the retail gas line?

2. From a resource recovery perspective, should biosolids handling and treatment be performed in a centralized location, or located at each wastewater treatment plants?
3. What are the benefits/costs/issues for collecting and integrating kitchen wastes into processing?
4. What are the benefits/costs/issues for collecting and integrating fats, oils and greases into processing?
5. What other organics should be considered for integration into the digestion process?
  - a. What is the optimal mix?
6. How have consumer concerns been managed (for users of compost etc.)?

## OTHER RESOURCE RECOVERY SOLUTIONS

Based on the following set of questions, during the interview stage, Respondents will be requested to provide more specific information on the relevant projects that were identified in response to PART 1

### “Other” Resource Recovery- Technology

1. What is the “other” resource recovery solution?
2. Demonstrate that this “other” resource recovery technology is proven and identify the key risks/benefits to the CRD.

### “Other” Resource Recovery - Revenues

1. Does the municipal owner of the wastewater system derive any revenue from the “other” resource recovery technology? If so, provide details.
2. Is the municipal owner required to provide any guarantees? If so, provide details.
3. What arrangements or guarantees are in place to protect against buyers of resources going out of business or renegeing on the arrangement? Is there a back up plan?

### “Other” Resource Recovery - Integration

1. What are the key factors that the CRD should consider in planning the integration of “Other” resource recovery technologies in its pipelines and/or treatment plants?

## PART 3: Follow-On Questions

1. Did the inclusion of the resource recovery component and associated capital and O&M costs result in an increase in user rates and if so how was this presented and justified to the ratepayers?
2. What initiatives were undertaken to obtain community acceptance of the proposed resource recovery component of the project?
  - a) prior to project approval
  - b) after operational commencement
3. What initiatives were undertaken to specifically address and manage any negative community concerns raised during the project approval phase?
4. What source control programs have been initiated and discuss their effectiveness and any shortcomings?
5. Identify any source control programs or other initiatives that will provide added value to the resource recovery operation.
6. Based on your experience to date with resource recovery, what would you do differently at the next opportunity and why?