



## RESOURCES FROM WASTE AN INTEGRATED RESOURCE MANAGEMENT APPROACH

### AUTHORS' EXECUTIVE SUMMARY

This document provides a summary prepared by the authors of the report "*Resources from Waste - Integrated Resource Management*" [the "IRM Report"] published by the Province of British Columbia on 20<sup>th</sup> May, 2008.

#### *THE IRM REPORT*

The IRM Report was commissioned by the Government of British Columbia to consider new approaches to managing water, solid and liquid wastes in communities across the Province. The focus was to reduce both costs and greenhouse gas emissions.

The Report has been reviewed by experts in British Columbia and internationally, with universal support for the concept and the need to apply it to demonstration projects.

#### *WHAT IS 'INTEGRATED RESOURCE MANAGEMENT'?*

IRM is significantly different from a system designed simply to recover resources from waste treatment. This more traditional approach focuses on treating wastes (usually at more centralised plants), then looks for opportunities for resource recovery. Such an approach has benefits but does not optimise the resource potential or the values.

Integrated Resource Management ("IRM") is a fully integrated approach to converting waste into resources. Key principles of this approach include:

- The goal of IRM is zero waste, with all wastes diverted from landfills and incinerators.
- IRM uses a "design with nature" approach that reuses all resources as much as possible.
- Waste is a valuable resource, not a liability that has to be disposed of at a cost to taxpayers. Solid and liquid wastes contain potential biofuels, electricity, heat, water and nutrients. With the price of energy increasing rapidly and water becoming scarcer, resource recovery is becoming increasingly important.

- Decisions are driven by the business case: how can we maximise the value (i.e., the profit net of cost) from waste, in order to minimise taxpayer impact? Also, how can we optimise non-financial benefits such as greenhouse gas emission reductions and healthy watercourses?
- Central to IRM is an integrated design process to managing water and waste such that value is maximised. Resource recovery plants are located near markets for the products; resulting in a system of decentralised plants in order to maximise the resource recovery opportunities, with the cost of localisation exceeded by other efficiencies and benefits.

#### *BENEFITS OF AN IRM APPROACH*

- The Climate Action Charter requires signatories to reduce GHGs by 33% by 2020 and make their operations carbon neutral by 2012. By applying an IRM approach, the model indicates communities can potentially reduce GHG emissions by 25% — a significant contribution to these targets that requires acceptable personal, family, corporate or government adaptation at low or no net cost to the taxpayer.
- Solid and liquid wastes can provide sufficient energy to heat the equivalent of 30% of a typical community's homes, and provide electricity for 10% of homes. In practice, heat recovery would be more efficiently supplied to large users such as commercial and institutional buildings, hospitals, government buildings, post secondary schools and shopping centres. The 'green electricity' would be uploaded to the grid.
- With the IRM approach, water from sewage treatment can be treated to a sterile (tertiary equivalent) level, i.e. exceeding many current treatment systems. This is done so the reclaimed water can be used to recharge streams, wetlands and groundwater to improve ecological health of watersheds, or offset non-potable uses such as irrigation or toilet flushing.
- IRM can generate biofuels to run the equivalent of 10% of a community's vehicles. This fuel source is carbon neutral, and does not take land away from agricultural productivity.
- IRM takes a 'just-in-time' approach, adding new treatment plants as the population grows. Capacity can be added as and where needed, rather than building excess capacity upfront.
- Taxpayer costs are significantly reduced, as the capital and operating costs are offset by the sale of resources.

#### *IRM IN THE CRD*

At the Province's request the IRM model was applied to the core area of the Capital Regional District, including Victoria and surrounding municipalities with a population of approximately 300,000. The Province had already directed the CRD to redesign its liquid waste management plan to provide for secondary level treatment.

The IRM model for CRD was mostly retrofitted within CRD's existing system, with up to 32 decentralised treatment plants, most of which could be located within buildings or existing municipal infrastructure. Heat could be recovered for local use by business and institutions; biosolids would then be pumped or otherwise diverted to more centralised digesters to generate electrical energy. The organic solid wastes from residences and commercial establishments can be fed to anaerobic digesters to generate other recovered resources, for example to create biofuels for bus transportation with the residuals being used for composting on agricultural lands.

The estimates for this model indicate that this approach could reduce municipal electricity costs required for pumping and waste treatment by about 33%. Further, the energy generated exceeds that required to power the waste treatment plants. It also has the advantage of being modular and scalable, which enables adaptation and growth of systems as and when needed, taking advantage of improvements in technology over time. This avoids the expense of constructing large treatment facilities in anticipation of projected population growth over the next 50 years, as with traditional approaches.

#### *NEXT STEPS*

- Currently the IRM study does not provide detailed engineering and financial designs directly applicable to a municipal system; it provides assistance for municipalities to understand how this might be applied in communities across BC, and the metrics and processes required to maximise resources and minimise waste.
- The report calls for a number of pilot or demonstration projects to test out the approach and refine the costs and benefits. It notes that portions of IRM have been undertaken in parts of BC and that variants have been undertaken internationally. The purpose of the pilots is to assess the application to circumstances in BC and ensure the concept is, as seems likely, applicable in a Canadian context and climate.
- The study recommends that further work be undertaken and that a coordination or "project office" be created within the Provincial government in collaboration with the private sector to support this change. This office would help municipalities consider how the IRM model can be adapted to meet each community's needs and circumstances.

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