

New Approaches to Waste
Integrated Resource Management
Overview

Traditional waste management is designed to address regulations while minimising cost. By contrast Integrated Resource Management (IRM) views waste as a resource which generates revenues. Nothing is wasted, everything has value. This simple change in approach has substantial benefits.

I. Waste Management: Why Change?

Waste is wasteful and expensive. Even with the best planning and management it fills landfills, costs enormous sums to dispose of, leeches into water tables, pollutes rivers and streams, or dumps toxins into the air we breathe. Landfills are one of the top sources of methane and GHGs, 21 times the power of carbon dioxide. Sewage is just as bad, with a fortune spent on sewer pipes that inevitably leak, creating smell, damaging health and even killing. Inadequately treated sewage is damaging fisheries and anoxic examples such as Chesapeake Bay are the visible consequence of trashing the environment, putting entire communities out of business.

Animals and fish eat our waste and we eat them. We're eating, drinking and breathing our own garbage. It's senseless. And yet someone, somewhere is digging new minerals out of the ground (using fossil fuels to do so) when they could be using the very thing being thrown away. Waste. Yet nature has no waste, everything is used. In reality therefore: *waste is simply a resource in the wrong place*. The question is whether waste can be viably turned back into a resource. We believe it can, but not by using traditional approaches to waste management. Hence IRM:

- Localised treatment plants filter and cleanse liquid waste, which can then either be discharged direct or treated further, allowing the water to be reused, e.g. in industrial processes.
- Organic materials are collected including household and commercial wastes, which are combined to increase resource recovery efficiency.
- Heat can be recovered locally and sent to local users, including potential conversion for cooling. Plants are located to minimise cost and conversion losses while maximising returns and efficiency.
- Centralised plants process organic waste streams into gas and heat in a sealed process to produce biofuels. Remaining solids can be processed either as fertiliser or in a cogeneration system.
- Cogeneration plants convert the combined wastes to produce heat and electricity. Plants are sited close to users and provide heating and/or cooling.

- Both localised and centralised plants are planned to maximise energy recapture, use and re-use, storage and so on to further enhance value.
- IRM aspects, optimisation and plant sizing, types and locations are driven by a business model and process, which is vital to an optimised implementation of IRM.

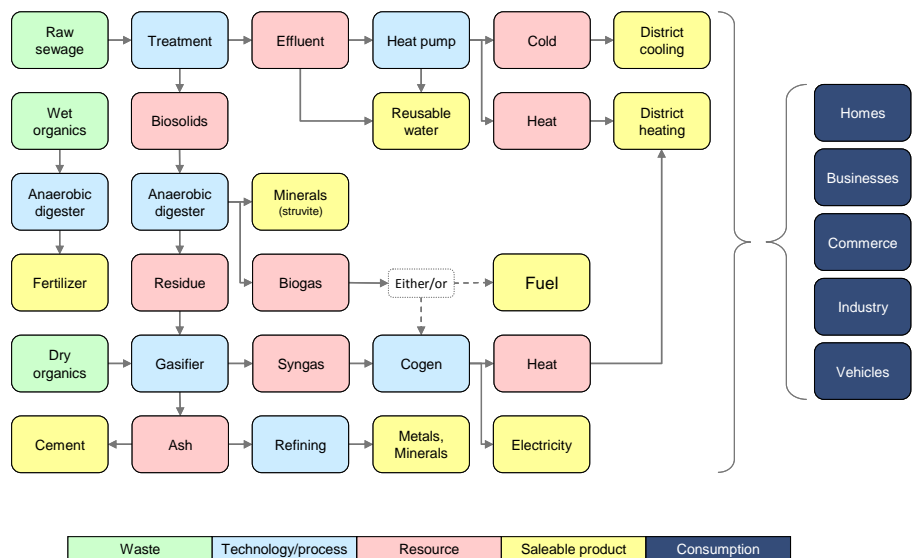
The compelling value proposition is that IRM benefits both economics and the environment, minimising community costs and maximising revenues. This is more than a philosophical change: it is a fundamentally positive shift in the way resources are managed that benefits the community.

2. IRM Advantages

- IRM costs the same or less than traditional solutions. *IRM is potentially profitable, net of costs.* This means taxpayer funding is limited or may even potentially be unnecessary.
- IRM recovers heat, produces chilled water and reduces energy demands, providing saleable *heating or cooling the equivalent of up to 26% of a community's homes.*
- IRM generates electrical energy and biogas. It is estimated it could *power the equivalent of up to 17% of a community's personal vehicles.*
- IRM can *reduce Green House Gases by 24-33% below 1990 levels.* This is a large contribution to meeting GHG targets. If optimised, IRM can exceed the original Kyoto GHG reduction target.
- IRM moves towards "zero waste",* reducing or conceivably eliminating landfills.
- IRM consumes less land.* The IRM approach uses small, localised facilities that can be placed in basements, under roads and parking lots. Other plant footprints are also reduced.
- IRM *components are largely "off the shelf"* and can be quickly installed as, where and when needed.

- IRM's quick phasing ability lowers debt & risk. Build, adjust or expand an existing or new system as much and often as required, whenever and wherever growth happens.

- Traditional systems rely on large infrastructure and demand projections that might never be met. *IRM avoids having to fund today for a population that might never arrive when or where predicted.*



The IRM Decision Tree is informed by the integrated financial model to optimise value

- IRM can discharge at tertiary disinfected level or better, i.e. IRM exceeds environmental levels compared to most traditional systems.

- IRM recycles water locally, reducing water demand, delivery and processing costs, often multiple times. IRM's focus on water re-use is a critical advantage where water is in short supply.
- IRM treatment is localised, limiting failure risk and impacts compared to a centralised plant. IRM is a more risk-tolerant, independent & resilient approach than centralised systems.
- Distributed systems can be incrementally upgraded as technology improves. Thus, IRM optimises phased continual improvement, making financing, maintenance and replacement more affordable.
- IRM reduces energy for pumping: IRM thus reduces community energy costs, reduces upstream Green House Gases, and reduces cost and pressure on electrical grid expansion.
- IRM can reduce capital infrastructure cost, especially useful where pipes need replacing or are leaking. IRM is more effective at containing, reducing or eliminating odour.
- IRM generates local jobs instead of exporting cash and jobs through gas imports. This increases community wealth through local responding effect.
- Taxpayer cost can be stabilised, reduced or eliminated. IRM is better value to the taxpayer.

3. Government Direction

IRM is spreading throughout northern Europe but the mechanism has to be adapted for North America. IRM is thus achievable but it takes commitment to change. The change and impact is not small but is important.

Following our ground-breaking study published in 2008, the province reviewed and assessed our claims and in 2009 published a guide we helped draft, and is now encouraging adoption of "Integrated Resource Recovery" – a variant of IRM. Funding is now aligned with this direction.

4. Concluding Comment

"I conclude that this IRM plan is conceptually sound and on the right track, and if implemented it would likely provide a model of great value to countless municipalities throughout the world."

*Dr. Charles McNeill,
Chief Ecologist,
United Nations Development Program,
11th February, 2008.*

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