fidelis resource group

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 from which revenues can be generated. Nothing is wasted, everything has value. This simple change in approach has substantial benefits, yet is based on some of the oldest and most proven technology available.

Waste Management : Why Change?

The introduction of carbon trading and carbon taxes means that sewage management must be re-evaluated. IRM is the result. The main driver is an integrated business case that includes the environment, which forces a fundamental change in approach to waste and makes it viable to be environmentally sustainable.

The components of IRM are not new and are proven, for example during the Second World War gasifiers powered buses and variants on IRM are used extensively in Scandinavia and central Europe. However IRM requires a fundamental shift in how communities treat their waste. The driver behind configuring and implementing IRM is a *fully integrated model that includes environmental pricing*.

In summary, here's how it works:

- Localised treatment plants separate solid waste in sewage from liquids and the liquid waste is filtered and cleansed. The liquid can then either be discharged direct or depending on needs and applicable regulations, further sterilisation allows the water to be reused for irrigation, recycled through commercial/industrial use, or simply discharged into groundwater.
- Other organic materials are collected. This includes household and commercial waste, which are combined at the appropriate stage of the process with other wastes to increase resource recovery efficiency.
- Heat can be recovered locally from the sewage and other waste streams. Using heat pumps, the heat can be sent to local users. Plants are thus located to minimise cost and maximise returns while minimising efficiency and conversion losses.
- At more centralised plants – the size, scale and location will vary by community – the organic waste streams will be converted into gas and heat in a sealed process (anaerobic digesters), to produce biofuels. After this has been completed the remaining solids can be processed for either use as fertiliser or for combining with dry solid waste in a cogeneration system.
- A cogeneration system burns the combined solid wastes while minimising harmful impacts to the environment and produces significant heat and electricity. These "Cogen" plants need to be sited close to the users of their products, such as a hospital or other large energy/heat consumer.

- Both localised and larger centralised plants' energy and resource recovery can be enhanced by planned merger of recovered resources with other energy recapture, use and re-use, storage and so on to further enhance resource management value.
- The model, its optimisation and plant sizing, types and locations are driven by a business model and process, which is vital to determining best net value.

The reason to change is that IRM makes economic and environmental sense. Sewage is no longer waste and landfills are banks from which resources can be withdrawn. This is more than a philosophical change: it is a fundamentally positive shift in the way resources are managed that makes both money and sense.

IRM Advantages

- IRM costs the same or less than traditional solutions. However waste generates revenues, so *IRM is 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 to buildings and businesses, *heating 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 is projected to *reduce Green House Gases by up to 24%*. Municipalities can contribute to meeting or exceeding GHG targets. If optimised, IRM can exceed the original Kyoto GHG reduction target.
- IRM is a "zero waste" system/process, reducing or eliminating landfills, generating fertilizer, road base and other products by diverting waste into energy and other resources. This reduces cost and improves land use.
- IRM consumes less land. The IRM approach uses small, localised wastewater treatment facilities (as little as 5% of traditional system size) that can be placed under roads and parking lots. Other plant footprints are also reduced.
- IRM's wastewater treatment components are largely "off the shelf" and can be installed quickly, where and when needed. It uses proven technology, but in business case-driven sequences, to maximise viability.
- IRM can discharge at tertiary disinfected level or better. Traditional systems often discharge at secondary level. Developed within a planned water use hierarchy, this can reduce demand for potable water, watershed, filtration, treatment and piping costs and either recharges groundwater or can be used in business or for irrigation. Water becomes reusable, often multiple times, which is critical in locations where water is short.
- IRM can quickly meet incremental capacity, significantly lowering taxpayer burden & risk. Build what's needed, when and where needed. This supports planning & development flexibility, avoids

financing future capacity based on risky growth projections, thus reducing the burden on today's population and taxpayers.

- IRM treatment is localised, limiting the risk and impacts of failure compared to a larger central plant. Distributed systems can be incrementally upgraded as technology improves, eliminating dependence on obsolete centralised plant. This supports community independence and disaster risk management.
- IRM substantially reduces the energy required for pumping wastewater (up to 95% reduced volume), a major source of energy consumption & maintenance: IRM thus reduces ongoing community costs and taxes.
- IRM reduces capital cost for older infrastructure, especially useful where pipes need replacing and cracked pipes are generating odour or are leaking. Odour is contained, reduced or eliminated.
- Taxpayer cost can be stabilised, reduced or eliminated, reducing or eliminating reliance on local taxpayer charges or senior governments for capital funding.

Concluding Comment

The IRM Study Team sought input from international experts and peer reviews were obtained independently. All the reviews supported the concept and recommended proceeding. One quote summarises the conclusions.

"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.

For further information see:

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