

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.

Waste Management : Why Change?

Energy price spikes and oil supply interruptions, carbon trading, carbon taxes and more mean that many aspects of modern communities are being re-evaluated, including waste management. IRM is one such result, driven by a business case that includes the environment. This fundamental change in approach can turn cost into revenue, potentially making it viable to be 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 Europe. The driver behind configuring and implementing IRM is a fully integrated model and process if value and environmental benefits are to be optimised. 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 and using heat pumps, is sent to local users. Depending on temperature, the heat can be converted into cold for cooling. Plants are located to minimise cost and conversion losses while maximising returns and efficiency.
- 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 consumer. Cogen plants can provide heating or cooling.

- 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.
- IRM aspects, optimisation and plant sizing, types and locations are driven by a business model and process, which is vital to correct implementation of IRM and determining the best net value.

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

IRM Advantages

- IRM costs the same or less than traditional solutions. However waste generates revenues, so 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 to buildings and businesses, 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 is a "zero waste" concept, 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.
- Many IRM components are largely "off the shelf" and can be installed quickly, as, where and when needed. It uses proven technology, but in business case-driven sequences, to maximise viability.
- Because IRM can be phased it can lower debt & risk. Build or expand an existing or new system as much and often as required, whenever and wherever growth happens.
- Traditional systems rely on building large infrastructure to meet projected demand which might never be met, increasing debt burden for a system that might never be needed. IRM avoids taxpayers having to fund today for a population that might never arrive when or where it predicts.
- 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 required for pumping wastewater, a major source of energy consumption & maintenance: IRM thus reduces community energy costs and reduces upstream Green House Gases.
- 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.
- Taxpayer cost can be stabilised, reduced or eliminated, reducing or eliminating reliance on local taxpayer charges or senior governments for capital funding. IRM is better value to the taxpayer.

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.

For further information see:

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