Recycling of used disposable diapers and other incontinence materials.
LIFE97 ENV/NL/000120

Project description:

Background

Disposable nappies have become one of the largest single items to be deposited into landfills. Furthermore, 50 to 80% of the waste from institutions such as elderly people homes and care centres consists of Incontinence System Waste (ISW) most of which ends up in landfills or is incinerated. In the Netherlands and North Rhine Westphalia alone it is estimated that the size of the market for ISW ranges from 120 to 150 thousand ton per year.

Objectives

The project offered a solution for the recycling of disposable diaper waste, disposable incontinence materials and diaper manufacturing wastes through the recovery of fibres, plastics and super-absorbing polymers. It comprised: a) the development of an infrastructure for separate collection of 25,000 tonnes/year of diaper/inco waste from health care institutions, day care centres and households in the Netherlands and NRW; b) the construction of a diaper/inco waste recycling demonstration plant in the Netherlands (25,000 tonnes/year); c) external re-use of recovered materials (into paper products, plastic products).

Results

In the end, a demonstration plant with a design capacity of 70,000 tons a year was constructed in Arnhem. Economic analyses revealed that the initially intended size of 25,000 tons per year was not viable. The Incontinence System
Waste consists of approximately 53% water, 30% wood fiber, 11% plastic, 2% Super Absorbent Polymer (SAP) and 4% faeces and other material. About 80% of the fiber is being recovered and all of the plastic. The water goes to a biological wastewater treatment plant at the site. Of the referred to input, 6% wood fiber, 2% SAP (initially) and 4% faeces will not be recovered. On a dry basis, more than 75% of the input stream is being recovered. Research is ongoing to recover SAP as well. The recovered fiber is a high quality long fiber that is being sold to the paper industry. The plastic fraction consists of 60% LDPE and 40% PP and is being sold for application in plastic wood. The application for other purposes such as plastic film production and oil absorbent products is under development. The environmental advantage of the process is that with each ton of recycled ISW, 400 kg of wood, 145 cbm natural gas and 8700 cbm water is saved as the recovered raw materials pulp and plastic don't have to be produced. The patented process is based on a large-scale pilot plant development in Canada and is very competitive with commercial incineration. The Arnhem facility is the first commercial operation and it was to be operating at full capacity by the end of 2000. Although there has been a reasonable demonstration that the process works on a pilot scale, there was quite some risk involved with this project. The combination of the new market for acquiring the ISW, a complex logistics system with cross border permitting, an up scaled facility and new products as output, makes this to a high risk demonstration project. The intention was to erect similar plants in other EU countries after full proof of a sustainable operation. The project is fully transferable to regions where about 20 million people live within a radius of 200 km. At the time of writing a decision to expand into other regions could not be taken as the existing facility was under-utilized. The various parameters to be used for expansion evaluation were still under development. The expectation is that a basis for such an evaluation would be available in the first half of 2001. An important factor for the further expansion is whether regions can be found where authorities seriously execute the general policy of recycling as the better option above incineration. Although the official policy in the Netherlands and Germany is to give priority to recycling, the lower level authorities in some areas try to get a high share of the waste to landfill and/or incineration. They often have a financial stake in these operations and the prices for incineration are artifically kept low. However, the introduction in 2000 of an additional tax to be levied in the Netherlands on burnable waste that goes to landfills will change this situation and improve the market outlook for Knowaste. Through the recovery of fibres, plastics and super-absorbing polymers, the implementation of this technology is a clear example of sustainable development. The company has developed a technology to process disposable diaper waste, adult incontinence materials and diaper manufacturing wastes into three high quality material streams. Experiences at pilot scale have been successful. The technology appears to be solid and not complicated as it is largely based on equipment that is used extensively throughout the paper industry. Although other alternative waste treatment methods for diaper/inco waste are currently investigated and developed (such as composting), none of these methods comprises a total high quality re-use of all materials that make up diapers and adult incontinence materials, as is the case in the current project. As such, the environmental contribution of the project is not restricted to waste reduction, but also comprises savings of resources.
Environmental issues addressed:

Themes

Waste - Medical waste
Services & Commerce - Healthcare - Social work
Waste - Hazardous waste
Water - Waste water treatment

Keywords

waste water treatment, hospital waste, technology transfer, recycling, separated collection

Target EU Legislation

- Waste
- COM(1996)399 - Communication on an updated "Community strategy for waste management" (30.07.1996) ...

Natura 2000 sites

Not applicable

Beneficiaries:

Coordinator
Knowaste B.V.

Type of organisation
International enterprise

Description
Knowaste is a company that recycles Incontinence System Waste (ISW). The Arnhem facility is capable of processing 70,000 tons of diaper material per year. In operation since 1999, this technologically advanced large-scale facility was built to meet the regional recycling needs of the densely populated areas of The Netherlands and Germany.
Administrative data:

- **Project reference**: LIFE97 ENV/NL/000120
- **Duration**: 01-MAR-1997 to 01-DEC-1999
- **Total budget**: 5,651,727.46 €
- **EU contribution**: 849,644.69 €
- **Project location**: Gelderland(Nederland)