ReCOOL - Reuse of Anti-Freeze/ COOLants through Innovative Recycling Technology for LIFE+

LIFE12 ENV/SE/000292
ReCOOL for LIFE+

Beneficiary:

Type of beneficiary
International enterprise

Name of beneficiary
Recyctec AB

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Duration of project:
36 months (01/07/2013 – 30/06/2016)

Total budget in euro:
1,481,850.00

EC contribution in euro with %:
616,050.00 (50.00 %)

Theme: Waste: Hazardous waste

Project background

Ethylene glycol is an organic compound with properties that make it useful for many industrial applications. Its low freezing point means it is used as an antifreeze in the automotive industries, whilst it is also an excellent heat transfer agent, for either cooling or heating systems. It is also used as a raw material in the production of polyester fibres and for soft drinks bottles.

However, ethylene glycol is toxic and harmful for the environment due to the presence of heavy metals, such as lead, cadmium and chromium. It is produced from ethylene gas, a by-product from natural gas and crude oil production processes.

Today, when the additives in the antifreeze/coolant lose their effect, the ethylene glycol stays intact but it is unsuitable for re-use without the rest of the additives, so it is considered waste. In the best cases, around one third of this waste is collected by a waste company and sent for incineration in power plants. The remaining 66% is discarded into sewers and drains, with very negative environmental impacts.

The beneficiary, Recyctec, has been working since 2008 to develop a technology for the recycling of glycol waste. It has successfully demonstrated some success in small-scale tests at laboratory level, reaching a high purity level for the recycled glycol.

Project objectives

The ReCOOL for LIFE+ project aims to demonstrate how large volumes of hazardous ethylene glycol waste can be recycled into near-virgin quality glycol. It thus aims to provide a valuable and useful recycled industrial product, thereby reducing the environmental impact of waste antifreeze and coolants, and also saving natural resources and providing economic benefits.

The project aims to develop a complete and fully functional pilot plant containing the ethylene glycol purification technology developed by the beneficiary at laboratory scale. This technology will purify glycol from waste by evaporating its water content at all stages of the process. It is based on an energy-efficient process using steam.

The project expects to achieve a near 100% removal of water by evaporation, producing almost pure glycol. Furthermore, it expects to show that it is possible to recycle the same glycol many times – potentially without limit - without significant deterioration in quality.

The project will test the up-scaled technology with an initial batch of 36 000 litres, before demonstrating the feasibility of full-scale recycling of 10 million litres of used coolant/antifreeze. It should, thus, prove to be a suitable model for full-scale recycling of ethylene glycol across Europe, with the potential to recycle over 270 million litres/year.

Expected results

- The world's first production of recycled glycol with at least 95% purity;
- Demonstrated potential for recycling the same material many times;
- Demonstrated technology for minimising the use of new resources – notably from crude oil; and
- A reduction in the importation of mono-ethylene glycol to Western Europe from the Middle East and Russia.