

REPORT SUMMARY

September 2009

Sustainable Innovation, Waste Economics, Low Carbon Technologies

Techno-economic and Environmental Evaluation

Oakdene Hollins investigates the potential to roll out a new lead recycling technology from Cambridge University.

A novel lead paste recycling technology has been developed by the Department of Materials Science and Metallurgy at the University of Cambridge. Oakdene Hollins investigated the competitive position of the new technology compared to existing technologies. We looked particularly at the economic, environmental, carbon and energy savings versus the capital and running costs of a pilot plant. Further, we undertook market research in selective countries, and developed an international market entry strategy.

In principle the new technology has low carbon potential along with cost advantages against the existing pyro-metallurgical lead recycling plants. Its competitiveness largely depends on the low cost availability of consumables, mainly citric acid and sodium citrate.

In the report, Oakdene Hollins suggest and develop criteria for a viable market entry strategy for the implementation of this new technology (such as the emerging enforcement of legislation, a trusted partner with an existing lead infrastructure, availability of consumables such as citric acid and sodium citrate at low cost and growing market potential for battery use).

We calculate that a pilot plant with one tonne per day of scrap battery is scalable and achievable at around US\$290,000. We show that, among the countries researched, China and Turkey hold greatest promise for a pilot plant or implementation of full scale technology.

Further discussions are recommended with battery manufacturers to cater for their needs in terms of the specifications of the final saleable product; there are further potential exploitation and value-added opportunities available to the battery manufacturers from efficiency improvements.

-End-

Background to this report:

The lead acid battery is the world's most widely used electrochemical system. For example, according to the European Storage Battery Manufacturers Association EUROBAT, 70% of rechargeable batteries - used in a wide range of automotive, industrial and portable applications - are lead acid batteries.

Lead is one of the most efficiently recycled metal commodities. Up to 90% of the lead from a scrap battery can be recovered and re-used to make new batteries, but conventional pyro-metallurgical recycling technologies have a number of environmental impacts.

Dr R. Vasant Kumar at the University of Cambridge has developed a novel lead paste recycling technology. The new (hydro-metallurgical) process potentially has less environmental impact than, and is technically superior to, existing recycling processes. Cambridge's innovation has been carried out on a laboratory scale only, so it is important to establish how such benefits would be translated to industrial-scale applications.

For additional information please contact:

Dr Hüdaı Kara, Head of Renewables and Carbon Management, Oakdene Hollins Ltd, 3rd Floor, Pembroke Court, Cambridge Street, Aylesbury, UK, HP20 1RS

Tel: +44 (0)1296 337165

Fax +44 (0)1296 330351

Email: hudai.kara@oakdenehollins.co.uk

About Oakdene Hollins Ltd:

Oakdene Hollins is a research and consulting company working to support change toward more sustainable and less carbon-intensive products, processes, services and supply chains. The business sectors we work with include Food & Drink, Textiles & Clothing, Metals & Mining, Wastes Management, Chemicals & Materials, Sustainable Innovation and European & UK Policy. We have built a strong reputation for integrity, reliability and excellence with public sector and private industry clients alike. We operate at a European scale and manage the Ecolabel scheme in the UK in collaboration with TUV/NEL.

Oakdene Hollins employs people with science, economics, business administration and manufacturing disciplines, so that within each industry sector we can offer the following core services:

- *Market Appraisal*
- *Technology Appraisal*
- *Protocol and Standards Development*
- *Economic Modelling*
- *Lean Manufacturing Projects*
- *Financial Impact Assessment*
- *Management of Research Projects*
- *Ecolabelling Advice*
- *Carbon Footprinting*
- *Critical Review of Life Cycle Assessments.*