Summary Series

Small scale energy from waste

Drivers and barriers

IEA Bioenergy

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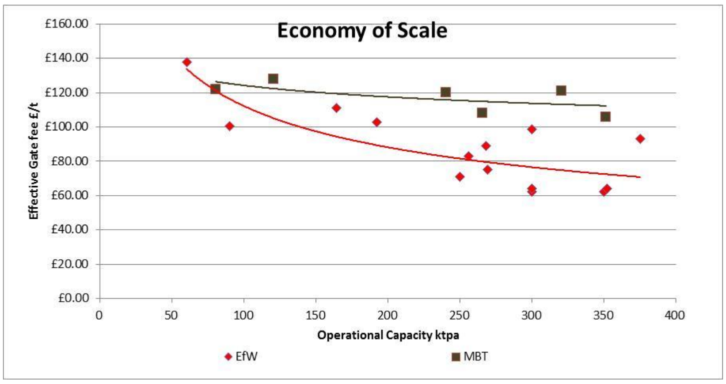
SUMMARY

In 2004, IEA Bioenergy Task 36 – 'Integrating Energy Recovery in to Solid Waste Management Systems' reviewed small scale energy from waste (EfW) systems (Stein and Tobiasen, 2004). That review examined the technology and economics of small-scale energy conversion systems and reported on the level of commercial availability in Task 36 member countries. While there have not been major technology developments within the area, there are many other aspects that need to be considered when establishing a small scale EfW plant. This report is focused on the drivers and barriers regarding small scale EfW.

A yearly capacity of 100,000 tonnes per year (t/y) has been set as the limit for small scale EfW in this topic report. The study only considers thermal treatment plants (combustion, gasification and pyrolysis); it does not include anaerobic digestion. The drivers and barriers have mainly been identified through three case studies, one each in France, Sweden and the UK, but literature and people working within the field of EfW have also been consulted on the subject.

There are clear policy drivers which are influencing EfW development in general, but the decision to develop facilities on a small scale are more relevant to local politics and situation. The factors behind the development of different small scale facilities will differ, as evidenced in the three examples of France, Sweden and the UK. The national implementation of the EU Landfill Directive was something that was considered a driver in all three case studies.

It is recognised that costs, both operational and capital, are higher for small scale EfW facilities, but that despite this, there are often other drivers which take precedence over economics alone. Whilst it may be challenging in some cases to demonstrate value for money, other benefits will support a case for small scale EfW.



Gate fee vs operational capacity in the UK. (Local partnerships, 2014)

One of the barriers or challenges with the small scale plants is the need for employees that are flexible and able to manage many different things. Small scale plants have less room to hire specialists compared to larger scale organisations.

While EfW so far has mostly been driven by waste management goals, in the future, financial incentives related to **energy and resource drivers** may further drive the development of smaller scale EfW facilities to advanced conversion technologies (like gasification and pyrolysis). These technologies enable flexibility in how outputs from EfW are used, and are likely to be at a smaller scale than waste combustion. For example, syngas from waste gasification can be used as a fuel in dedicated gas engines, for conversion into liquid fuels, or ammonia or methanol, which can be used in transport fuels and/or as a chemical feedstock. Energy and resource drivers will add to waste management and landfill diversion targets.

Geography can be a driving factor for small scale EfW, e.g. when considering waste management in remote places like islands. However, in many cases there are additional drivers.

Security of supply is a factor to consider. A larger plant might have the economics of scale, but uncertainties in the supply will affect the economic risk assessment and might thus make it harder to initially finance the investment.

The advantages offered by small scale EfW, such as the treatment of waste close to the point of generation, the generation of jobs in the local community, and lower transport distances, all serve to increase the **public acceptance** of such facilities. With their smaller footprint, smaller scale EfW facilities can be more easily integrated into existing industrial areas.

Technical issues are not deemed to be a specific barrier. Technologies deployed at small scale are established, and include conventional combustion facilities such as moving grate and oscillating kilns, and advanced conversion technologies.

CONCLUSIONS

Small scale plants have clear economic disadvantages compared to the larger plants, which will be a barrier, especially for plants acting on an open market where the waste generally flows to the plants with the lowest gate-fees. Aspects that can counter that disadvantage are:

- A political will and policies to treat the waste locally
- Increased security of supply
- Higher acceptance amongst the local population
- The need for local energy generation (mainly heat)
- Incentives for climate change mitigation/renewable energy generation
- Geographical issues (making logistics harder)

Even though the EU has set a framework for waste management with the Waste Framework Directive (2008/98/EC), the Landfill Directive (1999/31/EC) and the Industrial Emissions Directive (2010/75/EU) there has been room for different national and local adaptations of those frameworks. The local situation and local politics are decisive for the prospects of small scale plants.

The full report is available from:

http://task36.ieabioenergy.com/publications/small-scale-energy-waste/

IEA BIOENERGY

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The mission of IEA Bioenergy is to increase knowledge and understanding of bioenergy systems in order to facilitate the commercialisation and market deployment of environmentally sound, socially acceptable, and cost-competitive bioenergy systems and technologies, and to advise policy and industrial decision makers accordingly. The Agreement provides platforms for international collaboration and information exchange in bioenergy research, technology development, demonstration, and policy analysis with a focus on overcoming the environmental, institutional, technological, social, and market barriers to the near- and long-term deployment of bioenergy technologies.

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