ENERGY RECOVERY FROM WASTE: OPPORTUNITIES AND CHALLENGES FOR THE BALTIC SEA REGION

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Facing challenges of global warming as well as seeking to increase energy independence, one of the main EU policy goals is to achieve a low-carbon economy. Improving energy efficiency in district heating systems, which (together with cooling) represents more than half of total energy use, is among of main priorities in the EU. An EU project “Innovations in District Heating” (InnoHeat) is aiming to analyze the current state of district heating distribution networks and energy facilities, and find opportunities for improvements in the project countries (Lithuania, Sweden, Poland and Germany). In one of the recent project conferences organized during 7-8 April, 2014, the president of Polish District Heating Association Mr. Jacek Szymczak addressed energy recovery from municipal waste as an opportunity for Polish district heating systems, which I would like to discuss.

Municipal waste might be seen as a resource of thermal energy for district heating, including the production of electricity. According to Mr. J. Szymczak, Poland underutilizes its energy potential from municipal waste estimated at more than 13 mega-tones generated annually. There is only one waste incineration plant in operation and a few more are only in planning stages. Meanwhile the main fuel (about 60-70%) for the district heating systems in Poland is coal, which also stands for the bulk of air emissions resulting in seven Polish cities ranked among the most polluted cities in the EU.

In many Eastern European, including e.g. Poland, landfilling is still the main alternative for waste management with about 60% of all municipal waste ending up in landfills (with or without treatment) and the share of landfilled bio-degradable waste reaching about 80% (Eurostat data for 2010-2012). Given the high landfilling rates and the dependency on coal, waste incineration could be seen as a better way for waste valorisation, especially when cogeneration is considered. Thus, waste incineration might be seen as a good opportunity from both the environmental (avoiding green gas emission) and economic (securing energy supplies, avoiding expensive gas use) points of view.

However, the decision to go for incineration should consider several other aspects and potential risks.

First of all, conducting public hearings, planning, permitting and procuring are lengthy processes, sometimes taking up to ten years to conclude. The not-in-my-backyard attitude of the public is perhaps the most serious barrier in most countries, especially in Eastern Europe where there generally higher public mistrust in authorities and higher risks of low transparency in public procurement processes.

Second, the economic feasibility of waste incineration is highly dependent on the economies of scale. The main sources of revenue for an incinerator are gate fees and to some extent the sales of thermal energy and electricity. Therefore, waste incinerators should be large, and thus they represent a considerable investment, which is automatically associated with long-term financial liability. For instance, an incinerator of 150,000 ton annual capacity planned in Szczecin requires an estimated investment of ca. 250 million Euro. This represents a long-term financial commitment with capital lock-in for the next 25-30 years (the estimated average lifetime of an incinerator).

Third, building a large incinerator automatically requires the uses of thermal energy to be nearby, that is a large industrial consumer or a large enough population with developed district heating network. Placing a large incinerator in tightly populated area is always problematic due to the public scare of the dangerous substances (e.g. dioxins and furans). Furthermore, strict environmental requirements for emissions from waste-to-energy plants are much higher than those for power

plants running on traditional fuels. This demands significant investment into complex flue gas cleaning equipment.

Fourth, it is climate policy risk. Although waste-to-energy plants have income from gate fees as well as the production of energy, in the future they may be subject for incineration (carbon) tax, as it has been done in Sweden (now suspended, but was ca. 40 Euro/ton of fossil waste fraction) and is till practiced in e.g. Belgium and Denmark. Moreover, the EU has a clear policy goal for waste management sector – to increase waste prevention (do not generate waste) and to increase material valorisation of waste as highest priorities for waste management. For instance, the EU Waste Framework Directive sets the target of 50% material recycling for household waste by 2020. This means that less waste will be available for waste-to-energy plants. For example, in Sweden, the overcapacity incinerators are already facing the shortage of waste and drops in its calorific value due to increasing material recovery from waste. As a result, waste is sourced from abroad – for instance from Norway (ca. 80 kilo-tons in 2012) and other countries.

At the same time, opportunities may exist when thinking about flexible energy plants in terms of types of fuels. For instance, Fortum Ltd. has built a waste-to-energy plant in Klaipeda (Lithuania), which is designed to use both municipal waste and bio-fuels (wooden pellets). Such examples may help avoiding the uncertainties raised by stricter environmental requirements and increasing recycling targets. However, the economic feasibility of similar installations is much more complicated, since e.g. gate fees are no longer paid when using bio-fuels.

All in all, waste-to-energy plants could be considered as a good option in achieving a low-carbon economy, including a substitution of fossil fuels, reducing air pollution from burning coal and addressing energy security to some degree. However, issues like long-term technology lock-in, high financial liability and risks due to changes in waste management approaches need to be considered when planning the investments into incineration infrastructure.

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