Proposed Grid Code Modifications for Waste-to-Energy Plants

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Introduction

There is a Waste-to-Energy plant (W2E) operated by Indaver connecting to the grid in the near future, with potentially another W2E plant operated by Covanta connecting in Dublin in a year or two. Clarity is required over how these plants should be dealt with in the Grid Code. There is quite limited scope for W2E plants in Ireland, as there's roughly 1.6m tonnes of waste in Ireland (north and south). Given that the Covanta plant is 72MW, and will consume 600ktonnes of waste, the extrapolated all-island figure is roughly 200MW.

Background Information

Waste-to-Energy Plants (W2E) recover energy from Municipal Solid Waste (MSW).
Their primary function is waste-processing – they are paid to process MSW. Secondary Functions include Electricity Generation, Steam Generation for District Heating, Metal Recovery from Waste etc. The waste processing function allows Ireland to meet various EU directives diverting waste from landfill. W2E plants are classified as renewable (Elec Regulation Act 1999):

> "renewable sustainable or alternative forms of energy" means energy used in the production of electricity which uses as its primary source one or a combination of more than one of the following –
>
> (a) Wind, (b) Hydro, (c) Biomass, (d) Waste, including waste heat, (e) Biofuel (f) Geothermal (g) Fuel cells (h) Tidal, (i) Solar, (j) Wave;

W2E plants are designed to operate continuously (input driven rather than output driven) – base load plant at the top of merit order. A condition of the W2E license is the achievement of a minimum efficiency level according to 'R1' waste recovery formula (calculated over 1 year). The electrical power output can be controlled by bypassing steam turbine but this leads to lower efficiency as energy is being spilled, and so they could breach their EPA license by not achieving the R1 efficiency criterion.

W2E units are designed to run with no governor droop (inlet control mode) and so are not designed to provide POR/SOR etc. They are not designed to run on secondary fuel, however their fuel make-up is highly variable, with up to five days worth of fuel being kept onsite (Indaver).

The CER (in direction to ESB Networks on Dublin W2E) have indicated the wider public benefits of W2E including

- Fuel diversification / indigenous fuel
- Kyoto obligations

The Grid Code

Both Indaver and Covanta have made submissions to EirGrid on Grid Code requirements. The main challenging areas are:

- Provision of Reserve – while technically possible by modulating the steam valve, it is highly undesirable from efficiency viewpoint. Also conditions on plant from EPA may prohibit such steam emissions
- Secondary Fuel requirements – W2E can incinerate a wide variety of materials, but hard to be more specific than that. Secondary fuel is particularly of concern for security of supply, especially if fuel is not indigenous. However, it would appear that the secondary fuel clause does not apply to W2E units.
- Possible issues on remaining synchronized at low frequencies for prolonged periods of time (Covanta / Alstom) – but need more details on exact limitations (CC7.3.1.1 (b) – (d))

Both Covanta and Indaver expect to meet GC requirements for FRT / Reactive power requirements.

There is also the issue of wind curtailment, which will necessarily increase as these units will be must-run units. However, they are also designated as renewable, and will have a positive impact on Ireland's 2020 target.

Proposed Grid Code Amendments

New text is highlighted in blue.

CC.7.3.1.6
Notwithstanding CC7.3.1.1 and taking account of CC.7.3.1.4, the **TSO** recognises that **Generation Units** such as **Waste to Energy Units** operating under license from the EPA whose primary function is the incineration of waste and who must adhere to environmental regulations on efficiency and emissions, may not be designed to provide **Operating Reserve**. The **TSO**, with agreement of the **CER**, may accommodate a limited number of such units, while having due regard to **Prudent Utility Practice**.

Additional Glossary Definition:

Waste to Energy Unit: An incineration plant for the thermal treatment of waste products that produces electricity as a by-product of the incineration process. This type of **Generation Unit** is required to adhere to EU regulations on energy efficiency under the Waste Framework Directive (2008/98/EC).

Referenced above:
*CC.7.3.1.4 Notwithstanding CC.7.3.1.1 combustion turbine, hydro, or other technology based **Generation Units** shall as appropriate, register and perform to **Operating Characteristics** giving maximum flexibility of operation, consistent with their type and model of generation plant, in accordance with **Good Industry Practice**. Where appropriate, **Operating Characteristics** and in particular start times, should be registered separately for normal (planned) starts, and for starts required under conditions of system stress, such as following the loss of a **Generation Unit**. The **Generator** will maintain operational procedures and practices, which ensure that there are no unnecessary delays in responding to **Dispatch** instructions in accordance with the technical capabilities of the **Generation Plant**.*