Background

RWE is a leading European energy company. RWE Generation UK owns and operates around 8000MW of coal and gas power stations across the UK, including Markinch CHP (Combined Heat and Power) biomass plant. Markinch Power Station in Fife is a state-of-the-art biomass plant which replaced an older coal and gas fired CHP plant on the site of former premium paper and board manufacturer Tullis Russell. Initially the plant was built to support Tullis Russell Papermakers; unfortunately the business went into administration in 2015.

The plant continues to provide steam to the remaining paper processor on the site, Glenrothes Paper Limited. The station can generate 55MW (net capacity) of electricity to the local distribution network, enough to power around 100,000 homes and is capable of supplying up to 120 tonnes of industrial steam per hour. The biomass fuel is mainly made up of approximately 90% locally recovered wood waste which is sourced locally and the remaining 10% is virgin wood sourced from sustainably managed forests. The station is fuelled by around 450,000 tonnes of biomass fuel each year.

The station delivers a reduction in fossil fuel carbon dioxide emissions by around 150,000 tonnes per annum, delivering a major contribution to the UK’s renewable energy generation targets. The plant is the largest of its kind in the UK and represents an investment of £300 million and is RWE’s largest investment in power generation in Scotland. Markinch CHP Power Station will supply heat to the Glenrothes Energy Network through a newly constructed Energy Centre.
What is a district heat network and how does it work?

This is a system for distributing heat generated in a centralised location for residential and commercial requirements such as space and water heating. The heat is often obtained from a CHP plant burning various fuels. District heating plants can provide higher efficiencies and better pollution control than localised boilers. In addition district heating with combined heat and power is one of the most efficient and cost effective ways of reducing carbon emissions.

The core element of this particular district heating systems is the CHP plant, where heat and electricity are generated simultaneously. The excess heat output from the Markinch power plant will provide 90% of the heat supplied during the year. The back-up boiler capacity will be able to meet the entire heat demand unaided and can cover for breakdowns in the CHP plant.

After generation, the heat is distributed to the customer via a network of insulated pipes. District heating systems consist of feed and return lines; the heat distribution medium in Glenrothes’s case is through hot water.
Energy Centre next steps

RWE is a proud partner of the Glenrothes Energy Network alongside Scottish Government and Fife Council. This project is a fantastic opportunity to work with Fife Council on a project that supports Scottish Government’s climate change targets and transition to a lower carbon economy, providing renewable heat to the local community of the station.

RWE purchased land adjoining the power station which housed former Tullis Russell buildings. These have been demolished over the past twelve months and, having received planning permission, this will be the location of the Energy Centre. RWE are working towards a full build and initial first heat to the district heating network in December 2018.
Energy Centre technology

The Energy Centre will take excess steam from the Markinch CHP biomass plant and will transfer heat from this, using heat exchangers, into the hot water circulating around the network. The Energy Centre also contains three natural gas fired back-up boilers which ensure there is a supply of heat, 24 hours a day, 7 days a week, even when the power station is not operating.

In addition to the heat exchangers and boilers, the Energy Centre also contains large water tanks which act as thermal stores. These heat stores ensure a smooth supply of energy to the network. The building will be approximately 900 m² which houses the district heating water recirculation pumps, ancillary plant and standby boilers. The development would also include an adjacent chimney or exhaust stack and the thermal stores. The Energy Centre will be operated by the team at Markinch CHP Power Station and will not require any additional workforce.

Details:
- Building will be approximately 30 x30m x 8m high
- 3 x 4.25MW backup hot water boilers
- Electrical Substation
- Control equipment for the steam heat exchangers and gas boilers
- Mechanical and Electrical equipment
- District heating water circulation pumps
- Exhaust stack with four flues about 12 meters high within a single windshield (the four flues give the potential for an additional boiler should the network size increase in the future)
- Two outdoor thermal storage vessels

The power station will amend its Pollution Prevention Control (PPC) permit to take account of the new Energy Centre.