KET/2012/0400 – Update

The table below sets out the anticipated vehicle movements associated with the development once fully operational.

	AM Peak Hour		PM Peak Hour	
Trip Type	Inbound	Outbound	Inbound	Outbound
Light vehicle	10	10	10	10
Heavy Vehicle	2	2	2	2

This is based on the following assumptions:

HGV's

Volume of waste to be processed:	90,000 tonnes per annum
Average payload per HGV:	20 tonnes
Number of HGV's per year:	5,000 (approx)
Operational days per year:	250
Number of HGV deliveries per day:	20
Operational hours per day:	10
Maximum number of HGV's per hour:	2
Total two-way movements per hour:	**4 (2 in and out)**

Light vehicles

No. of (Direct) jobs created:	30
No. of employees on site per day:	24
Day shift (09:00 – 17:00):	12
Late shift (starting after PM peak):	6
Early shift (starting before AM peak):	6
Non-vehicular travel:	35%
Maximum cars one-way per hour:	8
Visitors per day:	2
Total maximum cars one-way:	10
Total two-way movements per hour:	**20 (10 in and out)**

There are no restrictions proposed as to where waste can be sourced however the submitted details state that waste is to be sourced from Northamptonshire and the surrounding area. The Transport Assessment does not assess impacts on the strategic highway network as the local impacts identified are minimal and any impacts further afield are likely to be even smaller.

It is noted that the supporting documents refer to the installation of solar panels and wind turbines however no drawings or other details have been provided. Members may wish to suggest that further details are sought by the County Council by way of condition on any planning permission granted.

The Landfill Directive (99/31/EC) aims to prevent the negative impacts of landfill and amongst other measures, aim to reduce the proportion of biodegradable waste landfilled to:

- 75% of that produced in 1995 by 2010;
- 50% of that produced in 1995 by 2013;
- 35% of that produced in 1995 by 2020.

The East Midlands Regional Waste Strategy recognises that alternatives will have to be found in order to meet these targets. Policy 8 of the Northamptonshire Joint Municipal Waste Management Strategy (which deals with municipal waste only) states "We will seek a residual waste management solution which respects our desire to move waste up the hierarchy, which is environmentally sustainable, reliable and deliverable, which presents value for money and which is consistent with our response to the LATS set out in this Strategy".

Part 4 of the Officers report refers to 22 objections having been received. This refers to the number of objections received by Kettering Borough Council only and does not take account of any comments made directly to Northamptonshire County Council, who will consider these comments as the determining authority. 3 further letters have since been received by KBC raising similar concerns to those already identified, commenting on potential impacts to local property value and likely difficulties in implementing the infrastructure necessary to serve existing properties.

The attached extract from the Environmental Statement provides further information for members.

2. The Proposed Development

2.1 Overview of the Need for the Proposed Development

The East Midlands region produces around 6.3 million tonnes of commercial and industrial waste every year[1]. Northamptonshire accounts for around 1.1 million tonnes of regional arisings and latest estimates indicate that over 295 000 tonnes are currently subject to recycling, 295 000 to biological processing, and 166 000 to advanced treatment (thermal, pyrolysis, gasification, plasma arc and other waste to energy processes and other emerging advanced technologies)[2]. The Minerals and Waste Core Strategy Policy CS1 Northamptonshire's waste management capacity identifies target capacity for 'Waste Management or Advanced Treatment (Municipal Solid Waste and Commercial & Industrial Waste)' of: "...392 000 and 456 000 tonnes per annum for 2016 and 2026 respectively..." To meet these targets additional advanced treatment facilities, such as that proposed at the Magnetic Park Energy Centre, would be required.

In October 2009 Defra published its *Statement of Aims and Actions for Commercial and Industrial Waste in England*. This states that:

> *"A key part of our vision for commercial and industrial waste is to achieve a greater degree of convergence in policy between C&I waste and household waste. This is because in terms of carbon and other impacts it makes little difference whether the source of any given kind of waste is businesses or households. In the early part of the current decade, policy instruments to address municipal waste were much more strongly developed than for business waste: this was a consequence of the specific landfill diversion targets for biodegradable municipal waste set in the EU landfill directive.*
>
> *More recent policy development, however, has focussed more strongly on measures which apply to both business and household waste. This applies in particular to the significant increases in landfill tax announced in successive Budgets. Incentives to invest in energy from waste plants from the system of renewable obligation certificates (ROCs) also apply to both kinds of waste. And if landfill bans are put into place, applying to both municipal and non-municipal waste, that will help achieve yet further convergence."*

[1] http://www/defra.gov.uk/statistics/environment/waste/wrfg03-indcom/

[2] Northamptonshire Minerals and Waste Development Framework: Core Strategy DPD (Adopted May 2010)

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Defra's objectives for commercial and industrial waste are therefore the same as for household waste as outlined in the National Waste Strategy 2007. They are to:

- Reduce the amount of waste that arises in the first place - by more sustainable design, production, purchasing and use as well as reuse of products and materials in the economy;
- Increase the proportion of the waste that does arise which is productively re-used, recycled or recovered;
- Reduce significantly the amount of waste that is sent to landfill or incinerated without recovering energy;
- Manage any remaining residual waste responsibly; and
- Maximise the investment opportunities for business from commercial and industrial waste management.

The proposed development is aimed at contributing to Government's aims and vision for managing the commercial and industrial waste sector. Achieving this vision would enable businesses to save money, improve resource efficiency in the economy and reduce greenhouse gas emissions (by reducing reliance on fossil fuels) and other environmental impacts.

2.2 Alternatives

An ES should include details of the main alternatives to the development considered by the applicant[3]. In this context, the applicant has considered:

- Alternative locations for the proposed Energy Centre; and
- Alternative technologies to the proposed Energy from Waste gasification facility.

In view of the need to develop new recovery facilities and to divert wastes from landfill, it is not considered that the 'do-nothing' option is a viable or sustainable one.

2.2.1 Alternative Locations

A comprehensive site search exercise has been carried out by the applicant to determine whether there are any suitable and available sites in the East Midlands that would be suitable for the development of a strategic waste management facility. The sites considered, and reasons for not pursuing these sites, are as follows:

1. *Area of Land off Junction 16 M1 (known as Midway Park)*

   The potential for an Energy Centre at a new development known as Midway Park was considered. The proposed development site extended to approximately 146 ha with masterplanning for a mixed-use development comprising B1/2/8 uses as well as Hotel and Conference/ Fast food (A2).

[3] Schedule 4, part 1, paragraph 2 of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011 requires that an outline of the main alternatives is provided and an indication of the main reasons for the choice given.

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The site was not considered suitable by the applicants due to the lack of appropriate end-users, particularly residential properties, for the CHP element of the proposals.

2. *Site at Daventry International Rail Freight Terminal, Junction 18 M1*

Daventry International Rail Freight Terminal (DIRFT) is a rail-road intermodal freight terminal with an associated warehousing estate; the facility is located at the junctions between the M1 motorway, A5 and A428 with a rail connection from the Northampton loop of the West Coast Main Line. Current users at the site include Mothercare, Eddie Stobart, Tesco and the Royal Mail.

Whilst having excellent road and rail links, end users of energy, other than commercial electricity and some space heating, were again considered by the applicant to be limited. The site was therefore discounted.

3. *Peterborough - Area of Ground at Great Haddon*

The Great Haddon site represents an urban extension to the west of Peterborough and encompasses approximately 430 hectares of land. The site has good access to the strategic road network via the A1(M) to the west and the development proposals include for approximately 6 000 homes, strategic employment areas and other B1/2/8 uses.

Although it was considered by the applicant that the site represented a suitable location for the proposed Energy Centre, attempts to secure the necessary land were not successful. The development of an Energy Park at Storey's Bar Road in Peterborough by Green Energy Parks, utilising advanced mechanical recycling, biomass gasification and plasma vitrification technology, also presented competition for source waste and heat and power distribution. This site was therefore discounted by the applicant.

4. *Corby*

A site within Corby was considered as a potential location for the proposed Energy Centre. The site is located between two extensive and heavy industrial areas off the A6086/A6116 in the north-east of the town. Difficulties encountered with this site included the fact that it is in close proximity to sensitive receptors as it is less than 150 m from existing residential properties. Furthermore there was no prospect of new residential properties being developed locally to provide potential end-users for the CHP element. The potential for CHP supply to nearby industrial units was discussed but this did not come to fruition.

This site was therefore discounted by the applicant as a viable location for the Energy Centre.

In context of the above exercise, it was concluded that the Magnetic Park site represented the most suitable location for the development of the proposed Energy Centre. The site has good road links as well as multiple end users of heat and power on the nearby residential and industrial estates, as well as being located in an existing industrial setting.

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2.2.2 Alternative Technologies

The applicant carried out a review of various technologies for a similar previous application at Ashton Park, Bristol. The aim was to provide a low-carbon energy solution on a local scale to supply both residential and commercial properties. The technologies considered included wind turbines, biomass CHP, biomass heat only, energy from waste and gas-fired CHP.

In terms of the CO_2 savings, energy production, as well as minimising land-take, the energy from waste option proved one of the most viable. The potential for an EfW facility to act as a combined heat and power plant, and the fact that this option also has the additional benefit of contributing to sustainable waste management, led the developers to choose this technology as the most viable for the proposed Magnetic Park Energy Centre.

The proposed gasification technology developed by ENERGOS can be developed at a much smaller scale than conventional EfW facilities based upon incineration. They can be developed as a more local solution that will not crowd out further recycling and composting. ENERGOS is seeking to develop a number of similar schemes throughout the UK and was awarded planning consent for a similar scheme in Irvine, Scotland in 2007 and Knowsley, Merseyside in 2009. A plant on the Isle of Wight is operational, and there are a further seven plants operating in Norway and Germany demonstrating that it is a proven technology.

The applicant therefore considers the proposed CHP plant using gasification EfW technology offers the most deliverable and practical option for the proposed Magnetic Park Energy Centre.

2.3 Development Description

2.3.1 Overview

Full details are provided for the proposed EfW facility based upon the ENERGOS technology. The following is the development description:

Erection of an energy from waste gasification facility, turbine and boiler halls, air cooled condenser farm and associated plant, together with site access, weighbridge, visitors centre, car parking and landscaping.

Key components include: a reception hall and fuel bunker for the receipt of the waste fuel; a two staged thermal conversion process which initially gasifies the waste fuel prior to high temperature oxidization; two heat recovery steam generators (HRSG); an energy utilisation system; a flue-gas cleaning system; and a control and monitoring system.

It will have the capacity to process approximately 96 000 tonnes of waste per annum and generate around 8 megawatts (MW) of electricity or 32MW of heat.

2.3.2 Details of the EfW Facility

Introduction

The EfW facility will comprise plant, machinery and building design to allow the conversion of non-hazardous waste into energy (electricity and heat).

The development details can be found in the following drawings:

- RDC-EFW_888_50: Visual 1;

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- RDC-EFW_888_51: Visual 2;
- RDC-EFW_888_52: Visual 3;
- RDC-EFW_888_95: Coloured Site Layout Rev C;
- RDC-EFW_888_96: Coloured Elevations Rev A;
- RDC-EFW_888_110: Site Layout Rev H;
- RDC-EFW_888_115: Plant Layout;
- RDC-EFW_888_120: Amenity Block Rev C;
- RDC-EFW_888_200: Elevations Rev G;
- RDC-EFW_888_300: Visitors Centre Rev A;
- RDC-EFW_888_301: Visitors Centre - Elevations;
- RDC-EFW_888_302: Roof Plan;
- RDC-EFW_888_302: Typical Section.

The development will have the capacity to process up to 96 000 tonnes of waste per annum based on a nominal calorific value of 11.7 MJ/Kg, comprising mostly commercial and industrial waste, but will also be able to process municipal solid waste.

Following processing, recyclable materials (such as metals), which can comprise up to 3.5% of total inputs, will be taken off-site for re-processing. Residues from the facility which can comprise between 16% and 30% of total waste inputs dependant on waste composition will be sent for final disposal at a suitably permitted, proximate waste disposal facility if no alternative use for the material is commercially available.

The EfW facility has the potential to be a comprehensive Combined Heat and Power (CHP) plant. The electricity generated will have a nominal gross capacity of 8MW and the steam turbine will be designed to allow both high and low pressure steam to be readily exported to the adjacent commercial industries on Magnetic Park and the Millbuck Industrial Estate. Residential properties of the Grange II development would benefit from hot water via a proposed district heating network as well as a supply of electricity. There is also the potential to supply heat and power to the existing housing development at the Grange. This option is currently being investigated by the applicant. This will increase the overall energy efficiency of the plant. The ENERGOS EfW technology is also classed as ACT (Advanced Conversion Technology) and the biomass content in the waste qualifies for Renewable Obligation Certificates (ROCs).

Unlike traditional EfW facilities (i.e. incineration), the technology employed involves a two stage system, which initially gasifies the waste to produce synthetic gas, or 'syngas'. This gas is then transferred to a second stage where controlled oxidation of the syngas takes place. This produces stable process-related emissions which are compliant with current emission limits given in Directive 2000/76/EC (the Waste Incineration Directive or WID).

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Design Evolution

The architectural design for the Magnetic Park Energy Centre has been prepared by RDC Development Consultants.

The main building has been designed around the internal ENERGOS plant. In order to form an initial design a typical plant layout was issued by ENERGOS. Given the aspiration to deliver a landmark building it was decided to enclose all of the plant within the building envelope, with potentially visually intrusive elements of the building's process equipment being contained leading to a less industrial looking building fitting of its aspirations and location.

Having established the plant layout in conjunction with ENERGOS the building elevations were evolved. Following a design review it was found that the massing of the building could be reduced resulting in a reduction in the building height. The curved nature of the roof closely follows the internal plant and so minimises voids which would be created if the building had been formed from a series blocks.

Further information on the design of the proposed development is provided in the Design and Access Statement submitted as part of this planning application (RDC Development Consultants, 2012).

Layout

The EfW facility is made up of the following principal elements:

- A main building - this will house the majority of process plant and will have a flue stack. All waste material will be unloaded inside the building. At its highest point, the main body of the building will be ~30 m high and be ~100 m long by ~50 m wide (max). It is anticipated that the flue stack will extend to a maximum height of ~53 m high;
- Turbine Hall/Boiler Room - this will be a separate building ~14.5 m high, 32 m long and 13 m wide;
- Sub-station compound - this will be a separate building ~7.5 m high, 10.1 m long and 7 m wide;
- Air cooled condensers - the condensers are supported on an 'A Frame' structure; the height of the structure is ~20 m from ground level and is ~32 m long and ~13 m wide; and
- Sprinkler tank - the tank will be ~9 m diameter and 8 m high.

In addition, the external site areas will include:

- Two weighbridges (in and out);
- Site entrance and circulation roads;
- 18 car parking spaces;
- Visitor Centre, incorporating photovoltaic panels, integrated wind turbines and green roof, and associated parking spaces; and
- Landscaping.

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Process Description

As noted above, the plant employs a two stage system that first gasifies the waste to produce a synthetic gas which is then transferred to a second stage where it is oxidized. The two stage system enables a thorough control of the process which minimises emissions including Nitrogen Oxides (NOx), Carbon Monoxide (CO), Total Organic Carbon (TOC) and dioxins and ensures compliance with the limits given in the WID.

The plant has the capability of using several different waste streams as fuel, including:

- Commercial and industrial waste (the primary fuel source expected for the facility);
- Municipal solid waste;
- Final non reuse/recyclable wastes such as paper reject from the recycling process; and
- Residual wastes from other processes such as Mechanical Biological Treatment (MBT).

The following describes its key stages (illustrated on Figure 7 of the Design and Access Statement submitted in support of this planning application).

Waste Receipt and Fuel Preparation System

Waste will be delivered by heavy goods vehicles (HGVs) via Eagle Avenue and unloaded in the waste bunker.

The plant is equipped with a pre-treatment system that includes a shredder with belt conveyors, magnetic belt for metal separation, eddy current separator for non-ferrous metals and a pick up crane. An overhead crane system feeds the shredder and the hopper of the gasification chamber. The overhead crane loads the shredder. The magnetic metal will be extracted from the shredded waste and transferred to containers. Shredded waste (fuel) is unloaded in the fuel bunker.

Fuel Bunker and Transport System

Fuel is transferred from the fuel bunker by use of the overhead crane and unloaded into hoppers upstream of the feeding chamber of each gasification chamber. The fuel mixture is then fed from the feeding chamber into the gasification chamber.

Odour in the vicinity of the plant is minimised by using air from the bunker hall as process air for the gasification and high temperature oxidation process.

Thermal Conversion

Thermal conversion takes place in two steps. Drying, pyrolysis and gasification of the fuel, producing a synthetic gas or 'syngas', is carried out in the gasification chamber. In the high temperature oxidation chamber a staged oxidation is facilitated by multiple injections of air and recycled flue-gas.

The gasification chamber is equipped with a fixed horizontal oil-cooled grate that is divided into several separate sections, each with a separate air supply. A hydraulically operated water-cooled plunger feeds the fuel into the gasifier grate. A water-cooled guillotine is installed at the inlet of the gasification chamber to control the thickness of the fuel bed. A hydraulically operated water-cooled feeder (duplex feeder) secures the fuel transport along the grate. The duplex feeder is designed in such a manner that in addition to the longitudinal transport, a good

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local mixing of the moving fuel bed is achieved to promote local homogeneity of the fuel. A proprietary software programme controls the fuel-feeding rate into the gasification chamber as well as transportation along the grate. The bottom ash (typically 18% of the input waste) is discharged from the gasification chamber at the end of the grate and cooled in a water-basin before transportation to the bottom ash storage. The stored bottom ash is then transported for alternative end uses, such as road sub-base, bulk fill, asphalts, foamed concrete and cement bound materials in construction projects, or to a suitable waste disposal facility by HGV at regular intervals. The nearest such facility is at Oakley Road, Rushton, Kettering.

The syngas produced in the gasification chamber is transferred via a channel to the high-temperature oxidation chamber. Injection of air and re-circulated flue-gas through distributed nozzles in the high temperature oxidation chamber ensures temperature control and complete high temperature oxidation of the syngas. Flue-gas exiting the high temperature oxidation chamber is passed to the heat recovery steam generator.

Auxiliary burners are used during plant start-up, shutdown and as stand-by burners to ensure that the temperature in the high temperature oxidation chamber is above 850°C while the plant is in operation.

Heat Recovery Steam Generator (HRSG)

Each of the two HRSG units that recovers the energy from the flue-gas is connected downstream of each high temperature oxidation chamber. The HRSG is a combined water-tube and smoke-tube boiler with an economiser. The water-tube boiler section consists of water-tube bundles (evaporator and super-heater) that are easily removable for service and maintenance. The system is equipped with a feed-water tank, feed-water pumps, make-up water system, blow-down tank for blowing of the boiler and facilities for cleaning (shot cleaning) of the heat transfer surfaces (flue-gas side) during operation.

Steam Turbine and Air Cooled Condenser

Steam from the two HRSG units is passed to a common condensing steam turbine for the generation of electricity. Exhaust steam from the steam turbine is condensed by an air-cooled vacuum condenser and the condensate is passed back to the feed-water tank for re-use in the facility.

Flue-gas Cleaning System

The EfW facility is supplied with a dry flue-gas cleaning system located downstream of each HRSG. The flue gas cleaning system consists of adsorbent silo, bag-house filter and storage silo for filter dust. The cleaning of the flue gas is based on injection of adsorbent (lime and carbon) into the flue-gas for absorption of acid components, adsorption of heavy metals, mercury, TOC and dioxins. Fly ash and adsorbents are separated from the flue-gas in a bag house filter.

Residue is collected at the bottom of the filter and pneumatically transported to the filter dust storage silo. The silo is drained at regular intervals through a sealed system into designated HGVs for transport to disposal in accordance with statutory regulations.

The flue-gas fans are located downstream of each bag house filter. These fans maintain the required air current in the gasification and high temperature oxidation chambers and discharge the flue-gas to the atmosphere via a common flue-gas stack. A portion of the flue-gas is recycled to the high temperature oxidation chamber by use of a re-circulated flue-gas fan.

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Control and Monitoring System

The facility is equipped with a control and monitoring system, which performs automatic control of the process. The facility operators interact with the control system via the human machine interface (HMI) in the control room. The HMI presents all important process data, including flue-gas emissions. An independent emergency shutdown system (ESD) takes control during emergency situations and secures the facility into a safe state to avoid damage to people, environment and equipment.

Emission monitoring of flue-gas components is performed according to Directive 2000/76/EC. Any special requirement from local authorities related to emissions is not included in the scope, but will be supplied on request.

A separate historical data logging system stores all process data in a database and is used for analysis purposes.

Utilities

The EfW facility will be supplied with the following process utility systems:

- Electrical system excl. transformer and connection to the grid;
- Emergency power generating unit;
- Process air system;
- Re-circulated flue gas system;
- Compressed air system;
- Hydraulic system;
- Water cooling system;
- Thermal oil system;
- Process sewage system; and
- Fuel oil or gas system.

Operating Hours

With the exception of an 'emergency situation' (for example the unexpected closure of another facility) it is proposed that the facility would generally only accept the delivery of waste and the despatch of materials during normal daytime hours: 0800 to 1800 hours during weekdays and 0800 to 1300 on Saturdays; it is accepted that this will be subject to a planning condition should the development be approved. No delivery, despatch or on-site movement of waste would therefore take place on Sundays or bank holidays, again, except in the case of emergencies. Notwithstanding this, the facility will be designed to provide sufficient internal storage of waste and residues to enable continuous operation over the longer public holiday periods of Christmas and Easter.

The internal processing of materials will operate on a continuous (24 hour) basis, however, on-site loading, sorting and handling operations would be limited to the delivery and despatch hours set out above. Routine and non-routine maintenance operations within the building(s) will take place as and when required. Routine maintenance operations outside the building(s)

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will be scheduled to take place during the daytime (delivery) hours and will only extend into the night time and/or weekends should this prove necessary to maintaining the continuity of the process. Any non-routine maintenance and repair operations will be undertaken as and when they arise.

Landscaping
A landscaping strategy has been prepared and details are provided on Figure 9.15 of this ES.

Material Delivery and Despatch
It is envisaged that heavy goods vehicles (HGVs) delivering waste to the site and taking recyclable materials (mainly metals) and residues off-site would travel to the site via the A14 and A6, and access the site using an existing access point from the junction of the B576 (Harborough Road) and Stoke Road. An HGV routing plan has been is included as Figure 12.1 of this ES.

2.4 Other Consents

In addition to planning permission, other consents will be required to enable the proposed development to proceed. Of particular importance to this development is the need for Environmental Permits from the Environment Agency that will control all operations associated with the facilities based upon various risk assessments. Information presented in this ES will be used in the preparation of the Environmental Permits.

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