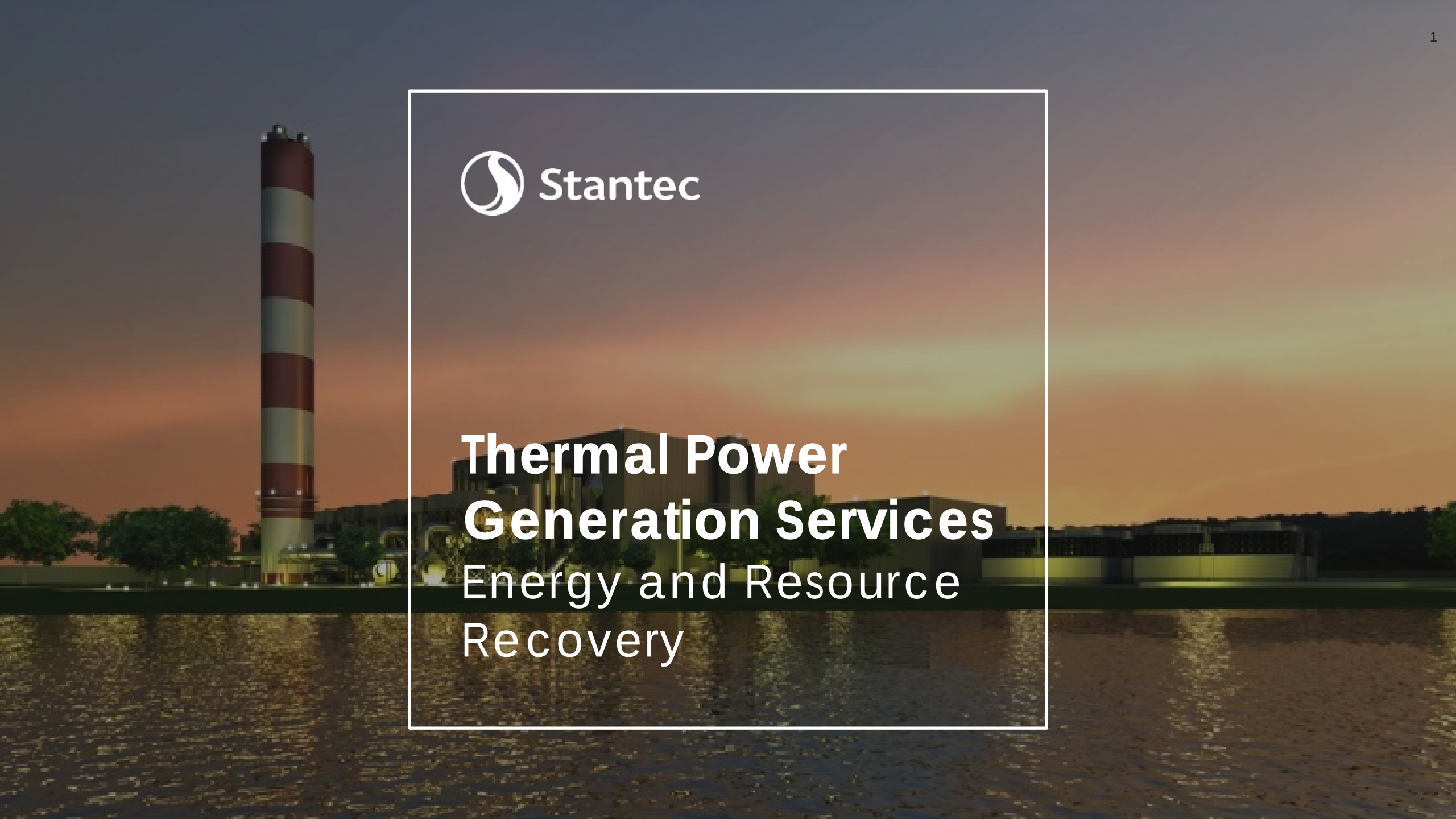
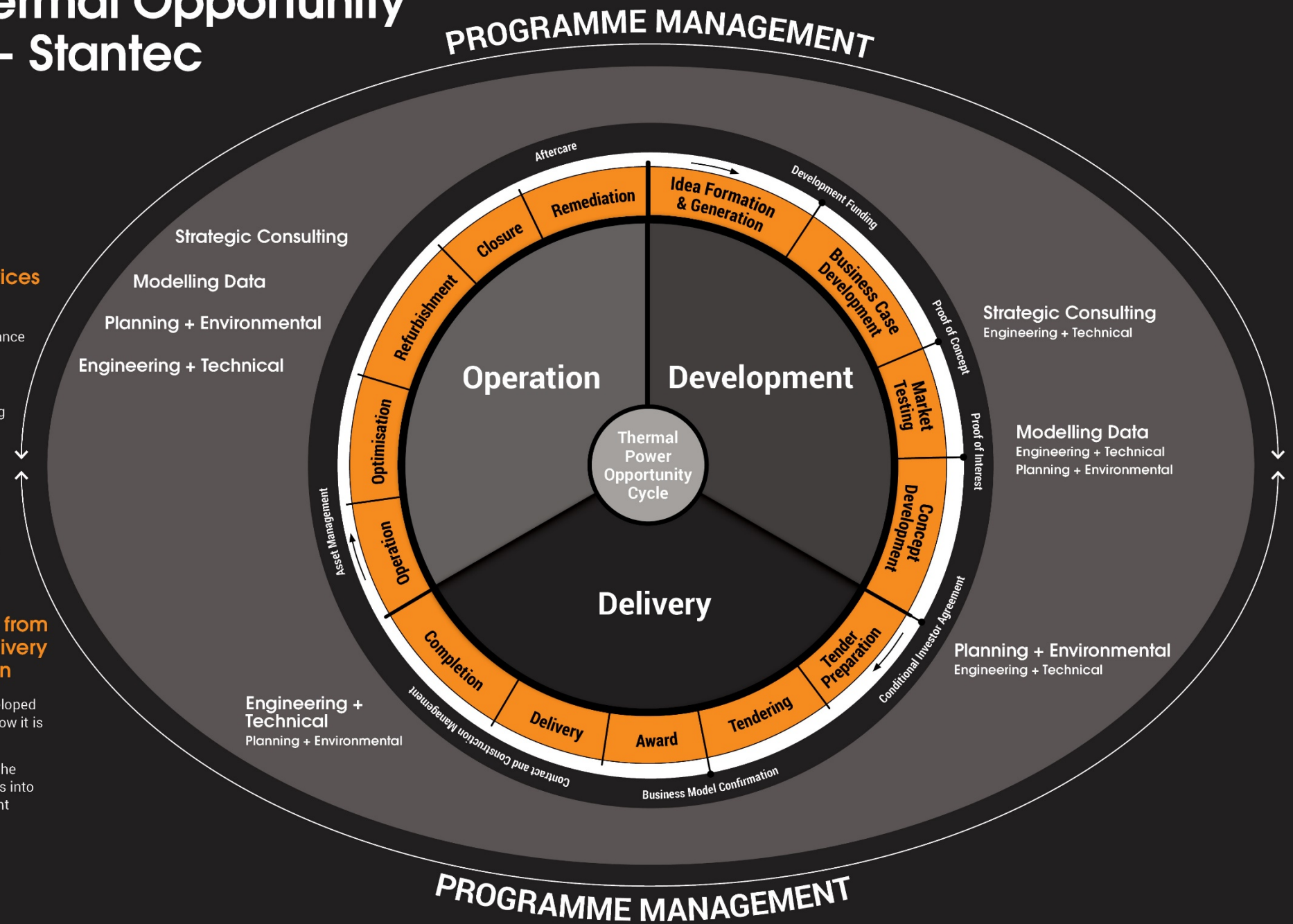


Stantec

Thermal Power Generation Services

Energy and Resource Recovery

The Thermal Opportunity Cycle - Stantec



Thermal power generation services

- Project planning
- Environmental compliance
- Planning & EIA
- Procurement support
- Design and engineering
- Owner's engineer
- Construction support and management
- Start-up and commissioning
- Optimisation and post take-over services

Project services from feasibility to delivery and optimisation

How your project is developed is just as important as how it is engineered.

At Stantec we maintain the excellence of our designs into the project's development and beyond.

Milton Keynes Waste Recovery Park

Client: Amey
Location: Milton Keynes, UK – 2013
Technology: ATT, AD, MT
Stantec Role: Owner's Engineer/Designer/EPCm Duties / Project Management/Cost Management

Overview

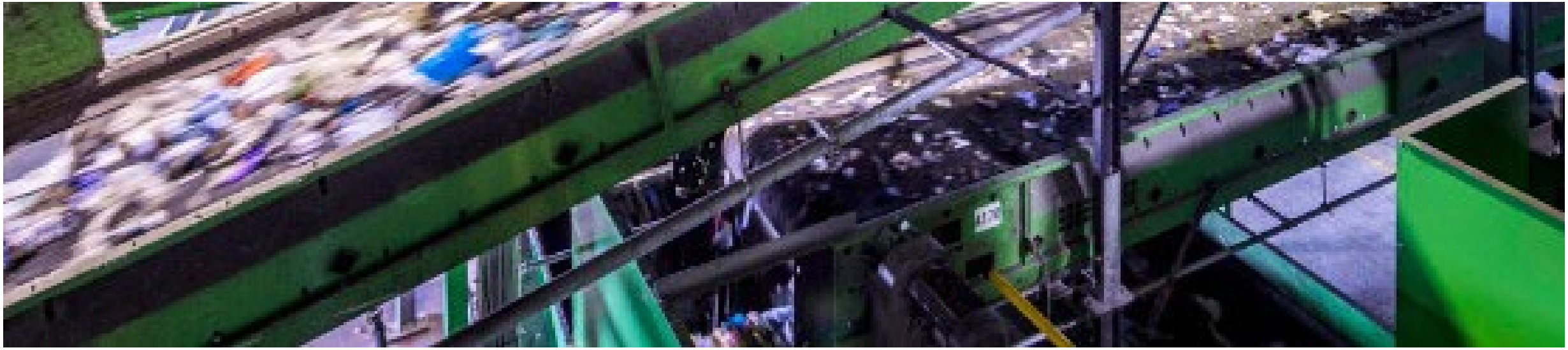
AmeyCespa has signed a contract with Milton Keynes council to design, build and operate a waste treatment facility based on the maximum incoming flow of 120,000 tpa of residual waste. The Milton Keynes Waste Recovery Park (MKWRP) will treat residual waste from households in the borough as well as commercial waste from local offices, shops and restaurants.

The Council has a no mass burn policy, meaning the proposed technologies to treat the waste, involved three processes and contracts:

- Civils and building work by Volker Fitzpatrick;
- Mechanical treatment technology by Stadler, to extract recyclable materials;
- IVC and AD by Celtic Bioenergy, which treated any food or organic waste to create renewable energy and a compost-like output for use on brownfield sites; and,
- An Energos advanced thermal treatment facility turned any remaining, unrecyclable waste into a gas to be combusted to generate high temperature steam, then 7MW of electricity in a turbine.

The Waste Recovery Park is operational since 2016, with AmeyCespa operating the plant for 15 years.

Stantec undertook an Owners Engineer role for the project which included additional support through the project to provide EPCm services.



Isle of Wight Waste Contract

Client: Amey Cespa
Location: Isle of Wight, UK – 2015
Technology: Originally Energos now Michaelis
Stantec Role: Owners Engineer/EPCm Support /Project Management

Overview

Project involves two processes:

Mechanical treatment technology by Stadler to extract recyclable materials from residual waste;

Energos advanced thermal treatment facility which will turn any remaining, unrecyclable waste into a gas, which is combusted (Now Michaelis incincerator)

As Owner's Engineer Stantec will be supporting Amey through the project by providing technical advice and reviews with a team who have experience of the proposed technologies, construction management services, programme management and SHEQual management.

Key tasks include:

- Design and delivery workshops
- Integrated Programme;
- Programme management and monthly reporting
- OE Support pre-NTP
- OE Support following NTP
- OE Support through mobilisation and construction
- On-going provision of Design and engineering support
- Construction and commissioning management

Dunbar Energy Recovery Facility (ERF)

Client: Viridor
Location: Dunbar, Scotland, UK - 2014
Stantec Role: Owner's Engineer/Designer

Overview

EfW facility comprising a two-stream plant processing up to 300,000 tpa of waste and the capacity to generate up to 30MWe, including provision for adding a heat export facility up to 17 MW.

- Babcock & Wilcox Vølund (BWV) and Interserve JV appointed as EPC for the 3 year project
- BWV is providing the technology by way of two EfW boilers, the DynaGrate® dynamic fuel combustion system, steam turbine and a dry flue gas cleaning system.
- The plant is based at Viridor's existing rail-linked Oxwellmains waste treatment hub in Dunbar, and forms part of a total of £357 million of investment made by the company during the last 18 months.

Key tasks include:

- Kick off Meetings/Workshops
- Review of programme & monthly reporting
- Support through mobilisation and construction for ancillary projects
- Ongoing provision of design and engineering support including design reviews/HAZOPS
- Construction and commissioning management services
- Design of ancillary works
- Principal Designer (Duty under CDM 2015)

Istanbul Incinerator

Client: Istanbul Municipality
Location: Istanbul, Turkey – 2017
Stantec Role: Owner's Engineer

Overview

Europe's largest energy-from-waste plant for municipal solid waste is to be built in Istanbul. The turnkey contract, together with one-year operation has been awarded to the Swiss company Hitachi Zosen Inova together with its Turkish partner Makyol. The plant will process 1 million tonnes of waste per annum generating around 70 MW of electricity.

The signing of the contract in September 2017 between the client Istanbul Metropolitan Municipality (IMM), and a consortium comprising Swiss cleantech company Hitachi Zosen Inova (HZI) and the Turkish construction firm Makyol, signals the start of the execution phase.

Stantec's role will be:

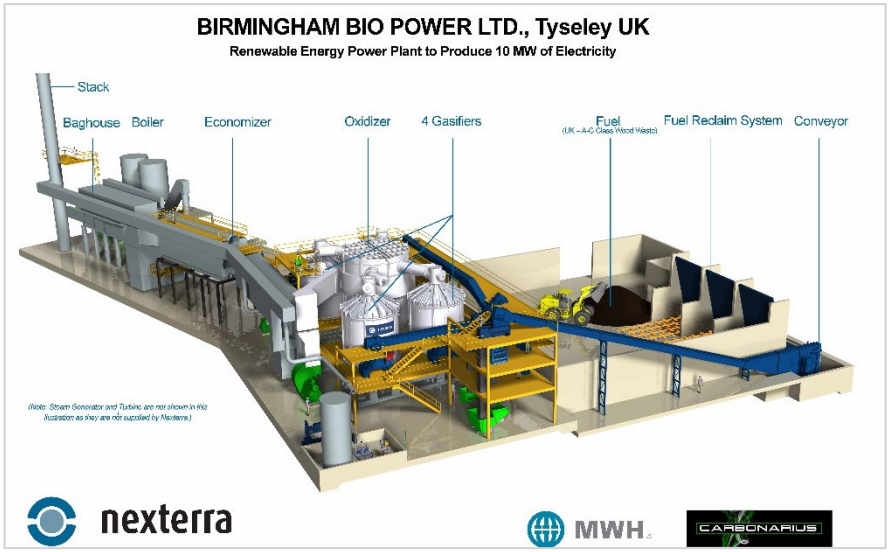
To ensure the design develops in accordance with international and national standards and meets legislative regulations and the terms of the contract.

We will also oversee all designs, studies, reports, projects, and calculations prepared by the contractor and report progress to IMM through a number of progress reports which provide progress, comments and recommendations prior to construction starting on site.

Key tasks include:

The following roles are currently being provided by Stantec for the design phase of the project:

- Owner's Engineer
- Review of Contractor's Preliminary and Final Project Design (MEICA/ Civil and structural/Compliance & Permitting/Geotechnical/Landscape/Architectural)



Birmingham Bio Power Tyseley Biomass Plant-Design

Project: DBO of 10MWe biomass plant
Location: Tyseley, Birmingham
Technology: Nexterra

Overview

The Birmingham Bio-Power plant in Tyseley, provides 9MWe (net) of renewable electricity to the national grid.

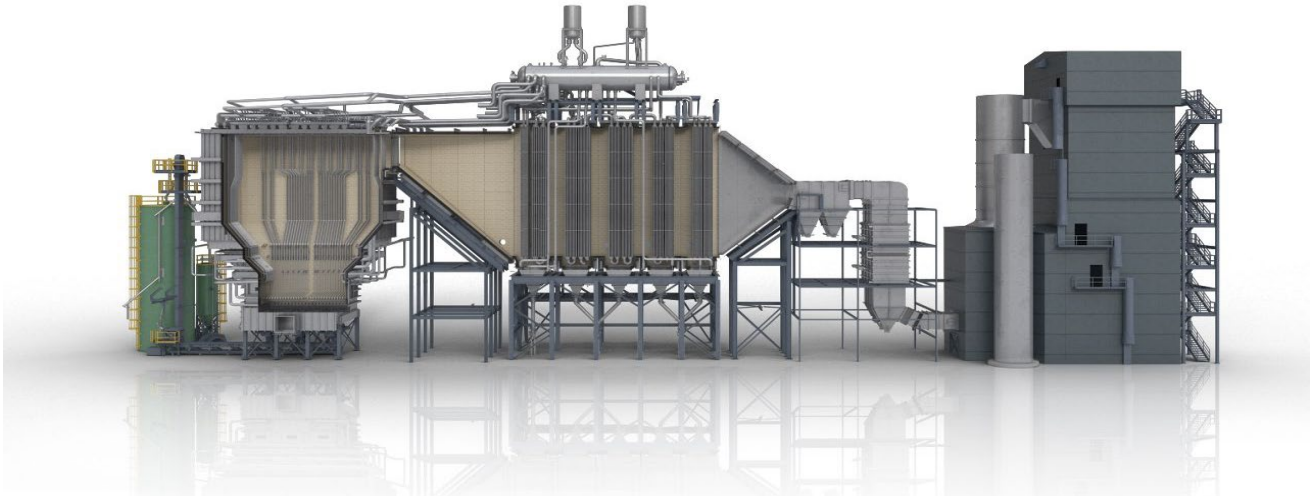
Birmingham Bio-Power is a special purpose vehicle set up by Carbonarius for the Tyseley project with other equity investors and debt providers including the UK Governments Green Investment Bank.

Power is raised by using an advanced gasification technology to gasify waste wood, raise steam and drive an efficient steam turbine unit.

All emissions from the gasification process are treated and continually monitored to meet exacting EU requirements.

Key tasks include:

- Design support and design reviews
- Now exporting to grid
- Nexterra technology is a UK first.
  Due diligence carried out by Stantec
- Plant optimisation
- Incentive Optimisation



Biomass Plant Ince Park

Project: O&M of 21.5MWe biomass plant
Location: Ince Park, Chesire, UK

Overview

A £87 million waste-to-energy project in Cheshire, UK. Development of a renewable energy plant at Ince Park Resource Recovery Centre. The plant will export 21.5 MW (megawatts) of clean, affordable power, utilising over 150,000 tonnes of material that would otherwise go to landfill.

Funding for the project is being provided by the Bioenergy Infrastructure Group, a new investment entity that is building a portfolio of waste-to-energy assets. The group comprises Infracapital, Aurium Capital Markets, Foresight Group and Helios Energy Investments.

The work will also help meet the UK's landfill diversion and carbon reduction objectives.

Key tasks include:

- Design review and development
- Generation to grid in February 2018
- Operation and maintenance

Biomass Plant Welland Bio Power – Northamptonshire-Design

Project: DBO of 10.6MWe biomass plant
Location: Welland, Northamptonshire

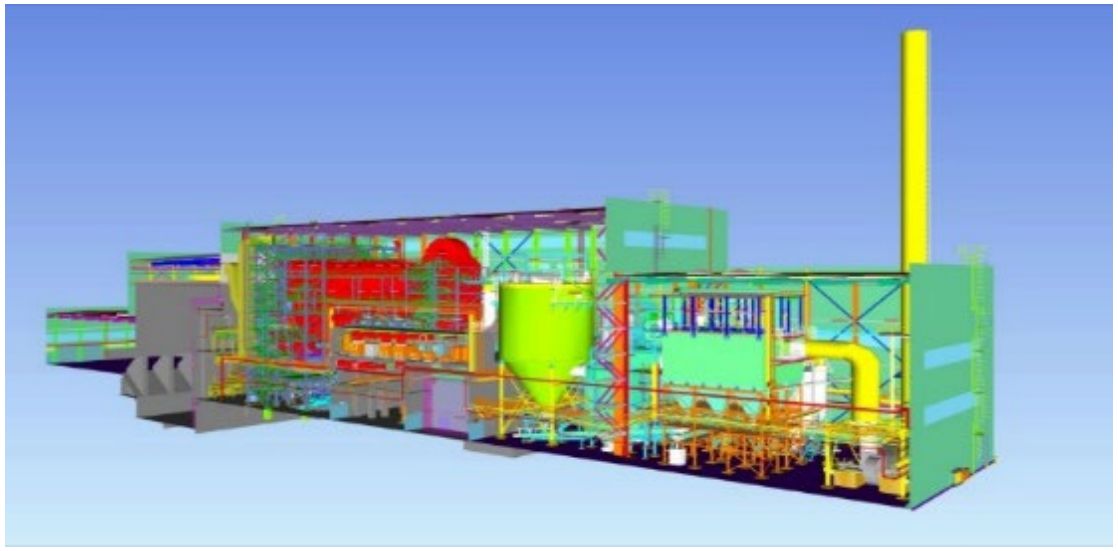
Overview

A project developed by Cogen (formerly Carbonarius) and Balfour Beatty, with investment partners Noy Infrastructure & Energy Investment Fund and Equitix MA Infrastructure Fund. Stantec Treatment secured an EPC contract to build the 10.6MW (gross), which will divert up to 60,000 dry tonnes of waste wood away from landfill each year and save more than half a million tonnes of CO2 over the course of its lifetime.

Stantec installed state-of-the-art equipment with the core gasification technology being provided by Nexterra Systems Inc. The project qualified for ROC's for renewable energy support, as an advanced conversion technology. Power is raised by using an ACT technology to gasify waste wood, raise steam and drive an efficient steam turbine unit. All emissions from the gasification process are treated and continually monitored to meet exacting EU requirements.

Key tasks include:

- Design review and development support
- Generation to grid in March 2017



Meath EfW Plant

Client: Indaver
Location: Dublin, Ireland
Technology: BW Volund
Stantec Role: Owner's Engineer / EPCm

Overview

210,000 TPY Energy from Waste Plant. 70 MWth – 17 Mwe.

Stantec undertook the process design, design integration and detailed design of Power Island.

Plant comprises a waste reception bunker with overhead feed cranes, an incineration furnace with recovery boiler producing superheated steam, a flue gas cleaning plant and a power island. The steam is used for electricity production through a turbo-generator system.

The project was implemented under a multi-contracting strategy by Indaver Ireland Ltd in close collaboration with the projects and engineering department of Indaver NV in Belgium. Stantec was awarded the contract to provide engineering services and act as a technical advisor.

Key tasks include:

- EPCm role
- 3D Layout design & integration
- Detailed design of steam cycle and power island
- Plant is outperforming on throughput and power. Technical excellence in design
- Interface management
- Technical tender book preparation and bid evaluation
- Construction and commissioning support

MBT-AD Plant Biffa West Sussex, RDF – 5MWe

Client: Biffa
Project: MBT/AD & RDF Plant
Location: West Sussex, UK
Technology: Stadler, Eggersman
Stantec Role: Project Management and Engineering Services (PMES)

Overview

Biffa signed a 25-year contract to treat the County's municipal waste, 330,000 tpa, at a state-of-the-art Mechanical Biological Treatment (MBT) and Anaerobic Digestion (AD) facility.

Fuel streams produced by the MBT and AD processes will provide Refuse Derived Fuel (RDF) and methane which will turn supply gas to electricity via CHP engines (5 MWe) based at the site.

This represents a significant part of Sussex County Council's capability to meet its targets for recycling and diversion of waste from landfill as well as recovery of energy for the next 25 years.

Key tasks include:

- Full-time site based Contract Administrator
- Full-time Site Representative
- Project Manager
- Commercial and contract management
- Technical design reviews and attendance at design meetings, Safety Reviews and Hazops
- Planning administration
- CDM Co-ordinator

Use of HoloLens for Design and Operability Reviews

Client: Veolia
Project: Southwark Reuse and Recycling Centre
Location: London, UK

Overview

Veolia's operation team were planning to make modifications to the existing plant at Southwark with the introduction of a new conveyor.

Stantec proposed the use of mixed reality to enable the operations team to undertake a design and operability review on site using the 3D model provided by the package supplier.

Stantec visited site and reviewed the location for the new conveyor and agreed protocols with the package supplier for submittal of their 3D format for use in the mixed reality software.

Stantec prepared the 3D model to ensure compatibility for use in the HoloLens software and visited site to undertake a design and operability review with the operations team who were able to view the proposed installation and comment on specific issues with regard to access, motors, maintenance and H&S.

Key tasks include:

- Site review and inspection
- Review supplier 3D model
- Prepare mixed reality model
- Undertake operability on site with operations team

Waste Modelling Assessment at Landor Street Integrated Resource Recovery Facility

Client: Suez
Project: MRF waste modelling
Location: Birmingham. UK

Overview

Suez opened the Landor Street Material Recycling Facility (MRF) in 2013 and operated the plant as both a recycling faciltiy and a solid recovered fuel (SRF) manufacturing facility to process commercial waste from across the city into fuel for the CEMEX cement works in Rugby. In 2017 Suez suspended the SRF operations at the plant.

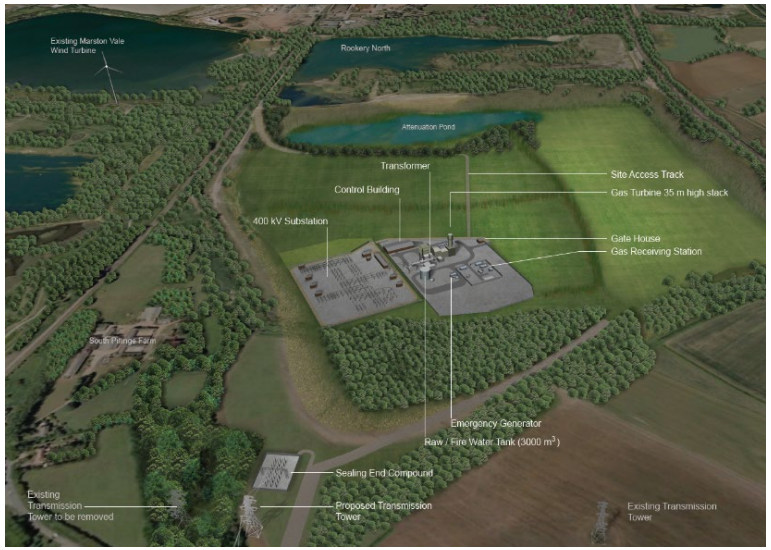
The plant currently operates as a recycling facility only and as such Suez is reviewing the potential to upgrade the existing equipment at Landor Street to optimize the operation of the recycling facility. The purpose of this study is to model the current operation of the plant using Stantec's Optimi$e Waste Modelling Tool and review with Suez the potential options for modifying its operation and maximising waste streams and revenues.

By modelling the base case using the data provided by Suez, Stantec will use their in-house waste tool to produce a detailed process model of Landor Street Integrated Resource facility. The model will mimic the site and will allow adjustable removal rates and efficiencies to be entered for each item of equipment to better simulate the actual performance of the works utilising real world data.

The model will then be calibrated against site operational data and expected waste input and will produce a dashboard which will identify the expected purity of the recyclates and pinch points within the process.

Key tasks include:

- Site visits, data collection, operator reviews
- Data review and interpretation
- Configuration, modification of the parameters within the Optimi$e Waste Modelling tool to provide an accurate representation of the current condition of the process
- Reporting - The production of a summary of the performance of the process, with proposals for further modelling scenarios.



Millbrook Power Project

Client: Drax Group Plc
Location: Bedford. UK

Overview

The Project is located in the Rookery, near Bedfordshire. The Power Generation Plant and new substation are located within Rookery South Pit, a former clay extraction site at around 15mbgl. The gas and electrical connections would be sited on agricultural land to the south.

Stantec were involved from the early stages of the Project and assisted in assessing the initial feasibility of the site.

Stantec then managed all pre-examination planning and environmental work. This has included liaison with the Planning Inspectorate and Local Authorities, and other statutory consultees, management and preparation of the Planning Statement and Consultation Report and management of statutory and non-statutory consultation phases.

Stantec also managed the environmental assessment process, producing all technical EIA sections, the compiled Preliminary Environmental Information report (PEIR) and Environmental Statement (ES).

Stantec was then retained by MPL to support them through the examination of the Project and more recently, to manage the discharge of all DCO Requirements.

Key tasks include:

- Management and coordination of all environmental documents including PEIR and ES.
- Technical environmental assessments including air quality, noise, ecology, water quality and flood risk, ground conditions (including phase 1), landscape and visual impact assessment, traffic and transport assessment, socio-economics.
- Planning services and project management.

Riverside Energy Park

Client: Cory
Location: London, UK

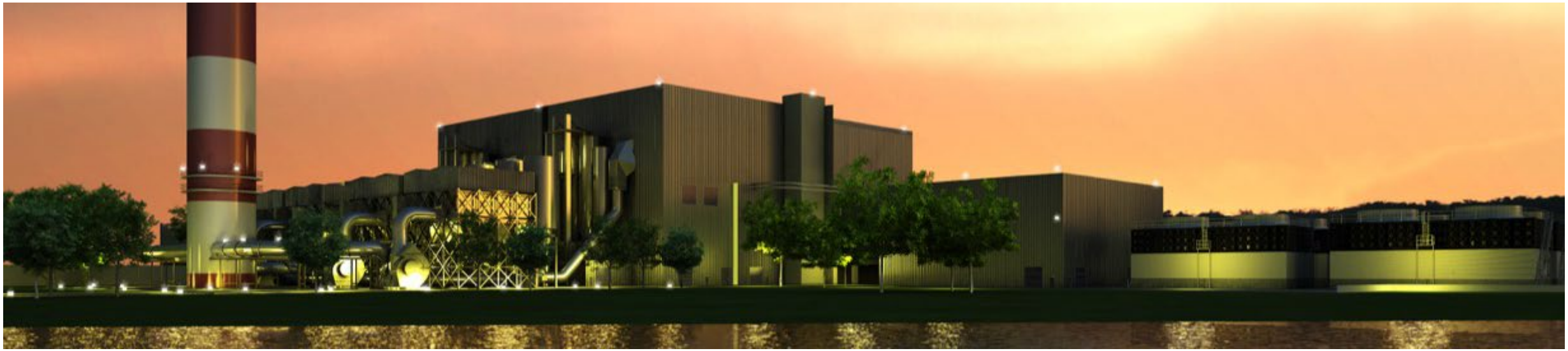
Overview

Our DCO planning and EIA teams have been leading on these elements for the Riverside Energy Park DCO which was accepted for examination in December.

The project comprises an integrated energy park (<50MWe) comprising waste energy recovery, waste anaerobic digestion, battery storage and solar generation and associated electrical connection.

Key tasks include:

- Undertaken using 2017 EIA Regs
- Cumulative assessment with power generation projects
- Incorporating and assessing flexibility required for development of an ‘energy park’
- Addressing (and assessing) two electrical connection options included in application
- Working on latest iteration of Consultation Report and other DCO documents



Thermal Power Energy from Waste

Client: **Keppel Seghers**
Project: **Ineos EfW**
Location: **Runcorn, UK**
Stantec Role: **Detailed Civil Design/Procurement**

Overview

Part of a PFI initiative waste management project by the GMWDA to provide an integrated solution for the 1.3m tonnes of municipal waste diverting up to 75% of waste from land fill. One of the largest privatisation project in the EU waste management and renewable energy market.

- Rail Siding for Train Deliveries of RDF (3 Trains / day each with 51 20 tonne containers)
- Tipping Hall & Bunker
- 4 streams of Furnace /Boiler/Flue Gas Cleaning/ Furnaces and Boilers
- Stack Control / Admin building
- Turbine building / Cooling Towers
- Site Infrastructure

*2*70 MWth, 70 MW power plus 51 MW steam.*

Key tasks include:

- Detailed Civil, Structural and Architectural Design
- Tenderbook and bid review
- CDM Coordinator / Designer
- EIA/IPPC Services

Get in touch

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Design with community in mind