



CASE STUDY
15201

Parc Adfer

Post-Recycled Energy Recovery Facility



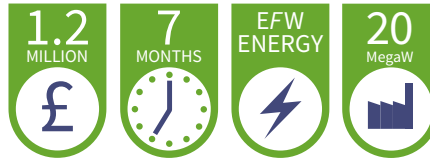
Parc Adfer development

In 2014 Wheelabrator Technologies was selected as the preferred bidder to build and operate the Wheelabrator Parc Adfer facility over the next 25 years as a public-private partnership (PPP), with support from the Welsh Government to serve the five local authorities that make up the North Wales Residual Waste Treatment Project (NWRWTP). These authorities are Conwy County Borough Council, Denbighshire County Council, Flintshire County Council, Gwynedd Council and the Isle of Anglesey County Council.

Parc Adfer will treat post-recycled waste to create energy and recyclables. It will also deliver jobs and a range of economic benefits for the area. Post-recycled waste fuel for the facility will be provided primarily by the five authorities, which initiated the procurement to achieve long-term targets for recycling and diversion of waste from landfill. A further long-term contract is in place with a top tier waste management company, ensuring that over 70 percent of the facility's fuel supply is hedged at fixed prices. The remaining capacity at the facility will be offered to commercial waste collection companies.

Parc Adfer will help the five local authorities meet the Welsh Government's 2025 municipal waste and recycling targets which are to recycle 70 percent of waste and to send no more than five percent of it to landfill. Metals and aggregates are recovered from the facility's bottom ash and will improve the Partnership's recycling rates by around seven percent. Throughout the life of the Parc Adfer facility, this could amount to over a million tonnes of aggregates and 60,000 tonnes of metals.

Powersystems high voltage (HV) power engineering were responsible for the design, procurement, installation, testing and commissioning of the high voltage, high power low voltage and the associated control and protection system infrastructure associated with the construction of the 20 MW Energy Recovery Facility.



Project facts and figures:

- ▶ **On the full site, more than a million man-hours without a lost time incident**
- ▶ **Connection voltage: 33 kV**
- ▶ **Power Transformer: 21/25 MVA ONAN/ONAF 33/11 kV Transformer with On-Load Tap Changer**
- ▶ **Switchgear: Mitsubishi 7 Panel Withdrawable Switchboard**
- ▶ **Site Transformers: 2 No. 3150 kVA 11000/415 V & 2 No. 2500 kVA 11000/415 V Cast Resin Transformers**
- ▶ **Generator Turbine capacity: 20 MW**





Powersystems partnerships

In 2017 Powersystems UK Ltd were approached by Mitsubishi Europe who were looking to partner with a specialist electrical contractor for large-scale projects they were intent on tendering. Mitsubishi, being extensively a major business to business, and business to consumer. supplier, required the technical design, installation and commissioning expertise Powersystems hold to deliver the high voltage and high power low voltage aspects of major projects. This partnership enabled Mitsubishi to tender the works to Tier 1 EPC Companies on a design and build basis whilst championing their own products where applicable, and so in May 2017 the Powersystems/Mitsubishi partnership tendered their first project, Parc Adfer.

Scope of works and major design considerations

CNIM, the projects main EPC Contractor, issued out an extensive tender enquiry to three major bidders, the Powersystems/Mitsubishi partnership being one of them. The enquiry was a competitive bid but it also required detailed design back-up with the tender for major capital items such as the Power Transformer, 11 kV switchboard and major HV cable circuits. Powersystems bid team, working closely with their 'in-house' designers compiled a detailed tender bid incorporating design and 'value engineering' options.

The scope in brief comprised of a 33kV cable circuit from the DNO's 33kV metering substation, through a 21/25MVA 33/11 kV Power Transformer and onto a 7 Panel 11 kV switchboard, (switchboard supplied by Mitsubishi). Four Cast Resin Transformers, fed from the 11 kV Switchboard, were supplied and installed providing auxiliary LV power supplies to the plant. Finally, two 11 kV outgoing circuits were also installed supplying HV supplies to the 20 MVA Steam Turbine and the site standby generator. All the required equipment for the contract was designed, procured, installed and commissioned by Powersystems, with the exception of the 11 kV switchboard which was free issued to Powersystems by Mitsubishi to install and commission.



Parc Adfer Project timings

Construction of Parc Adfer commenced in December 2016 and completed in December 2019, with Powersystems contract award starting in July 2017.

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66kV **275kV** **33kV** **11kV** **132kV** **400kV**



How Powersystems have helped

Powersystems lead the high-level design of the electrical infrastructure right from the start providing CNIM with design solutions and back-up technical reports on all aspects of the HV tender scope. This included: switch room layout design, protection systems for power transformers (protected by a bespoke stand-alone protection panel designed and built by Powersystems) and HV circuit installation calculations.

What the client wanted

Wheelabrator Technologies contracted the main M&E contract for the energy recovery plant to Constructions Industrielles de la Méditerranée (CNIM), a French equipment manufacturer and industrial contractor with a portfolio of projects worldwide. In turn CNIM required an expert High Voltage contractor to provide the main high voltage systems which they were confident with to meet the high and demanding client specification.

CNIM's appointment of the Powersystems/Mitsubishi partnership for the Parc Adfer project was a first for the partnership, CNIM's award being made on Powersystems impressive design and technical back-up capabilities coupled with in-house site trades persons for site installation and Mitsubishi's global brand and impressive 11 kV Switchgear.



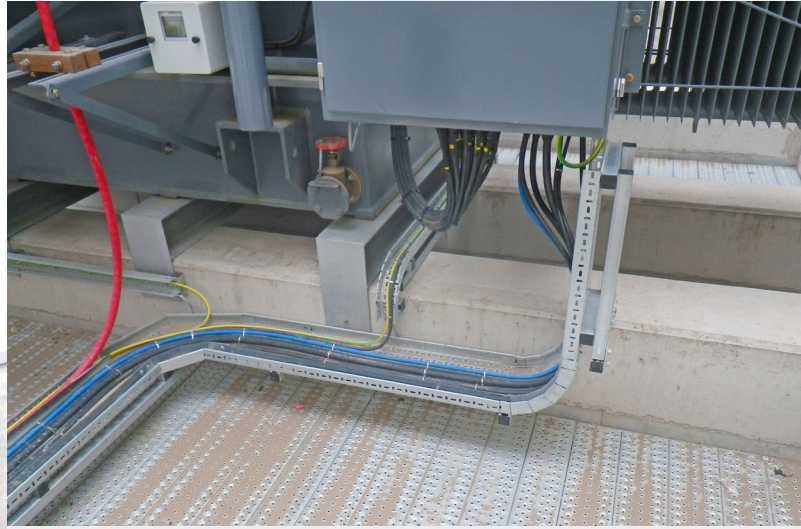
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The results:

Parc Adfer proved to be a successful project, not only for CNIM but also the Powersystems/Mitsubishi partnership: the contract was delivered on time, to specification and on budget. It is a testament to the fact that future projects are being successfully tendered by the Powersystems/Mitsubishi partnership with positive feedback from CNIM on the professional approach and expertise they experienced from Powersystems.



Environmental benefits

- ▶ UK Government best practice targets to recover energy from post-recycled material for use in heat and power schemes
- ▶ Reduce greenhouse gases by preventing methane release from landfill and reducing the reliance on fossil fuels
- ▶ Recycling of metals from ash and the provision of ash as a replacement for primary aggregates in the construction sector
- ▶ Use of materials that might otherwise go to landfill or be exported to Europe

Economic benefits

- ▶ More than £51,000 in funding granted to local community groups and organisations during the construction phase
- ▶ Clean, sustainable energy generated for more than 30,000 homes (or enough power for a town nearly four times the size of nearby Connah's Quay)
- ▶ 35 new operational roles created, following many hundreds of roles during construction
- ▶ More than a million man hours without a lost time incident



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