Chapter 15 Climatic Factors

15. Climatic Factors

Climatic Factors and the Proposed Development

Context

15.1 Delivering on the green economy is a firm target of the NI Executive and the region is well placed to benefit from investment in this sector. The Northern Ireland (NI) Executive's Investment Strategy supports the Programme for Government and the RDS with respect to investment in the emerging sustainable and renewable energy market.

15.2 The Investment Strategy makes this clear:

"Our population has increased and a greater proportion is now older. Our towns and cities have grown and people's needs and expectations about service entitlement and service standards have changed. New technology, for example, is opening up faster and better ways of delivering services, often at a lower cost per transaction. More energy efficient solutions are now available, delivering both cost and emission reductions and with the potential to increase our use of renewable energy sources rather than the traditional fossil fuels.

With less money to go around, we will invest in better and more efficient ways to deliver essential public services rather than simply cut the availability or quality of those services in order to save money." (P11, NI Investment Strategy)

15.3 In a section entitled 'Protecting our People and the Environment', the Investment Strategy highlights the importance of renewable sources in electricity generation. The long-term targets are emphasised, stressing that the UK Climate Change Act 2008 legislated for an 80% mandatory cut in the UK's carbon emissions by 2050 (compared to 1990 levels), with a target of 34% by 2020.

15.4 In order to meet this target and become more energy efficient, one suggested method is to replace inefficient infrastructure with new technologies; enabling Northern Ireland (NI) to become less reliant upon fossil fuels.

"Compliance with international standards is another driver of investment. In waste management, for example, European Law requires us to make less use of landfill and invest more in new waste treatment facilities." (P13, NI Investment Strategy)

15.5 EfW and MBT facilities in Northern Ireland (NI) would comply with EU law and would bring a number of extra benefits to the region. The following list demonstrates just some of the key benefits associated with MBT, EfW and IBA facilities:

- Cost effective thermal treatment process and established proven technology;
- No extensive preparation of waste material is required and the MBT and EfW facilities are adaptable to changes in the mix of waste material;

- The EfW process recovers energy in the form of electrical power and heat. The proposed development will generate 14MW of electricity, the equivalent of powering 30,000 households;
- The combined MBT and IBA facilities will recover valuable recyclates (such as metals plastics and aggregate) for further processing;
- The combined MBT and EfW processes diverts waste from landfill, thus preventing greenhouse gas (methane) emissions; and
- Municipal waste is a non-fossil fuel. Recovery of energy from this source by EfW processing means that less fossil fuels such as coal, gas and oil need to be burned - preserving this limited resource for future generations.

15.6 The Northern Ireland (NI) Investment Strategy and waste planning policy which sets out the waste hierarchy (PPS11, pg.11) recognise the importance of managing waste effectively, combining this aim with a target to increase renewable energy generation. Considering the aforementioned benefits, the development of MBT and EfW technology at Hightown will complement these interrelated targets.

15.7 The MBT and EfW plants being proposed as part of the arc21 residual waste treatment project (RWTP), have the potential to contribute to the overall aim of the Waste Management Strategy (http://www.doeni.gov.uk/towards_resource_management.pdf); reducing landfill waste and instead managing it in such a way that it becomes beneficial to the environment. The strategy emphasises:

'…The substantial quantity of waste generated must be recycled, composted or recovered by other methods, including energy recovery…' (pg.31).

15.8 In addition to extracting recyclable materials, the MBT processing can produce a fuel for subsequent thermal treatment. In addition, the EfW has the potential to contribute to meeting NI's non-fossil fuel obligations and Government's policies on renewable energy, as well as helping the region to meet its landfill diversion targets.

'…Government continues in its firm belief that energy from waste will be a necessary component of the preferred infrastructure, both in terms of its policies on renewable energy and to ensure that Northern Ireland meets its landfill diversion targets. Energy from waste facilities may also provide diversity and security of supply…' (pg.46)

15.9 Developing MBT and EfW technologies at Hightown Quarry will contribute towards local, regional, national and EU targets, as well as to satisfy governmental belief in its role in environmental change.

Baseline conditions

15.10 The climate of Northern Ireland can be said to be relatively benign at present and is strongly influenced by its mid latitude position on the ocean side of the British Isles (SNIFFER, 2007).

This oceanic influence provides relatively constant mean annual temperatures, between 8.5^{o}C and 9.5^{o}C at low altitudes.

15.11 Seasonally temperatures vary with July being the warmest month and January and February being the coldest. The number of hot days (where the mean daily temperature is greater than 18°C) experienced at the Armagh Observatory in a year is highly variable, but has generally been high since the late 1980s (EHS, 2004). The number of cold days (mean daily temperature less than 0.5°C) is also variable, but has been very low since the late 1980s (EHS, 2004).

15.12 Precipitation is strongly related to topography, with upland areas receiving 1600mm or more per year, while the driest lowland areas receive 800mm or less (1961-1990 averages). Annual rainfall totals at Armagh Observatory (collected since 1930) are highly variable from year to year, but no long-term trend is obvious (EHS, 2004). Seasonal variation is not large, with the wettest months occurring between August and January (SNIFFER, 2002). Heavy rainfall events are infrequent due to the relatively low topography and limited severe summer convectional activity (SNIFFER, 2002).

15.13 Mean annual potential evapotranspiration (PET) is highest in the south east and lower in north west and upland areas (SNIFFER, 2002). Precipitation exceeds PET for all months of the year in highland areas, with soil moisture deficits occurring for 3.4 months in lowland areas, particularly to the south of Lough Neagh and the south east coast (SNIFFER, 2002).

15.14 Wind speeds are higher than those found in southern parts of the United Kingdom due to the position of Northern Ireland with respect to Atlantic depression tracks, although coastal areas are afforded some protection by the rest of Ireland and proximity to Scotland (SNIFFER, 2002). Annual mean wind speed ranges from less than 4.1 metres per second in sheltered inland sites to more than 6.7 metres per second on the North Antrim coast (SNIFFER, 2002).

15.15 It is considered that, with the potential exception of extreme events, the proposed development will not be impacted by the current climate of Northern Ireland as it will be designed to the relevant and current building codes and standards which are cognisant of prevailing climatic conditions. There is a potential though that a changing climate could impact upon the proposed development and this is considered below.

A Changing Climate

15.16 It is widely recognised that the climate of Northern Ireland and the rest of the world is changing due to continued and increasing worldwide anthropogenic emissions of greenhouse gases into the atmosphere. It is also recognised that even if efforts to control further emissions are successful it is inevitable that there will be some degree of climate change.

15.17 A changing climate has implications for the proposed development in a number of ways as follows:

- The proposed development may contribute to emissions of greenhouse gases both during construction and operation and therefore contribute to climate change; and
- The proposed development may be vulnerable to impacts brought about by a changing climate. The proposed development may have implications for how Northern Ireland adapts to a changing climate.

15.18 A Climate Change Risk Assessment (CCRA) has been carried out which provides an assessment of the risks and opportunities to the United Kingdom caused by climate change up to the year 2100. This CCRA also deals with potential threats and opportunities on the regional level and, as such, considers a range of potential scenarios for Northern Ireland (See Climate Change Risk Assessment for Northern Ireland, January 2012).

15.19 As noted in the Northern Ireland CCRA report, the CCRA is based on the UK Climate Projections, which were published in 2009 (UKCP09). This provides projections of climate change for the 2020s, 2050s and 2080s compared with the period 1961-90.

15.20 Table 15.1 presents a range of potential scenarios for Northern Ireland based on climate models and recent data published by UKCP09 (United Kingdom Climate Projections 09):

Table 15.1 Climate Change Scenarios for Northern Ireland based on UKCP09

Variable Probability Lecvelle		**2020s Medium**			**2050s Medium**			**2050s High**		
		10%	**50%**	**90%**	**10%**	**50%**	**90%**	**10%**	**50%**	**90%**
Mean temp (°C)	Annual	+0.7	+1.2	+1.8	+1.3	+2.1	+3.0	+1.4	+2.3	+3.3
	Spring	+0.7	+1.2	+1.7	+1.2	+1.9	+2.9	+1.4	+2.2	+3.3
	Summer	+0.4	+1.3	+2.2	+1.0	+2.2	+3.5	+1.1	+2.4	+4.0
	Autumn	+0.6	+1.3	+2.0	+1.3	+2.2	+3.2	+1.4	+2.3	+3.4
	Winter	+0.5	+1.1	+1.8	+0.9	+1.7	+3.7	+1.0	+1.9	+2.9
Daily Max. temp (°C)	Summer	+0.3	+1.6	+3.0	+0.9	+2.7	+4.8	+1.1	+3.0	+5.4
Sea surface temp (°C)	Annual	Mean annual temperatures of the coastal waters around Northern Ireland are projected to increase by around 2.5 degrees (2.2-2.7°C) by the 2080s, under a medium emissions scenario.								
Mean precip-itation (%)	Annual	-3	-0	+2	-4	-1	+3	-4	-1	+3
	Spring	-4	+2	+8	-5	+2	+10	-4	+2	+9
	Summer	-17	+5	+7	-27	-13	+3	-28	-12	+4
	Autumn	-5	+4	+15	-4	+6	+18	-6	+8	+25
	Winter	-2	+4	+10	+2	+9	+19	+2	+9	+19
Wettest day precipitation (%)	Summer	-9	0	+10	-9	+1	+12	-9	+2	+13
	Winter	-5	+4	+13	-1	+9	+22	-1	+10	+25
Cloud Cover (%)	Annual	-3	-1	0	-4	-2	-1	-5	-2	+1
	Summer	-5	-1	2	-7	-3	1	-7	-3	+1
	Winter	-2	0	+3	-2	0	+3	-2	0	+3
Relative Humidity (%)	Annual	-1	0	0	-2	-1	0	-2	-1	0
	Summer	-3	-1	+1	-4	-1	+1	-4	-1	+1
	Winter	**-1**	**0**	**+1**	**-1**	**0**	**+1**	**-1**	0	+1

Identified Challenges to the Energy Sector from a Changing Climate

15.21 As noted in the CCRA Energy Sector Report, the UK energy sector plays an important role in the UK economy contributing to 3.7% of Gross Domestic Product (GDP) and employing 150,200 people (5% of industrial employment). It also contributes a large fraction of the UK's total carbon dioxide (CO_2) emissions, since energy production is largely reliant on fossil fuels with emissions from power stations currently accounting for just under one-third of total CO_2 emissions. In 2009, 5% of the UK energy mix came from nuclear or renewable generated electricity.

15.22 The Climate Change Act 2008 sets a clear and credible long term framework for the UK to reduce its greenhouse gas (GHG) emissions including a legal requirement to reduce carbon emissions by at least 80% below 1990 levels by 2050 and by at least 34% by 2020.

15.23 As stipulated by the Renewable Energy Directive (2009/28/EC) there is a 15% target for renewable energy contribution towards total energy demand for 2020; this equates to a 30% contribution towards electricity demand for 2020. The devolved administrations are also committed to their own individual adaptation and mitigation targets and policies. These commitments (both national and devolved) mean that the future energy mix will change, but the exact mix (particularly beyond 2050) remains uncertain. Therefore all climate risk-related decisions in this sector will need to be made in the context of this changing landscape and its associated uncertainties.

Key findings for the United Kingdom:

1. *Climate change risks facing the industry, including flooding, reduced water supply and extreme temperatures, could adversely affect the ability of the UK Energy Sector to meet projected energy demand.*
2. *Power stations, electricity substations and other energy infrastructure located in vulnerable areas are likely to face an increased risk of flooding, potentially disrupting energy supplies.*
3. *The number of power stations at risk of flooding in England and Wales is projected to rise from 19 today to 26 (21 to 27) in the 2020s to 38 (31 to 41) in the 2080s. The risk of flooding to major substations is projected to rise from 46 today, to 53 (48 to 60) by the 2020s and 68 (57 to 79) by the 2080s.*
4. *The requirements for cooling are likely to increase in the future due to higher temperatures. For example, energy demand for cooling in London could rise from approximately 1.6 to between 2.2 TWh (Terawatt-hour) and 2.5 TWh, which could have significant associated costs.*
5. *The findings for demand for cooling must be considered in context with the impact of climate change on demand for heating (BE9 in the Built Environment Sector), which is projected to reduce by approximately 15% by the 2020s, 25% by the 2050s and 40% by the*

2080s (for the p50 medium emissions scenario). These reductions would have associated economic benefits.

6. *Increases in temperature are expected to reduce the capacity of the electricity networks since in high temperatures certain types of equipment must be "de-rated" (i.e. the amount of current carried must be reduced). De-rating is part of a wider issue since the network experiences approximately 1.5-2% load growth per year and this may increase substantially if the transport system or heating becomes dependent on electricity.*
7. *Weather sensitivities are routinely taken into account in the energy sector, in order to plan maintenance or ensure sufficient contractors are available during large weather events (for example snow or gales). While this does not always specifically include considerations of the impacts of climate change, it provides a good basis upon which such considerations can now be made.*

15.24 In specific reference to anticipated potential climate change impacts for the energy sector in Northern Ireland, the regional CCRA examined:

- Disruption caused by increased flooding;
- Effects of heat on the transmission and distribution network;
- Costs and disruption from international suppliers;
- Water availability for power generation; and
- Changes in demand, particularly for heating and cooling.

15.25 These could have indirect consequences for those suffering from fuel poverty, should energy prices increase as a result.

15.26 As noted in the Regional CCRA, other climate change consequences for the energy sector, such as heat related damage or disruption, power station cooling and turbine efficiency, were not considered high priority for Northern Ireland.

15.27 As of 2012, Northern Ireland has three major electricity generating stations: Ballylumford and Coolkerragh, which are gas fired, and Kilroot, which is coal and oil fired. Currently, approximately 6% of power generation in Northern Ireland is from renewable sources (nearly all of this is wind generated) and the target is for this to increase to 40% by 2020, coupled with an overall energy consumption reduction of 1% per annum.

15.28 As noted in the Northern Ireland CCRA, the potential impacts on the energy sector in Northern Ireland are considered in turn (with text from CCRA report in italics), along with consideration of how operation of the proposed development will interact with this issue as follows:

Flooding

15.29 All of the main electricity generating stations are located on the coast. As noted in the Northern Ireland CCRA only one of these (Coolkeeragh) is in the floodplain. However, the vulnerability of all 18 electricity substations to flooding is currently unknown.

15.30 In relation to the proposed development, it is considered that potential flooding is not an issue at the application site and, as such, is not considered further. This issue is considered in detail in Chapter 7 of this ES.

Transmission and distribution

15.31 Northern Ireland has an aging transmission infrastructure, especially in the west and north, with a predominance of overhead transmission. Elements of the transmission and distribution network are over 30 years old. These are less likely to be affected by flooding, but increases in temperature could affect the efficiency of electrical transmission and distribution systems resulting in the de-rating of equipment and reduction in capacity. This in turn would mean that it would be more costly for the supplier to deliver the same amount of energy to customers and these costs would at least in part be passed on to the customers. Network capacity losses due to de-rating of overhead power lines are projected to be between 1% and 5% by the 2080s for the transmission network and between 1% and 19% by the 2080s for the distribution network, across the UK. Regional projections, however, suggest that relatively small percentage change would occur in Northern Ireland (Energy Sector Report).

15.32 As noted above, it is considered that this issue is less likely to be a major problem in Northern Ireland than the rest of the UK and while the proposed development will be a modern energy generation facility that will feed into the transmission and distribution network.

Reliance on International Fossil Fuels

15.33 Currently Northern Ireland's main power stations are reliant on imported fossil fuels. The future viability of this supply may be affected by future global and local impacts of climate change and this represents an area where further research is required. Northern Ireland is at 'the end of the pipeline' in Europe for natural gas, and would be affected by disruption of the gas supply from countries such as Russia. This is compounded by the lack of gas storage available in Northern Ireland. The international energy market is changing as reserves (such as those in the North Sea) are being depleted and greater reliance is being put onto a smaller number of large reserves.

15.34 This is resulting in longer supply chains and the longer the supply chain, the greater the vulnerability of that supply chain to disruption and associated cost implications (either derived from increased operational costs or market forces). Examples of disruption caused by climate change include the thawing of permafrost impacting on trans- Russian and trans-Alaskan pipelines. In the future, this may affect the prices and security of UK energy and fuel imports (Foresight, 2011).

15.35 The development of an EfW facility at Hightown will lead to a strengthening of the energy mix within Northern Ireland. In essence, the use of waste as a fuel represents an indigenous fuel source. As such, from this aspect, the proposed development represents a benefit to the region as the proposed development would help reduce the dependence on imported fossil fuels and contribute to making Northern Ireland less vulnerable to supply chain disruption.

Water for Cooling

15.36 Water is required for cooling of power stations. If temperatures rise, the amount of water required for power station cooling would change as the water becomes warmer.

15.37 More water would be needed to achieve the same amount of cooling. If water quantities were not increased, there would be a reduction in generation capacity. As all of Northern Ireland's power stations are on the coast, this would mean that there would be an increase in demand for water from the sea or estuaries, rather than inland sources. Therefore, the consequences of this will be limited to within energy sector and not affect the water sector.

15.38 The proposed development is not located in a coastal area and the EfW facility is equipped with an air-cooled condenser unit which utilises air for cooling. It will therefore not be able to utilise sea water for cooling purposes. It is the intention that all water supplied to the proposed development will be from the NI Water supply network. NI Water has confirmed that there is the capacity within the water supply network to supply the proposed development, albeit with some upgrades to the infrastructure required (see Sections 7 and 17 for more detail).

15.39 In terms of sourcing the water, NI Water carry out regular comprehensive reviews of their water supply requirements which includes issues such as where water will be sourced (Water Resource Management Plans) and these reviews are subject to environmental (including a changing climate) considerations (through the Strategic Environmental Assessment process). As such the issue of water supply for the proposed development and how this may be impacted by a changing climate will be regularly considered as part of the wider NI Water review of water supply within Northern Ireland.

15.40 The live steam flows from the steam generator (in the EfW) to the turbine will be utilised to generate electrical power efficiently. A multi-stage turbine converts the steam energy into rotational energy driving the generator for electrical power generation. A small quantity of steam will be extracted from the turbine to be used for the internal air preheating and for the heating of the feedwater. Building heating and hot water supply to the MBT is also supplied from this point. No further heat extraction for export is identified at this stage though investigations are on-going to identify possible Heat Off-Takes in the Hightown area. When the expanded steam leaves the turbine it is condensed in the air-cooled condenser and then flows to the main condensate tank.

15.41 Some processes have to be cooled. This includes, for example, cameras for the combustion chamber monitoring, sampling points for the steam and water, as well as turbine and generator oil coolers. A closed circuit cooling system collects the transferred heat and transports the

warm cooling water to the heat exchangers. The residual heat in the cooling circuit is reduced in air-cooled heat exchangers and fed to the respective cooling locations.

Demand

15.42 If temperatures rise, the demand for energy to provide cooling (for air conditioning of homes, offices, factories, ICT, etc.) may increase, although this is unlikely to be significant for Northern Ireland based on projections for cooling degree days. Actual future cooling demand is also likely to be highly dependent on a number of other factors, including the extent of future uptake of cooling systems and changes in building design (although the scale of this is limited by the turnover in building stock). In turn, these factors will be influenced by the measures taken to achieve a low carbon future and economic growth.

15.43 Currently the total demand for electricity is much higher in the winter than the summer due to heating and lighting requirements. Projections of future demand for electricity in Northern Ireland were not determined due to lack of data. Analysis for Great Britain indicated that winter demand would continue to be higher than summer demand and this is also likely to be the case for Northern Ireland. Based on projections for heating degree days, however, a significant reduction in total energy demand for heating is anticipated for Northern Ireland by the end of this century.

15.44 Some of the projections related to energy supply are uncertain because of the current transition to a low carbon economy, both in terms of generation and demand. Northern Ireland has a particularly large potential for onshore and offshore wind energy generation. A large shift in types and locations of power generation and, hence, transmission grid, may alter the scale and source of climate change impacts for the energy sector.

15.45 As noted above, projections for future energy demand in Northern Ireland were not determined due to a lack of data. It is therefore not clear at present how the proposed development will interact with demand in terms of climate change. It is worth noting that as described in the Northern Ireland Greenhouse Gas Emissions report (February 2011) it is expected that the contribution of the energy sector to greenhouse gas emissions within Northern Ireland will decrease. This is partly due to an increase in the renewable energy sector e.g. wind turbines. One aspect of onshore wind generation is that output is vulnerable to changes in weather. It is anticipated that the proposed development would represent an increase in security of supply over renewable energy in the event of a changing climate in that the proposed development will be less vulnerable to changes in weather patterns e.g. decrease in wind. Therefore the proposed development could represent a more reliant source of energy.

Identified Challenges to the Waste Sector from a Changing Climate

15.46 Within the Northern Ireland Regional CCRA, note is made of the identified challenges to the Waste Sector from a changing climate and it is worth quoting this at length (as follows in italics):

15.47 The effect of climate change on waste disposal practices was also raised as an important issue by Northern Ireland stakeholders, with respect to:

- Leachate production, land degradation and composition;
- Flooding of site facilities;
- Vermin, odour, litter and dust;
- Pathogen activity;
- Subsidence and slope instability at landfills; and
- Types of flora and fauna covering or around facilities and choice of ecological communities used to restore landfill sites.

15.48 Climate change is set to have an impact on waste management within Northern Ireland. Northern Ireland's ten landfill sites are likely to remain operational for 30-40 years and stay biologically active for a further 60-70 years, allowing projected climate changes to have a large impact on landfill waste.

15.49 With an increase in summer temperatures and a decrease in precipitation, it is likely that landfill sites will produce more dust and a greater odour. As many landfill sites are located in close proximity to housing, there could be an impact on the local community.

15.50 Additionally, temperature projections indicate a more favourable climate for vermin. The effects of temperature on landfill are complex, but changes in gas production and settlement may occur. Landfill bacteria are temperature dependant therefore a large temperature rise (P90, 2080 scenario) may act to increase the volume of landfill gas produced significantly.

15.51 Projected increases in winter rainfall and heavy rainfall days may have an impact through soaking and dispersing waste awaiting collection, changes in leechate production and concentration and altering the rate of decomposition, affecting the lifetime of the site.

15.52 Additionally, increased flooding through rainfall events can disrupt the infrastructure causing delays in waste collection and dispersing pollutants. Capping layers and bunds may be eroded and slope stability may be affected, increasing the chance of materials and pollutants being washed off site.

15.53 In relation to the proposed development, clearly the amount of waste going to landfill would be reduced substantially and as such some of the anticipated impacts on the waste sector from a changing climate will be ameliorated – for example the potential changes in gas production, or the potential changes to odour. It is also the case that the proposed modern waste management facility will reduce the potential for an increase in pests, or at least make these easier to control than at an open landfill site. The proposed facility will also not require any capping layers or bunding that could potentially be impacted by a changing climate as noted in the Regional CCRA.

15.54 However, note that some potential impacts from a changing climate on waste disposal activities will remain no matter what choice of disposal route is utilised – for example any potential impacts on collection will remain.

Other Interactions of the Operation of the Proposed Development with a Changing Climate

15.55 In addition to the interactions described above with the identified challenges to the energy and waste sectors from a changing climate it is recognised that operation of the proposed development may in itself contribute to a changing climate through the generation of greenhouse gases.

15.56 In order to assess the impact of the proposed project on the environment the Environment Agency's WRATE tool has been used to quantify the amount of Greenhouse gases emitted, as well as other key environmental indicators.

15.57 WRATE stands for Waste and Resources Assessment Tool for the Environment. It is a Life Cycle Assessment (LCA) tool developed specifically for calculating the environmental impacts of waste management systems.

15.58 WRATE allows the environmental impacts of the waste management systems to be assessed over the life-cycle of all of the material, collection, treatment technology and transport elements. By using a combination of the default data in the model's databases and project specific data an overall assessment of the net benefits of the proposed solution versus the 'baseline' of send to landfill can be established. The WRATE Study is included in Appendix 15.1.

15.59 Overall the environmental performance of the modelled system shows a considerable benefit to the environment for all of the critical indicators, i.e. Global Warming Potential, Human Health, Acidification, Eutrophication, Resource Depletion and Aquatic Ecotoxicology.

15.60 Global Warning Potential (GWP) Greenhouse gases are chemicals which absorb energy in the form of light and re-emit it in the form of heat. They are believed to be responsible for the rise in atmospheric temperatures in the industrial era (mainly due to carbon dioxide) by trapping energy from the sun in the atmosphere which would otherwise escape into space. The potential for various chemicals to do this varies considerably, such as methane which is 23 times more potent than the standard comparator, carbon dioxide.

15.61 The table overleaf is an extract from the WRATE Study and shows, by constructing the MBT and EfW facilities, an overall net benefit of approximately 57,474 tonnes CO2-Eq per annum, and an actual net benefit to the environment of 9,764 tonnes approximately per annum when compared against the baseline of sending the waste to landfill.

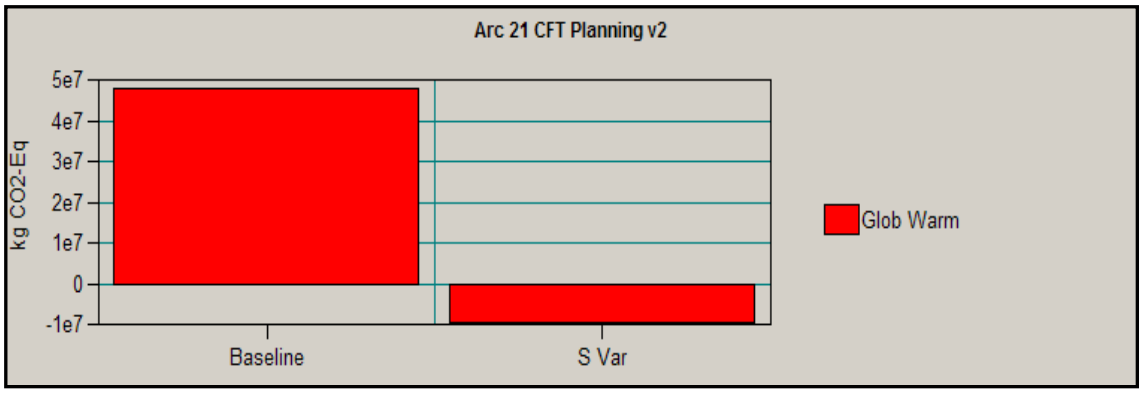

Fig 15.1 GWP (100) Results from WRATE Study

15.62 The Northern Ireland Greenhouse Gas Emissions Reduction report (February 2011) notes that the landfilling of waste accounted for 92% of Greenhouse Gas Emissions from the waste sector. As mentioned above converting the waste to energy would substantially reduce the need for landfill and will lead to a reduction in the amount of gases such as methane being produced which would also have the impact of reducing greenhouse gas emissions.

Construction of the Development and a Changing Climate

15.63 The proposed development may contribute marginally to emissions of greenhouse gases during the construction period (see Chapter 14) but these will be vastly outweighed by the net benefits to the environment of the final scheme which will divert waste from landfill.

15.64 It is difficult to be precise as to the machinery to be used as this is determined by the appointed contractor(s), but it is likely to include at least the following: cranes, hydraulic excavators, dumper trucks, tracked bulldozers, generators, cement mixing equipment, fork lift trucks and piling machinery. There would also be refuelling equipment (bowsers) and various goods vehicles (including HGVs) and staff vehicles (private cars and mini-buses).

15.65 There are numerous mitigation measures which can be taken to reduce the level of contribution to a changing climate from this proposed scheme or which will help the proposed development and the surrounding area adapt more readily to a changing climate.

15.66 Many of these mitigation measures are detailed in the relevant sections of this Environmental Statement. For example, in Chapter 13 ‘Noise’ there are recommendations that machinery is well maintained and switched off when not in use in order to reduce noise impacts. This will have the added benefit of reducing fuel consumption and emissions and thereby reduce the contribution to a changing climate.

15.67 Similarly the use of Sustainable Drainage Systems (SuDS) as detailed in Chapter 7 ‘The Water Environment’ would aid adaptation to climate change by enabling peaks to be removed from run-off profiles compared to conventional drainage systems and storage structures (conventional systems could potentially experience failure with climate change, particularly during wetter winter months). The use of SuDS provides an opportunity to reduce the impact of increased rainfall by managing flows within the site and reducing peaks in forward flows downstream.

15.68 The detailed design of the scheme will also be critical in reducing the contribution to climate change from the proposed development, as well as making it more adaptable to a changing climate. For example, the buildings on site will be designed and constructed in accordance with the latest building regulations. These regulations are increasingly cognisant of the issue of climate change and for example increasingly encourage further the conservation of fuel and energy.

15.69 In addition to the mitigation measures detailed within this Environmental Statement an Environmental Management Plan (EMP) has been developed. This EMP covers issues during the construction stage which will reduce the contribution of the scheme to climate change. For example, the EMP encourages the careful use of resources (including fuel) and material, encourage a reduction in waste and encourage materials to be procured from sustainable sources.

15.70 As part of the EMP, it is suggested that any contractor working on this project should actively try and reduce their energy consumption / carbon footprint from construction activities.

Summary

15.71 The development of the proposed residual waste management facility at Hightown Quarry will strengthen the energy mix in Northern Ireland by generating electricity from the waste process. In generating electricity and providing a longer term potential heat off-take from the site to serve businesses and future housing the overall development makes an important contribution towards reducing dependence on fossil fuels.

15.72 The WRATE assessment that has been prepared calculates the environmental performance for the proposed waste management facility and enables this to be compared with the existing practice of directing the majority of waste to landfill.

15.73 The results of this demonstrate a considerable benefit across a range of critical indicators including global warming potential, human health, acidification, eutrophication, resource depletion and aquatic ecotoxicology.

15.74 Further contributions can be made from the environmental management practices that are put in place during the construction phase.

15.75 It is considered that the proposed development will make a significant long-term beneficial contribution to climate change when compared to the current waste management practices in the arc21 region.