WITNESS STATEMENT

1. EXPERIENCE AND QUALIFICATIONS

My name is Ria Lyden. I am an Associate Director of Arup Consulting Engineers.

I have a Bachelor of Engineering Degree in Civil Engineering and a Master of Business Administration Degree. Both degrees are from University College Cork. I am a Chartered Engineer. I am a Fellow of the Institution of Engineers of Ireland and a member of the Institution of Structural Engineers. I have worked as a civil and environmental engineer for 26 years.

Since 1992 I have prepared, or supervised the preparation of numerous environmental impact statements for a wide range of industrial, infrastructure, institutional, commercial and residential projects.

2. INTRODUCTION

Arup Consulting Engineers were the main consultants to Elsam Dublin Waste to Energy Ltd, now DONG Energy, for the preparation of the EIS and waste licence application, on behalf of Dublin City Council, for the Dublin waste to energy project.

Arup prepared chapter 19 of the EIS, Sustainability.

The purpose of my evidence today is to provide a summary of the approach adopted in the EIS to address the sustainability of the waste to energy project and outline the main findings.

3. SUSTAINABILITY

The Planning and Development Act 2000 requires that development must be consistent with "*proper planning and sustainable development*". The widely accepted definition of sustainable development, on which chapter 19 of the EIS was based, is that outlined in the World Commission on Environment and Development report "Our Common Future" (1987), that "humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs".

Sustainable development is not a fixed state of harmony, but rather a "process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are made consistent with future as well as present needs" (ibid). Within this context, the sustainability of the proposed waste to energy project was assessed.

4. APPROACH TO ASSESSMENT OF SUSTAINABILITY

Sustainability was addressed at two levels in the EIS – the macro level and micro level. On the macro level, the sustainability of waste to energy as a process was addressed at policy level, in relation to national, regional and local plans and policies for development in general, waste management and renewable energy. These issues were addressed in chapter 3 of the EIS. The sustainability of siting a waste to energy facility on the Poolbeg site was addressed in chapter 4. Evidence has already been presented to the oral hearing on these issues. Chapter 19 addresses sustainability at the micro level, in relation to the specifics of the proposed waste to energy facility currently before An Bord Pleanála for consideration.

Buildings and their components can have considerable environmental impact, for example through operational energy, transportation of people between them, raw materials consumed by the building, and the use of land. They also perform important economic and social functions, and can make a significant contribution to quality of life.

The BRE (Building Research Establishment) Centre for Sustainable Construction published a Digest in 2000, "Digest 446 Assessing Environmental Impacts of Construction", which sought to account for, not just environmental issues, but also the economic and social aspects of sustainability relevant to construction. Based on wide-ranging consultation, a range of issues was identified, and assigned a percentage weighting, derived from perceived importance assigned by the expert panels constituted by the BRE.

This BRE Digest has been used as a framework or check list under which the many aspects of the sustainability of the project were addressed.

There are other, very detailed approaches to sustainability assessment such as the BRE's Environmental Assessment Method, 'BREAM', and a number of proprietary methods such as Arup's 'SPEAR' assessment tool. These were considered not to be appropriate for the EIS stage of the Dublin WTE project.

5. THEMES AND SUB-THEMES

The issues identified in the BRE digest as relevant to sustainability are categorised into three themes: environmental, economic and social. The environmental sub-themes are global, local and site issues and internal environment. Economic sub-themes include construction, materials, building stock and infrastructure. The social sub-themes are equity and community. The themes, sub-themes and issues are listed in Table 1 below.

The BRE study used panels of professionals from across the industry to judge the weight of each of the sustainability issues. The method of calculating the results of the weighting exercise proved effective in impartially determining the consensus view within and between groups. Accordingly the results shown in Table 1 are considered meaningful for comparisons of the environmental, social and economic themes of sustainability, and for evaluation of the issues within each of these themes.

Table 1 Average Allocations of Importance to Sub-themes and Issues

THEME	SUB-THEME	Issue	Weighting
1. Environment	1.1 Global Issues	Climate Change	8.4
		Habitats and Ecosystems	3.9
		Fossil Fuel Depletion	2.0
		Ozone Depletion	1.8
		Toxic Air Pollution	1.4
		Marine Water Pollution	1.2
		Acid Deposition	1.1
	1.2 Local and Site Issues	Transport Pollution and Congestion	3.5
		Habitats and Ecosystems	2.7
		Local Air Pollution	2.6
		Waste Recycling	1.8

THEME	SUB-THEME	Issue		Weighting
		Water Pollution		1.7
		Waste Disposal		1.4
		Contaminated Land		1.2
		Noise Pollution		1.2
		Water Extraction		1.2
		Minerals Extraction		0.8
		Fossil Fuel Extraction		0.7
		Forestry		0.6
		Farming		0.4
		Dust Pollution		0.2
	1.3 Internal Environment	Health		2.6
		Comfort		1.2
2. Economy	2.1 Construction	Employment		3.3
		Refurbishment		2.5
		Profitability		2.3
		Maintenance and Repair		2.1
		Productivity		1.4
		New Build		1.2
		Overseas competitiveness		0.8
	2.2 Construction Materials	Employment		2.6
		Profitability		2.2
		Product Value		2.0
		Productivity		1.4
		Overseas competitiveness		1.2
	2.3 Infrastructure	Energy and Water		2.7
		Telecommunications		1.7
	2.4 Building Stock	Stock Value	Housing	1.7
			Industrial	1.4
			Commercial	1.4
			Other	0.3
3. Social	3.1 Equity	Social Exclusion	Employment	5.6
			Education	3.2
			Security	2.3

THEME	SUB-THEME	Issue		Weighting
			Affordable Housing	1.6
			Healthy Housing	1.6
			Transport	1.0
			Worship	0.2
	3.2 Community	Urban	Identity stewardship	2.5
			Integration	1.4
			Consultation	0.7
		Transport	Cities	1.4
		Town and rural communications		2.7

5.1 Environment

5.1.1 Global Issues

Climate Change

Climate change is given a weighting of 8.4% in Table 1, and is therefore the global issue considered most relevant to construction. Increasing levels of greenhouse gases (GHGs) have been linked with changes in climate and global warming. Dr Edward Porter has given detailed evidence in this regard.

Habitats and Eco-systems

Habitats and eco-systems are given a weighting of 3.9% in Table 11. Adjacent to the eastern border of the site is the Irishtown Park which is classed under the Docklands Area Master Plan as a Natural Habitat Area. This is a classification of terrestrial ecological importance. Dublin Bay contains a number of designated conservation sites including Special Areas of Conservation (SAC) and Special Protection Areas (SPA). Ms Eleanor Mayes has given detailed evidence in this regard. Development of the site will have to be in the context of the ecological and amenity importance of the area. Measures to minimise impacts on habitats and ecosystems are detailed in Chapters 14 and 15 and have been further elaborated upon in evidence to this hearing by Ms Eleanor Mayes and by Mr Chris Emblow.

Fossil Fuel Depletion

Fossil Fuel Depletion is given a weighting of 2.0 in Table 1. The combustion of 600,000 tonnes of waste will generate a net power output of approximately 60MWe which will be supplied to the National Grid. This is equivalent to the typical power requirement of circa 50,000 houses and will give a direct benefit in terms of GHG emissions which would have been released in the production of 60MWe from power stations. If the waste to energy facility was to be operated fully on gas oil it would require approximately 20 tonnes of gas oil (diesel) per hour in order to generate 60 MWe of electricity.

Diesel oil will be used as an auxiliary fuel for start-up, support burners and for the emergency diesel generator. The annual auxiliary fuel requirement is expected to be less than 1500 tonnes/year.

As Dublin is at the development stage in terms of district heating networks the waste to energy facility has been primarily designed to optimise power output. The design thus results in a net power output of 60MWe. However, the site is close to the potential location for a district heating system in the docklands of Dublin so there may be an opportunity in the future to facilitate the future supply of

district heating. The facility will thus be constructed with built in provisions for the supply of district heating to the city of Dublin should a future district heating scheme come into place. District heating is detailed further in Section 5 of the EIS and has been elaborated upon in evidence given by Mr Olivier Galliot at the oral hearing.

Reducing energy that will be consumed during the life of the development has been a priority through the design process. This ensures that a maximum net power output is achieved. The waste to energy facility has been designed and optimised to achieve a very high overall energy efficiency and energy recovery, taking into account the techno-economic feasibility and the availability of users for the energy recovered. The measures proposed for minimising energy use and maximising energy recovery, are detailed in Section 5 and include:

1. Optimising furnace and boiler geometry so as to improve combustion performance.
2. Optimising combustion air injection so as to improve combustion performance.
3. Insulating the boiler adequately to insure that additional heat will be transferred for energy recovery and adequate heat will be retained in the furnace.
4. The boiler, which will transfer the flue gas energy for production of steam, will have a thermal conversion efficiency of at least 80%.
5. The condenser pressure is minimised using cooling water thus securing a higher electrical efficiency to that obtained with air-cooled condensers and/or wet cooling towers.
6. The in-house energy demand has been reduced to the widest possible extent. This includes the following:
7. Flue gas treatment systems are designed and ordered in such a way that flue gas reheating is avoided.
8. Use of primary fuels is limited to the consumption of the auxiliary burners

Ozone depletion, toxic air pollution and acid deposition

Ozone depletion, toxic air pollution and acid deposition are given a weighting of 1.8%, 1.4% 1.1% respectively in Table 1. These issues are dealt with in detail in Chapter 8. In summary, all substances which will be emitted from the proposed facility will be at levels that are well below even the most stringent ambient air quality standards and guidelines. Dr Edward Porter has provided further detailed evidence to this hearing to ensure that An Bord Pleanála has the most up-to-date data available to it.

Water Pollution

Marine Water Pollution is given a weighting of 1.2% in Table 1. The only substance to be emitted to waters will be cooling water, with biocide added. This is discussed in detail in Chapter 12 and has been elaborated upon in evidence given by Mr Hans Jacob Vested and Dr Dorte Rasmussen at this hearing.

5.1.2 Local and Site Issues

Many of these issues overlap with topics covered elsewhere in this EIS. Potential for pollution to air, water, land, and in the form of noise and dust is already described, in chapters 8, 9, 10, 11 and 12, with mitigation measures proposed as appropriate. Impacts on habitats and ecosystems are dealt with in chapters 14 and 15 whilst archaeological, architectural and cultural heritage is dealt with in chapter 16. In each case, efforts have been made to minimise the impacts, emissions and waste that will be generated by the facility.

Transport Pollution and Congestion

Transport Pollution and Congestion are given a weighting of 3.5% in Table 1 whilst Local Air Pollution is giving a weighting of 2.6%. Transport is dealt with in Chapter 7 and the atmospheric emissions resulting from traffic is dealt with in Chapter 8.

Waste recycling and waste disposal

Waste recycling and waste disposal are given a weighting of 1.8% and 1.4% respectively. The waste to energy facility will divert 600,000 tonnes of waste from landfill and the net electrical output from the plant for export to the national grid will be 60MW. Waste to energy will be the preferred residual waste treatment option and waste still requiring landfill at this stage will comprise residual waste in excess of the capacity of the plant, plus other non-combustible residues.

Approximately 147,000 tonnes of residues (bottom ash, boiler ash and flue gas residues) will arise during the operation of the facility. Reuse and disposal of these residues is dealt with in Chapter 10. In each case, efforts have been made to minimise the emissions arising from the residues and to ensure best practice is applied in their treatment and disposal.

80% of the residues from waste incineration will be bottom ash. This can be used in road construction or as railway ballast, following treatment in an ash recycling plant in place of virgin aggregates. It is expected, based on experience elsewhere in Europe, that the boiler ash will be non-hazardous. It may be incorporated with bottom ash and reused.

Flue gas treatment residues will be classified as hazardous waste for disposal but may be recovered as backfill material for disused mines. Mr Claus Nørgaard has given evidence to this hearing of proposals in this regard.

The facility will also recover and recycle ferrous materials during the bottom ash treatment process. The recycling of metals will require less energy than processes using virgin inputs and thus lead to a direct saving in energy and thus GHG emissions.

Water Pollution

Water Pollution is given a rating of 1.7% in Table 1. Impacts on the surrounding marine environment arising from cooling water discharges and biocide discharge and are discussed further in Chapters 12 and 15. In summary, procedures will be put in place to monitor and to control emissions to the sea. Detailed evidence has been provided to An Bord Pleanála by Mr Chris Emblow, Ms Eleanor Mayes and by Mr Hans Jacob Vested and Dr Dorte Rasmussen.

Approximately 250,000m^3 of water is expected to be consumed annually. The facility will be equipped with a rainwater collection system enabling collection and reuse of rainwater to reduce the consumption of potable water. In addition, the facility will use treated effluent "grey water" from the adjacent municipal sewage treatment plant which alternatively would have been discharged to Dublin Bay.

Light Pollution

The Site will have external lighting at night on standard lighting poles, providing safe and sufficient lighting of the site area. The lighting system will be designed to minimise light spill and light pollution. The stack and main building will be provided with obstacle warning lights, in compliance with the requirements of the Irish Aviation Authority.

Internal Environment

The health and comfort of building users is a key aspect of a sustainable building design. Typical healthy and comfortable interiors are warm and bright, well ventilated, use natural materials and are ergonomically designed. The building interiors will be designed to a high standard.

5.2 Economy

The economic impacts of the proposed development are assessed in Chapter 13 Human Beings. In its construction phase, a profitable business opportunity will be provided for contractors. In operation, it will play an important part of the Waste Management Plan for the Dublin Region for 2005-2010.

Employment

Employment is given a weighting of 3.3% in Table 1. The proposed development will provide employment during construction and operation. The peak construction workforce during construction will number 500. A total of 64 people are expected to be employed at the facility during the operational stage. Details of the economic impact of the project are assessed in Chapter 13 and in Chapter 17 of the EIS.

Construction Materials

Procurement of the materials that will be used during the construction period also has wider economic benefits. Suppliers will profit from contracts to provide materials, and provide employment in fulfilling the contracts.

Infrastructure

The design of the facility has endeavoured to optimise energy and resource use during the operational lifetime of the project. Notwithstanding the benefits of energy and resource efficiency that may be gained by implementing energy conservation measures, the development will provide a net power output of approximately 60MWe. This will be supplied to the National Grid and will therefore provide a valuable power supply.

Building Stock

The development will enhance the existing industrial built assets on the site. It will also be compatible with and complementary to the other land uses of the area, contributing to balanced development, in accordance with the current Dublin City Development Plan.

The building has been designed to a high architectural standard, as a landmark building to improve the general appearance and ambience of the whole Peninsula. Refer to Chapter 6 of this EIS, Landscape and Visual Impact, for further details on the architectural treatment of the building.

The construction materials, methods and design that have been proposed for the development are such that it will have a relatively long useful life, maximising the long-term economic benefit arising from the development.

Property Values

Research into price impacts associated with thermal treatment plants treating non-hazardous waste in Europe indicates that there is no measurable impact on property values, the volume of transactions or the desirability of property in neighbouring locations. Evidence has been given to the oral hearing in this regard.

5.3 Social

Equity

The issue considered to be most important by BRE in their assessment of the environmental impacts of construction, in relation to social equity, is employment. As outlined above, the facility will provide primary employment for up to 500 people during the 36 month construction phase. There will also be wider benefits in secondary employment, for suppliers of materials and suppliers related to the

construction. It is envisaged that up to 64 jobs will be provided when the development is operational and there is also likely to be secondary jobs created in the wider economy in the operational phase.

Community

Dublin City Council recognised the need and importance of public involvement and has been involved in a continuous community information process on the project for last 6 years. Dublin City Council sought involvement from much earlier stage in the process and this is described in chapter 2 of the EIS.

Community Gain

Dublin City Council is planning to implement a community gain initiative, if granted permission for the development. Evidence has been given to the oral hearing on the community gain proposals.

6. CONCLUSION

The assessment indicates that the Dublin WTE project is in accordance with sustainable development objectives and requirements.

6.1 References

Building Research Establishment Centre for Sustainable Construction (2000) Digest 446 'Assessing Environmental Impacts of Construction'

World Commission on Environment and Development (1987) Our Common Future Oxford University Press, Oxford