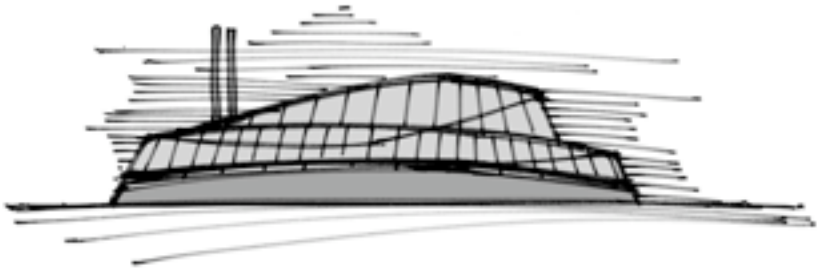
DUBLIN WASTE TO ENERGY

ORAL HEARING

Brief of evidence - architecture

FRIIS & MOLTKE ARCHITECTS, DENMARK



Experience and qualifications

Name:
Jan Fritsdal

Qualifications:
I have a Master of Science in Engineering with specialization in Architecture from Aalborg University, Denmark.

Experience:
I work for the architect company Friis & Moltke A/S, Denmark where I mainly work with competition projects, planning, presentations and digitalization. My role in the Dublin Waste to Energy project is within the design and digitalization of the building.
Currently I am working on the design of a 2 x 800 MW power plant in Greifswald, Germany.

FRIIS & MOLTKE is a modern architect office that has been among the leading firms of Danish architects since it was founded. FRIIS & MOLTKE has been the motive force behind a wide range of architectural projects from single family houses and subsidised accommodation to big, exclusive housing units, and from small public institutions to major planning and building projects that include hospitals, prison, stadiums, industrial facilities, administration buildings, and institutes of education – always with sympathetic insight into the preconditions for the task and the client's needs, based on holistic thinking and simplicity.

Many of FRIIS & MOLTKE's projects originated in architecture competitions won by the firm. Working on competitions is a source of change, new approaches, and professional development, and ensures the constant development of our competences and views of architecture. The results from the drawing office are created through cooperation – both with our clients and at the drawing offices. FRIIS & MOLTKE is active in Denmark and abroad and the firm is currently engaged in projects in Germany, Ireland, Turkey, and Korea.

FRIIS & MOLTKE was founded in 1954 by Knud Friis and Elmar Moltke. Today, FRIIS & MOLTKE is a limited company with 55 employees who work at drawing offices in Århus, Aalborg, and Køge, and is owned by the five partners: Palle Hurwitz, Niels Erik Thomsen, Mikkel Wienberg, Martin Wienberg, and Mogens Husted Kristensen.

Design methodology

The Design methodology describes the work process in regard to the Dublin Waste to Energy project. It was executed in close collaboration with Elsam (now Dong Energy) to develop a strong individual design concept coherent with the technical installations. A number of phases were setup as parameters for the developing design:

Phase 1: Information gathering
Collecting materials to create an overall background for the project. This includes a study of previous designed industrial facilities from our own portfolio such as the incinerator facilities L90 in Esbjerg, Denmark, Incinerator Århus Nord, Denmark, etc . A thorough reading of the "Preliminary Description of Architectural Work" which is the document describing the project and clients functional demands for the plant.
The information forms a basis for an analysis of the expected wished for the contractual client together with engineers from Dong Energy (Elsam).

Phase 2: Site registration and analysis
Visits to the site, the Poolbeg Peninsula and the surroundings for a systematic investigation and registration of the area in relations to issues as orientation, site boundaries, vegetation, access, heights, wind and sun, area characteristics, etc. are

Phase 3: Sketching
In this phase a thorough brainstorm is made in relations to the information gathered in phase 1 & 2. A large number of ideas / concepts / sketches are introduced during the process where the aim is to select one or few proposals for further development.

The purpose is to choose the best solution(s), which fits to the expected wishes for the client in collaboration with the contractor. In this process one solution in the end of phase 3 will be further developed in phase 4.

Phase 4: Specifying the proposal
The chosen proposal is gradually developed within the preliminary description of the architectural work described for the project by the clients' functional demands. Preliminary computer models are represented during the process.

In this phase the following activities are addressed:

- Logistic planning in relations to transportation access in and out of the site as well as internal roads and landscaping, parking areas, weigh bridges, reception facilities etc.
- A plant layout including the technical installations, control room, workshop, container / tank facilities, etc.
- Description and visualization of the architectural aspects including 3D computer visualizations.
- Description of the main choices within building materials.
- Tender description in cooperation with the contractor.

In phase 4 it is possible to switch back to phase 3 if the demands are not fulfilled in the design process.

Phase 5: Completion
Completion of the presentation material as part of the contracts tender material to the client.

Introduction

The following text describes the design process as it applies to the Dublin Waste to Energy facility and provides a response to submissions on the architectural and design aspects of the facility.

The following sections are:

- General design methodology
- Design process as it applies to the Dublin Waste to Energy
- Building treatment
- Mitigation measures considered

Design process – Dublin Waste to Energy

Designing a large-scale industrial compound is an immense task. It is a task that will have a significant visual impact on the surroundings and in this sense important that the visual impact is taken into consideration during the design process.

The Dublin Waste to Energy plant is a very complex building. Each component of the technical system fulfils a certain position in the process of handling the waste treatment - such as the waste bunker, the boilers, flue gas cleaning, turbines etc. It is an absolute advantage to gather the facility as one unit by setting up the installations in a continuous flow. It also eliminates a spaghetti-like setup of numerous tubing combining the different technical installations filling up the entire site similar to what is seen on a refinery.

Two examples of non-sheltered open industrial facilities - 1) AGAC incinerator at Reggio Emilia Italy and 2) Scrubber unit in Iowa, US.

1 

2 

By having several units would also mean that all or most of the units would have to be enclosed in some form of shape, which would add to the cost of façade coverage in comparison to one unit. It would not make the plant smaller, but just spread out the different size units to a bigger area. From these considerations we wanted a simple and understandable structural form.

The Poolbeg Peninsula has a very central position in the Dublin Bay area. The landscape and existing structural development on Poolbeg Peninsula has an industrial character. It is clear that little treatment has been applied to the

landscape and buildings. To change this path it will be important to rethink and refine the nature of new industrial development.

The site boundary is marked with a red line

The overall design measures were to:

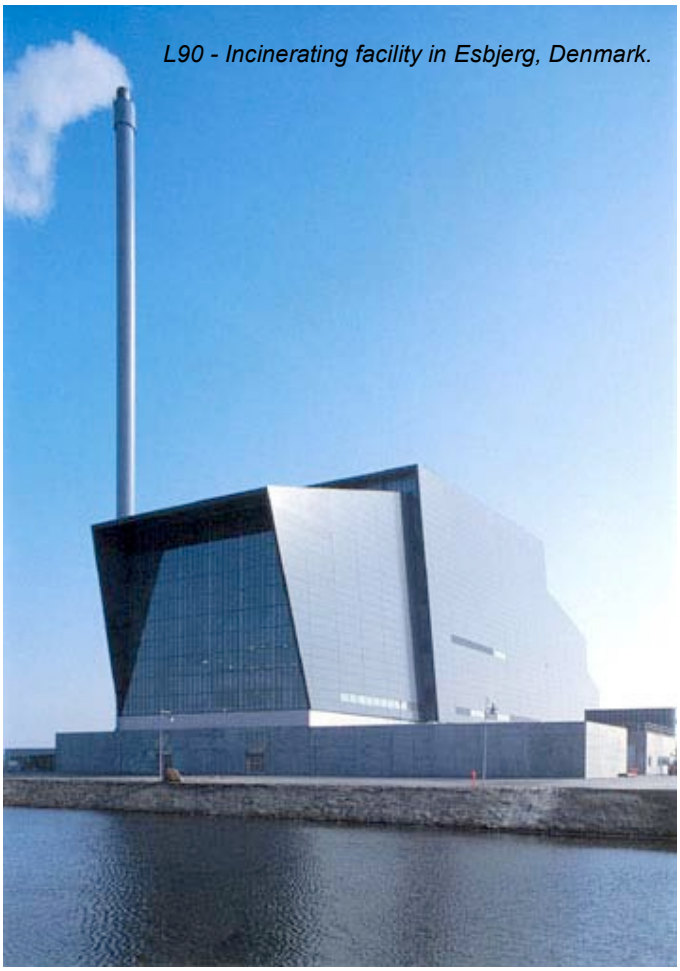
- Create an understandable form, which would have a dynamic expression and at the same time a simple and recognizable shape possible to identify from a distance.
- Minimize the visual impact a facility of this size would have on the surroundings.
- Plan an easy accessibility and flow to and within the site in relations to the employees, Lorries, visitors etc.
- Create a building layout in relations to the technical facilities with good access for the employees working at the facility and at the same time optimize the volume and square meters of the plant.

References to industrial facilities in Denmark

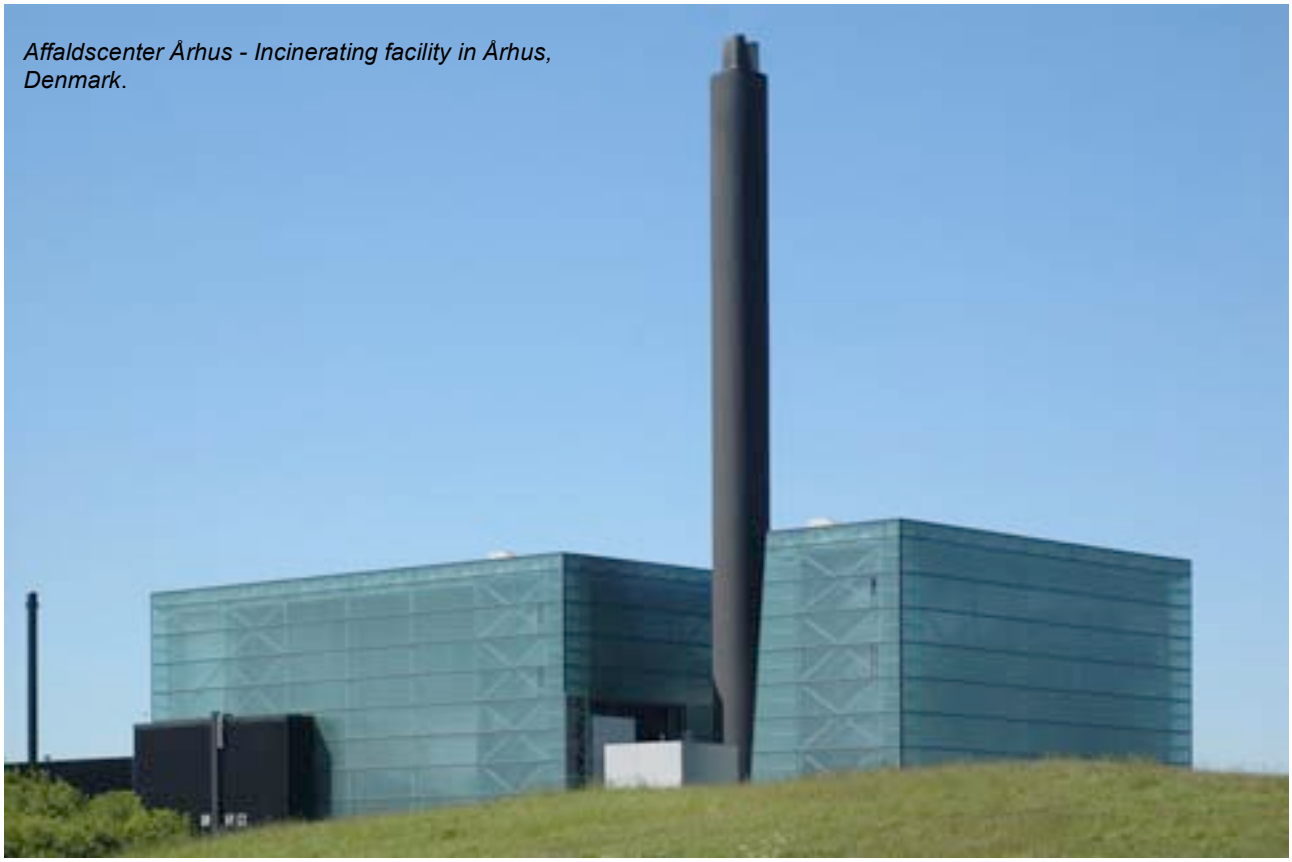
Sønderborg PowerStation

Industrial facilities in Denmark from our own portfolio.

Affaldscenter Århus



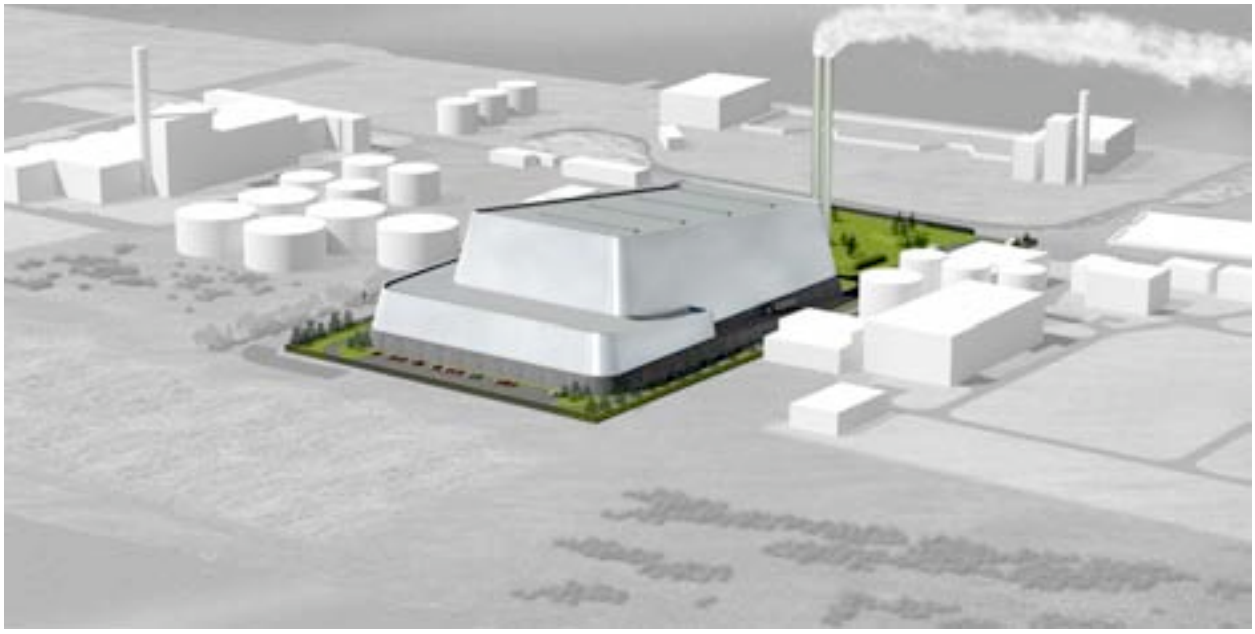
L90 - Incinerating facility in Esbjerg, Denmark.



Affaldscenter Århus - Incinerating facility in Århus, Denmark.

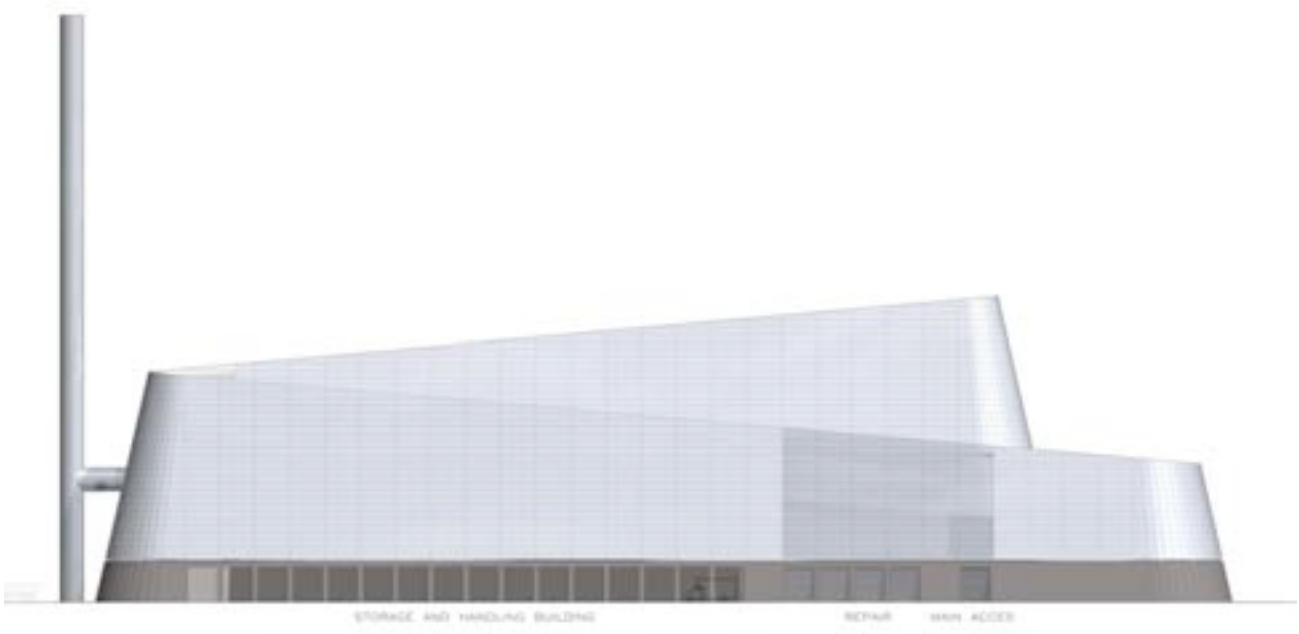
Building treatment

The main building occupies a central position on the site. The design stands a one significant unit enveloping the technical system in a dynamically shaped shell structure. By wrapping a skin around the multifarious technical systems the visual impact of the structure changes into a simple and understandable shape with one strong individual identity.



The base provides anchorage and robustness for the building. It is seven metres in height and among other elements contains an elongated ramp providing for access to and from the waste reception hall.

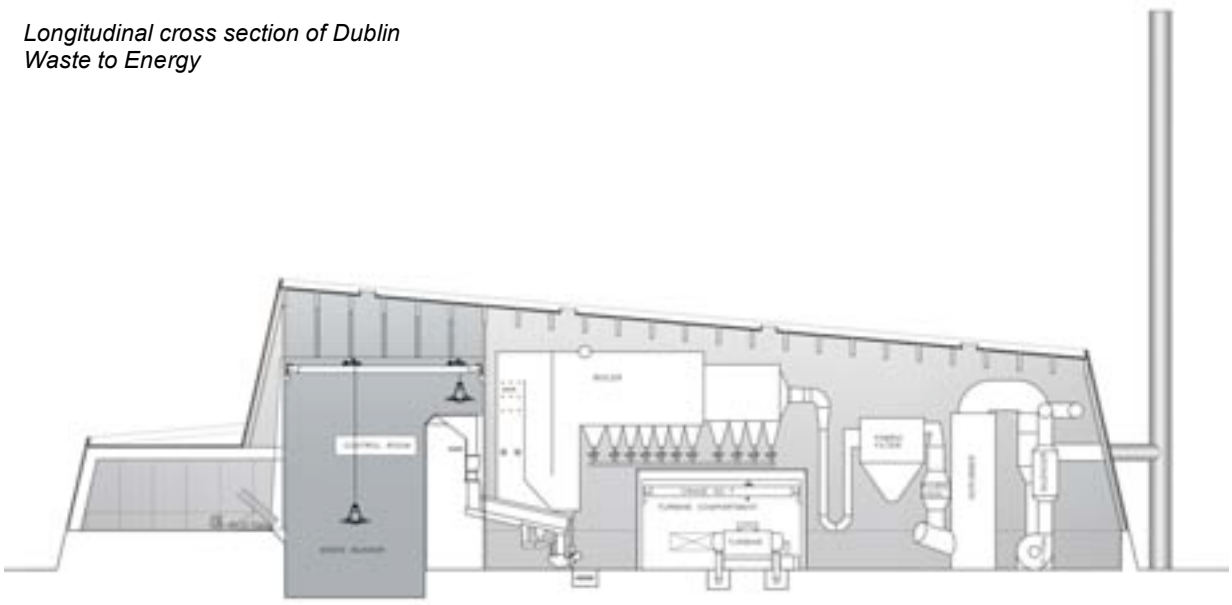
The technical elements include the waste reception hall, waste handling, waste processing activities, boilers, turbines *etc*. together with the various administration and operational elements. While these are internal activities the main technical elements will be illuminated and it will be possible to view such elements through the glazing in the external screen. The control and administration area faces toward the west offering views towards the city.



The screen surrounds the technical plant in an organic; wrap-around manner with characteristic rounded corners and inward-sloping facades. The overall height of the structure is 52m and it provides the building with a contemporary

architectural styling. The screen is designed so that its structural divisions are equipped with distinctive glass areas through which the technical plant can be viewed. In particular, from Pigeon House Road, the large-scale technical flue gas cleaning equipment will be visible through the northern glass façade. In the evening this feature will be of particular note as internal lighting will illuminate the steel structures, walkways, scrubber towers, flue gas ducts *etc*.

Longitudinal cross section of Dublin Waste to Energy



The twin stacks to be located alongside the northern elevation of the proposed building. The stacks are slender and rise to 100m in height – approximately half of the height of the two existing ESB stacks at Poolbeg Generating Station. In operation a plume will be visible from the stacks and the degree of visibility will vary depending on climatic factors, including temperature and wind speed. Plumes and the impact of various climatic conditions of their density and dispersion is a feature associated with the existing stacks at Poolbeg.

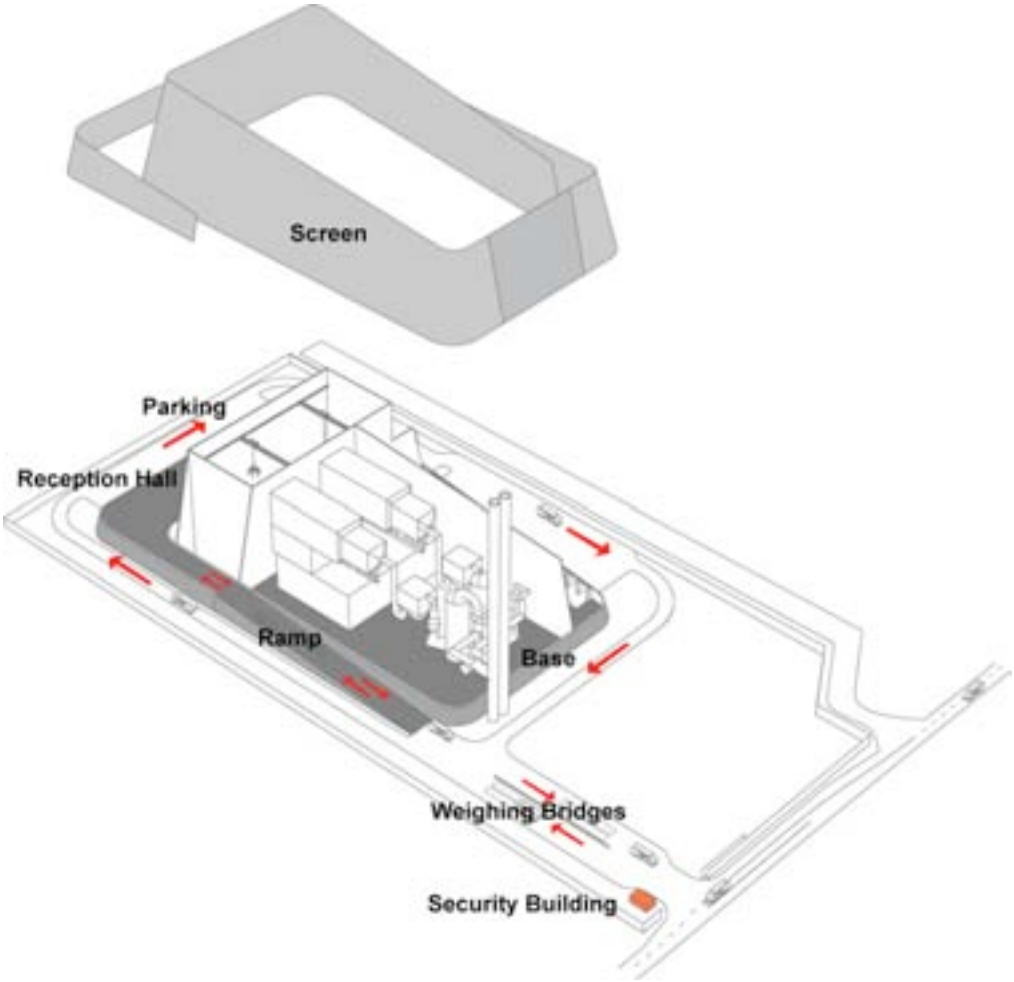
Other elements include an entrance security building, weighbridges, site fencing, landscape berming, planting of mature trees and general landscape works. A pump house is to be located on the northern side of Pigeon House Road. In addition two parallel ‘in-water’ and ‘out-water’ pipes - each approximately 1.0m in diameter - will arch up and over Pigeon House Road at the northeast corner of the site.

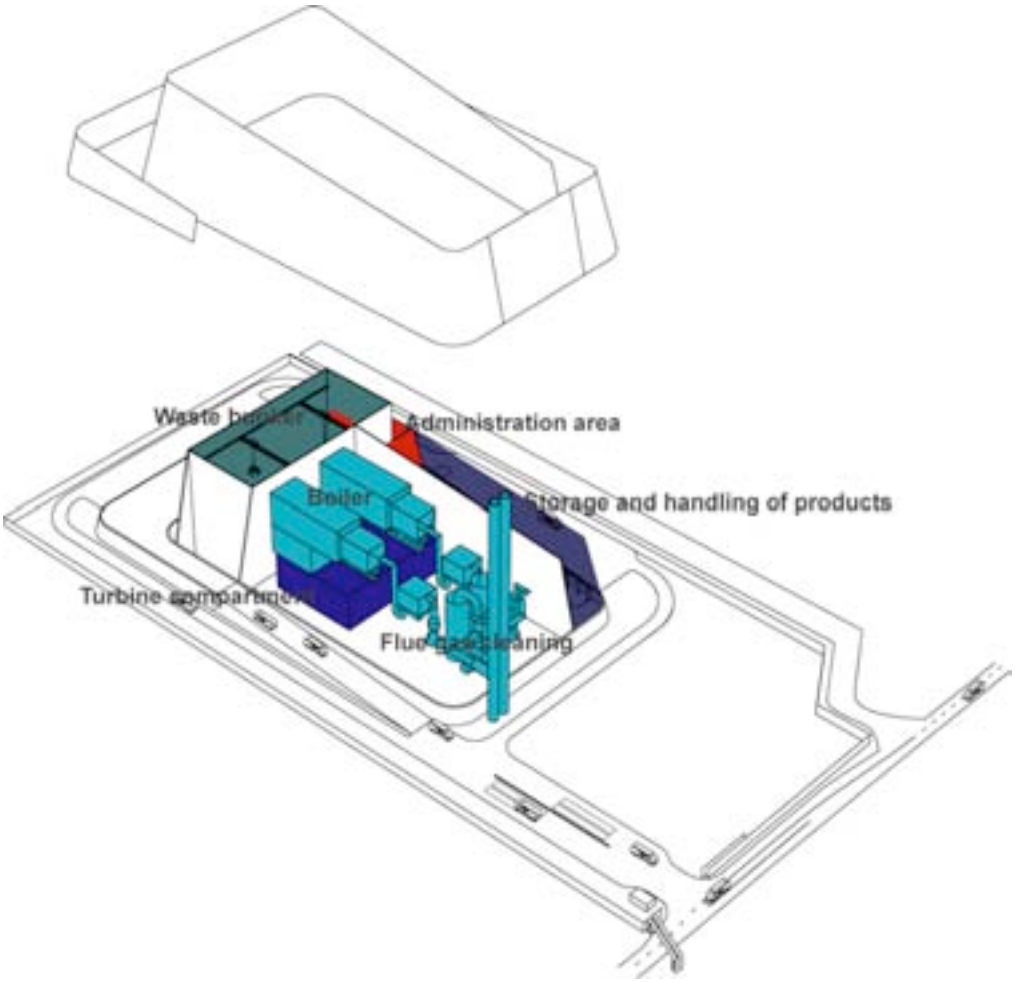
The shell function as a protective shield for the everyday life and long-term run of the plant. The always-changing Irish weather situation will have no damaging effect on the processing plant itself and the employees will be able to move freely around under one roof.

The quality and maintenance of the façade

The base, including all the visible walls in the façade are proposed as dark grey concrete elements providing a clear contrast to the light metal facades of the building screen. The roof covering will be of a greyish colour similar to the facade-colour with a minimum of installations. The majority of plant will be fitted underneath the roof construction except for the fire vents and the access openings for the staff.

The façade material selected at this point in the process is a lacquered metal or aluminium sandwich panel. It is a surface that will not change substantially over time. The colouration should stay the same and the glossiness will over time become slightly more mat. It is important to keep a level of maintenance washing the façade and after 20-30 years apply a new coating. The panels are tested in accordance with the European recommendations for the Sandwich Panels and they meet the requirements of the highest level.


Screen
Parking
Reception Hall
Ramp
Base
Weighing Bridges
Security Building


Waste boiler
Administration area
Boiler
Storage and handling of products
Turbine compartment
Flue gas cleaning

Mitigation measures

The design and layout includes a number of positive elements which relate to:

- Openness – the building is designed to reveal its function rather than hide it. Visibility and openness create insight into and an understanding of the concept ‘waste to energy’.
- Landmark – with its sculptural simplicity the building should differ from the other industrial buildings in the area in original expression. The plant will be visible from large parts of the city of Dublin, but the integrated form will give a positive supplement to the city skyline.
- The surroundings – the building has been orientated on the site in a manner to allow it take into account any future changes in the Poolbeg area. By creating an attractive strong connection from north to south along the site, the development seeks to define a building line and character.
- In terms of landscape restoration, it is proposed to establish a strong visual evergreen screen along the eastern, southern and western boundaries of the site.

The main optimization of the structure has been done in relations to the size of the technical installations and the outer visual impact of the facility.
To trim the structural form, the architectural idea has been investigated by working with 3d modelling. The functionality and setup of the plant roughly describes and dictates the plan layout of the building and thereby also influences the architectural treatment. From this 3d investigation the outer skin – base and shell have been fitted to these requirements;

- To minimize the visual impact of the plant, the façades has been tilting by 13 degrees, which both gives the building a dynamic expression and at the same time minimize the volume and visual impact of the plant.
- The rounded corners ads to the dynamic concept and at the same time lighten up the hardness of the structural design – softening of the hard edges.
- Tilted roof structure. Adapting the roof to fit the size requirements of the technical element such as the boilers, reception hall, the waste bunker and Crain, etc. It also ads to the dynamic shape and minimize the visual impact especially from the south side.
- The colouration of the façade panels in a light grey coloration – lacquered aluminium or something similar tones down the visual impact to the surroundings. The sky average from a blue – light blue and over to white or greyish colorization. The aluminium colour fits these spectra very well in regard as not being a contrast colour, but a colour close to the average colour of the sky. The Façade will also obtain the present days colour because of the light reflection.
- The separation of the shell and base divides the building structure into two items - the heavy anchor and the light shell. The base provides a strong foundation for the plant and movement of heavy vehicles – as a protective wall in regard to the movement of traffic. The shell as the protective shield against the weather and protection of the technical installations. The visual separation also contributes to the dynamic expression of the plant. The separation is a contrast between robustness versus lightness.
- The Pollutant lighting seen at non-encapsulated industrial facility is controlled through glassed areas in the shell.

Illustration of the mitigation measures during the design process

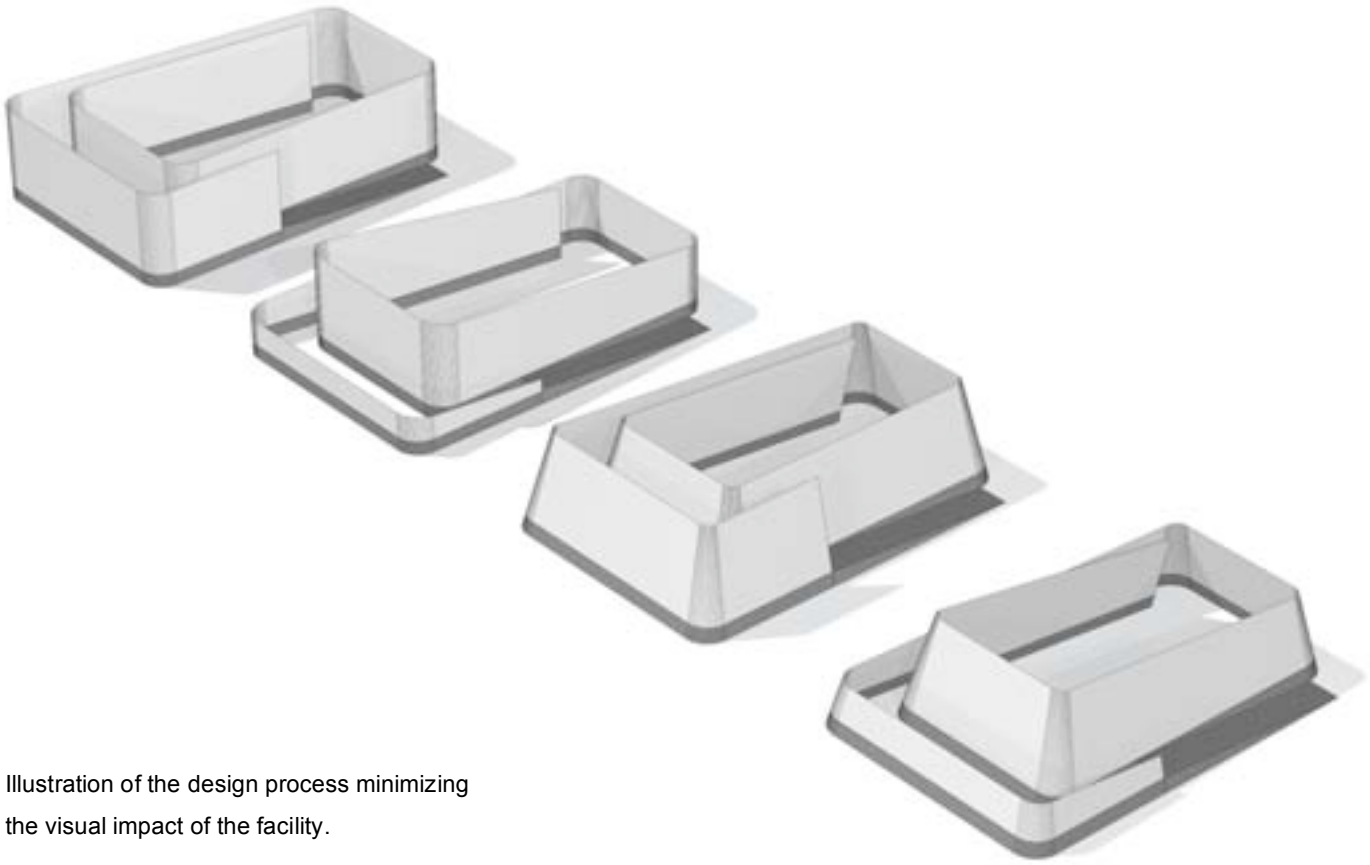
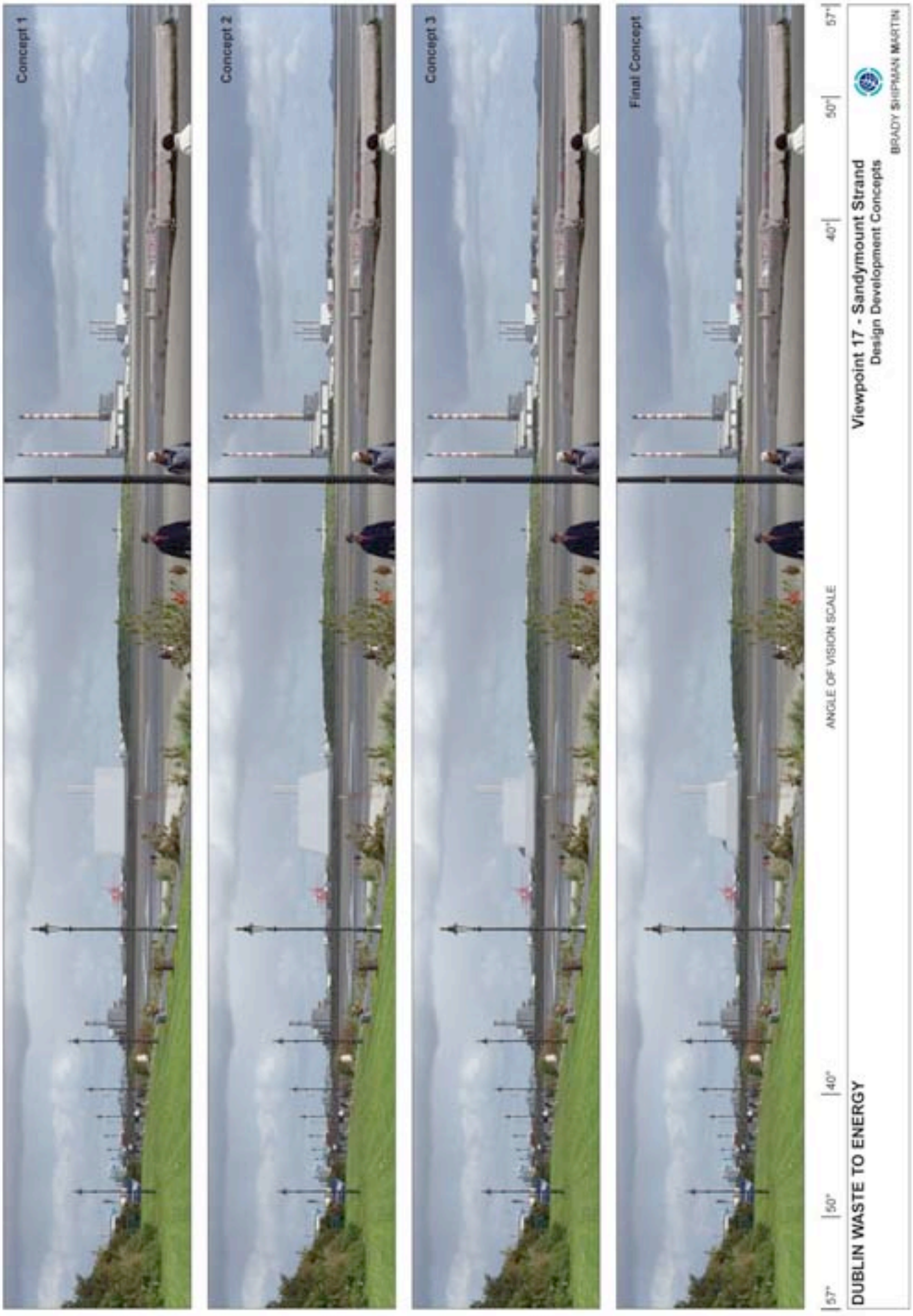


Illustration of the design process minimizing the visual impact of the facility.

The images visualize the design process and how the tilted walls and sloping roof has softened the visual impact and character of the building



Conclusion

The state-of-the-art building utilises the latest technologies in modern materials and will be among the forerunners in advanced industrial buildings. The proposal will show how Industrial facilities can be refined and obtain a strong visual identity. It is important to understand, that good architecture doesn't only apply to concert halls, museums, residential living etc. but also applies to large-scale industrial structures. A large-scale industrial building will have a certain impact on the landscape and viewer and therefore it needs to be treated with respect. Our team of architects have work very hard during the design process to create a building, which has a strong sense of identity and a dynamic expression and at the same time using mitigation measures in dealing with the visual impact.

The proposed development must be viewed as a change in the approach to and character of existing development on the peninsula. While the peninsula has many large and industrial buildings these are obviously functional and form a characterless collection of container stacks, silos, warehouses, *etc*. Against this background the proposed development seeks to enclose the entire waste to energy process within a single structure of some architectural landmark merit. In this way the building can be a harbinger for a positive rejuvenation / redevelopment of the peninsula.

If such redevelopment is to be realized then the industrial development should be of the highest quality capable of marking the commencement of new intentions for the area. The scale of the subject development means that the proposed building will be of major visual significance for the entire area. It will be a landmark building of original expression and simplicity which will be seen from Clontarf through Dublin Port and Ringsend to Sandymount and further afield.

In overall terms the development will be of significant visual presence on the peninsula. However, this should not be considered to be of a negative nature. Rather as a landmark structure the development has potential for positive visual impact in defining a new approach for the architectural treatment of industrial development on this pivotal landscape/townscape/seascape site.