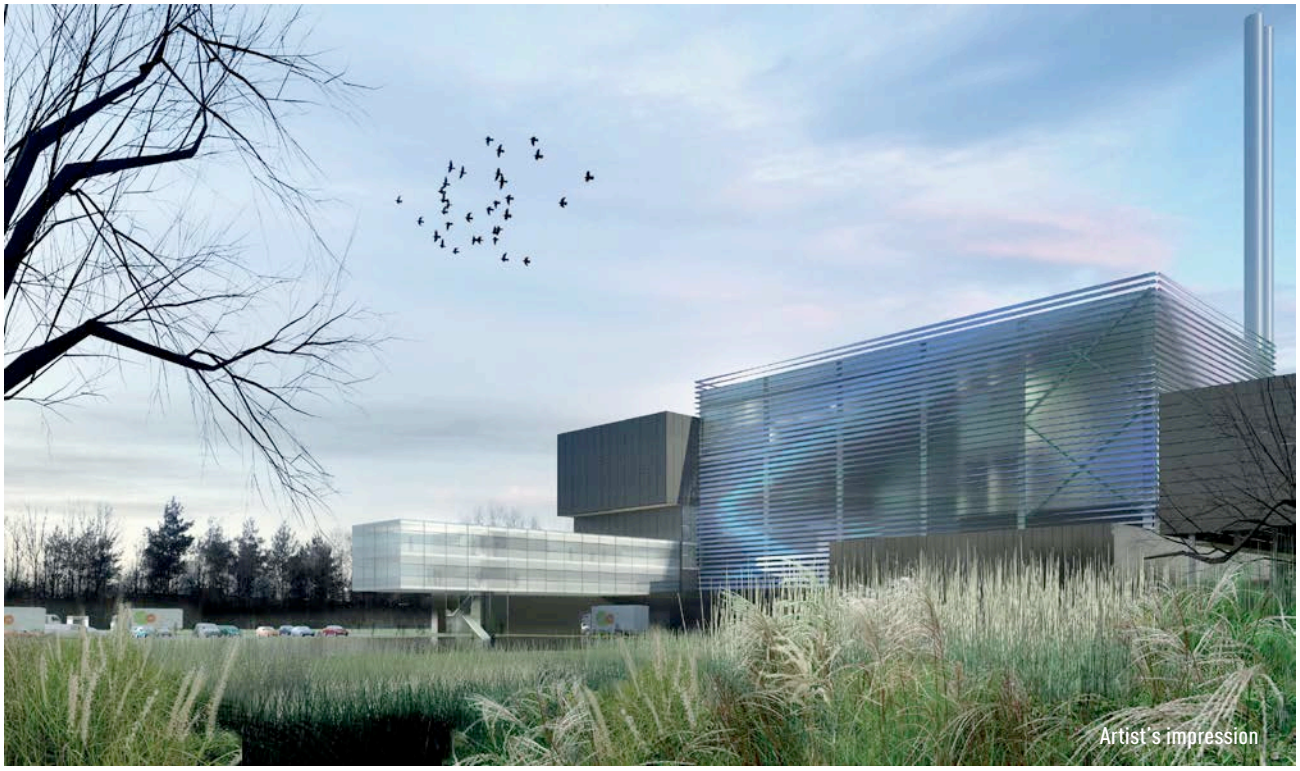
Suffolk energy-from-waste facility

Case study



Artist's impression

In 2008, Suffolk County Council placed an OJEU notice for bidders to prepare private finance initiative proposals to design, construct and manage a facility to process waste for 25 years. SUEZ recycling and recovery UK (formerly SITA UK) commissioned Grimshaw to prepare a design for the new energy-from-waste facility at Great Blakenham, Suffolk, and with Grimshaw's help, were appointed to construct and operate the facility.

The facility has the capacity to process 269,000 tonnes of waste per year, generating enough electricity for 30,000 homes. The proposed site was previously occupied by a Council works department and backs directly onto Gipping Valley – an area of historic waterways and local nature reserves.

Creating a balance between industry, nature and community was key for the design. This also meant that one of the biggest design challenges was housing the energy-from-waste facility in a large single volume. The design of the building reflects both the industrial agricultural heritage of Suffolk and the changing character of the Suffolk sky – where its appearance alters depending on the time of day, the time of year and the perspective from which it is seen. The building has been designed to achieve a BREEAM Excellent rating.

A planning application for the building was approved in July 2011 and the facility opened in December 2014.

> "We commend the client for demonstrating their commitment to high quality design in industrial architecture in the scheme presented.
>
> The design team's approach to site organisation and built form is exemplary, not least in its effort to ensure the development is specific to its brief and its context.
>
> We welcome the discipline and honesty in the approach to the form, massing and expression of this facility. The design is both unique to the brief and specific to the place. We welcome the efforts to express the functionality of the building and give a sense of the processes within."
>
> CABE (The Commission for Architecture and the Built Environment), 15 November 2010

Creating a balance between working buildings, nature and community

Key design considerations

1. The site is arranged to create an open and positive front with a closed back that allows back-of-house facilities to be screened.

2. The building is set back from the entry point to create a landscaped entrance and to provide views out to the Gipping Valley.

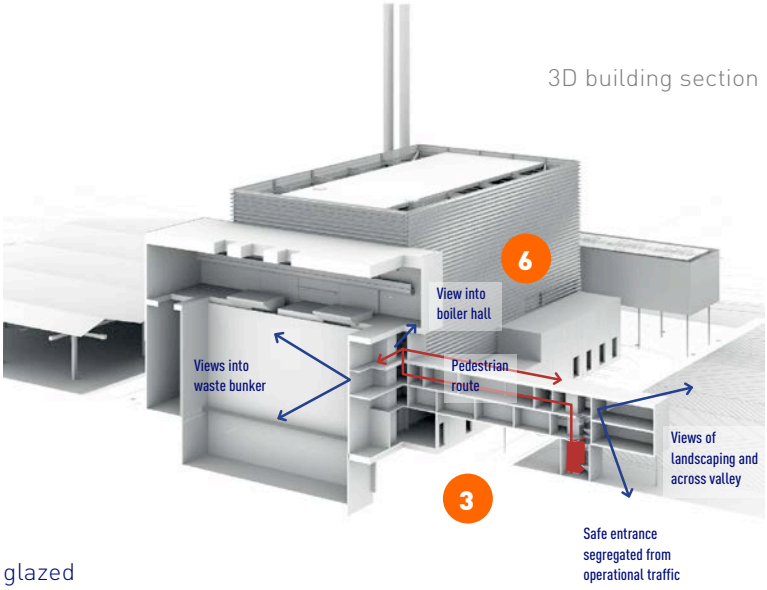
3. The office accommodation is a lightweight glazed element that is elevated to provide safe segregation of pedestrians and vehicles.

4. The components of the plant have been kept distinct to minimise overall scale and to enhance architectural appearance.

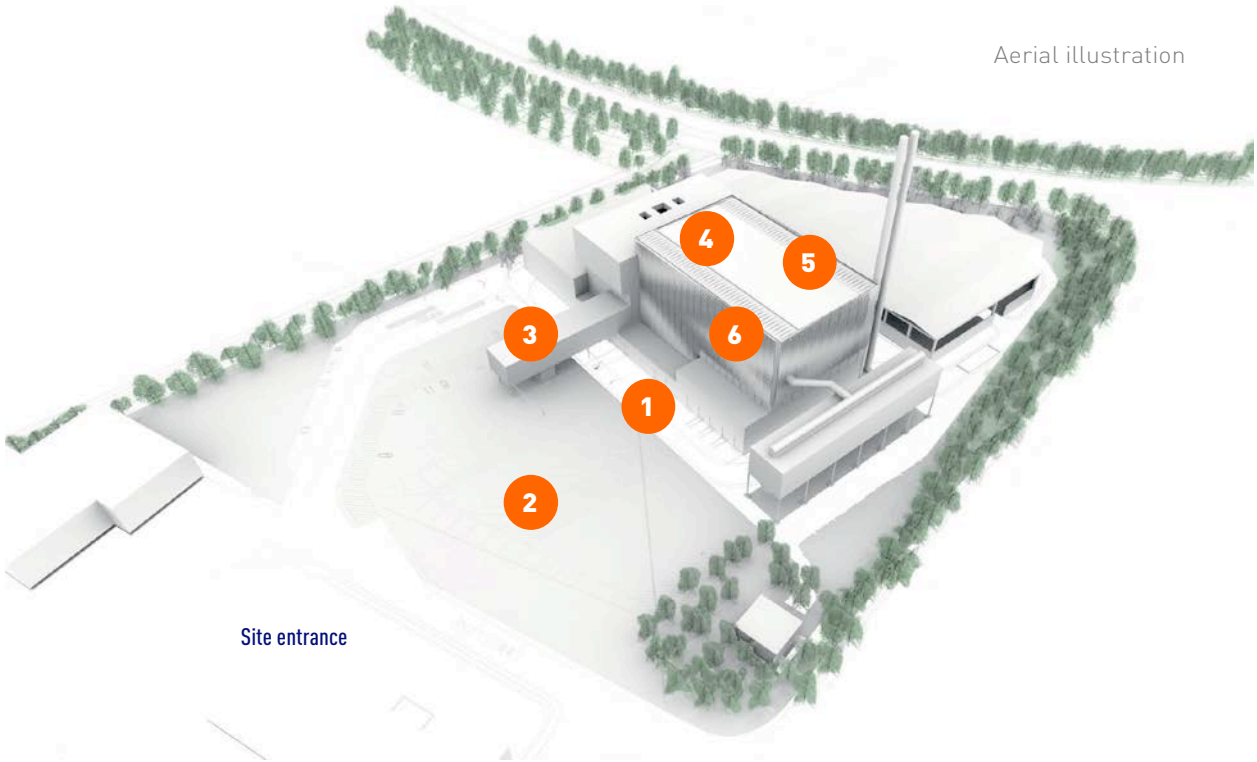
5. Large ETFE pillows have been installed in the roof to maximise natural light in operational areas.

6. The boiler hall has been expressed as a key feature with a continuous louvred facade.

3D building section



Aerial illustration

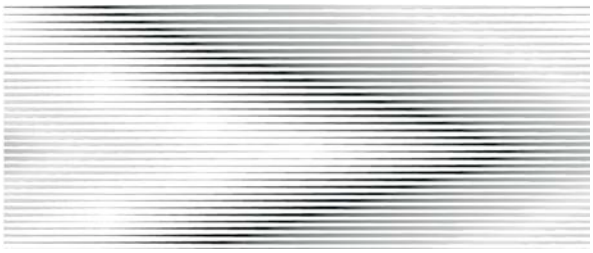


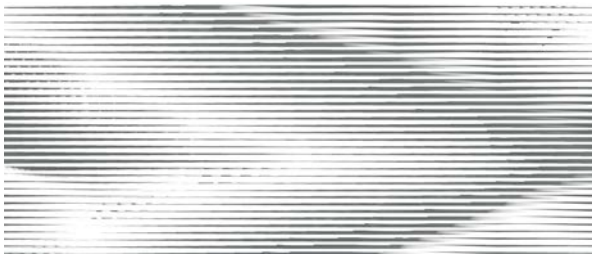
Boiler hall facade

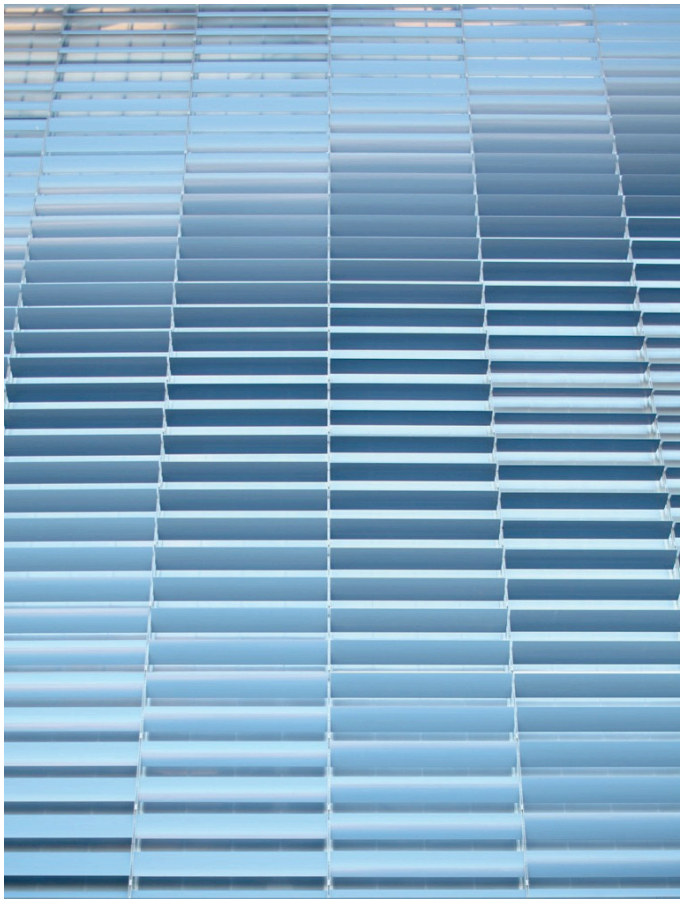
The design of the boiler hall facade responds to the renowned Suffolk sky as a dominating feature of the county's rural landscape.

The boiler hall facade is a key feature of the building, designed to reflect the changing character of the Suffolk sky.

It is clad in a dual-layer cladding system with a semi-translucent inner skin that softens its appearance against the sky, and a bespoke horizontal louvre system on the outside that alters the appearance of the building depending on angle of view and time of day.



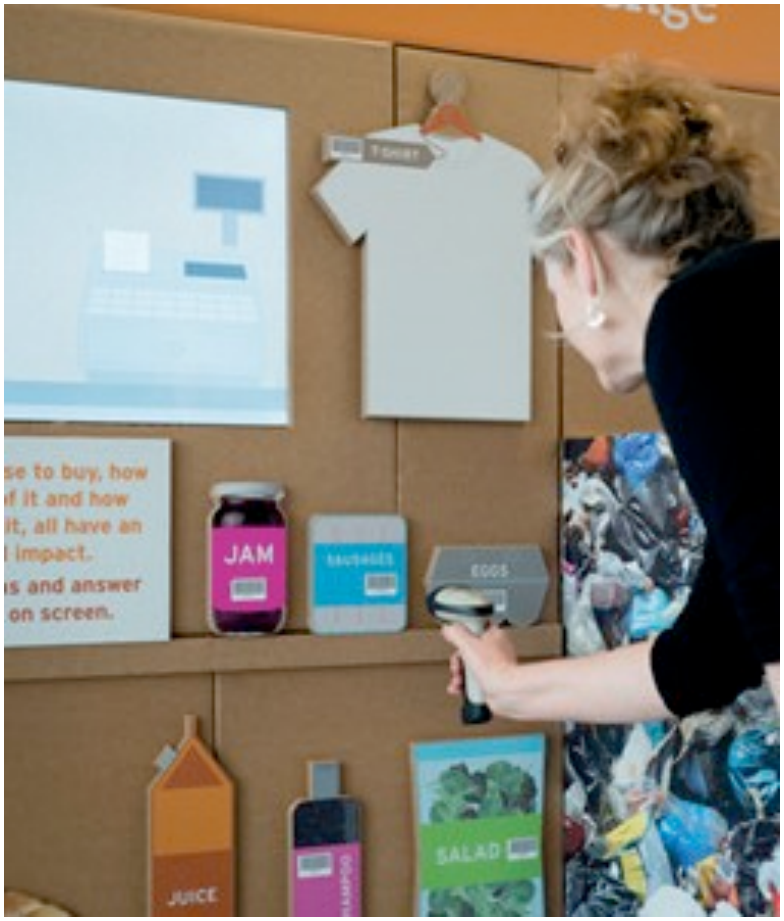




View from Paper Mill Lane

Visitor centre

The building provides a high quality visitor centre that engages with the local community, showcases how waste is dealt with in Suffolk and how the energy-from-waste process is helping to make Suffolk the Greenest County.



"Just to let you know, it was the best school trip ever!"

"An excellent introduction to energy-from-waste and a very interesting tour of the plant."

"As a local resident, I am very happy to see how the plant works and have some of my worries answered – brilliant!"

"We all learned something new and realised what amazing things we can make with rubbish."

Key facts

The facility provides a solution to disposing of the waste left after recycling. It puts the waste to good use as a fuel to generate electricity.

It supports SUEZ recycling and recovery UK's vision of living in a society where there is no more waste and Suffolk County Council's ambition to make Suffolk the greenest county.

Cost benefits

Over 25 years, switching to energy-from-waste will be at least £350 million cheaper than continuing to landfill.

Environmental benefits

The facility diverts up to 269,000 tonnes of waste from landfill, reducing greenhouse gasses by 75,000 tonnes a year.

The facility generates enough electricity for 30,000 homes. It has been designed to achieve a BREEAM Excellent rating for environmental management.

Landscaping is underway to transform the front of the site into a wildlife area with woodland, a wildflower meadow and features to encourage small mammals and insects.

Nothing goes to waste – metals are recycled and ash is used as an aggregate in local building projects.

Economic benefits

During construction, over 100 local firms won contracts, worth around £13.5 million, to supply goods and services to the site. It is estimated a further £1 million will continue to be spent in the local economy each year.

Other benefits

SITA Trust provides funding for community and environmental improvement projects within a three-mile radius of the site. So far, 11 projects have received £240,000.

There are plans to use surplus heat from the facility for a nearby greenhouse project. This would greatly improve the efficiency and environmental performance of the facility.

Our visitor centre offers tours of the facility and information about waste and recycling and the need to find alternative sources of energy.

Facility opened

December 2014

Capacity

269,000 tonnes of waste a year from Suffolk households and some businesses

Architect

GRIMSHAW (designer of the Eden Project in Cornwall)

Cost of the building

£180 million

Jobs

400 during construction and 47 permanent jobs

Main contractor

CNIM/Lagan

Visitor centre designer

DesignMap (who helped turn the Cutty Sark in London into a top visitor attraction)

Whole build cost

£180 million

Cost per metre squared of gross floor area: £24,603.6/m^2

Cost per metre squared of total site area: £4,568.5/m^2

Demolition materials from the highways depot, which once stood on the site, were used in the foundations of the new building.

Services cost

£4.7 million (water and power)

Gross floor area

7,316 metres squared

Total area of site

3.94 hectares (39,400 metres squared)

Circulation area (roads)

6,295 metres squared

Function areas

7,000 metres squared

Storage area

316 metres squared

Area of the grounds for community use

8,093 metres squared (20%)

This is the meadow that includes an area set aside for outside learning.

Area of building for community use

195 metres squared (2%)

This includes the visitor centre rooms and the Orwell meeting room, which is available for community use.

Predicted electricity consumption

1,100 megawatt hours a year

The site powers itself and provides electricity to the National Grid (enough for 30,000 homes). The extensive use of natural light in the building reduces the amount of energy needed.

Predicted fossil fuel consumption

156,000 litres a year

Diesel is used to start up the burners, but once they are running the waste is self-igniting.

Predicted renewable energy generation

80,000,000 kilowatt hours a year.

Predicted water use

27,446 cubic metres a year

Predicted water use to be provided by rainwater or grey water

10,000 cubic metres a year

Rainwater is collected on site and used in the process.

Throughout construction every effort was made to minimize the environmental impact of a major building project. Noisy work only took place during the day, light pollution was kept to a minimum and there was continuous dust monitoring on site.