

Project

Anaerobic digestion plant



- AD site**
- 1 Anaerobic digestion building
 - 2 Organic water-recycling building
 - 3 Visitor centre
 - 4 Plant control and colleague facilities
 - 5 Existing potato packing factory

Location

Cambridgeshire

Architect

Boyarsky Murphy Architects

Completion date

End of 2012

By Amanda Birch

In a pioneering new power plant, food waste normally destined for landfill will instead be processed to produce electricity and heat for a neighbouring potato packing factory. Any excess electricity will be sold on to the national grid.

Unusually for an industrial development, the buildings have been designed by an architect — in this case, London-based Boyarsky Murphy. The project has also endeavoured to be as sustainable as possible.

Three buildings will be built on the 4ha site: an anaerobic digestion building; an organic water recycling building; and a visitor centre.

The client, Local Generation, is a new company that provides low-carbon sources of renewable

energy. Nicholas Boyarsky says it was keen to elevate the quality of the design from “crinkly tin sheds”, and, instead, ETFE cushions and locally sourced straw bales will be employed to form the building’s envelopes.

The digestion plant will be situated in the flat fenlands of Cambridgeshire just north of March. It will process waste from the potato packing factory, along with imported food waste.

The east of England produces some 787,000 tonnes of food waste every year, with a large proportion of this going straight to landfill, and producing significant and potentially harmful quantities of methane.

The new anaerobic digestion plant is projected to process 30,000 tonnes of this waste into bio-gas and a digestate that can be used as a soil conditioner.

ORGANIC WATER-RECYCLING BUILDING

The function of the 46m-long organic water recycling building is to clean impurities from the water used in the anaerobic digestion building and the potato packing factory so it can be reused. This is done using organic processes that involve plant life, water creatures, aeration and filtration.

A key feature of the building will be the huge water-filled tanks cast in concrete and sunk 8m into the ground.

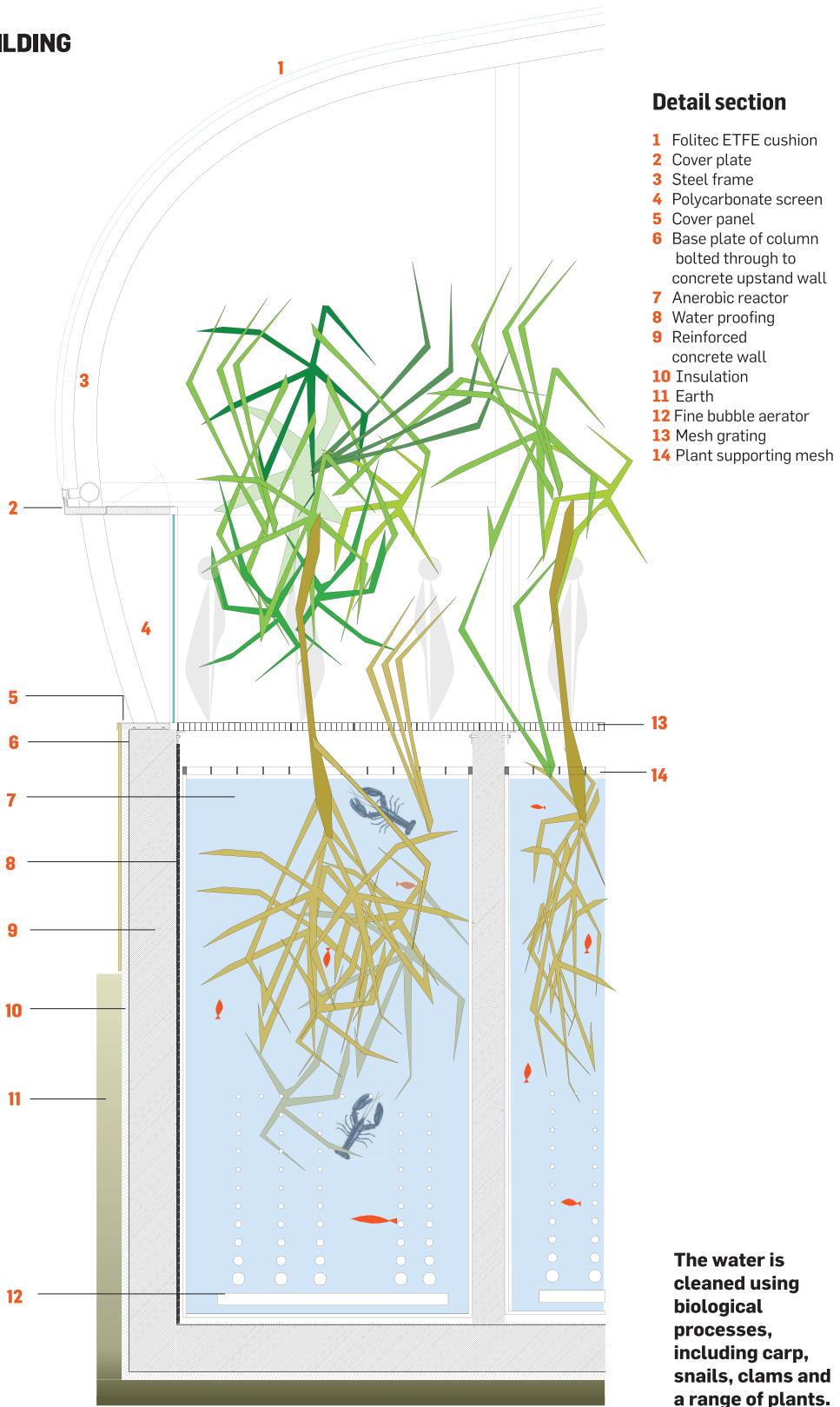
The building is essentially a glasshouse, though ETFE pneumatic cushions have been used as the main cladding material rather than glass since they require a far lighter support structure.

The supporting structure comprises a series of tubular steel frames (circular hollow sections) at approximately 3m centres. These members are supported on the walls of the concrete tanks and act as curved portal frames with mid-span vertical support provided by internal columns. Tie-rod bracing is incorporated into plan bays adjacent to the gable ends to provide overall stability to the structure.

Aluminium extrusions are bolted to tee-sections on the top of the steel frames to form the clamped boundaries to the ETFE cushions. The cushions are patterned with a frit that follows the curved frame profile.

The two-to-three layered ETFE elements are welded together to form an airtight deflated cushion. These are fixed into the aluminium extrusion on four sides and then inflated.

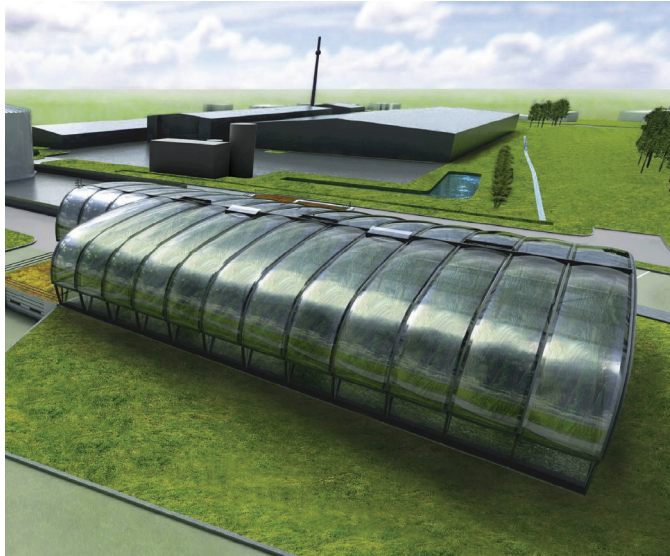
The cushions provide insulation and resist wind loads as well as allowing ultraviolet light to pass, thus enabling the plants to flourish within the tanks.



Detail section

- 1 Folitec ETFE cushion
- 2 Cover plate
- 3 Steel frame
- 4 Polycarbonate screen
- 5 Cover panel
- 6 Base plate of column bolted through to concrete upstand wall
- 7 Anaerobic reactor
- 8 Water proofing
- 9 Reinforced concrete wall
- 10 Insulation
- 11 Earth
- 12 Fine bubble aerator
- 13 Mesh grating
- 14 Plant supporting mesh

The water is cleaned using biological processes, including carp, snails, clams and a range of plants.



The organic water-recycling building uses a series of tubular steel frames to support ETFE cushion cladding.