



Fenland Glasshouse, a greenhouse heated by Industrial Heat pumps

Cambridgeshire, UK

AGR Renewables Ltd, being a specialist in supplying sustainable and renewable solutions developed the 20 Ha sustainable greenhouse complex powered through a combination of industrial heat pumps and CHP (Combined Heat & Power) gas engines. The project was initiated in 2021 as a standalone greenfield development and finished in 2022. Alfa Laval supplied all semi-welded plate heat exchangers for the ammonia industrial heat pumps delivered by IESenergy ApS.

IESenergy 



The energy centre

The adjacent 60 MW energy centre was installed by Clarke Energy. The energy centre contains the 33 MWth heat pump system and 9 MW of CHP plant and backup boiler system. The CHP plant is providing electrical power, which is to be used to power the glasshouse, the LED grow lights and various site auxiliaries.

The heat pumps

The heat pumps from IES Energy Aps are recovering heat from the irrigation water collected in the large ponds. The heat pump installation consists of four ammonia* heat pumps installed in parallel, totally delivering the 33 MW of thermal heating. This installation providing the hot water for heating of the glasshouse qualified for the UK Renewable Heat Incentive (RHI) scheme.

* Ammonia is a very efficient natural refrigerant with zero global warming potential and no long-term environmental effects. The heat pumps with modern plate heat exchangers helps safeguard both efficiency and a low volume fill of ammonia.



The Alfa Laval supply

Alfa Laval supplied all the key heat exchangers of the heat pumps, mainly the 14 semi-welded plate heat exchangers of T20BW-type as condensers and evaporators.

Ammonia heat pumps Fenland Glasshouse

General	
Supply heating of 220,000 m ² , growing cucumbers. Source: heat recovery from irrigation water ponds.	
Temperatures	
Temperature source (irrigation water)	12°C → 8°C
Temperature supply (heating water)	32°C → 55°C
Refrigerant	
Refrigerant	R717/Ammonia
Global warming potential (GWP)	0
Ozone depletion potential (ODP)	0
PFAS content	0
Quantity	650 kg/unit
Capacity	
Annual heating production (heat pump)	~65,000 MWh/year
Heating capacity	33 MW
Expected operating hours	4,000 hours/year
Number of heat pumps	7
1 x single-step heat pump	4.7 MW heating capacity
3 x two-step heat pumps	9.4 MW heating capacity
COP	
COP heating two-step heat pump	4.5
COP heating single-step heat pump	4.3
CO ₂	
CO ₂ emission yearly saving	12.6 Mega tonnes CO ₂ eq
Major equipment in the plant	
7 pcs Mayekawa screw ammonia compressor 280J	
7 Elin water cooled motors	
7 Alfa Laval flooded ammonia evaporators T20BW-FD semi-welded plate heat exchangers with SS 304	
7 Alfa Laval ammonia condensers T20BW-FT close approach semi-welded plate heat exchangers with SS 304	
Alfa Laval subcoolers = 4 x T10-EW on final step and 3 x M10-BW on first step	
Grundfos circulation pumps (glycol and water)	

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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