

CASE STUDY

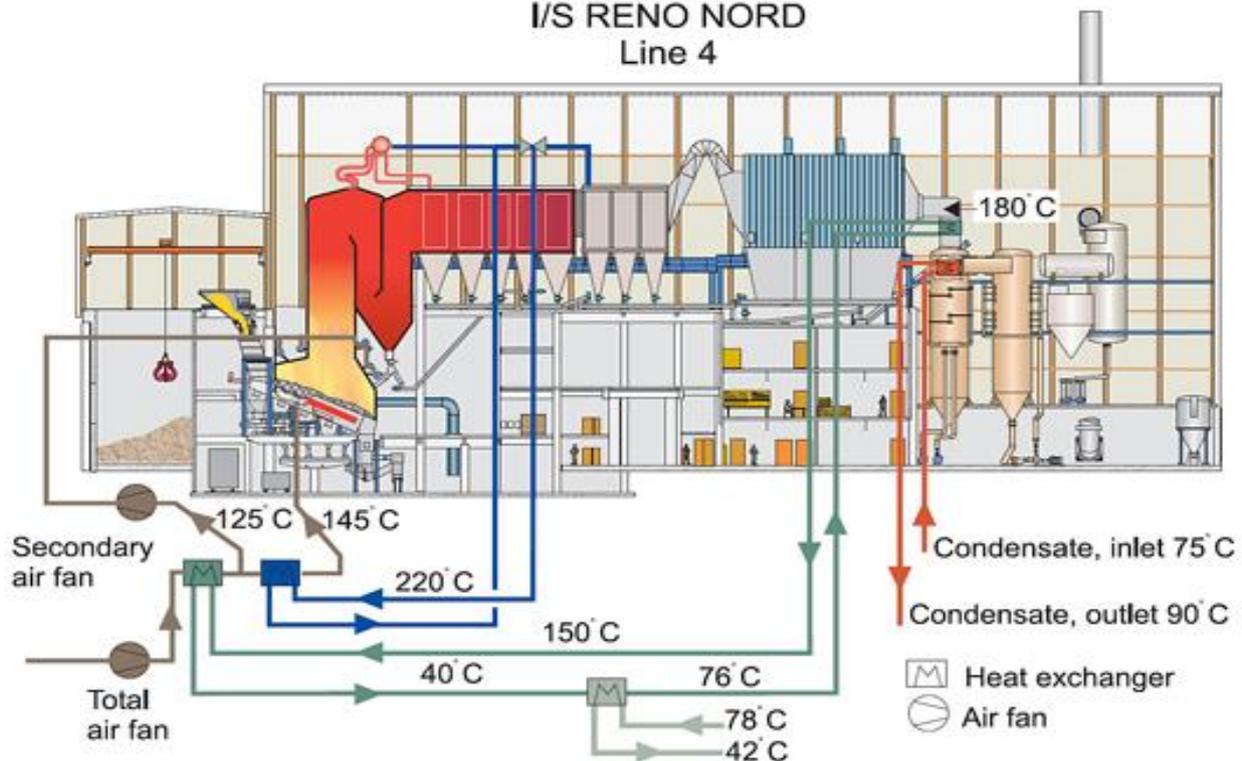


MF Case 20: Reno Nord, Denmark Waste to Energy Plant-I/S

I/S Reno Nord is treating municipal solid waste (MSW) from 225.000 inhabitants from 7 municipalities in the northern part of Denmark. I/S Reno Nord is a partnership owned by the 7 municipalities.

Waste to Energy Plant I/S Reno Nord, line 4

I/S RENO NORD Line 4



(illustration: I/S Reno Nord)

In October 2005 one of the most modern and efficient waste-to-energy plants in Denmark was officially opened at I/S Reno Nord in Aalborg. The nominal capacity of the plant is 20 t/h waste at a calorific value of 12 MJ/kg, corresponding to approx. 160,000 t/year. The total cost was 680 million DKK (92 million Euro). Reno Nord line 4 in Aalborg, Denmark, is a state of the art incineration plant that produces both electricity and district heating.

The turbine generates approx. 18 MW of electricity, which will be fed into the main grid. Furthermore, the plant will supply approx. 43 MW of heat to the district heating network in Aalborg. The efficiency is approx. 100%, and the energy produced will supply approx. 16,000 houses with electricity, and approx. 30,000 houses with district heating.

Policy and preconditions

The plant complies with the EU's directive on waste incineration which sets out minimum performance criteria. The Danish government is committed to improving the environment of its cities and to fighting climate change. Finally, the local governments in the region combined to develop a regional facility which would meet the expectations of EU and Danish law and of their constituents.

Funding and Financing

The table below sets out estimated revenues for the facility.

Item	unit price	Total	
		*1000 DKK	*1000 Euro
Gate fee incoming waste	635 DKK/ton (85 €/ton)	83.000	11.140
Sale of Heat	72 DKK/ GJ (9,66 €/GJ)	87.000	11.675
Sale of electricity	500 DKK/MWh (67 €/MWh)	20.000	2.685
Total		190.000	25.500

It is not possible to obtain a specific operation budget for the incinerator as the annual accounts are consolidated. However, based upon official figures from I/S Reno Nord on gate fees and incoming waste amounts, data from the district heating company in Aalborg and the unit prices on electricity and heat, it is estimated that the annual turnover is 28% of the investment, indicating that the plant is profitable. The annual report of 2016 shows a total debt of DKK 388 million, indicating debt has been paid down. (http://www.renonord.dk/media/aarsrapporter/renonord_aarsrapport_2016_web.pdf)

Other forms of waste to energy are also profitable, which opens up a potential opportunity. In the US, companies are offering "turn-key" finance for fuel cells generating electricity from methane capture from waste water treatment plants. These companies make a commercial profit and also pass on some of the savings made from significantly lower electricity input to the plant.

In relation to retrofitting buildings to promote distributed clean energy, the Property Assessed Clean Energy (PACE) initiative in the US is innovative. The costs of investing in solar photovoltaic systems, energy-efficient windows, and insulating a home will not be recovered when the home is to be sold. These up-front costs are considered to be one of the most significant barriers to solar and energy-efficiency retrofits. Using PACE, property owners can finance energy-efficiency and renewable-energy measures in homes and commercial buildings without the need for government subsidies. This is because the PACE initiative enables them to "mortgage" these improvements, recovered through the property tax, and thus to pay only for the benefits they derive during the period they own the property in question.

Institutions and management

The operation is corporatized and run as a business separate from the local governments involved. They are however represented on the Board.

Lessons learned

Given economies of scale are significant in energy generation, grouping local governments together to make investments in green technology is sensible. The key issue is the regulatory context of such groupings, which must be very clear in order to ensure smooth operation of the facility.

References

I/S Reno Nord <http://www.renonord.dk/>

B&W Vølund a/s http://www.volund.dk/Waste_to_Energy/References/Reno_Nord (Retrieved 15th June 2015)

Annual Report 2016 <http://www.renonord.dk/default.aspx?m=2&i=101> accessed 2 Nov 2017

Credentials

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