



CASE
STUDY

Case Study



Clean Energy

Aarhus, Denmark - the Climate Plant

Aarhus is situated in Denmark, northern Europe but still in the humid continental climate zone, influenced and unstable by the ocean. Therefore, it experiences mild spring, warmer summer, rainy and windy autumn and cooler winter months. Aarhus has on average approximately 3200 heating degree days. Aarhus is the seat of the council of Aarhus municipality with 314,144 inhabitants and 249,709 (1 October 2011) in the inner urban area. According to Aarhus municipality, the "Greater Aarhus" area has a population of about 1.2 million people. In 2007 the City of Aarhus set the political goal to become CO₂-neutral by 2030. This is the objective for Aarhus, as one of the six official "Eco-Cities" in Denmark. Plans have led to a deliberate and productive course for tackling climate change in Aarhus. The city has been working with climate issues for a number of years, by means of environmental action plans, energy management systems, wastewater plans, green accounts and environmental impact analysis of construction projects. Furthermore, Aarhus is one of the leading cities in Denmark when it comes to the district heating supply, public transport possibilities and extended cycle path system. The City of Aarhus has committed itself in 2009 in various agreements to:

- reduce its energy consumption by more than 20 % before 2020;
- reduce the annual electricity consumption of the municipal buildings with at least 2% per year; and
- reduce CO₂ emissions by 2% each year until 2030.

The approach in the City of Aarhus is an implementation by phases, mainly following a forecasting approach (from input to output) from: (i) set the goal and the vision; (ii) analysis of the potential and definition of the climate target, with regards to the quantitative target and the time frame; and (iii) implementation. The climate plan for the City of Aarhus consists of several generations of climate plans reaching towards 2030. The plans have generally a 2- year perspective in order to guarantee progress, adjustment and evaluation. The climate plans are versatile, and their priorities' embrace

the municipal organization, the business community and educational institutions. Good practices and factors for success are:

- Detailed CO₂ mapping: the municipal survey (carried out in collaboration with consultants, their own technical department, experts, representatives from business associations, and other stakeholders) of the CO₂ emissions in the municipal area, by sector and type of activities (transport, industry, trade, public and private buildings. This formed the basis both for understanding the carbon impact of the activities, assessing the saving potential, making a list of priorities, planning investments and actions;
- Highly committed management in the Municipality;
- Political commitment at the highest level;
- Separate groups with the necessary expertise are established to prepare energy plans, e.g. the “heat plan”;
- Introduction of Climate Partnerships with other cities;
- Existence of well-developed climate friendly technologies and businesses on site (e.g. district heating and wind energy);
- Monitoring and updating of projects and Climate Plans; every second year there is a new accounting of the CO₂ and adjustment of the data.

The Climate Plans are made based on the feedback from the CO₂ balance and the assessment of the projects, the budget of the municipality, and the discussion with all stakeholders. The municipality ideally wants to be less and less involved in financing, while keeping the role of assistance/guide in creating “Climate Partnership” with the private citizens/businesses. However, whether those plans are really in line with the goal of being CO₂-neutral by 2030 is uncertain.

Aarhus is also home of one of the biggest biomass-fuelled Combined Heat and Power (CHP) stations in the world. The Studstrup plant [is burning] wood pellets instead of coal... , bringing green heating and electricity to city residents and businesses whilst reducing CO₂ emissions by 1 tonne per resident. ... The recently completed conversion of Studstrup is the biggest single event in the entire green revolution for Aarhus. The switch from coal to wood pellets at Studstrup not only gives the biggest total CO₂ reduction in Aarhus to date, but is also the biggest conversion to green energy in Denmark. The Climate Plan 2016-2020 will set the city's next climate target, and within the heating area, the new biomass-fuelled CHP station at Lisbjerg will also come on line within the next few months with green heating. The City Council will thus bolster green district heating again, ensuring green supplies for many years to come, as the Studstrup plant will supply 50% of the green district heating annually, and the biomass-fuelled CHP will supply 20% on an annual basis.

Aarhus Power Plant



Image courtesy of DONG Energy

An excellent example. Apart from the switch from coal to wood pellets now completed, the city's Department of Waste and Heating built two massive electric boilers at Studstrup 18 months ago. They can generate electricity to produce district heating when wind turbines are running at full capacity, and electricity prices are low. Studstrup is an excellent example of how we make

maximum use of our resources to the benefit of the climate, and ensure competitive prices for the consumer. We will use water, solar power and biomass and get the various technologies to work together to complement each other in the best way possible ... The conversion, costing around DKK 13 billion, makes Studstrup one of the biggest biomass-fuelled power stations in the world. It is expected to produce district heating in the future based on biomass for around 106,000 homes, with green electricity equivalent to the annual consumption of around 230,000 homes.

References

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Credentials

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