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Application for Global District Energy Climate Award 2009



Application by C4 Energi AB, Municipality of Kristianstad, Sweden

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Summary

C4 Energy Group, a small municipality owned energy utility have during the last 30 year built up a substantial district energy operation. High efficient CHP solutions, close to 100 %, and the overall system design give an outstanding positive environmental impact. The fuel mix in the system as per today is more than 99 % based on renewable fuels, mostly forestry residues, (wood chips). Thru competitive pricing, environmental profile as well as development of innovative price models and customer services the market demand for district heat supply is continuously high.

We hereby hope that our district energy operation would be a good candidate for The First Global District Energy Climate Award.

Description of Company and District Energy Operation

For more than 100 years ago the Municipality of Kristianstad, as many municipalities in Sweden, established the “Kristianstads Elektricitetsverk” that produced and distributed electricity. The production was at that time based on 100 % coal and oil.

In 1980 the first initiative was taken to establish a district heating system. In the beginning smaller oil based heat production units supplied 100 % of the heat demand in the system. At that time it was naturally quite hard to sell a district heat supply to customers having their own oil- or electricity boiler for their demand of hot water and comfort heating. The municipality was persistent though in its ambition to gain environmental advantages in the long run and continued to encourage the establishment of the new heat distribution system.

In 1994 the number of customers and their heat demand had grown to a degree that a new large CHP plant (the Allöveket plant) could be built. The new boiler, a 50 MW_{th}, bubbling bed boiler was designed to be operated mainly on wood fuels, like residual wood chips from forest felling and residues from different wood manufacturing industries. The steam turbine and electric generator was designed to, at a maximum, produce 15 MW_e. The CHP plant was also designed for allowing the use of local biogas, utilized in a nearby landfill and also produced in a local biogas plant. (*Were biogas is produced by fermenting recovered local industrial and household organic waste*).

In 1996 the electricity market in Sweden was deregulated and “Elektricitetsverket” was transformed into a Shareholders company with C4 Energi AB (C4) as parent and with C4 Elnät AB (electricity distribution) as a 100 % subsidiary. ***The C4 Energy group as per today with some key figures is described in enclosure 1.***

The last 10 years price development on fossil fuels as well as the system price of electricity has made our CHP production very competitive. Higher taxes on non renewable fuels and electricity together with our local and environmentally friendly profile has made our district het business booming. A continuous growth in number of customers, not least depending on our attractive pricing compared to customers alternative. A second large CHP boiler was installed at the Allöverken site in 2007. An additional steam turbine and electric generator will also be installed within 2-3 years. In the overall system we also have a number of smaller boiler units of which most of them are operated on renewable fuels. Fossil fuels are only used as start up fuel and as back-up fuel if there are lager failures in the main units. ***The system layout is presented in enclosure 1.***

The C4 district heating and CHP operation has grown from zero in 1980 to a turnover of approximately a quarter of a billion SEK (~24 million €) today. Our fuel mix is to more than 99 % based on renewable fuels. Our CHP plant can certainly be defined as “Highly efficient” with an over all efficiency of close to 100 %. *Based on the wet wood chips efficient heat value where two large flue gas condensers condensate the steam end recover steam saturation heat from flue gases.*

Compared to our customers originally use of fossil fuel or electric boiler heating systems (calculated on a national system fuel mix) the C4 operation have reduced CO₂ emissions with some -120 000 tons (1990-2008). Our district heat business employs today nearly 40 people and including sub suppliers we have created at least the same amount of jobs outside our own business. E.g. in fuels supply chain, district heat pipe deployment etc. etc.

The Municipality of Kristianstad has a goal to become a fossil fuel free Municipality. The C4 district heat and CHP business has contributed most in this effort so far. Other initiatives is biogas production and use in cars/busses etc. Ongoing plans for wind mill production etc. The Municipality of Kristianstad in general as well as C4 specifically has become an important place to visit to study environmental related issues and initiatives. C4 have on yearly base quite large number of national and international visitor groups. *Enclosure 2 gives one example of district heating and CHP visitor handout.*

From the mid of 2009 a new legislation were effected regarding ***a minimum once a month*** real time reading of ***all customers*** electricity meters. The legislation primarily addressed that the market should be more flexible and it should be easier and quicker to change electricity supplier. Of course on the political agenda was also the idea that customers awareness of their electricity consumption would also lead to savings in their electricity consumption.

Since 2008 C4 has its entire electric grid ***as well as all district heating customers*** automatically read energy meters. In total some 30 000 AMR meters that every hour around the clock and year collects data from the very smallest customer to the largest. Metering data are automatically collected by a metering collection system and centrally processed. Billing is thereby processed out from “real time hourly readings”. The next step in this work will be that we – step 1 – also print consumption statistics of every customer’s consumption on the invoices and – step 2 – making it available for the customer in a Webb interface.

The new AMR system is today and will be developed further as an important tool for C4 to introduce new services for our customers, e.g. energy saving initiatives. In 2009 we employed a new engineer that will be dedicated to develop a new “Energy Service business” within the company. This continuous work will of course be a very important step in addressing the European Union commitment to reduce energy consumption and climate change combat.

C4 have during the years come to dominate the market in the geographical areas were we have developed the back-bone of our district heating infrastructure. This specifically in the customer segments such as professional real estate owners, industries and other commercial businesses. During the later years C4 has grown rapidly in the segments private homes/villas.

Giving one example of a very recent success story is the conversion of a diary industry from oil to district heating supply. In this case we also supply steam to the customer. By this conversion we replace 1650 m³ oil per year and decrease CO₂ emissions with some 4800

metric tonnes/year. We not only thereby assist the customers' ambition to become "green" in their profile but we also decrease the customers' energy bill. And of course it's still a good contract for us directly and also indirectly since we can produce more electricity on this heat demand.

C4 have during the last 10 years been very active and taking initiative to cooperating with other District energy companies in our region of Sweden. The cooperation has addressed technical as well as market and customer service matters. E.g:

- Developed different offerings of service- and functionality guarantee contracts which have been a success in the market. *If a customer will have a technical failure in their sub central (which is owned by the customer) – we have 24 hours 365 days a year service. We fix customers problems immediately and without any extra appearance fee or costs. Private customers only pay a yearly "insurance fee" of 50 €*
- We have produced a "customer care hand book – kit" – *Today offered by The Swedish District Heating Association. E.g. we regularly invite customer to meet us and discuss specific energy matters and other related issues more in general. Twice a year we also distribute a District Heat Magazine to all our district heat customers*
- Developed differentiated pricing models for district heat supply.
- Studied "competence export potential"
- Studied - how to convert a house from direct electricity heating system (*no circulating water system*) into a water based system and district heat supply.

Some other "milestones" in the C4 Energy group is that we were environmentally certified according to ISO 14001 in 2006. The same year we were REKO certified. *A commitment to the "Standard of conduct" developed by The Swedish District Heat Association.*

The same association at the yearly convents in 2005 and 2007 awarded C4 an honourable recognition of our efforts to successfully expand our business.

In 2007 and 2009 we measured the customers' satisfaction - being a customer to C4. As can be seen in **enclosure 1**, the Customer Satisfaction Index in 2009 was 4.42 on a 5 grade scale. In this case "Villa" customers but we are confident that our good result will be repeated when we in 2010 will carry out a new survey but this time addressing all customer segments.

Hopfully, these lines have given you a good example of what we believe is a successful establishment of an Highly Efficient, Environmentally outstanding system and Customer oriented District Heating business.

Enclosures:

1. *Presentation of the C4 Energy group and main system layout as per 2009 with some key figures.*
2. *Example of Handout to District Heating and CHP visitors*
3. *Last number the District Heating Magazine "Fjärrvärmenytt" distributed to all customers*
4. Summary in English of the "Competence export report"

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