1. COVER PAGE STATING:

1.1. NAME AND LOCATION OF THE SYSTEM.

ENA Energi AB, located in Enköping Sweden.

1.2. NAME OF THE OWNER AND TYPE OF OWNERSHIP.

ENA Energy is owned to 100 % by the municipality of Enköping.

1.3. NAME, ADDRESS, PHONE NUMBER & E-MAIL OF THE PERSON SUBMITTING THE APPLICATION.

Urban Eklund
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ENA Energi AB
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Sweden
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2. ONE PAGE MOTIVATIONAL LETTER SPECIFYING:

2.1. WHETHER YOUR SYSTEM IS A

A) MUNICIPAL SCHEME WITH MORE THAN 10.000 USERS,

The district heating system in Enköping is owned by the municipality and the system have more than 95% of the heat market connected. In the city area of Enköping more than 20 000 people lives.

2.2. WHICH AWARD CATEGORY DESCRIBES BEST YOUR PROGRAMME:

We think that we best fit in the category C.

A) NEW DISTRICT ENERGY SCHEME, (LESS THAN 5 YEARS IN OPERATION)

The district heating system started in 1972 in Enköping, so it's not a new system!

B) EXPANSION OF EXISTING SCHEME,

The district heating system in Enköping have an ongoing expansion with the growth of the city. We have new customers all the time but the consumption is quite constant due to energy savings.

C) MODERNIZATION OF EXISTING SCHEME,

In a district heating system we need to have modernization and new more cost effective ways to produce heat. We have change the production from oil, coal, gas, electrical to now 100% biomass and also CHP.

D) DISTRICT COOLING.

Due to no low cost heat in the summer period we haven't started with absorption cooling.

2.3. WHY AND HOW THE PROGRAMME WAS IMPLEMENTED? WHAT HAS BEEN ACHIEVED?

In the early 1970s the town of Enköping in Sweden constructed a district heating system. The local government operated oil boilers to satisfy the heat demands. However, concerns regarding energy security surfaced when the local Swedish military regiment approached the local government about imported fossil fuels and the need for domestic energy supplies. Bioenergy was suggested as presenting opportunities for development. *Enköpings Värmeverk* was started in 1972 by the local government and in 1979 woodchip boilers were constructed and experimentation with biofuels continued through the 1980s, building up knowledge and skills within the company.

In the 1990s ENA Energy realized that heat production for the town needed improving, primarily because Enköping was growing towards 20,000 residents. With the town situated close to lake Mälaren and nearby Stockholm, the expression "the most central town in Sweden" comes from the fact that over 30 percent of the Swedish population lives within a radius of 120 kilometres from Enköping . In conjunction with the need for electricity and heat were concerns over climate change and energy security. Renewable energy was discussed as a solution to these problems and bioenergy emerged as the most promising alternative for Enköping.

During the 1990s market conditions for bioenergy were improved when the Swedish government imposed taxation on the emission of carbon dioxide from the combustion of fossil fuels to produce heat, commonly known as the carbon tax. The carbon tax only applies to heat and not electricity. The carbon tax affected district heating systems encouraging the switch from fossil fuels to biofuels. In 1994 a CHP Plant was established in Enköping and commissioned to use only biofuels. *ENA Kraft* was created to operate the CHP Plant, which was established by *Enköpings Värmeverk* and *Mälarenenergi*. *ENA Kraft* delivered heat to Enköping and electricity to the neighboring town of Västerås.

The CHP Plant launched the shift towards an innovative bioenergy system. The capacity of the CHP plant is 45 MW of heat and 24 MW of electricity. The CHP Plant supplies 85 percent of the heat demand in Enköping, primarily for the district heating system, which is connected to nearly all the buildings in the town. The 'green' electricity is for sale on the Nord Pool market, which includes Sweden, Norway, Denmark, and Finland.

In 1997 an oil boiler in Enköping was converted to use wood powder, and then in 2003 and in 2009 it was replaced with new technology combusting crushed pellets, which resulted in all heat production for the district heating system originating from bioenergy. When the CHP Plant was developed in the town of Enköping many energy companies around Sweden used a combination of fossil fuels and biofuels in CHP Plants. Oil boilers were commonly used to supplement CHP Plants. However, the local energy companies in Enköping decided to completely avoid fossil fuels and make commitments to exploiting opportunities in bioenergy.

The CHP Plant operates almost all year around except 6-8 weeks in the summer . The CHP Plant supplies more than 90 percent of the heat demand in Enköping. A variety of biofuels are used in the CHP Plant, including bark, sawdust, salix, woodchips and reused wood . The boiler converted to use wood powder, which was replaced by a new technology combusting crushed pellets, supplies less than 10 percent of the heat demand in Enköping and generally operates during the warmer parts of the year and peak load. Oil is only used for startup and emergency back up.

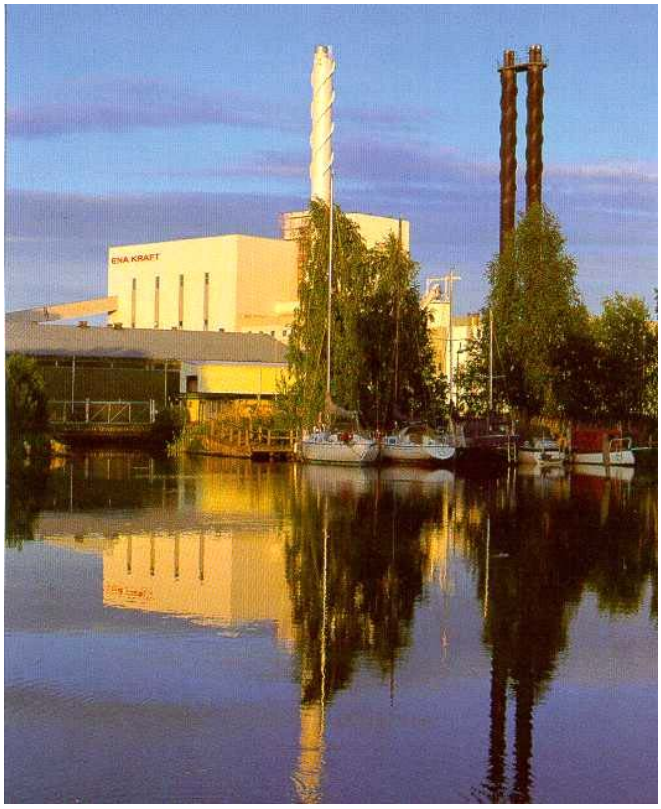
The initial stages of developing bioenergy in Enköping required the services, experience and long term contract of a fuel supplier. However, a diversity of biofuels was needed for the expanding bioenergy system. The risks of price fluctuations on biofuels from forestry in the surrounding region encouraged ENA Energy to explore agricultural options. Energy crops were examined and partnerships formed with farmers and the Swedish University of Agricultural Sciences.

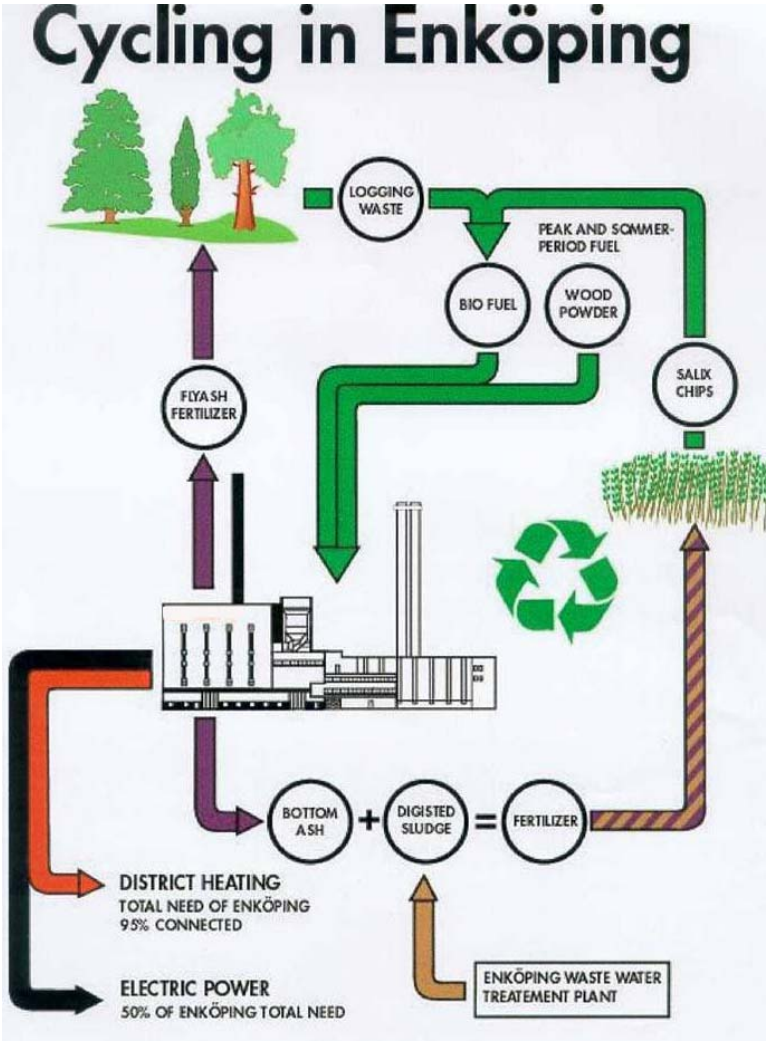
ENA Energy initiated a project to develop salix plantations. There was little interest from farmers at the beginning of the project. The project set several goals, including transport distance should be less than 20 km from the CHP Plant, salix plantations should be more that 10 ha, and a mixture of bottom ash from the CHP Plant and digested sludge from the Waste Water Treatment Facility should be used as fertilizer. The fertilizer was delivered free of charge to salix farmers. The fertilizer makes the energy crops grow faster. ENA Energy have 150 ha of salix plantations within the company.

A spin-off project involving waste water irrigation of nearby salix plantations was unexpected. To fulfil the Baltic Sea Agreement, which requires each local government in Sweden reducing nitrogen leakage to the Baltic Sea by 50 percent, the local government in Enköping decided to use the nitrogen rich water from the Waste Water Treatment Facility on the salix plantations. The Waste Water Treatment Facility financed the irrigation pipes, and the salix farmer entered into an agreement with the local energy companies to provide biofuels. Put simply, the production of energy crops in Enköping combined with the waste water irrigation offers an attractive scenario for all these actors.

3. 250 WORDS SUMMARY AND LOGOS

WOODCHIPS FIRED DISTRICT HEATING POWER PLANT





Metalcycle in Enköping CHP-plant

Total fuel input: 350 GWh

Chips
Sawdust
Willowtree
Bark

100%

Boiler

Electrostatic precipitator

Flue-gas condenser

Chimney

Condensed water 30 000 m³/year

Salix uptake from ground:

Cd: 9,8 g/ha & year
Cu: 55
Cr: 41
Hg: 0,34
Ni: 28 Pb: 9.86 Zn: 731

Cd: 10%
Cu: 50%
Cr: 60%
Hg: 20%
Ni: 30%
Pb: 20%
Zn: 20%

Bottom ash

Cd: 90%
Cu: 50%
Cr: 40%
Hg: 80%
Ni: 70%
Pb: 80%
Zn: 80%

Fly ash

Deposit

Enköping river

Ash/sludge mix

Cd: 0,75 g/ha & year
Cu: 194,5
Cr: 26,1
Hg: 0,33
Ni: 12,9 Pb: 15 Zn: 324

120 ha willowfield

Digested sludge

Waste water treatment plant

Clean water + sludge water

Clean water

3,8 milj. m³/year

Irrigation project

Cd:<1,1 g/ha & year
Cu: 183
Cr: <13
Hg:<0,4
Ni: 25 Pb: 13 Zn: 341

76 ha willowfield

200 000 m³/year

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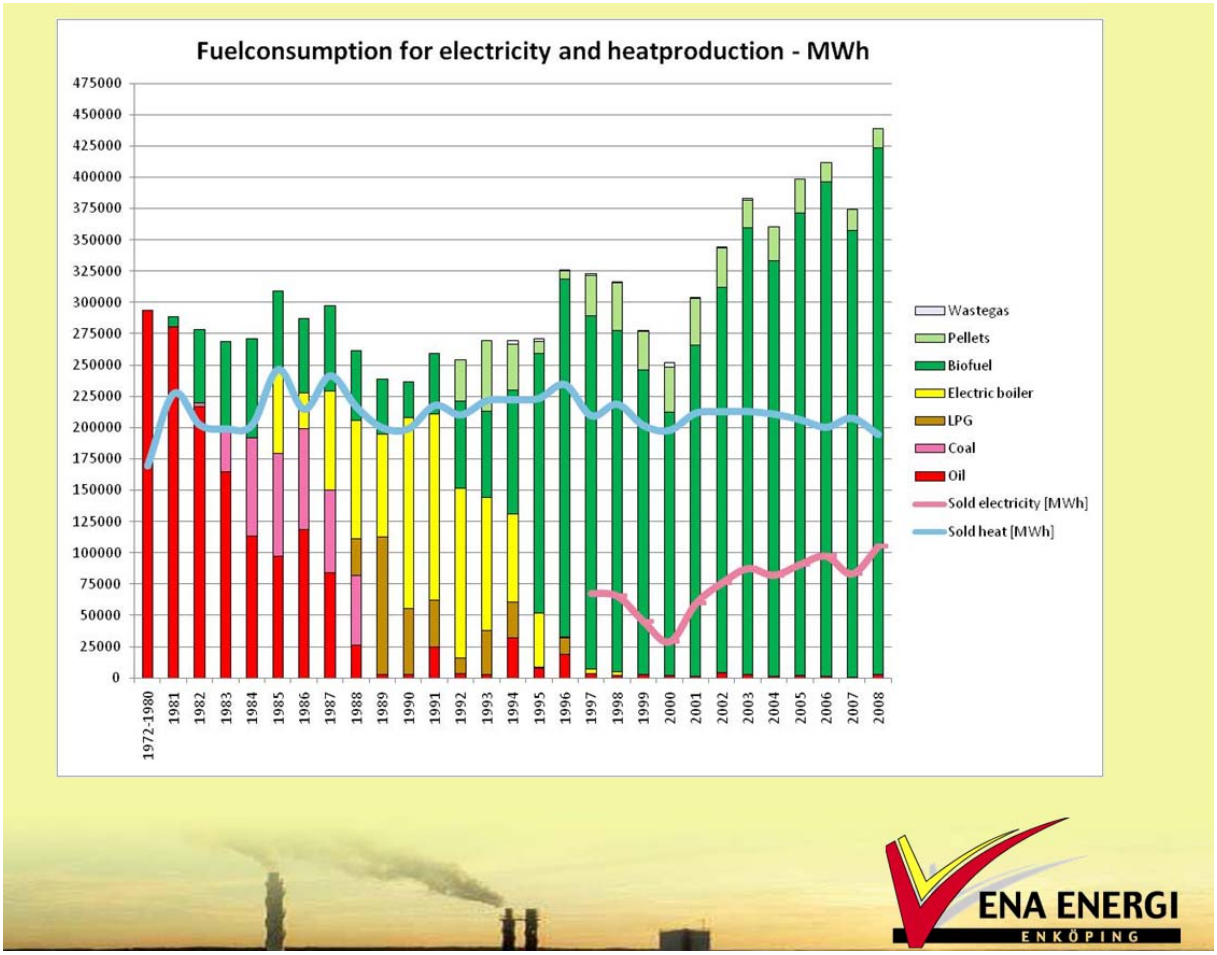
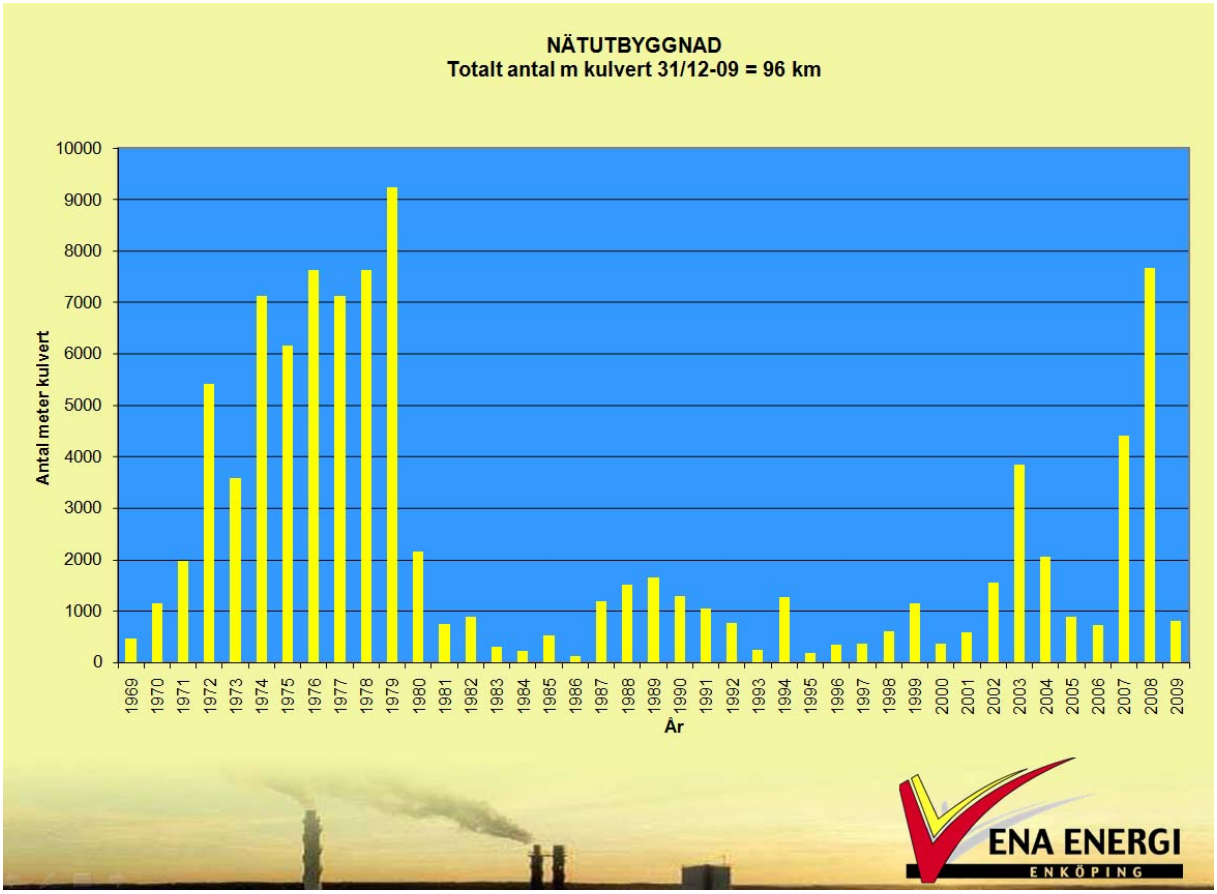


ENA ENERGI
ENKÖPING

4. WRITTEN DESCRIPTION (MAX. 10 PAGES) COVERING

4.1. SYSTEM HISTORY, CONFIGURATION OF PRODUCTION UNITS, DISTRIBUTION NETWORK, NUMBER OR SQUARE FOOTAGE OF BUILDINGS/CUSTOMER FACILITIES SERVED, AVERAGE AGE OF PRODUCTION AND DISTRIBUTION SYSTEM FACILITIES.

Year	mobile boiler	PC Tjädern	PC Borstbindaren	HPC Simpan	PC Stenvreten	ENA KVV
-69	2x2,9 MW Eo1					
-70	2x2,9 MW Eo1					
-71 -72		2x11,5 MW Eo4	2x11,5 MW Eo4			
-73	change to Eo4					
-76			2x5,8 MW Eo4			
-77	Not in use		PC Borstb. Not in use	HVP 1. 25 MW Eo4		
				HVP 2. 50 MW Eo4		
				HVP 3. 25 MW FB test crude oile		
-81					2x5,8 MW Biomass	
					1x10 MW Eo4	
-82				HVP 3. change to coal 15 MW		
-84				Electrical steam boiler 36 MW		
-85					Fluegas cooler	
-87				Hot water storage tank		
-88				HVP 3. not in use		
				HVP 2. oil/gas 50 MW		
-92				HVP 3. Wood pellets test 1		
-93					Gas from city dump 200 kw	
-94						1x55 MWv 24 Mwe
-96				HVP 3. Wood powder test 2 22MW		
-97				HVP 2. only oill		
-03				gas not in use		
-06					2x5.8 MW utrangerade	
-09				HVP 3. Wood powder test 3 15 MW		Fuel dryer



Graf above shows yearly growth of distribution network in meters. In 2011 it will be almost 100 km.

4.2. DATA SUPPORTING THE SYSTEMS OVERALL ENERGY EFFI CIENCY IN TERMS OF USEFUL ENERGY DELIVERED TO END USE CUSTOMERS DIVIDED BY FOSSIL PRIMARY ENERGY INPUT TO PRODUCTION/DISTRIBUTION PROCESS, SPECIFI CATION OF FUEL/ENERGY INPUT MIX.

In 2010 ENA Energi delivered 237 GWh heat and 95 GWh electricity with only 2560 ton fossil CO2 (8 kg/MWh!!)

4.3. HOW HAS THE PROGRAMME REDUCED GREENHOUSE GAS EMISSIONS AND/OR OTHER EMISSIONS IN YOUR COMMUNITY? ENVIRONMENTAL BENEFI TS WHICH THE SYSTEM PROVIDES OVER OTHER AVAILABLE ENERGY OPTIONS (TRENDS IN CO2, NOX, SO2, PARTICLE EMISSIONS). PLEASE DESCRIBE FUEL AND WATER CONSERVATION ACHIEVED.

From 100% oil for heating we now use almost 100% renewable biomass for heating and we also produce 100% bioelectricity on more than 90% of the heat load in the CHP plant. We also use the ash and waste water to produce new biomass.

4.4. WHAT MAKES YOUR PROGRAMME OUTSTANDING AND INNOVATIVE?

We have during a long time work together with the community to take care of resources that other whys should been lost. We have to work together for a better system that involve the hole community in Enköping.

We solve a local heat demand with a regional cooperation and with a global environmentally thinking.

4.5. HOW HAS THE PROGRAMME IMPROVED THE QUALITY OF LIFE OF YOUR COMMUNITY?

(Even when we go to the toilet in Enköping we are doing some good thing for the environment)

4.6. WHAT WERE THE CHALLENGES YOU FACED AND HOW WERE THEY OVERCOME?

The owner of ENA Energy (Government of Enköping) have always worked for better economical and environmentally solutions for the heat demand. So when we work closely together with our customer, equipment manufactories, fuel supplier, farmers and the city don't have any large problems to overcome.

4.7. HOW WAS THE PROGRAMME FINANCED?

The program is mainly financed by the heat customers but they have a cost lower than 75% of other district heating systems in Sweden.

5. ATTACHMENTS:

5.1. MAX. 10 PHOTOS, GRAPHS OR SIMILAR

More information and photos on www.enae.se

Video informing about ENA Energi

http://www.youtube.com/user/ENAEnergi#p/u/0/qfBYgvvjG68