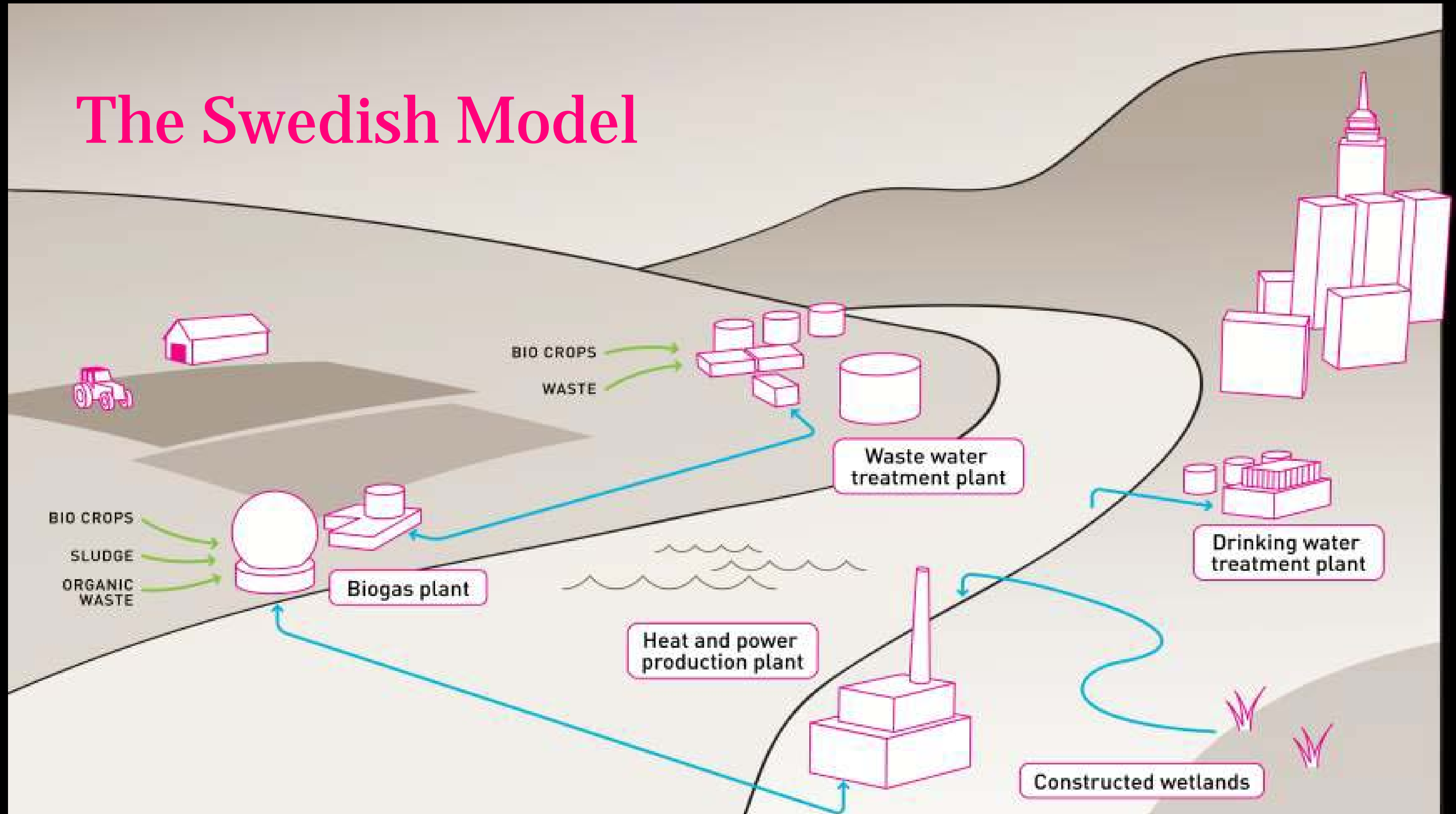


SymbioCity CleanWater Offer

A Swedish Integrated Water and Wastewater Business Initiative

The Swedish Model



SymbioCity CleanWater Offer

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CleanWater business areas

Integrated Water Management

Drinking Water Supply

Wastewater Services and Systems

Bio Gas – Energy Production



Planning of Water Resources

Reference project Lyckebyån

Background

The new EU framework about water means that all water resources are supposed to be planned on river basin level. The river Lyckebyån concerns three municipalities and three counties in the southeast of Sweden. To have influence on coming rules for the use of the water resource in Lyckebyån the three municipalities Emmaboda, Lessebo and Karlskrona intend to provide the water authority with a vision plan.

The project

The legal Association of River Lyckebyån, including the three municipalities, decided that the best way to influence on the decisions about the acceptable use of the water resource was to create a plan that considered all demands on the water resource. Such a planning must involve all stakeholders in the river basin – landowners, municipalities and their water and waste water treatment plants, industries, hydro power plants, organisations of different kind etc – and consider all demands for the future. Of course a good water status must be in focus but also variety in quantity. To achieve these goals a Water Advise Unit will be settled as responsible for the vision plan and the contacts with The Water Authority.

Important experiences

The organisation for the planning of the water resource according to the EU Framework is shown in this illustration. Taking initiatives the stakeholders of the river basin will fulfil demands from EU but will also have the possibility to influence on decisions about the water resource.

Facts

Participating companies

Vatten och Samhällsteknik AB has been the adviser to find out the suitable organisation for this kind of planning on river basin level.

Finance

The Swedish Water and Waste Water Association

The Association of River Lyckebyån

Vatten och Samhällsteknik AB



Systems Analysis

Wastewater and Biowaste in Gothenburg, Sweden

Project

The objective was to develop support for decisions on the future sustainable management of wastewater and biowaste in the Göteborg region. Eight system alternatives were studied within a time frame from now to the year 2050 with five criteria for sustainability based on the Urban Water Framework: Hygiene, Environment (divided into Emissions and use of Resources), Economy, Socio-cultural and Technical function.

Conclusions

- ▶ Considerable differences between the studied alternatives when single indicators were considered, but small with multicriteria analysis.
- ▶ No indication to abandon the centralised system of today.
- ▶ Using wastewater sludge or to extract a pure phosphorus product at the treatment plant are the most sustainable ways to return phosphorus to agriculture.
- ▶ If more than 15–30% of the nitrogen is to be returned in wastewater and biowaste, this will require too much energy.
- ▶ Considerably more nutrients in the wastewater than in the biowaste. It is more sustainable to digest biowaste than to compost it.
- ▶ It will always pay off to reduce the pollutant sources in the society.

Facts

Finance:

City of Gothenburg
Gryaab (regional wastewater company)

Analysis:

CIT Urban Water Management AB

References:

Malmqvist & Heinicke, 2007
City of Gothenburg, 2007
(in Swedish).



Drinking Water Supply

Water Treatment Plant Lofsdalens vattenverk

Background

Härjedalen in Sweden is well known for its beautiful surroundings. The area is not heavily populated most of the year but during the winter season the sleepy villages becomes ski paradise for ski yearning people coming. Heavy variations as far as number of drinking water consumers are concerned and long distances between the existing water purification plants has challenged the authorities responsible for the drinking water supply.

The project

Surface water is used as raw water for production of drinking water at Lofsdalens water purification plant. The surface water is contaminated with organics and humic acids which made it unsuitable for drinking without water treatment. The demands as far as drinking water consumption is concerned vary during the year, the spectra is between 100-700 m³/day. In the past the solution was flocculation and filtration with chemicals. With the variation in flow and low temperatures of the water at winter time the plant needed a lot of manual attendance for regulating the chemical addition. The maintenance people from the main city was located 100 km from the plant and the travel costs was big with several visits a week to the plant.

A complete NF plant, delivered by HOH Vattenteknik AB became the solution for cost efficiency. The plant is totally automatized and the steering and control of the plant can be made from a central control room in the main city which saves money and environment due to long distances in the area.

Reflections

The plant has been operating as originally planned for over 10 years. In order to save both economical and environmental resources solutions with low maintenance needs must be taken into consideration. According to roomers the skiers in Härjedalen enjoy their drinking water just as much as their skiing, in other words- we are satisfied!

Facts

Participating companies

HoH Vattenteknik
Sweco

Finance

Municipality of Härjedalen



References Wastewater Services and Systems

Gao Bei Dian sewage treatment plant

Beijing, China

SIDA financed

Order value: SEK 173,300,000

Design and supply of mechanical and electrical equipment for a municipal sewage treatment plant with a capacity of 500 000 m³/d, serving more than 1,200,000 people, including supervision.

Date of completion: November 2000



Bio Gas – Green Gas concept of Biogas

Könnern Biogas upgrading plant

Background

The Biogas Plant Könnern in Germany was planned to produce biogas from green gas products and then to be burnt in gas engines (CHPs). According to Malmberg's customer, this was in the beginning of the project the best solution according to the subvention guidelines, EEG. A new version of the subvention was launched and a technical bonus was added so that upgraded biogas by Malmberg was the most profitable solution.

The project

Malmberg Biogas got in April 2007 an order to deliver the biggest biogas upgrading plant in Germany, also the biggest one in the world to produce clean methane to the natural gas grid from green products. The plant is based on the principle of a water scrubber and Malmberg Technologies in the field of upgrading biogas had then been focusing on the best solution for optimizing the upgrading plant together with the production plant. So that biogas in the total values chain could be produced to the lowest cost.

The scope of delivery was an upgrading plant including injection station to the natural gas grid – the delivery time was set to inject gas at 20 December 2007 in Könnern. The upgraded biogas should be distributed by the gas company MITGAS (owners RWE), and to be sold as a new product launched as “MitBioGas”, both private and commercial purpose. The profit for the customer was to sell green gas at the same cost as for “fossil” natural gas.

Facts

Participating companies

Malmberg Water AB
EnviTec Biogas GmbH
others

Finance

agri.capital GmbH

Bio Gas – Green Gas concept of Biogas

Könnern Biogas upgrading plant

Important experience

In the past the traditional way of using biogas in Germany was to inject electricity direct to the electric grid at the biogas production plant.

With Malmberg Biogas the customer has found a new way; through the natural gas grid the customer can higher the efficiency in total by injecting the electricity in other locations and then make use of the heat losses, which today stands for 2/3 of the input to the gas engine. Heat resource by biogas plants was in the past seen as a surplus, today must the total energy demand be optimized.

New heat solutions are implemented for a total decreasing of the energy demand. Energy from biogas will therefore only allow heat from green energy, which has resulted in that products with low heat demand, both in production and upgrading, will be the most optimal ones.

Facts

Participating companies

Malmberg Water AB
EnviTec Biogas GmbH
others

Finance

agri.capital GmbH



Bio Gas – Energy Production

Skellefteå Biogas Plant

Background

The municipal biogas plant, situated at Tuvans wastewater treatment plant in Skellefteå, receives domestic waste, slaughterhouse waste and liquid waste

The project

The plant has three receiving units, of which two are for source-separated domestic waste and one for slaughterhouse waste.

The units for domestic waste are equipped with four bottom screw conveyors each for decomposition and homogenisation of the incoming substrates and discharge to the transport conveyors for further transport to two mixers. In the mixers, the substrate is diluted to the right DS concentration. From the mixers, the substrate is led to a bio-separator for separation of non-digestible material. After that, the substrate passes through a disperser for further decomposition and is then led to the buffer tanks.

The slaughterhouse waste is transported with a bottom screw conveyor to the disperser for decomposition and from there to the buffer tanks.

Liquid waste is pumped to the buffer tanks via the disperser.

From the buffer tanks the substrate is pumped to two hygienisation tanks where the substrate is heat-treated at 70 °C before it is pumped to the digester. To avoid too high temperature in the digester, the incoming substrate is cooled with the dilution water flow that is recycled to the process.

The produced biogas is then upgraded to vehicle fuel.

Facts

Participating companies

Läckeby

Finance

Skellefteå Municipality



SymbioCity CleanWater Offer

Companies

ABS Pumpex AB	Kemira Kemi AB, Kemwater
AnalyCen	KSB Mörek AB
Anox Kaldnes	Läckeby Water AB
Brenntag Nordic AB	Malmberg Water AB
Cerlic	Nordic Water Products AB
CIBA Speciality Chemicals Sweden AB	ProMinent
Danfoss AB	Doserteknik AB
Eka	Saxlund International AB
Emotron AB	Scanacon
ENWA AB	SWECO AB
GOODTECH MRAB Sweden AB	Tomal AB
Grundfos AB	Torell Pump AB
HOH Vattenteknik AB	VA-ingenjörerna
Hydropress Huber AB	Vatten och Samhällsteknik
ITT Water & Wastewater Sweden	Weedo AB
	WILO Sverige AB
	Zander & Ingeström AB

Municipal organisations

Umeva	Malmö Stad
Norrvatten	Gryaab
SYVAB	Mälar Energi
Stockholm Vatten	Borlänge Energi
Mitt Sverige Vatten	Sydvatten

Governmental bodies

Swentec – Swedish Environmental Technology Council	Ministry of Enterprise, Energy and Communications
Swedish Trade council	Ministry of the Environment
Ministry for Foreign Affairs	

NGO's

Swedish Water & Wastewater Association	Swedish Association of Local Authorities and Regions
Swedish association of suppliers of fluents and water treatment equipment	Stockholm International Water Institute
NKV – The National Committee of Water	

Finances

Sida – Swedish International Development Cooperation Agency	Swedfund
DemoEnvironment	Kaupthing Bank
NEFCO	Nordic Investment Bank
	The Swedish Export Credits Guarantee Board

Research organisations

IVL Swedish Environmental Research Institute	Royal Institute of Technology
Urban Water	Lund University
Chalmers University of Technology	

