Biogas Production at Flint WWTP

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Some facts 2008

- Population: 140,000
  - Number of students are 19,000
  - Fifth largest town in Sweden

- Long tradition of integrating energy and environmental solutions in full scale industrial and profitable system solutions

- No access to Natural Gas Pipelines

Linköping, Sweden
30 %

>90 %

>6 %

Long Term Climate Focus
Business Idea:

- Design, Own and Operate biogas plants.
- Operate and Optimize biogas plants at WWTP with profit sharing.
- Project manage, establish, and optimize existing biogas plants.

Leading experience from stable and high load, energy efficient operation within:

- Biogas from Waste Water Treatment Plants.
- Biogas from Industrial Organic Wastes (Slaughter house, food waste, etc)
- Biogas from other organic substrates (Ethanol stillage, crops, etc)
Complete Supply Chain Experience
One Process – Several Solutions
Biogas business in Linköping

- 16 years experience from process, production, and market development of biomethane to vehicles.
- 3 production plants, 13 public fuelling stations, and 1 bus depot.
- Bio-fertilizer is sold to farmers and replace artificial mineral fertilizer.
- Employs ~45 persons in production, process, and market, of which 12 persons within SBI.
- Export of knowledge, patents, and production concepts through Swedish Biogas International LLC on US market.

Development from Linköping, Sweden
Purpose of the venture was to create a better air quality

- Pre-study of possible solutions 1989
- Pilot project for upgrading of biogas 1990
- First five biomethane buses 1992
- Full-scale project started 1994
- Full-scale biomethane plant 1996
- Never stopped the buses since 1996

>6% of all vehicle fuel is biomethane today!

Biomethane in Linköping, Sweden
Municipal company

Exclusive licence agreement and close cooperation

SvenskBiogas
Municipal company
Production, distribution and sales of biomethane in the region of Linköping.

Center of Excellence Biogas

Privately-held company
Process development and production of biomethane on an international market.

Partner Companies
SBI has exclusive rights to do business, sublicense, and develop knowledge and patents regarding to biogas production and processes owned by Svensk Biogas and the Tekniska Verken Group.

- Sixteen years experience from operations, service, repairs and development of full scale biogas plants on a wide substrate base.

- Access to three full-scale production plants as references and for ongoing development.

- Modern laboratory reactors (1 and 2.5 gallons) and pilot plant (10 000 gallons) for development and verification of new and improved processes.

- Four accepted patents regarding the biogas process and additives to the process.

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**Intellectual Properties**
Biogas Production at Flint WWTP
In Sweden

- SBI was selected as a leading biogas company by US Ambassador Wood, spring of 2007.

In Michigan

- State of Michigan searched for:
  - sustainable job-creating businesses
  - businesses to be established within Center of Energy Excellence bill/concept and bi-lateral agreement between USA and Sweden.

- Initial contacts between Michigan and SBI and performance of due diligence regarding production and process knowledge.
  → SBI chosen by MEDC as anchor company for Center of Energy Excellence in Flint.
External Funding
Michigan Economic Development Corporation (MEDC)
Swedish Energy Agency/Vinnova

Swedish Biogas International
LLC Established in Michigan
“Anchor Company”

Center of Energy Excellence (CoEE)
Center of Excellence Biogas (CoEB)
SBI Flint Biogas Production Plant

Anchor Company Model
Pre-Engineering

• Performed by SBI and Flint during summer/fall of 2008, financed by MEDC and Swedish Energy Agency.

During September of 2008 MEDC granted 4 MUSD to SBI.

Inauguration of Center of Energy Excellence

• Performed the 26th of September, 2008 by the Swedish King Carl XVI Gustaf, Governor Granholm, and other distinguished participants.
The scope of the project is:

• To generate significant cost savings and an energy efficient solution for digestion of sewage sludge at the Flint WWTP.
• SBI will license the process technology to Flint in a long-term cost-sharing and optimizing agreement.

Step 1
• Produced biogas will be used for electricity and heat

Step 2
• Upgraded biomethane will be used by vehicles on a captured fleet market.
Influent box → Grit chamber → Prim. settling → Aeration tanks → Final settling → Cl₂

Incoming waste water

Sludge Storage

Dewatering

Biogas Plant
(detached solution, can go back to original solution by switch of a valve)

Recipient

Flint WWTP without Biogas Production
Incoming sludge

Thickener → Tube Heat Exchanger → Digester

Current Sludge Storage → Dewatering

Flare

Gas consumption

CHP

Aeration

Upgrading → Vehicle fuel

Step two

SBI Flint Biogas System Solution
• Final engineering completed and purchasing of components started.

• SBI responsible for design, build, and transfer of plant to Flint.

• Focus on maximizing purchasing from Michigan based companies to generate local/regional jobs.

• Construction to start spring/summer 2009.

• Start-up of plant planned for late fall/winter of 2009.

Status of Flint Biogas Project
Swedish Biogas International LLC established with office in Flint, Michigan.

Center of Energy Excellence partner with Kettering University to expand and further develop business.

Looking for long-term production partnerships in line with ongoing business at Flint WWTP.
We secure your investment in the complete bio-methane cycle!

Swedish Biogas International AB strive toward a sustainable future by optimizing, operating and owning bio-methane plants on a global market. We supply local solutions to global problems.

We have long, practical experience from

- Organic waste
- Crops, stillage
- WWTP

www.swedishbiogas.eu

Thank You for Your Time!

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