

# From Sweden to Korea with Bio- methane as vehicle fuel

Swedish Biogas International  
Eco energy Holdings

2010.12.17

# New & Renewable energy trends



US



CHINA



KOREA



JAPAN



EU

✓ Most of the countries has the target to provide **20%** of total energy, as **New & Renewable energy** by 2020

✓ **Actual situation 2010. 12**

UK 15%  
GERMANY 18.7%  
DENMARK 30.0%  
SWEDEN 49%  
KOREA 2.4%

Let us first look at  
Sweden and city of



**Linköping**

# Education of Sweden



- ✓ Education about Renewable energy start already at children school

# Linköping a great biogas city



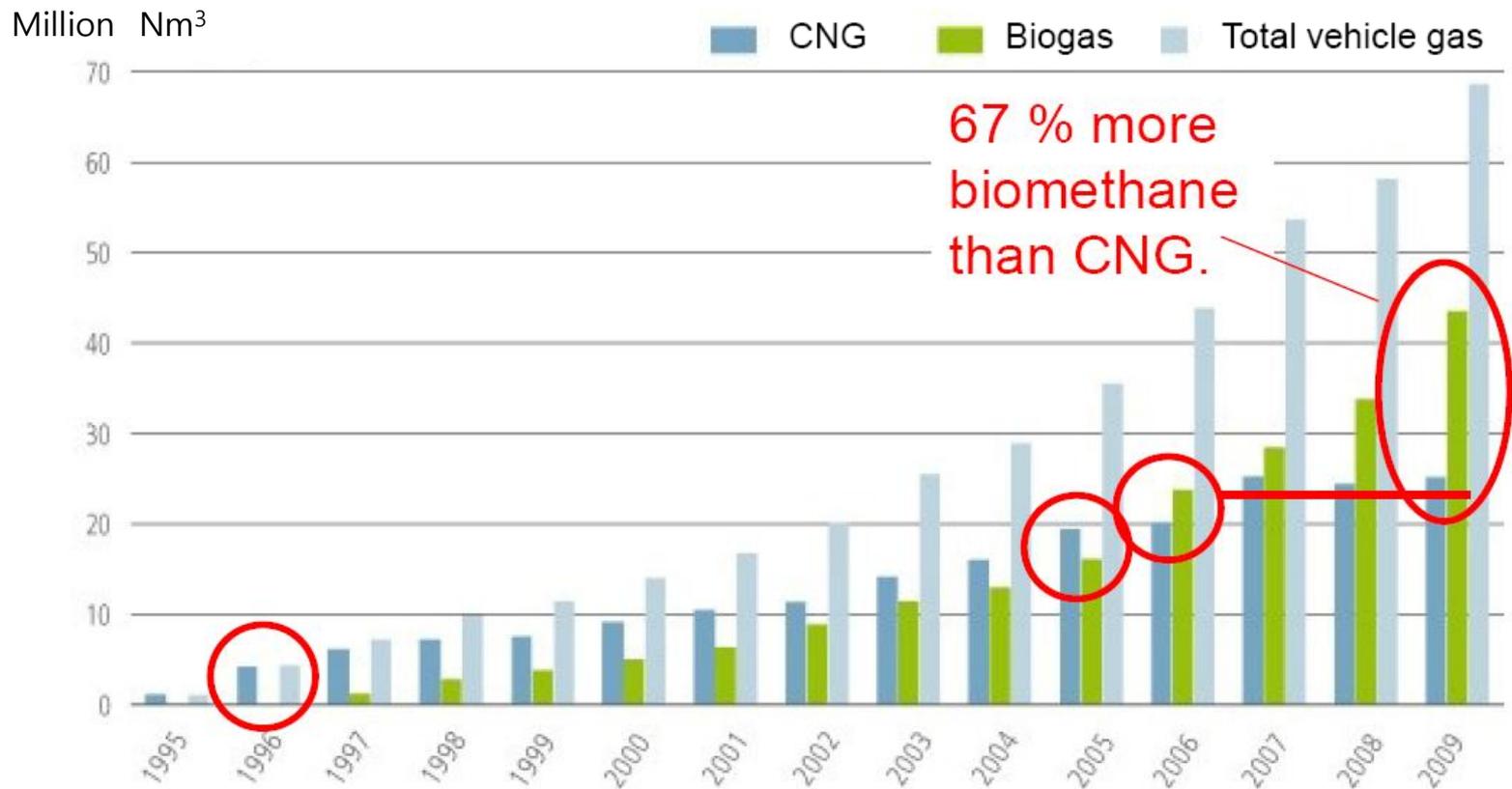
## Q : Why did Linköping start with Biogas?

- ✓ To improve the air quality in the city central
- ✓ All started by cooperation between municipality owned company, TEKNISKA VERKEN and University of Linköping in 1989

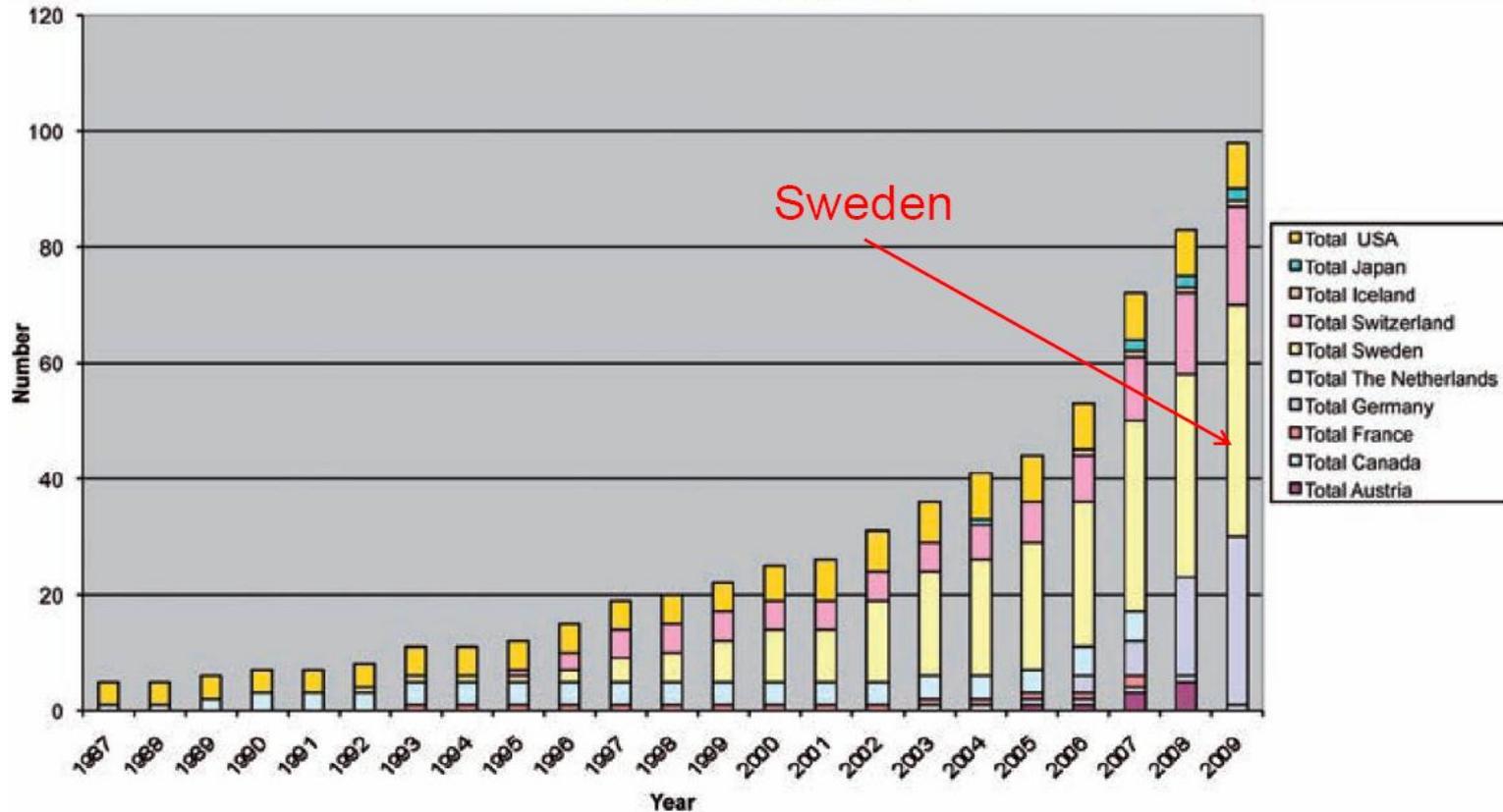
# Background & Experience

- ✓ Pre study of possible solutions 1989
- ✓ Pilot project, upgrading Biogas to Bio-methane 1990
- ✓ First five buses on WWTP Bio-methane 1992
- ✓ Full – scale production, waste to Bio-methane 1994
- ✓ All city buses (65) on Bio-methane 1996
- ✓ First public fuelling station 2001
- ✓ Ethanol waste to Bio-methane, in Norrköping 2006
- ✓ Swedish Biogas International (private co) 2006
- ✓ 2007 – 2010 9 National Bio-methane plants were built

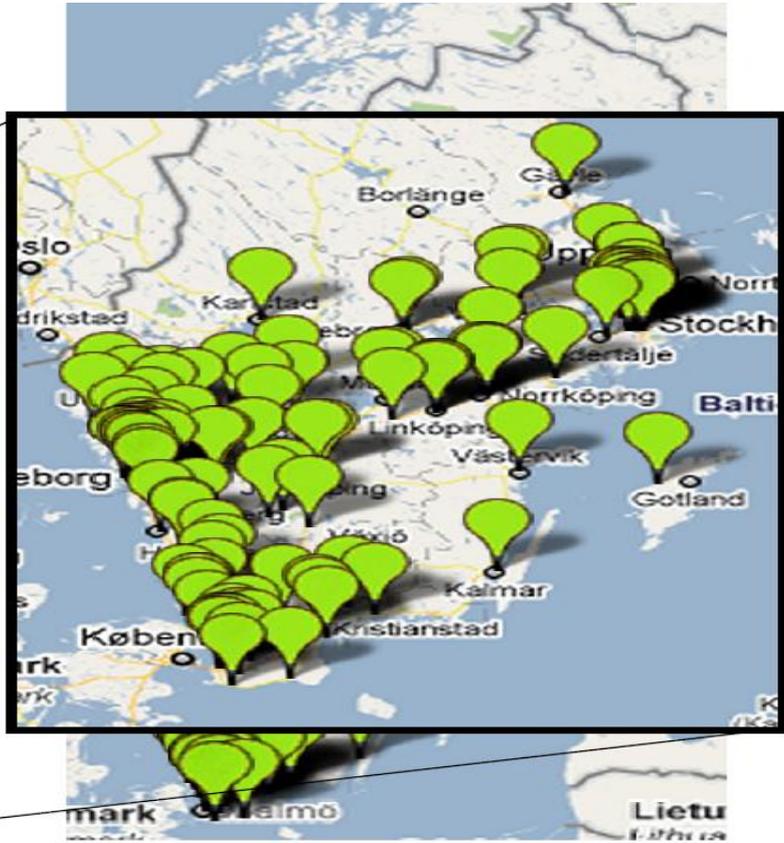
# Sales of Bio-methane based vehicle gas in Sweden



# Biogas upgrading plants in the world



# Gas (CNG+Biogas) filling station in Sweden



# How Swedish Biogas International entered into Korea market

## ✓ There are two main reasons that SBI come to Korea

- 2006.11 **Gangwondo Biogas team** visited Sweden City of Linkoping
- 2007.05 Swedish Biogas International made a feasibility study on Biogas plant in Wonju
- 2008.01 **Eco Energy Holdings** visited Sweden and City of Linkoping
- 2008.08 Swedish Biogas International carry out a pre-engineering phase of Wonju Biogas plant
- 2008.11 Eco Energy Holdings and Swedish Biogas International establish Bio Methane Seoul to construct the first upgrading plant and Filling station for vehicle fuel in Korea
- 2009.06 Swedish Biogas International Korea Ltd was established. Joint venture 60% EEA / 40% SBI
- 2009.09 The first filling station for Biogas fuel was opened in Seonam, Seoul
- 2010.01 SBIK carry out proposal for Wonju Biogas plant
- 2010.12 Establish of SPC for Wonju Biogas plant
- 2011.03 Construction of Wonju Biogas plant will start Construction period will be around 24 months

# LFG plants operated by Eco Energy

## - Eco Energy is 100% owned by Eco Energy Holdings

### Sudokwon 50MW LFG Power Plant

<b>Type</b>	Steam turbine generator
<b>Location</b>	Baekseok-dong, Seogu, Incheon
<b>Operator</b>	Eco Energy Co., Ltd.
<b>Facility scale</b>	50MW/h (the world's largest scale) Supply for 180,000 households (Based on 200kwh/month household consumption)
<b>Status</b>	Under operation
<b>Electricity Sales Revenue</b>	\$ 27~36 mil (\ 0.3~40 bn) per year
<b>Operating Revenue</b>	\$ 18 mil (\ 20 bn) per year
<b>Investment</b>	\$ 87 mil (\ 95.9 bn)
<b>CERs</b>	About 1.2 million CO2 tons/year



# First Bio-methane filling station in Korea



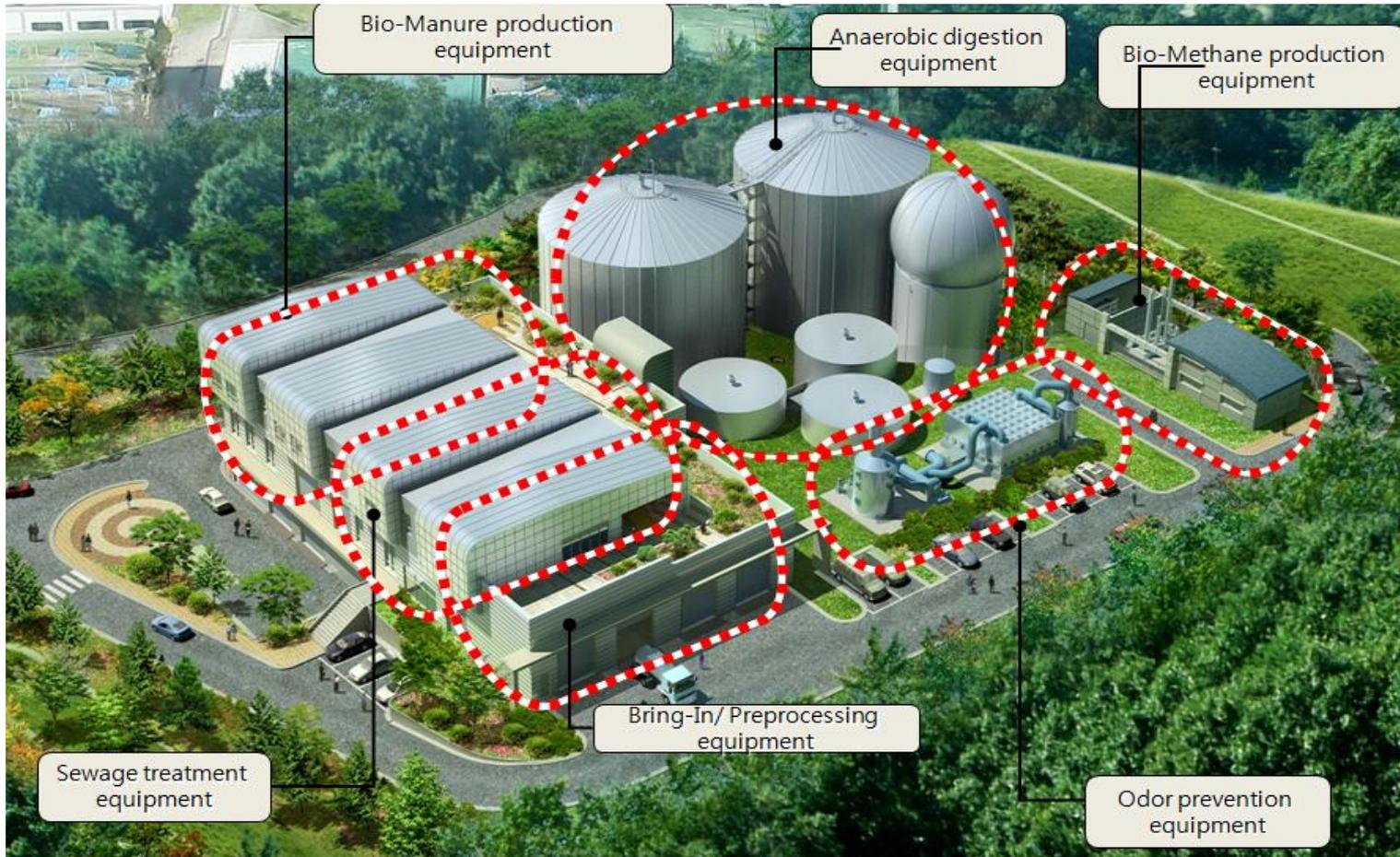
## Seonam WWTP, Seoul, Korea

- ✓ Opened September 2009
- ✓ 100% Bio-methane
- ✓ Upgrading : Water scrubber
- ✓ Capacity : 230 Nm<sup>3</sup> Biogas/h



## Bio-methane Seoul Ltd.

# Wonju Biogas plant



# THINK Bio gas!

## Cheap - Clean - Green

- ✓ Korea is already prepared with CNG busses in all cities, which can also be run on Biogas
- ✓ There are 15,000 tons of food-waste/day in Korea, which can replace 220,000,000 L of gasoline/year

# Summary

## Of my experience from Korea Bio-energy industry

- ✓ Korea is well prepared, but missing experience
- ✓ Korea has excellent manufacturers of equipment,  
as well as very qualified environment engineers
- ✓ Korea has lack of policies and regulations,  
or too complicated regulations

## Remember!

- ✓ There are NO short cut when building a Biogas plant
- ✓ Test the substrate, Test, Test, Test 6 – 18 month
- ✓ Secure the Operation Experience

# Your partner to develop Korea market!

Eco Energy Holdings & Swedish Biogas International



15 years experience in operating LFG plants

17 years experience in operation Biogas plants

# Thank you

