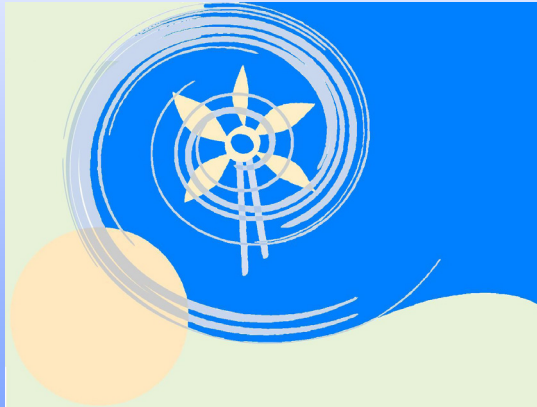


Renewable energy from crops and agrowastes, CROPGEN

European Biomass Research, Industrial Perspective
Jönköping, 30 May 2006



Arjo Heinsola

Metener Ltd

- ✓ **Established in 2001**
- ✓ **Utilizes the practical knowledge and experiences from the biogas plant which Erkki Kalmari constructed to his milking farm on 1998**
- ✓ **The biogas plant has run continuously since it started it's operation**
- ✓ **Erkki Kalmari is having heat and electricity to his farm and the fuel for his car**
- ✓ **Research cooperation with University of Jyväskylä since 2000**



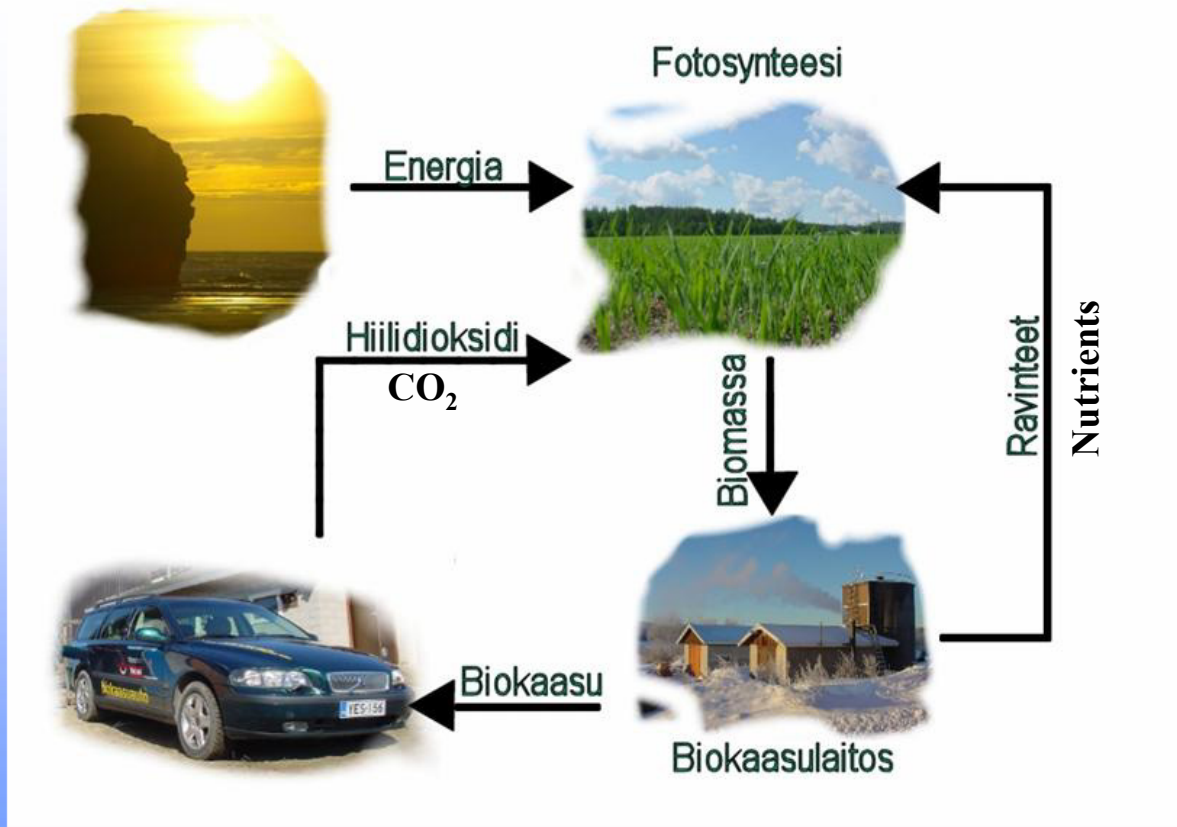
- ✓ **5-7 employees; construction-, automation- and electrical specialists**
- ✓ **Tens of prefeasibility studies and various designs made**
- ✓ **Constructed two farm scale biogas plants and the third one is under construction**
- ✓ **Designed and constructed two biogas aggregate units; 30 kW and 22/30 kW**
- ✓ **The biogas upgrading unit has been designed and constructed into the sea container; cleaning capacity 40 m³/h**



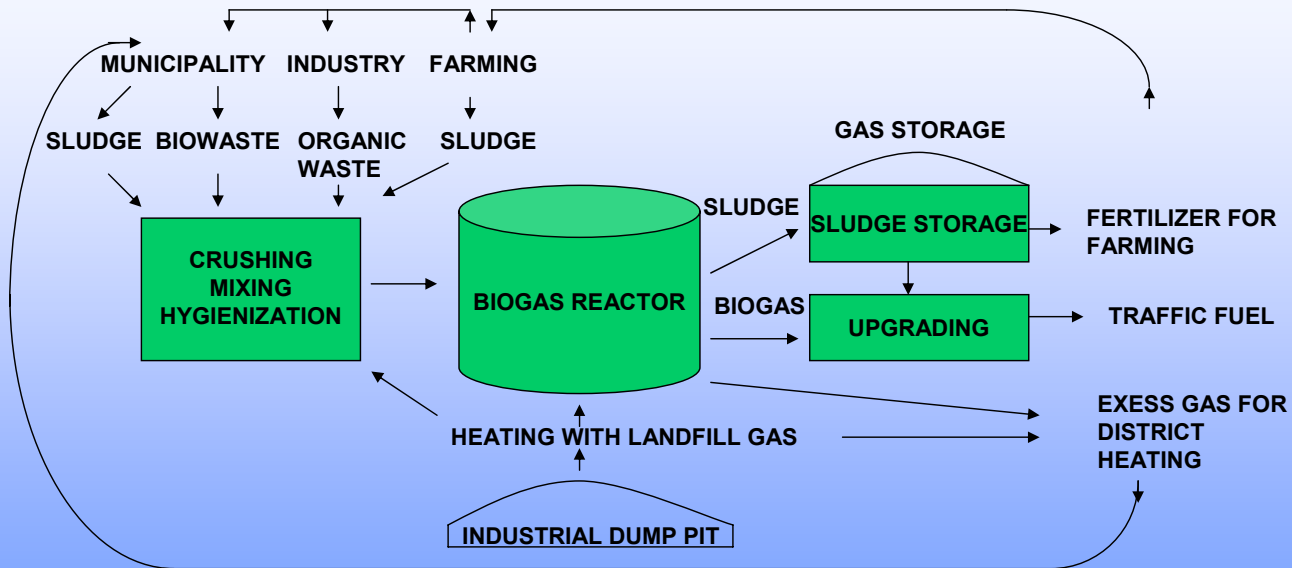
- ✓ **Two test reactors are under construction.**
- ✓ **The first biogas filling station in Finland is under design**
- ✓ **Expert's reports**
- ✓ **The objective is to create effective equipment chain from the field to the vehicle's tank**

- ✓ **Rising awareness of biogas in Finland**
- ✓ **Distribution of knowledge of biogas; tv, radio, magazines and newspapers, seminars, visitors**
- ✓ **Political influencing**





TRAFFIC FUEL AND FERTILIZER FROM BIOWASTE CONCEPT FOR ONE SMALL MUNICIPALITY OF MIDDLE FINLAND

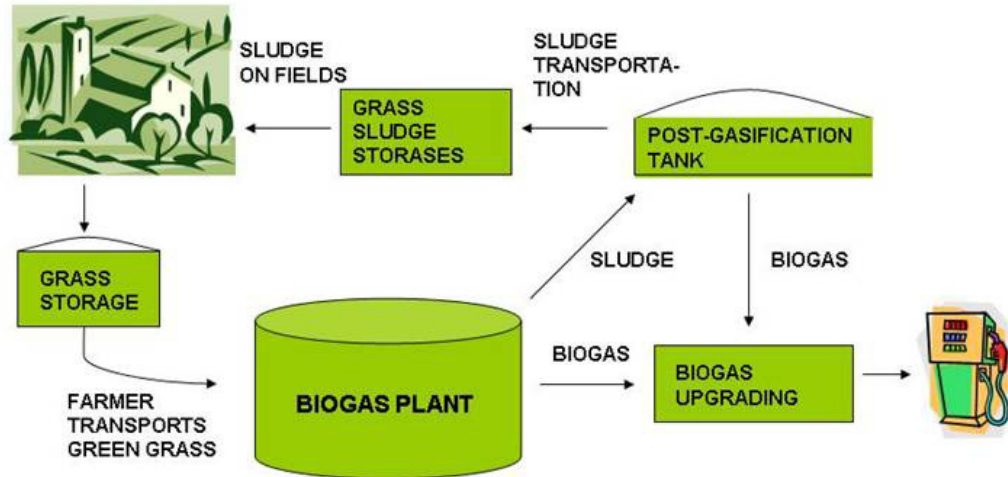


Aino Palmroth, University of Jyväskylä, Erkki Kalmari, Metener Ltd,
2005



TRAFFIC FUEL AND FERTILIZER FROM GREEN GRASS CONCEPT FOR ONE SMALL MUNICIPALITY OF MIDDLE FINLAND

SOME PART OF FEELDS IN
GRASS PRODUCTION



Aino Palmroth, University of Jyväskylä, Erkki Kalmari, Metener Oy, 2005



Why to participate in CROPGEN project

General reasons;

- × To reduce climate change effects by taking renewables into use
- × To keep countryside alive by creating new business possibilities

Benefits for the company;

- × Enables close cooperation with researchers
- × Gives the latest research knowledge into use
- × Gives the financial support for the practical biogas research
- × Motivates for the research and development



- × **Contributes in equipment development**
- × **Helps to create important contacts**
- × **Contributes expertise in the biogas field**
- × **To give credence for acting as the bioneer**

During this CROPGEN project the confidence in the field biomass concept has increased





BIOGAS PLANT IN THE PIG FARM

European Biomass Research, Industrial Perspective
Jönköping 30 May 2006





BIOGAS AGGREGATE UNIT, 30kW



BIOGAS BURNER





BIOGAS UPGRADING UNIT

European Biomass Research, Industrial Perspective
Jönköping 30 May 2006





CONTROL BOARD OF THE UPGRADING UNIT

European Biomass Research, Industrial Perspective
Jönköping 30 May 2006





IN SWEDEN 2002

European Biomass Research, Industrial Perspective
Jönköping 30 May 2006

