

Demonstration plant for pig manure based biogas production – to produce renewable energy, improve manure nutrient management and reduce nutrient leaching from industrial pig production to the Baltic Sea

The Baltic Sea is one of the most polluted seas in the world. The overload of nutrients results in large algae blooms and vast areas of “dead” sea bottoms. A key point source for the nutrient load is industrial meat production, a growing activity in the Baltic Sea region. BalticSea2020 started a ten year program in 2010, “The Intensive Pig Production Program” with the objective to identify and implement cost-effective measures to reduce the leaching of nitrogen and phosphorus from industrial meat production. Measures and technologies have been identified and the next step is realization, evaluation and demonstration in a demonstration plant.

Project duration: 2011 – 2020

Pig manure based biogas production - a Win/Win solution

Pig manure should be treated as a resource and not as a waste. BalticSea2020 research studies¹ conclude that pig manure based biogas production combined with improved manure management can benefit society, pig farmers, biogas companies and the environment;

- *Farmer/ biogas companies* – improved fertilizer, reduced costs for heating, diversified sources of income
- *Society* – less dependence of fossil fuels, new job opportunities, clearer water and less odor problems from pig production
- *Environment* – reduced emissions of climate gases to air and nutrients to water

Poor manure management add to eutrophication

The demand for meat is increasing in the Baltic Sea region, and a shift from small scale to large scale meat production is predicted. Manure management at intensive meat production installations is often neglected and large quantities of nitrogen and phosphorus leach to nearby waterways and eventually to the Baltic Sea.

A pig produces large amounts of manure, with three to four times more nitrogen and phosphorus than a human. Historically the manure was used as cheap and effective

¹ The technical reports “Best Available Technologies for Manure Treatment”, “Cost Effective Phosphorus Management Measures” and “Best Available Technologies for Pig Manure Biogas Plants in the Baltic Sea Region” are available at the Baltic Sea 2020 website <http://www.balticsea2020.org/english/alla-projekt/oevergoedning/eutrophication-ongoing-projects/59-intensive-pig-production-program> <http://www.balticsea2020.org/english/alla-projekt/oevergoedning/eutrophication-ongoing-projects/59-intensive-pig-production-program>.

BalticSea2020

fertilizer for the farm plant production. Nowadays, agriculture is often specialized either on meat or plant production, and the natural recirculation of nutrients is broken.

Measures to reduce nutrient leakage from industrial pig production

The measures and technologies which have been proposed as “Best Available Technologies” to reduce leaching from intensive pig production are:

- Anaerobic digestion of manure - to improve the fertilizer value of the organic nitrogen (N) is converted to mineral fertilizer in the process.
- Separation of manure/digestate into a liquid fraction with most of the nitrogen and a solid fraction with most of the phosphorus (P) - to enable proper dosing of N and P according to the plants need
- Efficient manure management (storage, spreading and dosing) - to improve recirculation of nutrients in the manure and reduce losses to air and water.
- National frameworks and regulations which support proper dosage of N and P in manure, such as standards for nutrient concentrations in manure and norms for maximum dosage of both nitrogen and phosphorus.

The Demonstration plant

These measures (with the exception of “national frameworks and regulations”) will be implemented, evaluated and demonstrated in a demonstration plant. We expect to prove that

- nutrients leaching from intensive pig production can be significantly reduced and
- pig manure can be used as a resource for renewable energy and for plant production.

The plant will be built in cooperation with authorities, pig farmers, biogas companies as well as financial and scientific institutes. Demonstration facilities will be included, to share the environmental and economic performance of the plant with concerned actors within intensive livestock farming and biogas production.

Time plan

- 2011 – Feasibility study, identification of project partners
- 2012 – Projecting of biogas plant and manure treatment
- 2013/2014 – Construction and upstart
- 2013/2020 – Monitoring, evaluation, documentation and demonstration.

Project Manager BalticSea2020

Lotta Samuelson, Master of Science in Natural Resource Management, Stockholm Resilience Centre at Stockholm University.

E-mail: lotta.samuelson@balticsea2020.org, Tel: 08-673 97 61, Mobile: 0708 238 747