

# Lantmännen Agroetanol, Sweden

**Stringent CO<sub>2</sub> reduction criteria lead to business success**

<b>Year of implementation:</b>	2005, updated 2015
<b>Location:</b>	Norrköping, Sweden
<b>Technology:</b>	Ethanol biorefinery Location of the ethanol plant close to biomass-based CHP ensures deliveries of renewable electricity and process heat.
<b>Principle feedstocks:</b>	Wheat and other grains, as well as starch-rich residues from the food industry
<b>Products/markets:</b>	Fuel ethanol and co-products in the form of protein-rich feed. A further co-product here is the (biobased) carbon dioxide that is captured and sold as industrial raw material to customers in the food processing and packaging industry.
<b>Technology Readiness Level (TRL):</b>	TRL 9 – actual system proven in operational environment

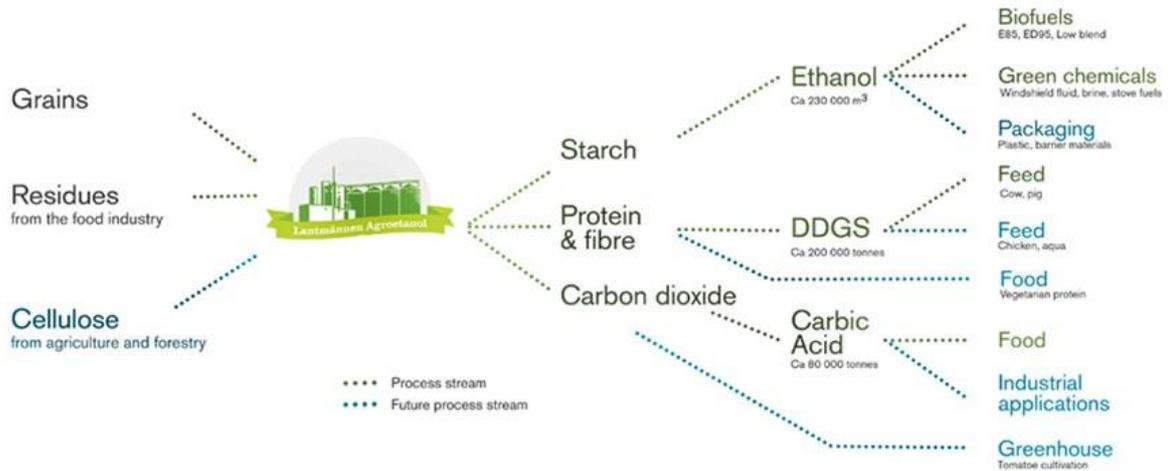
## DESCRIPTION

Lantmännen is a Swedish agricultural cooperative owned by 25,000 Swedish farmers, providing food, feed and fuel nationally and internationally. Since 2001, Lantmännen has produced fuel ethanol at a facility in Norrköping in South-Eastern Sweden based on wheat and other grains as well as residues from the food industry. The plant was initiated to develop new markets for agricultural products. Thanks to efficient processes, the use of renewable process energy from adjacent biomass-fueled CHP and important co-products in the form of protein-rich feed and biogas, the fuel ethanol produced reduces GHG emissions by more than 90 % compared to fossil fuels.

From 2015, Lantmännen is also marketing a renewable ethanol fuel for diesel engines called Agro Cleanpower 95, which reduces GHG emissions by up to 90% compared to fossil diesel. A noteworthy co-product here is the (biobased) CO<sub>2</sub> sold as industrial raw material to customers in the food processing and packaging industry, i.e. an example of biobased carbon capture and use (Bio-CCU).

Yet, the ethanol production at the Lantmännen plant has had significant problems in terms of business performance. However, beginning in the second half of 2015, the plant has become profitable as a result of increased ethanol volumes exported instead of used within Sweden. This is a result of differences in policy structures: e.g., in Germany, policy measures rewards renewable fuels depending on GHG emission reduction potential whereas Swedish policy currently do not. This has made Lantmännen's ethanol highly competitive in other European markets and has resulted in substantial profits. In 2018 Sweden will introduce similar policy measures as Germany which may change where Agroetanol will have its main markets.

Agroetanol has an annual capacity to convert 600,000 tons of grains into 230,000 m<sup>3</sup> ethanol with 200,000 tons of protein feed as co-product, mainly for cattle, and 200,000 tons of CO<sub>2</sub> which is collected, liquefied and turned into green carbonic acid (mainly for beverage production).



*Opportunities for the Lantmännen biorefinery in Norrköping, Sweden*

<b>Stakeholders involved:</b>	Swedish farmers, AGA (purchaser of CO <sub>2</sub> ), Lantmännen, European policy makers, Swedish policy makers
<b>Contribution to Sustainable Development Goals:</b>	The Lantmännen biorefinery contributes to several SDGs: delivering a sustainable vehicle fuel (SDG 7), industrial development based on sustainable feedstocks (SDG 9), synergies between food-energy markets (SDG 12), and substantial life cycle GHG emission reductions through system improvements, co-production and CCU (SDG 13).
<b>Employment:</b>	<i>No information available</i>
<b>Replicability and scale-up potential:</b>	The scale-up potential at local and regional level is low, medium at national level and high at international level. However, the international trend in biofuel policy is to disincentive all crop-based fuels independent of life cycle environmental performance. This leads to significant political risk pertaining to replicability and scale-up.
<b>Success factors:</b>	Policy-driven market demand for biofuels with substantial GHG emission potential; Collaboration between several different market actors over time.
<b>Constraints:</b>	Focus in international policy on singling out specific raw materials rather than focus on life cycle emission performance. Political uncertainty in the EU pertaining to classification of specific raw materials (i.e. grain residues) as eligible for double counting in the EU RED.



*Lantmännen biorefinery in Norrköping, Sweden*

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**More information:**

<https://www.lantmannenagroetanol.se/en/>

<https://www.lantmannenagroetanol.se/en/produkter/etanol/ed95/>

<https://lantmannen.com/en/about-lantmannen/financial-information/interim-reports/>