

# Sustainability with climate focus

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Hans Berggren, CEO

Sveriges Stärkelseproducenter (SSF)

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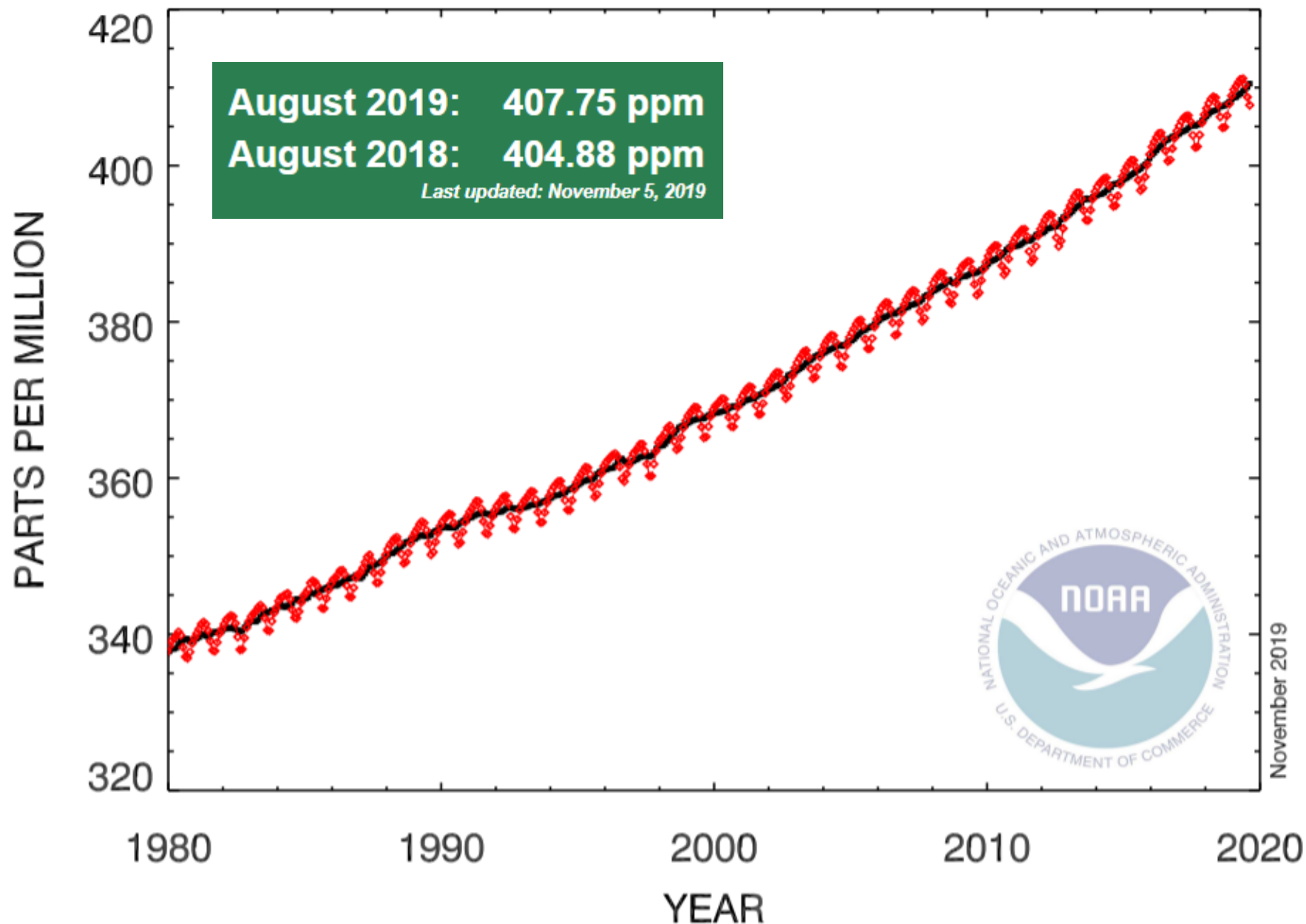


- Swedish Starch Producers Association
- Founded 1927
- Owned by 600 potato growers in southeast of Sweden
- 400 employees in Sweden + 300 employees abroad
- Represented in +50 countries
- Revenue 190 M€

# Content

- What causes rising CO<sub>2</sub> content in the atmosphere?
- What can be done in Lyckeby?
  - **To reduce our footprint – topic of today**
  - To utilize starch replacing fossil material – topic of another day
- Need for political support

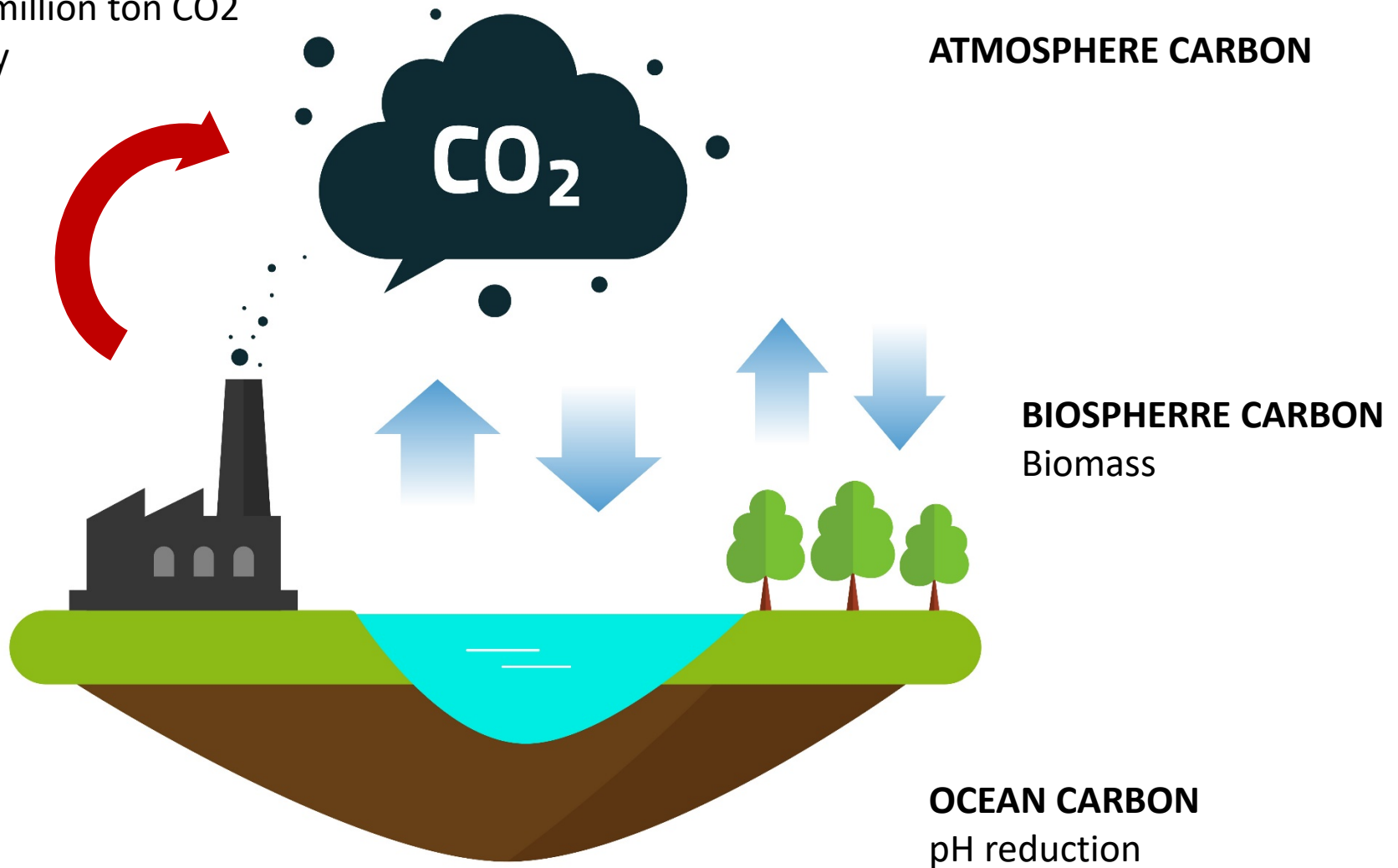
# GLOBAL MONTHLY MEAN CO<sub>2</sub>



# The Carbon Cycle

**FOSSIL use**

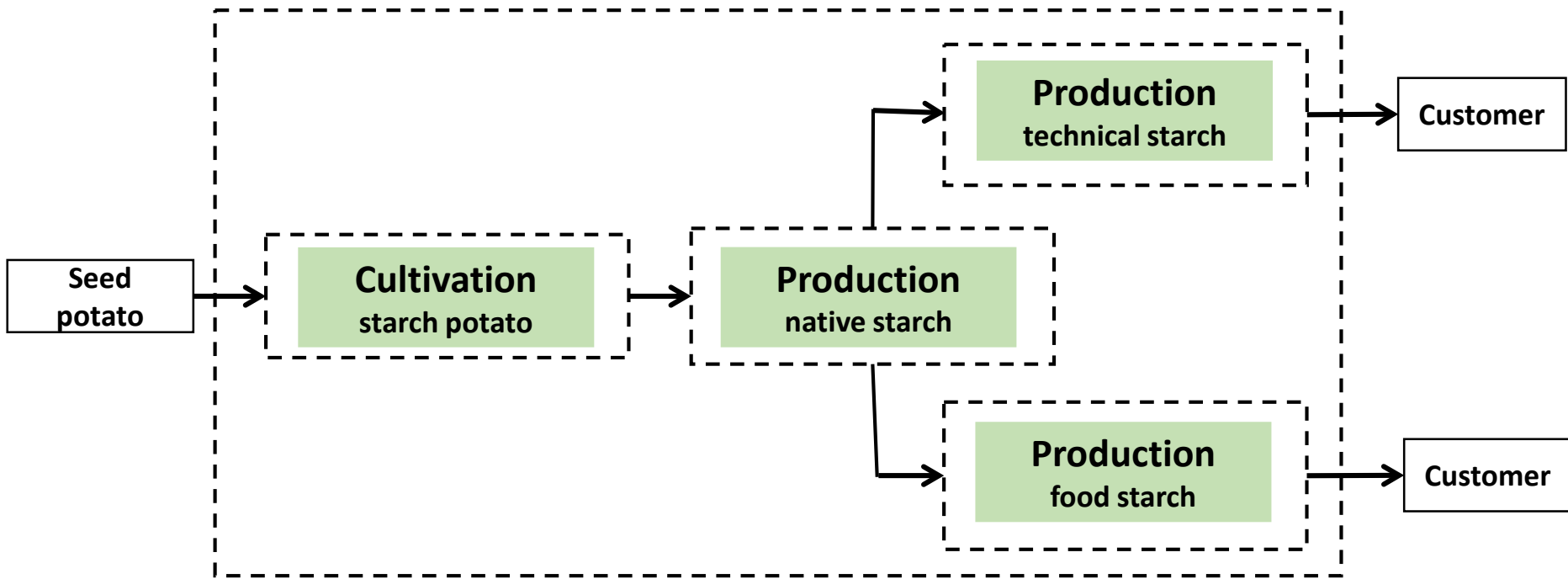
+ 100 million ton CO<sub>2</sub>  
per day



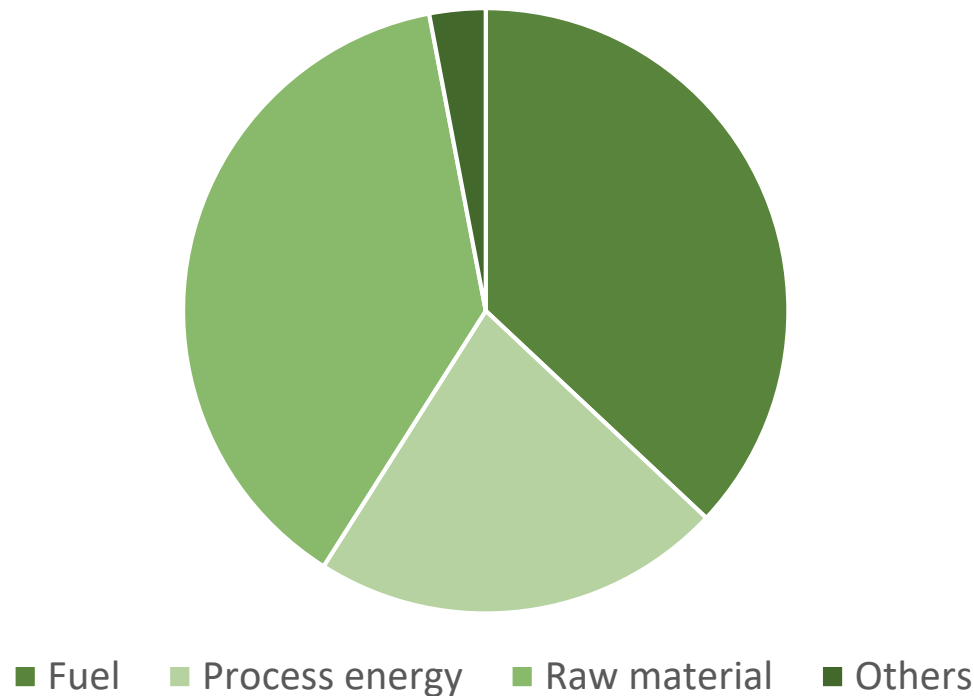
# What can Lyckeby do?

## Climate impact assessment with lifecycle perspective

4 connected systems from cultivation to transport to customer

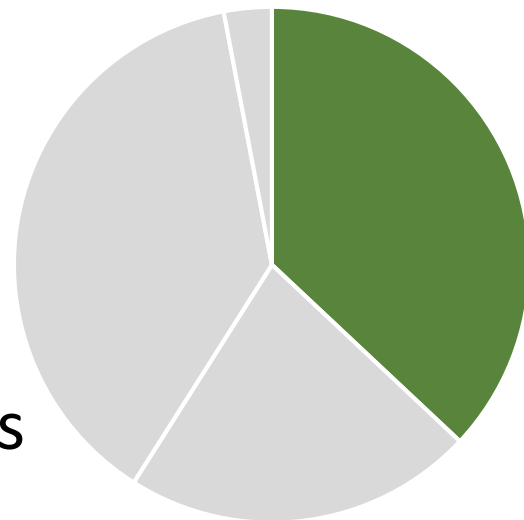


# Distribution of total climate impact from our starch operations (%)



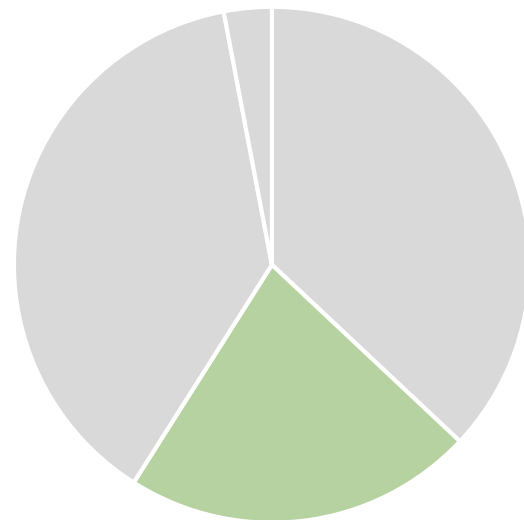
# Fuel

- Cultivation process, transport of potatoes and transport to customers
- Possible actions
  - Reduce driving through better cultivation technology
  - Reduce driving through better logistics
  - Replace fossil fuel by electric power
  - Replace fossil fuel through successively substitution
  - Replace fossil fuel with HVO in own agreements



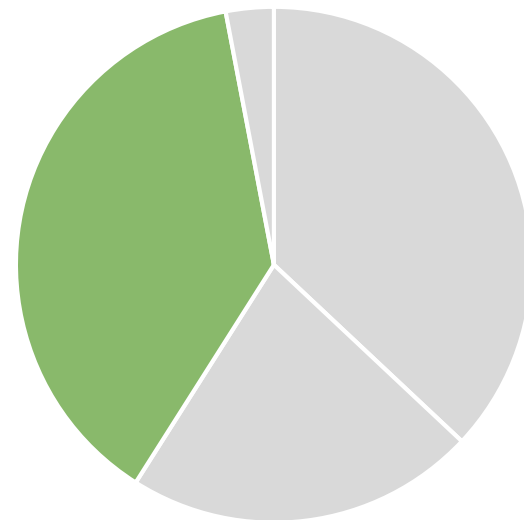
# Process energy

- Production of native starch and refining of modified starch
- Possible actions
  - Reduce through optimized processes
  - Conversion of steam boilers to electricity
  - Conversion of steam boilers to renewable energy
  - Increase proportion of clean label starch



# Raw material

- Commercial fertilizers, plant protection, process chemicals
- Possible actions
  - Reduce through optimal cultivation
  - Reduce through optimal process
  - Eliminate with modern plant breeding technologies
  - Renewable energy for production of raw material



# Site Directed Mutagenesis for Sustainable Starch Production

# Sustainable production

Today:



Chemical modification  
Similar technology for 80  
years

Future:



Clean label starch – product of  
tomorrow  
Clean label technology for  
equivalent products

*Vision  
"The green starch factory"*

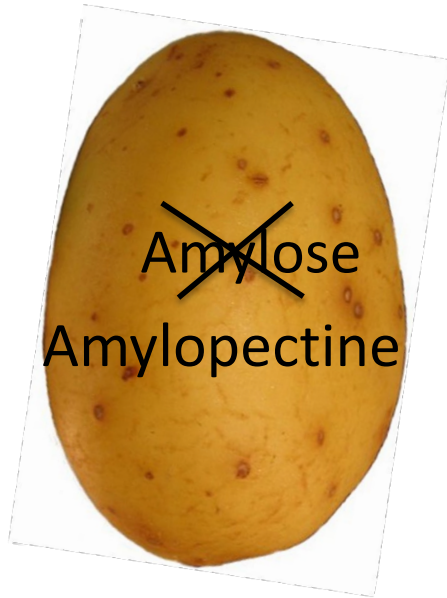
# Using NBT we have managed to solve storage stability.



Research project in collaboration with



# Site directed mutagenesis for improved sustainability



Site-directed  
mutagenesis  
CRISPR-Cas9

New variety:

**Amylopectine starch**

- ✓ Natural storage stability
- ✓ No need of chemical modification



Reduction of process chemicals: 4-5000 MT/year

Reduction of energy consumption: 0,5 GWh/year



- Project started 2014
- 2019 → field production
- 2022 industrial production of new, climate friendly, starch products



# Late blight resistant potato

- The use of plant protection products against leaf mold is extensive in potato cultivation
- By creating varieties that are naturally resistant to the fungus, we can reduce the use of plant protection by up to 75%
- At the same time, the use of fuel is reduced
- Breeding work is in progress, the first varieties will be evaluated in 2020

# Need of political support

- Further policy decisions are needed to increase the availability of renewable energy sources
- Modern plant breeding is stopped by EU legislation, we need a change of the GMO-legislation

# Thank you!

