Sustainable Advanced Biofuels and more – St1 Biorefinery

Building a sustainable European biofuel industry
Gothenburg Nov 4th 2019

St1 Oy
Patrick Pitkänen
St1 vision: “To be the leading producer and seller of CO₂-aware energy”

Our goal is to

• Develop and commercialize functional and environmentally sustainable solutions
• Deliver these solutions profitably

Each solution must be

• Technically ready for use today
• Ecologically and ethically sustainable
• Logistically feasible

\[ E = St^1 \]
St1 home market

Home market consists of Finland, Sweden and Norway. Headquarters in Helsinki. Employs more than 770 people. Operations are strengthened by strategic long-term partnerships in various areas.

STATION NETWORK
Total of ca. 1300 St1- and Shell-sites in Finland, Sweden and in Norway.

ENERGY PRODUCTION
St1 value chain video
St1 Biorefinery Business Development & Production
St1 Cellunolix® process is optimised for softwood saw dust

Saw dust

**Biorefinery products:**
- turpentine
- furfural
- vinasse

**Energy**
- steam
- electricity

**Additives**
- enzymes
- yeast
- chemicals

**Utilities**
- water
- cooling water

**Water circulation**

**Ethanol 99.7%**

**Waste water**
- anaerobic digestion
- existing waste water treatment plant
- water systems

**Sawdust**

**St1 Cellunolix® process**

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- steam
- electricity

**Additives**

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**Sawdust**
Cellunolix® Products
Sustainable & biobased solutions for different uses and applications

Lignin

Biogas & Liquid Carbon dioxide
St1 Advanced Ethanol Production in Circular Economy

- Over a decade St1 has developed waste based advanced ethanol production concepts for various waste feedstocks.
- Biorefinery concept and technology development is done hands-on from lab to pilot and furthermore to demonstration scale ending up to a commercial replication.
- Current development focus is in:
  - new feedstock
  - Process enhancement
  - own enzyme onsite production
  - biorefinery side products to valuable renewable products.
- Development is made in partnership with world class commercial and academic partners.