BornBioFuel 1

Type Cellulosic (2nd generation) bioethanol demonstration plant, proof-of-technology, core technology development (Phase 1)

Location(s) BioGasol, Ballerup, Denmark
Aakirkeby, Bornholm, Denmark

Participants

- BioGasol (Leader)
- Scientific partners: Aalborg University (AAU), Agrotech

Budget 59 million DKK (8 million EUR)

Funding

27.5 million DKK (3.5 million EUR) from The Danish Energy Agency (EFP)
31.5 million DKK (4 million EUR) from BioGasol and financial partner(s)

Schedule

Begin:	January 2008
Operation:	June 2009 (Pre-treatment)
End:	January 2010

Objectives

- Process- and equipment design and development of core technologies (Pre-treatment and C5 fermentation) at pilot capacity scale
- Maturation and up-scaling of core technology to industrial standards
- Proof-of-technology to achieve commercially viable solutions
- Feasibility analysis results to determine future pricing

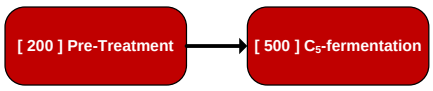
Capacity

- Feedstock: Pre-treatment: 500 kg pr. hour (100% Dry Matter)
  Flexible biomass: corn fiber, corn stover, grasses, garden waste and straw
- Yearly Operation: approx. 700 hours pr. year

Other related projects

- Maxifuel Pilot Plant. Proof-of-concept. Process development at Technical University of Denmark (DTU)
- BornBioFuel 2. Integrated demo plant. Phase 2 of the BornBioFuel project
- Optimization of the BornBioFuels 2nd generation bioethanol concept (AAU)

Block Diagram



BornBioFuel 2

Type Cellulosic (2nd generation) integrated bioethanol demonstration plant (Phase 2)

Location Aakirkeby, Bornholm, Denmark

Participants

- BioGasol (Leader)
- Industrial partners: Siemens, Alfa Laval, Grundfos, Østkraft
- Scientific partners: Aalborg University (AAU), Washington State University, BSEL

Budget 205 million DKK (27.5 million EUR)

Funding

85 million DKK (11.5 million EUR) from The Danish Energy Agency (EUDP)
30 million DKK (4 million EUR) from industrial partners (in kind payment)
90 million DKK (12 million EUR) from BioGasol and financial partner(s)

Schedule

Begin:	October 2010
Operation:	November 2010
End:	November 2011

Objectives

- Integration of core BioGasol technologies into a complete plant
- Reduce technical and financial risk for future full-scale plants
- Demonstrate technical feasibility and feedstock flexibility
- Test centre for technology developments at semi-industrial scale
- Maturation and up-scaling of core technology

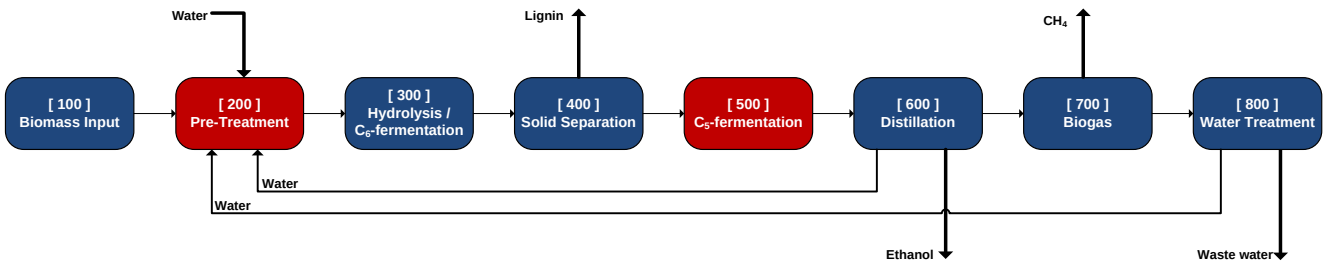
Capacity

- Feedstock: 3.4 tonnes pr. hour (100% Dry Matter)
  Local ligno-cellulosic biomass: grasses, garden waste and straw
- CEtOH: 5.2 million liters pr. year
- Co-products: Lignin, CH4 (Biogas), Hydrogen
- Yearly Operation: 7000 hours pr. year

Other related projects

- Maxifuel Pilot Plant. Proof-of-concept. Process development at Technical University of Denmark (DTU)
- BornBioFuel 1. Proof-of-technology. Process- and equipment development
- Optimization of the BornBioFuels 2nd generation bioethanol concept (AAU)
- West Coast Bio Refinery. Integrated demo plant with Pacific Ethanol, Oregon, USA

Block Diagram



West Coast Biorefinery (WCB)

Pacific Ethanol, Inc.

Type Cellulosic (2nd generation) integrated bioethanol demonstration plant

Location Boardman, Oregon, USA

Participants

- Pacific Ethanol Inc. (Leader)
- Technology Provider: BioGasol
- Scientific partners: Washington State University, BSEL

Budget 280 million DKK (37.5 million EUR, 48.6 million USD)

Funding

140 million DKK (24.3 million USD) from The Department of Energy
140 million DKK (24.3 million USD) from PEI, BioGasol and financial partner(s)

Schedule

Begin:	June 2009
Operation:	October 2010
End:	June 2013

Objectives

- Integration of core BioGasol technologies into a complete plant
- Reduce technical and financial risk for future full-scale plants
- Demonstrate technical feasibility and feedstock flexibility

Capacity

- Feedstock: 5.8 tonnes pr. hour (100% Dry Matter)
  Local ligno-cellulosic biomass: straw, hybrid poplar and corn stover
- CEtOH: 10 million liters pr. year
- Co-products: Lignin, CH4
- Yearly Operation: 7000 hours pr. year

Other related projects

- Maxifuel Pilot Plant. Proof-of-concept. Process development at Technical University of Denmark (DTU)
- BornBioFuel 1. Proof-of-technology. Process- and equipment development
- BornBioFuel 2. Integrated demo plant. Phase 2 of the BornBioFuel project
- Optimization of the BornBioFuels 2nd generation bioethanol concept (AAU)

Block Diagram