



Borregaard

The Sustainable Biorefinery

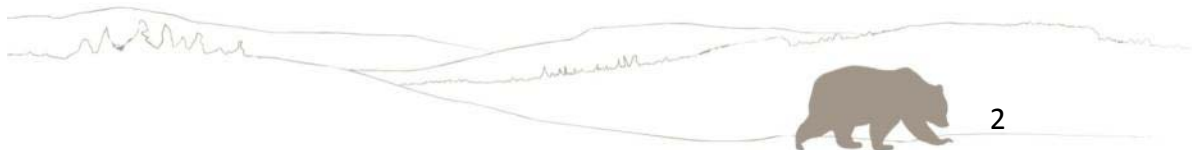
Corporate presentation

Per A. Sørli
President & CEO

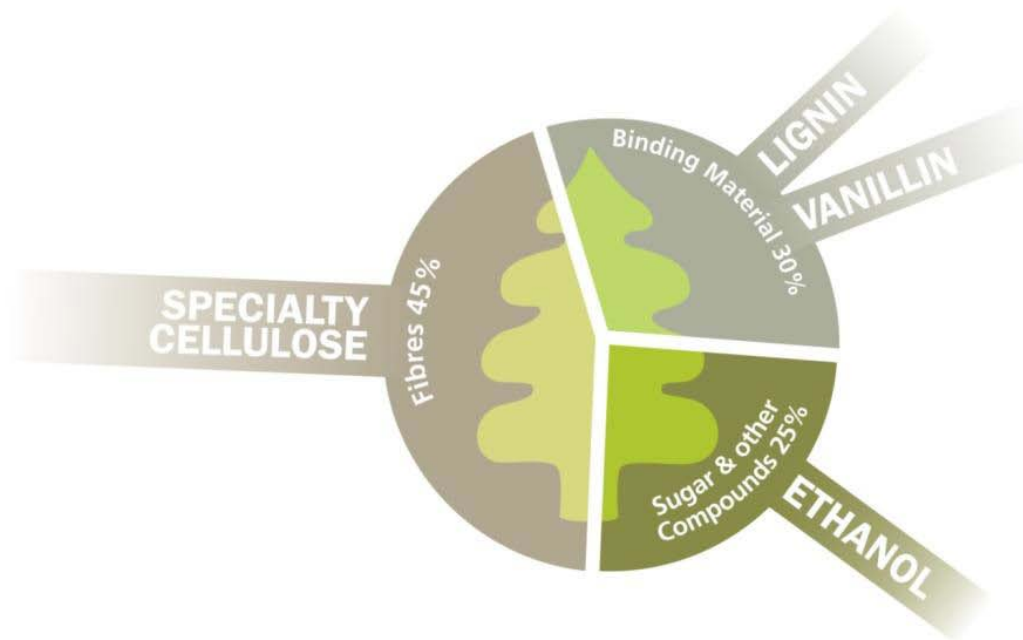
November 22, 2011

Agenda

- The Borregaard business model
- Organisation and business areas
- Strategy
 - Specialisation and innovation
 - Continuous improvement



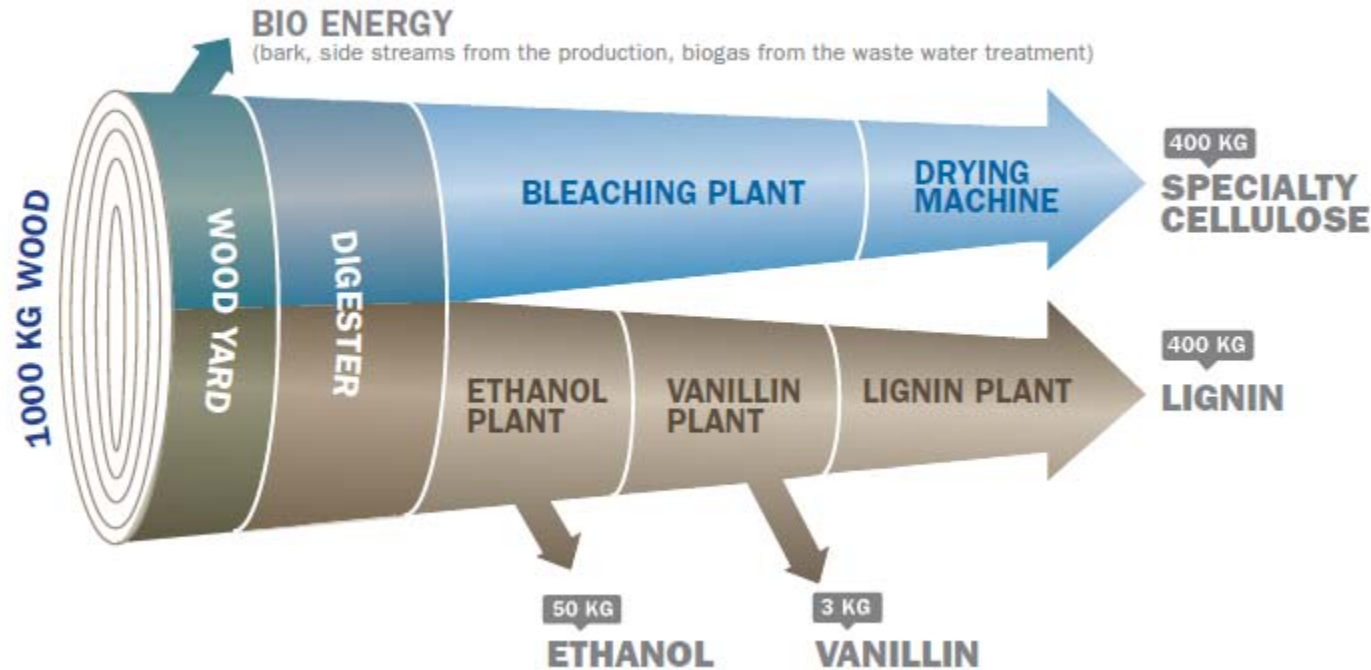
Borregaard is the global leader in biobased chemicals
A niche player with a specialised product portfolio



Borregaard's biochemicals are sustainable and environmentally friendly substitutes to petrochemicals

Borregaard is the world's most advanced biorefinery

High raw materials utilisation and products with a wide range of applications



Cellulose	Lignin	Vanillin	Ethanol
Construction materials	Concrete additives	Food	Pharmaceutical industry
Cosmetics	Animal feed	Perfumes	Bio Fuel
Food	Mining	Pharmaceuticals	Paint/ varnish
Tablets	Batteries		Car care
Paint / varnish	Briquetting		
Filters	Soil Conditioner		
Textiles			

Borregaard's biorefinery concept is documented to be sustainable with products that can substitute oil based alternatives

Raw Material



Natural
Renewable
Non toxic
Non GMO
Sustainable sourcing

Processes



Reduced emissions
**Energy conservation/
renewable energy**
High raw material utilisation
Risk management

Products

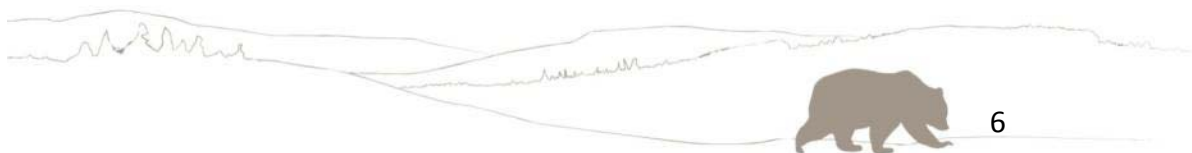


High performance
**Substitutes oil based
products**

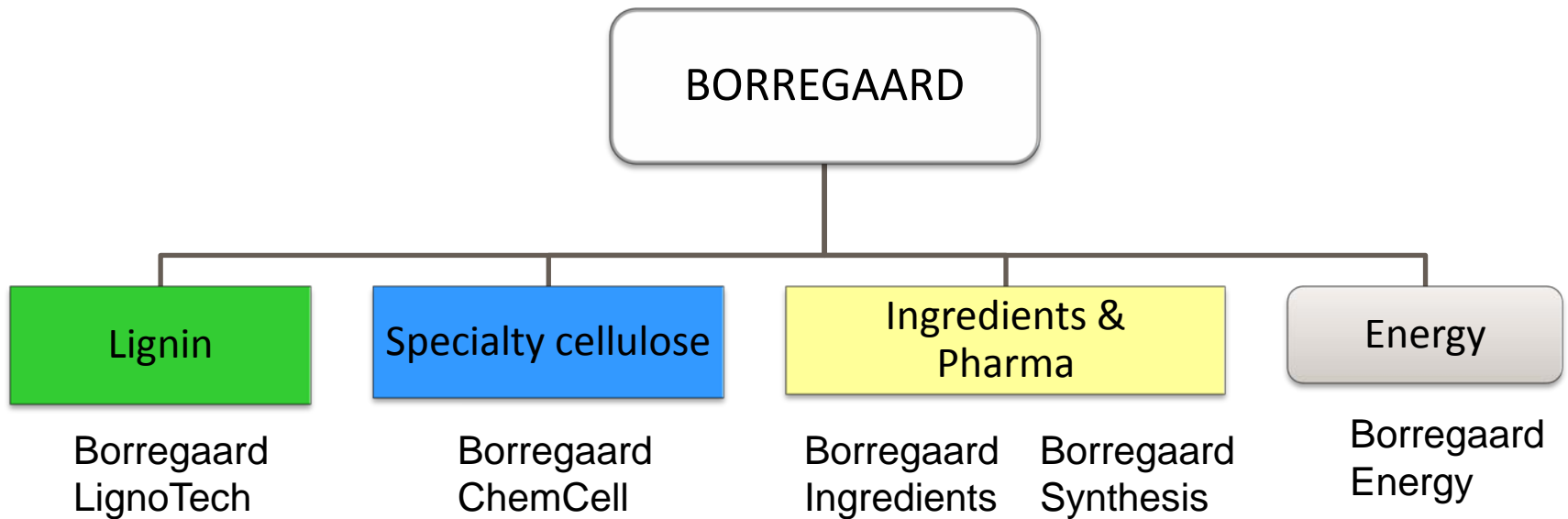
Independent Life Cycle Analysis confirms favourable GHG-footprint for our biochemicals compared to relevant alternatives

Agenda

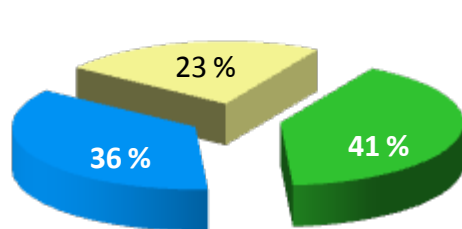
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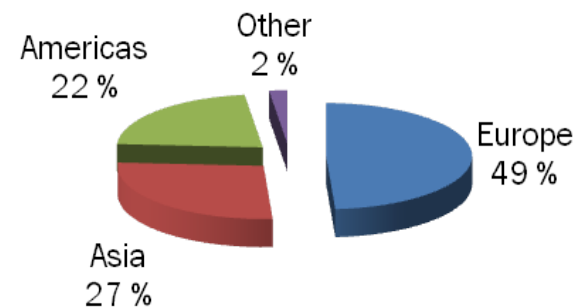
Borregaard – Business areas



Sales distribution (Industry 2010)



■ Lignin
■ Spec cellulose
■ Ingredients&Pharma



Borregaard LignoTech

World leader in lignin based products

Production

Norway, England, Germany
Spain, Czech Republic, USA,
South Africa, Brazil

Products

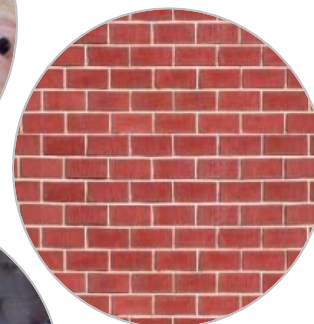
A broad range of dispersing
and binding agents and other
performance chemicals

Applications

- Construction
- Agro chemicals
- Animal feed
- Bricks & tiles
- Lead batteries
- Soil conditioner
- Mining
- Gypsum board

Market position

- Clear no 1 and only global supplier
- Unique technical and application expertise



Borregaard ChemCell

High quality specialty cellulose

Production:

Sarpsborg, Norway

Capacity: 160,000 mt

Products

High quality and tailor made specialty cellulose

Applications:

- Ether
 - Construction/building industry
 - Food
 - Cosmetics
- Acetate
 - Filters
 - Plastics
 - LCD screens
- NC/Other
 - Pharmaceutical industry
 - Printing ink
 - Explosives

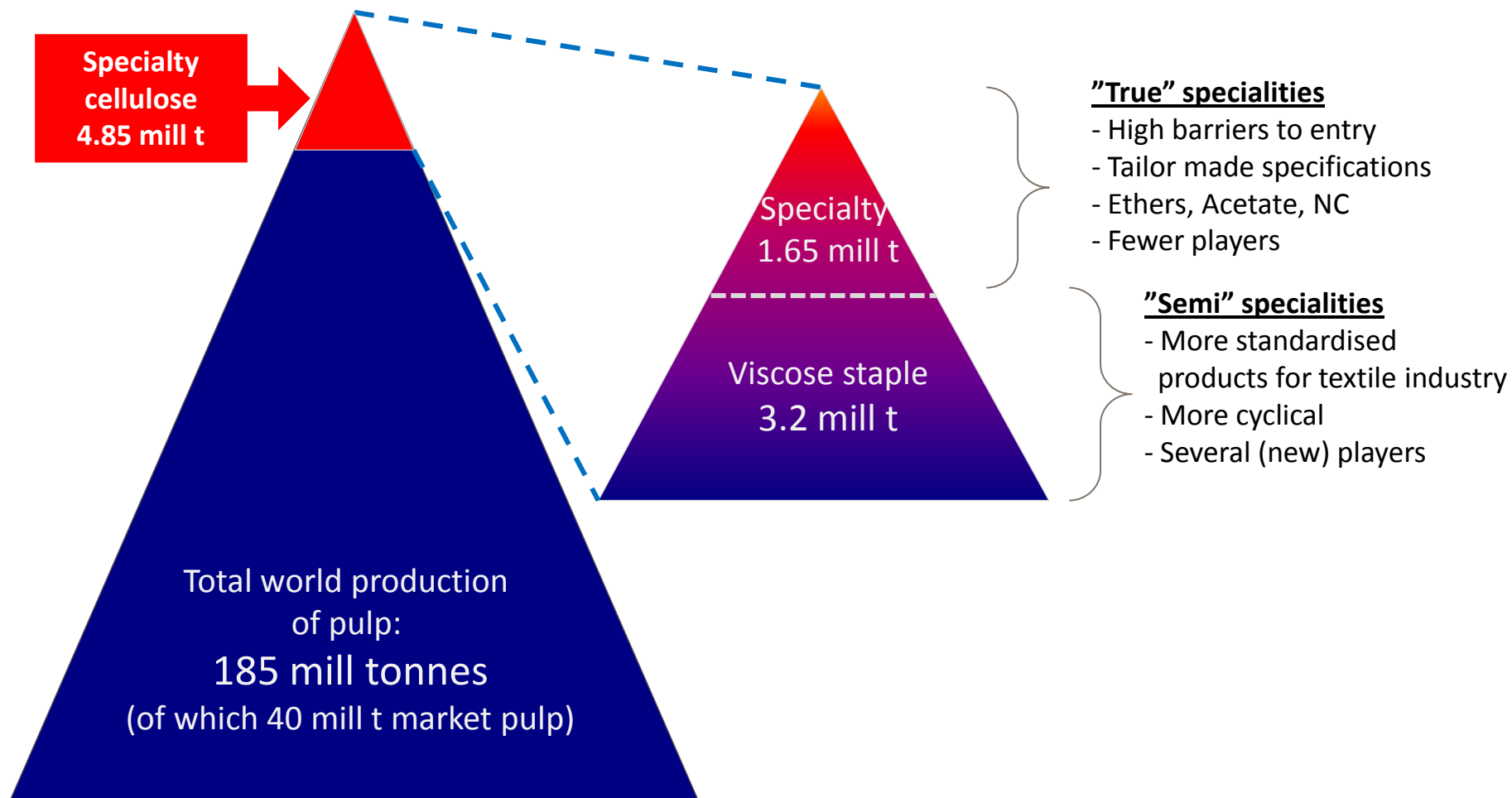
Market position

Strong positions in Europe and globally within selected applications



Borregaard ChemCell

Focus on high end applications



Est. 2010 figures

Borregaard Ingredients & Pharma

Pharmaceutical intermediates and food ingredients

Pharma Production Norway

Products

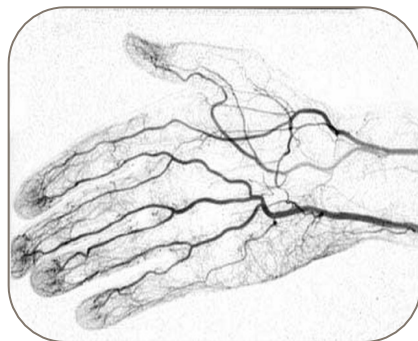
- Aminoalcohols
- Intermediates for the pharmaceutical industry

Applications

- Pharmaceuticals
- X-ray contrast media

Market position

- Leading supplier of x-ray contrast media intermediates



Ingredients Production Norway

Products

- Vanillin
- Ethyl vanillin
- Omega-3 oil

Applications

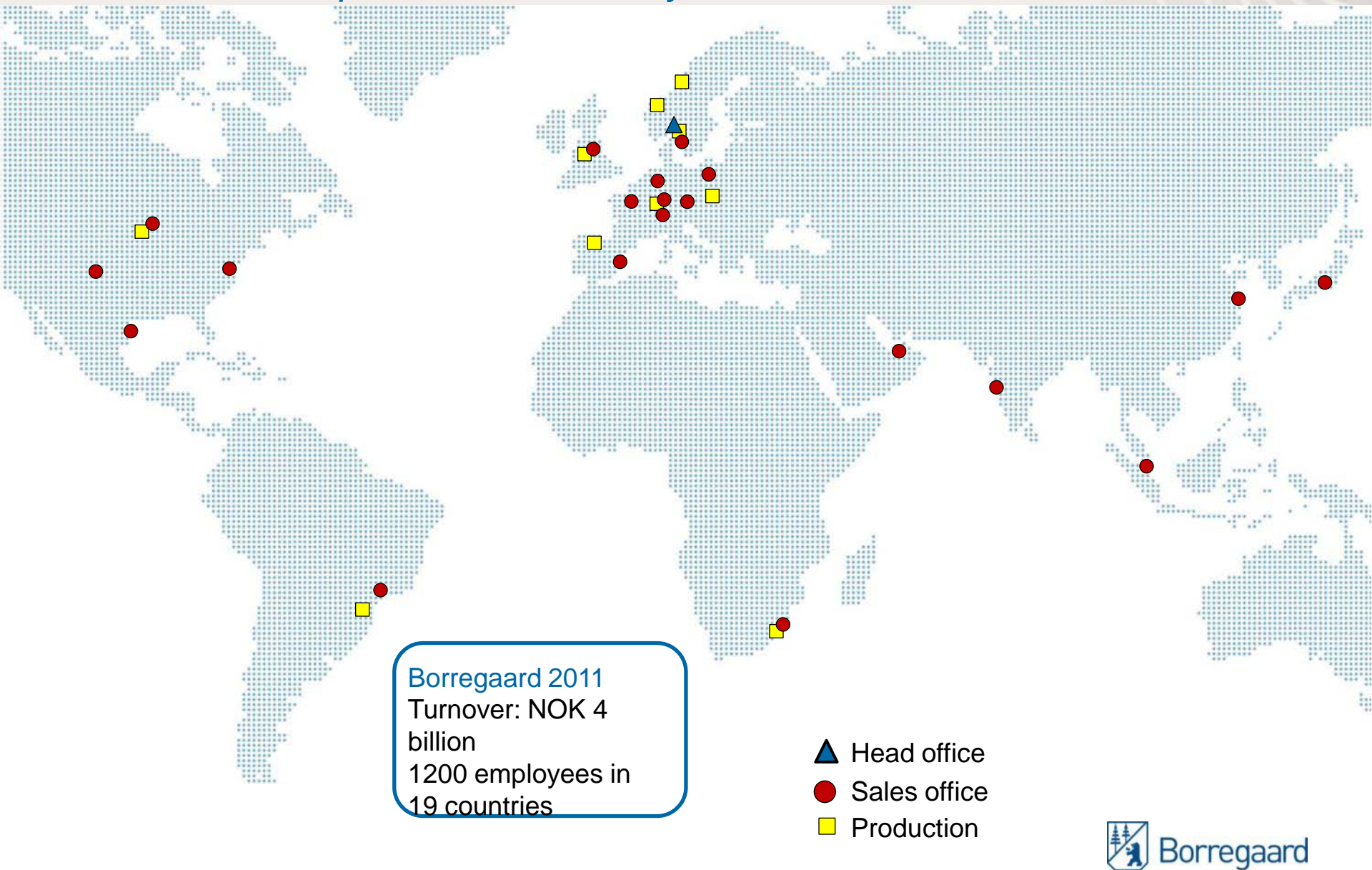
- Snacks
- Bakery products
- Confectionary
- Perfume
- Nutrition
- Dairy products

Market position

- Leading supplier of vanilla flavour
- The only supplier of wood based vanillin
- Unique Omega-3 nutritional oils

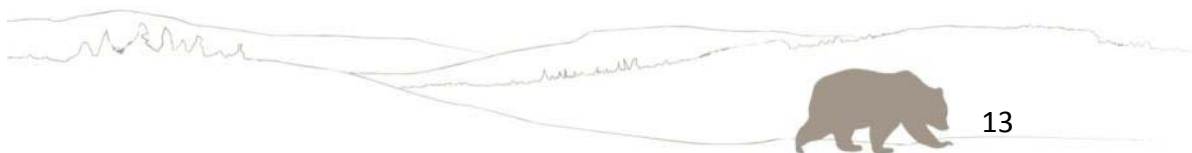
Borregaard

Global presence - Proximity to customers



Agenda

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Dual strategic focus

Ambition

- Establish position as world leader in innovation and productivity in selected market segments

Strategy

- Further specialisation and innovation
- Continuous improvement

Organisation for innovation



New cellulose based materials

- Innovation – involving the whole organisation
 - Top management focus
 - Innovation Management Teams
- More than 25% of Borregaard's revenues from new products (developed the last 5 yrs)
- R&D Centre with 60 employees, 25 PhD's
- R&D spending close to NOK 100m/year



Environmentally friendly products to the agro sector



Patent application for new process for 2G bioethanol

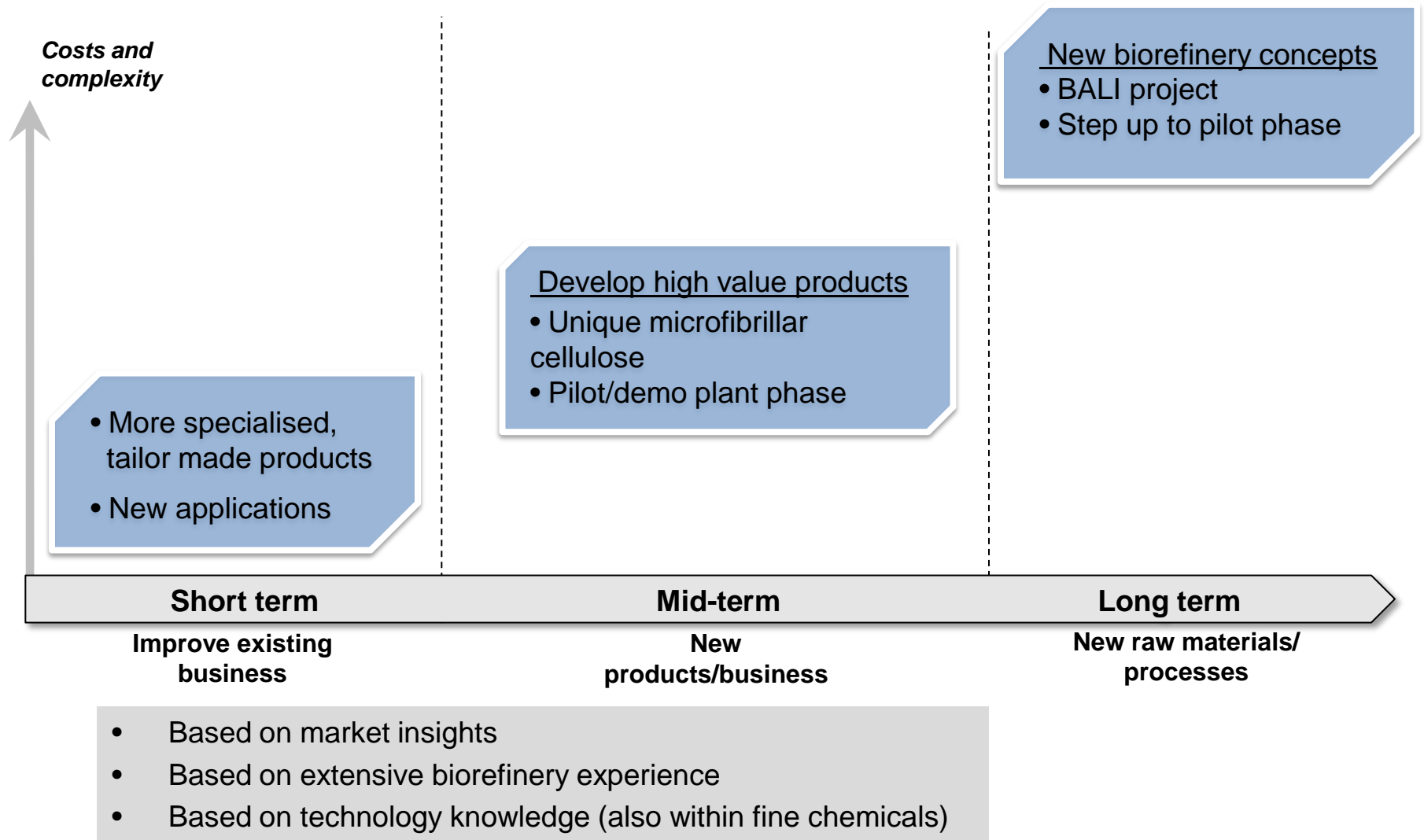


Development of new processes within EHS



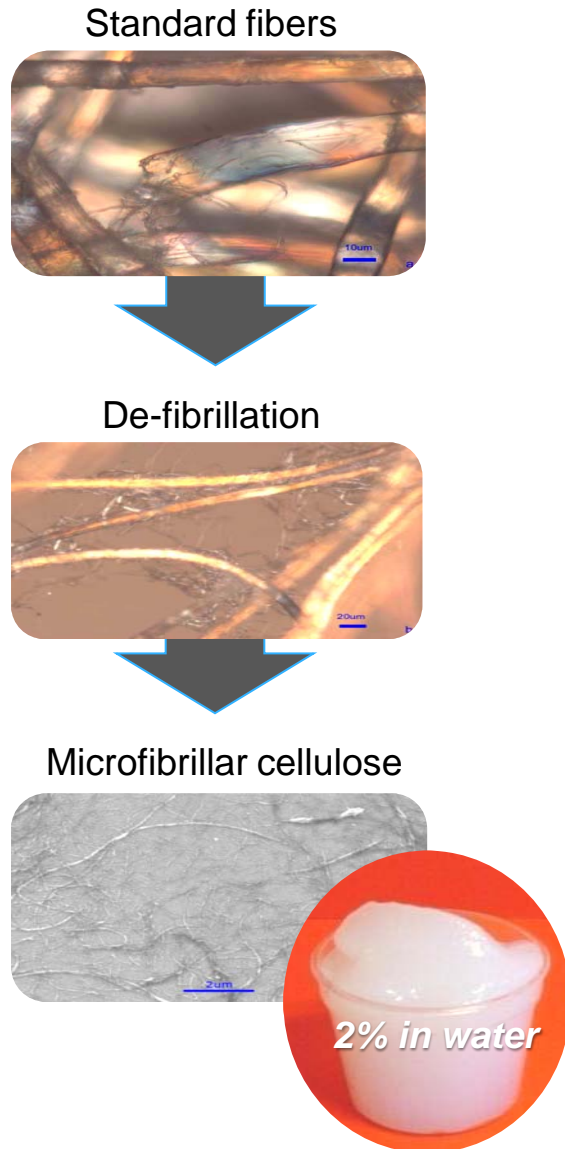
Utilisation of "new" biobased raw materials

Balanced innovation portfolio

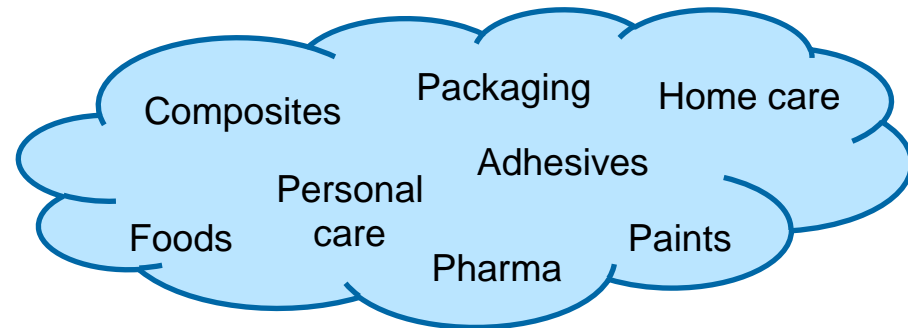


Innovation project: Microfibrillar cellulose

Unique product concept based on cellulose



Unique properties – many applications



- Potential in large number of market segments
- Launched in food applications
- Product development under NDA with large international companies

Pilot plant (NOK 40m) under construction at the Sarpsborg Site

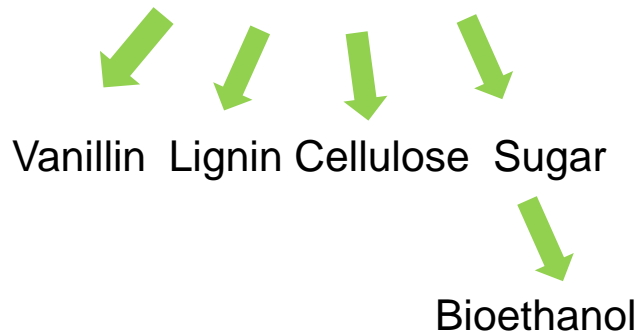
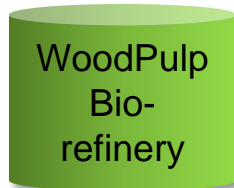
Innovation project: Development of new biorefinery concept

New raw materials – New process - Flexible product portfolio

Today's biorefinery



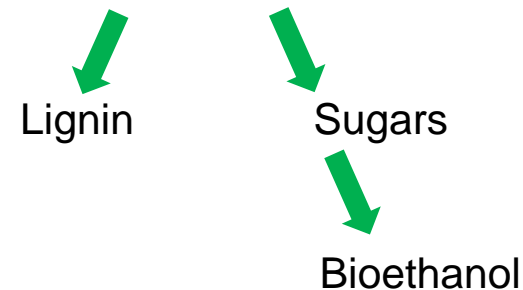
High cost raw material



BALI concept



Low cost raw material



Pilot plant (NOK 130m) under construction at the Sarpsborg Site

Borregaard's biorefinery position and innovation projects

enjoy considerable external recognition and support

- **EU projects**

- EuroBioRef; BALI pretreatment & enzymatic hydrolysis
- Suprabio: Microfibrillar cellulose



- **Norwegian projects**

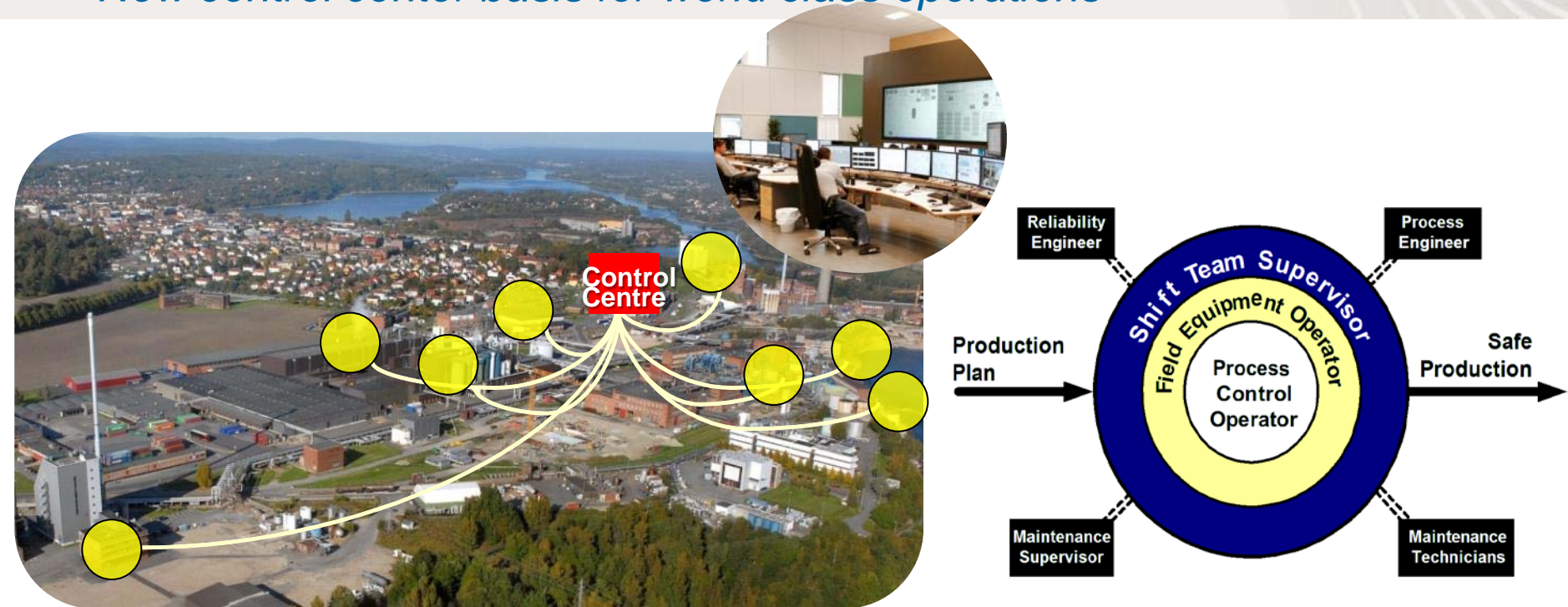
- Biomass2Products
- Support to BALI Pilot



- Preferred partner in several projects
- Central position in important and relevant EU projects
 - NOK 110m in EU/Norwegian support so far

Continuous improvement programs

New control center basis for world class operations



Previous 15 control rooms
combined into one new control center

Organisation:
New roles and responsibilities

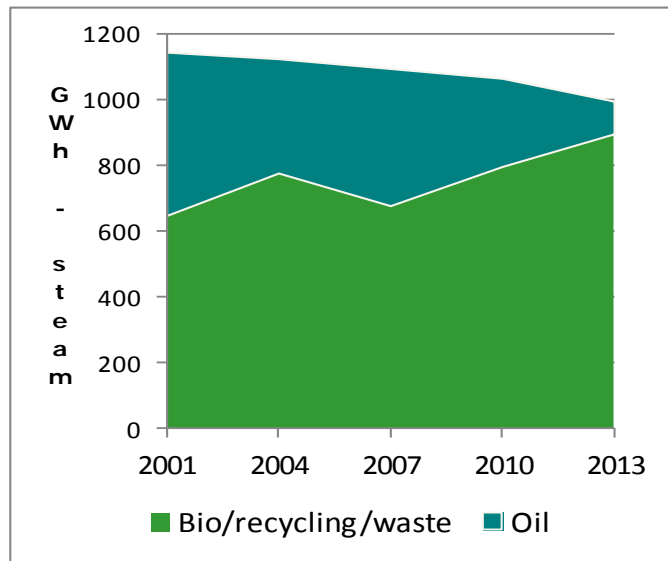
Increased productivity and improved HSE performance
through process stability and optimisation of the integrated production chain.

Targeted improvement of NOK 250 million from 2009-2012 (including headcount reduction of 200 man-years)

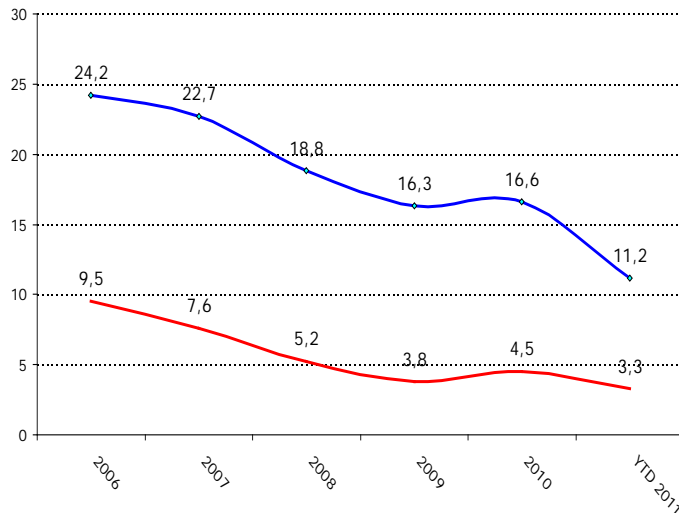
Continuous improvement within EHS

More sustainable operations

Thermal energy production (steam)



H1/acc. w/absence (red) and H2/all acc. (blue)



Environment

- Investment in new waste water treatment facility to reduce COD emissions to be finalised in 2013
- Long term energy strategy has reduced the use of heavy oil to steam production
 - Base load is covered by renewable sources and waste incineration
 - Reduced energy costs and greener products

Health

- Low sick leave levels

Safety

- Safety programmes have improved safety performance

More information

www.borregaard.com

www.orkla.com

