

# Business model, businesses & strategy

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July 2021



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# Borregaard is a global leader in biochemicals

*High value added through full raw materials utilisation  
Borregaard's biochemicals are sustainable and environmentally  
friendly substitutes for petrochemicals*

**SPECIALITY  
CELLULOSE  
& CELLULOSE  
FIBRILS**

▲ 45% FIBRES



**BIOPOLYMERS  
& BIOVANILLIN**

▲ 30% LIGNIN  
(BINDING MATERIAL)

**BIOETHANOL**

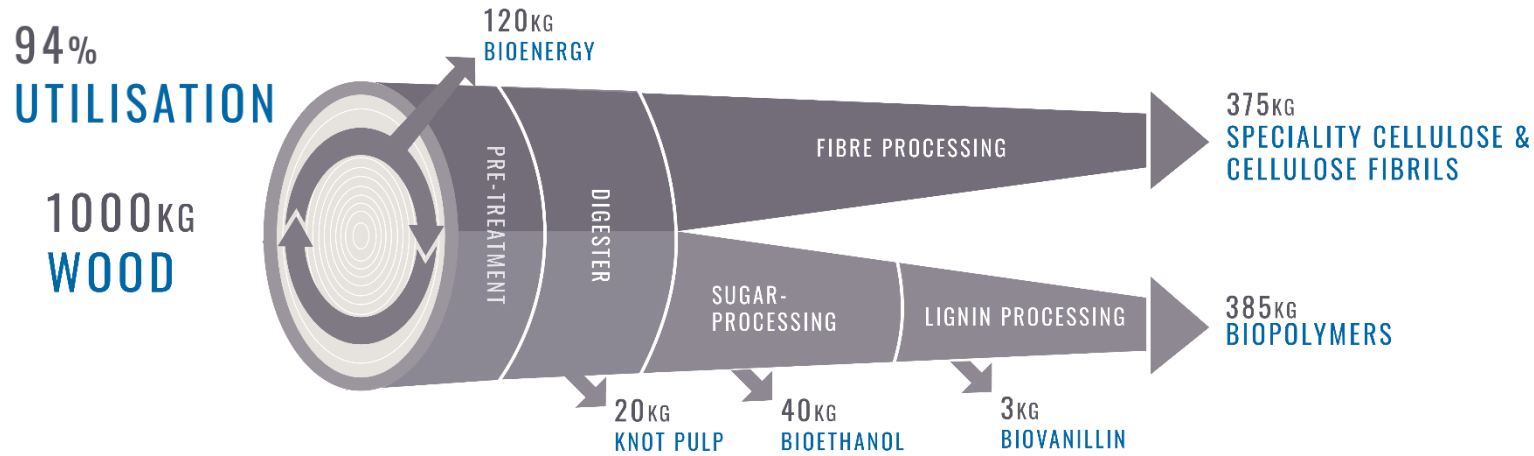
▲ 25% SUGARS

# Operates one of the world's most advanced biorefineries

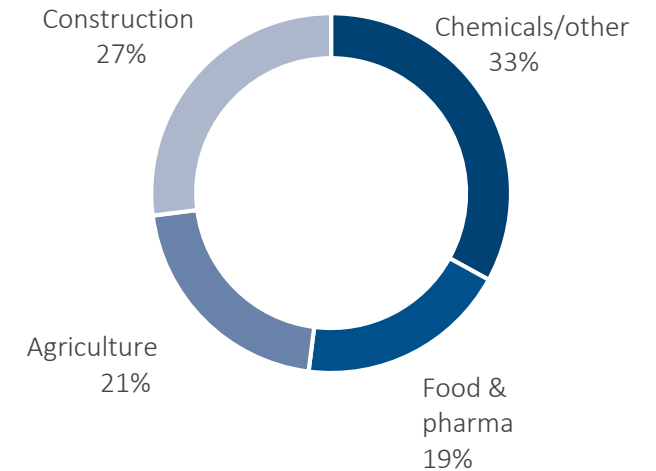
Integration models:

- Own integrated
- Partner integrated
- Independent

Integrated production system serving diverse markets



End markets 2020



## SPECIALITY CELLULOSE

- Construction materials
- Filters
- Inks and coatings
- Casings
- Food/pharma/personal care
- Textiles

## CELLULOSE FIBRILS

- Adhesives
- Coatings
- Agricultural chemicals
- Personal care
- Home care
- Construction

## BIOPOLYMERS

- Concrete additives
- Animal feed
- Agrochemicals
- Batteries
- Briquetting
- Soil conditioning

## BIOVANILLIN

- Food and beverages
- Perfumes
- Pharmaceuticals

## BIOETHANOL

- Biofuel
- Disinfectants
- Pharmaceutical industry
- Home and personal care products
- Paint/varnish
- Car care

# Global niche player with a market driven organisation



## BioSolutions (57%<sup>1</sup>)

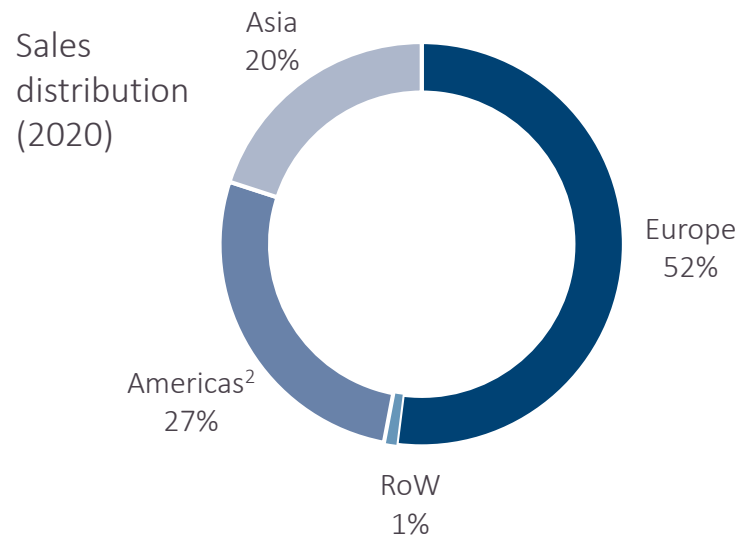
Largest supplier, technology leader in lignin-based biopolymers with global markets, only producer of wood-based vanillin

## BioMaterials (33%<sup>1</sup>)

Leading global speciality cellulose supplier, pioneer in cellulose fibrils

## Fine Chemicals (10%<sup>1</sup>)

Leading producer of fine chemical intermediates for contrast agents, significant producer of 2<sup>nd</sup> generation bioethanol



### Market driven organisation

- ~120 FTEs strong sales/technical service organisation
- Dedicated sales force for each business unit
- ~90% of sales handled through own organisation

1) Segment revenue as a % of total revenue 2020  
2) USA/Canada 22%, rest of Americas 5%

# The specialisation strategy

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## Specialisation in global niches

- Markets with high barriers to entry
- Leading market positions through application knowledge and proximity to markets
- Diversified market strategy and global market positions secure maximum flexibility

## Strong innovation efforts and continuous improvement

- Business driven innovation model that involves the entire organisation
- Continuous productivity improvement through more efficient organisation, competence development and smart use of technology

## Competence is the main competitive advantage

- Competence differentiates Borregaard from the competitors
- Combination of competences in sales & marketing, R&D and production

# Strategic priorities

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## **Specialisation and diversification** within BioSolutions

- Specialisation through innovation and market development
- Balance market risk through diversification of product portfolio
- Timing of further volume expansion guided by demand development and profitability

## **Increased value added** from the unique Sarpsborg biorefinery

- Leverage high-value lignin raw material base in biopolymers and biovanillin
- Enhance product mix in speciality cellulose and bioethanol
- Strong focus on innovation and productivity efforts

## **Development** of the cellulose fibrils business

- Continued market development across multiple applications and geographies
- Timing of second step expansion guided by demand development

## **Sustainability**

- Continued emphasis on ESG aspects along entire value chain

# Completed and ongoing strategic projects



## Specialisation, diversification and growth within BioSolutions

- Florida plant (1<sup>st</sup> phase) started up mid 2018
- Upgrade and increased specialisation in Sarpsborg (2019)

## Develop the unique biorefinery asset in Sarpsborg

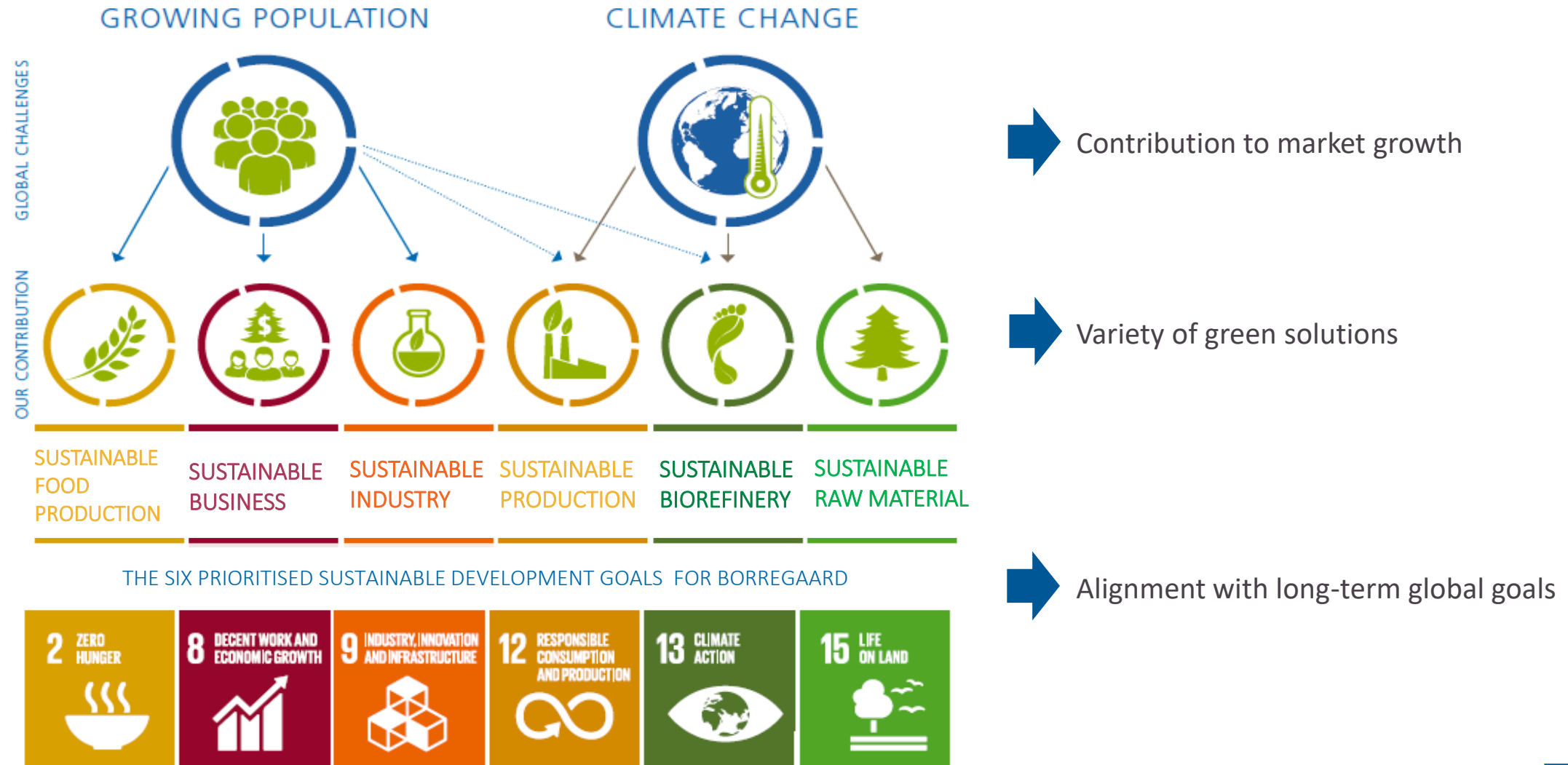
- High-end bioethanol expansion started up in Q1-18
- Ice Bear capacity expansion completed end 2018
- Lignin upgrade/specialisation in operation from July 2019
- Wood based vanillin capacity expansion, completion 1H-21

## Establish cellulose fibrils as a new business area

- Commercial-scale production facility completed in Q4-16
- Exilva market introduction ongoing



# Alignment with UN's Sustainable Development Goals



# Integral part of market offering

## RAW MATERIALS



Natural, renewable, sustainable raw materials

## PROCESSES



Efficient and sustainable production and value chain

## PRODUCTS



Sustainable biochemicals

### Sustainable and certified wood

- Documentation
- PEFC<sup>1)</sup> and FSC<sup>1)</sup> standards
- Lignin raw materials from certified forests

### Reduced emissions improve LCA<sup>2)</sup>

- Target based CO<sub>2</sub>-reductions
  - Energy conservations
  - New/green energy sources
- Reduced emissions to water and air
- “Greener” logistical solutions

### Products add sustainability value to customers

- **Climate:** LCA<sup>2)</sup> shows favourable GHG footprint
- **Biobased:** Natural raw materials preferred
- **EHS<sup>3)</sup>:** Non-toxic, harmless products

1) PEFC: Programme for the Endorsement of Forest Certification, FSC: Forest Stewardship Council  
2) Life Cycle Analysis  
3) Environment, Health and Safety

# Climate change – targets and rating



## Science Based Targets for GHG emissions approved by SBTi<sup>1</sup>

- Targeted reductions in greenhouse gas emissions:
  - 53% by 2030
  - 100% by 2050
  - Base year = 2009
- Targets are in line with the ambitions in the Paris Agreement and the Norwegian Climate Law



## Borregaard maintained a CDP 'A' rating in 2020<sup>2</sup>

- Highlighted as a global leader in corporate climate action
- Achieved a place on the CDP Climate Change 'A List'
  - 9,600 companies reported to CDP in 2020
  - 270 (2.8%) were awarded an 'A' rating

<sup>1</sup>) Science Based Targets initiative

<sup>2</sup>) CDP: Global non-profit organisation that drives companies and governments to reduce their greenhouse gas emissions, safeguard water resources and protect forests



# BioSolutions

## Market position

- Largest supplier of lignin
- Only supplier of wood based vanillin
- Unique technical and application expertise

## Production

- Norway, USA, South Africa\*, Germany, Spain\*, Czech Republic, UK

## Applications

- Concrete admixtures
- Gypsum board
- Ceramics
- Animal feed
- Agro chemicals
- Soil conditioner
- Oil field chemicals
- Batteries
- Flavours & fragrances
- Personal care and pharmaceuticals

## Key attractions

- A sustainable and broad product portfolio
- Large and diverse customer base
- High barriers to entry



# Biopolymers: Lignin – a sustainable and flexible raw material

Product performance depends on the pulping process and the raw material

## Sulphite pulping process

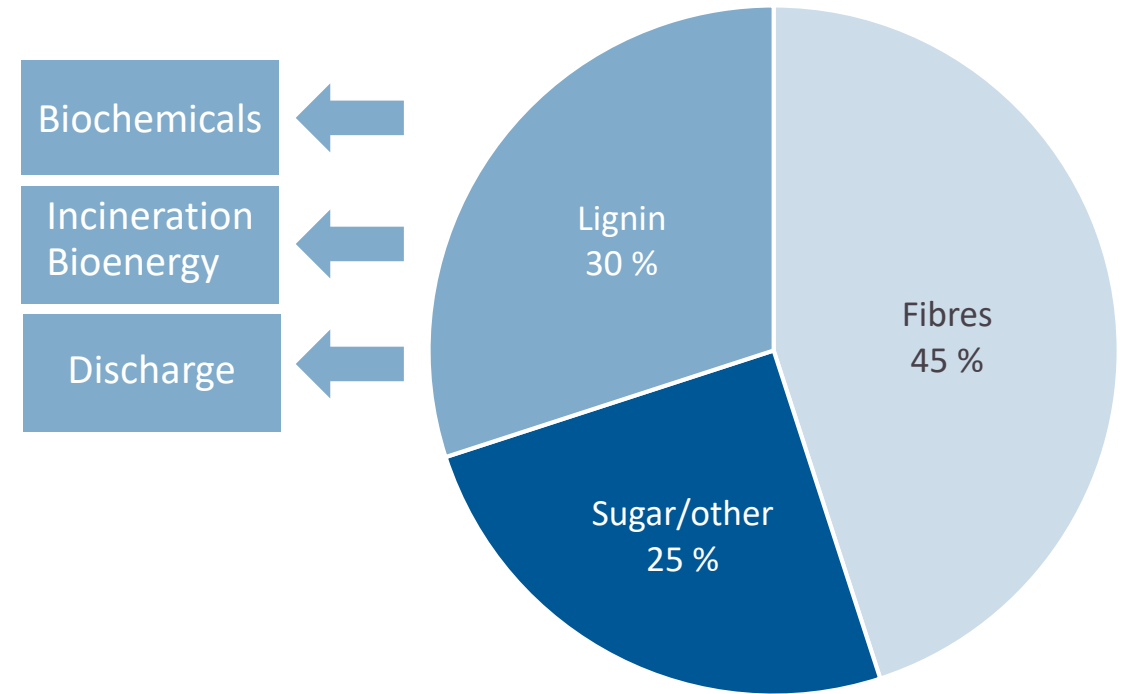
- Versatile lignin used in a variety of products/applications
- Quality depends on the chemicals base
- Water soluble
- Limited number of sulphite mills

## Softwood (pine/spruce) vs hardwood and straw

- Softwood lignin has superior modification potential

## Kraft (sulfate) pulping process

- Lignin is normally incinerated to recover energy and chemicals
- Not in water soluble form from the pulp mill
- Pulp producers are exploring potential for industrial use of kraft lignin

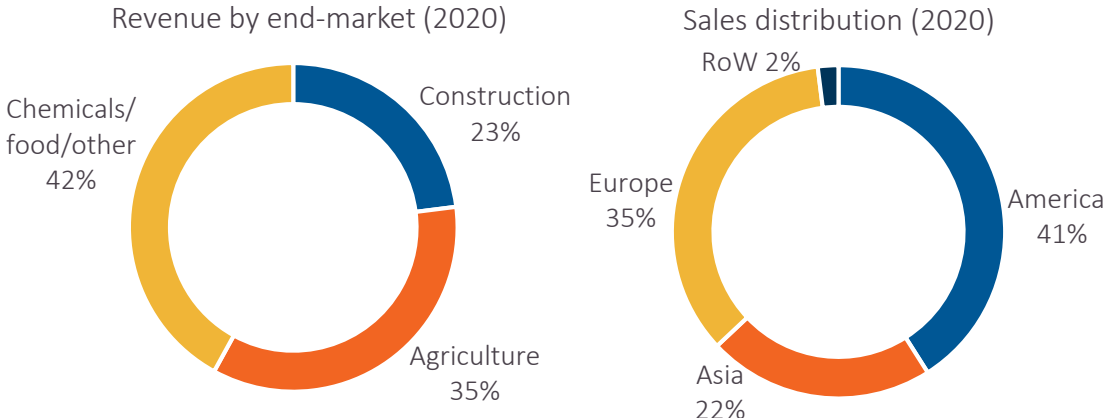


# Diversity: Around 620 products to 3,000 customers

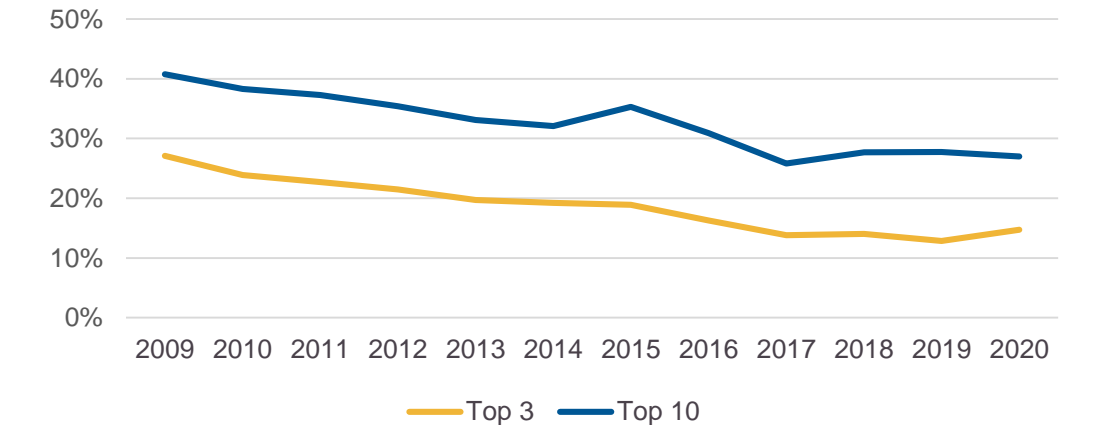
## BioSolutions properties

| Properties                            | Applications   |
|---------------------------------------|--|
| Binding agent                         | <ul style="list-style-type: none"> <li>• Ceramics</li> <li>• Dust solutions</li> <li>• Feed</li> <li>• Granulation aid</li> </ul>  |
| Dispersing agent/<br>rheology control | <ul style="list-style-type: none"> <li>• Carbon black and pigments</li> <li>• Concrete admixtures</li> <li>• Dyestuffs</li> <li>• Metals and minerals</li> <li>• Micronutrients</li> <li>• Plant protection and plant nutrition</li> </ul> |
| Crystal growth control                | <ul style="list-style-type: none"> <li>• Batteries</li> <li>• Oil field chemicals</li> <li>• Water treatment</li> </ul>  |
| Functional additive                   | <ul style="list-style-type: none"> <li>• Antioxidants</li> <li>• Complexing agent</li> <li>• Phenol replacement</li> <li>• SoftAcid</li> <li>• Soil conditioner</li> <li>• UV protection</li> </ul>  |
| Flavours and fragrances               | <ul style="list-style-type: none"> <li>• Food</li> <li>• Fragrances</li> <li>• Personal care</li> <li>• Pharmaceuticals</li> </ul>   |

## Revenues by end-market and region<sup>1)</sup>



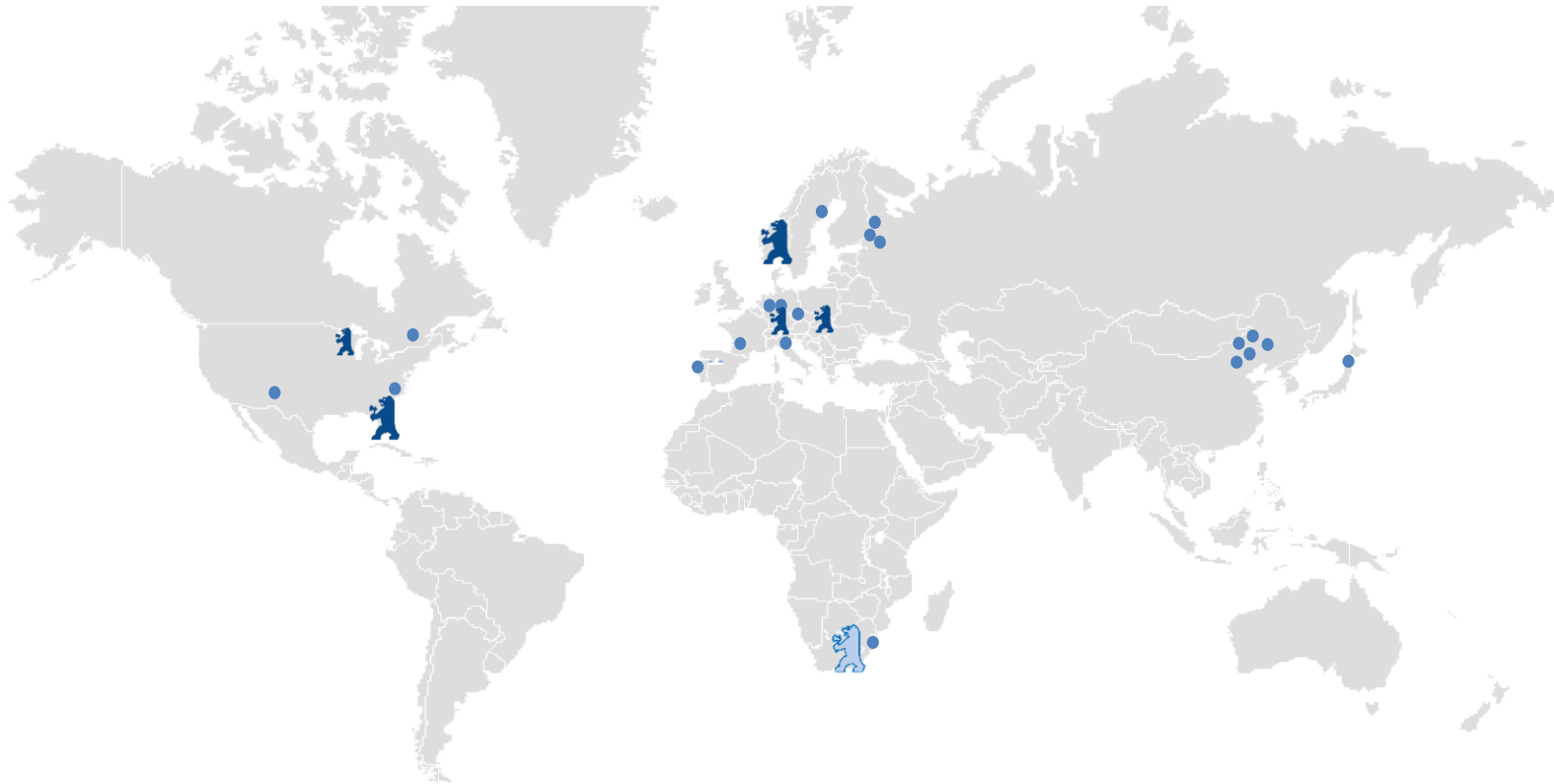
## Top 10 and top 3 customers in % of revenues



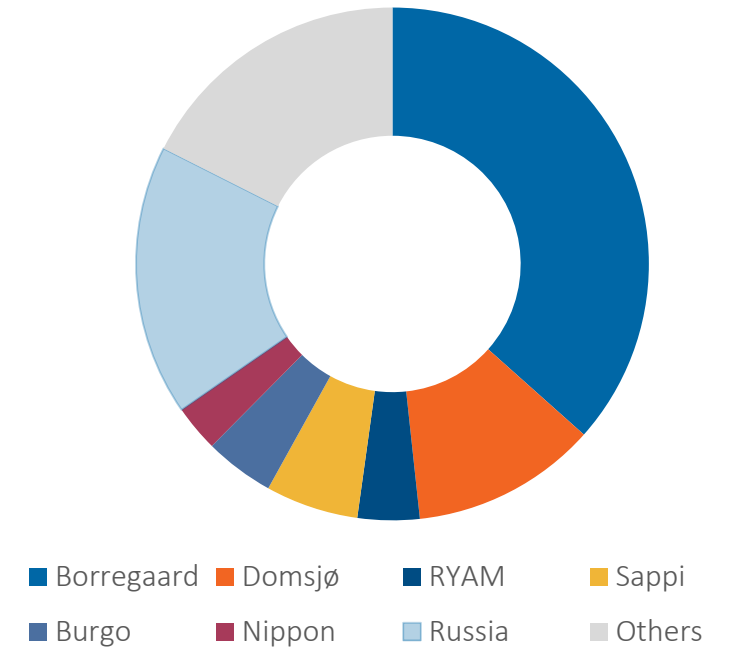
1) Includes LignoTech South Africa sales



# Current global lignin supply

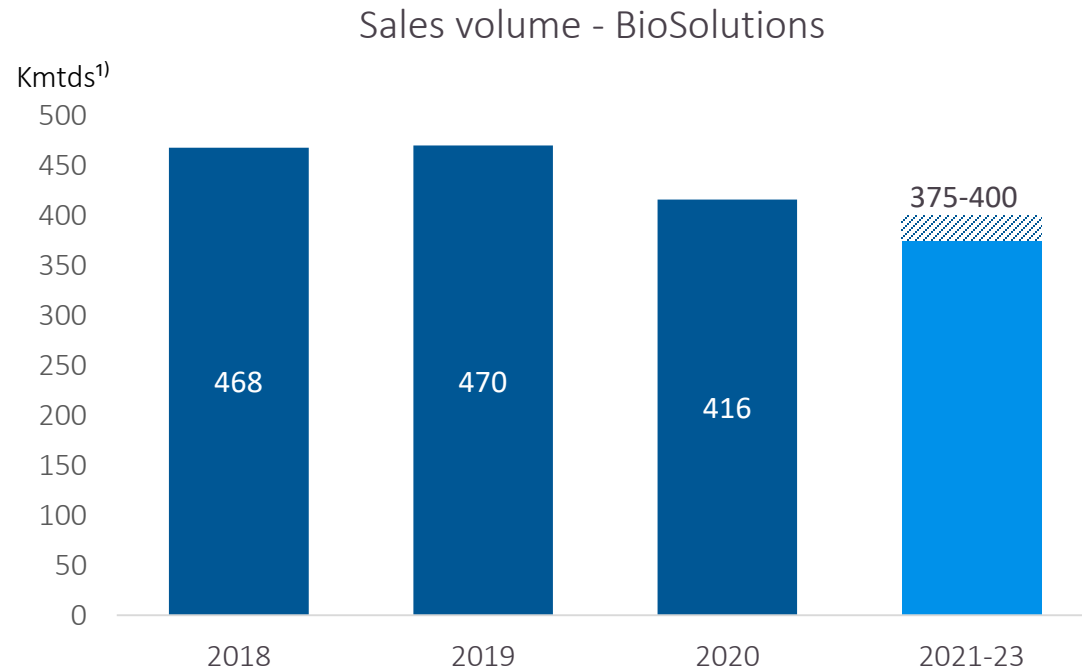


By sales volume



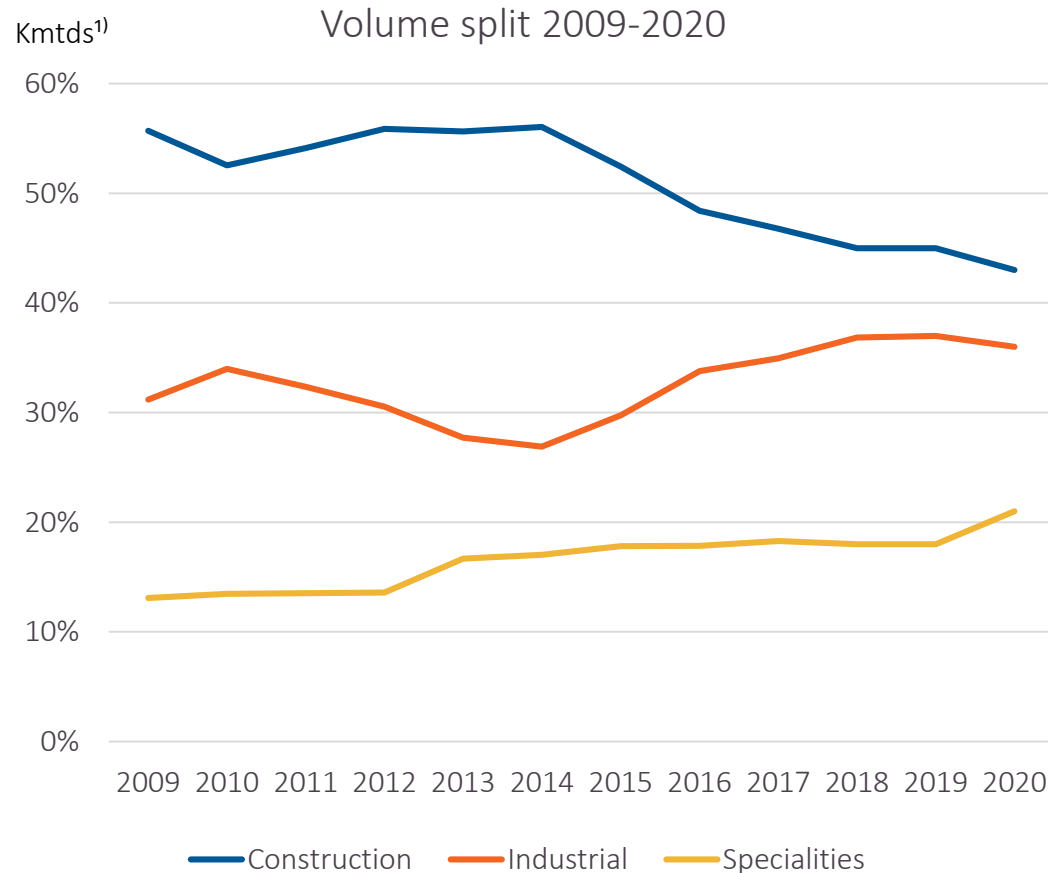
Global lignin supply ~1 million mtds in 2021 (assuming South Africa and Spain not operating; Florida ramp-up)

# Implications of reduced lignin raw material supply



- Lost volume is hardwood-based with limited potential for specialisation
  - Construction and Industrial low-end markets affected
- Construction – a cyclical market with increasing use of oil-based alternatives to lignin, reinforced by a low oil price
  - Lignin offered in markets where its value is recognised
- Value-based diversification in Industrial markets
- Speciality markets not affected

# Strategic priorities – key considerations

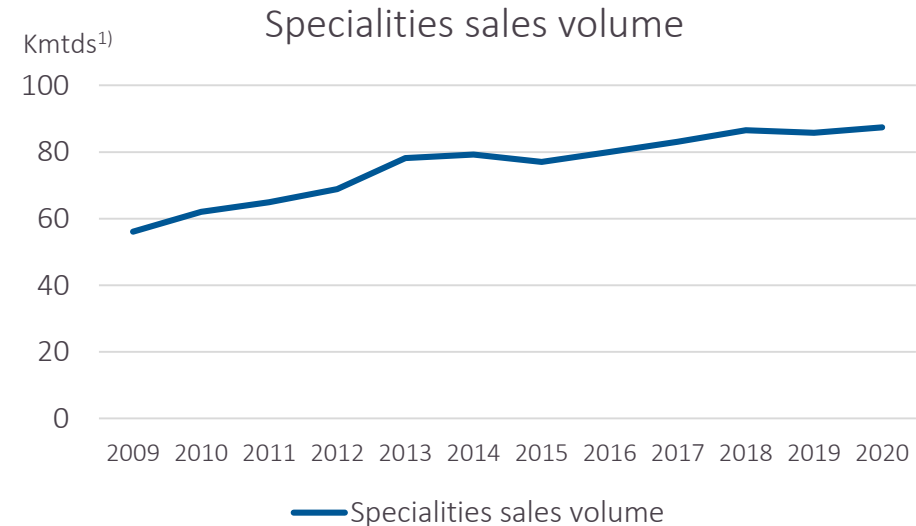


## New supply situation - an opportunity to sharpen strategy

- Optimise value of biopolymers portfolio
  - Reduce exposure to low-end and cyclical markets
- Diversify based on value-added
  - Focus on advanced applications with high value-added, stable growth and preference for sustainable solutions
- Specialise through innovation and market development
  - Drive value growth based on expertise and sustainable solutions with unique performance



# Industrial and Specialities



## Industrial







- Significant global volume growth since 2015 across a wide range of applications
- Demonstrates capabilities in innovation, market development and sales
- Robust and growing customer and application base

## Specialities








- Growth based on capabilities in innovation, application development and sales
- Lead acid batteries for automotive and industrial applications on steady growth path
- Increasing use of green alternatives in agrochemical applications, flavours and fragrances

1) Metric tonne dry solid (thousand)

# Lignin applications, functionality and substitutes

| Application   | Functionality                       | Competing technologies                                    | Value proposition: |                           |
|---|-------------------------------------|---|--------------------|---------------------------|
|   |                                     |   | Green alternative  | Cost/value vs. synthetics |
|  Batteries             | Crystal growth control              | Few   | ✓                  | ✓                         |
|  Oil field chemicals   | Dispersant and binder               | Synthetics  | ✓                  | ✓                         |
|  Plant protection      | Dispersant                          | Synthetic surfactants                                     | ✓                  | ✓                         |
|  Plant nutrition       | Soil conditioner / complexing agent | Humic acid, ethylenediaminetetraacetic acid (EDTA)        | ✓                  | ✓                         |
|  Animal feed pellets  | Binder                              | Starch residues, bentonite and mechanical compacting      | ✓                  |                           |
|  Concrete admixtures | Plasticiser                         | Naphthalene and melamine sulfonates, polycarboxylic acids | ✓                  | ✓                         |

# Lignin in agriculture

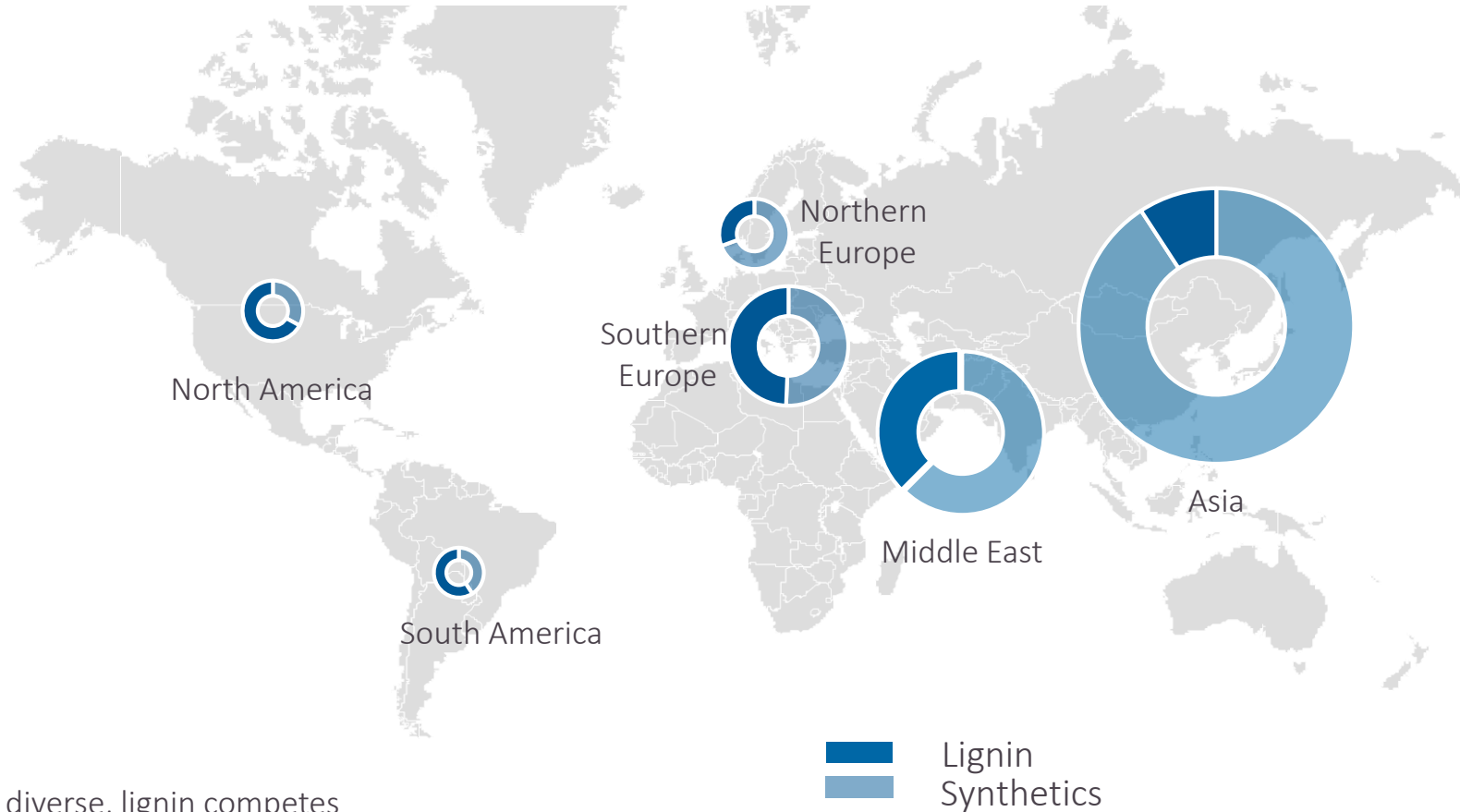
| Plant nutrition  |  |   | Crop protection   |  |
|--|--|---|---|--|
|   |  |  |  |   |
| Micro-nutrients<br>( Zn, Fe, Cu, Mn)   | Soil conditioners<br>(source of organic carbon)                                    | Macro-nutrients<br>(N, P, K, S)   | Pesticides<br>(dispersant)  |  |
| Complexing agent   | Nutrient use efficiency  | Basic nutrients   | Water-based   | Solvent-based  |
| ✓  | ✓  | ✗   | ✓   | ✗  |
|  | Binder for feed, granulation aid for limestone and fertilisers                     |   |   |  |

# Lignin in lead acid batteries

|             |   |  |   |   |
|-------------|---|--|---|---|
|             |    |    |    |    |
|             | Conventional vehicle  | Micro-hybrid   | Hybrid  | Electric vehicle  |
| Automotive: | ✓   | ✓  | ✓   | ✓   |
|             | Flooded battery as start battery  | Absorbent Glass Mat (AGM) and Enhanced Flooded Battery (EFB) as start/stop battery   | AGM and EFB as start/stop battery   | Flooded battery for hotel function <sup>1)</sup>                                      |
|             | Fuel for motion   | Fuel for motion  | Fuel/NiMH/lithium ion for motion  | Lithium ion for motion  |
| Other:      |  |  |  |  |

<sup>1)</sup> Heating, ventilation, air conditioning, lighting, radio, gauges, etc.

# Concrete admixture formulation preferences



- Admixture market diverse, lignin competes with captive synthetic products
- Regional and local formulation preferences
- Climate influences formulation



# Sustainability - competitive edge

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## Capitalise on Borregaard's biorefinery model and biobased solutions

- Replace fossil raw materials
- Documented favourable environmental footprint
  - Wood-based biopolymers
  - 2<sup>nd</sup> generation feedstock
- LCA - Life Cycle Analysis
- EPD - Environmental Product Declarations



# Sustainability - competitive edge in use

## Plant nutrition – favourable environmental footprint

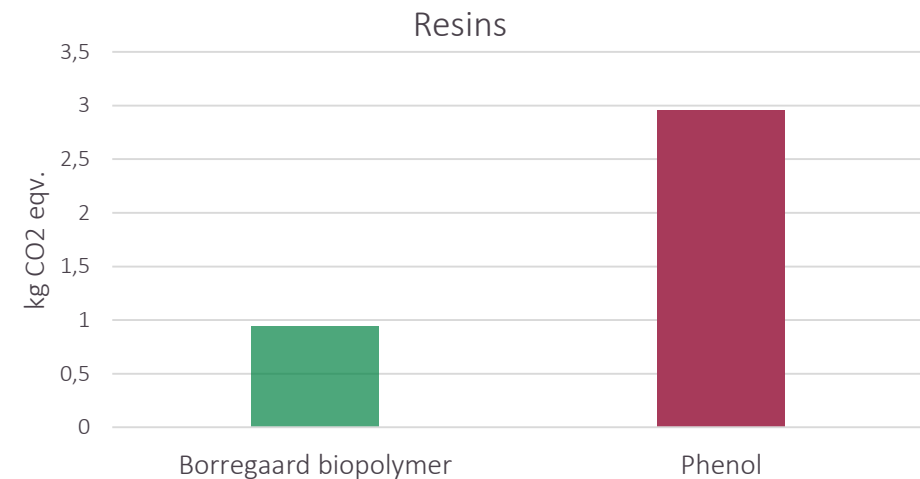
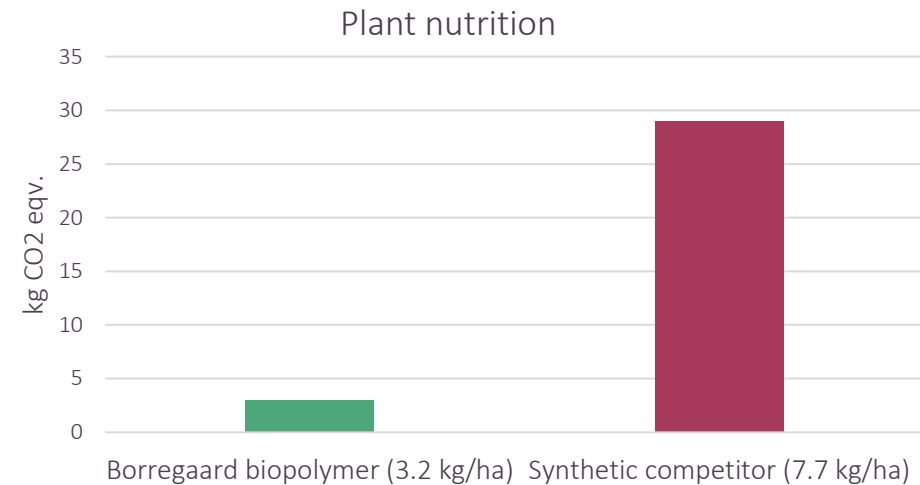
- Borregaard's biopolymers - the sustainable alternative to synthetics for formulating micronutrients
- High efficiency, lower dosage
- 90% reduction in CO<sub>2</sub> emissions compared to synthetics

## Resins – sustainable replacement for petrochemicals

- Significantly increases the renewable content in resins
- >65 % reduction CO<sub>2</sub> emissions per feedstock unit

## Animal feed additives – alternative to antibiotics

- Alternative to antibiotic growth promotors
- Less corrosive and safer to handle than organic acids in pure form
- Patented SoftAcid® technology



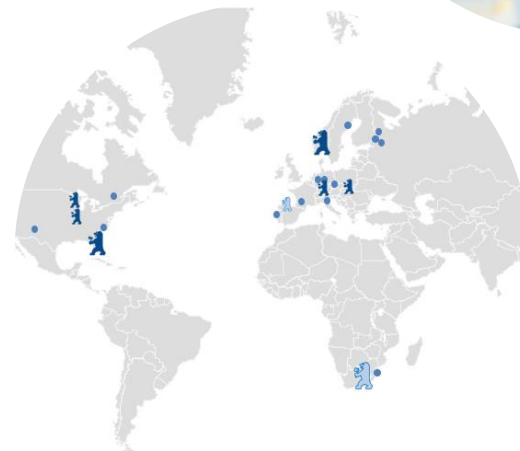
# Innovation strategy

## Priorities

- Specialisation and diversification
- High value applications
- Unique, tailor-made solutions
- Increase value of Florida product portfolio

## Competitive edge

- Unique competence base
- Diverse raw material base and advanced technology
- Sustainability



# Innovation - introducing novel products

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## Plant protection – opportunities in water-based formulations

- New products for water-based formulations, the fastest growing segment in plant protection

## Batteries – unique product performance

- New organic expander for improved charging commercialised
- Proven performance in existing (AGM<sup>1</sup>) and new (EFB<sup>2</sup>) battery technology, including automotive start/stop function

## Oil field chemicals - launch of the BioDrill product line

- New, high performing, sustainable product for water-based drilling muds



1) Absorbent Glass Mat

2) Enhanced Flooded Batteries



# LignoTech Florida



## The venture

- Located at Rayonier Advanced Materials' (RYAM) Fernandina Beach softwood sulphite pulp mill
- Borregaard (55%) and RYAM (45%) ownership
- Borregaard's know-how and technology

## Expansion project in two phases

- Phase one (2018) represents 100,000 mtds capacity, investment USD 110 mill.
- Phase two will give additional 50,000 mtds, investment USD 25 mill.

## New plant officially opened 26 June 2018

- Investment completed on time and cost
- Production commenced in June

## Commercialisation

- Diversified product and application portfolio established
- Sales volume developing according to plan



# Update on Sarpsborg lignin investment programme

500 mNOK capex, 70% expansion/30% replacement

- Additional dryer with packaging capacity
- Tanks for storage of liquid materials
- Improved solutions for logistics, infrastructure and energy
- In operation from July 2019
- Capex  $\approx$ 10% below budget

## Several benefits







- Further specialisation on a unique raw material base
- Reduced exposure to cyclical market segments
- Optimisation of production campaigns, internal and outbound logistics
- Substantial environmental and safety benefits

Annual cost savings >40 mNOK expected

- Gradual realisation through 2020
- Full impact from 2021



# Positive trend for Borregaard's wood-based vanillin

|   | Vanilla beans   | Plant based vanillin   |   |   |   | Oil based vanillin & ethyl vanillin   |         |
|---|---|--|---|---|---|---|---------|
|   |  |  |  |  |  |  |         |
| Raw material                                | Beans   | Ferulic acid from bran/straw   | Eugenol from clove  | Lignin from wood  | Guaiacol from creosote/tar  | Guaiacol  | Guethol |
| Key selling points                          | Natural/ flavour profile  | Plant based/natural raw material/sustainability /flavour profile                   |   |   |   | Price   |         |
| Sales volume (MT) <sup>1)</sup>             | ≈2400 <sup>2)</sup>   | ≈2000  |   |   |   | ≈15 000   | ≈5 000  |
| Indicative price level USD/kg <sup>1)</sup> | ≈350  | ≈400   | 25 - 100  |   |   | 10 - 15   |         |
| # of manufacturers <sup>1)</sup>            | 1000+   | 5  | 4   | 1   | 3   | 3 - 5   | 5       |
| Growth <sup>1)</sup>                        |   | ≈10%   |   |   |   | ≈1%   |         |

1) Company estimates

2) Cured vanilla pods contain around 1-2% vanillin, corresponding to around 25 – 50 MT on pure vanillin basis

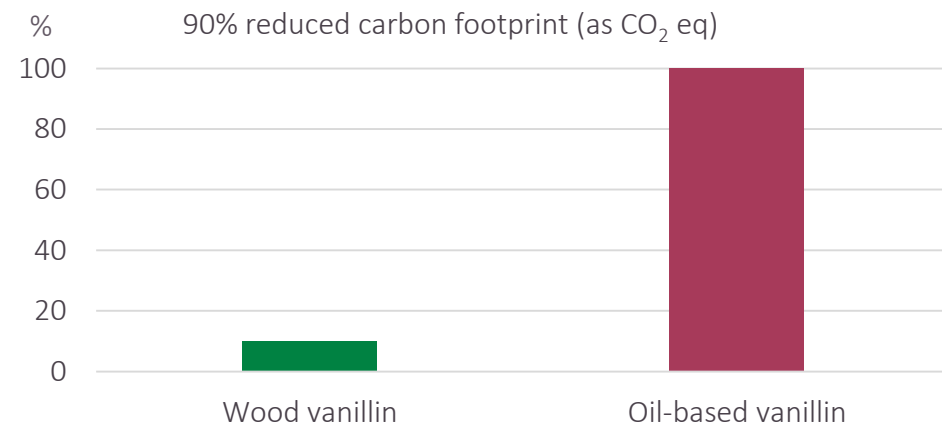
# Biovanillin - well positioned for growth

## Strong demand growth for plant-based vanillin

- Consumer preferences
- Sustainability

## Competitive edge

- Global market leader in plant-based vanillin
- Attractive flavour profile
- Unique raw material base
- Certified spruce wood, sustainable forestry
- >90% reduced carbon footprint vs oil-based vanillin
- Cost competitive technology
- Capacity expansion ongoing





# Capacity increase for wood based vanillin

- Capacity increase at least 250 tonnes
  - Part of the increase will be gradually realised during construction phase
- Construction started 2H 2019, completion 1H 2021
- Debottlenecking of existing facility
- Capex NOK 130 million



# Speciality cellulose

## Market position

- Strong positions in Europe and Asia within high-end niches

## Production

- Sarpsborg, Norway with capacity of 160,000 metric tonne

| Focused applications | Market growth <sup>1)</sup> |
|----------------------|-----------------------------|
| • Ethers             | 3-4%                        |
| • Acetate            | -2-0%                       |
| • Nitrocellulose     | 0%                          |
| • Casings            | 3-4%                        |

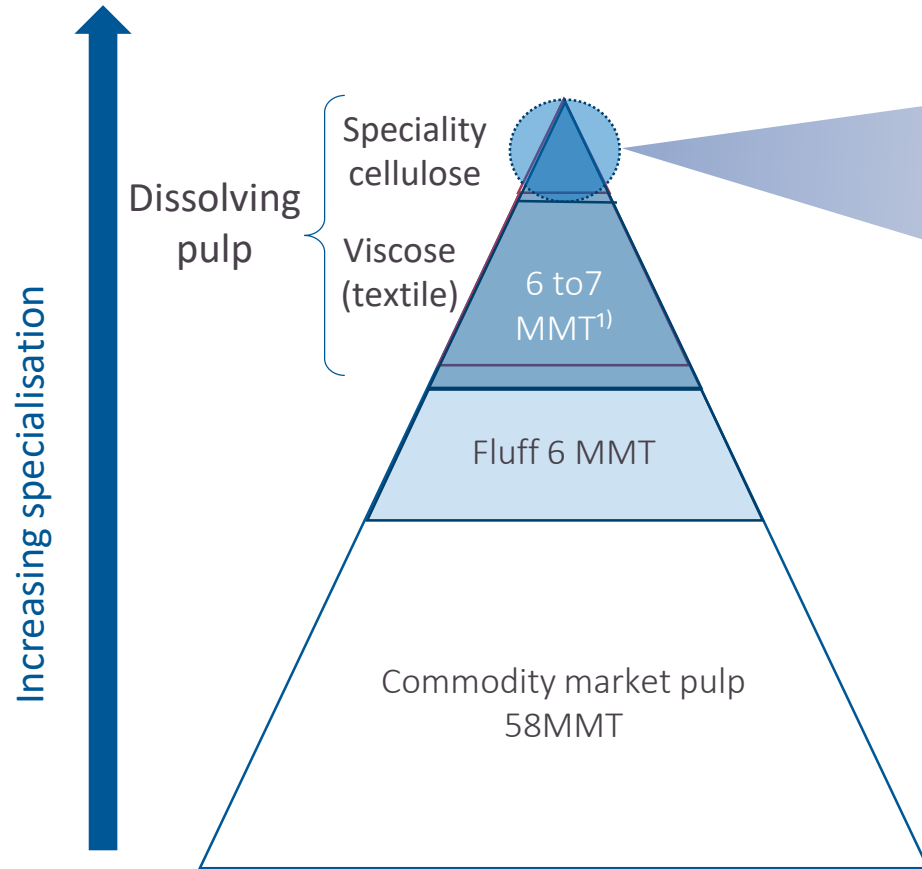


High quality speciality cellulose with strong niche positions

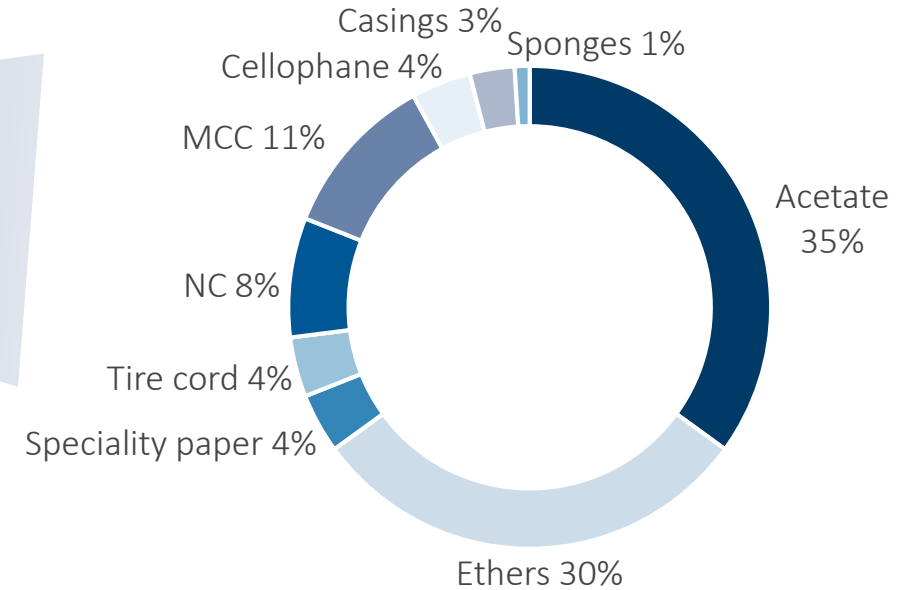


# The speciality cellulose market - 2020

Total global cellulose market



Speciality cellulose market ~1.6 MMT



## Recent trends

- Total speciality cellulose market relatively unchanged
- Viscose (textile) market growth 8.4% annually last 5 years. Textile impacted by coronavirus pandemic – demand for textiles temporarily reduced in 2020
- Industry restructuring

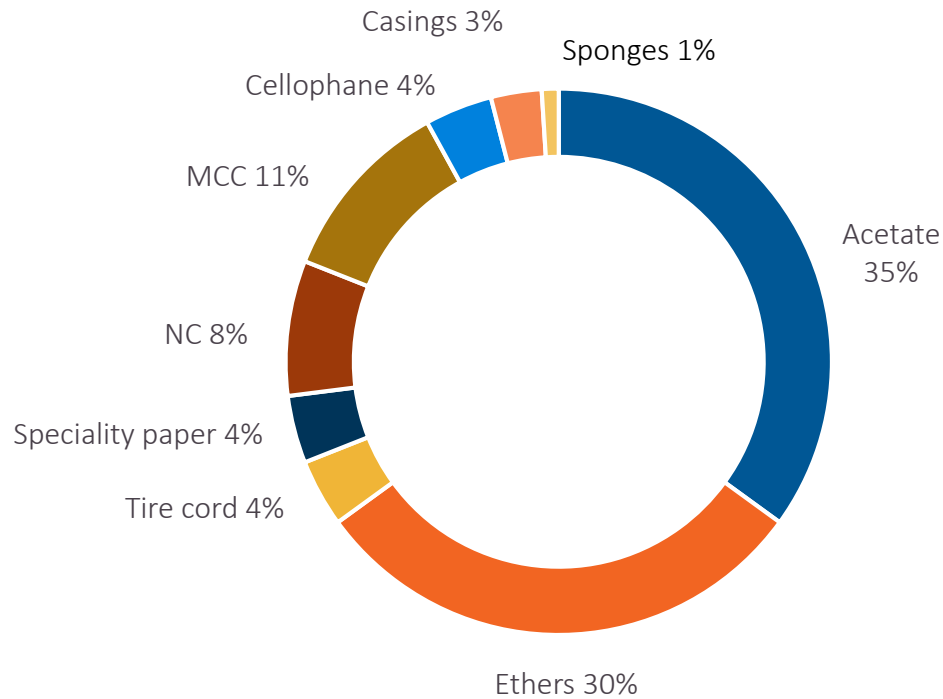
1) Million metric tonnes

Source: Borregaard estimates, Celco market reports, RISI 2020

All figures in cellulose tonnes – wood pulp and cotton linter pulp/refined cotton. Dissolving pulp figures do not include fluff and (modified) paper pulp

# Speciality cellulose market

Speciality cellulose demand 2019 (1.6 million mt<sup>1)</sup>)



|                    | Segments                         | Applications  | Market size '000 mt (2019) | Annual growth 2019-2023 |
|--------------------|----------------------------------|---|----------------------------|-------------------------|
| Highly specialised | Acetate                          | Cigarette filters, plastics, LCD, yarn                  | 550                        | -2-0%                   |
|                    | Ethers <sup>2)</sup>             | Construction, coatings, food, pharma, personal care     | 480                        | 3-4%                    |
|                    | Speciality paper                 | Automotive filtration, bank notes                       | 60                         | 1-2%                    |
|                    | Tire cord                        | High-performance tire cords                             | 60                         | 3-4%                    |
| Other specialities | Nitrocellulose (NC)              | Coatings, printing inks, nail varnish, energetic grades | 125                        | 0%                      |
|                    | Microcrystalline cellulose (MCC) | Food, pharma  | 180                        | 3-4%                    |
|                    | Cellophane                       | Food packaging  | 55                         | 0-1%                    |
|                    | Casings                          | Sausage casings   | 55                         | 3-4%                    |
|                    | Sponges                          | Sponge cloths   | 20                         | 1-2%                    |

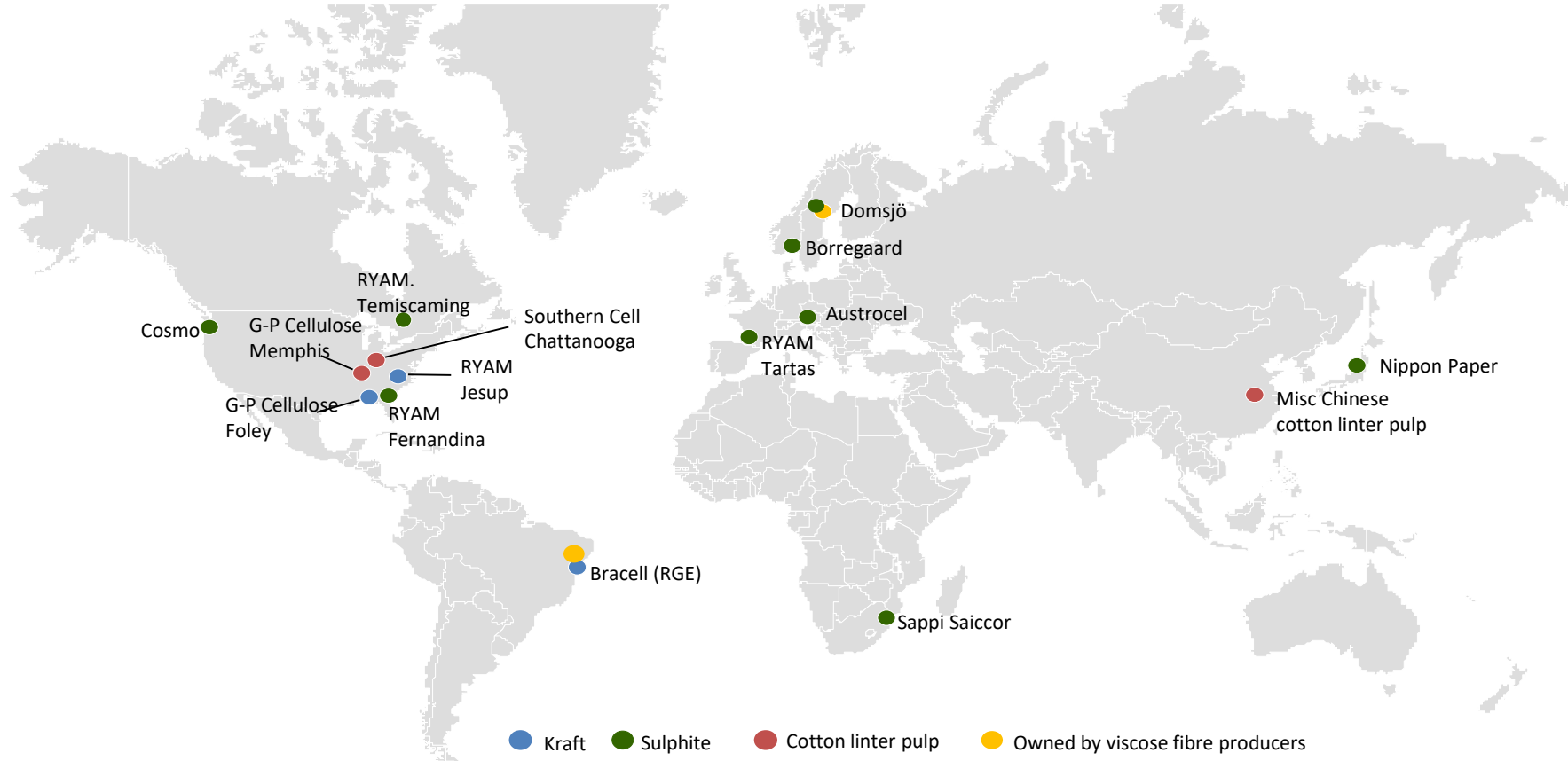
Source: Celco market reports, RISI and Borregaard estimates

<sup>1)</sup>Metric tonne

<sup>2)</sup>Cellulose ether capacity excl. technical grade CMC

# Speciality cellulose suppliers

- 12 players supplying 1.6 million mt speciality cellulose
- Top 4 players (Rayonier Advanced Materials (RYAM), Georgia-Pacific (G-P) Cellulose, Bracell and Borregaard) have 90%<sup>1)</sup> market share
- Top 4 players use textile and fluff markets as capacity filler
- Limited volumes from viscose pulp producers into speciality segments due to barriers to entry



<sup>1)</sup>Source: Celco market reports and Borregaard estimates

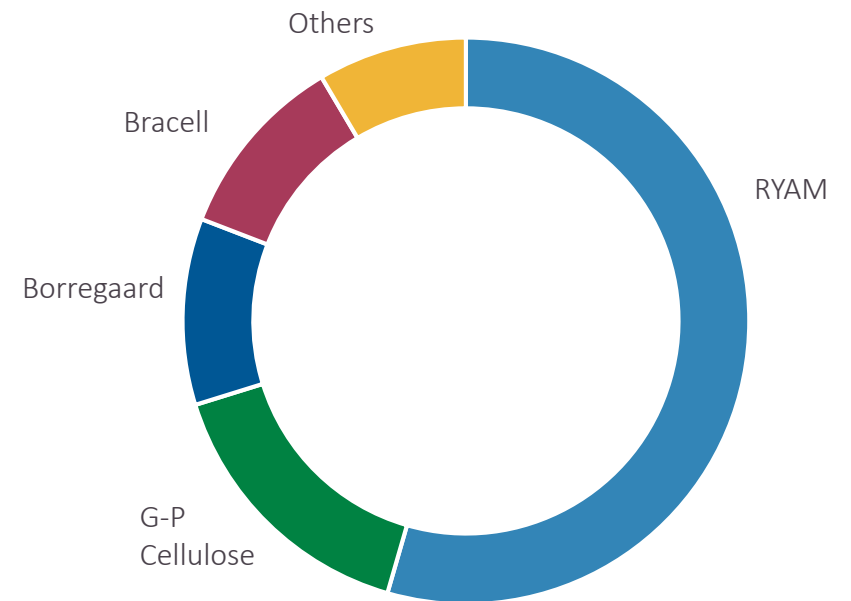
# Speciality cellulose industry

- Speciality cellulose market is approximately 1.6 million mt
- Top 4 speciality cellulose producers have 90 % market share and use hardwood and softwood as raw material
- In addition, there are a few cotton linter pulp producers supplying this market
- Main end-uses for speciality cellulose include acetate and ether, accounting for more than 60% of the market

Top 4 speciality cellulose producers by wood species and pulping process

|               | Hardwood/<br>kraft | Softwood/<br>kraft | Hardwood/<br>sulphite | Softwood/<br>sulphite |
|---------------|--------------------|--------------------|-----------------------|-----------------------|
| RYAM          | ✓                  | ✓                  |                       | ✓                     |
| G-P Cellulose |                    | ✓                  |                       |                       |
| Bracell       | ✓                  |                    |                       |                       |
| Borregaard    |                    |                    |                       | ✓                     |

Speciality cellulose sales volume by producer



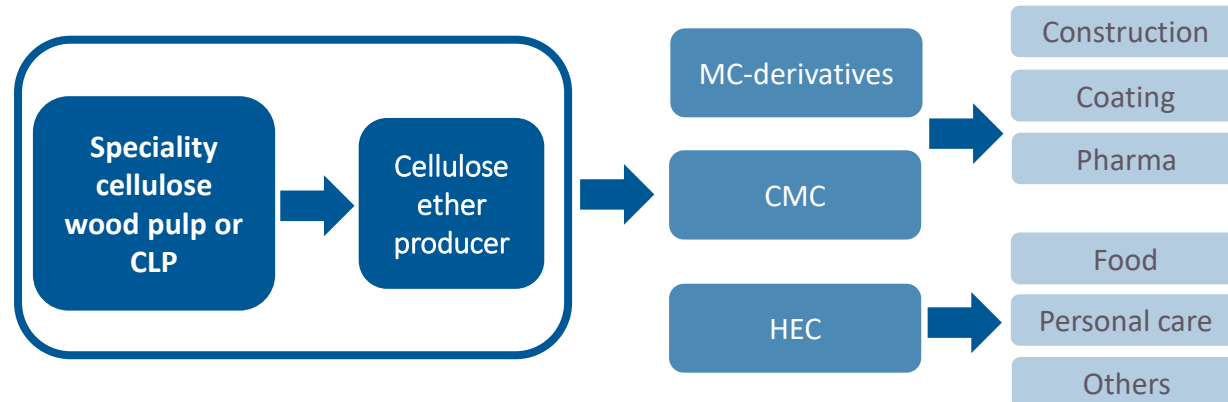
# Cellulose ethers overview

Borregaard supplies speciality cellulose wood pulp to cellulose ether producers

The three main products manufactured by the ether producers are:

- Methyl cellulose derivatives (MC, MHEC, MHPC)
- Carboxy methyl cellulose (CMC)
- Hydroxy ethyl cellulose (HEC)

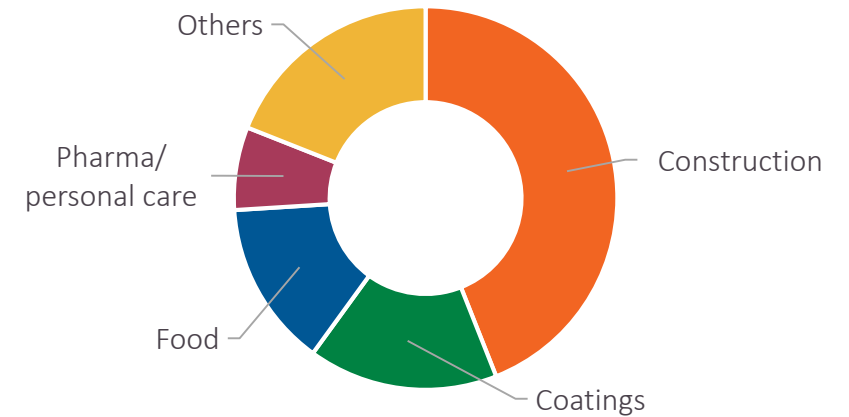
Almost all products are used as additives to modify the rheological properties of water-based systems



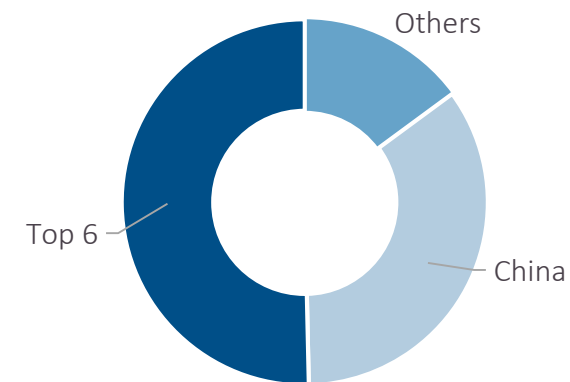


# Cellulose ethers – solid growth and attractive opportunities

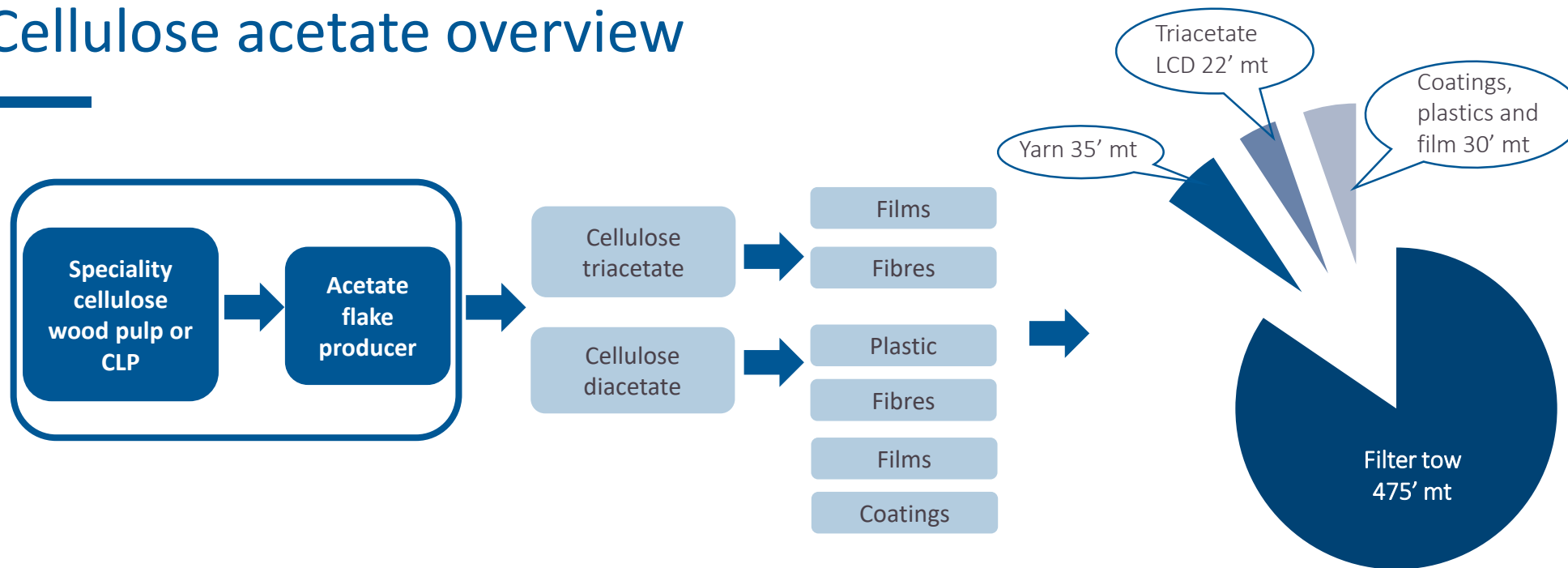
- In 2015-20, demand for ether pulp grew > 4% annually, expected at 3-4% going forward
  - Solid growth in all segments – temporary setback due to Covid-19
- Top 6 cellulose ether producers represent approx. 50 % of global capacity
  - Major players are Ashland, Dow, IFF, Lotte, Nouryon and Shin Etsu
  - High concentration of producers and growth in Europe and Asia
  - 1/3 of global capacity is in China, mainly using cotton linters pulp and refined cotton as a cellulose source, except for non-GMO regulated products for Europe
- New cellulose ether capacity under construction in Europe and Asia
- Industry consolidation ongoing
- Borregaard well positioned for growth and further specialisation in close cooperation with key customers



Cellulose ether industry structure (total 480 kt ether pulp)



# Cellulose acetate overview



- Top 5 acetate flake producers represent >90% of global capacity (Celanese, Eastman, Daicel, Cerdia and NCFC)
- Borregaard supplies speciality cellulose wood pulp to acetate flake producers. In 2015-20, demand for acetate pulp declined 2% annually, expected at -2-0% going forward
  - Global cigarette consumption declining, China is the key market
  - 'Heat-not-burn' cigarettes (e.g. PMI IQOS) becoming popular, still small share
  - Growing concern for waste issues related to cigarette filters

**Ice Bear is an enabler for entering non-filter tow applications**

# Ice bear – continued growth and new applications

Strategic initiative defending existing market positions and enabling further specialisation and flexibility within acetate

Ramp-up based on market demand and customer qualification

- Further growth projected in 2021-23 within several speciality applications

Stricter regulations and issues with fossil-based plastics driven by consumer trends creates opportunities for Ice Bear

- Acetate yarn and plastics are plant-based products
- End products can be tailored for biodegradability
- Joint product development with key customers

Further opportunities in ethers and tire cord



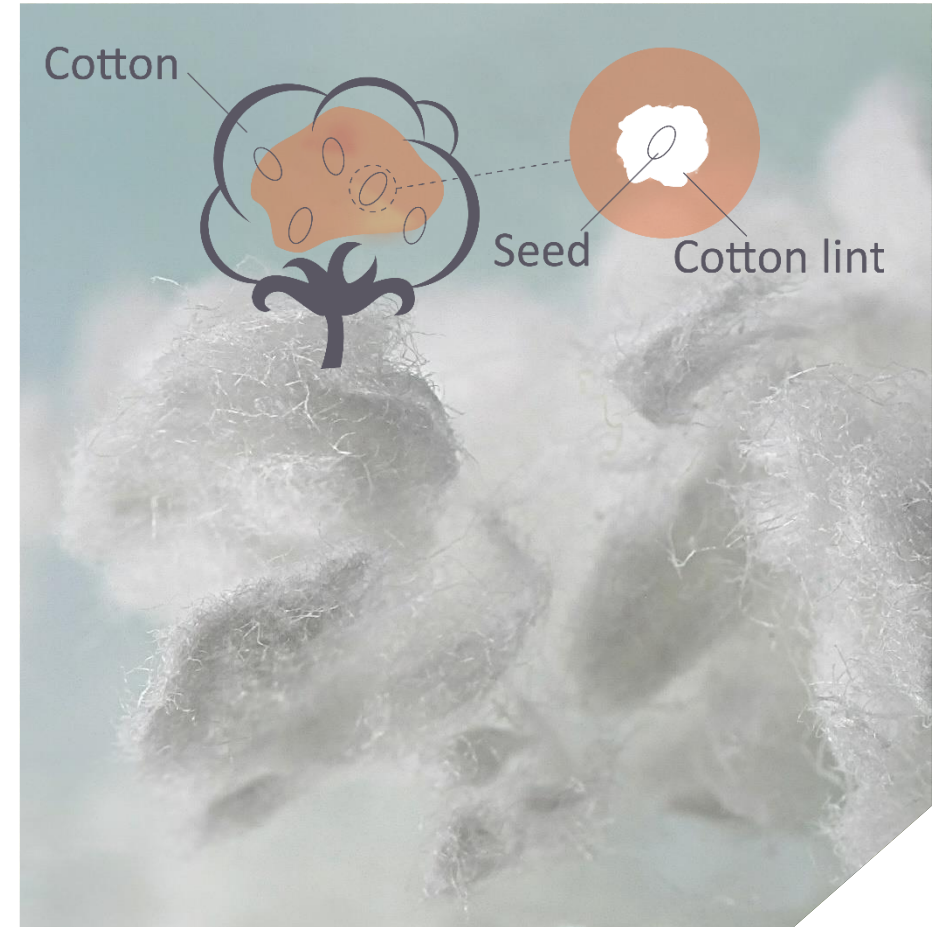
# Speciality cellulose – sustainability driving growth

- Increasing demand for wood certification and sustainability assessments driven by current consumer trends
- Customers active in consumer goods applications (food, pharma and personal care) are very committed to sustainable sourcing of renewable or biodegradable raw materials – growing interest in all segments
- Water based paints with ether-based thickeners gained share over the last 20 years at the expense of solvent based paints driven by reduction of volatile organic carbons emissions by law
- Cotton is becoming increasingly controversial



# Cotton linter pulp vs. speciality wood pulp

- Cotton linter pulp (CLP), a by-product from cotton farming, is an alternative raw material for cellulose based products like ethers and acetate
- Used "as is" or in blends with fluff pulp
- Where GMO-free is a must, CLP cannot be used
- Cotton's use of land, pesticides and water is increasingly controversial
- CLP has a significantly larger environmental footprint compared to speciality wood pulp
- Growing environmental concern among consumers may favour speciality cellulose produced from wood





# Exilva cellulose fibrils

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Global leader in micro-/nanofibrils

- Competitors in pilot plant or captive use phase

Large scale plant with 1000 tonnes dry capacity

- Use cellulose as raw material
- Zero emissions

Embryonic but fast-growing market

Product is a network of micro and nano fibrils with large surface area

- 1 gram covers a tennis court

Key benefits

- Improve and control flow
- Create a barrier or a film

More than 30 application areas

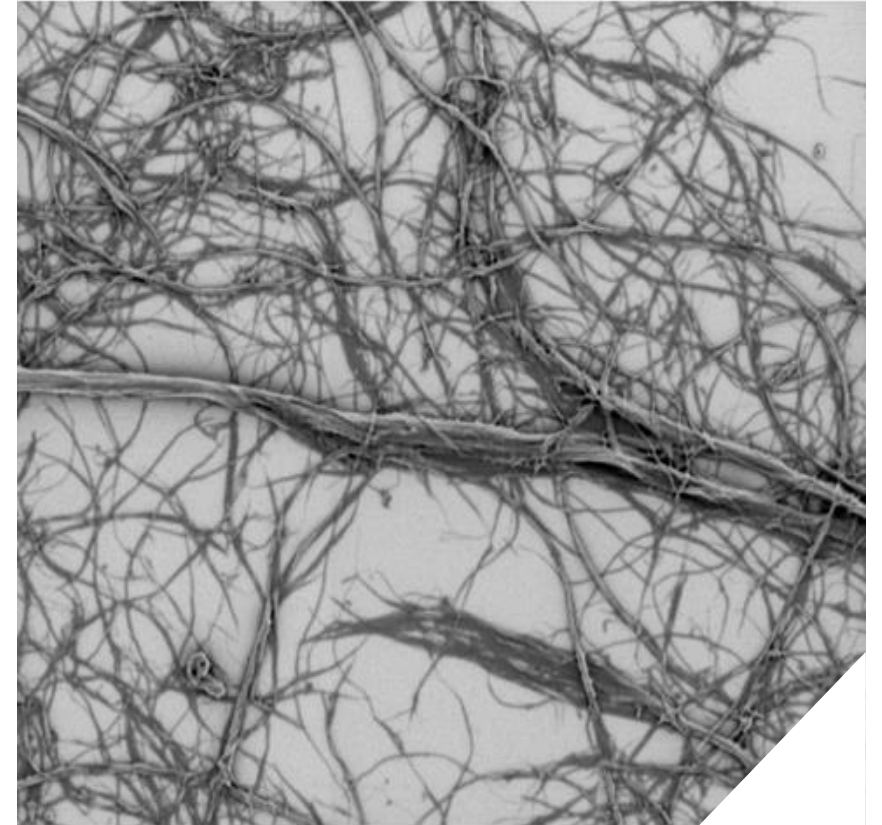
- From pharma to concrete



# Cellulose fibrils – Exilva

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- Microfibrillar cellulose (MFC) is cellulose fibers defibrillated into millions of tiny fibrils (100,000 times thinner than hair)
- Exilva is Borregaard's brand name for microfibrillar cellulose used in industrial applications
- Exilva is a sustainable biobased material with multifunctional properties
  - Improves flow, stability, flexibility and strength in industrial formulations and materials
  - Enables customers to develop new and improved products



# Nanocellulose landscape

Three main product categories, with significant variations within each product group, few standards exist

- NCC/CNC - nano cellulose crystals
  - NFC/MFC - nano/microfibrillated cellulose
  - CNF - ionic cellulose nano fibrils
- 
- Typically more complementary than competing in use, some overlaps
  - Crystals and ionic fibrils classified as nano by EU and USA (EPA), while NFC/MFC are not as they form micro clusters

One commercial size plant exists in each category

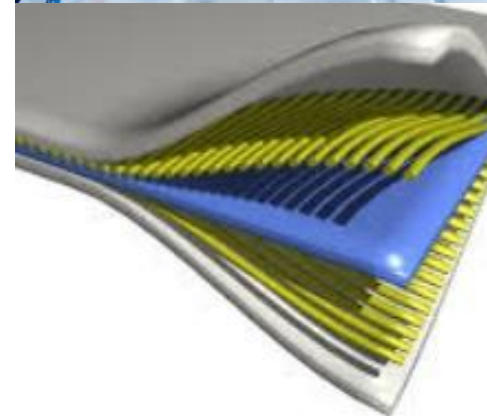
- NCC/CNC - Cellulforce, Canada
- NFC/MFC - Exilva, Norway
- CNF - Nippon Paper, Japan
- Many pilot plants with 5-30 mt capacity



NCC/CNC – strength focus



NFC/MFC – rheology focus



CNF – composites focus

# Exilva – growing pipeline and customer base

## 70 regular customers

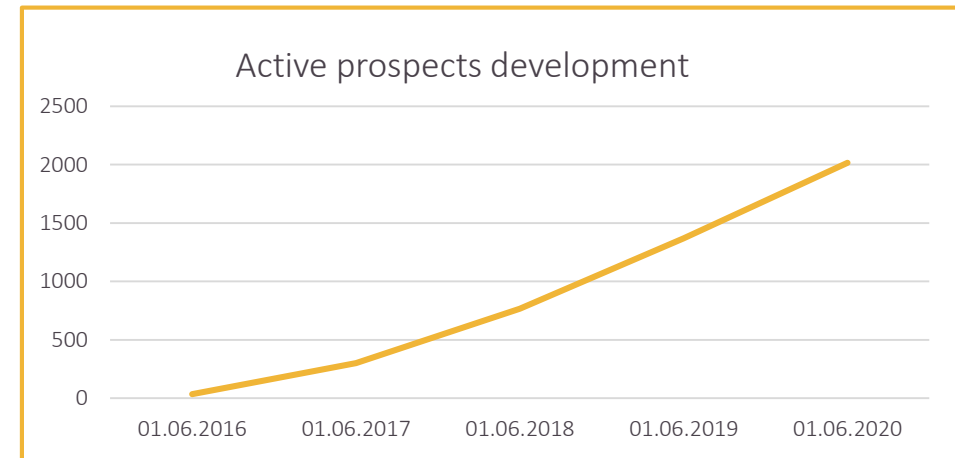
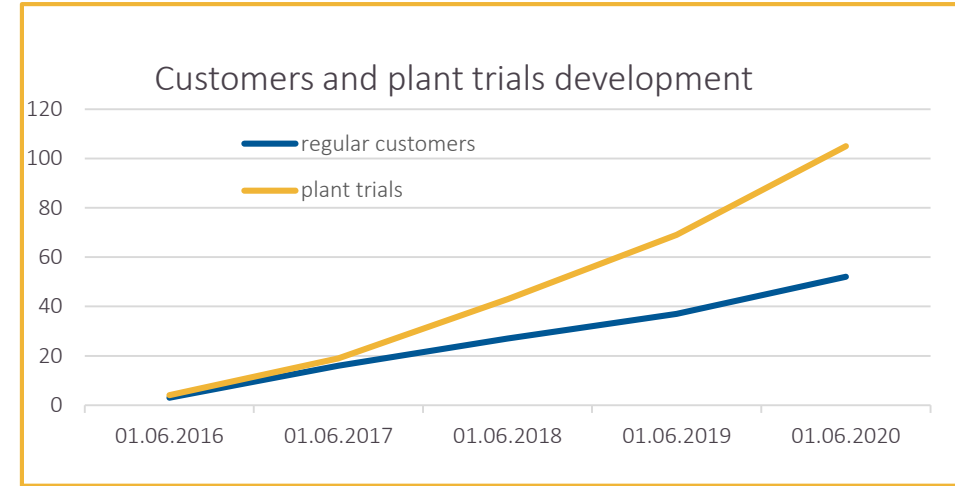
- Significant sales increase year on year
- Good growth with key customers

## More than 2200 active prospects

- Classified as a prospect when a sample is sent
- Net increase (adjusted for closed/lost) +35 per month
- >130 in plant trial phase, Covid-19 slowed down plant trials
- Positive from lab trials + 400
- Long lead times/feedback; varies from 1-5 years, with 3 years average

## Approx 900 prospects closed/lost

- No clear trends on technologies or applications
- <10% lost due to cost issues



# Sustainability and performance driving demand

## Moving from solvent based to water-based

- Exilva enables some coatings and adhesives to be reformulated to water-based systems without reducing performance

## Replacing carbomers

- Carbomers are versatile acrylic copolymers used amongst other in personal and home care products
- Exilva can replace these in certain formulations

## Removing or reducing the use of boron compounds

- Borons are classified as Substances of Very High Concern
- Exilva can replace boron in certain applications like adhesives for corrugated board

## Enhancing strength of bioplastics

- Product strength is the main challenge
- Exilva can increase strength in some of these polymers

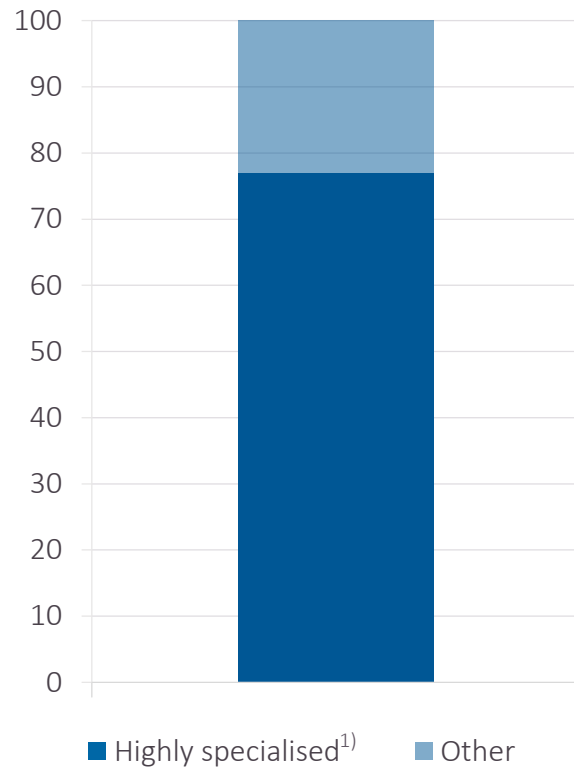




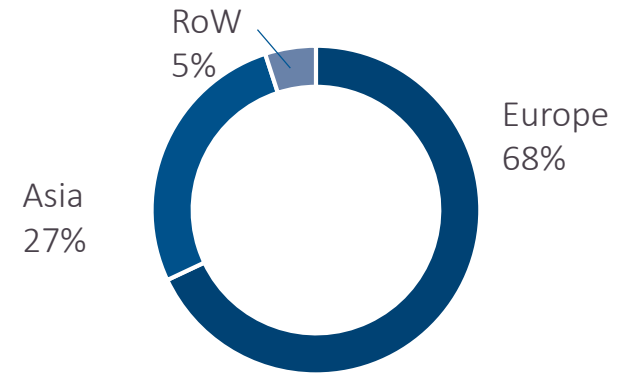
# Sales distribution 2020

Borregaard is positioned in high-end segments in Europe and Asia, with strong and long-lasting customer relationships

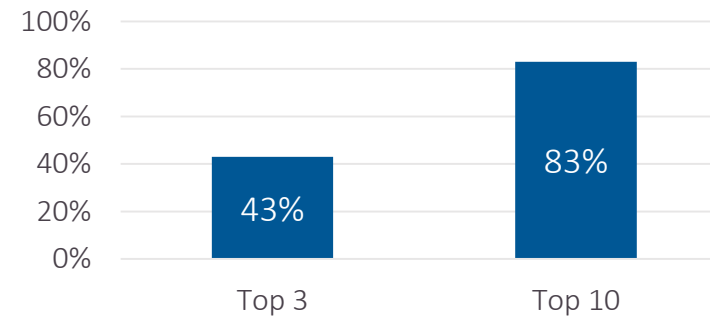
Volume split %



Geographical split (sales revenues)



Customer base and concentration (sales revenues)



Source: Borregaard estimates  
1) Acetate, ether and tire cord grades

# Fine Chemicals

## Fine chemical intermediates

### Market position

- Leading producer of intermediates for contrast agents

### Production

- Sarpsborg, Norway

### Products

- C3 aminodiols
- Intermediates for pharmaceutical products

### Applications

- Contrast agents for medical imaging
- Medicines

### Market growth<sup>1)</sup>

- 5-7%



## Bioethanol

### Market position

- Leading producer of second-generation bioethanol

### Production

- Sarpsborg, Norway

### Products

- Pure and denatured bioethanol

### Applications

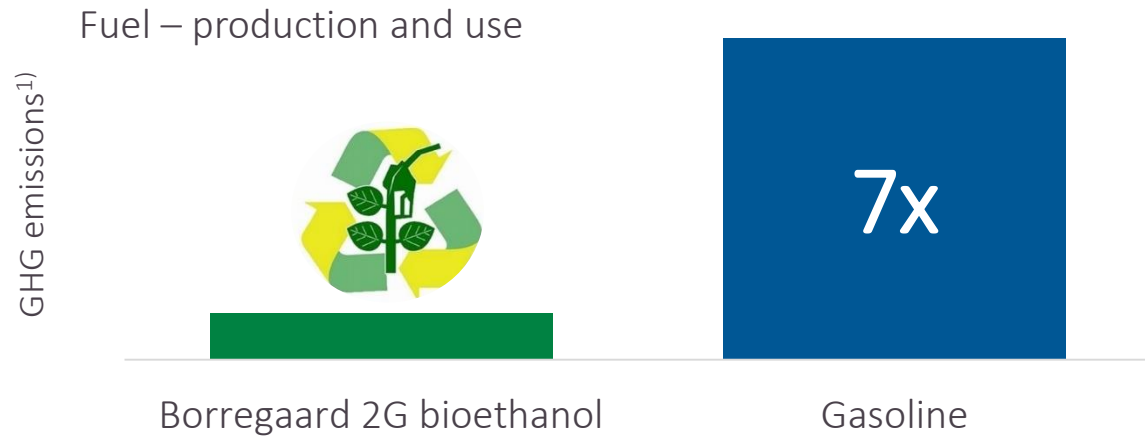
- Biofuel, disinfectant, pharmaceutical industry, home and personal care products, paint/varnish, car care

### Capacity

- 20 million liters

# Sustainability

## Favourable climate footprint



### 2<sup>nd</sup> generation bioethanol vs petroleum-based fuel

- Increased demand in different countries due to incentives

# Research & development

- ~18%<sup>1)</sup> of Borregaard's revenues come from new products<sup>2)</sup>
- Innovation Management Teams
- ~90 employees in R&D – of which 67 at the research centre in Sarpsborg – 28 have a PhD
- R&D and innovation spending 3.6% of revenues in 2020<sup>3)</sup>
- IP strategies for each BU and major innovation projects



Cellulose Fibrils: Exilva microfibrillar cellulose



«BALI»: Utilisation of various biomasses for lignin products



Continuous specialisation and improved products

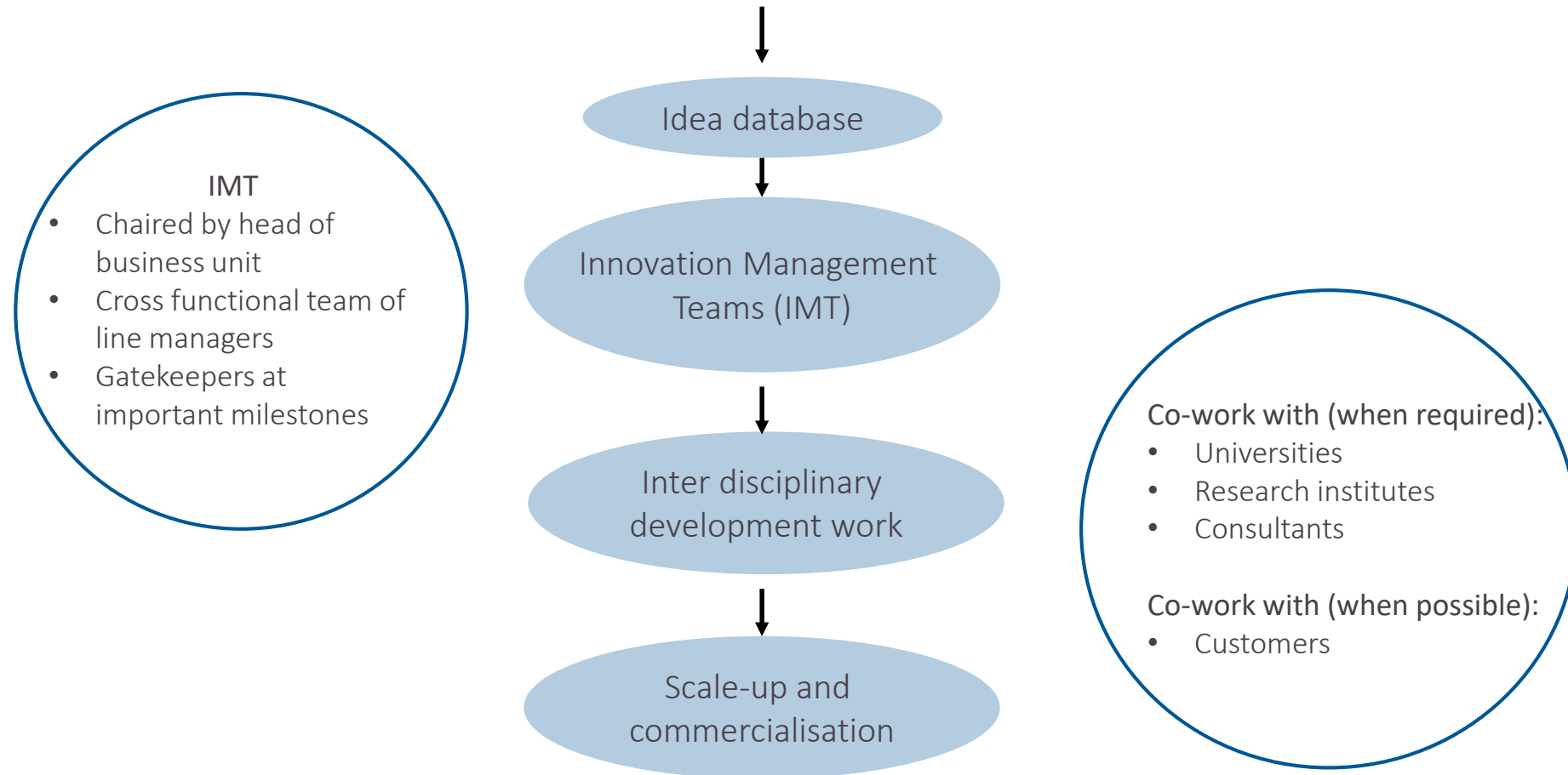
1) Average last 5 years. 13% in 2019

2) Launched the last 5 years

3) Includes R&D centres, operation of BALI/Exilva pilots and market/application innovations

# Business driven innovation model

Ideas from sales, technical application, R&D, production, external partners





# Financial objectives and dividend policy

## Financial objectives

- ROCE<sup>2)</sup> >15% pre-tax over a business cycle
- IRR >15% pre-tax for expansion capex
- Average net working capital at 20% of operating revenues
- Replacement capex at depreciation level
- Maintain key financial ratios corresponding to an investment grade rated company
  - Leverage ratio<sup>1)</sup> targeted between 1.0 and 2.25 over time

## Borregaard's dividend policy

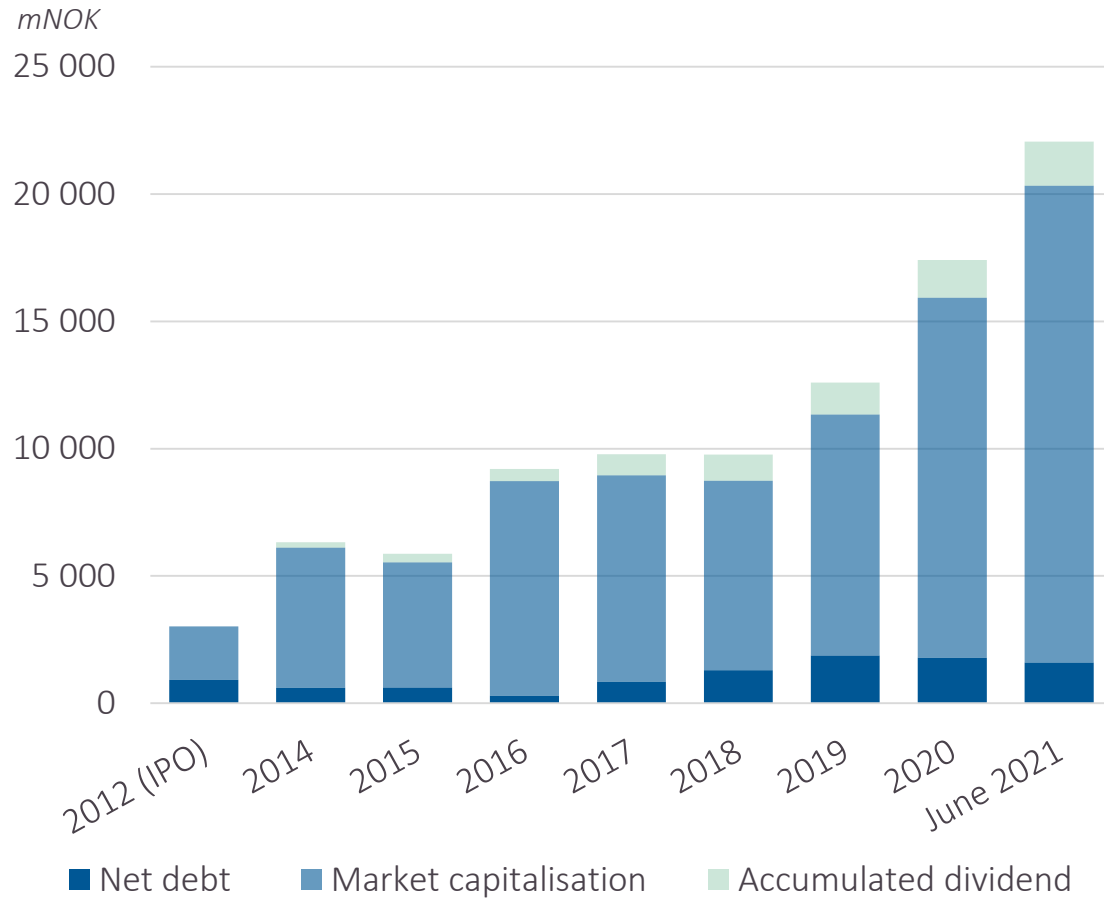
- To pay regular and progressive dividends reflecting Borregaard's expected long term earnings, free cash flows and expansion capex
- Annual dividend is targeted between 30% and 50% of net profit for the preceding fiscal year



1) Net interest-bearing debt divided by last twelve months' EBITDA adj.<sup>2)</sup>

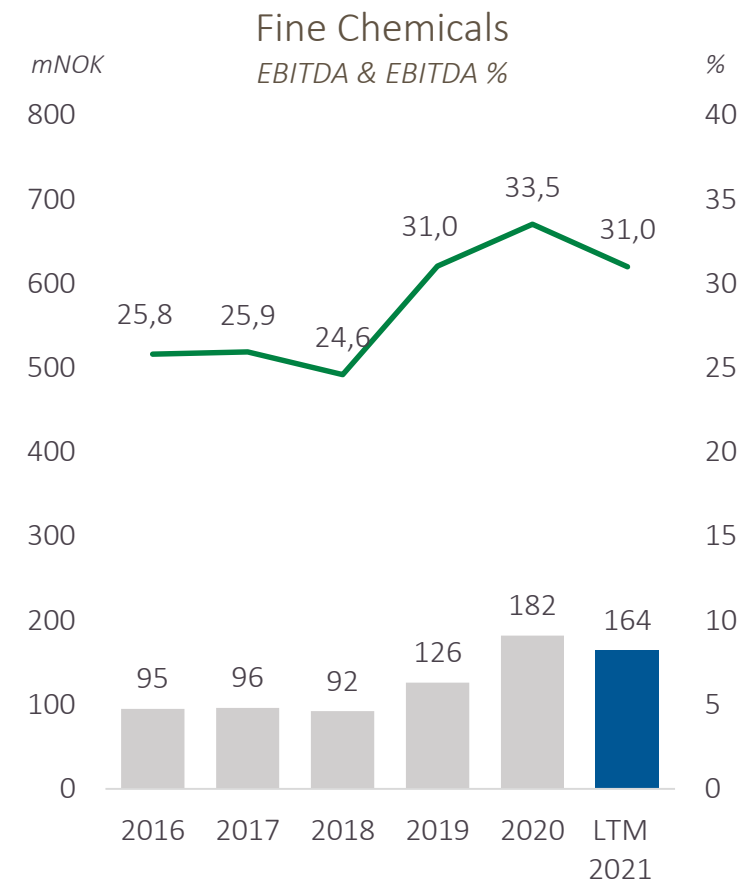
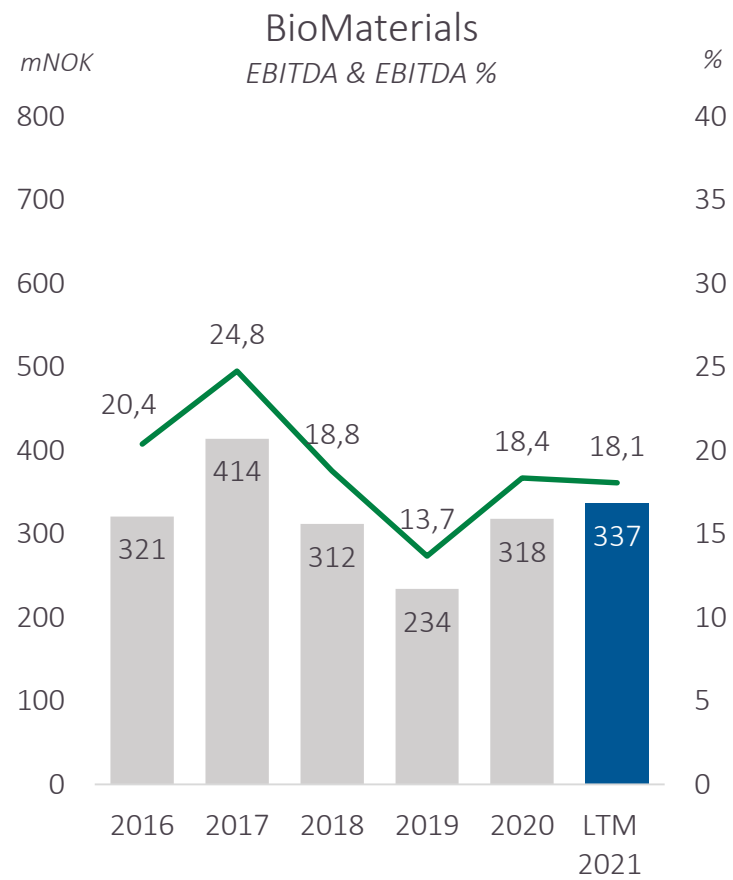
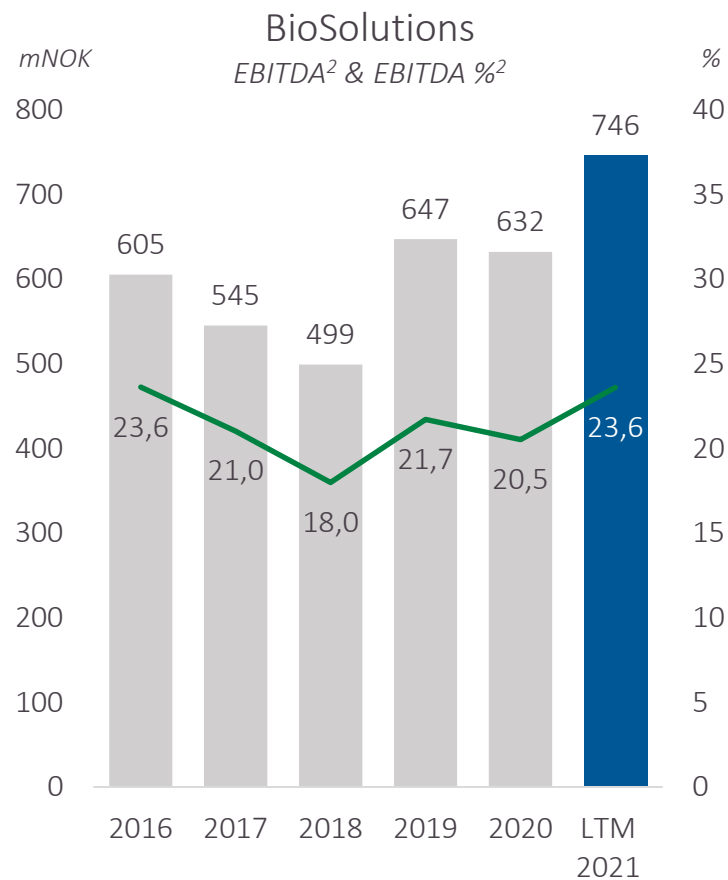
2) Alternative performance measure – see Appendix

# Value creation since IPO



|   | CAGR  |
|---|-------|
| Share price, including reinvestment of dividend | 32.5% |
| Enterprise value = market cap + net debt        | 24.5% |

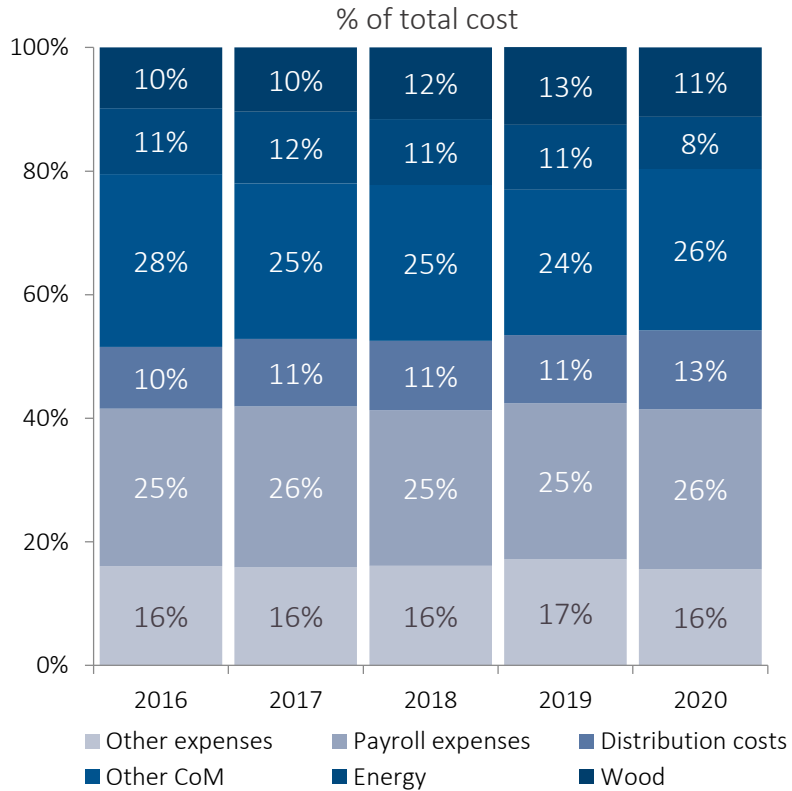
# Key segment figures 2016 – 2021 (LTM)<sup>1</sup>



1) Last twelve months as per June 2021

2) Alternative performance measures - see Appendix

# Key cost items 2016-2020



- Total costs in 2020 close to 4.2 billion NOK
- 4.9% CAGR from 2016 to 2020
- Main cost components' share of total costs relatively stable over time

|                    |  |
|--------------------|--|
| Wood               | <ul style="list-style-type: none"> <li>• 75%-85% sourced from Norway, the rest mainly from Sweden</li> <li>• Annual price and volume contracts, mid-year adjustments occur</li> <li>• Includes inbound logistics, ~30% of wood cost</li> </ul>   |
| Energy             | <ul style="list-style-type: none"> <li>• Energy consumption: Heat energy 2/3, electricity 1/3</li> <li>• Heat energy: Base load mainly covered by renewable energy sources, peak-load mainly covered by LNG and spot electricity</li> <li>• Electricity: Long term contract to 2029 for substantial part of needed volume</li> </ul> |
| Other CoM          | <ul style="list-style-type: none"> <li>• Chemicals<sup>1)</sup> and other raw materials like lignin raw material</li> <li>• Internal production of caustic soda</li> <li>• Contract manufacturing of petrochemical-based vanillin</li> <li>• Change in inventories</li> </ul>  |
| Distribution costs | <ul style="list-style-type: none"> <li>• Most products sold delivered customer</li> <li>• Logistical optimisation important, especially for Performance Chemicals</li> </ul>   |
| Payroll expenses   | <ul style="list-style-type: none"> <li>• Continuous productivity improvement, including de-manning and cost reduction activities</li> </ul>  |
| Other expenses     | <ul style="list-style-type: none"> <li>• Repair and maintenance, external services, rental/leasing and other operating expenses</li> </ul>   |

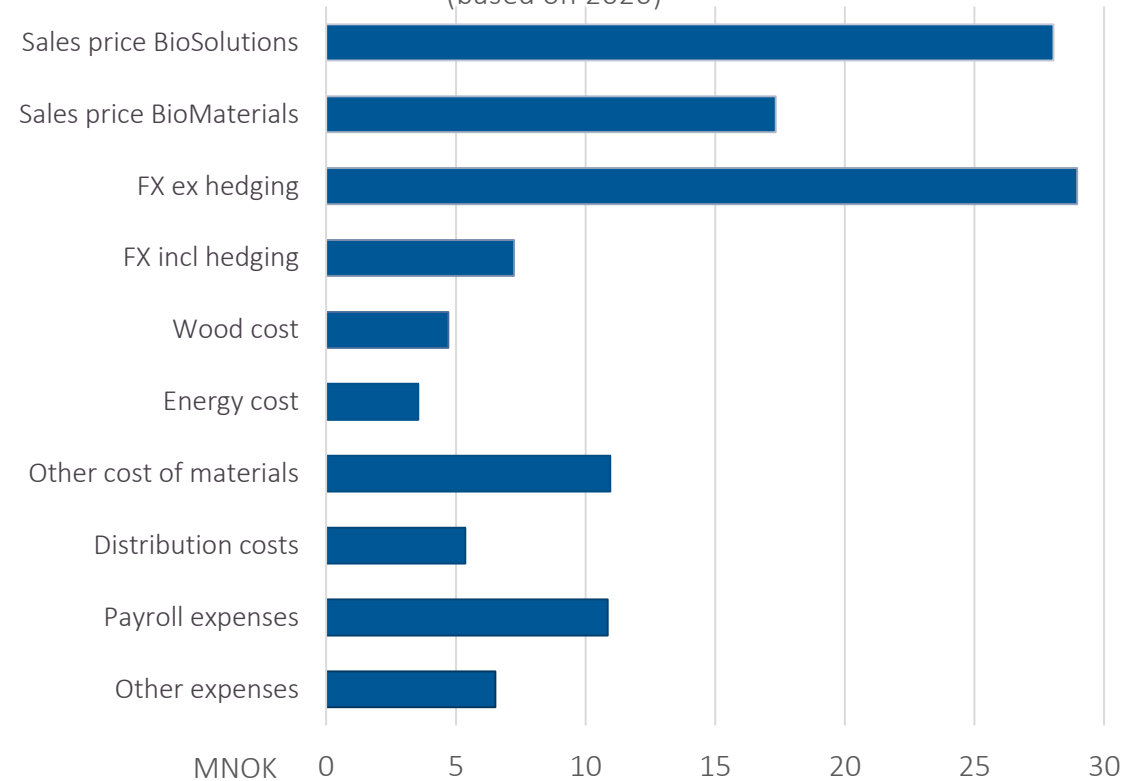
1) Main chemicals are caustic soda, salt, sulphur, epichlorohydrine and guethol

# Sensitivity on EBITDA<sup>1)</sup>

- Global presence, diversified product portfolio and GDP-driven demand reduce market risk
- Oil price affects demand and competition in certain markets, but main effect historically has been on NOK FX rate
- Significant FX exposure, softened by FX hedging<sup>2)</sup> in the medium term
- No major single component in other cost of materials
- Distribution costs: Most products sold “delivered customer”
- Other expenses are repair and maintenance, external services, rental/leasing etc.

Sensitivity of 1% change

(based on 2020)



1) Alternative performance measure – see appendix

2) Hedging based on expected net cash flow (EBITDA)

- Base hedge - 75%/50% on a rolling basis for 6/9 months for major currencies

- Extended hedge - 75%/50% of the next 24/36 months if USD and EUR are above predefined levels



# FX impact and policy

## Currency hedging strategy

- Purpose is to delay effects of currency fluctuations and secure competitiveness
- Hedging based on expected net cash flow (EBITDA<sup>2</sup>)<sup>3</sup>
- Base hedge - 75%/50% on a rolling basis for 6/9 months for major currencies
- Extended hedge - 75%/50% of the next 24/36 months if USD and EUR are above defined levels
  - EUR; gradually increased at effective rates from 9.25 to 9.75
  - USD; gradually increased at effective rates from 8.00 to 8.50
- Contracts<sup>4</sup> - 100% hedged
- Balance sheet exposure hedged 100%
- Net investments in subsidiaries hedged up to 90% of book value in major currencies

## FX exposure

- Borregaard's revenues are primarily in USD or EUR, while costs are primarily in NOK
- Net FX exposure in 2020 USD: 58% (approximately 177 mUSD)
- EUR: 41% (approximately 112 mEUR)
- Other: 1% (GBP, BRL, JPY, SEK, ZAR)

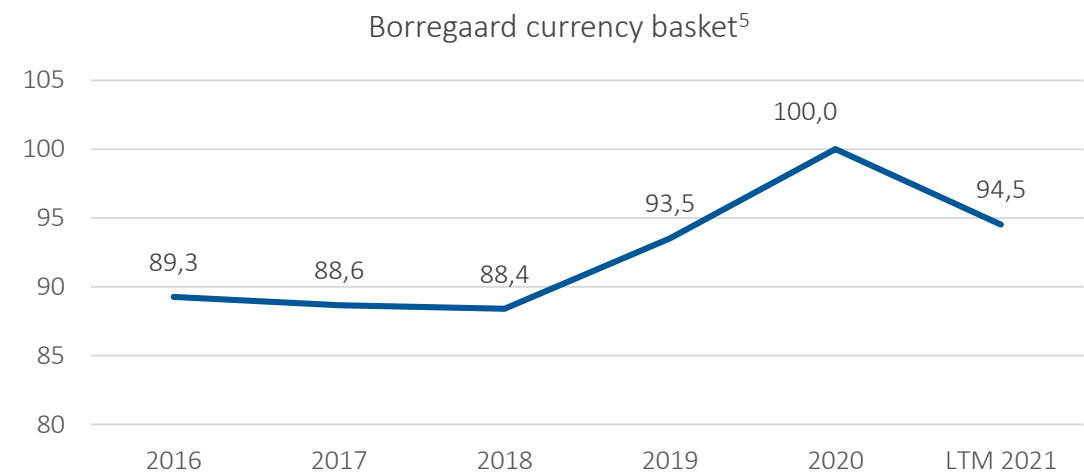
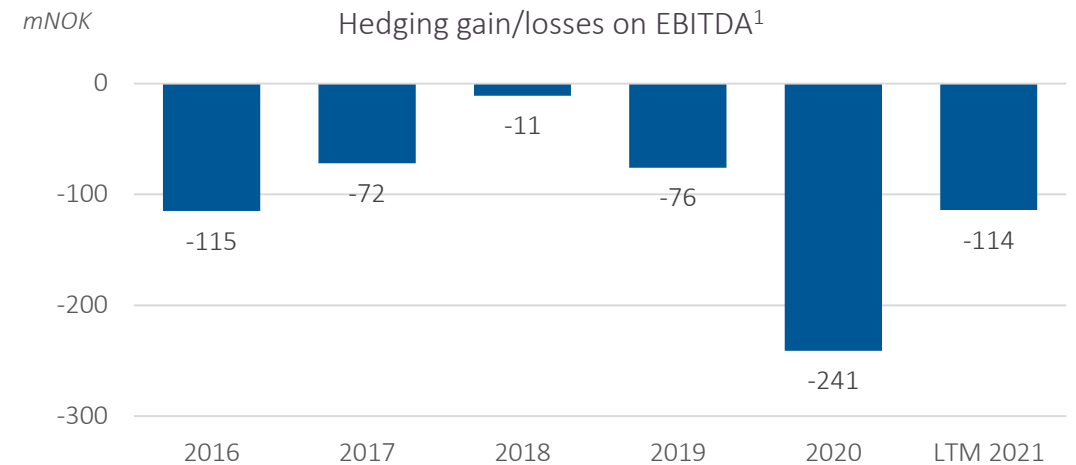
1) Last twelve months as per June 2021

2) Alternative performance measures - see Appendix

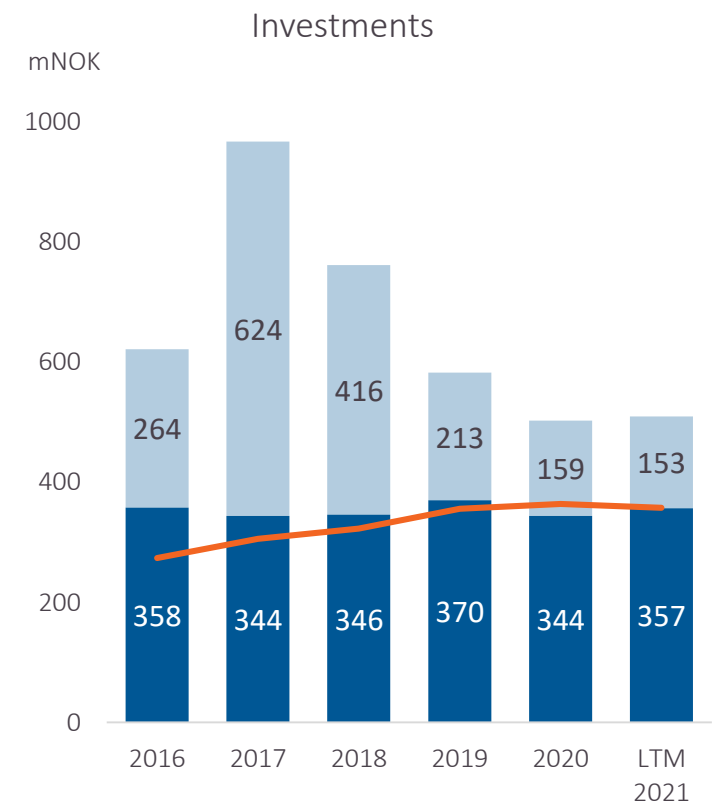
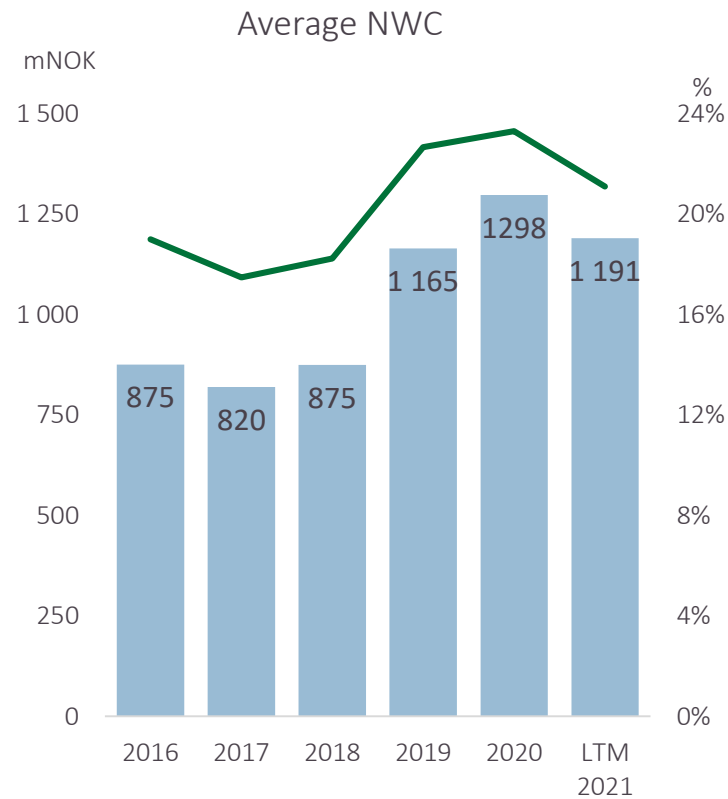
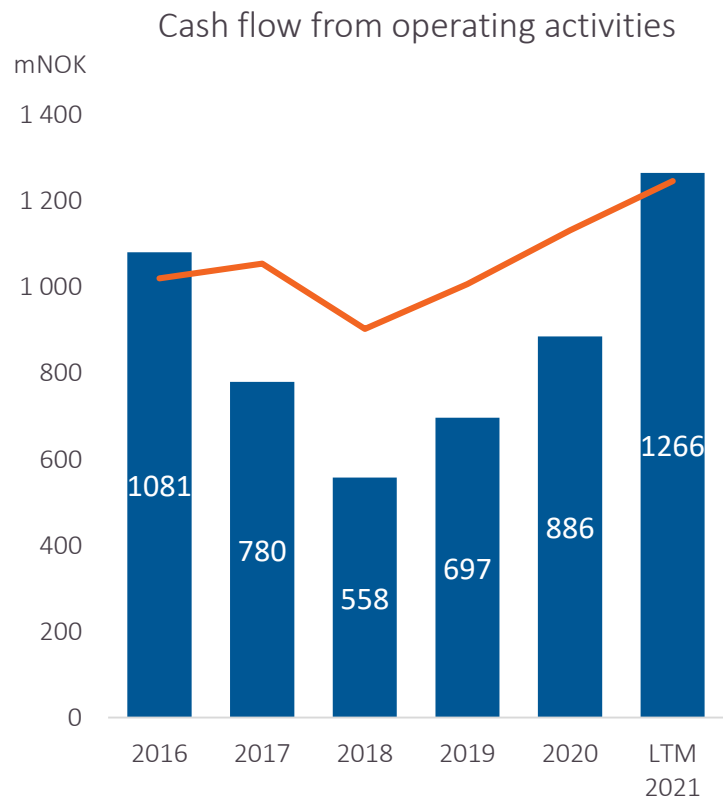
3) Net cash flow hedging mainly in the Norwegian company

4) Strict definitions for contracts applied for 100% hedging (mutually binding agreement in which price, currency, volume and time are defined)

5) Currency basket based on Borregaard's net exposure in 2020 (=100)



# Cash flow, NWC and investments 2016 – 2021 (LTM)<sup>2</sup>



■ Cash flow from operating activities    — EBITDA<sup>1</sup>

■ NWC avg    — % of OpRev ex hedging

■ Replacement    ■ Expansion    — Depr. ex IFRS16

1) Alternative performance measures - see Appendix  
 2) Last twelve months as per June 2021

# Investment forecast 2021-2023

## Replacement investments

- Targeted at depreciation level
- Upgrade of caustic soda production facility a major investment in 2020 and 2021

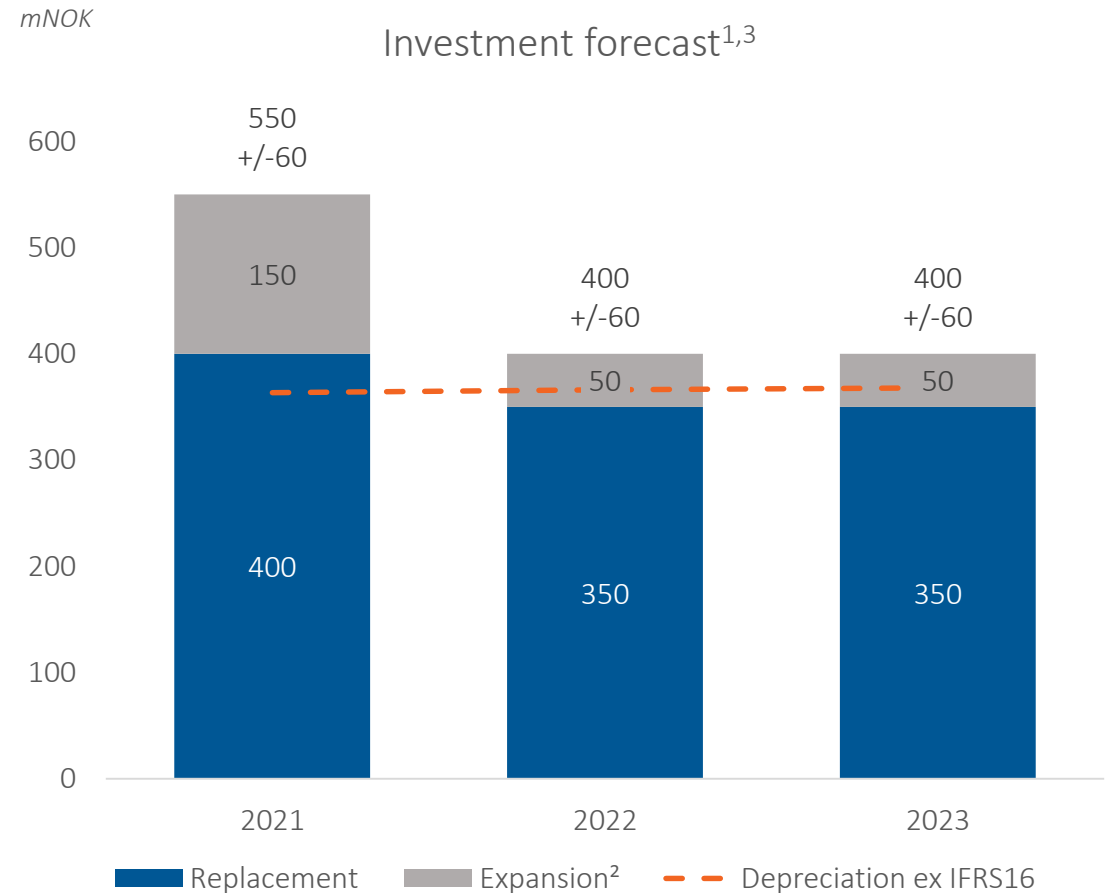
## Expansion<sup>2</sup> investments

- Capacity expansion for wood-based vanillin the main project (130 mNOK, completion mid-2021)
- A few smaller expansion projects are ongoing or planned

## Revised forecast due to carry-over from 2020

- Mainly related to the caustic soda production facility (replacement) and capacity expansion for wood-based vanillin (expansion)

## New projects may lead to additional investments



<sup>1</sup> Uncertainty is related to final investment decisions, timing of investment payments, execution time and risk and unexpected events

<sup>2</sup> Alternative performance measure, see Appendix for definition

<sup>3</sup> Total investments Q1-21 were 95 mNOK, of which 59 mNOK were replacement investments and 36 mNOK were expansion investments

# Major expansion investments – BioSolutions

## Florida – Biopolymers New lignin plant



Investment 890 mNOK (110 mUSD) in 100,000 mtds<sup>1)</sup> capacity (phase 1)

Volume ramp-up in line with 3-year plan, profitability behind expectations, mainly due to an unfavourable product mix and higher distribution and fixed costs

## Sarpsborg site – Biopolymers Upgrade and specialisation of plant



Investment 450 mNOK in increased drying capacity, storage tanks and improved solutions for logistics, infrastructure and energy

Cost savings in Norway according to plan, additional restructuring of German operation. Reduced exposure to cyclical market segments and further specialisation

## Sarpsborg site – Biovanillin Capacity expansion



Investment 130 mNOK in increased capacity of at least 250 tonnes for wood-based vanillin

Completion of capacity increase mid-2021, part of the increase in production already realised during last twelve months

EBITDA improvement target next 3 years:

150-250 mNOK vs 2020 LTM<sup>2)</sup> through volume increase, optimisation of product mix, further specialisation and cost savings

1) Metric tonne dry solid

2) Last twelve months as per June 2020

# Major expansion investments – BioMaterials & Fine Chemicals

Sarpsborg site – Speciality cellulose  
*Ice Bear project*



Sarpsborg site – Cellulose fibrils  
*Exilva plant and commercialisation*



Smaller expansion projects  
*Bioethanol and pharma intermediates*



Investment 215 mNOK in increased capacity and quality improvement for high purity cellulose

Investment 225 mNOK in commercial scale (1,000 tonnes dry material) production facility for Exilva cellulose fibrils

Investments totalling more than 100 mNOK in increased capacity for water-free bioethanol and pharma intermediates

Ice Bear volume has gradually increased, significant contributor to stabilise results over time and reduce exposure to textile cellulose

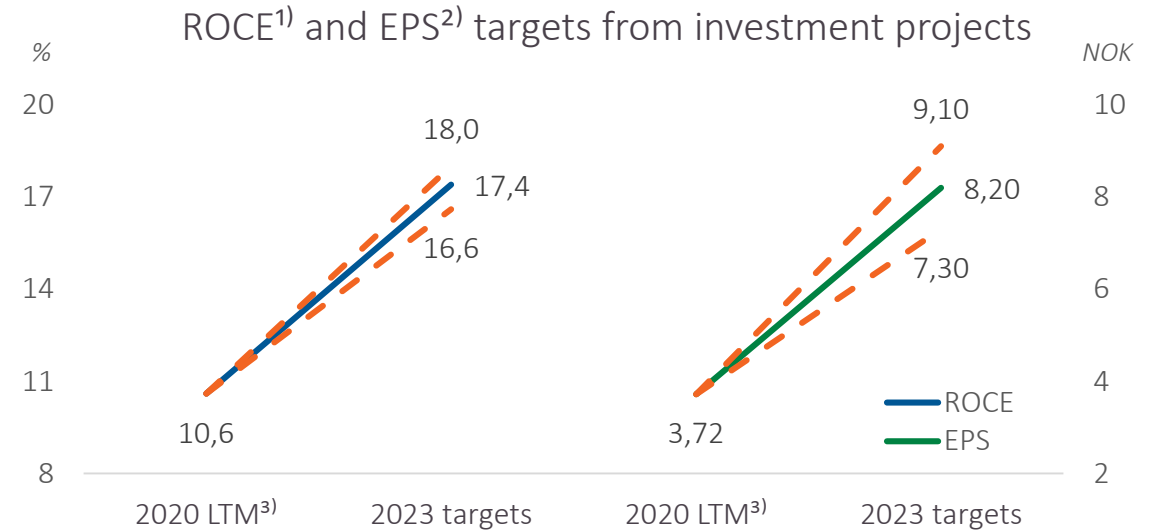
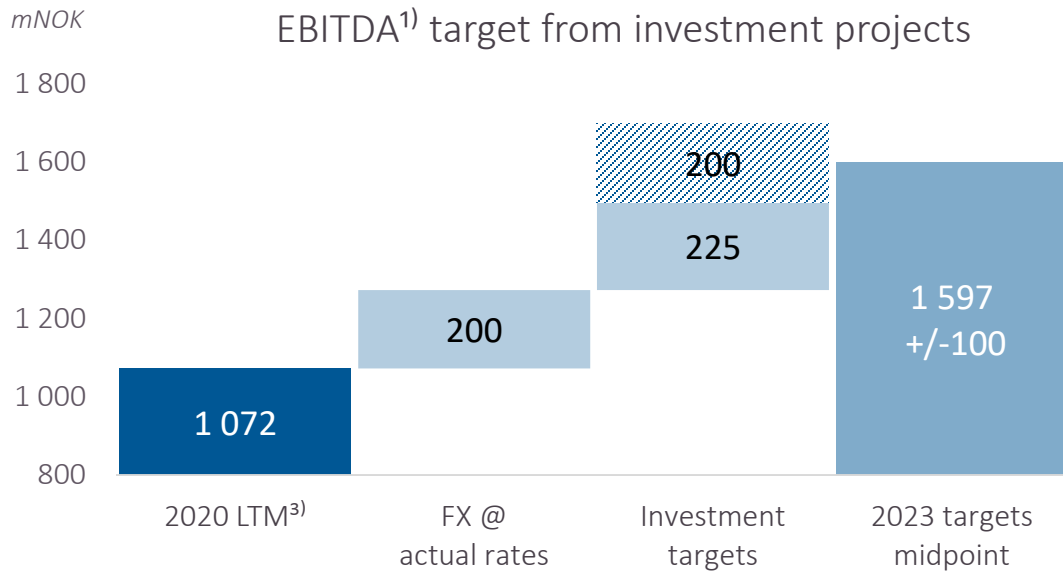
Strong interest from the market and growing number of commercial customers. Sales volume still low and lead-times continue to be quite long

Successful bioethanol expansion with extraordinary result in Q2-20, cost effective debottlenecking for pharma intermediates

EBITDA improvement target next 3 years:  
75-125 mNOK vs 2020 LTM<sup>1)</sup> through volume increase and further specialisation



# Impact from investments on key financials



If targets are met, Borregaard will improve profitability and meet ROCE objective in 2023

### Assumptions

- Actual FX rates USD 9.00 and EUR 10.70 vs NOK, including effects from existing hedging positions
- Forecasted investments at midpoints. NWC increasing with revenues. Dividend increased in line with policy. Potential larger expansion investments beyond forecast may negatively affect key financials in the period
- Other parameters constant (major uncertainties are market demand, world economy, Covid-19 situation, general cost inflation and input factor prices)

1) Alternative performance measures - see Appendix  
 2) Earnings per share  
 3) Last twelve months as per June 2020

# Capital structure

## Target for capital structure

- Maintain key financial ratios corresponding to an investment grade rated company
- Leverage ratio<sup>1</sup> targeted between 1.0 and 2.25 over time

## Solid capital structure as per 30.6.21

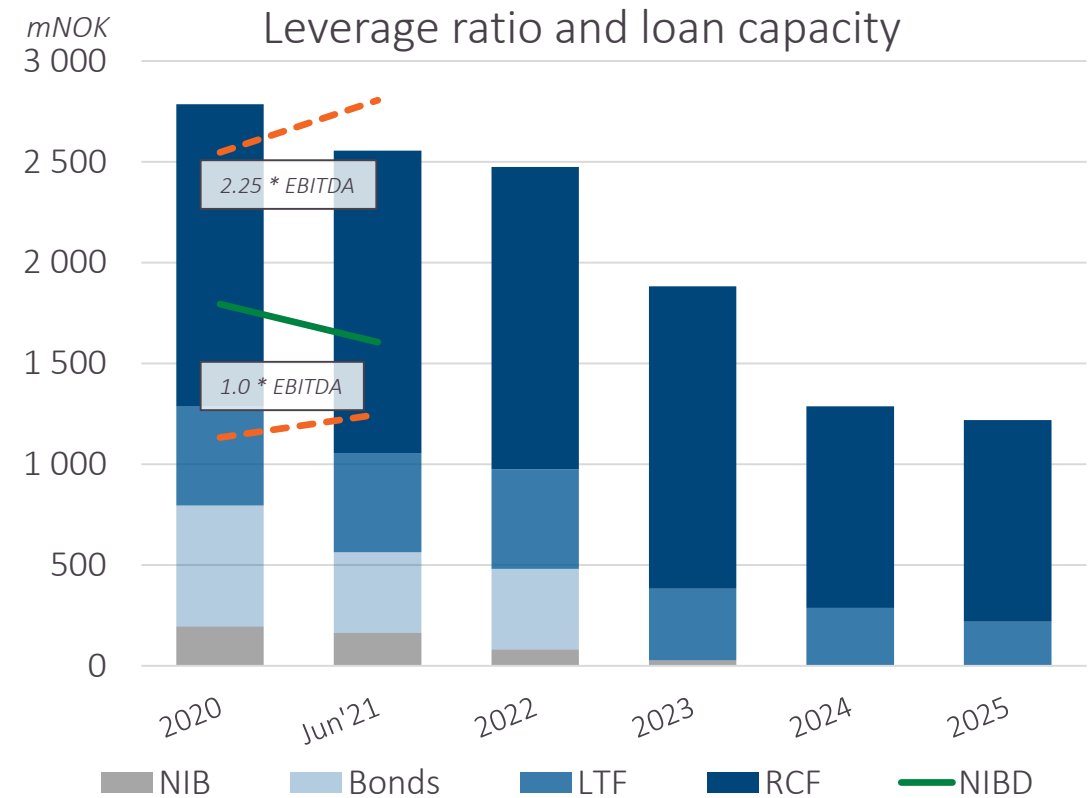
- Leverage ratio 1.29 (covenant <3.50)
- Equity ratio<sup>1</sup> 56.2%

## Long term credit facilities

- New revolving credit facilities (RCF) in July 2020, maturity 2024 and 2026, margin linked to sustainability targets
- 60mUSD term loan for LignoTech Florida (LTF), tenor 8.5 years from completion of project phase 1
- Bond issues, 400 mNOK, maturity June 2023
- Nordic Investment Bank (NIB) loan, 40 mEUR, maturity 2024

## Short term credit facilities

- 225 mNOK overdraft facilities
- 15 mUSD overdraft facility in LignoTech Florida
- 300 mNOK commercial paper



# Highly experienced and proven management team



**CEO**

**Per A. Sørli**

- CEO since 1999
- Member of management team since 1990
- **31 years** with Borregaard



**Per Bjarne Lyngstad**

- CFO
- 23 years in current position
- **33 years** with Borregaard



**Liv Longva**

- SVP Strategic Sourcing
- In current position from June 2020
- **13 years** with Borregaard



**Tom Erik Foss-Jacobsen**

- EVP BioSolutions
- In current position from May 2019
- **22 years** with Borregaard



**Kristin Misund**

- SVP R&D and Business development
- In current position from May 2019
- **28 years** with Borregaard



**Gisle Løhre Johansen**

- EVP Speciality Cellulose and Fine Chemicals
- In current position from May 2019
- **30 years** with Borregaard



**Dag Arthur Aasbø**

- SVP Organisation and Public Affairs
- 13 years in current position
- **28 years** with Borregaard



**Ole Gunnar Jakobsen**

- Plant Director - Sarpsborg Site
- 13 years in current position
- **26 years** with Borregaard



**Sveinung Heggen**

- General Counsel
- 8 years in current position
- **8 years** with Borregaard

# Appendix – alternative performance measures

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In the discussion of the reported operating results, financial position and cash flows, Borregaard refers to certain measures which are not defined by generally accepted accounting principles (GAAP) such as IFRS. Borregaard management makes regular use of these alternative performance measures and is of the opinion that this information, along with comparable GAAP measures, is useful to investors who wish to evaluate the company's operating performance, ability to repay debt and capability to pursue new business opportunities. Such alternative performance measures should not be viewed in isolation or as an alternative to the equivalent GAAP measure.

- *EBITDA*: Operating profit before depreciation, amortisation and other income and expenses.
- *EBITDA margin*: EBITDA divided by operating revenues.
- *Equity ratio*: Equity (including non-controlling interests) divided by equity and liabilities.
- *Expansion investments*: Investments made in order to expand production capacity, produce new products or to improve the performance of existing products. Such investments include business acquisitions, pilot plants, capitalised R&D costs and new distribution set-ups.
- *Other income and expenses*: Non-recurring items or items related to other periods or to a discontinued business or activity. These items are not viewed as reliable indicators of future earnings based on the business areas' normal operations. These items will be included in the Group's operating profit.
- *Leverage ratio*: Net interest-bearing debt divided by last twelve months' EBITDA.
- *Net interest-bearing debt (NIBD)*: Interest-bearing liabilities minus interest-bearing assets.
- *Return on capital employed (ROCE)*: Last twelve months' capital contribution (operating profit before amortisation and other income and expenses) divided by average capital employed based on the ending balance of the last five quarters. Capital employed is defined as the total of net working capital, intangible assets, property, plant and equipment, right-of-use assets and investment in joint venture minus net pension liabilities.