

## **Summary - Norse Biotech AS**

Norse Biotech AS's vision is to develop a range of high value, innovative products from all components of locally sourced biomass. We are a team of Norwegians and Americans with backgrounds in chemistry, engineering, biology, process design and business development. We are based in Elverum, with research partners located across Norway, Europe and the U.S.

Our first product to reach commercialization will be carbon nanotubes. We will construct a pilot scale production research plant in Elverum in 2020. We have identified our first customer, a European rubber manufacturer. Along with our partners Norse Metal Elverum and Polytechnic University of Milan we will use our existing patented catalyst and process designs to manufacture the carbon nanotubes for delivery to our customer in 2020. In addition, the research pilot facility will enable the process operating parameters to be optimised to facilitate the move from petroleum to bio-based feedstocks to create greener, high performing carbon nanotubes, a unique product in a growing marketplace.

Our vision is to develop high value products from locally sourced biomass. Lignin constitutes approximately 20% of the total mass in woody biomass and has not been fully utilized for production of bio-materials. We hope to change that. In addition, our proposed process for separation of lignin also involves separation of cellulose and hemicellulose which can be utilized for additional product production. The development of an intensified (significantly more efficient) separation process that will smoothly integrate into the downstream carbon nanotube production process will establish a route for the cost-effective processing of a wide range of plant biomass by-products to sustainably produce speciality materials. The establishment of the intensified separation method will aid the replacement of petrochemicals and significantly contribute to the development of a sustainable bioeconomy in Norway.

### **Strategic Challenges:**

1. How should we launch our natural cleaning product?
2. What other product development directions based on a biomass feedstock should we pursue?

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