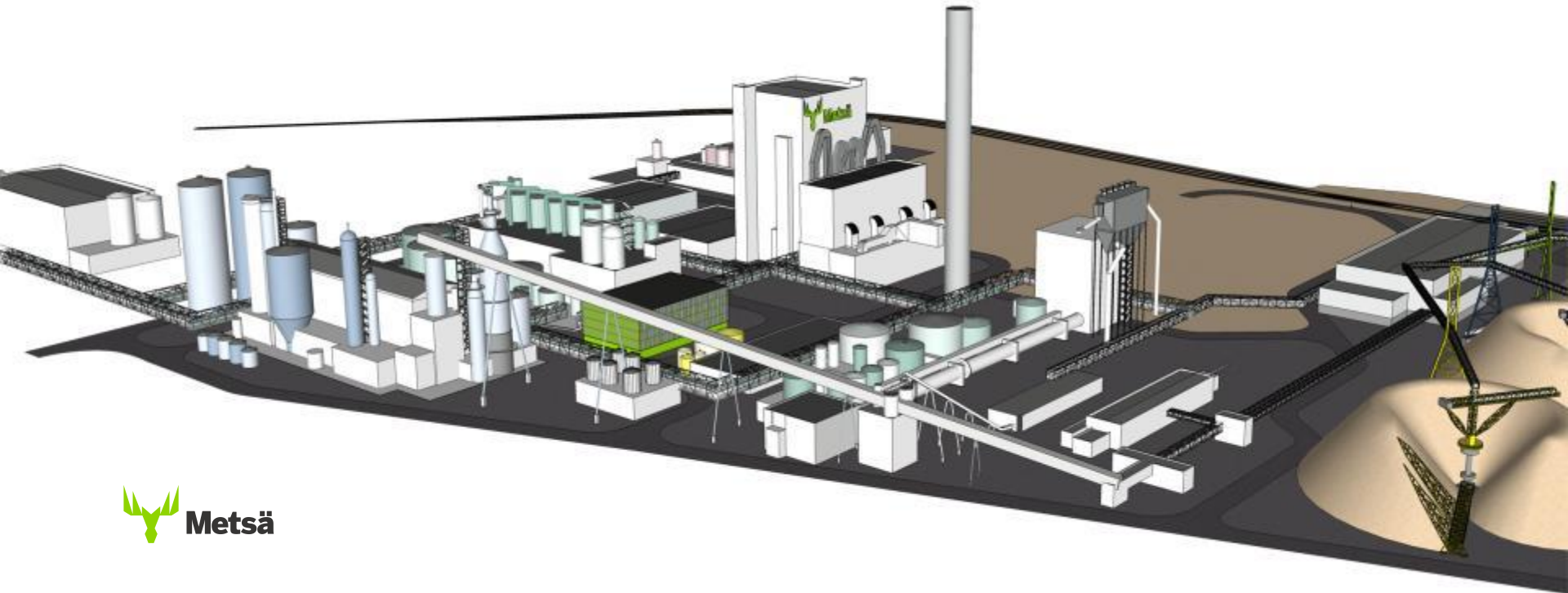


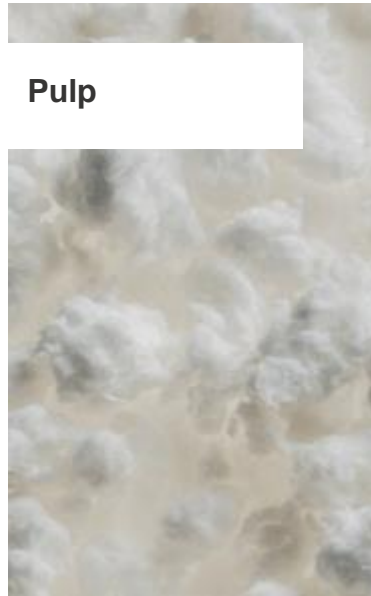
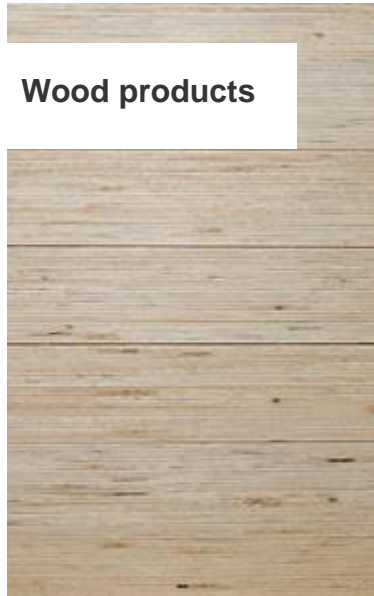
# Research & development needs in a forest biorefinery

Dr. Kari Kovasin, Metsä Fibre



# Metsä Group – Leading player in selected businesses

We focus on products and services with promising growth prospects and in which we have strong competence and a competitive edge



# Metsä Fibre pulp mills

## JOUTSENO

- 690,000 t softwood pulp
- 3.5 million m<sup>3</sup> of wood
- 135 employees



## KEMI

- 600,000 t softwood and birch pulp
- 2.9 million m<sup>3</sup> of wood
- 169 employees



## RAUMA

- 650,000 t softwood pulp
- 3.4 million m<sup>3</sup> of wood
- 120 employees



## ÄÄNEKOSKI

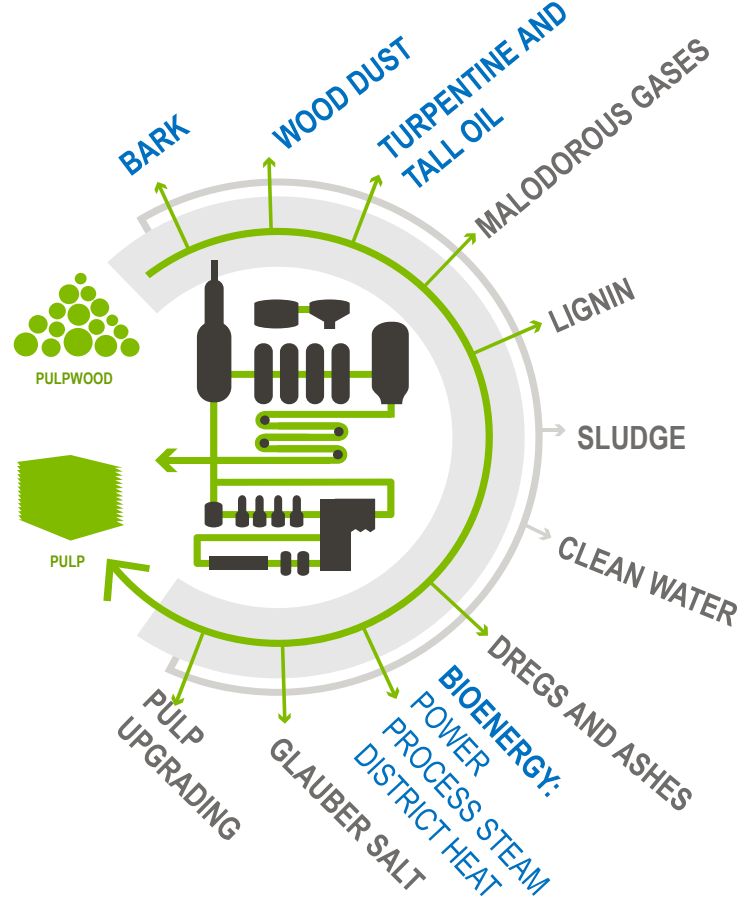
- 530,000 t softwood and birch pulp
- 2.4 million m<sup>3</sup> of wood
- 171 employees



# Äänekoski Bioproduct Mill: The biggest forest industry investment in Finland

- €1.2 bn investment, decision made in April 2015
- Annual pulp production: 1.3 million metric tons
- Annual wood use: 6.5 million m<sup>3</sup>
- Main markets for pulp: Europe and Asia
- Other default products: Tall oil, turpentine and bioenergy in various forms
  - Bio-electricity generation 1.8 TWh/a
  - Electricity self-sufficiency 240% (current Metsä Fibre average ~150%)
  - Use of fresh water ~10 m<sup>3</sup>/t pulp (current Äänekoski mill ~20 m<sup>3</sup>/t)
- Start-up in Q3/2017

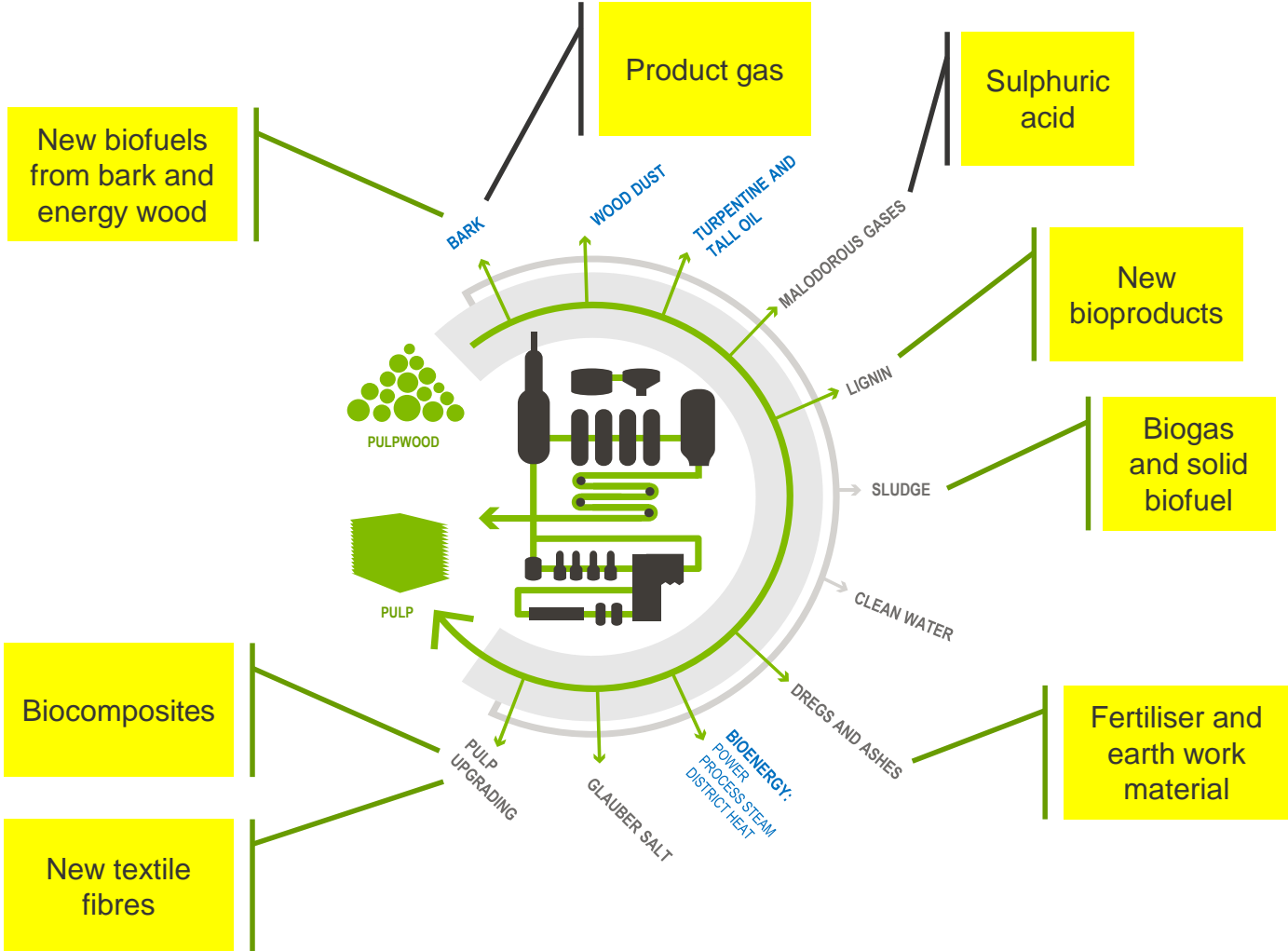
Over 50% of the wood dry mass ends up in the mill's side-streams



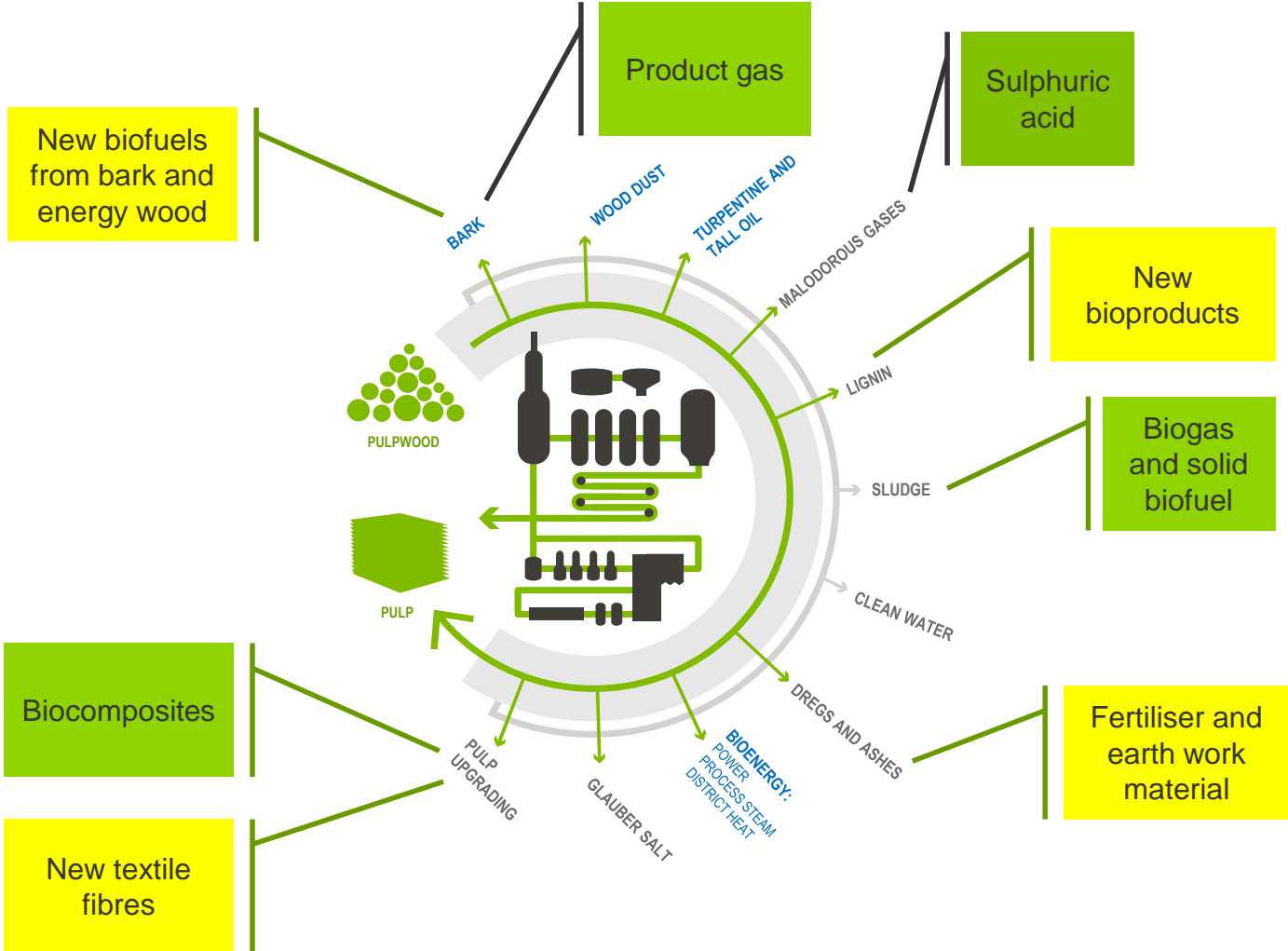
Blue font: Current products of pulp production



Public R&D pathways towards new bioproducts, January 2015



Green = Decision to go to commercial phase made, situation May 2016



# Requirements and development **needs for the R&D infra**

- The traditional fibre products (pulp for printing paper, packaging board and tissue paper) will stay as the main product lines of Metsä Fibre
- For this reason:
  - Current R&D co-operation practices and models with the key institutes and universities are well established and thus highly efficient
  - Main requirements for partners are: **expertise** in chemical pulping processes and products, **flexible** service, **straight-forward agreement policy** (e.g. IPR)
  - Available research equipment: **flexibility** in terms of unit processes (allows for several concepts & various capacities), **scalability** of results obtained (not too small equipment), and possibility to produce **samples** in scale of 100 kg to a couple of tons
- The currently existing pulp and paper (P&P) sector institutes & universities in Europe meet the demand listed above



# Requirements and development needs for the R&D infra

- Many of the new and emerging products are not in the comfort zone of the P&P industry:
  - Lignin for materials and other non-fuel end-uses or platform chemicals
  - Carbohydrates for new products and platform chemicals
  - Composite materials
- Existing European R&D expertise & infrastructures (serving other process industries):
  - In principle, sufficient expertise is already available, but not always recognized by us
  - Limited knowledge of the forest industry
  - We call for flexibility and capability of coordinating the existing infrastructures for new raw materials and product lines
  - When it comes to building new pilots, first find out availability elsewhere in Europe. Companies are not bound by borders, when looking for pilot plants
  - Requirements: flexibility to incorporate various process concepts, scale-up/scale-down, and coping with the hydrophilic nature of wood based feedstock