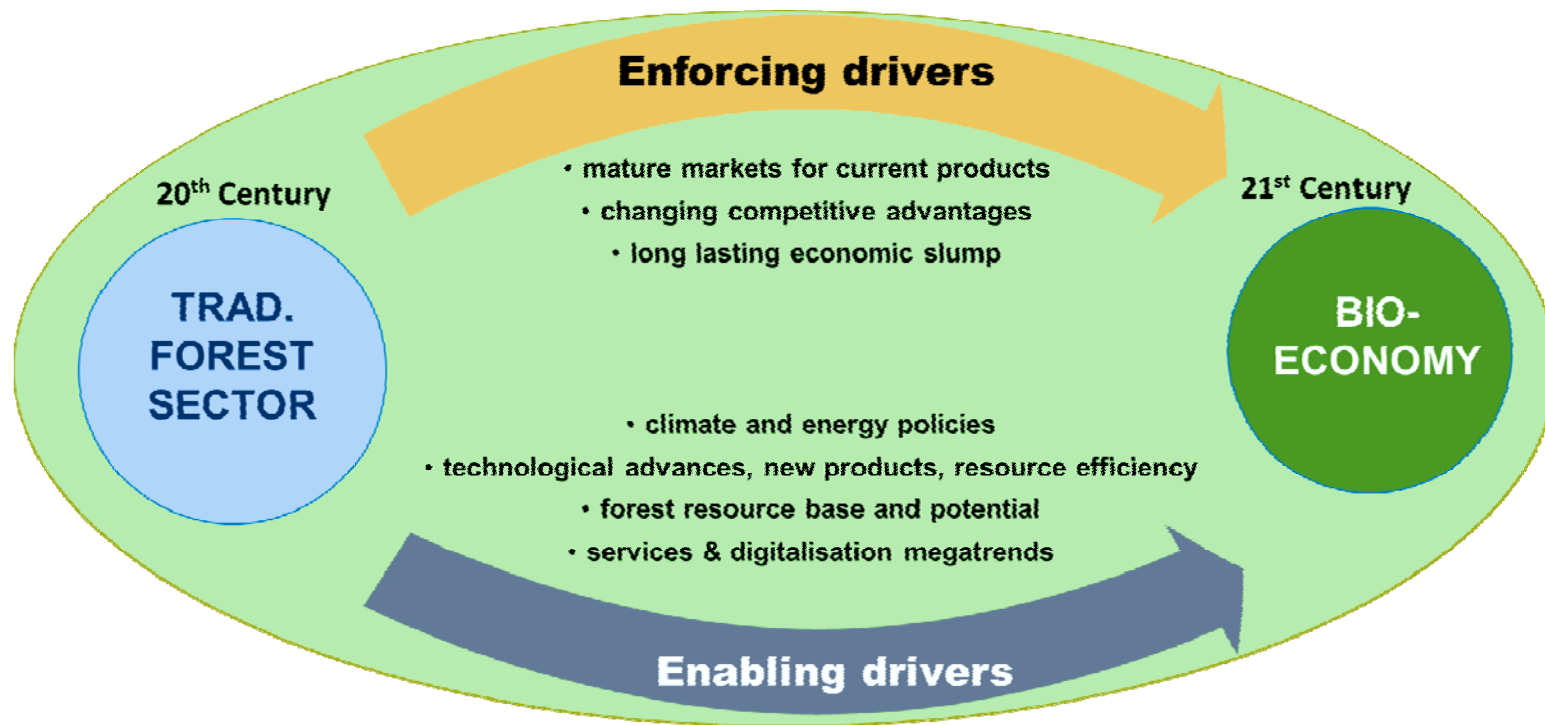# Bioeconomy & Science

- **Bioeconomy notion shapes our understanding of policies**

- **Bioeconomy - a policy slogan:**
  - a challenge to scientists
  - a puzzle for research

- ## Research
  - Motivation and meaning of the concept
  - Relation to other policies
  - Producers' attitudes

- **This presentation presents some highlights of this work**

Challenges to the humankind

- **Climate change**
  - Reduce CO_2 emissions, keep temperature increase well below 2^0 C
  - *By 2050 emissions and sinks must be in balance*

- **Population and middle class growth**
  - By 2050 we will be 9 billion; by 2030 2 billion new middle class people
  - Safeguarding *food supply and energy and resource* availability

- **Poverty eradication**
  - Difficult socio-economic and political problem
  - *Combating famine, improving rural income*

- **Economic growth & jobs**
  - How to foster growth in transition to low carbon economies

Road to bioeconomy:
Creative destruction in forest-based sector

Destructive forces

- Demand for
    - communication paper products decreases
    - a number of other forest products stagnates

- Long economic slump in the EU since 2008

- Relocation of some forest industry investments
    - fast-growing markets in Asia,
    - low-cost production regions like South America

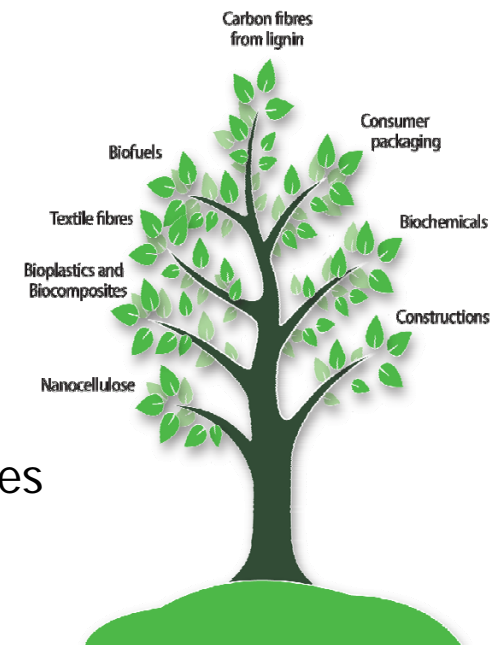- Link to economic growth (GDP) still prevails for many EU forest products

Creative forces

- Forest industry and other industries are changing their strategies and business models, investing in new forest-based products

- New demand for old products, such as dissolving pulp for textiles or tall oil for biodiesel

- Demand is driven by the need to use forest-based materials to replace non-sustainable products or raw materials that compete with food production

- Wood fibre can provide the same products as fossil raw materials

Set a new goal

Competitive, advanced & climate-smart forest bioeconomy

- New business models *(consumers)*

- New bioproducts and industries *(textile, pharmaceutical)*

- Services *(most rapidly growing industry)*

- Traditional products *(pulp and paper, biofuels & bioenergy)*

- Higher value-added, lower dependence on business cycles

> Many challenges lie ahead...

Carbon fibres from lignin

Consumer packaging

Biofuels

Textile fibres

Biochemicals

Bioplastics and Biocomposites

Constructions

Nanocellulose

Challenge 1. Climate change

- Climate policy shapes the forest sector and forest management:
  - Carbon price impacts now directly *(bioenergy, biofuels, biomaterials)* and indirectly *(forest management)*

- Incentives needed to promote the forest sector's role in climate mitigation
  - Must be planned carefully
  - Forest sector can contribute more than now

- ***Balance wisely wood use, enhanced sink & material substitution***

Carbon neutrality

Challenge 2. Trade-offs in the short and long run

- Bioenergy important up to 2030, but role may decrease over time
  - Increase of wind & solar, electric cars

- Harvesting, emissions and sink in short and long-run
  - Carbon debt: emissions for first 50 years, benefits after 100 years
  - Scientists' opinions differ on the importance of the time aspect

- Investing in "old" in short run may promote "new" in long run
  - Profits from current production funds investments to "new bioeconomy"
  - New bioproducts need to find their niches in joint production with pulp

Challenge 3. Improving policy coherence

- Policy program targeting a given sector should support policies targeting another sector, and vice versa
  - *Climate and bioeconomy* policies must be policy coherent
  - *Biodiversity and other environmental aspect and bioeconomy* must be better synchronized – sustainable bioeconomc

- Coherent policies create synergies for forest bioeconomy targets

- Create and find synergies with other policies and initiatives
  - Innovation programs
  - Industrial programs

Summing up

A welcome policy initiative

Goes beyond the current performance

Boosts creative forces in forest sector