LIGNO SILVA
CENTRE OF EXCELLENCE OF FOREST-BASED INDUSTRY

Implementing break-through technologies for increasing added value in wood and paper processing

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National Forest Centre – Forest Research Institute

International conference **BIOECONOMY** AND **CIRCULAR ECONOMY**

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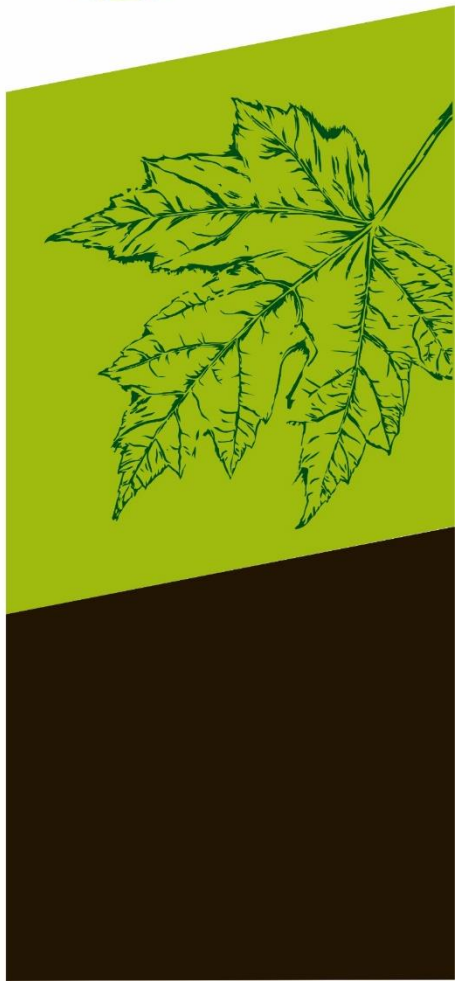
Presentation focus

- National Forest Centre / Centre of excellence LignoSilva – short introduction
- Bioeconomy in Slovakia
  - position of Forest-based industry
  - conceptual remarks
- Implementing breakthrough technologies for increasing added value in wood and paper processing
- CE LignoSilva - Open collaboration platform



National Forest Centre

LIGNO SILVA CENTRE OF EXCELLENCE OF FOREST-BASED INDUSTRY

Status: Semi-budgetary public institution
Managing authority: Ministry of Agriculture and Rural Development

Budget: ~ 12 mil. EUR
Employers: ~ 250

Legal address: T. G. Masaryka 22, 960 22 Zvolen
Country: Slovak Republic
Homepage: www.nlcsk.org

Forest Research Institute

Forest Management Institute

Institute for Forest Resources and Informatics

Institute for Forest Consulting and Education

Centre of Excellence LignoSilva

LignoSilva connects the research capacities of the **National Forestry Centre** and the **Pulp and Paper Research Institute** in Bratislava with relevant business entities in the wood production and processing sector and European initiatives (**BIOEAST**), platforms (**Forest Technology Platform**, **InnovaWood**) and research organizations e.g. **European Forestry Institute**.

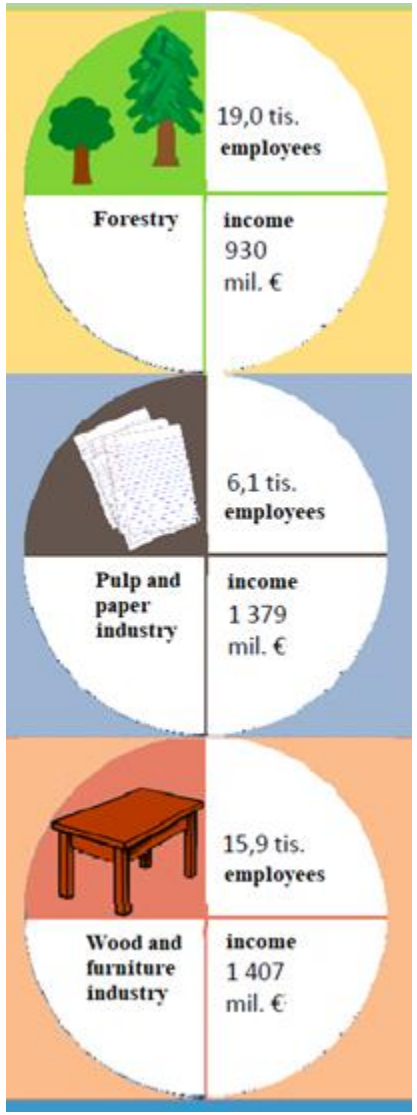
2014 - 2016	2016	2017	2018 - 2023	2020
Project CSA H2020 Widespread Teaming phase 1	Project CSA H2020 Widespread Teaming phase 2	Ministry of Agriculture Research project	Research agency Infrastructure project	Institutionalization of the Centre of Excelence
467 tis. €	Seal of Excellence	120 tis. €	9.88 mil. €	

Forest-based Sector Technology Platform

National Support Group

Forestry Working Group

Bioeconomy in Slovakia – strategic thinking



Strategic partnerships

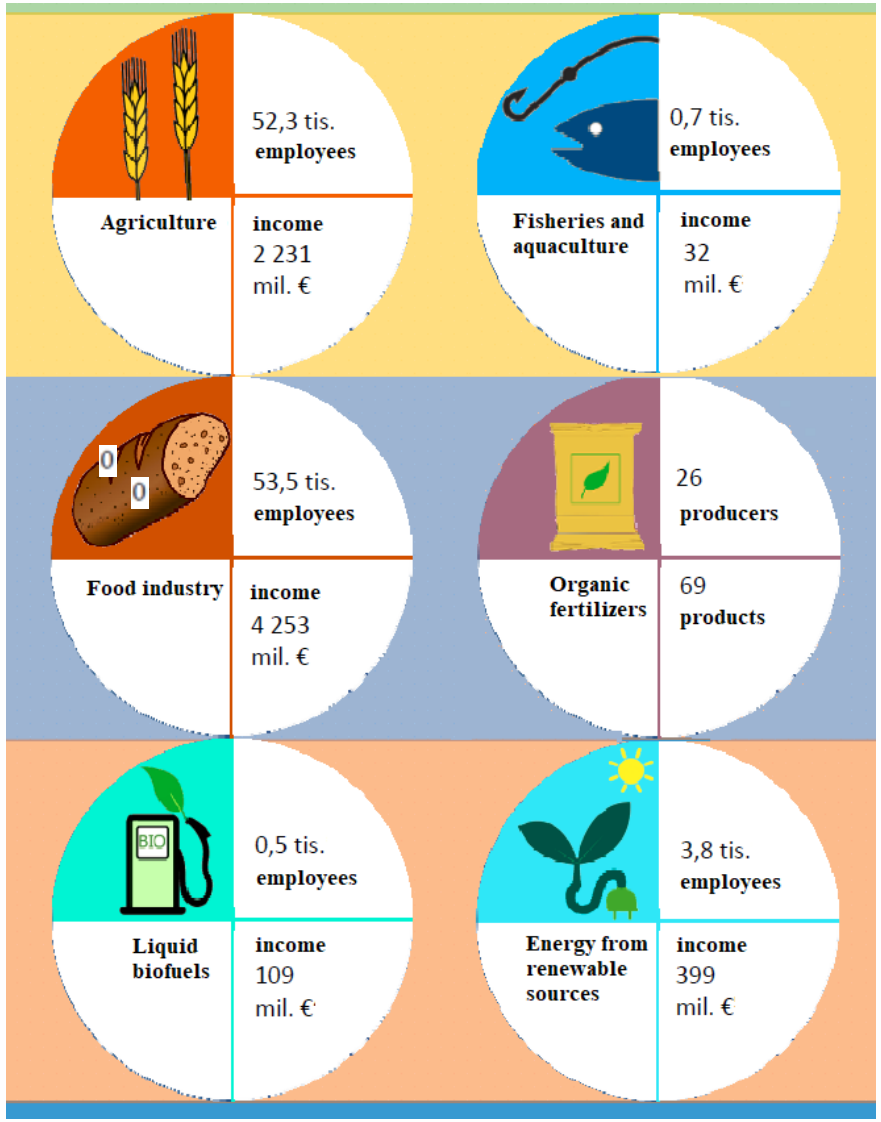
Complementarity (but not separation)

Synergy (new products and services)

GDP: 85 mld. €
AF-FBS: ~ 9 %

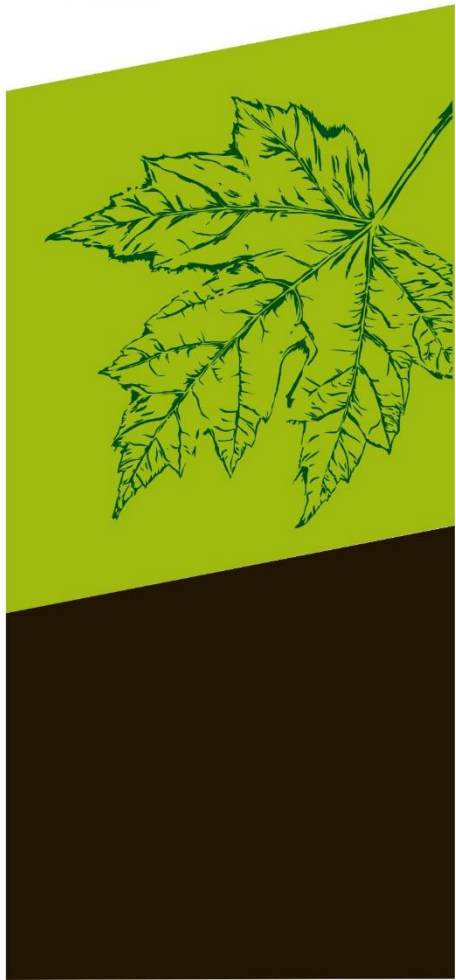
Employment: 150 ths.

Numbers as arguments

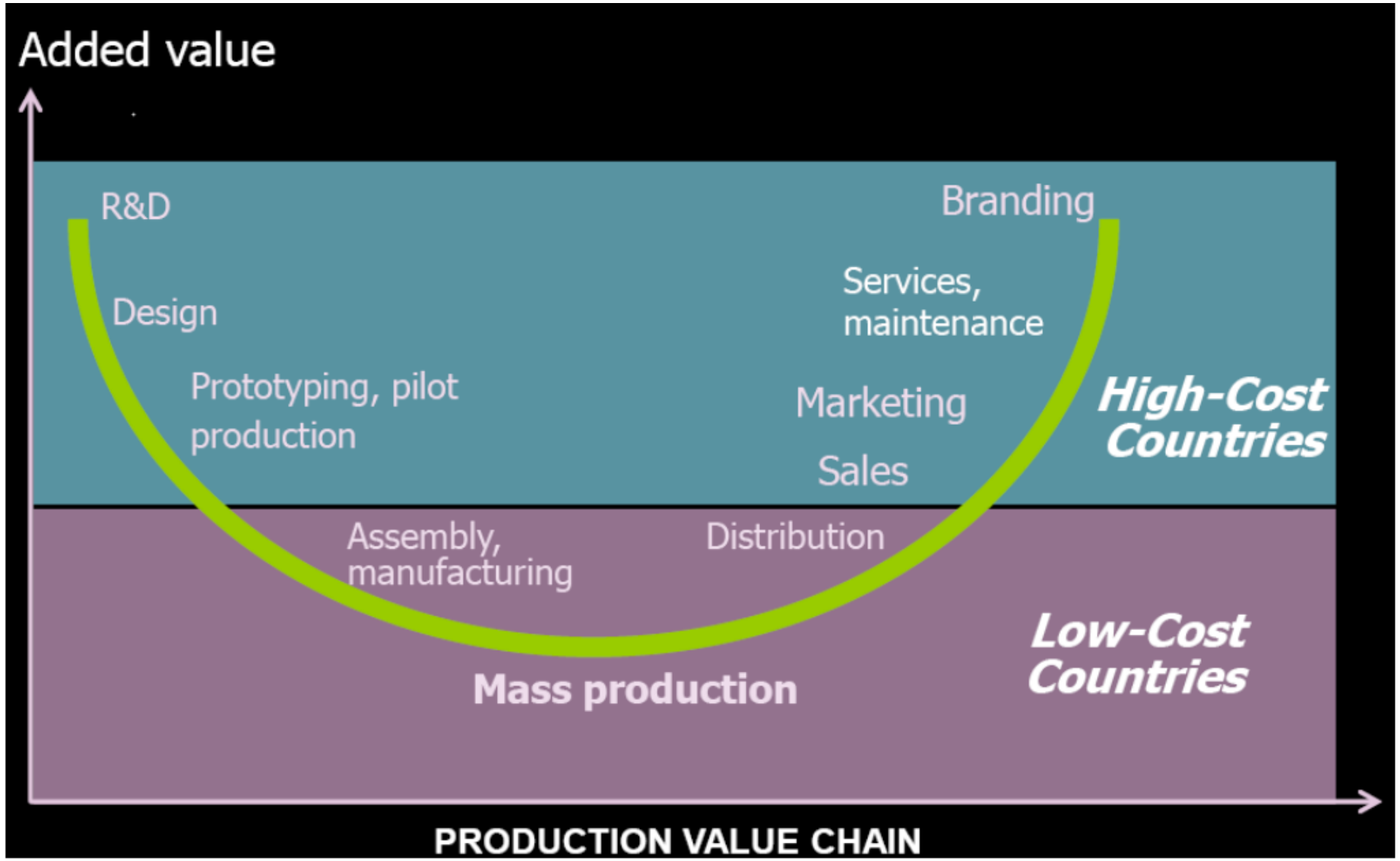


Slovak FBS Bioeconomy - ongoing process

- **Objective:** to maintain the FBS's competitiveness, the need for innovation and investment in new products and services, the need for synergies between the sectors concerned.
- **Process:** transition of society from fossil to green economy, redefining the position of FBS in a new conceptual framework: Bioeconomy-Resilience-Multifunctionality-Governance.
- **The problem of FBS:** seize the opportunity and manage the process of structural change to a sector with higher added value:
  - Securing resources and implementation of R&I projects is the basis for the transformation of the sector to higher added value (ESIF, H-EUROPE, BBI JU), completion of research infrastructure
  - Creation of an institutional environment - comparable to the EU-13 countries (critical mass of skills: mobility, incentive system of remuneration, recruitment system for top and young researchers., trained support staff, clearly defined organizational goals and performance parameters).



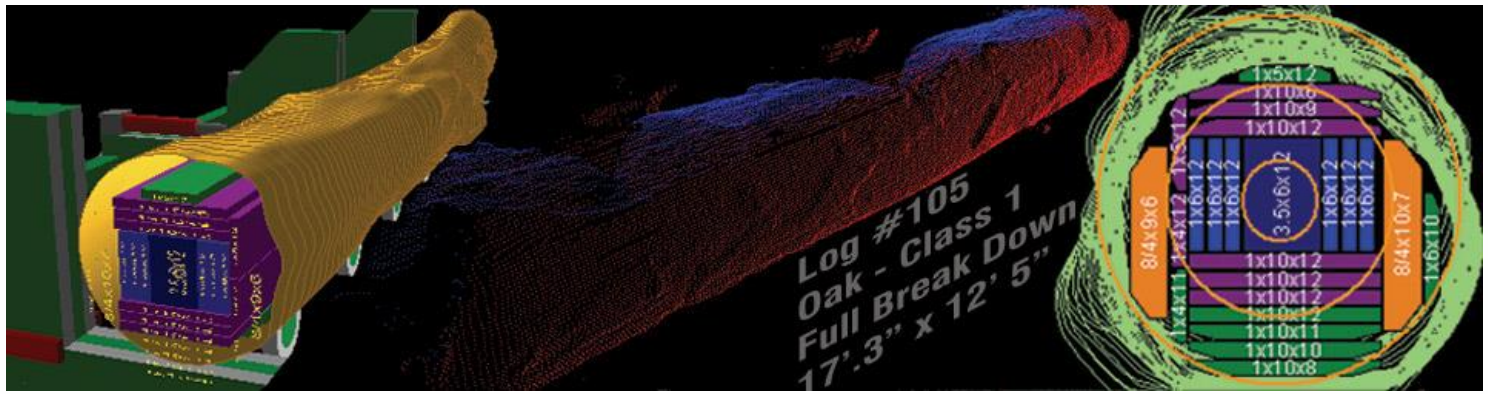
Value chain – is there reason for smile in FBS?



Source: Lauri Hetemäki: Future of European Forest-Based Sector, SUMFOREST Foresight Workshop, Brussels, December 2, 2014

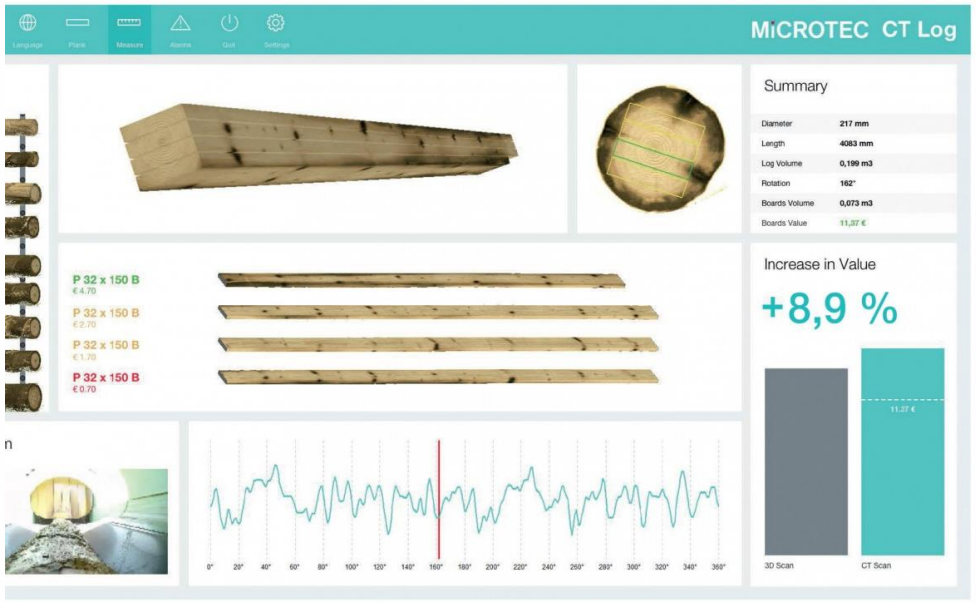
New technologies in wood processing

- Scanning of wood logs for the purpose of:
  - Defining the exact volume of a log
  - Defining the exact shape of the log
  - Qualitative classification - external defects / internal defects of wood
  - Wood flow tracking - digital trace of each piece of log
  - Automation in the wood processing chain / production line
  - (records → acceptance → cutting plans → sorting → production → storage → packaging)
- The result is higher added value of wood utilization and reduction of production costs.



Tomographic scanners (CT scanners)

- The CT scanner for logs is based on a static frame supporting a rotating portal using an innovative large cone beam reconstruction algorithm.
- The log passing through the scanner is illuminated by X-rays. Different values of absorption of this radiation determine the density of different points of the wood.
- The Tomographic Inversion algorithm displays an image of the density distribution of the scanned section for each section.



Tomographic scanners (CT scanners)

1 .Real log scan

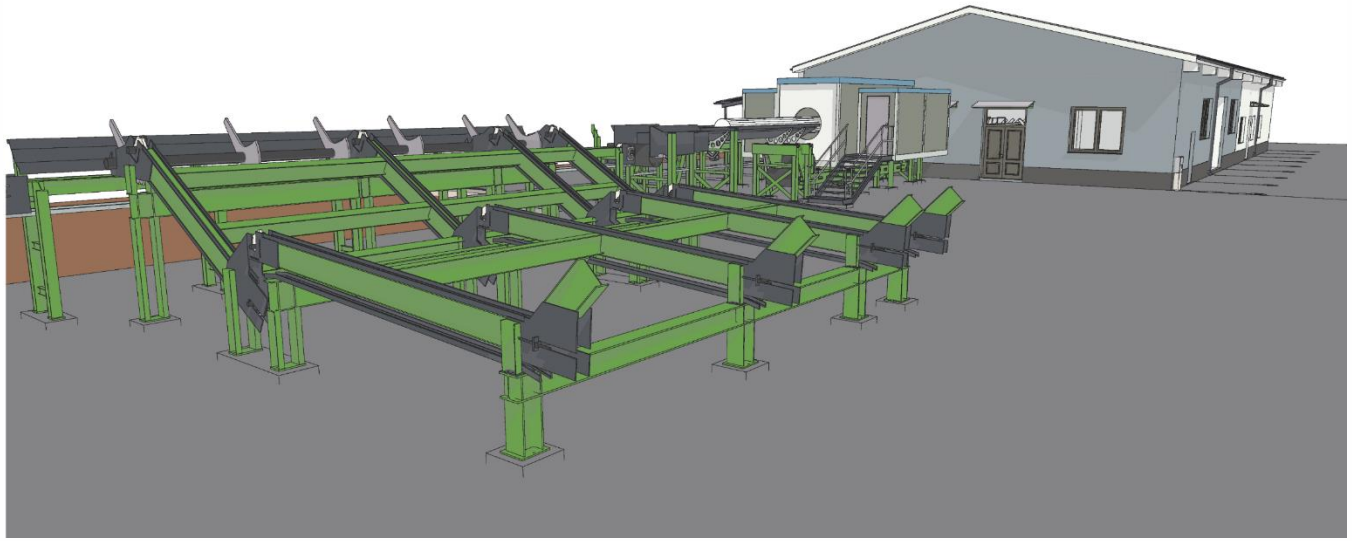
2.Defects detection

3. Cutting plan draft

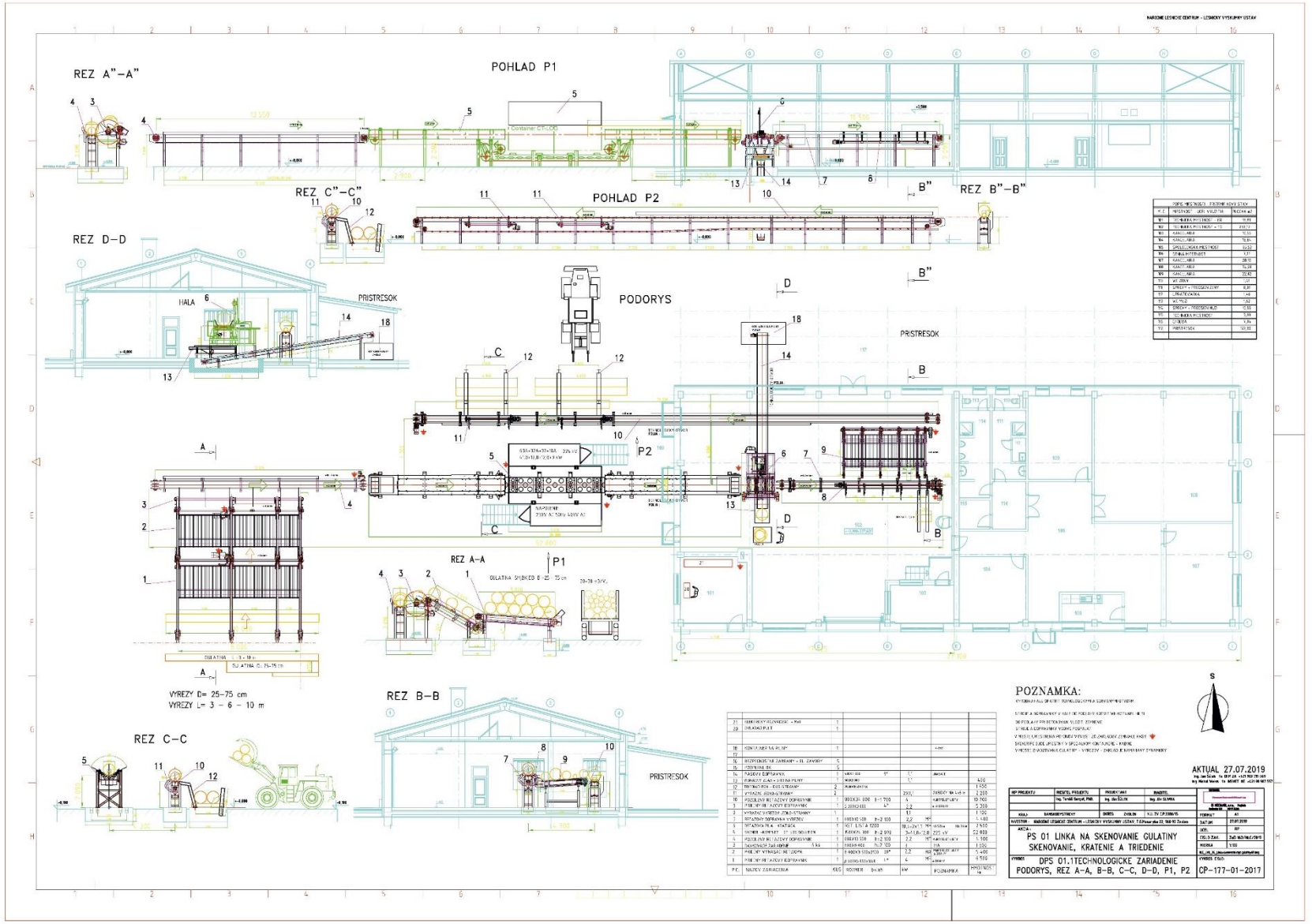
4.Optimization taking into the consideration the defects, required outputs

Demonstration CT scanning line

- NFC Technological park – locality Stráž near Zvolen.
- Funded by the project Centre of Excellence of Forest-Based Industry LignoSilva



Demonstration CT scanning pilot line



Demonstration CT scanning line - parameters

- Wood species: spruce, beech, oak
- Log length: 1500 - 10000 mm
- Log diameter: 250 - 750 mm
- Diameter of scanned species: max. 650 mm for spruce, max. 550 mm for beech, oak
- Maximum through diameter: 900 mm
- Ambient temperature: -30 ° C to + 45 ° C
- Max. humidity: <80% rel.
- Wood flow shift operation speed: max 5 m / min
- Conveyor system: rubber belt
- CT.LOG program performs a tomographic inversion in real time and generates a complete three-dimensional log density profile with the following resolutions:
  - longitudinal direction: 10 mm
  - transverse direction: 2.0 mm x 2.0 mm

Open collaboration platform

- Unique technology with great development opportunities (only 8 CT logs in the world)
- Availability of the Zvolen locality (central Slovakia)
- Important component of digitization of wood processing process in Slovakia (Industry 4.0)
- Possible quality certification of wood logs with a high-quality scan of their internal structure.
- Development and testing of algorithms for automatic detection of wood defects

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http://lignosilva.nlcsk.org/

EUROPEAN UNION
European Regional Development Fund
OP Integrated Infrastructure 2014 – 2020

MINISTRY
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Thank you for your attention

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