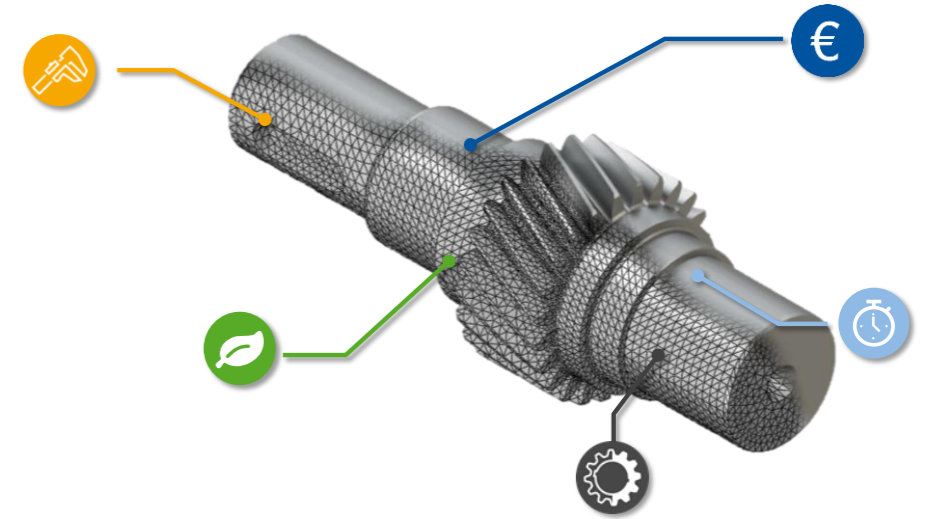


TOP
GEAR



How can the use phase be taken into account?

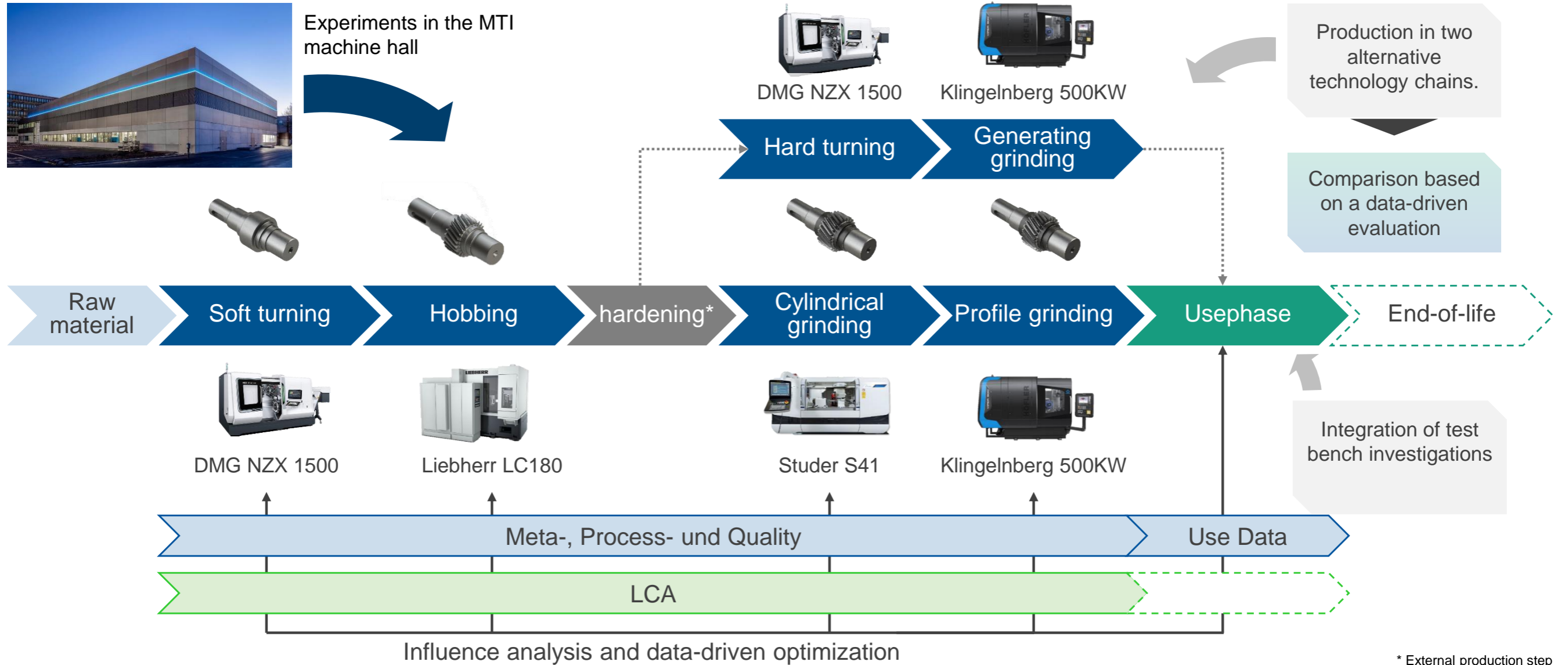
Aachen, 14.03.2024

Challenges and good practices for carbon footprint identification in very early development stages of automotive products

Gonsalves Grünert – Manufacturing Technology Institute (MTI) of RWTH Aachen University



This project has received funding from the Research Fund for Coal and Steel under grant agreement No 101033989



* External production step

LCA according to ISO 14040 / 44

1. Goal & Scope



- Purpose of LCA
- Functional Unit
- Definition of productsystem
- Definition of boundaries

2. LCI



- Process recording
- Identification of energy and material flows
- Methodology for Quantification

3. LCIA

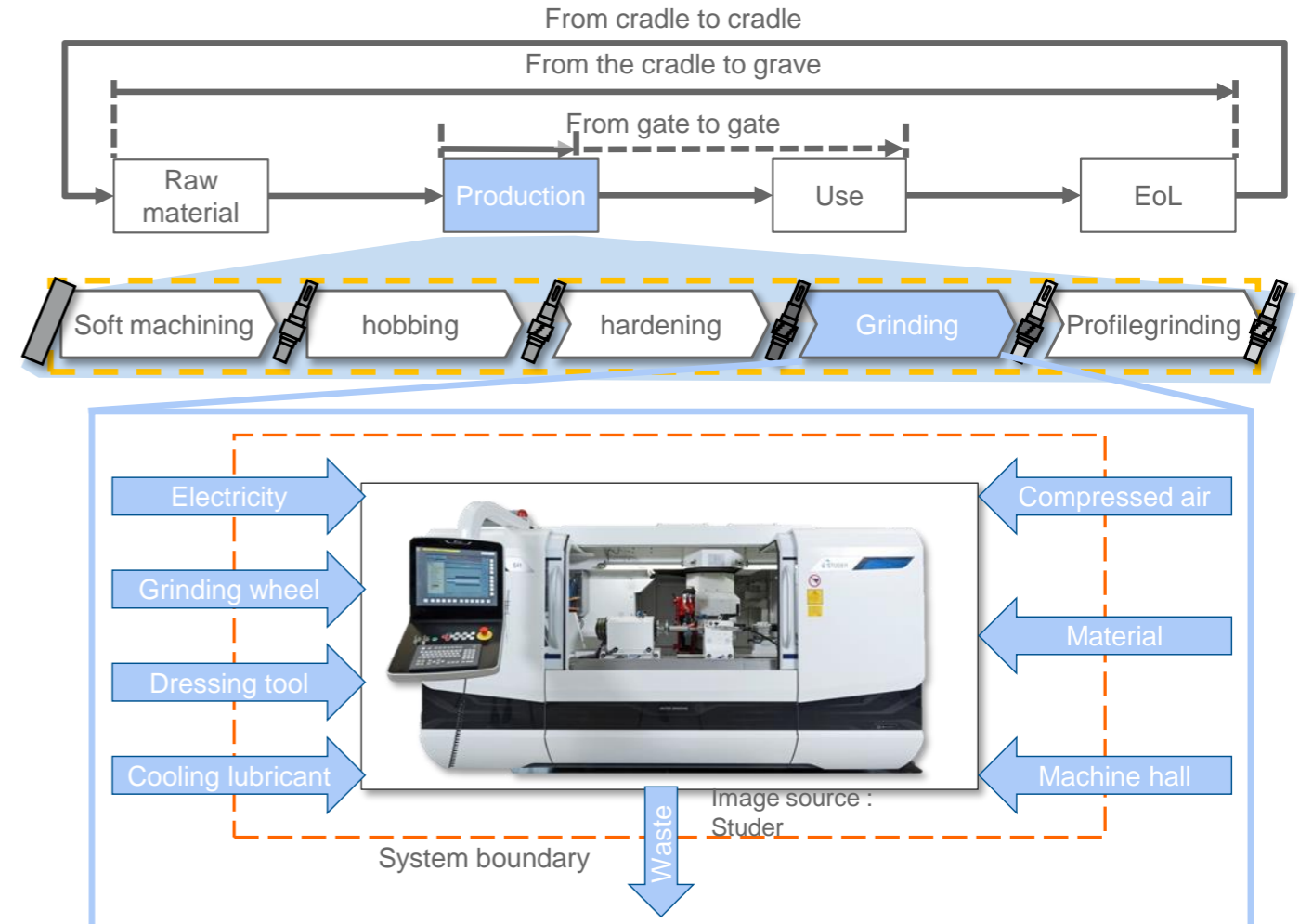


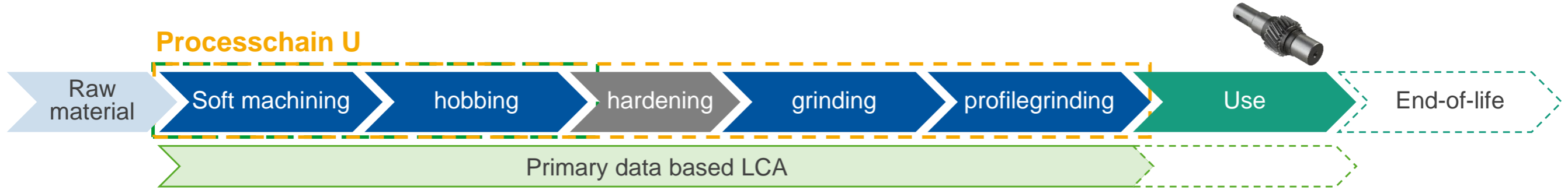
- Definition of impact categories and indicators
- Selection of LCIA methodology

4. Results

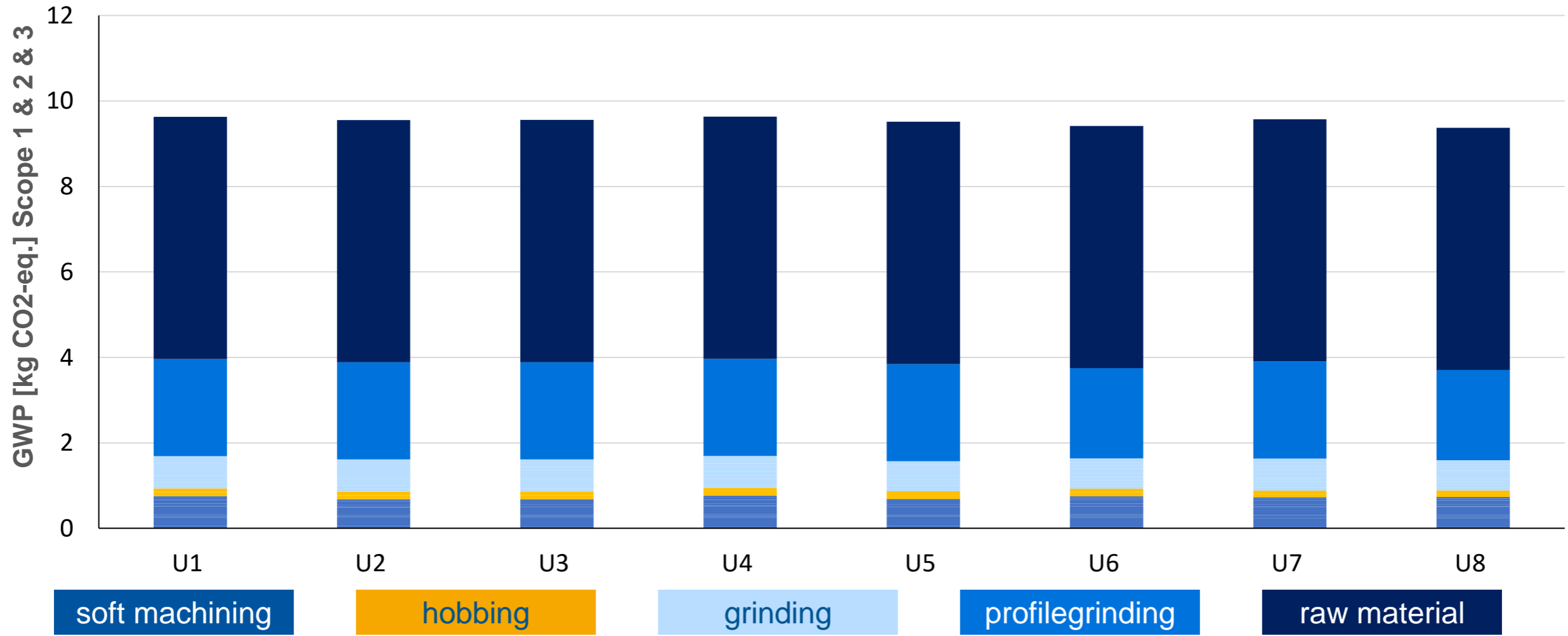
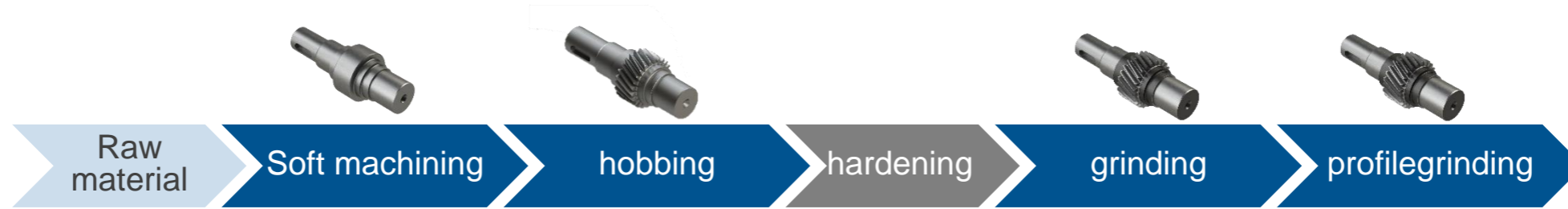


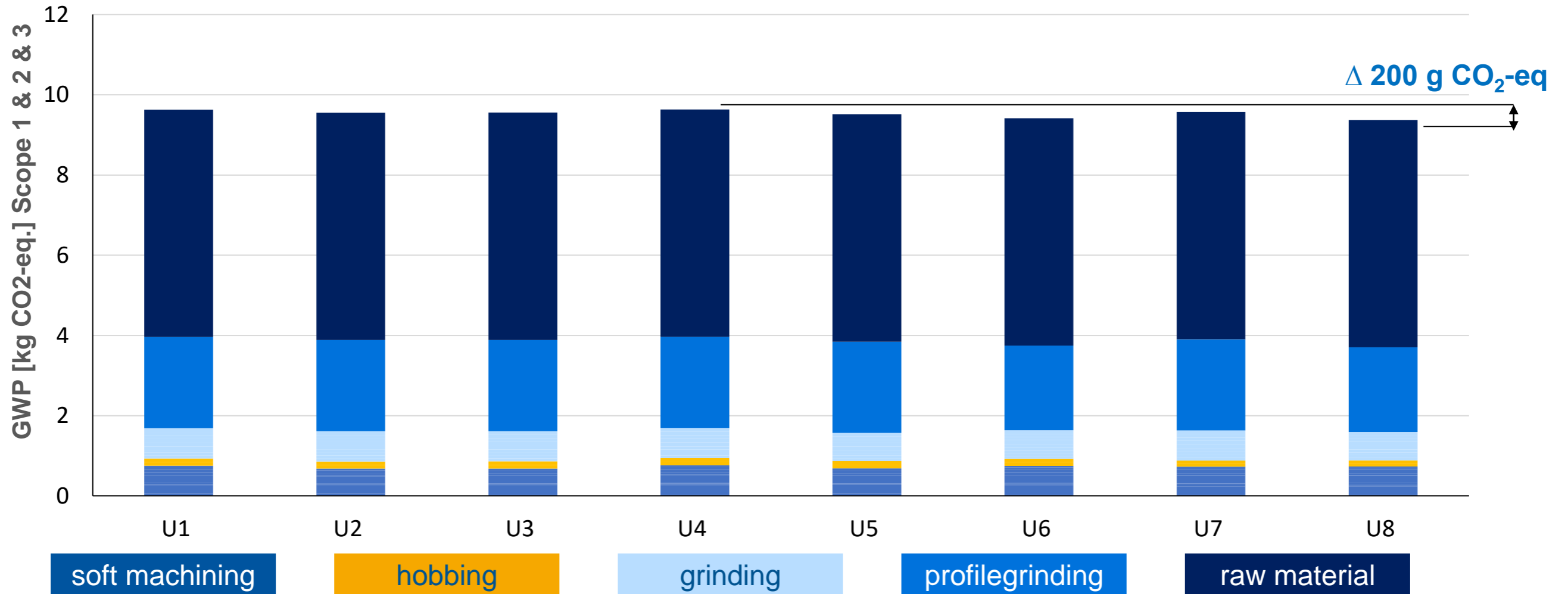
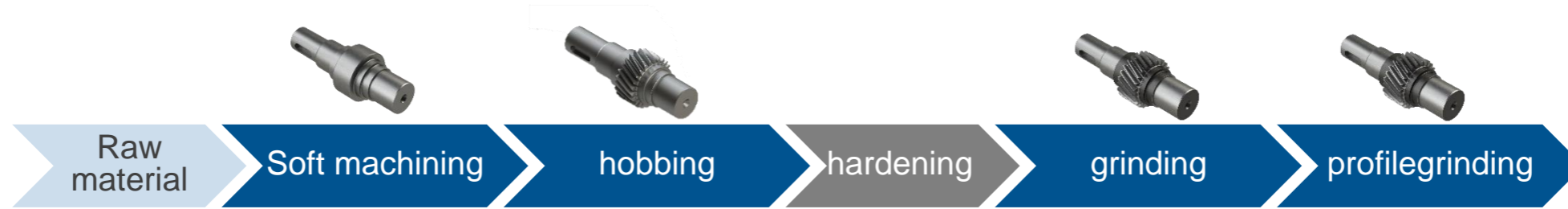
- Interpretation of the results
- Evaluation of the technologies
- Process comparison
- Overview of ecological factors

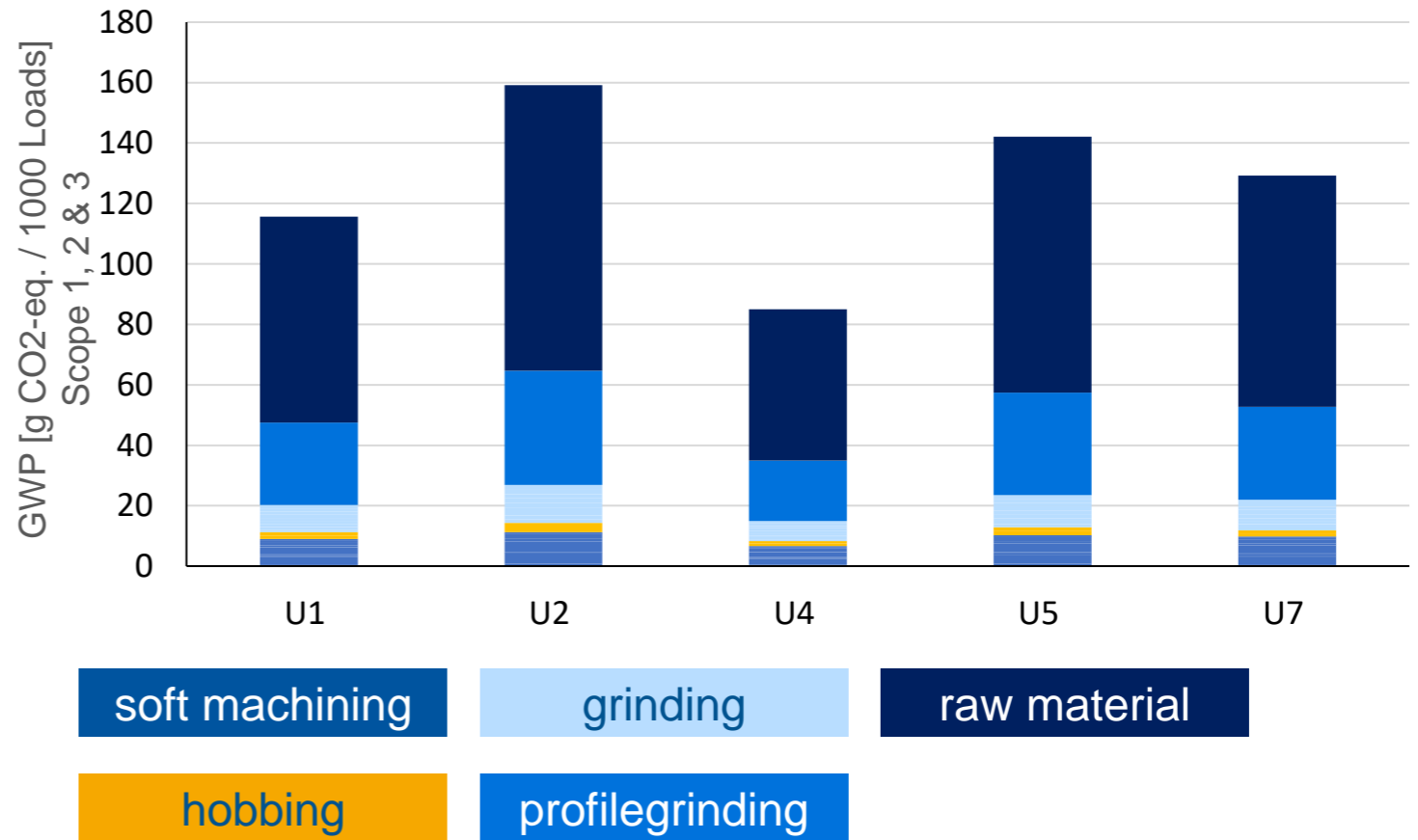
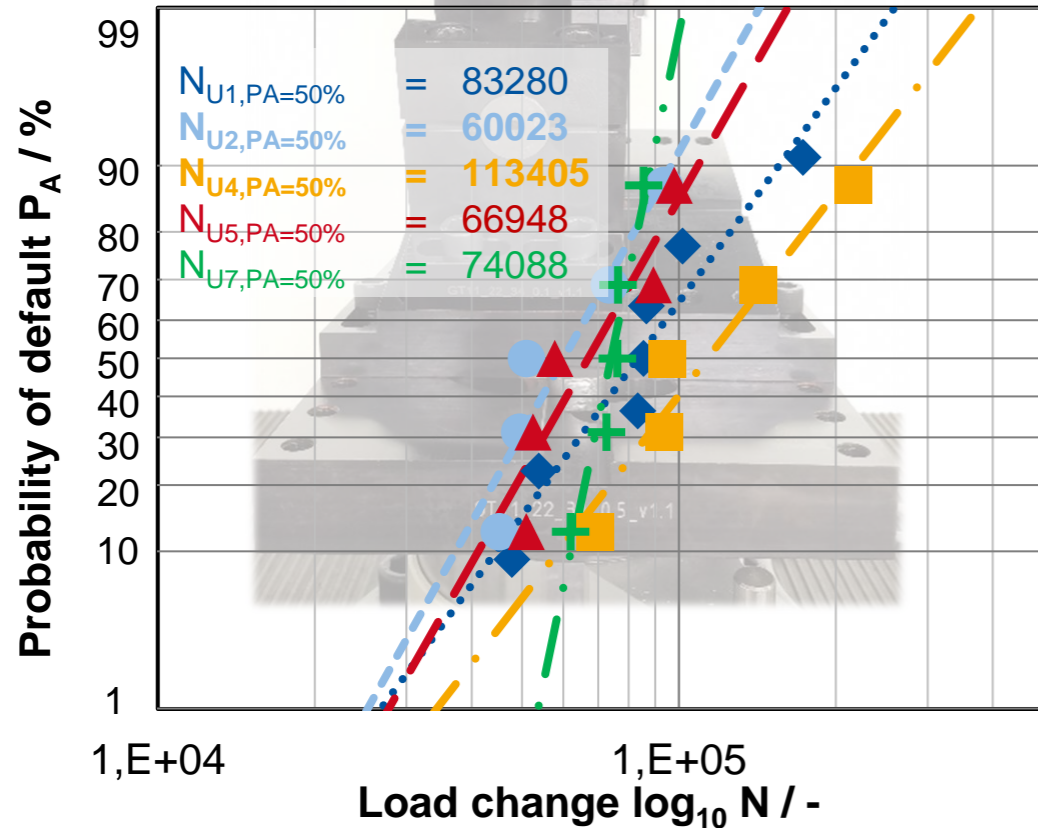




Test groups	Soft machining	Hobbing	Grinding	Profile grinding
U1	Reference	Reference	Reference	Reference
U2	No finishing	Concentricity error 1	Reference	Reference
U3	No finishing	Concentricity error 1	Reference	No finishing
U4	Worn out tool	Concentricity error 2	Reference	Reference
U5	No finishing	No finishing	Productivity	Reference
U6	Reference	Reference	Productivity	Productivity
U7	Productivity	Productivity	Reference	Reference
U8	Productivity	Productivity	Productivity	Productivity

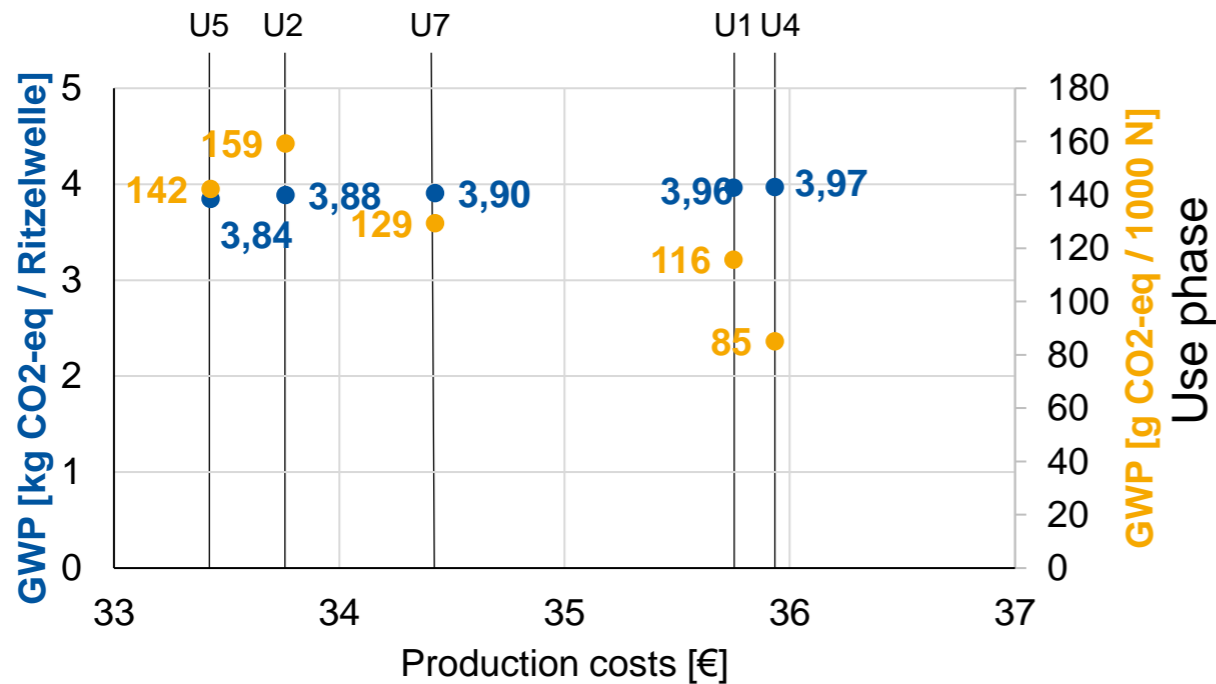








Product Carbon Footprint - PCF



- Test group **U5** has the **lowest production costs** and causes the **lowest emissions** in relation to the product carbon footprint (PCF)
- Test group **U4** has the **highest production costs** and the most emissions in relation to the **PCF** - **taking a use phase** into account, **U4** causes the **lowest emissions**.

N = Loads



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Thank you for your attention!

www.topgear-project.eu

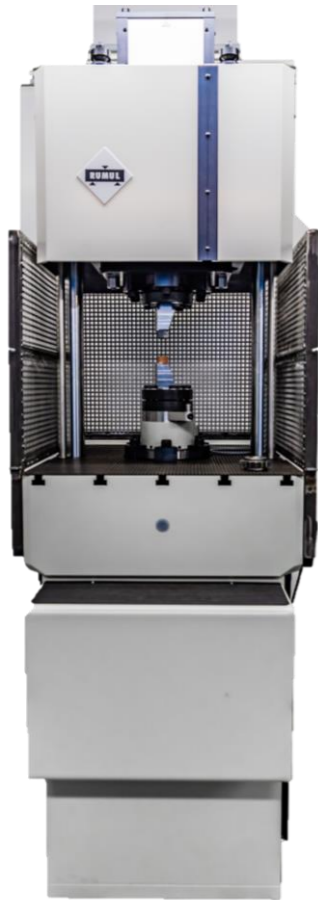


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Test concept pulsator

Pulsator test bench - Electromagnetic resonance Pulsator RUMUL Testronic 150

Test bench



Operating parameters

- $F_{\max} = \pm 225 \text{ kN}$
- $f_{\max} = 260 \text{ Hz}$
- $d_{a,\max} = 390 \text{ mm}$
- $s_{\max, \text{dyn}} = 5 \text{ mm}$
- Accuracy class of the force display 1.0 according to DIN EN ISO 7500-1

Legende

- 1 Variable exciter mass
- 2 Springs for center load
- 3 Drive for medium load
- 4 Exciter magnet
- 5 Test gear
- 6 Load cell

Principle sketch

