



gste JAHRESTREFFEN 2019, 8. Nov. 2019, JÜLICH

SOZIO-ÖKONOMISCHE FORSCHUNGSSCHWERPUNKTE DES IEK-STE

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SYSTEMS APPROACH & MISSION

Traditional focus: Supply-side

- Techno-physical integrity
- Technology cost

New focus: Socio-technical configurations

‘..., where technologies, institutions, actors, social practices and cultures mutually depend on each other, ...’

[adapted from H. Rohracher, IJETM, 9 (2-3)]

Mitglied der Helmholtz-Gemeinschaft

STE-Übersicht.pptx

Energy System



Energy Studies Need Social Science

- Socio-economic, life cycle thinking
- Society, actors and preferences
- Energy and externalities
- Sociology of technology

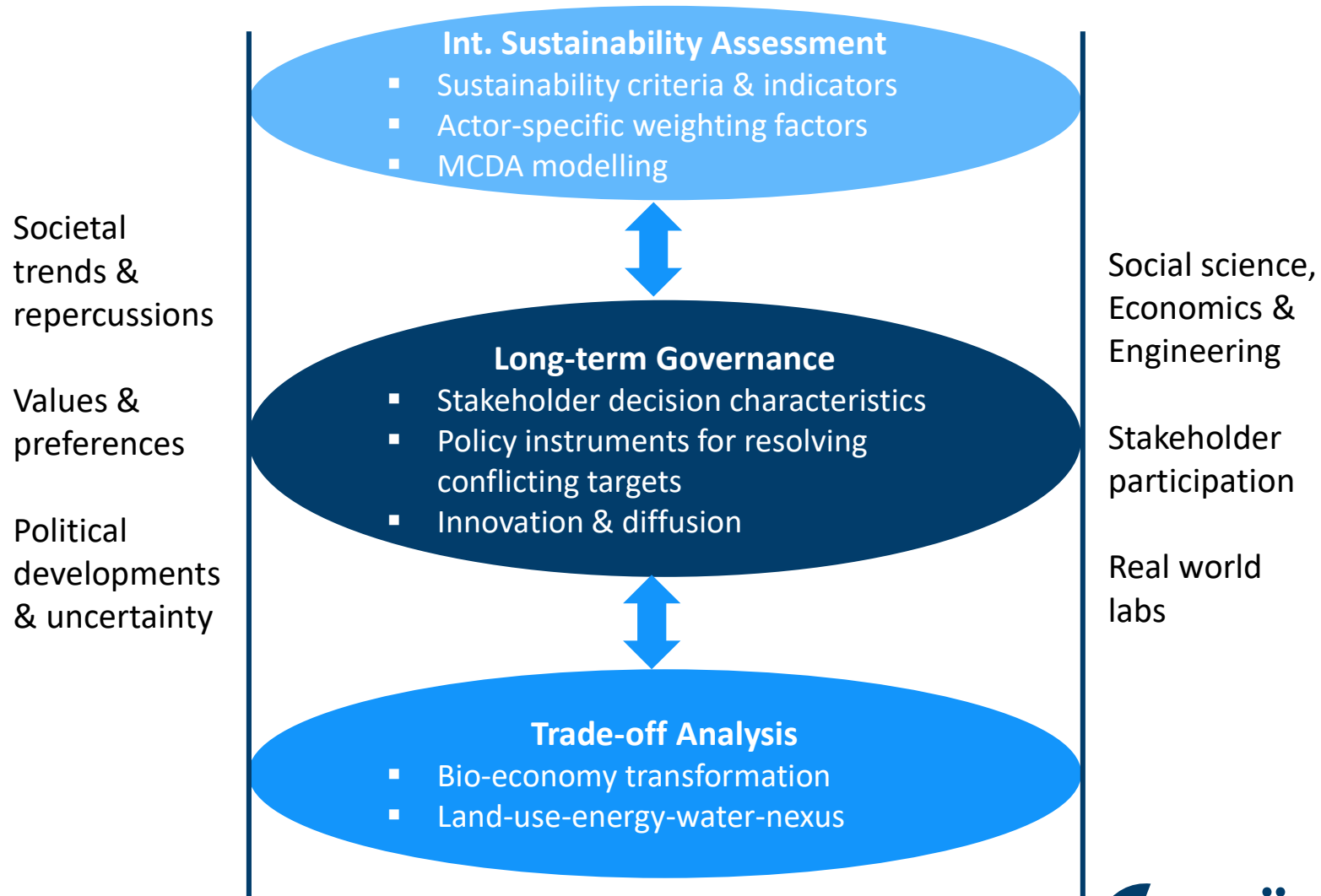
[B. Sovacool: Nature (2014), Vol. 511, 529-530]

Mission:

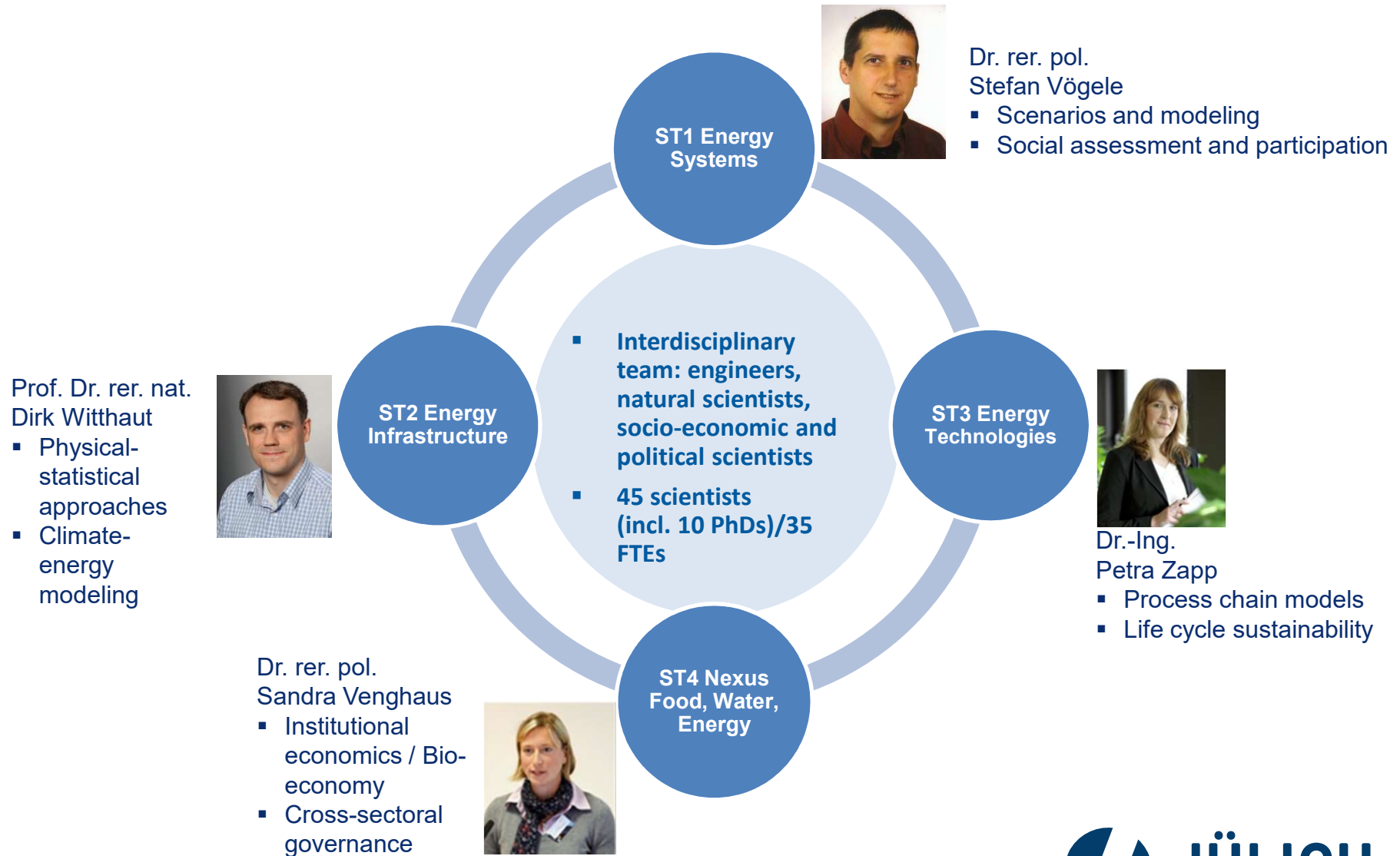
Assessment of energy systems

- in the context of leitmotifs, e.g. Sustainable Development, Green Economy, ...,
- considering economic, environmental and social aspects

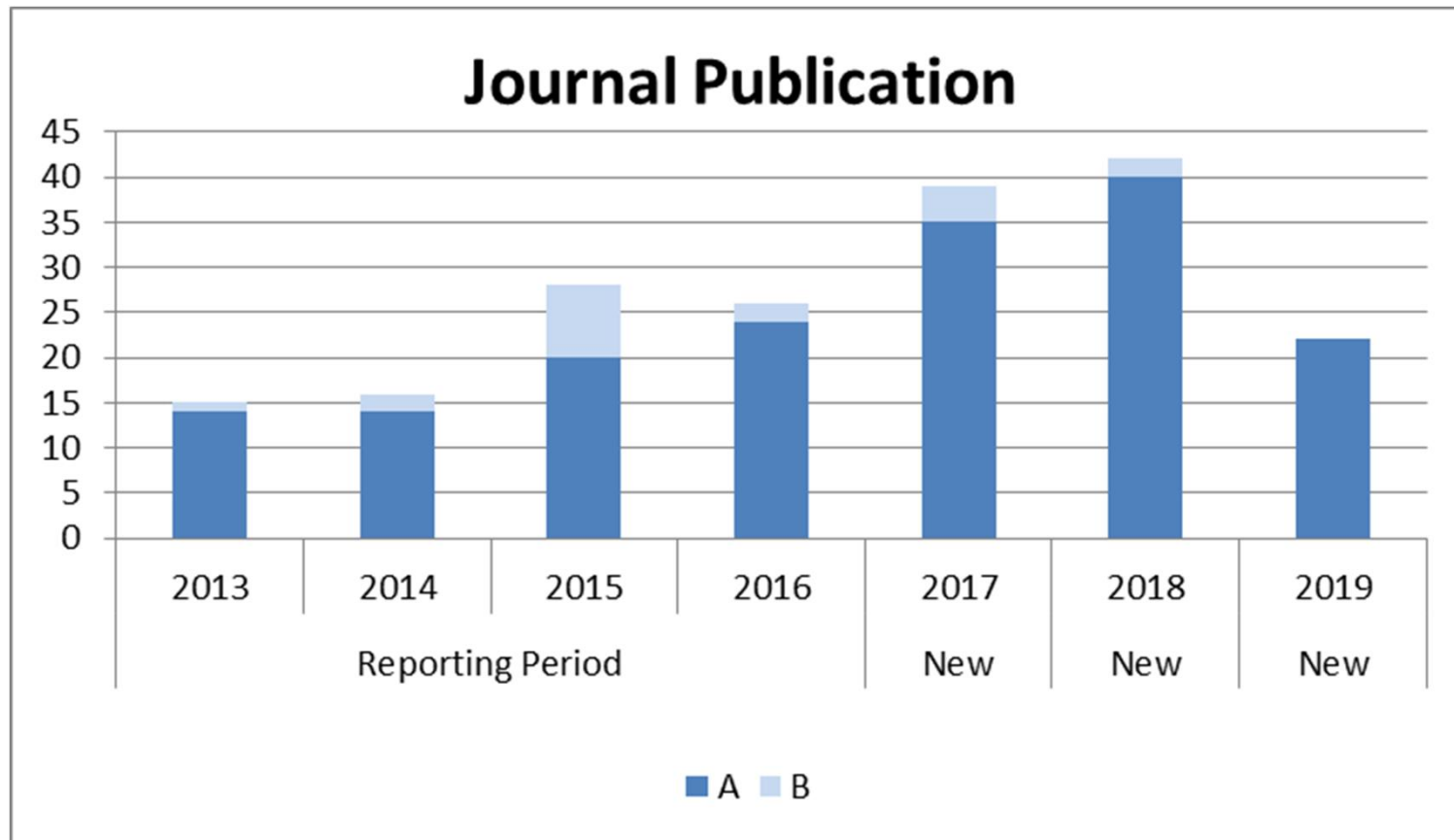
NEW APPROACHES FOR SOCIO-TECHNICAL ENERGY SYSTEMS ASSESSMENT



EXPERTISE / ORGANIZATIONAL STRUCTURE



NEW APPROACHES FOR SOCIO-TECHNICAL ENERGY SYSTEMS ASSESSMENT

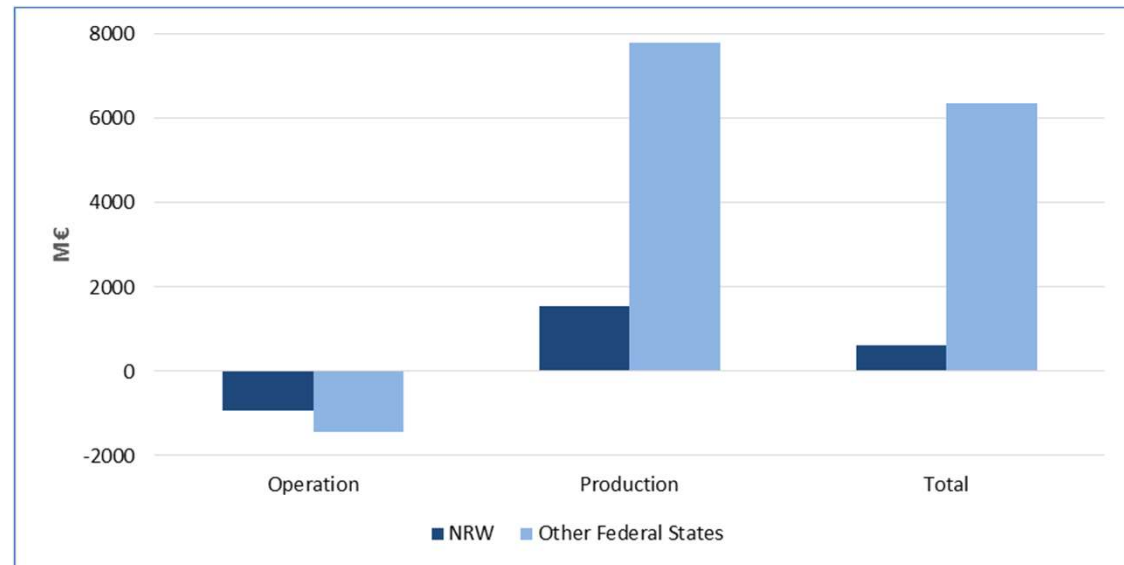


EXEMPLARY STUDIES

Socio-Economic Impacts: The Transition to Renewable Energy Technologies – Impact on Economic Performance of North Rhine-Westphalia

Multi-Regional IO-Analysis for NRW

- MRIO modeling
 - 16 Federal States
 - Sectoral disaggregation
 - Foreign trade
 - Added value (wages/salary, taxes, profit)
- 5 impact channels
 - Operation of RET: Operation, Financing, Substitution
 - Production of RET: Production, Substituted investment



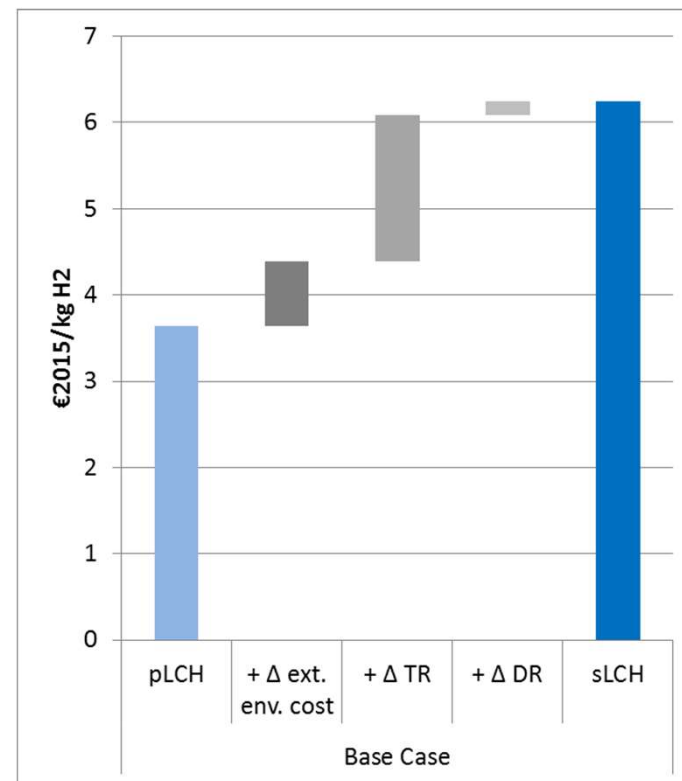
Aniello, G. et.al. (2019), Applied Sciences, Vol. 9, 3783

EXEMPLARY STUDIES

Energy, Pollution, Externalities: Levelized Cost of Energy from Private and Social Perspectives -The Case of Improved Alkaline Water Electrolysis-

Process-based Impact Assessment

- Process chain H₂ generation
 - Germany, Austria, Spain + upstream processes
 - LCAI-based environmental impacts
 - Monetary valuation of environmental impacts
- Levelized cost approach
 - Business/private vs societal perspectives
 - Corporate tax, discount rates
 - Monetization of external environmental effects



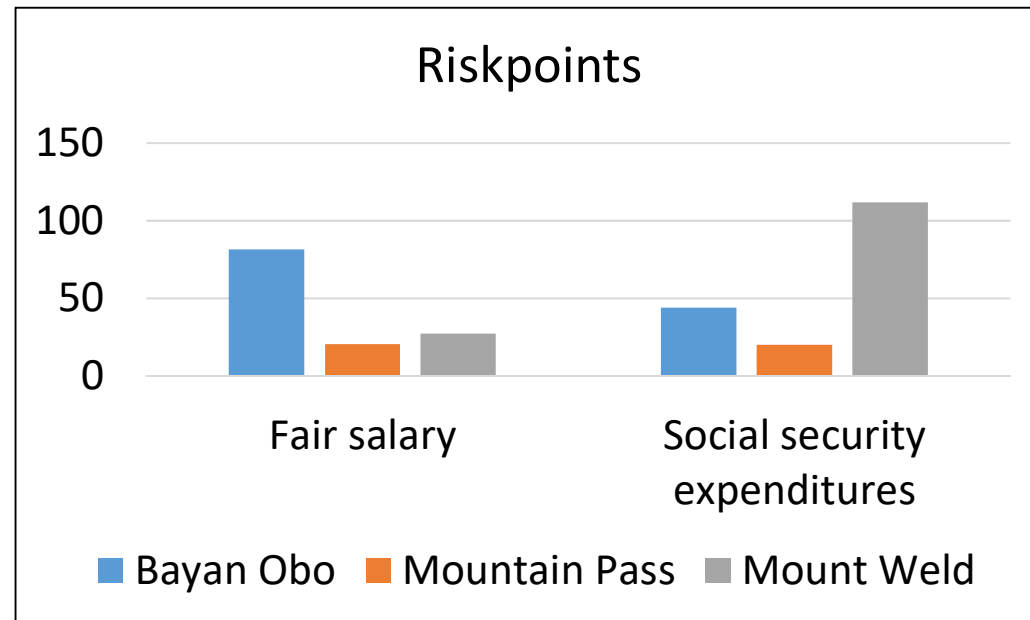
Kuckshinrichs, W. et.al. (2018), Journal of Cleaner Production, Volume 203, 619-632

EXEMPLARY STUDIES

Life Cycle Thinking: Social LCA for Rare Earth NdFeB Permanent Magnets

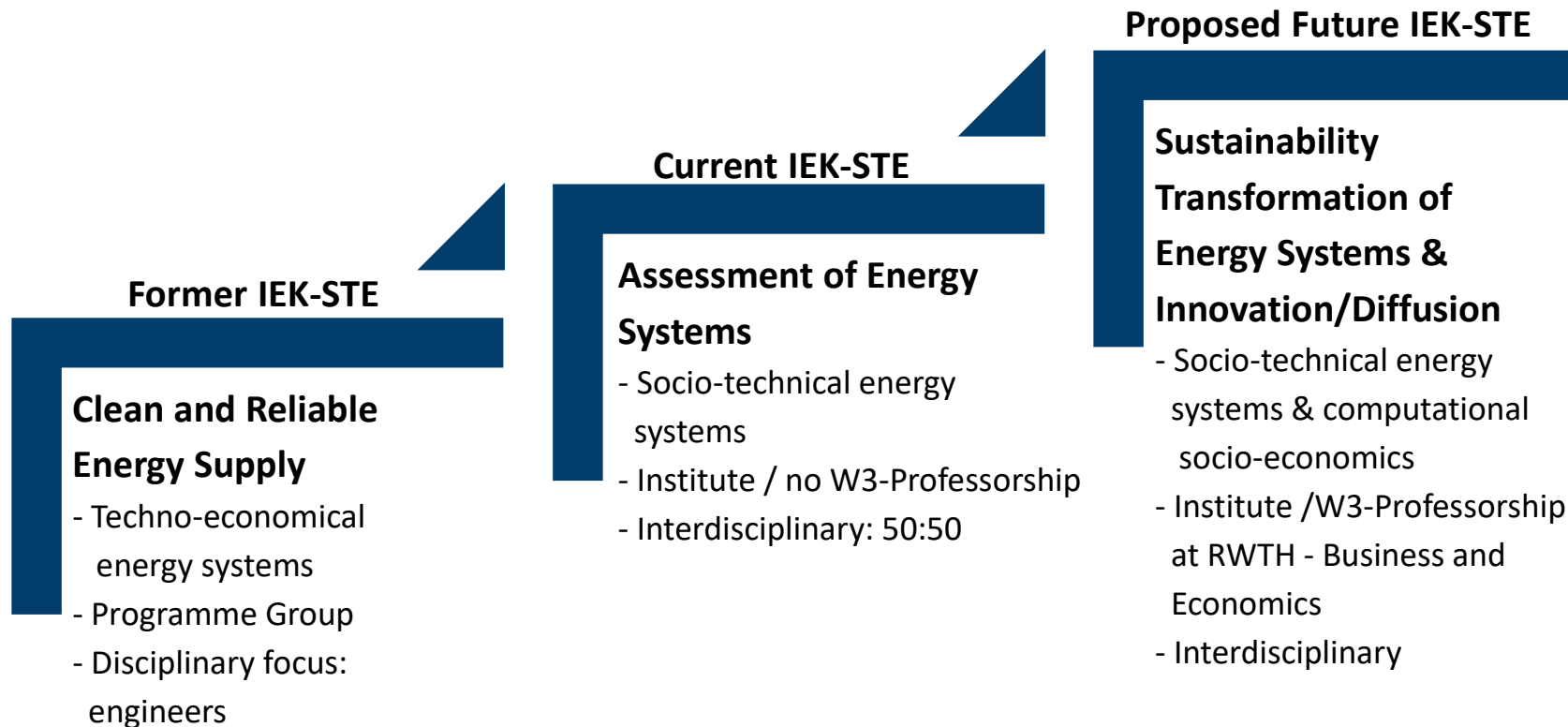
Social LCA of RE magnets

- Technical modelling with spatial relation
 - Bayan Obo: China
 - Mountain Pass: US → China → Japan
 - Mount Weld: Australia → Malaysia → China → Malaysia
- Social indicators
 - Fair Salary
 - Social security measures
 - Fatal accidents
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Werker, J. et.al. (2019), Sustainable Production and Consumption, Vol. 19, 257-269

OUTLOOK



From Clean and Reliable Energy Supply to Transformation of Socio-technical Energy Systems

- Actors' Perspectives
- Socio-technical Feasibility
- Innovation/Diffusion

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