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Research profile – June 2024

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Institute of Chemical, Environmental and Bioscience Engineering

Research Unit - Thermal Process Engineering and Simulation

[HTTPS://COLAB.TUWIEN.AC.AT/DISPLAY/CD/1.5.+VORLAGEN](https://colab.tuwien.ac.at/display/cd/1.5.+vorlagen)

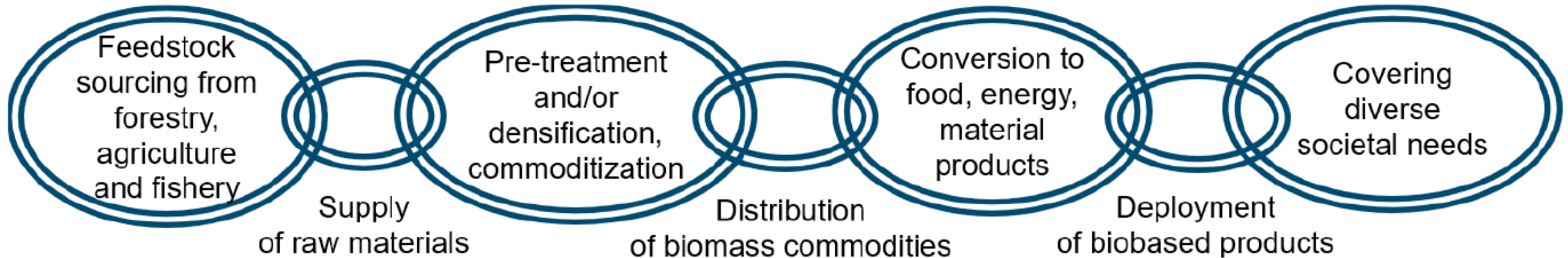
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Unique **scientific networks, and skills**

- IEA Technology Collaboration Programs ← INTERNATIONAL
 - 2025-2027 international lead on flexible bioenergy and system integration (BMK Sektion III – Innovation and Tech)
 - Publications, projects, strong personal links on Bioeconomy & TA relevant topics e.g., densification/conversion tech, supply chains, sustainability assessment, regional development, ...
- Scientists 4 Future – Obmannstellvertreter ← AUSTRIA
 - Excellent relationship with Profs. and post-docs of most Austrian Universities and research institutions e.g., BOKU, IIASA, Complexity Science Hub, ÖAW, TU Graz, Uni Innsbruck, Salzburg, CCCA, ...
- TU Wien community ← INSTITUTIONAL
 - Energy Economics Group <-> ICEBE
 - Strong networking – e.g. via Gudrun Weinwurm, with Brigitte Ratzer (current TU strategy), and many more
 - Circular Bioeconomy Excellence Community (interfaculty exchange on Biobased Industries Consortium)

Focus on **volumetrically significant energy and material flows** through the economy*

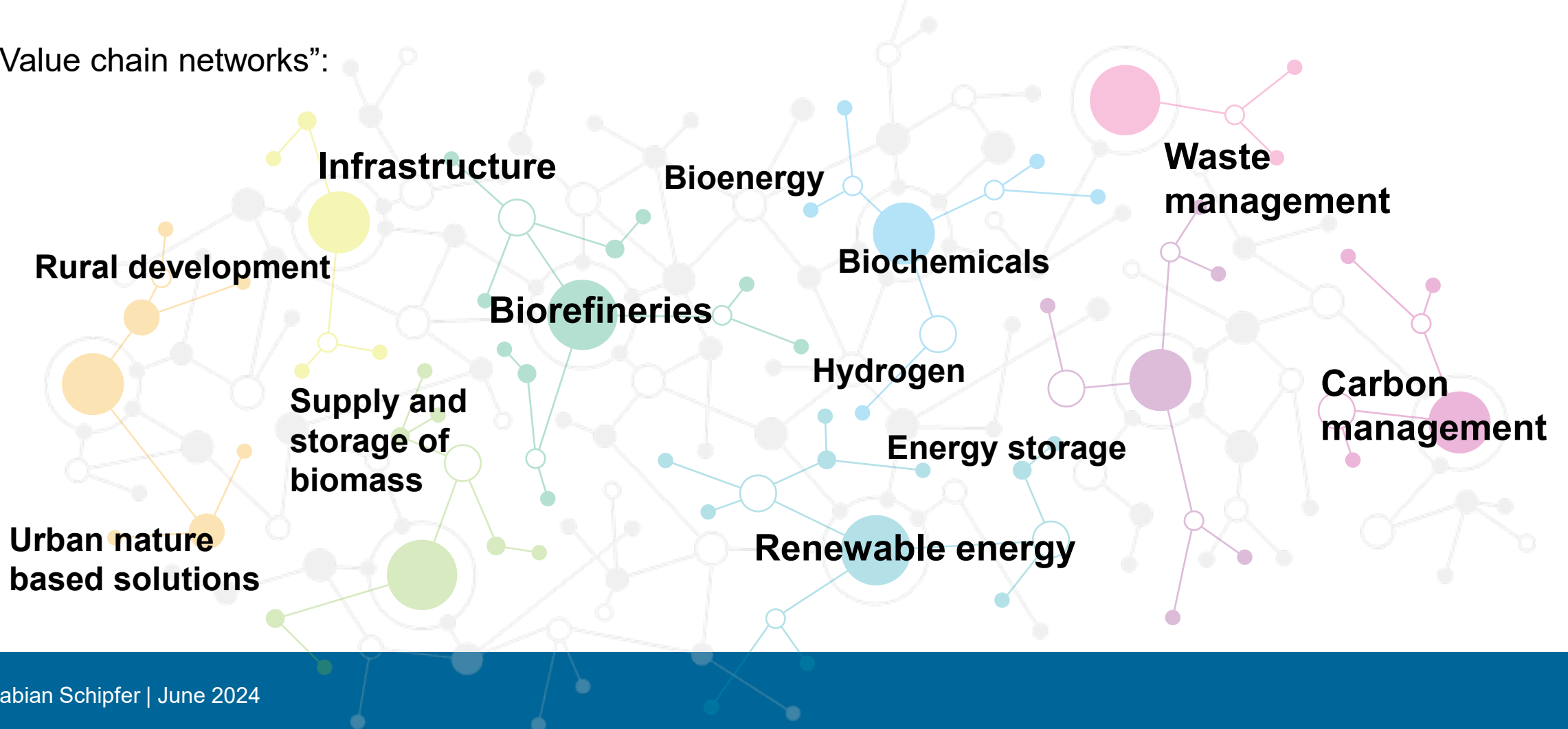
Starting point in 2012 - “Biomass value chains”:



** includes electricity, heat, bulk chemicals, building materials, fertilizer, food, feed, CO₂, hydrogen does not exclude but no explicit focus on pharmaceuticals, fine chemicals, bioactive components*

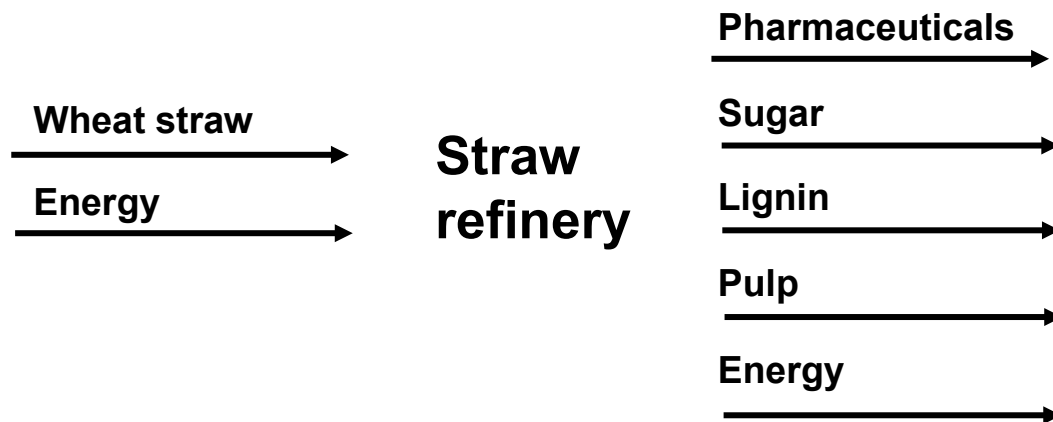
What are and how to measure and model **system integration** aspects?

“Value chain networks”:



Example – **integrated biorefinery**

The Organosolv biorefinery example:



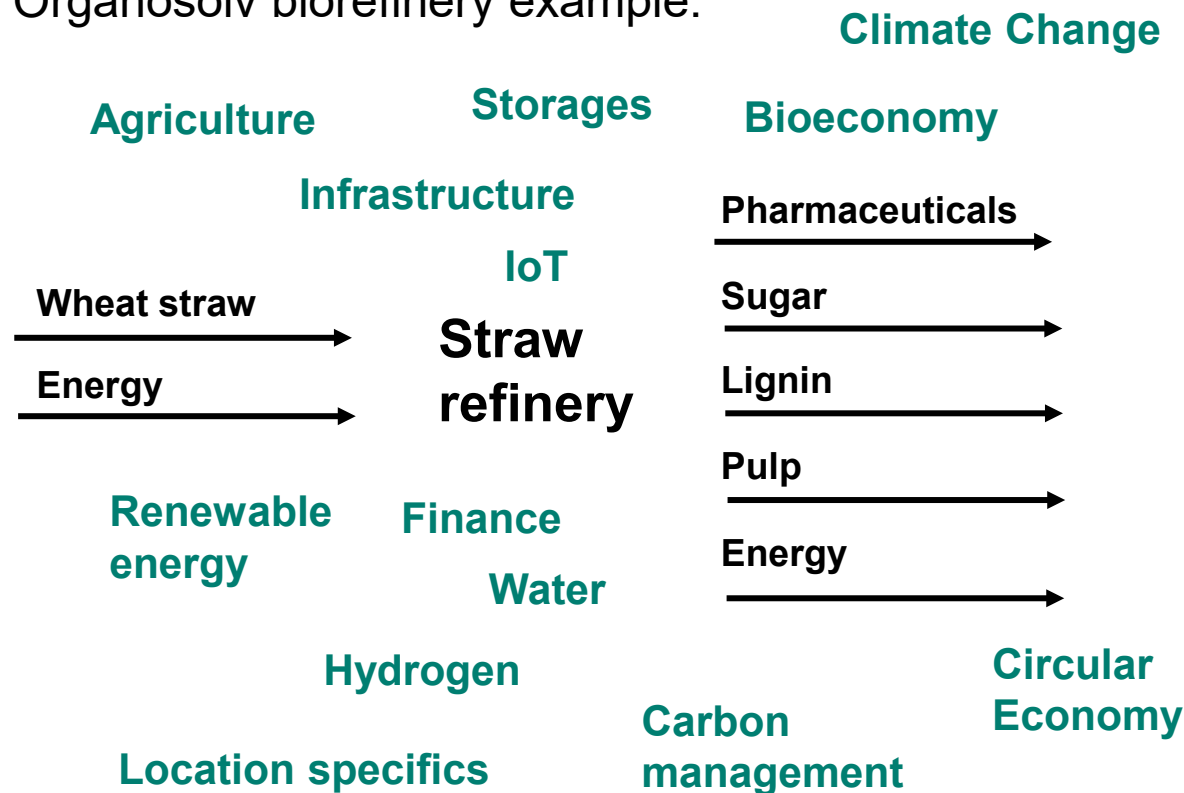
Accompanying with systems perspective to
→ **identify most promising R&D strategy**

- Lowest hanging fruits?
- Highest market potential (of future markets)?
- Highest societal impact?
- Favourable local, policy & social settings?
- Cost & resource efficient supply chains?
- Earth & human system risks –
what are threats, what are opportunities?

→ most promising feedstock & product portfolio
→ system integration benefits

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→ most promising feedstock & product portfolio
→ system **integration benefits**

A link between process engineering & systems engineering

Environmental & quantum physics Diplom +

12 years PhD and PostDoc experiences in various aspects of technology assessment (TA)

*Interdisciplinary integrator -
Schnittstelle*

Techno-environmental-economic	AND social scientific
Value chain assessment	Policy analysis
System modelling	Facilitating inter- and transdisciplinarity
Scenario modelling	Scientific community management
Econometrics	Risk management
Efficiency and reliability assessment	Gender and social justice <> ethical design
Safe-and-sustainable by design	Bibliometrics and Linguistics
Life cycle analysis	Risks & opportunities of science communication
Start-up and funding strategies	
Scale-up – proposal review & investor consulting	



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Thank you for your attention

Submit your manuscript here:

<https://energysustainsoc.biomedcentral.com/circularbioeconomy>

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<https://www.tuwien.at/en/tch/icebe/e166-02>

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All publications:

<https://perma.cc/M7DY-NWA8>

Peer-reviewed publications:

<https://orcid.org/0000-0001-6732-6919>