



IEA Bioenergy
Technology Collaboration Programme



IEA Bioenergie Task40

Biobasierte Wertschöpfungsketten für eine integrierte Bioökonomie

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Technology Collaboration Programme

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Biobasierte Wertschöpfungsketten [IEAB Task40]

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Sponsor: Forschungsförderungsgesellschaft (FFG)

Call: Forschungskoooperation Internationale Energieagentur Ausschreibung 2021

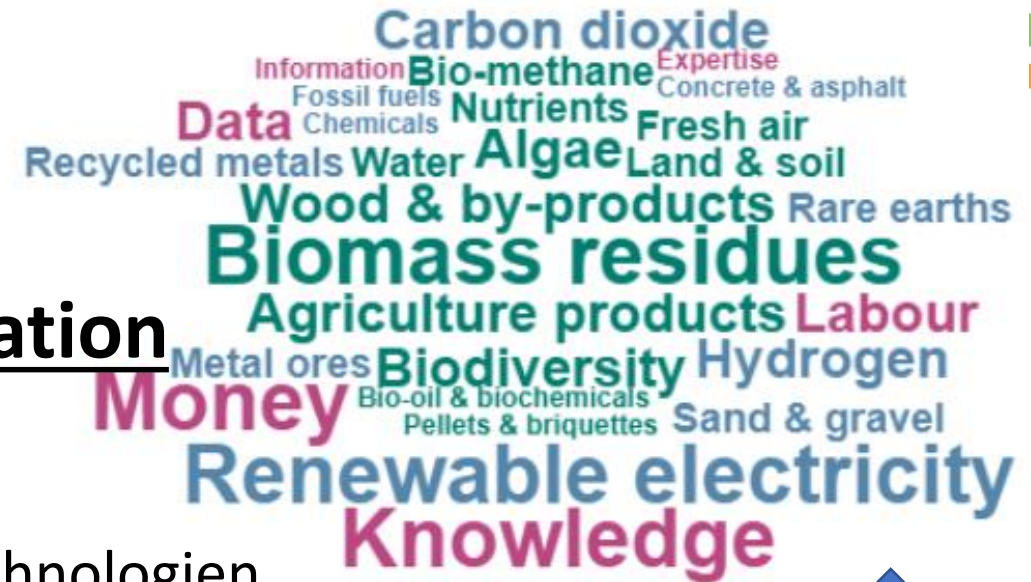
Type: Forschungsnetzwerk

Runtime: 01.2022 – 12.2024 (36 months)

Volume: Total: ~k€ 90 >>>> for ICEBE: ~k€ 60

Keywords: International knowledge exchange, bioeconomy, international trade, regional deployment

Kernaussagen



1. Infrastrukturen und Netzwerke sind die **Schnittstellen der Systemtransformation**
2. Vorbehandlungstechnologien und Konversionstechnologien, verbinden die Land- und Forst- und Abfallwirtschaft mit Netzwerken
3. Die Verschränkung von heterogenen Netzwerken für unterschiedliche (greifbare und nicht-greifbare) Ressourcen muss jedoch besser verstanden, antizipiert, und geplant werden.
4. Denn Systemintegration und Netzwerkkopplung bieten zahlreiche Möglichkeiten und Gefahren, sowie Synergien und Zielkonflikte, die bisher nur eingeschränkt betrachtet werden.



20 Jahre Versorgungskettendiskussion

50+ Berichte auf unserer Homepage

<https://task40.ieabioenergy.com/iea-publications/task-40-library/>



- Fachagentur für nachwachsende Rohstoffe (FNR)
- Internationales Institut für Nachhaltigkeitsanalysen und Strategien (IINAS)



- Deutsches Biomasseforschungszentrum (DBFZ)
- Ea Energy Analysis



- Research Institute of Sweden (RISE)
- Utrecht University (UU)



- RWE Generation NL BV
- Idaho National Laboratory (INL)



- Department of Energy (DOE)
- AEE Intec

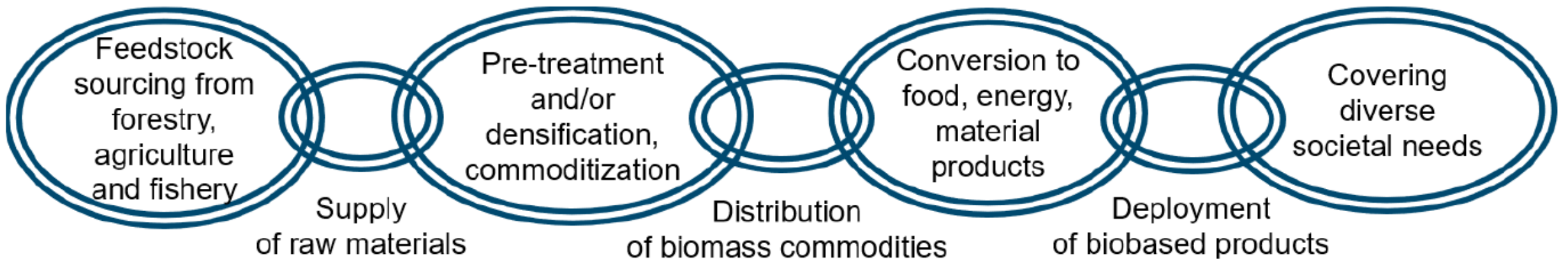


- Wild & Partner
- TU Wien

Zahlreiche

- **wissenschaftliche Publikationen**
- **Bücher**
- **Präsentationen**
- **internationale und**
- **nationale Berichterstattungen**

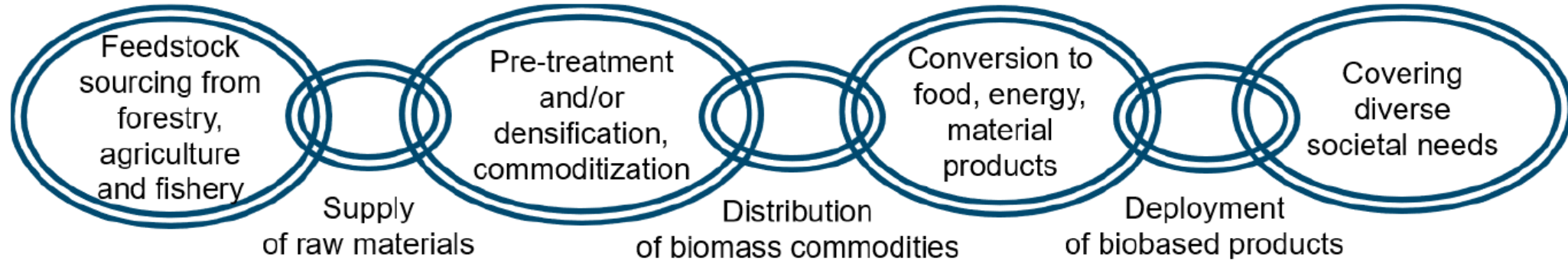
20 years supply chain discussion



Own illustration, adapted from: Schipfer, Fabian, und Lukas Kranzl. „Techno-economic evaluation of biomass-to-end-use chains based on densified bioenergy carriers (dBECs)“. *Applied Energy* 239 (1. April 2019): 715–24.

<https://doi.org/10.1016/j.apenergy.2019.01.219>.

20 years supply chain discussion



Sourcing topics (first report)	Distribution topics (first report)	Deployment topics (first report)
	International bioenergy trade (2010)	Sustainability certification (2010)
	Wood pellets markets (2011)	Science-policy interface (2013)
	Liquid biofuel markets (2012)	Large industrial bioenergy (2013)
Forest biomass mobilisation (2016)	Wood chips, biojetfuels, torrefaction (2012)	Cascading use of biomass, global bioeconomy, small-scale heating (2016)
Socio-economic impacts (2017)	Advanced biofuels, biomethane markets (2014)	Biocarbon capture and storage (2020)
Biomass waste streams & trade (2019)	Biorefineries, future use of pellets (2019)	Industrial process heat (2021)
Local, low-value, biomass (2022)	Hydrogen, renewable gases (2022)	Bioeconomy synergies (2022)

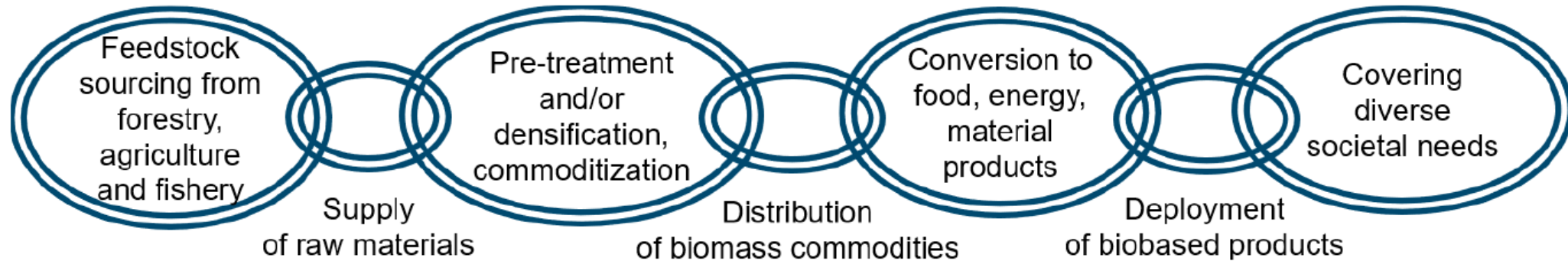
Technologies connecting networks

Wood logs, wood chips, torrefied pellets, briquettes, liquid biofuels 1st, 2nd, 3rd generation, biomethane, hydrogen, carbon dioxide ...

→ SUPPLY chains and WASTE DISPOSAL chains for food, materials (traditional, advanced), energy, and other (landscape management, ...) requirements of society

→ Solid, liquid, and gas NETWORKS, heat and power GRIDS, and STORAGE

Next: Networks connecting societal goals



Sourcing benefits	Distribution benefits	Deployment benefits
<ul style="list-style-type: none"> • Stakeholder diversification • Multi-level value creation and decision making • Green jobs, jobs, jobs • Biosphere link > Taking care of a changing environment 	<ul style="list-style-type: none"> • Networks of networks -> ability to shift resources between different networks • Flexibility and reconfigurability to react to uncertainties in sourcing and demand 	<ul style="list-style-type: none"> • from cost-efficient services to sufficient and equitable services • resilience and reliability, safety and security • for conscious waste & carbon management and much more

Empfehlungen

1. Bioökonomieversorgungs- & entsorgungsketten fördern:

- Erwartungen an Kostenregression und Wettbewerbsfähigkeit moderieren
- Heterogenität und Multifunktionalität ist eine Chance, keine Hindernis
- Regional und international vernetzt -> kein Widerspruch
- Engmaschig, klein, komplex, teuer, schlecht automatisierbar, ...



2. Leistungsindikatoren reformieren:

- Effizienz + Resilienz, Verlässlichkeit, Flexibilität, Inklusivität, Suffizienz ...

3. Synergien konkretisieren:

Klimaneutralität 2040	verantwortliche Lieferketten	Agrarpolitik	Rural Proofing
Biodiversitätstrategie	Farm to fork Strategie	Waldstrategie	Wasserwirtschaft
Entwaldungsverordnung	Carbon Farming	Green Jobs	Städteagenda
Internationaler Handel	Kohlenstoffabbau	Bodenschutz	Rural Pact
		Eiweißstrategie	Kohäsionspolitik

All publications:

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

Peer-reviewed publications:

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Thank you for your attention

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Getting over the fossil counterfactual

Before:

1. Sourcing biomass for bioenergy from one supplier
2. Medium-scale commodification for
3. Globalised supply chains
4. Allocation via international markets
5. For large-scale conversion to power and transport fuels

After:

1. Sourcing biomass primarily for non-energy from many suppliers
2. Energy as waste management
3. Small-scale, mobile (?) treatment
4. Regional to international chains
5. Involvement of diverse stakeholders
6. For small and medium-scale energy services, for flexibility, for carbon sequestration, for bioeconomy synergies

Not getting into the P.V. counterfactual

Photo-voltaic (P.V.) as a placeholder for all feedstock-independent renewable heat and power

The numbers game is lost

for economic & ecological sustainability in direct product comparisons

... efficiency and automatization advantage of no metabolism (no feedstocks)

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→ What are the long-term, societal benefits of regional to international, fine-mashed, heterogeneous, complex biobased value chains?