



Solution Architect for Global  
Bioeconomy & Cleantech Opportunities



Sustainable Bioenergy  
Solutions for Tomorrow

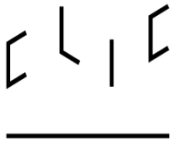
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# (How) Can centralised waste and sanitation infrastructure be replaced with local biogas treatment and nutrient recycling? **Case Tampere**

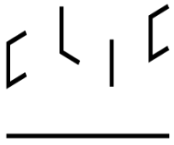
**Maarit Särkilahti TUT**



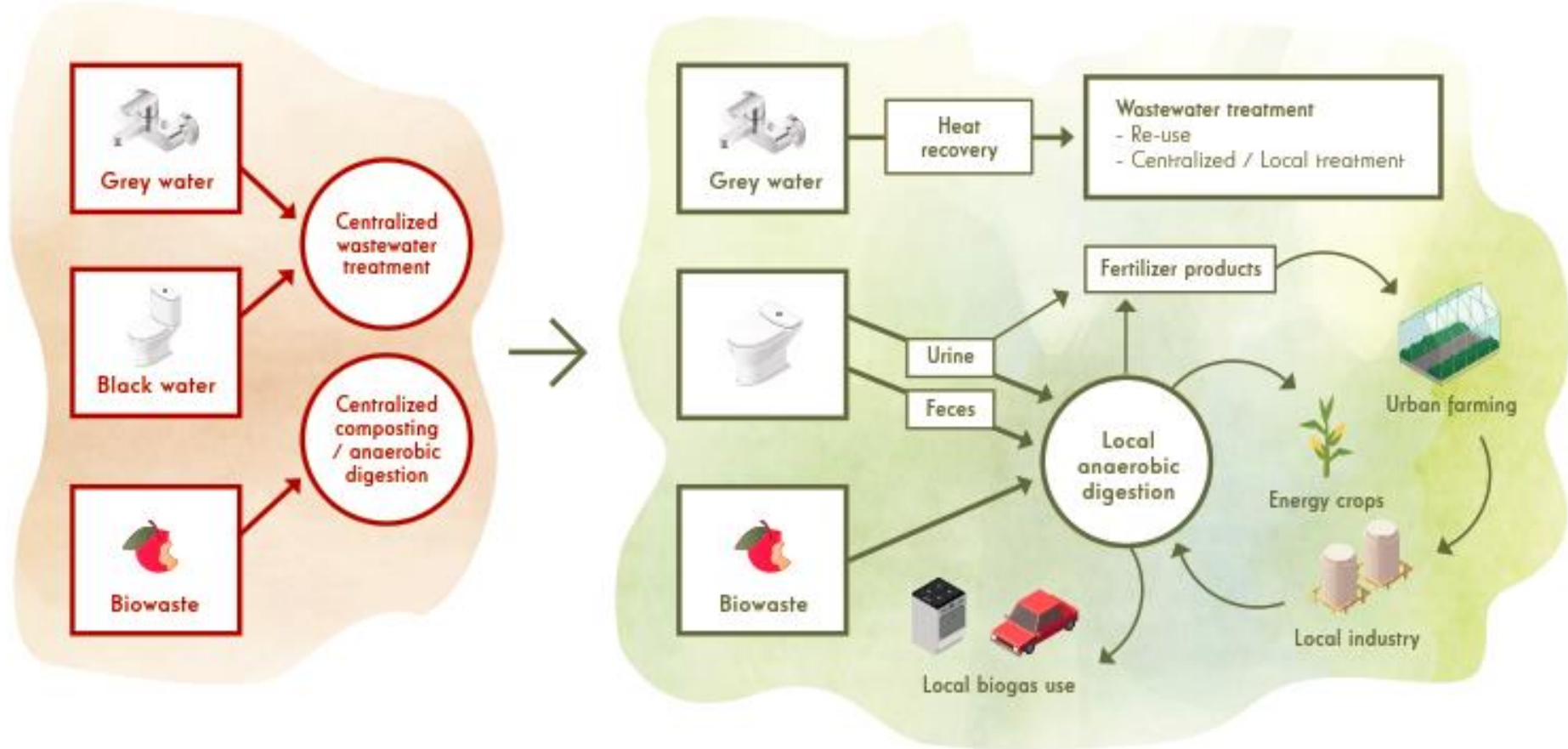
# Content

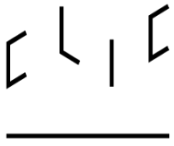
1. Linear  circular urban metabolism
2. Research methods
  - Expert interviews & workshop
  - Multi-level perspective
3. Drivers, barriers, and enablers for alternative system implementation
4. Recommendations: Enabling socio-technical transition





# From linear to circular urban metabolism

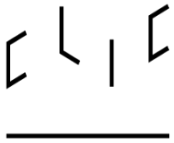




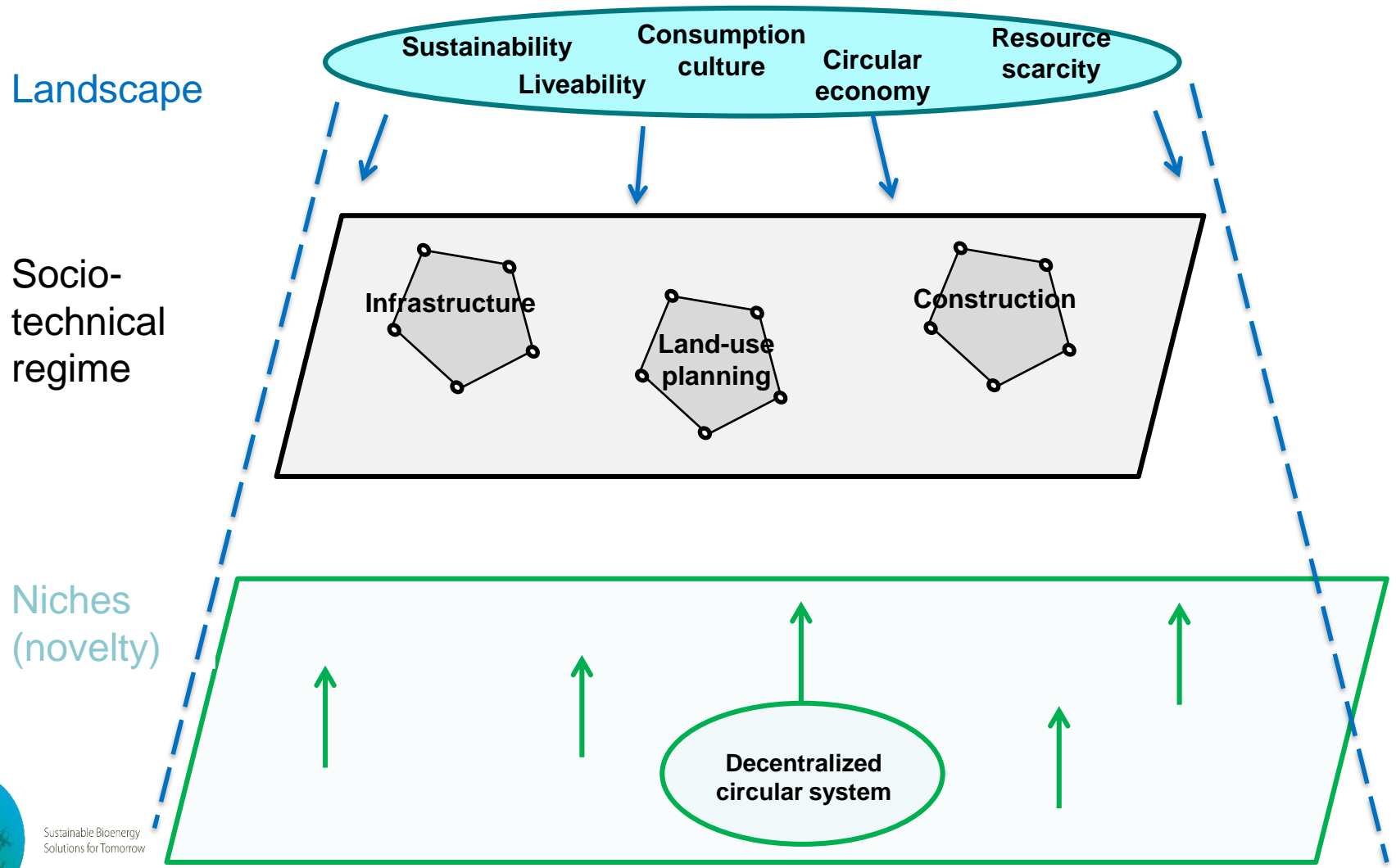
# Testing Decentralized circular system

## 17 interviews & a workshop

	Organisation	Expertise
1	City of Tampere	Water management
2	City of Tampere	Impact assessment and stakeholder participation
3	City of Tampere	New residential area management (Vuores project)
4	City of Tampere	New residential area management (Vuores project)
5	City of Tampere	Energy and climate
6	City of Akaa	Politician
7	Municipal undertaking	Central wastewater treatment plant under planning
8	Municipal undertaking	Waste R&D
9	Municipal undertaking	Automatic vacuum waste collection system
10	Construction company	Construction contracting
11	Consultant	Energy and environmental design: calculation, competitions, planning
12	Consultant	Planning of water, sewage and storm water networks
13	Technology/service provider	Waste/wastewater collection and treatment systems for marine sector
14	Technology/service provider	Biogas business
15	Technology/service provider	Participating in city planning/development and offering gas solutions
16	Technology/service provider	Gas R&D
17	Technology/service provider	Biogas business development



# Multi-level perspective on sustainability transition



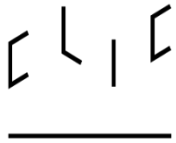
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*“For city planners, it is easy to promote new solutions, but construction companies bring in economical facts. Sales people sell anything, and some construction companies avoid everything new. Right way is somewhere between.” (Construction company)*

*“In new area planning, there are so many things that it is easy to choose old system here. New invites people to complain and slow down the process. Sometimes we study new ideas, but they are not implemented because residents or other city officers are against them.” (Consultant)*

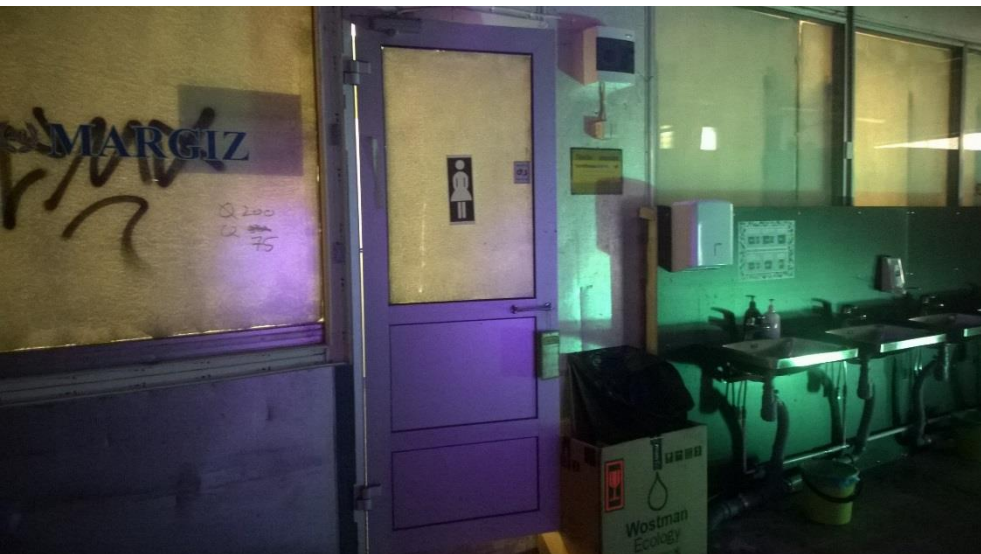
*“Large share of city financial resources is used to infra, and water infra works well. Therefore changes in it need to be reasoned well.” (City of Tampere)*

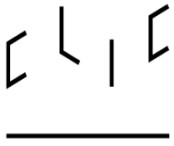


## Drivers



- The City of Tampere is moving towards open and interactive urban planning methods
- Actors promote green values
- Technology for the decentralised circular system is available
- Existing infra (e.g. gas grid) may support the system





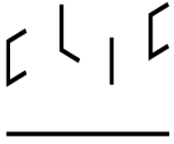
## Barriers



- Information breaks within the network of actors
- Sparse population and water abundance
- It is unclear which technologies/solutions city should enable
- Economics and acceptability override environmental values
- Current operators dominate
- Actors get into planning too late
- New actors have unclear roles in land-use planning
- The cost-efficiency of new and small-scale solutions is a challenge
- Pilot upscaling is not systematic
- Existing infra (e.g. long pipelines) may reduce system benefits



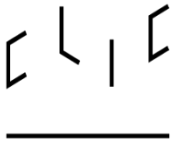




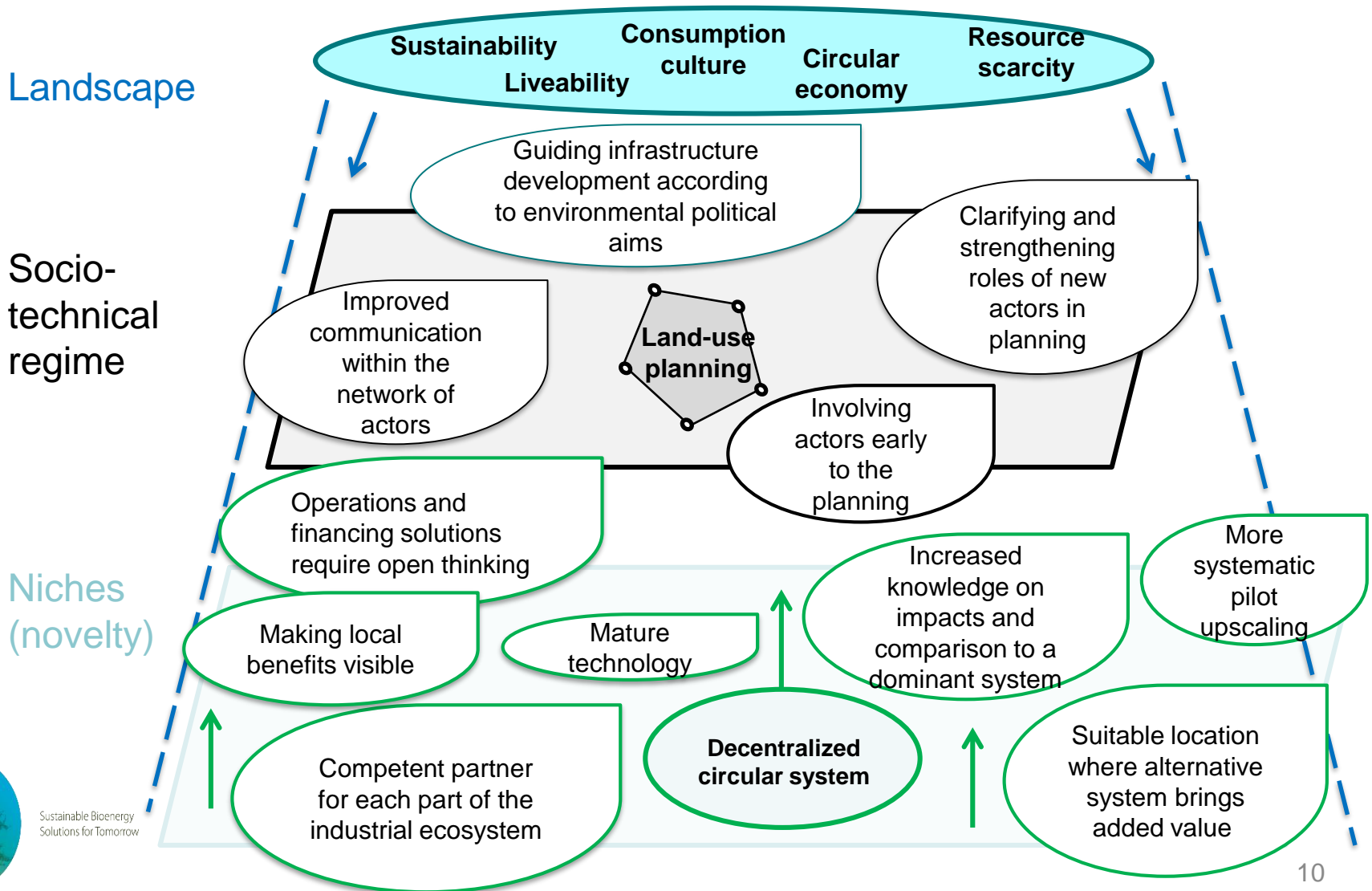
# Enablers

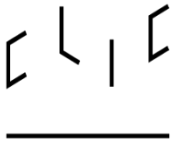
- The project owner
- Guiding infrastructure development regarding policy aims
- Residents' values should be considered in urban planning
- Communication professionals
- Suitable locations
- A visible loop and local benefits increase attractiveness
- Increased knowledge on impacts and comparison to dominant system
- Technology needs to be mature enough
- Competent partners for each part of the industrial ecosystem
- Operations and financing solutions require open thinking





# Suggestions to improve conditions supportive for a circular system neighborhood





## Conclusions

- As technological development is accelerating, public sector needs to improve its ability to react, learn and adapt.
- A crucial challenge is to take actors and alternative solutions more systematically into urban land-use planning.
- Despite its enabling role, city should guide infrastructure development according to (environmental) political aims.
- Alternative industrial ecosystem requires open thinking, competent partners, mature technology, and suitable location.
- Visible local benefits improve system attractiveness and acceptability.
- Further research should include residents' role in sustainable infrastructure development, communications in land-use planning, pilot upscaling, and impact assessment

