Dissemination of biogas system solutions in the Global South
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Nordic Biogas Conference - Session 3B
International dissemination of biogas systems solutions
Agenda

• Introduction
• Why is the Global South interesting?
• Demand side - Biogas contexts in the Global South
• Supply side - Swedish biogas sector
• Conclusions
Introduction

• Nordic Biogas Model can be of great interest in many parts of the world
  • Organic waste is digestated
  • Biogas is upgraded for transportation
  • Digestate can be used as fertilizer

• Biogas systems could help achieve several of the SDGs
Introduction

However, the Nordic Biogas Model requires certain conditions for successful implementation

Overall question: How can the Nordic Biogas Model be implemented in different international contexts?
Why is the Global South interesting?

• Large un-explored resources for biogas production
• Need for proper waste management, energy, and food security
• Opportunity for more transformative sustainability impact
• It is a more challenging context (e.g., informal and unstable institutions)
Global South

To analyze the diffusion of biogas systems in the Global South, we need to understand how the different environments and the biogas systems influence each other.
Sweden

Biogas production

Anaerobic digestion units

Biogas use

Paraná

Biogas production

Anaerobic digestion units

Biogas use

Figure 1. Biogas production in Sweden according to the energy produced in different sectors. Biogas production from landfills and gasification is not included in the figure. Source: SEA.

Figure 2. Number of anaerobic digestion units per sector in Sweden. Source: SEA.

Figure 3. Use of biogas produced in Sweden. Source: SEA.

Figure 4. Biogas production in Paraná according to the volume produced in different sectors. Biogas produced from sewage and landfills is not included in this figure. Source: CiBiogás.

Figure 5. Number of anaerobic digestion units per sector in Paraná. Source: CiBiogás.

Figure 6. Use of biogas produced in Paraná. Source: CiBiogás.

(Magnusson, Zanatta et al. 2022)
Different context across Brazilian states

• Interactions between different environments and local biogas systems differ across different administrative levels and sectors
  • Biogas actors change the context to fit biogas systems
  • Biogas actors change the biogas system to fit the context

User environment – Paraná
The adoption of farm-based biogas systems in Paraná transforms the practices and routines of users

User environment – São Paulo
The adoption of biogas systems in the sugarcane industry (ethanol) fits the practices and routines of users

(Zanatta et al., under review)
Policy coherence in a fragmented context

• Pre-conditions for biogas production, distribution and use differ considerably between the Brazilian states (Kanda, Zanatta et al., 2022)

• Biogas systems as being locally embedded constitutes a challenge in hierarchical market economies such as Brazil (Kanda, Zanatta et al., 2022)

Source: Gustafsson & Anderberg (2021)
Socio-economic structures and system formation

Sweden
- Municipalities as core actors
- Collaborative and complex systems
- Trust based relations
- Bottom-up
- State as supporter

Paraná
- State organizations as core actors
- Vertical integration: private actors that control the value chain
- Top-down
- State as coordinator

(Magnusson, Zanatta et al. 2022)
Supply side - Swedish biogas sector

- Business models
- Target countries
- Export barriers
- Government support
Supply side - Swedish biogas sector

Very rarely is the entire biogas system solution exported.

(Kanda et al., 2022)
Target countries for export

Swedish biogas companies focus on the Global North. (Kanda et al, 2020)

Number of companies exporting to various markets: Norway (6), Germany (5), England (4), Denmark (3), China (3), Canada (3), Netherland (2), Italy (1), Chile (1), Slovenia (1), USA (1), Argentina (1), France (1), Belgium (1), Poland (1), Lithuania (1), Latvia (1)
<table>
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<tr>
<th>Funding Agency(ies)</th>
<th>No. of projects</th>
<th>Total financing</th>
<th>Target markets</th>
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Public funding for biogas projects targets the Global South.
Comparing barriers to internationalization

With increasing export experience, companies perceive barriers as less challenging.

(Kanda et al, 2020)
Conclusions

How can the Nordic Biogas Model be implemented in different international contexts?

• **Adaptation**: the Nordic Biogas Model needs a local touch.
• **Collaboration**: between Nordic and local actors.
• **Differentiated government support**: for Global North and South.