

From global climate goals to local practice—mission-oriented policy enactment in three Swedish regions

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Abstract

As the national and supranational levels of government embrace the concept of missions to solve wicked problems, the importance of understanding how missions move from one level of governance to another becomes essential. In this paper, we present a comparative case analysis of evolving regional biogas systems to consider how global missions on climate action are enacted in local practice. Referring to wickedness in terms of contestation, complexity, and uncertainty of both problems and solutions, we examine how such framings affect the operationalisation of the missions. Our results indicate that in the process of local translation, wickedness often increases, but additional wickedness does not always worsen the outcomes.

Key words: mission-orientated; wickedness; biogas; fossil-free; regional.

1. Introduction

In a short time, mission orientation has become a buzzword in academic and practice-oriented discussions on the design of effective innovation policies. Innovation study scholars, public officials, and politicians use this term to label policies that address grand societal challenges such as climate change, resource depletion, air and water pollution, and accumulation of waste (Mazzucato et al. 2019). Technological change alone cannot address these challenges; they require a more comprehensive range of sociotechnical transformations (Hansen and Coenen 2015). Mission-oriented policies thus often refer to the United Nations (UN) Sustainable Development Goals, which call for the mobilisation of resources and dedicated action at all levels of society, from individual citizens to intergovernmental organisations and multinational corporations. These policies go beyond public (co-)funding of research and development to compensate for weak appropriability (Mazzucato and Semieniuk 2018). Instead, they suggest that governments leverage private investments in industrial development (Spencer et al. 2005) and new market creation (Mazzucato 2016) to solve societal problems. A key element of this is the formulation of attractive visions, which can enrol a variety of actors (Mazzucato 2018).

Mission-oriented policies assume active governance processes. In contrast to market failure approaches that intend to level the playing field for market actors, a fundamental principle of mission orientation is with providing direction and breaking down broad societal objectives into timed and quantified goals (Mazzucato 2018). Still, there must be room for entrepreneurial experimentation to avoid lock-in to suboptimal solutions (van der Loos et al. 2020). Hence, mission orientation involves a critical balancing act between

directionality and variety creation (McKelvey and Saemundsson 2018).

The perspective taken in most academic discussions of mission-oriented policies is the perspective of the national state, drawing on the notion of ‘the entrepreneurial state’ (Mazzucato 2011). These discussions suggest that national governments can and should attain leading roles in driving transformative processes by devising appropriate mixes of policy instruments (Rogge and Reichardt 2016; Schot and Steinmueller 2018; Weber and Rohracher 2012). However, local space significantly influences transformative processes (Hansen and Coenen 2015). As reflected in UN and European Union (EU) goals for sustainable cities and communities, as well as the burgeoning literature on strategies for urban development (Bulkeley and Betsill 2005; Dassen et al. 2013; Webb et al. 2016), governance is located at multiple levels, involving a variety of policymakers with different territorial jurisdictions (Hooghe and Marks 2003). Hence, despite the national focus of much of the literature on mission-oriented innovation policies, missions are embedded in multi-level arrangements and increased attention on the subnational level is warranted (Bours et al. 2021; Bugge et al. 2021; Wanzenböck and Frenken 2020). This paper adds a local governance perspective to academic discussions on implementing mission-oriented policies. We bring the notion of policy translation as a metaphor and sensitising tool to the idea that policy is not a linear process with an end state but an unfolding process consisting of translations and contains ‘assemblages’ of human and non-human actors (Clarke et al. 2015). Our analysis elucidates vital interactions between levels of governance, showing how national missions are translated into a local context. The paper addresses the following research question: *how are mission-oriented policies enacted in local practice?*

Translation as a part of enactment (Singh et al. 2013) combines attention with action (Smircich and Stubbart 1985; Weick 1988). Such a view assumes that it takes people acting individually and within organisations to make sense of and generate the events, decisions, objects, and situations required to turn mission-oriented policies into practice. The paper analyses regional cases with strong anchoring in local contexts. The analysis is based on the notion that mission-oriented policies comprise problems and solutions (Wanzenböck et al. 2020). In our case studies, the focal solution is the production and consumption of biogas, and the focal problem is an energy transition as necessitated by the broader problem of climate change. In the Swedish national context, where the cases are located, this is framed as a broad mission of developing a fossil-free welfare nation (Regeringskansliet 2016). The mission does not prescribe any specific solution; several different solutions can be deployed, and biogas is one of them.

As a solution, biogas is distinguished by its versatility; it can address a variety of problems (Hagman et al. 2018; Winquist et al. 2019). Therefore, it is associated with several different areas of policy (Gustafsson and Anderberg 2021). Our case studies describe how local actors play an essential role in formulating and implementing strategies for locally-embedded biogas solutions. The case analysis shows significant differences in the advocacy of biogas systems and in the framing and re-framing of problems to match biogas as a preferred solution, and it further points to the evolving and embedded character of missions (Janssen et al. 2021), suggesting that mission-oriented policies are not just designed at some specific point in time and a specific scale.

The paper is structured accordingly. Following this introduction, a theory section elaborates on mission-oriented policies along different dimensions. A section on research methods follows this. The subsequent sections comprise an overview of the Swedish biogas context, followed by the individual cases and a comparative analysis. A concluding section summarises the main findings from the analysis and presents policy implications.

2. Mission orientation and wickedness

Drawing on Rittel and Webber's (1973) seminal paper on planning dilemmas and wicked problems, Wanzenböck et al. (2020) conceptualise mission-oriented policy-making as the alignment of societal problems and innovative solutions. The notion of wicked problems challenges 'evidence-based', scientific, and rational planning approaches to public policy (Head 2019). Instead of considering stakeholder involvement, such as lobbying and negotiation, as obstacles to informed policy-making, wickedness calls for inclusiveness and reflexivity, much akin to the processes commonly associated with responsible innovation (Stilgoe et al. 2013).

Policy formation addressing wicked problems has been considered with sensitivity to the concept of *policy translation* used as a lens to view events and discourses enacted during the localisation of policy. Wittmann et al. argue that mission-oriented policy-making requires multiple translation steps and conceptualises missions as '... multiple, interconnected translation processes' (Wittmann, et al., 2021). The authors describe three translation processes: first, societal problems are translated into a mission, followed by a further translation into goals, and lastly, into implementation.

Policy translation as a description of policy movement has gained attention and is a development of policy studies that previously considered policy movement as transfer, diffusion, or convergence (Stone 2012). In contrast, translation as a metaphor is a helpful starting point when foregrounding the continuous shaping and reshaping of policy between different governance levels. Moreover, it highlights the agency of the actors who must negotiate and establish new translations of missions while at the same time defending the established status quo (Callon 1986; Latour 2005). With this lens, analysts pay attention to how policy moves from an idea to operationalisation and accounts for the 'translators' in their analysis (Clarke et al. 2015). This theoretical approach is used in this paper to bring forward the role of the local and regional public authorities as translators.

Policy translation is one aspect of policy enactment and includes the processes of formation, interpretation, and contextualisation as policy becomes practice (Singh et al. 2013). The view of policy translation, as described by Clark et al. (2015), considers the additional concept of assemblage, as taken from the actor-network theory (Latour 2005), to avoid a state-centric view of policy-making and foreground the work done by local actors/actants (Clarke et al. 2015; Savage 2020). The importance of considering existing local actors, as well as the resources they possess and the structures they operate in, finds support in a recent study of regional innovation systems in mission-oriented innovation (Bugge et al. 2021), and according to Wanzenböck and Frenken (2020), this can be explained by the contested nature of problem identification, as well as the contextual nature of problem-solving in the enactment of mission-oriented policies.

Local translation and contextualisation of national and supranational missions involve (re)definition of problems and advocacy of solutions to these problems. Wanzenböck et al. (2020) argue that mission-oriented policies should strive for convergence between solutions and problems, and they propose that mission-oriented policy ideally travels from divergent to convergent views on both problems and solutions. This is illustrated by three different mission-oriented pathways in the problem-solution space, moving from disorientation to alignment, as seen in Fig. 1.

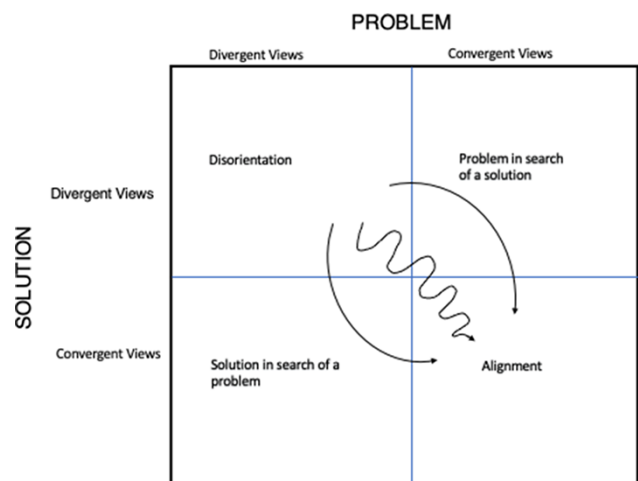


Figure 1. Mission-oriented policy pathways from disorientation to alignment (based on Wanzenböck et al. 2020).

According to [Wanzenböck et al. \(2020\)](#), the wickedness of problems and solutions can be described along three dimensions: contestation, complexity, and uncertainty. Contestation results from divergence in stakeholder groups, including the values they advocate and their claims ([Laufer and Jacobsson 2016](#)). Contestation may arise around attention to and ownership of problems, as well as around the appropriate solutions to these problems. Stakeholders promote different narratives to enrol support for the problem framings and the solutions they advocate ([Smith and Raven 2012](#)). Such promotion of a shared narrative is vital for stakeholder groups to raise expectations, which are essential for the creation and shaping of markets ([Ottosson et al. 2020](#)). This can result in advocates of specific solutions, which can benefit from drawing attention to the problem to which they claim to have a solution.

Complexity refers to system scope and interdependencies between system elements, including technical artefacts and infrastructure, actors, networks, and institutions. The societal problems addressed by mission-oriented policies are often multi-scalar and multidimensional, with an unclear division of responsibilities ([May et al. 2013](#)). Mission-oriented policies aim at sociotechnical transitions that challenge established system structures and boundaries ([Weber and Rohrer 2012](#)). Proposed solutions will interfere with established practices, routines, and lines of thinking, challenging established system configurations. This will open space for renegotiation about the division of responsibilities between different actors, the public and private sphere, different areas of jurisdiction, and different levels of governance—from global to local.

Uncertainty refers to insufficient or fragmented knowledge and ambiguity about the causes and consequences of problems and the feasibility of solutions ([Wanzenböck et al. 2020](#)). This means that there will be room for interpretation; different actors may interpret problems and solutions to suit their agendas, and policymakers find insufficient support for their decisions from scientific research. Even if the proposed solutions appear effective, a widespread diffusion may lead to additional problems commonly referred to as problem-shifting ([Turconi et al. 2013](#)). This can be illustrated by the electric car, widely promoted as a promising solution to urban air quality problems and greenhouse gas (GHG) emissions from traditional petrol-fuelled cars. However, even if the electric car is charged with renewable energy, it will most likely result in additional environmental impacts in terms of toxicity, freshwater eutrophication, and metal depletion ([Hawkins et al. 2012](#)). Problem-shifting suggests that the solution promoted by one actor may be considered a problem for another actor, pointing to the inseparability of problems and solutions ([Rittel and Webber 1973](#)). Wickedness means that analysts of mission-oriented policy processes must consider problems and solutions jointly and in relation to the actors participating in the processes.

3. Research methods

Regions are important areas for analysis from both actor and spatial perspectives in the transition away from fossil fuels ([Hodson and Marvin 2009](#); [Truffer and Coenen 2012](#)) and, in many ways, embody the ‘think global act local’ mantra, which has been a growing theme within the environmental discourse ([Lawhon and Patel 2013](#)). This has been strengthened through the implementation of the UN Sustainable Development

Goals, which have explicitly engaged subnational and local levels of government ([Weiland et al. 2021](#)). This paper uses an embedded comparative case study approach ([Yin 2009](#)) to explore how local practice enacted mission-oriented policies. The focus is on the development of biogas systems in three Swedish regions, which comprise local public administrations in terms of county councils and municipalities. Although these local administrations are empowered through a relatively-decentralised governance structure in Sweden, they still face many limitations and constraints regarding what they can affect ([Eriksson et al. 2020](#)).

Our selection of specific geographic regions relies on a theoretical sampling logic with the ambition to learn from contrasting cases ([Eisenhardt and Graebner 2007](#)). The three selected regions, Kalmar, Jönköping, and Gotland, display different characteristics. Kalmar has approximately 250,000 inhabitants and is located in the southeast of Sweden, along the Baltic Sea, a marginal sea that has suffered from eutrophication due to the leakage of fertilisers from the surrounding agricultural land. Jönköping is an inland region with approximately 366,000 inhabitants. It is an important transit region with significant traffic flows on roads connecting different parts of Sweden. Finally, Gotland is an island in the Baltic Sea with about 60,000 inhabitants, has a strong historical legacy, and is a popular tourist destination.

Document analysis was used as part of method triangulation in conjunction with participant observations and semi-structured interviews. Data collection began in September 2019 with a 1-day workshop with representatives from public authorities from the three regions included in the study. The workshop focused on presenting the experience of biogas market development up to that point and expectations for future development. From this, a document analysis focused on relevant public service actors’ expressed strategies and activities between 2006 and 2020. The case study was conducted within a national research centre that brings together academia, industry, and public organisations in cross-disciplinary research on biogas systems allowing for ‘engaged scholarship’ ([Van De Ven and Johnson 2006](#)). This research method seeks to address the problem of limited knowledge transfer within academia by leveraging ‘arbitrage’ whereby different forms of knowledge, when combined, encourage synthesising knowledge from different sources with the aim that knowledge can be transferred and applied easier ([Harrison 1997](#)). Representatives from the regions were initially contacted to determine their interest in participating in a research project on the regional perspectives on biogas market development. Data were collected during seventeen biogas networking events lasting between 4 and 7 h, allowing the authors to understand the biogas market conditions from a regional and public authority perspective. Interviews with representatives from each region complemented the document study. The criteria for partaking were that participants should have worked with the biogas strategy or practical implementation of biogas systems. In total, six respondents with connections to Kalmar, three from Jönköping, and three from Gotland participated.

The interviews have been presented in a manner to increase anonymity for the participants. All interviews were conducted in Swedish via Zoom’s online meeting tool and recorded after permission. [Appendix A](#) presents a compilation of the interviews, which lasted approximately 1 h and were transcribed

and translated by the first author. As recommended by [Bowen \(2009\)](#), the list of documents used is presented in [Appendix B](#). Thematic coding of the documents and transcribed interviews was performed using the framework presented by [Wanzenböck et al. \(2020\)](#). The data were analysed considering the initial categories: contestation, complexity, and uncertainty. These categories were used to determine the effect on convergence and divergence of the problem–solution framing and were the starting point for considering the strategies, actions, and policies regarding biogas within the regions for the period study. This deviates from the original use of the framework by [Wanzenböck et al. \(2020\)](#), who mapped issues according to a static end-point, whereas we have used the framework to show the changes in framing throughout the period under study.

4. The Swedish context

As previously mentioned, this study considers the multilevel governance and policy movement through government bodies. In Sweden, there are three levels of government: national, regional, and local. There are elected political bodies at each level—a national parliament, 21 county councils, and 290 municipal councils. Regional government, local government, and self-government are central elements in the Swedish democratic system, and since 1862, each of the three levels has had the right to levy taxes. Thus, regions and municipalities have considerable autonomy within the boundaries and obligations the parliament decides ([SKR 2022](#)).

At the national level, the government is assisted by several ministries and governmental agencies. The ministries are responsible for governmental agencies, such as the Swedish Energy Agency (SEA) and the Swedish Environmental Protection Agency, which implement actions that parliament and government have decided. However, the government steers the agencies through budgets and directives but is not allowed to intervene in an agency's specific decisions in carrying out its duties. There is thus no direct relation of authority between government/ministry and government agency.

In Sweden, the development of biogas systems has been a part of national policies to reduce GHG emissions. This relationship is observable in the Swedish government's financial investment support schemes and demand-side subsidies for biogas ([Larsson et al. 2016](#)). On a national level, the strategy to reduce GHG emissions can be connected to the signing of the Kyoto protocol in 1997, which was brought into effect in 2005. Although not defined as a formal mission, the Swedish government embarked on a comprehensive plan to phase out reliance on oil by 2020, driven by a growing concern for global warming and a strong concern for energy security and access to fossil energy ([OPM 2006](#)). This was followed by more dedicated efforts for reductions in GHG emissions when the national goals were formed, and the Swedish government aimed to achieve net zero emissions of GHG by 2050 ([Regeringskansliet 2009](#)). This goal was later revised after recommendations from the national enquiry in 2016 ([SOU 2016](#)). Finally, the goals were brought into law with the Climate Act incorporating the goal of becoming fossil-free by 2045 in 2017. The missions for eliminating reliance on oil and becoming a fossil-free state have been the steering missions, and the subnational bodies were expected to design appropriate local strategies to reach these goals. As Sweden's electricity

production is almost exclusively based on hydro, nuclear, wind, and biomass ([IEA 2022](#)), the transport and industry sectors are the most significant users of fossil fuels and emitters of GHGs ([Swedish Environmental Protection Agency 2022](#)), and therefore, these sectors have been the focus within national and regional policies aiming for emission reductions.

Biogas production in Sweden is mainly based on sewage and organic wastes. In 2019, as much as 64 per cent of the nationally-produced biogas was upgraded to biomethane and used as a vehicle fuel ([Swedish Energy Agency 2020](#)). This is a particularly unique market arrangement as most European countries use biogas primarily to generate heat or electricity ([Dahlgren et al. 2019](#); [Lindfors et al. 2022](#)). City buses operating in public transport have been an important initial market segment, and gas-fuelled buses were initially a strategy to address the problem of bad air quality in city centres. As Sweden has no national gas grids, access to compressed natural gas is restricted. In the absence of this fuel, local biomethane production has made it possible for municipalities and public transport authorities to substitute diesel buses with gas buses ([Olsson and Falldé 2015](#)). While the initial motive for using biogas as a vehicle fuel was related to local air quality, later motives for national governmental support of increased national production of biogas are mainly related to climate policies ([SOU 2019](#)).

While Sweden has had various programmes to address climate issues, biogas as a solution has not played a significant role in these plans. It was not until 2019, when the Swedish government produced a whitepaper that outlined the socio-economic value along with the potential production and consumption limits for the country, that a comprehensive plan began to be defined. The report outlined the need for long-term financial support for biogas, which was considered in 2022 when the Swedish parliament decided that support would be given to the industry and would continue up to 2040 ([Regeringskansliet 2022](#)). Prior to this, the SEA had promoted the environmental benefits of biogas ([Swedish Energy Agency 2010](#)), and financial and policy incentives existed but have been deemed neither to be long-term enough nor to have the correct structure in order to increase national production even if the policies increased demand for biogas ([Larsson et al. 2016](#); [Lönnqvist et al. 2019](#)).

5. Kalmar region—biogas as a convergent solution to divergent problems

5.1 From waste management to NoOil

Biogas has been produced in the Kalmar region since the 1960s as part of wastewater treatment. However, with the county council's decision in 2006 to phase out fossil fuels, a new role for biogas began to form ([Region Kalmar 2020](#)). The decision was produced from a regional development context, and regional growth was a significant factor in the strategy formation. The programme received little contestation, and many of the municipalities embraced it. The primary goal was a transition away from fossil fuels by 2030, and the largest municipality (Kalmar) was the first to implement it in 2008. Locally, it was considered a brave move considering that the plans at that time from the national level were far less ambitious (*Interview: Kalmar Municipality 2020*).

The decision to embrace a fossil-free vision became the basis for multiple projects and activities between 2006 and

2010 when the programme NoOil was officially launched with the specific mandate of reaching a fossil-independent region. The project was led from the regional level. However, many activities connected to the project were required on the municipal level. The effect of the NoOil programme in terms of the biogas strategy was that it functioned as an overarching platform for activities connected to biogas promotion, including networking between private and public actors and information campaigns directed at the public. Although the project included activities to promote a range of renewable energy alternatives, the campaign is attributed as a driving force for the biogas market growth in the region (Region Kalmar 2020). In addition, we observed that the strategy NoOil experienced low levels of contestation for a range of solutions to the problem of fossil dependence, which meant that instead of creating a space for divergent solutions where separate solutions competed, the NoOil programme allowed a place for a range of different solutions to work together. A unifying comment from the respondents and the documents analysed was to clarify that no solution could solve the problem and that encouraging a range of solutions was the best way forward (Länsstyrelsen i Kalmar 2008).

As part of the phasing out of fossil fuels, the regional goals focused on the production and use of renewable fuels, stressing the importance of ensuring that actions must come from a variety of sectors and emphasising that biogas was an essential resource that the region should leverage specifically to address fossil fuels within the transport sector. A high share of emissions is due to transportation, and the national subsidies for biomethane have made solutions economically feasible, so transportation was prioritised over other potential uses of biomethane. The rationality was also justified by the low emissions from Swedish electric power generation, which meant that there were few gains for substituting existing power generation, as opposed to substituting petrol or diesel in transport.

Despite the convergence around the NoOil project, biogas in the early period under study experienced uncertainty as a market, which was often described as the *biogas puzzle*, whereby the consumption, production, availability of substrate, and the infrastructure for distribution needed to be in sync (Interview: Kalmar Läns Trafik 2020; Kalmar Municipality 2020) (Mörbylånga kommun 2016). In order to deal with this uncertainty, the regional support for biogas as a part of a fossil-free future began to emphasise the additional benefits beyond emission reductions of bioenergy, including biogas, specifically in the agricultural sector in a national enquiry (SOU 2007). The enquiry argued for biogas production as a strategy to reduce methane and nutrient leakages from manure. Thus, the framing for biogas began to become more than a part of a process for waste management or a strategy to substitute fossil fuels but was framed as a part of sustainable animal agriculture. The governmental enquiry spurred Kalmar to perform local estimations for potential biogas production, acknowledging the need for partnership between the public and private sectors to ensure realisation.

5.2 Concern for eutrophication

Once biogas was firmly established as part of the NoOil programme, the regional networks began to define a somewhat separate problem and solution narrative for biogas, presenting biogas as a potential solution to a broader range of problems.

This was partly evident through the specific biogas strategies produced by the county council in 2009, which frame biogas as a vital part of a fossil-free future and a strengthened rural development, highlighting the positive socio-economic effects biogas could bring to the region (Regionförbundet i Kalmar Län 2009). The regional biogas advocacy organisation 'Biogas South East' presented the second biogas strategy in 2014 on behalf of three neighbouring counties Kalmar, Kronoberg, and Blekinge. The strategy was formed through workshops with public and private actors active in the biogas market, followed by a remittance period with all municipalities, county councils, and affected private actors (Energikontor Sydost 2014). The county councils assumed that the high engagement in the strategy-making process would increase the likelihood of success for the recommended action (Energikontor Sydost 2014). In addition, it provided concrete actions and goals to reduce uncertainty and minimise contestation due to the high actor engagement.

Concurrently, there was an increasing concern for a separate problem regarding the acute situation of the eutrophication of the Baltic (Bossier et al. 2021; Lehmann et al. 2011). This problem was brought to light as a regional development desire was to increase the animal agriculture sector in the region while maintaining the same environmental goals and complying with legislative requirements regarding land usage. Within the region of Kalmar, a long-standing problem exists regarding the high density of animals kept for animal agriculture and the resulting nutrient leakage (Länsstyrelsen Kalmar län 2005). The problem itself was not highly contested. However, there was a high degree of wickedness regarding positioning possible solutions. The Baltic is a sea that borders nine countries, meaning that it can be considered a public good (Markowska and Zylicz 1999). Similar to other problems of a common or public good, it results in a lack of clear ownership of the problem and a high degree of uncertainty in how to deal with the problem (Karlsson et al. 2016), resulting in proposed solutions with a high degree of divergence. Dealing with the effects of eutrophication has become a key driving force in strategy formation, which is incidental to the fossil-free society mission but resulted in synergy building. A respondent noted that the widening of the problem scope enrolled a more diverse set of actors and further noted that the agricultural sector in the region has its own goals and is exposed to demands that coincide with the interests of an expanded biogas market (Interview: Kalmars Läns Traffic). Hence, the agricultural sector has become instrumental in creating a regional biogas market.

The recent approval of two new biogas plants realised through private investment and funding from the national climate programme demonstrates the change in problem-solution space when the problem becomes localised. When a new plant was proposed on the island of Öland, the municipality of Mörbylånga and local farmers were lead actors in lobbying activities. Moreover, they were active as co-ordinators to realise the plant. The financing for the prestudy was organised as part of the water governance, arguing that biogas could play a positive role in the problem of eutrophication in the Baltic Sea. However, although there were connections to water quality issues, the framing focused on the goals of replacing fossil fuels. In this case, the water quality problems resulting from animal agriculture were re-framed to fit with the fossil-free future vision. A second large-scale plant was approved in Mönsterås. This is the largest biogas

Kalmar – Problem-Solution framing from the biogas systems perspective

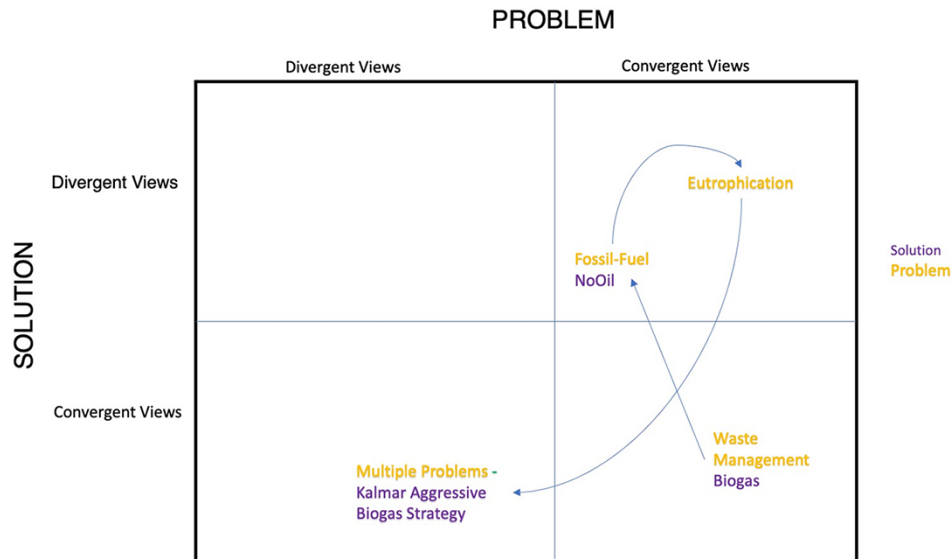


Figure 2. The solution–problem space for Kalmar’s fossil-free mission.

plant in the region for the treatment of animal manure, and it was financed in part through one of the main national funding mechanisms for the promotion of technologies leading to reduced GHG emissions. The approval decision was not directly connected to the fossil-free goals, but rather to the goals of the local farmers:

The company was formed with the aim of developing a biogas plant in the municipality, with the long-term goal of managing the manure that arises, and thus ensures that the owners’ activities can expand within the framework of society’s environmental requirements and the owners’ own environmental goals. The area has a large surplus of phosphorus and if animal husbandry is to expand, manure management must be disposed of in an innovative and cost-effective way. The biogas plant is therefore seen as a necessity for an economically and ecologically sustainable growth in the area. (Mönsterås kommun 2020)

5.3 Adjusting to multiple problems

The pathway shown in Fig. 2 can be considered slightly linear for Kalmar in the respect that key programmes, starting with the NoOil campaign, gained momentum with low contestation involving a range of actors from the public and private sectors seeking solutions to the problem of fossil fuel emissions. Additional convergence around biogas as a solution appeared when the more local problems of eutrophication began to become more acute, resulting in the public sector pursuing an aggressive strategy in favour of biogas. This convergence for the solution appeared even though the problem space became more divergent as it grew in scope. The low levels of contestation for biogas and the strong narrative that it was a solution that could address more than one problem significantly influenced the acceptance of a vital procurement decision for public transport in 2016 (*Interview: Kalmar Läns Trafik AB*). In the spring of 2021, the region hosted a conference, ‘The Biogas Goldrush’, which captured the momentum

of the biogas development and highlighted the biogas advocacy’s success. The county council had aimed for 300 GWh of production by 2030, and when the two newest plants are operating, the region will be producing near this goal at 245 GWh (Region Kalmar 2020), resulting in Kalmar being the region in this study, which has come closest to fulfilling its goals. As the fossil-free mission and the goals of biogas market creation were so tightly linked to regional development and the local context, the transition to fossil-free was not simply finding alternatives to fossil fuels. The additional problems could be argued to increase the problem divergence in the case of Kalmar. However, it also resulted in a convergence around biogas as a solution by reducing the contestation and enrolling new actors in the mission.

6. Jönköping region: a convergent solution to a convergent problem

6.1 Biogas as sustainable waste management

In the Jönköping region, the 2009 energy and climate strategy for the largest municipality framed the problem of climate change as a global problem and one which they were obliged to address through a range of EU and national goals. The problem, when broken down to a local level, was focused on the use of energy where the transport sector was noted to be central due to the region being a central transport hub (Jönköpings kommun 2009). At this point, biogas production was strongly connected to wastewater treatment and organic waste processing, a perspective that remained throughout the period under study, whereby goals for biogas production were tightly linked to goals and strategies in this area. Sweden has a high level of organic waste separation, and the connection between municipal organic wastes as a problem and biogas as a solution has been relatively uncontested in the region. In 2009, the region’s largest biogas plant in Jönköping was publicly owned, with public transport buses consuming a significant portion of the produced biomethane. The respondents

indicated that further market expansion was restricted only by the lack of infrastructure in the region's rural areas.

6.2 Biogas' role in a plus energy region

In 2010, the county council's climate and energy strategy presented a vision of a plus energy region. The strategy focused less on the problem or grand challenge faced and instead of how the environmental crisis could present opportunities for green growth within the region. The strategies placed significant attention on utilising the regional profile as an entrepreneurial region along with its geographic position along one of Sweden's busiest transport hubs to create a 'climate-smart' region. With a strong belief in the region's heritage of nurturing successful small- and medium-sized enterprises along with favourable conditions to produce renewables and possibilities to use forestry as a carbon sink, the county council laid out a plan for becoming a net exporter of renewable energy by 2050 ([Länsstyrelsen i Jönköpings län 2010](#)). Although the strategy encompassed all energy areas under the county administration's remit, a particular note was made to the transport sector, which was deemed a sector with significant potential to contribute to attaining the objective. This deviation in focus from the initial objective of becoming fossil-free to the expanded objective of producing an excess of local energy meant an increased consensus as more actors were engaged, but it remained unclear how the objective could be achieved. In terms of biogas as a solution, being an energy source that could be produced locally, it was envisioned to make a small yet important contribution to the net-plus energy strategy.

6.3 Convergence through biogas agreements

Although there was low contestation on the regional and county levels regarding the role that biogas could play in more sustainable waste management, the role the public actors should possess in this transition was contested when in 2014, controversy over the public ownership and economic viability of the primary biogas plants became problematic and led to questioning of the expansion of the local biogas market. In addition, refuelling stations were still lacking in rural areas. While prominent private actors such as E.On and FordonsGas had established distribution infrastructure in the highly-trafficked areas, finding profitable business models for distribution in rural areas proved difficult. It was then in 2014 that Jönköping created its first biogas strategy. This initiated a period when biogas received increased political attention and was strengthened by regional-level commissioned studies that considered biogas's socio-economic value beyond GHG reductions, which led to the framing of biogas as more than a renewable energy source. However, this did not result in any significant growth in biogas production despite the importance of the plus net renewable energy region plans. Addressing the markets' stagnation, the region's energy office determined that the lack of a common biogas strategy for all levels of government throughout the region was partly to blame. The result of this conclusion was the development of a biogas agreement between the regional and municipalities. The biogas agreement ([Region Jönköpings län 2018](#)) intended to coordinate actions concerning procurement, infrastructure, and policy from multiple levels and provide synergies between the different municipalities in the region. In 2021, the county council reported that the agreement had begun to produce

results, with more municipalities having established fuel stations for biomethane and increased use of biogas in public transport ([Region Jönköping 2021](#)).

The focus on emissions and becoming a net-plus exporter of renewable energy strategy was seen to detract, especially in the early years of this study, from the variety of additional problems that have otherwise been associated with biogas as a solution, as expressed by two of the respondents.

Biogas is not the most important part, the circularity is the most important, and the recycling of nutrients ... and this is not prioritised enough, it is not a known fact with politicians either. (*Interview: Energy Office Northern Småland*)

We have a lot of forest in Jönköping and a lot of milk and meat production in the country. Then, there is all the waste that can be used for biogas and then the production of fertilisers, which becomes circular for the farming sector. I would say this is the biggest value we have from biogas. (*Interview: Jönköping County*)

Although the strategy of the county administration emphasised growth opportunities rather than solving problems, this was not observed at the local level. In the municipalities, various problems were emphasised and clearly connected to justifications for action. In one of the periphery municipalities, which hosts the region's second-largest biogas plant, the problem of climate change as being the greatest crisis of today is very clear with the municipality announcing ambitions to be a leader in the energy transition ([Sävsjö Kommun 2012](#)).

With transportation still at the forefront of its policy, increasing the divergence of the solution space, the Jönköping region energy office launched a dedicated project in 2018 with the intention to promote and communicate the importance of all renewable options for transport. Its mandate was to 'work for a variety of renewable and non-fossil fuel and charging alternatives' ([Energi Kontor Norra Småland 2021](#)), equally promoting all alternative transport fuels: electrical, hydrogen, biomethane, ethanol, and biodiesel. The focus on transport remained in line with the region's focus on fossil-free and emission reductions as opposed to a separate narrative for biogas. However, it also showed a deviation where the focus was not solely on producing renewables but also on encouraging the use of imported renewable fuels.

With only two larger biogas plants, the limited scope and ambition for biogas in the Jönköping region reduced the complexity of biogas as a solution and lowered the basis for contestation. However, it also limited the basis for support of biogas investments. [Fig. 3](#) highlights how events and framings occupied different problem-solution spaces regarding the degree of convergence and divergence. With waste management being a central part of the initial framing for biogas, it allowed the public sector to make initial investments in production and procurement. However, as the later mission for a fossil-free state was answered with a call for creating a plus energy region, biogas as a solution began to become a part of a more divergent solution space in terms of uncertainty and complexity, even if there still exist low levels of contestation surrounding these strategies. However, broad strategies to promote the production of renewables and the use of renewable energy in transport have not been sufficient for reaching the region's goals in biogas production.

Jönköping – Problem-Solution framing from the biogas systems perspective

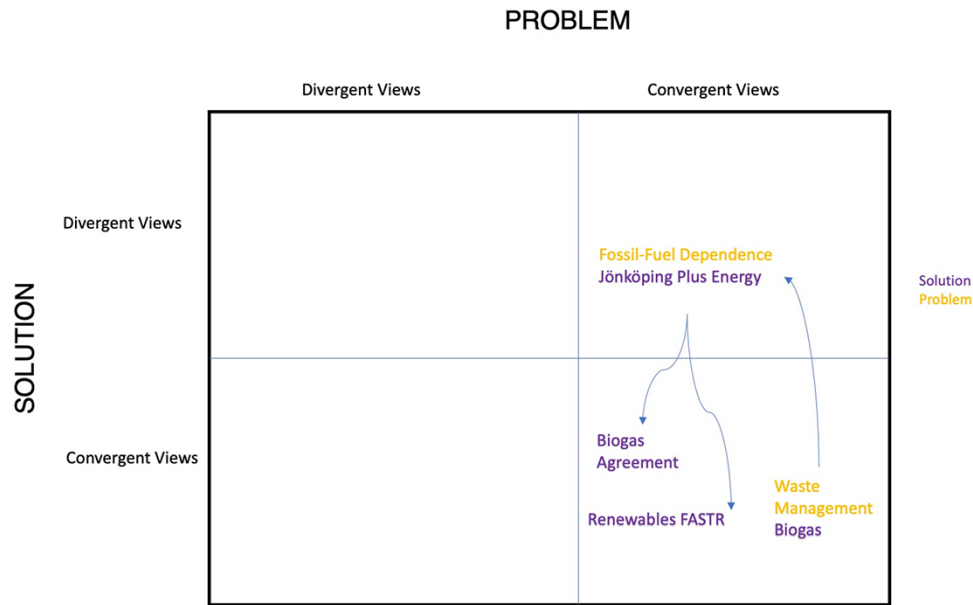


Figure 3. The solution–problem space for Jönköping’s fossil-free mission.

7. Gotland region – divergent problems with divergent solutions

7.1 A sustainable island

For Gotland, the journey to a specific goal of a fossil-free region began as a futuristic vision containing complex problems with uncertain solutions. The vision for Gotland was a holistic approach where a reduction in emissions represented part of a broader change in the relationship with the local environment and its resources. This resulted in a high degree of wickedness of the problem as it left room for vagueness and disputes as to how it should be accomplished. As early as 1996, the island declared that by 2025, it should be an ‘ecologically sustainable society’ and, in 2008, the goal of being climate neutral in 2025 was set even if the definition of what it meant was not clear (*Länsstyrelsen i Gotland 2011*). However, despite a portrayal of an island in harmony with nature, the per capita CO₂ emissions were, and still are, considerably higher than the average for Sweden. Moreover, Gotland was the only region in Sweden to increase its emissions between 1990 and 2015 (*Swedish Energy Agency 2019*). A narrower vision towards a fossil-free future came first when the state tasked all county councils to provide a strategy to align with the national goals of net zero emissions by 2050 (*Länsstyrelsen i Gotlands län 2012*).

Despite the vagueness of the overall vision, which contributed to the complexity, specific strategies for biogas were advocated, and biogas as a solution to rising emissions was promoted in the first biogas strategy in 2009. The strategy framed the central problem clearly as an urgent need for the transformation of energy usage due to the looming climate crisis.

7.2 Local renewables, circularity, and waste management?

The picture of a unifying action around rising emissions found in the biogas strategy was only part of the discourse. When the

first biogas strategy was formed in 2009, the ability to handle organic waste and facilitate nutrient recirculation on the island instead of shipping the waste to the mainland was also a pressing issue, which meant that an effective waste management policy was a prioritised issue. Thus, the synergies of producing biogas came naturally and could justify public funding for production and consumption. Biogas was framed as an ideal means to improve the circulation of resources on the island, a concept promoted for some time on Gotland (*Interview: Region Gotland 1*).

The existence of one clear and uncontested problem, such as climate change, was not a sufficient justification for biogas, and other framings of the problem were strengthened as additional arguments in the second biogas strategy were presented. In 2014, the county council produced an updated biogas strategy, and the focus on transport as the primary role for biogas remained (*Region Gotland 2014*) despite being a local dairy company that consumed the most significant portion of the gas in its industrial processes. The focus on transport was a part of the legitimising process for the upcoming procurement decisions for the public transport system, where biogas would play a prominent role. Still, the emphasis on transport included various activities aimed at convincing private consumers to invest in cars that could use biomethane as a concrete step where individual citizens could engage in the process towards an emission-free island. The social and geographical conditions of the island and the portrayal of biogas as the best solution for private and public transport made it precisely so.

Biogas is the best solution from an environmental perspective, the best we have today. And it is important to say that means the best, which is available to us here on Gotland. (*Interview: Region Gotland 1*)

Once the county council had chosen biogas as a priority fuel, it highlighted various problems that biogas could help

Gotland – Problem-Solution framing from the biogas systems perspective

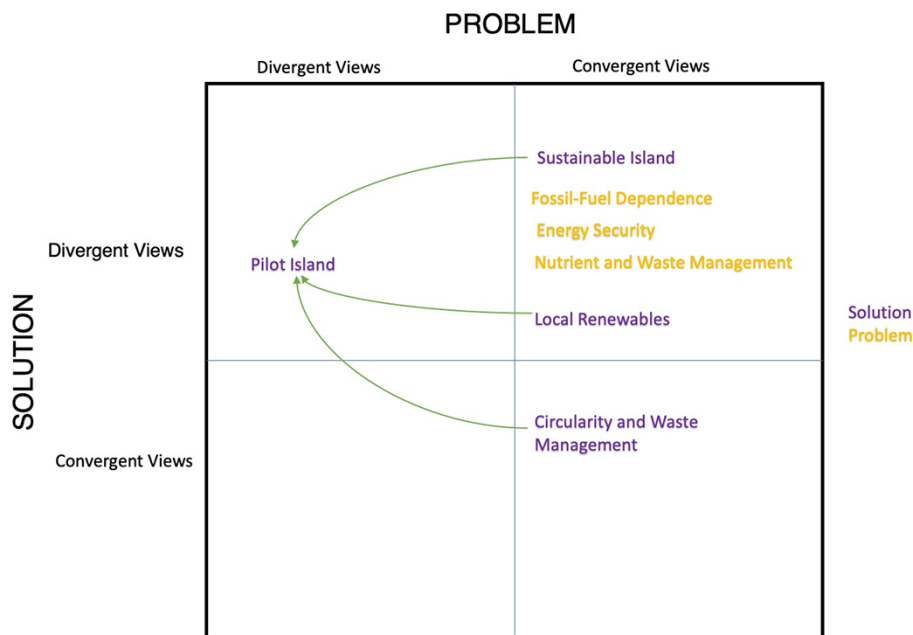


Figure 4. The solution–problem space for Gotland’s fossil-free mission.

solve to strengthen the decision. For Gotland, one of the strongest arguments concerned the role biogas could play in improving energy security and the local supply of renewable energy on the island. Energy security was considered such a crucial long-term goal that importing biogas for a limited period was considered acceptable while the market was being established.

When Region Gotland presented its second biogas strategy document in 2014, the take-up of privately-owned cars had not been as high as was hoped, but due to the high consumption of biogas from the local dairy company, biogas production had still seen growth. In 2013, the region realised that the potential for market growth was restricted by the difficulties of attracting private consumers and the limited scope of public transport on the island. However, despite the experienced problems, the ambition did not change with the goal of producing 100 GWh by 2020 and 300 GWh by 2030.

7.3 Gotland—a pilot island

The situation changed again in 2018 when the SEA performed a prestudy on Gotland to determine the appropriateness of the island to act as a pilot region for the transformation of energy systems, and the project began in 2019. This large-scale project cemented the focus not merely on increasing fossil-free energy sources but also on emphasising energy security and producing energy for own needs with increased renewable energy production (Swedish Energy Agency 2019). In 2021, the SEA created two separate funding projects to engage small and medium businesses in projects, which would develop innovative, scalable solutions for a fossil-free transport system and a robust energy system in interactions with electricity systems on Gotland (Swedish Energy Agency 2021a). The ambition was to take the lead in transitioning to a sustainable energy system (Swedish Energy Agency 2021b). Although the use of biofuels in transport was one area of interest,

both projects’ aims prioritised innovation and connections to fossil-free systems in connection with electrification. In terms of biogas, only one actor connected to the biogas market applied for funding, and the application was rejected. The actor felt that biogas as a potential solution suffered as the focus on innovation weighed heavier than the impact in terms of energy security or emission reduction (*Interview: Private Actor Biogas Industry*).

The SEA decided that wind, solar, geothermal, and bio-fuels would be invested in through a pilot project. At the same time, the county board released their future strategy for renewable transport (*Länsstyrelsen i Gotlands län 2020*) and attempted to confine the solution space to reduce complexity, placing focus on locally-produced fuels and stressing that too much diversification can lead to a lack of the robustness of the transport system. Therefore, they argued that local electricity, hydrogen, and biogas should be prioritised. With this infrastructure plan, the problem was not framed in terms of a long-term vision of a fossil-free state. Instead, the focus was on the shorter-term goal of conforming to the national goals for reducing emissions and creating a strategy to address energy security problems and sustainable local growth.

Adding to the complexity and uncertainty of the solution space were the lengthy discussions regarding the possibility of a new electrical cable running from the island to the Swedish mainland, which would allow Gotland to produce a surplus of renewable electricity from wind, which could be sold to the mainland. However, this was seen as a complex and controversial solution and, in 2017, was no longer considered viable by the Swedish government, and the discussions ceased. These discussions led to a great deal of uncertainty for the planning of larger energy projects as actors waited for a decision on the national level.

Fig. 4 maps key points in shaping the problem–solution space for the Gotland region. Considering the dynamic nature of the problem–solution space in this case, changes could

originate from within the region and from events outside the control of the local actors, such as the situation regarding the possibility of an electric cable to the mainland. Gotland demonstrated through its biogas strategy and the regional infrastructure plan an ability to shape the problem and solution space from the bottom-up, including pressing issues in terms of nutrient and waste management, while simultaneously being in continual negotiation with national initiatives. The significant synergies of the problem framing have been between the fossil-free vision and the goal of attaining energy security. At the same time, the increased complexity and uncertainty introduced by the cable discussion hampered the growth of renewable energy production. As new actors, such as the SEA with the sustainable island pilot project, were enrolled, one could have expected this to create alignment with a converging problem and solution space. However, our analysis points to a development in another direction, as the vision of a sustainable island kept the problem–solution space broadly defined, allowing for multiple end goals. This increased both the complexity and possibility of contestation. Hence, from the perspective of biogas, this resulted in divergence, in terms of both problems and solutions. Biogas, as a local renewable energy source, was positioned as one of several competing solutions. However, in terms of the strength of the desire to achieve circularity of resources on the island, biogas has been positioned as a convergent solution with low contestation.

8. Comparative analysis

All three regions have presented visions of a future where fossil fuels no longer have a place in the local economy, but the degree to which biogas has been able to connect to these visions and secure itself as a viable solution varies. Each region has created a local energy transition narrative, which allows the problem–solution space to change and adapt to the local context. Demonstrating a ‘bottom-up’ approach (Bours et al. 2021), strategies formulated in the regions connected to missions presented by the national government on net zero emissions and the development of a fossil-free welfare state. However, these local missions had notable variations; ‘NoOil’ in Kalmar, ‘Plus Energy Region’ in Jönköping, and ‘Sustainable Island’ on Gotland show diverse translations and interactions with the emerging national missions.

When considering the strategy that each region adopted for the inclusion of biogas in the larger missions, it could be seen that in all three regions, the promotion of biogas was an effect of other goals aside from GHG emissions. Thus, it was not limited to one single mission or grand challenge. This was connected to and often motivated by the ability of biogas to play an active role in tackling multiple problems at different scales, but it can also be linked to the instance of biogas being affected by a variety of policy areas (Gustafsson and Anderberg 2021). The versatility of biogas has been studied in similar contexts (Winquist et al. 2019), and this versatility can affect the ease with which it is possible to analyse pathways for biogas as it will be following multiple pathways at any one time. The need to associate biogas with problems other than climate change may be due to the relatively small amount of energy that can be harvested from biogas, even when including input streams outside current waste streams. However, it can also be explained by considering the non-linearity of political policy-making, where the step from the identified problem to

the proposed solution and to implementation is often messy and undergoes a constant process of framing and re-framing (Clarke et al. 2015).

During the initial phase under analysis, the regions adopted a pragmatic green growth approach, whereby the national mission would result in opportunities to be leaders in renewable energy. The weighting of this parallel narrative was particularly emphasised in Jönköping’s ambition to become a net exporter of renewable energy by 2050. For Jönköping, the initial connections of biogas as a part of wastewater and municipal organic waste solutions meant that it had a firm grounding as an uncontested solution to a well-defined and uncontested problem. However, when the county council initiated a journey towards exporting biofuels, biogas became part of a broad vision of an entrepreneurial region with access to large amounts of renewable resources for production and, due to the geographic location, a considerable potential for consuming renewables. By forming the strategy around the uncontested waste management problem and having only a modest part in the convergent goal of a plus energy region, biogas could situate itself in an alignment position. This is not to say contestation was completely absent, and tensions did occur due to the lack of common strategies through the different administrative levels. As opposed to the other two regions where the solution was attached to local problems, in Jönköping, the problem was most often framed as a global problem with opportunities at the local level. By contrast, the experiences from Kalmar suggest that when successfully implemented, biogas is framed as a solution not only to a global problem but also to locally contingent problems, indicating a strong adherence to a perceived win–win situation. This narrative enrolls many actors in numerous activities that create economic value and address local sustainability issues (see Ottosson et al. 2020).

One source of divergence in a problem–solution space can be the degree of uncertainty. According to (Wanzenböck et al. 2020), this is characterised by having many solutions, be they technical or more societal, which all have potential, but there are no clear indicators of which one solution is better than any of the others. This uncertainty was observed on Gotland where the broad vision as a ‘world-leading sustainable island’, including the goal of energy security, comprised many competing technologies, while the resources to invest in and promote innovations are limited. In contrast to both Kalmar and Jönköping, Gotland did not reach convergence around biogas as a solution. The resulting divergence is reflected in the amount of funds from the national climate investment programme awarded to biogas in the region of Gotland compared to other renewable technologies, which was the lowest for the three regions. The result at the end of the period under study was not an aggressive biogas policy, as seen in Kalmar, but a continued state of disorientation existing under high-level goals.

The initial problem addressed in Kalmar, the removal of fossil fuels, is a relatively binary goal, and in theory, it would be easy to know if the goal has been achieved. However, the problem remains wicked with high complexity in that it involves a wide variety of actors, requires a broad buy-in of shared values, and relies on uncertain technological and societal developments. We can contrast this to eutrophication connected to animal agriculture, which is a problem with fewer stakeholders and where the social context of the problem is that the limited stakeholders are usually directly connected to

or are the source of the problem (Barnett et al. 2018). Adding eutrophication as a problem besides fossil fuels resulted in a more convergent solution in Kalmar. However, it is important to stress that the problems accumulated and resulted in added complexity, with biogas turning into a solution in search of the problem(s) it could address, suggesting that one solution can benefit from being associated with several problems, a scenario that mirrors the proposition that one problem should be associated with several solutions (van der Loos et al. 2020). This underlines the multidimensionality of the problem–solution space and, considering the risk of problem-shifting (Turconi et al. 2013), suggests that alignment in all relevant dimensions may not always be the ideal position for the implementation of mission-oriented policies.

In each region, significant work was performed to reduce GHG emissions and attain a fossil-free status before the official national targets. The national level provided a framework and timeline for creating strategies such as the ‘road to 2030’ or the fossil-free infrastructure planning, but as opposed to top-down mandates, these national targets were seen as something that aided and enabled existing policies and strategies. This can be considered given the translation that occurs when a top-down policy is to be adopted and implemented locally (Stone 2012). Critical policy scholars have argued that policy is never simply copied from one situation to another and local norms, culture, practice, and path dependencies will influence policy movement (Prince 2010). However, this view alone does not capture the intentional directions and agency that local and regional actors create with their policy objectives, as was seen in the regions. This is particularly relevant in Sweden, with a high level of autonomy for each governmental level. Although we can observe that shaping and redefining the problem–solution space did occur, it is important to acknowledge this with a sensitivity to the existing objectives and strategies defined.

9. Conclusions

Adding a local governance perspective to academic discussions on implementing mission-oriented policies, this paper has analysed the enactment of mission-oriented policies in three Swedish regions. The case analysis focused on biogas, a versatile system solution with strong local dependencies. The analysis showed how biogas was one of many solutions considered in the studied regions, and it also showed how biogas was promoted as a solution to a wide range of problems. While the national mission-oriented policy context was similar in the regions, translations varied depending on local preconditions. In all the regions, the implementation of biogas was anchored in the national mission to cut GHG emissions and develop a fossil-free welfare state. Moreover, national policies that subsidise biomethane as vehicle fuel provided direction for creating markets in the regions. However, the direction of the national mission was insufficient to justify local action, and the degree of success varied between the regional cases. In all regions, global problems were re-framed as local opportunities, and locally-bound problems were added to the mission. This made it possible to make a stronger case for biogas as a solution and enrol additional actors in support. Moreover, the local policymakers had to respond to emergent issues arising from national initiatives and local contingencies. Thus, the local missions became more multifaceted and dynamic than the national mission.

In Sweden, the development of a fossil-free welfare nation, born out of a concern for the climate crisis, can be considered a mission aiming for transformation, and in our case studies, we have seen how translations of this mission are linked to various local problems. On the one hand, this was a diverging process as it increased the complexity of the mission. On the other hand, the process was converging, enrolling actors in support and thus reducing the propensity for contestation. New alliances were formed as the vision of a fossil-free future was blended with urgent local problems. The addition of urgent local problems led to increasing involvement from the private sector. Although we could see a distancing from the national mission when narratives and policy motivations moved to a local level, this also facilitated local resource mobilisation. Hence, the regional biogas systems received attention and momentum, resulting in system development and progress.

Our case analysis demonstrates the usefulness of the framework outlined by Wanzenböck et al. (2020) for understanding how wickedness defines and affects the problem–solution space in local practice. Despite not witnessing an unequivocal direction from disorientation to alignment in our studied cases, the different dimensions of wickedness proved to be a suitable tool for analysing local mission-oriented pathways. Importantly, we have seen that such pathways do not necessarily move from divergence to convergence. Movements in other directions are also plausible, which does not necessarily prevent action. The analysis has shown how translation processes enact mission-oriented policies in local practice (see Clarke et al. 2015). Such processes entail local interpretations, reformulations, extensions, and new ways of framing problems and solutions. This means that rather than striving to reduce wickedness, policymakers must learn to cope with it.

The analysis pointed to the heterogeneous nature of the actors involved in the continual translation of missions. In all regions, networks, such as the regional energy offices, were essential for presenting and operationalising biogas as a solution. In contrast to vertically-integrated organisational forms, networks are particularly suitable for addressing wicked problems (Ferlie et al. 2011). These networks were regionally anchored in our cases, although some co-operation across administrative regions occurred, highlighting that regions are not simply a fixed geographical space (Allen and Cochrane 2007; Massey 2005). When co-operation between private and public actors is involved, the boundaries of geography also become less relevant. The sensitivity to place is in line with other studies, which showed the importance of local diversity to enact transformative change (Wanzenböck and Frenken 2020) and the value of a bottom-up operationalisation of policy where solutions and problems are locally anchored and built upon local conditions (Bugge et al. 2021). Our analysis contributes to these findings by highlighting the importance of local translation of national mission-oriented policies. The analysis shows how processes of translation evolve in local contexts and how this results in unique pathways in the problem–solution space. By following biogas as a specific solution in three regional cases, the analysis shows how local enactments depend on the positions that individual solutions attain in relation to legitimate problems and other proposed solutions in the local context.

With significant possibilities for local connotations, biogas may be an extreme case, which will depend on local

enactment. Moreover, as a nation, Sweden is characterised by a governance structure that provides local policymakers with a relatively strong agency, which is also reflected in our case studies. Future studies may adopt comparative case study approaches to zoom in on missions with different problems and solutions in national contexts with different governance structures. Such comparisons could provide further insights into the local enactment of mission-oriented policies.

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Data availability

The interviews have been made with consent with the stipulation that transcripts or recordings will not be published. Public documents are accessible via the references given in the paper.

Conflict of interest statement. None declared.

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Appendix A. Interviews.

Actor	Role	Date
Kalmar Municipality	Environmental Strategist	February 2020
Kalmar Läns trafik AB	Public Transport Analyst	February 2020
Region Kalmar County	Regional Development Officer	December 2020
Energy Agency for Southeast Sweden	Project Manager	December 2020
Kalmar County Administration	Environmental Strategist	Mar 2020
Biogas Consultant	Kalmar/National	October 2020
Jönköping County Administration	Environmental Strategist	April 2020
Energy Office Northern Småland	Project Manager	June 2020
Jönköping Municipality Politician	Jönköping Municipal Opposition	October 2020
Region Gotland	Eco-strategist	November 2019
Region Gotland	Project Manager Green Transport Project	November 2019
Private Actor Biogas Industry	Business Development Biogas Market	November 2021

Appendix B. Documents.

Year	Document	English (translated by authors)	Actor
2009	Biogasnät på Gotland	Biogas network on Gotland	Gotland Biogasförening
2009	Regionalt tillväxtprogram för Gotland 2008–2011	Regional growth programme for Gotland 2008–2011	Gotland Municipality
2009	Region Gotland—Vision 2025	Region Gotland—vision 2025	Gotland Municipality
2009	Biogasstrategi Gotland	Biogas strategy Gotland	Kommunstyrelsen
2010	Rapport från Gotlands Energdialog	Report from Gotlands Energdialog	SEA
2011	Energi dialog 2011 Gotland	Energy dialogue 2011 Gotland	Gotland County Council
2011	Energiläget 2010	Energy overview 2010	Region Gotland
2012	Gotlands Färdplan 2050	Gotland's roadmap 2050	Gotland County Council
2012	Klimat- och energimål för Gotland 2012–2020	Climate and energy goals for Gotland 2012–2020	Gotland County Council
2013	Region Gotland fokusområden	Region Gotland focus areas	Region Gotland
2014	Energiplan för Region Gotland Energi 2020	Energy plan for region Gotland Energi 2020	Region Gotland
2014	Gotland Biogasstrategi 2014–2019	Gotland Biogas Strategy for 2014–2019	Region Gotland
2015	Biogasbilisten: Biogas är mer än ett bilbränsle	Biogas motorist: biogas is more than a car fuel	Region Gotland
2017	Energiläget En avstämning av Gotlands klimat- och energimål	The energy situation: a progress report of Gotland's climate and energy goals	Gotland County Council
2019	Gotland Plan för arbetet med infrastruktur för elfordon och förnybara drivmedel	Gotland's plan for the work with infrastructure for electric vehicles and renewable fuels	Gotland County Council
2019	Energipilot Gotland Färdplan för att möjliggöra att Gotland blir pilot för ett hållbart energisystem	Energy pilot Gotland: roadmap to enable Gotland to become a pilot for a sustainable energy system	SEA
2019	Tillsammans mot 2030—Energi- och klimatstrategi	Together towards 2030 — energy and climate strategy	Gotland County Council
2020	Vårt Gotland 2040—Regional utvecklingsstrategi för Gotland	Our Gotland 2040 — regional development strategy for Gotland	Region Gotland
2009	Energi and Klimatprogram information	Energy and climateprogram information	Jönköping Municipality
2010	Klimat- och energistrategi Med nya klimatomål för Jönköpings län	Climate and energy strategy with new climate goals for Jönköping County	County Administration
2012	Färdplan 2050—underlagsrapport för Jönköpings län	Roadmap 2050—background report for Jönköping County	Jönköping County Administration
2015	Biogas från stallgödsel i Jönköpings län En förstudie	Biogas from manure in Jönköping County—a feasibility study	Jönköping County Administration
2016	Samhällsnyttan med biogas—en studie i Jönköpings län	The societal benefits of biogas—a study in Jönköping County	Energy Office North Småland
2017	Samverkan för biogas i Jönköpings län	Collaboration for biogas in Jönköping County	Politisk styrgrupp, Kommunalt forum
2017	Värdet av biogas: En samhällsekonomisk analys av biogasens nyttor	The value of biogas: a socio-economic analysis of the benefits of biogas	Energy Office North Småland
2018	Utvärdering av ERUF projektet Kraftsamling biogas II	Evaluation of the ERDF project 'Collaboration for biogas II'	Energy Office North Småland
2018	Överenskommelse kring biogas i Jönköpings län	Agreement for biogas in Jönköping County	Region Jönköpings
2019	Klimat- och energistrategi för Jönköpings län	Climate and energy strategy for Jönköping County	County Administration Jönköping

(continued)

Appendix B. (Continued)

Year	Document	English (translated by authors)	Actor
2019	Infrastruktur för elfordon och förnybara drivmedel	Infrastructure for electric vehicles and renewable fuels	County Administration Jönköping
2020	Stöd till energikartläggning	Aid for energy audits	County Administration Jönköping
2008	Regional klimat- och energistrategi för Kalmar län	Regional climate and energy strategy for Kalmar County	Kalmar County Administration
2009	Biogas i Kalmar Län	Biogas in Kalmar County	Region Kalmar
2010	Fossilbränslefri region nya mål och utmaningar	Fossil fuel-free region new goals and challenges	Region Kalmar
2012	Räppport färdplan 2050	Roadmap 2050 report	Kalmar County Administration
2014	2014 Biogas i Mörbylånga kommun—fungerar det?	2014 Biogas in Mörbylånga Municipality—does it work?	Mörbylånga kommun
2014	Regional strategi och handlingsplan för biogas till fordon i Blekinge, Kalmar, och Kronobergs län	Regional strategy and action plan for biogas for vehicles in Blekinge, Kalmar, and Kronoberg counties	Kalmar County Administration
2015	Regional strategi och handlingsplan för biogas till fordon i Blekinge, Kalmar, och Kronobergs län—Halvvägsutvärdering	Regional strategy and action plan for biogas for vehicles in Blekinge, Kalmar, and Kronoberg counties—halfway evaluation	Energy Office South East
2015	Mörbylånga Lokaliseringsutredning slutrapport	Mörbylånga localisation investigation final report	Mörbylånga kommun
2016	Fossilbränslefria Kalmar kommun 2030 Klimat—och energiprogram	Fossil fuel-free Kalmar Municipality 2030 climate and energy programme	Kalmar Municipality
2016	2016 Rapport Biogas Mörbylånga LOVAprojekt	2016 Rapport Biogas Mörbylånga LOVA project	Mörbylånga kommun
2019	Fossilbränslefri region—mål, strategier, och handlingsprogram	Fossil fuel-free region—goals, strategies, and action programmes	Region Kalmar
2019	Klimat- och energistrategi Kalmar län	Climate and energy strategy Kalmar County	Kalmar County Administration
2019	Fossilbränslefri-kommun-2030	Fossil industry-free municipality-2030	Kalmar Municipality
2019	KLT Kalmar Skydd av miljön—working report	KLT Kalmar protection of the environment—working report	Region Kalmar
2019	Kommun Kalmar handlingsplan-for-fossilbränslefri-kommun-2030	Municipality Kalmar action-plan-for a fossil free municipality for 2030	Kalmar Municipality
2019	Klimat- och energistrategi för Kalmar län	Climate and energy strategy for Kalmar County	Kalmar County Administration
2020	Biogasresan i Kalmar län, slutlig	The biogas journey in Kalmar County, final report	Region Kalmar