Journal of Circular Economy (2026) 4:1, 472-493
https://doi.org/10.55845/joce-2026-4114

RESEARCH ARTICLE

# A Practical Tool for Sustainable Value-Focused Decision-Making: A Case Study on Climate Actions of Municipalities from the Global North

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Received: 14. July 2025 / Accepted: 3. March 2026 / Published: 17. March 2026


## Abstract

Research has highlighted the importance of values in sustainability transitions but has not provided practical tools for incorporating them into decision-making. This paper addresses that gap by examining how municipal experts view a digital decision-support tool designed to visualise and communicate the co-benefits and values of climate actions. Through a case study methodology, the research utilises interviews with experts from four municipalities across Australia, Finland, and the United States. The study demonstrates that integrating value-focused thinking and open policy practice can lead to more transparent, inclusive, and context-specific sustainability decision-making. This approach contributes to gradual yet meaningful progress towards circular and sustainable society.

**Keywords** Value-focused Thinking · Open Policy Practice · Insight Network · Co-benefit · Decision Support Tool · Climate Action · Circular Economy

## 1. Introduction

Public demand for effective and inclusive climate action highlights a persistent value gap: despite the transformative potential of values in guiding sustainability decisions, they remain underutilized in shaping climate strategies (Bouman et al., 2024; Chan et al., 2020). This disconnect limits the inclusiveness and effectiveness of sustainability efforts, particularly because sustainability transitions are inherently multi-actor processes, where policies and decisions reflect diverse stakeholder values (Köhler et al., 2019).

Existing sustainability transition literature emphasizes the importance of integrating values into sustainability decision-making (Zolfagharian et al., 2019). Since climate actions are fundamentally value-driven, understanding what is truly valued, and what is intended to be sustained, is critical (Bouman et al., 2021; Waas et al., 2014). In the context of a just transition, this requires sensitivity to local socio-spatial, techno-economic, and political conditions (Guldmann et al., 2019; Hansen et al., 2024). Without such contextual awareness, sustainability strategies risk overlooking community priorities.

To address this complexity, **Value-Focused Thinking (VFT)** (Keeney, 1992) offers a proactive approach that begins by identifying values and translating them into clear objectives with means-ends networks. VFT has proven effective in structuring complex, value-laden decisions and fostering consensus in multi-stakeholder environments (Vieira et al., 2024). Its integration with **Open Policy Practice (OPP)** (Tuomisto et al., 2020) further enhances transparency by making values explicit throughout the decision-making process.

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OPP consists of various data structures, methods, and tools, i.e., a decision-making philosophy. The basic principles are collaboration, openness, causality, criticism, and intentionality.

One of the OPP tools used in this research is an insight network which consists of varying nodes and edges (arrows), creating understanding of causal relationships of actions and objectives.

OPP addresses what decision analysis methods such as multi-criteria analysis (MCA) does not take as self-evident, for instance openness and criticism. However, it does not rule out the possibility that methods such as MCA could be used within OPP as decision-making support. In other words, OPP and MCA support each other, but OPP can also employ other prioritization methods. (Dean, 2022; Tuomisto et al., 2020.) In this study, understanding priorities are supported with VFT and insight networks. A 2022 research paper supports VFT to be effective in qualitative value-priority-setting (Françozo & Belderrain, 2022), which applies to the values associated with climate actions (Bouman et al., 2022). Thus, the study creates opportunities to examine the sustainability of decision-making to an increasing extent.

Despite promising frameworks, practical tools remain limited. Firstly, previous applications of VFT have been inconsistent, and, secondly, existing tools often fail to provide a holistic approach, support cross-sector collaboration, or, thirdly, adapt flexibly to diverse contexts (Françozo & Belderrain, 2022; Boyd et al., 2022; Karlsson et al., 2020). This gap underscores the need for research that combines VFT and OPP to develop actionable, transparent, and collaborative decision-support methods—responding directly to calls for openness and clarity in value-based sustainability planning (Zolfagharian et al., 2019; Karlsson et al., 2020). Therefore, we posed the following questions:

1. What values emerge in expert views and how can they be categorised according to value-focused thinking?
2. What use cases do experts see for a tool based on insight networks in their work related to values?

To answer these questions, we examined the development of an insight network tool and its characteristics with VFT. The examination proceeded as follows. First we selected two circular economy-based climate actions and conducted two rounds of interviews with four climate experts from Australia, Finland, and the US to assess the insight network tool. This enables examining how the underlying values of the climate actions can be perceived through the insight networks when VFT is used as an objective structuring framework. In addition, providing insights into how values can influence decision-making. Secondly, we investigated whether OPP offers a way to implement value-focused thinking and emphasise the co-benefits of climate actions. In doing so, we build upon existing research by introducing a value categorisation and testing a robust tool for transparently incorporating values into sustainability decision-making. Moreover, we enhance OPP based on the research of Tuomisto et al., 2020 by analysing insight networks.

The paper is structured as follows. First, the literature review explores the existing research on sustainability and decision-making, with a particular focus on values and value-focused thinking and practical tools that aid in achieving sustainability goals. Next, the methodology used is described, followed by the presentation of the results. Finally, the results are thoroughly examined in the discussion and conclusions section.

# 2. Theoretical Background

The following chapter discusses first about values that are fundamental for climate actions according to previous research. Secondly structured VFT framework reasons why aligning actions with fundamental values brings benefits and improves decision-making. Finally, the chapter showcases what kind of tools have already been developed and what kind of improvements the tools need in order to enable transparent value-based decision-making.

## 2.1. Values

Values guide personal and group behaviour and judgement, as they are connected to identity. In connection with climate actions, values can be categorised into altruistic, biospheric, egoistic, and hedonic values (Dietz, 2013; Steg, 2016; Stern & Dietz, 1994). People's approach to values remains relatively stable over time, guiding decision-making (Halstead, 1996; Schwartz, 2017). According to Dietz (2013), decision-making involves facts and values. Therefore, when deciding which climate actions should be implemented underlying values should be understood too.

Altruistic values indicate care for the welfare and wellbeing of others, primarily humans. Prioritising altruistic values promotes support for climate action, as they are seen as beneficial for society as whole. Prioritising biospheric values advocates care for climate, environment and nature (Bouman et al., 2018; de Groot & Steg, 2008; Lee et al., 2022). Altruistic and biospheric values are interconnected and share similarities, as they both fall under the category of self-transcendence values (Steg et al., 2014). Self-transcendence values refer to individuals prioritising the well-being of others and the natural world (Schwartz, 1997, 2017), and they are generally associated with stronger pro-environmental beliefs and behaviours (Bouman et al., 2018; Steg et al., 2014). One thing hindering people to act on their biospheric values has been identified by Bouman et al (2020) being how individuals perceive others value nature. I.e. People think that others do not have as strong biospheric values as they themselves have. Making people aware how much others prioritise biospheric values is critical for climate actions to gain support.

Prioritising egoistic values indicates a focus on self-centered aspects as material possessions, money, status and power. Hedonic values, on the other hand, relate to seeking comfort and pleasure for oneself. Therefore, both of these values are often at odds with climate actions, as many climate actions are viewed as financial burdens or uncomfortable, requiring individuals to give up enjoyable things (Steg et al., 2014). However, climate actions are sometimes cost-effective and make sense from a financial perspective. For example, housing insulation saves heating costs and also increases comfort. It is not always the case that egoistic and hedonic values hinder the support of climate actions (Hanel et al., 2018; Ponizovskiy et al., 2019).

The challenge lies in how people prioritise certain values (Schwartz, 2017). Meaning, climate actions too have an underlying value mix behind them (Ponizovskiy et al., 2019; Stern & Dietz, 1994; Verplanken & Holland, 2002). Understanding the reasons given for climate actions to identify accepted climate actions is important for larger-scale climate change mitigation(Bouman et al., 2021; Steg, 2018). Therefore, a diverse set of values must be considered when thinking about policies to support climate action implementation (Bouman et al., 2021).

## 2.2. Sustainability Decision-Making and Value-Focused Thinking

Sustainability decision-making is fundamentally rooted in values, as choices often reflect the beliefs of stakeholders and the specific contexts in which they operate. Moreover, multi-stakeholder decision-making benefits from decentralisation, as it enhances collaboration and responsiveness at the local level (MacDonald et al., 2019). To be effective, sustainability objectives should be integrated across all levels of governance – local level being one (Waas et al., 2014). A critical component of decision-making in sustainability is the formulation of the decision problem itself – essentially determining what exactly should be sustained (Martin, 2015). However, a persistent challenge in this context is the lack of tools that are both flexible and robust enough to examine complex issues holistically, while also allowing for detailed analysis. For decision-making to be transparent and accountable, it must incorporate clear mechanisms for valuing outcomes (Martin, 2015). This raises fundamental questions: whose values should be prioritised, and who should bear the financial responsibility for enabling sustainable transitions (Kortetmäki et al., 2025)?

Value-focused thinking (VFT) offers a promising framework for addressing these challenges. Value-focused thinking has been instrumental in the local circular economy energy transition by identifying stakeholder values and aligning values to strategic objectives (Aasa et al., 2025; Mishra et al., 2022). Vieira et al. (2024) applied VFT to align actions with fundamental values within a complex organisational context. Its integration with problem-structuring methods supports consensus-building and strategic clarity in multi-stakeholder and uncertain environments(Françozo & Belderrain, 2022). Unlike the reactive nature of alternative-focused thinking, which begins by evaluating existing options, VFT starts by identifying fundamental values and translating them into actionable objectives (Keeney, 1992). This proactive approach has been successfully applied in corporate sustainability contexts, where it supports the development of meaningful goals and helps avoid greenwashing by grounding decisions in scientifically justifiable reasoning (Manninen & Huiskonen, 2019). Parnell et al. (2013) found that VFT not only facilitates the creation of new decision opportunities but also helps avoid suboptimal choices. Originally developed with climate change decision-making in mind (Keeney, 1996), VFT remains highly relevant today. By anchoring decisions in clearly defined values, it enables the development of tailored, context-sensitive solutions (Françozo & Belderrain, 2022).

Figure 1. below presents the suggested framework of VFT. The first step is to identify fundamental values. The second step is to translate these fundamental values into clear objectives, as fundamental values themselves can be quite abstract. These objectives can be called means-objectives, only important for achieving outcome that reflects the fundamental values. In this study means-objectives are the climate actions. The third step is to evaluate which objectives are more important than others. Decision-makers should constantly ask: Why is this important (WITI)? WITI-test keeps in mind how means values are connected to the fundamental values. The fourth step is to build means-ends networks that visualise how the objectives are achieved (Françozo & Belderrain, 2022).

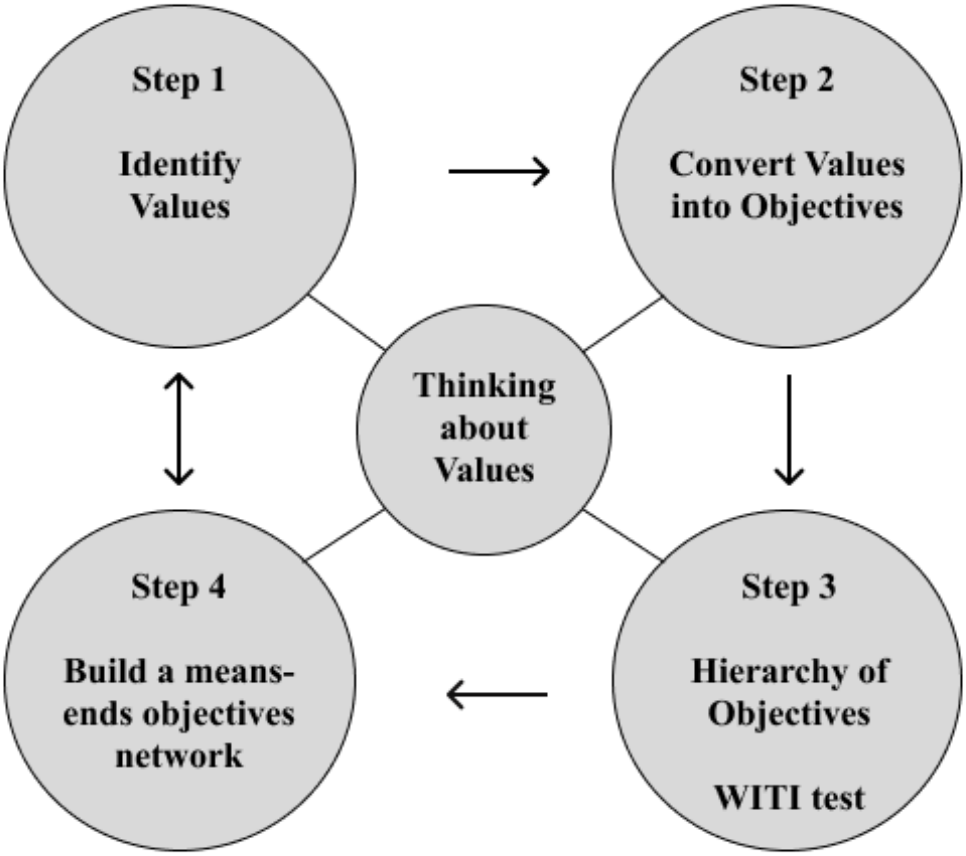


**Figure 1.** Suggested VFT framework (adapted from Françozo & Belderrain, 2022).

Selart and Johansen (2011), as well as Parnell et al. (2013), observed that VFT participants generated fewer ideas, possibly due to increased cognitive effort and motivation requirements. However, the ideas produced through VFT were rated as more innovative and creative, suggesting a trade-off between quantity and quality in the ideation process (Selart & Johansen, 2011). By focusing on higher-quality actions and ideas, VFT aids organisations in achieving strategic objectives. Clearly documenting these objectives helps stakeholders evaluate the benefit-to-effort ratio of proposed actions, aligning organisational efforts more effectively (Selart & Johansen, 2011; Keeney, 1996). Case study where multiple objectives were set by multiple actors indicated that VFT can solve problems in this context. With VFT actors were able to systematically present their thoughts with means-ends networks. Cases were water management, strategic planning for Information systems and disposal of plaster water showcasing that VFT approach can create solutions in varying domains. (Morais et al., 2013.)

VFT has been applied to sustainability decision-making in the business sector, where it provided the opportunity to implement genuine sustainable solutions rather than merely engaging in greenwashing. VFT enables the integration of a scientific perspective into decision-making, ensuring that outcomes are in line with prioritised values. This approach allows decision-makers to concentrate on sustainability issues that are more

closely aligned with an organisation and its values. (Manninen & Huiskonen, 2019.) This study is in the context of municipalities where actions should be in line with the values of political decision makers. Therefore, it is meaningful to analyse VFT in municipal climate work.

## 2.3. Co-Benefits and Tools

Co-benefits are closely linked to sustainable decision-making because they represent the additional, often unintended, positive outcomes that arise from actions aimed primarily at achieving sustainability goals. Co-benefits have been defined in various ways. For example, Gao et al., (2018) describe how emission mitigation in various sectors could lead to societal health benefits as co-benefits. On the other hand, Mayrhofer and Gupta (2016) define co-benefits as an umbrella term that covers climate-related, economic, environmental, social, political and institutional benefits. In this study, co-benefits are defined as beneficial impacts of a climate mitigation action other than emissions reduction.

Co-benefits are used in climate-related decision-making, with or without comprehensive knowledge or all the benefits, synergies, and trade-offs (Karlsson et al., 2020). Co-benefits are usually viewed as a positive side-effect of a certain measure, also referred to as a "win-win" situation. Moreover, co-benefits can also be negative or neutral (Mayrhofer & Gupta, 2016), as the perception of co-benefits depends on the values held by a particular stakeholder (Adger, 2003). Co-benefits vary across location and sectors, indicating that actions should be carefully considered in terms of how co-benefits manifest in a specific context (Qian et al. 2021). Context also plays a major role in effectiveness; therefore actions must be scientifically evaluated at a local level (Jokiaho & Vanhuyse, 2025; Ulpiani et al., 2025). In the context of the circular economy, Lampinen et al. (2025) found that decision-makers should utilize approaches specific to the local context when considering circular economy actions locally.

Climate considerations are often not the primary motivation behind climate-relevant actions; instead, it is other benefits that frequently drive decision-making. Numerous studies have emphasised the wide-ranging benefits of climate actions across various sectors (Bain et al., 2016; Cohen et al., 2021; Gao et al., 2018; Karlsson et al., 2020; Qian et al., 2021). For example, Finn and Brockway (2023) identified 86 distinct co-benefits linked to energy reduction initiatives, while Sovacool et al. (2020) catalogued 128 potential co-benefits spanning economic, environmental, social, political, and technical domains. These findings highlight that climate actions often yield broader societal gains beyond their core environmental objectives, such as emission reductions.

Researchers have increasingly emphasised the importance of flexible and transparent tools capable of comprehensively identifying and communicating the co-benefits of climate actions. There is a growing demand for digital tools that facilitate collaboration in climate action efforts (Bocken et al., 2023). At present, local decision-making often occurs within siloed departments, which hinders the effective use of existing co-benefit knowledge. Although municipalities may possess valuable insights, the lack of cross-departmental communication prevents this information from being fully utilised (Boyd et al., 2022; Cohen et al., 2021; Karlsson et al., 2020; Lah, 2025; Ulpiani et al., 2025). One way to address these challenges is to design tools that bring together relevant stakeholders, enabling understanding of all co-benefits that might otherwise remain unknown. Karlsson et al. (2020) further argue for the integration of the combined value of all relevant co-benefits into the decision-making process. Similarly, Sovacool et al. (2020) stress the importance of including socially oriented co-benefits, not just economic and environmental ones. Finn and Brockway (2023) suggest that strengthening multidisciplinary evaluation is essential to ensure that diverse perspectives and values are adequately represented in climate policy planning.

Some Finnish municipalities are using climate watches to manage their climate action work. They assign a quantitative impact to emissions, but other impacts remain qualitative in nature. (Espoo Climate Watch, 2025; Jyväskylä Environmental Watch, 2025; Kotka Climate Watch, 2025; Urjala Climate Watch, 2025). The Finnish Environment Institute (SYKE) has developed a climate action assessment tool for Finnish municipalities, but it focuses primarily on impacts on emissions, with limited consideration for economic and health impacts, leaving out a variety of social benefits from their assessment (Karhinen & Lounasheimo, 2025). These tools also do not visually highlight the different co-benefits of the actions.

While practical climate action tools have been developed, implementation at the municipal level is still at an early stage, as examples from Finnish municipalities demonstrate. These early-stage tools focus on emissions and economic impacts and are therefore not aimed at enhancing value-based decision-making

(Colona, 2023; Pignatelli et al., 2023; Vanhuyse et al., 2025). Moreover, it is important for these tools to demonstrate their tangible impact on advancing climate initiatives and enhancing the identification and realisation of co-benefits (Fox et al., 2019). In order to further accelerate the transition to sustainability, these tools must include how decisions can be made based on values (Pignatelli et al., 2023; Vranić et al., 2024).

# 3. Research Design and Methods

## 3.1. Research Setting

This study examines the effectiveness of a tool called Kausal Paths (version 2024-02), developed by Kausal Ltd. The tool aims at open collaboration and co-creation, specifically tailored to align with the principles of OPP. Kausal Paths serves as a platform for computational models and decision analysis and prioritisation. Initially developed for assessing the impacts of climate actions on emissions, the tool's functionality has since expanded to include estimation of monetary costs, savings, health benefits, and other co-benefits. It is also utilized to convey complex sustainability issues to both decision-makers and the general public. At present, Kausal Paths is actively employed in the development of climate action plans and climate city contracts (Kausal, 2025).

Kausal Paths is currently being used by more than a hundred cities in Europe, North America, and Australia. The typical use is to calculate greenhouse gas emission inventories and effects of climate action plans on emissions, costs, and health co-benefits. The typical user is a member of the sustainability team of the city, but the public user interface helps many cities communicate these topics to decision makers and the general public as well. This study is the first one where the tool has been used to explicitly describe values and priorities by using value-focused thinking and insight networks.

Open policy practice is a structured approach to decision support that enhances evidence-informed policymaking through openness, collaboration, and systematic evaluation (Tuomisto et al., 2020). It integrates scientific knowledge, multi-stakeholder input, and causal reasoning to improve policy decisions and public trust. Open policy practice has been applied in climate policy, environmental health, and urban planning, demonstrating its effectiveness. At its core, OPP operates on five principles, namely **collaboration, openness, causality, criticism, and intentionality**. These principles promote transparent, participatory, and accountable decision-making, while incorporating diverse perspectives. The method employs *insight networks*, which visualise causal relationships between policy options and outcomes. These networks help identify trade-offs, uncertainties, arguments, and stakeholder values, thereby facilitating a deeper understanding of complex policy issues. An insight network consists of *knowledge crystals,* which serve as structured repositories of continuously updated research and expert opinions, enabling accessibility and quality control.

A key feature of OPP is its participatory approach, which encourages interaction between decision-makers, researchers, and citizens. This approach fosters *shared understanding*, where different perspectives on facts, values, and disagreements are explicitly documented. Moreover, it clarifies the reasons for conflicts and exposes misinformation, while promoting rational, evidence-based discussions. Criticism is integral to OPP, and all information is subject to continuous review and challenge with a view to maintaining scientific rigour. Criticism and the other principles of open policy practice are listed in Table 1. In addition, the objectives and societal values of decision-makers are specifically mapped to ensure alignment with public priorities. In this study, values are interpreted from interviews with climate experts and presented in insight networks based on OPP (Tuomisto et al., 2020), using Kausal Paths as a tool. Insight networks enable means-ends networks in a manner similar to that proposed by the VFT approach (Françozo & Belderrain, 2022; Keeney, 1996).

**Table 1.** Principles of open policy practice (From Tuomisto et al., 2020).

| Principle | Description |
|---|---|
| Collaboration | Knowledge work is performed together with a view to producing shared information. |
| Openness | All work and information are openly available for reading and contributing to anyone interested at all times. Any exceptions must be publicly justified. |
| Causality | The focus is on understanding and describing the causal relationships between the decision options and the intended outcomes. The aim is to predict what impacts are likely to occur if a particular decision option is chosen. |
| Criticism | All information presented can be criticised based on relevance and alignment with observations. The aim is to reject ideas, hypotheses – and ultimately decision options – that do not stand up to criticism. |
| Intentionality | The decision-makers explicate their objectives and decision options under consideration. In addition, the values of other participants or stakeholders are documented and considered. |

While the steps of VFT describe practical work with a meaningful order, OPP principles are aspects that should be considered during every step of the work. However, the frameworks are closely related, as the means-ends networks follow causality, one of the OPP principles. So, these networks are similar to insight networks in OPP. In addition, intentionality is reflected in the work of identifying the objectives in VFT, and criticism is closely related to "Why is this important?" approach. Therefore, the two frameworks support each other well and both give practical guidance to the work of understanding and informing decisions.

## 3.2. Testing the Value-Based Decision-Making Tool in Municipalities' Climate Actions

The empirical part of the study was conducted as a qualitative case study. A qualitative approach was considered appropriate for exploratory study and complex phenomena (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). A multiple case study was chosen, because it can illustrate an emergent theory and allows for analyses both within and between cases (Eisenhardt & Graebner, 2007; Yin, 2009). We sampled four municipalities and two climate actions within each municipality to test the tool based on the process and theoretical reasons described below. To select the municipalities, accessibility for the collection of primary data (interviews) was taken into account. The interviewees, one from each municipality, were identified through Kausal's client network of municipalities. All the selected municipalities demonstrated a strong commitment to climate action, which was reflected in their climate action plans, declarations of climate emergencies, and the use of Kausal Platform, an online tool for collecting, prioritising, communicating, and managing climate actions. In addition, at least one climate or sustainability expert was employed, some had larger teams within each of the four municipalities. Second, municipalities were selected from different countries in order to test the tool in different cultural contexts. The selected municipalities were from Australia, Finland, and the United States, that is, from the global north. The names of the municipalities were anonymised to encourage the interviewees to express insights and values that may be politically or otherwise sensitive. The population size of the municipalities varied between 17,000 and 250,000 inhabitants. In addition at least one climate or sustainability expert was employed within each of the four municipalities. Table 2. below presents an overview of the various cases.

After extensively reviewing municipal climate action plans, municipalities were selected based on their similarities in climate actions. A total of nine municipalities were contacted, and four were accepted to take part in the study. The climate actions were selected to cover actions related to electric vehicle charging infrastructure (EVCI). In addition, actions were related to shared micro mobility systems (SMMS), namely bikes, e-bikes, and e-scooters. We link EVCI and SMMS to CE, because they operationalize CE principles (sharing, resource efficiency, life cycle extension, and system integration) while the sharing economy provides the behavioural and business model foundation for these practices. All municipalities implemented EVCI as a climate action. Municipalities 1 and 3 also had SMMS climate actions, whereas municipalities 2 and 4 did not. In addition, the climate actions were selected to incorporate a variety of conflicting values. These actions needed to be sufficiently complex and not easily justifiable. Transportation issues, such as micro mobility systems, were considered adequately complex for this examination. Furthermore, relatively similar cases were

selected in order to be able to compare their actions. Finally, we selected cases that represent the circular economy, as it is widely regarded as one of the most promising pathways towards achieving sustainability. In urban contexts, the circular economy is often regarded as a technological solution to environmental and economic challenges. While social dimensions are increasingly acknowledged, they still receive considerably less attention than ecological and economic aspects (Calisto Friant et al., 2023). As a result, social considerations, including value-based perspectives, remain underrepresented in many decision-making processes related to the circular economy (Temesgen et al., 2021; Vanhuyse et al., 2021). Existing research on decision-making in the circular economy has focused primarily on identifying which material and resource flows should be closed to ensure environmental and economic sustainability (Torkayesh et al., 2022). However, this emphasis often overlooks the broader social implications and the value-laden nature of sustainability transitions.

**Table 2.** Interviews and basic information.

| Code name | Climate plans | Role | Date | Length (minutes) | Has the action EVCI | Has the action SMMS |
|---|---|---|---|---|---|---|
| Municipality 1 | Climate action, resilience, sustainability | Sustainability coordinator | 14.12.2023 & 21.2.2024 | 53 & 50 | Yes | Yes |
| Municipality 2 | Climate action plan | Climate expert | 19.12.2023 & 16.2.2024. | 44 & 60 | Yes | No |
| Municipality 3 | Biodiversity and climate action plans | Head of climate policy development | 5.1.2024 & 26.2.2024 | 34 & 53 | Yes | Yes |
| Municipality 4 | Climate action plan | Environment and sustainability coordinator | 31.1.2024 & 4.3.2024 | 45 & 35 | Yes | No |

## 3.3. Data Collection

We conducted semi-structured interviews with one local climate expert in each municipality studied. They were selected because they were familiar with the background of the selected climate actions. They were not asked to speak on behalf of the municipality's political decision-makers, but to express their own understanding of what the municipality prioritised and what it did not when deciding the climate action. There were two rounds of interviews, which were recorded on Teams and transcribed. Each participant received an information letter before the interview and consent was asked from the municipalities if required. Also, before each interview started the rights of the interviewee were explained. The transcribed material with timestamps amounted to a total of 77 pages in the first round and 143 pages in the second round. In the first round, the interview protocol asked specifically about the benefits and drawbacks linked with a particular climate action and their prioritisation, without asking directly about values. Based on the first round insight networks were created. In the second round, the interviewees assessed the insight network based on values. In the second round of interviews, we spent between 7 and 15 minutes before each interview introducing what the decision-making tool was, how it was constructed, and what content was produced, based on the first round of interviews (See table 3.).

**Table 3.** Summaries of the first round interviews.

| Code name | Summary |
|---|---|
| **Municipality 1** | One of the goals of this action is to shift modes away from the single occupancy vehicles. SMMS make the city more accessible to those without cars. Municipality 1 hired a consultant who found out that shared micro mobility is one of the best practices and their internal transportation planner is an expert in the subject.<br>Municipality 1 thinks that building charging infrastructure may not be the use of the funds or the most effective but it is monitored to see if they should change their opinion in years to come. Municipality does not own gas stations therefore why would municipality own charging points. Instead, setting policies allows private companies to meet the demand in the market and achieve municipality's goals. Improving air quality and reducing greenhouse gas emissions are both equally important priorities for the municipality. |
| **Municipality 2** | High-quality and sustainable transportation options drive the municipality's actions (such as SMMS)which means raising the service level of the municipality. This also reduces emissions from transportation. Health benefits and reduced car trips are seen as co-benefits for this action.<br>The law requires municipalities to offer EV charging infrastructure. Also financial benefits for municipalities. Charging points reduce emissions when people swift from petrol cars to EVs. Municipality sees charging infrastructure as basic service. |
| **Municipality 3** | SMMS changes behavior to sustainable mobility and reduces car driven trips. Reduced emissions are not seen as a major factor for this action in municipality 3.<br>The law requires municipalities to offer EV charging infrastructure.The municipality 3 does not believe that the charging infrastructure for electric cars would significantly reduce emissions. |
| **Municipality 4** | Electrifying short trips do not reduce transportation emissions as much as electrifying longer trips. Costs are too high and it is difficult to get third parties to get involved. SMMS does not attract tourists to the area.<br>Demand for the public charging points came from local NGOs and the state government funded the first charging point. Local government supports third parties to build charging infrastructure via policies and state government funding makes building charging infrastructure profitable for third parties. Tourism is an important line of business for the area and if municipality 4 does not have EV charging points they will choose another place to visit. |

For this study, a single shared Kausal Paths model was developed for all municipalities from scratch, based entirely on the first round of interview materials. The nodes in the model were given values that reflected the order of magnitude of the typical variables in cities. These values were used to illustrate the logic of the causal descriptions from actions to outcomes. The differences between cities were described as differences in key variables, notably utility weights. For example, if a city wanted to have a shared micromobility system, the utility weights were set in a way that a cost-efficiency analysis produced a recommendation to build it; in contrast, if a city did not want the system, utility weights were set in a way that a cost-benefit analysis recommended to not build it. The point of the exercise was to find values that would reproduce the reasoning of each city, not to elicit actual values from the interviewees. Uncertainties were not explicitly considered. The logic of each model was verified from the interviewee during the second interview.

## 3.4. Data Analysis

The analysis of the data proceeded as follows. First, we created extensive summaries of the climate actions, based on the interviews, to build a rich understanding of the climate actions and their impacts. In addition, categories of values were identified (see Table 4). We used the summaries to visually describe the causal chains from actions to outcomes into a semi-quantitative model. In practice, we used meaningful units and quantities to describe the variables in the insight network, but the numeric values were merely illustrations of possible amounts. In addition, the value judgements were operationalised as numeric weights that were assigned to different outcomes. The numeric weights were numbers that produced the same prioritisation as an expert had described for their city. This made it possible to visualise and explain the priorities of a city within the tool, as well as compare the differences between cities. Third, after the second interviews discussing the visualisations, content analysis was conducted on how the interviewees agreed or disagreed with the opinions of other climate

coordinators – that is, whether they agreed with what co-benefits were visualised and how the causal connections were expressed with the insight networks.

The value analysis method allows the researcher to examine the underlying values in the data (Wæraas, 2022). For the second round of data analysis, this study employed abductive content analysis. Here, the researchers familiarised themselves with the theory to gain an understanding of the underlying empirical phenomenon. Coding was conducted based on the data, and the thematization of the codes was assessed with the theory.

**Table 4.** Value analysis coding scheme with examples of how the values were expressed in the interviews.

| Main theme | Subtheme | Code | Interview citation example |
|---|---|---|---|
| Altruistic | Security — personal | Personal Safety | "I think if someone is able to have closer access to their home so that they're not walking alone at night – that can improve personal safety. Maybe there are no sidewalks in their area. So, reducing having to walk in unsafe locations via micro mobility might be useful." |
| | Benevolence — caring | Welfare of people | "The increase in EVs in the city not only affects air quality but also has an impact on noise. It is eagerly anticipated here – like the rising moon – in the hope that it will address noise challenges through the proliferation of EVs." |
| Biospheric | Universal — nature | Environmental impact | "Reducing GHG emissions and improving local air quality are both benefits of the action. I wouldn't say any one aspect should be prioritised over the other." |
| Egoistic | Power — resources | Economic implications | "Tourism is a big industry in [the municipality]. We have towns that are visited by large numbers of tourists at different times of the year. Undoubtedly, there is a part of the market where tourists are driving EVs. So, if we don't have EV infrastructure, and we're not supporting and facilitating it, they will somewhere else. And this has flow-on effects for our businesses and our community." |
| Hedonistic | Certainty | Relief of anxiety | "In [our country] range anxieties are a real thing. We have long distances between our cities and towns, and I think if you've got an EV in one of our cities, you're pretty well looked after. You don't have to go too far to find a public EV charger. But one of the challenges at the moment is to extend the network into our regional and rural areas" |

# 4. Findings

The interviews with municipal climate experts yielded empirical findings, particularly regarding the SMMS and EVCI climate actions. All cases included EVCI as a climate action, while SMMS was implemented only in municipalities 1 and 3. These findings offer insights into which values are reflected with co-benefits and how experts perceive the insight network in their respective contexts.

## 4.1. Values

Values were implicitly analysed from the data, and this analysis is supported by citations from the interview data. The results revealed four fundamental values related to climate actions, and decision-making can also be tied to these values. However, it was not possible to determine the exact hierarchy of each value in decision-making based exclusively on the interviews. Some rough inferences were made based on the status of the actions: if a city had decided to not implement an action, we concluded that the costs or risks outweighed the benefits perceived by the municipal decision makers. These inferences were used in summarising the results for the cities.

Altruistic values are reflected in SMMS actions by ensuring that transportation options are accessible to individuals across all socio-economic groups, particularly those in lower income brackets, such as students in municipality 3. This inclusivity promotes social equity and supports the broader goal of sustainable urban

mobility. In addition, measures aimed at enhancing pedestrian safety and reducing noise pollution can also be seen as altruistic, as they prioritise the well-being of people over the convenience of cars. These actions demonstrate a commitment to collective welfare, which is a core principle of value-based decision-making in sustainable systems (see Table 4: Altruistic).

Biospheric values are reflected in multiple ways through two actions. First and foremost, the reduction of emissions is clearly in alignment with biospheric values. Actions aimed at mitigating emissions include transitioning to more sustainable forms of transportation. In addition, it was thought that actions could change people's behaviour. However, experts have raised concerns that EVCI may be unsustainable if the electricity comes from fossil fuels, potentially still encouraging car use and posing issues with battery material sustainability. Third, limiting the risk of environmental hazard also reflects biospheric values, as less fossil fuel transportation would lead to a reduced risk of petroleum leaks (see Table 4: Biospheric).

On the other hand, egoistic values suffer, as implementing these actions costs money. However, this issue is being managed by developing policies or allowing companies to implement these actions, thus reducing the cost of operation for the municipality. Electric vehicle charging infrastructure is now included in building codes and companies are permitted to offer SMMS. This way the costs are delegated to the companies that would implement actions. The egoistic value is reflected when people have more transportation options to choose from, giving the public more freedom.

The expert from municipality 4 stated that implementing EV charging infrastructure could boost the local economy by attracting tourists, linking these monetary benefits to egoistic values:

*Tourism is a big industry in [municipality 4]. We have towns that are visited by high numbers of tourists at different times of the year. Undoubtedly, there is a part of the market where we have tourists that drive EVs. So, if we don't have EV infrastructure, and we don't support or facilitate it, they will go somewhere else. And that has flow-on effects for our businesses and our community. So yes, there are definitely financial and other benefits as well. (Municipality 4)*

Hedonistic values were reflected in relieving range anxiety for people who have EVs. Providing EVCI promises certainty for this stakeholder group (see Table 4: Hedonistic).

In summary, all four values were reflected in varying ways in each municipality, suggesting that actions should be considered based on the context. Table 5. Showcases which actions are connected to the objectives in the insight network and fundamental values as well as which municipality gave this reasoning.

**Table 5.** How climate actions connect to the fundamental values.

| Fundamental value | Objective in the insight network | Climate action | Municipality |
|---|---|---|---|
| **Altruistic** | Air quality | EVCI, SMMS | 1, 2, |
| | Service level | SMMS | 3 |
| | Health | SMMS | 2, 3, 4 |
| **Biospheric** | Emissions | EVCI, SMMS | 1, 2, 3, 4 |
| **Egoistic** | Accessibility | EVCI, SMMS | 1, 2, 3, 4 |
| | Economic outcome | EVCI, SMMS | 1, 2, 3, 4 |
| | Energy company profit | EVCI | 3 |
| | Duty | EVCI | 2, 3 |
| | Jobs | EVCI | 2 |
| **Hedonic** | Urban coziness | EVCI, SMMS | 1, 2, 3, 4 |

## 4.2. Insight Network for Decision-Making

According to the experts, the insight networks that were created (see Figure 2 and Table 6) improved communication and visualised co-benefits effectively. Due to the varying systems in which municipalities operated, some co-benefits had to be further explained by the interviewee.

In addition, experts noted that visualization supported communication and helped involve relevant stakeholders in discussions about how actions affect goals. They described it primarily as a tool for experts rather than decision-makers, emphasizing its usefulness for assessing which actions align with decision-makers' values:

*In my opinion, this would be a very useful tool. I immediately thought that perhaps it could even be used to describe ecosystem services and the formation of their values. And maybe even to find the routes we are interested in. (Municipality 3)*

*It would be useful in conversations, for sure. It visually reflects the complexity behind each of the actions as well. (Municipality 4)*

As the insight networks reveal all the benefits of each action, comparing them becomes easier. This was perceived as a beneficial feature, as it could help identify the most cost-effective actions. However, experts noted the importance of clarifying which objectives carry the most weight. Since they work toward strategic objectives set by political decision-makers, they indicated that the tool might help achieve those goals, but clearer communication from decision-makers on what needs to be achieved was required:

*Well, we experts have longed for this opportunity. We're able to present the facts and describe the impacts and the magnitude and so forth, but the political decision-makers should be making those value choices. (Municipality 3)*

A more comprehensive examination of the tool and the networks created highlighted the fact that the aspect of safety was missing from the description. In this context, safety refers to the reduction of car-driven trips, leading to a decrease in car accidents. Two experts noted this oversight, offering slightly different reasoning based on their contexts. These comments indicate the potential to visualize co-benefits associated with certain climate actions:

*When it comes to safety, we have a lot of big focuses on [strategic vision] right now – on how we can reduce accidents involving cars and other vehicles. (Municipality 1)*

*The electrification of society does reduce this sort of handling of fuels. And that, in turn, reduces environmental risks. I imagine that electric vehicle charging points could help build a sort of image resource. (Municipality 2)*

Experts also asked some questions for clarification – for example, on how certain aspects are linked together. After hearing the explanation, they understood the reasoning, but since their own context varied, it was not seamlessly applicable to their situation.

*I think that's an interesting tie of the health benefits – that they can have economic impacts. (Municipality 1)*

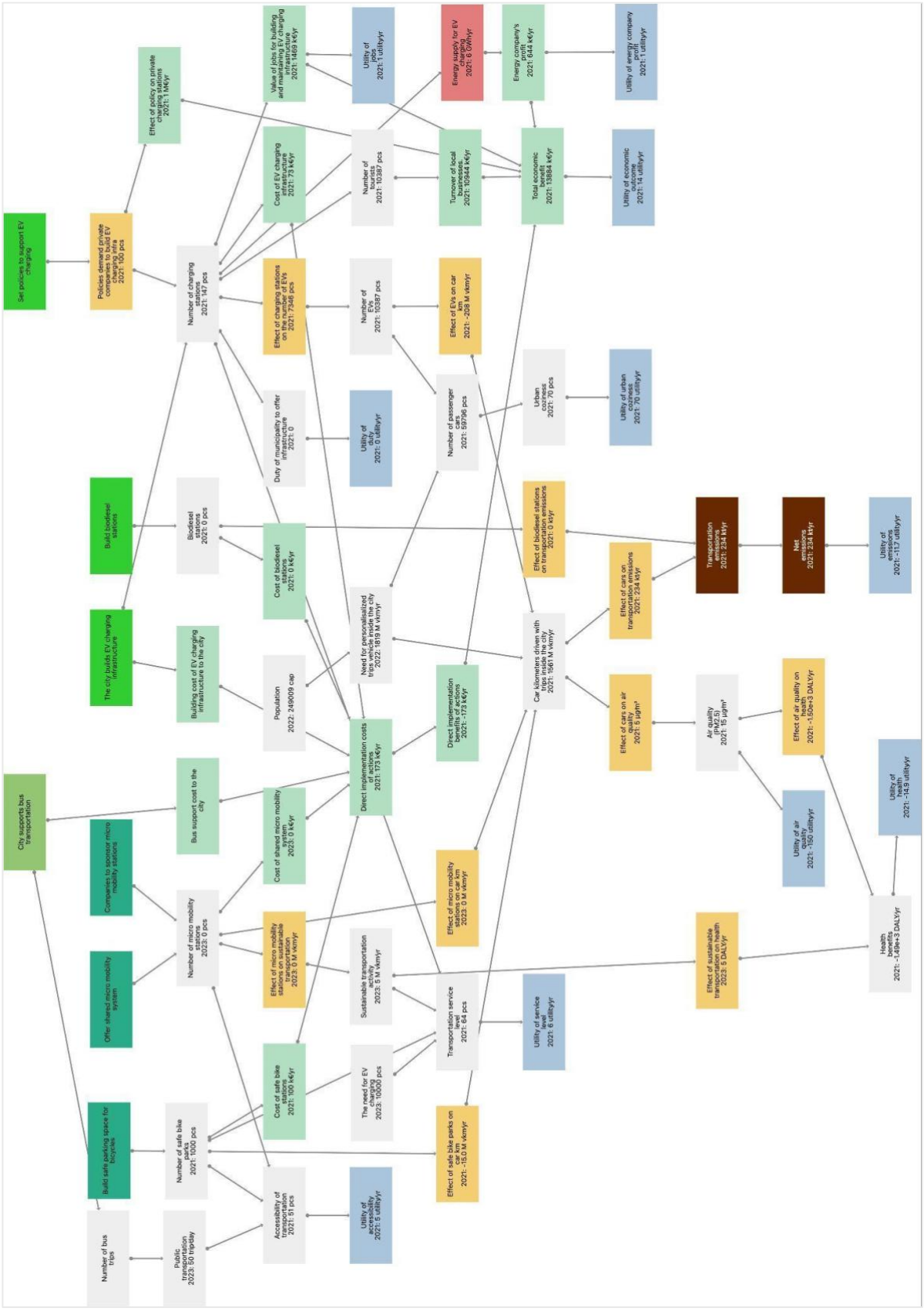


**Figure 2.** The insight network was built based on the views of city experts on the two transportation actions and related causal chains to valuable outcomes. The name and an illustrative amount are shown for each node if available. Colors: The three dark green colors represent different action types. Light green: costs. Yellow: effect of the upstream node on the downstream node. Red: energy. Blue: utility. Brown: emissions. Light gray: all other node types (See Table 6.).

**Table 6.** Node Types by colour in Figure 2.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Action node | Action node | Action node | Costs | Effect | Energy | Utility | Emissions | Other node types |

# 5. Discussion

This study aimed at answering two questions. Firstly, we asked what values emerge in expert views and how can they be categorised according to value-focused thinking? Secondly, we asked what use cases do experts see for a tool based on insight networks in their work related to values?

In response to the first question, in our study, experts' views are broadly aligned with the four fundamental value categories identified by Bouman et al. (2021): egoistic, altruistic, biospheric, and hedonic. However, interview data revealed that not all actions reflected these values equally, indicating that value alignment is context-specific and requires local evaluation. Visualizing these relationships through insight networks provided transparency and helped experts justify decisions. By mapping co-benefits and connecting actions to stakeholder values, the tool offered a practical way to assess whether climate actions reflect diverse priorities. Hence, the insight network tool supported value-focused thinking by making values explicit and linking them to climate actions. (see Bouman et al., 2024).

In response to the second research question, experts identified several use cases for the insight network tool. First, they emphasized that visualizations improve communication and transparency, supporting calls for more value-based decision-making and the inclusion of social impacts in circular economy planning (Temesgen et al., 2021; Vanhuyse et al., 2021; Calisto Friant et al., 2023). Constructing networks for each action, as suggested by the VFT approach, helped reveal co-benefits, an aspect previously highlighted by Ulpiani et al. (2025) as essential for advanced decision-support tools. Second, the tool extends this concept beyond mapping GHG emissions and air quality benefits to visualizing multiple co-benefits. Insight networks therefore offer a way to advance sustainability and circular economy transitions, particularly as cities remain in the early stages of this shift (Vanhuyse, 2024). Third, the study confirms that combining VFT (Francozo & Belderrain, 2022) with OPP (Tuomisto et al., 2020) provides a good methodological fit and flexibility across contexts in the Global North. Fourth, the study contributes to OPP research by empirically demonstrating the tool's potential benefits. For example, experts noted missing elements such as safety, suggesting that visualizing impacts helps identify overlooked issues. This aligns with Tuomisto et al., (2020) vision of collaborative learning through structured frameworks. Additionally, insight networks address departmental isolation in climate-related decision-making (Karlsson et al., 2020; Lah, 2025; Ulpiani et al., 2025). Experts indicated that involving all relevant stakeholders in creating insight networks could mitigate this challenge and enhance the use of co-benefit information. However, the tool's usability is currently limited to experts, highlighting the need for a more user-friendly design. Finally, the study's generalizability is constrained by the small number of cases and the fact that experts did not directly use the tool. Future research should examine how actual use of insight networks influences climate initiatives and explore ways to integrate preferred values more explicitly into decision-making. Future research should also examine the applicability of the tool in different contexts, including the Global South, and explore approaches for identifying local values more systematically. This could involve creating new climate actions using the VFT approach rather than only assessing existing ones, ensuring that experts do not rely on vaguely defined goals.

To summarise, this study suggests that the insight network tool effectively highlights values related to climate actions by enabling value-focused thinking, revealing co-benefits, and improving cross-departmental communication. It supports evaluating which climate actions are most beneficial in municipal contexts and contributes to understanding the social impacts of circular economy initiatives. The findings show how values can be transparently considered in decision-making and how combining Value-Focused Thinking (VFT) with Open Policy Practice (OPP) offers a practical framework for structuring complex sustainability decisions.

# 6. Conclusion

The insight network tool helps experts and decision-makers evaluate climate actions by making stakeholder values explicit, visualizing co-benefits, and improving cross-departmental communication. It is designed for use during strategic planning and policy development, when organizations such as municipalities need to prioritize actions that align with local values and sustainability goals. By combining Value-Focused Thinking (VFT) with Open Policy Practice (OPP), the tool provides a structured, transparent approach to decision-making advancing circular economy and sustainability transition. Sustainability experts could evaluate with better information which climate actions fit the strategic goals the municipalities want to achieve. Visualisation with an insight network enables comprehensive co-benefit mapping and better communication in the decision-making process. These remarks help to advance sustainability decision-making in circular economy transitions.

This study is subject to certain limitations that should be acknowledged. First, the relatively small number of participants constrains the generalizability of the findings. To enable broader inferences, future research with more cases is necessary. Second, although the cases examined were drawn from diverse geographic locations, a wider and more heterogeneous selection of cases would contribute to a more comprehensive understanding of the potential co-benefits and limitations associated with the combined methods. Such variation could be achieved by including cases from different contextual settings, both within and beyond the Global North.

Notwithstanding these limitations, the present research lays the groundwork for several promising avenues of future research. As climate action decision-making was examined retrospectively in this study, subsequent research should investigate methods, such as VFT, that facilitate value-laden decision-making from the outset. Furthermore, future studies should explore local multi-actor settings to more fully capture the values informing decision processes, given that the current investigation relied on interviews with a single informant per location. Finally, this research creates opportunities to examine the application of the OPP-VFT framework, enabling more interactive and context-sensitive forms of research.

**Acknowledgements** We want to thank Pauliina Jalonen for providing information about different tools; Annalise Mancinelli for conversations about academic language; Paul Petry and David Caicedo Sarralde for meaningful discussions about values and their connections in insight networks; and Kristina Leppälä for giving us the opportunity to present this research at the master's thesis stage during the Circular Economy Morning Coffee sessions hosted by the Research Center of Sustainable Circular Economy (CECE).

**Author Contributions** Lauri Kurkela: Conceptualisation, data collection, methodology, analysis of the data, writing original draft, editing. Jouni Tuomisto: Conceptualisation, methodology, developing the tool, editing, visualization. Kaisa Henttonen: Methodology, writing, reviewing, editing, supervision, funding acquisition.

**Funding** The work of the authors was supported by a doctoral researcher's start-up grant awarded by the University of Eastern Finland Business School (Grant ID: 68/02.04.01/2025) and the OLVI Foundation (Grant ID's: 20250420; 20251180).

**Data availability** The full insight network is available at Kausal Paths platform https://greentransition.paths.kausal.tech/en/graph. The code used to create the insight network is available at Github https://github.com/kausaltech/kausal-paths/blob/main/configs/greentransition.yaml

# Declarations

**Competing Interests** Jouni Tuomisto is in the team that develops the Kausal Paths tool at Kausal Ltd. Otherwise, the authors declare no competing interests.

**Ethics Approval and Consent to Participate** Each participant voluntarily agreed to be interviewed. Consent was asked from the municipalities that required it.

**Consent for Publication** All content was anonymised, and each participant received an information letter before the interview and before each interview started the rights of the interviewee were explained.

# References

Abildtrup, J., Jacobsen, J. B., Vedel, S. E., Mantau, U., Mavsar, R., Pettenella, D., Prokofieva, I., Schubert, F., Stenger, A., Varela, E., Vidale, E., & Thorsen, B. J. (2024). Preferences for climate change policies: The role of co-benefits. *Journal of Environmental Economics and Policy*, *13*(1), 110–128. https://doi.org/10.1080/21606544.2023.2223182

Adger, W. N. (2003). Social capital, collective action, and adaptation to climate change. *Economic Geography*, *79*(4), 387–404. https://doi.org/10.1111/j.1944-8287.2003.tb00220.x

Andre, P., Boneva, T., Chopra, F., & Falk, A. (2024). Globally representative evidence on the actual and perceived support for climate action. *Nature Climate Change*, *14*(3), 253–259. https://doi.org/10.1038/s41558-024-01925-3

Bain, P. G., Milfont, T. L., Kashima, Y., Bilewicz, M., Doron, G., Garðarsdóttir, R. B., Gouveia, V. V., Guan, Y., Johansson, L.-O., Pasquali, C., Corral-Verdugo, V., Aragones, J. I., Utsugi, A., Demarque, C., Otto, S., Park, J., Soland, M., Steg, L., González, R., … Saviolidis, N. M. (2016). Co-benefits of addressing climate change can motivate action around the world. *Nature Climate Change*, *6*(2), 154–157. https://doi.org/10.1038/nclimate2814

Bocken, N., Pinkse, J., Darnall, N., & Ritala, P. (2023). Between circular paralysis and utopia: Organizational transformations towards the circular economy. *Organization & Environment*, *36*(2), 378–382. https://doi.org/10.1177/10860266221148298

Bouman, T., Steg, L., & Dietz, T. (2024). The public demands more climate action, not less. *Climatic Change*, *177*(11), 1–8. https://doi.org/10.1007/s10584-024-03832-0

Bouman, T., Steg, L., & Kiers, H. A. L. (2018). Measuring values in environmental research: A test of an environmental portrait value questionnaire. *Frontiers in Psychology*, *9*. https://doi.org/10.3389/fpsyg.2018.00564

Bouman, T., Steg, L., & Perlaviciute, G. (2021). From values to climate action. *Current Opinion in Psychology*, *42*, 102–107. https://doi.org/10.1016/j.copsyc.2021.04.010

Boyd, D., Pathak, M., van Diemen, R., & Skea, J. (2022). Mitigation co-benefits of climate change adaptation: A case-study analysis of eight cities. *Sustainable Cities and Society*, *77*, 103563. https://doi.org/10.1016/j.scs.2021.103563

Calisto Friant, M., Reid, K., Boesler, P., Vermeulen, W. J. V., & Salomone, R. (2023). Sustainable circular cities? Analysing urban circular economy policies in Amsterdam, Glasgow, and Copenhagen. *Local Environment*, *28*(10), 1331–1369. https://doi.org/10.1080/13549839.2023.2206643

Chan, K. M. A., Boyd, D. R., Gould, R. K., Jetzkowitz, J., Liu, J., Muraca, B., Naidoo, R., Olmsted, P., Satterfield, T., Selomane, O., Singh, G. G., Sumaila, R., Ngo, H. T., Boedhihartono, A. K., Agard, J., de Aguiar, A. P. D., Armenteras, D., Balint, L., Barrington-Leigh, C., … Brondízio, E. S. (2020). Levers and leverage points for pathways to sustainability. *People and Nature*, *2*(3), 693–717. https://doi.org/10.1002/pan3.10124

Cohen, B., Cowie, A., Babiker, M., Leip, A., & Smith, P. (2021). Co-benefits and trade-offs of climate change mitigation actions and the Sustainable Development Goals. *Sustainable Production and Consumption*, *26*, 805–813. https://doi.org/10.1016/j.spc.2020.12.034

Colona, F. (2023). Climate governance by numerical data: The kaleidoscopic political space of a decarbonization dashboard. *Geoforum*, *144*, 103801. https://doi.org/10.1016/j.geoforum.2023.103801

de Groot, J. I. M., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior: How to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior*, *40*(3), 330–354. https://doi.org/10.1177/0013916506297831

Dean, M. (2022). A practical guide to multi-criteria analysis. *UCL: London, UK*, *33*, 142. https://doi.org/10.13140/RG.2.2.15007.02722

Dietz, T. (2013). Bringing values and deliberation to science communication. *Proceedings of the National Academy of Sciences*, *110*(supplement_3), 14081–14087. https://doi.org/10.1073/pnas.1212740110

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, 14(4), 532-550.

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of management journal*, 50(1), 25-32.

Espoo Climate Watch. (2025, June 9). https://ilmastovahti.espoo.fi/en

Finn, O., & Brockway, P. E. (2023). Much broader than health: Surveying the diverse co-benefits of energy demand reduction in Europe. *Energy Research & Social Science*, *95*, 102890. https://doi.org/10.1016/j.erss.2022.102890

Françozo, R. V., & Belderrain, M. C. N. (2022). A problem structuring method framework for value-focused thinking. *EURO Journal on Decision Processes*, *10*, 100014. https://doi.org/10.1016/j.ejdp.2022.100014

Gao, J., Kovats, S., Vardoulakis, S., Wilkinson, P., Woodward, A., Li, J., Gu, S., Liu, X., Wu, H., Wang, J., Song, X., Zhai, Y., Zhao, J., & Liu, Q. (2018). Public health co-benefits of greenhouse gas emissions reduction: A systematic review. *Science of the Total Environment*, *627*, 388–402. https://doi.org/10.1016/j.scitotenv.2018.01.193

Guldmann, E., Bocken, N. M. P., & Brezet, H. (2019). A design thinking framework for circular business model innovation. *Journal of Business Models*, *7*(1), Article 1. https://doi.org/10.5278/ojs.jbm.v7i1.2122

Halstead, M. (1996). Values and values education in schools. In M. Halstead, *Values in Education and Education in Values*. Routledge.

Hanel, P. H. P., Litzellachner, L. F., & Maio, G. R. (2018). An empirical comparison of human value models. *Frontiers in Psychology*, *9*. https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01643

Hansen, A. S., Manniche, J., & Larsen, K. T. (2024). Navigating sustainable transition processes at the local level: The case of Energy Island Bornholm. *Environmental Innovation and Societal Transitions*, *53*, 100930. https://doi.org/10.1016/j.eist.2024.100930

Jokiaho, J., & Vanhuyse, F. (2025). *The co-impacts of climate action in cities*. Stockholm Environment Institute. https://doi.org/10.51414/sei2025.001

*Jyväskylä Environmental Watch*. (2025, June 9). https://ymparistovahti.jyvaskyla.fi/en

Karhinen, S., & Lounasheimo, J. (2025, June 3). *Kuntien kasvihuonekaasupäästövähennysten skenaariotyökalu: ALasSken-mallin laskentaperiaatteet*. https://hiilineutraalisuomi.syke.fi/wp-content/uploads/sites/8/2025/05/ALasSken-1.1-menetelmakuvaus-1.pdf

Karlsson, M., Alfredsson, E., & Westling, N. (2020). Climate policy co-benefits: A review. *Climate Policy*, *20*(3), 292–316. https://doi.org/10.1080/14693062.2020.1724070

*Kausal*. (2025, June 30). Kausal Paths. https://kausal.tech/products/kausal-paths

Keeney, R. L. (1992). *Value-focused thinking: A path to creative decisionmaking*. Harvard University Press. http://ebookcentral.proquest.com/lib/uef-ebooks/detail.action?docID=3300726

Keeney, R. L. (1996). Value-focused thinking: Identifying decision opportunities and creating alternatives. *European Journal of Operational Research*, *92*(3), 537–549. https://doi.org/10.1016/0377-2217(96)00004-5

Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., Alkemade, F., Avelino, F., Bergek, A., Boons, F., Fünfschilling, L., Hess, D., Holtz, G., Hyysalo, S., Jenkins, K., Kivimaa, P., Martiskainen, M., McMeekin, A., Mühlemeier, M. S., … Wells, P. (2019). An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions*, *31*, 1–32. https://doi.org/10.1016/j.eist.2019.01.004

Kortetmäki, T., Oksanen, M., & Puumala, M. (2025). *Kestävyyden filosofia*. Gaudeamus.

*Kotka Climate Watch*. (2025, June 24). https://ilmastovahti.kotka.fi/fi-FI/

Lah, O. (2025). Breaking the silos: Integrated approaches to foster sustainable development and climate action. *Sustainable Earth Reviews*, *8*(1), Article 1. https://doi.org/10.1186/s42055-024-00102-w

Lampinen, M., Lehtimäki, H., & Mielonen, N. (2025). Catalyzing the circular economy: Socio-cultural and spatial trajectories in industrial ecosystems. *Circular Economy*, *2*(2). https://doi.org/10.55845/BHLO9795

Lee, J. A., Bardi, A., Gerrans, P., Sneddon, J., van Herk, H., Evers, U., & Schwartz, S. (2022). Are value–behavior relations stronger than previously thought? It depends on value importance. *European Journal of Personality*, *36*(2), 133–148. https://doi.org/10.1177/08902070211002965

MacDonald, A., Clarke, A., & Huang, L. (2019). Multi-stakeholder partnerships for sustainability: Designing decision-making processes for partnership capacity. *Journal of Business Ethics*, *160*(2), 409–426. https://doi.org/10.1007/s10551-018-3885-3

Manninen, K., & Huiskonen, J. (2019). Sustainability goal setting with a value-focused thinking approach. In A. Aagaard (Ed.), *Sustainable business models: Innovation, implementation and success* (pp. 89–118). Springer International Publishing. https://doi.org/10.1007/978-3-319-93275-0_4

Martin, L. (2015). Incorporating values into sustainability decision-making. *Journal of Cleaner Production*, *105*, 146–156. https://doi.org/10.1016/j.jclepro.2015.04.014

Mayrhofer, J. P., & Gupta, J. (2016). The science and politics of co-benefits in climate policy. *Environmental Science & Policy*, *57*, 22–30. https://doi.org/10.1016/j.envsci.2015.11.005

Mishra, R., Naik, B. K. R., Raut, R. D., & Paul, S. K. (2022). Circular economy principles in community energy initiatives through stakeholder perspectives. *Sustainable Production and Consumption*, *33*, 256–270. https://doi.org/10.1016/j.spc.2022.07.001

Morais, D. C., Alencar, L. H., Costa, A. P. C. S., & Keeney, R. L. (2013). Using value-focused thinking in Brazil. *Pesquisa Operacional*, *33*, 73–88. https://doi.org/10.1590/S0101-74382013000100005

Parnell, G. S., Hughes, D. W., Burk, R. C., Driscoll, P. J., Kucik, P. D., Morales, B. L., & Nunn, L. R. (2013). Invited review—Survey of value-focused thinking: Applications, research developments and areas for future research. *Journal of Multi-Criteria Decision Analysis*, *20*(1–2), 49–60. https://doi.org/10.1002/mcda.1483

Pignatelli, M., Torabi Moghadam, S., Genta, C., & Lombardi, P. (2023). Spatial decision support system for low-carbon sustainable cities development: An interactive storytelling dashboard for the city of Turin. *Sustainable Cities and Society*, *89*, 104310. https://doi.org/10.1016/j.scs.2022.104310

Ponizovskiy, V., Grigoryan, L., Kühnen, U., & Boehnke, K. (2019). Social construction of the value–behavior relation. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.00934

Qian, H., Xu, S., Cao, J., Ren, F., Wei, W., Meng, J., & Wu, L. (2021). Air pollution reduction and climate co-benefits in China's industries. *Nature Sustainability*, *4*(5), 417–425. https://doi.org/10.1038/s41893-020-00669-0

Schwartz, S. H. (1997). Values and culture. In S. H. Schwartz, *Motivation and Culture*. Routledge.

Schwartz, S. H. (2017). The refined theory of basic values. In S. Roccas & L. Sagiv (Eds.), *Values and behavior: Taking a cross cultural perspective* (pp. 51–72). Springer International Publishing. https://doi.org/10.1007/978-3-319-56352-7_3

Selart, M., & Johansen, S. T. (2011). Understanding the role of value-focused thinking in idea management. *Creativity and Innovation Management*, *20*(3), 196–206. https://doi.org/10.1111/j.1467-8691.2011.00602.x

Sovacool, B. K., Martiskainen, M., Hook, A., & Baker, L. (2020). Beyond cost and carbon: The multidimensional co-benefits of low carbon transitions in Europe. *Ecological Economics*, *169*, 106529. https://doi.org/10.1016/j.ecolecon.2019.106529

Steg, L. (2016). Values, norms, and intrinsic motivation to act proenvironmentally. *Annual Review of Environment and Resources*, *41*(1), 277–292. https://doi.org/10.1146/annurev-environ-110615-085947

Steg, L. (2018). Limiting climate change requires research on climate action. *Nature Climate Change*, *8*(9), Article 9. https://doi.org/10.1038/s41558-018-0269-8

Steg, L., Perlaviciute, G., van der Werff, E., & Lurvink, J. (2014). The significance of hedonic values for environmentally relevant attitudes, preferences, and actions. *Environment and Behavior*, *46*(2), 163–192. https://doi.org/10.1177/0013916512454730

Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, *50*(3), 65–84. https://doi.org/10.1111/j.1540-4560.1994.tb02420.x

Temesgen, A., Storsletten, V., & Jakobsen, O. (2021). Circular economy – Reducing symptoms or radical change? *Philosophy of Management*, *20*(1), 37–56. https://doi.org/10.1007/s40926-019-00112-1

Torkayesh, A. E., Rajaeifar, M. A., Rostom, M., Malmir, B., Yazdani, M., Suh, S., & Heidrich, O. (2022). Integrating life cycle assessment and multi criteria decision making for sustainable waste management: Key issues and recommendations for future studies. *Renewable and Sustainable Energy Reviews*, *168*, 112819. https://doi.org/10.1016/j.rser.2022.112819

Tuomisto, J. T., Pohjola, M. V., & Rintala, T. J. (2020). From insight network to open policy practice: practical experiences. *Health research policy and systems*, *18*(1), 36. https://doi.org/10.1186/s12961-020-00547-3

Ulpiani, G., Pisoni, E., Bastos, J., Monforti-Ferrario, F., & Vetters, N. (2025). Are cities ready to synergise climate neutrality and air quality efforts? *Sustainable Cities and Society*, *118*, 106059. https://doi.org/10.1016/j.scs.2024.106059

*Urjala Climate Watch*. (2025, June 24). *Urjalan ilmastovahti*. https://ilmastovahti.urjala.fi

Vanhuyse, F. (2024). The Urban Circularity Assessment Framework (UCAF): A framework for planning, monitoring, evaluation, and learning from CE transitions in cities. *Circular Economy and Sustainability*, *4*(2), 1069–1092. https://doi.org/10.1007/s43615-023-00314-w

Vanhuyse, F., Fejzić, E., Ddiba, D., & Henrysson, M. (2021). The lack of social impact considerations in transitioning towards urban circular economies: A scoping review. *Sustainable Cities and Society*, *75*, 103394. https://doi.org/10.1016/j.scs.2021.103394

Vanhuyse, F., Murray, S., Gugu, S., & Rendle, N. (2025). *The NetZeroCities Economic European Model: An overview of the NetZeroPlanner by Deliverable D1.6*.

Verplanken, B., & Holland, R. W. (2002). Motivated decision making: Effects of activation and self-centrality of values on choices and behavior. *Journal of Personality and Social Psychology*, *82*(3), 434–447. https://doi.org/10.1037/0022-3514.82.3.434

Vieira, G. B., de Souza, Y. L., Simões, A., de Almeida, J. A., & Belderrain, M. C. N. (2024). Using value-focused thinking in an integrated process to support decisions. *Pesquisa Operacional*, *44*, e276110. https://doi.org/10.1590/0101-7438.2023.043.00276110

Vranić, S., Galizia, A., Parodi, A., Falk, U., Mazzetti, P., Kalas, M., & Ommer, J. (2024). Citizens4Climate—A dashboard to support citizen science activities for climate action. *2024 IEEE 20th International Conference on E-Science (e-Science)*, 1–7. https://doi.org/10.1109/e-Science62913.2024.10678715

Waas, T., Hugé, J., Block, T., Wright, T., Benitez-Capistros, F., & Verbruggen, A. (2014). Sustainability assessment and indicators: Tools in a decision-making strategy for sustainable development. *Sustainability*, *6*(9), Article 9. https://doi.org/10.3390/su6095512

Yin, R. K. (2009). Case study research: design and methods (4th ed.). *Sage Publications*.

Zolfagharian, M., Walrave, B., Raven, R., & Romme, A. G. L. (2019). Studying transitions: Past, present, and future. Research Policy, 48(9), 103788. https://doi.org/10.1016/j.respol.2019.04.012

# Appendix 1.

1st round interview questions

1. Could you describe your role in the municipality?
2. How long have you been in that position?
3. Where did the initial idea come from? (For the action)
4. Who participated in deciding on the action?
5. What other options were available? Were there mutually exclusive options when you chose the action?
6. How were the opinions of the citizens considered?
7. Why was this particular action chosen? (Are there some priorities why this was chosen?)
8. What are the immediate effects of the action?
9. What impact do you think this action will have overall? (Societal level/city level)
10. What scientific evidence is there regarding its effectiveness? (Does the action have evidence to do so/lower emissions?)
11. What are the co-benefits of climate action? (What kind of benefits will this action bring?)
    - What co-benefits were considered when deciding on the action?
12. Have adverse effects been considered in these actions? (Are there any downsides to these actions? Examples?)
    - How are the drawbacks being managed?

# Appendix 2.

2nd round of interview questions

1. Is the insight network accurately formed? Do you find the descriptions detailed enough? / Does the network capture your reasoning of the topic?
2. How do you perceive others' opinions?
3. How do you see the potential use of weight for utilities in decision-making?
4. How could this tool be utilized? By whom? For what purpose?
5. Do you see this as a useful aid in decision-making? How/why not?
6. Could it be used for preparing decisions at the municipal level?
7. Would the insight network increase discussion between stakeholders and would it add value for decision making?
8. Does the tool actually demonstrate the choices that you would make? If not, why?