# Mitigating future crisis through collective meaning making – megagaming sustainable energy systems

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## ABSTRACT

Future crises such as natural disasters will be shaped by climate change and involve complex causal relationships affecting multiple societal actors. To enhance understanding and engagement with these challenges, this paper presents a large-scale social game (megagame) approach designed to explore energy production, distribution, and consumption within a broader socio-political context. Megagames, as large-scale social simulations, enable participants to experience decision-making processes, trade-offs, and systemic interdependencies. Findings from six iterations of the game reveal that participants struggle to act early enough to mitigate emissions, prioritizing short-term goals over long-term sustainability. However, through gameplay, they develop a deeper awareness of the interconnectedness of energy, society, and climate. The game fosters experiential learning, demonstrating the challenges of transforming energy systems while addressing climate-induced disasters. Results suggest that megagames can be effective tools for fostering systems thinking, stakeholder collaboration, and climate action, making them valuable for education, policy development, and crisis preparedness.

### Keywords

Natural disasters, climate change, Megagame, serious games, simulation, crisis management, energy

## INTRODUCTION

Future crises – and consequently, disaster sites – will be characterized by the slow changes brought about by ongoing climate change. How these crises will manifest, which societal actors will be affected and involved, and who will suffer the consequences will unfold through complex causal relationships.

One way to visualize and enhance understanding of such complex systems is through megagames – large-scale social games where participants take on predefined roles, allowing them to explore different perspectives and scenarios. Megagames merge board games, simulations, and role-playing in a format that engages a large number of participants, typically between 20 and 100 people. They can be used as educational games, in this case, to develop a better understanding of how the energy system shapes the conditions for a sustainable future and how different actors influence one another, both directly and indirectly.

This paper presents *Switching the current,* a megagame which encompasses energy production, distribution, and consumption, alongside politics, business, and citizens, all striving to achieve sustainable development in alignment with the UN Agenda 2030 goals. This work-in-progress paper reports on observations made in connection to six megagames about the energy system, society, and climate conducted in the project *Switching the current*. Specifically, the paper reports on how the megagame format, and the design of the *Switching the Current* game, impact participant reactions to events during game time, as well as reaction to the game as such after gameplay.

Megagaming to better understand the mechanisms behind climate change is relevant to the field of crisis management as it provides a pro-active stance to exercising rather than the traditional, re-active approach where exercises focus on dealing with disasters as they already have happened. This paper contributes to ISCRAM's mission by exploring innovative methods for proactive crisis preparedness and resilience building in the face of climate-induced natural hazards. The megagame format, as will be illustrated, enables a systemic exploration of energy transitions and their cascading consequences, bridging the gap between long-term sustainability planning and short-term crisis management. By fostering experiential, cross-stakeholder learning, the game addresses one of ISCRAM's central challenges: enabling coordination and decision-making across sectors under complex and uncertain conditions.

### Energy, climate, and natural hazards

The scientific consensus overwhelmingly supports the view that human activities are a major driver of climate change. However, public and political debates remain polarized, with some arguments even questioning the existence of global warming (Myers, Doran, Cook, Kotcher & Myers, 2021; Brulle et al., 2012; Brulle, Carmichael & Jenkins, 2012; Busch & Judick, 2021). Still, human contributions to climate change have been linked to floods, storms, drought, wildfires, landslides (Borres, Tupas & Jerrad, 2014), and even earthquakes (Yasuhara, Komine, Murakami, Chen, Mitani & Duc, 2012). Disaster response and crisis management research generally focus on how to manage such events and their consequences. However, efforts to limit the human contribution to climate change—and thus the potential for such disasters—are also needed. This work-in-progress paper presents an innovative method for increasing public understanding of the human role in climate change. The aim is to enable participants to grasp both the challenge of creating a sustainable energy system and the necessity of adapting to climate-induced consequences, such as drought and climate migration.

Energy usage, primarily related to the burning of fossil fuels, is the main human contribution to climate change. Increasing understanding of how the energy system interacts with societal systems, the environment, and the climate is therefore a major challenge, as urgent action is needed to reduce human impact on the climate and to adapt society to the changes science predicts will occur. However, challenges involving multiple interacting factors and significant temporal distance between causes and effects are difficult to grasp for humans (Sterman, 2001; Dörner, 1980). Experts in complex problem solving have suggested that new kinds of intelligence are needed to address 21st-century challenges—intelligence based on systems thinking rather than the problem-solving models traditionally measured in psychological research (Funke, 2021). A lack of systems thinking prevents decision-makers—and people in general—from understanding the complexities of climate change and acting accordingly.

Various approaches to support understanding of sustainability and climate change have been proposed and tested (Douglas & Brauer, 2021; de la Torre, Onggo, Corlu, Nogal & Juan, 2021). Among these, serious gaming—an approach that combines learning with the engaging experience of gaming—has been highlighted (den Haan & van der Voort, 2018). Large-scale social games (megagames) have been proposed as a way to increase awareness of the relationship between energy consumption and climate change, and to support dialogue about, and experimentation with, new pathways to a sustainable society (Johansson, Berggren & Leifler, 2023).

### The human inability to grasp complex systems

Humans in general have difficulties in understanding, and dealing with, systems involving multiple interacting components, multiple, interacting, feedback loops, and slow response to actions (Dörner & Schaub, 1994; Pah, Sheppard, Boomsma & Groves, 2014). Further, immediate needs are perceived as more important than future needs (Funke, 2021) and local challenges, such as environmental impact, are perceived as more important to deal with than global challenges (such as climate change) (Leiserowitz, Kates & Parris, 2005). Having the ability to cope with such frustration and uncertainty demands self-management, the ability to look beyond immediate desires and apply multiple perspectives on a problem (Funke, 2010).

As suggested already by Maslow, humans aim to fulfill basic needs like food, housing, reproduction, and safety before engaging in more altruistic activities. Climate change already have impact on basic needs through draughts and other factors influencing basic living conditions, as well as through more immediate violent disruption such as natural disasters. However, the psychological distance between individual human beings and the effects of climate change, seem to create a situation where people are more prone to engage in dealing with the effects of climate change rather than preventing climate change. This is also reflected in attitudes on a global scale. A survey conducted show that citizens in developed countries are more concerned with environmental issues than citizens in developing countries (Leiserowitz, Kates & Parris, 2005). Again, this may be related to the fundamental fact that a secure and stable income and living situation, leaves room for such concerns. High income is also correlated with higher education, something that is associated with awareness of ecological hazards (Otto & Gugushvili, 2020).

Efforts to increase awareness about climate change generally have limited success. For example, one-way communication about climate change rarely results in increased engagement in these questions (Moser, 2016; Nisbet, Cooper & Ellithorpe, 2015). Instead, it may instead cause anxiety (Ojala, 2016). The narrow economic and technical understanding of the energy system and the energy issue, which has historically been dominant, risks leaving issues, solutions, people, perspectives and certain practices aside in research, technology and politics. Although energy is about electrons, power plants, carbon dioxide emissions and technical components, etc., it is also about social issues, values and power relations (Miller, Richter & O ‘Leary, 2015). The *Switching the current* project aims to find new ways of communicating about energy and climate by combining different approaches such as serious games, negotiation games, explorative games and future workshops.

### Megagaming

New stories of transformation towards a sustainable society are needed (Wibeck et al., 2019). To reach this, we must become able to critically assess our current dominant narrative frame (Amsler & Facer, 2017). One way is through experiential learning through in which those narrative frames are used, so that we may reflect on how we operate based on those narrative frames. Those frames tend to be in use when we act in social contexts where we need to make use of our prior intuitions for how to behave in social contexts. Large-scale social games allow participants to enact social complexity. Megagames typically engage between 20-100 participants in a game which can be seen as intersecting role-playing, board gaming, and strategy gaming. For meaningful use of large groups, people need to have some structure to act in accordance to a certain role, but also latitude to develop their own ideas of how to change the current situation. The social dynamics of large groups of people will inevitably reflect real-world complexities in dealing with multiple agendas. The resulting learning experience might therefore convey a deeper and more meaningful reflection on social dynamics and complexity, especially as related to the challenges of societal transformation.

A large-scale social simulation game, like *Switching the current* that is concerned with the unknown future, and possibilities for new social arrangements, will need to offer space for role-playing (Aguilar-Millan, 2019). To accommodate a sufficiently large number of players to allow social dynamics to come into effect, it must have enough structure and visual cues to support joint sense-making, which boardgames have developed to support. To ensure that participants will be able to relate the outcomes of the game to their daily context, a sufficiently detailed simulation (or representative realism, see (Feinstein & Cannon, 2002), must be available to ground decisions in real-world orders of magnitude and relationships. Such a gaming environment will exhibit characteristics that have implications for design and learning. For example, there will be an initial phase of orientation, confusion even, as a large group of people orient themselves around a scenario and all different relationships and components represented in it. After that phase, there will be a period when participants manage to gauge which relationships they must be mindful of, and how to enact changes in the wider system. This typically takes three to four rounds (each round typically lasts between 20-60 minutes depending on the number of participants and the development of the game) as effects of participant actions tends to be delayed in a complex system like a megagame.

As the game is grounded in real-world issues, such as existing social structures, incentives and roadmaps for change, the participants may find that what they do during the game will be far from sufficient for achieving the goals we have in real life. This needs to be addressed during debriefing time (Kriz, 2010). Finally, a large-scale social simulation can be a mentally taxing experience, so the game cannot be allowed to run for too long, especially if there is to be time for debriefing afterwards.

### Switching the current

The megagame Switching the Current aims to promote dialogue about the energy system, especially between key actors responsible for energy production and those dependent on or affected by it. The game has been developed iteratively, with alterations made between each session based on feedback and observation. Each game requires extensive preparation—typically involving 20–100 dedicated participants, 5–10 researchers and game masters, appropriate venues for 10–20 gaming tables, and logistical arrangements for food, facilities, and staffing.

The primary objective of the game is to transition away from fossil fuel energy and uphold the ecological sustainability of local ecosystems. Failure to actively pursue this goal within the framework of the game results in progressively severe consequences reflective of scientific predictions for the planet. Additionally, game facilitators have the option to introduce supplementary events or outcomes based on the players' advancement. $CO^2$ emissions are represented by black stones that are places in three different bowls representing the 1,5-degree goal, the 2,0-degree goal, and the 2,4-degree goal. Stones are given to the participants after each game turn to reflect their emissions, starting by taking stone from the 1,5-degree bowl until it is empty, then moving to the other bowls. However, the participants are also encouraged to pursue local goals related to their specific stake-holder perspective. For example, population players should improve or maintain the ”happiness index”. Further, most stake-holder groups in the game are to some extent entangled in the financial system, meaning that they need to keep their finances in balance during the game. For example, the population players must be able to pay for energy consumed for transportation and housing, as well as food and other expenses. Achieving the primary objective of reducing emissions must thus be weighed against more immediate goals, just as in real life.

Participants in Switching the Current assume roles representing different societal stakeholder groups and functions. In pilot sessions, these included three population groups (high-income, medium-income, and low-income), a power distribution company (Conglomo), a power and district heating producer (Elementa), a municipal council, a fuel supplier (Boxhome), and a regional industry actor (Regional Industries).

Physically, the game is organised around several tables featuring board game components that represent key aspects of each stakeholder’s operations. In addition, large screens display news flashes and feedback throughout gameplay (**Figure 1**).

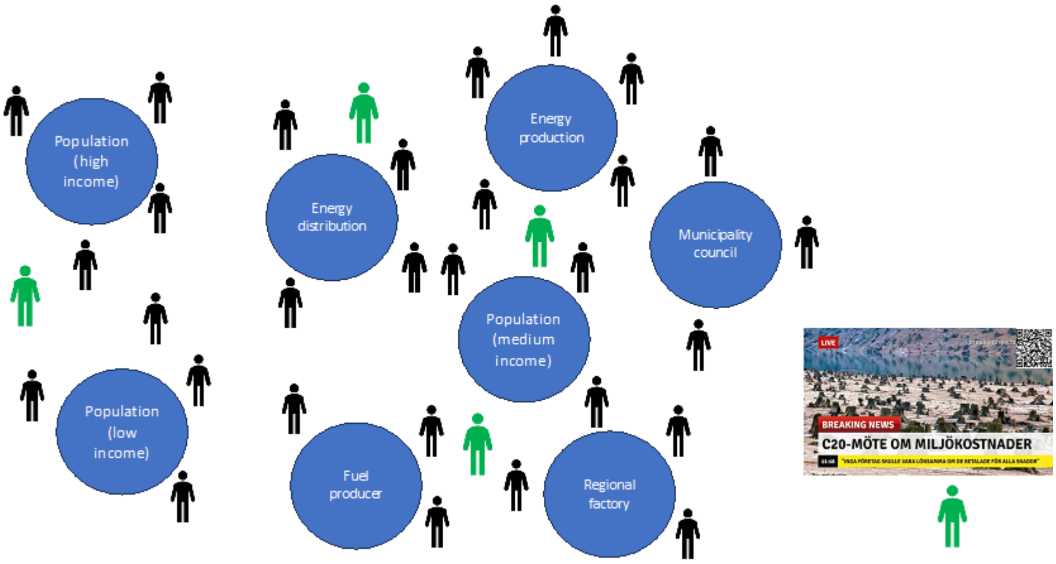


**Figure 1. Conceptual setup of the megagame. Persons depicted in black represent players, persons in green represent control (game masters).**

Explaining all dependencies in the game is beyond the scope of this paper, but to give an idea of the complexity, the most fundamental dependencies can be described in the following way: Population groups provide workforce to industry, which in turn provide income for the population groups. In turn, they buy goods and food from industries, and energy in different forms (electricity, fossil fuel, biofuel, and district heating) from energy producers. Energy producers buy and sell different forms of energy from each other, and from the international market. A regional council provides health and education to the population groups, also needs energy, food, and goods to do this, which they buy from energy providers and industries. All use of fossil fuels, products produced in a non-sustainable way, or food produced in a non-sustainable way results in $CO^2$ emissions. All financial transactions are managed through contracts between buyers and sellers. At each gaming table, there is a steady-state representation of the balance between income and expenses.

Population gameboards are designed so that needs in terms of food, goods, education, and healthcare must be met to maintain or increase the population's general happiness. Failure to reach specified happiness results in increased expenses and possible decline of workforce. In a similar fashion, businesses (industry, energy distributors and energy producers) must meet shareholder demands in terms of profit, otherwise their stock-market value will be reduced. Resources for production of energy, goods, and food comes from local production or the international market. Local production is limited by the amount of forest and cultivated land in the region where the game takes place. Increasing local production too much will result in a long-term decline of re-growth of forest (Chow, Rudemo, Buffoni & Leifler, 2023) and erosion or similar problems in farming. International market prices vary during the game, and certain products may be temporarily out of stock. As described, changes to the game is achieved through negotiation of different trading arrangements (**Figure 2**) or by creating new conditions through research (project cards).

**Figure 2. Participants negotiating in the Switching the current megagame. Photo by Thor Balkhed.**

Each session generates large amounts of data, including survey responses and video recordings. Typically, at least 10 cameras are used to document gameplay. Following each game, a thorough evaluation is conducted to assess whether the game or its surrounding procedures need improvement. So far, seven megagames have been conducted, although we have not been able to analyze all data in detail yet. The games were conducted at different locations with different kinds of participants (see **Table 1**). Also, as the game design is iterative, some changes have been made to both the rules and the general design of the game boards, although few changes have been introduced since the "New Town 2"-game. The number of roles in the game has gradually increased.

**Table 1. Overview of the conducted games.**

| Game | Number of participants | Type of participant |
|---|---|---|
| New Town | 18 | Municipality officials |
| Student Town | 25 | University students |
| Woods Town | 24 | Climate researchers & policy makers |
| Coast Town | 79 | High school students |
| New Town 2 | 27 | Municipality officials, Researchers, policy makers, private companies |
| East town | 28 | University students, researchers, Phd Student |
| Coast Town 2 | 120[1] | High school student |

Each gaming session typically lasts between 3-6 hours, and the entire event normally last for about 8 hours

[1] 120 is an estimate. A total of 160 participants were expected. However, as the game took place on a high school (SWE: Gymnasium) some participants did not turn up due to illness etc. A realistic estimate is around that around 120 pupils attended the whole game. Of these, 104 verified survey responses were collected after the game.

including introduction to the game, pauses, and debriefing. When the participants arrive, they are asked to sign an informed consent and a background survey. Then, they are assigned to a role in the game. This is followed by a general introduction to the game and the Switching the current project. After the introduction, they are assigned to their gaming table and are walked through and introductory game turn which typically lasts for about 45 minutes. After that, the actual game begins. An example is seen in Figure 1. The games lasted between 3-5 turns. After that, the participants are divided into groups of 10-15 people and a debriefing session is conducted. All sessions were recorded on video, and all gaming sessions were followed by a debriefing session which lasted between 30-50 minutes. Surveys were also conducted before and after each gaming session. The gaming tables were also documented at the first and the last turn of the game, making it possible to follow changes through the game.

## FINDINGS

The results reported here consist of general impressions from the researchers conducting the megagames as some general phenomena have been found to reoccur in most of the games. More detailed findings concerning specific phenomena from the very large data set generated during the project is gradually being published in conference contributions and journals (Johansson, Breggren & Leifler, 2023; Chow, Rudemo, Buffoni & Leifler, 2023).

Two clusters of observations are presented: General observations regarding participant *reactions in game*, and participant *reactions to the game*. By *in the game* we refer to different strategies and behaviors used by the players in the game. By *to the game* we refer to reflections made by the participants in the post-game surveys and the debriefing sessions.

### Reaction in the game

A general observation from all games was the fact that the participants in general acts too late when it comes to reducing $CO^2$ emissions. In all games, the Paris agreement (the 1,5-degree goal) was exceeded. As the game design reflects a point of departure similar to reality, this is very hard to prevent. Further, the participants often focused on immediate priorities, such as keeping their finances in balance (population boards), making profit (company boards), assuring general happiness in the populations (populations and community boards). Initial confusion and lack of understanding of the dependencies between different player groups in the game also created situations where the players were too involved in establishing a basic idea of the game to deal with high-level goal fulfillment, even though they knew that reducing $CO^2$ emissions was an important task in the game.

Even if the participants generally failed to meet the 1,5 degree goal, all participants belonging to in-game groups that had the financial pre-conditions to reduce emissions engaged in that endeavor. Total emissions can easily be assessed by counting the number of certain tokens the participants have in play at the end of each game-round. When the game starts, emissions mimic the real-world situation today (2024) in Sweden for the different rolesin the game. In the Student town game, all population groups managed to reduce emissions by almost a 100%. In the Woods town game, the low-income group only reduced their emissions marginally. Medium-income achieved a reduction of about 50%, and high-income reduced by 100%. In the Coast town game, both low-income and medium income reduced their emissions with about 70% while high-income only managed to reduce their emissions by 50%. Some enterprises, like Regional industries, reduced their emissions substantially in every game (at least 60%). The average reduction of $CO^2$ emissions from the games that have been analyzed as far can be found in **Table 2**. Thus, our results suggest that the income group reflects the ability to reduce emissions when considering the average reduction in emission from five games.

Another observation that is connected to the first one is that the player group scientists struggled to get attention, especially in the early parts of the game. The role of the scientist was to support the other players with innovation and suggestions for change, mainly in the form of ‘project cards’, a game component that the participants can use to partly change the rules of the game, such as new ways of constructing more energy-efficient housing or lifestyle change that demand less air travel. In the early stages of a game, the participants are typically occupied with understanding the game and fulfilling short term goals and tend to neglect the approaches from the scientist. In later stages of the game, when it becomes obvious that the participants need to act to cope with climate change, the scientists usually gain a lot of attention and are instead in high demand.

While collaboration was one of the intended goals of the game design, many participants got stuck in negotiating deals with other participants to fulfill their own goals. Most players realized that this is not a viable long-term solution and gradually began to seek solutions that would benefit more players. It can be assumed that this partly was done to secure own goals, but it nonetheless increased the collaborative aspect of the game. Several examples exist where participants found common goals that were pursued in parallel by different participants.

**Table 2. Average reduction of emissions in % for each income group. Analysis is based on data from the New Town, Student Town, Woods Town, Coast Town, and East Town games[2].**

| | Low income | Medium income | High income |
|---|---|---|---|
| Average reduction of emissions | 40% | 60% | 62% |

### Reactions to the game

Participants in the conducted megagames were offered two opportunities to share their initial impressions of the megagame, first by answering a survey, and immediately after by participating in a debriefing session. Debriefing sessions followed the protocol suggested by Kriz (2010) and were recorded. A common, and expected, response was that almost all participants report a feeling of either confusion or frustration, and sometimes both, especially in the beginning of the game. The origin of confusion and frustration can be traced both to the fact that the megagame format was new to most participants, and to the complexity of the task as such. In general, the participants report in the post-game survey that they need at least 2 rounds before they understand the game well enough to take proper actions (Johansson, Berggren & Leifler, 2023). There are several reasons for this: First, *Switching the current* comprises many dependencies between different game components, particularly the different game-boards, reflecting the complexity of energy consumption in society. Second, the large number of participants is a source of complexity in itself – navigating in the room(s) also means interacting with many different people. This is also an important feature of the megagaming format as it should encourage interaction and dialogue between the participants. This is in a sense designed into the game by the complexity of the task and the large number of participants. Another aspect of time was the realization that the effects of actions sometimes only can be seen after several rounds in the game.

The debriefing sessions conducted after the games suggest that the megagaming format was immersive, especially the interactions that took place with other participants. For example, some participants state that they felt guilt when thinking about their own actions in the game. This was expressed by participants in the high-income groups as they grasped the fact that they could have helped the low-income group if they had understood the collective benefits of doing so. In a similar way, some participants reported feeling "stuck" in the financial system which, like in reality, demand continuous growth. Especially when playing as a commercial entity, the participants felt obligated to create revenue to satisfy shareholders. Creating revenue and pursuing reduced emissions is difficult as switching from for example fossil fuels to biofuels is associated with a significant cost in terms of investments in climate neutral energy.

A positive aspect reported by most participants is an increased understanding of the interconnectedness of society when it comes to energy. In this sense, frustration is indeed the flipside of increased understanding as frustration partly emerges as a consequence of increased systems understanding. Once frustration is overcome and becomes actionable, it also becomes productive when the participants understand that they need to create agreements with a large number of other players to reach their goals, Thus, they simultaneously have gained new knowledge and got frustrated from the same knowledge.

## Discussion

Another important dimension concerns the barriers to meaning making that arise when participants are confronted with the complexity of energy transitions and climate-induced systemic risks. Early stages of gameplay were frequently marked by confusion and frustration, reflecting both the unfamiliarity with the megagame format and the cognitive load associated with navigating multiple interdependencies. These emotional and cognitive responses can be understood as barriers to meaning making, but also as potential entry points for deeper learning. As participants gradually made sense of the system dynamics and intergroup dependencies, many began to reframe their understanding of their own role and agency within the wider socio-technical system.

The rich data collected through surveys, debriefings, and video recordings provides a unique opportunity to analyze how and when participants begin to overcome these barriers. Such analysis may shed light on the processes through which meaning is constructed under complex and uncertain conditions, and how experiential formats like megagames can support this meaning making over time. This is particularly relevant in the context

[2] There are missing data from the New Town 2 game that prevents the calculation to be made for that game. We have not been able to analyze the outcome of the last game, Coast Town 2 at this time.

of crisis preparedness, where aligning mental models across stakeholder groups is crucial for coordinated action.

A methodological challenge associated with organizing megagames about energy systems is that most participants who agree to take part likely have an interest in sustainability issues or gaming, or possibly both. These interests serve as motivational drivers, leading participants to strive for optimal outcomes. However, while the game design emphasized representative realism rather than high realism, it still reflected numerous real-world behaviors, including social unrest, greenwashing, self-interest, and frustration over a lack of progress. On the other hand, the positive aspects of the game, such as highlighting the importance of collaboration in driving systemic change and the urgency of climate action, were also apparent. This raises a key question: Would similar outcomes be observed in a more diverse participant pool, particularly one including individuals with varied economic and political perspectives on climate action? While the game successfully replicated many real-world dynamics – such as economic constraints, negotiation, and policy trade-offs – it may not fully capture the unwillingness, and conflicting interests present in broader societal decision-making.

An essential aspect of the game was its capacity to illustrate the cascading consequences of climate inaction. Throughout the sessions, extreme weather events—such as floods, heatwaves, and storms—were introduced as part of the simulation to mirror the increasing frequency of such disasters in reality. These events, triggered by accumulated emissions and unsustainable practices, led to economic disruptions, social instability, and infrastructural strain, echoing real-world challenges faced by societies worldwide. Participants' responses to these crises were particularly telling, as they had to negotiate between short-term economic goals and long-term resilience-building strategies. The role-playing dimension of megagaming (Aguilar-Millan, 2019) fostered deep engagement, as reflected in participants' reported feelings of frustration and guilt when their decisions contributed to worsening conditions, but also in the intense negotiations required to align diverse interests.

Furthermore, the game's design supported a systemic understanding of the interconnections between society, energy, finance, and climate-induced disasters, key competences to cope with complexity (Funke, 2021). The challenge of creating a megagame about energy systems is not only designing an immersive learning environment but also about constructing an experience that captures the complexity of socio-technical and environmental interdependencies. For example, during debriefings, participants noted that they only realized in retrospect how early-game decisions – such as prioritizing economic growth over sustainability – contributed to later catastrophic events, including food shortages, forced migration due to coastal flooding, and overwhelmed healthcare systems. This aligns with previous studies on human interactions with complex systems. These realizations may influence participants' future decision-making in policy, business, or personal contexts, reinforcing the value of megagames as educational tools. These insights demonstrate the power of megagames not just as educational tools but as structured simulations for exploring the complexity of real-world systems. To better understand their unique advantages, it is useful to compare them to other simulation formats used in policy training and disaster response.

### The Benefits of Large-Scale Social Simulations

Running large-scale social simulations differs from other types of exercises or simulation-based games. Here, the boundaries are less direct, allowing participants to explore activities and test system dependencies in ways that mirror the complexity of real-world decision-making. Compared to traditional exercises (such as table-top, command-post, and field exercises) and gaming simulations, alternative choices and actions in megagames are less constrained. The game control team provides a framework and scenario for participants to explore, but not all possible paths are predefined. This flexibility requires game masters to remain open to emergent solutions while allowing participants to navigate and challenge the boundaries of the game.

However, there are several challenges to running a megagame: ensuring participant involvement and satisfaction, designing a game that accurately represents the system and its subsystems, providing a clear and up-to-date situational picture, scaling the game based on participant numbers, and training facilitators to handle uncertain rules and evolving game dynamics. Using a defined game engine or rule set supports game control in managing the scenario and serves as a basis for evaluation and assessment. Incorporating climate-related extreme events into the scenario design adds further complexity, as participants must balance mitigation, adaptation, and recovery strategies in a dynamic environment.

### Megagaming and Information Systems

Although *Switching the current* wasn't designed to support the design of information systems for crisis response or management, the format holds potential for such efforts. As the megagame is a simulation of a societal-wide socio-technical system, there is no reason why it couldn't serve as a testbed for the development and evaluation of information systems by providing a rich, dynamic environment where communication, coordination, and data flows are central to success. Within the game, participants enact complex roles across multiple domains and must rely on shared situational awareness, decision support, and negotiated information exchange to navigate emergent crises. This creates conditions that mimic real-world information challenges: uncertainty, information asymmetry, delayed feedback, and conflicting goals. By observing how participants interact, manage information, and experience bottlenecks or breakdowns, it is possible to identify user needs, prototype information tools, and evaluate system usability and impact. Megagames could therefore offer a unique opportunity for holistic testing of information systems when compared to traditional evaluation techniques that usually circle around a limited, use-specific, scenario. Using megagames as a platform would allow for the identification of societal-wide implications of new information systems. The work needed to implement a megagame and the number of participants needed to run a game suggests that such testing preferably should take place within an existing megagame.

## CONCLUSIONS

Megagames present a novel and underutilized method for simulating crisis complexity in a way that mirrors the multi-stakeholder, uncertain, and interdependent nature of real-world disaster scenarios. By engaging participants in large-scale, role-based simulations, megagames enable exploration of system-wide dynamics such as resource allocation, climate resilience, and collective risk mitigation. The format is particularly effective in fostering cross-stakeholder coordination, as participants are required to negotiate, align priorities, and make decisions under time pressure and incomplete information—conditions that strongly resemble those faced in actual crisis situations.

Moreover, megagames offer a compelling environment for testing future-oriented information systems. The emergent and adaptive nature of gameplay creates a dynamic testbed where communication channels, decision-support tools, and coordination mechanisms can be evaluated across organizational boundaries. As such, megagames hold promise not only as educational or engagement tools, but also as platforms for developing and validating socio-technical solutions within complex adaptive systems—an area of increasing relevance to improving information systems for crisis response and management. Furthermore, the megagame can serve as a crisis training format – not only for managing the consequences of climate change, such as natural disasters, but also for understanding and addressing the underlying causes.

## ACKNOWLEDGMENTS

The authors and the project group would like to thank the Swedish Energy Agency for supporting this study, grant number 51869-1.

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