Building trust while modeling with stakeholders as requirement for social learning

Meike Düspohl[a], Tuck Fatt Siew[a] and Petra Döll[a]

[a]Institute of Physical Geography, Goethe University Frankfurt, Germany (duespohl@em.uni-frankfurt.de, tuckfatt.siew@em.uni-frankfurt.de and P.Doell@em.uni-frankfurt.de)

Abstract: Many participatory modeling approaches (PMA) aim at supporting social learning among stakeholders. Trust is one important requirement for successful social learning. We relate our experiences trying to improve participatory modeling with local experts in the identification of a region-specific strategy for renewable electricity generation. The PMA was implemented in Groß-Gerau, a county in Germany. In the case study, we evaluated an innovative combination of methods that support the region-specific strategy identification. The methods applied are actor modeling (AM), scenario development and Bayesian Networks (BN). The evaluation of the case study and informal information shows that stakeholders do not trust each other. What would have been the design of the PMA that could positively influence the building of trust among stakeholders? Based on a literature analysis, we identified five factors that positively influence trust building among stakeholders in a PMA. These factors are: (1) mutual understanding of individual stakeholders' values, (2) enhanced fair, balanced, trustworthy communications during the PMA, (3) skilled facilitation and mediation, (4) availability of a core of mutual knowledge and (5) minimization of stakeholder turnover impacts. Finally, we present an enhanced design of the PMA to support trust building among stakeholders. This design includes an intensive get-to-know each other of the stakeholders and the engagement of a skilled facilitator during the PMA.

Keywords: participatory modeling approach; stakeholders; participatory methods; trust

1   INTRODUCTION

In many cases, participatory modeling approaches (PMA) aim at enhancing social learning among stakeholders (de Kraker et al., 2011). Social learning is a process of reframing and convergence of stakeholders´ perspectives on the problem, possible solutions and implementation by collaboration (Pahl-Wostl et al., 2007b). One important requirement for successful social learning is trust among participating stakeholders (Sol et al., 2013). According to practitioners and researchers, trust is needed for effective decision making (Wondelleck & Yaffee, 2000). Hahn et al. (2006) determined that trust building and knowledge generation are the central components for collaboration. Trust is central to teamwork, leadership, and organizational culture. Perhaps trust is so coveted because the effects of distrust can be destructive. Fear, scepticism, and opposition are among the most notable consequences of a lack of trust in organisations (Wondelleck & Yaffee, 2000).
But what is trust? Trust can be defined as the expectation that others will act in a way that is agreeable for a stakeholder without the possibility of the stakeholder to intervene. According to Davenport et al. (2007), "two key underlying assumptions emphasize that trust (1) requires a certain degree of dependence and (2) accompanies a particular set of expectations".
A standard tool to promote trust is the participation of stakeholders, like in a participatory modeling approach to support a decision making process. However, this participation does not necessarily result in trust (Gray et al., 2012). Indeed, stakeholders stated that they did not trust each other in our own experience evaluating a PMA used to design a region-specific strategy for renewable electricity generation. In retrospective, we ask: What would have been the design of the participatory modeling approach that could positively influence the building of trust among stakeholders?
This paper aims at giving an answer to that question and introducing an enhanced design of a PMA using knowledge gained from a literature study. To achieve this aim we give in the next section an overview of the design of the case study. We then present the factors that influence trust. In the final section, we discuss the results gained from literature analysis and conclude by highlighting

components that could be integrated in an enhanced design of a PMA to support the building of trust among stakeholders.

2   Design of a PMA

Germany is aiming at achieving energy for consumption (electricity, heat, fuels) to be supplied with up to 20 % of renewable energy in 2020. On a larger scale, regions and cities are asked to support that national goal by transforming their electricity generation systems. In the county of Groß-Gerau, 30 % of the electricity consumption from renewable energy by the year 2020 is targeted to be produced within the county. The current generation of renewable electricity (data from 2007) is less than one percent of the electricity consumption. The potential contribution of renewable electricity is about 20 times higher than the electricity consumption in 2007 (Table 1).

Table 1. Actual and potential contribution of renewables to electricity generation in different sectors in Groß-Gerau, with total electricity consumption of 1246 Mio. kWh in 2007 (TU Darmstadt, 2008).

Energy source	Contribution of renewables in 2007 (Mio. kWh/a)	Potential contribution of renewables (Mio. kWh/a)
Biomass (in gaseous form)	5.4	27
Photovoltaics	6.4	1233
Deep geothermal energy	0	22962
Wind energy	0	222
Total	11.8	24443

To support the identification of an implementable strategy for achieving the 30 % goal of the county, we set up a PMA aided by an innovative combination of participatory methods (i.e. actor modeling, participatory scenario development and Bayesian Network modeling). A total of 15 stakeholders were involved in the PMA, covering a broad range of experts who are representatives from the private sector, politics, research and non-governmental organizations. The PMA, comprising interviews and workshops with identified stakeholders, started with a meeting with the key stakeholder to address the design of the PMA.

The conceptual design of the PMA is shown in Figure 1. It included four steps in which participatory methods and communication tools were combined. The steps are:

- Step 1: Describing the current system from a stakeholder's perspective using actor modeling (AM)
- Step 2: Exploring possible futures with normative scenarios
- Step 3: Quantifying the effects of actions on goal achievement with Bayesian Network (BN) modeling
- Step 4: Identifying implementable (short-term) actions with BN modeling.

The entire strategy development process took approximately one year to be completed. During this period, we conducted in total fourteen interviews and four half-day workshops addressing step 1 to 4. Step 1 was reached in workshop 1 and 2, while step 2 started in workshop 2 and ended in workshop 3. Step 3 and 4 were executed in workshop 4. A more detailed description of the PMA is elaborated by Düspohl &Döll (2014, to be submitted).
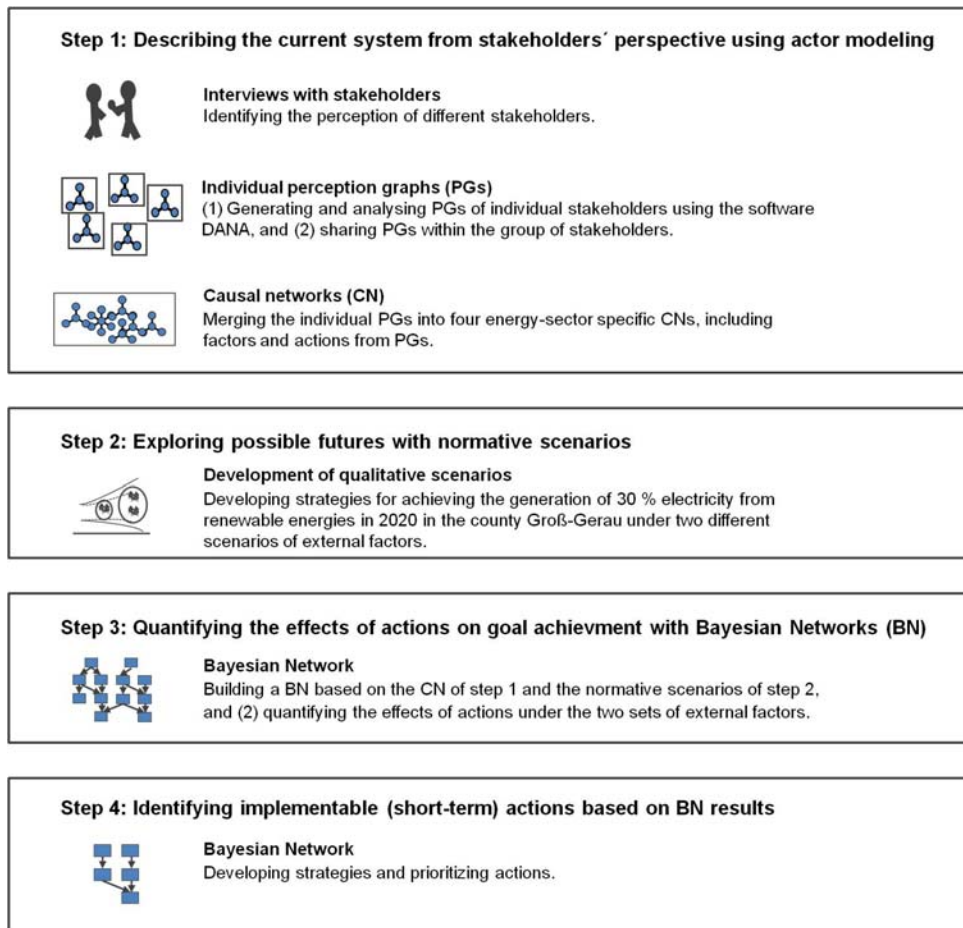
Step 1: Describing the current system from stakeholders' perspective using actor modeling

Interviews with stakeholders
Identifying the perception of different stakeholders.

Individual perception graphs (PGs)
(1) Generating and analysing PGs of individual stakeholders using the software DANA, and (2) sharing PGs within the group of stakeholders.

Causal networks (CN)
Merging the individual PGs into four energy-sector specific CNs, including factors and actions from PGs.

Step 2: Exploring possible futures with normative scenarios

Development of qualitative scenarios
Developing strategies for achieving the generation of 30 % electricity from renewable energies in 2020 in the county Groß-Gerau under two different scenarios of external factors.

Step 3: Quantifying the effects of actions on goal achievment with Bayesian Networks (BN)

Bayesian Network
Building a BN based on the CN of step 1 and the normative scenarios of step 2, and (2) quantifying the effects of actions under the two sets of external factors.

Step 4: Identifying implementable (short-term) actions based on BN results

Bayesian Network
Developing strategies and prioritizing actions.

Figure 1. Design of the PMA with steps and methods applied. (Düspohl &Döll, 2014, to be submitted)

By adopting a PMA, we also aimed at social learning among the stakeholders as well as supporting an active stakeholder network for further collaboration to accelerate electricity generation in Groß-Gerau. The achievement of this goal was assessed at the end of the PMA. Based on the PMA evaluation results and informal discussions with stakeholders, we found out that there was a lack of trust among the stakeholders which might limit the possibility for the collaborative development of a realizable management strategy.

3 WHAT ARE FACTORS THAT INFLUENCES TRUST?

Trust is required for social learning (Sol et al., 2013) and effective decision making (Wondelleck & Yaffee, 2000). Therefore, trust building should become one of the central components for collaboration (cf. Hahn et al., 2006). With a view to the outcome of our PMA, the question is: What would have been the design of the participatory modeling approach that could positively influence the building of trust among stakeholders? To answer this question we first identify factors that influence trust among stakeholders by conducting a literature search.

3.1 Mutual understanding of individual stakeholder values

The availability of information about the values of a stakeholder is one of the important factors that influence trust building among individuals. In the case that information about the values and objectives of others regarding the PMA are lacking, emotions and heuristics fill the knowledge gap. According to Schwarz & Clore (1983), people use their momentary affective states as information. These "affect-as-information" heuristics and similarity with the individual have a significant influence on personal trust judgments (Dunn & Schweitzer, 2005) and the level of trust (Gray et al., 2012). Although studies have shown that not all trust judgments regarding another person are rational and knowledge based decisions, individuals who have different backgrounds and obtain different values and objectives are

seen as unknown, therefore less trustworthy (Webber, 2002). On the contrary, when the objectives and expectations of an individual are well known, the trust decision is built on existing evidence or associations, and individuals are perhaps judged as trustworthy.

3.2 Enhanced fair, balanced, trustworthy communications

The mode of communication during a PMA has an impact on the development of trust among the stakeholders. PMA facilitators should clearly outline the scientific questions being asked, the methods and knowledge produced, how this knowledge informs policy, and most importantly how the knowledge created can be integrated with the goals of stakeholders (Gray et al., 2012). Having been informed about what will happen with the results at the beginning of a PMA, stakeholders may be less likely to express skepticism (Davenport et al., 2007). In addition the limits and uncertainty connected to modeling results should be transparently addressed. During a PMA, communication with stakeholders should be undertaken in such a way that the stakeholders gain the feeling that people listen to them instead of forcing them with rules and legislation (Hahn et al., 2006). Likewise, the creation of a trustful informal setting like a flexible network provides an opportunity for repeated interactions and communication, thus supporting trust development (Hahn et al., 2006; Pahl-Wostl & Hare, 2004).

3.3 Skilled facilitation and mediation

Effective communication asks for a skilled facilitator. The personal qualities of the facilitator, and his or her ability to build trust and establish alliances, are important. The facilitator should be well trained in group interactions and have appropriate skills and expertise in participatory approaches (Mostert et al., 2007), including leadership. As pointed out by Pahl-Wostl et al. (2007a), "the role of leadership is to generate the trust needed to engage in an open debate and leave entrenched positions."Leadership does not include imposing one view on a group. Instead, it guides the group members (i.e. participating stakeholders) to express and share their views. This is relevant for establishing collaborative leadership, which can be described as "convening" the stakeholders and caring about an ongoing partnership, rather than controlling the process.

3.4 Availability of a core of mutual knowledge

Knowledge has been shown to exist as a factor correlated with trust (Siegrist & Cvetkovich, 2000). If the level and type of knowledge held by one stakeholder is not consistent with the level and type of knowledge important to another stakeholder, then a potential disconnection between these two ''knowledge systems'' may decrease trust (Gray et al., 2012).

3.5 Minimization of stakeholder turnover impacts

During a PMA, stakeholders are responsible for bringing the views of their organizations to the process and giving their organizations feedback on the outcomes of the process. As they gain a sense of belonging to the multi-stakeholder approach, trust and understanding can develop. However, the transfer of this trust and understanding to the organizations of the representatives is a critical point. Over-reliance on individual representatives seems to be risky for a successful PMA because individuals may leave their organizations and thus the PMA (Mostert et al., 2007). Stakeholder turnover can be compared with the situation in an organization, in which Davenport et al. (2007) identified staff turnover as one important constraint to building trust.

4   DISCUSSION AND CONCLUSION (ENHANCED DESIGN OF A PMA)

Five factors that influence trust building among stakeholders in a PMA have been identified in the previous section based on the analysis of literature. These factors play a role in contributing to the success of a PMA. However, not all of these factors can be influenced by the organizing researchers in a PMA. Trust is built or not built during interactions among stakeholders inside as well as outside of the PMA. It should be recognized that:
- To gain information about the values of different stakeholders might be a challenge in a PMA due to the complexity of values. Höppner (2009) state that values are often complex and multi-dimensional and are likely to vary across and within stakeholder groups.

- The development of mutual knowledge depends on the personal interest of the involved stakeholders. Motivating stakeholders to gain mutual knowledge about a complex issue is, according to Siegrist & Cvetkovich (2000), a complex task and cannot be ensured during a PMA.
- There is no possibility to influence stakeholder turnover during a PMA. One possible solution to prevent the loss of trust could be making sure that there is some back-up representation (with associated familiarity and trust) for each essential stakeholder entity in the PMA.

Taking these concerns into account, we propose the integration of the following components in the enhanced design of the PMA implemented in our case study.

- A skillful facilitator could be engaged throughout the entire PMA. The facilitator of the PMA could explain in a clearer and more explicit way regarding the scientific questions being asked and the outcomes gained during the PMA. The importance of a collaborative leadership can be highlighted.
- At the beginning of workshop 1, an interactive get-to-know-each-other session can be organized to provide an opportunity for participating stakeholders to share their values and to express their expectations regarding the PMA. The subsequent workshops could take place in the working environment of the participating stakeholders, and not always at the location of the key stakeholder. This approach helps to enhance the development of personal relationships among the stakeholders and therewith trust-building outside the PMA.
- Best-practice examples from other counties or regions in Germany which have comparable aims regarding their renewable electricity generation could be presented and shared with the participating stakeholders, showing the possibility to achieve common goals.
- Throughout the PMA, stakeholders could be informed about actual developments in the current problem field to support mutual knowledge generation.

We are aware that additional efforts at building trust require extra resources and more intensive engagement. Last but not least, trust should be handled with care because it is much easier to destroy than to generate. As mentioned by Gray et al. (2012), negative events have much greater impact on self-reported trust than positive events do. Trust can be easily destroyed in such situations as (1) making decisions in the traditional top-down, expert-driven style, without listening to the stakeholders (Davenport et al., 2007), (2) providing information about values of stakeholders and about the PMA in general to external staff not involved in the PMA (Sol et al., 2013), (3) avoiding face-to-face communication – instead prefer communication via e-mail or other mediums (Vogler, 2010), (4) trying to hide uncertainty, limits or even risks of new technologies or of modeling results (Dahinden et al., 2001; Rayner, 2010) and (5) using incorrect information during the PMA (Lorenzoni et al., 2007). These situations should be avoided during a PMA that requires trust for successful social learning.

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