Creating successful transitions in energy

By respecting stakeholder values and securing trust and cohesion

Joke Kort (1st Author) & Nicole de Koning
TNO
Human behavior and Organizational Innovation
Groningen/Den Haag, The Netherlands
Joke.kort@tno.nl, Nicole.dekoning@tno.nl

Charlie Gullström Hughes
KTH
Department of Architecture (Architecture Technology)
Stockholm, Sweden
Charlie.gullstrom@arch.kth.se

***Abstract*—Initiatives to promote energy transition would benefit from a holistic approach that acknowledges a system's overall capacity, willingness and affordances towards change, (besides creating the preconditions for change). This article proposes a design-oriented quadruple helix approach to energy transition by discussing a value-based framework that addresses willingness and ability to change, by incorporating the value-system of each involved stakeholder. The approach establishes common ground and a shared vision towards transition-related outcomes by enhancing trust and cohesion in the participatory-design process.**

Keywords—Energy transition, stakeholder collaboration, trust, values, participatory design, tenants, housing corporations

I. INTRODUCTION

Past research in the energy domain mainly focused on technological innovation (e.g. increasing energy efficiency, grid technologies and networks); new governance (e.g. policy making and business value networks); and behavioral research (e.g. consumer behavior analysis, prediction algorithms, automation or feedback systems informing consumers and providing advice) (for an overview see [1]). In parallel to these approaches, which we categorize as 'change-enabling' since they create the preconditions for change, we observe a growing interest to specifically safeguard stakeholders' 'willingness to change' and the ability, at system's level, to 'accommodate change'. For example, Steg's [2] consumer values research provides insight in factors that motivate or inhibit individuals to act pro-environmentally (willingness to change) complemented with strategies to encourage pro-environmental actions (ability to change). Research from all perspectives addressed above each adds its own specific, valuable contribution to the energy transition. Still, we frequently observe governance structures (initiatives) that fail to become fully adopted in practice, and locally initiated initiatives by citizens, struggle in terms of corporate and governmental support. So why is this? *We hypothesize that the emphasis on means and measures to 'enable change' does not sufficiently well account for the 'willingness and ability to change' of the system as such.* What is needed is a change-process that is governed by a design-oriented perspective and that enables transition by also considering stakeholders' willingness and ability to change in a quadruple helix approach. In this article, we present a basic framework for initiatives relating to energy transition which specifically addresses the 'willingness and ability to change' by analyzing and incorporating each of the value systems of participating stakeholders in a design-oriented transition process. Desired outcomes are formulated to align with identified values. To account for mutual dependencies and enhance mutual understanding, trust and cohesion are central measures that define our framework. Section II addresses the theoretical background for the framework presented in Section III. Section IV presents our preliminary results and conclusions from ongoing research.

II. THEORETICAL BACKGROUND

Rotmans defines a transition as: 'a structural societal change that is the result of economic, cultural, technological, institutional as well as environmental developments, which both influences and strengthen each other' [3]. Nam and Pardo state that transitions include a technological dimension (technical and infrastructure innovation), a human dimension (values, knowledge, insight and sharing), an institutional dimension (governance and policy development) and a corporate dimension (provisioning and sustainable business) [4]. Hall et. al. [5] furthermore emphasize that a transition is based on integrative and holistic approaches. An example of such an approach is given by van Waart, Mulder and de Bont [6]. They address transitions through participatory prototyping by focusing on: Improving (mutual) understanding between stakeholders; Contributing to a shared vision among stakeholders which addresses concerns and values; Strengthening the social fabric of stakeholders, to sustain future collaboration; and achieving the above through the collective creation of prototypes by stakeholders. They have applied their approach successfully in Smart Cities research as a one-day hackathon. These theories and practices can be summarized by the following four measures to enable successful transition through structural change by a process 1) that thoroughly includes and affects all stakeholders to ensure that governance, corporate, technological, and the human dimension influence and strengthen each other; 2) that is based on integrative and holistic approaches; 3) that emerges through stakeholders actively contributing to a shared vision and collaborating to realize this vision; 4) in which trust and

the social fabric between stakeholders is strengthened. We find a variety of approaches in User Centered Design (UCD) that foster these measures by openly sharing and aligning values, concerns, interests and knowledge, resulting in (mutual) understanding, a realistic shared vision and the grounds for a sustainable future collaboration. UCD approaches furthermore provide evaluation methods to establish long term changes and effects within systems, and could elaborate, for example, the results of a hackathon [6].

III. Approach

To complement existing approaches, we propose a value-based experience framework to iteratively address how processes and designs relate to stakeholder and human values. Approaches such as Value Sensitive Design (VSD) [7] create insights in the values of all stakeholders, and monitor and evaluate these values throughout the (design) process. VSD includes three phases to align values in designs: (1) 'Conceptual investigations' focus on exploring all relevant values within a system. (2) 'Empirical investigations' draw on the human dimension in relation to values. (3) 'Technical investigations' evaluate how designed solutions address all values within a system. The Value-based User eXperience framework (VUX) from Kort, which elaborates on the UX framework [8] by adding ten psychological needs described in [9 in 10], can be viewed as a more detailed specification of the 'Empirical investigations' from VSD. In the following we discuss the application of VSD and VUX to achieve a fruitful framework for energy transition. Building on the theories, methods and frameworks addressed in section II and emphasizes the willingness and ability to change of the whole system in transition. This approach is currently applied in the project: MVI-Bewonerscommunicatie, which aims to realize a transition towards energy sustainable (domestic) buildings through renovation or rebuilding. For such a transition relating to housing corporations, it is required that 70% of the tenants agree, which however is hardly ever achieved. The application of our approach has led to the following project methodology in four steps: 1) An analysis of the value systems of different stakeholders (governance, corporate, technology and human dimension) guided by 'Conceptual investigations' from VCD, and the psychological needs addressed in VUX. Values, interests and concerns are explored in ongoing and finished projects from housing corporations, representing different stages of a transition. This step provides initial insights relating to aligned and conflicting stakeholder values, interests and concerns in different stages of a transition process. 2) Participatory design approaches are used to further explore different stakeholder values in specific ongoing projects, to identify aligned and conflicting values, interests and concerns. These sessions focus on improving a (mutual) understanding, trust and social cohesion among stakeholders. By openly addressing values and concerns, contributing and exchanging insights, knowledge and experiences, stakeholders learn from each other, fine-tune their perspectives and identify a shared vision of a desirable future (outcome) representing their own values, interests and concerns. Further, by actively contributing, stakeholders gain a sense of ownership of the shared vision created, improving and strengthening trust and a sustainable future collaboration. 3) Follow-up sessions with stakeholders are hosted to translate the co-created shared vision into concrete designs of the transition process (planning of actions, stakeholder roles, responsibilities, and means supporting the desired communication and information exchanges for collaboration, trust and cohesion) and desired future results. 4) VSD 'empirical and technical investigations', complimented with the psychological needs from VUX, serve to iteratively evaluate the implementation and adoption of the designed process and solutions in practice. Results are used to fine-tune the process as well as proposed design solutions.

IV. Conclusion

First preliminary results from using our approach in step (1) and (2) indicate the prevalence of different conflicting values, interests and concerns between stakeholders, as well as within stakeholders. Addressing these conflicts at the right time and through collaboration has been identified as fruitful, leading to more successful transition processes, within a shorter time-period, with better relationships between stakeholders and a higher stakeholder satisfaction about the process as well as the results. Trust, between stakeholders during collaboration, in the process itself and in the future outcomes in terms of effects on values are key to successful transitions.

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