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# Components and Factors for Actualization of Collective Action Initiatives in the Energy Sector

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## Abstract

In this conceptual paper, we develop a framework for understanding how collective action initiatives (CAIs) in the energy sector (e.g., energy collectives, positive energy districts, wind power cooperatives, etc.) form and gain agency and power- a phenomenon we label as 'actualization'. We build on the mobilization model described in Gregg, et al. (2020) to better elucidate how specific factors are related and how they influence the linkages between the internal (interests, organization, resources) and external (opportunities and threats) dimensions of CAI mobilization. To do this, we develop an actualization framework, organized by three conjunctive components (triggers, enablers, and innovation), each composed of inclusive disjunctive factors. Our hypothesis is that a CAI needs to satisfy each of the components with a combination of factors in order to actualize its agency and power to effect changes in a local or regional energy system. In this way, the framework provides more detail in explaining and predicting how CAIs succeed or fail. We test the hypothesis on a selection of case studies from the literature. Our hypothesis appears to hold, suggesting that further research is warranted to test and develop the framework. We furthermore conclude that factors can reinforce each other, or also serve as a barrier to CAI actualization. In the latter, the proposed framework can provide insights into alternatives ways around barriers to secure agency and power within a CAI.

*Key Words: Collective Action Initiatives, Energy Cooperatives, Energy Transition, Social Innovation*

## Introduction and Background

Mitigation of climate change requires a large-scale transition in our global energy systems, namely, fossil fuel divestment from the energy portfolios on the global, regional, national and local scales. Because energy services permeate so many facets of our economic and social life, the energy transition, by its nature, is a socio-technical transition, requiring both technical and social innovations to bring about systemic and institutional change.

As increased investment in technological research and innovation and economies of scale have made renewable resources cost-competitive with fossil resources, the share of renewable energy has steadily increased on the grid. This has led to electricity generation being more distributed (i.e. spatially dispersed) and has opened new possibilities for ownership models. Moreover, increased demand flexibility, both through virtual storage and batteries, becomes more important to keep the grid balanced with an increasing share of intermittent energy resources. When combined with the social issues of energy poverty and energy justice, there has been an increased interest in what types of social innovation are emerging to respond to these developments. In particular, studies on

collective action initiatives (CAIs) (e.g., energy collectives, positive energy districts, wind power cooperatives, etc.) have allowed for a better understanding of how local communities and grassroots movements can shape the energy transition (Seyfang et al., 2013). There is evidence that CAIs, such as energy cooperatives, are becoming more common in some European countries, though still highly susceptible to shifting policy regimes (Wierling et al., 2018). Nevertheless, CAIs are seen as having potential to change the trajectory of developments in the energy system so that it supports sustainable development to a greater degree (Padovan et al., 2019).

Energy collectives have been studied through the lens of different sustainable transition approaches, e.g. applying multi-layer perspective (MLP) and strategic niche management (SNM) (Dóci et al., 2015; Gui & MacGill, 2018; Hasanov & Zuidema, 2018; Seyfang & Haxeltine, 2012); technological innovation systems (Agbemabiese et al., 2012; Hawkey, 2012); and transition management (TM) (Kaphengst & Velten, 2014; Späth & Rohracher, 2010). These approaches have proven useful for explaining the role of CAIs as strategic innovation niches. Nevertheless, sustainable transition theories have been increasingly subject to the critique that they do not yet explain well social movements and the aspects of agency, power and politics within transition processes (Avelino & Rotmans, 2009; Foxon, 2013; Köhler et al., 2019; North, 2011; Shove & Walker, 2007). While some attempts have been made to address this critique (e.g., Avelino & Rotmans (2009), Avelino & Wittmayer (2016)), less attention has been paid to such aspects within the actual niche formation, i.e., the interests of and motivation for individuals and groups to mobilize and innovate (Shove & Walker, 2007).

Therefore, we build on the conceptual study of Gregg, et al. (2020), which combined transition theory with social movement theory, and developed a general mobilization model to explain the dimensions of CAIs: internal interests, organization, resources, and external threats and opportunities (Figure 1). Gregg, et al. (2020) hypothesized that these dimensions, when in alignment, would allow for successful mobilization of a CAI, and would furthermore create a feedback mechanism wherein the CAI would garner more power and social control as it solidified its internal dimensions. In this study, we therefore ask how to understand the linkages between these dimensions and the specific factors that allow CAIs to actually form and gain or lose agency and power. I.e., which components and factors allow for the actualization of CAIs?

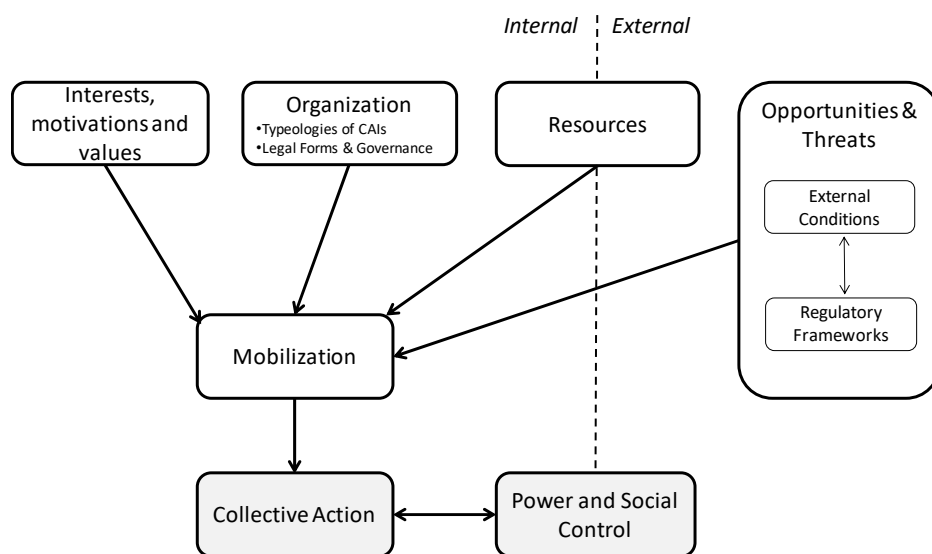


Figure 1. A mobilization model for Collective action initiatives in the energy sector (Gregg et al., 2020).

## Method

In this study, we explore aspects of the mobilization model in more depth using documented case studies, e.g., from Ooms et al. (2016). The goal is to create an orthogonal framework, a *CAI actualization framework*, which contains specific components to describe in detail how an energy CAI forms, and succeeds or fails. The components are then mapped to the mobilization dimensions in Gregg, et al. (2020). Using the CAI actualization framework, we describe each case example according to three components: their initial drivers (triggers), enabling factors (enablers), and innovation. Each component is further disaggregated into different (inclusive disjunctive) factors.

Table 1. Matrix for classifying energy CAIs. The three main rows describe the components. Each component is composed of different factors.

<i>CAI actualization framework</i>		<b>Factors (inclusive disjunctive, sufficient conditions)</b>		
<b>Components (conjunctive, necessary conditions)</b>	<b>Triggers</b>	<u>Crisis situation:</u> e.g., policy changes, lack of funding, energy poverty, community dissolution	<u>Unmet needs or desires:</u> e.g., lack of options, opportunities, and/or local control; desire for autonomy, identity, and/or sustainability	<u>Activism:</u> e.g., organization, protest, collectivism, networks, charismatic leader
	<b>Enablers</b>	<u>Change in perception or skills:</u> e.g., education campaigns, skill development, workshops	<u>Creation of identity:</u> e.g., sense of belonging, group identity, branding	<u>Other:</u> e.g., funding mechanisms, changes in legislation
	<b>Innovation</b>	<u>Social:</u> e.g., new models for organization and governance, decision making and distribution of power	<u>Technological:</u> e.g., new technologies that enable systemic change, development or improvement to existing technologies	<u>Market:</u> e.g., new business models, value chains, valorization paradigms

Our hypothesis is that CAIs are more likely to succeed if there are strong contributions within each of the three components (rows); i.e., an initial driver or trigger, and enabling factor and an innovative component are all necessary conditions for a CAI to gain power. This hypothesis thereby also posits that there are different pathways to success: the factors (columns) represent sufficient conditions for a CAI within a given component. Logically, our hypothesis is expressed in equations 1 and 2, where c

represents the component (with the subscript being the row number) and  $f$  represents a particular factor (with the subscript being the particular row and column numbers).

$$c_1 \wedge c_2 \wedge c_3 \rightarrow CAI \text{ actualization} \quad (1)$$

$$(f_{1,1} \vee f_{1,2} \vee f_{1,3}) \wedge (f_{2,1} \vee f_{2,2} \vee f_{2,3}) \wedge (f_{3,1} \vee f_{3,2} \vee f_{3,3}) \rightarrow CAI \text{ actualization} \quad (2)$$

The terminology of the framework is chosen to reflect the stated hypothesis. I.e., we understand a 'component' as a necessary part of a whole, with the connotation is that components are finite in number. Without all the components present, the CAI will fail to actualize, according out hypothesis. 'Factors', on the other hand, contribute to a whole, but are not necessary for the whole to exist. The connotation of the term 'factor' is that they are innumerable, they are causal, and they are not necessarily mutually exclusive. It is for this reason the term 'factor' is preferred over 'element', which implies mutually exclusivity, or 'aspect' which emphasizes the subjective perspective and lacks the causal connotation of 'factor'. Factors contribute to the components- when the latter are all present, a CAIs actualization becomes possible.

## Results and Analysis

Preliminary results are summarized here on four case studies.

### Cloughjordan Energy Collective (The Young Foundation)

In 1999, a group of Irish individuals was concerned about the climate, and created an ecovillage community where they could live more sustainably. They sold memberships to a collective in order to raise funds. Within a year, 25 members joined the collective, which gave the impetus to push the project forward. They developed a three-pronged renewable energy strategy: low energy housing, minimizing person vehicles, and district heating. The collective then reached out to university faculty and politicians and invited them to serve as board members to provide greater oversight of the sustainability aspects of the community. This resulted in more legitimacy and expanded the impact and awareness. The collective was supported by the Sustainable Projects Ireland Ltd. (SPIL), which linked it to the Global Ecovillage Network (GEN) and the Transition Towns project. Though the village struggled in the aftermath of the great recession, it still remains.

*Triggers:* Desire for sustainability (unmet desires), group of likeminded citizens (activism).

*Enablers:* Sustainability movement (change in perception), local voice in decision making at community level (creation of identity), securing EU funding (other).

*Innovation:* Viable Systems Model (VSM) management principles, consensus decision-making (social), wood pellet burners (technological).

### Solar Community Bologna, Italy

The Solar Community is a collective that promotes local renewable energy generation. The collective was founded in the years between 2010 and 2014. About 150 residents in six neighboring towns joined the initiative, promoted by the municipalities, key industries, and the University of Bologna. In 2015, the initiative was extended to a complimentary citizen-led initiative throughout Bologna. The initiative grew to 200 members and even more supporters. It finances new solar PV projects in the region. While the Solar Community would like to expand into other areas, but currently lacks sufficient funds to enable this.

*Triggers:* Creation of a network of solar communities (activism).

*Enablers:* Communication to local families about changing energy behavior, adult education, building social capital (change in perception), Regional recognition, promotion of renewable energy by the Italian government (other).

*Innovation:* Municipalities and industry enabled the initiative with bottom up organization of citizens, consumer association model (social), local enterprises gained access to a large number of potential clients (market).

#### GoiEner, Spain

GoiEner began in 2012 as a non-profit citizen cooperative, largely based on volunteers implementing renewable energy systems. Currently there are 13 salaried employees, approximately 100 volunteers, and over 5000 partners. Partners have the opportunity to purchase renewable electricity from GoiEner. Changing policy regimes regarding renewable energy tariffs by the Spanish government have been a barrier and reduced investor incentives in renewable energy, though the cooperative is still confident that the model can be duplicated throughout Spain.

*Triggers:* No voice in the decision of large energy suppliers and desire for energy sovereignty (unmet needs and desires); Initial group of volunteers formed the cooperative (activism).

*Enablers:* Learning from other examples and members gaining expertise in the energy system (change in perception), development of cohesion and empowerment within the community through shared experiences (creation of identity).

*Innovation:* Strong volunteer aspect, neighbor/peer participation (social); A large number of enterprises joined the collective, giving the collective power to trade energy in the Spanish market (market).

#### Qvinnovindar, Sweden

In 2007, rural activist Wanja Wallemyr started a woman's only collective to promote sustainable energy, and to shift the gender power balance in the energy sector by economically empowering women. The collective began with nine members who pooled their funding together in order to afford a share in a local wind park. The collective has since grown to over 80 members. The largest barrier is lack of access to financial resources, due to banks' inexperience and thus reluctance in providing entrepreneurial loans to females living in rural areas. The cooperative spun off a second similar female energy-based cooperative, Q2, which has also attracted interest from other countries.

*Triggers:* Lack of funds or financing opportunities for women to invest in the energy system (crisis situation); Lack of economic opportunities for women in the energy sector (unmet needs and desires); strong central leader, Wanja Wallemyr (activism).

*Enablers:* Women as active in the energy sector (change of perception); gender identity and solidarity through collective experience (creation of identity).

*Innovation:* Incorporating the gender issue in to sustainable energy (social); economic empowerment of women (market).

## Conclusions

From our preliminary findings, our hypothesis appears to hold. We furthermore observe that within a component, factors can reinforce each other. For example, within the triggers component, activism is often a response to unmet desires, as it was for the Young Foundation and GoiEner. We also note that the factors composing the initiation framework can also be potential barriers, and thus the framework

demonstrates potential alternatives for overcoming barriers. For instance, with the Qvinnovindar, the lack of financing was a barrier for the component of enablers, but then this served as an impetus for creating identity and changing perceptions, thus satisfying the component of enablers. In terms of the innovation component, we find that our case studies often had more innovation in the social and market factors than in the technological factor. Of course, sustainable transition theory holds that these innovations are socio-technical, and thus they have so dependency. Nevertheless, it underscores the importance of social innovation within CAIs and their mobilization, and furthermore the role of social innovation in the low carbon energy transition.

We recognize that the factors and components included in the actualization framework are not exhaustive, and that more case studies may reveal additional components and factors for energy CAIs. Moreover, we acknowledge that research into failed CAIs would be fruitful in strengthening the claims in this preliminary study. Yet, we find the framework useful for providing more insight to the mobilization dimensions identified in Gregg, et al. (2020). Depending on the case study, each component has the potential to intersect with each of the four mobilization dimensions, thus containing both internal and external dimensions. Therefore, it allows for a more nuanced understanding for the underlying factors that reinforce a CAI's agency and power.

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