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The precarious consensus on the importance of energy security: Contrasting views between Swiss energy users and experts

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ABSTRACT

Consented visions of a secure energy system are a driving force for energy policies and projects. But while there used to exist a fairly uniform understanding of energy security, in recent years competing visions have emerged. Examples include autarchic regional energy systems and highly integrated international ones. Each of these follows its own energy security logic. This paper explores linkages between individuals' understanding of energy security and their preferences for different energy visions, comparing energy users and experts. It draws from two consecutive studies in Switzerland. The first is a series of 12 qualitative interviews among energy system experts, who reveal a strong preference for an integrated energy system that is based on high-quality infrastructure. This stands in contrast to the countries' predominant paradigm of independence, which is not only present in the public discourse but also in national energy policies. The second study is an online survey that finds differences between energy users' ($n=194$) and experts' ($n=98$) understanding of energy security: Experts tend to see energy security primarily as the absence of supply disruptions, whereas energy users tend to take a long-term perspective and to include additional aspects in their considerations, such as environmental concerns. Thus, the societal consensus on the importance of energy security is a precarious one: conflicts about the meaning of energy security can strip the concept of its power to be a building block of societal energy visions. Decision-makers in policy and the energy sector therefore need to be aware that a shared understanding of energy security cannot be taken for granted. They should also recognize energy security as a strong argument for promoting renewables. However, it will not suffice to refer to a specific renewable project as "beneficial for energy security" – conveying its benefits from an energy security perspective requires knowledge of key actors' understandings of this complex concept.

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1. Introduction

Apart from providing a wide range of basic services such as heating and transportation, energy has infused almost all aspects of modern life. This is why there is a wide consensus among scientists [1–3], policy-makers [4–6], and the public [7–9] that ensuring energy security is of key importance for society. Consequently, shared visions of secure energy systems have been strong drivers of past and current energy projects and policies. Examples include the introduction of the International Energy Agency's strategic reserves to increase the buffer capacity of the oil market, or the current boom of shale gas production in the U.S., for which one key motivation was the country's desire to be independent [10].

Until the 1970's, there used to be a fairly uniform understanding of energy security. It focused on national states that sought to ensure access to energy resources through political or, if necessary, military means [5]. In the following three decades energy systems have undergone profound changes that have made them increasingly complex [6,11]. Examples include the international energy market becoming larger and more liquid – one indicator for that is the spot market volume of the largest European power exchange, which has quadrupled between 2005 and 2013 [12,13] – and the major geopolitical and socio-economic shifts that have occurred in the past decades. This includes the end of the cold war or countries that have made the transition from being net exporters of energy to net importers (such as China in the early 1990's, see [14]), or vice versa. As a result, the meaning of energy security has broadened and the concept has become increasingly fuzzy [3]. At the same time, energy security has become the subject of an intense scientific debate that revolves around recurring themes. An important one is its definition (e.g. Sovacool [15] presents a collection of 45 different ones) or, more generally speaking, its scope. But in that debate, the different definitions do not converge. For example, while there is wide agreement that the physical availability of energy is at the core of energy security, there is a heated debate on whether it should also encompass costs (often referred to as affordability) or social and environmental sustainability (for an overview of different aspects of energy security that are being discussed see e.g. [3,15–17]).

This ambiguity creates a fertile ground for discussion among scientists and it also presents considerable challenges for policy makers and the energy sector. As energy security is used as an argument in debates on the future development of the energy system it is highly relevant how the concept is understood by different societal actors. In particular, as security in general is something people value highly, many actors promote their individual positions regarding the future energy system by using the argument of energy security. This so-called *securitization* [18,19] makes it increasingly hard to develop shared societal visions of secure energy systems that could otherwise serve as catalysts for transition processes by enabling a common understanding of a complex issue among different stakeholders, which in turn contributes to a broad and continued support of societal endeavors in democracies, such as an energy transition [20,21]. Hence, such shared visions of the energy system are necessary, especially as the threats of climate change, global population growth, and growing environmental challenges are creating pressure for such a transition towards more renewables.

Instead of a shared vision, the current societal discourse on the future of energy systems comprises several competing visions of a secure energy system. There are two main opposing ones that stand out: that of an *autarchic energy system* and that of a *highly integrated one*. Energy autarky refers to "*a situation in which a region does not import substantial amounts of energy resources from other regions, but rather relies on its own resources to satisfy its need for energy services*" ([22], p.5802). From a security perspective, the key benefit of an energy autarchic country or region is that it is independent from foreign resources or regulations [22]. What is more, the idea of autarky generally has a positive connotation, which is why considerations of independence – along with environmental ones – have been shown to influence the populations' acceptance of certain energy technologies (e.g., nuclear power and wind energy, see [23,24]). In particular, the prospect of becoming energy independent is a "driving force in the societal acceptance of new energy projects" ([25], p. 80). But an autarchic energy system also has several downsides. These include a variety of negative local impacts, e.g. on landscape [26], or the social complexity of its realization [27]. For truly autarchic regions, which, e.g., do not have access to the (inter-) national power grid or oil and gas pipeline network, there is need for demand-side management measures and energy storage capacities to balance production and consumption across different timescales (e.g., by creating operating reserves or by seasonal storage). Especially these additional storage capacities are costly, so that ensuring a reliable service in decentralized systems is expensive [28]. An alternative vision of a secure energy system is based on technical and legal integration of energy carriers and markets. For Europe there are, for example, several policy and industrial initiatives (the best known being DESERTEC, see [29]) that seek to initiate such an integration of the electricity sector [30]. These foresee offshore wind farms in the North Sea, large solar power production in Southern Europe, and a massive expansion of the electricity grid. Several studies show that such an approach would not only be technically feasible but also a cost efficient way to decarbonize the electricity system while ensuring a reliable supply [30,31]. From a security perspective, the increase in