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Feasibility of energy justice: Exploring national and local efforts for energy development in Nepal

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ABSTRACT

The energy justice framework serves as an important decision-making tool in order to understand how different principles of justice can inform energy systems and policies. The realization of the urgency of providing modern energy technology and services particularly to rural areas has prompted both the Nepalese government and development institutions to focus on community-run renewable energy facilities. It is argued that off-grid and micro-scale energy development offers an alternative path to fossil-fuel use and top-down resource management as they democratize the grid and increase marginalized communities' access to renewable energy, education and health care. However, Nepal's energy development is also heavily influenced by demands from the fast-growing economies of neighboring countries such as China and India. As a result, this article evaluates the Nepalese national energy policies by applying the key aspects of the energy justice framework and showing the feasibility constraints due to geopolitical and biophysical factors to the implementation of energy just policies in this developing country context. The empirical evidence is derived from interviews during a one-month fieldwork in the Lalitpur and Katmandu districts of Nepal, site-visits, discourse analysis of expert statements, government policies and newspaper articles as well literature review on peer-review articles.

1. Introduction

Many contemporary debates around energy, revolve around security, climate change mitigation and poverty alleviation. Energy is considered as one of the principles in achieving the sustainable development goals (SDG) and increasingly questions are also being asked about the links between ongoing energy development and justice, equity and fairness. In order to raise awareness of the social dimensions of energy policies, the seventh SDG has been introduced in order to recognize access to clean and affordable energy as a universal right (UNDP, 2016).

Energy justice is thus an inspiring approach for scholars and decision-makers who want to engage with questions such as what energy is used for, what values and moral principles ought to guide energy decisions as well as who benefits and loses (McCauley et al., 2013; Jenkins et al., 2016; Sovacool et al., 2016). Sovacool and Dworkin (2015) have detailed several ways of utilizing these considerations in the energy justice-framework. Due to its interdisciplinary nature - ambitiously bringing together the philosophical concept of justice with energy studies - it is important to clarify the framework's potential applications. In it, it is clearly stated that energy justice can be used in three ways: As a concept for philosophers and ethicists to better integrate distinct distributive and procedural justice concerns; as an analytical tool for researchers striving to understand how values are presented in energy systems and/or energy related conflicts; and as a decision-making instrument that assists energy planners and consumers in making more informed energy choices. This article aims to evaluate Nepalese national and local energy efforts by applying the key aspects of the energy justice-framework, in particular its reflections on availability, affordability, intra- and intergenerational equity, and sustainability. It concludes by highlighting the importance of the feasibility constraints such as biophysics and geopolitics as these can pose limitations to implementing energy just policies and thus also to the energy justice framework applicability when moving from ideal to actual conditions.

Nepal is among one of the world's least developed countries, with one of the lowest energy consumption per capita in the world, and further has no major reserves of coal, natural gas or oil (Sovacool et al., 2011; Gurung et al., 2013). According to Herrington and Malakar (2016), the high magnitude earthquake in April 2015 aggravated the situation of energy access as around 30% of the electricity infrastructure of Nepal was damaged. Apart from that, Nepal is also the world's

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most recent republics due to the peace process that followed a decade-old political instability. According to Nepal and Jamasb (2011), to the civil war between the Maoist rebellion and the government of Nepal meant that political instability severely affected the state-owned sectors, including the energy sector, leading to fragmented leadership, changing priorities and policy discontinuity. During the peace process, the post-conflict government has introduced a number of reforms. Among those is a Rural Energy Policy (REP), that aims to ensure access to clean, reliable and appropriate energy in the rural areas, and to strengthen the local governance structures. In parallel to this development, bottom-up movements such as community groups have also mobilized to extend the coverage of the electricity network.

In addition to that, the realization of the urgency of providing modern energy technology and services, particularly to rural areas, has prompted the Nepalese government and development institutions such as the World Bank and the UNDP to support community-run renewable energy facilities. Due to its mountainous terrain Nepal has potential to generate significant amounts of energy through renewable sources, especially from micro hydro schemes. This is seen as a cheaper and more feasible way of providing modern energy for remote areas, because connecting remote areas to the national grid is costly. Several community-based initiatives now promote the adoption of a decentralized renewable energy management. It is claimed that such inclusive, co-operative approach with local governance structures can extend the access to and availability of renewable energy to all community members with particular attention to vulnerable members like women, Dalits (often viewed as the lowest social caste) and indigenous people (UNDP, 2012). However, scholars like Nightingale (2002), Jones and Boyd (2011) have pointed out that asymmetry in power relations within communities on the basis of wealth, status, gender and caste, may influence the ability to equally derive benefits from such development projects.

As an approach to analyze complex dependencies between energy systems and its socio-political environment, including aspects of power asymmetries, the energy justice-framework is introduced in this article as an instrument for informing decision-making processes. It is used as a way of understanding how principles such as availability, affordability, inter- and intragenerational equity and sustainability play out in Nepalese energy policies and practices. While decentralized renewable energy development is in progress at the community level, the Nepalese energy development is also heavily influenced by the relationship with fast-growing economies of neighboring countries such as China and India. Equal access for all and inter- and intragenerational equity are some of the principles that drive community-run renewable energy development. Yet at the same time national and regional energy actors argue for fossil-fuel development through utilitarian values such as national interest and dependency.

The contributions of this article are three-fold. Firstly, it contributes to an understanding of opportunities and challenges for energy transitions in Nepal by relating to the key aspects of the energy justice-framework. Secondly, the article fills a gap in the research literature regarding energy justice in a least developed country-contexts. Thirdly, it discusses how energy justice ideals in Nepal can be constrained by different factors such as natural events, geopolitics, scarce economic resources and poor infrastructure. This is done by introducing the notion of feasibility, which functions as a boundary-concept facilitating communication and understanding across disciplines and between different contexts and stakeholders. Through this concept the article consequently offers a critical assessment of the energy justice-framework's applicability in the Nepalese context as well as of the framework itself. The empirical evidence is derived from interviews during a one-month fieldwork in the Lalitpur and Katmandu districts of Nepal, site-visits, discourse analysis of expert statements, government policies and newspaper articles as well literature review of peer-reviewed articles.

The article is organized as follows. Section 2 briefly provides an overview of energy systems, electricity access and local initiatives in Nepal. Section 3 introduces the research design, the energy justice-framework, feasibility constraints and the ways in which the energy justice framework is used as a decision-making tool in this article. In Section 4, the findings of the analysis related to the framework's principles are presented and discussed. Finally, Section 5 concludes and offers some policy recommendations.

2. Nepal: energy background

Nepal is a country rich in natural resources, which can be utilized for renewable energy production, especially in the form of electricity from hydro, solar and wind power. However, due to political, technical and economic challenges the majority of Nepalese people still rely on traditional energy sources such as biomass (fuelwood, dung cake, rice husk) as they lack access to the infrastructure needed for modern energy forms (Gippner et al., 2013). When it comes to fuel type, biomass fuel from wood constitutes the largest share of the consumed energy (76%), followed by petroleum products (8%), animal waste (6%) and agricultural residues (4%) (Surendra et al., 2011). The demand for petroleum products is solely met by imports, consuming more than 40% of the total export earnings of Nepal (APEC, 2014). The residential sector (mainly cooking, heating, animal feed preparation and lightening) is the most energy-consuming sector with a share of about 89% followed by the industrial and transport sector (Surendra et al., 2011). Although agriculture remains an important source of growth in Nepal and the largest employment sector for a large segment of the population, its share in energy consumption is low, amounting to 0.9% of the national energy used in 2008/2009 (Surendra et al., 2011; World Bank, 2015). This is due to the low degree of mechanization of agriculture (Chetri, 2007).

According to Nepalese scholars and energy experts, there is a need for a paradigm shift from top-down and foreign-dependent energy development towards decentralized and self-sufficient energy systems (Jamasb, 2006; Bhattacharya, 2007; Nepal and Jamasb, 2011). As in most developing regions, the centralization-paradigm in energy development and management practices in Nepal mainly applies to the supply of energy to urban areas. By contrast, a majority of rural populations are disconnected from centralized energy systems (Chetri, 2007). This is also reflected in the use of electricity as an energy source. According to data from 2010, electricity constitutes only 2% of the total energy consumption, whereas petroleum products and coal represent 9% and 2%, respectively (MOF, 2011; Gurung et al., 2011).

Approximately 70% of the total population has access to electricity and out of this share, 45% uses the national grid while 25% uses off-grid solutions such as solar and micro-hydro power (Kumar et al., 2015). Currently, Nepal faces structural challenges in its electricity sector such as a burden of price subsidies, low service quality, low bill collection rates and high losses due to poor network and service coverage experienced under state-owned and controlled systems (Nepal and Jamasb, 2011, 2012).

The Alternative Energy Promotion Center (AEPC), established in 1996, is as a central organization of the Government of Nepal aiming to promote alternative energy development, particularly in rural areas. By 2014 more than 1000 micro hydro power plants with a total capacity of 25 MW had been installed. Through the National Rural and Renewable Energy Programme (NRREP), the government of Nepal has aimed to install micro/mini hydropower for electricity to an additional 150.000 households in the programme phase between 2012 and 2017. It is now argued that coordination between the Nepal Electricity Authority (NEA) responsible for extending the grid to rural areas and the AEPC needs to improve for example to avoid redundancy of micro hydro power installations with grid extension and better prepare for grid connection. Some end users as grinders, saw mills and oil expellers are further reluctant to switch to NEA grid because of unreliable supply or prominent problems such as load shedding (Kumar et al., 2015).