UNIVERSITY OF BIRMINGHAM

Distributional justice in solar energy development in India

Yenneti, Komali; Day, Rosie

[Link to publication on Research at Birmingham portal](#)

Distributional Justice in Solar Energy Development in India: the Case of Charanka Solar Park

Komali Yenneti[1,2*], Rosie Day[1]

[1] School of Geography, Earth and Environmental Sciences, University of Birmingham, B15 2TT, Birmingham, United Kingdom, E-mails: yenneti@niglas.ac.cn, r.j.day@bham.ac.uk

[2] Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences, Nanjing 210008, China

*Author to whom correspondence should be addressed; E-Mail: yenneti@niglas.ac.cn

Abstract

Large scale renewable energy developments, although seen as environmentally good, also have the potential to damage a community's well-being if the distribution of outcomes of the development, both good and bad, is unfair. Inequality in the distribution of benefits and costs, especially when some sections of a community benefit at the expense of others, can divide communities, damage relationships, and result in conflicts. In recent years, a considerable number of empirical studies examining the controversies over distributional inequalities in renewable energy practices have emerged. However, most have focused on the developed world; there has been little research in the context of the Global South, where large scale and rapid development of solar energy especially is anticipated to contribute to economic development and relieve energy poverty. This paper provides an empirical case study of 'Charanka Solar Park' in the Indian state of Gujarat. The objective is to qualitatively analyse the distributional concerns in the implementation of the large scale solar park, developed in a remote rural location. The research illustrates how the benefits of renewable energy development tend to accrue at regional and national level whilst local host communities bear adverse consequences. Distributional inequalities also occurred at the local scale in Charanka, where the upper caste and economically better of sectors of the community were able to take opportunities, while vulnerable pastoralists and small farmers suffered the most from loss of land resources and associated livelihoods. Thus, the uneven distribution of benefits arising from the solar park development reinforced and deepened existing inequalities. The paper concludes by discussing how distributional injustice in such developments might be ameliorated in the future.

Key words: Charanka solar park; Distributional justice; Energy justice; India; Social justice; renewable energy

1. Introduction

With over 300 days of sunshine, solar radiation of 5.6-6.0kWh/m^2 per day and the availability of large tracts of 'waste' land, the State of Gujarat in India has a huge potential for generating solar energy (GEDA, 2009). Realising this potential and the benefits that solar energy can bring in addressing climate change and energy security issues, the Government of Gujarat released the Gujarat Solar Power Policy (GSPP) in 2009, making it the first of India's states to do so. This was a year before the release of the National Solar Mission (NSM) of India, a national level policy for accelerating solar energy development in the country[1]. With more than 850MW of capacity installed by early 2013 under the GSPP 2009, Gujarat not only leads in total installed capacity but also in the number of projects (GEDA, 2013). Apart from supporting individual solar photovoltaic (PV) power projects, the GSPP 2009 was also an experiment by the State government to develop a series of public-private partnership based large-scale 'solar parks' in the state (Yenneti, 2014a, 2014b). The first of the solar parks was initiated in 2010 in a remote village called Charanka, and completed in April 2012. With an installed capacity of 216MW on about 2000 hectares of land, and an investment cost of about US$280 million, the project became the Asia's largest solar park after overtaking China's 200MW Goldmud solar park (Yenneti, 2014a). The project was not only given an award by the Confederation of Indian Industry (CII) for being the most innovative and environment-friendly project in India, but was also recognised globally.

At state and national scale, this is a success story. The huge amounts of power generated help to meet the demands of Gujarat and India's rapid industrialisation and booming economies, and the leap forward in the scale of renewable energy production progresses India's ambition to be world leading in climate change mitigation initiatives. Drilling down however, the picture is less universally positive. Concerns about the local upheaval and impacts of the mega-development come into view which echo those already raised in India by the implementation of large dam projects (e.g., Sardar Sarovar dam in Gujarat) and more recently economic development projects (e.g., Special Economic Zones) in India (Mukherji, 2012; Shiva, 1997; Vasudevan, 2008).

Before the solar park, Charanka was a small remote village with a population of around 1500, engaged largely in farming and animal herding. For about 4 months of the year, the village is home to a community of Rabari, a pastoral nomadic group who travel with their herds for the other 8 months. The land acquired for the solar park project came entirely from the environs of this one village. It was a combination of private land bought from small farmers and a large amount of government owned land, classified as 'waste' land. This waste land had however been used by subsistence farmers and Rabari as a common resource for grazing and gathering *gando*

---

[1] Due to decentralization, the national and state governments in India have equal legislative powers in making and implementation of energy policies. Accordingly, the Gujarat government's State solar policy is independent of the NSM.

baval (Prosopis juliflora), which is used for making charcoal. Hence, its loss represents a severe threat to their livelihoods and way of life.

This situation raises important questions about the distribution of the benefits and burdens arising from such developments. Large scale renewable energy projects are widely perceived as a good thing, both environmentally and socially, and as such, Charanka solar park was exempt from the requirement for an environmental impact assessment or any formal assessment of social impacts. Nevertheless the case of Charanka highlights the potential for marked inequity in the distribution of benefits and costs of such 'environmentally good' projects. Not only is such inequity unjust, but when it is taken seriously by affected communities, it affects the social acceptance of such development projects (McIntyre & Gilson, 2002; Walker & Devine-Wright, 2008). Given that Charanka solar park is merely the start of a wave of such large scale renewable energy projects in India and beyond, it is an opportune time to examine and reflect on these issues.

The objective of this paper is to identify and understand the distributional justice concerns in the implementation of the Charanka solar park, from the perspective of the Charanka village community. In doing so it aims to give some voice to the disenfranchised rural communities most impacted by such ambitious large scale development. The case study makes an important contribution to the growing field of energy justice as an example of theoretically informed empirical work on distributional justice in energy development, and especially by adding to the relatively small amount of literature on justice in renewable energy development in developing economies.

The remainder of the paper is organised as follows: first, it begins with theoretical debates on distributional justice, reviewing key concepts from social justice literature and moving on to explore how distributional justice has been considered in literature on renewable energy. Following the presentation of the case study's geographical context and the research strategy employed, distributional concerns in four themes are discussed through drawing on interviews with the Charanka community and representatives of solar power development companies. Finally, we discuss the issues in the context of notions of distributional justice, and provide some concluding remarks.

2. Theory

2.1 Formulations of Distributional Social Justice

While different theories of distributional justice have been formulated by different scholars in the past century, some of the most influential ideas originated with John Rawls. In his seminal work 'A theory of justice' (1971), Rawls argued that the fundamental idea in the concept of social justice should be fairness in the distribution of goods and advantages (also see Rawls, 1967). He proposed that a notion of fairness can be arrived at from an 'original position' whereby subjects

mentally position themselves outside of a society in which they know that they will be a member, but without knowledge of who in that society they will be. From this position, principles of fair distribution and functioning of institutions can be agreed. Rawls principles thus derived include that any inequality in a given distribution of primary goods (i.e. those fundamental to wellbeing, participation in society and the ability to access further opportunities) should favour those who are in more general terms the least advantaged in society, either directly or through trade-offs (Rawls, 1971). This proposition of justice as fairness was put forward in large part in opposition to utilitarian approaches (Bentham, 1789; Mill, 1863) which had been highly influential for more than two centuries. The utilitarian position, which would maximise aggregate utility (or happiness, satisfaction etc) runs the risk of overlooking and condoning systematic discrimination against some individuals and minority groups, and the sacrifice of their wellbeing for the greater good.

Critics of Rawls have been quick to point out that his principles are not so easy to apply in real situations: how do we know who the least advantaged are? What is to be counted in the distribution of goods? How do we assess whether justice is done or not, or to what degree? (Smith 1994, Dryzek 2000). Walzer (1983) also points out that goods (that are to be distributed) may not be valued similarly by all individuals and groups, adding a further complication. Nevertheless. Rawls notion of distributional justice has provided a touchstone for justice work ever since, heavily influencing following justice theorists including some of his critics (Harvey 1973, Soja 2010, Sen 1992, 2009).

A somewhat different notion of social justice to develop in the later 20th century came from the 'basic needs' school, for whom social justice means ensuring that all citizens have the means of meeting their basic needs, for example Fried 1983: A person has a claim on his fellows to a standard package of basic or essential goods – housing, education, health care, and food, i.e. the social (or decent) minimum – if by reasonable efforts he cannot earn enough to procure this minimum for himself. (p. 52). Griffin (1986) puts the list of basic needs under categories such as means of existence (food, clothing, shelter etc), pleasure (a good life), work, rest and play (well-balanced life), and social relationships (family, friends, etc).

Related to the basic needs approach but developing in a distinctive manner is the capabilities approach of Amartya Sen (1999, 2009), and similarly Martha Nussbaum (2000, 2011). Like Rawls, they are critical of utility focused assessments of optimal outcomes, given that people in different positions have different propensities to be satisfied, but they also critique Rawls' focus on primary goods as the object of concern in justice formulations. Instead, they argue, the focus should be on outcomes, and on what people are able to be and to do – their 'capabilities'. Importantly, individuals cannot convert primary goods to outcomes at the same rate, and so they argue the focus on outcomes is better. Nussbaum (2000, 2011) drew up a list of 'central capabilities', suggested as a list of what individuals should expect the state to support as a matter of justice, whilst Sen's approach argues that priority capabilities should be set through deliberation, and is more interested using capability sets (and their increase or decrease)

informationally to evaluate course of action, rather than formulating an ideal position such as Nussbaum's. Nussbaum's approach especially echoes the basic needs approach but the notion of capabilities embraces an idea of broader human flourishing and also has a greater focus on individuals' freedom to choose what opportunities to take. Both the basic need approach and the capabilities approach however are partial approaches to distributional justice however, in that they set the terrain for defining a minimum entitlement, or making relative assessments, but not a full sense of what a fair distribution would look like.

Formulations of distributional social justice have been drawn on to inform work beyond that traditionally considered as the concerns of social justice: in geography (e.g. Harvey 1973; Soja 2010 as mentioned above), and in environmental justice, where the distribution of environmental hazards and goods across social groups is of concern (e.g. Schlosberg 2004, 2007; Shrader-Frechette 2002; Walker 2012). In the last decade growing attention has been given to distributional issues in energy matters, with a body of work on 'energy justice' emerging with connections to previous social, environmental and spatial justice work (Sovacool and Dworkin 2014; Sovacool et al., 2013; Bickerstaff et al., 2013). It is to this latter body of work that this paper contributes, and to which we now turn.

2.2 Distributional justice, energy and the development of renewables

Until recently, social science interest in renewable energy had tended to focus its role in alleviating poverty and enhancing economic development (Chakrabarti & Chakrabarti, 2002; Junfeng *et al.*, 2002; Munday et al 2011). Recent years however have witnessed the evolution of justice concerns in energy both in policy rhetoric and academic research (Walker *et al.,* 2010). This has encompassed concerns over justice in not only access and consumption (Walker and Day, 2012; Hall 2013; Day et al., 2016) but also the distribution of energy production developments and their outcomes (Catney et al., 2013; Gross, 2007). For example, debates on the fair distribution of costs and benefits from wind energy development have multiplied in the UK (van der Horst & Toke, 2010; Cowell et al., 2011; Simcock, 2014) and extended to various other European countries such as Spain (Zografos & Martinez-Alier, 2009), France (Nadaî, 2007), Denmark (Toke, 2002) and Germany (Breukers & Wolsink, 2007)

The distributional justice concerns of these case study analyses range from the distribution of economic benefits (profit and compensation), social benefits (creation of jobs, education etc) and energy benefits (access to energy), to burdens such as losing land, livelihoods and amenity. Given that renewable energy projects contribute to achieving economic development and climate change targets, it is often argued that the environmental and energy benefits of renewable energy (and low-carbon technologies) accrue largely at regional, national and international level (Cass & Walker, 2009; Lorenzoni et al., 2007; Poortinga et al., 2006), while it is perceived that environmental and social impacts, such as noise, visual impacts, and land and habitat loss, occur mostly at the local level where projects are hosted (Mallon, 2006). Nevertheless, there is also potential for inequitable distribution of benefits and burdens *within* the local host communities.

For example, for a wind energy project, a simple analysis would identify the gainers as the landowners where the project is hosted, who would receive an annual income; and the losers would be neighbouring landowners and residents who would be affected by the location of turbines close to their properties but gain no revenue (Gross, 2007). The provision by developers of 'some form of additional, positive provisions for the people affected' is sometimes considered as an option for managing distributional arguments and other social and environmental impacts that accrue locally (Cowell et al, 2011,p539; Wolsink, 2007); whilst such community benefit packages can be a tool for managing conflicts and increasing local acceptance, they have generally been found to do less to address scalar inequities or garner local support than have alternative arrangements such as community ownership (Munday, et al 2011; Warren & McFadyen, 2010). Some studies have also connected distributional fairness and its perception with the extent to which procedural justice is seen to be done, through transparent and open decisions making (Gross 2007; Zoellner et al., 2008), echoing the wider environmental and energy justice literature on the connection and complementarity between procedural and distributional justice (Shrader-Frechette 2002; Walker and Day 2012; Schlosberg 2007).

Whilst such work on distributional justice issues in renewable energy development is enlightening and of practical significance, the explicit connection with distributional justice theory is in the main relatively weak, with intuitive notions of (un)fairness, and (in)equity generally not unpacked and specific, alternative formulations of justice not considered. It is also notable from the above review that there is also very little research on justice and renewable energy development in the context of developing economies. This is an important gap, given the ambitious plans for large scale renewable energy development in countries such as India and China, and expectations that renewable energy can foster sustainable development. It is crucial to examine issues of justice and injustice in energy development inthe global South, partly because of the rapid development of this sector, but also because the different social and economic context in which this development is taking place, which means that lessons from case studies in Europe and the UK many not be transferrable. This paper aims to contribute to the energy justice field by providing a theoretically informed analysis of energy justice in the context of renewable energy development in India.

3. Material and Methods

The research sought to investigate the specific social justice concerns in the implementation of a large solar power development in India, and in doing so, to broadly understand the social justice implications of projects of this kind and scale. The 'Charanka solar park' project, implemented under the GSPP was selected as a case study (see section 1). The case is particularly interesting not only in terms of the geographical features of the location and size and scale of the project, but also the social characteristics of the village. Charanka village lies in the district of Patan (district headquarters at Mehsana) not very far from the border of Pakistan and the unique saline marsh of the Great Rann of Kutch and the Little Rann of Kutch, and at a distance of 230 kms

from the state capital Gandhinagar (see figure 1). For the implementation of the solar park, more than 2000ha of land which was previously used as a grazing and farm land was acquired from the environs of Charanka village.

The social profile of Charanka is based on the Hindu caste based social stratification system in India. The seven castes of Charanka fall into four of the five major dominant castes in India (see table 1). Of all the different castes, Rabaris, a nomadic pastoral community, are the biggest in terms of numbers when present in the village. During their migratory movement for about eight months in a year, in search of fertile land and food for their goats and sheep, the Rabaris of Charanka cross more than 200kms in several halts. The dominant caste of the village both in terms of education and position are the farming and landowning Gadhvi community. Some of the members of this community work in large industries in urban areas and are also locally influential members of political parties. Koli and Thakore communities, also a part of the Kshatriya major caste along with the Rabari and Ghadvi, are in various occupations including skilled professions, agricultural labour, and farming. Ahirs are largely a cow-herding community and Harijans are agricultural labourers. The Muslim population's livelihood activities include farming, and other non-traditional occupations such as driving and owning small shops. There is also one Brahmin (priest) household who occupies the most respected position in the village. While Rabaris occupy a better position socially than some other caste communities such as Harijans, with a lack of land rights, low literacy and acute poverty, the Rabaris' life is more precarious than others in the village.

Table 1 Details of households in Charanka village

CHARANKA SOLAR PARK

Legend

▲ Settlements
— National Highway
—+— Railway Network
CHARANKA SOLAR PARK AREA
Rann of Kutch
Taluka Boundary
District Boundary
State Boundary

GUJARAT

INDIA

RANN OF KUTCH (Dry Desert)

CHARANKA SOLAR PARK

Santalpur

Patan

Mandar
Dhanera
Tharad
Disa
Palanpur
Siddhapur
Radhanpur
Patan
Unjha
Santalpur
Fatehgarh
Harij
Chanasma
Bhimasar
Mahesana
Jhinjhuvada
Kadi
Patri
Kalol
Kakrej
Viramgam
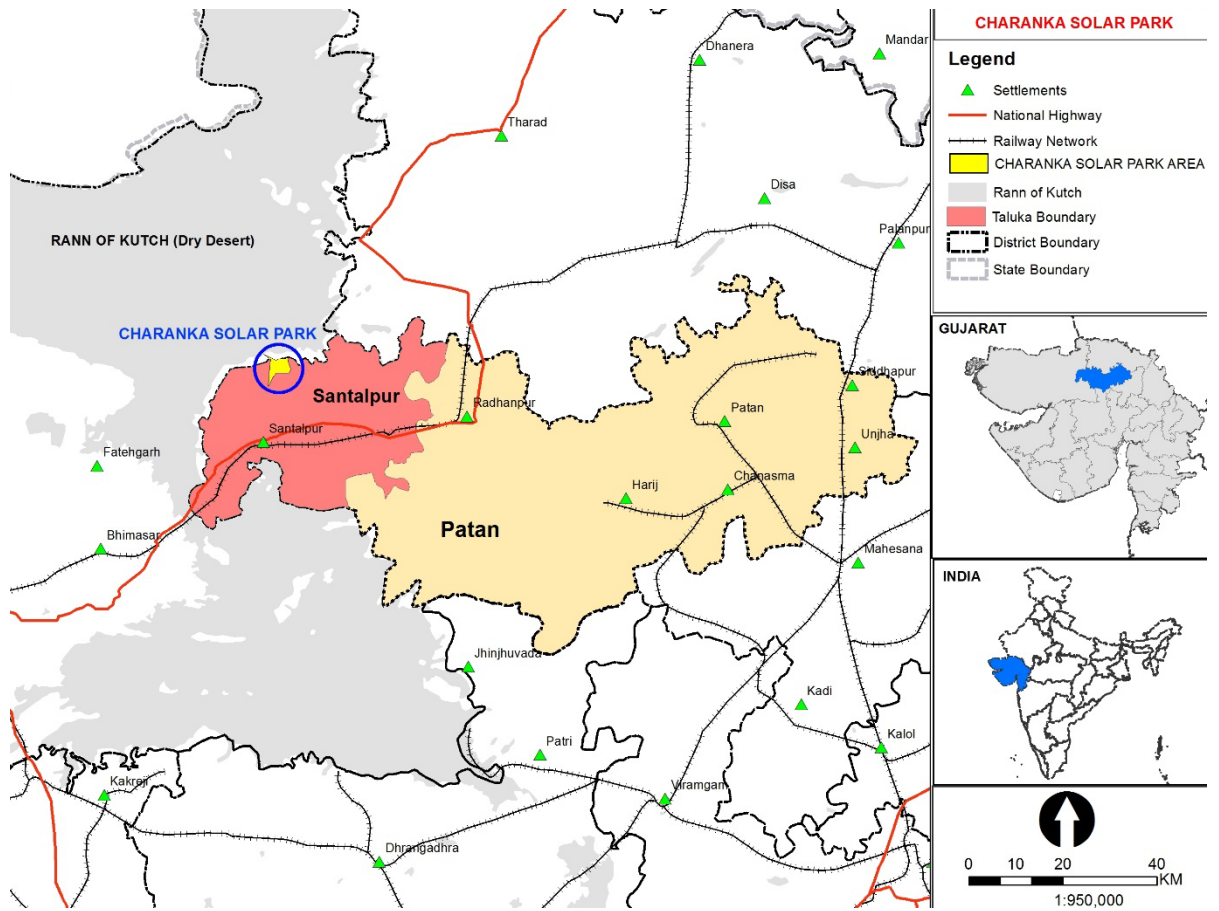Dhrangadhra

0 10 20 40
KM
1:950,000

Figure 1 - Location map of Charanka solar park

Fieldwork took place between October 2011 and January 2012. The research adopted a qualitative research strategy to provide in depth information on beliefs, experiences, and everyday realities of the informants' social worlds (Limb & Dwyer, 2001; Philip, 1998). Qualitative work was also felt to be more appropriate in view of the less than universal literacy of the village, and in order to better broach unequal power relations and build trust. The first author was resident in the village over much of this time, taking part in daily life and rituals and able to make observations; however in order to elicit in depth perspectives from a range of informants on a specific, focused set of concerns, semi-structured in depth interviews were employed as the primary method, rather than more extended participant observation.

The interview protocols were developed based on literature review and on initial experience in the case study site. The interview protocol had three main sections. The first consisted of questions about the interviewee, such as the details of his livelihoods/employment, etc. The second part addressed their relation to and knowledge of the solar park development. The third and largest section was designed to elicit their perspectives on the procedures surrounding the development and on its outcomes for them and the village. Being semi-structured, the interview protocol was designed to be used flexibly so that the conversation could be relaxed and flowing and relevant topics could be pursued as they arose.

The interview process started with the community interviews. Interviewees were identified and recruited with a stratified purposive sampling approach – aiming to get representatives from different castes and groups – and a 'snowball method'. A preliminary discussion with a 'village elite' (a Gadhvi farmer and large landowner) helped to locate key members of different castes who in turn helped initiate access to other interviewees of their respective castes. Based on the household social structure information collected from the village *Anganwandi* office (see table 1), potential interviewees representing different castes and occupations were approached.

In total, in order to get a reasonably representative sample, 30 focussed interviews were conducted, each for about 1- 1.5 hours. Community interviews were conducted in Gujarati, the regional language. Every interview began with the first author introducing herself, the motivation behind her visit to the village, and with a general discussion about the practices and traditions of the local community, which helped to bridge a gap between the researcher and the interviewees. While in most cases it was ensured that the interview was one-to-one, it was not always possible to be completely private, and sometimes nearby people would be eager to join in with their perspectives. Interviews were conducted at places the interviewees were comfortable; these included their 'home grounds', temple, walking in the village etc. In all cases every effort was made to ensure the participants' comfort, safety, and confidentiality

One important aspect that was observed in the interview process was that the village is still dominated by a patriarchal system. Any matters related to occupation and work are

dealt with by men. As a result, almost every time a discussion with women was initiated, the conversation would be taken over by men. It was also found that women claimed to know much less about the solar park, often responding to approaches with 'we don't know anything'. This made it more difficult to collect women's perspectives. With some perseverance, 6 of the 30 interviews were conducted with women, but it must be noted that women's perspectives were not as well represented as men's, and therefore potential gender-related aspects of injustice are not covered by this study.

Following the community interviews, a series of 'expert group' (project developers and government) interviews were conducted. With contacts given by the project implementing organisation to the first author, and a letter obtained ahead of the fieldwork from the principle secretary of a top bureaucratic organisation, it was possible to get access to both the business and government interviewees. Out of the 19 business developers in the solar park, interviews were conducted with representatives of 14. In addition, 6 interviews were carried out with government representatives. While a majority of the business developers' interviews were conducted at their site offices by simply knocking at the door, others were conducted by prior arrangement at other places such as head offices, and hotels. On occasion telephone interviews were conducted where the interviewee was unable to meet in person. The government representative interviews were conducted at their respective government offices. Most of the 'expert group' interviews were conducted in English, as a shared professional language, except the interviews with district level officials, which were in Hindi, the major pan-Indian language. All of the interviewees, except the district level official, were men. As expected away from major urban centres, all the business and public officials involved in the solar park project were men. This also reflects the general dominance of men in India's business and bureaucratic systems.

With permission of the interviewees, most of the interviews were audio recorded. In the process of translating the interviews from *Hindi* and *Gujarati*, every measure was taken to preserve the context and meaning of the original transcripts. The research employed a thematic analysis method (Bryman, 2008), with the help of computer assisted software 'QSR-NViVo', to identify themes and narratives of relevance to the research questions.

Given the setting of the research, in a remote and underdeveloped community, it is appropriate to offer some brief reflection on the researcher's (i.e., the first author's) positionality and the negotiation of relations. In India's rural areas caste and religion play a dominant role in defining the position of a person and during the interviews the first question posed to the first author was about her caste and location of residence. In those situations, the author had to softly deny or divert the topic to be neutral about caste or class-based or religion-based hierarchical structures. Inevitably, the community's initial perception was that the researcher was a 'privileged' Hindu, upper-caste (and class), educated, urban Indian who would not understand the life and hardships of poor rural communities. While this perception persisted to some extent throughout the fieldwork, the perceived social gap was somewhat lessened after she

accepted food and water from all caste groups. Dress – wearing a traditional three-piece dress worn by most young women in India – paying attention to mannerisms and use of language especially with elders, maintaining some local protocols, and experiencing the villagers' life by living in a temple also helped to build bridges. In interviews at all levels, the researcher had to renegotiate the power relations and attempt to build trust by being neutral and objective and at the same time genuinely empathetic about statements made by the interviewees. In general, factors such as the common nationality, to some extent common ethnic background, and sympathy for a female researcher facilitated conversations with interviewees who shared their perspectives generously.

4. Results

This section discusses the distribution of the costs and benefits of the solar park development with regard to the community of Charanka, as gleaned from the community interviews, with additional perspectives taken from the expert interviews. These are discussed in relation to land acquisition, employment, infrastructure, energy provision, and local economic development opportunities.

4.1 Land transaction mechanisms

Based on the research interviews, the single most important negative impact of the solar park development felt by the villagers of Charanka was the loss of access to land by the landless pastoralists, small farmers, and agricultural labourers:

> *...Though the solar park is in the government land, more than 50% of our village animals live on that land...Where do the cattle go for grazing now? More than 50% of families living in this village are Rabaris.* (Rabari Respondent)

The land acquired for the solar park project came entirely from the environs of Charanka. A major portion of Phase-I solar park (216 MW installed capacity) was on government-owned land, which had been a source of community subsistence for years, so the government's appropriating the land for the development had a grave impact on livelihoods, particularly of the Rabaris, an already economically marginal and landless group. Because of the remoteness and hard climatic conditions of the location, the land had been considered as wasteland by the government, but was used as common land by the villagers[2] – especially Rabaris – for grazing and farming. The land had also been an indirect source of livelihood in other ways, including through collecting *gando baval* (a woody shrub) as a source of fuel and selling it to charcoal factories.

---

[2] Traditionally Rabaris had uncontrolled access to grazing land. Even Post-Independence, The Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forests Rights) Act, 2006 of the Government of India maintains rights for local communities over disputed lands or on common property resources such as grazing lands. The ambiguity around right to access was compounded by conflicting claims about how the land was in fact being used.

In addition, Phase I of the solar park involved acquisition (through purchase) of some privately owned farmland. Unfortunately, without good information about the planned development (see anonymised for review) and therefore of the market value of the land, some illiterate small farmers and the few Rabaris who owned small land plots sold their land at low prices to middlemen from other villagers, due to a need for money for children's marriages, medical expenses and so on, and in expectation that they would have continued access to the commonly used 'waste' land in the village environs. The middlemen, who had information about the development from government sources and newspapers, sold the land on to the government at a much higher price. In this way these small farmers who sold their land were left with no other means of subsistence than temporary labour jobs in the solar park (section 4.2), ending their long-term and sustainable dependence on agricultural activities:

> *Some people in our village had already sold bits of land and already spent that money. Now what happens to the rest of their lives?* (Rabari Respondent)

Yet some others were more conscious of the implication of losing their land title and did not sell it;

> *They might give whatever price for the land – may be higher or lower, but, what would money mean to us, for those who live only on farming. Money doesn't stay permanently, land stays and the income on land is our survival* (Rabari Respondent).

According to the above respondent, land provides not only sustainable livelihoods to the poor communities, but also sustains a continuous income flow through the sale of crops, enabling investments in their children's education, thus arresting the intergenerational transmission of poverty besides providing insurance and access to credit markets. The interviews emphasised that many local people had a strong attachment to their land – even worshipping it on occasions.

Thus, even at the higher prices after the project was eventually publically announced and especially after the enclosure of the public land became obvious, some people refused to sell their land plots. During the course of the solar park implementation, some collective action and organised resistance among private landowners, led by some larger landowning village elite, resulted in some, mainly larger landowners, retaining their land (ref anonymised for review) and with impending state assembly elections, the government scaled back the planned installation from 500MW to 216 MW. This, they could implement on the enclosed 'waste' land and that already acquired from the landowners who, due to a need for cash, sold early without full knowledge of the project. Thus, the impacts of land use change fell on the pastoralists, agricultural labourers and the poorly informed illiterate farmers.

4.2 Employment opportunities

Employment opportunities are to be expected form a major development, and this was a topic that interviewees were keen to discuss with regard to who these benefitted. Though most interviewees accepted in the first instance that some kinds of jobs were created, they explained that they were mostly unskilled, low wage construction jobs and further, that those jobs being temporary, represented only a short term benefit, not compensating for the impact of land loss:

> *We are getting jobs, but what is the use of this kind of jobs...when construction after 2 years is over what will the illiterate villagers do?* (Muslim Respondent)

> *We just earn INR 150/day ($3 approx). According to these days' expenses, we can't get anything from that money* (Rabari Respondent, currency conversion added)

According to the above respondents the low wages that they earned from construction work was not enough to provide a sustainable living for a family, or fulfil their basic needs.

Apart from the daily wage construction labour opportunities, some better skilled interviewees had been able to access monthly fixed salaried employment opportunities were also reported by some of the interviewees:

> *I was working as store manager - cement and other products will come in and go out. I need to manage in-out register. I was getting Rs 6,500/month. Now I am working in x company, this is not a permanent job. While the project is there I will be working.* (Gadhvi Respondent)

The income of INR6, 000/month ($120) stated by the above respondent was a good salary for rural areas in 2011. While this interviewee was positive about the employment opportunities of the solar park and felt they had improved their quality of life, he acknowledged that as with the daily waged labourers the jobs were only short-term and the benefits temporary.

Though business interviewees also initially argued that the solar park provides a large number of job opportunities for Charanka and its neighbouring villages, they also agreed that those opportunities were largely low salary and temporary construction labour work. They attributed the temporary nature of the jobs to the mechanised solar power industry:

> *Currently there are about 250-400 people working but it's only till the project is commissioned, in operation you don't require many.* (Solar company Respondent)

Although the Gujarat Solar Power Policy (GSPP) 2009 obliged the project developers to recruit local people, factors such as lack of technical skills and limited availability of

working population in Charanka and its neighbouring areas drove them to recruit both skilled personnel and labourers from other parts of the state and the country. The lack of technical expertise in the region was primarily responsible for not only the temporary nature of the benefits accessed by the village community, but the outflow of more employment opportunities.

> *The main workers employed in the companies are from outside. It would have been still OK if the companies are employing people from Santalpur or Radhnapur.* (Rabari Respondent)

Thus while uneducated local communities lost land –related livelihoods and benefitted only from temporary low paid jobs, non-local workers emerged as beneficiaries with no personal costs and burdens. The discussions also posed unanswered questions about the long term livelihood of the local labourers, now without land resources, living in a poverty entrenched remote location.

4.3 Infrastructure development

A major development such as the Charanka solar park might be expected to bring infrastructure benefits to the region. Members of different communities in Charanka emphasised that they were lacking even the most basic facilities and the community's fundamental definition of (potential) benefits from the project was the provision of basic infrastructure and services (such as paved roads, schools, hospitals etc.) for the village. On such infrastructural development, it was claimed that for the purpose of development of the site and transportation of solar panels to to it, a stretch of 30kms of good road was constructed from scratch to connect the connecting the solar park site to the National Highway. Meanwhile, an existing road connecting the village to the neighbouring villages and regional centre, *Santalpur*,the location of a hospital, high schools, market and so on, was completely neglected (figure 1):

> *Solar park road is being constructed but that is for their benefits and mainly for the companies.* (Rabari Respondent)

> *This year the rains in just one month were in such a way that the road from here until Santalpur was closed. We were blocked up without being able to go out of this village.* (Rabari Respondent)

The 30km stretch of road connecting the solar park site and the National Highway under development (first author)

The 30km length narrow road connecting the village to the Taluka broken and drowned during monsoon (first author)

Figure 1: distributional injustice in physical infrastructure development

The above quotes illustrate the dominant conception of the villagers of the benefits of the project as *'the road is for the companies and electricity for the government.'* (Rabari Respondent). With no proper road connectivity and no public transportation systems, it was an onerous (and often expensive) task for the villagers to travel, a situation that compounded the non-availability of a hospital or a primary care centre in the village, as well as a secondary school.

Considering the lack of basic services in the village, some expert interviewees also expressed their future vision of physical and social infrastructure development in the village. However, the expert interviewees concluded that while there were a range of proposals for facilities, the task of completing the project on time was their foremost priority and any plans about community development would be given thought after the completion of the project:

> *Frankly, no one has done anything till now. Right now they are concentrating on project completion...on papers there are lot of schemes for village development... but until now nothing has been done as everybody is in a great rush to complete the project.* (Solar company Respondent)

Some of the community interviewees also reported that there were discussions on provision of social infrastructure by the project developers and government, but most of them were dubious about completion of those proposals:

> *Company representatives have come and gave so many promises. They said they will build school, health centre but all will be false as per our view.* (Gadhvi Respondent)

16

Though there were several proposals for social infrastructure development in the official documents of the project, such as the Master Plan and Detailed Project Report (DPR), none of those details were shared with the communities. In fact, there was no mandatory obligation for the business developers to implement them, and from the project initiation in 2010 until the second visit of the researcher in October 2012, 6 months after connection of the solar park, it was observed that no facilities had actually been provided, or begun. (figure 2). Interviewees felt that the government was 'false promising' to get their work done easily and get away amicably from the village, and the government and developers' failure in the promised benefit provision resulted in loss of trust of the community.

Open pond and open well submerged in the monsoon rains. These are major sources of drinking water for the village (first author)

Temporary tanked water treated and supplied in large bottles to the solar park developers (first author)

Figure 2: distributional injustice in social infrastructure development

4.4 Provision of clean energy

A frequently raised point regarding potential benefits of renewable energy project development is the local communities' access to low-cost or free clean energy (Cowell et al., 2011; Munday et al., 2011). In Charanka, benefits in the form of energy provision to the community were also discussed. The solar park development did lead to 24 hour electricity supply, and free supply of solar street lights by the project developers. Several respondents agreed that though electricity had for some time been available in the village, the solar park indirectly made it uninterrupted:

> *Though electricity was available before the project also, there were*
> *power cuts during monsoon due to infrastructure failures. Because of*
> *the solar park now it is 24 hours* (Muslim Respondent)

As per the *Rajiv Gandhi Grameen Vidyutikaran Yojana* (RGGVY), a programme of the central government of India initiated in April 2005 for the creation of rural electricity infrastructure, and attainment of the 'National Common Minimum programme' goal of providing access to electricity to all households in five years, the state of Gujarat was the first and one of only seven states[3] with 100% rural electrification status at the time of fieldwork (RGGVY, 2013). Nevertheless, according to respondents, the solar park development improved the quality and reliability of the energy supply in the village. While acknowledging the improvement, the above respondent also stated that continuous energy supply wasn't *per se* provided as a direct benefit to the village. Rather, as power failures in the village could delay the completion of the project, the government made sure that the supply was continuous and reliable during the project implementation time. The power supply to the village could become intermittent again, because a) the electricity produced in the solar park was connected to the grid and not provided to the local village, and b) the repair of all energy infrastructure within the solar park since the operation was supposedly carried out by the respective project developers, with the government no longer involved. As the *gamtal* (the central habitable place of a village) is located at a distance of about 2kms from the solar park and the private developers were only interested in their respective projects, potentially there would be no further assistance for infrastructure failures in the village especially during monsoons.

Villagers also argued that the improved reliability of the electricity supply wasn't particularly meaningful to them, because they didn't need constant electricity. If they had used electric bore wells for farming, it would have been more important, but because the village is located very close to the Rann of Kutch, the underground water is salty. Therefore, the farmers depend only on rains for water supply.

---

[3] The seven completely electrified states, of the 29 major states in India, are Andhra Pradesh, Gujarat, Haryana, Kerala, Maharashtra, Punjab, and Tamil Nadu (RGGVY, 2013).

Apart from solar street lights then, there were few energy benefits to the village. Conventional electricity, though improved, was not provided for free and energy from the solar park was not provided directly to the village. Some respondents hoped that solar energy might be provided for free in the near future - '*In the long run they might give free solar energy to the whole village. That will be a big benefit*' (Vaghela Respondent) – but at the researcher's last visit, this had not happened.

Furthermore, some interviewees explained that the energy benefits would accrue far beyond the village:

> *The electricity produced from the park would be supplied to outside states, outside of Gujarat. This is what is being discussed in the village.* (Rabari Respondent)

As the state of Gujarat is a power surplus state, the government of Gujarat benefits by selling the electricity produced at much higher prices to industrial units in the state and to the power-deficient neighbouring states. Therefore, energy benefits accrue at the national level and in other states, and monetary benefits to the state government and business developers, whilst there was minimal return to the local communities. This was a situation of which the villagers were clearly aware.

4.5 Local economic development opportunities

The energy justice literature notes that any inequitable distribution of benefits and outcomes of renewable energy projects may also create conflicts and resentment within the communities hosting those projects (Brady & Monani, 2012; Gross, 2007; Walker & Devine-Wright, 2008). Echoing this, various interviewees' accounts emphasised the inequitable distribution of economic opportunities within the village. Given the remote location of the solar park and the unavailability of any market areas or other facilities for at least 30kms, various interviewees reported that a few well-informed sections of the community had taken the solar park as an economic opportunity by setting up miscellaneous small businesses in the village to support the daily needs of the migrant workers:

> *These shops have grown recently, earlier there were only 2-4 shops. Now they got more benefits because of the solar park.* (Rabari Respondent)

There were also profits to be made from renting out construction equipment to the project developers. Given the project's need for earth movers, excavators etc., some of the respondents described how some people in Charanka and neighbouring villages took it as an opportunity:

> *We have a tractor since 2007. I used to use in my farm before but I*
> *gave to the solar park now. They give Rs 25 thousand. Diesel, which*
> *costs about Rs50 per litre, is also theirs.* (Vadiya Respondent)

Access to capital and / or credit would be necessary for villagers to take up opportunities to start up such retail or rental businesses; factors such as positionality in relation to caste, position in the village, and access to information also played a major role in who could capitalise and benefit. For example, a catering operation to serve the migrant construction workers was started by a well-respected and upper caste member of the village.

> *Ok, you are eating daily at the temple priest's house? He is providing*
> *food for the workers who are working in the solar park. There are no*
> *other facilities around the area.* (Gadhvi respondent)

Some of the large landowner and upper caste members of Charanka had benefited by leasing out land to the private developers for construction purposes:

> *There are farms which were given on lease, the companies might use*
> *that land for temporary shades or brick making. The large farm*
> *owners will get so much money.* (Ahir Respondent)

The power and authority in Charanka could be categorised into a hierarchy of - i) the *Upsarpanch* elected by the villagers, holding a certain amount of power and authority through office; ii) the *Brahmin* (priests) and the major land-owning *Gadhvis*; iii) the *Rabaris* (pastoral nomadic community); and iv) marginalised castes such as *Ahirs*, *Thakore*s and others. Along with the *Brahmins*, the upper caste Gadhvis were able to take better opportunities from the solar park project as they had better access to political processes, were educated, and owned large tracts of farm land. Reflecting on this, some of the interviewees including the person who started the catering service pointed out the unequal nature of the economic gains:

> *Let's say now you are eating at our place so I would be earning but*
> *the rest of the people here will not be earning. The whole village will*
> *not be benefiting.* (Brahmin Respondent)

5. Discussion

Table 2 summarises the distribution of the social and economic costs and benefits of the Charanka solar park development. Those who emerged as the major losers overall were the pastoralist Rabari community, who lost access to grazing land, and the landless agriculturalists, who likewise lost the common land resources on which they relied. Similarly, those among the lower caste and largely illiterate small landowners who were induced to sell their land before (the inadequate) information about the project

development percolated to the lower strata of the village also had their long term livelihoods severely compromised given the enclosure of the commonly used land at the same time. These groups were able to access employment in the solar park during the building phase but it was badly paid and short term, leaving their future very insecure. The higher status and more educated strata of the village were to some extent able to benefit from the development if only in the short term, through better employment and in some cases, business opportunities if their social and economic positions were good enough. Larger and higher status landowners were also better able to resist the purchase of their land for the development, through being better informed, less in need of quick cash and in a better social position to negotiate; although whether their reprieve is permanent remains to be seen. Nevertheless, the village community as a whole in general failed to gain collectively in ways that they ideally might from the large development on their doorstep, for example through upgrades to their infrastructure, provision of services, or cheap energy. Weak regulation meant that the developers were not obliged to follow through on plans to compensate and support the community in the longer term and so apparently, these plans did not come to fruition.

Meanwhile, the project developers clearly made gains with immediate revenue from favourable feed-in tariffs that would guarantee a good return on investment, as well as experience that would enable them to acquire new projects in other parts of the country. The Gujarat state government were also major profiteers from sale of power to neighboring states at favorable rates, profits from land lease to the developers, private investment in infrastructure development, and a consolidated reputation nationally and internationally as an economic development powerhouse. At the national level, other states of the country, from greater power availability and learning experience from GSPP 2009, and India, by gaining international recognition for implementing world's largest 'solar park', emerged as indirect benefit holders.

If we look at this in Rawlsian terms, we can conclude that there is an unjust distribution of costs and benefits, crossing scales. Clearly the distribution of primary goods (of income, wealth, and the basis of livelihoods) was not equal, and the inequality, rather than being to the advantage of the generally more disadvantaged sectors of society, worsened the situation of the already precarious Rabari and subsistence agriculturalists. Injustice can be seen within the village itself, in that the better off and higher status groups tended to benefit economically to some extent from the development or at least remain protected from severe loss; moving up scale, the underdeveloped village remained relatively disadvantaged with any gains being short term, whilst the gains to the developers, state and nation were more substantial and more secure.

An injustice can also be claimed in capabilities terms, following Sen or Nussbaum, or relatedly with reference to basic needs (Fried 1983, Griffin 1986). Many of those in the village of Charanka already had a quite insecure or limited access to the resource to provide for basic needs, or had not had the social and economic basis of Nussbaum's 'central capabilities' ensured; already a situation of injustice, but one which for some

sectors of the village was worsened by the development, due to the loss of land and livelihood, whilst for others an opportunity for their capability sets to be improved through ensuring compensatory provision of infrastructure, services and / or low cost energy, was not taken by the government and developers. The capabilities approach takes less account than a Rawlsian approach of where other benefits may accumulate, but it highlights the continuing injustice in the severely and unnecessarily limited opportunities for the villagers of Charanka, especially those of lower caste and the Rabari, to flourish.

To a significant extent, the distributional injustice in outcomes of the Charanka solar park development relate to procedural injustices (see reference anonymised). Information about the development was not provided directly to the village and not in a form that illiterate community members could access; had it been, some villagers may have realised greater profits from land sales or decided not to sell. The opportunistic buying and selling on of land by middle men is actually prohibited, but local authorities turned a blind eye. Other ambiguities about land rights especially those of the Rabari, as a 'scheduled tribe', were also inadequately investigated and dealt with and there were allegations by interviewees of deliberate misleading by government representatives to get villagers to relinquish any rights they did have (reference anonymised). The social hierarchy of the village based on the caste system which still operates strongly in much of rural India facilitated the procedural injustice, and therefore the unjust outcomes. Although the village was subject to a *panchayat*, a form of local self-government, and implemented *gram sabha,* or community meetings, the hierarchy meant that village elite, generally large landowners and the higher castes, held more power and lower status members were not well protected; for example information about the development did not percolate quickly, despite some villagers with contacts and business outside the village being aware at quite early stages. As scholars have pointed out, apparently participatory fora (*such as gram sabha*) can be ineffective and even serve to increase inequalities if power relations and the fair representation of marginalised groups are not addressed (Cleaver 2001, Wong 2012). More robust procedures at the local level would not necessarily have prevented any injustice, particularly in Rawlsian terms as the large benefits of this development would inevitably accrue outside of the village itself. However, the more vulnerable members of the community could have been better protected; it is also conceivable that stronger collective action by the village might have resulted in greater gains in terms of investment into the village facilities, as has been the case in some European cases where local communities have been able to make more demands of developers; or even an adjustment to the project siting plans to share the burden of land acquisition between more than one village rather that it falling solely on Charanka. Nevertheless, stronger state and national regulation along with enforcement of such would really be needed to exert greater pressure on developers and development planners, if justice in the form of the improvement in the capabilities and ability to secure basic needs of rural communities is to be ensured, in the face of such developments.

Table 2 Distribution of benefits and burdens for different groups

6. Conclusions

This paper has discussed the distribution of the benefits and burdens arising from the development of a mega solar energy park in India. Drawing on the accounts of the indigent village population and representatives of the various solar development companies operating in the park, we find that there is a strong case for claims of injustice in this distributional picture. Whilst the Gujarat and Indian government apparently work to utilitarian principles, whereby the taking of land resources from a minority is justified on the basis of achievement of a greater good in terms of national economic development and the meeting of carbon emission reduction targets, we can make this conclusion with reference to notions of justice taken from Rawls, whose condition that any unequal distribution should benefit the generally worse off in society in order to be claimed as fair or just, has not been met. We can also argue that basic needs have been endangered for the lowest strata of the local community, and additionally that their capability sets have been diminished, in the terms of Sen and Nussbaum, where there was a clear opportunity for their capabilities to have been expanded, had the distribution of benefits been given more attention with a view to widening it.

The research has several policy implications. First, as noted by previous literature, (Cowell et al., 2011; Munday et al., 2011), 'environmentally good' projects can create social inequities; therefore rather than being exempted from assessment procedures, they should be scrutinised in these terms. Governance arrangements need to take seriously commitments to the community and ensure they are delivered. Proper strategies, through stronger procedures and where possible community stakes in projects, should be adopted to ensure that the burden-bearers are not always the poor and marginalised. Second, as India initiates major programs to establish itself as a leading country in the development of solar energy, understanding and addressing injustices in the distribution of benefits and burdens arising from these developments is important for the success of both the proposed second phase of the Gujarat Solar Power Policy and National Solar Mission (NSM). Adequate provisions should also be made to ensure justice in distribution of outcomes. An effective strategy and stricter enforcement of it for ensuring these provisions of social justice in both the national and solar policies could also result in improved social acceptance of this 'environmentally good' energy technology.

This research has illustrated the value of the application of concepts of justice to solar energy implementation, which can only become more important as solar energy is rolled out on a massive scale globally. In India, further analysis of solar energy implementation in other states such as Rajasthan and Madhya Pradesh would offer useful comparisons and a deeper

understanding of the specifics of the concerns arising from the ambitious roll out of national and state energy development policies in the context of India's unevenly developed and hierarchically organised rural communities. Similar research would also be of value in other developing economies in the global South. For example, as there are parallels in terms of national policies and ambitious solar energy targets for the next few years, a comparative study with China may contribute to advancing energy justice literature on rapidly developing countries. The basic concerns of energy justice however have resonance globally and would also apply to the energy transitions of the more developed nations for example Germany with the *energiewende* 2020 and 2050 (Beveridge & Kern, 2013), and to other new energy technologies such as hydro and tidal power.

Acknowledgements

References

Agyeman, J., & Evans, B. (2004). "Just sustainability: the emerging discourse of environmental justice in Britain?" *The Geographical Journal*, **170**(2): 155-164.

Bentham, (1789). "*An introduction to the principles and morals of legislation.*" London: T.Payne & Son.

Beveridge, R., & Kern, K. (2013). "Energiewende in Germany: Background, Developments and Future Challenges." *The Renewable Energy Law & Policy Review*, **4**(1):3-12.

Bickerstaff, K., et al., (Eds.). (2013). "*Energy Justice in a Changing Climate: Social equity and low-carbon energy.*" Zed Books.

Brady, M. J., & Monani, S. (2012). "Wind power! Marketing renewable energy on tribal lands and the struggle for just sustainability." *Local Environment*, **17**(2): 147-166.

Cass, N., Walker, G., & Devine-Wright, P. (2010). "Good neighbours, public relations and bribes: The politics and perceptions of community benefit provision in renewable energy development in the UK." *Journal of Environmental Policy & Planning*, **12**(3): 255-275.

Cass, N., & Walker, G. (2009). "Emotion and rationality: The characterisation and evaluation of opposition to renewable energy projects." *Emotion, Space and Society*, **2**(1): 62-69.

Catney, P., Mac Gregor, S., Dobson, A., Hall, S.M., Royston, S., Robonson, Z., Ormerod, M., & Ross, S. (2014). "Big society, little justice? Community renewable energy and the politics of localism." *Local Environment,* **19**(7): 715-730.

Chakrabarti, S., & Chakrabarti, S. (2002). "Rural electrification programme with solar energy in remote region–a case study in an island." *Energy Policy*, **30**(1): 33-42.

Cleaver, F. (2001). "Institutions, agency and the limitations of participatory approaches to development." (In) Cooke, B., & Kothari, U. (eds.), *Participation: the new tyranny*?, New York: Zed Books, (88-101).

Cowell, R., Bristow, G., & Munday, M. (2011). "Acceptance, acceptability and environmental justice: the role of community benefits in wind energy development." *Journal of Environmental Planning and Management*, **54**(4): 539-557.

Day, R. et al., (2016). "Conceptualising energy use and energy poverty using a capabilities framework." *Energy Policy*, 93: 255–264

Devine-Wright, P. (2005). "Beyond NIMBYism: towards an integrated framework for understanding public perceptions of wind energy." *Wind Energy*, **8**(2): 125-139.

Dobson, A. (1998). "*Justice and the Environment: Conceptions of Environmental Sustainability and Dimensions of Social Justice*." Oxford University Press.

Dryzek, J.S. (2000). "Deliberative Democracy and Beyond: Liberals, Critics, Contestations." Oxford University Press.

Fraser, N. (1998). "Social justice in the age of identity politics: redistribution, recognition, participation." Discussion paper (No. FS I 98-108).

Fried, C. (1983). "Distributive justice." *Social Philosophy and Policy*, **1**(01): 45-59.

GEDA (2013). "Solar power projects installed as on 31.03.2013." Gandhinagar, Gujarat: Gujarat Energy Development Agency, Government of Gujarat.

———— (2009). "Solar power policy 2009." Gandhinagar, Gujarat: Energy and Petro Chemicals Department, Government of Gujarat.

Griffin, J. (1986). "*Well-being: Its meaning, measurement, and moral importance*." Clarendon Press.

Gross, C. (2007). "Community perspectives of wind energy in Australia: The application of a justice and community fairness framework to increase social acceptance." *Energy Policy*, **35**(5): 2727-2736.

Hall, S. M. (2013). "Energy justice and ethical consumption: comparison, synthesis and lesson drawing." *Local Environment*, **18**(4): 422-437.

Harvey, D. (1996). "*Justice, nature and the geography of difference*." Wiley.

———— (1973). "*Social justice and the city*." London: Edward Arnold.

Hicks, N.L., & Streeten, P. (1979). "Indicators of Development: The Search for a Basic Needs Yardstick." *World Development*, **7**(6): 567-580.

Holden, P., & Grossman, D. (2005). "Working for water in a democratic South Africa." (In) Bass, S. Reid, H. & Satterthwaite, D. (eds.), R*educing poverty and sustaining the environment: The politics of local engagement*. London: Earthscan. (180-193).

Hopkins, M. & R. Van Der Hoeven (1979), "Economic and social Factors in Development: A Socio-Economic Framework for Basic Needs Planning", WEP Research Working Paper, ILO, Geneva, (mimeo).

Junfeng, L., Li, Z., Runqing, H., Zhengmin, Z., Jingli, S., & Yangin, S. (2002). "Policy analysis of the barriers to renewable energy development in the People's Republic of China." *Energy for Sustainable Development*, **6**(3): 11-20.

Limb, M., & Dwyer, C. (eds.) (2001). "*Qualitative methodologies for geographers: Issues and debates*." London: Arnold.

Lorenzoni, I., Nicholson-Cole, S., & Whitmarsh, L. (2007). "Barriers perceived to engaging with climate change among the UK public and their policy implications." *Global Environmental Change*, **17**(3): 445-459.

Mallon, K. (2006). "Renewable energy policy and politics–a handbook for decision-making." *Wind Engineering*, **30**(1): 93-94.

McIntyre, D., & Gilson, L. (2002). "Putting equity in health back onto the social policy agenda: experience from South Africa." *Social Science & Medicine*, **54**(11): 1637-1656.

Mill, J. S. (1863). "*Utilitarianism*." London: Parker, Son and Bourn.

Mukherji, A. (2012). "India uproots most people for *progress*." Times of India. Available at http://timesofindia.indiatimes.com/india/India-uproots-most-people-for-progress/articleshow/13792551.cms [last accessed on 8th May, 2014]

Munday, M., Bristow, G., & Cowell, R. (2011). "Wind farms in rural areas: how far do community benefits from wind farms represent a local economic development opportunity?" *Journal of Rural Studies*, **27**(1): 1-12.

Nadaî, A. (2007). "*Planning*, *siting* and the local acceptance of wind power: Some lessons from the French case." *Energy policy*, **35**(5): 2715-2726.

Nussbaum, M. C. (2000). "*Women and human development: The capability approach*." Cambridge University Press.

_____ (1992). "Human Functioning and Social Justice - In Defense of Aristotelian Essentialism." *Political Theory*, **20**(2): 202-246.

Philip, L. J. (1998). "Combining quantitative and qualitative approaches to social research in human geography—-an impossible mixture?" *Environment and Planning. A*, **30**: 261-276.

Rawls, J. (1971). "*A Theory of Justice*." Cambridge, Massachusetts: Harvard University.

—————— (1967). "Distributive Justice." (In) Peter Laslett & W. G. Runciman. (eds.), *Philosophy, Politics, and Society*. Third Series, London: Blackwell; New York: Barnes & Noble. (58–82).

Rajiv Gandhi Gram Vidyuthikaran Yojana, RGGVY (2013). "Number of Un-electrified/Electrified Villages where Electrification Works are completed under RGGVY." Available at http://rggvy.gov.in/rggvy/rggvyportal/completed.jsp [last accessed on 23rd July 2013]

Schlosberg, D. (2004). "Reconceiving environmental justice: global movements and political theories." *Environmental Politics*, **13**(3): 517-540.

Sen, A. K. (2009). "*The idea of justice*." Cambridge, Massachusetts: Harvard University Press.

—————— (1999). "*Development as freedom*." Oxford: Oxford University Press.

Shiva, V. (1997). "*Biopiracy: The plunder of nature and knowledge*." South End Press.

Shrader-Frechette, K. S. (2002). "*Environmental justice: Creating equality, reclaiming democracy*." Oxford University Press.

Simcock, N. (2014). "Exploring how stakeholders in two community wind projects use a "those affected" principle to evaluate the fairness of each project's spatial boundary." *Local Environment*, **19**(3): 241-258.

Smith, D. M. (1994). "*Geography and social justice*." Oxford: Blackwell.

Soja, E. W. (2010). "*Seeking spatial justice*." Minneapolis: University of Minnesota Press.

Sovacool, B. K., & Dworkin, M. H. (2014). "*Global energy justice.*" Cambridge University Press.

Sovacool, B. K. et al., (2013). "*Energy security, equality and justice*." Routledge.

Times of India (2011). "Per capita income during 2009-10 rises by 14.5%." Available at http://articles.timesofindia.indiatimes.com/2011-03-08/india-business/28668260_1_capita-income-rural-areas-high-income [last accessed on 22nd July, 2013]

Tsoutsos, T., Frantzeskaki, N., & Gekas, V. (2005). "Environmental impacts from the solar energy technologies." *Energy Policy*, **33**(3): 289-296.

Van der Horst, D., & Toke, D. (2010). "Exploring the landscape of wind farm developments; local area characteristics and planning process outcomes in rural England." *Land Use Policy*, **27**(2): 214-221.

Vasudevan, R (2008). "Accumulation by Dispossession in India." Book review of Abandoned: Development and Displacement. Economic & Political weekly. March 15.

Walker, G., & Day, R. (2012). "Fuel poverty as injustice: Integrating distribution, recognition and procedure in the struggle for affordable warmth." *Energy Policy*, **49**: 69-75.

Walker, G., & Devine-Wright, P. (2008). "Community renewable energy: What should it mean?" *Energy Policy*, **36**(2): 497-500.

Walzer, M. (1983). "*Spheres of Justice*." New York: Basic Books, (10-13).

Warren, C. R., & McFadyen, M. (2010). "Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland." *Land Use Policy*, **27**(2): 204-213.

Watts, M., & Ebbutt, D. (1987). "More than the sum of the parts: research methods in group interviewing." *British Educational Research Journal*, **13**(1): 25-34.

Wolsink, M. (2007). "Planning of renewables schemes: Deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation." *Energy Policy*, **35**(5): 2692-2704.

Wong, Sam. "Overcoming obstacles against effective solar lighting interventions in South Asia." Energy Policy 40 (2012): 110-120.

Yenneti, K. (2014b). "*Social justice and solar energy implementation - a case study of Charanaka solar park, Gujarat, India.*" PhD thesis, School of Geography, Earth & Environmental Sciences, University of Birmingham.

Yenneti, K. (2014a) 'What makes Gujarat a hotspot for solar energy investments?' *Journal of Current Science*, **105**(5): 665-667.

Yenneti, K. (2013) "The Sun shines on India? – A review of implementation and financial continuum of the National Solar Mission." *Renewable Energy Law and Policy Review*, **4**: 280-291

Zografos, C., & Martínez-Alier, J. (2012). "The politics of landscape value: a case study of wind farm conflict in rural Catalonia." *Environment and planning. A*, **41**(7): 1726-1744.

Zoellner, J., Schweizer-Ries, P., & Wemheuer, C. (2008). "Public acceptance of renewable energies: Results from case studies in Germany." *Energy Policy*, **36**(11): 4136-4141.