

"The companies are powerful, people are weak": India's solar energy ambitions and the legitimation of dispossession in Rajasthan

Shayan Shokrgozar ^{a1}

Bérénice Girard ^b

^a University of Bergen, Norway

^b IRD, France

Abstract

Ecological degradation and climate change have led to widespread calls for altering sociotechnical practices. A sector in which this is particularly visible is energy; more specifically, in efforts to displace conventional sources of energy (e.g., thermal) in favor of lower-carbon alternatives (e.g., solar power). Despite the liberatory potentials of lower-carbon energy sources, a growing body of political ecology scholarship suggests that energy "transitions" perpetuate fossil fuel dynamics of extractivism, land dispossession, and commodification processes. More specifically, incumbent actors and ideas prevent otherwise socially, economically, and technically just alternatives from materializing through legitimating socioecologically unjust practices. Amidst these developments, India eyes global leadership on solar energy; with Rajasthan, in its western desert reaches, hosting the largest installed capacity in the nation and largest solar plant in the world, *Bhadla*. Drawing from qualitative field research including site visits, over 70 semi-structured and informal interviews, and discourse analysis of solar policy documents, we interrogate how the deployment of solar "parks" are legitimated by state-level political and technocratic powers, despite their socioecological implications for local residents, especially agropastoralists, and endangered other-than-humans. Grounding our work in political ecology and reflecting on the politics behind energy policies, we counter depoliticizing narratives of solar development, concluding that solar "parks", though presented as apolitical, are rooted in a political paradigm which combines ecological modernization and the ongoing neoliberalization of the Indian political economy.

Key Words: solar energy, political ecology, India, renewable energy, energy transitions, policy, postdevelopment

Résumé

La dégradation de l'environnement et le réchauffement climatique ont suscité de nombreux appels à transformer nos pratiques sociotechniques. Ces dynamiques sont particulièrement visibles dans le secteur de l'énergie, en particulier dans les initiatives visant à remplacer les sources conventionnelles d'énergie (comme le charbon) par des alternatives à plus bas carbone (comme l'énergie solaire). Malgré le potentiel libérateur des énergies à plus bas carbone, de plus en plus de travaux en écologie politique soulignent que les "transitions" énergétiques perpétuent les processus d'extractivisme, de dépossession des terres et de marchandisation liés aux combustibles fossiles. Plus précisément, les acteurs et idées en place empêchent la concrétisation d'alternatives plus justes techniquement, socialement et économiquement, en légitimant des pratiques injustes d'un point de vue socio-

¹ Shayan Shokrgozar, Department of Geography, University of Bergen, Norway. Email: shayan.shokrgozar@uib.no. Dr. Bérénice Girard, researcher, CESSMA, IRD, Paris, France. Email: girard.berenice@gmail.com. We would like to thank our colleagues at the University of Bergen and University of Stavanger for their comments on earlier drafts of this article and the anonymous reviewers for their insightful comments and feedback. We are especially grateful to our research participants for their time. Finally, we are grateful to the Meltzer Foundation and the Research Council of Norway (Project Number: 314022) for funding this research. The workload for this article amounted to a 70%/30% split between the first and second authors, respectively. Shayan Shokrgozar: conceptualization, methodology, data collection and analysis, draft preparation, revisions. Bérénice Girard: conceptualization, methodology, data collection and analysis, draft preparation, revisions.

écologique. Dans ce contexte, l'Inde vise une position de leader international dans le développement de l'énergie solaire. L'État du Rajasthan, situé à l'Ouest du pays, et en partie composé du désert du Thar, abrite la plus grande capacité solaire installée du pays et le plus grand parc solaire du monde, Bhadla. En nous appuyant sur des méthodes qualitatives, incluant des visites de parcs solaires et de villages impactés, plus de 70 entretiens semi-structurés et informels, et l'analyse des politiques solaires de l'État, nous interrogeons la manière dont le déploiement des "parcs" solaires est légitimé par les pouvoirs politiques et technocratiques au Rajasthan, en dépit de leurs implications socio-écologiques pour les résidents locaux, en particulier ceux vivant de l'agropastoralisme, et les non-humains menacés d'extinction. Nous inscrivons notre travail dans une approche d'écologie politique et analysons la dimension politique des politiques énergétiques. Nous nous opposons ainsi aux récits qui dépolitisent le développement solaire. Nous concluons que les "parcs" solaires, bien que présentés comme apolitiques, s'inscrivent dans un paradigme politique qui combine modernisation écologique et néolibéralisation en cours de l'économie politique indienne.

Mots clés: énergie solaire, écologie politique, Inde, énergies renouvelables, transitions énergétiques, politique, post-développement

Resumen

La degradación ecológica y el cambio climático han dado lugar a llamados generalizados para alterar las prácticas sociotécnicas. Un sector en el que esto es particularmente visible es el de la energía; más específicamente, en los esfuerzos por desplazar fuentes convencionales de energía (p. ej., térmica) en favor de alternativas con menor emisión de carbono (p. ej., la energía solar). A pesar de las potencialidades liberadoras de las fuentes de energía con menor emisión de carbono, un creciente cuerpo de investigación en ecología política sugiere que las "transiciones" energéticas perpetúan dinámicas de extractivismo de combustibles fósiles, desposesión de tierras y procesos de comodificación. Más específicamente, actores e ideas establecidos impiden que las alternativas sociales, económicas y técnicamente justas se materialicen al legitimar prácticas socioecológicamente injustas. En medio de estos desarrollos, India aspira al liderazgo mundial en energía solar; con Rajasthan, en sus regiones desérticas del oeste, albergando la mayor capacidad instalada en la nación y la planta solar más grande del mundo, Bhadla. Basándonos en investigación cualitativa de campo, que incluye visitas al sitio, más de 70 entrevistas semiestructuradas e informales, y análisis discursivo de documentos de políticas de energía solar, interrogamos cómo se legitiman los desarrollos de "parques" solares por parte de las autoridades políticas y tecnocráticas a nivel estatal, a pesar de sus implicaciones socioecológicas para los residentes locales, especialmente los agropastoralistas y las especies no-humanas en peligro. Fundamentando nuestro trabajo en la ecología política y reflexionando sobre la política detrás de las políticas energéticas, contrarrestamos las narrativas de despolitización del desarrollo solar, concluyendo que los "parques" solares, aunque se presenten como apolíticos, tienen raíces en un paradigma político que combina la modernización ecológica y la continua neoliberalización de la economía política india.

Palabras clave: energía solar, ecología política, India, energías renovables, transiciones energéticas, política, posdesarrollo

1. Introduction

The smoke and the din of mill chimneys and factories ... are held to be symbolical of material progress ... (but) they add not an atom to our happiness.

Mohandas K. Gandhi (1916, 158)

Despite thousands of years of human influence on the ecosphere (Bonneuil & Fressoz, 2017), the Earth's climate enjoyed relative stability throughout the Holocene (Rockström *et al.*, 2009). Colonialism, the Industrial Revolution, and civilization—"the logic, institutions, and physical apparatus of domestication, control, and domination" (Green Anarchy Collective, 2013, p. 2; Landstreicher, 2010) resulted in an upsurge in energy mobilization, upending that stability (Bhambra & Newell, 2022). Today, energy generation is the main driver of global environmental change (Daggett, 2019). Simultaneously, capitalism has demonstrated an unparalleled

ability to adapt, by feeding on the climate crisis (Batalla, 2020). Climate mitigation has been reconfigured into a lucrative agenda, creating new justifications for land commodification and appropriation (Federici & Linebaugh, 2019), while maintaining existing power hegemonies (Bebbington *et al.*, 2019).

One sector in which these trends are particularly prominent is the deployment of lower-carbon energy sources, such as solar energy. Their deployment have been characterized by the prioritization of growth over redistribution, and substitution over reduction (Siamanta, 2021; Hickel, 2021). Questions such as how much energy is necessary to provide decent living standards for the citizenry to maximize well-being remain underexplored (Millward-Hopkins *et al.*, 2020; Rao *et al.*, 2019). This failure to recognize alternative energy futures exists alongside socioecologically unjust expansions of infrastructures. More specifically, implementing lower-carbon energy, within the current modality of a market-driven transition, will demand the appropriation of land (Fairhead *et al.*, 2012), labor (Stock, 2021b), and "transition materials" (Dorninger *et al.*, 2021; World Bank Group, 2017). These unjust outcomes have led some scholars to see dominant climate solutions as the perpetuation of colonialism through "climate coloniality," manifesting itself through "colonial-capitalist extractivism and commodification, rapacious displacement and destruction, creation of sacrifice zones, and excessive exposure to harm from climate-induced disasters" (Sultana, 2022, p. 4).

Yet, as insights from historic and contemporary political ecology suggest, much like climate change itself, energy is often "rendered technical" and is a matter of concern for experts—in anti-political ways (Avila-Calero, 2017; Bouzarovski, 2022; Dunlap & Jakobsen, 2020; Knuth *et al.*, 2022; Li, 2007). As Ghosh and colleagues conclude, this "represent(s) a missed opportunity for transition that would leverage renewable energy development to create better lives for disadvantaged communities" (2023, p. 13). Countering these unjust trends in favor of enhanced energy futures warrants deconstructing (and delegitimizing) the different discursive, bureaucratic, technocratic, and financial legitimation practices that undergird current socioecologically destructive pathways. Grounding our work in political ecology, we explore the legitimation practices of Solar India in the state of Rajasthan; the state with the highest solar energy installed capacity in the country and the world's largest solar "park," Bhadla.

The deployment of solar energy in Rajasthan is primarily driven by utility-scale projects, demanding thousands of acres of land. Earlier research indicates acquiring land and resources at scale is unlikely to materialize without the enclosure of public and private lands through the use of extra-economic and extralegal powers (Ghosh, *et al.*, 2023; Levien, 2012; Yenneti *et al.*, 2016). Despite customary land being used for everyday necessities, particularly by the most marginalized sections of society (whether due to caste, religious and/or economic discrimination, and including grazing, fuelwood collection, seasonal farming, defecation, leisure) government owned lands are often categorized as "wastelands" by the public authorities that facilitate their appropriation (Baka, 2017; Gidwani & Reddy, 2011). When usage rights are transferred to solar developers, communities are dispossessed of common land without compensation or alternative livelihoods.

As expected, such acts of dispossession do not take place without resistance. In the 2010s alone, at least 15 court cases were initiated by dispossessed communities against land allotment for solar plants in Rajasthan, alongside protests and sit-ins held in villages to oppose the enclosures (Chari, 2020). These trends suggest that existing unequal socio-material relations can be challenged by deconstructing the practices of legitimation that enable them. Without legitimacy, political actors and public and private agencies and firms cannot procure the material resources necessary for implementing their projects (Kraft & Wolf, 2018). We therefore ask: Given the socioecological costs of *Solar Rajasthan*², how does the Government of Rajasthan legitimate its solar energy ambitions? Our investigations include fieldwork conducted by both authors over several months in 2022 and 2023 alongside a discourse analysis of the Government of Rajasthan's Solar Energy Policies published in 2014 and 2019.

In what follows, we first review proffered solutions to limit the climate crisis and present an overview of the theoretical underpinnings for our analysis. Subsequently, we provide an analysis of practices of legitimation for solar rollout, describing how *Solar Rajasthan* is legitimized. This is followed by a brief background on solar energy deployment in India and Rajasthan, and a presentation of our methodology. We

² An amalgam of institutions involved in Rajasthan's solar sector.

then move on to our empirical analysis. We claim that the Government of Rajasthan draws on larger national and international discourses to legitimate the construction of industrial-scale solar plants, which, while presented as apolitical, are rooted in the traditions of ecomodernism and techno-industrial climate mitigation and in the current neoliberalization of India's political economy. We conclude with the need to repoliticize *Solar Rajasthan* and to create new imaginaries of energy futures.

2. Climate change mitigation

Despite over three decades of climate change mitigation policies, CO₂ concentrations in the atmosphere continue to accumulate (Stoddard *et al.*, 2021). This brings into question the feasibility of dominant ideas in confronting the climate crisis, such as ecomodernism, which frames climate change as a techno-managerial issue to be solved thanks to available (or soon to be available) technological fixes (Swyngedouw, 2015). One such solution is the transition to lower-carbon energy sources, which has been pushed to front and center in many key mitigation debates. Yet, as historian Jones (2016, p. 5) warns,

...a common assumption is that we can simply replace coal-fired power plants with wind turbines and expect everything else to remain the same. History suggests otherwise. To plan more effective and equitable energy transitions, we need to incorporate a broader range of perspectives.

Therefore, there is a pressing need to explore "the infernal process of de-politicization" (Swyngedouw, 2015, p. 6) and to repoliticize energy transitions (Sareen *et al.*, 2023). The unexamined implementation of "renewable" energy sources, which rely on green extractivism (Dunlap 2021; Szeman & Wenzel, 2021), has become yet another source of ecological depletion and social fragmentation in many places across the globe (Dunlap & Correa Arce, 2022; Karam & Shokrgozar, 2023; Siamanta, 2019; Stock & Birkenholtz 2021). Scalar bias—where legal, regulatory, economic, and political elements favor megaprojects (Sareen & Haarstad, 2021)—has an important role to play in severing access to land and resources.

Simultaneously, shifting state intervention requires a change in broader and more fundamental political economic priorities. Historically, the international logic of *common but differentiated responsibility* meant that, in the global South, development could take precedence over mitigation of carbon emissions. However, in India, the politics of *opportunism*³, which has gained momentum since the late 2000s, has allowed the discourse of climate change mitigation through "green" growth to emerge as an impetus to see mitigation, including industrial-scale solar power projects (Sareen *et al.*, 2020; Stock, 2021a) as a lucrative opportunity to attain both goals simultaneously (Pillai & Dubash, 2021). Despite its low historic emissions, India has grown into one of the world's largest emitters, due to the emission intensity of a growing economy, a large population, and techno-economic constraints that delay displacing coal as a major energy source. Simultaneously, while annual expansion of solar energy is on track to reach an all-time high, so too is the use of coal (Roy & Schaffartzik, 2021). The material reality is that the addition of new primary sources of energy is occurring, rather than a transition (Smil, 2017; York & Bell, 2019). This leads many scholars, such as Knuth and colleagues (2022), to emphasize the imperative to maintain political pressure on those in power to ensure that the expansion of lower-carbon energy is displacing the total use of fossil fuels, instead of adding to an ever-larger total energy supply to feed India's place in the global economy.

While the displacement of fossil fuels remains imperative, given the energy and material throughput of lower-carbon alternatives, it is also important to consider to what end are vital forces—such as the sun, wind, and tides—being harnessed for energy production instead of serving the flora and fauna (Dunlap 2021). The extent to which prioritizing economic growth is leading to a multiplicity of crises needs consideration, along with the current modalities of development and how to attain climate mitigation with decent livelihoods (see Millward-Hopkins *et al.* 2020; Vogel *et al.* 2021). Bouzarovski (2022), for example, has gone so far as to

³ Pillai and Dubash (2021, p. 94) have situated India's climate governance within a politics of opportunism: "an approach that prioritizes traditional development objectives but admits, and sometimes expediently emphasizes, the language of mitigation in government."

suggest that dominant conceptions of just transitions—such as the European Green Deal—accommodate existing processes of climate degradation and social inequality, produce new forms of enclosure and division, and marginalize radical imaginaries and alternatives. This trend demonstrates Stirling's (2019) observation on the power of incumbent actors (and ideas) to neglect just pathways that are otherwise socially, economically, and technically possible.

3. Understanding practices of legitimation

You can't have a system built on sacrificial places and sacrificial people unless intellectual theories that justify their existence exist and persist...

Naomi Klein (2016)

Amidst growing calls for increasing the share of lower-carbon energy, the state of Rajasthan has emerged with the largest solar energy capacity in India, appropriately symbolized by the largest solar plant in the world, the *Bhadla Solar Park*. Drawing from Sareen (2020, 2023), we investigate the ways in which the Government of Rajasthan legitimates its solar energy ambitions. To better identify and deconstruct practices of government which depoliticize the deployment of solar parks, and which frame them as apolitical solutions to climate change, we also engage with Li's (2007) prominent work on the 'Will to Improve.' Li (2007) shows how development interventions are rendered technical through diverse practices such as setting boundaries between experts and others, defining relevant knowledge, and excluding complex political-economic dynamics from planning and implementation. Rendering technical, in sum, frames problems in a manner that can be diagnosed and solved through technical solutions by professional experts, an endeavor that can lead to conveniently ignoring domains of knowledge and life that would challenge this effort. Studying legitimation practices is helpful in untangling what Levien (2013) identifies as the justification for enabling evolving "regimes of dispossession", as weak justifications susceptible to stronger counter movements.

Practices of legitimation which "embody the very means by which an act becomes legitimate and normalized" (Sareen, 2020, p. ix) take place across four different registers of legitimation: discursive, bureaucratic, technocratic, and financial (see Table 1). They can take the form of discourses and lexicons, inscription and quantification techniques, mapping devices, exclusion of certain forms of knowledge, and sidelining of certain issues and political-economic dynamics and processes, among others. Amongst the four registers, discourse is more "free form" compared to the "more restricted, systemic logics" of the others (Jordan & Bleischwitz, 2020, p. 38). Therefore, the impact of the discursive element can be seen as having a spillover effect on others. This is especially pertinent, as while several approaches to discourse analysis have included artifacts and material practices in their analysis, they often lack an overarching reflection on the distribution of material, institutional and discursive resources across the sociopolitical spectrum and how this can be challenged (Leipold *et al.*, 2019).

We believe in the pertinence of employing practices of legitimation in large part because they invite us to pay attention to a wide variety of techniques, processes, and actions that – big or small – enable, validate, and favor certain actors or perspective over others, while at the same time providing a useful classification system. Practices of legitimation can thus help us untangle how 'rendering technical' seeks to define the limits and characteristics of intervention in a way that turns political questions into manageable issues, that can be solved with predefined technical solutions (Ferguson, 1994; Li, 2007). As Li (2007) underlines, rendering technical is an unsecure project, that can always be challenged, as ultimately reality, as asserted by Leopold and colleagues (2019), is a process of social meaning-making. Therefore, the truths produced by those who govern can always be contested by those governed.

Discursive	Legitimation practices that "normalize certain perspectives over others through textual and spoken interventions across a variety of forums."
Bureaucratic	Legitimation practices, "often codified and sequential, validate some actions and actors and constrain others."
Technocratic	Legitimation practices "perform systematic checks and approval of actions that entail technical expertise."
Financial	Legitimation practices, "often spatially remote and materially elusive, enable actors to block action or to fulfill financial requirements and proceed with material actions, shaping sectoral change."

Table 1: Practices of legitimation. Source: Sareen (2019)

4. Solar energy deployment in India and Rajasthan

Since 2007, India's domestic climate policy has consisted of a "win-win" discourse. Convergent with the discourse of ecomodernism and economic liberalism, climate action is presented as an opportunity for economic growth (Isaksen & Stokke, 2014) through increasing the share of lower-carbon energy; expanding energy access through solar power; and improving energy efficiency in industries. These objectives have been reinforced since 2014 and the election of Narendra Modi as Prime Minister of India. Branding himself and India as leaders in the transition to lower-carbon energy sources, the Prime Minister is showcasing ambitious targets for the development of solar energy and wind power. In Rajasthan, which is currently ruled by the opposition (the Congress Party), solar energy deployment seems to have become a nonpartisan objective.

Be it at the federal or state level, the transition to lower-carbon energy is perceived mostly as a technocratic issue, best left in the hands of technical experts (Mohan & Topp, 2018) and envisioned to be handled by the government, although implemented by the private sector. Despite the long-running process of liberalization of the Indian electricity sector, for example through the Electricity Act of 2003 (Kale, 2014), the central and state governments remain key players in the energy sector and have preserved some of their developmentalist functions, especially as regards to infrastructure development (Chatterjee, 2022). This goes along with a pragmatic commitment to neoliberalism, with many instances of deregulation, as well as attempts at disciplining customers and the creation of new arenas for capital accumulation (*Ibid*). Under this vision, industrial-scale lower-carbon energy rollout is attainable through favorable policies for private power producers (e.g., access to land and infrastructures, feed-in tariffs) and centralized, utility-scale, grid-connected projects (see Table 2).

Scale	Targets by 2025
Utility/ Grid Scale Solar Park	24,000 MW
Distributed Generation	4,000 MW
Solar Rooftop	1,000 MW
Solar Pumps	1,000 MW

Table 2: Rajasthan's 30,000 MW target by 2025.⁴

⁴ As of July 2023, installed solar capacity in Rajasthan is, according to one of our respondents from the state government, as follows: approx. 16,000 MW of ground mounted solar (mostly Utility scale solar parks), approx. 1,000 MW of solar rooftops and approx. 600MW of off-grid solar.

This mode of implementation of solar plants in Rajasthan resembles longer-standing energy policies in India, which favor large energy-generation projects developed in politically and geographically peripheral places—those with a history of land dispossession and colossal population displacement (Girard, 2019; Sharma & Bhatia, 2019). For instance, current estimates suggest that, in the first 50 years of India's independence, more than 16 million people were dispossessed of their land to build large dams—with a large majority belonging to the poorest and most marginalized sections of society (Baviskar, 2019). The dynamics of land dispossession have not slowed down with the liberalization reforms of the 1990s. On the contrary, dispossession now takes place on behalf of the public sector as well as for private interests and a larger array of projects (Levien, 2013). As pointed out by Levien (2012, p. 942) land is "increasingly desired by capital for industry, residential and commercial real estate and privatized infrastructure development." States, through a myriad combination of tax exemptions, lowering social protections, and ease of land appropriation often compete to attract investors, as "chief land brokers" (Levien, 2012). Nielsen and Nilsen (2022) propose a periodization of India's neoliberalization to understand the evolution of its regime of dispossession, characterizing the current period from 2014 onwards as confrontational (opposition is quickly categorized as anti-national) and geared towards the interests of large private conglomerates.

Ongoing deployment of lower-carbon energy plants in India have renewed land dispossession, uneven development, and socioecological injustices (Bedi, 2019; Singh, 2022, 2023), compounded with discrepancies in carbon footprints between urban and rural areas and between rich and poor in India (The Wire, 2021). To make matters worse, land dispossession for solar plants predominantly affects landless farmers and marginalized communities, mostly belonging to lower castes and scheduled Castes and Tribes, who do not have land titles and are dependent on common land (Ghosh *et al.* 2023; Stock, 2023). Landless peasants do not benefit from compensation for the enclosed land and have fewer possibilities to protest dispossession, alongside losing the opportunity for seasonal farm work. For farmers and herders, the loss of land access and means of production—and subsequent failure to earn a living or receive compensation for their loss—have led to precarity and the expression of "intimate sentiments of suffering" (Stock, 2023). The consequences of the enclosure of public lands is also gendered in subsistence communities, as women rarely have the opportunity to seek jobs in male-dominated industries (see also Stock, 2021b; Stock & Birkenholtz, 2021).

Methods

Our analysis is based on fieldwork conducted in Rajasthan over several months in 2022 and 2023, during which we carried out 73 semi-structured and informal interviews and 5 group interviews, with current and former representatives of diverse state agencies, solar developers, NGOs, activists as well as local politicians, landowners, herders, farmers, land aggregators, workers, and residents of areas in which solar plants are being built. We also engaged in non-participant observation, spending time around the solar parks, in villages within the vicinity of the projects, which added more nuance to our understanding of the place-based implications of the industry on agropastoral lands. The breadth of participants socioeconomic status and lifeway was an effort to reduce our entanglement in epistemic injustice; an effort oriented towards capturing stories from peoples with various ontologies and everyday life.

Furthermore, we carried out an analysis of the 2014 and 2019 Rajasthan Solar Energy Policies. Published by the Rajasthan Renewable Energy Corporation (RRECL), these policies are mainly targeted at potential investors and present the overall policy framework for solar rollout in the state of Rajasthan in English. Both the 2014 and 2019 editions of the Rajasthan Solar Energy Policy include forewords by the Chief Minister and State Minister of Energy at their time of publication. Thus, beyond their bureaucratic and technocratic jargon, these documents provide insight into the Government of Rajasthan's overall vision for and model of implementing solar energy, alongside how the state seeks to present itself to Indian and foreign investors.

We combed through the documents and interview transcripts, deductively highlighting instances of discursive, technocratic, bureaucratic, and financial legitimation practices, and if applicable, the justification for these practices. The interviews and observations allowed for the opportunity to clarify goals, follow up on their justification, and triangulate our findings, both for incumbent idea and counter narratives. The outcome is a findings section broken into these four subcategories that systematically explore them.

5. Empirical analysis: Interrogating practices of legitimation

In this empirical analysis, we visit each of the four practices of legitimation to unpack our case study. Drawing on Nielsen and Nilsen (2022), we encourage greater attention to various state practices, that though more discreet and less coercive than brute force, facilitate land dispossession and capitalist accumulation. Discursively, we demonstrate the existence of three dominant and interconnected practices of legitimation. Solar energy is presented as a driver of positive change, while different ontologies of land are ignored and new political constructions of land (i.e., wastelands) are imposed (Baka, 2017). Bureaucratically, we show that the state turns itself into a facilitator by setting up special policies that benefit large private developers. Technocratically, we show a tendency to use quantified targets and a narrow definition of sustainability, thus reducing social and political complexity. These practices reflect a larger global trend, in which subtle tweaks to discourses of green governmentality, ecological modernization, and environmentalism/ climate justice privilege existing policy instruments with the aim and result of supporting the existing system (Bäckstrand & Lövbrand, 2006). In other words, they legitimate the idea that "the techno-scientific and socio-economic elites have the necessary tool-kit to readjust the machine such that things can stay basically as they are" (Swyngedouw, 2013, p. 10-11). Financially, the elements necessary for decent living—traditionally tasked to the state—are now imagined as being provided by economic growth policies, brought about through private investments. Issues of redistribution and allocation of public funding are mostly hidden.

Discursive legitimation

We present our findings beginning with practices of discursive legitimation, consisting of the normalization of "certain perspectives over others through textual and spoken interventions across a variety of forums" (Sareen, 2019, p. 15). We identify three main practices. The first presents solar energy as a transformative technology with the capacity to cut carbon emissions. The second categorizes the spaces in which large solar parks are developed as barren or uncultivable. And finally, a third one renders the plight of local populations invisible.

Official documents make extensive use of the lexicon of change. This is especially the case in the foreword written by the Chief Minister to the Rajasthan Solar Energy Policy 2019, which speaks of a "green energy revolution" (GoR, 2019, p. 3). Solar energy, he contends, will "transform the energy scape of the state and the country" and usher in a "new chapter" in the history of energy in India (GoR, 2019, p. 3). The massive and rapid deployment of solar energy is portrayed as a national mission, and energy capacity targets are justified by claims of meeting "the global commitments" and being "a major contributing state for achieving the national target" of reaching 100 GW of solar by 2022 (GoR, 2019, p. 9-10). The nation is presented as a single unit, and existing inequalities and the differentiated historical and current responsibilities in carbon emissions within India are ignored. Similarly, climate change is presented as a global, yet a somewhat distant, threat, with no mention of its already visible effects on Rajasthan. This framing is important, as it plays on the citizenry's desire for development and patriotism, also evident in other southern contexts where infrastructural projects are concerned (e.g., Geschewski & Islar, 2022). Thus, on one hand, it favors an ambiguous feeling amongst those most affected by the solar parks, their personal fate contrasting with the collective goal of national development. And on the other, it facilitates the categorization of protests and opposition to solar parks as an anti-national endeavor (Nielsen & Nilsen, 2022).

The second practice consists of categorizing the spaces in northwestern Rajasthan, where most of the large solar parks are being built, as empty and available "barren" lands. In the 2019 Solar Policy, the other-than-human is perceived as either something to improve upon, or as a resource, with expressions such as "blistering sun" and "barren land" (GoR, 2019, p. 3). The Minister of Energy, in his foreword, argues that "natural endowments" such as land and solar radiation are successfully being leveraged by the state (GoR, 2019, p. 4). The policy document itself speaks of the "vast and largely untapped potential in terms of intense solar radiation" and of the "availability of vast barren/uncultivable government/private land" (GoR, 2019, p. 9). The same perspective is present in the 2014 Solar Energy Policy, which mentioned that "India is blessed with abundant solar energy and if harnessed efficiently, the country is capable of producing trillion-kilowatts of electricity" (GoR, 2014, p. 2). Similarly, the previous Chief Minister talks of the "opportunities offered by this

bounty of nature" and of the importance of making good use of "this inexhaustible energy source" (GoR 2014, p. 5).

Many of our interviewees, be they government employees or solar developers, would similarly refer to the abundance of "barren" land and solar irradiation to explain the current massive deployment of solar energy in Rajasthan. Asked about potential land conflicts related to solar energy rollout in Rajasthan, an entrepreneur dismissed our question, affirming that there were "50 to 100 times the land available" in Rajasthan (Jaipur, June 2022). Baka (2013) has demonstrated how categorizing land as "wasteland" is one of the most efficient techniques to appropriate land and how the term is a political construct, with a history dating back to colonial times, offering a conveniently loose definition to facilitate appropriation of land. Modern science, such as geographic information systems and satellite data, helps justify what land is "barren" or "uncultivable" (Bedi, 2019). This data ignores existing land-use patterns and enables the enclosing of public lands for non-agrarian ends. Thus, by using terms such as "un-cultivable land strips," "barren," and "unutilized" to describe the commons, actors and documents discursively erase "existing uses of these areas by deeming them 'backward' spaces that need to be 'improved upon'" (Stock & Birkenholtz, 2019, p. 988).

The third practice consists of rendering invisible the plight of local populations. This was particularly noticeable during our interviews. When asked about land conflicts, government employees and solar developers would often directly jump to issues of biodiversity protection, mentioning ongoing debates regarding the impact of transmission lines on the critically endangered Great Indian Bustard (*Ardeotis nigriceps*) or issues relating to the felling of the sacred Kejri trees (*Prosopis cineraria*). When pushed to talk about protests against land acquisition, interviewees would often disregard them and highlight the economic opportunities that the development of solar parks represented for these regions, such as employment opportunities and growing land values. A government employee (June 2022) argued that those complaining were trying to benefit from the situation, ignoring cases where government land is being enclosed. Thus, local landowners are considered lucky to be able to sell or lease their land at higher prices. Such discourses ignore other values attached to the land, as well as the existence of predatory acquisition practices. In their study of a solar park in the neighboring state of Gujarat, Yenneti *et al.* (2016) describe how intermediaries circumvent existing regulations to buy farmland at low prices from small landowners before reselling it to park developers for much more. A land aggregator (November 2022; January 2023) in Jaisalmer told us that if landowners with land valuable to solar developers are unwilling to lease their land, they try to buy it, and if landowners reject that offer, they will try deception, and manipulation, before moving to threats of violence and intimidation.

This practice of rendering invisible the plight of local populations is also apparent in the 2019 Solar Policy. While the GoR (2019, p. 9) reflects on how "large scale integration [of solar power] to the grid is a challenging task having both technical and financial implications," it fails to mention the social implications and challenges of utility-scale solar energy. The policy also lists the stakeholders as "utility scale power producers, small power generators, state utilities such as generation, transmission and distribution companies" and so forth, without mentioning those with customary access rights, primarily consisting of agropastoralists (GoR, 2019, p. 9). Sharma and Bhatia (2019) in their comparison of the solar policies of Indian States make a similar observation, mentioning how, even when policies refer to farmers and residents of remote areas, they often fail to refer to women, residents of slums or nomadic and pastoral groups and do not recognize the specific needs of these populations.

Bureaucratic legitimation

Practices of bureaucratic legitimation, are "codified and sequential," validating some actions and actors while constraining others (Sareen, 2019, p. 15). When it comes to practices of bureaucratic legitimation, policy documents tend to present, in a classic neoliberal vision, the state as a facilitator of private investments. In practice, this takes shape through the introduction of special policies to encourage the deployment of large solar "parks," and through easing the appropriation of land.

The Solar Policies 2014 and 2019 offer insights into the neoliberal transformation of the state. Using jargon such as "stakeholders," "consumers," "special purpose vehicles," "joint venture," and "resilient." they portray the state as flexible and reactive, working to create an investor-friendly context. The vision set forth in

the GoR's policy (2019, p. 10) is thus "to facilitate the development of infrastructure in generation, transmission, distribution and manufacturing sector of renewable energy." It then describes the role of the Rajasthan Renewable Energy Corporation in arranging statutory clearances and approvals and in "facilitating allotment of Government land" to solar developers (GoR, 2019, p. 16). This mostly benefits large private and public conglomerates. By contrast, smaller developers often find themselves "mired in red tape and delays" (Sareen, 2018).

In practice, this facilitation is done through the introduction of special policies, which mostly concern utility-scale solar. Amongst them, we can underline a special provision in the Land Revenue Act, which allows private sector developers to use agricultural land without needing to go through land conversion thanks to a process called "deemed conversion." The RRECL can also recommend the leasing of government land to private sector developers, allowing for the transfer of control over resources to capital. In these cases, the RRECL also often take charge of interacting with district collectors, who are responsible for giving the final approval for public land transfers. The requirement to get an authorization from local authorities, such as *Gram panchayats*, has also been lifted. When asked about this change in regulations, a government employee accused local elected representatives of corruption (June, 2022). A village elected official (*Sarpanch*) (November, 2022), expressed his frustration over the lack of ability to influence the trajectory of the solar projects in his community or the ability to hold the companies to account for ignoring their CSR responsibilities, saying his letters to the district authorities have gone unanswered, leading him to argue "the companies are powerful, people are weak."

Alongside these special policies, Yenneti *et al.* (2016) describe how in India, at the local level, enclosing the commons for solar "park" projects is sometimes carried out through extra-legal practices, such as misleading villagers and pastoral populations into signing documents waiving their rights to the land. During one of our field visits, in June 2022, residents of the village of Khimsar situated near one of Rajasthan's first grid-connected solar plants mentioned having been promised jobs and better electricity supply by the district administration in exchange for their common land, which never materialized. A local activist and landowner in Jaisalmer (January, 2023) told us he was offered higher rates than the market or opportunities for employment in exchange for his land and his silence, but was later faced with threats and harassment by land aggregators after continuing to reject the offer.

Technocratic legitimation

We now turn to practices of technocratic legitimation, which "perform systematic checks and approval of actions that entail technical expertise" (Sareen, 2019, p. 15). We can highlight how a narrow definition of what is green has come to dominate socio-technical imaginaries, with a tendency to reduce the social and political complexity of the contexts in which policies are implemented (Atkins & Hope, 2021; Li, 2007). Solar energy deployment in Rajasthan is currently driven by quantitative targets for installed capacity (see Table 2) (Arabindoo, 2020). This is accompanied by ever-growing estimates of the "renewable energy potential" of the state. This technocratic practice of estimating and systematically increasing the energy-producing potential of different spaces based on maps and data has long historic roots in India and has been documented for other sources of energy, including large hydropower (Girard, 2019). It fails to substantially consider the fate of populations living near the sites of generation and extraction, the inclusivity of the planning process, how well the energy produced is redistributed, or the consequences of solar plants for the local economy and power relations (Atkins & Hope, 2021). As described by a sustainability policy researcher in Delhi (December 2022), "it has happened before, it is happening now. We are making the same mistakes again. The underlying politics is the same. It is not going towards transformational politics."

A clear manifestation of this came from an interview we conducted with a researcher (December, 2022; January, 2023) at a land conservation center. He brought our attention to concerns about appropriating *Gochars* (pasturelands), which can be appropriated so long as other land is made available elsewhere. This is questionable. For example, clearcutting grazing lands from trees, shrubs, and bushes damages the habitat of migratory and domesticated animals who have a relationship with that land. In other words, the equivocation of two land parcels is false. Sharma and Bhatia (2019:66) similarly underline how "monetary compensation can

be inadequate because it does not account for appreciation in land value, the importance of land as a source of employment and its role in the socio-cultural dimension of people's lives." Thus, those aware of ongoing trends recognize that "just transition is more of hype than an actual phenomenon" (NGO worker, January, 2023).

This tendency for depoliticizing solar rollout is also visible in policy documents. In the Solar Policies 2019 and 2014, the techno-scientific approach for mitigation is presented as an apolitical solution. Except for the one-page forewords signed by the Chief Minister and the Minister of Energy, both Solar Energy Policies are devoid of any reference to politics or political choices. This is a trend Kallis, Demaria, and D'Alisa (2015) have described as the depoliticization of "sustainable development" in public debate—where the discourse is limited to offering technocratic and managerial governance in a positivist technocratic tradition, based on pervasive ideology (also see Anker, 2018; Gómez-Baggethun & Naredo, 2015; Li, 2007).

These trends are also evident in the push toward substitution of land uses without behavior change. For example, the GoR (2019, p. 9) argues that "electric vehicles are environmentally cleaner than fossil fuel-based vehicles. It is right time to push for a rapid transition of transport (sic) sector based primarily on electric vehicles." This objective is then justified through climate and sustainability discourses. An alternative that is starkly missing is the possibility of developing alternative modes of transportation and the continued role of certain social groups (such as the urban upper-middle class) in vehicular air pollution. This mode of technocratic legitimation, Stock (2021, p. 374) contends, is a form of *deus ex matigata*—a "plot device of neoliberal India (mobilized through Solar India's storylines) that promises social development through sustainable solutions without transforming political-economic structures that (re)produce social difference."

Financial legitimation

Finally, we turn to practices of financial legitimation which are "often spatially remote and materially elusive", and "enable actors to block action or to fulfill financial requirements and proceed with material actions, shaping sectoral change" (Sareen, 2019, p. 15). Solar energy, which has become financially competitive (even outperforming thermal power), is now predominantly presented as commercially viable energy that attracts the interest of public and private entities. While some of the new capacity will be sold to Rajasthan's distribution companies, most of the energy is evacuated outside the state and sold to other public and private entities in India. Rajasthan, in these changing times, sees itself as a large exporter of "green" power to the rest of India.

Policy documents and officials present solar energy as a great economic opportunity for Rajasthan, and India as a whole. State officials promote Rajasthan as a potential leader nationally—and internationally, as a "highly preferred destination for solar energy at the global level" (GoR, 2019, p. 9). For example, in her foreword to the 2014 policy, the former Chief Minister explains that the policy will "be an engine to draw in the much-required investment in the State. The benefits that shall accrue will go a long way in furthering development in the State" (GoR, 2014, p. 5). The government is thus hoping that its solar energy ambitions will offer Rajasthan the opportunity to attract large Indian conglomerates and foreign investors alongside an opportunity to generate employment for Rajasthani youth. Investor meetings and summits are a regular occurrence, with companies committing to large investments in the State, solar energy usually being one of the most popular sectors.

Two important elements, however, should be underlined. First, beyond general calls for development and job creation, ideas of redistribution or commitments to social welfare are minimal in the GoR (2014, 2019).⁵ Development is mostly imagined through attracting private investments and increasing energy production. Thus, energy policy is not thought of in terms of sufficiency, but rather in terms of potential, with the objective of extracting as much capacity as possible. This impacts the market, as in often-dire financial situations, public distribution companies prefer to wait for the next tender, hoping for lower bids (Rajshekhar, 2021). Furthermore, reports show that the employment potential of decentralized and small-scale solar is higher than that of utility-scale solar (Tyagi *et al.*, 2022). The scalar bias of Rajasthan's policies undermines the stated political objective of creating new jobs. In our field observation, villagers told us except for security guards,

⁵ Though see Sharma & Bhatia (2023) for an overview.

panel cleaners (1-2 times monthly), and land weeders—often out-of-state laborers—there are no employment opportunities created by the new industry (November, 2022, see also Singh 2023).

Secondly, solar policies provide an uncritical and partially false image of the market for solar. Recent media reports have underlined how the market is currently undergoing a tumultuous phase, as investments are slowing, and some private actors are leaving it due to, amongst other factors, increasing prices and competition from large energy conglomerates (Rajshkhar, 2021). Furthermore, little mention is made of the hidden costs of solar development—for instance, water access requirements in a context of water scarcity—while other elements (e.g., falling tariffs and large investments in transmission and distribution systems) are dependent on public funding and tax incentives. To secure funding from power developers, the solar policies provide for the creation of a Rajasthan Renewable Energy Development Fund, with required contributions to the fund increasing significantly between 2014 and 2019; however, producers who sell power to Rajasthan's distribution companies are exempt from the requirements. These trends bring into question the vision of solar energy as a great economic opportunity for the State. This is especially true for communities affected by the solar plants who insist that despite early enthusiasm for the opportunities offered by the solar industry they are yet to see anything materialize, other than loss of access to pasture. A local landowner in Jaisalmer district (December, 2022) put it succinctly: "Now you have put the solar parks, OK. At least have something for the poor people."

6. Discussion and Conclusion

So far, we have demonstrated how the discursive, technocratic, bureaucratic, and financial legitimization practices carried out by *Solar Rajasthan* depoliticize the development of solar "parks" in a variety of ways, including framing them as an indisputable achievement for the state and the nation; excluding local political economic dynamics, such as existing inequalities and power relations, from the domain of knowledge; and using calculations and maps to transform solar development into a technical domain (Li, 2007). We have also shown how solar development is rooted in a political paradigm that combines ecomodernism and the neoliberalization of India's political economy.

Under the current climate governance of opportunism (Pillai & Dubash, 2021), development goals, such as lower-carbon energy targets, and the expansion of the private sector have led to the appropriation of agropastoral lands and resources. The state acts as a facilitator for these dynamics, while the only place left for local villagers in political and technocratic discourses is that of "users" or "customers." The question of their rights is "subsumed by the promise of development" (Li, 2007: 128). In other words, in the new biopolitical reality created through solar energy resource frontiers, villagers are transformed into relative surplus populations, making the resources they sit on more important than their culture, labor, and life (Li, 2010).

While solar energy deployment is justified under the pretense of climate mitigation and expanding electricity access, in practice it functions as an opportunity to transform non-income generating land into new frontiers for domestic and foreign investments. "Wastelands," with their loose definition, become convenient categories to be appropriated as a commodity, stripped of their centrality to the lives of rural agropastoralists, and their loss accepted as the cost of modernity and development. The appropriation of land for solar parks, as a climate mitigation strategy, parallels similar practices in conservation, extraction of transition materials, and energy projects in the global North (Karam & Shokrgozar, 2023) and the South (Tornel, 2023). The ongoing practices of solar rollout, which prioritize expansion over redistribution, are in alignment with India's model of economic growth, which has accompanied an increase in inequality—with the top 1% of earners capturing 22% of the total income, against 6% in the early 1980s (Chancel & Piketty 2019; Kashwan *et al.*, 2022). These are trajectories that as described by Bertelsen (2021, 90) can be understood as a form of control over *bios* and *zoe*⁶ while precluding "the emergence of alternative potential trajectories of development, enrichment, [and] emancipation."

These insights illustrate the necessity for repoliticizing climate mitigation, to overcome it being overshadowed by economic growth—and instead to reintegrate other forms of growth, such as intellectual,

⁶ *bios* "as an urban form of life recognized as political beings" and *zoe* as "an urban life external to such recognition and protection" (Bertelsen, 2021, p. 87)

moral, and social growth as advanced by the Stockholm Declaration of 1972, now celebrating its 50th anniversary. By interrogating practices of legitimation that justify *Solar Rajasthan*, our hope is to contribute to their delegitimation: an effort that can support counter-movements engaged in anti-authoritarian and anticolonial resistance and self-defense by those unjustly affected by solar infrastructures. More broadly, we hope more political ecology scholarship will develop theories of power connected to the legitimation of ecomodernism, as lower-carbon energy infrastructures go mainstream. Their associated infrastructure—land and resource-intensive grids, storage, etc.—represent a new (and expanded) frontal attack on marginal rural communities (Knuth *et al.*, 2022). With these premises, we assert that *Solar Rajasthan* is a political choice rooted in hegemonic climate solutions (i.e. ecomodernism), that will primarily benefit the wealthy on the backs of the most vulnerable. And while progressive state action and normative commitments for just transitions remain imperative to tame capitalism, creating new imaginaries of energy futures remains crucial for decentering and ultimately eliminating capitalism's discursive and material grip over them.

We conclude that the current political economy of "just transitions" is ineffectual and exacerbates many of the same inequalities and injustices of the fossil fuel economy—necessitating the need for new emancipatory, disruptive, and anti-capitalist forms of everyday life (Bouzarovski, 2022). As the contribution of over a dozen scholars on topics ranging from energy and environmental justice to radical ecological democracy and post-productivism in India suggests (see Gerber & Raina, 2018)—an alternative vision of life and organizing society that is not bounded to the post-colonial order of development is possible, one that allows for the practice and use of alternative epistemologies (Whyte, 2013). Alternative (and better) energy futures will not materialize through techno-capitalism, but through embracing post-extractivist transition discourses seeking to bring about an insurrectionary and emancipatory paradigm shift (Escobar, 2015). *Solidaric solarities*, that Sareen and colleagues (2023, p. 3) articulate, are "modalities of harnessing solar energy to advance empowerment, interconnectedness and community wealth for victims of energy injustices, toward redistributive and emancipatory solar development."

References

- Abbasi, S. A., Abbasi, T., & Abbasi, T. (2016). Impact of wind-energy generation on climate: A rising spectre. *Renewable and Sustainable Energy Reviews*, 59, 1591-1598. <https://doi.org/10.1016/j.rser.2015.12.262>
- Anker, P. (2018). A pioneer country? A history of Norwegian climate politics. *Climatic Change*, 151(1). <https://doi.org/10.1007/s10584-016-1653-x>
- Arabindoo, P. (2020). Renewable energy, sustainability paradox and the post-urban question. *Urban Studies*, 57(11), 2300-2320. <https://doi.org/10.1177/0042098019885080>
- Asafu-Adjaye, J., Blomqvist, L., Brand, S., Brook, B., DeFries, R., Ellis, E., Foreman, C., Keith, D., Lewis, M., Lynas, M., Nordhaus, T., Pielke, R., Pritzker, R., Roy, J., Sagoff, M., Shellenberger, M., Stone, R., & Teague, P. (2015). *An Ecomodernist Manifesto*. Breakthrough Institute. <https://www.ecomodernism.org/>
- Atkins, E., & Hope, J. C. (2021). Contemporary political ecologies of hydropower: Insights from Bolivia and Brazil. *Journal of Political Ecology*, 28(1), 246-265. <https://doi.org/10.2458/jpe.2363>
- Avila-Calero, S. (2017). Contesting energy transitions: Wind power and conflicts in the Isthmus of Tehuantepec. *Journal of Political Ecology*, 24(1), 992-1012. <https://doi.org/10.2458/v24i1.20979>
- Bäckstrand, K., & Lövbrand, E. (2006). Planting trees to mitigate climate change: Contested discourses of ecological modernization, green governmentality and civic environmentalism. *Global Environmental Politics*, 6(1), 50-75. <https://doi.org/10.1162/glep.2006.6.1.50>
- Baka, J. (2013). The political construction of wasteland: Governmentality, land acquisition and social inequality in South India. In W. Wolford, S. M. B. Jr, R. Hall, I. Scoones, & B. White (Eds.), *Governing global land deals* (pp. 211-229). Wiley. <https://doi.org/10.1002/9781118688229.ch10>
- Baka, J. (2017). Making space for energy: Wasteland development, enclosures, and energy dispossessions. *Antipode*, 49(4), 977-996. <https://doi.org/10.1111/anti.12219>

- Batalla, O. (2020). Green Capitalism? Politics from the Necrocene to the Eleutherocene. *E-Cadernos CES*, 34, 64-85. <https://doi.org/10.4000/eces.5553>
- Baviskar, A. (2019). Nation's body, river's pulse: Narratives of anti-dam politics in India. *Thesis Eleven*, 150(1), 26-41. <https://doi.org/10.1177/0725513618822417>
- Bebbington, J., Österblom, H., Crona, B., Jouffray, J.-B., Larrinaga, C., Russell, S., & Scholtens, B. (2019). Accounting and accountability in the Anthropocene. *Accounting, Auditing & Accountability Journal*, 33(1), 152-177. <https://doi.org/10.1108/AAAJ-11-2018-3745>
- Bedi, H. P. (2019). "Lead the district into the light": Solar energy infrastructure injustices in Kerala, India. *Global Transitions*, 1, 181-189. <https://doi.org/10.1016/j.glt.2019.10.005>
- Bertelsen, B. E. (2021). A lesser human? Utopian registers of urban reconfiguration in Maputo, Mozambique. *Social Anthropology*, 29(1), 87-107. <https://doi.org/10.1111/1469-8676.12988>
- Bhambra, G. K., & Newell, P. (2022). More than a metaphor: 'Climate colonialism' in perspective. *Global Social Challenges Journal*, 2(2), 179-187. <https://doi.org/10.1332/EIEM6688>
- Bonneuil, C., & Fressoz, J.-B. (2017). *The shock of the Anthropocene: The earth, history and us*. Verso.
- Bouzarovski, S. (2022). Just Transitions: A political ecology critique. *Antipode*, 54(4), 1003-1020. <https://doi.org/10.1111/anti.12823>
- Bridge, G., Bouzarovski, S., Bradshaw, M., & Eyre, N. (2013). Geographies of energy transition: Space, place and the low-carbon economy. *Energy Policy*, 53, 331-340. <https://doi.org/10.1016/j.enpol.2012.10.066>
- Chabot, S., & Vinthagen, S. (2015). Decolonizing civil resistance. *Mobilization: An International Quarterly*, 20(4), 517-532. <https://doi.org/10.17813/1086-671X-20-4-517>
- Chancel, L., & Piketty, T. (2019). Indian income inequality, 1922-2015: From British Raj to Billionaire Raj? *Review of Income and Wealth*, 65(S1). <https://doi.org/10.1111/roiw.12439>
- Chari, M. (2020). How solar farms fuel land conflicts. *Mint*. Sept. 20. <https://www.livemint.com/news/india/how-solar-farms-fuel-land-conflicts-11600612526037.html>
- Chatterjee, E. (2022). New developmentalism and its discontents: State activism in Modi's Gujarat and India. *Development and Change*, 53(1), 58-83. <https://doi.org/10.1111/dech.12579>
- Clark, J. (2020). [What is eco-anarchism?](#) *The Ecological Citizen*, 3, 9-14.
- Collier, S. J. (2011). *Post-Soviet social: Neoliberalism, social modernity, biopolitics*. Princeton University Press.
- Daggett, C. N. (2019). *The birth of energy: Fossil fuels, thermodynamics, and the politics of work*. Duke University Press.
- Dawson, A., Armiero, M., Turhan, E., & Biasillo, R. (2022). Urban climate insurgency: An introduction. *Social Text*, 40, 1-20. <https://doi.org/10.1215/01642472-9495075>
- Dorning, C., Hornborg, A., Abson, D. J., von Wehrden, H., Schaffartzik, A., Giljum, S., Engler, J.-O., Feller, R. L., Hubacek, K., & Wieland, H. (2021). Global patterns of ecologically unequal exchange: Implications for sustainability in the 21st century. *Ecological Economics*, 179, 106824. <https://doi.org/10.1016/j.ecolecon.2020.106824>
- Dubash, N. K. (2021). Varieties of climate governance: The emergence and functioning of climate institutions. *Environmental Politics*, 30, 1-25. <https://doi.org/10.1080/09644016.2021.1979775>
- Dunlap, A. (2021). Does renewable energy exist? Fossil Fuel+ technologists and the search for renewable energy. In S. Betal & D. Rudolph (Eds.), *A critical approach to the social acceptance of renewable energy infrastructure: Going beyond green growth and sustainability* (pp. 83-102). Palgrave Macmillan. https://doi.org/10.1007/978-3-030-73699-6_5
- Dunlap, A., & Correa Arce, M. (2022). 'Murderous energy' in Oaxaca, Mexico: Wind factories, territorial struggle and social warfare. *The Journal of Peasant Studies*, 49(2), 455-580. <https://doi.org/10.1080/03066150.2020.1862090>

- Dunlap, A., & Jakobsen, J. (2020). *The Violent Technologies of Extraction: Political ecology, critical agrarian studies and the capitalist worldeater*. Palgrave Pivot. <https://doi.org/10.1007/978-3-030-26852-7>
- Dunlap, A., & Marin, D. (2022). Comparing coal and 'transition materials'? Overlooking complexity, flattening reality and ignoring capitalism. *Energy Research & Social Science*, 89, 102531. <https://doi.org/10.1016/j.erss.2022.102531>
- Escobar, A. (2015). Degrowth, postdevelopment, and transitions: A preliminary conversation. *Sustainability Science*, 10(3), 451-462. <https://doi.org/10.1007/s11625-015-0297-5>
- Fairhead, J., Leach, M., & Scoones, I. (2012). Green Grabbing: A new appropriation of nature? *Journal of Peasant Studies*, 39(2), 237-261. <https://doi.org/10.1080/03066150.2012.671770>
- Federici, S., & Linebaugh, P. (2019). *Re-enchanting the world: Feminism and the politics of the commons*. PM Press.
- Feindt, P. H., & Oels, A. (2005). Does discourse matter? Discourse analysis in environmental policy making. *Journal of Environmental Policy & Planning*, 7(3), 161-173. <https://doi.org/10.1080/15239080500339638>
- Foucault, M. (2003[1963]). *The Birth of the Clinic*. Routledge.
- Gerber, J.-F., & Raina, R. S. (2018). *Post-Growth Thinking in India: Towards Sustainable Egalitarian Alternatives*. Orient BlackSwan.
- Gandhi, M. J. (1916[2009]). Economic development and moral development. In Parel, A. (Ed.). *Hind Swaraj and other writings* (pp. 153-161). Cambridge University Press.
- Ghosh, D., Bryant, G., & Pillai, P. (2023). Who wins and who loses from renewable energy transition? Large-scale solar, land, and livelihood in Karnataka, India. *Globalizations*, 20(8), 1328-1343. <https://doi.org/10.1080/14747731.2022.2038404>
- Gidwani, V., & Reddy, R. N. (2011). The Afterlives of "Waste": Notes from India for a Minor History of Capitalist Surplus. *Antipode*, 43(5), 1625-1658. <https://doi.org/10.1111/j.1467-8330.2011.00902.x>
- Girard, B. (2019). *Les ingénieurs, le fleuve et l'état. Rôle et place des ingénieurs dans un grand projet technique: La gestion du Gange*. PhD dissertation, Sociology. EHESS.
- Gómez-Baggethun, E., & Naredo, J. M. (2015). In search of lost time: The rise and fall of limits to growth in international sustainability policy. *Sustainability Science*, 10(3), 385-395. <https://doi.org/10.1007/s11625-015-0308-6>
- Government of Rajasthan. (2014). *Solar for a brighter future*. <https://web.archive.org/web/20180922013752/http://rips.rajasthan.gov.in/menupdf/Rajasthan-Solar-Energy-Policy-2014-10.pdf>
- Government of Rajasthan. (2019). *Rajasthan Solar Energy Policy, 2019*. Energy Department. <https://rajnivesh.rajasthan.gov.in/Uploads/d64c2541-89cb-44ae-bcd4-a5090c9f59ba.pdf>
- Green Anarchy Collective. (2013). What is Green Anarchy? An introduction to anti-civilization anarchist thought and practice. *Green Anarchy Magazine*, 4. https://greenanarchy.anarchyplanet.org/files/2013/09/what_is_ga_primer.pdf
- Haberl, H., Wiedenhofer, D., Virág, D., Kalt, G., Plank, B., Brockway, P., Fishman, T., Hausknost, D., Krausmann, F., Leon-Gruchalski, B., Mayer, A., Pichler, M., Schaffartzik, A., Sousa, T., Streeck, J., & Creutzig, F. (2020). A systematic review of the evidence on decoupling of GDP, resource use and GHG emissions, part II: Synthesizing the insights. *Environmental Research Letters*, 15(6), 065003. <https://doi.org/10.1088/1748-9326/ab842a>
- Hickel, J. (2021). The anti-colonial politics of degrowth. *Political Geography*, 102404. <https://doi.org/10.1016/j.polgeo.2021.102404>
- Hickel, J., & Kallis, G. (2019). Is Green Growth possible? *New Political Economy*, 25(4). <https://doi.org/10.1080/13563467.2019.1598964>

- Illich, I. (1997). Development as planned poverty. In M. Rahnema & V. Bawtree (Eds.), *The post-development reader* (pp. 94-104). Zed Books.
- Isaksen, K.-A., & Stokke, K. (2014). Changing climate discourse and politics in India. Climate change as challenge and opportunity for diplomacy and development. *Geoforum*, 57, 110-119. <https://doi.org/10.1016/j.geoforum.2014.08.019>
- Jones, C. F. (2016). *Routes of power: Energy and modern America*. Harvard University Press.
- Jordan, N. D., & Bleischwitz, R. (2020). Legitimizing the governance of embodied emissions as a building block for sustainable energy transitions. *Global Transitions*, 2, 37-46. <https://doi.org/10.1016/j.glt.2020.01.002>
- Kallis, G., Demaria, F., & D'Alisa, G. (Eds.). (2015). *Degrowth: A vocabulary for a new era*. Routledge.
- Karam, A., & Shokrgozar, S. (2023). "We Have Been Invaded:" Wind energy sacrifice zones in Åfjord and their implications for Norway. *Norwegian Journal of Geography*. 77(3), 183-196. <https://doi.org/10.1080/00291951.2023.2225068>
- Kashwan P., Chung-En Liu, J., & Das, J. (2022). Climate Nationalisms: Beyond the binaries of good and bad nationalism. *WIREs Climate Change*, 14(2), e815 <https://doi.org/10.1002/wcc.815>
- Keyßer, L. T., & Lenzen, M. (2021). 1.5 °C degrowth scenarios suggest the need for new mitigation pathways. *Nature Communications*, 12(1), 2676. <https://doi.org/10.1038/s41467-021-22884-9>
- Klein, N. (2016, June 1). Let Them Drown. *London Review of Books*, 38(11). <https://www.lrb.co.uk/the-paper/v38/n11/naomi-klein/let-them-drown>
- Knuth, S., Behrsin, I., Levenda, A., & McCarthy, J. (2022). New political ecologies of renewable energy. *Environment and Planning E: Nature and Space*, 5(3), 997-1013. <https://doi.org/10.1177/25148486221108164>
- Landstreicher, W. (2010). Barbaric Thoughts: On a revolutionary critique of civilization. *The Anarchist Library*. February 8. <https://theanarchistlibrary.org/library/wolfi-landstreicher-barbaric-thoughts-on-a-revolutionary-critique-of-civilization>
- Larkin, B. (2013). The politics and poetics of infrastructure. *Annual Review of Anthropology*, 42(1), 327-343. <https://doi.org/10.1146/annurev-anthro-092412-155522>
- Leipold, S., Feindt, P. H., Winkel, G., & Keller, R. (2019). Discourse analysis of environmental policy revisited: Traditions, trends, perspectives. *Journal of Environmental Policy & Planning*, 21(5), 445-463. <https://doi.org/10.1080/1523908X.2019.1660462>
- Levien, M. (2012). The land question: Special economic zones and the political economy of dispossession in India. *The Journal of Peasant Studies*, 39(3-4), 933-969. <https://doi.org/10.1080/03066150.2012.656268>
- Levien, M. (2013). Regimes of dispossession: From steel towns to Special Economic Zones. *Development and Change*, 44(2), 381-407. <https://doi.org/10.1111/dech.12012>
- Li, T. (2007). *The will to improve: Governmentality, development, and the practice of politics*. Duke University Press.
- Li, T. M. (2010). To Make Live or Let Die? Rural dispossession and the protection of surplus populations. *Antipode*, 41(s1), 66-93. <https://doi.org/10.1111/j.1467-8330.2009.00717.x>
- Millward-Hopkins, J., Steinberger, J. K., Rao, N. D., & Oswald, Y. (2020). Providing decent living with minimum energy: A global scenario. *Global Environmental Change*, 65, 102168. <https://doi.org/10.1016/j.gloenvcha.2020.102168>
- Mohan, A., & Topp, K. (2018). India's energy future: Contested narratives of change. *Energy Research & Social Science*, 44, 75-82. <https://doi.org/10.1016/j.erss.2018.04.040>
- Nielsen, K. B., & Nilsen, A. G. (2022). India's evolving neoliberal regime of dispossession: From the Anti-SEZ Movement to the Farm Law Protests. *Sociological Bulletin*, 71(4), 582-600. <https://doi.org/10.1177/00380229221116932>

- Pillai, A. V., & Dubash, N. K. (2021). The limits of opportunism: The uneven emergence of climate institutions in India. *Environmental Politics*, 30(sup1), 93-117. <https://doi.org/10.1080/09644016.2021.1933800>
- Rajshekhkar, M. (2021). Even with low tariffs, why growth in India's solar sector is slumping. *The Wire*. <https://thewire.in/energy/solar-tariff-india-energy-business-renewables>
- Rao, N. D., Min, J., & Mastrucci, A. (2019). Energy requirements for decent living in India, Brazil and South Africa. *Nature Energy*, 4(12), 1025-1032. <https://doi.org/10.1038/s41560-019-0497-9>
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., ... Foley, J. A. (2009). A safe operating space for humanity. *Nature*, 461(7263), 472-475. <https://doi.org/10.1038/461472a>
- Roy, B., & Schaffartzik, A. (2021). Talk renewables, walk coal: The paradox of India's energy transition. *Ecological Economics*, 180, 106871. <https://doi.org/10.1016/j.ecolecon.2020.106871>
- Sareen, S. (Ed.). (2020). *Enabling sustainable energy transitions: Practices of legitimization and accountable governance*. Palgrave Pivot. <https://doi.org/10.1007/978-3-030-26891-6>
- Sareen, S., Girard, B., Lindkvist, M., Sveinsdóttir, A., Kristiansen, S., Laterza, V., Aguilar-Støen, M., & Langhelle, O. (2023). Enabling a just energy transition through solidarity in research. *Energy Research & Social Science*, 101, 103143. <https://doi.org/10.1016/j.erss.2023.103143>
- Sareen, S., & Haarstad, H. (2021). Decision-making and scalar biases in solar photovoltaics roll-out. *Current Opinion in Environmental Sustainability*, 51, 24-29. <https://doi.org/10.1016/j.cosust.2021.01.008>
- Sareen, S., & Kale, S. S. (2018). Solar 'power': Socio-political dynamics of infrastructural development in two Western Indian states. *Energy Research & Social Science*, 41, 270-278. <https://doi.org/10.1016/j.erss.2018.03.023>
- Sareen, S., Moss, T., Lund, C., Haarstad, H., Sovacool, B., & Wolf, S. (2020). Conclusion: Legitimation and accountability in energy transitions research. In S. Sareen (Ed.), *Enabling sustainable energy transitions* (pp. 117-135). Springer. https://doi.org/10.1007/978-3-030-26891-6_10
- Sareen, S., Sorman, A. H., Stock, R., Mahoney, K., & Girard, B. (2023). Solidaric solarities: Governance principles for transforming solar power relations. *Progress in Environmental Geography*, 27539687231190656. <https://doi.org/10.1177/27539687231190656>
- Sareen, S., & Wolf, S. A. (2021). Accountability and sustainability transitions. *Ecological Economics*, 185, 107056. <https://doi.org/10.1016/j.ecolecon.2021.107056>
- Sharma, K. R., & Bhatia, P. (2023). How just and democratic Is India's solar energy transition? An analysis of state solar policies in India. In P. Kashwan (Ed.), *Climate Justice in India* (pp. 50-73). Cambridge University Press. <https://doi.org/10.1017/9781009171908.004>
- Siamanta, Z. C. (2019). Wind parks in post-crisis Greece: Neoliberalisation vis-à-vis green grabbing. *Environment and Planning E: Nature and Space*, 2(2), Article 2. <https://doi.org/10.1177/2514848619835156>
- Siamanta, Z. C. (2021). Conceptualizing alternatives to contemporary renewable energy development: Community Renewable Energy Ecologies (CREE). *Journal of Political Ecology*, 28(1), 47-69. <https://doi.org/10.2458/jpe.2297>
- Singh, D. (2022). 'This is all waste': Emptying, cleaning and clearing land for renewable energy dispossession in borderland India. *Contemporary South Asia*, 30(3), 402-419. <https://doi.org/10.1080/09584935.2022.2099812>
- Singh, D., (2023). When 'green' becomes 'saffron': Wind extraction, border surveillance, and citizenship regime at the edge of the Indian state. *Journal of Political Ecology* 30(1). <https://doi.org/10.2458/jpe.5490>
- Smil, V. (2017). *Energy transitions: Global and national perspectives* (Second edition). Praeger.

- Sovacool, B. K., & Dunlap, A. (2022). Anarchy, war, or revolt? Radical perspectives for climate protection, insurgency and civil disobedience in a low-carbon era. *Energy Research & Social Science*, 86, 102416. <https://doi.org/10.1016/j.erss.2021.102416>
- Stirling, A. (2019). How deep is incumbency? A 'configuring fields' approach to redistributing and reorienting power in socio-material change. *Energy Research & Social Science*, 58, 101239. <https://doi.org/10.1016/j.erss.2019.101239>
- Stock, R. (2021a). Deus ex mitigata: Denaturalizing the discursive power of Solar India. *Environment and Planning E: Nature and Space*, 4(2), 354-382. <https://doi.org/10.1177/2514848620908166>
- Stock, R. (2021b). Praeclariat: Theorising precarious labour geographies of solar energy. *Antipode*, 53(3), 928-949. <https://doi.org/10.1111/anti.12698>
- Stock, R. (2023). Surya-shakti-sharir: Embodying India's solar energy transition. *Norsk Geografisk Tidsskrift - Norwegian Journal of Geography*, 77(3), 197-205. <https://doi.org/10.1080/00291951.2022.2136584>
- Stock, R. (in progress). *Laboring for light: Freedom dreams and energy unfreedoms of solar labor in Ghana*. Governing RE rollouts in Financially Constraints Context, Stavanger, Norway.
- Stock, R., & Birkenholtz, T. (2021). The sun and the scythe: Energy dispossessions and the agrarian question of labor in solar parks. *The Journal of Peasant Studies*, 48(5), 984-1007. <https://doi.org/10.1080/03066150.2019.1683002>
- Stoddard, I., Anderson, K., Capstick, S., Carton, W., Depledge, J., Facer, K., Gough, C., Hache, F., Hoolohan, C., Hultman, M., Hällström, N., Kartha, S., Klinsky, S., Kuchler, M., Lövbrand, E., Nasiritousi, N., Newell, P., Peters, G. P., Sokona, Y., ... Williams, M. (2021). Three decades of climate mitigation: Why haven't we bent the global emissions curve? *Annual Review of Environment and Resources*, 46(1), 653-689. <https://doi.org/10.1146/annurev-environ-012220-011104>
- Sullivan, S. (2013). Banking Nature? The spectacular financialisation of environmental conservation. *Antipode*, 45(1), 198-217. <https://doi.org/10.1111/j.1467-8330.2012.00989.x>
- Sultana, F. (2022). The unbearable heaviness of climate coloniality. *Political Geography*, 102638. <https://doi.org/10.1016/j.polgeo.2022.102638>
- Swyngedouw, E. (2013). Apocalypse Now! Fear and doomsday pleasures. *Capitalism Nature Socialism*, 24(1), 9-18. <https://doi.org/10.1080/10455752.2012.759252>
- Swyngedouw, E. (2015). [The non-political politics of climate change](https://doi.org/10.1080/10455752.2015.10455752). *ACME: An International Journal for Critical Geographies*, 12(1), 1-8.
- Szeman, I., & Wenzel, J. (2021). What do we talk about when we talk about extractivism? *Textual Practice*, 35(3), 505-523. <https://doi.org/10.1080/0950236X.2021.1889829>
- The Wire. (2021). Study finds India's rich emit 7x more emissions than the poor. *The Wire Science*. Jan 19. <https://science.thewire.in/environment/india-carbon-emissions-rich-poor-households/>
- Tornel, C. (2023). Energy justice in the context of green extractivism: Perpetuating ontological and epistemological violence in the Yucatan Peninsula. *Journal of Political Ecology*, 30(1). <https://doi.org/10.2458/jpe.5485>
- Tyagi, A., Lata, C., Korsh, J., Nagarwal, A., Rai, D., Kwatra, S., & Kuldeep, N. (2022). *India's expanding clean energy workforce*. Council on Energy, Environment and Water, Natural Resources Defense Council, and Skill Council for Green Jobs. <https://www.ceew.in/publications/indias-expanding-clean-energy-workforce>
- Vogel, J., Steinberger, J. K., O'Neill, D. W., Lamb, W. F., & Krishnakumar, J. (2021). Socio-economic conditions for satisfying human needs at low energy use: An international analysis of social provisioning. *Global Environmental Change*, 69, 102287. <https://doi.org/10.1016/j.gloenvcha.2021.102287>
- Watts, M. J. (2021). The agrarian question. In A. H. Akram-Lodhi, K. Dietz, B. Engels, & B. McKay (Eds.), *Handbook of critical agrarian studies* (pp. 53-66). Edward Elgar.

- Whyte, K. P. (2013). On the role of traditional ecological knowledge as a collaborative concept: A philosophical study. *Ecological Processes*, 2(1), 7. <https://doi.org/10.1186/2192-1709-2-7>
- World Bank Group. (2017). *The growing role of minerals and metals for a low carbon future*. World Bank. <https://doi.org/10.1596/28312>
- Yenneti, K., Day, R., & Golubchikov, O. (2016). Spatial justice and the land politics of renewables: Dispossessing vulnerable communities through solar energy mega-projects. *Geoforum*, 76, 90-99. <https://doi.org/10.1016/j.geoforum.2016.09.004>
- York, R., & Bell, S. E. (2019). Energy transitions or additions?: Why a transition from fossil fuels requires more than the growth of renewable energy. *Energy Research & Social Science*, 51, 40-43. <https://doi.org/10.1016/j.erss.2019.01.008>