



Contents lists available at ScienceDirect

Energy Research &amp; Social Science

journal homepage: [www.elsevier.com/locate/erss](http://www.elsevier.com/locate/erss)

Original research article

# Indonesia's energy transition and its contradictions: Emerging geographies of energy and finance

Sean F. Kennedy\*

Luskin School of Public Affairs, University of California, Los Angeles, 337 Charles E Young Dr E, Los Angeles, CA 90095, United States

## ARTICLE INFO

**Keywords:**  
Energy transition  
Financialization  
Indonesia  
Development

## ABSTRACT

Since 2015, the Indonesian solar electricity sector has witnessed unprecedented attention from international investors and developers, with planned solar photovoltaic (PV) projects announced in 2017 set to increase existing installed capacity from 9 megawatts (MW) to over 240 MW. This article examines the emerging geographies of renewable energy generation resulting from the rapid influx of foreign investment into Indonesia's solar PV sector. While foreign investment may prove successful in increasing the country's solar PV capacity, it may also produce several contradictory outcomes for Indonesia's energy transition. Efforts to reconcile demands of risk-averse, profit-driven investors and developers with the needs of the approximately 25 million Indonesians who currently lack access to electricity has resulted in a geography of renewable energy generation characterized by large-scale centralized generation facilities that constrain opportunities for local ownership and control over the energy system. The result – a major contradiction when viewed through the lens of Indonesia's energy transition development objectives – is not only a flow of economic benefits out of the country and limited improvement in energy access for much of the country, but a missed opportunity in terms of maximizing the socially and politically transformative potential a broader energy transition may entail.

## 1. Introduction

Despite strong growth across much of Southeast Asia, and abundant renewable energy potential [1], investment in renewable energy generation in Indonesia has historically lagged that of other countries in the region [2]. Since 2015, however, the Indonesian solar electricity sector has witnessed unprecedented attention from international investors and developers, with planned solar photovoltaic (PV) projects announced in 2017 alone set to increase existing installed capacity from 9 megawatts (MW) to over 240 MW [3]. While the 240 MW of planned projects falls far short of the country's ambitious target of adding an additional 3.6 gigawatts (GW) of solar PV by 2019, the recent surge in activity nevertheless suggests a significant shift in the political economy of Indonesia's electricity sector, and the potential beginnings of a broader transition from fossil fuels to renewable energy sources.

The sudden surge in foreign investment raises two questions that together form the focus of this article. First, why – and why now – has Indonesia attracted such significant attention from international developers and private investors, and at such unprecedented scale? Second, in the event that these proposed projects reach completion, how will the associated benefits and costs be distributed, both now and in the future? In response to calls for greater attention to the geographic

aspects of sustainability transitions [4,5], this article approaches these two questions by examining the development of Indonesia's solar PV sector as 'a geographical process, involving the reconfiguration of current patterns and scales of economic and social activity' [6]. In doing so, this article examines the processes through which the Indonesian solar PV sector has emerged, the ways in which the relationship between renewable energy and finance in Indonesia has evolved thus far, and the implications of this relationship for the future geographies of Indonesia's energy transition.

This article contributes to existing work on the geographies of energy transition [6,7], as well as recent work the financialization of natural resource management [8–10] and renewable energy generation [11] by furthering an understanding of the conditions under which an energy transition might emerge, the geographic and political economic characteristics of this apparent transition, and the political ecological implications for Indonesia's energy transition more broadly. Following a brief methodological overview in Sections 2 and 3 presents the theoretical context for the article, situating the concept of energy transition within recent work in critical geography and political ecology on the financialization of green infrastructure. Section 4 examines the confluence of domestic policy shifts and investment decisions that have informed the current geography of Indonesia's solar PV sector, focusing

\* Correspondence to: 3250 Public Affairs Building, Box 951656, Los Angeles, CA 90095-1656, United States.  
E-mail address: [sean.kennedy@ucla.edu](mailto:sean.kennedy@ucla.edu).

<https://doi.org/10.1016/j.erss.2018.04.023>

Received 29 June 2017; Received in revised form 21 March 2018; Accepted 12 April 2018  
2214-6296/ © 2018 Elsevier Ltd. All rights reserved.

in particular on the transformations in project scale, funding sources, and ownership structures that characterize the emerging sector. Following the convention of Indonesia's renewable energy targets, and given the difficulty in projecting future generation, this discussion focuses on capacity installed (i.e. megawatts) as opposed to actual generation (megawatt-hours). While attention to actual generation would provide greater insight, including land required to meet electricity demand [12], given that many of the projects discussed have not yet commenced operation such an analysis would require extensive estimation and is thus omitted from this discussion. Section 5 discusses the specific role of finance in shaping the emerging geography of Indonesia's solar PV sector, and examines the implications of the country's increasingly financialized energy transition in terms of immediate distributional outcomes and for Indonesia's energy transition objectives more broadly. Section 6 concludes.

## 2. Methodology

This article is based on policy, document, and media analysis informed by a review of grey and peer-reviewed literature, attendance at renewable energy finance conferences and webinars, and expert interviews. While all major Indonesian electricity-related legislation and regulations were reviewed, particular focus was directed at national-level Indonesian policies with direct relevance to renewable energy in general, and solar PV in particular. Direct analysis of relevant legislation and regulations was supplemented with a review of policy and legal reports produced by non-government and inter-governmental organizations, legal consulting firms, and research organizations including the International Renewable Energy Agency, the ASEAN Centre for Renewable Energy, Baker-McKenzie, PricewaterhouseCoopers, and Bloomberg New Energy Finance. Data relating to planned projects is drawn from publicly available sources including company reports, industry publications, and media articles. 15 semi-structured interviews with Indonesian policymakers, government officials, domestic and foreign renewable energy financiers, and renewable energy developers directly involved in the Indonesia solar PV sector were conducted between September 2016 and October 2017. Interviews were conducted at the World Renewable Energy Congress held in Jakarta, Indonesia from September 19–23, 2016, the SolarPlaza *Unlocking Solar Capital Asia* conference held in Singapore from September 28–29, 2017, at project locations in Java, East Nusa Tenggara, and Papua, and via Skype between September 2016 and October 2017. Where interviews are directly cited, interviewees have been anonymized due to the politically and commercially sensitive nature of the subject matter. A list of interview partners referred to directly in this article is included in the [Appendix A](#). These interviews were used to supplement the policy analysis and literature review, while also providing broader context and nuanced viewpoints from a variety of stakeholder perspectives.

## 3. Financialization and the geographies of energy transition

The term 'energy transition' can be broadly defined as the "radical, systemic and managed change towards 'more sustainable' or 'more effective' patterns of provision and use of energy" [13]. In recent years the study of energy transitions has witnessed a geographic turn [6,7], shifting from a focus on technological innovations driving change in socio-technical systems [4,5,14] toward a conception of energy transition as a 'geographical process, involving the reconfiguration of current patterns and scales of economic and social activity [6]. Under this radical, systemic, and geographic approach to energy transition, energy is conceptualized as more than simply an economic asset or an ecological phenomenon, but, owing to the inseparability of energy production, distribution, and consumption from political-economic and cultural processes, as a social relation [7,11]. Studying energy transitions from this perspective focuses attention on the ways in which drivers and outcomes of energy transitions, through their interplay with existing

social relations, play out unevenly across space [6]. Normative accounts of how energy transitions should be governed [15] and where renewable energy development should be located to minimize socio-ecological impacts [16], while invaluable to planners and policymakers, largely fail to account for the power relations and the broader political economic structures, land use, and ecological processes shaping the geography of renewable energy generation and energy transition and the profound contradictions that may result. Analyzing energy transitions from a geographical perspective emphasizes the study of places in which transition occurs, but also the spatial relations – geographical connections and interactions – within and between that place and other places [6], and thus provides a more comprehensive picture of the power relations shaping particular transitions [4] and the resulting distributional outcomes.

One geographic aspect of sustainability transitions that has received mounting attention in the areas of environmental conservation [8] and water management [9,10] but limited attention in the context of energy transition, is the role of finance. As with other resource sectors, the global renewable energy sector has been subject to a rapid increase in private sector participation, including a growing influence from private finance. Specific examples include the shift from subsidies and feed-in tariffs to competitive reverse auctions [2,17,18], innovations in risk management that shift financial and political risks from private to public entities [19,20], and a shift from public to private sources of finance [2]. In the case of the financialization of water infrastructure, investment decisions have come to be decided less by social or environmental need, but rather, "focused on the most effective means to guarantee a range of investment opportunities within an increasingly leveraged set of infrastructural assets" [10]. In this context, project 'bankability' – the ability of a project to generate sufficient profit to satisfy lender requirements [11,21] – has become the core metric against which project viability and desirability is judged. While the ways in which the apparent financialization of the renewable energy sector translates into ownership, control and geographical organization of the renewable energy industry has received limited attention, recent work suggest that financialization may promote a particular type of transition, one predicated on 'bankability', risk minimization, and short term profit maximization [11].

Similar to the ways in which financialization has produced contradictory outcomes in the pursuit of poverty alleviation [22] and ecosystem conservation [8] objectives, the development of renewable energy generation underpinned by the risk-return logic of finance is in some cases proving equally problematic, driving a rise in speculative investment decisions and increasingly opaque ownership structures as capital is increasingly distanced from actual productive assets [10,11]. As noted by Castree and Christophers, the source, nature and form of infrastructure finance has direct political implications in terms of risk allocation, return expectations, and ownership structures [20]. By association, the source, nature, and form of infrastructure finance may inform particular geographies of renewable energy generation, thus directing energy transition futures either toward a highly centralized system replicating many of the social and political inequities characteristic of the prevailing fossil-fuel regime [23], or towards a more distributed and potentially democratic energy future [24].

As this article demonstrates, the Indonesian solar PV sector has witnessed unprecedented attention from international investors and developers since 2015. Given experiences in other contexts, it follows that the dominance of financial logic that often accompanies greater private sector participation has the potential to produce serious contradictions as energy transitions move in directions favoring safe investments in tested large-scale, land-intensive technologies, while neglecting less financially attractive goals of energy efficiency, system resilience, improved energy access, and local economic development, thus closing the possibility for alternative energy transition futures.

Download English Version:

<https://daneshyari.com/en/article/6557436>

Download Persian Version:

<https://daneshyari.com/article/6557436>

[Daneshyari.com](https://daneshyari.com)