

# ACCOUNTABLE SOLAR ENERGY TRANSITIONS (ASSET)

Research and Policy  
Insights from  
Rajasthan and Portugal

**CET report 01/24**

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# Actionable knowledge for transformation.

## About CET

Climate change is one of the greatest societal challenges of our time. While we have acquired substantial knowledge about physical climate changes and their impacts on society, new knowledge is needed on how to achieve rapid, just and deep transformation of society.

The Centre for Climate and Energy Transformation (CET) is based at the Faculty of Social Sciences and is a hub for interdisciplinary research with a basis in the social sciences in this area. CET brings together researchers from three partner institutions - the University of Bergen, NORCE Norwegian Research Centre AS and NHH Norwegian School of Economics.



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# ASSET

**Project name:** Accountable Solar Energy TransitionS (ASSET)

**Project number:** 314022, Research Council of Norway

**Project period:** 2021 - 2024

**Project leader:** Siddharth Sareen, University of Stavanger and University of Bergen.



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## Introduction: The challenge of accountability in solar energy transitions



Figure 1. Solar energy transitions impact existing land use practices.

Solar energy is ascending to the top of the energy source pyramid. In the 2020s, it has emerged as the most affordable and fastest growing means to power the world. This is good news, because the world needs alternatives to fossil fuels more urgently than ever before. Climate change effects are mounting, while path dependency makes the displacement of fossil fuels challenging, despite rapid innovation. There is growing recognition of and commitment to time-bound greenhouse gas emission reduction targets. To fulfil these ambitions, reducing carbon emissions is the most vital and massive task. There is broad scientific consensus that the best way forward is to decarbonise electricity generation and electrify most sectors and activities. Here, solar energy rollout has an outsize role to play. Yet a competing urgency is the need to govern such energy transitions in a manner that secures equitable outcomes: a just transition that meets the needs of diverse parties and distributes benefits and burdens in line with principles of justice, care, and dignity.

During 2021-2024, a team of researchers funded by the Research Council of Norway through the Accountable Solar Energy TransitionS (ASSET) project have studied these issues in Rajasthan and Portugal, in an engaged and collaborative manner. The rationale for examining dynamics in this western Indian state and southwestern European Union member state respectively is manifold. Both these contexts are *financially constrained*, making them qualitatively distinct from frontrunners in solar adoption. Hence, their attractively *high solar irradiation rates* do not suffice in themselves to enable rollout. A suitable *political economic basis* must be in place for solar energy to out-compete other sources, notably fossil fuels, with tight state and national economic budgets. Moreover, these contexts are characterised by *energy poverty*, making expansion of renewable energy sources necessary to pair with energy access. These factors make the case contexts apt to understand how the governance of solar energy transitions can be accountable to ideals of socioecological justice, and considerations for place-based lifeways and knowledge systems.

## Methods: Multi-sited, multi-scalar engaged fieldwork and desk study



Figure 2. The ASSET project examined multiple spatial scales of solar energy deployment.

The approach adopted by ASSET researchers features classic qualitative social science techniques. The project combined detailed desk study of energy sector policies and implementation, with in-depth ethnographic fieldwork at multiple sites in both contexts, for many cumulative months. Three researchers drew on more than ten months of fieldwork in Portugal, and five researchers on more than ten months of fieldwork in Rajasthan, much of it during the 2021-2024 period, some during 2016-2020.

Fieldwork in both contexts involved hundreds of semi-structured expert interviews, with a diverse range of stakeholders. These included energy regulators, solar developers, energy investors, energy poverty experts, solar energy researchers, energy law experts, energy association representatives, managers and administrators in the electricity sector, solar energy installers, intermediaries, ecological experts, land and cultural heritage experts, agricultural stakeholders, solar energy capacity builders, engineers, solar park managers, and energy users and civil society groups active on socioecological issues. The team also undertook numerous project site visits within a multi-sited fieldwork strategy, and the project leader spent extensive time in both contexts to coordinate and ensure comparative and cross-cutting insights.

The project and collaborations it enabled produced over 20 peer-reviewed journal articles, a monograph published by Bristol University Press, an edited volume published by University College London Press, a special issue in the Norwegian Journal of Geography, another special issue in the journal Renewable and Sustainable Energy Transition, and a special section of the journal Energy Research & Social Science. In addition, it produced a solarpunk comic book, two reading groups, a podcast episode, and conference keynotes, sessions and invited talks. This report serves to highlight some key insights from ASSET, as part of outreach in 2024 (New Delhi and Jaipur in March, Lisbon in April, and Stavanger and Bergen in May).

## Conceptual contributions on accountable governance

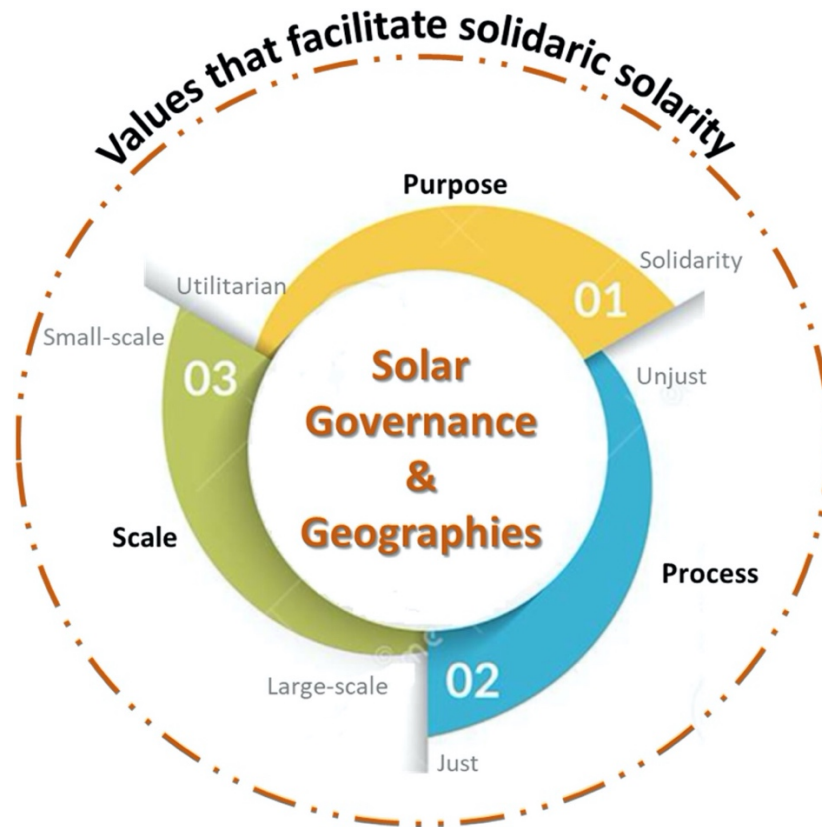


Figure 3. Governance and scalar heuristics to assess the solidarity of solarity.

Table 1. Forms of accountability based on the relationship between assessment and sanctions.  
**The LASH matrix for accountability analysis: Assessment and sanctions.**

|                            | Ability and willingness to sanction | No ability and willingness to sanction |
|----------------------------|-------------------------------------|--|
| Deliberative assessment    | (S) Strong accountability           | (H) Hollow accountability              |
| No deliberative assessment | (A) Authoritarianism                | (L) Laissez-faire                      |

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## Policy recommendations on Rajasthan

Table 2. Practices of legitimation that enable or prevent the realisation of sociotechnical alternatives.

|                     |   |
|---------------------|---|
| <b>Discursive</b>   | Legitimation practices that "normalize certain perspectives over others through textual and spoken interventions across a variety of forums."   |
| <b>Bureaucratic</b> | Legitimation practices, "often codified and sequential, validate some actions and actors and constrain others."   |
| <b>Technocratic</b> | Legitimation practices "perform systematic checks and approval of actions that entail technical expertise."   |
| <b>Financial</b>    | 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." |

In the context of a rapidly evolving energy sector and cognate aspects such as power lines, electric mobility, and infrastructural and industrial development, there are co-evolving relations of power and institutional structures. With this in mind, mobilising a sustainable and just transition requires a holistic understanding of changes in the energy sector and its wider context, including considerations across sectors, scales, and levels of decision-making. More specifically, one must consider a) institutional change, which entails engaging with the significance of socio-political dynamics, as new actors and ideas emerge, and old ones adapt or fade; b) accountability change, which entails examining how diverse parties ranging from the citizenry to the higher strata of decision-making maintain (or fail to maintain) dynamics responsive to social welfare and ecological well-being; and c) socio-material change, which entails a focus on infrastructures that allows interpretation of how their inertia has broader effects. Together, these bridging concepts enable actionable knowledge for energy transitions governance.

Despite climate change mitigation and socio-material changes having the ability to bring about better futures, the grip of incumbent ideas and institutions limit their full realisation. Efforts to portray solar rollout as a purely technical endeavour for climate change mitigation and developmental projects will not only fail to confront its political and contested nature, but also limit our collective ability to find desirable ways to reconfigure entrenched and vested interests of the fossil era. Adding insult to injury, industrial projects – whether renewable or not – can lead to dispossession and displacement of resource dependent communities, such as agrarian and pastoral peoples. These trends elevate the importance of mitigating harmful social relations, alongside climate change to ensure both a rich ecosphere and a diverse ethnosphere. Our research insights help identify socioecologically desirable policy pathways.

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## Policy recommendations on Portugal

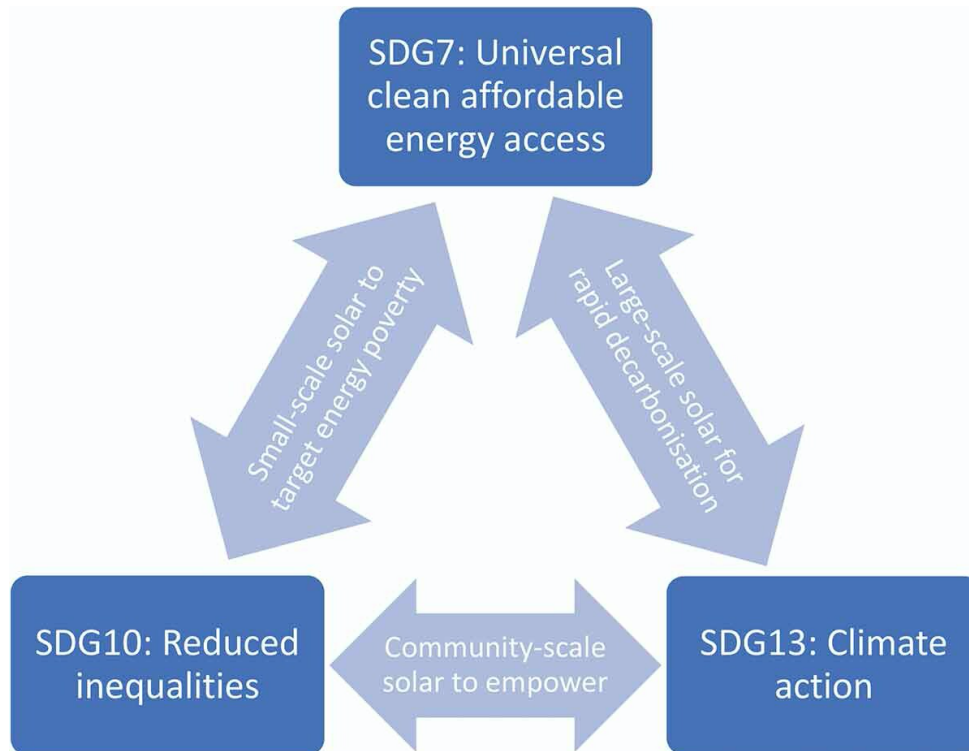


Figure 4. Multi-dimensional SDG7 interactions with SDG10 and SDG13 for solar PV.

Table 3. Policy insights based on accountability analysis of solar energy transition in Portugal.

| LASH matrix                | Sanctions   | No sanctions   |
|----------------------------|---|--|
| Deliberative assessment    | (S) -> Support and replicate<br>- Technocratic legitimation: regulate implementation in line with national solar targets<br>- Bureaucratic legitimation: decommission activities that undermine solar targets | (H) -> Challenge and mobilise<br>- No discernable instance during the period under study                                       |
| No deliberative assessment | (A) -> Criticise and metricise<br>- Discursive legitimation: deconstruct the basis for solar energy transition targets  | (L) -> Regulate and democratise<br>- Financial legitimation: treat differently scaled solar energy plants as non-commensurable |

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## Insights for solar energy transitions worldwide

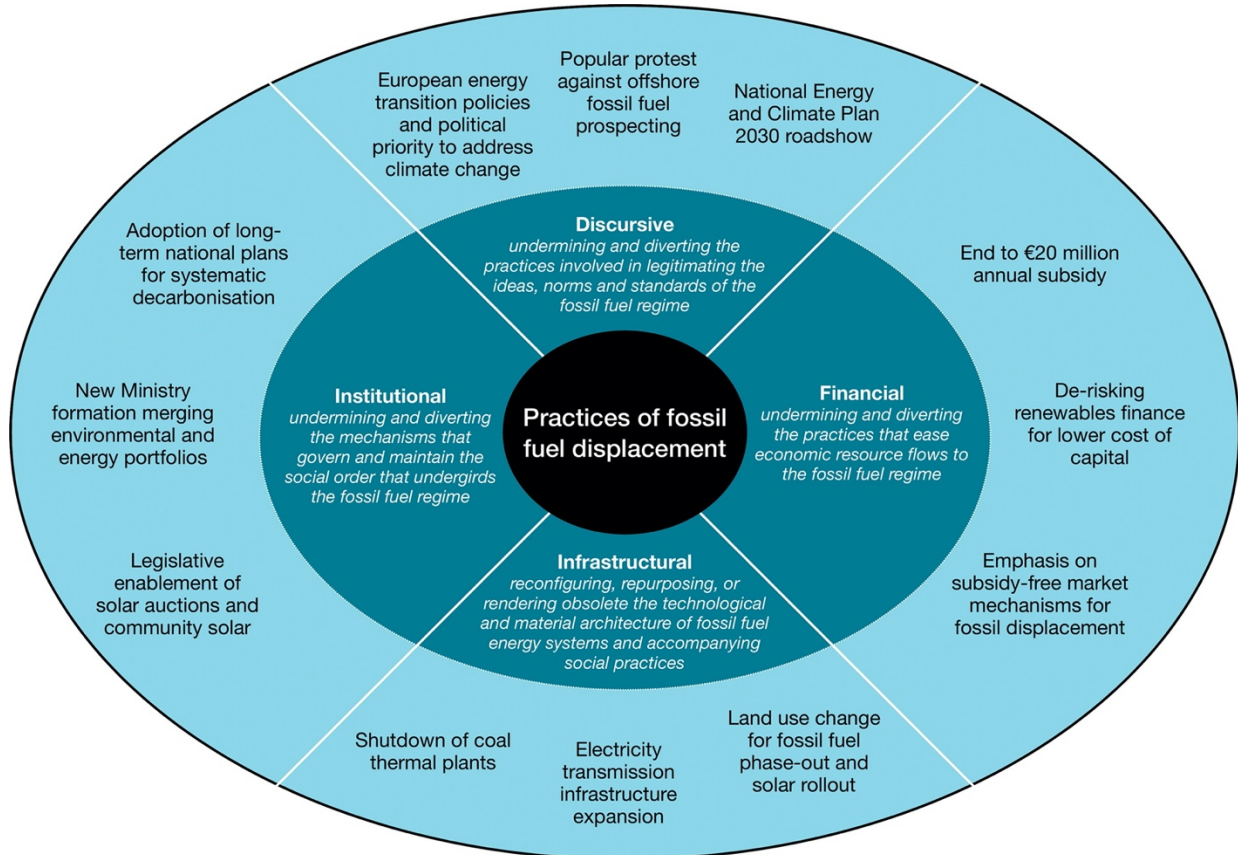
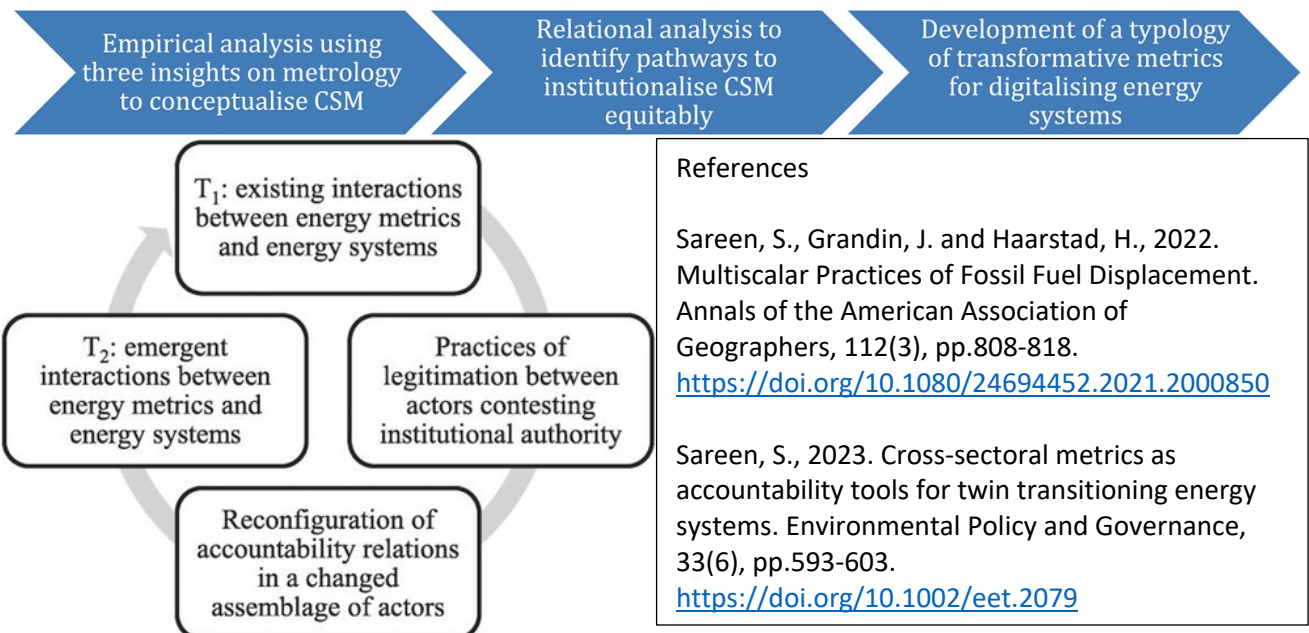


Figure 5. Practices of displacement in solar rollout and fossil phase-out in Portugal, 2017–2020.



Figures 6-7. Conceptualising institutionalisation of new metrics towards a theory of transformative metrics for accountable twin transitions.

## Actionable knowledge to enable accountable solar energy transitions

Table 4. Accountability analysis of community energy diffusion in Portugal as a transferable analysis.

|                                   | <b>Ability and willingness to sanction</b>   | <b>No ability and willingness to sanction</b>   |
|-----------------------------------|--|---|
| <b>Deliberative assessment</b>    | <i>(S) Strong accountability</i><br>Decree-Law 162 of 2019 and 15 of 2022 (mandatory transposition from EU directives) facilitate better economic models of energy sharing, clarity on proximity and define roles and responsibilities of actors (e.g. Public institutions, DSO) | <i>(H) Hollow accountability</i><br>Lack of resources for enabling energy communities (human resources at public institutions, financing support for experimentation, etc.);            |
| <b>No deliberative assessment</b> | <i>(A) Authoritarianism</i><br>Dysfunctional top-down efforts to provide a basis for effective energy community models, unresponsive licensing protocols and unfavourable regulations for collective housing buildings   | <i>(L) Laissez-faire</i><br>No systematic promotion of energy communities as a way to reduce energy bills, energy poverty or carbon emissions; rather, a reliance on ad hoc initiatives |

Table 5. A justice matrix to scrutinise energy poverty (EP) metrology in energy infrastructure transitions.

|                                  | <b>Shaping EP metrics</b>  | <b>Enacting metrology</b>                                  | <b>Reconfiguring metrics</b>                         |
|----------------------------------|--|--|--|
| <b>Distributive justice</b>      | How has (in)equity been framed in the metrics?                       | Who wins/loses in the design and deployment of EP metrics? | How can equity be inserted in EP metrics?            |
| <b>Procedural justice</b>        | Who is in-/excluded in defining EP metrics?                          | Who is in-/excluded in assessing EP?                       | How can inclusion be mainstreamed in EP metrics?     |
| <b>Recognition-based justice</b> | Which contexts do definitions of EP metrics (not) take into account? | How context-aware is EP assessment?                        | How can EP metrics reflect contextual heterogeneity? |

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