

***Networking for Climate Change  
Agency in the Context of Renewable Energy Governance in  
India***

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# ***Networking for Climate Change – Agency in the Context of Renewable Energy Governance in India***

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## **Abstract**

Climate change has disastrous impacts in the developing world and confronts countries like India with immense challenges. The demand for new modes of governance arises out of developing countries' dilemma that government as well as the market fail to address climate change and human welfare. In the context of the international climate change regime new modes of governance such as the Clean Development Mechanism (CDM) are institutionalised as alternative market-based policy devices; however, its implementation varies spatially. This paper puts the focus on the role on actor networks in specific local settings as determinant of effective renewable energy governance. The case of the Indian wind sector will demonstrate that ultimately state-market relations and interactions in evolving stakeholder networks are prerequisite to how challenges of climate change and development are tackled.

**Keywords:** renewable energy; governance; India

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## ***(I) Setting the Scene: Demand for Renewable Energy Governance in India***

Particularly for developing countries like India global challenges like climate change pose obstacles to imminent development needs and objectives. This increases the need to stimulate clean development through the use of alternative energy sources in order to secure energy supply and access for human welfare. This section argues firstly that developing countries are not only confronted with a trade-off between development and climate change but also with the dilemma of increasing government impasses. This calls into question the extent to which alternative energy paths such as renewable energy deployment can be embarked upon. The second point takes up on the potentials and challenges of renewable energy sources to contribute to effectively governing energy and development issues. Presenting the example of wind power deployment in India illustrates the energy governance dilemma in developing countries. This section concludes with the discussion about the conditions under which new modes of governance such as the CDM might support the effective implementation of renewable energy services in non-OECD countries.

### **I.1 Cruel Choices – Development in a Climate-constrained World**

Developing countries are confronted with fundamental threats to human welfare and security in today's globalised world (Amin 1999). Energy provides but one example of how poor people are deprived of basic living conditions due to the lack of access, affordability and security of supply and service delivery. Governments in countries like India face an overwhelming amount of tasks to provide public goods and services to ensure the minimum welfare requirements and to tackle global phenomena like climate change.

With increasing economic and social development, the demand for energy is soaring. This is triggered by sustained economic growth and rising income levels, which stimulates electricity demand for consumptive and productive purposes. Considering future energy projections, India will represent a third of global energy demand by 2050 which will place an immense stress on existing energy resources (Greenwood et al 2007: 45). Furthermore, due to the dismal shape of the Indian energy sector and scenario, the quest for alternative sources plays a major role (Ramana et al 2001: 5). Energy generation is inadequate to meet increasing demands as power shortages peak with about 20% (PowerLine 2007: 12). India suffers from an inefficient energy technology stock, a failing energy governance system and a high dependence on primary energy sources for commercial fuels (Ramana et al 2001: 3).

In addition, present power generation is strongly biased towards fossil-fuel based resources. This is not only highly inefficient but also bears detrimental local and global environmental impacts. Yet, the soaring and pressing energy demand and current supply shortcomings confront India with the dilemma to trade off environment against development.

Given the present scenario and prospective economic growth and hence energy demand projections, the main question really is how India might tackle its energy problem.

In order to meet Government's objectives of energy security by 2020 and energy independence by 2030 (Greenwood et al 2007: 45), renewable energy has become a priority sector. Renewable energy deployment promises to contribute to social sustainability by improving accessible and affordable energy supply – an essential governance service. Renewable energy also has the potential to meet challenges of energy security and energy supply. The supply of energy from fossil fuel sources is already limited and will decrease more rapidly considering global development projections. In contrast, renewable energy resources are abundant and have increasingly become more cost competitive to conventional power (Elliott 2007). As geopolitical dimension, most of the available fossil fuel resources are located in or transit through politically sensitive areas (Asif & Muneer 2007). Renewable energy resources, in contrast, are indigenous and hence decrease energy dependency as well as developing countries' concerns about neo-colonial dependency relations.

This short debate highlighted that developing countries like India are confronted with the tasks to cater for social and economic development as well as to take care of the climate change threat. Due to the interrelations between development and climate, for governments selecting either development or prioritising the combat of climate change is simply not an option. In the energy sector, alternatives that take care of both challenges emerge in the context of renewable sources.

## **I.2 Empirical Realities – Governance of Renewable Energy Sources**

This section continues with a brief empirical glance into the Indian renewable energy sector as one exit option to circumvent this governance dilemma. Taking wind energy as an example spatial variations in deployment rates raise the question about the prerequisites necessary for effective governance.

One essential advantage of renewable energy sources such as wind, water, biomass and sun is their ubiquity. Nearly all parts of the world benefit from some natural resource endowment that could be harnessed for various applications (Richards 2006). Despite this basic precondition for sustainable energy generation, a great diversity exists as to whether and how renewable energy sources are utilised.

Wind energy deployment in India illustrates this puzzle since wind power constitutes the most advanced renewable energy technology in the Indian renewable energy sector. Wind energy generation contributes roughly 70% to the entire renewable energy capacity installed in India. The Indian wind sector is described as nearly commercialised and also plays an important role in the global wind energy scenario (Bakshi 2006). However, despite the remarkable record of the Indian wind industry nationally as well as globally, it is puzzling that the state of Tamil Nadu has overachieved harnessing its wind potential while the neighbouring state of Kerala has barely touched its wind power potential (Table 1).

Table 1: Wind Energy Deployment in India

State	Installed Wind Capacity (MW)	Wind Power Technical Potential (MW)	Utilisation Rate (%)
<b>Tamil Nadu</b>	<b>3873</b>	<b>4750</b>	<b>81.5</b>
Karnataka	1011	6620	15.3
Maharashtra	1756	3650	48.1
Rajasthan	539	5400	10
Andhra Pradesh	123	8275	1.5
Madhya Pradesh	188	5500	3.4
<b>Kerala</b>	<b>2</b>	<b>875</b>	<b>0.2</b>
Gujarat	1253	9675	13
West Bengal	1	450	0.2
India	8746	45195	19.4

Source: MNRE 2008

Several arguments are usually brought up to solve this puzzle. Some debates consider technological maturity or contextual preconditions (Worrell et al 2001). Another strand of reasoning holds the variation of natural resource endowment accountable for differences in natural resource exploitation (Auer 2008). Other arguments brought into the field mention the accessibility to natural resources which in the case of wind concern the wind regime and the availability of adequate sites (Golait 2007). This paper sets out to explain the underlying reasons for spatial variations in how these natural resources are deployed for power generation. It assumes that socio-economic, political and economic explanations suggested

by previous empirically-based studies fall short of answering this puzzle. For this purpose, state-market relations are examined as contextual requirements for effective renewable energy deployment in a developing country setting. The concrete focus is on the role of stakeholder networks, i.e. governance arrangements, to find out who is governed, by whom and with what means.

### **I.3 Alternative Solutions – Government and Governing**

Globalisation poses not only new cruel choices such as between climate and development for developing countries but also leads to new opportunities to encounter these challenges. This section argues that the international climate change regime provides alternative means to govern climate change and cater for welfare objectives.

Persistent obstacles to effective renewable energy penetration call for the establishment of new modes of governance to tackle global challenges of climate change. Impediments relating to finances, technology and R&D are common to developing country experiences with renewable energy deployment and are difficult to come by in the developing country contexts (Asif & Muneer 2007). Governments do not have the capacities and capabilities or lack the political will to support alternative energy paths to circumvent the development versus climate dilemma. Increasingly, non-state actors and non-hierarchical modes of steering play an important role both in market regulation as well as quasi-policy vehicles. Consequently, new modes of governance such as market-related international policy instruments like the CDM<sup>1</sup> are considered as channels to trigger processes like renewable energy deployment in developing countries.

Point of departure for the design of such policy devices is the objective to internalise environmental damage in market instruments as an alternative to public command and control or private self-regulation (Fuhr et al 2007). Approaches to integrate private actors into the provision of public goods or services depart from the assumption that due to privatisation, liberalisation and deregulation processes worldwide, private actors are capable to exert policy impacts (Brühl et al 2004). This implies that for the stimulation of renewable energy deployment in developing countries, private capacities are consciously used. One example of

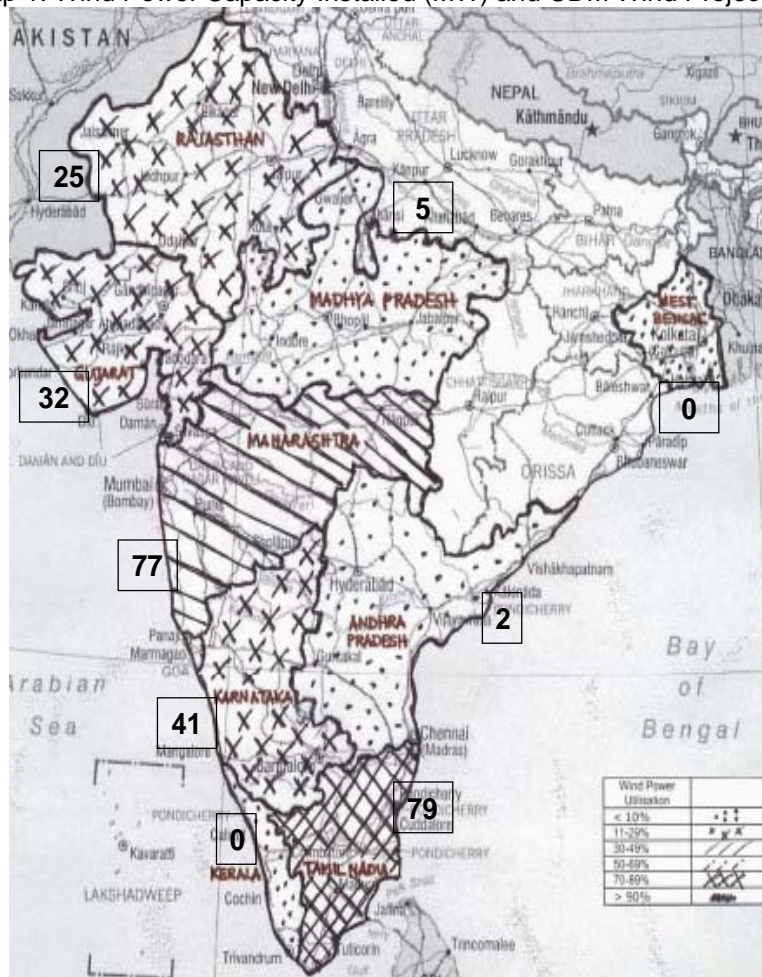
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<sup>1</sup> In the framework of the UNFCCC the CDM is institutionalised as a market-based policy mechanism that ultimately tackles the issue of climate change. The CDM constitutes a project-based mechanism between industrialised and developing countries. It facilitates investments in climate change-mitigating projects in developing countries that are rewarded with certificates to be accounted to specific greenhouse gas reduction obligations in industrialised countries.

new modes of governance in the realm of international climate politics is provided by the Clean Development Mechanism (CDM).

To what extent does the CDM so far promote wind energy deployment in India?

Map 1: Wind Power Capacity Installed (MW) and CDM Wind Projects in India



Source: UNEP Risoe 2007 and 2008 (b) (No. of CDM wind projects in rectangular boxes)

As illustrated above (Map 1), surprisingly, the CDM reflects the uneven pattern of spatial distribution in renewable energy resource deployment. In other words, states like Kerala that host no wind energy projects also do not benefit from CDM activities while wind power states like Tamil Nadu fully reap CDM benefits. This emphasises the importance to explore the underlying conditions for effective renewable energy governance in terms of who is governed, by whom, with what means and with what implications.

## **(II) *Governing Clean Development***

As argued above, dual challenges of climate change and development threaten the integrity of democratic nation states. This becomes apparent in the case of the Indian energy sector that encounters supply constraints due to resource depletion and suffers from severe shortcomings to provide basic electricity services. In addition, climate change adds pressure for a sectoral restructuring towards clean development paths. This section will first of all provide an academic background to debates on changes to democratic government and governance in the face of global challenges like climate change. On this basis, the perspective is shifted to implications for the kinds of state-market relations that underlie the governance of natural resources like energy. This will culminate into an analytical framework that serves the purpose to explore governance and agency in the case of the Indian energy sector.

### **II.1 Governance in the Context of Environment and Climate Politics**

Shifts from government to governance are no new phenomena and have been observed and explored in the context of OECD countries for quite some time. Environment and climate are issue areas where the implicit shift in state-market relations is most apparent. In the following, the argument that climate change not only creates the demand but international climate politics also provides solutions that go beyond the agency of nation states is explored. The Indian energy sector constitutes a prominent example of changing state-market relations in the course of moving towards renewable energy options to meet developmental and climate-related objectives.

Governance perspectives provide theory guidance to understand and explain renewable energy deployment-related dynamics, mechanisms and governance structures in developing countries. Governance refers to institutionalised modes of coordinating societal activities towards collectively binding rules and/or the provision of collective goods for a defined group of people (Risse and Lehmkuhl 2007: 20). Governance processes and structures intend to provide collectively binding rules, collective goods and services involving a variety of actors in non-hierarchical modes of steering e.g. through incentives or horizontal coordination (Göhler 2007). This debate refers back to earlier discussions in development politics and

economics regarding the role of the state and public administration in less developed countries (Riggs 1964, Fuhr 1987, Fishlow 1990, Fuhr 1994) and has re-emerged in/due to the changing global scenario. Governance perspectives tackle three important questions: Firstly, who governs and towards whom are governance arrangements directed; secondly, how and with what means does governance take place; and thirdly, with what impacts is governed and who actually benefits (Benecke, Branovic and Draude 2008). In this sense, governance perspectives reflect questions of power (Mayntz 2004). Lately, the governance concept has been applied outside the OECD context (Risse 2007) which bears the conceptual problem that the whole terminology relies on the notion of the modern (OECD) state and the separation of private and public spheres (Draude 2007: 6; Risse 2007: 14). Such differentiation is not compatible with realities in most developing countries where borderlines between public and private or state and non-state actors are blurred (Reno 1998; Zürcher 2007). Consequently, this calls for the acknowledgement and identification of so-called functional equivalents to our Western understanding of governance, i.e. alternative actors and alternative means of providing governance services such as renewable energy deployment.

Traditionally, energy sectors in developing countries like India are characterised by classical modes of hierarchical steering. This means that government is not only in charge of setting the framework conditions and regulating business behaviour. Government in many cases also takes full ownership of power generation, transmission and distribution. The Indian energy sector is dominated by the state, reveals little private sector activity and displays weak state-market relations (Rao 2004). However, the renewable energy sector presents an entirely different picture. Government dominates the establishment and implementation of rules and regulations for this sector. However, the generation of power from renewable energy services is to almost 90% in the hand of private parties. Transmission and distribution of electricity again is under state control due to public ownership of the respective infrastructure. Reasons for greater private-sector engagement are government policies that aimed explicitly at private participation in power generation. State-market relations are characterised in a different manner by greater flexibility and dynamics inherent in public-private interactions. Boundaries between providers and recipients of these governance services also become blurred as private parties receive governance services, i.e. infrastructure, regulations, as well as provide services through electricity generation. In this context, the CDM provides an entirely new mode of governance renewable energy that departs from the dominance of state-led steering and builds on multilevel public-private interaction.

Renewable energy deployment in developing countries is constrained by the lack of sufficient finance, technology and knowledge as well as access to epistemic communities. This creates the demand for different governance agency in this sector that through various forms of financing, development assistance, or other kinds of cooperation facilitates respective activities. Particularly new modes of governance respond to this demand involving multiple actors across the multi-level system in non-hierarchical modes of steering and various processes such as technology transfer and policy diffusion.

## **II.2 Pre-requisites to Effective Governance**

The case of wind energy deployment in India presents the puzzling situation that despite similar natural resource potential, deployment rates differ between states. This research puzzle continues with regard to the spatial distribution of CDM activities in the sector. Consequently, the question about pre-requisites for effective renewable energy governance that culminates into the successful deployment of wind projects emerges.

Two main approaches are selected from previous empirically-based research to discuss potential contextual requirements in respect to relevant theory debates:

The first set of empirical studies on renewable energy deployment in developing countries derives at the conclusion that issues such as policy and regulatory outcomes, public institutional performance and effectiveness, organisational behaviour and political often determine renewable energy deployment.

Neo-Institutionalist approaches and public policy literature propose potential explanations of why and how renewable energy deployment takes certain directions that relate to political institutions and outputs (Scharpf 2000: 770). Potential causal mechanisms suggest transaction costs, path dependencies, organisational routines and external institutional environment as determining successful renewable energy deployment (Peters 1999). Three aspects are identified as important entry points for understanding how policy conditions influence wind power deployment and call for further analysis and exploration. Firstly, history and the overall institutional environmental context seem important in shaping certain expectations and behaviour, opening windows of opportunity and creating development paths. Secondly, structures and characteristics of organisations at the meso level appear relevant for organisational agency. Thirdly, attitudes, interests and leadership at the organisational micro level emerge as influential for driving positions and activities in the wind energy sector.

Since more detailed explorations require looking inside institutional contexts constitutive of stakeholders in renewable energy governance, organisational sociology is drawn upon. This strand of literature promises comprehensive insights into the logics of organisations (Merton 1968) integrating all actors involved in relation to how “functional behaviour” is explained and reflects on renewable energy governance, i.e. wind energy deployment. The main argument holds that under certain conditions, organisations can produce unanticipated negative outcomes that deviate from the formal design and normative expectations (Vaughan 1999). Applied to renewable energy deployment in India, the following three aspects are summarised from this literature debate (DiMaggio 1983; Finnemore 1998; Merton 1968, Vaughan 1999) to explain the impact of governance actors on effective governance. Firstly, *capacities* are considered that comprise the wind power budget, internal and external staff and its qualification, as well as autonomy in relation to resource use and independent decision making. Secondly, *interests* pertain to the motivation, attitudes and role of individuals and the organisation, attitudes of leaders, and the organisational reputation in terms of accessibility and efficiency. The third and last factor considers *capabilities*, i.e. the history and experience of stakeholders with regard to wind and renewable energy. In summary, these literature debates suggest meaningful entry points to answer the questions of who governs and who is governed.

The second set of empirical studies on renewable energy deployment in developing countries argues that classical location factors are dissatisfactory for fully understanding governance and agency in the wind sector. In most of the Indian states opportunity structures per se are relatively similar; however, what economic actors make of them differs. These observations point towards the importance of relations, interactions and networks between stakeholders. Since the ways in which stakeholders engage in economic activities and tap on existing opportunities seems to matter, new economic sociology literature is considered (Glückler 2006). Point of departure is that the overall economic performance in terms of effective renewable energy governance depends on how relationally embedded actors are in emerging arrangements and how the interactions evolve in network structures. New economic sociology debates propose the concept of embeddedness (Granovetter 1985) as relevant for exploring how through emerging arrangements and interactions stakeholders shape and utilise opportunities for wind power deployment. In a nutshell, actors’ relations comprise the two elements of dyadic ties as well as of interaction constellations between stakeholders involved in renewable energy governance in the wind sector. Dyadic ties are defined according to attributes of reputation, social capital and formality (Hite 2003, Emirbayer 1994, Burt 1992, Bathelt 2003). The characterisation of dyadic ties constitutive of relations between stakeholders enables the identification of typologies of actors’

arrangements characterised by similar types of ties. Interactions in network constellations between stakeholders are acknowledged as other feature characteristic and constitutive of networks. Looking at the relations and interactions between stakeholders involved in renewable energy governance allows identifying and characterising the means and effects with which governance takes place.

In summary, economic sociology literature provides one relevant approach to understand how and with what means governance takes place.

### **II.3 Role of State-Market Relations for Effective Energy Governance**

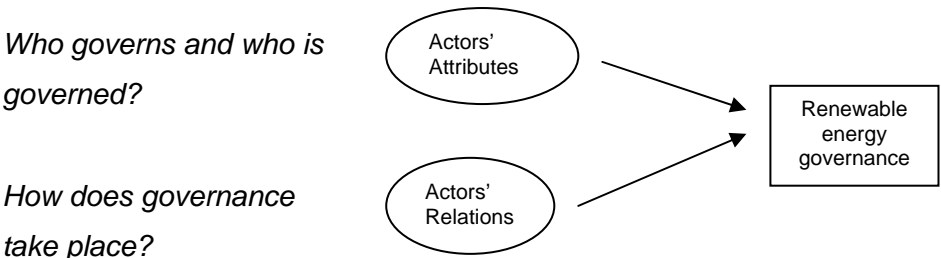
The role of agency in the context of renewable energy governance turns out relevant for understanding successful governance outcomes such as wind power deployment. Exploring state-market relations tackles new kinds of agency alongside the questions of who is governed, by whom, how and with what means that bear implications for the effectiveness of governance. This section will elaborate on the kinds and ways in which stakeholder networks serve to analyse agency and to uncover state-market relations in response to these questions.

Stakeholder network analysis provides an analytical framework comprising both explanatory dimensions and has the potential to include conceptual theory debates about network effects on renewable energy governance. First of all, stakeholder networks analysis considers the question who is governed by whom. Drawing upon Organisational Sociology, stakeholder network analysis focuses on the governance actor as constitutive element of networks and examines characteristics in relation to other stakeholders and the overall context of renewable energy governance. Secondly, stakeholder network analysis responds to the question how governance takes place. In this context, relations and interactions between governance actors are explored in the light of New Economic Sociology debates (Richter 2001). The analysis of social networks focus on the interaction of interdependent actors and the unit of analysis is based on actors as well as their relations (Thatcher 1998: 398).

The main objective of stakeholder network analysis is to identify renewable energy stakeholder networks and to map their structures, characteristics and dynamics. This involves the identification and characterisation of key actors. In order to discuss the role of state-market relations for effective renewable energy governance, on the one hand, actors' attributes are explored in relation to wind power deployment. On the other hand, linkages and different characteristics of exchange relations are identified which allow for building typologies of actors' arrangements and interaction constellations. Lastly, studying the effects

of networks, i.e. distinct configurations of state-market relations emerging in the specific local context, requires looking at issues such as changes on policy processes, context of policy choices and path dependencies (Thatcher 1998: 406).

In the following, an explanatory model is developed based on stakeholder network analysis that aims to explain effective renewable energy governance in the context of locally-specific state-market relations. As point of departure, new empirical realities require a bottom-up understanding, i.e. an attention towards what local conditions in terms of stakeholder attributes and relations in networks really look like and how they impact on wind power deployment. Given these circumstances, the specific characteristics and dynamics of state-market relations are relevant for understanding governance outside the OECD world. This also makes the case for a stakeholder network approach in order to enable a detailed analysis of multi-level and multi-stakeholder realities.



On the whole, renewable energy stakeholder networks are conceptual devices that from an overall governance perspective serve to grasp governance arrangements in non-OECD settings. Renewable energy networks mutually constitute of stakeholders characterised by their attributes as well as stakeholder relations. Networks are dynamic and evolutionary. Distinctive forms of renewable energy networks emerge out of the interactions between these constitutive elements in the context of emerging, locally-specific demands on renewable energy governance. Interactions and relations in networks produce facilitating and impeding effects in an intentional and unintentional manner on renewable energy governance. These effects involve multi-level agency and dimensions. Renewable energy stakeholder networks are considered necessary conditions for effective renewable energy governance in terms of successful renewable energy deployment. In addition, renewable energy stakeholder networks exert multi-level effects through several causal mechanisms on output and impact dimensions of renewable energy governance. External stimuli in terms of new modes of governance might trigger the emergence of effective renewable energy governance through promoting implicit processes or changes in stakeholder networks given a critical mass of stakeholders or a conjuncture of internal and external circumstances.

This paper focuses on the Indian wind sector as an example of renewable energy governance in developing countries. It explores the role of agency and state-market relations as prerequisite for effective renewable energy governance. The main argument is that renewable energy stakeholder networks exert multi-dimensional effects on renewable energy governance through characteristics and dynamics of stakeholder engagement in distinct multi-level interrelations.

Embraced by the overall governance framework, questions of how and why certain stakeholder networks exert differential effects on renewable energy governance are argued alongside the underlying theory debates of organisational and new economic sociology. In this regard, network effects depend on the access, brokerage, information and asset exchange and involve mechanisms of trust as well as transaction cost considerations. Conditions under which stakeholder networks are effective in terms of renewable energy governance, i.e. successful deployment, refer to the environment and the entire multilevel energy governance system. This provides specific windows of opportunities and channels for the diffusion of ideas and practices. Renewable energy stakeholder networks are subject to change and involve an important time dimension. In conclusion, stakeholder network analysis specifies agency and facilitates the identification of who is governed, by whom, how, with what means and effects.

### ***(III) Case Study: Stakeholder Networks in the Indian Wind Sector***

Diverse dilemmas of meeting development objectives and tackling climate change faced by developing countries like India imply threats to the sovereignty of nation states as the ability to secure welfare of their constituency is called into question. In the context of the international climate change regime, alternative modes like the Clean Development Mechanism (CDM) emerge as potential solutions and take up government's tasks and responsibilities in a functionally equivalent manner. Yet, the ways and the success with which these opportunities are seized depend on the state-market relations characteristic of a specific governance context and agency. This section will take the concrete empirical case of the Indian wind sector. The purpose of exploring stakeholder networks guided by the analytical framework elaborated previously is to identify state-market-relations as prerequisite for effective renewable energy governance.

### III.1 Governance Agency in the Indian Wind Sector

This section will apply stakeholder network analysis to explore governance in the Indian wind sector in the two local contexts of Kerala and Tamil Nadu<sup>2</sup>. Guiding questions evolve around who is governed by whom, with what means and how. Stakeholder network analysis explores the distinct stakeholder interactions and characteristics in the governance of the Indian wind sector. The main conclusion points to the relevance of governance agency in terms of state-market relations for effectively shaping wind energy governance in Tamil Nadu and Kerala.

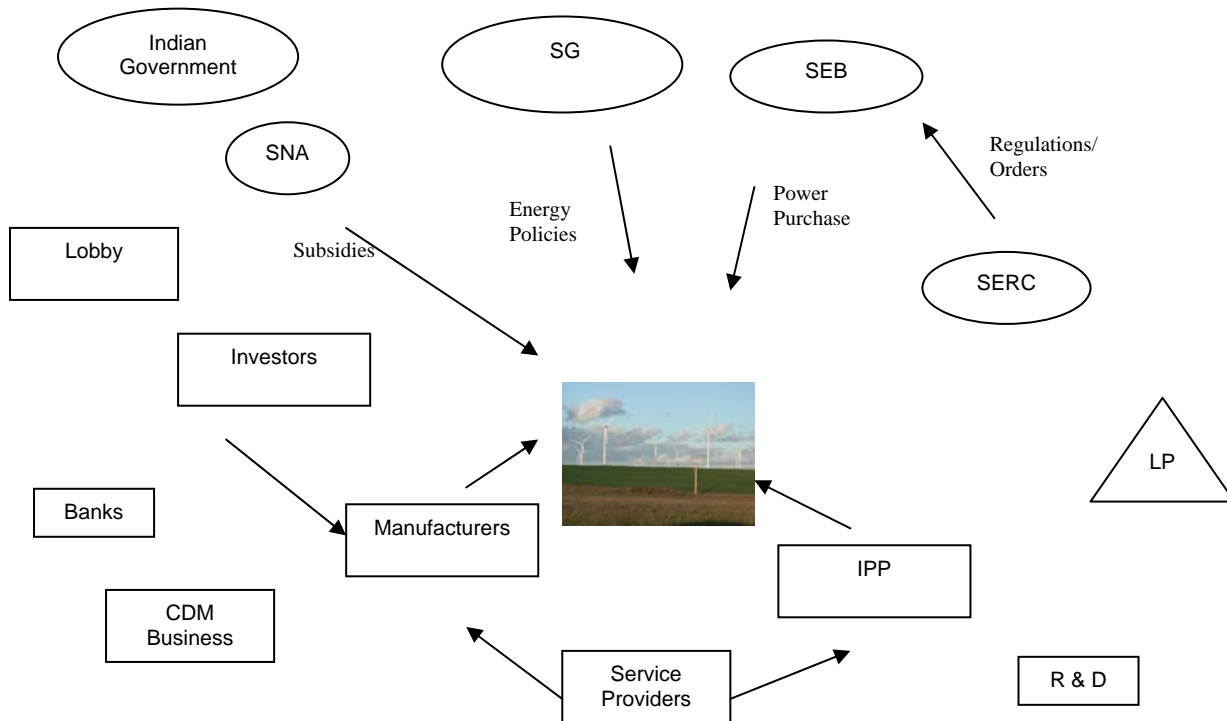
As point of departure, state-market relations are considered crucial determining renewable energy governance. In the case of India, unlike the conventional power sector the renewable energy sector is not dominated by public enterprises. Still, local and national authorities without doubt play an important role in shaping and influencing governance throughout renewable energy deployment procedures. Literature debates above suggest on the whole that policy conditions interrelate with market processes. Multilevel stakeholder networks that embrace not only state-market but multi-stakeholder relations and interactions emerge as decisive for renewable energy governance. In the following, stakeholder network analysis will explore state-market relations in the case of wind energy in the contexts of Kerala and Tamil Nadu. This takes place in the framework of governance research that pays attention to the aspects who governs whom and how. As will be demonstrated, the success of wind power in Tamil Nadu is explained by stakeholder networks characterised by locally-specific state-market relations and interactions.

#### *(a) Who governs and who is governed?*

Looking at the governance actors involved in renewable energy governance in the wind sector in both states at first sight derives at the astonishing conclusion that who is governed by whom are relatively similar:

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<sup>2</sup> Empirical research was conducted in India during a six month field visit from August 2007-January 2008. Data and interpretations presented in this paper are based on a series of interviews, observations and ethnographic mapping exercises with a range of local stakeholders.



- Legend:
- SG: State Government
  - SNA: State Nodal Agency
  - SEB: State Electricity Board
  - SERC: State Electricity Regulatory Commission
  - IPP: Independent Power Producer
  - R&D: Research and Development Networks
  - LP: Local People

Firstly, governance providers are identified as actors that are responsible for the entire structures and procedures required to ensure the delivery of services in the field of renewable energy. These range from the design of policy baselines, governance institutions and processes to implementation support and involve the same kinds of institutions and organisations in all of the Indian states. At the central level, the Ministry of New and Renewable Energy Sources (MNRE) takes the lead suggesting non-binding policy guidelines and regulations to the states and channels the subsidies and funds for programmes and other initiatives to promote renewable energy. The Ministry of Power (MoP) and attached to it the Central Electricity Regulatory Authority (CERC) coordinate power-related activities pertaining to power regulation and electricity transfer. As concerns the local level, the most important stakeholders are State Government, specifically the Energy Department that is responsible for policy making and implementation with regard to energy and wind energy

issues. The State Electricity Board (SEB) as electricity utility is assigned with the tasks of grid management, grid infrastructure, wind power purchase and transmission and distribution of wind power<sup>3</sup>. The State Electricity Regulatory Commission (SERC) was institutionalised under the Electricity Act 2003 and the Electricity Regulation Act 1998 to respond to the need for greater regulatory oversight and direction in the electricity sector. This semi-autonomous institution is assigned with the tasks to independently arbitrate, fix and oversee the implementation of regulations for wind sector stakeholders, i.e. generators, suppliers, transmitters and users of these electricity services. The State Nodal Agency (SNA) promotes renewable energy deployment at the local level through channelling central-level subsidies, implementing demonstration projects and providing assistance to interested parties.

Governance recipients are these stakeholders in renewable energy governance that benefit from receiving renewable energy services, i.e. electricity. Defined in terms of end product or outcome of the renewable energy governance process, electricity is delivered to the local people that are constituents of a specific local area as assigned by local authorities. Local people are often not organised in any manner and do not have an official stake in the process. Regarding other civil society actors, NGOs do not feel compelled to argue the case for wind energy or to defend the rights of affected communities. Neither do media actors take a stake in wind energy related issues. Nevertheless, local people are the key addresses to supposedly benefit from governance service delivery and are also directly affected by wind farm installations.

The distinction between governance providers and governance recipients that so far classically differentiates between public actors and non-state actors cannot be maintained as concerns the private sector. Business actors have a twofold role in the renewable energy governance process. On the one hand, private sector companies are governance providers as they generate and deliver renewable energy services in terms of electricity to local constituents. On the other hand, business actors are governance recipients since they depend on governance services as for example the provision of appropriate governance structures and procedures to operate. To complicate matters even more, private sector stakeholders are to some extent involved in setting the appropriate framework conditions for their own engagement in electricity production. Through lobby activities with regard to state government and official involvement in regulatory processes, public and private actors engage together in the provision of governance framework conditions.

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<sup>3</sup> Furthermore, issues such as selling wind power to third parties or allowing wind power to be used for captive consumption also lie within the responsibility of the TNEB.

With regard to the private sector, the most important stakeholders in wind energy deployment in the Indian context are manufacturers<sup>4</sup>. The wind turbine manufacturer Suzlon was selected as representative of this industry due to the fact that Suzlon is an indigenous actor and holds about 50% of the market share. Increased power sector liberalisation opens avenues for new actors such as Independent Power Producers (IPP) to provide alternative business models in the wind energy segment through third party sale of wind power. IndoWind was selected as most representative IPP as only very few actors have so far engaged in the IPP-mode. Demand for wind power installations results to a great extent from investors that are not involved in the wind deployment procedure per se but invest for different reasons such as independent power supply or tax benefits<sup>5</sup>. Ashok Leyland represents a typical case of an investor with the core business in the automobile sector. Service providers include a range of actors from knowledge brokers, suppliers of different technical parts for wind farm installations, legal and financial service providers to different types of consultants. The Centre for Wind Energy Technology (C-WET) was selected as a consultancy that engages in turbine testing and a wide range of consulting activities with regard to wind farm installation procedures all across India. Lastly, even though wind lobbies represent and argue the case for wind turbine manufacturers and investors across India, i.e. at national level, they were identified relevant particularly in the local context of Tamil Nadu.

In summary, as regards governance agency in the renewable energy sector, distinctions between governance providers and recipients as well as between state and market are blurred. Even though governance stakeholders per se are similar in each Indian state the ambiguous roles imply some scope for locally-specific agency. As will be demonstrated in the following, this depends firstly on the characteristics of actors and secondly, on how governance takes place in the context of actors' relations.

At this stage, attention is drawn to qualitative aspects as concerns the characteristics of governance actors and explores the extent to which actors' attributes determine renewable energy service delivery.

The following table summarises the main results of the stakeholder network analysis that served to explore the characteristics of governance actors according to the criteria suggested by Organisational Sociology literature:

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<sup>4</sup> Due to the oligopoly structure of the wind energy market, manufacturers have quite significant stake and power in shaping market and business developments.

<sup>5</sup> Hence power requirements for internal consumption are immense and so are investment appetites as to avail of the tax benefits promised.

Table 2: How governs? Actors' Attributes

	<b>Tamil Nadu</b>	<b>Kerala</b>
<b>Actors' Attributes</b>	<ul style="list-style-type: none"> <li>- Highly-favourable actors' attributes with regard to wind symmetrically characterising the organisational context of the majority of stakeholders</li> <li>- Actors' attributes of public actors reflect high interests and staff quality imminent in organisational routines and leadership</li> <li>- Actors' attributes of private actors display high experience and resources</li> <li>- Civil society actors' attributes are low given absence of resources and organisation</li> </ul>	<ul style="list-style-type: none"> <li>- Less favourable actors' attributes for wind energy deployment asymmetrically characterising different stakeholders</li> <li>- Actors' attributes of public actors reflect low interests and staff quality in organisational routines and cultures despite individual leadership efforts</li> <li>- Actors' attributes of private actors suffer from low experience</li> <li>- Civil society attributes reveal some capabilities but negative attitudes to wind energy</li> </ul>

Governance agency in the Tamil Nadu case is characterised by highly-favourable actors' attributes that drive stakeholder engagement in renewable energy governance. On the parts of public actors, a strong orientation towards renewable energy deployment with regard to human resource aspects and political will exist. Private actors are also willing to invest resources and avail of experience with regard to wind power deployment.

This means that governance providers comprising public as well as private actors are on the whole characterised by favourable attributes such as capacities, capabilities, interests and attitudes to engage in renewable energy governance. Private sector stakeholders as indirect governance recipients and providers display favourable attributes which indicates the effective delivery of governance services. Local people as governance addressees reveal rather weak characteristics. This raises interesting points for further debate on issues of power and equality, legitimacy and effectiveness of renewable energy governance.

In contrast, the Kerala case shows that governance actors characterised by unfavourable attributes with regard to wind power prevent effective renewable energy governance. Public actors avail of resources and experience but lack interests, qualification and political will. Despite the individual leadership, the organisational culture and characteristics ins some institutions like the SNA remain unfavourable of wind energy. Private actors have little experience in the local context even though availing of resources. Surprisingly, civil society actors feature more pronounced attributes than in the Tamil Nadu context due to experiences and resources; however, their attitudes remain unfavourable to wind energy.

In terms of governance providers, the Kerala case implies that unfavourable characteristics of public actors render ineffective the provision of prerequisites to effective governance. This

has a feedback effect on private actors. In their role as complementary governance providers, the imbalance of favourable versus less supportive attributes implies difficulties to contribute meaningfully to the renewable energy processes. As governance recipients, the operation of business actors is impeded by the lack of appropriate governance structures. Local people as governance recipients are characterised by more pronounced attributes than the local constituency in Tamil Nadu. However, the culture of protest and history of negative experience render local people governance addressees difficult to satisfy. This suggests potential explanations for why renewable energy governance in this local context might be more of a tricky issue.

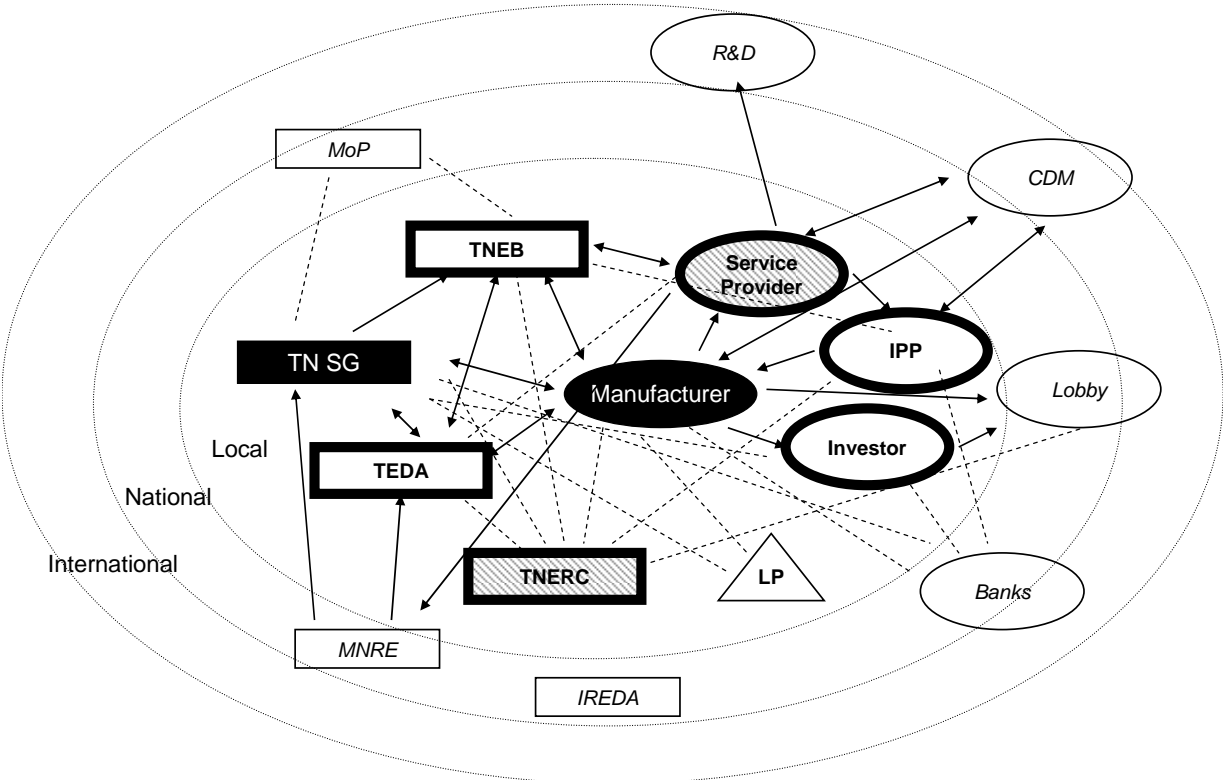
*(b) How does governance take place?*

The previous analysis suggests that the focus on governance actors and structures alone is insufficient for understanding the complexities of renewable energy governance. The focus on who governs and is governed sets the context for how service delivery actually takes place. In order to explain differences in wind energy deployment between states with similar governance structures yet differently characterised actors requires the examination of how governance takes place. For this purpose, stakeholder network analysis is applied to look at the relations and interactions between governance actors. The main results derived from ethnographic research are contrasted in two stakeholder network mappings.

In the case of Tamil Nadu, stakeholder relations on the whole emerge as embedded in a network of trusting relations. On this basis, interactions evolve between public and private sector constellations in a constructive and mutually supportive manner:

Map 2: Tamil Nadu Renewable Energy Stakeholder Network

**Renewable Energy Stakeholder Networks – Tamil Nadu**



**Legend:**

<b>Actors' Capacities</b>	
	High
	Significant
	Medium
	Insignificant
	Low
<b>Actors' Relations</b>	
	Embedded Relations
	Immediate Relations
	Disembedded Relations

To go into a bit more detail, stakeholder relations are characterised as such that public and private actors are relatively embedded in emerging actors' arrangements that feature low degrees of formality and significant amounts of interaction intensity and quality. As surprising

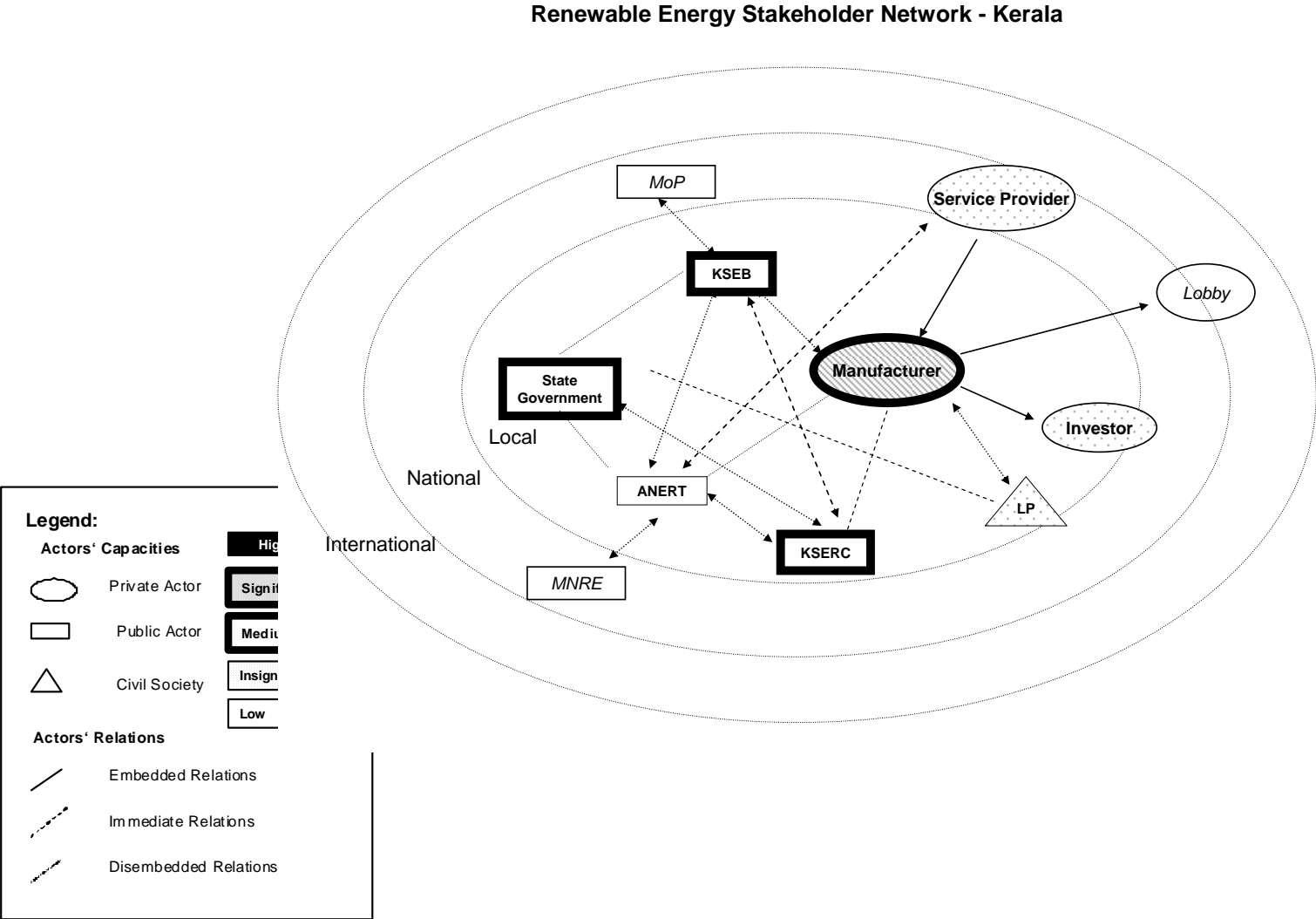
outcome, the majority of actors' arrangements are characterised by dyadic ties with less emphasis on factors such as social capital and reciprocity. This relates to the scope and scale of actors' relations and interactions that utilise the entire multi-level network and implies the importance of space, locality and also time for embedded ties to emerge in actors' arrangements. Furthermore, interactions take place in networks structured in quite an open manner particularly on the parts of key private sector players.

In a nutshell, stakeholder network analysis in the case of Tamil Nadu concludes that how governance takes place and what means are employed becomes visible in the relations and interactions between multilevel stakeholders. Governance providers as regards public actors are bound in formal relations but have developed some level of reciprocity and trust. This facilitates communication and the set up of supportive structures and procedures to serve the common purpose of wind deployment. In this process, the role of private actors as governance providers is determined by the types of relations and interactions between public and private actors. Due to the evolving mutual relations and trustful interactions, framework conditions that serve interests and purposes of private sector stakeholders have been established. In their role as governance recipients, this emerged as precondition for private actors to effectively take up operations in electricity generation.

How and with what means does governance take place in the context of Kerala?

As in the case of Tamil Nadu, in order to draw conclusions on the kind of state-market relations and their impacts on effective renewable energy governance stakeholder network analysis of relations and interactions is required. As the mapping (Map 3) illustrates, stakeholders are bound together in relations that are disembedded in the overall network with little social capital and trust characterising interactions.

Map 3: Kerala Renewable Energy Stakeholder Network



In contrast to the governance setting in Tamil Nadu, the Kerala case reflects a greater variety of emerging actors' arrangements. On the whole, actors' relations are characterised by disembedded ties of low quality and high formality. This is particularly true for actors' arrangements involving relations between public and private stakeholders. However, also public actor arrangements are characterised by formalistic elements enhancing mutual dependencies and the focus on "proper process" that allows for little flexibility and access. The insignificantly emerging actors' arrangements between private actors extend beyond the state-level boundaries and feature embedded ties. The Kerala case also illustrates that interactions in structurally closed constellations are detrimental for wind energy deployment. Particularly the fact that interaction constellations between public actors are constituted of formalistic ties impedes exchange with and access to private stakeholders.

In a nutshell, the Kerala case confirms that the nature of relations and interactions between stakeholders explain how and with what means renewable energy governance takes place. Particularly between governance providers comprising public and private entities, relations are characterised by little common understanding. Interactions are based on a limited amount of trust and reveal very formalistic tendencies. This impedes the agreement on and the establishment of supportive governance structures and procedures. This lack of access to public actors and the invisible hurdles posed to private stakeholders render the implementation of governance structures and the effective delivery of renewable energy services difficult. In addition, contested relations between private actors as service providers and local people as governance addressees poses obstacles to meeting objectives of successful wind power deployment.

**III.2 Effectively Governing Renewable Energy - Impacts of Stakeholder Networks**

Wind energy governance takes place differently in Tamil Nadu and Kerala and is explained by the distinctive configurations and dynamics of stakeholder network. Stakeholder network analysis is the previous first step and facilitates the identification of how governance takes place by, with, and for whom in the case of wind energy deployment. In this section, the second step is to compare the specific stakeholder networks with regard to respective state-market relations and to draw implications on the effects of networks on the adoption of new modes of governance.

As overall conclusion, wind energy deployment takes place given that stakeholder networks are constituted by actors characterised by high renewable energy orientation, by actors' arrangements of relatively significantly-embedded relations and by structurally-open interactions.

Table 3: Stakeholder network effects

	<b>Network Effects</b>	<b>Network Mechanisms</b>
Output (stakeholder activities)	<ul style="list-style-type: none"> <li>➤ Design framework conditions for wind deployment</li> <li>➤ Getting policy &amp; regulations right</li> <li>➤ Bringing the key stakeholder constituency on board</li> </ul>	<ul style="list-style-type: none"> <li>- Organisational routines established</li> <li>- Evolution of norms</li> <li>- Establishment of leadership</li> <li>- Creating access – move beyond formal interactions</li> </ul>
Outcome (stakeholder behaviour change)	<ul style="list-style-type: none"> <li>➤ Implementation of and abidance to policies &amp; regulations</li> <li>➤ Deployment of wind projects</li> </ul>	<ul style="list-style-type: none"> <li>- Engagement in public-private interactions</li> <li>- Manifestation of common goals and understandings</li> <li>- Exchange of assets</li> <li>- Manifestation of reputation and trust</li> </ul>
Impact	<ul style="list-style-type: none"> <li>➤ Access to additional</li> </ul>	<ul style="list-style-type: none"> <li>- Brokerage – technology diffusion</li> </ul>

(change in policy target)	support mechanisms ➤ Push for supportive policies & attitudes ➤ Extension of lobby activities	- Norm entrepreneurship – policy and norm diffusion
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Governance agency matters in as far as stakeholder networks exert certain effects on the governance of renewable energy (Table 3). This means that the nature and the dynamics of state-market relations crucially determine the effectiveness of renewable energy service delivery. The empirical examples of Tamil Nadu and Kerala show that the more intense state-market relations in terms of embeddedness and quality of interactions between public and private stakeholders, the more supportive general framework conditions and the smoother implementation activities.

The spatial distribution of CDM activities reflects nearly the same patterns as wind power deployment. This means that Kerala does not harness wind power but also does not benefit from the participation in new modes of governance. On the one hand, this appears counter intuitive as new modes of governance are designed for the specific purpose to overcome implementation deadlocks and catalyse clean development activities. Yet, considering the nature of these new modes of governance and the interplay within the local setting leaves little room for surprise. To start with, the CDM as a market-based policy instrument is governed through the mutual interaction of public and private actors with the objective to circumvent traditional hierarchal, i.e. state-led, approaches. Relations and dynamics between private and public actors beyond the state are characteristic of governance agency that takes place in this context. What happens when new modes of governance are confronted with local settings defined by locally-specific governance agency?

In the case of Kerala, stakeholder network analysis characterises state-market relations as relatively centralised, disembedded governance agency. In this context, actors that are involved in the CDM as new mode of governance experience difficulties to access the prevalent governance structures, actors and processes.

In contrast, governing renewable energy in Tamil Nadu occurs through an interactive and embedded public-private actor network. This facilitates the integration of new modes and actors governing wind power.

Renewable energy stakeholder networks, in the end, explain the extent to which technology transfer takes place and how policy/norms are diffused in the concrete local context. In this sense, stakeholder network effects emerging due to certain dynamics and characteristics of renewable energy governance arrangements determine how CDM potentials are taken up in the specific local context. However, external stimuli such as the CDM over time play a role in opening windows of opportunity to instil an awareness of or interest in wind energy deployment. This means that stakeholder networks are not only the condition for effective

renewable energy governance, but might also be the consequence of new modes of governance encountering local realities. The final and concluding implication is that for external stimuli like the CDM to exert effects in local contexts, a critical mass of supportive governance agency is required for enabling access to the renewable energy stakeholder network.

#### ***(IV) Governance Prerequisites and Implications***

Tackling the cruel choices between development and climate change objectives, e.g. through the deployment of alternative energy sources, bears several implications for existing local stakeholder networks. Social science debates propose that understanding changing state-market relations requires a different governance-based approach to explain how governance takes place in this context. This paper argues the case for stakeholder network analysis as analytical and conceptual device to grasp governance agency in terms of state-market relations and gain an impression by whom, for whom, how and with what means governance takes place outside the OECD world. Stakeholder network analysis points towards the significance of state-market relations, characteristics and interactions in evolving networks for the effectiveness of renewable energy deployment.

The key results of stakeholder network analysis suggest that successful governance agency in the deployment of wind energy takes place given that renewable energy networks are constituted of and characterised by:

- i. Highly-favourable attributes of actors participating in renewable energy deployment
- ii. Actors' arrangements embedded in dyadic relation characterised by high social capital, reciprocity and low formalism in structurally open interactions
- iii. Given a certain market environment in which the exploitation of new opportunities in emerging sectors such as wind energy is required.

In the light of the governance framework, these findings imply firstly, that even though the questions who is governed by whom appear straightforward at first sight, qualitative differences emerge when specific characteristics and attributes are considered. This bears implications on how governance takes place and the means employed in interactions. Governance processes and mechanisms are understood in terms of the relations and interactions between stakeholders embedded in multilevel networks. This allows for going beyond the state-market and public-private divide and deals with the ambiguities between providers and recipients of renewable energy services.

In summary, this paper makes the case for stakeholder network analysis to grasp state-market relations and their impacts on renewable energy governance. Furthermore, it allows for considering new modes of governance in interplay with local realities and implications on the legitimacy and effectiveness of renewable energy governance.

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