Chapter 9
Emerging Frontiers of Energy Transition in Sri Lanka

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Abstract Energy transitions in the global South have evolved over time and space. Climate emergency has pushed countries towards renewables, and energy transitions have been part of the international political discourse coupled with climate commitments. Exploring the complex and diverse interactions between energy transitions and climate change mitigation is essential, especially to the global South, where on the one hand, it is seen as part of the development discourse and on the other as honouring the international climate commitments. There is a growing need to identify and analyse potential social and economic disruption arising from energy transition, taking into account policies and strategies to ensure equitable energy systems and minimise if not pre-empt disruption. Examining the patterns of the energy transition, dynamics of transition from a justice perspective in the overall socio-political and economic contexts will outline the emerging frontiers of the energy transition. This chapter looks at the challenges of escaping the carbon lock-in using an analytical framework where the interplay between agents and the nexus—climate commitments, energy security and justice—is analysed with the socio-politico-economic considerations to understand the trajectories of energy transitions. The framework brings fresh insights into understanding the carbon lock-out pathways in the global South context through the case study from Sri Lanka. It is argued that a holistic policy framework for energy transitions must incorporate democratic concerns from below to create pathways for just energy transition.

Introduction

Climate change is widely seen as a crisis, and governments worldwide have acknowledged it and have formulated international treaties and climate commitments. There is ample academic scholarship to prove that climatic changes have created existential threats to human societies in the age of anthropogenic global warming. Research has

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shown that climate change affects more in the global South than in the global North due not least to population, economic vulnerability and governance issues (Aiken et al., 2017; Blicharska et al., 2017; Udin, 2017). In the fight to save the planet, energy has become one of the critical areas where drastic changes are required. Forging transitions towards green energy solutions in the global South is thus a key concern for mitigating climate change, reducing societal vulnerability and fostering development.

Energy transitions refer to profound changes in energy systems. They involve many interconnected elements: political will, regional and global political interests, policy instruments, energy providers, delivery systems, technology, innovation, and end-users (Hoggett, 2014; Westphal, 2011). The climate emergency has brought decarbonisation and energy transition to the forefront. The Paris Accord of 2015 seeks to limit average global temperature rise to "well below 2 °C" in the present century; to achieve this the global energy transition has to aim for near total decarbonisation of the world energy system by 2050 (IRENA, 2018).

Developing countries increasingly foresee energy transitions as part of their development strategy. Energy security—ensuring enough energy for all—is a significant concern for any developing nation. The UN Paris Climate Change Conference and the ensuing Paris Agreement require every country in the world to make plans for and commit to reducing emissions. This has created considerable policy challenges. The shift in energy systems has predominantly focused on technology and finance, seeking to address the challenge of climate change through strategies for ecological modernisation that involve multiple stakeholders (Newell, 2018). Over the past decade, renewable energy diffusion has thus been pursued through private investments, multilateral and bilateral assistance and the help of novel technologies. There has been less focus on user-oriented strategies or social issues such as climate justice.

Energy transitions are now also viewed from a socio-technical perspective, and the emergence of just transitions literature has given more emphasis on issues of justice in energy transitions (Geels & Schot, 2007; Kern & Smith, 2008). It has been argued that the failure to address the justice issues in energy transitions can create new or reinforce old inequalities (Jenkins et al., 2017). The broader term socio-technical transitions refers to profound structural changes in systems such as energy and transport, which involve long-term and complex reconfigurations of technology, policy, infrastructure, scientific knowledge and social and cultural practices towards sustainable ends (Geels, 2011). The UN Sustainable Development Goal seven calls for access to affordable, sustainable and modern energy for all. It states that a just transition should incorporate social and economic considerations, with equity and 'leaving no one behind' as guiding principles (UN, 2017).

In the recent academic literature, innovation has received much attention, especially regarding sustainability transitions. Innovations act in multiple ways as both 'push' and 'pull' factors driving the energy transition. Advances in technology, improved efficiency, and cost reduction have made renewable energy a competitive alternative and central to the energy transition discourse. There is, however, a widespread concern that the renewable energy sector has yet to make emerging new

clean energy technologies such as solar and wind accessible to low-income communities, both rural and urban. Clean energy companies continue to market their products primarily to commercial customers, financially capable of adopting new technologies for economic gain. Those less well-off still await their turn, as they have done in the past. Investment and innovation remain a major challenge for developing countries to induce renewable energy systems into the policy mix.

For policymakers in developing countries, ensuring energy security while adhering to climate commitments and guaranteeing energy justice is a challenge. Various drivers and barriers influence the energy transition pathways. The dialectical relationship between energy justice, energy security and climate commitment shapes policy. While the current climate commitments of states are geared towards achieving the envisioned 2050 target, IRENA (2021, 9) and others note that the transition speed is far from what is needed to be in line with the Paris Agreement. In order to achieve the 2050 target, the commitments need to reflect in policies. IRENA (2021, 9) also points out that if these policies are not fully implemented, emissions could potentially rise by 27% over the coming three decades. This encapsulates the importance of policy advancement and its challenges in energy transitions.

There is growing literature on the policy challenges in energy transitions in developing countries (Saculsan & Mori, 2020; Murshed, 2021). However, there has been little research that describes and explains the energy transitions in the light of climate commitments and justice. This chapter tries to address this knowledge gap by looking at how entanglements between climate commitments, energy security, and justice shape policy advancement and how the interlinkages between government, private sector, and the public shape energy transition. Against this backdrop and through a case study of Sri Lanka, the chapter addresses the following question: How has Sri Lanka progressed on a decarbonised development path through energy transitions? The chapter uses agency theory to understand the situated actors' and agentic processes in the energy transition in the case of Sri Lanka.

Building on existing literature, the next section outlines an analytical framework that centres on notions of carbon lock-in. Section "Methods" introduces the case study by contextualising Sri Lanka's energy landscape. The research methods are presented in Section "Sri Lanka's Energy Landscape" and followed by the framework's operationalisation through the Sri Lankan case study in Section "Analysis and Discussion". Finally, the analytical conclusions in Section "Conclusions" argue that the energy transition pathways are determined and regularised by national priorities rather than international climate commitments and the question of justice remains peripheral and detached from the state's energy transition discourse.

Analytical Framework: Unlocking the Carbon Lock-in

There is a tendency of carbon-intensive systems to persist over time and delay low carbon alternatives, which has come to be known as the "carbon lock-in." It happens

due to single or multiple factors—economic, technical, political and institutional—and has a large impact, influencing the decisions that characterize our lives (Erickson et al., 2015). The social and institutional connection between fossil fuels and the ways in which we use energy has tenacious powers that are extremely resistant to change. Despite the climate impacts being known and the availability of cost-effective alternatives, the inertia of high carbon systems poses challenges for policymakers that are very hard to overcome. Carbon-intensive development trajectories are sustained and reinforced through path-dependent processes (Berkhout, 2002; Unruh, 2000). This section develops an analytical framework for understanding the role of agency in carbon lock-in and identifies the possible pathways to "loosen" the carbon lock-in.

The framework contains two triads (Fig. 9.1). The energy transition is taking place as an outcome of the contended appositeness of these two triads. Firstly, energy transition does not occur in an automatic and mechanistic way in a vacuum; agency plays a key role as policy, finance, politics, and society need to be in line to achieve the transition. In any energy transition, three key agents shape the transition and its pathways, namely, government, private sector, and the public. This is represented in the left-hand triad. These agents influence and are influenced by a second triad: a nexus of climate commitments, energy security and justice concerns.

The latter triad delineates a state's energy transition pathways. For every government, energy security is a primary concern in energy transition; hence energy is deeply embedded in other sectoral and policy contexts (Goldthau & Sovacool, 2012). Apart from energy being a national security concern, it is also a global concern where governments have committed to decarbonisation, and these climate commitments have a role in charting pathways to energy transition (Kern & Rogge, 2016; Meckling & Hughes, 2018). At the local level, energy justice forms the core of energy transition discourse, and people at the lowest level of the power structure and in the peripheries face justice issues (Healy & Barry, 2017; Kumar, 2018; Mulvaney, 2013). They try to make their voices heard through different avenues and methods.
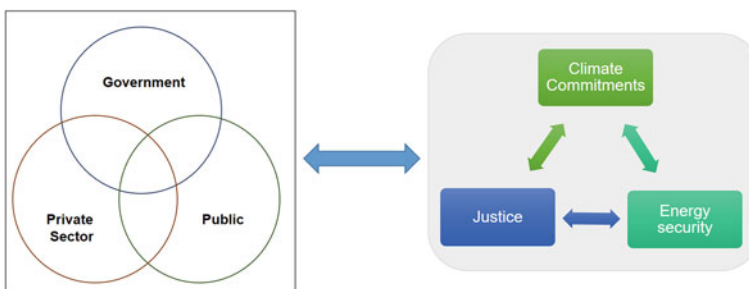
Interplay between triads

Fig. 9.1 Analytical framework of two interlinked triads of energy transitions

Climate Commitments—Energy Security—Justice

The climate commitments of a nation are underlined by its Nationally Determined Contributions (NDCs). One of the vital components for executing the global response to climate change under the UNFCCC Paris Agreement are voluntary commitments to emission reductions called NDCs. NDCs presented to the United Nations Framework Convention on Climate Change (UNFCCC) outline the nation's process to decrease emissions.

Energy security is at the present firmly snared with other energy strategy issues, for example, giving sufficient attention to existing energy structures and relieving environmental impacts (Goldthau, 2011). It is a common perception that energy security implies various things in various circumstances and to various individuals. In 2007 the Asia Pacific Energy Research Centre introduced the "Four As of energy security": availability, accessibility, affordability and acceptability (APERC, 2007). Over the years, indicators for defining energy security have varied. Hippel et al. (2011) presented a 'comprehensive energy security paradigm' with six indicators, whilst a generic framework for the description and analysis of energy security by Hughes (2012) contained three. Sovacool (2011) proposed 20 indicators for energy security. Chester (2010) argues that the concept of energy security has indeed become both 'slippery' and 'multi-dimensional'. The meaning of energy security has varied over the years and in accordance with the needs of the specific sector focus. Through a comprehensive literature review, Christian Winzer (2012) concludes that the common concept driving all energy security definitions is the shortfall of insurance from or versatility in the face of risks brought about by or affecting the energy supply chain.

Energy justice has arisen as another crosscutting research field that tries to apply justice standards to energy strategy, energy creation and frameworks, energy utilisation, energy activism, energy security and environmental change. Energy justice aims to give all people, across all regions, protected, affordable, and manageable energy. It is defined in three subsets. The first fundamental of energy equity is distributional justice. This is an inherently spatial idea that addresses both the inconsistent allocation of ecological advantages and impacts and the lopsided appropriation of related duties (Walker, 2009). The second fundamental is procedural justice, which aims for fair strategies that involve all partners in a non-prejudicial manner (Bullard, 2005; Walker, 2009). All parties ought to have the option to participate and their choices ought to be considered continually. This requires cooperation, fair-mindedness and transparency by government and industry (Davies, 2006) as well as the fitting and thoughtful commitment systems (Todd & Zografos, 2005). The third fundamental of energy justice is recognition justice. Recognition is not equivalent to cooperation; recognition justice is more than resilience and asserts that people should be genuinely addressed, that they should be safeguarded from risks and be offered concrete political rights (Schlosberg, 2013). Fraser (1998) identifies three main categories of misrecognition; cultural domination, non-recognition, and disrespect. This is a very important aspect of environmental justice where the rights of ethnic minorities, underprivileged and marginalized comes into the forefront.

The interconnections between climate commitments, energy justice and energy security pose the following core questions:

1. How might a low-carbon energy transition influence energy security and vice versa?
2. How do climate commitments endanger and empower energy justice?
3. How can energy security challenge and ensure energy justice?

To understand this interplay, it is important to understand the role of agency. The agency plays a role in shaping energy transition pathways. The relationship between government, private sector, the public and resulting dynamics influences energy policymaking and affects the outcomes. Onyx and Bullen (2000, 29) define agency as 'the capacity of the individual to plan and initiate action' and the capacity to react to issues outside of one's immediate range of authority to create an ideal impact. Harvey (2002, 173) defines agency as 'the capacity of persons to transform existing states of affairs'. Bhaskar (2010) describes it as the deliberate causality that achieves a novel situation that would not have happened otherwise. Agency is essential for citizens to be able to influence their social context, and all the more critically to react and rise above misfortune and emergency. It cultivates social activity that enables residents to obtain rights and assets (Horvath, 1998); citizens should know that they have agency. The private sector also has agency based largely on technology/innovation and investment/finance. The public sphere has agency through its institutions, policymaking, governance, and administration.

Interlinkages between these triads and the role of the agency are explored in the energy transition pathways with the related drivers and barriers. The Sri Lankan case study outlines the emerging frontiers in Sri Lanka's energy transitions against the backdrop of the 'climate commitments-energy security-justice' nexus.

Government/State: Indifference and Inertia Towards Sustainability Transitions

Governments play a crucial role in energy transition, where a distinction can be made between top-down and bottom-up approaches. The top-down approach means that state actors engage at the global level in international negotiations on climate mitigation. The other is the bottom-up approach, where local needs and political interests receive priority. Policymaking is determined by the government's balancing act to fulfill these obligations at once local and international. Sustainable energy transitions include a shift of assets between the contending private sector and political electorates. Actors in this process have fluctuating levels of political and financial power. As regards government, the transition literature has looked at the development of socio-technical aspects (Baker et al., 2014; Geels & Schot, 2007; Goldthau & Sovacool, 2012; Smith et al., 2005), political structures and political economy factors (Voß & Bornemann, 2011; Meadowcroft, 2009, 2011; Fouquet, 2016).

Given the importance of energy for economic development and growth, energy security has most often been the priority in energy policymaking. Reduction of greenhouse gases and combating climate change has been identified as a public good with its complex externality problems (Burck et al., 2011). The recent focus on climate change and environmental protection has also been incorporated even though governments have varying opinions on the matter. Since the ratification of the Kyoto protocol in 1998 and the subsequent climate conference in Copenhagen in 2009, many countries could not deliver on their commitments (Löschel et al., 2010; Nordensvärd & Urban, 2011; Ekins & Speck, 2014).

Dolsak (2001) argues that contention between the public and private sector about policies has led to conflicts between national and global priorities. This has made some countries continue their existing energy setups without transitioning due to political risk. Some countries are prepared to act only if global monetary assistance is provided. The third category of developing countries is openly dedicated to combating climate change, even using their limited resources.

Private Sector: New Avenues

In a developing country context, the private sector plays a crucial role in the energy transition. The private sector is important in two key ways. First, new technologies and innovations need to be introduced into the developing countries by the private sector. Second, investments and finance are crucial for any energy transition where states are too poor to support the transition. Energy technologies are central to both the problem and the solution. For Sri Lanka to become a low-carbon society, there is a need to unlock the technological efficiency potential and lower emissions of both energy-supply and end-user applications (Acemoglu et al., 2012; Gillingham et al., 2008; IPCC, 2014). Technologies to reduce energy consumption have been recognised as cost-effective measures to spur a sustainable energy system and attract much attention.

The commercialisation of clean energy technology is inhibited by two externalities associated with 'clean' innovation (Jaffe et al., 2005; Rennings, 2000). Firstly, environmental costs are not reflected in conventional energy generation, to the disadvantage of clean technologies. Secondly, knowledge spillover is often a disincentive to innovation since developers capture only a fraction of the benefits from the knowledge and technological learning they create while incurring almost all costs. Negative market features such as asymmetric information, institutional or regulatory failures, and bounded rationality add to policy intervention's rationale (Gillingham & Sweeney, 2012). Besides, substituting conventional energy is complicated by the "initial installed base advantage" of conventional energy (Veugelers, 2012), which implies a technological lock-in stemming from high returns to scale, network effects and industry standards (Arthur, 1989). These are among key considerations that demand policy measures to encourage clean energy investment (Acemoglu et al., 2012).

Scaling up renewables to meet energy security and environmental goals requires an altogether more significant investment than estimated. While the central part of investment might come from the private sector, public capital suppliers have a significant task to incentivize these private sources. IRENA (2015) report points out that most of the investment needed for renewable energy transition must come from the private sector, and historically it has covered a large share of renewable energy investment, accounting for over 85%. It serves as a critical project implementer and will in the future continue to act as a central driving force of renewable energy deployment (IRENA, 2016). Over the past decade, international organisations have promoted a market-based approach that puts energy, historically a public good, into the private sector's realm and continue to push this to make energy a private commodity. The state's inability to finance the renewable transition and the push from bilateral and multilateral donors to involve the private sector has led the private sector to dominate the energy sector. It is argued that the global energy transition will depend on the ability to develop countries to attract massive levels of investment for the renewable energy markets (IRENA & CPI, 2020; IEA, 2020).

Public: Quest for Justice

Providing clean, safe, reliable, and affordable energy for all is a key challenge that most of the developing world is facing. People are at the centre of the energy transition as prosumers. The choices, preferences, and behaviours of individuals and households are essential to energy transitions. This behavioural factor, along with acceptability and affordability, is essential to a just energy transition. Energy transitions will struggle without sufficient public support (Perlaviciute & Steg, 2015). Investment in specific energy efficiency technologies such as light bulbs and electric vehicles, the adaptation of rooftop solar, construction of windmills or solar parks and energy consumption are all contingent on the public's acceptance and actions. It is also important to communicate that a just energy transition also offers possibilities for inclusive and progressive development. Civil society and social movements can be viewed as a key to problem-solving, including both affirmation and contestation related to market and state activities (Grin et al., 2011).

Methods

The empirical analysis is drawn from a dataset assembled over two years, from September 2018 to January 2021. Primary data was obtained through 36 semi-structured interviews, of which eight were conducted digitally. Secondary data was collected from government policy documents, Cabinet papers, Gazettes, reports, websites, presentation materials and academic literature. Data collection occurred in

five phases, out of which two were direct fieldwork, another two were desk research, and one was virtual fieldwork due to the Covid-19 pandemic.

The first phase, conducted between September 2018 and November 2018, focused on understanding the fundamentals of Sri Lanka's energy transition. It mainly contained secondary data. The second phase was the first field visit to Sri Lanka from November to December 2018, when interviews were conducted with government officials, politicians, local level administrators, civil society organizations, private sector and ordinary citizens. Altogether 12 interviews were conducted. The third phase took place between January to October 2019 in the form of desk reviews and email communications. The fourth was fieldwork in Sri Lanka from November 2019 to January 2020, where 16 more interviews were conducted. The final phase of the data collection comprised virtual fieldwork (Skype and Zoom interviews, WhatsApp and Viber chats and email correspondence) and data analysis of the secondary data.

Interviews were conducted in the local languages (Tamil and Sinhala) and were transcribed into English, the coding was done manually and the quotations were categorized into government, private sector and public. They were also coded with reference to energy security, climate commitments and justice. Integration of primary and secondary data produced a dataset that was used to analyze the actors and agency in the energy transition in Sri Lanka.

Sri Lanka's Energy Landscape

Sri Lanka has agreed to make electricity generation 100 per cent renewable as rapidly as possible and by 2050 at the latest (UNDP & ADB, 2017; ADB, 2019). Sri Lanka pledged at the 22nd UNFCCC Conference of Parties in Marrakech, Morocco, as part of the Climate Vulnerable Forum, to use only renewable energy for electricity generation by 2050. At that time—in 2016—52% of Sri Lanka's electricity was generated through fossil fuels (ADB, 2019; World Bank, 2019). Indigenous fossil fuel resources are scarce, so fossil fuels are imported, which amounts to a significant part of Sri Lanka's annual import expenditure. According to the available reports, Sri Lanka's annual electricity consumption growth rate is 2.6%, and electricity sales have an annual increase of 4.9% (CEB, 2019). Sri Lanka has a high energy intensity in the economy, indicating a comparatively high economic output per unit of energy used (CEB, 2019; Central Bank, 2020). Fossil fuels dominate Sri Lanka's primary energy supply sources (see Fig. 9.2).

The share of renewable energy in the primary energy mix is about 46% in 2017, showing a 5.8% reduction compared with 2015 (ADB, 2019). Sri Lanka has almost achieved 100% electrification by 2018; but the areas affected by the civil war in the Northern Province were left behind even though the war ended almost a decade ago (see Fig. 9.3). By 2017, the industrial sector accounted for 24.3%; the transport sector 36.2%; households, commerce, and others accounted for 39.6% of the total energy use (CEB, 2019).

Fig. 9.2 Sri Lanka's energy mix. *Source* SEA 2019

■ Hydro ■ Thermal oil ■ Thermal coal ■ Wind ■ Mini-hydro ■ Solar/dendro/biomass
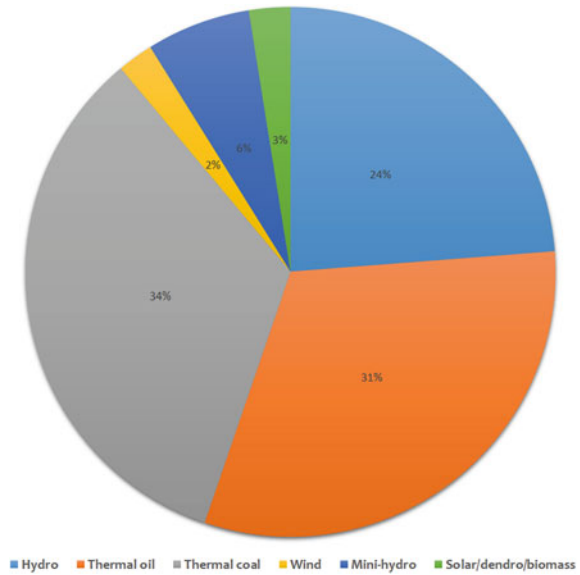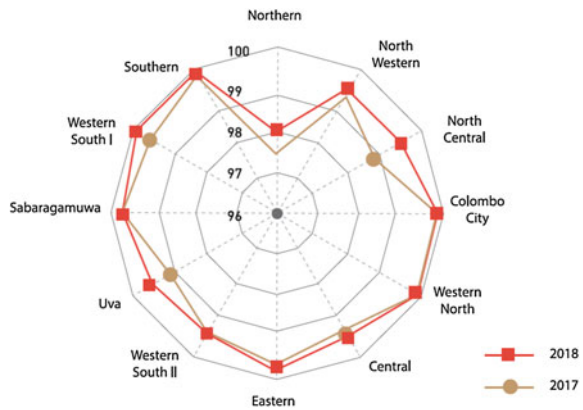
Fig. 9.3 Access to electricity in different provinces breakdown, *Source* CEB annual report 2018

Sri Lanka has ample renewable energy sources (UNDP and ADB 2017, World Bank, 2019). Electricity generation in Sri Lanka was almost 100% from hydropower until mid-1995 (World Bank, 2019). Almost all the economic potential has already been developed for hydropower generation in large-scale power plants, and possible small-scale hydro projects are underway. Due to the increase in electricity demand during the last 25 years, its power generation mix has shifted to a mixed hydro and thermal system. Solar power is abundantly available in Sri Lanka as the country lies within the equatorial belt. There is also good wind energy potential, and it is estimated that Sri Lanka can gain a utilizable wind power potential of 5600 MW, of which only 228 MW has been utilized up to now (CEB, 2020).

In 2006 when the new government took office, it produced the overall development plan 'Mahinda Chintana: Vision for a New Sri Lanka, a ten-year development framework (2006–2016)'. For the energy sector, the framework reads: "*sustainable development of energy resources, conversion facilities and delivery systems to enable access to and use of energy services by the entire population, and the safe, reliable delivery of such energy services at a regionally competitive price, through commercially viable institution subjected to independent regulation.*"

As a follow-up, in June 2008 the Sri Lankan government published National Energy Policy and Strategies, which contained vital policy guidelines that included: providing basic energy needs, ensuring energy security, promoting indigenous resources and protecting the community from the adverse environmental impacts of energy facilities. In March 2015, the Sri Lanka Energy Sector Development Plan for a Knowledge-based Economy 2015–2025 outlined specific targets, and two of them were crucial for increasing renewables in the energy mix: (1) to make Sri Lanka an energy self-sufficient nation by 2030; (2) increase the share of electricity generation from renewable energy sources from 50% in 2014 to 60% by 2020, and finally (3) meet the total demand from renewable and other indigenous energy resources by 2030. In line with this, Sri Lanka submitted its NDCs in September 2016 to UNFCCC.

In 2017, the United Nations Development Programme and Asian Development Bank produced a report on the possible scenarios for achieving '100% electricity through renewable energy in 2050'. In its findings, the report identified the plausible electricity generation mix and financial interventions required for Sri Lanka to achieve its goal, while also highlighting the numerous technical and economic challenges the country is likely to face on its road to 100% renewable energy in the power sector. It also pointed out a fundamental challenge for the policymakers: it estimated that investments around USD 55 billion would be necessary for the power sector to achieve the 100% renewable energy scenario by 2050, while this achievement would save the government USD 19 billion by avoiding the use of imported fossil fuels (UNDP & ADB, 2017).

Analysis and Discussion

The analytical framework described in Section "Analytical Framework: Unlocking the Carbon Lock-in" will be applied to the Sri Lankan case study to analyse the role of agency in the climate commitments-energy security-justice nexus. Special attention is given to how institutional inertia in the government sector contributes to carbon lock-in. Further, the private sector and the public's role in reinforcing carbon lock-in and negated justice will also be discussed.

Agency in Play

The analytical framework's application to the Sri Lankan case is illustrated in an actor centric diagram that outlines the key Sri Lankan actors involved in the energy transitions and climate change (Fig. 9.4). The analysis shows that the modes of the agency are not external to institutions and space; instead, they are tied with institutional resources and processes. This mode of the agency is explained through human-centric accounts of agency, where the qualitative interview data will be used and the analysis will be conceptualized through the framework.

The Sri Lanka government has four ministries that are central within climate and energy. Ministry of Power is tasked with 'Catering to the power requirement of all urban and rural communities based on the long-term power generation plan and providing power supply that establishes the market competitiveness of Sri Lankan businesses and establishing energy security. Ceylon Electricity Board (CEB), which controls electricity generation, transmission, distribution and retailing, is assigned under the ministry. Under this ministry, there is a State Ministry for Solar, Wind and Hydro Power Generation Projects Development, which is tasked with assisting in the formulation of renewable energy projects with the goal of "assuring of obtaining low-cost power." Sri Lanka Sustainable Energy Authority (SLSEA), created through a Parliament Act tasked to facilitate renewable resources and energy efficiency, is under the State ministry's purview. The Ministry of Energy is tasked to focus on petroleum and natural gas, but it also has the broader responsibility to 'formulating policies in the subject of energy' and ensuring the obtainment of low-cost energy. Ceylon Petroleum Corporation, an institution under the Ministry of Energy, provides petroleum to CEB to produce electricity.

The Public Utilities Commission of Sri Lanka (PUCSL) is the economic, technical and safety regulator of the electricity industry. The commission regulates the industry
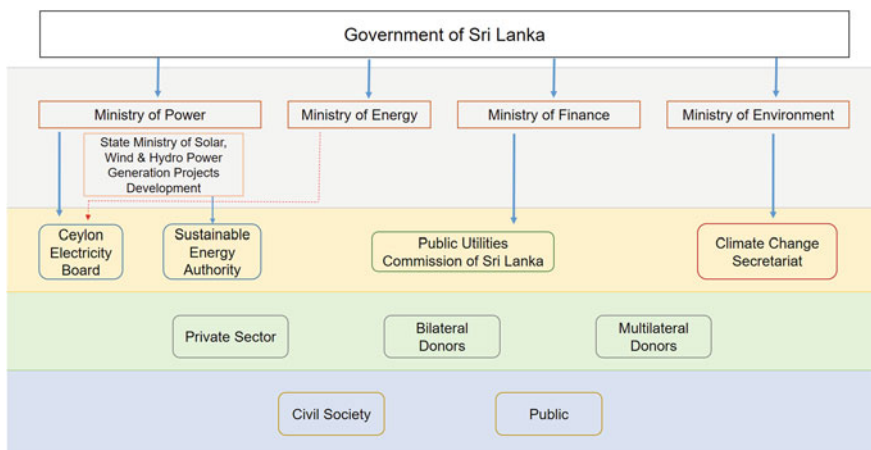

Fig. 9.4 Energy sector actor diagram

through licenses, regulations, rules and methodologies, and is an independent body under the Ministry of Finance. The Climate Change Secretariat (CCS) is the foremost institution in Sri Lanka that coordinates climate change-related matters and was established in 2008 under the Ministry of Environment. It is the national focal point on climate change-related matters and leading the process of mainstreaming climate change into other development areas.

These four institutions—CEB, SLSEA, PUCSL, CCS—and their ministries play a crucial role in shaping the policy pathways on Sri Lanka's energy transition. Interestingly these institutions have non-compatible goals that are outlined in their mandates. It creates an interesting paradox for the institutions to cooperate. The recent developments in the Sri Lankan energy sector illustrate this paradox. The new government coming into power in 2019 announced in early 2020 that the renewable energy contribution to the national grid should be 80% by 2030 (Sirimane, 2020). At the end of 2019, 40% of power generation is from coal, 40% from oil and 15% is from hydro. Less than 3% is from wind and solar (CEB, 2020). Coal and oil are essential, and the plan foresees the transformation of energy sources from 70% imported fuel to 80% indigenous sources (CEB, 2020). This paradigm shift is foreseen in a very short period of ten years that is challenging and needs policy consistency.

Nevertheless, in January 2021, the Cabinet approved two coal power plants and two LNG plants 300 MW, each totalling 1200 MW (Andree, 2020). As a follow-up in September 2020 the President said Sri Lanka would focus on achieving 70% electricity from renewables by 2030 instead of 80% (Daily News, 2020). Sri Lanka's latest Long Term Generation Expansion Plan (LTGEP) for the period 2020–2039, foresees 55% new coal and oil additions (CEB 2019).

A Sri Lankan energy expert, who has worked in the government sector, explained the thought process of the government institutions and their internal conflicts:

> The government institutions work in silos. They are very much focused on achieving what has been assigned to them. Institutions do not work holistically; they fail to see the bigger picture and the possible synergies. There is always a tug-of-war between institutions over superiority. The independent institutions – in this case, PUCSL – suffer the most. (Interview, 28-09-2020)

The interviews with the officials in these institutions at the local and national level showed the disconnect between competing narratives that each organisation pushes forward. Officials working for the SLSEA position themselves closer to CEB rather than PUCSL, which is advocating for renewables. The SLSEA, even though is mandated to look for a sustainable energy future, feels that Sri Lanka needs more coal power plants and argues that the vision of the SLSEA is "an Energy Secure Sri Lanka" while acknowledging that Sri Lanka has its NDCs to achieve.

To illustrate the above, the coded qualitative data was used to produce a sector prioritisation matrix, that is, an indication of which of the overarching energy issues are prioritized among the principal actors. The primary and secondary data were classified into three sectors, and then each of them was coded according to their priority. For example, if interview data suggest high priority for energy security and the next priority to justice and the least priority to climate commitments, it was

Table 9.1 Sector prioritisation matrix

Sector	Subsector	Energy security	Climate commitments	Justice
Government	CEB	1	3	2
	SLSEA	1	2	3
	PUCSL	3	2	1
	CCS	2	1	3
Private sector	Solar and wind	2	1	3
	Fossil fuel	1	3	2
	Bilateral/multilateral	1	2	3
Public	Public (war zones)	2	3	1
	Public (general)	1	3	2
	Civil society	2	3	1

1, High; 2, Medium; 3, Low

coded accordingly, giving 1 to high priority and 2 to medium priority and 3 to low priority (see Table 9.1). After coding, specific patterns started to emerge within the sectors. For example, the people living in the former war zones gave priority to the justice aspect of energy, while others prioritised energy security. Likewise, the different institutions within the government had varying priorities and preferences. Subsectors of sectors emerged after the coding process, and it is reflected in the table above.

This table gives an overall view of the agencies in play and their priority in the nexus. In the table, the government is comprised of four key organisations, namely Ceylon Electricity Board (CEB), Sri Lanka Sustainable energy authority (SLSEA), Public Utilities Commission of Sri Lanka (PUCSL), and Climate Change Secretariat (CCS). Likewise, the private sector is sub-categorised into three: Companies that work on solar and wind energy, companies that produce electricity through fossil fuels and the bilateral and multilateral agencies like World Bank, Asian Development Bank and Japan International Cooperation Agency (JICA). While coding, the priority among the people living in the former war zones and the other regions differ, and the people's priority order is different to the civil society. Here the civil society encapsulates the broader meaning, including NGOs, civil society and grassroot organisations. In line with the analytical framework, this matrix shows the complicated nature of energy policymaking. The foremost actors in government prioritise energy security and align with the fossil fuel sector. This contrasts with climate commitments, which are only championed by the institutions working on renewable energy, but they stand alone and are relatively powerless.

Finally, energy justice is also a marginalised concern, championed by civil society and the public. In contrast to the institutions, there is a lack of strong agency at the bottom. In short, there is a powerful alliance for energy security, and it is understood as sustaining fossil fuel and the foremost driver of business-as-usual, or 'lock-in' in

energy provisioning. The following sections will analyse the agencies' preferences through the framework to demonstrate the emerging energy transition pathways.

Institutional Inertia

In the Sri Lankan setting, the climate commitments-energy security-justice nexus can be understood through the institutions. Resistance to change is referred to as institutional inertia. Over the years politicization of institutions for public administration has made them weak and subservient to politicians (Uyangoda & Törnquist, 2013). This politicization and weakening have given the institutions a considerable loss of leeway, where they are rigid, unresponsive, leaving little room for policy change and adaptation.

Based on the collected data, three main mechanisms of institutional inertia can be identified in the case of Sri Lanka: (1) uncertainty, (2) path dependence, and (3) power. The following section will recapitulate how these mechanisms generate inertia and act as barriers to achieving just energy transitions and climate commitments.

Uncertainty

Government officials at the different levels pointed out during the fieldwork that the state institutions are weak and they experience policy changes, political influence and interference in decision making. It was evident during the conversations with the local level administrators; they explained the difficulties of being co-governed by different ministries, which take contrasting stances to each other, causing a lot of uncertainty. Local institutions, even though have the authority to act, avoid it and it has been their easiest and safest option. Unavailability of coherent and policy informed decisions and instructions creates uncertainty in the state institutions and institutional inertia. It was striking to find that even within one institution there are divergent opinions and policy stances that are contrary to each other. It happens at the national level where institutional incongruences and contradictions add to the uncertainty of the institutions expected to cooperate and deliver policy outcomes.

During the interviews, almost all acknowledged that uncertainty influences their way of working. At the local level, uncertainty is a sense of fear, where local officials are cautious that they do not do anything that upsets their superiors. Therefore, they are hesitant to initiate or explore, and instead prefer to stay dormant. At the top level, it is about dejection towards the system that is politicised. One official from a critical institution said:

> For us, uncertainty is not an exception but a norm. Our political decision-makers focus on political outcomes, which are short-sighted and not policy-driven. In most cases, these political decisions pave the way for policymaking. Eventually, we know it will change with the change of government in the next five or ten years. (Interview 09-01-2020)

Politicization in policymaking was very evident with Sri Lanka's changing renewable energy targets. At the outset it was planning for 100% renewables by 2050, then it became very ambitious and stated 80% renewables by 2030 as an election promise. Later it came down to 70% and then the cabinet approved the building of coal and LNG plants. At the present rate, Sri Lanka will end up with 45% renewables by 2030 according to estimates. The constant changes are attributed to decisions that are not in line with the policies. The data affirm that uncertainty appears at the institutions' different levels due to politicization and has promoted inertia. It has been a significant drawback in achieving just energy transitions politically and policy-wise.

Path Dependence

Path dependence refers to the outcomes of 'self-reinforcing or positive feedback processes' in a social system (Pierson, 2004, 10). Mahoney (2000) argues that path dependence generates a historically embedded inertia. This can be explained as the inability to change development paths due to past choices and decisions. For instance, this is the case in a 'carbon lock-in', where the possibility for just transitions is curtailed by the historical precedence and domination of the carbon-based energy sector. The outcome is that there is a lack of support politically and socially for lockout. Path dependence relates to both formal and informal institutions. Assemblages of technologies, bureaucracies, and worldviews also influence the institutions' path dependencies (Burch, 2011). Institutional inertia is embedded in social structures, power relations and daily practices that help to sustain the incumbent practices and resist change (Hoffman & Ventresca, 1999).

Electricity generation in Sri Lanka was almost 100% from hydropower until mid-1995. With globalisation taking its shape and influence in South Asia in the late 1990s, Sri Lanka witnessed a rapid electricity demand growth. Sri Lanka's limited potential to develop new hydropower facilities allowed the shift to a mixed hydro-thermal system in electricity generation. Initially, the state-owned CEB was the only entity allowed to engage in electricity generation, transmission, and distribution. After 1996, Sri Lanka allowed the private sector to develop power plants to sell electricity to CEB. This had a drastic impact on the Sri Lanka's energy mix. (see Fig. 9.5).

Even though Sri Lanka had the option to invest more in renewables, the CEB and the private sector preferred to take oil and later coal as additional electricity generation sources. "Least-cost option" was the credo of successive Sri Lankan governments. CEB, as well as private companies, were resistant to change. One retired CEB official echoed this and explained how path dependence influences policy decisions.

> When Sri Lankan energy mix became mixed with oil and coal, it perfectly fitted our demand-side management, especially to handle our peak load. Adding thermal into the system did not hamper our existing systems, which were dominated by hydro. So that change was smooth, and over the years, we were convinced that thermal power generation along with hydro is the best-case option for least cost power generation. When Sri Lanka came up with its climate commitments in 2016, it was just a fancy idea. There was no buy-in from CEB, but we agreed
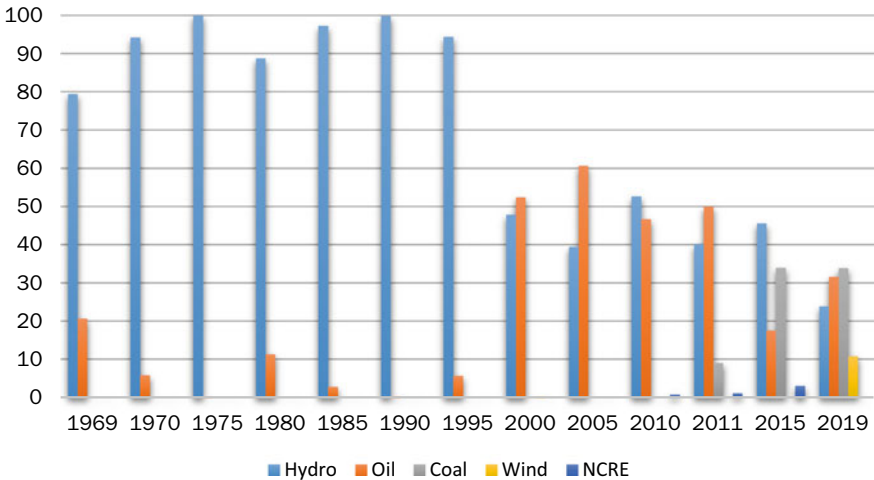
Fig. 9.5 Electricity generation mix 1969–2019, *Source* CEB, 2019

that Solar PV could act as standalone without being connected to the grid since it will create instability to the grid." (Interview, 16-12-2019)

Sri Lanka has drafted several possible pathways to achieve 100% renewables by 2050. CEB is in favour of the continued use of fossil fuel since it will not distress the present energy infrastructure. It also argues that it is the cheapest option (CEB, 2019). It has been estimated that the government needs around US$54–US$56 billion in total in the power sector to achieve a 100 per cent renewable scenario (UNDP & ADB, 2017). Hence even though there are frameworks, policies, and vision to decarbonize and achieve climate commitments, the carbon lock-in strengthened by path dependence continues.

Power

During an interview with a very senior government official who has worked over four decades in ministries and institutions, I asked the following question: "*Have you ever asked the policymakers what was their basis for any new policymaking or the reasons for the change in the existing policy?*" This question captured the essence of institutional inertia in Sri Lanka. Several interviews pointed out directly and distinctly the role of power in their institutional functioning. It was evident through the fieldwork that in several institutions that are working in the realm of energy transitions and climate change, the role of power and the hierarchical attitude are embodied within the DNA of those institutions. Power is an actor's capacity to influence the relationship between that actor and those being influenced (Orjuela, 2008). Power is also produced or legitimized by those who obey (Lilja & Vinthagen, 2009). In this sense, in the Sri Lankan institutional context, power is understood as

consensual with common interests between those with much power and those with less and gives the legitimacy to wield power over someone (Hydén & Mmuyo, 2008; Orjuela, 2008).

The senior government official had this to say when asked his take on this question.

> If you go and ask the officials in these institutions who formulate the policies, what was the primacy for policymaking, you will find out that people are not their main concern. It is all about politics and power. Sri Lanka is adding renewables not because it sees it as a future, but they see some profit out of it, and it helps to tick off some boxes in international fora.

Sri Lanka presents a critical disjuncture in the experience of the energy transition, as seen in many other societies in the developing world; with a fundamental dichotomy between the multiple interests of the society and the state power.

It is evident that institutional inertia has its mechanisms and that these mechanisms are interconnected and reinforce each other. The complexity of a negotiated compromise among the institutions has repeatedly demonstrated that collectively and individually, agency undermines climate commitments by pursuing sectoral agendas or inaction. The case data demonstrate a close relationship between government institutions and energy security. Many institutions put energy security first, but others put affordability and availability highest.

Private Sector in Energy Finance

Sri Lanka's renewable energy uptake is mainly taken care of by private sector investments or through donor assistance—as loan or grant—and both mainly in the form of solar and wind projects. Over the past decade, Sri Lanka has witnessed renewable projects that have caused justice and equity questions (Theiventhran, 2021). On the one hand, there is protest and resistance from the public for renewable energy projects; and on the other, there is an uneasiness about renewable energy uptake among CEB, which is founded on three fundamental premises.

1. Wind and solar power output are subject to resource intermittency that affects grid stability.
2. Lower production factors with wind and solar power require a larger quantum of capacity to be installed to match an equivalent thermal power plant's energy yield.
3. The costs incurred in building renewable plant capacity plus backup generation to combat intermittency results in higher electricity prices.

Over the past year, there has been a slowdown in approvals for renewable energy projects and several reasons have been cited. It is noteworthy that Sri Lanka purchases emergency power from private sector companies, which have been operating since they were allowed into the energy sector in 2006.

There are two competing narratives in relation to private sector finance in renewable energy in Sri Lanka. One argues that private sector finance is decisive to achieve

global climate commitments, where renewable uptake is instrumental in bringing the desired changes to the energy system (during the interviews private sector entities working on renewables argued strongly on this). The other argues that incorporating renewables will create instability in the energy system and make electricity generation expensive (This was outlined in the interviews with the CEB and few energy experts). Sri Lankan private sector in energy is diverse and has competing and complementing interests that make policymaking strenuous. The Sri Lankan private sector in renewables is emerging and yet to find its full potential of the agency. By contrast, the private sector which is working with fossil fuels is well established including its relationship with the state and policymakers.

The role of the bilateral and multilateral donors in renewable uptake is mixed. China and India have provided grants to build solar and wind parks in Sri Lanka. Asian Development Bank (ADB) has financed a 100 MW Wind Park. On the other hand, China has built Sri Lanka's first coal power plant, India and China are bidding for coal plants in Sri Lanka. India, Japan and China are involved in LNG projects. World Bank has recommended LNG and argues LNG is the best way to meet the growing energy demand in Sri Lanka (World Bank, 2019). Both bilateral and multilateral donors argue that their support is to ensure Sri Lanka attains energy security.

The Sri Lankan case shows that the private sector as an agency induces energy policymaking through its attractive financial capabilities. Nevertheless, it is not linear, on the one hand, companies working on renewables are pushing for more renewables so that Sri Lanka meets its climate commitments; whilst the bilateral and multilateral actors with their focus on energy security support the continuation of and even new facilities for fossil fuels. Energy finance both private and from donors has thus overpowered concerns about issues such as energy justice.

Is this putting the cart before the horse? Clearly, both private and public sectors have vital roles to play: but as we have seen, the private sector has increasing agency, which in some cases is pulling outcomes in the direction of fossil fuels and path dependency, as well as lacking focus on the social justice issues of the energy transition. One might add that they also appear to prioritise supply side over demand side energy efficiency and energy conservation, topics that do not explore in detail here but which are equally vital for sustainable energy transitions.

Public

Sri Lanka's public discourse on energy is mixed. Sri Lanka has a history of regular blackouts, and the environmental impact of Sri Lanka's first coal power plant has created some awareness. The public has remained largely silent with very little agency, but it has had a significant impact on the national discourse when they act. The PUCSL officials detailed that the cataclysmic failure of the first power plant and its environmental disasters prompted the public to react to the proposed second coal power plant in Sampoor, the Eastern part of Sri Lanka. Environmental activists pointed out that public protest and subsequent halting of the power plant have proved

the public's power and created awareness over coal plants. Environmental organizations and social movements stood in solidarity with the public and created a form of social capital that evolved as an agency, taking advantage of Sri Lanka's climate commitments in order to also harness a fight for justice.

This resistance also promoted a discourse about renewables as the better way forward and created an atmosphere for policymaking in favour of renewables as noted by a senior official at the ministry of environment. However, a few years down the line solar and wind facilities have also come under criticism and have faced resistance. Loss of land, livelihood and environmental concerns, lack of consultation and awareness are some of the reasons for these protests. The interviews with the protesters and civil society activists revealed that there are questions of justice in multiple ways. People feel that these energy projects are being imposed upon them. Interviewees at the grassroots level stressed the importance of openness and answerability of the state and the importance of procedural justice. Further, they said that their social and political capital is weak and they can only have a minimal impact, whereas private capital and the state's institutions have a powerful agency that dominates the energy transition discourse and undermines justice.

These social issues are compounded by the lack of clear policy frameworks, the private sector's economic motives, and the state institutions' institutional inertia. This had an impact in shaping the climate commitment-energy security-justice nexus, where energy security became the primary concern and affordability and cost are higher priorities too, the energy justice became the least concern.

Conclusions

In this chapter, the case of Sri Lanka's ongoing energy transition was explored from an agency perspective. The analysis brought together the dynamics of different actors and how different formations influence or have little influence on Sri Lanka's energy transition discourse. Agency in different forms creates critical frontiers both spatially and temporally. Understanding how these processes constituted these agencies and contrariwise could empower the policymakers to design interventions that accommodate competing narratives and achieve acceptability and sustainability. This chapter investigated how the 'climate commitments-energy security-justice nexus has influenced the energy transition pathways in Sri Lanka. The analysis explained the agency's role and how the carbon lock-ins are reinforced through institutional inertia, and how justice issues are neglected or undermined. Hence, the Sri Lankan case study points to some essential paradoxes and possibilities regarding clean and just energy transitions in developing country contexts. A holistic policy framework for energy transitions must incorporate democratic concerns from below. To do this calls for, at the very outset, a firm political commitment for renewables and sustainable solutions to be designed and implemented in ways that are acceptable by all.

The problem of path dependency is that it has provided the basis for energy security while it has failed to address the climate question. However, path dependency

provides options to conceptualize energy transitions in an energy security perspective that has taken the central role in de-carbonization discourse and has reinforced carbon lock-in. A key challenge in any new type of transition is to confront and negotiate unknown challenges and concerns, in this case, new energy systems with renewables and accommodating the gradual phase-out of fossil fuels as well as social justice. In this process, inertia among actors could reinforce the path dependency, undermine the path creation, and fortify carbon lock-in. In the case of Sri Lanka's energy transition, there are three emerging frontiers. These can help to understand how climate commitments influence energy transitions in developing countries and what space does justice has in this relationship.

First, Sri Lanka's climate action process has been a relatively subdued, painless process not conducive to decisive actions, with weak institutions, where policies and frameworks were made without incorporating them into the more comprehensive national policy. Quite paradoxically, international organizations and multilateral partners have pushed for better alignment between climate action and energy transition, yet supporting fossil fuels. Later the private sector joined in on the action. Inertia adds to this lack of effectiveness.

Second, the 'reconstitution' of state-private sector relations. The relationship between private finance for renewables and energy justice is complicated. The emergence of a post-liberalized political economy and the decline of state control in private capital, weak state institutions and limited public finance has reconfigured Sri Lanka's state-private sector relations. This 'reconstitution' of state-private sector relations has paved the way for the re-politicization of Sri Lanka's energy landscape favouring the non-renewable future—the opposite direction from the country's goals.

Third, Sri Lankan policymakers, like its citizens, have taken energy transition for granted based mainly on affordability and availability. Clean energy has not been a critical part of the energy security discourse, and the call for climate action is detached from the energy transition. Nor has energy justice been in focus. Sri Lanka has not experienced a significant climate calamity even though it experiences severe droughts and floods annually. Climate action was an outcome of Sri Lanka's international engagements, especially with the United Nations. Sri Lanka's NDCs and its commitment were not born from a public or social movement. Sri Lanka's climate commitment was not grassroots-driven and was not based on local needs. Sri Lankans feel the impact of climate change in many ways, but there was no sensitization about climate action.

All the above can lead to a new condition of hollowed-out energy transitions, detaching de-carbonization from energy security, impeding social and justice issues, and confining the action to a relatively minimal and in part undesirable energy transition. In summary, responding to the climate commitments while ensuring equitable energy necessitates an inclusion and recognition of the different capabilities, and the agency approach offers a valuable framework for exploring the emerging frontiers of the energy transition.

It is surely fair to say that whilst issues of carbon lock-in, path dependency and inertia are found in many countries, both rich and poor, their impact particularly impedes increased attention to "newer" aspects of energy transitioning such as social

justice. Energy is still often seen as mainly a technical-economic field, with little attention to the cultural and social sciences aspects and approaches. Such considerations depend on the entire socio-political context. They are still relatively little in focus internationally and are naturally both complex and sensitive. Social justice issues highlight the uneven distribution of agency in Sri Lankan society. In a post-conflict context such as Sri Lanka, this may further hinder or raise opposition to positive energy transitions.

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