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The political economy of electricity distribution in developing countries

A review of the literature

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Executive summary

Different public services vary in the forms of politics and governance they adopt, but certain political and governance-related opportunities and constraints around the delivery of specific services frequently recur. The Overseas Development Institute (ODI) Sustainable Governance Transitions programme is seeking to generate evidence and guidance on how such constraints and opportunities affect the provision of different public goods and services in order to draw out practical implications for the development of realistic, politically informed strategies and programmes.

This paper applies a framework for analysing the effects of sector characteristics on service outcomes, developed by Mcloughlin (2012), and a mapping of the underlying governance dynamics and features of the broader political system (Wild et al., 2012), to electricity services in developing countries. Based on an indicative review of the literature, it provides a preliminary assessment of how sector characteristics influence the politics and governance of the delivery of electricity services in developing countries and of how common problems and constraints in governance affect the provision of electricity services to consumers.

The private good nature of electricity allows for delivery of the service to specific consumers. However, this requires effective enforcement, which is absent when overall governance and accountability mechanisms are weak. The monopolistic nature of grid-based electricity, the main means of delivery, presents opportunities for rent seeking and can lead to inefficient services, underinvestment and poor maintenance of infrastructure. The separation of electricity generation from transmission and distribution under power sector reform measures in many countries can give rise to separated decision-making and policy incoherence.

The high demand for electricity owes to the value citizens place on the service, including its externalities. This can give electricity considerable political salience, reflected in the promises and actions of politicians seeking broad electoral support or the support of particular groups. Electricity supply and pricing appear to have greater traction for politicians than increasing levels of access to electricity, probably because those with political influence already have connections to the grid.

The common governance constraints found in other services can also be seen in the governance of electricity distribution, the focus of this paper. Electricity distribution presents a collective action challenge, addressed by electricity being regarded as a public service and a responsibility of government, despite its private good nature. In remote locations, mini-grids through community action are a response. Electricity theft and poor financial performance of distributors are problems where monitoring and oversight by distribution companies and regulators are weak. When accountability mechanisms between politicians and citizens (electricity consumers) and between politicians and electricity service providers are not strong, particular interest groups can be given preference in receiving electricity and favourable tariffs or subsidies.

The review in this paper is not comprehensive, and the focus is on electricity distribution only, rather than on the power sector as a whole or the wider energy sector. However, even from a partial review of the literature, it is clear that the public service of electricity distribution is open to political influence. It also suggests that further political economy analysis in the electricity sector and wider energy sector would offer potential for greater understanding of how governance in the sector might be strengthened to improve the efficiency and equitability of services. Analysis of the political economy of sector reform, in particular around the nature and effectiveness of regulatory bodies and rural electricity authorities, would increase understanding of the sector as a whole. Political economy analysis of power generation, including the fossils vs. renewables question, is necessary for green growth and low carbon development. In developing countries, where cooking is the largest single use of energy, analysis of the political economy of energy for cooking would help explain why policymakers neglect this issue.

1 Introduction

Different public services can vary in the forms of politics and governance they adopt, but certain political and governance-related opportunities and constraints around the delivery of specific services frequently recur. The characteristics of different sectors can be used to differentiate between services, and between functions within them, and to understand whether and in what ways these characteristics enable or constrain prospects for inclusive, accountable service provision.

The Overseas Development Institute (ODI) Sustainable Governance Transitions programme is seeking to generate evidence and guidance on how political and governance constraints and opportunities affect the provision of different public goods and services. It is looking at how institutions, incentives and behaviour explain variations in performance and outcomes in different sectors, in order to draw out practical implications for the development of realistic, politically informed strategies and programmes.

A framework for analysing the effects of sector characteristics on service outcomes, devised by Mcloughlin and Batley (2012) for the Sustainable Governance Transitions programme, was applied to specific health, education and water and sanitation services. This generated three broad findings:

- The characteristics of a service influence the incentives for politicians, providers and users to commit resources to producing it, and for politicians and providers to be accountable to citizens for its performance.
- Sector characteristics may determine the balance of power between different actors and interests groups involved in delivery, and the likely form and effectiveness of provider compacts.
- Sector characteristics set the broad parameters for whether and how citizens collectively mobilise around them and make demands on delivery organisations.

In addition, a mapping was undertaken of the underlying governance dynamics and features of the broader political system that shape the delivery of multiple public goods and services (Wild et al., 2012).

In this paper, we seek to apply both mappings to electricity services in developing countries. Based on an indicative review of the literature, we provide a preliminary assessment of how sector characteristics influence the politics and governance of the delivery of electricity services in developing countries, and of how common problems and constraints in governance affect the provision of electricity services to consumers. For reasons of resources, and because the focus is on services delivered to the consumers of electricity, the review is limited to electricity distribution. We do not consider political economy factors in electric power generation, significant and important as these are.[1]

The paper begins with a background introduction to the electricity sector, which provides an outline of the context in which electricity services are supplied (Section 2). Section 3 reviews electricity distribution against the sector characteristics framework. Section 4 discusses common governance constraints in relation to electricity distribution. The paper concludes by summarising key points from the preceding sections and providing some pointers for further political economy analysis of the electricity sector in developing countries (Section 5).

2 Background to the electricity sector

In most countries, electricity has been regarded as a public service since the middle of the 20th century. A majority of developing countries have now adopted universal access to electricity as a development objective. Adequate and reliable supplies of electricity have been a principal focus of national energy

1 See Dubash (2002) and Victor and Heller (2007) for a fuller discussion of political economy in the power sector.

policies, as a consequence of its role in enabling economic growth and improving people's standards of living. Even when private sector actors deliver electricity, the availability and reliability of the supply is regarded as a responsibility of government.

Nevertheless, there are significant differences between and within countries in terms of levels of access to electricity. Worldwide, 1.3 billion people have no access to electricity, and another 1 billion have only an intermittent supply (IEA, 2011). The great majority of those without access live in Sub-Saharan Africa and South Asia. In Europe and North America, electricity supplies reach almost everyone, but in Sub-Saharan Africa only 30% of the population has access.

Rates of improvement in terms of expanding access and delivering inclusive electricity services also vary. Vietnam, for example, increased its electrification rate from less than 10% to 98% over three decades. Ghana increased the proportion of the total population with access to electricity from 45% in 2005 to 72% in 2010, and is aiming for universal access by 2020. In some countries, however, there has been very little progress and, under business as usual scenarios, there will still be 1.4 billion globally without electricity by 2030 (IEA, 2011).

Within countries, differences in access to electricity are to be found between rural and urban areas. Across sub-Saharan Africa, for instance, 56% of the urban population lacks access to electricity, compared with 89% of the rural population. Worldwide, the proportion of the population without access in rural areas is five times higher than that in urban areas (IEA, 2011). The main consumers of electricity are households and industry, although the share of each of these sectors in total electricity consumption varies between countries. In some countries, agriculture is also a significant consumer of electricity. Political economy factors seem to partly determine the differences in coverage and outcomes between countries.

Among those who do have access to an electricity service, consumption of electricity is correlated with income. Low-income households tend to consume a minimum amount of electricity (for lighting), and are prepared to pay for this, but beyond this minimum their demand is highly price-elastic. Connection charges and tariffs can be a barrier to access for low-income households even when an electricity supply is physically available.

Barriers to expanding access to electricity have been broadly categorised as financial and economic; capacity and technical; and policy and institutional (Practical Action, 2010; Sovacool, 2012; Watson et al., 2012). The first of these include high costs of investment and operation (and the affordability of tariffs), access to investment finance and the effectiveness of cost recovery mechanisms. In the second category are technical and managerial capacities to design, install and operate electricity systems, and the efficiency of the technologies deployed. The third category includes the adequacy of the policy framework and the effectiveness of institutions responsible for implementing policy – the focus of the remainder of this paper.

Inclusivity of electricity services, for example, is affected by whether there are specific objectives to expand access in overall policy and in the remits of electricity regulators and organisations delivering electricity.[2] The effectiveness of electricity services is affected by regulations determining incentives for different actors in the sector. Discussion in the literature of barriers and interventions to extend access tends to have a techno-economic and managerial emphasis, but political economy factors also clearly play a role.

Electricity is in demand not for itself but for what it enables people to do. Practical Action (2010) identifies six different kinds of essential energy service that electricity can be used to provide: lighting; cooking and heating; space heating; cooling; information and communications; and earning a living. In order to be able to use electric power for these services, equipment or appliances are necessary, as well as a supply of electricity. It is the latter, however, that is regarded as the public service, and in this paper we focus on the political economy of the supply of electricity, rather than the political economy of what the electricity is used for.

2 Around half of developing countries have an electricity access target.

An electricity service can be supplied in many different ways. The value chain for an electricity supply has five main components: energy source; generation; transmission; distribution; and final user. An electricity service tends to exclude the energy source (e.g. coal mining), although for renewable electricity the source can be a free good (e.g. solar radiation and wind) and is not always distinct from generation. The service also tends to exclude the fittings and appliances of users that make electricity useful. In this paper, we focus on the transmission and distribution elements of the value chain, which deliver the electricity to users.

We can distinguish between grid-based delivery systems, mini-grid systems (where transmission and distribution are conflated) and off-grid systems (where generation and distribution are extremely localised). As we also see in the water sector (see Mcloughlin and Batley, 2012), network supply can have quite different characteristics from off-grid or non-networked supply. Grid systems, typically with capacities over 3,000 kW, take advantage of economies of scale in power generation and distribution to large populations. Mini-grid systems, 100 kW to 3,000 kW in capacity, comprise small- or medium-scale generation plants and localised distribution (e.g. a small town or community). Off-grid systems are stand-alone generation and distribution systems, typically serving a single household or business.

The organisation of an electricity service, the scale of the system and the nature of the links between elements in the value chain can clearly influence the accountability relationships that help determine quality and inclusiveness. Before the power sector reforms of the 1980s and 1990s, generation, transmission and distribution were all frequently the responsibility of a single utility company, often in the public sector. Today, separate organisations (companies) can be found at each stage of a grid-based system, while the significance of mini-grid and off-grid services is increasing.

The post-reform organisational structure of electricity services varies considerably between countries, influenced by both local context and political economy. In some countries, weak governance (corruption, lack of transparency) has compromised the ideal of sector reform, while the negative effects of reform for consumers (higher tariffs and stronger enforcement of revenue collection) exceed any benefit from improved service performance. Williams and Ghanadan (2006) suggest that the resulting lack of social legitimacy of such sector reforms is manifested in power theft, vandalism, protest and electoral politics.

Unsurprisingly, governance of the electricity sector has been a subject of previous studies, which tend to cover the power sector as a whole or the wider energy sector.[3] These have tended to focus on specific issues – such as transparency and accountability or users' experiences – but have not looked at particular types of electricity services, their characteristics and the implications for incentives and accountability relationships.

For example, the Electricity Governance Initiative (EGI), led by the World Resources Institute and Prayas Energy Group, addresses the transparency and accountability of decision-making processes in the power sector (Dixit et al., 2007). The toolkit (with 64 indicators) developed for the EGI allows assessment of policy and regulatory processes and the social and environmental effects of policymaking and implementation in the sector as a whole. Application of the toolkit in India and South Africa has focused on power sector reform (EGI South Africa, 2007; Mahalingham et al., 2006). Other studies have examined users' experience of electricity services from a political economy perspective, in a specific location or concerning a specific aspect of electricity services, such as subsidies or theft (Golden and Min, 2012; Jain, 2006). The literature on such experiences is dominated by South Asian cases, including that of Oda and Tsujita (2010), who provide one of the few statistical studies.

A recent systematic review of barriers to the use of modern energy (Watson et al., 2012) also found a lack of empirical research focusing on politics and power balances and their impact on modern energy services. The authors found weak evidence on the extent to which effective policymaking for rural electrification is

3 Victor and Heller (2007), for instance, address the political economy of power sector reform. Rehman et al. (2012) examine political economy factors influencing access to all forms of energy. Burke (2012) considers the political economy of renewable energy.

hampered by a lack of power among rural populations. Although political commitment and leadership at different levels have been cited as keys to success in improving access to energy, there has been little systematic investigation of interventions and political dynamics that help overcome these hindering factors. In particular, there has been little reflection on experiences of regulation and regulatory authorities in enforcing collective rules for electricity access.

To address the lack of more systematic or comprehensive analysis, as a first step this paper looks at the political economy of electricity distribution,[4] unpacking both those features specific to electricity distribution and factors in the wider governance context that will also shape electricity distribution. It focuses on electricity services that consumers receive, which may have some similarities to the basic services considered by Mcloughlin and Batley (2012) and Wild et al. (2012): those provided by electricity distributors to residential and business consumers (i.e. grid or network systems). This focus should allow for clearer comparison of the application of political economy concepts and approaches with other sectors.

3 Sector characteristics

In order to help understand how forms of governance and politics operate within a service sector, and how this may vary between sectors, Mcloughlin and Batley (2012) identify four categories of service characteristic and more specific technical characteristics in each category. These characteristics, summarised in Table 1, influence the behaviour of actors involved in service delivery and the accountability relationships between politicians, service providers and service users. In this section, we draw from some of the literature to understand how these characteristics shape the governance and politics of electricity distribution in developing countries.

Table 1: Sector characteristics

Nature of good	Type of market failure	Nature of task	Nature of consumption
• Rivalry • Excludability	• Monopoly tendency • Externalities • Information asymmetry • Merit	• Measurability and variability of outputs Discretion of frontline staff • Transaction intensity • Variability • Professionalisation	• Frequency of use • Predictability of use • Territoriality • Political salience

3.1 Nature of the good

The distinction in economics between public and private goods is based on the degree to which they are *rival* (i.e. if the good is consumed by one person it cannot then be consumed by another) and/or *excludable* (i.e. when the good is consumed it is possible to exclude any person from its benefits). Public goods are neither rival goods nor excludable; private goods are both rivalrous and excludable.

When considering the private or public good nature of electricity services, it is important to avoid confusion about the service (good) in question. The energy services electricity provides (lighting, heating, cooling, communications and motive power) can be private or public goods. Lighting within the home, for instance, is a private good, whereas street lighting is a public good. The electricity delivered to public and private providers of lighting has the nature of a private good, however, because the electricity consumed by one user is unavailable to others and users can be excluded from the service.

4 Backward linkages in the electricity value chain, to transmission, power generation and energy sources, are not discussed in detail.

In other words, the private good nature of electricity for domestic or business consumption emerges from the fact that it is both a *rival good* and an *excludable good*. Although not a public good in the economic sense, the public service role of electricity supply, which entails politicians being held accountable for its provision, derives from its natural monopoly characteristic (see below) and high entry costs, its value to consumers and its role as an enabler of other activities or services (also known as 'externalities'). It is the availability and reliability of an electricity supply that is therefore often regarded as the public service.

The inherently physical nature of this form of electricity delivery gives it its 'excludable good' nature. Grid electrification requires the physical availability of infrastructure or, in the case of domestic systems, equipment to deliver electricity to the consumer and the supply of electricity to the point of use. Individual electricity consumers are excluded from access if they do not have a physical connection. Even when there is a connection, the supply of electricity can be made excludable (or limited) by technical means to an individual consumer or to a geographical area.

Exclusion from an electricity service, however, needs to be enforced. Meter tampering, unmetered consumption and unsanctioned connections to the grid are common ways in which electricity is stolen (Golden and Min, 2012). Electricity theft is a major problem in some countries, where governance generally is weak, amounting to 15% or more of the power generated (Smith, 2004). In some developing countries, for example in India and Nepal, electricity thefts may even be politically motivated and corrupt staff from the electricity supplier may take bribes to allow the practice to continue (Smith, 2004). This has implications for forms of political accountability, as this form of electricity service, even though it is excludable in principle, in practice relies on enforcement, which opens up space for rent-seeking opportunities or political patronage. In some contexts, political actors might be complicit in non-payment and free-riding so long as they receive petty kickbacks, which will undermine incentives to exclude those who can pay such kickbacks.

Grid expansion to rural areas has not advanced well in most developing countries, given high investment costs associated with the extension of existing grids to rural and remote communities. The supply of grid electricity to rural and remote areas is more costly per connection than it is in more densely populated urban and periurban areas.[5] Econometric analysis by Oda and Tsujita (2010) found location to be the most significant factor determining electrification. Villages in remote areas are unelectrified because of cost ineffectiveness and the technical difficulties in electricity connection (ibid.). There may also be political incentives here too, as low population density coupled with high upfront investment costs in rural areas may mean fewer perceived political 'returns' (including in votes, or political support) for network expansion. This has also been the case in roads, for example in parts of sub-Saharan Africa (World Bank, 2010), and more specifically in Laos (Rafiqui, 2003), Ethiopia, Zambia and Vietnam (Bryceson et al., 2008).

Furthermore, exclusion from a grid-based electricity service can be through price. Tariffs for electricity tend to be regulated and to vary with the quantity of power consumed. Lifeline tariffs for low-income households are often set to enable a minimum level of access, cross-subsidised by higher-paying consumers. Payment enforcement is necessary if tariff structures are to be effective. In South Africa, an inability to pay electricity bills and mounting arrears eventually led to electricity cut-offs by the local municipality of about 60% of households (in 2000) (Kamoto, 2005). Where accountability is weak, subsidised tariffs can allow for theft (India) or diversion of resources to particular groups for political reasons; moreover, where some people or groups are seen to be exempt (because of their political connections), high rates of non-payment may be likely. This was also found to be the case in relation to tariff setting for water supply, in Sierra Leone for example (Harris et al., 2012).

In the case of off-grid systems, high initial investment costs can also result in the exclusion of poor households (for both mini/micro community-based and household projects). For instance, in Zambia, the

5 In Bangladesh, for example, the cost of grid extension (including labour, materials and other costs) is about $6,690 per km; in Kenya, it is $12,550 per km (Glania and Rolland, n.d.).

monthly fee for solar home systems is $5, in a nation where approximately 60% of the population lives on less than $1 a day (Gustavsson and Ellegard, 2004).

3.2 Type of market failure

Mcloughlin and Batley (2012) identify four kinds of market failure relating to public services: monopoly, externalities, information asymmetry and the notion of merit goods – some of which the previous section touched on.

Negative externalities in an electricity system are mainly in electricity generation, as pollutants from the burning of fuel or as environmental and social damage resulting from construction of large-scale infrastructure. There are some minor negative externalities from electricity transmission and distribution, through (aesthetic) landscape damage and the impact of high-voltage and high-frequency electromagnetic waves on health, for example. A positive externality from the provision of electricity in remote communities is that the availability of electricity can help attract skilled personnel (e.g. teachers and nurses) to rural postings. Similarly, an electricity service is an enabler of opportunities for other activities: it allows for the improvement of health and education services; it opens up opportunities for new and more productive activities; it reduces the marginal cost of additional connections; and it provides a socio-psychological benefit of modernity. These positive externalities can contribute to high demand for electricity.

While most people are well aware of the benefits of an electricity supply, through both their own use of electricity and consumption by others (i.e. electricity is not a merit good, as defined by Mcloughlin and Batley (2012)), differences of knowledge and information about electricity services can influence access. Consumers rely on an electricity supplier to provide the connection and for advice on tariff options. They depend on suppliers or dealers for information about options for off-grid systems (e.g. solar PV panel choice). This can create particular information asymmetries, where suppliers and providers have high amounts of technical knowledge. In order to hold providers to account, a degree of knowledge is also required in consumers, which can be limited by these information asymmetries, particularly where general levels of education are low and exposure to an electricity service new or limited.

There can be real implications for politics and accountability relationships as a result of these information asymmetries: Nepal and Jamasb (2011) found that, coupled with political instabilities in Nepal, they created opportunities for unfair rent seeking and corruption, in the form of the licensing and approval of unfeasible projects, loss-making power purchase agreements with the private sector and the use of the state utility for electoral and political purposes.

Another key characteristic is the extent to which the grid-based transmission and distribution of electricity lends itself to a natural monopoly. For long-distance (high-voltage) transmission, a national grid tends to form the monopoly, but there can be multiple local distributors, each serving a particular locality and exercising a local monopoly. There may be competition to secure concessions to ensure these local monopolies, but entry costs (including technical knowledge and expertise) can be high, limiting the number of potential entrants. The monopolistic nature of grid-based electricity supply derives from the high infrastructure investment costs and economies of scale in generation and transmission.

Again, this monopolistic nature of electricity distribution can have particular political and accountability effects. In particular, it can contribute to ‘captive users’ or users at each stage of the network, which are dependent on the prevailing upstream monopoly (e.g. users dependent on service providers, distribution companies dependent on transmission companies). This lack of competition can prevent users from showing their dissatisfaction (e.g. where they cannot ‘exit’ and opt for other providers) and can drive down incentives to improve performance owing to the lack of open competition.

An illustration of the centrality of monopoly to electricity services can be seen in the experience of Ghana. Before Ghana’s electricity reform, its electricity sector consisted of two state enterprises, the Volta River Authority (VRA) and the Electricity Corporation of Ghana (ECG). VRA had a monopoly in generation and transmission, and ECG was the main distribution utility. The government initiated reforms in the power sector

in 1993, including plans to dismantle the VRA and allow other operators to generate electricity in Ghana. These plans were never executed, largely because of opposition from the VRA, which argued that Ghana's position in the regional power pool would be weakened, and also from the country's largest consumer, Kaiser Aluminium. In other words, the existence of the monopoly created vested political interests that then resisted reform efforts. Privatisation of the ECG alone failed to reduce system losses, and a tripling of tariffs to address financial losses was withdrawn after public outcry (Williams and Ghanadan, 2006).

This highlights why moving from public to private ownership does not necessarily offer a solution to the lack of competitive pressure, as informal monopolies may still exist and undermine incentives for improving performance. In summary, reflections on the nature of the market failure – or what is under-provided – helpfully highlight some particular political effects. On the one hand, some positive externalities exist, whereby the recognised role of electricity services as an enabler of other activities or services increases its value to users. However, the existence of strong monopoly tendencies and of high information asymmetries can undermine incentives to improve performance or address users' complaints. This has implications for accountability relationships for service providers, and between providers and users at different levels.

3.3 The features of different tasks

While the discussion above looked at general features around electricity services, it is also helpful to reflect on the characteristics of different tasks within this service, which will also have implications for politics, incentives and accountability relationships.

For the provision of efficient and inclusive electricity services in developing countries, where levels of access are low and demand often exceeds supply, the critical tasks include investment in extension of the infrastructure to provide the service; allocation of the power that is available to specific consumers; setting of tariffs (and subsidies) to manage demand and ensure inclusivity of the service; and collection of revenue to ensure financial sustainability.

Investments in extension: The availability of an electricity supply will be highly visible in terms of the presence or absence of physical infrastructure. It is also highly measurable, usually through the use of meters, or, in the case of off-grid systems, through the operation of lights and appliances. There will therefore be particular incentives to improve infrastructure and for investments in extension, as these may offer greater opportunities for political returns, shaping politicians' decisions in terms of how resources are allocated. Importantly, this drive towards 'quantity' often comes at the expense of 'quality'; that is, given a relatively low infrastructure budget, the desire is to spread this over as large an area as possible, often resulting in sub-par infrastructure for the vast majority. In addition, experiences suggest investment in the visible physical infrastructure also results in the relative neglect of key investments in software, operations and maintenance, thereby again resulting in sub-optimal outcomes from the infrastructure deployed.

Allocation of power to different users: In a supply-constrained environment, as the electricity sector in developing countries tends to be, the relative supply–demand equilibrium across the different user groups, for example industrial, commercial, agricultural and domestic, and the sub-segments in each (low, medium and high income), is often directly affected by political economy drivers. Efforts to establish documented or unwritten hierarchies among these users will be inherently connected to the politico-economic ambitions of the government/political class of the day. For example, given both their economic contribution and their voting bloc strength, a cut in supply to the agriculture sector in certain states in North India is often a last resort, and generally comes at the expense of industrial and residential users. Similarly, given their more concentrated populace, cities tend to suffer fewer supply cuts than remote and dispersed users.

For **tariff setting and revenue collection,** there may be particular implications for accountability relationships between users and service providers. Frontline staff for a grid-based electricity service have a large presence of meter readers, revenue collectors and, when faults need repairing, electrician technicians. Information asymmetries regarding the level of technical knowledge needed for installation or maintenance lead to a high level of discretion with these individuals (i.e. a technician will operate largely on their own for electricity repairs, with limited supervision or oversight). This can create additional opportunities for rent-

seeking behaviour or for forms of corruption. For instance, case study analysis in South Asia (India, Pakistan and Bangladesh) highlights overwhelming evidence of frontline staff engaging in meter fraud and inaccurate reporting through taking bribes (Golden and Min, 2012; Smith, 2004).

In Punjab, Jain (2006) found many farmers would either bribe frontline staff or use political connections to obtain electricity access, revealing the ways in which this discretion coupled with information asymmetries shapes accountability between users and providers. On the question of tariff setting, as stated above under 'allocation of power to different users', political socioeconomic priorities dictate how tariffs are structured across the different user segments, and therefore the share of the true economic cost the government bears as a subsidy for that segment. In the example above from South Asia, electricity used to access water in an agricultural context in these states is provided free of cost. Even where tangible tariffs have been set and infrastructure exists to track revenue, formal institutions may have limited strength to follow up on and enforce tariffs, which results in poor revenue collection. That is to say, political entities, which often oversee public utilities, may ensure that enforcement of 'revenue protection' measures is not robust, for rent-seeking or patronage reasons.

3.4 Demand characteristics

While the discussion above focuses on how electricity services are delivered, it is also important to reflect on how users experience services and what shapes the level and type of demand for these services.

One important feature is that the demand for electricity is continuous (not episodic, as in the case of curative health care, where it is only needed at times of ill health). For those who have access to electricity, consumption is daily. Their actual level of consumption may vary with the time of day and seasonally, but this generally requires a continuous connection, because electricity cannot be readily or cost-effectively stored. This can translate into high demand for electricity, often reflected in consumers' willingness to pay.[6] Level of demand is correlated with incomes, however. Low-income households are generally prepared to pay for a minimum level of service, but after this is met their demand is highly price-elastic. Among higher-income groups and commercial consumers, there is willingness to invest in and operate off-grid back-up systems for their own use, or even to opt out of the grid supply altogether when the service is erratic and unreliable. In communities excluded from plans for grid extension, high level of demand for an electricity service can lead to local investment in community-owned mini-grid schemes.

The relatively high demand for electricity makes the provision of an electricity supply and the price of electricity politically salient. This is particularly pronounced where demand exceeds supply, a situation found in many countries that have underinvested in the power sector, as politicians can use this to secure support, and the setting of prices is influenced politically for the same purpose.

For example, in some countries politicians use promises of grid extension, subsidised tariffs or supply guarantees to win electoral support or gain political influence. In India, an electricity subsidy for farmers was first used as a political tool in Andhra Pradesh during the 1977 elections (Jain, 2006). Badiani and Jessoe (2011) show that the level of subsidies tends to increase significantly in the year before elections. Golden and Min (2012) conclude that electricity theft by farmers exceeding their subsidised power allocation increases before elections. Electricity continues to be a political tool in India today, with a politician in Gujarat promising to provide a 90% subsidy for the installation of solar and wind power for irrigation pumps,[7] and the

6 The Global Energy Assessment (GEA, 2012) cites evidence from the World Bank that the benefits of household lighting were valued at $5-16 a month, and the additional benefits of entertainment, time savings, education and productivity at $20-30 a month – much higher than the $2-5 monthly average expenditure.

7 http://gujaratcongress.org/english/2012/09/cong-farms-votes-with-power-packed-promises-says-fields-will-get-16-straight-hours-of-supply/ (accessed 17 October 2012).

state chief minister of Bihar declaring he will not seek re-election in 2015 if his government fails to provide electricity to the villages.[8]

3.5 Implications of sector characteristics

The combination of its natural monopolistic characteristic and its value to customers as an enabler for socioeconomic benefit has meant that the electricity sector is viewed more as a public service than as the economic good it more formally can be considered. A consequence of this is that politicians and governments of the day are considered accountable for the service and its provision. This has created fertile ground for the political class to use electricity and its availability to culture patronage of select pockets of the populace through targeted actions, for example dispensation of infrastructure spend or tariff subsidies. Importantly, the focus, given the starting point, has been on this form of access to electricity as opposed to any measure of quality of the service. Further down the electricity supply chain, information asymmetries and the absence of professionalisation have weakened direct user accountability.

4 Common governance constraints

Section 3 set out some of the key characteristics of individual tasks/activities and of the sub-sector of electricity services (as defined above). These provide rich insights into why particular incentives seem to persist and the effects on different types of political and accountability relationships. However, we know some features of the wider context or governance environment are likely also to shape how electricity is delivered.

Here, we can usefully draw from a number of common governance constraints that have been identified as commonly affecting service delivery and performance across different sectors. Wild et al. (2012) identify these as political market imperfections; policy coherence; levels of performance oversight or monitoring; challenges for collective action; and moral hazard. In this section, we review whether and how these constraints have been found to affect electricity distribution.

4.1 Political market imperfections

The nature of the general relationship between politicians and citizens determines the degree to which the latter hold the former to account, including for the provision of inclusive public services. Where relationships between politicians and citizens are imperfect, this can undermine the effectiveness and efficiency of public services and skew the allocation of resources. In electricity distribution, this may mean investment in grid extension or protection from load shedding to secure the support of particular groups, the diversion of resources for patronage or rent seeking, emphasis on visible infrastructure rather than reliability of service, weak regulatory bodies and inefficient resource use.

Brown and Mobarak (2009) show that in countries where democratic political systems and institutions prevail, the balance of electricity services is towards residential use, whereas in authoritative systems industry receives a greater share of the electricity supply. Where political accountability for electricity is weaker, the supply of electricity to particular groups and the allocation of subsidies are both used for political advantage. Much of the evidence comes from South Asia, which may be because of its longer experience of widespread electricity services or reflect attention to what is perceived as particularly weak governance in the sector.

A number of studies (Golden and Min, 2012; Oda and Tsujita, 2012) have argued that electricity service provision is liable to political capture by local elites. In India, relatively well-off farmers who have tubewells comprise powerful interest groups, often with strong influence over state legislators and therefore access to

8 http://www.eai.in/club/users/aathmika/blogs/1410 (accessed 16 October 2012).

electricity connections and secure power supplies. Jain (2006), for example, found the duration of electricity availability to be longer in areas that were more developed than those situated in less developed areas.

Oda and Tsujita (2012) highlight that access to electricity can also be manifested through social strata and caste. In Bihar, Muslims and scheduled castes and tribes are both considered weaker sections of society, but the section with political influence, in this case Muslim groups, had access to electricity, while villages dominated by scheduled castes and tribes did not. This reflects the broader impacts of identity politics, which manifests itself across different sectors in Bihar, including in electricity.

In India, many politicians secure support by delivering free or highly subsidised electricity (in the form of either fuel subsidies or grid electricity connections) to citizens (Vaishnav, 2012). It has already been noted that the level of subsidies (through unmetered supplies) tends to increase significantly in the year prior to elections (Badiani and Jessoe, 2011). Power thefts in India are often supported or overlooked by the government over concerns about losing votes (Golden and Min, 2012). In Punjab, in order to win elections, the Congress government announced free electricity to farmers with seven acres or less of land. In Nepal, power tariffs are not determined by economic principles but are based on the vested interests of politicians, who often cater to the rich and elite rather than the poor. One consequence of politically motivated subsidies in countries like India, China, Indonesia and Pakistan has been losses in funds for electricity utilities, which impair their ability to extend and improve services (Rehman et al., 2012).

4.2 Levels of policy coherence and performance oversight/monitoring

Across different sectors, issues of policy coherence and performance oversight seem to have common effects in terms of constraining or improving delivery. Policy coherence refers to whether policies are implementable, and roles and mandates clearly defined (this refers to the strength of the policy framework) and can be manifest ‘vertically’ (in terms of allocation of ownership and division of roles between different layers) and ‘horizontally’ (including intersectoral complementarities). This is related to performance oversight/monitoring, which refers to those systems for monitoring, overseeing and sanctioning performance across the supply chain. These issues seem to be less well covered within the available literature, but we can identify some key issues, which would warrant further exploration and research.

First, electricity distribution services are integral to the power sector as a whole, and are therefore affected by the coherence of policies for the power sector and the wider energy sector. Grid-based electricity distribution is dependent on the power generation stage of the value chain, whereas off-grid systems are affected by policies that regulate fuel prices. As power sector reform organisationally separates electricity generation from distribution in many countries, it gives rise to separate decision-making and policy incoherence at different stages in the value chain. Regulatory bodies are intended to ensure there is greater coherence in the system as a whole but, because of some of the political market imperfections discussed above, and weaknesses in sanctions and oversight, these have not often been able to overcome some aspects of policy incoherence. This can be further complicated in countries such as India, where there are policy differences between different states too.

Second, as Section 3 discussed, some of the characteristics of electricity distribution, including monopoly tendencies, information asymmetries and political returns (including from visible infrastructure), can undermine systems and incentives for performance monitoring. These will also be shaped by some of the underlying dynamics discussed above, to do with political market imperfections and preferences for allocations to particular groups over others, as well as policy incoherence. Thus, where governance and some of these accountability mechanisms and institutions are weak, theft occurs, bills are unpaid and supply is unreliable because of poor maintenance. Lack of transparency is also apparent in the awarding of service concessions and infrastructure contracts.

A key gap in the current literature relates to reflection on the effectiveness of regulatory organisations, including insights into how politics influences their operations. The monopolistic nature of electricity

distribution and high entry costs could contribute to a lack of effective oversight by regulatory bodies (particularly where accountability mechanisms generally are weak), and ineffective legal redress and regulators are subject to political influence. There remains a pressing need to explore this further.

4.3 Challenges for collective action

As discussed previously, electricity in the purest economic definition is a private good but, owing to its inherent linkages with development and quality of life, it is often perceived as a public service or good. This is derived from the fact that it naturally lends itself to being a monopoly with particularly high entry costs, and that its value to consumers comes from its role as an enabler of other activities or services. A consequence of this is that while from an operational standpoint it is easy to exclude non-contributing participants, this proves more difficult in practice. This is particularly true when communities are poorer and more remote. As a result, incentives for provision of and participation in corrective collective action are reduced significantly. This attribute is exemplified in a study by Elinor Ostrom (1990, cited in Cox at al., 2010), which identified a set of eight principles of design to enable the management of common pool resources – the common thread running through was that local political/governance institutions had to drive collective action initiatives and communities needed to sign on once they were in place, rather than the other way around; that is, local communities had little incentive and desire to ensure 'compliance' by themselves.

Even at an individual customer level, there are a number of points at which collective action responsibilities falter. As indicated earlier, frontline staff within electricity utilities tend to have significant discretion and to benefit from information asymmetries. As a result, in developing nations, there is a proliferation of unsanctioned electricity connections, often set up with the connivance of these local technicians. Even where sanctioned connections to the grid exist, there is often circumventing of electricity meters, resulting in significant revenue leakage, raising the costs of the service for all. Similarly, punitive fines and retrospective charges are often 'disposed of' by individual customers with frontline staff themselves at a local level (most often through bribes). All of these revenue side actions, and loopholes, prove to be significant disincentives for collective adherence, for example to tariffs, when reviewing the grid-connected electricity sector, contributing to poor financial performance of the sector (Smith, 2004).

From an infrastructure standpoint, overcoming the challenge of deploying and maintaining an adequate level of infrastructure requires the involvement of a number of different types of organisations, public authorities and private firms. All of these stakeholders are interlinked in complex ways that make overall management of the system difficult. The problems of institutional collective action are therefore exacerbated, since each of these different organisations answers to different constituents or customers, and therefore the provision of reliable infrastructure is lost to 'gaming'.

On the other hand, community-scale village power projects such as mini/micro hydro projects often have the characteristics of common pool resources, which are strongly affected by the collective action of users. This does not, however, mean they are free from individualistic actions. The common pool resources (such as bio-gas digester, micro hydro) for electricity provisions are themselves human-constructed and therefore are open to exploitation by one user or elites within the village, reducing resource availability for others. Greacen (2004), through the example of mini hydro plants in Thailand, showed that this was true both in the case of usage, where users experience short-term incentives to appropriate too much of the resource (on a seasonal basis when the yield of the system itself may be low) and in the ongoing maintenance (capital and labour resources). Understanding whether and how these dynamics might be present in a given context therefore requires understanding of some of the collective action challenges within the sector and how these might interact with the wider environment.

4.4 Moral hazard

The notion of moral hazard is that an actor in the service delivery system (value chain) is not, or cannot be, held fully accountable for their actions and therefore takes decisions that are riskier or more short-sighted. In

electricity distribution, lack of investment in grid extension and low levels of access in rural areas may be influenced by the lack of political power of rural and remote communities.

Poor financial performance of service providers may continue because they believe they will not be allowed to fail. In India, for instance, government bailouts, funding or soft-budget loans that support less efficient firms create a lack of the financial discipline necessary for effective management (Auriol and Blanc, 2009). The government is intending to bail out cash-strapped power distributors in a move that would help restructure more than $35 billion in debt but will contribute nothing to reform in the distribution sector (*Hindustan Times*, 2012). Similarly, poor maintenance of transmission and distribution infrastructure may be encouraged by an understanding that reinvestment will be provided from the public purse supported by concessional finance.

5 Conclusions

Application of political economy analysis at the sectoral level provides a means to understand how political factors shape the delivery of goods and services to citizens. The sector characteristics identified by Mcloughlin and Batley (2012) provide a framework for this analysis and shed light on how the exercise of political influence is shaped by the nature of the service. This includes electricity, which is regarded as a public service in most countries.

The private good nature of electricity allows for delivery of the service to specific consumers. However, this requires effective enforcement, which is absent when overall governance and accountability mechanisms are weak. The monopolistic nature of grid-based electricity, the main means of delivery, presents opportunities for rent seeking and can lead to inefficient services, underinvestment and poor maintenance of infrastructure. Regulatory bodies have been established in most countries to ensure efficient and fair services, but these too are subject to the effectiveness of overall governance conditions.

The high demand for electricity owes to the value citizens place on the service, including its externalities. This can give electricity considerable political salience, reflected in the promises and actions of politicians seeking broad electoral support or the support of particular groups. Electricity supply and pricing appear to have greater traction for politicians than increasing levels of access to electricity, probably because those with political influence already have connections to the grid.

The common governance constraints found in other services can also be seen in the governance of electricity distribution, the focus of this paper. Electricity distribution presents a collective action challenge, addressed by electricity being regarded as a public service and a responsibility of government, despite its private good nature. In remote locations, mini-grids through community action are a response. Electricity theft and poor financial performance of distributors are problems where monitoring and oversight by distribution companies and regulators are weak. When accountability mechanisms between politicians and citizens (electricity consumers) and between politicians and electricity service providers are not strong, particular interest groups can be given preference in receiving electricity and favourable tariffs or subsidies.

This review has not been a comprehensive study and has focused narrowly on electricity distribution, rather than the power sector as a whole or the wider energy sector. However, even from a partial review of the literature, it is clear that the public service of electricity distribution is open to political influence.

The review undertaken for this paper also suggests that further political economy analysis in the electricity sector and wider energy sector would offer potential for greater understanding of how governance in the sector might be strengthened to improve the efficiency and equitability of services. Analysis of the political economy of sector reform, in particular around the nature and effectiveness of regulatory bodies and rural electricity authorities, would increase understanding of the sector as a whole. Political economy analysis of power generation, including the fossils vs. renewables question, is necessary for green growth and low carbon development. In developing countries, where cooking is the largest single use of energy, analysis of the political economy of energy for cooking would help explain why policymakers neglect this issue.

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