Engineering, Economics & Regulation for Energy Access in Developing Countries

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Power systems in developing countries

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Today’s objectives

1. Become familiar with the situation of the power sector in developing countries
2. Get the regulatory perspective
3. Get the political economy perspective
Today’s program

1. Examination of some facts
2. The regulatory perspective
3. The political economy perspective
Let’s start with some FACTS
Striking differences between countries...
Land area
But GDP of Sub-Saharan Africa equivalent to just one small OECD country – the Netherlands

Source: Anton Eberhard, Oct 2017
Population
Wealth (2015)
Land area
Electricity production (2006)
Carbon emissions (2000)
What happens in their power sectors?
Let’s focus on sub-Saharan Africa (SSA)

Source of most of these slides: Anton Eberhard, Oct 2017
PEOPLE WITHOUT ACCESS TO ELECTRICITY
PEOPLE WITHOUT ACCESS TO ELECTRICITY
Share of population without electricity access & also absolute value (millions)
Electricity consumption per capita
(kWh per person per year)

Production Capacity per Country (kWh per person per year)

- USA = 29,730 kWh per person per year
- France = 14,772 kWh per person per year

World Average: 2,500 kWh per person per annum
Installed generation capacity per capita
(MW per million people)

- Sub-Saharan Africa: 98
- South Asia: 203
- Latin America & Caribbean: 604
- Middle East & North Africa: 803
- East Asia & Pacific: 937
- Europe & Central Asia: 1,654
- North America: 3,418

## Electricity generating capacity in SSA

<table>
<thead>
<tr>
<th>Country</th>
<th>MW</th>
<th>GDP (PPP) 2013 $(billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>7044</td>
<td>972.65</td>
</tr>
<tr>
<td>Sudan</td>
<td>3038</td>
<td>153.09</td>
</tr>
<tr>
<td>Ghana</td>
<td>2812</td>
<td>103.65</td>
</tr>
<tr>
<td>DRC</td>
<td>2444</td>
<td>50.47</td>
</tr>
<tr>
<td>Mozambique</td>
<td>2382</td>
<td>28.40</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>2094</td>
<td>129.86</td>
</tr>
<tr>
<td>Zambia</td>
<td>1985</td>
<td>57.07</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1970</td>
<td>25.92</td>
</tr>
<tr>
<td>Kenya</td>
<td>1766</td>
<td>124.02</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1659</td>
<td>117.66</td>
</tr>
<tr>
<td>Cote d’Ivoire</td>
<td>1521</td>
<td>65.55</td>
</tr>
<tr>
<td>Angola</td>
<td>1509</td>
<td>166.11</td>
</tr>
<tr>
<td>Cameroon</td>
<td>1238</td>
<td>69.98</td>
</tr>
</tbody>
</table>

- Total is around 85GW
- Without S. Africa only 40GW
- Spain has more
- 12 counties account for 90% of capacity
- 27 have grid-connected power systems smaller than 500MW
- 14 smaller than 100MW
- Few economies of scale
- Large energy resources remain undeveloped
Reliance on back-up diesel generators
(% of firms & electricity produced from “captive” generators)
Global installed electricity generation capacity & population of 20 top economies & Africa or India

Africa has 15% of total population but only 3% of power

Source: EIA, The Beijing Axis Analysis & A. Eberhard presentation, October 2017
Installed electricity generation capacity & population of 10 top economies in Africa

Source: EIA, The Beijing Axis Analysis & A. Eberhard presentation, October 2017
Generation capacity requirements in SSA will double by 2030 and treble by 2040

Source: IEA, 2015
Generation (MW) capacity additions in SSA were flat in 1990s but are now picking up
China and private investment in IPPs are the fastest growing sources of investment in power in SSA (5 year rolling average – excl. RSA)
DFI contribution to IPP investments

![Graph showing DFI investment in IPPs over the years]

- Investment Mn $ vs. Year (1990-2013)
- Blue line: IPP Investment
- Red line: DFI investment in IPPs
Generation

• Sub-Saharan Africa is facing a severe shortage of installed power generation capacity (90 GW with South Africa; about half without), despite considerable renewable energy potential.

• It is the world region with the lowest per capita energy consumption.

• Thirteen countries account for more than 80% of the installed power generation capacity in Sub-Saharan Africa. Twenty-seven countries have installed capacity of less than 500 MW each, while 14 countries have power systems of less than 100 MW.

• While South Africa uses mostly coal to generate its power, the remaining regional installed capacity is made up primarily of hydropower (51%) and fossil fuels (24% natural gas, 18% diesel/HFO).

• The situation is further exacerbated by low capacity utilisation and high transmission and distribution losses. Additionally, despite having comparatively high electricity tariffs, pricing is for the most part not cost reflective, resulting in insolvent utilities unable to install more capacity or, in many cases, maintain current equipment.
Generation

• Very little generation capacity was added in SSA between 1990 and 2000 – only about 1,83 GW.

• Since 2000, there has been an increase in the rate of capacity additions, resulting in the development of 13,8 GW of new capacity between 2000 to 2016, albeit from a very low base.

• Public sector financing of new generation capacity is severely limited, remaining constant at around 50% of total investments in the period 1990 – 2013.

• The fastest growth in power sector investment in Sub-Saharan Africa in recent years has been coming from privately financed Independent Power Projects (IPPs) and Chinese investments (see Figure).

• In addition, while the majority of IPPs are still thermal-based (gas or diesel), renewable energy IPPs are breaking through in a significant way on the continent, largely driven by auction-based procurement.
Transmission lines per capita
(kilometers of transmission lines per million people)


The label “Africa” corresponds to “sub-Saharan Africa minus South Africa”
Comparison of electricity supply costs with cash collected in 2014

USD per kWh billed

Making Power Affordable for Africa and Viable for Its Utilities
Today’s program

1. Examination of some facts
2. The regulatory perspective
3. The political economy perspective
Regulation & political economy

• “Regulation is a way to control individual and collective human behavior by means of rules and restrictions” (source: Wikipedia)
  – Regulation of the power sector is the direct &/or indirect control by the Government over the behavior of the private &/or public enterprises in this sector.
Regulation & political economy

• “Political economy is the study of production & trade & their relations with law, custom & government, and with the distribution of national income & wealth” (source: Wikipedia)
  – PE examines how political forces affect the choice of economic policies, especially as to distributional conflicts & political institutions. And conversely.
The regulatory perspective

• A quick review of regulatory frameworks
• A departure from the “standard model”
• Where developing countries stand now
  • Regulatory challenges
Power sector regulatory frameworks

Traditional regulation
Traditional regulation

Typical features

• Public service obligation in franchise territory

• Regulated monopoly
  – The electric utility makes all economic & technical decisions: centralized planning & operation
  – Under regulatory review (frequent overlap of public ownership & regulation)

• Cost-of-service remuneration

• Regulated tariffs

• Voluntary coordination transactions of limited importance among utilities
Traditional regulation

Typical structure of the companies

Generation

Transmission

Distribution/Retail

Consumers

Generation

Transmission

Distribution/Retail

Consumers
Power sector regulatory frameworks

Market-based regulation
Market-based regulation

Typical features

• **Unbundling** of activities
  – generation & retailing are open to competition
  – transmission & distribution remain regulated
  – diverse alternatives with system & market operation

• End consumers can **choose supplier** (retail market)

• **Wholesale market**: organized &/or bilateral

• Diverse **contracts** (*physical, financial*) to hedge the risk

• Operation & investment **planning** is **no longer a centralized** activity

• Independent **regulator**
Market-based regulation
The structure of markets
Basic policies for the change to market-based regulation

• Liberalization
  – of the wholesale market
  – of the retail market

• Restructuring
  – unbundling of vertically integrated activities
  – action (if needed) on horizontal concentration

• Privatization

• The need for transition measures
The new regulation
Unbundling of activities

- Accounting, legal or ownership unbundling
- A regulation open to competition requires unbundling of
  - Regulated from liberalized activities
  - Regulated activities with conflicts of interest
- Analysis of the transaction costs
  - unbundling + commercial transactions *versus* implicit internal transactions
Gradual liberalization of generation

1) “External generation” (Non Utility Generation, NUG) with “avoided cost” remuneration (“qualifying facilities”)

2) BOO (build-operate-own) & BOT (build-operate-transfer) contracts after sporadic public auctions

3) Competitive bidding after systematic public auctions & remuneration according to contracts

4) Independent generators (independent power producers or IPPs) with limited access to the network or to consumers

5) Independent generators (IPPs) with complete access to the network and to consumers
Power sector organization models
Some prototypic power sector organization models

- Four prototypic models (*)
  - abstractions; they do not describe specific systems & reality has created a diversity of models that do not fit well into these categories
- Correspond to varying degrees of monopoly, competition & choice
- Public or private ownership is ignored
  - Model 1: monopoly at all levels
  - Model 2: purchasing agency
  - Model 3: wholesale competition
  - Model 4: wholesale & retail competition

Model 1: Monopoly
Model 2: Purchasing agency (single buyer)
Model 3: Wholesale competition
Model 4
Retail & wholesale competition
The textbook or “standard model” of the restructured & liberalized power sector

Some material for this section has been borrowed from S. Littlechild & P. Joskow in *Electricity Market reform: An international perspective*, Elsevier, 2006.
Components of the “standard model”

*(the 10 commandments)*

- **Privatization**, to enhance performance & reduce the interference of the government
- **Vertical separation** of competitive & regulated monopoly activities
- **Horizontal restructuring** to create a level playing field for competition
- **Independent System Operator**
- Voluntary energy & ancillary services **markets & trading arrangements**
Components of the “standard model”
(the 10 commandments)

(continuation)

• Open access to the transmission network, plus adequate locational signals
• Free choice of supplier with an adequate design & utilization of retail tariffs
• Creation of independent regulatory agencies
• Provision of transition mechanisms
• ... & nothing more!
What has happened in the developing countries?

This section of the presentation owes much to documents & presentations by Prof. Anton Eberhard & colleagues at Cape Town University, in particular Catrina Godinho.
# The Traditional Industry Model in Developing Countries

<table>
<thead>
<tr>
<th>Traditional Model in Developing Countries</th>
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</thead>
<tbody>
<tr>
<td><strong>Sector Structure</strong></td>
</tr>
<tr>
<td>- State owned</td>
</tr>
<tr>
<td>- Vertically integrated</td>
</tr>
<tr>
<td>- Highly bundled</td>
</tr>
<tr>
<td><strong>Policy &amp; Regulation</strong></td>
</tr>
<tr>
<td>- National energy ministry</td>
</tr>
<tr>
<td><strong>Revenue &amp; Tariffs</strong></td>
</tr>
<tr>
<td>- Tariffs set by ministry</td>
</tr>
<tr>
<td>- Direct subsidies from state budget</td>
</tr>
<tr>
<td>- Cross-subsidies from industry</td>
</tr>
<tr>
<td>- Metering and collections constraints</td>
</tr>
<tr>
<td><strong>Financial &amp; Investment Conditions</strong></td>
</tr>
<tr>
<td>- Utility finances tied to national budget</td>
</tr>
<tr>
<td>- Self-financing limited by revenue generation and tariff arrangements</td>
</tr>
<tr>
<td><strong>Operational Performance</strong></td>
</tr>
<tr>
<td>- Operational performance tied to utility financial conditions, national technical capacity, physical and geographical endowment, national economic conditions, and management practices</td>
</tr>
<tr>
<td><strong>Consumption &amp; Access</strong></td>
</tr>
<tr>
<td>- Low per capita consumption and access rates</td>
</tr>
<tr>
<td>- Extractive industries and government typically account for majority of demand</td>
</tr>
</tbody>
</table>
THE NEED FOR A NEW MODEL IN DEVELOPING COUNTRIES

- Utilities lacked ability to self-finance, leading to supply shortages and maintenance backlogs
- State utility model producing untenable public debt, need to reduce government spending and borrowing
- Need new sources of finance to meet rising electricity demand and drive economic growth
- Government interference for political interests undermines utility/sector governance and operations
- Corruption, cronyism, corporate malfeasance
- Low public tolerance for cost recovery without service improvement
- Poor management incentives with soft budgets and no competition
EXTERNAL DRIVERS OF A NEW MODEL IN THE 1990S & NOW

- Technology – OCGT then RE generation & ICT modernisation
- Capital market deregulation in OECD countries increases DFI flows
- Power sector deregulation in OECD countries launches multinational power companies
- The era of structural adjustment programmes gives development partners significant power through conditional loans
- Third & forth wave democratisation opens space for democratic development
- Globalisation builds momentum – including international governance (e.g. MDGs, UNFCCC, WTO, etc.)
THE STANDARD MODEL OF POWER SECTOR REFORM

From the early 1990s onward, the World Bank – along with other development partners - made power sector lending conditional on countries’:

- commitment to the guiding principles set out in the policy paper, and
- agreement to work with the Bank in translating the ‘generic’ approach into a country specific programme.

By the end of the 1990s, under pressure from development partners and/or internal pressures, more than half of developing countries had initiated ‘standard model’ type reforms. Many more have joined the bandwagon since.
THE WORLD BANK’S STANDARD MODEL

The 1993 policy document provided a new ‘generic’ policy framework or ‘menu’ of reform options, based on the guiding principles of transparent regulatory process, commercialisation and corporatisation, and private sector participation.

- Increased private sector participation – privatisation & new investment (IPPs)
- Organisation/structural changes – decentralization & competition
- Corporatization & commercialisation of the utilities
- Legislative, regulatory and legal reform – separation of roles – independent regulators

This is considered to be one of the earliest articulations of what would become known as the ‘standard model’.
Departure from the “standard model”

This section of the presentation owes much to documents & presentations by Prof. Anton Eberhard & colleagues at Cape Town University, in particular Catrina Godinho.
“After more than 15 years of reform efforts, this new industry model has not fully taken root in most developing countries. Finally, we identify and characterize the emergence of new hybrid power markets, which pose fresh performance and investment challenges.”

Katharine Nawaal Gratwick *, Anton Eberhard

* Management Programme in Infrastructure Reform and Regulation, Graduate School of Business, University of Cape Town, Private Bag X3, Rondebosch 7700, South Africa

Abstract

Following earlier reforms in the power sectors of industrialized countries and emerging markets (e.g. Chile), developing countries were encouraged to unbundle their electricity industries and to introduce competition and private sector participation. This paper highlights the developments that led to how power sector reform came to be defined as a standard model and theoretical framework in its own right, and how the model was used prescriptively in many developing countries. However, we also show that, after more than 15 years of reform efforts, this new industry model has not fully taken root in most developing countries. Finally, we identify and characterize the emergence of new hybrid power markets, which pose fresh performance and investment challenges.
A REVIEW AND EXPLORATION OF THE STATUS, CONTEXT AND POLITICAL ECONOMY OF POWER SECTOR REFORMS IN SUB-SAHARAN AFRICA, SOUTH ASIA AND LATIN AMERICA

Anton Eberhard & Catrina Godinho

Graduate School of Business, University of Cape Town

Abstract

This paper provides an overview of market-oriented power sector reforms in Sub-Saharan Africa, South Asia, and Latin America over the past twenty-five years. The role of political economy contextualities in driving, constraining or otherwise influencing power sector reform is explored through a review of the essential literature. Though this literature is considered to have considerably expanded the scope of understanding around power sector reform and development, political economy research in the area is found to be lacking in methodological coherence and theoretical substance. Future efforts are needed to systematically bring together the array of insights, methodological approaches and recommendations in this literature, as well as better bound, differentiate and systemise political economy research in the area going forward. Two initial frameworks are advanced through this paper in relation to this dual research imperative.

MIR Working Paper – February 2017
Reality in developing countries is different from the “standard model”

- By the end of the 1990s many developing countries, under pressure from the WB & other development institutions, had started “Standard Model” like reforms
- However, the reforms were harder to implement than anticipated, few countries have unbundled their power companies, and wholesale & retail competition have not been really implemented.
- The WB played a major role in driving reforms, with very different outcomes in these countries
Reality in developing countries is different from the “standard model”

Power sector reform in many developing countries has not followed the **standard model**
- Few countries have fully unbundled their utilities
- Private sector participation often limited to IPPs
- Wholesale and retail competition often absent

Instead, **hybrid power markets** have developed
- Incumbent state-owned utilities have retained dominant market positions
- Independent Power Producers (IPPs) are being introduced on the margin, i.e. both State Owned Enterprise (SOEs) and IPPs are involved in new generation investments
Reality in developing countries is different from the “standard model”

• 19 countries (in SSA): One vertically integrated state-owned utility
• 15 countries: One main vertically integrated utility with generation companies
• 7 countries: One main vertically integrated utility with other operators
• 3 countries: Partial vertical unbundling, some with other operators
• 4 countries (Ghana, Nigeria, Uganda & Sudan): Full vertical unbundling, some with horizontal unbundling

➔ Vertically integrated state-owned utility is still the norm. Limited unbundling. Nowhere there is competition in the market.
“The standard model for power sector reform had many authors and proponents ... despite numerous warning signs not to apply the standard model to small systems such as those characteristic of most Sub-Saharan countries, the model was used extensively with little regard to country specifics. Furthermore, such a model although applied, has not actually been realized. Instead, hybrid electricity markets have emerged, which present a series of challenges.”

“The question arises as to how stable or sustainable will these hybrid markets prove to be? Part of the answer lies in the degree to which the above planning, procurement and contracting challenges are recognized and addressed.”

“In most developing countries, we now have hybrid power markets with elements from both the old and new industry models. The public and the private sectors coexist. New planning, procurement and contracting challenges arise, which if not specifically addressed, could frustrate further investment in new power generation capacity.

Indeed, there is already significant evidence that investment in much needed new capacity is lagging and that these delays are in part due to the new challenges of hybrid markets neither being recognized nor tackled explicitly.

For example, in these hybrid markets, confusion often arises as to who is responsible for planning.”

POWER STRUCTURES IN SOUTH ASIA

Eberhard & Godinho (2016), University of Cape Town.

KEY
- Generation activities
- Transmission activities
- Distribution activities
- State owned entity
- Private owned entity (PSP)
- Regulatory agency exists
- Grid connected for power import/export

GROUP 1: Vertically integrated with no PSP
- AFGHANISTAN

GROUP 2: Vertically integrated with PSP
- MALDIVES
- NEPAL
- SRI-LANKA

GROUP 3: Vertically unbundled
- Without PSP
  - BHUTAN
- With PSP
  - BANGLADESH
  - INDIA
  - PAKISTAN
Regulatory challenges...
Key regulatory challenges

• Insufficient power infrastructure capacity
  – lack of public resources & difficulty in attracting private investment, both in generation & transmission

• Unreliable electricity supply
  – in need of investment also in distribution, inadequate incentive regulation, conflictive consumer interaction resulting in theft & non-paid bills

• Lack of & unequal electricity access
  – In need of a viable electrification business model

• Tariffs systematically below the high (as a result of inefficiency) supply costs
Today’s program

1. Examination of some facts
2. The regulatory perspective
3. The political economy perspective
The political economy perspective

- Contextualities of power sector reform
- Components of an integrated political economy approach
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Issues in a political economy map

• Which political and economic interests currently dominate? How could reforms be crafted to meet some interests, while advancing the principles of transparency or private sector participation?

• Which ideas currently surround the power sector? How could they be augmented to become congruent with reforms? Are there easy-win areas?

• What makes the institutional basis for reforms weak? Where will support have the greatest impact and/or contribute to building momentum?

• How does de facto power work? Can it be harnessed or mitigated?
Contextualities of power sector reform

- Macro-economic circumstances:
  - Crisis, reform and underdevelopment

- Socio-political conditions
  - Political instability, corruption & inequality

- Institutional environment
  - Weak formal institutions & political will

- Power sector context
  - Finance, structure & performance
<table>
<thead>
<tr>
<th>Pre-Reform Contextualities 1980s-1990s</th>
<th>Contextualities as Determinative Factors of Reform 1990s-</th>
</tr>
</thead>
<tbody>
<tr>
<td>National fiscal shortfalls/crises common, high dependence of foreign investment and loans, frequent incidence of debilitating national debt.</td>
<td>Fluctuating DFI, regional financial crisis (eg. Asian Financial Crisis ’98) and high interest debt undermine success of reforms, even where implemented → failure to attract investment = failure to develop power sector.</td>
</tr>
<tr>
<td>Era of structural adjustment programmes (SAPs) and conditionality (1980s), and economy wide liberalisation and reform programmes.</td>
<td>Economy wide SAPs or reforms in other key sectors increase the transaction costs and complexity of power sector reform, sometimes detrimentally. In some cases, successful market-based reforms in other sectors (within the country or region) provide legitimacy to those in the power sector, in others the opposite occurs.</td>
</tr>
<tr>
<td>Low levels of socio-economic development, high income inequality, pervasive poverty &amp; high population growth forecast. Economic growth hampered by lacking infrastructure and basic services.</td>
<td>The interdependence of power sector development and economic growth is either mutually reinforcing of growth or creates a trap of suppressed demand and insufficient supply, often depends on external conditions – especially the ability to attract foreign investment or loans.</td>
</tr>
<tr>
<td>Subsidies across public service sectors - tied to national budget.</td>
<td>Subsidies are substantial, hard to remove and informally protected by vested political and/or economic interests⁸. This had undermined some of the key objectives of reform: improving financial situation of utility, reduce pressure on public coffers, and fostering efficiency through competition. India is a prominent example in South Asia.</td>
</tr>
<tr>
<td>Key macro-economic priorities include: economic growth, industrialisation (including in agriculture), diversification of the economy, creating jobs and tackling inflation.</td>
<td>Where ‘standard model’ reforms do not explicitly serve these priorities, public and political backlash can hamper reform efforts. Eg. Labour unions/parties can oppose reforms that effect jobs – often the case where reforms aim to tackle bloated and inefficient state-owned utilities.</td>
</tr>
<tr>
<td>Private sector, including finance/equity markets, underdeveloped.</td>
<td>National private sector not always able to meet investment needs or to step up to private utility ownerships/management. This has been detrimental to the success of market-based reforms. Government has typically maintained a dominant position in situations where private sector is underdeveloped, or foreign companies step in – often fermenting public/political discontent.</td>
</tr>
<tr>
<td>Socio-Political Conditions: Political Instability, Corruption &amp; Inequality</td>
<td>Recent/existing civil strife/war, including: military coup’s, political revolution, Cold War era proxy wars, and ethnic conflict.</td>
</tr>
<tr>
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<tr>
<td>Authoritarian systems or nominal democracy (dominant/single party system or dictatorship) common, yet third wave of democratisation (1974-1990s) spreads to Latin America (1980s) and Sub-Saharan Africa (1990s) increasing the number of democratic regimes in these regions.</td>
<td>Authoritarian leadership can enable or constrain reforms depending on whether or not they serve the interests of incumbents. This either provides the necessary commitment for reform in situations of political instability and weak formal institutions (such has been the case in Uganda), or blocks reforms for political reasons through use of de jure and de facto power.</td>
</tr>
<tr>
<td>Strong communist, socialist, anti-colonialist and labour movements/political parties/civil society groups.</td>
<td>The legitimacy of market-based power sector reform, specifically privatisation, incongruent with popular ideological beliefs of public and key actors in many developing countries. In Latin America, strong ‘political will’ has been able to push reforms through despite negative public sentiment to privatization, in South Asia the opposite was the case for much of the 1990s and early 2000s.</td>
</tr>
<tr>
<td>High levels of socio-economic inequality (often reflecting historical ethnic, urban/rural, class divides) coalesce with the distribution of political power and status</td>
<td>Incumbent elites, new or old, depend on strong relations between political and economic power (and the means of gaining/maintaining both). Where government, state owned enterprises (SOE’s) and strategic resources used to secure/maintain power, reforms that decrease this power are opposed. This in part explains the difficulty experienced in privatising utilities across Sub-Saharan Africa and South Asia.</td>
</tr>
</tbody>
</table>
### Table: Key Challenges in Implementing Power Sector Reforms

<table>
<thead>
<tr>
<th>Institutional Environment: Weak formal Institutions &amp; ‘Political Will’</th>
<th>Key formal institutions/ rule of law (importantly property right &amp; contract law) often relatively new, weak and unreflective of the means through which economic and political power are distributed.</th>
<th>Inadequate legal foundation for contract law and enforcement deters investors, poorly understood and uncharted informal institutions obscure the real distribution of power and networks.</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Formal institutions often lack broad public support/ legitimacy due to perceptions around the source of such institutions (external/colonial/previous regime) or due to poor performance and rampant corruption through such institutions.</td>
<td>Low support/legitimacy of formal institutions undermines efficacy of reforms. Eg. Cost-reflective tariffs, if not viewed as legitimate, not paid. High T&amp;D losses – examples of which can be found in table 1 and 2 – are a common yet detrimental outcome.</td>
</tr>
<tr>
<td></td>
<td>Institutional capacity weak due to limited financial, human and material resource and the ‘political’ distribution of such resources.</td>
<td>Implementing complex and politically unfavourable reform under conditions of weak institutional capacity near impossible. Success of reforms depend on capacity to implement. Sub-Saharan Africa’s LDCs a case in point.</td>
</tr>
<tr>
<td></td>
<td>Strong linkages commonly exist between political and economic power, facilitating corruption, clientilism and nepotism.</td>
<td>Corruption, rent seeking and clientilism deters investors, delegitimises government in the eyes of the public, and undercuts the possible benefits of reform. Eg. Bribes/corruption in procurement contrary to competition and least-cost planning.</td>
</tr>
<tr>
<td></td>
<td>Informal institutions maintain and reinforce the distribution of economic and political power – typically concentrating power in the hands of executive members of government, with strong links to the productive sectors of the economy.</td>
<td>‘Political will’ is frequently used to describe cases where those in power persistently pursue reform agendas in line with the ‘standard model’, and is commonly identified as a key to implementing reforms. This is somewhat intuitive, however greater attention needs to be paid to what it is that underlies ‘political will’ – specifically interests, ideas, power and institutions.</td>
</tr>
<tr>
<td><strong>Power Sector: Finance, Structure &amp; Performance</strong></td>
<td><strong>Finance tied to national budget, direct subsidies and access to foreign loans - public debt financing of capital projects common.</strong></td>
<td><strong>For the most part, poor collection, non-cost reflective tariffs, and transmission and distribution losses have prevented utilities from becoming financially viable and undermined investment/privatisation. Finance continues to depend of government budget, including through entrenched subsidies and recurrent utility bailouts. An example is provided by India.</strong></td>
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<tr>
<td>Tariff setting and subsidies highly politicised, commonly below cost recovery, effecting utility and national fiscal position.</td>
<td>Cost-reflective tariffs ultimately determine the long-term success of reforms, yet this has been one of the most challenging aspects to implement due to political interference.</td>
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<tr>
<td>‘Traditional industry model’ – vertically integrated, highly bundled state-owned utility. In some cases, distribution and smaller generation facilities falls to local government.</td>
<td>Persistence of the ‘traditional industry model’ evident in all regions, including those where ‘hybrid market models’ have maintained key elements such as state ownership or, as is the case in most Sub-Saharan African countries, vertically bundled utilities.</td>
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<tr>
<td>Insufficient generation capacity, limited transmission and distribution networks, low electrification rates/access, suppressed demand, aging and poorly maintained infrastructure, high transmission and distributions losses &amp; theft.</td>
<td>In most cases, the ‘starting conditions’ of the power sector has determined the pace and momentum of sector development. Comparing Latin America, South Asia and Sub-Saharan Africa – the ‘starting position’ of each region is aligned with the progression of reforms and reform outcomes, from best to worst.</td>
<td></td>
</tr>
<tr>
<td>Performance reflective of utility financial conditions, national technical capacity, physical and geographic endowment, national economic conditions and management practices.</td>
<td>The same conditions that caused poor performance in the 1980s and 1990s frequently endure, and performance remains problematic in all regions – particularly T&amp;D losses, theft, and commercial losses. There are links between reform and improved performance, however these are contingent on other factors as well. Renewable energy technologies have recently provided an opportunity for leapfroging. Eg. Electricity access in remote, rural areas.</td>
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<tr>
<td>System modernisation required.</td>
<td>System modernisation slow and piecemeal, linked with economic growth and development.</td>
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</tr>
</tbody>
</table>

**Source:** Developed by author, with reference to key texts - Dubash, 2002; Besant-Jones, 2006; Williams & Ghanadan, 2006; Victor & Heller, 2007; Sen, 2014; Jamasb, Nepal & Timilsina, 2015.
Components of an integrated political economy approach

• National structural characteristics
• Political & economical institutions (formal & informal)
• Sector analysis
• Policy reform process
• Situational temporary factors
<table>
<thead>
<tr>
<th>PE Component</th>
<th>Core Focus Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>National structural characteristics</td>
<td>• State formation,</td>
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<td></td>
<td>• History,</td>
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<td></td>
<td>• Geopolitics,</td>
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<td></td>
<td>• Natural environment &amp; resources,</td>
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<td></td>
<td>• Macro-economic status/structure,</td>
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<td></td>
<td>• Demographics,</td>
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<td></td>
<td>• Socio-economic conditions,</td>
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<td></td>
<td>• Culture, religion, ideologies</td>
</tr>
</tbody>
</table>

We present the framework in this table to provide a structured overview of the key areas considered in political economy (PE) research. This framework is intended to help researchers and practitioners advance our understanding of the political dynamics of sector reforms. It is a critical area to focus on, particularly the explicit treatment of all the components that we identify and the use of established tools, such as stakeholder analysis.
| Political and economic institutions (formal and informal) | • Regime,  
• Structure,  
• Distribution power and resources,  
• Incentives,  
• Responsiveness,  
• Accountability,  
• Inclusive/exclusive,  
• Transparency & legitimacy (level and source of legitimacy),  
• Capacity & capability |
<table>
<thead>
<tr>
<th>Sector analysis</th>
<th>Stakeholder analysis of public, civil society, traditional, media, private, political, state and external/foreign actors:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Historical evolution of sector,</td>
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<td>• Structural features &amp; organisation,</td>
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<td></td>
<td>• Relevant institutions &amp; policies,</td>
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<td></td>
<td>• Stated sector objectives,</td>
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<td>• Performance,</td>
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<td></td>
<td>• Transparency/ Information</td>
</tr>
<tr>
<td></td>
<td>• Power (type, distribution &amp; source),</td>
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<tr>
<td></td>
<td>• Mode and degree of Influence,</td>
</tr>
<tr>
<td></td>
<td>• Interests,</td>
</tr>
<tr>
<td></td>
<td>• Incentives,</td>
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<tr>
<td></td>
<td>• Ideas/ ideology,</td>
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<tr>
<td></td>
<td>• Networks and relationships,</td>
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<tr>
<td>Policy analysis:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Content,</td>
</tr>
<tr>
<td></td>
<td>• Viability (political, techno-economic and organisational),</td>
</tr>
<tr>
<td></td>
<td>• Impact on sector organisation/performance,</td>
</tr>
<tr>
<td></td>
<td>• Impact on stakeholders, interests and incentives,</td>
</tr>
</tbody>
</table>
| **Policy/reform process** | • Policy making and implementation processes,  
| | • Incentives and capacities of actors working in policy formulation, negotiation and implementation  
| | • Past policy process timelines and experiences (of relevance) |
| **Situational/temporary factors** | • ‘Focusing events’ (eg. crises, news, regime transition, technological breakthrough, etc.),  
| | • Policy/reform/issue champions and/or coalitions,  
| | • External actors, donor agencies  
| | • Stability/volatility across the political economy system  
| | • International political economy conditions (eg. commodity price fluctuation, shifting geopolitical alliances/dynamics, ideological shifts etc.) |
This is all for now!