



**Support for  
Wind Power Development in Mozambique  
The Institutional and Economic Feasibility  
Approach to IPP Issues and PPA  
Policy Framework**



ENERGY, CLIMATE  
AND SUSTAINABLE  
DEVELOPMENT

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Jyoti Prasad Painuly



# The Institutional and Economic Feasibility Study

- ❑ Energy policies and other relevant strategies
- ❑ The Energy Policy: The energy policy, formulated in 1997
- ❑ Other Energy Related Legislative Framework
  - **Ministerial Law No. 20/97** ; Establishes DNE duties
  - **The Electricity Law (No. 21/97)**: The new Electricity Act approved in 1997 defines the general policy for the organisation of the electrical energy sector
  - **Municipal Legislation**: A new municipal legislation was also enacted in 1997, which allocates some functions in investment planning and the operation of electricity services to local authorities.

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- **The Energy Strategy (2000):** The Energy Strategy complements the Energy Policy, indicating the plan of action for the energy sector
  - **PARPA and the Performance Assessment Framework (PAF):** Mozambique's Poverty Reduction Strategy, PARPA, includes energy as one of the six main issues
  - **Concession Approach for Private Participation in Electricity Supply:** Private participation in electricity supply, using concession approach was implemented in 1999 in Vilankulos
  - **Governmental and other organisations with linkages to power sector**
    - **Ministry of Energy**
      - **Directorate of Electrical Energy (DNEE)**
      - **Directorate of New and Renewable Energies (DNER)**
      - **Directorate of Liquid Fuels (DNC)**
      - **Directorate of Planning and Studies (DEP)**
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- Ministry of Mineral Resources
    - National Directorate for Coal and Hydrocarbons (DNCH)****
  - Directorate of Economics (DoE)**
  - National Electricity Council (CNELEC)**
  - Technical Unit for Hydroelectric Projects (UTIP)**
  - Electricidade de Moçambique (EDM)**
  - Fundo Nacional de Energia (FUNAE)**
  - Ministry of Agriculture**
  - Ministry for the Coordination of Environmental Affairs, MICOA**

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- **Private Sector Organisations**
    - **Hidroeléctrica de Cahora Bassa (HCB)**
    - **Mozambique Transmission Company (MOTRACO)**
    - **Southern Africa Power Pool (SAPP)**

# Other Relevant Activities

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## ❑ **Mozambique Energy Reform and Access Program (ERAP)**

- World Bank / GEF project, initiated in 2003, with a total cost of 81.5 million dollars. It comprises: (i) reforms necessary for improved performance of the energy sector (in particular electricity) and accelerated access to electricity, in rural and peri-urban communities, and (ii) investments in electricity supply infrastructure (including renewables)

## ❑ **Fortis wind/ water pumping system**

- 2 Fortis Montana 5 kW wind turbines

## ❑ **Concession Approach in Mozambique**

- Inhambane Province- consortium of ElectroTec (Mozambique) and Rural Maintenance and Siemens (South Africa)

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## □ Donor Interventions

- Two categories of funding agencies;
  - Lending Institutions providing credits (loans): African Development Bank (AfDB), Arab Development Bank for Africa (BADEA), Islamic Development Bank (IDB), Nordic Development Fund (NDF), Agence Française pour le Développement (AFD, France), Kreditanstalt für Wiederaufbau (KfW, Germany), OPEC Fund, Kuwait Fund, World Bank (WB).

Loan funding is concessionary, and commonly for infrastructure investments.
  - Grants Donors include Danida (Denmark), Norway, and Sida (Sweden). Spain and Japan have also provided some grants.

## Approach to IPP Issues and PPA

### Energy Policy in Mozambique

- ❑ To ensure reliable energy supply, at the lowest possible cost, so as to satisfy current levels of consumption, and the needs of economic development;
- ❑ To increase the availability of energy for the domestic sector, particularly coal, kerosene, gas and electricity;
- ❑ To promote the development of conversion technologies and environmentally benign energy uses (solar power, wind power and biomass);
- ❑ The IPP participation... ;
  - **introducing independent power producers (IPPs) in new generation projects....**

# IPP Experiences in Developing Countries

- ❑ IEA; Investment needed in DCs Elect. Sector; 5 trillion \$ by 2030 (2 trillion in new gen. cap.)
- ❑ Deloitte; 140-160 billion \$ annually (through 2025)
- ❑ IPP: Wealth of experience- starting 1990; 50 emerging economies IPPs operating
- ❑ Investment in infrastructure from a high of \$46 billion in 1996 to a low of \$15 billion by 2003.
- ❑ Government opportunism and corruption cited as main factors in some analyse
- ❑ Learning for IPPs also; Demand for reforms- better commercial and regulatory environment

## IPP Models

**Natural Monopoly:** Vertically integrated utility with no competition in generation, transmission and distribution. The system tends to be opaque and inefficient in this case.

**Single Buyer:** only one buyer (one distribution company), who chooses from various generators (IIPs). There is some competition in this case, but only in generation.

This is Planned in Mozambique? (Also used in early stages in Asia)

**Wholesale Competition:** In this case, there are several distribution companies and they buy directly from the IPPs. However, customers of distribution companies have no option but to buy from single supplier (their distribution company). There is competition in generation, and distribution becomes transparent.

**Retail Competition:** This is close to the full competition as all customers also have choice of supplier, in addition to the conditions that exist in wholesale competition. Distribution is further split to retail level and retail industry is competitive.

# Experiences in Developing Countries

	Country Outcome GOOD	Country Outcome POOR
Investor Outcome GOOD	Merida III (Mexico) Eastern Power (Thailand) Quezon Power (Philippines) Adapazari (Turkey) Paguthan (India)	Norte Fluminense (Brazil) Caña Brava (Brazil) Sidi Krir (Egypt) Uruguaiana (Brazil) Kondapalli (India) Shajiao C (China) GVK Jegurupadu (India)
Investor Outcome POOR	Shandong Zhonghua (China) Meizhouwan (China)	Trakya Elektrik (Turkey) Termoceara (Brazil) PPN Power (India) Cavite (Philippines) Elcho (Poland) Dabhol (India)

Source: Erik J. Woodhouse, 2005. *A Political Economy of International Infrastructure Contracting: Lessons from the IPP Experience*, Stanford University.

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- ❑ Malaysia: Local IPPs only
  - ❑ Thailand- good experience- starting 1994
  - ❑ Philippines; Early starter- 1988; Expensive elect- IPP good exp.
  - ❑ Egypt- 1998: Low prices IPPs (2.3 cents / Kwh- from Gas; Competition + subsidized gas)
  
  - ❑ Kenya: Very low IPP interest
  - ❑ China; mixed experiences- contract enforcement difficult- reduced prices but may affect future investments
  - ❑ India: Dabhol controversial- some other successful
  - ❑ Latin America- mixed. Reformed sector. Chile –good; Argentina- bad due macroeconomic crisis
  - ❑ Brazil; difficult due to hydro and partial reforms

# DOs

Source: Erik J. Woodhouse, 2005. A Political Economy of International Infrastructure Contracting

Lessons from the IPP Experience, Stanford University

- ❑ **Insist on competitive and transparent bidding in allocating projects**

Investors will build power plants at low prices if host governments provide clear and transparent bidding and demand low prices.

- ❑ **Anticipate the need to manage stress in the private power sector**

Financial stress- from macroeconomic shock or sudden demand fluctuations, political stress- opposition from civil society or entrenched interests.

- ❑ **Be careful of tension between short- and long-term goals**

Need for long-term investment

- ❑ **Be careful of the tension between power sector reform and attracting IPPs**

Fully reformed: Private, competitive electricity markets governed by an independent regulatory authority v/s move for state control

# For IPPs

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- ❑ **Look beyond contracts and prices for risk management**

Risk engineering" are necessary but not sufficient instruments for managing risk

- ❑ **Get good contracts in form, but be flexible in reality**

Enforcing contracts is not easy. Arbitration expensive.

- ❑ **Focus on fuel risk**

Countries absorbed substantial risks in providing fuel arrangements for their IPPs in early stages; these arrangements are not likely sustainable if replicated on a large scale.

# Approach to the Power Purchase Agreement (PPA) and Tariff Setting

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- ❑ Single buyer model OK considering Mozambique market size but generation, transmission, and distribution function of the utility should be separate and transparent
- ❑ A PPA needs to be transparent, should encourage efficiency, and at the same time provide enough incentive to investors to invest
- ❑ A PPA is to make sure that efficient investments are made in the electricity sector, that the IPPs are dispatched according to the least cost principle
- ❑ For this, A PPA design could be as two part contracts with a fixed element and one or more variable elements. The fixed element is linked to the capital costs and the capacity of the plant. This element substantially mitigates the risk of the investor and also guarantees the buyer that a certain amount of capacity is available at specified circumstances.

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- The variable elements of the agreement should be linked to the actual electricity production and this part serves as an incentive to produce electricity when it is most valuable to the buyer according to the Least Cost Dispatch principle.  
(could be formed as time-of-day payments)
  
  - This principle can however not be followed in case of wind IPPs, since they have no control over the resource (wind).  
Power is to be bought as and when produced by the wind IPP.

## Some requirements for efficient functioning of IPPs

- ❑ There needs to be a regulator
- ❑ The distribution utility (EDM in this case) should have possibility to cover costs with tariffs. In case issue of affordability arises, subsidy should be provided by the government directly, and not through deteriorating finances of the utility, which creates opaqueness and inefficiency in the system
- ❑ Tariff needs to be structured in a way to; a) recover all costs, and b) be based on the principle of marginal system costs
- ❑ Specific support schemes for renewables such as wind will be required. Therefore, if renewable such as wind electricity is planned to be introduced, feed in tariffs may need to be planned
- ❑ IPPs must have non-distorted access to Transmission and Distribution systems.

# Policy Framework

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- ❑ **1. Political Support:** This is primary requirement. Directives, targets etc.
  - ❑ **2. Legislative Support:** This is needed to create an **assured market** for renewable energy, and provide **access to grid** for renewable power among others.  
Feed-in-law, RPS etc.
  - ❑ **Fiscal and Financial Support Measures:** These are needed to supplement legislative measures
  - ❑ **Administrative Support:** Simplifying the bureaucratic procedures and taking up renewable energy programmes at local level, and support for technology development through public funding in initial stages
  - ❑ **Awareness Measures:** Public opinion in favour of renewables has been a major factor for success of renewables in EU countries.
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- ❑ **Technological Development:** Research, demonstration and implementation
  - ❑ **Other Renewable Energy Supportive Policies**
    - Public Benefit Funds
    - Net Metering
    - Transport Biofuels Policies
    - Market Infrastructure Policies
  - ❑ **Institutional set-up for renewable energy**

Exists in Mozambique- Directorate of New and Renewable Energy

Tasks ahead:

    - Setting agenda including targets for renewables, developing expertise in the country, organizing networks and providing financial assistance for renewable energy development
    - Drafting national policies including renewable Energy legislation
    - Bringing together all stakeholders, pooling of information, coordination, organizing analytical work

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- Tracking global development in renewable energy technologies, exchanging information within and outside country
  - Promoting entrepreneurship and investment in renewable energy, including development of local expertise
  - Advocacy and awareness raising for renewables in general, as an instrument for sustainable development

# Questions

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- ❑ Administrative/legal platform for the wind activities( demo) and for eventual future wind energy activities in Mozambique  
What is needed?
- ❑ The interest, competence and capacity of the private sector and eventual consequent wind energy activities in Mozambique  
Does it exist? What is missing? How to build capacity for that?
- ❑ Best-practise- what needed ?
- ❑ Electricity prices?
- ❑ Other issues

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# THANK YOU

Contact;  
J.P. Painuly  
UNEP Risoe Centre  
[j.p.painuly@risoe.dk](mailto:j.p.painuly@risoe.dk)