



RENEWABLE ENERGY TRAINING PROGRAM FINANCING RENEWABLE ENERGY PROJECTS

PPAs and Tariff Design

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Power Purchase Agreement and Tariff Design Outline

- What is a PPA ?
- Structure of PPA pricing: Capacity, Energy and other Charges
- Policy incentives
- Case Study : Geothermal plant in Kenya



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What is a PPA ?



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What is a PPA?

- Legal binding agreement between Seller (owner) and Purchaser (typically a utility or a bulk trader)
- Tenor between 5 and 20 years
- Seller under the PPA is an Independent Power Producer (IPP)
- Plays a key role in the financing of the IPP (key to obtaining non-recourse financing)
- Provides a certainty of revenue for seller and security of supply for purchaser
- Locks a price for the seller (short) and the purchaser (long)

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Plethora of Risks to be addressed/allocated...





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Risk allocation


- Major part of the risk allocation will happen in the PPA
- A risk well addressed is a risk that is allocated to the party best able to handle it:
 - He has the authority, the expertise, the financial capabilities
- Some risks are shared between parties when there are too big or when there is no clear-cut separation in the responsibilities
- A risk matrix is the result of a negotiation: there is no scientific formula
- A risk matrix valid in developed market will not necessarily be valid in emerging market

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Key Articles in a PPA

Table 4.1a Typical Main Clauses/Articles in a PPA for a New Fossil-Fueled Power Plant

Definition of Contract Terms	Seller's Responsibilities	Purchaser's Responsibilities
Construction of the power plant	Compliance with technical, operational and environmental standards and regulations	Compliance with the grid code
Compliance with metering and telecommunication specifications	Control, operation, and dispatch of the power plant and maintenance coordination	Interconnection with transmission system
Supply of fuel	Availability commitments and capacity testing procedure	Supply of and payment for electricity
Fees, pricing and billing	Time and place of payment	Compliance with laws
Liability and indemnification	Payment guarantee (if any)	Contract term
Insurance	Force majeure	Taxes
Liquidated damages	Suspension, events of default and termination, and buy-out	Assignment of rights, benefits and obligations
Dispute resolution	Law, jurisdiction; agents for service	Representations and warranties



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Specificities of a PPA for Renewable Plant

- Seller committed to be available when there is enough natural resource: conditional availability
- Resource assessment key element (P50; P90; P99)
(Refer to Fitch presentation on criteria)
- Energy output forecast by seller a week, a day or a few hours in advance taking into consideration weather forecast
- Revenue sharing from Carbon Credits
- Royalties involved (for a geothermal plant)

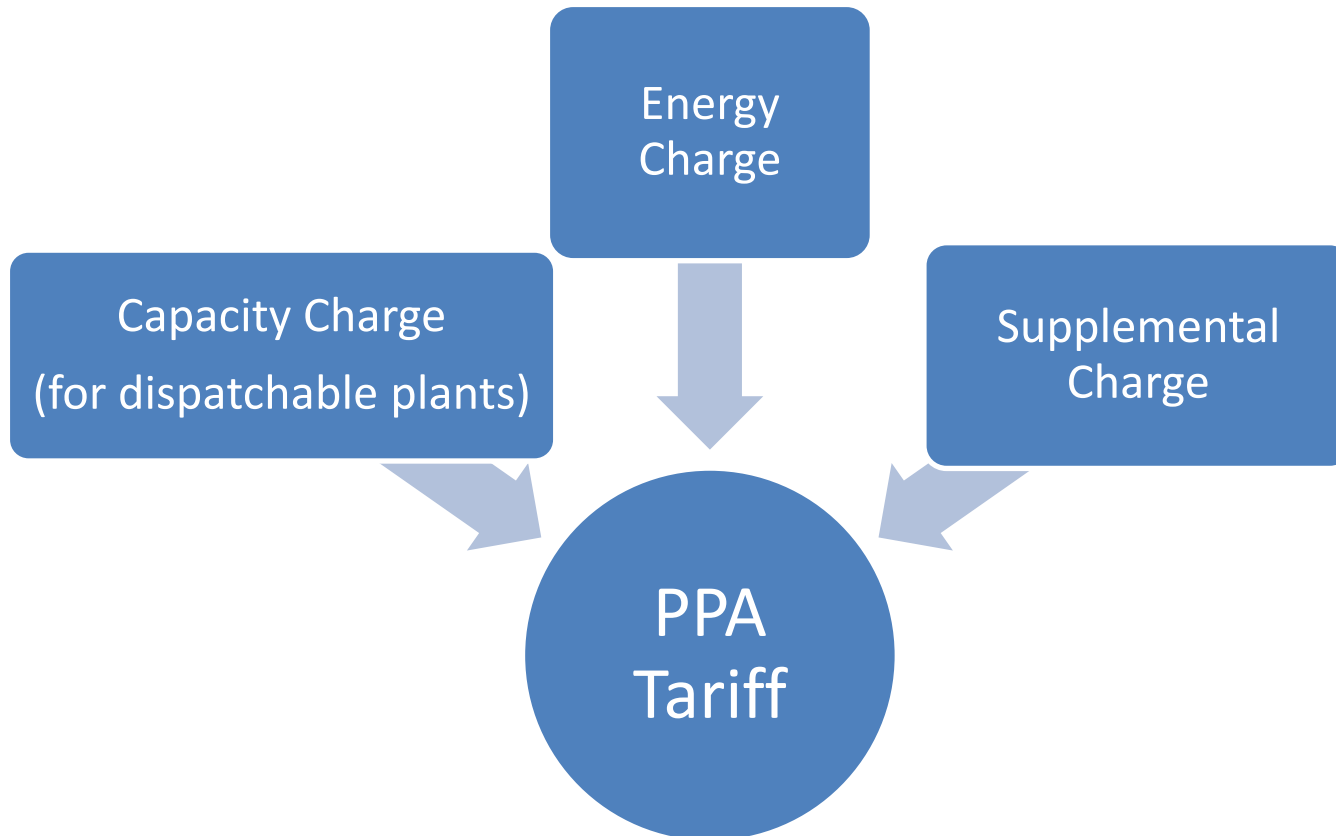


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Structure of PPA Pricing

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Structure of PPA Pricing

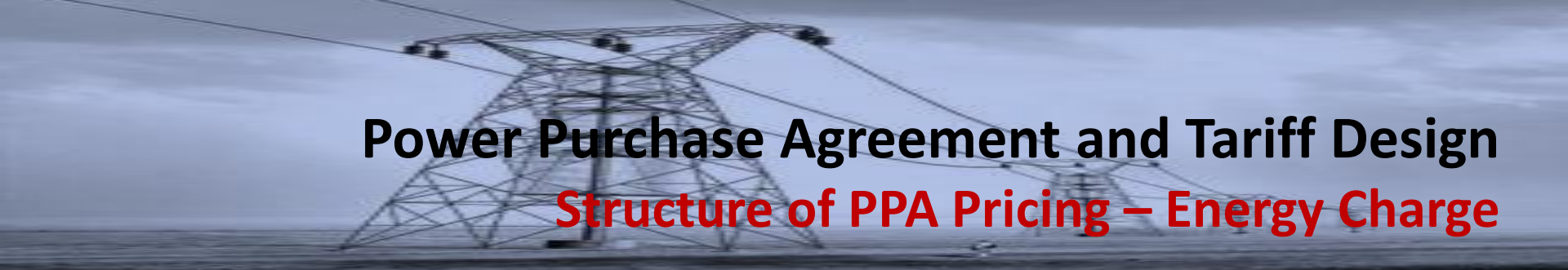




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Structure of PPA Pricing – Capacity Charge

- The **Capacity Charge** is a fixed payment that is paid each period for each kilowatt of available (not dispatched) capacity
- It includes fixed charges involved in the construction, operation, and maintenance of the power plant, including charges for:
 - Repayment of the **principal and interest** of the debt used to construct the facility
 - **Return on equity** capital invested
 - Fixed **operation and maintenance** (O&M) costs that are independent of the amount of energy generated (e.g., staffing costs, administrative expenses, operator fee, insurance premiums, etc.)
 - Possible fixed costs related to **fuel supply and transportation**, such as demand or through-put charges, or minimum take-or-pay obligations
- Invested equity is typically recovered through depreciation of power plant assets based on prescribed rates in applicable tax laws



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Structure of PPA Pricing – Energy Charge

- The **Energy Charge** is paid each period for each kilowatt hour of energy dispatched and delivered at the agreed delivery point during that period
- It includes variable costs involved in the generation of the energy delivered, including charges for:
 - **Commodity charges** for each unit of fuel used, including the cost of fuel and its transportation to the plant
 - **Variable operation and maintenance costs** (e.g., spare parts, lubricants, and other consumables)
 - A **major maintenance** sinking fund to cover the costs of required turbine maintenance based on usage



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Structure of PPA Pricing – Supplemental Charge

- The **Supplemental Charge** covers other costs not included in either the Capacity or Energy Charges, including:
 - The costs of start-ups beyond an agreed number each year reflecting the cost of fuel per start-up and likely a contribution to the major maintenance sinking fund
 - The costs of ancillary services provided if such services are included in the scope of the PPA
 - Any supplemental charges for repairing damage to the facility as a result of a Force Majeure event if such repair is the responsibility of buyer
- Indexation and escalation is likely to apply to reflect fluctuations in inflation and exchange rates depending on the character and type of the costs involved

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PPA Payment

Dispatchable plant	Non dispatchable plant
Open Cycle, CCGT, Coal, Nuclear, HFO Geothermal, Biomass, Hydro Reservoir	Wind, CSP, Photovoltaic Run-of-River Hydro
Capacity charge (USD/kW/month)	Energy charge (cents/kWh)
Energy charge (cents/kWh)	
Supplemental charge	



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Tariff Design



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Feed-In-Tariff

- Policy mechanism designed to accelerate deployment of renewable energy
- Long Term contracts based on the cost of generation of each technology
- Often include "tariff degression", a mechanism according to which the price (or tariff) ratchets down over time in order to encourage technological cost reductions
- The goal of feed-in tariffs is to offer cost-based compensation to renewable energy producers, providing the price certainty and long-term contracts that help finance renewable energy investments
- Designed on the PPA model



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Green/Renewable Energy Certificates

- Regulation places an obligation on electricity supply companies to produce a specified fraction of their electricity from renewable energy sources
- Certified renewable energy generators earn certificates for every unit of electricity they produce and can sell these along with their electricity to supply companies
- Programs allow more price competition between different types of renewable energy
- However, there is uncertainty on the value of the certificate as well as the energy produced
- Financing of these RE plants on the basis of certificates becomes more difficult



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Case Study



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Olkaria III plant expansion in Kenya

- One of four IPPs (1 geothermal + 3 HFOs) that received World Bank Partial Risk Guarantee in Kenya (FY12)
- 36 MW expansion of an existing geothermal plant (48 MW) bringing total capacity to 84 MW
- Project awarded to OrPower4 following a competitive bidding process (project company owned by Ormat)
- Existing facility underpinned by a 20 year PPA concluded with KPLC in 1998 (Capacity and energy payments)
- New plant expected to be commissioned by April 2013



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Olkaria III expansion : PPA

- Under this PPA, OrPower was required to :
 - Undertake the Geothermal Reservoir Development
 - Design, procure, construct, test, finance, commission, operate and maintain the generation facilities and sell the NEO to KPLC
 - Design, procure, construct, test, finance and commission the transmission interconnector
- KPLC undertook to pay capacity and energy payments in USD dollars (foreign currency risk falls onto KPLC)
- Unlike the thermal IPPs, KPLC has the obligation to make capacity payments to the IPP in the event of both natural and political force majeure events regardless of the availability of the plant(*)



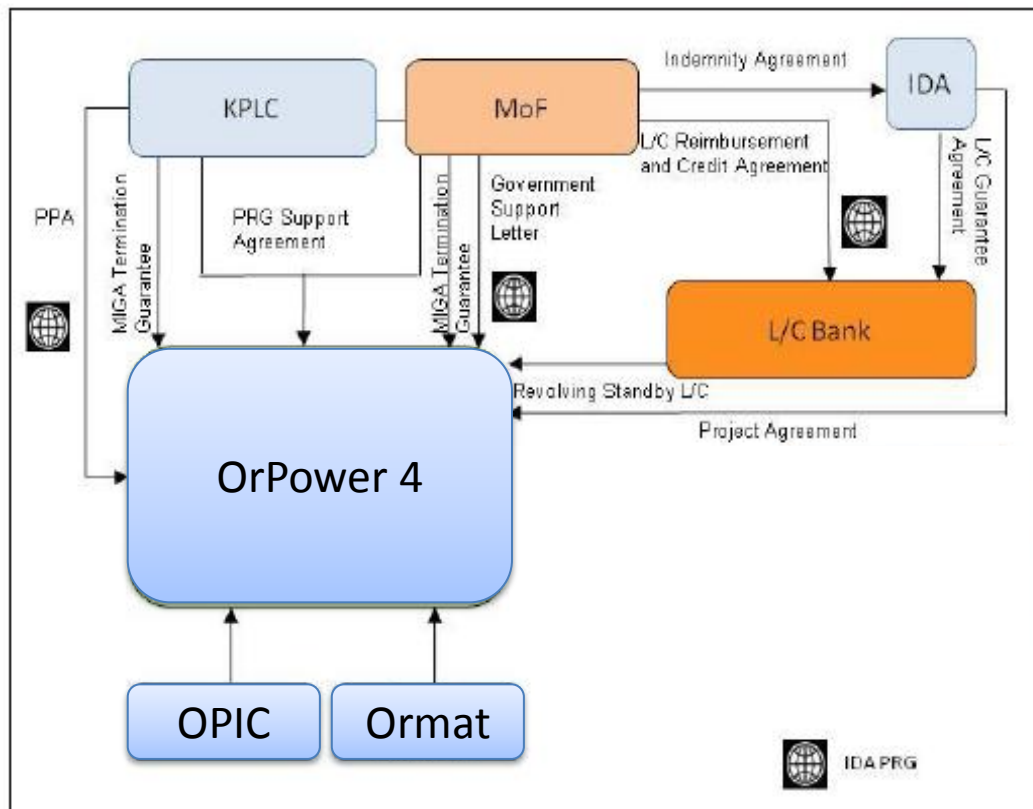
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Olkaria III expansion : Financing structure

- Total cost of expansion 212 million USD:
 - US\$31 million of new equity injection
 - a US\$165 million loan from Overseas Private Insurance Corporation (OPIC)
 - and the balance through internal cash-flow
- MIGA obtained Board approval for Transfer Restriction, Expropriation and War and Civil Disturbance coverage for Ormat's equity for the existing facility as well as for the expansion for a total amount of US\$134 million
- While the Bank approved the PRG of an amount of 26 million USD equivalent to four months of capacity payment and energy payments plus contingencies

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Olkaria III expansion : WBG Risk Mitigation structure



- IDA PRG will back KPLC's ongoing payment obligations only under the PPA and GoK's ongoing payment obligation under its letter of support
- MIGA will provide termination cover for KPLC's Breach under PPA and Political Events under GoK Letter of Support

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Expansion of Olkaria III plant: Risk allocation matrix

Phase	Risks/Obligation	Contractual Responsibility			Risk Mitigation	
		IPPs & Lenders	KPLC	GoK	PRG	MIGA
Pre-Construction	Site		X			
	Plant design	X				
	Debt & Equity Financing	X				
Construction Period	Cost overruns	X				
	Construction delays	X				
Operation	Operation & Maintenance	X				
	Power Capacity Availability	X				
	Output Quality Specifications	X				
Concession Term	KPLC System Availability		X		X	
	Payment of Energy and Capacity Payments and Fuel charge		X	X	X*	
	Force Majeure Events affecting KPLC		X	X	X****	
	Currency devaluation		X			
	Currency, Convertibility, Transferability	X				
	***Political Event (ongoing obligation)			X		
	Other Force Majeure Events	X**	X		X	
	Termination Payment due to KPLC		X			X
Default	Termination Payment due to ***Political Event			X		X



THANK YOU