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Upfront Tariff by NEPRA for New Bagasse Based Cogeneration Projects





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Upfront Tariff



- Pursuant to CCI decision CCI.4/3/2012 and ECC decision dated 06 March 2013 NEPRA determined upfront tariff for bagasse /biomass Co-gen. Projects.
- This Tariff is applicable for New Bagasse Cogeneration Projects Established under framework of Cogeneration Policy of Government of Pakistan announced on May 29, 2013 and thereafter modified on August 28,2013.
- Adjustment of Upfront tariff by NEPRA on **July 07,2015**
- Date of Opting for Upfront Tariff for Bagasse based projects is extended till **28th May 2017**



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Historical Background



- 2006 – “Policy for Development of Renewable Energy for Power Generation 2006” (**RE Policy 2006**) for the Promotion of RE employing Small hydel, wind & solar.
- 2008 National Policy for Co-generation by Sugar Industry .
- March 6, 2013-Framework for Power Cogeneration (bagasse/biomass) approved by ECC and made a part of RE Policy 2006.
- National Electric Power Regulatory Authority Upfront Tariff (Approval & Procedure) Regulation,2011.
- May 29, 2013- Upfront Tariff announced by NEPRA.





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Terms & Conditions



- Upfront Tariff is applicable only to **New Cogeneration Plants** using High Pressure Boilers (minimum **60 bar Pressure**)
- New Cogeneration Plant can be either **within or outside the premises of a Sugar Mill**
- Existing Power Purchase Agreements (PPA) will continue in Parallel
- There is no maximum or minimum cap for installed capacity for cogeneration project
- The decision to opt for **upfront tariff once exercised will be IRREVOCABLE**



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Terms & Conditions



Power Supply to be offered to Purchaser	
DISCOs	11 KV or 132 KV
CPPA	132 KV

- The **Cost** of interconnection, grid station upgrades etc. for power evacuation shall be **incurred by the respective DISCO/ NTDC**.
- Fuel Cost Component is based **on Bagasse**, However other renewable fuels like **Rice Husk, Cotton Stalks** can be used as per requirements
- Use of **Coal in mix or alone is not allowed**





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Terms & Conditions



- **COD** Should be achieved within 24 Months from the date of grant of Upfront Tariff by **NEPRA in each case.**
- Notional construction period is 20 months from Financial Close.
- The Tariff control period is **30 years Term.**
- All energy offered for sale by co-generation project shall be taken by the power purchaser on priority.
- The co-generation projects based on foreign financing may opt for the approved Upfront Tariff. However, the risk of currency exchange rate for foreign financing will be borne by the project sponsors.





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Basis for Tariff



- Upfront Tariff is based on **Auxiliary Consumption of 8.5%**
- **Approved** Annual Plant Capacity Factor (APCL) of **45%** based on 180 days of Operation (120 days + 60 days)
- **Availability** of Cogeneration Plant during Operation **92%**
- **Approved Net Heat Rate** for Cogeneration Projects is **24.50%**
- Bagasse Price is Linked with **Imported Coal Heating Value** for the Purpose of Indexation
- NEPRA may review the fuel pricing mechanism after a period of 5 years. However, US\$ 100.67/ton shall be the floor/minimum price.



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Fuel Price (Bagasse) Calculations



Parameters	Bagasse	Imported Coal
Net calorific value (Btu/Kg)	6905	23810
Price of Imported Coal FOB per Ton		US\$ 81.4 or Rs.7977.20
Marine Freight		US\$ 19.19 or Rs 1880.62
Marine Insurance		US\$0.0814 or Rs.7.98
Applicable Coal Price in US\$		US\$ 100.67
Exchange Rate (PKR./US\$)		98
Applicable Coal Price in PKR		Rs.9865.8
Price of Bagasse PKR/ton	2861.12	
Fuel Cost Component (PKR/kWh)	5.7703	



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Project Cost Estimate



- Project Cost per MW basis is taken as 0.9966 Million USD as detailed below;

Project Cost Estimate in Million USD/MW	
Reference Project Cost	(US \$ M)
EPC Cost	0.8112
Other Project Cost	0.0695
Financing Fees & Charges	0.0176
Interest during Construction (IDC)	0.0984
Total	0.9966





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Financial Features



- Equity Financing will be **20%** and Debt Financing will be **80%**
- The Term of Loan for debt servicing will be **10 years after COD** with grace period of 20 Months.
- Tariff has been calculated based on Local Financing.
- Debt Servicing is based on quarterly KIBOR (at 9.5 %) and spread of 3%.
- Return on Equity is allowed 17% for 30 year term.
- Working Capital Cost (Interest Charges) based on KIBOR at **9.5%** with **2 % Spread**.





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Financial Features



- Withholding tax of 7.5 % on dividend of Equity is not Part of Upfront Tariff and is a Pass Through Item.
- Levelized Upfront Tariff based on 30 Year term and discounted at 10% per annum is **10.4078 PKR/kWh**
(10.6202 cents/kWh)
- Approved Annual Insurance Expense is **1% of EPC Cost**
- Upfront Tariff based on reference PKR/US\$ rate of Rs. 98



O&M Cost

- Annual O & M Cost is **3.25% of EPC Cost**
 - Fixed Component **40%**
 - Variable Component **60%** [Foreign + Local Components]
 - 75% **Foreign** based on US CPI and PKR/USD Exchange Rate
 - 25% **Local** based on Local CPI



One Time Adjustment



The upfront tariff shall be adjusted at Commercial Operation Date for following components:-

- i. 40 % of total Project Cost shall be adjusted for exchange rate variation on quarterly basis as per assumed injection of equity and debt spread over a period of 20 months.

Debt and Equity Injections	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 5	Qtr. 6	2 Months	Total
% of Total Project Cost	20%	20%	15%	15%	10%	10%	10%	100%

- ii. The debt service component will be adjusted on account of variation of in quarterly KIBOR over the reference KIBOR of 9.5% plus spread of 3%.
- iii. ROE and ROEDC components of reference Upfront Tariff will be revised for variation in PKR/US\$ exchange rate (Ref. PKR/US\$ exchange rate of Rs.98)





Indexation/Adjustment

- The following indexation shall be applicable to the reference tariff after on time adjustment on COD :-
 - 1) Fuel cost component will be adjusted on account of variation in price of bagasse on yearly basis in advance w.e.f 1st of October of each applicable year.
 - 2) The local O&M component will be adjusted on account of local inflation on quarterly basis.
 - 3) The foreign O&M component will be adjusted for exchange rate variation and US CPI on quarterly basis



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Indexation/Adjustment



- 4) The cost of working capital shall be adjusted on account of variation in 3-month KIBOR while the spread of 2% will remain fixed.
- 5) The Debt Servicing component will remain unchanged except for adjustment due to variation in Quarterly KIBOR.
- 6) ROE as well as ROEDC shall be adjusted for variation in exchange rate.





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Upfront Tariff With Split



Tariff Components	1-10 years (Rs/kWh)	11-30 years (Rs./kWh)	Indexations
Fuel Cost	5.7702	5.7702	Fuel price
Variable O&M Local	0.1074	0.1074	Local CPI
Variable O&M Foreign	0.3223	0.3223	PKR/US\$, US CPI
Fixed O&M Local	0.2865	0.2865	Local CPI
Insurance	0.2204	0.2204	-
Working Capital	0.1924	0.1924	KIBOR
Debt Service	3.8249	-	KIBOR
Return on Equity	1.0155	1.0155	PKR/US\$
Total	11.7396	7.9147	





One Time Adjustment by NEPRA



- NEPRA pursuant to Clause 19 (II) of Upfront Tariff determined on 29 May 2013, adjusted the Upfront Tariff on May 31, 2015 for Following Components

i. Project Cost

Revised Project Cost	Million USD
EPC Cost	0.7960
Other Project Cost	0.0682
Financing Fees and Charges	0.0173
Interest During Construction	0.0980
Total	0.9795



One Time Adjustment by NEPRA



ii. Return on Equity (ROE) & Debt Servicing

	Original Reference Component	Adjusted Reference Component	Adjustment Applied
Return on Equity	Rs. 1.0155 / kWh	Rs. 1.0346 / kWh	One time adjustment in Project Cost
Debt Services	Rs. 3.8249 / kWh	Rs. 3.8970 / kWh	One time adjustment in Project Cost





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One Time Adjustment by NEPRA



iii. Fuel Cost Component

	Reference	Adjusted
USD / PKR Exchange Rate	98	101.6
Coal Price per Ton	81.4	77.31
Bunker Index	641.8219	629.6417
Marine Freight	19.19	18.83
Marine Insurance	0.0814	0.0773
Applicable Coal Price	100.67	100.67
Bagasse Price (Rs./Ton)	2,861.12	2,966.18
Fuel Cost Component (Rs./kWh)	5.7702	5.9822



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One Time Adjustment by NEPRA



iv. Variable Adjustment

	Original Reference Component	Adjusted Reference Component	Adjustment Applied
Variable O&M Local	Rs. 0.1074 / kWh	Rs. 0.1197 / kWh	Pakistan CPI
Variable O&M Foreign	Rs. 0.3223 / kWh	Rs. 0.3393 / kWh	USD and US CPI
Fixed O&M Local	Rs. 0.2865 / kWh	Rs. 0.3194 / kWh	Pakistan CPI
Insurance	Rs. 0.2204 / kWh	Rs. 0.2204 / kWh	No Adjustment
Working Capital	Rs. 0.1924 / kWh	Rs. 0.1733 / kWh	KIBOR Variation





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Adjusted Reference Tariff



Tariff Components	1-10 years (Rs./kWh)	11-30 years (Rs./kWh)	Indexations
Fuel Cost	5.9822	5.9822	Fuel price
Variable O&M Local	0.1197	0.1197	Local CPI
Variable O&M Foreign	0.3393	0.3393	PKR/US\$, US CPI
Fixed O&M Local	0.3194	0.3194	Local CPI
Insurance	0.2204	0.2204	-
Working Capital	0.1733	0.1733	KIBOR
Debt Service	3.8970	-	KIBOR
Return on Equity	1.0346	1.0346	PKR/US\$
Total	12.0859	8.1888	





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Adjusted Levelized Tariff



- Adjusted Levelized Tariff based on 30 Year term and discounted at 10% per annum is **10.7291** PKR/kWh (**10.5601** cents/kWh)





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Thank You



High Pressure Cogeneration for Sugar Sector in Pakistan

