

Discussion paper for public hearing on 19-03-2004

Review of Tariff / incentives for purchase of power by APTRANSCO from Non-conventional energy projects effective from 01-04-2004

Background:

Against the background of fast depletion of fossil fuels, Government of India (GOI) formulated policy framework in 1993-94 for promotion of generating capacity from non-conventional energy (NCE) sources with the objective of conserving fossil fuels, besides developing generation which is environmental friendly.

In order to formulate necessary framework to support the plan, Ministry of Non-Conventional Energy Sources (MNES) was constituted by GoI. The Indian Renewable Energy Development Association (IREDA) was also set up to extend financial assistance on softer terms to NCE projects.

The State Governments were also requested to formulate their policy framework including the tariff payable for encouraging generation from NCE sources, keeping in view the tariff guidelines laid down by GoI.

Government of Andhra Pradesh (GoAP) announced uniform incentives for the projects based on renewable sources of energy, namely, Biomass, Bagasse - based Co-generation, Mini Hydel, Wind and Waste to Energy etc., in November, 1997. These incentives were to be reviewed after three years. Andhra Pradesh Electricity Regulatory Commission (APERC) which was constituted in March, 1999 had reviewed these incentives in the context of third party sales. APERC after following due process of hearing all

stakeholders fixed the tariff for various NCE developers in O.P.No. 1075 / 2000 dated 20-06-2001 based on the guidelines of MNES. According to this

- The price applicable for purchase APTRANSCO was to be Rs.2.25 per unit with 5% escalation per annum with 1994-95 as the base year.
- For captive use, wheeling and banking was permitted to be continued as per the G.O. No. 93 dt. 18-11-1997 till further orders of the Commission.

The above order of APERC provided for review of the incentives, prices etc., to take effect from 01-04-2004 and for further review of purchase price of individual project on completion of 10 years from date of commissioning of the project (by which time the loans from financial institutions would be repaid).

Based on the above, the current (2003-04) price stood at Rs.3.48 / kWh for the power from all categories of NCE Projects supplying power to APTRANSCO.

The Electricity Act 2003 provides for the role to be played by the Commission as specified below :

- a) Section 86 (1) (e) of The Electricity Act 2003 provides that the Commission would promote renewable and non-conventional energy sources.
- b) Sec 86 (1) (e) of the Act also provides that the Commission would fix the quantity of non-conventional energy to be purchased as a percentage of total purchase from all sources by the licensee.
- c) Section 86 (1) (a) of the Act empowers the State Commission to fix the tariff for generating stations in the State.

The Commission sought proposals on prices to be fixed for non-conventional energy from APTRANSCO which has been purchasing power from the NCE projects and NEDCAP which is the Nodal Agency to promote NCE projects.

The proposals received from APTRANSCO and NEDCAP were sent to various NCE developers to file suggestions / objections by 03-11-2003 which was later extended to 13-11-2003 at the request of some of the developers. APTRANSCO and NEDCAP filed their responses on the objections / suggestions received from the developers. NEDCAP, subsequently on 19-11-2003, made submissions revising some of the parameters for tariff computations it had submitted earlier.

The Commission heard those NCE Developers / Associations who requested for personal hearing, besides NEDCAP, IREDA, APTRANSCO and Irrigation Department in the hearing held on 22 - 23 December, 2003.

The status of non conventional energy projects sanctioned and commissioned, category – wise in Andhra Pradesh are as follows.

Table - 1

Sl.No	Fuel	Capacity sanctioned MW	Commissioned MW	Yet to be Commissioned MW
1	Wind	147.54	92.54	55.00
2	Mini Hydel Plants	113.80	77.80	36.00
3	Bio-mass	410.55	150.25	*260.30
4	Bagasee	243.50	112.00	131.50
5	Municipal waste	12.60	12.60	---
6	Industrial Waste / Poultry and Distillery	43.66	5.5	38.16
	Total :	971.65	450.69	520.96

* includes 48 MW exclusively based on energy plantation.

The table below gives the tariff proposals of APTRANSCO.

Table - 2

Particulars	Per unit Tariff (Levelised Tariff over the life of the project)		Year-on-year escalation	
	Existing Plants Rs / kWhr.	New Plants Rs / kWhr.	Existing	new
Mini Hydel	2.42	2.31	---	---
Bagasse	2.23	2.25	2%	2%
Bio-mass	2.27	2.27	2%	2%
Waste to Energy	Nil	2.66	---	1%
Wind	2.52	2.55	---	---

The tariff proposals of NEDCAP are given in the table below :

Table - 3

	Initial proposals	Revised proposals	
	Existing as well as new plants (Rs. / unit)	Existing plants (Rs. / unit)	New plants (Rs. / unit)
Bagasse	Rs. 2.62 – 1 st year Rs. 2.48 – 10 th year.	3.20 1 st year 3.32 10 th year	3.30 1 st year 3.36 10 th year
Bio-mass	Rs. 3.27– 1 st year Rs. 3.77– 10 th year.	4.04 1 st year 4.35 10 th year	As for existing plants
Mini Hydel	Rs. 2.96– 1 st year Rs. 2.26 – 10 th year.	3.23 1 st year 3.00 10 th year	3.19 1 st year 3.07 10 th year
Wind Farm	Rs. 4.54– 1 st year Rs. 3.19– 10 th year.	3.92 1 st year 2.86 10 th year	As for existing plants
Waste to Energy	Rs. 2.99– 1 st year Rs. 3.19 – 10 th year.	4.04 1 st year 4.35 10 th year	As for existing plants

Based on the contentions of the NCE developers the prices are as given in table below :

Table - 4

Type of Projects	(Rs. / unit)
Bagasse	3.52 to 4.65
Bio-mass	3.49 to 4.30
Mini Hydel	3.5 to 4.97
Wind Farm	3.5 to 4.78
Waste to Energy	3.84 to 4.76

A comparison of key parameters for computation of tariff filed by APTRANSCO, NEDCAP and developers is provided in Annexure - I

APTRANSCO has submitted that a single-part tariff has been proposed as two-part tariff cannot be applied for NCE projects for the following reasons :

- i) They are not dispatchable as per existing practices in State.
- ii) Power is not firm.
- iii) Variable component of tariff is variant and not transparent thereby making price discovery mechanism difficult.
- iv) While 97% of the total energy is purchased from only 14 suppliers, the balance 3% is purchased from 89 non-conventional energy developers.
- v) Implementation of two part tariff in respect of non-conventional developers would therefore involve large administrative machinery for monitoring and settlement. Hence, according to APTRANSCO two-part tariff is not practicable.

As per APTRANSCO's ARR filing, likely power purchases from NCE projects are as follows, taking into consideration the existing and committed sources of non-conventional energy :

Type of non-conventional energy	Purchases (MU)
Biomass	1064
Bagasse	447
Mini Hydel	112
Wind	31
Waste to Energy	148
Total	1802

Total financial commitment at the current tariffs is expected to be Rs.627 Crores; Rs.415 Crores as per APTRANSCO's proposal; Rs. 681 Crs as per NEDCAP's proposal; Rs. 636 – 806 Crs as per the tariffs sought by developers.

The Commission proposes to finalize the tariffs applicable from 01-04-2004, balancing the interests of the consumers and developers. It has accordingly scheduled a public hearing on 19-03-2004. Those who wish to send their views in the matter may do so in writing in the form of a letter and also indicate if they would like to participate in the hearing by 18-03-2004.

Views on other issues relating to wheeling and banking may also be expressed.

Annexure - I

Key parameters for tariff computation

Bagasse co-generation Power Projects:

S.No (1)	Elements of tariff (2)	APTRANSCO proposal (3)	NEDCAP original proposal (4)	NEDCAP revised proposal (5)	Sudalgunta Sugars Ltd. (6)	South India Sugar Mills Association of AP (SISMA) (7)
1	Nominal capacity	15 MW	1 MW	1 MW	8 MW	-
2	Cost per MW	Rs. 3 Crs	Rs. 2.5 Crs	Rs.3 to 3.5 Crs	Rs.2.5–2.9 Crs	Rs. 3.25 – existing Rs. 3.7 –new
3	PLF	80%	50%	50%	80%	51%
4	Debt Equity Ratio	70 : 30	70 : 30	70 : 30	64 : 36	70 : 30
5	Debt repayment	10 years	10 years	10 years	-	-
6	Interest on term loan	13% - existing 10% - new	11.5%	11 % - Existing 10%- New	14%	13% -existing 10% - new
7	Interest on working capital	12% for one month stock	-	13 %	13%	12%
8	ROE	14% - existing 11% - new	16%	16 %	-	16%
9	Depreciation	7.84%	5%	7.84 %	5%	7.84%
10	O & M expenditure	2.5% of project	3%	4 %	3.8%	5%
11	O & M escalation	4%	2%	5 %	4%	8%
12	Policy period	3 years	10 years	10 years	-	-
13	Cost of fuel	Rs. 600 / MT	Rs. 533/MT-existing	Rs.600 / MT	Rs. 650 / MT	Rs.650 / MT-

			Rs. 600 / MT-new			own Rs. 800 / MT purchased
(1)	(2)	(3)	(4)	(5)	(6)	(7)
14	Fuel cost escalation	4%	2.5%	---	-	5%
15	Fuel consumption	2.08 Kg / unit	2 Kg / unit	2 kg / unit	-	-
16	Auxiliary consumption	9%	10%	10 %	-	10%
17	Insurance charges	-	1%	1 %	1%	0.5%
18	GCV	2300 Kcal	-	---	-	2300 Kcal
19	SHR	4761 Kcal / unit	-	---	-	4761 Kcal / unit
20	Wheeling charges	-	2%	---	-	-
21	Banking charges	-	2%	---	-	-
22	3 rd party sale	-	-	---	-	-
23	Tariff per unit	Rs.2.23-existing Rs. 2.25 – new	Rs.2.62 – 1 st year Rs. 2.48 - 10 th year	1 st year Rs.3.20 (for existing) and Rs.3.30 (for new) 10 th year Rs.3.32 (existing) and Rs.3.36 (New)	Rs.4.65	Rs.3.09 without ROE Rs. 3.52 with ROE
24	Tariff escalation	2%	-		-	5%
25	Other points	-	-		Submitted performance report for 4 years.	

Bio-mass based Power Projects:

S.No	Elements of tariff	APTRANSCO proposal	NEDCAP proposal	NEDCAP revised proposal	Bio-mass Developers Association	RR Bio Energy	Other Developers
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Nominal capacity	10 MW	1 MW	1 MW	6 MW	12 MW	3 – 6 MW
2	Cost per MW	Rs. 4 Crs	Rs. 4 Crs	4 Crs	Rs. 4.11 Crs	Rs. 10 Crs	Rs.4 - 4.11 Crs
3	PLF	80%	80%	80%	93%	72.5%-1 st year 90% - 2 nd year	70 – 80%
4	Debt Equity Ratio	70 : 30	70 : 30	70 : 30	72 : 28	-	-
5	Debt repayment	10 years	-	10 years	7 years from April, 2004	7 – 10 years	8 to 10 years
6	Interest on term loan	13% - existing 10% - new	12.5%	13% without subsidy	13%	11%	11 – 15%
7	Interest on working capital	12% for one month stock	-	13%	15% for two months stock	-	12 – 14% for 2 – 3 months stock
8	ROE	14% - existing 11% - new	16%	16%	0% for calculations	11%	16%
9	Depreciation	7.84%	5%	7.84%	7.84%	8.33%	7.84 – 9.72%
10	O & M expenditure	2.5% of project cost	5%	5%	7.84%	4%	5 – 10%
11	O & M escalation	4%	2%	5%	6%	-	5%
12	Policy period	3 years	10 years	10 years	10 years	10 years	10 years
13	Cost of fuel	Rs. 889 / MT – existing Rs.1000 / MT – new	Rs. 1100 / MT	Rs. 1100 / MT	Rs. 1300 / MT	Rs. 1000 / MT	Rs. 1100 to Rs. 1600 / MT

14	Fuel cost escalation	4%	5%	5%	6 - 8%	-	5%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
15	Fuel consumption	1.00 Kg / unit	1.4 Kg / unit	1.4 kg / unit	1.38 Kg / unit	0.83 Kg / unit	1.4 Kg – 2 K unit
16	Auxiliary consumption	9%	10%	10%	9%	-	8.89 – 15%
17	Insurance charges	-	1%	1%	Included in O&M	Included in O & M	-
18	GCV	3200 Kcal	-	-	2900 Kcal / Kg	-	3000 Kcal / Kg
19	SHR	3500 Kcal / unit	-	-	4000 Kcal / unit	-	
20	Wheeling charges	-	2%	-	-	-	2%
21	Banking charges	-	2%	-	-	-	2%
22	3 rd party sale	-	-	-	-	-	-
23	Tariff per unit	Rs. 2.27	Rs. 3.27 – 1 st year Rs. 3.77 - 10 th year	Rs. 3.51 – 1 st year Rs. 4.11 – 10 th year	Rs. 3.54 – 1 st year Rs. 4.12 – 7 th year (*) without ROE	Rs. 4.35 – 1 st year Rs. 3.65 – 2 nd year	Rs. 3.49 to Rs. 4.30
24	Tariff escalation	2%	-	-	-	-	5%
25	Other points	-	-	-	Suggested for two part tariff – stated that above working are based on balance sheets of 4 Nos Bio-mass developers.	Requested to consider their project is a special case as it is based on Integrated Gasification Combined Cycle Technology,	1)100% depreciation for 1 st year for IT liability is only available on some equipments 2)Depreciation needs adjustment in 10years. 3) 2 to 3% interest

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						which is stated to be technical break through.	subsidy be considered.
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Mini-Hydel Power Projects:

Sl. No (1)	Elements of tariff (2)	APTRANSCO proposal (3)	NEDCAP proposal (4)	NEDCAP revised proposal (5)	Small Hydro Power Developers Association (6)	NCL Energy Ltd. (7)	Saraswathi Power & Industries Ltd. (8)	Sri Jaya Lakshmi Power Corp. (9)
1	Nominal capacity	3 MW	1 MW	1 MW	-	7.5 MW	2.6 MW	4 MW
2	Cost per MW	Rs. 4.5 Crs	Rs. 4.5 Crs	Rs. 4.5 Crs – existing Rs.3.625 Crs - new with capital subsidy	Rs. 6 Crs / MW for capacity 1 MW and below Rs. 5 Crs / MW for above 1 MW	Rs. 5.31 Crs (cost increase is due to low generation in last 3 years)	Rs. 4.4 Crs	Rs. 5.56 Crs
3	PLF	40%	35%	35%	PLF is much less than 35 – 40%	35%	26 – 37%	Less than 40%
4	Debt Equity Ratio	70 : 30	70 : 30	70 : 30	-	79 : 21	70 : 30	75 : 25
5	Debt repayment	10 years	10 years	10 years	10 years	-	7 years	-
6	Interest on term loan	13% - existing 12% - new	8.5%	8.5% - existing 11.75% - new	-	14.5%	11.1%	18%
7	Interest on working capital	12% one month for O & M stock, 2 months	-	-	-	12%	14%	-

		receivables						
8	ROE	14% - existing 11% - new	16%	16%	20%	16%	16%	16%
9	Depreciation	3.4%	5%	5%	-	3.4%	-	-
10	O & M expenditure	1.5% of project cost	1.5%	1.5%	Not less than 3%	3.5%	1.5 + 1% for insurance	-
11	O & M escalation	4%	5%	5%	5%	5%	4%	-
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
12	Policy period	3 years	10 years	-	10 years	10 years	20 years	Contd...
13	Cost of fuel	-	Rs. 0.39 / unit Water cess	Water rate 39 Ps / unit for 0 – 5 years 78 Ps / unit for 5 – 10 years 117 Ps / unit beyond 10 years	Water cess @ Rs. 0.39 / unit proposed by NEDCAP has no basis	Rs. 0.39 / unit upto 5 th year Rs. 0.59 / unit from 6 th – 10 th year and Rs. 0.89 / unit above 10 years	Water cess Rs. 0.21 / unit for 5 years Rs. 0.42 / unit till 10 th year and Rs. 0.84 / unit thereafter	Water cess higher than the proposed in the tariff.
14	Auxiliary consumption	0.5% + 0.5%	0.5%	0.5%	-	1%	-	-
15	Insurance charges	-	1%	1%	-	-	-	-
16	Wheeling charges	-	-	-	2%	-	1%	2%
17	Tariff per unit	Rs.2.42 – existing Rs. 2.31 – new	Rs. 2.96 – 1 st year Rs. 2.26 - 10 th year	Existing projects Rs.3.23 – 1 st year Rs. 3.00 – 10 th year New projects Rs. 3.19 – 1 st year	Rs. 3.50 – Rs.3.80 for projects more than 1 MW Rs.4.00 – Rs. 4.30 for projects less than 1	Rs. 4.55 / unit	Rs. 4.97 / unit – 1 st year Rs. 3.08 / unit – 20 th year	Rs. 4.05 / unit with 6% annual escalation

				Rs. 3.07 – 10 th year	MW			
18	Other points	-	-	Water cess calculated for a project with 5 mtr head, 68.5 Cumecs of water requirement, 200 days working for 20 MU generation	Raised preliminary issues such as legality of notice and proceedings for tariff determination when court case on 3 rd party sale is pending.	-	-	Proposed escalation 6% for 5 years thereafter price to be reviewed again.

Wind farm Power Project:

Sl. No (1)	Elements of tariff (2)	APTRANSCO proposal (3)	NEDCAP proposal (4)	NEDCAP revised proposal (5)	IL & FS Wind farms Ltd. (6)	Indian Wind Power Association Karnataka Council (7)	Renewable Energy Developers Association (8)	Other Developers (9)
1	Nominal capacity	1 MW	1 MW	1 MW	6.5 MW	-	-	-
2	Cost per MW	Rs. 4 Crs	Rs. 4 Crs	Rs. 3 Crs – existing Rs. 4.15 Crs - new (above costs are with depreciation benefit)	Rs. 4.75 Crs	Rs. 4.5 Crs	Rs. 4.5 Crs	Rs. 4.5 – Rs. 5 Crs

3	PLF	25%	14%	16% - existing 20% - new	12%	22 – 23%	14%	14 - 20%
4	Debt Equity Ratio	70 : 30	70 : 30	70 : 30	-	70 : 30	-	-
5	Debt repayment	10 years	10 years	10 years	-	10 years	-	7 – 10 years
6	Interest on term loan	15% - existing 12% - new	12.5%	11%	-	12%	-	-
7	ROE	14% - existing 11% - new	16%	16%	16%	16%	11% for new project is not realistic	16%
8	Depreciation	7.84% for life of 25 years	5% for life of 20 years	5%	5.28% for 20 years	7.83% SLM for 20 years	-	5.28%
9	O & M expenditure	1% of project cost	1%	1%	2% including insurance	1.5%	1.75%	1 – 1.75%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
10	O & M escalation	4%	5%	5%	-	4%	5%	5%
11	Policy period	-	10 years	10 years	-	20 years	10 years	20 years
12	Insurance charges	-	-	1%	-	-	-	1%
13	Wheeling charges	-	2% & Banking 2%	2%	-	4%	2%	2% - 5% maximum
14	Tariff per unit	Rs.2.52 – existing Rs. 2.55 – new	Without 80% depreciation Rs.6.42 – 1 st year Rs. 4.11 - 10 th year with 80%	Existing Rs. 4.54 – 1 year Rs. 3.21 – 10 th year New Rs. 3.92 – 1 st year Rs. 2.86 – 10 th	-	Rs. 4.78 – 1 st year Rs. 3.19 – 10 th year	-	Rs.3.5–Rs.4 / unit with minimum escalation of 2%

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			depreciation Rs.4.54 – 1 st year Rs. 3.19 – 10 th year	year with 5 annual escalation				
15	Other points	12% interest on working capital has been considered for two months receivables	-	Depreciation of 80% during 1 st year of operation	TRANSCO calculations have not taken in to account of transformation and transmission losses (i.e., 4 to 5%).	To mitigate higher cost in earlier years, proposed 2 alternatives i.e., (i) Rs. 3.48 – 1 st year with 2% escalation for first 10 years than to freeze the tariff at Rs. 4.1 / unit. (ii) Rs. 3.36 – 1 st year with escalation of Rs. 4.5 every alternate year.	They stated that assuming the life of the wind farm as 30 years, policy should remain firm for atleast 10 years.	Requested for considering 3– 4% of energy for transformation and transmission line losses.

Waste to Energy Power Projects:

Sl. No (1)	Elements of tariff (2)	APTRANSCO proposal (3)	NEDCAP original proposal (4)	NEDCAP revised proposal (5)	Selco International Ltd & Sriram Energy Systems Ltd (6)	Vensa Biotek Ltd. & Sai Renewable Power (P) Ltd. (7)	Other Developers (8)
1	Nominal capacity	6 MW	1 MW	1 MW	-	4 - 6 MW	-
2	Cost per MW	Rs. 6 Crs	Rs. 5.5 Crs	Rs. 6 Crs	Rs. 6.036 Crs – Rs. 7.65 Crs	Rs. 6 Crs	Rs. 6 Crs
3	PLF	80%	70%	70%	70%	70%	70%
4	Debt Equity Ratio	70 : 30	70 : 30	70 : 30	-	57 : 43	-
5	Debt repayment	10 years	10 years	10 years	-	-	-
6	Interest on term loan	7.5%	7.5%	9.5%	6.87%	-	-
7	Interest on working capital	12%	-	-	12.5% – 14.5%	12% – 14.5%	14%
8	ROE	11%	16%	16%	16%	16%	16%
9	Depreciation	7.84%	5%	7.84%	5% - 7.84%	7.84%	7.84%
10	O & M expenditure	4%	2%	5%	3.75 – 4%	5%	5%
11	O & M escalation	4%	2%	5%	5%	5%	5%
12	Policy period	10 years	10 years	10 years	6 – 10 years	10 years	10 years
13	Cost of fuel	Rs. 500 / MT with 4% annual escalation	Rs. 600 / MT with 5% annual escalation	Rs. 650 / MT with 5% annual escalation	Rs. 800 – Rs. 1200/- with 4% annual escalation	Rs. 606 – Rs. 650 with 5% annual escalation	Rs. 650 with 5% annual escalation
14	Auxiliary	10%	-	10%	-	-	-

	consumption						
15	Insurance charges	-	1%	1%	1%	1%	1%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
16	Tariff per unit	Rs.2.66	Rs. 2.99 – 1 st year Rs.3.19 – 10 th year	Rs. 4.04 – 1 st year Rs. 4.35 – 10 th year	Rs. 4.39 – Rs. 4.76	Rs.3.84 – Rs.3.87	Rs. 4.27 Contd...
17	Other points	-	-	-	-	-	Submitted calculations carrying out corrections for 1% insurance and 0.5% transformation loss in the tariff proposals of APTRANSCO and projected the average cost for 10 years at Rs.3.28 / unit