ANDHRA PRADESH
ELECTRICITY REGULATORY COMMISSION

11-4-660, 4th & 5th floors, Singareni Bhavan, Red Hills, Hyderabad-500 004.

O R D E R

IN THE MATTER OF

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED (APTRANSCO)

R.P.No.84 / 2003 in O.P.No.1075 / 2000

FOR

PURCHASE OF POWER FROM NON-CONVENTIONAL ENERGY PROJECTS

Date March 20, 2004.

ANDHRA PRADESH ELECTRICITY REGULATORY COMMISSION
11-4-660, 4th & 5th floors, Singareni Bhavan, Red Hills, Hyderabad.

O R D E R

R.P No 84 / 2003 in OP No 1075 / 2000 dated 20-03-2004

The Commission initiated suo-motu proceedings for determination of tariff applicable to Non-Conventional Energy Projects of Andhra Pradesh to take effect from 01-04-2004 onwards.

The Commission having heard the Non-Conventional Power Project Developers, Non-Conventional Energy Development Corporation of Andhra Pradesh Ltd. (NEDCAP) and Transmission Corporation of Andhra Pradesh Ltd. (APTRANSCO) who appeared before the Commission on 22-12-2003 and 23-12-2003 and the general public during the public hearing on 19.3.2004 and having considered the objections and the oral and written submissions made by the parties passed the following Order.

BACKGROUND:

Government of India (GOI) formulated a policy framework in 1993-94 for promotion of generating capacity from non-conventional energy (NCE) sources with the objective of conserving fossil fuels and to reduce environmental pollution arising out of the emissions following the combustion of fossil fuels. The policy framework provided for certain incentives and facilities for promoting capacity addition through NCE sources including renewables. The incentives included subsidy (capital / interest) for setting up generating plants based on non-conventional (including renewable) sources. Among other parameters under the policy framework, the tariff payable for power from the NCE sources was predetermined in 1993-94 to take effect from 01-04-1994 with escalation year-on-year.

2) In order to formulate necessary framework to support the plan, Ministry of Non-conventional Energy Sources (MNES) was constituted. In addition, GOI also set up Indian Renewable Energy Development Agency (IREDA) to extend financial assistance on "Softer Terms" to the NCE projects, based on the policy framework of GOI.

Various 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.

3) Keeping in view the guidelines of MNES, GOI, dated 13-09-1993, Government of Andhra Pradesh (GoAP) vide GO.Ms.No. 93 dated 18-11-1997 announced the following uniform incentives to all projects based on renewable sources of energy viz., Wind, Biomass, Bagasse co-generation, Municipal / Industrial waste and Mini Hydel for purchase of power by the erstwhile Andhra Pradesh State Electricity Board (APSEB):

Sl.No	**Description**	
1	Power Purchase Price	Rs. 2.25/- per unit
2	Escalation	5% per annum with 1997-98 as base year and to be revised on 1st April of every year up to the year 2000 AD.
3	Wheeling Charges	2%
4	Third Party Sales	Allowed at a Tariff not lower than HT Tariff of APSEB.
5	Banking a) Captive Consumption b) Third Party Sales	Allowed up to 12 months. Allowed throughout the year on 2% banking charges. Allowed on 2% Banking charges from August to March

4) GoAP in its order Go.Ms.No. 112 dated 22-12-1998 issued the following amendments:

i) The uniform incentives specified in G.O.Ms.No. 93, dated 18-11-1997 shall be available only to the power projects where fuel used is from non-conventional energy sources which are in the nature of renewable sources of energy.

ii) The operation of the incentives scheme shall be watched for a period of 3 years and at the end of the 3 year period from the date of G.O.Ms.No. 93, the Andhra Pradesh State Electricity Board shall come up with suitable proposals for review for further continuance of the incentives in the present form or in a suitably modified manner to achieve the objectives of promotion of power generation through non-conventional sources.

iii) Though there is a provision for banking and third party sale, in the absence of conferring the status of licencee under section 3 of the Indian Electricity Act, the Entrepreneurs / Developers of non-conventional energy power may be handicapped in effecting third party sales to the needy and contracted consumers. Therefore, it is ordered that the Entrepreneurs / Developers covered by G.O.Ms.No. 93, dated 18-11-1997 who make the third party sale of energy shall be deemed to be licencees for the purpose under section 3 of the Electricity Duty Act, 1939 read with section 28 of Indian Electricity Act.

5) Andhra Pradesh Electricity Reform Act, 1998 came into force on 01-02-1999. Pursuant to the said Act, Andhra Pradesh Electricity Regulatory Commission (APERC) was constituted on 03-04-1999.

The uniform incentives extended to Projects based on non-conventional / renewable sources of energy were to be reviewed after a period of 3 years from the

date of GO.Ms.No. 93 dated 18-11-1997 regarding the continuance of the incentives in the manner prescribed in the said order or in a suitably modified form to achieve the objectives of promotion of power generation through non-conventional sources. In view of the Reform Act, the task was therefore to be undertaken by the Commission.

6) The Commission decided to hear all the developers of the non-conventional energy, APTRANSCO and IREDA, which has been granting loans to the developers, on the following issues:

(i) Whether from the billing month December 2000, the developers of non-conventional energy should be permitted to continue to supply to third parties or they should be permitted to sell to the licensee only;

(ii) Whether the rate applicable for supply to licensee from the billing month of December 2000 should be worked out taking Rs.2.25 per unit with 5% escalation per annum with 1994-95 as base year; and

(iii) The review about sale with effect from 1-4-2004 and further review after completion of 10 years from the date of commissioning of the individual projects.

The Commission issued notices to all the developers and other stakeholders to submit their views / objections on the above issues.

7) After hearing developers / Associations, NEDCAP, IREDA and APTRANSCO on 31-10-2000 and 01-11-2000 and after considering the additional representations, the Commission issued orders on 20-06-2001 in O.P.No.1075/2000, inter alia directing as under:

a) The existing incentives under G.O.Ms.No. 93, dated 18-11-1997, which are continued under the orders of the Commission from time to time till 24-06-2001 under Commission's letter No.2473, Dated: 24.04.2001 are extended for the time being till 24-07-2001. (The temporary extension has been given to enable the developers to finalise agreements/arrangements relating to supply of power to APTRANSCO prior to 24-07-2001).

(b) With effect from the billing month of August 2001, all generators of non-conventional energy shall supply power to APTRANSCO only as per the following terms:

i) Power generated by non-conventional energy developers is not permitted for sale to third parties;

ii) Developers of non-conventional energy shall supply power generated to APTRANSCO/DISCOMs of A.P. only.

iii) Price applicable for the purchase by the supply licensee should be Rs.2.25 per unit with 5% escalation per annum with 1994-95 as the base year.

c) APTRANSCO shall arrange payment for the supply of power purchased from developers of non-conventional energy by opening a Letter of Credit in favour of the suppliers of power.

d) A *suo motu* review of the incentives to take effect from 1st April, 2004, will be undertaken by the Commission after discussions with all the concerned parties.

e) There will also be a review of the purchase price with specific reference to each developer on completion of 10 years from the date of the commissioning of the project (by which time the loans from financial

institutions would have been repaid) when the purchase price will be reworked on the basis of return on equity, O & M expenses and the variable cost.

f) It was further stated that wheeling and banking charges would continue to be regulated by GO.Ms.No. 93 of 18-11-1997 till further orders of the Commission.

8) The order dated 20-06-2001 was challenged by some of the developers of non-conventional energy by filing appeals / writ petitions in the Hon'ble High Court of Andhra Pradesh on the directions contained in the Order for the sale of electricity from such non-conventional energy sources to APTRANSCO only and prohibiting the third party sales. The Hon'ble High Court had passed orders staying the enforcement of the Commission's order in the above petition.

9) Pursuant to the orders of the Commission in OP.No.1075 / 2000, some of the developers have entered into Power Purchase Agreements (PPA) with APTRANSCO accepting the terms and conditions set out in the order dated 20-06-2001. The present order deals with such NCE developers who have agreed to sell electricity generated by them to APTRANSCO and those who may now be willing to supply electricity to APTRANSCO on the terms and conditions as may be determined by the Commission. These developers either have not challenged the order dated 20-06-2001 of the Commission or withdrawn their cases from the Hon'ble High Court of Andhra Pradesh. It is clarified that the present order deals with directions contained in the order dated 20-06-2001 passed by the Commission for sale of electricity to APTRANSCO only and therefore does not deal with those NCE developers who had not agreed to sell the electricity generated by them to APTRANSCO.

10) The status of different categories of NCE projects in the State is as follows:

Status of non-conventional energy projects sanctioned and commissioned, category – wise

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	Biomass	410.55	150.25	*260.30
4	Bagasse	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 based on energy plantations.**

Proposals for tariff from 01-04-2004

11) As decided by the Commission in its order dated 20-06-2001 in OP.No. 1075 / 2000, a review of the incentives (including purchase price) effective from 01-04-2004 has now been undertaken and decided by the Commission in this order.

12) The Commission in its tariff order for FY 2003-2004 directed APTRANSCO and NEDCAP to file proposals for tariffs and incentives for various categories of NCE projects to take effect from 01-04-2004.

The following tariff proposals were received from NEDCAP and APTRANSCO on 02-08-2003 and 06-10-2003, respectively:

APTRANSCO's Tariff Proposals

Particulars	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%
Biomass	2.27	2.27	2%	2%
Waste to Energy	Nil	2.66	---	1%
Wind	2.52	2.55	---	---

NEDCAP Tariff proposals

(Per unit)

Bagasse	Rs. 2.62 – 1st year Rs. 2.48 – 10th year.
Biomass	Rs. 3.27 – 1st year Rs. 3.77 – 10th year.
Mini Hydel	Rs. 2.96 – 1st year Rs. 2.26 – 10th year.
Wind Farm	Rs. 4.54 – 1st year Rs. 3.19 – 10th year.
Waste to Energy	Rs. 2.99 – 1st year Rs. 3.19 – 10th year.

13) The proposals received from APTRANSCO and NEDCAP were sent to all NCE Developers in Andhra Pradesh including those effecting sale of power to third parties, inviting objections / comments, if any, on the proposals (23-10-2003). In addition, MNES, IREDA and the Irrigation Department of GoAP were also issued notices inviting suggestions / comments.

The last date for receiving the objections was fixed as 03-11-2003, extended however to 13-11-2003 at the request of some developers.

14) In response to the notices issued, 86 Developers / Associations filed their objections / suggestions / representations.

15) Forty-four developers / Associations requested for personal hearing.

16) The objections received from the Developers were sent to NEDCAP and APTRANSCO to communicate their comments / clarifications.

17) NEDCAP's response was received on 19-11-2003, wherein they proposed some revised norms for tariff computation, while APTRANSCO's response was received on 06-12-2003.

18) The Commission conducted a hearing on 22-12-2003 and 23-12-2003 which was attended by the representatives of the Developers / Associations and the IREDA, in addition to the NEDCAP and APTRANSCO. During the hearing 30 developers / Associations presented their views before the Commission. The list of developers / Associations who presented their views during the hearing is enclosed in the Annexure –A. NEDCAP was directed to work out and indicate the actual revised tariffs based on the norms proposed by them vide their letter dt. 19-11-2003. NEDCAP by letter dt. 06-02-2004 submitted the revised tariffs as follows:

	Existing Plants (Rs. / unit)	New Plants (Rs. / unit)
Bagasse	3.20 1st year 3.32 10th year	3.30 1st year 3.36 10th year
Biomass	3.51 1st year 4.11 10th year	As for existing plants
Mini Hydel	3.23 1st year 3.00 10th year	3.19 1st year 3.07 10th year
Wind Farm	3.92 1st year 2.86 10th year	As for existing plants
Waste to Energy	4.04 1st year 4.35 10th year	As for existing plants

19) The Commission issued a public notice on 4th March 2004 inviting objections from general public on the tariff proposals of APTRANSCO and NEDCAP and the tariffs sought by the developers. The public hearing was conducted on 19th March, 2004 to enable the public to make their submissions before the Commission. The Commission received responses from more than 500 persons and 14 persons presented their views before the Commission. The list of persons who presented their views during public hearing is enclosed in the Annexure - B. During the hearing, a number of issues have been raised on the fixation of tariff. The issues raised by the public, the developers, and the response of APTRANSCO are dealt with in the respective paragraphs while discussing the corresponding issues herein.

Commission's Analysis

20) Before considering the issues on merits, the Commission will deal with the preliminary objections raised in the proceedings on 22nd and 23rd December, 2003.

A) It was urged during the hearing that the order dated 20-06-2001 passed by the Commission has been suspended by the Hon'ble High Court, and that the suspension of the order continues.

In view of the suspension of the order dated 20-06-2001, the Commission cannot undertake review of the incentives.

As mentioned herein above, the Commission, in this order is not examining any of the issues concerning the direction contained in the order dated 20-06-2001 that the NCE Developers shall not sell electricity to third parties and they are required to sell the electricity only to APTRANSCO. The Commission in this order is dealing with only those NCE Developers who had accepted the order dated 20-06-2001 and voluntarily agreed to sell electricity to APTRANSCO on the terms and conditions contained in the order dated 20-06-2001. The other NCE Developers

may also sell electricity to APTRANSCO if they choose to accept the terms and conditions as may be laid down by the Commission. It is clarified that under this order, the Commission is not giving any direction that the NCE Developers shall not sell electricity to third parties or that they shall sell electricity only to APTRANSCO. The NCE Developers who have agreed to sell electricity to APTRANSCO are not covered by the suspension order of the Hon'ble High Court.

B) It has been urged that the notice issued by the Commission only refers to the determination of the price at which the NCE Developers will sell electricity to APTRANSCO. The notice does not deal with review of other incentives.

The Commission in this order will deal with sale of electricity by NCE Developers to APTRANSCO and related issues. The Commission is not dealing with other issues relating to sale of electricity to third parties, wheeling charges payable, etc. In view of the above, the review is restricted to the price for the sale of electricity to APTRANSCO.

C) It has been urged that there is no provision of law under which the tariff proposals could be made by the purchaser of energy and the NCE Developers being placed in the positions of an objector.

The Commission is now undertaking a review of the price of those NCE developers who are currently selling electricity to APTRANSCO as per terms of sale prescribed in the order of the Commission in O.P.No. 1075 / 2000. That order of the Commission provides for review of the incentives which essentially relate to price and banking w.e.f. 01-04-2004. The Power Purchase Agreements signed by the APTRANSCO and NCE developers include provisions for such review by the Commission w.e.f. 01-04-2004. The review of the price at which the APTRANSCO shall purchase power from the NCE developers is within the jurisdiction of the

Commission u/s 21 (4) of the Andhra Pradesh Reform Act and also u/s 86 (1) (a) of the Electricity Act, 2003. Accordingly, the Commission sought proposals from APTRANSCO and NEDCAP for the revised price and forwarded them to the NCE developers for their comments / proposals and heard APTRANSCO, NEDCAP and NCE developers on their proposals. The objections raised are hyper-technical and without merit.

D) It has been urged that APTRANSCO being the State Transmission Utility is prohibited under the Electricity Act, 2003 from purchasing and selling electricity effective from 10-06-2004. APTRANSCO is therefore not a proper party to be considered for purchase of electricity.

In terms of sections 39 and 41 of the Electricity Act, 2003, a State Transmission Utility and a Transmission Licensee are prohibited from undertaking trading i.e., purchase of electricity for resale as defined in section 2 (71) of the said Act from 10-6-2004. The APTRANSCO can however continue the activities of trading and transmission till 09-06-2004 as provided in the first proviso to section 14 of the Electricity Act, 2003. By 10-06-2004, the transmission and trading activities will have to be segregated. On such segregation, the power purchase agreements of APTRANSCO including the agreements with NCE developers will vest in the entity which will succeed APTRANSCO in respect of the trading activities.

E) It has been urged that in terms of section 61 of the Electricity Act, 2003, the Commission is required to frame tariff regulations specifying the terms and conditions for determination of tariff.

The proviso to section 61 of the Electricity Act, 2003, requires the tariff regulations to be framed by 09-06-2004 and till then the Commission can proceed on the basis of the existing regulations. Further, as mentioned above, the Commission

in this order is dealing only with those energy developers who have agreed to sell electricity to APTRANSCO on the terms and conditions contained in the order dated 20-06-2001. Such an agreement falls under section 21 (4) of the Andhra Pradesh Reform Act. The APTRANSCO is at present the Bulk Supply Licensee. The Commission has therefore jurisdiction to deal with agreements with such energy developers and APTRANSCO as a licensee. As and when the trading and transmission functions of APTRANSCO are segregated, pursuant to the mandate under sections 39 and 41 of the Electricity Act, 2003, the entity established to undertake the trading function will deal with the above power purchase agreements.

F) It has been urged that in terms of section 86 (1) (e) of the Electricity Act, 2003 the Commission is required to specify the percentage of electricity to be purchased from NCE sources and unless the purchase quantum is decided, the price should not be fixed.

The total quantum of purchase from NCE sources is being determined by the Commission and shall form a part of the tariff order which the Commission will issue for the year 2004-2005.

21) <u>Issues for consideration on merits:</u>

The Commission has considered, inter alia, the following issues:

i) Whether the tariffs and incentives should be uniform for all the categories of NCE projects as provided earlier in MNES guidelines, GoAP orders and APERC's order in OP.No 1075/ 2000 dated 20-06-2001 or should they be different for different categories of NCE projects.

ii) Whether the tariff should be a single part tariff or a two part tariff.

iii) Whether the tariff should be project specific or uniform for all projects falling in a category.

iv) Whether there should be a cap on tariff when a project exceeds the expected minimum performance.

v) Social and environmental considerations.

vi) Control period

22) The fixed cost portion of the tariff has common components like interest on loans, interest on working capital, depreciation and return on equity (ROE). But the variable cost portion varies widely on account of the raw material/fuel used. Each category of NCE projects is distinct from another in raw material consumption. Similarly the operating cost and the availability of raw material for each category vary widely. Even the free sources of energy like water and wind are not uniformly available across the State. The availability varies mainly depending on the location of the project. All these have wide ranging influence on the tariff. Hence, the Commission considers that it may not be appropriate to fix uniform tariffs / incentives for different categories of the NCE projects.

23) The public has brought out the following general issues:

- The agricultural wastes which were earlier being burnt in the fields are now being effectively utilized for producing electricity in Biomass plants.
- Power generation from these agricultural wastes provides employment, direct as well as indirect, to rural population.
- It is contributing to improve literacy levels.
- It is also contributing to optimum utilisation of resources.
- Biomass plants are eco-friendly.

- They are helping grid stabilization, improve voltages in rural areas and reduce burden on thermal plants.
- The biomass plants are in the initial stage of the development and they need support till the industry is stabilised. The availability of biomass fuel is dependent on various issues like agricultural production etc. As the prices are not controlled, there are wide fluctuations in the fuel price. Further, the industry has to incur unforeseen expenditure in the monsoon season. The Commission should therefore consider not only economic factors but also social factors such as rural employment and environmental factors like reduced pollution of environment. When there is huge deficit in generation, the Non-Conventional plants especially Biomass plants ought to be encouraged.

- Any major departure from the existing tariff structure will force closure of industry and will lead to unemployment of thousands of workers. The Commission should therefore provide encouragement to this industry.

24) On the other hand, it was also pointed out that the promotion of non-conventional energy projects should not be at the cost of consumers. Except wind and mini-hydel projects, most of the NCE projects also contribute to environmental pollution depending on the type of fuel used. Consuming 30% of conventional fuel further worsens this. So, it should be evaluated based on commercial principles also. It was also stated that the sanctioned capacity of the biomass plants was much in excess of the capacity that could be sustained on the quantum of biomass available as revealed by the study conducted by Administrative Staff College of India (ASCI) in February, 2001. Excess capacity has raised the cost of the fuel (biomass), burdening the consumers. Thus no fresh biomass plants be allowed.

25) While considering the tariffs for NCE sources, the Commission too recognises the following advantages in promoting non-conventional / renewable sources of energy:

i) Conserving the fast depleting fossil fuels.

ii) Reducing environmental pollution.

iii) Social benefits (direct / indirect)

- Providing employment to (mostly) rural population.
- Developing skills among rural population.

iv) Distributed generation as envisaged in the Electricity Act 2003.

v) No rehabilitation is involved in most of the cases.

vi) Short gestation periods.

vii) No environmental concerns.

viii) Reduction in green house gases and protection of the Ozone layer.

ix) Solution for disposal of garbage / Industrial Waste.

26) The Commission is keen to fix the tariff for NCE sources broadly in line with the following principles:

a) Transparency and interaction with the public, utility and developers.

b) Balancing the interest of all stakeholders

c) Consistency in principles and their application

d) Minimization of regulatory uncertainty

27) APTRANSCO has submitted that 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 NCE developers.

v) Implementation of two part tariff in respect of NCE developers would therefore involve large administrative machinery for monitoring and settlement. Hence, according to APTRANSCO, two part tariff is not practicable.

Some of the objectors too suggested that tariffs be determined on single part basis.

28) <u>The Electricity Act 2003:</u>

a) Section 86 (1) (e) of the Electricity Act, 2003 provides that State Regulatory Commission would promote renewable and NCE sources.

b) Sec 86 (1) (e) of the Electricity Act, 2003 also provides 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 Electricity Act, 2003 empowers the State Commission to fix the tariff for generating stations in the State.

29) <u>Tariff Determination</u>

Some of the objectors have criticised the current practice of maintaining the same tariff for all categories of NCE sources. The Commission is also of the same view as the project cost and the fuel are different for each category and allowing the same tariff across the categories is neither appropriate nor in the interests of the consumers. The Commission has decided to fix the tariff on cost-plus approach so

that each element of fixed and variable cost is properly addressed and not to follow any other adhoc basis for fixing the prices at which the different categories of NCE developers sell electricity to APTRANSCO.

Accordingly, the following factors are taken into consideration in determination of the tariff:

i) Capacity of the plant

ii) Project cost per MW

iii) Plant load factor

iv) Heat rate of the plant

v) Calorific value of the fuel

vi) Cost of fuel

vii) Hydrology risks (hydro plants)

viii) Auxiliary Consumption

ix) Operation & Maintenance (O & M) Expenditure, O & M escalation

x) Debt-equity Ratio

xi) Return on equity (ROE)

xii) Interest on term loan

xiii) Interest on working capital

xiv) Depreciation

xv) Royalty on water charges (hydro)

Because of lack of convergence of the views of APTRANSCO and the developers on certain basic issues like cost of fuel and consumption, the Commission deputed the officers of the Commission to some of the NCE projects to study the working of the power plants, type of fuel used and their consumption, to get an indication of the working of such NCE projects .

The data obtained by the staff is co-related with the material available on record and the Commission made efforts to balance the interests of all the stakeholders, while keeping the primary objective of promoting NCE based power projects.

30) <u>Methodology:</u>

The key issue involved in determination of tariff in case of projects is whether to consider single part tariff or two part tariff.

The Commission recognises the fact that two part tariff will be difficult to implement in view of the large number of the plants of low capacity. But at the same time, the Commission considers that beyond the threshold level of generation, the developers should get only variable cost (if any) and incentives and not the fixed charges. The Commission would also like to determine the tariff for all the projects of one category based on the year of commissioning of each project.

31) <u>Specific issues raised by the objectors and the response by APTRANSCO in regard to tariff determination :</u>

1. Benchmarking of capital cost should be based on market trends confirmed through competitive bidding from time to time. Though APTRANSCO is in agreement with this approach, it expects a detailed procedure from the Commission for an effective competitive bidding.

2. One of the objectors questioned the basis on which APTRANSCO had fixed the RoE @ 11%. APTRANSCO has replied that this rate is worked out as follows:

   Rate of Govt. bonds – 6%

   Developers' risk – 4%

   Income –tax – 1%

3. The tariff beyond threshold limit should be limited to the variable cost and incentives only and not the full tariff. The APTRANSCO preferred a single part tariff for the entire energy for purchase.

4. As APTRANSCO has suggested depreciation @ 7.84% p.a, the developer should not be allowed to go in for third-party sale after enjoying the front loading in tariff.

5. As APTRANSCO has proposed levelised tariff, there is no need to provide for annual escalation. One of the objectors suggested escalation only on variable cost.

6. NCE projects provide rural employment and hence should be encouraged. APTRANSCO has replied that any cost paid beyond reasonable level towards encouragement will unduly increase the burden on the consumers.

The Commission has dealt with all these objections and the responses of APTRANSCO at the appropriate places in the order.

32) <u>Control period</u>: One of the objectors has requested that the control period should be only for 3 years, as the Commission needs to review the tariff frequently. The Commission feels that frequent review would create uncertainty in the tariff. At the same time a longer period of 10 years may not reflect the real change in the market scenarios in determining the variable cost. Hence it desires to have a control period of 5 years.

Tariff determination for Bagasse based Co-generation Plants

33) CAPITAL COST:

M/s. NEDCAP indicated a project cost of Rs. 2.5 Crs / MW initially but subsequently revised it to Rs. 3 Crs / MW, for old projects and Rs. 3.5 Crs / MW for new projects, while APTRANSCO considered a capital cost of Rs. 3 Crs / MW as reasonable for all projects. One of the Developers has quoted a figure of Rs. 2.5 Crs / MW to Rs. 2.9 Crs / MW. The South Indian Sugar Mills Association Andhra Pradesh (SISMA-AP) projected the capital cost as varying from Rs. 3.25 Crs–Rs. 3.75 Crs / MW.

All these numbers indicate that there is no convergence of views on capital cost of projects. The Commission, in order to arrive at the tariff was keen to estimate the project cost based on the details available with some reliable organizations having maximum information on each project. M/s. NEDCAP and APTRANSCO are the two Government organisations which have the data either from their own analysis or from Detailed Project Reports (DPRs) filed by the developers. The capital cost of each project is varying depending on its size and technology.

During the hearing with the developers, SISMA-AP quoted capital cost of Rs. 3.25 Crs/MW. As this cost is also falling in the range quoted by NEDCAP, the Commission agrees to Rs. 3.25 Crs/MW as the project cost for Bagasse based Co-generation projects without distinguishing between old and new projects.

34) Auxiliary Power Consumption:

According to APTRANSCO, the DPRs indicate Auxiliary Consumption of 8% only but it has considered Auxiliary Consumption of 9% as reasonable. SISMA-AP

and NEDCAP have indicated the Auxiliary Consumption at 10%. The Commission is of the view that compared to conventional power projects, the NCE projects have less auxiliary system. These projects should be operated efficiently to minimize losses and maximize production as provided in the Energy Conservation Act. Hence the Commission allows auxiliary consumption at 9% only.

35) <u>Fixed cost coverage</u>:

The threshold Plant Load Factor (PLF) has to be arrived at for fixed cost coverage. The APTRANSCO has assumed a PLF of 80% while NEDCAP indicated a PLF of 50%. M/s. Sudalagunta Sugars has indicated PLF of 80%. However SISMA-AP worked out the PLF at 55% taking into consideration the captive consumption of sugar factory and actual crushing season of 150 days.

One of the objectors has suggested that the Commission should consider only the actual levels of PLF achieved by different types of NCE projects for fixing the PLF for fixed cost. In case of Bagasse based Co-generation Plants, the PLF depends mostly on availability of Bagasse in the crushing season. According to SISMA-AP, in the last 10 years, the average crushing days of all the sugar factories of Andhra Pradesh put together work out to around 130 days. Assuming that the projects can run for 130 days during the crushing season and another 100 days during non-crushing season (with the stored Bagasse and other Biomass fuels), the average PLF that can be achieved is around 55% when the project runs at a capacity of 90%. Even though the actual PLF achieved during 2002-03 ranges from 10.35% to 84.05%, Commission considers threshold level of PLF at 55% worked out on the basis of the availability of fuel, as reasonable.

36) Cost of Fuel:

The power is basically generated out of the Bagasse produced by crushing of sugar cane in the manufacture of sugar. APTRANSCO has considered Bagasse price as Rs. 600 / MT for new projects and Rs. 533 / MT for existing projects (base year 2000-01) whereas NEDCAP has indicated it as Rs. 600 / MT, while developers have sought price of Bagasse as Rs. 650 / MT. The Commission recognises that the price of Bagasse is the key parameter influencing the project economics and determination of tariff. The fuel for the Co-generation plant during crushing season is virtually free. However, if Co-generation plant does not exist the Bagasse will fetch some price. As such the issues like calorific value of Bagasse, Station Heat Rate (SHR) and its linkage to sugar cane prices need to be addressed adequately. As Co-generation is an efficient process where the cycle efficiency is high, it needs to be encouraged.

In the DPRs, the Gross Calorific Value of the Bagasse is around 2270 Kcal / Kg, whereas APTRANSCO has considered the Gross Calorific Value of Bagasse as 2300 Kcal / Kg and the same is also projected by the Developers. NEDCAP during revised submissions indicated Gross Calorific Value as 2000 Kcal / Kg. The Commission considers Gross Calorific Value of 2300 Kcal / Kg as proposed by APTRANSCO reasonable for price determination of Bagasse.

The Commission feels that there cannot be any relationship between price of sugar cane that is being fixed by Govt., and the price of Bagasse. One of the objectors has pointed out that Bagasse is a wasteful residue and must be available free of cost. However the Bagasse is also in demand by other industries like paper, cattle feed etc., and accordingly market forces determine the price of Bagasse.

For determination of Bagasse price, Commission has adopted equivalent heat value of coal. The Commission has considered the pit head cost and calorific value of coal to arrive at the fuel price linked to heat content. The fuel price in terms of Rupee / tonne equivalent to gross calorific value of 2300 kcal / kg works out to around Rs. 562 / MT. NEDCAP has also submitted that the average cost of Bagasse, based on heat equivalent of coal works out to Rs.575 / MT. The Commission therefore considers Rs. 575 / MT as a reasonable and fair price for Bagasse.

37) <u>Fuel Price Escalation</u>

APTRANSCO and NEDCAP have considered the escalation in the fuel cost at the rate of 4% whereas the Developers have sought 5% escalation. The current rate of inflation is also around 4% per annum but as the fuel is procured from un-organized sector, the Commission considers the escalation for fuel price at the rate of 5% as reasonable and fair.

38) <u>Specific fuel consumption:</u>

The fuel consumed in the Co-generation plant will cater to

- Production of steam to process plant.
- Supply of power to the sugar industry (Captive consumption) during crushing season.
- Delivery of power to APTRANSCO.

The consumption of fuel intended for supply of power to APTRANSCO needs to be considered and costed.

The projections by different agencies are widely varying. APTRANSCO assumed 2.08 kg / kWh, while NEDCAP assumed 2 kg / kWh. The expert committee

constituted by the GoAP for Biomass Power Projects has considered allowable Station Heat Rate of 3650 Kcal / Kwh. However, there was no such committee for Bagasse based projects. Considering the similarities between both the categories, the Commission considers SHR at 3700 Kcal / Kwh for Bagasse projects as reasonable and fair. Based on this, the Commission considers 1.60 Kg / Kwh as the rated average of specific fuel consumption during crushing and non-crushing season.

39) <u>O & M Expenditure:</u>

APTRANSCO has stated that the O & M expenditure of 2.5% of capital cost has been considered as per DPRs made available by some of the developers.

The developers have contended that the O & M expenditure of 2.5% of capital cost assumed by APTRANSCO is too low. NEDCAP has considered 3% initially and subsequently raised it to 5% (including insurance). SISMA-AP claimed 5.5% for O & M expenditure including insurance whereas one developer (M/s. Sudalagunta Sugars) claimed 3.8% based on actual expenditure.

For thermal projects, the O & M expenditure allowed as per CEA guidelines is 2.5% per annum. But Bagasse based co-generation projects are very small in capacity and are of evolving technologies. These cannot therefore be compared to bigger projects of advanced technologies. At the same time it is a fact that the O & M of the steam generator cannot be totally apportioned to power generation as part of the steam generated is utilised for the industry. The Commission considers O& M expenditure of 3% per annum (including insurance) as reasonable.

40) O & M Escalation:

The developers have stated that escalation on O & M is to be considered between 4%-8%.

M/s. NEDCAP has indicated the escalation at 2% initially but later revised it to 5%.

APTRANSCO submitted that the O & M escalation was provided at 4% based on the trend of inflation after considering the variation of Wholesale Price Index & Consumer Price Index (WPI & CPI) during the past few years.

The Commission considers the escalation of 4% on O & M expenditure as proposed by APTRANSCO as reasonable as it falls in line with the rate of inflation.

41) Debt- Equity Ratio:

APTRANSCO and NEDCAP have assumed Debt-Equity Ratio at 70:30. The Developers are also generally in agreement with the same.

Debt-equity ratio is mainly determined by the Financial Institutions for approving project loans. As these projects are mainly financed by IREDA / Financial Institutions and they insist for Debt-equity ratio of 70:30, the Commission too considers the Debt-equity ratio of 70 : 30 as reasonable.

42) Return on Equity:

The developers have sought 16% Return on Equity (ROE). NEDCAP has also proposed ROE of 16%.

APTRANSCO has submitted that due to declining trend of interest rates in the economy, they have considered ROE at 14% and 11% for the existing and new projects respectively.

Some of the developers have raised the issue on Minimum Alternate Tax (MAT) which is equivalent to 7.5% of the book profits. APTRANSCO has replied that as per the provisions of the IT Act, all the power projects enjoy a tax holiday for the first 10 years. The project can have necessary tax planning to minimise tax incidence, whether MAT or otherwise. However the tariff calculations have assumed an additional 1% return on equity which provides additional cash flow to the developer for necessary apportionment between tax and return.

The Commission admits this liability as part of the tariff. The Commission recognises that in a regime of falling interest rates, the ROE should also correspondingly reduce. But keeping in view that GOI attaches great importance to promotion of non-conventional energy, the Commission wishes to encourage the non-conventional power projects which are environment friendly but are fraught with risks and uncertainties. In order to cover risks and also to provide an incentive to promote development, Commission considers ROE at 16% for the existing projects as well as for new projects to provide encouragement to the non-conventional sector. The additional cushion provided in ROE should be in a position to cover MAT liabilities also.

43) <u>Interest on Term Loan:</u>

APTRANSCO has considered the interest on term loan at 13% for the existing and 10% for the new projects, whereas NEDCAP has considered Interest on Loan as 11% for the existing projects and 10% for the new projects after interest subsidy. The developers however sought 13% on existing projects and 10% to the new projects. All the stakeholders have uniformly quoted 10% as interest rate for new projects. This must be on account of falling interest rates. But the impact of falling

interest rate are not being reflected in the interest rates of old projects. Some of the Developers are reported to have swapped their loans for lesser interest rates. The Commission is of the view that this has to be followed by other developers too so that benefit of falling interest rates can be passed on to consumers.

In view of the above, the Commission considers 10% rate of interest on Term Loans as reasonable for existing as well as new Projects.

44) Interest on Working Capital:

APTRANSCO considered 12% interest on working capital, though M/s. Sudalagunta Sugars requested for 13% whereas SISMA-AP has considered 12%.

The Commission is in agreement with APTRANSCO / SISMA-AP and allows 12% as interest rate on working capital as this is also in line with the on-going interest rate of Banks for working capital.

45) Depreciation:

APTRANSCO considered depreciation @ 7.84% and submitted that 70% depreciation is allocated during the term of the loan and the balance 20% has been spread on the balance life of the Project. But NEDCAP and one of the developers (M/s. Sudalgunta Sugars Ltd) have suggested only 5% p.a. while SISMA-AP has agreed with APTRANSCO and proposed 7.84% p.a. as depreciation.

The depreciation rate of 7.84% is as per the rates approved for Independent Power Producers (IPPs) so that this amount can be used for repayment of loans. The Commission while approving uniform rate of depreciation both for existing as well as new projects, allows depreciation at the rate of 7.84% per annum from the date of commissioning till the depreciation allowed accumulates to 70% of the project

cost. The balance depreciation of 20% of the project cost will be allowed every year equally for the balance period of the PPA so that the total depreciation allowed for the project does not exceed 90% of the project cost.

Some of the objectors have pointed out that the higher recovery of depreciation through tariff in the earlier years may not encourage the developers to sell energy to APTRANSCO in the later years. The Commission agrees that this method of charging depreciation is front-loading the tariff but it is allowed in the tariff only with an intention to enable the developers to repay their loan liability. But at the same time the Commission does not like the benefit to drift away. Hence in order to get the recovery of the same in the later years, the developers shall have to sell energy and capacity to APTRANSCO as contracted in the PPA for the entire term of the PPA, which is 20 years from the year of commissioning.

46) Taking into account the technical and financial parameters considered by the Commission in the preceding paragraphs, the fixed cost tariff for Bagasse Based Co-generation Plants is estimated as follows:

Year of operation (n^{th} year)	**Fixed Cost Rs / Unit**
1st	1.72
2nd	1.67
3rd	1.63
4th	1.59
5th	1.55
6th	1.51
7th	1.47
8th	1.43
9th	1.35
10th	0.90

The variable cost tariff for Bagasse based projects is estimated as follows:

Financial Year	Variable Cost Rs / Unit
2004-2005	1.02
2005-2006	1.07
2006-2007	1.12
2007-2008	1.18
2008-2009	1.24

The above tariff includes annual escalation on variable cost and O & M expenditure.

The existing and new projects shall be entitled to a tariff with the component of fixed charge based on the year of operation (n^{th} year) and variable charge corresponding to the financial year of the operation.

As observed earlier, fixation of uniform tariff across all Bagasse based co-generation plants with varying capacities, technologies and operating conditions would lead to uneven tariffs and undue enrichment of some developers. The Commission therefore proposes a two tier tariff for the Bagasse based co-generation plants distinguishing those operating up to 55% PLF and others operating above 55% PLF. Where, Plant Load Factor during a settlement period exceeds 55% (the level at which the fixed cost is expected to be recovered), only variable cost indicated above and incentive of 21.5 paise / unit as explained in Para (47) below shall be paid for every unit delivered in excess of the above PLF.

47) <u>Incentive</u>

One of the objectors has pointed out that only incentive should be paid beyond the threshold level of PLF. The Commission has noticed that some of the Bagasse based co-generation projects are generating beyond the threshold level of

55% also. The Commission is inclined to encourage this non-conventional generation. But at the same time, the consumers should not be burdened with the same tariff beyond threshold PLF as the developers would have recovered the entire fixed cost at the threshold level of PLF itself. In order to encourage the developers and without unduly burdening the consumers, the Commission deems it fit to provide an incentive of 21.5 paise per unit as fixed by Central Electricity Regulatory Commission (CERC) in its tariff notification dated 20th December, 2000 for conventional generation projects. This incentive will be for actual generation beyond the threshold PLF of 55% at generator terminals i.e. including captive and auxiliary consumption.

Tariff determination for Biomass based Power Projects

48) Potential of Biomass for Power generation.

Ministry of Non-conventional Energy Sources appointed Administrative Staff College of India (ASCI) to study the potential of Biomass in the State.

GoAP appointed an expert committee in 1997 consisting of officers of APSEB, Industries Department, Agriculture Department, NEDCAP and Non-conventional power project Developers to assess the district-wise availability of Biomass in the State. The Committee, after study of the district-wise resources of Biomass estimated that the available Biomass would support a generation of 448.5 MW.

The ASCI submitted a report in October 2001 wherein the Biomass potential was estimated to support a generating capacity of 224.43 MW on a sustained basis.

GoAP has lately authorised NEDCAP to promote pilot projects based on energy plantation totaling a capacity of 48 MW recognising the fact that the available Biomass in the State is only adequate for projects already sanctioned.

Notwithstanding the above, there have been adverse reports in the media as well as in the submissions made to the Commission that Biomass Developers are resorting to dubious means of procuring the fuel by cutting of trees in the forests and using woody Biomass as fuel which are not permitted species. However, there is no concrete evidence to establish the same. But the Commission raised this issue with NEDCAP and they confirmed in consultation with the forest officials that there were only stray incidents where heavy penalties were imposed on the defaulters.

49) <u>Cost of the Project:</u>

The developers in their initial filings submitted that Rs. 4 Crs. / MW of the project cost adopted by APTRANSCO is lower, compared to the actual cost incurred which is in the range of Rs. 4.00 Crs to 4.11 Crs / MW. APTRANSCO submitted that the benchmark of capital cost as submitted by them (APTRANSCO) is based on the information provided in the DPRs and the cost would actually decrease further if capital subsidy provided by the State Government to these projects is also considered.

M/s. NEDCAP replied that no capital subsidy is provided by the State Government for Biomass projects and the indicative project cost is Rs. 4 Crs. / MW only.

During the hearing with the developers, after detailed deliberations, the Biomass Energy Developers Association (BEDA) agreed for consideration of the project cost at Rs. 4 Crs/ MW.

One Developer, namely M/s. R.R. Bio-Energy Ltd, stated that he proposed to set up a 12 MW power plant based on integrated gastification combined cycle technology whose capital cost according to them worked to out Rs. 9 Crs / MW. The cost of the generation therefore was estimated at Rs. 4.35 / unit. While the

Commission appreciates the efforts of the developer in the implementation of new technology, it is of the opinion that the burden of such abnormal tariffs cannot be passed on the consumers.

Based on the above, the Commission accepts the benchmark capital cost of Rs. 4 Crs / MW for Biomass projects.

50) Plant Load Factor:

APTRANSCO has considered a plant load factor of 80% for computation of the tariff. M/s. NEDCAP also suggested a PLF of 80%. However the developers contended that the PLF should be considered at 70% in view of the uncertainties involved.

The Commission reviewed the PLFs achieved by the Biomass power plants during the past 2 / 3 years as submitted by APTRANSCO and it appears that these projects can achieve PLF of 80%.

The Developers during hearing also admitted that the PLF of over 80% is achievable.

The Commission therefore considers a PLF of 80% as threshold for fixed cost coverage.

51) Auxiliary consumption:

i) APTRANSCO stated that it considered auxiliary consumption at 9% of the gross generation based on DPRs. They further stated that the auxiliary consumption in case of some of the projects is around 4-5% only.

ii) NEDCAP indicated auxiliary consumption at 10%.

iii) The developers have stated that the auxiliary consumption of 9% as considered by APTRANSCO is low and actual consumption is in the range of 9-15%.

The developers during the hearing accepted for consideration of Auxiliary Consumption at 9%.

Compared to conventional power projects where 9% auxiliary consumption is allowed the non-conventional power projects have less auxiliary system. Further, the Commission is of the view that these plants should be properly audited and operated efficiently to minimize losses and maximize production as enunciated by the Energy Conservation Act. Hence the Commission considers auxiliary consumption of 9% which is also as per the DPRs of some of the projects.

52) <u>O & M Expenditure:</u>

The developers have contended that the O & M expenditure of 2.5% of capital cost assumed by APTRANSCO is too low and unrealistic.

They further stated that there is no provision for 1% insurance, which is mandatory requirement of lenders.

M/s. NEDCAP have indicated an O & M expenditure of 5%.

APTRANSCO however stated that the O & M expenditure of 2.5% of capital cost has been considered as per Central Electricity Authority (CEA) guidelines, which includes insurance cost.

The Commission recognises that there are no guidelines of CEA for the operating norms for the NCE Projects.

Considering the fact that the biomass based projects are labour-intensive, still in the development stage and the technology is to be further perfected, the

Commission is convinced that O & M expenditure needs to be considered at a level higher than 2.5%.

After examining the Audited Accounts of some projects, the Commission came to the conclusion that O & M expenditure including insurance can reasonably be fixed at 4% instead of 2.5% assumed by APTRANSCO.

53) <u>O & M Escalation:</u>

The developers argued that 4% escalation on O & M as projected by APTRANSCO is low and should be fixed at 5%.

M/s. NEDCAP indicated the escalation at 5%.

APTRANSCO submitted that the O & M escalation was provided at 4% based on the trend of inflation after considering the variation of WPI & CPI during the past few years.

The Commission considers the escalation of 4% on O & M as proposed by APTRANSCO as reasonable and accepts the same.

54) <u>Cost of Fuel:</u>

Cost of fuel is the most important parameter that determines the cost of generation in a Biomass power plant. While APTRANSCO and M/s. NEDCAP have assumed Rs. 1000 / MT and Rs. 1100 / MT respectively as the cost of Biomass fuel, the developers projected a cost of Rs. 1300/ MT. In view of the very conflicting projections by the different agencies, the Commission deputed its officers to some of the Projects, which have been in operation for the past 1 – 2 years to ascertain the factual position.

The Developers during the hearing on 22.12.2003 submitted that due to increase in the number and capacity of the Biomass plants in the State, the cost of

rice husk has gone up substantially. Further they are meeting their fuel requirement to the extent of only around 60% by rice husk, meeting the balance through other material like woody Biomass, cotton stacks, chilly stacks etc.

The Commission asked the developers as to why they cannot use conventional fuels like coal to the extent permitted by MNES. The developers submitted that the landed cost of coal is higher than the cost of Biomass fuel and hence they are using coal to the barest minimum possible.

The details of the price of rice husk given by the AP Rice Millers Association varied from Rs. 900 – Rs. 1400 depending on the season. The price of other Biomass fuels as furnished by M/s. NEDCAP varied from Rs. 600 – 900 / MT. The study team of APERC observed that the rice husk is utilised up to 50-60% and balance requirement is met from other fuels. Considering the weighted average price of rice husk and other materials (60:40), the price of fuel works out to about Rs. 1000 / MT.

The Commission has therefore adopted a price of Rs. 1000 / MT for the Biomass fuel.

55) <u>Fuel Cost escalation:</u>

While the developers pleaded for providing for an escalation of 6% per annum, APTRANSCO and NEDCAP assumed an annual escalation of 4% and 5% respectively.

The current rate of inflation is also around 4% per annum but as the fuel is procured from the unorgainised sector, the Commission considers the escalation of fuel price at the rate of 5%.

56) Fuel Consumption:

APTRANSCO has projected a fuel consumption of 1.09 kg/ unit based on a station heat rate of 3500 kcal / kWh and calorific value of fuel at 3200 kcal / kg.

M/s. NEDCAP has assumed the fuel consumption of 1.4 kg / kWh. The developers also indicated the fuel consumption at 1.4 kg / kWh, considering a Gross Calorific Value of 2900 kcal / kg and SHR of 4000 kcal / kWh.

The report of the expert committee which also had Biomass developers as its members, indicated 3650 kcal / kWh as the heat rate allowable with a fuel calorific value of 3250 kcal / kg which translates into 1.12 kg / kWh.

The Commission is inclined to accept the figures as per the Report of the expert committee as all the stakeholders well represented on it. The Commission also sent a team of its professional staff to some of the projects and their observation indicates the average fuel consumption as above 1.2 kg/kwh. The Commission is of the opinion that non-conventional power projects should improve the operational efficiency notwithstanding the fact that they are a promoted category power projects. The burden of higher fuel consumption by the Power Projects resulting in higher costs cannot be passed on to the consumers. The Commission, considering the fact that the technology is in a development stage, provides for a station heat rate of 3700 kcal / kWh and fuel calorific value of 3200 kcal / kg, which corresponds to a fuel consumption of 1.16 kg / kWh.

57) Debt-Equity Ratio:

The Biomass Energy Developers Association have indicated a debt-equity ratio of 72 : 28 while APTRANSCO and NEDCAP assumed debt- equity at 70:30.

Debt-equity ratio is mainly determined by the Financial Institutions for approving project loans. As these projects are mainly financed by IREDA / Financial Institutions and they insist on debt-equity ratio of 70 : 30, the Commission considers the debt-equity ratio of 70 : 30 as reasonable and fair.

58) <u>Return on Equity:</u>

The developers have sought for 16% Return on equity. NEDCAP has also proposed ROE of 16%.

APTRANSCO submitted that due to declining trend of interest rates in the economy, they have considered ROE at 14% and 11% for the existing and new projects respectively. The Commission recognises that the NCE projects are fraught with risks and uncertainties. In order to provide an element of security as well as incentive for promotion of NCE sources, the Commission considers ROE at 16% for the existing projects as well as for the new projects.

59) <u>Interest on Term Loan:</u>

APTRANSCO has considered the interest on term loan at 13% per annum for the existing and 10% for the new projects. NEDCAP indicated 12.5% for existing and 13% for new projects as interest subsidy is not available for the new projects.

The Biomass developers sought for 13% interest rate for the existing projects and desired the same to be extended to new projects also.

The Commission has allowed interest rate of 10% for both existing and new Bagasse projects as they are entitled to interest subsidy of about 2% on an average for most of the projects. As there is no such subsidy element for some of the

Biomass projects recently commissioned and for new projects, the Commission allows 12% as interest on term loan for both the existing and new projects.

60) Interest on working capital:

The developer requested for interest on working capital at 15% per annum for two months' stock.

APTRANSCO has replied that the loan repayment and interest cost in the tariff are recovered by the developers on monthly basis, while the payments to the lenders are generally made on quarterly basis, which provides extra cushion to the developers. Further, it is considering 12% as interest rate on working capital.

The storage of fuel stock beyond one month is dependent on various factors like non-availability of stock on continuous basis, storage facilities, the actual practice followed by the developers and the price during season / off-season. In the absence of all these details, the Commission considers only one month's stock of fuel as constituting the working capital component. Regarding interest rate on working capital, the Commission considers 12% as reasonable rate of interest on working capital.

61) Depreciation:

The developers requested for provision of recovery of entire cost of the plant within 8 – 10 years.

APTRANSCO considered depreciation @ 7.84% and submitted that 70% depreciation is allocated during the term of the loan and the balance 20% has been spread on the balance life of the Project.

The depreciation rate of 7.84% is as per the rates approved for Independent Power Producers (IPPs) so that this amount can be used for repayment of loans.

The Commission while approving uniform rate of depreciation both for existing as well as new projects, allows depreciation at the rate of 7.84% per annum from the date of commissioning till the depreciation allowed accumulates to 70% of the project cost. The balance depreciation of 20% of the project cost will be allowed every year equally for the balance period of the PPA so that the total depreciation allowed for the project does not exceed 90% of the project cost.

Some of the objectors have pointed out that the higher recovery of depreciation through tariff in the earlier years may not encourage the developers to sell energy to APTRANSCO in the later years. The Commission agrees that this method of charging depreciation is front-loading the tariff but it is allowed in the tariff only with an intention to enable the developers to repay their loan liability. But at the same time the Commission does not like the benefit to drift away. Hence in order to get the recovery of the same in the later years, the developers shall have to sell energy and capacity to APTRANSCO as contracted in the PPA for the entire term of the PPA, which is 20 years from the year of commissioning.

62) Taking into consideration the technical and financial parameters as discussed above, the fixed cost tariff for the Biomass Power Projects works out as follows:

Year of operation (n^{th} year)	**Fixed Cost Rs / Unit**
1st	1.61
2^{nd}	1.57
3^{rd}	1.53
4^{th}	1.49
5^{th}	1.45
6^{th}	1.41
7^{th}	1.37
8^{th}	1.33
9^{th}	1.26
10^{th}	0.87

The variable cost tariff for Biomass based projects is estimated as follows:

Financial Year	Variable Cost Rs / Unit
2004-2005	1.27
2005-2006	1.33
2006-2007	1.40
2007-2008	1.47
2008-2009	1.54

The above tariff is inclusive of annual escalation on variable cost and O & M expenditure.

The existing and new projects shall be entitled to a tariff with the component of fixed charge based on the year of operation (n^{th} year) and variable charge corresponding to financial year of operation.

One of the objectors has suggested that the Commission should consider only the actual levels of PLF achieved by different types of NCE projects for fixing the PLF for fixed cost. As observed earlier, fixation of uniform tariff across all Biomass based plants with varying capacities, technologies and operating conditions would lead to uneven tariffs and undue enrichment of some developers. The Commission therefore proposes a two tier tariff for the Biomass based plants distinguishing those operating up to 80% PLF and others operating above 80% PLF. Where Plant Load Factor during a settlement period exceeds 80% at generator terminals i.e. including captive and auxiliary consumption (at which level the fixed cost is expected to be recovered), only variable cost indicated above and incentive of 21.5 paise / unit as explained in Para (63) below shall be paid for every unit delivered in excess of the above PLF.

63) Incentive

The Commission has noticed that many of the Biomass projects are generating beyond the threshold level of 80% also. The Commission is inclined to encourage this efficiency. But at the same time, the consumers should not be burdened with the same tariff beyond threshold PLF. In order to encourage the developers and without unduly burdening the consumers, the Commission allows incentive similar to that of conventional generation projects. The incentive will be at the rate of 21.5 paise / unit of actual generation beyond the threshold PLF of 80% as the developers would recover the entire fixed cost at the threshold level of PLF itself.

64) Purchase of power from future Biomass based power projects

The Commission finds that as against the report of ASCI where the Biomass potential in the State was assessed in 2001 as adequate to support a generating capacity of only 225 MW on a sustained basis, sanctions for Biomass plants have been given for about 410 MW. This explains why the fuel cost of Biomass has shot up. As the demand is going up, the supply has remained fixed. Under these circumstances, it is not in consumers' interest to encourage setting up of additional Biomass plants till the supply position improves. In fact, the Government of Andhra Pradesh have done well in clearing eight Biomass plants on the basis of additional plantations being raised towards the requirement of the fuel on an experimental basis. It is necessary to watch the performance of these 8 projects. The Commission would therefore not permit purchase of power from new Biomass power projects other than those already sanctioned by NEDCAP, by APTRANSCO from the date of this order. This will be reviewed after three years.

Tariff fixation for mini – hydel projects:

65) Capital Cost :

M/s. NEDCAP and APTRANSCO indicated a project cost of Rs. 4.5 Crs / MW. During the hearing, the developers requested that higher capital cost must be allowed for smaller plants. The Commission agrees to the fact that the cost of smaller projects is likely to be more than that of the larger projects due to economies of scale. However, MNES has been providing more capital subsidy for new smaller projects and less for the new bigger projects thereby nullifying the impact of difference in project cost to some extent. Similarly, for existing projects, MNES is providing different rates of interest subsidy for smaller and larger projects. If one goes by the actual project capacities and the various levels of subsidy, it would lead to adopting different project costs and the corresponding tariff numbers. Hence the Commission is inclined to adopt same project cost both for larger and smaller projects. The Commission therefore considers that a uniform capital cost of Rs.3.625 Crs / MW (Rs. 4.5 Crs less capital subsidy of Rs. 0.875 Crs) would be reasonable for mini-hydel projects, whether small or large.

66) Plant Load Factor:

In case of Hydel power plants, the PLF depends mostly on monsoon, rainfall in the catchment area, changes in hydrology factor etc, apart from the size of the plant.

APTRANSCO assumed a PLF of 40% while NEDCAP indicated a PLF of 35%.

The developers stated that the actual average PLF is much less than 35%.

- They further stated that the PLF achieved during the past 3 years is very less.
- The commissioning of the projects in the upper riparian States would adversely affect power generation in the coming years.
- Further, whenever any breaches occur in the irrigation canals, the generation will be lost during the shutdown period of the cannal.

APTRANSCO stated that the PLF of the plants prior to FY 2001 is reported to be over 40% average PLF. However the PLF for FY 2002 is around 35% whereas during FY 2003, it has come down further due to reduced monsoon flow. APTRANSCO further stated that it would be difficult to imagine or conceive a project with a lower PLF, as it would be economically unviable.

The Chief Engineer, Nagarjuna Sagar, representing Irrigation Department Govt. of AP stated as follows:

"It is a known fact that every business runs on risks of its own. It is true that the recent years have experienced bad monsoons. But the power developers have set up their plants choosing the site and source on their own.

While granting permission to the plants certain conditions were imposed and were agreed to by all the power developers. The most important and relevant of them are as follows:

a) The generation of power is subject to the extent of water made available through the canal by the department for irrigation needs of the ayacut. The firm has no right to demand the release of any water nor have any claim for compensation for non-release (or) short release

(or) release at certain periods only, in the canal by this department and the decision of this department is final and binding on the firm.

b) The firm has to make all payments on account of any royalties, taxes, cesses (or) levies etc imposed by the Govt. (or) competent statutory Authority for utilisation of water for generation of power at the rates approved from time to time.

Regarding delay in canal water flows due to breaches, the Department attends to breach closing work on war footing and at first all the temporary bunds are laid in immediately and water flow is restored in the least possible time in the interest of the standing crops.

The less flows that are spoken about are mainly due to bad monsoon, in particular in the state of Karnataka and it is not due to **raising of the crest level of Alamatti Dam, alone.** Three years back the inflows into Srisailam Dam were of the order of 1000 to 2000 TMC. Almatti Dam having a capacity of 130 TMC has no great effect on the decreased inflows. However due to the Almatti Dam crest raising, there would be delay in realisation of inflows into the Andhra region.

However the crops will be supplied water for the required period to the extent water is available. Regarding water rate, the same has been decided by the Government vide G.O. 39 dated 02-04-2002. In general in a period of 100 years only 75 years are considered as dependable rainfall years for the design of Irrigation Projects. Therefore there will be short spells of bad rainfall years and we may expect them to be followed by years of good rainfall".

The average PLF that was achieved from 1996 as per APTRANSCO's filing is as follows:

Year	PLF
1996	31%
1997	36%
1998	40%
1999	47%
2000	40%
2001	33%
2002	22%

The average PLF of the above 7 years works out to 35%. Even though the inflows in the catchment area was extremely encouraging for the years prior to 1997 and the generation for the year 2003 was disappointing, the Commission intends to consider mainly the normal monsoon years and considers PLF of 35%. The Commission also recognizes the fact that the output of power from mini hydel plants is dictated by irrigation needs.

A benchmark parameter of 35% is considered reasonable for computation of tariff based on cost plus approach. Further, it has come to the notice of the Commission that some plants have been working with a plant load factor of over 90%. The Commission is of the opinion that different plants operating with different capacity factors cannot be equated. The Commission therefore proposes a two tier tariff, distinguishing the plants which are operating up to 35% and above 35% PLF.

67) <u>Auxiliary consumption:</u>

i) APTRANSCO stated that it considered auxiliary consumption at 1%

ii) NEDCAP indicated auxiliary consumption at 0.5%.

iii) The developers however during hearing sought for consideration of transformation losses in addition to auxiliary consumption.

Central Electricity Regulatory Commission (CERC) in its notification dated 26-03-2001 indicated the auxiliary consumption at 1% including transformation losses. The Commission, therefore, considers auxiliary consumption proposed by APTRANSCO at 1% for tariff computation.

68) <u>O & M Expenditure:</u>

The developers have contended that the O & M expenditure of 1.5% of capital cost assumed by APTRANSCO and indicated by NEDCAP is too low and unrealistic.

They further stated that no provision for 1% insurance is made. They also stated that insurance is mandatory as per lenders' requirement.

They requested during hearing that 3.5% of capital cost be provided towards O & M expenditure.

APTRANSCO however stated that the O & M expenditure of 1.5% of capital cost has been considered as per CEA guidelines, which includes insurance cost.

NEDCAP indicated O & M at 1.5% and insurance at 1% of capital cost.

The Commission considers the provision of 1.5% of capital cost towards O & M expenditure and insurance as per CEA guidelines and as also proposed by APTRANSCO as reasonable.

69) <u>O & M Escalation:</u>

The developers argued that 4% escalation on O & M expenditure is low and should be fixed at 5%.

M/s. NEDCAP indicated the escalation at 5%.

APTRANSCO submitted that the O & M escalation was provided at 4% based on the trend of inflation after considering the variation of WPI & CPI during the past few years.

The Commission considers the escalation of 4% on O & M expenditure as proposed by APTRANSCO as reasonable.

70) <u>Royalty (Water Rate):</u>

Irrigation & Command Area Development Department, GoAP issued order vide GOMs.No. 39 dated 02-04-2002 fixing the rates for consumption / Non-consumption use of water for industrial purpose and Hydel power generation as detailed below.

Sl.No	Description	Water rate for Non-consumptive use of water per '000 gallons (paisa)	Water rate for consumptive use of water per '000 gallons (paisa)
1	**<u>For all categories of industries as defined under Industrial Development and Regulation Act and all power generation units, Hydel, Gas, Thermal and Naphtha Generation.</u>**		
	a) Water drawn from natural sources.	1.5	150
	b) Water drawn from reservoirs.	3.0	300
	c) Water drawn from canals	4.5	450
2	**For Hydel generation:**		-----
	A) Major Hydro-Electric Schemes	1.5	
	B) <u>Mini / Small Hydel Schemes</u>		-----
	a) For unit capacity upto 500 Kw	Exempted	
	b) <u>For unit capacity above 500 kW and rated head upto 5 mts.</u>		
	1) Upto 5 years from the date of Commissioning	Exempted	
	2) After 5 years from the date of Commissioning.	1.0	
	3) After 10 years from the date of Commissioning.	1.5	
	c) <u>for unit capacity above 500 kW and rated head abov 5 mts</u>.		
	1) Upto 5 years from the date of Commissioning.	1.5	
	2) After 5 years from the date of Commissioning.	3.0	
	3) After 10 years from the date of Commissioning.	4.5	

The water rate is variable depending upon the capacity of the project, head, discharge and the period after commissioning of the project. As per the NEDCAP, the royalty per kWh of power generated for the projects above 5 mtrs head, 3.75 MW capacity working for 200 days in a year and generating 20 MU, translates into the following.

Rs. 0.39 / kWh upto 5 years.
Rs. 0.78 / kWh beyond 5 years and upto 10 years.
Rs. 1.17 / kWh beyond 10 years.

The rates specified above are not conducive for promotion of generation of power from mini hydel plants. GoAP must relook into this aspect and rationalise the water rates for non consumptive use by mini hydel plants. Till a revised policy decision is taken by GoAP, the water rates specified in the GO are applicable. The Commission will consider these charges as pass-through and they will be paid directly by the APTRANSCO and DISCOMs to GoAP. These charges have therefore not been factored in the tariff computation.

71) <u>Debt- equity ratio:</u>

Some of the developers / Association have suggested a debt-equity ratio of 79 : 21 while some others suggested for 75 : 25, whereas APTRANSCO and NEDCAP assumed Debt-equity at 70:30.

Debt-equity ratio is mainly determined by the Financial Institutions for approving project loans. As these projects are mainly financed by IREDA / Financial Institutions and they insist for debt-equity ratio of 70 : 30, the Commission considers debt-equity ratio of 70 : 30 as reasonable.

72) <u>Return on Equity:</u> The developers have sought 16% to 20% Return on equity, while Small Hydro Power Developers Association has sought ROE of 20%.

APTRANSCO submitted that due to declining trend of interest rates in the economy, they have considered ROE at 14% and 11% for the existing and new projects, respectively. The Commission recognizes that the NCE projects are fraught with risks and uncertainties. In order to provide an element of security and to promote development of non-conventional power projects, the Commission considers ROE at 16% for the existing projects as well as for new projects.

73) <u>Interest on Term Loan:</u>

APTRANSCO has considered the interest on term loans at 13% for the existing and 10% for the new projects.

The developers of mini hydel projects during hearing stated that prevailing interest rates are higher as no interest subsidy is available from MNES. They requested for a provision of 14%.

NEDCAP indicated an interest rate of 8.5% for the existing (after interest subsidy) and 11.75% for the new projects.

While determining the project cost, the Commission has adopted same price for both existing and new projects. The capital subsidy or interest subsidy more or less nullifies the higher interest rate for one category vis-à-vis the other one. As the Commission considered the capital cost after adjusting for capital subsidy, interest rate is considered without adjusting for the interest rate subsidy. Hence Commission considers the interest rate of 12% for both existing and new projects.

74) <u>Interest on working capital:</u>

Some developers requested for interest on working capital at 14% per annum.

APTRANSCO considered 12% interest on working capital.

The Commission is in agreement with APTRANSCO in allowing 12% as the interest on the working capital as this is in line with the on-going interest rates of banks for working capital.

75) <u>Depreciation:</u>

APTRANSCO has calculated depreciation to match the loan repayment profile and this works out to 6.7% of the project cost for the first ten years. The balance depreciation is spread over for the life of the project. But one of the developers (M/s. NCL Energy Ltd) has agreed with APTRANSCO's assumption on depreciation rate of 6.7% per annum. But NEDCAP has suggested only 5% as depreciation.

As per CEA notification, the advance depreciation is allowable if there is a mis-match between the book depreciation and the loan repayment requirement. Hence the calculation as provided by APTRANSCO is acceptable to the Commission.

Some of the objectors have pointed out that the higher recovery of depreciation through tariff in the earlier years may not encourage the developers to sell energy to APTRANSCO in the later years. The Commission agrees that this method of charging depreciation is front-loading the tariff but it is allowed in the tariff only with an intention to enable the developers to repay their loan liability. But at the same time the Commission does not like the benefit to drift away. Hence in order to get the recovery of the same in the later years, the developers shall have to sell energy and capacity to APTRANSCO as contracted in the PPA for the entire term of the PPA, which is 20 years from the year of commissioning.

76) Taking into account the technical and financial parameters considered by the Commission, the tariff for mini hydel power plants is estimated as follows.

Year of operation (n^{th} year)	Tariff Rs / Unit
1st	2.60
2nd	2.52
3rd	2.44
4th	2.36
5th	2.27
6th	2.19
7th	2.11
8th	2.03
9th	1.95
10th	1.88

The existing and new projects shall be entitled to a tariff based on the year of operation (n^{th} year).

The above tariff is exclusive of the Royalty. As observed earlier, fixation of uniform tariff across all mini hydel power plants with varying operating conditions would lead to unequal tariffs. The Commission therefore proposes a two tier tariff for the mini hydel power plants distinguishing those operating up to 35% PLF and other operating above 35% PLF. The Tariff indicated above will be applicable for the Power Plants up to PLF of 35% and where PLF during a settlement period exceeds 35%, only an amount of 21.5 Ps. as has been allowed to other categories of NCE developers (in place of the tariff indicated above) shall be paid for every unit delivered in excess of 35% PLF at generator terminals i.e. including captive and auxiliary consumption.

Municipal waste and Industrial waste based projects

77) The Developers of Waste to Energy stated that their projects are demonstrative and first of its kind in India where earlier performance data is not

available. In view of high risk and the projects being social and environmental friendly, special incentives / price should be given for promoting such projects.

These power projects can be categorized into

a) Industrial waste to energy

b) Municipal waste to energy

The Commission notes:

- The projects are in the nascent stage.
- The essential raw material (fuel) is industrial waste / municipal waste
- Fuel is delivered at no cost or nominal cost
- Handling of fuel, processing and transportation of processed fuel from municipal dumping yards to power houses constitutes the price of raw material.
- No operating experience and hence capacity factor cannot be predicted.

While the need to dispose off these wastes to produce useful energy without causing environmental and civic problems cannot be over-emphasized, the responsibility to dispose off these waste products vests with the concerned agencies.

While the Commission has no reservations whatsoever that the projects of this type need to be encouraged, the agencies responsible for disposal of these waste products should share the cost of implementation of these projects with the developers.

a) <u>Industrial waste to energy :</u>

Among the NCE projects, industrial waste to energy projects are identifiable more with the Biomass projects. Hence, the Commission treats Industrial waste based power projects on par with Biomass projects and authorizes purchase of the

energy by APTRANSCO at the rates permitted for sale of power from Biomass power projects.

b) Municipal waste to energy

This category requires a special treatment considering the nature of the project activities. These are in the nature of public utility service. The capital cost of the projects is in the range of Rs. 6 Crs / MW. The Commission is therefore of the opinion that the project of electricity generation from Municipal Waste should have a different tariff and therefore is inclined to continue the tariff for these projects on the guidelines of MNES in refined format without going into the cost details and rationalize the tariff by adopting following methodology.

The Commission likes to retain the base unit price of Rs. 2.25 as on 1.4.1994 and the escalation index of 5% p.a. But, the escalation would be simple and not compounded every year. In other words, the base price as on 01-04-2004 will be Rs. 3.37 / unit. For the reasons explained earlier, the Commission considers this as a reasonable tariff for municipal waste to energy projects.

Wind Electricity Generating Plants

78) There are about 24 developers in the State who own nearly 270 wind energy generators of varying capacities. Hence each generator is potentially a different project. The tariff determination for each project therefore would be a very difficult task for the Commission.

While analyzing the performance of these projects over the past three years, it is observed that the capacity factors achieved have been widely varying, from 10% to 20%, depending on the site, technology adopted and efficiency of management of operations.

However, the Developers acknowledged that there is improvement in the technology and the project costs have also come down as 50% of the components for Wind Farm are manufactured in India.

Further, from the October, 2002 MNES publication on Wind Power Development in India, the following is noted :

Development of Wind Energy Technology has made a significant progress. Present-day Wind Turbines are highly sophisticated machines incorporating advanced technologies and are designed to deliver energy across a range of wind speeds. The cost of generation has reduced dramatically as manufacturing and other costs have come down. The introduction of higher capacity machines with large rotor diameter and higher hub height will enable more cost effective and effective harnessing of Wind Power. It is expected that cost could fall as a result of economies of scale as market expands.

79) <u>Plant Load Factor:</u>

In case of Wind Energy generating plants, the PLF depends mostly on wind velocity at the project site, changes in environment etc, apart from technology.

APTRANSCO assumed a PLF of 25% while NEDCAP indicated a PLF of 16% for existing plants and 20% for the new plants. M/s. IL & FS Wind Farm and other developers stated that the average PLF is around 12%. Indian Wind Turbine Manufacturers Association estimated a PLF of 20% whereas Indian Wind Power Association, Karnataka Council, estimated a PLF of 23% with better rotor profile and hub height. M/s. IL & FS Wind Farm also recommended a PLF of 18% for new plants on account of increasing hub height from 35mt to 50mts.

APTRANSCO stated that normative PLF at 25% is assumed as most of the DPRs have estimated PLF at this range. They also recommended economic justification for the utilisation of assets.

The data submitted by the Developers, APTRANSCO and NEDCAP in support of PLF achieved for the existing plants is as under.

Developers :

Site	2000-2001	2001-2002	2002-2003
Ramgiri	10.71%	11.30%	10.02%
Tallimadugula	12.92%	14.08%	13.56%
Kadavakullu	11.46%	18.66%	14.38%
Kondameadpally	---	20.97%	19.44%

In the above statement, the capacity of all the Wind plants installed, some of which are defunct and are not operating has also been considered for arriving at average PLF. Low capacity utilisation in comparison to similar projects can be due to operational inefficiencies of the particular plant and such aberrations should not be considered for tariff working.

APTRANSCO submitted data for PLFs as follows.

Site	2000-2001	2001-2002	2002-2003
Ramgiri	16.6%	18%	18%
Kadavakallu	---	21%	18%
Kondameadpally	---	----	19%

The generation report submitted by NEDCAP for 2001-02 indicates average PLF of around 16.5% and later indicated that 20% PLF can be considered for new projects.

From the data submitted it was noticed that even in Ramgiri (where the plants are reported to be operating at lowest PLF) the PLF of some of the plants stands at 17%-19%, which may be due to efficient management of the power plant by some of the developers.

As per MNES publication, generally, the wind farms can have capacity utilization in the range of 20%-25%. MNES has already identified the sites having Annual Mean Wind Power density grater than 200 kgs / sqmt at a height of 50 mt, which are considered suitable for Wind power projects. It is acknowledged that some of the existing projects were under-performing, initially due to inappropriate selection of sites, inadequate data, lack of compatibility of machine with Indian environmental conditions, stability, outage problems, grid faults etc. The initial problems are mainly overcome as a result of feedback from earlier projects.

With a detailed and thorough project planning and implementation with improved O & M services, the availability and performance of machines can be improved considerably even in existing projects. New projects with modern machines of lighter and larger blades, higher tower heights, direct drive, variable speed gears and operation using advanced power electronics can have considerable impact in achieving higher PLF. Recently erected Enercorn Power Projects with 1 x 230 kW units at Tirumala, is reported to have achieved a higher PLF of around 36%.

80) Considering the uncertainties as discussed above, a strictly “Cost plus” approach if adopted would lead to distortions and would result in higher tariff for the initial years and the resultant extra burden on the consumers.

Indian Wind Power Association proposed following three alternatives for 20 year term for power purchase, quoting that these would mitigate the higher tariff for the initial years:

- Rs. 3.41 / unit with 2% escalation every year.
- Rs. 3.29 / unit with 4.5% escalation every alternate year.
- Levellised cost of Rs. 3.74 / unit

Indian Renewable Energy Association and other developers wanted continuance of the MNES policy. The Commission therefore is inclined to continue the guidelines of MNES in a refined format without going into the cost details and rationalize the tariff by adopting the following methodology.

Energy purchase rate: The Commission likes to retain the base unit price of Rs. 2.25 as on 1.4.1994 and the escalation index of 5% p.a. But, the escalation would be simple and not compounded every year. In other words, the base price as on 01-04-2004 will be Rs. 3.37/kwh. As these projects have no variable expenses and negligible increase in maintenance cost, the tariff will be frozen for a period of five years, to be reviewed however, thereafter.

81) <u>Conclusion:</u>

The tariffs arrived at along with escalation under each category will be applicable as detailed in the respective paragraphs under each category. The aforementioned tariffs are, however, also subject to the following:

i) In regard to tariff for Bagasse based co-generation projects, where the Plant Load Factor during a settlement period exceeds 55% (the level at which the fixed cost is expected to be recovered), only incentive of 21.5 paise /unit and variable cost as indicated in para (47) above shall be paid for every unit delivered in excess of the 55% PLF.

ii) As regards to tariff for Biomass based power projects, where the Plant Load Factor during a settlement period exceeds 80% (the level at which the fixed cost is expected to be recovered), only incentive of 21.5 paise / unit and variable cost as indicated in para (63) above shall be paid for every unit delivered in excess of 80% PLF.

iii) The tariff for mini-hydel power projects is exclusive of Royalty.

iv) In the case of tariff for mini-hydel power projects, where the PLF during settlement period exceeds 35%, only an incentive of 21.5 paise/kwh shall be paid for every unit delivered in excess of 35%.

v) The tariffs authorized above will be applicable w.e.f 01-04-2004 to all NCE power plants of respective categories for sale to APTRANSCO.

vi) The above tariff structure is valid for a control period of five years with effect from 01-04-2004. Thereafter, the Commission will review the prices and incentives after consultation with the Developers and licensees.

vii) A further review of the individual projects will be undertaken on completion of 10 years from the date of commissioning of the project, by which time the loan is expected to have been substantially repaid, and the purchase price will be based on O & M expenditure, return on equity, variable cost and residual depreciation, if any.

viii) For those developers having captive consumption who supply excess energy to APTRANSCO after meeting their internal consumption, the current practice of meter reading at the interconnection point and grossing up for auxiliary consumption in order to arrive at PLF will be misleading as it will not take into consideration the captive

consumption. The incentive payments begin after threshold PLF. In order to ascertain the PLF levels, APTRANSCO should make arrangements for authenticated meter reading at the generator terminals so that the two-tier tariff is properly implemented.

ix) Developers will be entitled to dispatch 100% of the available capacity without reference to Merit Order Dispatch subject, however, to any system constraints.

82) The tariffs proposed by APTRANSCO for NCE projects are lower than those worked out by the Commission. APTRANSCO has adopted levelised tariff methodology to compute tariffs for NCE projects. The tariffs based on levelisation proposed by APTRANSCO will not provide for realistic tariff compensation. The levelised tariffs are used in project evaluations, and have significance only for project selections and to even out the tariff for the entire tariff period. It would not be fair to adopt a levelised tariff which is worked out for the entire life-span of a project of 20 years for the five-year period of 2004-2009. If the levelised tariff methodology is adopted, the developers may not be in a position to repay the loans, meet their expenses and earn a reasonable profit, not to speak of NCE projects being provided with incentives and encouragements as envisaged in the Electricity Act, 2003. The Commission has therefore computed the tariffs based on realistic costs that the NCE developers would incur from year to year, based on the normative parameters as discussed in the earlier paragraphs. In this methodology, the tariffs of NCE developers would be cost-reflective and at the same time once the loans are repaid, the fixed charges component of tariffs would come down substantially. The Commission believes the tariffs worked out by it as above, adequately balance the interests of all stakeholders. As mentioned herein above the front loading of the

tariff has been allowed in the case of all projects to facilitate the developers, on specific condition that they will have an obligation to supply energy / capacity to APTRANSCO and / or its successor entity throughout the duration of the PPA.

The Commission takes note of the point raised by the study team of APERC that the plants visited by them are not being operated efficiently and there is lot of scope to optimise the operation and improve the efficiency. The endeavor of the Commission has been to arrive at the tariffs for NCE projects which will balance the interests of all the stakeholders while encouraging green/renewable energy. This has been explained in detail in the earlier paragraphs while discussing the technical and financial parameters of each category. The Commission is therefore of the view that the tariffs determined for sale of energy by NCE developers to the licensee are fair and reasonable. If any developer is aggrieved by any specific issue, he can approach APTRANSCO individually with sufficient data on his cost of generation. APTRANSCO shall look into the issues raised by the developer and approach the Commission for necessary directions. The Commission would consider the issues of such developers after APTRANSCO has examined the same.

As and when, however, trading function of APTRANSCO is segregated and vested in the new entity pursuant to the Electricity Act, 2003, the terms and conditions contained herein shall be binding on the new entity in the same manner as applicable to APTRANSCO.

This order shall enure to the benefit of the successor entity of APTRANSCO and such successor entity shall be bound by the obligation of APTRANSCO.

This order is signed by Andhra Pradesh Electricity Regulatory Commission on 20th March, 2004.

Sd/-	**Sd/-**	**Sd/-**
SURINDER PAL	**K. SREERAMA MURTHY**	**G. P. RAO**
(MEMBER)	**(MEMBER)**	**(CHAIRMAN)**

A N N E X U R E – A

List of developers / Associations who made personal submissions before the Commission during public hearing on 22-12-2003 and 23-12-2003.

Sl. No.	Name of the Developer	Name of the Representative & Designation
	Biomass	
1	M/s Biomass Developers Association.	Sri. G. Ramesh, President Sri. K. Abhiram Reddy, Vice President. Sri. M. Ravi Kanth, Treasurer. Sri. K.L Raghunath, Chartered Accountant Sri. U. Veerandra Kumar, Secretary.
2	M/s. Shree Paper Ltd	Sri. P. Kamaleswara Rao, MD
3	M/s. R.R. Bio-Energy Ltd.	Sri. K. Sudhakar, Director
4	M/s. JOCIL Ltd.	Sri. P. Kesavulu Reddy, Vice President
5	M/s. Veeraiah Non-Conventional Power Projects Ltd.	Sri. P. Poorna Veeraiah, Joint Managing Director
6	M/s. My Home Power Ltd.	Sri. R.K Roy Choudary, Director
	Bagasse Co-generation	
7	M/s The South India Sugar Mills Association of AP on behalf of 8 Nos. Bagasse based Co-generation Plants	Sri. Ashok Herene, Advisor, SISMA Sri. Bhale Rao, Secretary.
	Waste to energy	
8	M/s Selco International Ltd	Sri. Dr. Rama Krishna, Chairman & Managing Director.
9	M/s Sai Renewable Power Ltd	Sri. P. Narendra
10	M/s Vensa Bio-Tech Ltd	Sri. I. Murali Krishna, Director (Technical)
11	M/s Shriram Energy System Ltd	Sri. K. Gopala Krishna Murthy, Managing Director
12	M/s P.S.R Green Power Pvt Ltd	Sri. P.S Rao.
	Wind Farm	
13	M/s IL & FS Wind Farms	Sri. Subhash Matru Vaishya, Managing Director

14	M/s Indian Wind Power Association (Karnataka Council)	Sri. A.V Raghavan, Chartered Accountant.
15	M/s Indian Wind Turbine Manufacturers Association	Sri. D.V. Giri, Hony. Secretary & Committee Member (IWTMA)
16	M/s B.H.E.L	Sri. J. Bala Chandran, Senior Manager
17	M/s Saritha Synthetics & Industries Ltd	Sri. S. Parthasarathi, Dy. Manager.
18	M/s Sri Vasavi Industries Ltd	Sri. S. Parthasarathi, Dy. Manager.
19	M/s Renewable Energy Developers Association	Sri. G. R. Ram, Conveyor.
20	M/s Hyderabad Chemical Products Ltd	Sri. N. Srigiri Rao, Assistant Manager (Finance & MIS)
21	M/s Hyderabad Chemical Supplies Ltd	Sri. N. Srigiri Rao, Assistant Manager (Finance & MIS)
22	M/s Nile Ltd	Sri. K.V Ramana, Director (Finance)
	Mini-Hydel	
23	M/s K.C.P Ltd	Sri. C. Kodanda Ram, Advocate Sri. K.V, Srinivasa Rao, Advisor
24	M/s Shivani Power Spinners Ltd	Sri. G. Choudaraiah
25	M/s Espar Pak Pvt Ltd	Sri. G. Choudaraiah
26	M/s Bhavani Hydro Power Projects (P) Ltd	Sri. G. Choudaraiah
27	M/s Deccan Cements Ltd	Sri. G. R Ram, Senior Vice President
28	M/s Balaji Energy Pvt Ltd	Sri. P.V.S.S.S Rama Rao, Advocate
29	M/s NCL Energy	Sri. S.S. Raju, Executive Director.
30	M/s Small Hydro Power Developers Association	Sri. K. Gopal Choudary, Advocate. Sri. G. Choudaraiah, President. Sri. N. Sudhakar, Member. Sri. A.P.S. Rama Rao, Secretary.

Respondents

1	APTRANSCO	Sri. G. Sai Prasad, JMD Sri. P.M.K Gandhi, Director Sri. Kesava Rao, Director (Transmission), Sri. Y. Srinivas, Consultant. Sri. Charan Jeet Singh, Consultant

2	NEDCAP	Sri. S.E. Sekhar Babu, VC & MD Sri. B. Jayarami Reddy, General Manager. Sri. O. Subhramanyam, Dy. General Manager
3	M/s Indian Renewable Energy Developers Association	Sri. D. Mazunder, Director / Technical.
4	Engineer-in-Chief (Irrigation CAD)	Sri. A. Satyanarayana Reddy, Chief Engineer, Nagarjuna Sagar Project.

A N N E X U R E - B

List of persons who made personal submissions before the Commission during public hearing on 19-03-2004.

Sl.No	Name of the person	Organization
1	Sri. M.Venugopal Rao	Special Correspondent, Prajashakthi.
2	Sri. Akkineni Bhavani Prasad	Vice President, Federation of Farmers' Association
3	Sri. M. Thimma Reddy	People's Monitoring Group on Electricity Regulation
4	Sri. K. Venkateswara Sastry	Chartered Engineer, Industrial and Power Plant Consultant
5	Sri. G. Narendranath	Rastriya Rythu Seva Samithi
6	Sri. N. V. Ramana	Vice President, BASIX
7	Sri. K.S.Rao	Director, Projects, Orissa Power Consortium Ltd.
8	Sri. P.S. Rao	M.D. of M/s. P S R Green Power Projects Ltd.
9	Sri. K. Kameswara Rao	President, A.P. Cane Growers Association
10	Sri. Muralidhara Rao	
11	Sri. Sachithananda Rao	
12	Sri. M. Rajaiah	M/s. Vijay Agro Products Ltd

13	Sri. C.N. Sundaram	Consultant
14	Sri. M. Kesava Reddy	Former Chief Engineer, VTPS