

## **Karnataka Electricity Regulatory Commission**

### **Discussion Paper**

**On**

### **“Harnessing Captive Power Generation” in Karnataka**

#### **I. Preamble:**

The Electricity Act envisages development of power system based on optimal utilization of resources. Economics dictate harnessing existing avenues of generation and DSM measures in preference to investments in new power plants. One such area of focus would be harnessing the existing Captive Power Generation in the State.

It is estimated that the aggregate captive generation capacity in the country is about 25,000 MW and is estimated to be operating at load Factor below 50%[N.K. Singh report]. Hence, there is a vast scope to harness this additional available capacity in order to meet the shortage situation, especially during peak hours. In this context, the EA 2003 provides a basic framework for utilizing this surplus energy.

In Karnataka it is estimated that the installed captive generation capacity is about 1000 MW [1 MW & above] and is operating at an average load factor of about 25%. Thus there is a potential to harness the available surplus capacity from such captive units.

In this context KERC is bringing out this discussion paper inviting comments from stakeholders /experts so that available surplus power from the existing captive plants can be efficiently utilized to partially meet the shortages.

## **II. Legal Framework**

### **a. Electricity Act 2003**

EA 2003 provides the following framework for captive generation:

**Section 2 (8)** : *" Captive generating plant" means a power plant set up by any person to generate electricity primarily for his own use and includes a power plant set up by any co-operative society or association of persons for generating electricity primarily for use of members of such cooperative society or association;"*

**Section 2 (16)** *" Dedicated Transmission Lines "* means any electric supply line for point to point transmission which are required for the purpose of connecting electric lines or electric plants of a captive generating plant referred to in section 9 or generating station referred to in section 10 to any transmission lines or sub-stations or generating stations or the load centre, as the case may be;

**Section 9.** *" (1) Notwithstanding anything contained in this Act, a person may construct, maintain or operate a captive generating plant and dedicated transmission lines:*

*Provided that the supply of electricity from the captive generating plant through the grid shall be regulated in the same manner as the generating station of a generating company.*

*(2) Every person, who has constructed a captive generating plant and maintains and operates such plant, shall have the right to open access for the purposes of carrying electricity from his captive generating plant to the destination of his use:*

*Provided that such open access shall be subject to availability of adequate transmission facility and such availability of transmission facility shall be determined by the Central Transmission Utility or the State Transmission Utility, as the case may be:*

*Provided further that any dispute regarding the availability of transmission facility shall be adjudicated upon by the Appropriate Commission."*

**Last proviso to Section 38 (2) (d)(ii) , 39 (2) (d)(ii), 40 (c)(ii) & 42 (2):**

*Provided also that such surcharge shall not be leviable in case open access is provided to a person who has established a captive generating plant for carrying the electricity to the destination of his own use.*

**b. National Electricity Policy (NEP)**

The NEP issued by Gol on 12.2.2005 envisages the following with regard captive generation:

**5.2.2** *The Government of India has initiated several reform measures to create a favourable environment for addition of new generating capacity in the country. The Electricity Act 2003 has put in place a highly liberal framework for generation. There is no requirement of licensing for generation. The requirement of techno-economic clearance of CEA for thermal generation project is no longer there. For hydroelectric generation also, the limit of capital expenditure, above which concurrence of CEA is required, would be raised suitably from the present level. **Captive generation has been freed from all controls***

**5.2.24** *The liberal provision in the Electricity Act, 2003 with respect to setting up of captive power plant has been made with a view to not only securing reliable, quality and cost effective power but also to facilitate creation of employment opportunities through speedy and efficient growth of industry.*

**5.2.25** *The provision relating to captive power plants to be set up by group of consumers is primarily aimed at enabling small and medium industries or other consumers that may not individually be in a position to set up plant of optimal size in a cost effective*

manner. It needs to be noted that efficient expansion of small and medium industries across the country would lead to creation of enormous employment opportunities.

**5.2.26** A large number of captive and standby generating stations in India have surplus capacity that could be supplied to the grid continuously or during certain time periods. These plants offer a sizeable and potentially competitive capacity that could be harnessed for meeting demand for power. Under the Act, captive generators have access to licensees and would get access to consumers who are allowed open access. Grid inter-connections for captive generators shall be facilitated as per section 30 of the Act. This should be done on priority basis to enable captive generation to become available as distributed generation along the grid. Towards this end, non-conventional energy sources including co-generation could also play a role. Appropriate commercial arrangements would need to be instituted between licensees and the captive generators for harnessing of spare capacity/energy from captive power plants. The appropriate Regulatory Commission shall exercise regulatory oversight on such commercial arrangements between captive generators and licensees and determine tariffs when a licensee is the off-taker of power from captive plant.

**5.7.1 (c)** Captive generating plants should be permitted to sell electricity to licensees and consumers when they are allowed open access by SERCs under section 42 of the Act"

**c. National Tariff Policy**

The Tariff Policy issued by Gol on 6.1.2006 provides for the following with respect to Captive Power Plants:

**5.4** While it is recognized that the State Governments have the right to impose duties, taxes, cess on sale or consumption of

*electricity, these could potentially distort competition and optimal use of resources especially if such levies are used selectively and on a non- uniform basis. In some cases, the duties etc. on consumption of electricity is linked to sources of generation (like captive generation) and the level of duties levied is much higher as compared to that being levied on the same category of consumers who draw power from grid. Such a distinction is invidious and inappropriate. The sole purpose of freely allowing captive generation is to enable industries to access reliable, quality and cost effective power. Particularly, the provisions relating to captive power plants which can be set up by group of consumers has been brought in recognition of the fact that efficient expansion of small and medium industries across the country will lead to faster economic growth and creation of larger employment opportunities.*

*For realizing the goal of making available electricity to consumers at reasonable and competitive prices, it is necessary that such duties are kept at reasonable level.*

## **6.2 Tariff structuring and associated issues**

*(1) A two-part tariff structure should be adopted for all long term contracts to facilitate Merit Order dispatch. According to National Electricity Policy, the Availability Based Tariff (ABT) is to be introduced at State level by April 2006. This framework would be extended to generating stations (including grid connected captive plants of capacities as determined by the SERC). The Appropriate Commission may also introduce differential rates of fixed charges for peak and off peak hours for better management of load.*

## **6.3 Harnessing captive generation**

*Captive generation is an important means to making competitive power available. Appropriate Commission should create an*

*enabling environment that encourages captive power plants to be connected to the grid.*

*Such captive plants could inject surplus power into the grid subject to the same regulations as applicable to generating companies. Firm supplies may be bought from captive plants by distribution licensees using the guidelines issued by the Central Government under section 63 of the Act.*

*The prices should be differentiated for peak and off-peak supply and the tariff should include variable cost of generation at actual levels and reasonable compensation for capacity charges.*

*Alternatively, a frequency based real time mechanism can be used and the captive generators can be allowed to inject into the grid under the ABT mechanism.*

*Wheeling charges and other terms and conditions for implementation should be determined in advance by the respective State Commission, duly ensuring that the charges are reasonable and fair.*

*Grid connected captive plants could also supply power to non-captive users connected to the grid through available transmission facilities based on negotiated tariffs. Such sale of electricity would be subject to relevant regulations for open access."*

### **III Harnessing of Captive Power Generation- Initiatives:**

The initiatives taken up by various organizations in order to harness the CPP is discussed briefly below:

i. **Forum Of Regulators [FOR]**

FOR has constituted a Group for Preparation of Paper on "Appropriate commercial arrangements required to be instituted between licensees

and the captive generators for harnessing of spare Capacity Energy from Captive Energy from Captive Power Plants". The group has recommended as follows, as noted in the minutes of the FOR meeting held on 18.1.2006:

- SERCs should carry out an exercise to figure out the total installed captive generation in the state.
- SERCs should identify availability of firm and infirm captive generation separately.
- Stand alone captive plants, which were not connected to the grid earlier, should be encouraged to have connectivity with the grid.
- SERCs to encourage distribution licensees to procure firm committed supply from captive generation and determine the price based on hours of supply.
- The prices for firm supply could be differentiated for peak and off peak power and the tariff could include variable cost of generation and reasonable compensation for getting capacity charges. Alternatively SERCs may consider fixing maximum and minimum ceiling price for such purchase.
- SERCs may also encourage distribution licensees to procure firm power from CPPs through Competitive bidding on a composite tariff basis.
- Firm supplies contracted should be scheduled as per the merit order dispatch and UI mechanism shall be applicable.
- The price of infirm supply should be linked to UI rates at the time of injection.
- SEMs need to be installed at Captive plant as well as open access consumer end for third party sales under open access.
- Tripartite agreement for wheeling should be signed by seller, buyer and the Licensee.
- CPP/ Consumers should be allowed to reduce their CD at any time and to any extent without any penalty
- SERCs to ensure that parallel operation charges/grid support charges are as low as possible.

- Start up/Standby Charges should not exceed the charges fixed for temporary connection.
- LC equivalent to one-month bill shall be opened by distribution licensee.
- There should be no minimum guarantee charges.

## **ii. Central Electricity Authority [CEA]**

CEA in association with Ministry of Power conducted a Workshop on harnessing of Captive Power on 20.03.2006, which was attended by organizations like MNES, Wartsila, BHEL, PTC, PFC, CII, ISMA, and PHDCCI & THERMAX. The following major points were discussed:

- a. M/s Wartsila presented various IC engine technologies for CPP along with the cost of generation. According to the presentation, the cost of generation using HFO is Rs. 4.84 per unit, based on Bio-oil it is Rs. 4.22 and based on Gas it is Rs. 2.39 per unit.
- b. CII has recommended for providing banking facility for CPPs, Frequency based tariff for inadvertent sale, uniform Custom duty for import of fuels at 5%, Reduction of excise duty to 8% for FO, import duty to be par with project equipment import, exempt CPPs from electricity duty and entry tax on fuel, Reduction of CD without penalty and nominal CD charges of Rs.20/kVA for standby connection.
- c. ISMA stated that there is a potential of 6200 MW grid exportable power by sugar mills and so far only 850 MW has been harnessed. The slow progress is attributed to frequent downward revision in tariff. To encourage Co-generation based CPPs, they have suggested that PPAs should be for a minimum period of 10 years, Merit Order & ABT should not be made applicable, Wheeling & banking should be allowed and withdrawal of banked energy should not be linked to grid frequency/ToD.
- d. PTC has stated that market is prone to seasonality of surpluses and some of the CPPs cannot tailor their generation to these requirements. Further, inadequate transmission capacity & metering for small CPPS is also matters of concern for harnessing CPPs. They have recommended



- reduced wheeling charges and also reduction of existing long-term PPA period of 25 years for CPPS.
- e. PFC has stated that it would finance upto 50% of the project cost for CPPs with a 12-year repayment period and moratorium of 6 months after scheduled commissioning. The interest rate offered by PFC varies from 8.25% to 9.75% based on rating of the companies. Further, PFC would provide debt-refinancing for existing CPPs.
  - f. PHDCCI has recommended that there should be parity in price and wheeling charges throughout the country and also there should be a single-window agency at each State to handle CPPs.
  - g. BHEL discussed various technologies available for CPPs based on the type of fuel used.
  - h. Thermax have discussed that EPC route for implementation of CPP has several advantages and has to be followed. Further, The tariff should be in par with other generating stations & SERCs should consider reasonable RoI for CPPs.
  - i. MNES has estimated that there is a potential of 15,000 MW from co-generation and 2000 MW from industrial waste in the country. The medium term RE potential is estimated at 200,000 MW. To harness this potential MNES has proposed to have co-ordinated & focused R &D, Leverage CDM, Levy tax on fossil fuel based generation, Expansion of delivery system and focus on HRD.

(Ref: CEA website)

### **iii. Action initiated by some of the states**

#### **a) Tamil Nadu:**

Tamil Nadu Electricity Regulatory Commission has brought out a draft consultative paper on Captive Generating Plants. The state has 22 existing CPPs with an aggregate capacity of 432 MW. 5 more plants are expected to be commissioned in the year 2005-06 with a total capacity of 297 MW.

As per this draft consultative paper,

- TNERC proposes to link the rate of purchase of 'firm' CGP power to the prevailing grid frequency and subject to a band of minimum (floor)

and (ceiling) maximum rates. The proposed rates are maximum of Rs 3.80 (two thirds of UI charge at 49.0 Hz) and minimum of Rs. 2.30 (currently, intersecting at UI rate frequency of 49.756Hz).

- Co-generation based CGPs have been provided with 10% premium over the above rates.
- 'Infirm' CGP power is priced at 90% of the rate fixed for firm /infirm power.
- The demand charges for a captive user shall be 37.03% of the applicable demand charges for that category of captive user for the 'deemed demand' supplied by the CGP holder plus 100% of the applicable demand charges for that category of captive user for the balance demand supplied by the distribution licensee.
- For standby arrangements distribution licensee shall be paid the tariff of that category of consumer or UI charges whichever is higher.

**b) Maharashtra:**

a) The Maharashtra Electricity Regulatory Commission has passed orders in the matter of power purchase and other dispensation in respect of fossil fuel based Captive Power Plants on 08.09.2004. The state has 143 CPPs (136 for own use, 3 are for own use & sale to third party and other 4 CPPs are for own use and sale to MSEB).

The highlights of this Order are as follows:

- Reduction in contract demand for a CPP holder as well as third party purchaser of CPP power allowed.
- CPP synchronized with the grid will pay additional demand charges only on the standby component and only on the quantum, if any, in

excess of CD with a mechanism for penal charges for exceeding contract demand.

- Rate of purchase of firm power by a distribution licensee is linked to UI charges with ceiling price of Rs.4.00 and floor price of Rs.2.30.
- Rate for infirm power is 90% of the rate prescribed for firm power
- Co-generation based CPPs have been provided with 10% premium over the above rates.

b) In addition, MERC has passed an order in the matter of CII proposal to use captive power to mitigate load shedding in Pune Urban Circles of MSEDCL on 25.01.2006. The salient outcome of this order is as follows:

- CPPs shall utilize their surplus captive power during peak hours and making available the grid power for supply to other consumers.
- The difference in peak hour variable tariff applicable to the industrial units and the normative price of generation determined by MERC, will be payable to the captive generators for the reduction in quantum of electricity consumed from grid.
- MERC will adopt the principles of normative pricing, in relation to the fuel used and the heat rate, to determine the cost of CPP generation.
- All the incremental cost arising out of this arrangement needs to be internalized by the Consumers of Pune Urban Circle.
  - \* The payment made by the licensee to the CPPs including interest on loan taken for funding the same would be considered while processing the ARR and tariff application of the licensee.

#### **IV. Promotion of captive generation in Karnataka:**

- (i) Historically, CPPs have been freely allowed to be established in the state. After the establishment of the KERC in Nov 1999, the

Commission has also allowed CPPs to be setup freely and no licenses or permissions are required to be obtained.

- (ii) Even before the reforms were initiated in the state in 1999, the GoK had allowed CPPs wheeling and banking arrangement for their own consumption using the state grid, with nominal wheeling and banking charges. After the enactment of KER Act 1999, the agreements entered into for wheeling and banking prior to the said Act have been continued since such concluded contracts have been saved in the KER Act.
- (iii) In respect of sugar based co-generation plants which are essentially captive in nature, surplus power has been allowed to be purchased by the licensees at pre-determined tariffs.
- (iv) The GoK has encouraged CPPs by exempting them from payment of electricity tax for own use and has granted sales tax rebate of 4% on purchase of fuels.
- (v) The Commission has determined the wheeling charge for NCE based CPPs at 5% .
- (vi) Commission has allowed the captive power plants to sell their surplus power to third party under open access, subject to payment of cross subsidy surcharge by the consumer.
- (vii) Presently, there is no grid support charge payable by the consumers having CPPs. The licensees are yet to propose these charges.
- (viii) Intra-State ABT is proposed to be introduced to cover all CPPs with an installed capacity of 25 MWs and above connected to the grid.

Earlier, in its effort to bridge the gap between demand and supply, in the year FY98, the erstwhile KEB had invited CPPs to supply power to the grid at Rs. 2.25 per unit for a short period of 4-8 weeks. In response, only ITPL had come forward to supply 3 MW of power. Similarly in FY01, KPTCL had proposed to buy from CPPs at Rs. 2.60 per unit during peak hour & at Rs. 2.20

during off peak hours. However, there was no response from any of the CPPs in the state.

## **V. Harnessing of Captive Power Generation in Karnataka**

### **1. POWER SCENARIO IN THE STATE**

#### **a. Installed Capacity & Energy input:**

The total Installed Capacity of the State including central share as on 05.12.2005 is as follows,

<b>Name</b>	<b>Source</b>	<b>Capacity in MWs</b>
KPCL	Hydro	3165.95
KPCL	Thermal	1470.00
KPCL	Wind	4.56
VVNL	Hydro	240.80
VVNL	Thermal	127.92
IPPs		586.00
Non Conventional Energy	Co-gen/Wind Hydro / Biomass	962.19
Central Generation Share	Thermal	1256.00
<b>TOTAL</b>		<b>7813.42</b>

Details of input energy to the state grid for the period FY03 to FY07 is as follows,

<b>Year</b>	<b>Energy Input (MUs)</b>
2002-03	29279
2003-04	31210
2004-05	33110
2005-06 Provisional	34367
2006-07 Projected	38057

## **b) Peak & Energy Shortage**

As per the CEA's 16<sup>th</sup> EPS projections for FY05, the peak & energy requirement for Karnataka in FY05 is 6826 MW & 39467 MU respectively. The actuals for FY05 is 5624 MW & 33110 MU. This indicates a peak shortage of 17.61% and energy shortage of 16.11% with respect to CEA's projections in FY05. Therefore, there is need to harness surplus capacity available with the CPPs in order to meet a portion of this peak and energy shortage.

## **c) Captive Power Plants: The need to harness its utilization:**

A large number of Captive Power Plants of various types, sizes and using different fuels are available within the state. These Power Plants are being utilized by the industries mainly as backup supply when there is poor quality & interruptions in grid supply. Some captive plants acts as a standby unit for grid supply. There are a few captive power plants which are meeting the power requirement of the consumer entirely (ITPL & ITC) without depending on grid supply. Since majority of the captive plants are being operated at low PLF, surplus power available from these CPPs could be fed to the grid to meet the power shortages to some extent, especially during peak hours.

Harnessing the surplus power from the Captive Power Plants has the following advantages:

- Partially bridge the gap between Demand & Supply.
- Optimize the investment made in CPPs
- Improve the efficiency of CPPs by operating at a higher PLF (Plant Load Factor).
- Additional revenues could be generated by the CPPs by sale of surplus power

The installed capacity of CPPS, the surplus power available in the State and the basic issues is discussed in the following paragraphs.

## 2. Installed Capacity of Captive Generation in the State:

The installed capacity of Captive Generation (above 1MW) in the State is about **810 MW**, after excluding sugar based co-generation plants which are already feeding to the grid. The range of installed capacity of CPP above one Megawatt is as follows:

Installed Capacity Range	Nos	Installed Capacity	
		MW	%
01 to < 10	199	493.72	61
10 to <20	3	43.11	5
20 to < 30	4	106.09	13
30 to < 40	0	0	0
40 to < 50	1	48.00	6
50 to < 100	0	0	0
100 & above	1	118.50	15
<b>TOTAL</b>	<b>208</b>	<b>809.42</b>	

These Captive Power Plants operate on different sources of primary energy, as classified below:

Prime Mover	Installed Capacity (as on 31.03.2005)	
	MW	% of TOTAL
Hydro	6.7	0.008
Steam	172.42	21.30
Diesel	436.54	54.72
Diesel / Steam	19.72	2.44
Fuel oil	174.02	21.50
<b>TOTAL</b>	<b>809.42</b>	<b>100.00</b>

The details of Captive Generators above 1 MW in Karnataka with the details of energy generated and PLF are enclosed at **Annexe 1. KERC proposes that the minimum capacity of the CPP to supply to the grid should be 1 MW.**

The data available on the Captive Power Plants show a large variation in the PLF across various CPPs. The usage of captive power mainly depend upon factors like:

- Economies of operation of CPPs compared to supply.
- Reliability & Availability of grid power, since the CPP is largely a standby arrangement.
- Time of captive power usage by the CPP holder (daily, seasonal) depending upon the requirement.
- Geographical location – urban or rural
- Nature of Business (Industry, product)
- Availability of fuel & its economics.

### **3. Extent of Surplus Power Available from the CPPs in the State:**

There is no clear indication about the extent of surplus power available from the CPPs to the grid. The CEA had earlier conducted a workshop on tapping of surplus power from CPPs at Bangalore on 23.6.2005 and has assessed the surplus power from CPPs available in the state as 76.4 MW as detailed below:

<b><u>From sugar Mills:</u></b>	<b>MW</b>
i. Ugar Sugar Works Ltd	29.00
ii. DavanagerJ Sugar Co Ltd	18.00
iii. Sree Renuka Sugars Ltd	7.50
iv. Sri Nandi Sahakari Sakkare	12.00
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Total	66.50



**From other CPPs**

i. Vasavadatta Cement	1.40
ii. Welcast Steels Ltd	1.50
iii. Mysore Paper Mills	7.00
	-----
Total from others	9.90
	-----
Total Availability	76.40
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It is to be noted that PPAs have already been entered into by the above sugar mills for supply of power to the ESCOMs and hence no further surplus may be available from these units, which they may confirm. If availability from sugar mills is excluded, the surplus assessed to be available from other CPPs appears to be negligible. However, in view of large installed capacity of about 800 MW in the CPPs in the state, operating at an average PLF of about 25%, the Commission would like to undertake this exercise once again to identify the surplus power available from the CPPs.

A few developers namely M/s Hariyana Steel & Power and M/s Sathavahana Ispat Ltd have submitted proposals to set up Captive Generating Plants with an installed capacity of 10 MW and 22.5 MW respectively and have expressed their willingness to supply surplus power at a rate of Rs. 2.30 & Rs. 2.60 per unit respectively to the licensees.

**KERC desires to know the quantum of power that will be made available to the grid on firm and infirm basis from CPPs.**

**4. The basic issues for harnessing surplus generation from CPPs to the grid are the following:**

- i. Cost of generation of power by CPPs
- ii. Availability of Transmission Network for off-take of power

#### **i. Cost of generation & Tariff for CPPs:**

Cost of generation of power by the CPPs is the single largest issue in harnessing surplus power to the grid. The cost of generation by the CPPs is very high mainly due to high fuel cost apart from higher capital cost. As per the World Bank report on '**Environmental Issues in the Power Sector-Karnataka**', the variable cost of generation from Diesel is Rs.4.50 per unit when the cost of Diesel was Rs.22.00 per litre. At the present cost of diesel at about Rs.35.00 per litre, the variable cost works out to be Rs. 7.16 Per unit.

A study report by IIM, Bangalore on '**Examining the 3.25 scheme introduced by KPTCL and its effects**' in the year 2002, had observed that the cost of generation using diesel would be Rs. 4.50 per unit (considering cost of diesel as Rs.19 per litre) and using LSHS / Heavy FO as Rs.2.80 per unit. Considering the present prices of LSHS/FO the cost of generation would be not less than Rs. 5 per unit.

As per the article on 'Back up power' in **Power Line** of January 2006, the average cost of generation for diesel based CPP is around Rs 7.00 to 11.00. In the Case study in the heavy engineering and manufacturing sector as reported in February 2006 issue of Power Line, the cost of generation is indicated in the range of Rs.6.75 to Rs.8.80 per unit.

The cost of generation mainly depends upon the nature of fuel used apart from operational efficiencies of the plants and as such the cost of generation for each plant varies considerably. There can be no standard scale for adopting the cost of generation for such varied parameters of generation.

With the inter-state ABT in place, the maximum tariff at which the grid could absorb surplus power from the CPPs is the UI rate. It is well known that the UI rate is dependent upon the grid frequency at the time of drawal and the maximum UI rate prevailing is R.5.70 per unit at a frequency of 50.5 hertz. Therefore, it would not be economical for the grid to absorb power from the CPPs at a rate higher than the UI rate.

The prevailing UI rate is given below:

Frequency	UI rate paise/unit
Not below 50.50 Hz	0.0
Below 49.02	570.0

Each 0.02 Hz is equivalent to 6.0 paise/unit in the 50.5 to 49.8 Hz frequency range and 9.0 paise/unit in the 49.8 to 49.0 Hz range.

In fact, TNERC has proposed in the draft regulations to absorb surplus power from the CPPs at 2/3 rds the UI rate.

As suggested in Tariff Policy & also as per the recommendations by Forum of Regulators (FOR), to encourage sale of surplus power of Captive Generators to ESCOMs, Regulators may allow some portion of the fixed cost in addition to variable cost of captive generation. This shall be applicable where there is no bidding for tariff.

Following are the alternative approaches for determination of tariff for absorbing surplus power from CPPs:

- a. Cost plus approach
- b. Time of Day approach linked to UI rate.
- a. Competitive bidding approach
- b. Avoided Grid usage during peak

**a. Cost plus approach:**

This approach is to ensure that the Captive Power Generator recovers all costs that are prudently incurred including a fair rate of return on his prudent investment. As discussed earlier, since the cost of generation varies widely across the CPPs depending upon mainly the nature of fuel and operational efficiencies, it would not be prudent to determine the tariff under this approach for absorbing surplus power.

**b. Time of Day approach linked to UI rate:**

Under this approach, the tariff for power purchase shall be related to Time of day principles linked to UI rate. The rates could be different for peak, off-peak and intermediate peak periods and the tariff shall be the maximum UI rate during that period.

Already there exist UI charges effective under the inter-state ABT. These UI charges are basically worked out based on the Diesel prices. The UI charges can be the criteria for Captive generators to supply surplus power to ESCOMs. This approach avoids complexities in fixing tariff for CPPs. Also it takes care of other system constraints like frequency that is necessary for maintaining grid discipline.

**c. Competitive Bidding approach:**

Under this approach, the Distribution Licensee/s shall call for Competitive Bids from the interested CPPs to supply required capacities for predetermined or open-ended time frame with or without upper ceiling limit as desired. The Capacity utilization by ESCOMs can be on the basis of merit order. The tariff so determined shall be adopted by KERC as mandated under EA 2003/Tariff Policy.

The guidelines for procurement of power under the competitive bidding route by distribution licensees have already been issued by the MoP/GOI and the same guidelines may be followed by the licensees for procurement from CPPs.

This approach appears to be a feasible option to absorb surplus power from the CPPs.

**d. Avoided Grid usage during peak**

In this approach the consumer does not consume any power from the Grid during pre-determined peak time but consumes power from its own CPP during such period. Because of this avoided Grid usage during peak by the

consumer, the ESCOMs can cater to the needs of other category of consumers during such period. In return, ESCOMs should compensate the consumer for the extra cost of generation during such periods, by way of credit in the monthly energy bill of the consumer. The compensation could be the difference between the variable cost of generation from the CPP and the prevailing grid tariff (TOD tariff) for the consumer, which could be pre-determined using benchmark prices for the fuel. This approach is similar to the approach adopted by MERC in Pune area as discussed earlier.

However, this approach would be complex and would require close monitoring.

#### **ii. Availability of Transmission Network for off-take of power.**

The other requirement for off take of power from a CPP is availability of required Transmission/Distribution Network. As most of the CPPs are already connected to the grid, availability of transmission network is not a constraint. However, in case they are not presently connected to the grid, the State transmission utility along with ESCOMs (depending upon the voltage levels) have to provide required transmission corridor to absorb surplus power, wherever required, at their cost.

### **VI. OTHER RELATED ISSUES**

**a) Metering:** All Captive Power Plants desirous of selling power to either Distribution Licensee or Third party shall install ABT compliant, 0.2 accuracy class meters at the generation end and at the point of sale.

**b) Billing and Accounting:** The distribution licensee buying power from one or more CPPs shall settle payment within seven days after the completion of the billing cycle. The billing cycle is normally one month. In case of third party sale, SLDC shall maintain the energy accounting.

**c) UI Rates:** The UI Rates are as prescribed by CERC and are subject to revision by CERC. The same revised rates will be applicable for the sale of power by CPPs to Distribution licensee.

**d) Grid Support/parallel operation Charges:** The transmission utility is yet to come up with its proposal on grid support charges. The same will be dealt with as and when the transmission utility files the proposal with the Commission.

**VII. KERC invites comments on:**

- (i) The need to absorb surplus power from the CPPs to the Grid to meet the shortage, especially during peak hours.**
- (ii) Absorption of surplus power from CPPs would increase the power purchase cost of the licensees and consequently the cost of supply. Whether the increase in cost on this account should be loaded to all the consumer categories equitably through tariff or to any specific consumer categories selectively.**
- (iii) Among the alternative approaches for pricing of surplus power from the CPPs as discussed above, what could be the appropriate approach for pricing such surplus power? In case Competitive-bidding approach is adopted, what should be the floor price and ceiling price?**

Comments may please be provided to the Commission latest by 31.05.2006.