POWER AND AGRICULTURE CRISIS IN ANDHRA PRADESH

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Introduction

Andhra Pradesh obtained the dubious distinction of being first in the number of farmers' suicides in the country. The new Congress government which assumed power in the state in mid May of 2004 announced aid package to provide succor to the families struck with this tragedy. Helplines were also set up to come to the help of farmers' who are in distress. Even these did not stop the spate of suicides in the state. This only points to the deep crisis that engulfed the state's agriculture sector. This cannot be addressed with some ameliorative steps, but need substantial policy initiatives to change the direction of the sector.

A large number of farmers who committed suicide during last year and this year were in debt because of borewells. This was the case in the past also. The first significant spate of suicides surfaced in 1998 in Warangal and Karimanagar districts. The People's Tribunal that had enquired in to these suicides observed that in two thirds of the cases it had examined farmers had contracted debts towards digging open wells or drilling bore wells. The recent news reports on the farmers' suicides also show that farmers invested the borrowed money in drilling borewells, and as they led to very low quantity of water, or no water in many cases farmers were stuck with dead investment. As the sources of further loan/investment were closed they chose to end their lives.

These sad deaths of borewell farmers point to a nexus between power and spreading crisis in agriculture sector. Yet the power tariff do not form substantial part of the cost of agriculture production, but investment made in drilling the borewell and energizing is substantial. According to a World Bank study while power tariff forms only 4.5% of the gross income in AP. But if one were to include the fixed costs of sinking a well, installing a pump, repairs and maintenance, irrigation costs go up to 36%. For the marginal farmers it is as high as 64% of total costs in AP (World Bank 2001). This demands an examination of the power sector in so far as its relation with the agriculture sector.

Contribution to spread of well irrigation

Extension of power distribution network to even interior villages and energisation of irrigation pump sets contributed to increase in irrigated area and to increased food grain production. The number of energized pump sets increased according to the APSEB figures, from 5.79 lakhs in 1983-84 to 18.24 lakhs in 1997-98. According to the census of agriculture pumpsets conducted in response to APERC's order total number of pumpsets stood at 20.51 lakhs in 2003-04. As a result of this increase in number of pumpsets area

under well irrigation doubled during this period. Net sown area under well irrigation increased from 8.38 lakh hectares in 1983-84 to 16.76 lakh hectares in 1997-98. In 2002-03 area under well irrigation increased to 18.43 lakh hectares. In 1983-84 well irrigation accounted for 21.61 percent of the total irrigated area. This increased to 42.5 percent in 1997-98. This increased to 43.15 percent in 2000-01 when total net irrigated area reached the highest figure at 45.39 lakh hectares. This proportion further increased to 51 percent in 2002-03. During this year total area irrigated under all sources declined to 36.14 lakh acres because decline in rain fall. This shows that well irrigation in general withstood drought conditions/fall in rain fall compared to other sources of irrigation. Compared to other sources of irrigation area under well irrigation consistently increased. During the same period there was decline in the area under tank irrigation. While it stood at 10.87 lakh hectares in 1983-84, it was 5.63 lakh hectares in 1997-98. It further declined to 4.25 lakh hectares in 2002-03. Canal irrigation also experienced decline. It declined form 18.39 lakh hectares in 1983-84 to 15.38 lakh hectares in 1997-98. It also further declined to 12.09 lakh hectares in 2002-03.

Even more significant aspect of this spread of well irrigation is that this growth in well irrigation took place mostly in backward areas like Telangana, Rayalaseema and north Coastal areas where the scope for canal irrigation is limited. In Telengana area under well irrigation increased by 167 percent between 1981-82 and 1997-98. Within this area Warangal district registered 324 percent growth rate, Adilabad 315 percent, Nizamabad 248 percent, Khammam 189 percent, Karimnagar 137 percent, Nalgonda 118 percent, Mahaboobnagar 101 percent. Coastal region registered 86.10 percent growth in area under well irrigation during the same period. In the North Coastal districts of Srikakulam, Vizianagaram and Visakhapatnam area under well irrigation increased by more than four times. In the remaining districts of the region East and West Godavari districts witnessed a growth of 146 and 93 percent respectively. Compared to these two regions Rayalaseema region witnessed a lower growth, 75 percent. Within this region Kurnool district registered a growth of 400 percent. In the remaining districts of this region well irrigation is already widespread. In 1981-82 it accounted for more than 50 percent of the irrigated area. Besides this precarious ground water availability might have come in the way of further expansion of well irrigation. This expansion in well irrigation would not have been possible without the availability of power at subsidized rate. To this one has to add introduction of drilling technology, and submersible motors. Without these two factors also expansion in well irrigation might not be as much as we experience today. Any escalation in power tariff will have adverse impact on well irrigation and on the lives of nearly a crore of population who depend on well irrigated agriculture.

This made possible increased food grain production to meet the nutritional needs of increasing population. If the pump sets were not energized achievement of food security might have been in doubt. Besides contribution to food production it enlarged livelihood opportunities to the people from backward regions. It provided succour to nearly a crore of population.

Though total area irrigated under wells registered substantial increase average area irrigated under each pumpset declined over the period. In 1983-84 on the average 1.45

hectares were irrigated under each pumpset. This declined to 0.92 hectares in 1997-98, and it further declined to 0.90 hectares per pumpset. This shows that well irrigation is also coming under stress. On one side groundwater levels declined because of its over exploitation leading to lesser water yield. On the other side duration of power availability also declined over the period. In 1980s power availability was about 13 hours per day. In 1990s the government/utilities announced that power supply to agriculture would be restricted to nine hours only. But rarely supply reached this figure. In 2003-04 the government/utilities announced that the power supply will be only for seven hours. The hours of supply of power also might have led to decline in the average area irrigated under pumpsets. It was reported that when the period of power availability declined some farmers increased the number of pumpsets. A World Bank survey has shown that in AP 4 percent of the farmers owning electric pumpsets owned more than one pump (World Bank 2001, p.17). As the groundwater levels plummeted farmers drilled more than one borewell. A case study of Musampally in Nalgonda district by P. Sainath published in The Hindu provides a vivid description of the spread of borewells and enormous investments pumped in to it. As the per pumset irrigated area came down the investment burden increased proportionately. If the cost of failed borewells is added to this the investment burden on well irrigation will increase further. This is one of the indicators of increasing stress in agriculture in AP.

Over estimation of agricultural consumption

Table – 1 **DISTRIBUTION OF ELECTRICITY**

Category	1980-81	1990-91	1995-96	1996-97	1997-98	1998-99
Power Distributed. MU	6915	20233	29457	32092	36358	38721
Industry. MU	3363	7042	7798	8207	8595	8655
Percentage	48.63	34.80	26.47	25.57	23.64	22.35
Agriculture. MU	915	6285	11399	7835	9336	9866
Percentage	13.23	31.06	38.70	24.41	25.67	25.48
Domestic. MU	546	2079	3276	3801	4535	5090
Percentage	7.90	10.28	11.12	11.84	12.47	13.15
T&D Losses MU	1523	3978	5551	10281	12020	12312
Percentage	22.03	19.67	18.85	32.04	33.06	31.80

Source: Power Development in Andhra Pradesh – 1998-99

It has been alleged that the high consumption by the agriculture sector is the culprit behind the decline of power sector in AP. The subsidy provided to the irrigation pump sets was draining the resources of the APSEB. But an examination of the sector shows that the picture is otherwise. As the agriculture sector consumption is not metered the

consumption of this sector is arrived by elimination process. From the distributed energy, the energy consumed by the metered sections is deducted. From this difference the energy that the Board wants to show as T&D loss is deducted. The remaining power is shown as consumed by the agriculture sector. No scientific method is used to arrive at the magnitude of T&D losses. Amulya K. N. Reddy and Gladys D. Sumithra's comment on Karnataka situation holds good for Andhra Pradesh also: "Unfortunately, the technical losses have not been measured or derived from the T&D system diagram by standard electrical engineering computations. Instead, all the T&D losses (including the technical losses) are being obtained as a residue. That KEB's assignment of T&D losses is suspect follows from the fact that, from 1984 to 1994, its reported T and D losses are decreasing even through the ratio of LT loads is increasing even though electrical engineers know that, in the absence of major system improvements, T and D losses should increase with an increase in the share of LT loads" (1997: 589). In order to show that the Board is running technically very efficiently they had shown very low T&D losses. The T&D losses that stood at 23.08 percent in 1981-82 gradually declined to 18.85 percent in 1995-96. Consequently, the magnitude of agriculture consumption is shown to be high. As a result of this calculation commercial losses/theft of power and also some part of technical losses were shown as being consumed by the agriculture sector. APSEB used the agricultural supply to hide many of its technical and commercial shortcomings, in particular its commercial T&D losses. It was estimated that these losses account for 20 to 30 percent over and above the given figure. If these losses are taken into account then the proportion of power consumed by the agriculture sector will be low, lower than 47.8 percent in 1994-95. consumption by the agriculture sector may be as low as 23 percent. No wonder that total blame is laid on the farmer for wasting of energy.

The consumption in the agriculture sector is overestimated. This starts with the number of irrigation pumpsets (IPS). According to the APSEB there were 18.24 lakh IPS in the 1997-98. This number stood for all the sets energized since the time of the formation of the board in the year 1959. From this list sets that are disconnected and cancelled for various reasons are not removed. According to an estimate out of these registered IPS the operating sets are about 13.65 lakh. If one lakh unregistered sets are added to these total IPS operation in agriculture sector were around 14.65 lakhs during the year 1997-98 (M.H.P. Rao, 1999). It is also to be recognized that for various reasons all these energized sets are not available for operation round the year.

M. Hariprasad Rao felt that power consumption was under estimated in metered sector and over estimated in non-metered sector, i.e., agriculture sector. According to his estimates 8 per cent of the meters are not functioning, 15 percent of the meters are not sealed and 15 percent of the meters are not recorded properly. In total 38 percent of the meters can not be relied upon. Because of these 10 percent of the power produced is not reaching the consumers. But this is shown as consumed by the agriculture sector. He also pointed out that the government overestimated the number of pump sets by 25 percent, working hours (1620 hours) in an year by 33 percent and power consumption by one 5HP motor (4.55 units) by 20 percent. Because of all these power consumed by the agriculture sector was shown to be two times more than its actual consumption. According to him proportion of power consumed by the agriculture sector may be 25 percent, but not 47.8

percent. According to him losses in transmission and distribution are 25.5 percent higher than the government estimates. He pointed at that even Board officials accepted that power theft in metered sector is 200 percent more than the estimated one (The Hindu, September, 5 1997). As the pump usage is overestimated, the effective tariff is underestimated. Based on these false premises government intends to bring far reaching changes in the power supplied to the agriculture.

According to an estimate agricultural sector energy consumption in all the districts of AP state in the year 1996-97 was about 5,213 MU. This includes likely theft in that sector. If one assumes even the same rate of consumption during the next year i.e., 1997-98 for the same number of sets, the consumption in agricultural sector could not be higher than 5222 MU. (MHP Rao, 1999). As opposed to this the consumption of agriculture as shown by the APSEB for the year 1996-97 is 7835 MU and for 1997-98 is 9336 MU. The difference is 2622 MU (50.30%) and 3938 MU (72.95%) in 1996-97 and 1997-98 respectively.

Subsequent to the attempts to bring in reforms in the power sector in the state with the assistance of the World Bank some of these numbers were revisited and revised. Agriculture consumption was brought down from 11399 MU in 1995-96 to 7835 in the next year 1996-97. As a percentage it declined from 38.70 percent to 24.41 percent. Corresponding to this T&D losses increased from 5551 MU (18.85percent) to 10281 MU (32.04 percent). As explained above even the revised agriculture consumption figures are on the higher side.

Between 1983-84 and 1997-98 area under well irrigation increased by 100%, number of pump sets increased by 215%, and power consumption in agriculture increased by 506%. Increase in number of pump sets might be because of the replacement of diesel engines, animal drawn and other indigenous systems with electric motors following power subsidization. But it is the jump in aggregate power consumption in agriculture that defies logic.

The coming in to being of APERC did not alter the agriculture consumption figures much. The agriculture consumption figures continued to be inflated. In the year 2002-03 12,469 MU were shown as consumed by the agriculture sector. In 2003-04 it stood at 11,703 MU. In 2004-05 agriculture consumption is expected to be 10,800 MU. These are high by any standard. According to alternative estimates this consumption could be around 8000 MU (PMGER 2001) Compared to this T&D losses are shown to be on the decline all the time. This is evident from the following table.

Table – 2 **DISTRIBUTION OF POWER CONSUMPTION**

Particulars	**2002-03**	**2003-04**	**2004-05**
Metered Sales	44.1%	48.5%	50.4%
Agricultural Sales	28.7%	26.5%	25.9%
T&D Losses	27.2%	24.99%	23.61%

Wastage

Substantial amount of energy is being wasted because of inefficient use of irrigation pump sets. It is common to attribute this inefficiency to subsidized, low power tariff. It is alleged that as power is being supplied at very low rates farmers are not paying any attention to efficient use of the same. But, given the limited ground water availability and irregular power supply this charge of unbridled power consumption on farmers do not hold good. The fact that this inefficiency is because of improper choice of pump, piping and accessories like using non-fricitionless foot-valves and GI delivery pipes instead of HDPE-piping, bad quality of pump and bad maintenance, are not well recognized. There are economically attractive possibilities of increasing this efficiency. Many field studies and pilot projects have demonstrated that 35 to 50 percent of the power supplied to agriculture can be saved. In spite of the immense possibilities in saving energy no adequate steps are taken by the powers that be.

Rather the establishment and its guiding force, the World Bank in the present case, find the solution in increased tariffs. They contend that if tariff is raised the farmers themselves will go in search of efficient pump sets. In response to a call to look at the possibilities of increasing the efficiency of pump sets the World Bank contended, "Upgrading appliance efficiency is best fostered… (if tariff is increased). The Bank's immediate priority is to …. address price distortions and institutional deficiency". (Prayas, p.25). Tragedy is that even if farmers go in search of efficient sets they will not be available in the market and absence of proper market regulation.

Metering

The supporters of reforms in the country and the world bank have argued that the absence of metered supply of power is the important reason for the mounting losses of the electricity boards. They advocated a reverting back to metered power supply. Metering of agricultural pumpsets is also suggested to know the power consumed by this sector and also to correctly arrive at T&D losses which is not possible with out meters. But the logistical problems involved in metering and billing 20 lakh farmers spread all over the state is not taken in to account.

In 1960s and 1970s the state governments encouraged farmers to go for well irrigation and offered energisation of pumpsets. AP is also one of these states. As the number of pumpsets began to increase metering and billing of these connections emerged as a problematic one. The one solution found was to bring in slab based flat tariff. This flat tariff has overcome these logistical problems. But it has its own problems. There was resistance to flat tariff upwards. And measurement of agriculture power consumption has become a ticklish one.

In the background of controversy over the free supply of power to agriculture and unreliability of the sector's power consumption figures there were strident calls for metering agricultural connections in the state (Jayaprakash Narayan 2004). In this context one has to keep in mind the transaction costs involved in metering the agricultural

connections. A Rural Electricity Corporation's study had shown that the metering cost was 15-20 percent of the cost of power supplied to agriculture in Maharastra (Shah, T *et al* 2003, p.7). The situation is in no way different in AP. Even the APERC which has ordered the distribution companies to complete metering by March 2005 is well aware the problems involved in metering agricultural connections and is not very optimistic about its orders being carried out. It is to be recognized that in metering installing the meter and its maintenance is not the only cost. Other problems include meter tampering, pilferage, under billing, corruption at the level of the meter readers. As far as farmers are concerned flat rate tariff is the most transparent and they need not be at the mercy of the meter readers. Under the advise of the World Bank General Musharraf government in Pakistan reverted back to metered supply to agricultural connections in 2000. Again all the ills of metered tariff appeared. Power theft and meter tampering became widespread. Total power theft reached nearly seven billion units worth Pakistan Rs. 1400 crore.

Subsidy to the agriculture sector

Subsidy to the agriculture sector is being treated as the cause for all ills of the power sector in the state. While the agriculture sector is consuming more power than any other sector, it provides least proportion of revenues. It is the industrial sector that provides bulk of the revenue. In 1985-86 while agriculture sector consumed 28.8 percent of power distributed, industrial sector consumed 54.8 percent. In 1994 – 95 while power consumed by the agriculture sector increased to 47.8 percent, that of the industrial sector declined to 29.1 percent. Subsidies to the agriculture sector cost Rs.162.3 crores in 1985-86. This increase to Rs.1733.88 crores in 1997-98. But the question is how far these figures are reliable.

Table – 3 **POWER CONSUMPTION IN AGRICULTURE SECTOR**

Year	No. of Agrl. Connections	Power Consumption	Average Rate (PS/PU)	Cost per Unit(LT) (PS/PU)	Loss per Unit (PS/PU)	Total loss on Agrl. Consumption (Rs in Crore)
1983-84	579286	1540	9.21	68.08	58.87	90.66
1984-85	636003	2354	6.12	60.63	54.51	128.32
1985-86	724715	2569	5.74	68.93	63.19	162.34
1986-87	819523	3347	4.87	68.90	64.03	214.31
1987-88	936758	3980	4.72	70.68	65.96	262.52
1988-89	1036484	4461	4.28	77.03	72.75	324.54
1989-90	1111569	5276	4.22	84.88	80.66	425.56
1990-91	1193363	6285	2.88	88.90	86.02	540.64
1991-92	1273972	6972	3.28	102.90	99.62	694.55
1992-93	1398049	7894	8.10	117.83	109.73	866.21
1993-94	1504975	9022	6.40	126.74	120.34	1085.71
1994-95	1605807	10922	5.27	154.22	148.95	1626.83
1995-96	1642993	11399	2.81	172.50	169.69	1934.30
1996-97	1821291	7835	13.52	183.95	170.43	1335.32

1197-98	1824689	9336	16.12	201.84	185.72	1733.88
1998-99	1884678	9500	16.88	231.00	214.12	2034.14

Source: APTRANSCO.2000 Transmission Corporation of Andhra Pradesh: Factual Position. And, 1999. Power Development in Andhra Pradesh – 1998-99.

While cost per unit of power at LT end was about 201.84 paise in 1997-98 the electricity board received only 16.12 paise from agriculture; and as a result of it, it incurred a loss of Rs. 1,733.88 crore. But if we take 5398 MU as the actual consumption in the agricultural sector per unit income from this sector will be 28 paise and loss incurred will be Rs. 938.40 crore.

At this stage we have to take into account the implications of cross subsidization. " When utilities serve different categories of users, it is customary to have differential pricing. The fundamental basis for this approach is that , in the context of income inequality, the poor must be protected with lower prices, where as the rich , who can afford it, pay higher prices. The system is invariably designed so that the users paying higher prices cross subsidise the poor who pay lower prices and there by ensure the overall financial viability of the utility. It is, therefore, customary that differential pricing and cross subsidise go together in order to guarantee financial viability". Industrial and commercial consumers are cross subsidizing agricultural and domestic consumption. While the average cost of power supply is Rs.2.29 per unit the industrial consumers are paying about Rs. 3.19 per unit and commercial consumers are paying Rs. 3.69 per unit. As a result of this additional income accruing to the board is about Rs. 907.8 crore (Rs.778.02 crore from industry and Rs.129.79 crore from commercial). This amounts to Rs.31.4 crore effective subsidy provided by the state government/APSEB. Even if we add subsidy of about Rs.163.25 crore provided to domestic consumers the total subsidy will not cross Rs. 200 crore. This show that subsidies to agriculture in particular are not the main cause of financial problems because the losses on this account are more than compensated by surplus from the industrial and commercial consumers.

If the state government still talks about losses running into crores of rupees they should be located elsewhere, primarily T&D losses including theft of power and not in agriculture sector.

This is only one aspect of this issue of losses incurring because of subsidies to agriculture sector. Water impounded in various irrigation projects cannot be taken to backward areas through canals. But the power produced under these projects can be used to exploit ground water. If the power produced by the hydro-power stations are meant for energizing irrigation pumpsets the whole talk of subsidy to agriculture sector appears irrelevant. During 1997-98, 7244.49 MU of energy is generated in the hydel sector. Even if the T&D losses account for 25 percent of the power generated the remaining power (5433 MU) roughly equals agricultural consumption. During the same year cost of power produced per unit in this sector is 19.44 paise while per unit tariff for agriculture amounted to 26 paise. At this juncture another aspect to be noted is that power to agriculture is supplied during non-peak hours. Besides this the supply is irregular and of fluctuating voltages. This itself implies lower tariff. Even the World Bank document

acknowledges this, "It is unlikely that the short-term, under the current political situation the agricultural tariff can be increased significantly when the supply situation is far from satisfactory". (1999 p.11). This implies that in stead of obtaining positive subsidies the agriculture sector is providing surpluses.

The picture did not become clear even after the APERC coming on to the scene. The arbitrary cost to serve measure employed by the APERC further compounded the picture. This is evident from the following table:

The figure on the subsidy provided to agriculture hinges on the cost to serve and the quantum of agriculture consumption adopted by the APERC. If we assume that agriculture consumption is overestimated by nearly 3000 MU the subsidy received by the agriculture sector comes down by nearly Rs. 600 crores. If we take in to account agriculture sector's claim for cheaper power and the fact that it is supplied power during the non-peak period this subsidy will come down further.

Table – 4 **AGRICULTURE SUBSIDY**

Particulars	2001-02	2002-03	2003-04	2004-05
Agriculture Consumption (MU)	9815	9936	11350	11450
Cost to Serve for Agriculture (Rs/U)	2.57	2.38	1.81	1.61
Agriculture Tariff (Rs/U)	0.31	0.31	0.32	0.36
Revenue from Agriculture (Rs in Crore)	302.00	305.00	362.98	409.17
Cross Subsidy (Rs in Crore)	1370.62	1222.38	926.61	821.15
Govt Subsidy (Rs in Crore)	849.83	837.39	664.70	609.97
Total Subsidy (Rs in Crore)	2220.45	2059.77	1591.31	1431.12

Source: Tariff Orders of APERC.

In case tariffs commensurate with the cost to serve were to be implemented in keeping with the tariff philosophy being adopted by the APERC the above total subsidy figures indicate the additional burden to be borne by the agriculture sector.

New Tariff Policy

It is the tariff policy adopted by the APERC, and the tariff related sections of the new Electricity Act 2003 which pose great danger to the agriculture sector, and may possibly the cause of crisis whenever this tariff philosophy is implemented in total.

Before examining the tariff policy let us have a look at the existing agriculture tariffs. For well irrigation both slab system and per unit metered tariff are in operation. In the case of slab rate DPAP area and non-DPAP are treated separately. In the case of DPAP area the slab rate ranges from Rs. 225 per HP per year for motors of 3HP to Rs. 575 per HP per year for motors of more than 7 HP. In the case of non-DPAP areas per HP slab rate is Rs. 50 more than the corresponding HP in the DPAP areas. In the case of metered unit rate no such distinction is made. It is 20 paise per unit up to the consumption of 2500 units per annum and 50 paise for the units above 2500 units per annum. For horticulture crops metered tariff is must. For the out of turn allotment of agriculture connections metered tariff is must and tariff is one rupee per unit. These agriculture connections come under low tension category (LT).

But under the existing sector policy for power these tariffs are bound to change. To have an understanding of the expected changes in tariffs in the future a look at the tariff philosophy embedded in the new AP Electricity Reforms Act 1998, the policy sought to be followed by the APERC and the relevant sections of the new Electricity Act 2003 is necessary.

After assuming power on 13 May 2004 the Congress led state government of AP announced free power to agriculture. This is a deviation from the sector policy programme. While announcing free power the Congress government also stated that it will carry out the reforms. Both of them cannot be carried out simultaneously. The way it is being implemented people feel that free power scheme would be wound up sooner rather than later. Whatever its fate may be here we assume the exiting tariff prior to the free power announcement.

For many years, Electricity Boards in India have consciously adopted the policy of cross subsidy in tariff making. Based on an assessment of capacity to pay, some sections of the consumers (low consumption domestic, agriculture etc) have tariffs which are less than the cost of supply. The resultant loss of revenue to the Board is compensated from two sources: a) by the consumers who have capacity to pay who have tariff higher than the cost of supply (industrial) - this is the cross subsidy portion and b) by the government in terms of direct subsidy. Modification of this approach to tariff (especially the cross subsidy policy) is one of the stated components of the reform program.

Under the tariff policy that has come in to operation after the enactment of AP Electicity Reforms Act 1998 cross-subsidies are to be completely eliminated and subsidies provided by the government also is to be brought down drastically. Though the Act mentions that some sections of the consumers can be subsidized on the basis of their paying capacity and the quantity of power consumed, the overall trend is towards total elimination of subsidies and bring in tariffs that reflect cost-to-serve. It was contended that subsidies and cross-subsidies distort market signals and lead to inefficient operation of the sector.

The World Bank which played an important role in the evolution and implementation of power sector reforms in Andhra Pradesh was very much for comprehensive changes in the power tariff policy and wanted the tariff to reflect the costs of power generation and

market and did not want the tariffs to be distorted by subsidies and cross-subsidies. In its comprehensive report ' Andhra Pradesh: Agenda for Economic Reforms' it held that the only way out of the present predicaments in the power sector was to implement all encompassing reforms. This includes tariffs that will see gradual elimination of cross-subsidies and substantial reduction of subsidies. Regarding agriculture tariffs it recommended that initially tariff should be 50 paise per unit, and this should be gradually increased to see that it covers 50% of cost to serve within three years of the initiation of reforms in the power sector. The World Bank's Project Appraisal Document (PAD) for loan of Rs. 4,250 crore under the AP Power Sector Restructuring Programme (APSRP) mandates average annual tariff hikes of 12-15%, implementing cost based tariff and reducing government subsidy to zero.

The policy adopted by the Government of AP is also on the same lines. The policy statement went along the lines of the World Bank report and made similar recommendations. This marked a paradigm shift in the power policy: state ownership to private ownership; budgetary support to private capital; self reliance to globalisation and cross subsidy to cost based tariff.

The policy statement of the GoAP says: "*The main components of the proposed reform program are: …. Establishment of an independent regulatory commission to …..set cost and efficiency based tariff to ensure the credit worthiness and viability of the sector and to progressively eliminate tariff distortions and subsidies*" (Detailed Policy Statement, GoAP, 1997).

In order to give a concrete shape to this reform policy the GoAP enacted the Andhra Pradesh Electricity Reforms Act of 1998. One of the important objectives of this Act is to rationalize generation, transmission, distribution and supply of electricity avenues for participation of private sector in the electricity industry. Under this Act tariff setting powers are vested with the AP Electricity Regulatory Commission (APERC). The Commission in turn has to set the tariffs in such a way that the producers/suppliers recover their costs.

The APERC made its approach towards tariff abundantly clear through its Tariff Philosophy paper released in October 1999: "*In fact, tariffs served* (till now) *more the social objectives at the expense of efficiency and cost recovery…. This situation is no longer sustainable. The new licensees are required by the Act* (Reform Act) *to use their resources in an economical and effective manner and the tariff are required to be compensatory."* It is clear from this that a key aspect of the reform program was to gradually increase tariff over the next few years and to gradually remove cross subsidy.

As per the broad reform plan APERC has formulated a long term tariff plan (LTTP) draft of this is released in February 2002 and the final order was released in March 2003. LTTP envisages a multi year tariff plan, which involves reduction of cross subsidy and tariff at cost to serve. The Electricty Act – 2003 , enacted by the central government in June 2003 also has similar approach to tariff. This Act provides for complete elimination of the cross subsidies. In fact using the provisions of the Act many of the industrial consumer who contribute to cross subsidy may opt out of state owned power distribution

companies. This would imply high tariffs for the majority of the low-end consumers including agricultural consumers who will be left with no other option.

The sum and substance of the tariff policy is that tariffs for the agriculture sector will be increasing gradually, if not suddenly as APERC specifically wants to guard the consumers from tariff shocks, to reflect disappearing cross-subsidies, declining subsidies and covering increasing cost of power supplied to it.

Tariff Trends:

This policy is also more or less reflected by the tariff orders issued by the APERC since its inception in 1999. There was a massive tariff hike in the first year of the reform and subsequently tariff has remained more or less the same. In the subsequent years tariff hike is not as much as the World Bank proposed. This is because of the massive anti-tariff hike agitation after the first tariff order of the year 2000-01.

The tariffs announced from 2000 to 2004 show that the above described tariff policy is already in implementation. While tariff for subsidized categories like agriculture and domestic consumers is increasing the tariff for subsidizing category like industry is coming down. Between 2000 and 2004 tariff for agriculture sector increased by 50 percent. During the same period tariff for the households using less than 50 units per month increased by 80 percent. In the case of HT industry it declined by one percent. If tariffs according to cost to serve were to be implemented agriculture tariff will increase by five times.

It is also to be noted that reform has resulted in increase in revenue and reduction of T&D losses. From 1999 to 2004, the total units handled by TRANSCO increased by 25% whereas the revenue went up by 71%. The fruits of the improvement in performance has not resulted in any reduction of tariff to the majority of the low end consumers. In fact incentives and tariff reduction have been offered to high end industrial consumers.

Impact of the changes

The liberalization and structural adjustment programmes are going to cost agriculture sector heavily. As a result of rolling back subsidies in the name of restoring rational price mechanism prices of all in puts used in agriculture viz. fertilizer, pesticides, seeds, implements are increasing. Now in the name of power sector reforms power tariff for agriculture is being hiked. Already credit facilities for agriculture are declining fast. This will impose enormous burden on the farming community. When the agriculture product imports are opened the prices are expected to decline complicating the situation for the farmers. Small and marginal farmers will be the most affected as they lack in resource capability. For the farmers hailing from the backward regions, who largely depend on well irrigation, the problem will be compounded.

We examine the impact of proposed tariffs with an example of paddy, which is the crop predominantly cultivated under irrigation.

IMPACT OF TARIFF CHANGES (Paddy/per acre)

Tariff	Present	@50 ps per unit	@50% of cost	@full cost
Power Charge(Rs)	756	1050	1690	3381
Total Cost (RS)	7256	7550	8190	9881
% of power charge in total cost	10.42	13.91	20.63	34.22
% of increase in total cost	--	4.05	12.87	36.18

Power consumption per acre of paddy cultivation is taken as 2100 units. While calculating total cost of cultivation land and capital values are not taken into consideration. This aspect is significant in the case of well irrigation where, unlike under surface irrigation, much of the investment in digging and energizing the well comes from the farmer. On average it costs Rs.60,000 on each well. Gross revenue per acre of paddy cultivation, with productivity at 18 quintals per ace, is put at Rs 10,500. If land and capital values are also taken into account there will be no surplus left or the farmer. If the power sector reforms as far as agriculture sector are to be carried out fully farming as an activity will become unviable. The above table shows that as a result of these measures proportion of power tariff in total cost of cultivation will increase from 10.42 percent at the present rate to 34.22 percent if tariff according to full cost to serve is taken. Similarly, total cost of cultivation will increase by 36.18 percent. If the increasing costs of seeds, fertilizers, pesticides and other costs are also taken into account the cost of cultivation will spiral up further. At the same time the prospects of prices of agricultural products increase is very bleak given the opening up of trade and escalating imports.

Recent spate of suicides of farmers provides a grim reminder of the things going to happen if the present reforms are not halted. According to the news reports a large number of the farmers who committed suicide contracted loans to drill borewells. Failure of government to provide financial support for digging and deepening of irrigation wells has forced these farmers to incur heavy debts. This is one of the factors that broke their backs. If the power tariff is to be increased as suggested under the reforms one can well imagine the outcome.

In this context it will be pertinent to underline the caution sounded by the People's Tribunal that enquired into suicides during 1998 and 1999: "It is therefore very necessary for the government to intervene in agriculture. Unless the government invests and creates the required facilities, the small and marginal farmer cannot be assured of a share in the development pie. Encouraging marketisation without taking these measures would only benefit agribusiness interests and to some extent the big farmer. The policies of marketisation could be a noose around small farmer's neck".

Increasing power purchase costs

Apart from the general policy of tariffs based on cost-to-serve the power tariffs have to also factor in increasing power purchase costs as the contribution of IPPs to the state power grid is gradually and steadily increasing.

In 1995 GoAP approved setting up additional power generation capacities in the private sector. Approval was given for 8.short gestation projects with 1750MW total capacity, 32 Mini Power Plants (MPP) with an aggregate capacity of 760.25 MW, 92 mini hydel plants with a capacity of 244.17 MW, 43 wind power plants with a capacity of 60.74 MW and 33 bio-mass based power plants with a capacity of 209.42 MW.

Already power plants of four IPPs – GVK, Spectrum, Lanco and BSES – with a combined capacity of 999 MW and two mini power plants – LVS (36.8 MW) and Srivathsa (17.2 MW) have become operational. Recently APERC gave consent to PPAs of four gas based power plants – GVK Extension, Gautami Power, Konaseema EPS Oakwell Power and Vemagiri Power Generation and one thermal power plant being set up by BPL. These will be connected to the grid by the year 2007.

The above changes in power generation resulted in increased power purchase costs. This is explained with the help of the following table.

Power Generation & Purchase								
Source of Power	**Available Capacity (MW)**		**Units Purchased (MU)**		**Total Cost (Rs in Crore)**		**Per unit cost (Rs per unit)**	
	1998-99	**2003-04**	**1998-99**	**2003-04**	**1998-99**	**2003-04**	**1998-99**	**2003-04**
APGENCO	5,910	5,927	25,127	26,369	2,925	4,201	1.16	1.59
IPP*	482	1.111	4,128	8,125	824	1,977	2.00	2.43
Others**	885	2,000	8,237	12,359	1,141	2,208	1.38	1.79
Total	7,277	9,038	37,492	46,853	4,890	8,386	1.30	1.79

*IPPs include mega and mini power plants in the private sector and APTRANSCO's share of APGPCL.
** Others include central generating stations and other SEBs.
Source: ARRs for the years 2000-01 and 2003-04

Between 1998-99 and 2003-04 total power generation capacity available to the state increased by 24.2% while total units purchased by APTRANSCO increased by 25%. During the same period total power purchase costs to APTRANSCO increased by 71.5% and per unit cost increased by 37.7%.

This is mainly because of higher cost of power purchased from IPPs. In the year 2003-04 the per unit cost of power from IPPs stood at Rs.2.43 compared with Rs.1.79 of Central generating stations and Rs.1.59 of APGENCO. While APGENCO's share in power

purchase costs (50% in 2003-4) is less than its share in the power supplied in the case of IPPs its share in the power purchase costs (17.34% in 2003-04) is more than its share in the power supplied. In the case of central generating stations its share in the power purchase costs and power supplied are almost the same. In other words, spiraling power purchase costs can be attributed to high cost of power purchased from IPPs.

This high cost of power from IPPs in turn is because of inflated fixed costs being paid to them. This becomes clear when we compare fixed cost of IPPs with the fixed cost of NTPC's Simhadri thermal power plant. While for a capacity of 999 MW IPPs are being paid Rs. 846.8 crore towards fixed cost, for a capacity of 1000 MW NTPC-Simhadri plant is being paid Rs. 541.3 crore towards fixed costs. IPPs are being paid Rs. 300 more than NTPC plant towards fixed costs.

This also becomes apparent when we compared the fixed costs of APGPCL a joint venture project with IPPs: BSES, GVK, Spectrum and Lanco.

Generation Cost		
Source of Power	**Per MW fixed capital/charges (Rs Cr)**	**Per Unit purchase cost of power:** (Rs/kWh)
APGPCL	0.42	1.50
BSES	0.73	1.80
Spectrum	0.86	2.08
GVK	0.87	2.18
Lanco	0.90	2.72

The above table shows that payments made to the IPPs for power purchase are exorbitant.

Added to this all the future additions in the power generation capacity will be in the private sector with the exception of RTPP's second unit. Because of this, the power purchase costs will increase further.

To these increasing power purchase costs another item need to be added. This is the proposed hike in the gas being sold by the Gas Authority of India Limited to various gas based power producers in the name of bringing parity with international prices though gas drilling costs are much less in India and already the gas companies are netting huge profits. According to the new proposals gas price is going to be hiked to Rs. 5,800 per thousand standard cubic meters of gas from the present rate of Rs. 2650. This will result in substantial rise in power production costs in the gas based power plants.

In the background of increasing power purchase costs and tariffs reflecting the cost to serve of power becoming the rule the agriculture tariff is set to rise substantially.

Conclusion

Energisation of pumpsets led to expansion in irrigated area in the state. The ongoing reforms in the power sector threatens the well irrigation. Because of the new tariff policy and increasing power purchase costs power tariffs will be increasing. Increasing tariffs will make cultivation under energized pumpsets costly and unviable.

What farmers want is water/irrigation and not power as such. Well irrigation farmers need to be treated equally with command area farmers under the irrigation projects.

Farmers resorted to well irrigation to overcome uncertainty of dryland agriculture. But that uncertainty still stalks them. To address this groundwater exploitation is to be regulated and power is to be supplied to the wells at regular hours.

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