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EVALUATION OF THE 1994 PRIVATE POWER POLICY

BY

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INTRODUCTION

Since 1988 efforts have been made to bring private investment into the power sector. This is because sufficient investment in public sector had not been possible and for many years there had been loadshedding in the country. This process of privatisation was expected to be done in such a way that it would bring about benefit through higher efficiency to the general customers. A number of privatisation plans have been made, the first one being the Private Sector Energy Development Fund with the help of the World Bank, which was designed to introduce private sector power generation in Pakistan and which offered many incentives to investors so that economical packages of power generation would be obtained.

The expected benefits from privatisation were, 1) greater availability of investment and, 2) a greater efficiency largely brought about by competition. It was, therefore, expected that the private power generation would be through a process of competitive bidding. However, the first power project for the private sector the Hub Power project was initially done on a negotiated basis to start off the process.

In 1992, the Government decided to privatise the entire public sector and to this end WAPDA appointed consultants for preparation of a comprehensive privatisation plan. This plan covered the area of generation, transmission and distribution.

According to the plan, the generation sector was thought to be such that competition could be introduced and higher efficiency and the lower pricing was to be obtained through creating an energy market where generators would bid for any requirement and thus a competitive market would be created which would result in the lowest price. Consequently, there would be no need to regulate the generating industry as competition would ensure fair pricing.

In regard to transmission, it was realised that this was a monopoly. It is through the transmission system that the various power stations can deliver power all over the country and deliver it to the Area Boards for delivery to ultimate customers. This was, therefore, to be a regulated

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monopoly. In addition there would be a Marketing and Load Despatch company which would create a power pool using the transmission system to despatch power from the generating companies appropriately to the Distribution Companies. Since the electric energy cannot be stored supply and demand must be balanced from instant to instant and this must be done by the Load Despatch company. This despatching company would be the manager for the power market referred above.

The distribution function was also found to be a monopoly function and it was proposed that the present Area Boards should be corporatised and privatised. The mode of privatisation was to be selected after careful study as there were a number of possibilities.

In regard to the existing power stations, it was proposed that each of them be corporatised separately and after having been properly established and run as independent entities they would be privatised in such a manner as to create the private power market referred above.

The manner in which the privatisation is to be done has, therefore, to be such that the expected benefits listed above i.e. higher availability of power, elimination of loadshedding and better efficiency resulting in lower cost for the customers would be realised. Unfortunately, the current privatisation policy has been such that it has brought large increases in cost which have already resulted in increase of tariff over 75% in the past three years and will result in doubling of the tariff over the next three years with a further increase of about 15% to 20% every year for a long time thereafter. In other countries both in the West and the developing world where the privatisation has been effected it has invariably brought reduction in prices due to the greater economic efficiency that has been achieved. It is only in Pakistan's case where privatisation would result in exceptionally high increases in tariff. This is entirely due to the manner in which privatisation has been done while the policy of privatisation is sound its formulation and execution have been deeply flawed.

THE NEW THERMAL POLICY

The various options that could be adopted for a policy for new private power generation are 1) competitive tendering for all new generation, 2) a private-public partnership, 3) a fixed price option. It has to be kept in mind that the final objective is a competitive generation market.

The competitive tendering plan would call for setting up of power stations at specific locations and of specific sizes which have already been identified by the planning process of the WAPDA and KESC in the recently completed National Power Plan (NPP). For each of these sites, the Government would invite qualified bidders to quote the best tariff that they would charge and the best bid offering the lowest evaluated cost over the life of the project would be chosen. The contract conditions would be structured to promote a competitive market in the future. In this option the entire capital would be raised by the competing companies. Such a process of bidding would be repeated every year according to the need for new generation, since electricity industry has a high load growth and every year new investments are required.

In the private public partnership, the private investors would again be invited by competitive bidding to take part in projects together with WAPDA or KESC who would be responsible for some of the up front investments. These could be for instance selection, purchase and development of sites, interconnection expenses and some local investment. Part financing through the Government run Energy Development Fund could also be made available. This could result in reduced risk for the investors. The projects would still be independent companies managed by the private sector investors.

The third option is for the Government to pre-determine the tariff and the conditions of contract and to invite private sector parties to come and establish power stations on this basis. This is the most difficult option as firstly the tariff is very difficult to set and as there is no bidding process there is no rational way of choosing investors. How to set the tariff ? The tariff consists of two parts, one is the capacity charge expressed in Rupees or Dollars per KW per annum. This is a fixed charge and is meant to cover the capital cost by means of the return on equity and amortisation of debt. We have to first determine the exact capital cost, this can best be done through bidding and can vary widely from year to year. The next problem is how to set the return on equity. Investors require returns depending on their perception of risk and this varies enormously from country to country and time to time. As the private power process becomes established perception of risk would decrease and expected returns lowered. So in regard to return on equity we have, on the one hand, to make sure, if we want to fix it ourselves, that it is high enough to attract a sufficient number of investors and on the other hand, not so high that the tariff becomes expensive and unaffordable. In a competitive process investors would be the ones to evaluate risk factors and lower their expected return to the most competitive value. As regard

the debt this is easier to determine as terms of foreign currency loans are fairly standard. It is these problems that make setting a fixed tariff very difficult. It also precludes the possibility of competition and lowering of costs. As such it is the least desirable option.

Unfortunately, the Government has chosen to adopt the fixed price option and has had to set this rate at such a high value that we are seeing radical increases in customer tariffs. This very high rate attracted a large number of proposals. While the expected shortfall, according to the Task Force for Energy Policy set up by the Government, was about 2500 MW till the year 1997-98, applications for about 26000 MW were received.

In choosing investors it has been claimed that a first come first served policy has been adopted. This again resulted in the exclusion of many highly qualified foreign bidders who had established independent private power projects in their own countries, but who took some time to study the situation. Eventually thirty one proposals were awarded letters of support for new projects, many of them to unqualified people, who found it difficult to develop the projects.

THE 6.5 CENT PLAN

The tariff of the fixed price option is as follows. The capacity charge is $228/KW per annum and the energy charge is 2.2 cents/kwh. The equivalent cost calculated at a 60% annual load factor is 6.5 cents/kwh. The capacity charge is equivalent to 4.3 cents/kwh at this load factor, but if it happens that this factor is lower the equivalent cost per Kwh will increase correspondingly. For instance if the annual load factor is 40%, which is currently expected, the capacity cost will become 6.45 cents/kwh instead of 4.3 cents/Kwh and the total cost would be 8.65 cents/kwh.

Because the entire policy is designed to gain foreign investment the tariff is indexed to rupee devaluation and to US inflation in the following manner. Return on equity is indexed both to Rupee rate of exchange and US inflation and the debt service is indexed to rupee rate of exchange. This indexation will prevail over the 30 years life of the project. The energy charge is indexed to cost of fuel and is a pass through item. In other words, whenever the cost of fuel goes up the energy charge will go up accordingly. Effectively thus the tariff is payable in US dollars. Tariff calculations show that the tariff expressed in US dollars will rise somewhat over the term of the agreements but when expressed in Rupees will follow the rupee devaluation. It also means that the return on

finally adopted shows an increase of 36% in the capacity charge and 20% in the overall tariff.

Another way of looking at it is to calculate backward as to what project capital cost does the capacity charge imply? Assuming that the return on equity would be 20% and assuming that the debt would be for 20 years at a rate of interest of 12%, which is entirely in foreign exchange, the capacity charge is equivalent to a project capital cost of $ 1350/KW. Compared to this, what is the actual cost of various type of power plant?

Thermal power plant technology is of three kinds. First is the steam turbine which has the longest life but a high capital cost which in late 1993 was about $900/kw, including all constructions costs as well as financial charges. The steam turbine technology is one of moderate efficiency and the usual efficiency of plant of 300 MW size is 38%. The second technology is that of combined cycle which uses a combination of gas turbines and steam turbine. Usually, one steam turbine is connected to two gas turbines as a group working together. The steam turbine does not use any fuel but is driven by the very hot gases from the exhausts of the gas turbine. This technology is much more efficient and less capital incentive. For future generation it is now the technology of choice. The capital cost of this technology is about $750/kw and the efficiency is 48%. The third technology, which is not usual for large power stations is that using diesel engines. Usually, diesel engines are of small size and of a short life. However, the capital cost is about $600 to 700/kw and efficiency is about 42%. Each technology has its own technical advantages and disadvantages.

Now it will be seen that the varying capital cost and varying efficiency and thus varying fuel cost result in different costs of generation and this could be used to advantage. But setting a single tariff which is based on the highest capital cost and the highest fuel cost would result in very large profits for other technologies.

For steam plant where the capital cost is $900/kw the pay back period is four years whereas for a combined cycle the pay back period is 3.1 years. The corresponding returns on equity are 54% and 76%. Most of the proposals for which letters of support have been issued show a capital cost of about$1100/kw, the average being $1042/Kw, indicating heavy over-pricing particularly for the combined cycle projects. Even on this capital cost the rate of return on equity would be 35%. It means that many investors will be able to finance their entire equity by means of

over-pricing and such other practices. This easily leads to conditions which have made many other sectors of private industry sick in Pakistan.

This explains the great rush of proposals which were obtained after the publication of the policy in April, 1994. Applications of about 26000 MW were received. Letters of support for 7500 MW using mostly furnace oil as fuel were issued. Out of the 7500 MW worth of letters of support about half the projects have made progress. So far 3523 MW projects (excluding the 1292 MW Hub Power Project) are stated to have attained financial close and are thus likely to materialise. This will result in a very large surplus of power.

The prime goal of achieving efficiency and competition have thus been totally defeated by the new thermal policy. The returns are so huge that incentive to efficiency are absent. The actual return to the investors is at least 35% and up to 75% if actual costs are taken into account. This return is in US dollar and in real terms, In other words, since the return is indexed to even US inflation. It is the highest return on the US dollar available anywhere in the world.

After the new thermal policy was announced, during 1995 the international prices for thermal power plant have reduced very substantially as international competition has become very fierce. In addition, Russia which has an annual manufacturing capacity of more than 15000 MW has also entered the market. This has resulted in the capital cost of thermal machinery going down by about 20%. When this is taken into account, the over all cost would be reduced to 4.8 cents/kwh as compared to 6.5 cents/kwh. This is equivalent to capacity charge of $ 140/kw per annum. Because of the fixed price policy no advantages is being taken of this development in the world market. That the capital cost of thermal plant has gone down radically has also been verified by the recent studies by Canadian consultants for the updating of the NPP. They have calculated that the cost of generation from combined cycle plant as of 1995 was in the range of 4.63 to 4.81 cents/kwh, again based on a 60% plant load factor. The capacity payment that they have calculated varies between $ 105 and 110 per KW per annum. The energy cost that they have calculated is 2.64 to 2.71 cents/kwh because they have used a higher cost of fuel than stated in the Thermal Power energy policy document. Clearly the 6.5 cent policy needs to be immediately abandoned and replaced with a competitive price policy.

PRIVATISATION OF EXISTING PLANT

The privatisation of the existing plant can be used as a means of introducing competition into the power generation market and if need be it can be used also to regulate prices also. The way to do this would be to corporatise the power stations and to privatise them gradually over a period of time by the sale of shares in the local market. This would help in reducing somewhat the foreign exchange risks which are entailed in the thermal policy for new generation described above. The pricing structure would not be fixed but be dependent upon the market conditions after the establishment of the generation pool. This would ensure the minimum cost of generation and also create the private market, which is the ultimate goal as it means that after this new investments in power would not need Government guarantees or take over of commercial risks. The only alternative is the regulation of the rates through an independent and powerful Regulatory Authority.

However, the power market and the cost of the power, which represents about 70% of the cost to ultimate customers, as established under present policy is neither subject to competition nor is regulated. Instead private monopolies are being created and the tariff has been arbitrarily fixed at a very high rate. The Government has made no effort whatsoever to introduce competition and create conditions of greater efficiency. As a matter of fact, the power stations are being privatised on the very same basis as new plant. While a nominal competitive procedure has been established, in which the bidders would bid a national capital purchase price and would be given management control after purchase of 26% of the equity other matters such as compensation to labour and staff, transfer of control arrangements and most importantly the Power Purchase Agreement (PPA) and power tariff are subject to subsequent negotiations. This is the key area where competition has not been brought in.

The first plant that has been privatised is Kot Addu. It is the largest thermal power station in Pakistan. It is quite new, the last unit is still being completed, and uses the latest combined cycle technology. It is thus a plant, which is highly desirable and properly handle a very strong competition could have been introduced. However, what has happened is that the winning bidder, having priced the plant at $ 1583 million and paid a sum of $ 216 million as 26% of the equity is given entire control for the project. In regard to amortisation of capital cost the debt of about $756 million is retained by the Government and will be paid by the new company through the tariff. This is already being done by WAPDA.

The tariff that has been set is effectively even more than the tariff for new power. While in the PPA the nominal tariff is 6.15 cents/kwh there are a host of provisions in it which transfer many risks to WAPDA and which increase the tariff to about 6.85 cents/kwh. First of all, the tariff is stated for a 65% annual load factor. This leads to an increase when converted to a 60% load factor to compare it with new generation. Secondly, the nominal capacity of the plant has been set very low as compared to its installed capacity and there is a provision that in case the actual production is greater, then the capacity charge will be proportionately increased. The output can easily go up by 10% to 12%. The effect of these two provisions is to make the actual cost about 6.85 cents/kwh. Further, this being a very efficient plan the actual energy cost is lower than that of steam turbine plant. The Kot Addu project is being paid an energy charge at about the same rate as the steam plant, but Kot Addu has an efficiency of 48% compared to steam plant efficiency of 38%. The tariff allowed is equivalent to a capital cost of $ 2100 million.

The actual cost of generation at Kot Addu when in the Public Sector including all costs such as debt service return on equity, fuel charges and so on was 4.2 cents/kwh. This 4.2 cents is at a lower annual plant factor. While the energy charge will remain about the same as before the capacity cost has been increased by 2/1-2 times as compared to when the plant was in the public sector without any compensating payments for capital cost. The tariff of this plant includes a higher proportion of equity. The indexation of equity to US inflation will result in a gradually increase of the cost of generation from this plant over its 25 years project agreement life by about 10% as compared to a slight decline for new plant.

As a part of the privatisation process of thermal plant a due diligence process is carried out. In this process which is for the information of bidders, engineering consultants make a technical evaluation of the state of the plant and its efficiency, financial consultants evaluate its assets and liabilities. These studies, which were carried out by international consultants showed that the plant is of very high quality and was being run efficiently and satisfactorily. There was little chance for improvement in efficiency and availability. If the plant were to be run according to previous practice which seems to be dictated by the system requirements the cost of production with a lower annual plant factor would be about 10.5 cents/kwh, more than double the old cost. Clearly, the country would have been much better off without the privatisation of Kot Addu.

The other large public sector thermal generating plant in the Pakistan system have the following capacities:

Guddu	1,595 MW
Jamshoro	880 MW
Muzaffargarh	1,370 MW
Multan	240 MW
Faisalabad	420 MW
Bin Qasim,Karachi	1,260 MW
Lakhra	150 MW
	5,915 MW

All of these plants are due for privatisation and the process is proceeding apace. The privatisation plan is the same as Kot Addu and involves handing over control on sale of 26% of equity to foreign bidders. It is likely that the terms and conditions allowed would be similar to Kot Addu. It would also mean that the tariff would be similar. All of these plants including Kot Addu add up to 7500 MW. If they are privatised and are allowed the same capacity charge as has been allowed to Kot Addu this will result in an additional expenditure of $843 million (Rupees 31.2 billion) per annum after the privatisation of these power stations. In 1995-96 the revenue of WAPDA and KESC was approximately 2.8 billion. The additional burden for the privatisation of the public sector plants of $843 million is one third of existing revenue. The opportunity which was available to introduce competition and lower tariffs in the privatisation of existing plants, has been entirely lost. Instead huge new burdens will be placed on the customers.

TRANSMISSION POLICY

The consultants plan for privatisation calls for a single transmission company which will be regulated by the National Electric Power Regulatory Authority (NEPRA). However, new additions to the extra-high voltage transmission system at 500 kV are being contracted out to the private sector on the same basis as power stations by the payment of an annual rental fee, the investor building the transmission line and grid stations. Since no fuel is used in transmission and the maintenance cost is very low, so the entire rental consists of a capacity charge payable regardless of the usage of the facility. The first section, the Fourth 500 kV Circuit from Jamshoro to Lahore has been awarded through a famously non-transparent bidding process, which allowed only 8 days for bidding for a project estimated to cost $ 450 million and covering a large part of the country. The rental allowed is such that the entire capital cost would

be recovered in less than two years and over a period of 10 years an amount more than four times the cost would be paid. Thereafter the annual payments are reduced for the balance 20 years duration of the contract. If the line were used to its capacity the rental results in an average transmission cost of 4 cents/kwh. A calculation of the transmission cost based on the estimated capital cost leads to a figure of 1.4 cents/kwh for transportation of energy from Jamshoro to Lahore. In other words, the tariff allowed is nearly three times. This would be added to the amount to the energy that could be transmitted from power stations in the Karachi area to the north where the bulk of the load lies.

It may be mentioned that even at present Sindh has got much more generation than the load in the area. The original list of projects sanctioned contained about 2800 MW of power stations located in Karachi and it was expected that large amounts of power would need to be transported north. However, only a quarter of the Karachi projects have reached financial close and the rest are not likely to materialise. This reduces the need for more extra-high voltage transmission very considerably. Recent studies have shown that at least half of the mileage of the Fourth Circuit would not be needed and at least half the expenditure and contract payments for the Fourth Circuit are unnecessary.

The apportionment of the transmission system to various private parties on a fixed price contract basis is both exceedingly expensive and quite contrary to the privatisation of transmission policy prepared by the consultants. How the cost of transmission will be calculated and regulated will become exceedingly difficult and complicated which would inevitably result in a large increase of the transmission cost, again resulting in increases in the tariff to customers. It can only be hoped that further projects would not be allowed the same rates as allowed in the Fourth Circuit contract.

DISTRIBUTION POLICY

The distribution system supplying power to consumers is also planned to be privatised. At present, there are eight Distribution Area Boards in WAPDA, one each in the provinces of NWFP, Sindh and Baluchistan and five in Punjab. The Karachi area is served by KESC. While the KESC system will be privatised separately each of the Area Boards of WAPDA will be individually privatised. For this purpose, they have to be corporatised first. The first Area Board being privatised is that of Faisalabad. This is being done without addressing many of the major issues involved in a systematic privatisation.

The main issues are, first of all the determination of the capital cost and the present worth of the investments in the Area Board. Secondly it has to be decided whether the tariff for each of the Area Boards would be uniform throughout the country or whether the tariff should be a separate one for each Area Board. The mix of customers and cost conditions being different in each area board, the process of privatisation implies that there would be a separate tariff in each area board. Alternatively, if the tariff has to be kept uniform as a matter of national policy, special provisions would have to be made to either capture any revenue surplus or provide subsidies as the case may be. The current tariff structure contains large cross subsidies, which need to be eliminated when the area boards are privatised. The cross subsidies mean that the industrial and commercial classes of customers are charged much more than their economic cost while the house-hold and agricultural customers are charged less. Roughly speaking, the agricultural customer are charged about 1/3rd of their actual cost. The household tariff is a steeply increasing tariff. It is very low for the first 150 units and thereafter it increases steadily becoming very high after 600 units. It is the low end which is meant to provide low-cost electricity for the low income customers that is subsidised, whereas the high end domestic customers are paying much more than their economic cost and are contributing somewhat to the cross-subsidy. There is no subsidy from the Government. It comes entirely from other classes of customers. Now if the subsidies are retained what will happen is that private Distribution Companies will not connect the low income customers at all and would concentrate only on the profitable customers. This is why the cross-subsidies need to be removed. This implies substantial increases in the low- end household tariff as well as in the agricultural tariff. This is going to be very difficult for any government to achieve. If subsidies are to be retained to some extent they would have to be provided by Government.

At present, the entire village electrification programme which is a very important component of the Social sector programme is also entirely subsidised and this subsidy also comes entirely from other classes of customer, the urban customers and the industrial and commercial customers. Even the operating costs of the villages cannot be met from their income. Therefore, privatised Distribution Companies will not take any interest in village electrification and this programme would receive a major setback. This is borne out by the experience with the Gas Distribution Companies which despite much prodding from the

Government have made very little progress in providing gas supply to villages or small cities or even the poorer areas of large cities.

The bulk of the employees of the WAPDA more than 90,000 out of total of 120,000 in the electricity sector are employed in the Distribution Area Boards. While in the case of thermal power stations provision can be made for a golden hand-shake and some way of retrenchment of existing staff can be found. This is very difficult in the case of Distribution Area Board and some way needs to be found for staff to be largely retained by privatised Distribution Companies while allowing them sufficient managerial flexibility. A carefully crafted labour transition plan needs to be prepared.

Now the Distribution Companies as happens elsewhere in the world should buy the electricity from the Transmission Company in bulk and then sell it in retail to their customers and make their profit from reducing costs. The principal problem faced by the Area Boards are those of distribution losses and collection of revenues. The privatised Distribution Companies should necessarily be responsible for both reduction in losses and collection of arrears. This will be possible only if they buy their electricity in bulk and then sell to their customers and the Commercial Risks of collection of revenue and reduction of losses rest with them. This is the only way that incentives to efficiency can materialise. If they are inefficient they should not get any return on their investment and on the other hand, they should get increasing returns for greater efficiency. For a typical Distribution Company the purchase of bulk power constitutes 80 to 85% of costs and their own operations of constitute only 15% to 20% of their total costs. However, the entire revenue has to be collected from the customer by the Distribution Company. Consequently, if the Company is inefficient this would have a very strong effect on their ability to pay the bulk tariff.

One of the urgent needs of Pakistan is introduce a very large energy conservation programme. By any calculation the electricity sector whether it is the public or in the private sector requires very large investments. Over the next 20 years the investment needs average about $ 2 billion annually. It is getting very difficult to finance such investments every year. The tariff is already so high that increases to fund development expenditures are very difficult. In any case development funds for projects which have a life of thirty years or more need to be raised from equity or borrowing. But as matters stand, the national savings rate is not sufficient to finance the investment programme whether in the public or in the private sector. Foreign

borrowings also have a limit. The only option is to have a large energy conservation programme to be carried out by the Distribution Companies. This must provide strong incentives to customers to save electricity. Only then can investments be brought down to a reasonable level.

The Government has not addressed any of these issues but is proceeding to privatise the Faisalabad Area Board. Consequently, the consultants have recommended a very unorthodox procedure for this privatisation which essentially absolves the Distribution Company from all commercial risks and incentives for greater efficiency. Their revenue would be calculated from a set formula and will not have any relation to revenue collected. It would in effect guarantee to them a return on their investment in all circumstances. The formula also gives them an increase in revenue if the load increases. There is, of course, a natural load growth every year so they need not make further efforts in that area. It also allows an increase if number of customers increases. A small deduction is made which is proportioned to the losses. Thus there are small incentives for reduction in losses and increase in customers. There is no provision for promotion of energy conservation. However, there are no penalties for non-performance and for not collecting revenue.

What is proposed is that the Government would set the tariff themselves and the privatised distribution company would collect the revenue accordingly. From this, they would deduct the calculated share of revenue as described in the paragraph above regardless of how much revenue they have collected or have billed and the balance would be passed on to WAPDA which would be treated as the cost of bulk supply by WAPDA regardless how much electricity they have actually used.

Obviously, this system completely negates all the principles of privatisation; there are hardly any incentives to efficiency or even of a reasonable system of management. It is quite clear that no effort of any kind except a rough revenue collection which would cover their own costs is needed. Inefficiency is built into such a system. In case of failure to perform the entire risk is that of WAPDA and any losses will have to be borne by all the customers in the shape of general increases in tariff.

EFFECT ON COSTS AND TARIFF

That the private power policy will result in overall increases in tariff which are of a very high order is not in doubt. What the overall effects will be are however difficult to calculate. It depends critically on how the policy in respect of generation, both existing and new, transmission and

privatization of Area Boards unfolds and whether any modifications are made to mitigate high costs. To make an accurate estimate large amounts of data have to be collected and a detailed model of the power sector, which would include the future pattern of load growth, the various options of thermal and hydel power, the siting and location of new plant, fuel transport, power transmission, the detailed pattern of area load growth, the operation of existing plant, the cost of various types of fuel and so on. There are many interactions among these factors and a detailed study is both lengthy and intricate. Such a study was done by WAPDA through the National Power Plan (NPP) prepared jointly by WAPDA's Planning Department and Canadian consultants. This is the most comprehensive planning study ever done in Pakistan and is being updated annually. If the Government had so desired it could have used this NPP as the basis for its policy for the development of power and this would have resulted in least cost development and the smallest increases in tariff. To capture the effects of the proposed policies in regard to private power simpler calculations of each sector can be made to give a reasonable estimate of the increases in costs that can be expected. We can also consider what changes need to be brought about to improve matters. The principal determinants of future investments and tariff requirements are the peak electricity demand (MW) and the annual energy consumption (GWH). The peak demand determines the required generation additions and thus the new investments and the energy consumption mostly determines the revenue expected. Variations in these factors have a strong influence on required tariff. If we under invest there is loadshedding and over-investment causes unnecessary capacity costs which raise the tariff. The major factors affecting costs and tariff are considered below.

REQUIRED GENERATING CAPACITY

The private power was planned to take off in 1989 when the first Hubco Power Purchase Agreement (PPA) was signed and work on the project was to begin in April, 1990. However, the project was delayed due to disputes between the contractors and investors and the project was considerably delayed. There were changes of contractors and investors, the sponsors could not expeditiously raise bank loans and the PPA had to be renegotiated and the tariff raised a number of times. Finally construction was started in December, 1992, and the first unit was commissioned in June, 1996 and the last unit will be started in April, 1997.

Because of these delays and fears that loadshedding would increase so much as to cripple the national economy WAPDA was allowed to start some thermal projects in addition to the hydel projects at Terbela units 11-14 and Mangle 9 & 10 (a total of 1928 MW). The thermal projects were extensions at Kot Addu, Guddu, Muzzafargarh, Kotri and Faisalabad and a new station at Lakhra using indigenous coal. These have added 270 MW, 565 MW, 972 MW and 410 MW in the years 92-93, 93-94, 94-95 and 95-96 respectively and will add 505 MW in 96-97. Thus the thermal additions to the public power in this period of 1989 to 1997 will be 2822 MW and the hydel addition was 1928 MW, a total of 4750 MW.

These additions although much less than required enabled loadshedding to be contained in that since 1989 when it was about 2000 MW it slowly decreased upto 1993. However, in the three years 93-94 to 95-96 the load growth has radically reduced and has totalled about 10%, (falling virtually to zero in 95-96) instead of the forecast increase of 29% for this period. This zero growth is expected to continue till at least June 1997. This is 1400 MW less than forecast. It implies a reduction of 1660 MW in needed generation capacity. The effect of this has been that in 1996 loadshedding has not taken place at all and this situation is expected to continue. Even by June 1997 the Hubco capacity is not needed and any new private power will be entirely surplus. Thereafter, if the economy revives from its deep recession the load growth at about 7% is expected to resume, taking into account the effect of high tariff increases. The load in 1997-98 (June, 1998) is thus expected to be 10,700 MW from the present 9900 MW. However if we take a very optimistic view and load growth were to resume in 1996-97 (of which there are no signs) the load will be 11,400 MW in 97-98. This means that the required generating capacity will be 13,300 MW. These developments mean that the requirements of new generation are radically reduced and the planning and ordering of new capacity needs to be modified accordingly.

The Private Power Policy resulted in issuance of Letters of Support for about 7500 MW of thermal power using imported oil. Further an MOU was signed with M/s CEPA for 5700 MW of power at Keti Bunder in Thatta, where a sea port is to be developed, using coal. This plant consists of 8 units, the first two units will use imported coal and will be commissioned in 1999-2000. The other six units are expected to use local Thar coal and be commissioned at the rate of two units every year. The projects using oil as fuel, of which 16 are claimed to have attained financial close, and are expected to be commissioned in 1997-98. They represent a total capacity of 3523 MW of which 660 MW is located in KESC area and the balance will supply power to WAPDA.

The power balance that results in the years 1997-98 and 2002-03 the end of the eighth and the ninth Five Year Plan periods is given in Table I.

TABLE I : PAKISTAN POWER GENERATION BALANCE

Year	Max. Load (MW)	Required Generation (MW)	Hydel Generation Planned (MW)	Thermal - Generation Planned (MW)	Total Planned (MW) Surplus (MW)
1997-98	11,378	13,312	4,825	12,863	17,688 4,376
2002-03	15,959	18,034	6,459	16,856	23,315 5,281

This means that there will be a large surplus of private power. As a matter of fact all of the new power under the new 6.5 cent policy will be surplus. In addition the Hub Power Project will be largely surplus in 1997-98. In the year 2002-03 the position will be even worse in total, although the Hub Power and a few other projects will be utilised. The capacity cost per year (which has to be paid anyway regardless of usage) of this unused power capacity will be $998 million and $ 1200 million in the two years respectively. The tariff would have to cover these extra expenses every year, enormously raising the rate. At a load growth of 7% the planned capacity in 2002-03 will suffice till the year 2007 without any further additions.

Such a large surplus of power will reduce the usage or annual load factor of all the power stations. The effective price of the electricity as generated will then considerably increase. Energy production and the resultant cost of private power is shown in Table II.

TABLE II: PAKISTAN ELECTRIC ENERGY

Year	Max. Load (MW)	Energy Demand (GwH)	Hydel Energy (GwH)	Thermal Energy (GwH)	Annual LF Thermal (%)	Busbar cost (cents/ kwh)
1997-98	11,378	64,604	21,740	42,864	38.0	9.0
2002-03	15,959	89,458	28,760	60,698	41.1	8.5

The cost of electric energy from all the power stations will thus be effectively increased by 31% to 38% due to the surplus capacity.

EFFECT OF PRIVATISING EXISTING PLANT

As we have seen above, the privatisation of existing plant will also increase the rates payable. The example of Kot Addu shows that the effective tariff allowed may even be above the tariff for new plant. Assuming that in future the rate allowed will not be above the new power tariff we can calculate the extra payments involved in the privatisation. The fuel cost is a pass through item and the energy charge should remain much the same. If there are any savings due to more efficient operation they will accrue to the investors. The principal effect will be on the capacity charge. At present, WAPDA's generating costs are 4.2 cents/kwh. on average and this also happens to be the cost at Kot Addu. This is because the older power stations have a small debt burden. Of this total cost the capacity cost is 2.0 cents/kwh or $ 105/kw/year. The difference is $ 123/kw/year which is the extra charge payable on privatisation. Since a total of 6853 MW of existing thermal generation on the WAPDA and KESC system is likely to be privatised the total extra burden works out to be $ 843 million per annum.

EFFECT ON CONSUMERS TARIFF

The tariff for sale to customers has been increasing rapidly over the last few years in real terms and this seems to be accelerating. Over the last three years total increase of 75% of the average tariff has taken place. This has resulted in consumer complaints and the tariff has become a matter of concern for the Government. Currently the average tariff stands at Rs.2.24/kwh.

A number of studies have been carried to determine the future trends of tariff. WAPDA's Canadian consultants (NPP study) have estimated that in 1997, 1998 and 1999 average tariff increases of 24%, 25% and 19% will be required. In these three years the cumulative increase is estimated at 85% and over the six years from 1993 to 1999 the average tariff will increase 3.21 times. After 1999 they calculate that increases will be only due to inflation and they estimate 7% for this. However, the consultants have not taken into account the present reduced demand for power and have assumed that future private power will be purchased at 4.8 cents/kwh through competitive bidding. They have also not taken into account the effect of privatisation of existing power plant.

Another study of the future tariff has been carried out by the National Power Regulatory Authority (NEPRA). This study is actually an update of a detailed study carried out by American consultants during 1995.

This study takes into account the reduced demand and its consequences, but does not include the effect of privatising existing plant. It also assumes that only 2500 MW of private power will be commissioned instead of 3500 MW. The NEPRA estimates that an increase in tariff of 112% overall will be required from 1995-96 to 1997-98. In other words, the tariff would more than double. From the NEPRA's figures it is estimated that the tariff increase from 1993 to 1999 will be 3.50 times as compared to 3.21 for the NPP study. The two studies thus agree reasonably well. However even these studies under-estimate the increases as no account of privatisation of existing plant has been taken. This will add an estimated $ 843 million to the required revenues every year. Further only a partial allowance was made for the extra costs of surplus generation.

There will be substantial increases in tariff due to private extension of the transmission systems and the hurried privatisation of Area Boards. At present these increases cannot be worked out but it seems reasonably certain that by 1999 the tariff will be at least 4.5 times its level in June, 1993 and twice it level in June, 1996.

Can such huge increases be effective? The tariff is different for domestic, tubewell and industrial customers and there are cross subsidies. These subsidies have to be removed. This means that domestic and tubewell customers will experience even greater increases. Such customers may well expect to see increases of 6 to 8 times in their tariffs The industrial tariff is already so high that it is economical for industries to set up their own generation. This will further reduce load growth and make the collection of revenue more difficult. It will be counter productive to make large increases in the industrial tariff.

SUMMARY OF EFFECTS

It can be concluded that the present privatisation policy has been formulated keeping in mind the interests of investors only. The policy package has such a high tariff and such provisions and guarantees that it is an offer that "cannot be refused". However in this process the interests of customers have been totally ignored. It requires tariff increased so high that they cannot be implemented.

The indexations mean that all payments will be effectively in Foreign Exchange. For a nominal investment of $ 5.6 billion (although this is heavily overstated) an annual repayment in excess of $ 1.25 billion will be

needed in the form of capacity payment and the irony is that 70% of this payment is not required.

The super incentives have resulted in the new projects being started all together and will result in over-capacity of 4100 to 5300 MW up to the year 2002-03. If such a large thermal surplus is available what will be the justification of starting new Hydel projects. The present thermal programme means that no hydel project can be put up till after 2010.

The privatisation of existing thermal plant on the model of Kot Addu will cause an additional burden of $ 843 million in foreign exchange to be created. How will these extra payments in Foreign exchange be provided when the revenue earned is in rupees and the national foreign exchange earning capability is not increased.

By adopting the present method of privatisation a golden opportunity of introducing competition and thus inducing efficiency in this area has been lost. Instead fat monopolies have been created. For instance one firm now controls 2900 MW of generation which is three fifths of the present thermal generation. This can only cause higher costs in the future as well.

The indexation of all payments to rupee exchange rate and to US inflation and the Government guarantee to provide foreign exchange has produced high exchange risks for the future. This situation is sure to aggravate gravely any economic difficulties that the country may face. The foreign exchange obligations constitute a large fraction of our earnings.

To meet these obligations annual tariff increases of 25% per annum will be needed at least up to the end of the century. Thereafter if better policies are adopted the situation may mitigate somewhat otherwise the same situation will continue. In three years the tariff will on average double over the next three years. It is unlikely that such large increases in revenue could be effectively collected.

CHANGES IN POLICY AND ITS EXECUTION

How can things be improved. First of all it is not necessary to order all the new plant. The PPAs of all projects on which work has not been started should be cancelled. It is believed that about 1100 MW is under construction and the balance of 2523 MW can be cancelled or phased out over five years. The CEPA project is entirely unnecessary and it needs to be cancelled in its present form. Any coal project should be based on

local coal and we should first develop the Thar mines which will take 5-7 years. The cost of CEPA power delivered to the Northern market will be 11.0 cents/kwh after adding transmission cost of 4.0 cents/kwh.

Secondly, future power project should be competitively bid. We could radically reduce costs and advantage can be taken of better market conditions. The NEPRA have recommended that present PPAs should also be renegotiated.

Thirdly, the present generation should be privatised in such a way as to create a competitive market. This will help to gradually eliminate the presently created monopolies. Corporatisation should be the first step and privatisation of generation should follow that of Area Boards.

Fourthly, to help mitigate future price increases Kalabagh Dam should be started. Only such a large hydro project can have a significant effect on electricity prices.

Transmission is a key monopoly as it strategically connects the generation market with the distribution customers. Any entity controlling transmission can exert strong monopoly pressures on both Generation and Distribution companies. It should be kept in the public sector.

NEPRA should be made effective and strongly autonomous so that an impartial regulatory environment can be created.

The Distribution Area Boards should first be corporatised and then privatised after making due provision for their current problems. The privatisation should be done in such a way that a competitive environment is created, and companies have strong incentives for efficiency. This is only possible if market risk is with the companies and there is the possibility of their losing money if they do not perform.