Time and Cost Overruns of the Power Projects in Kerala

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K. P. Kannan **

Abstract

Delays in project implementation and the attendant cost overruns have been a regular feature of the electric power sector in Kerala. Almost all public projects, including the prestigious major hydroelectric project of Idukki, have been victims of time and cost overruns owing to several avoidable factors, labour disputes being singled out as the prime villain. This paper analyses the cost of inefficiency involved in the time and cost overruns in the power projects of KSEB, and their possible causes.

‘Quite obviously it came up through the waste,
Rejects through ignorance or apathy
That passage back. The problem must be faced;
And life go on…..’

— Roy Fuller (‘The Image’)

Introduction

This paper on time and cost overruns of the power sector projects in Kerala is part of a larger study on ‘The Plight of the Power Sector in India: Inefficiency, Reforms and Political Economy,’ and discusses the costs of inefficiency in the context of the Kerala power sector at the project implementation stage. In an earlier paper (Kannan and Pillai 2001 a), we have discussed the cost of inefficiency involved in general in the Indian power sector at the various stages of operation. Here we analyse the cost of inefficiency involved in time and cost overruns in the power projects in Kerala. This is of much significance in the present context of arguments by the government in favour of private sector participation in power generating capacity addition, on the pretext of a resource crunch. The government is said to be facing a severe shortage of funds and is hence incapable of undertaking new power projects. However, as we will show, this argument is flimsy as the government is

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actually overspending on each of the projects undertaken. Each project involves immense cost overrun. Had the government been able to implement each project efficiently within the normally expected constraints of time and cost, it could have saved huge resources and hence undertaken many more additional projects. It is not that the government has no resources meant for power development, because it is actually overspending; the problem lies in the inefficiency of management, coupled with the political economy of corruption. The present paper has the limited objective of bringing this aspect to light. Following this introduction, the paper briefly discusses the individual projects experiencing time and cost overruns, and goes on to present a comparative analysis. Next it examines the costs of delays and their possible causes. Finally, it briefly discusses the political economy of corruption involved in the time and cost overruns of the power projects in Kerala, and draws conclusions.

Delays in project implementation and the attendant cost escalation have been a regular feature of the power sector in Kerala. Normally, the construction of a major hydro-power plant is expected to be completed within eight to ten years, and that of a mini hydel project in two to three years. However, the Kerala experience, with longer time and higher cost overruns in the case of both major and mini hydel projects, is baffling. A ‘classic’ example is the Kakkad hydroelectric project of 50 megawatt (MW) installed capacity; the project was sanctioned as early as in 1976 with an original cost estimate of Rs.1,860 lakhs; this project was proudly presented as the least-cost hydroelectric project in the State! It was scheduled to be commissioned in 1986, but took twenty-three years for the Kerala power system to tap the energy potential of this project (major construction works on it started only in 1979), at an estimated cost of Rs. 153.5 crores, about 725 per cent above the original one!

The Kakkad story is not an exception, but forms part of an endless series of overruns in Kerala’s power system. The prestigious project of Idukki also was a victim of time and cost overrun, mainly due to labour disputes, the prime villain in every instance. Idukki Stage I project (three units of 390 MW) could not be commissioned in the Fourth Five Year Plan (1969–74) as scheduled and had a long gestation period owing to labour problems. It was finally commissioned in 1976. When Idukki Stage II project (three units of 390 MW) was put on line in 1986, after a time overrun of about eight years, it had a cost escalation of 115 per cent over the original estimate.

Similarly, the next project, Idamalayar (of 75 MW, started way back in 1970 and commissioned in 1987), suffered a time overrun of about nine years and a cost increase of 285 per cent. Two major firm power augmentation schemes, Sabarigiri Augmentation and Idukki Stage III, too had the same fate. Started in 1972 and 1975 respectively, the works on these projects could not be completed...
till the turn of the 90s. A cost overrun of nearly 780 per cent (the highest ever among the projects in the Kerala system!) and a time overrun of ten years go to the discredit of Sabarigiri Augmentation scheme, beyond any common sense accounts. And a cost increase of about 270 per cent, with a time overrun of about ten years, lies behind the Idukki Stage III project.

Project-Wise Analysis

Data on time and cost overruns of sixteen other hydro-power projects are available for analysis, the data having been collected from the various volumes of Economic Review of Kerala State since 1985. These projects are 1) Kakkad, 2) Kallada, 3) Lower Periyar, 4) Pooyankutty, 5) Malampuzha, 6) Madupetty, 7) Malankara, 8) Chimony, 9) Peppara, 10) Azhutha Diversion, 11) Kuttiar Diversion, 12) Poringalkuthu Left Bank Extension, 13) Vadakkeppuzha Diversion, 14) Vazhikkadavu Diversion, 15) Kuttiadi Tail Race and 16) Kuttiady Extension. The details of these projects are given in Table 1 (and also in the Appendix).

1. Kakkad

This project, considered the least-cost hydroelectric project in Kerala, is to use the tail race waters of Sabarigiri power house (PH), together with the inflow of two tributaries of Kakkad river, viz., Moozhiyar and Veluthodu streams, over a gross head of 132.6 m. for power generation of 262 million units (MU) with an installed capacity of 50 MW.

Though the project was sanctioned by the Planning Commission as early as in 1976 at an estimated cost of Rs.1,860 lakhs, construction began only in 1978–79 for want of funds. Moreover, progress was tardy. The length of the interconnecting tunnel driven as by the close of 1986–87 was only 886 metres (out of 3,036 metres). The poor performance was mainly due to labour disputes for over a year (from October 3, 1985 to October 29, 1986. Though the work was resumed on October 30, 1986, it was interrupted on February 6, 1987, owing to a rock fall inside the tunnel. In the case of the power tunnel, some progress was achieved only in 1986–87; two earlier contracts with poor performance had to be terminated here.

Over a period of twenty-three years, involving a time overrun of about thirteen years, when it was finally commissioned in 1999, the cost escalation of this project was 725 per cent above the original estimate. That is, the actual cost was more than eight times the original cost estimate. It should be noted that a project is sanctioned at the costs that exist when the project is submitted. The cost estimate is likely to increase over time on account of price inflation. Though the original cost estimate is presumed to include an allowance for possible price inflation, often the actual experience can deviate from the assumptions. Hence, it is natural to consider
Table 1: Profile of Time and Cost Overruns of the Projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Energy Potential (MU)</th>
<th>Year of Starting</th>
<th>Originally Scheduled Year of Completion</th>
<th>Year of Commissioning</th>
<th>Estimated cost (Rs. Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idukki II Stage</td>
<td>1007</td>
<td>1970</td>
<td>1978</td>
<td>1985–86</td>
<td>3168</td>
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<tr>
<td>Idukki III Stage</td>
<td>376</td>
<td>1975</td>
<td>1981</td>
<td>1991</td>
<td>410</td>
</tr>
<tr>
<td>Sabarigiri Augmentation</td>
<td>125</td>
<td>1972</td>
<td>1980</td>
<td>1990–91</td>
<td>128</td>
</tr>
<tr>
<td>Idamalayar</td>
<td>320</td>
<td>1970</td>
<td>1978</td>
<td>1987</td>
<td>2340</td>
</tr>
<tr>
<td>Kakkad</td>
<td>262</td>
<td>1976</td>
<td>1986</td>
<td>1999</td>
<td>1860</td>
</tr>
<tr>
<td>Malampuzha</td>
<td>5.6</td>
<td>1987</td>
<td>1989</td>
<td>?</td>
<td>295</td>
</tr>
<tr>
<td>Madupetty</td>
<td>6.4</td>
<td>1987</td>
<td>1989</td>
<td>1998</td>
<td>292</td>
</tr>
<tr>
<td>Malankara</td>
<td>65</td>
<td>1987</td>
<td>1990</td>
<td>?</td>
<td>780</td>
</tr>
<tr>
<td>Chimony</td>
<td>6.5</td>
<td>1987</td>
<td>1990</td>
<td>?</td>
<td>314</td>
</tr>
<tr>
<td>Peppara</td>
<td>11.5</td>
<td>1987</td>
<td>1990</td>
<td>?</td>
<td>392</td>
</tr>
<tr>
<td>Pooyankutty</td>
<td>645</td>
<td>1986</td>
<td>–</td>
<td>?</td>
<td>25000</td>
</tr>
<tr>
<td>Kuttiar Diversion</td>
<td>36.6</td>
<td>1988</td>
<td>1990–91</td>
<td>?</td>
<td>214</td>
</tr>
</tbody>
</table>

Note: * = by 1993; ? = Year of commissioning still remains uncertain.
Source: Government of Kerala, Economic Review (various years).

and identify that part of the cost escalation that is due to price inflation, which can
by no means be attributed to improper project formulation and/or implementation.
However, what remains in the cost overrun over and above the effect of price increase
is a matter of concern demanding explanations in terms of real factors involved in
faulty planning and execution. For each of the projects, we have estimated the
price inflation in terms of WPI for all commodities experienced during the project
implementation period, in order to differentiate between the effects of price inflation
and those of other factors on capital expenditure. It should be noted that the effects
of price inflation on capital expenditure account for the share of time overrun in
cost escalation.

The WPI for all commodities registered in 1999 an increase of only 461.2
per cent over 1976 (when the Kakkad project was sanctioned). This implies that
the cost escalation is about 1.5 times the general price inflation (as given by the
WPI for all commodities). Thus, it is clear that price inflation alone is not responsible for cost overrun; about 260 per cent of the increase in cost estimate can be attributed to factors other than price inflation, which can evidently be treated as a waste of resources.

2. **Kallada**

   This project envisages construction of a dam toe power station of 15 MW installed capacity and generation of 53 MU of power from the existing Kallada irrigation project. Though the contracts for civil works were settled in April 1985, and works began immediately, frequent releases of water through the irrigation outlets of the dam flooded the work areas, preventing the progress of works.

   The project was sanctioned in 1981 at an original cost estimate of Rs. 1,180 lakhs and was commissioned in 1993–94 at a (revised) cost of Rs.1,802 lakhs, representing a 52.71 per cent increase. It was to be commissioned at the earliest by 1989, but had to undergo a time overrun of five years. During the same period, the WPI (all commodities) rose by 148 per cent; and the revised cost estimate of this project appears not to have been inflated to that extent.

3. **Lower Periyar**

   This is a tail race-cum-run-off-river scheme in the lower reaches of Periyar river downstream of Neriamangalam power house. The scheme envisages utilisation of the waters of Neriamangalam power station, the spill from Kallarkutty dam and the available yield from Perinjankutty catchment and the catchment areas below the dams at Kallarkutty, Idukki, and Cheruthoni river, over an average gross head of 302.63 m. for power generation, with an installed capacity of 180 MW and annual generation of 493 MU.

   Started in 1983 at an original estimate of Rs.8,843 lakhs, the project was commissioned in 1997 and its revised cost estimate as in 1999–2000 stood at Rs.353 crores. Over these fourteen years (including a time overrun of six years), the cost estimate increased by about 300 per cent against an increase in the WPI (all commodities) by 194 per cent. Thus, after accounting for the full impact of price inflation on the capital cost of the project, about 111 per cent increase needs to be explained by other factors such as wasteful management.

4. **Pooyankutty**

   The scheme envisages construction of a 148 metre-high concrete dam across River Pooyankutty and a surface power station with two units of 120 MW each, i.e., with an installed capacity of 240 MW and annual generation of 645 MU. The Planning Commission approved the scheme as early as in August 1986. However, the central government’s sanction of forest clearance is yet to be received. The state government and KSEB are reported to have fulfilled all the formalities for the issuance of sanction, including the proposals for compensatory afforestation
as required under the Forest Conservation Act of 1980. So far, only minor preliminary works have been done.

A fourteen-year incubation for a project proposal is ample evidence of the lethargy and non-commitment on the part of the planners. During this period, the cost estimate was revised upward by 228 per cent, from Rs. 250 crores to Rs. 820 crores, far exceeding (by 45 per cent) the general price inflation (182.7 per cent) during this period.

It should be mentioned here that project overrun is usually analysed with reference to the time when construction works began; that is, after the project has been accorded all clearances and sanction. As far as Kerala is concerned, the organised environmental concerns succeeded in lobbying the government at the initial stage itself, that is, not to accord clearances to a particular project at all, for example, Silent Valley, Pooyankutty, etc. Thus, there has not been in Kerala a situation like the Narmada Valley dilemma, where environmentalists contribute to the time overrun of a project. In the case of Pooyankutty, therefore, we are not analysing the time overrun involved.

5. Malampuzha

A mini hydel project of 2.5 MW with an annual generation of 5.6 MU, this scheme envisages construction of a power station on the downstream side of the existing irrigation dam (owned by the State PWD) to utilise the irrigation release. This project, which was started in 1987 and expected to be on-line by 1989, is now expected to be commissioned ‘in the near future.’ After twelve years with a time overrun of about ten years as in 1999–2000, the capital cost was revised from the original Rs. 295 lakhs to Rs. 679 lakhs — an increase of about 130 per cent. Over the same period the WPI (all commodities) registered an increase of 169 per cent.

6. Madupetty

Another mini hydel project of 2 MW with 6.4 MU of annual generation, this scheme aims at construction of a dam toe power house at the existing Madupetty dam for power generation using the water released from the Pallivasal hydroelectric project. Started in 1987 and expected to yield its energy by 1989, this mini project was at long last fully commissioned by January 1998 after a time overrun of about nine years. The cost estimate was revised from Rs.292 lakhs to Rs.775 lakhs by 1995, which, however, fell to Rs. 478 lakhs by 1998, providing a good example of the reliability of the estimation procedure of KSEB; this is true of most of the projects. The cost increase in this case is 64 per cent, against the general price increase of 145 per cent.

7. Malankara

Another small hydroelectric (HE) project with an installed capacity of 10.5 MW and annual generation of 65 MU, this scheme envisages the construction
of a dam toe power station at the Malankara dam of the Muvattupuzha valley irrigation project (under construction by the State PWD). The project will utilise the tail water releases from the Moolamattom power house of Idukki hydroelectric project together with the inflow from 153 square km. free catchment less the irrigation requirements.

This project, which was started in 1987 and expected to generate power by 1990, has by now (1999–2000) registered a time overrun of about nine years; its capital cost was revised over the period from Rs.780 lakhs to Rs.43.36 crores by 1997 and then to Rs.41.13 crores by 1998 and 1999–2000, thus undergoing a phenomenal increase of 427.3 per cent against a wholesale price rise of 169 per cent. Reminiscent of the mammoth inflationary influence of the ‘other factors’ on the capital cost of Kakkad project, in this case the other factors of sheer waste and overestimation account for an increase of as much as about 258 per cent in the capital cost, which calls for another careful diagnosis.

8. Chimony

Another mini hydel project, this scheme envisages installation of a generating unit of 2.5 MW in a dam toe power station at Chimony irrigation dam (under construction by the State PWD). It is expected that 6.5 MU of energy can be economically generated during the period December–May.

This project was started in 1987 and was originally scheduled to be commissioned in 1990. But in 1993 it fell prey to a dispute between the contractor of the electrical works and KSEB, and all the works were paralysed thanks to a stay order from the High Court obtained by the contractor. By 1993, the capital cost was revised from its original level of Rs.314 lakhs to Rs.425 lakhs, representing an increase of 35.35 per cent against a general price rise of 72 per cent over the same period.

9. Peppara

This small project was proposed to benefit Thiruvananthapuram city by making use of the drinking water supply released from Peppara dam (owned by the Kerala Water Authority) through a dam toe power house of an installed capacity of 3 MW and an annual generation of 11.5 MU.

The Peppara project was started in 1987 and was supposed to have the normal gestation period of three years. It was finally commissioned only in 1996, with a time overrun of six years and a cost escalation of 73.7 per cent over the original estimate of Rs.392 lakhs, against a general price rise of 118.3 per cent during this period. Note that the cost estimate was earlier revised to Rs.850 lakhs in 1995 and then reduced to Rs.625 lakhs in 1998 only to rise again to Rs.671 lakhs in 1999 — another instance of haphazard planning.
10. **Poringalkuthu Left Bank Extension**

This scheme is to construct a second power station with an installed capacity of 16 MW and an annual generation of 38 MU for better utilisation of the water release from the existing scheme (Poringalkuthu power house). Its works were started in 1989 and it was expected to be commissioned in 1992–93. After a time overrun of about six years, it was commissioned in 1999; the original cost estimate of Rs. 9.02 crores rose by about 374 per cent to reach Rs. 42.7 crores. Comparing this with the rise in the WPI (all commodities) over the same period by 113 per cent, about 261 per cent of the increase in the cost estimate is found to be attributable to ‘other factors’ of wasteful management and overestimation.

11. **Kuttiyadi Tail Race**

This project proposes to utilise the regulated discharge from the existing Kakkayam power station of Kuttiyadi hydroelectric project for power generation in a station to be located further downstream. The proposed installed capacity is 2.5 MW and the annual generation 15 MU.

The project was started in 1989, and expected to be commissioned in 1992–93. By 1999–2000, with a time overrun of seven years, the estimated cost rose by 225 per cent from the original Rs.397 lakhs. The general price rise during this period was 132 per cent, indicating an increase of about 93 per cent in the cost estimate owing to ‘other factors’, over and above the influence of price inflation. Note that the revised estimate in 1997 was Rs.14.48 crores (265 per cent above the original) and in 1998, Rs.13.38 crores!

12. **Azhutha Diversion**

This scheme envisages diversion of waters from the 16,8389 sq. km. catchment of the upper reaches of Azhutha river, a major tributary of River Pamba to Idukki reservoir for increasing the power potential of Idukki power project by 57 MU. The scheme will provide diversion of about 57.6 mm$^3$ of water on an average per annum.

Work on this project was started in 1987, and it was expected to be commissioned in 1991. After a time overrun of about six years, it was partially commissioned in June 1998. By 1999–2000, the original cost estimate was revised upward from Rs.290 lakhs to Rs.14.46 crores, an increase of nearly 400 per cent, against the rise in WPI (all commodities) by 145 per cent. Thus, factors other than price rise appear to account for an increase of about 254 per cent in the cost estimate.

13. **Kuttiyar Diversion**

This scheme envisages diversion of waters from a catchment of 10.4 sq. km. of Kuttiyar river (a tributary of Muvattupuzha river) to Idukki reservoir to raise the power potential of Idukki power project by 36.6 MU.

Started in 1988 at an original cost estimate of Rs.214 lakhs, the project
was to be completed at the earliest by 1990–91. It is now expected to be commissioned in the near future, with a cost escalation of 343.5 per cent to Rs.949 lakhs over a time overrun of about eight years as in 1999–2000. This is against a general price rise by 132 per cent during the same period. Thus, about 211 per cent increase in the cost estimate of this project remains to be explained in terms of ‘other factors.’

14. Vadakkeppuzha Diversion

This scheme envisages diversion from the 3.43 sq. km. catchment of Vadakkeppuzha, a tributary of Muvattupuzha river, and 0.625 sq. km. catchment of Pothumattom stream, also of Muvattupuzha basin, to Idukki reservoir to augment the firm generation of Idukki project by 12.3 MU.

When the project work was started in 1989, it was proposed to be completed by 1991–92. However, even after a time overrun of eight years as in 1999–2000, the commissioning date remains ‘not fixed,’ and the original cost estimate of Rs.131 lakhs rose by 292 per cent to Rs.514 lakhs against a rise in WPI (all commodities) by 132 per cent over the same period, leaving 160 per cent increase in the cost estimate to be accounted for by ‘other factors.’ Note that the cost estimate was revised upward to Rs. 786 lakhs in 1997–98 and then downward to Rs. 705 lakhs in the next year only to be drastically cut down again to Rs. 514 lakhs in 1999–2000.

15. Vazhikkadavu Diversion

This scheme envisages diversion of waters from 6 sq. km. of catchment of Vazhikkadavu to the Idukki reservoir by a diversion tunnel to increase the firm power of Idukki project by 24 MU.

Started in 1989, the project was expected to be completed by 1992–93. However, even after a time overrun of about seven years as in 1999, its date of commissioning remains uncertain. The original cost estimate had to be revised by a phenomenal 760 per cent, dwarfing even the classical Kakkad phenomenon, from Rs.186 lakhs to Rs.15.99 crores against a general price inflation of 132 per cent over the same period. Thus, an increase to the tune of about 628 per cent in the cost estimate remains on account of the influence of ‘other factors’ — a shocking case of mismanagement in the preparation of project proposal and cost estimation, that too in the case of only a diversion project, meant only to increase water availability.

16. Kuttiady Extension

As the storage capacity of the existing Kuttiady reservoir is highly inadequate, the inflow cannot be fully utilised now. Hence, under this extension scheme, capacity addition (one unit of 50 MW; 75 MU) to the existing power station is proposed. Though the Planning Commission cleared the project in January 1992, major works on it started only in February 1994, and it was originally expected to be commissioned in 1995–96. After a time overrun of four years, it was finally commissioned in 2000, with a cost overrun of 544 per cent over the original estimate.
of Rs.30.73 crores (that went up to Rs.198 crores), against a general price inflation of just 73 per cent, leaving an unbelievable waste gap of 471 per cent!

**A Comparative Analysis**

As already explained, the capital cost of a project is estimated on the basis of the price level prevailing when the project proposal is made; hence, there is a time element of error involved in it, representing underestimation in the face of inflation. The cost estimate is often revised upwards to take account of this, especially when the price level is rising rapidly and/or the time overrun involves an element of uncertainty as to completion of the project. Ideally, a revised cost estimate should sufficiently cover the general price rise. Hence, what remains in the revised cost escalation of a project over and above the general price inflationary influences merits serious consideration; it may represent an overestimation due to uncertainty or a deliberate attempt at mismanagement of resources.

Of the twenty projects we have considered above, all but seven have significantly high remainder in their revised cost estimates in excess of the general inflationary impact (Table 2). The seven projects are Idukki II, Idamalayar, Kallada, Malampuzha, Madupetty, Chimony, and Peppara. In the case of the Chimony project, work on which had to be suspended owing to a dispute with the contractor, which resulted in court intervention, inadequate coverage of the general price inflation in the revised cost estimate might be a case of underestimation. In the case of a number of projects (for example, Kakkad, almost all the mini projects and some of the diversion projects), the cost estimates have been revised every year, upwards and then downwards, indicating inconsistent planning.

It should be noted that apart from the ‘classical’ case of Kakkad project, it is mini hydel projects and diversion schemes that have become comparatively more prone to time and cost overrun. The mammoth cost escalations in the case of the Malankara mini hydroelectric project and Vazhikkadavu diversion are a result of some element of error that has crept into the project design and estimation. The other things appear to have great sway over most of the other projects also.

In general, these twenty projects of the last three decades account for time overruns ranging from 62.5 per cent (Kallada) to 500 per cent (Malampuzha) of the expected period of construction, and for cost overruns ranging from 52.7 per cent (Kallada) to 777 per cent (Sabarigiri Augmentation), of the original cost estimate (excluding Chimony).

For a more objective comparison, we can analyse the capital cost per kWh of potential energy of these projects (Table 2). Among the power plants considered, Idukki II Stage had the lowest capital cost per unit of electricity (68 paisa per unit). Among the augmentation schemes, Idukki III Stage had the lowest

**Table 2: Cost Escalation of Power Projects (as in 1999–2000)**
cost (40 paise per unit). The highest cost escalation of Sabarigiri augmentation project has spread very thinly over the large units of its energy potential, resulting in a capital cost of only 90 paise per unit. The capital cost of Idamalayar stands at Rs.2.81 per kWh of energy. At the other extreme, one’s common sense may be baffled at the mammoth capital cost of Rs.26.40 per unit according to the latest estimate in the case of the Kuttiady extension project. Energy from the still unborn Pooyankutty project too is priced very high at Rs.12.7 per unit! Malampuzha (Rs. 12.10 per unit) and Kuttiady Tail Race (Rs. 8.60 per unit) are also planned to be high-cost energy generators. Note that the capital cost of energy from Kakkad, the classical example of time and cost overrun, is Rs.5.90 per unit.

It would be enlightening to compare these figures with the original capital cost of the Enron project (Dabhol power project phase I) in Maharashtra, much criticised as ushering in an era of stupendously high-cost energy in India. Its original capital cost of Rs. 4.48 crores per MW of capacity at the normal load factor of 68.5 per cent implies a unit capital cost of Rs. 7.50 per kWh. The Kuttiady extension project, undertaken with a Canadian loan and contracted for its completion with a
Canadian firm (SNC Lavalin), involves a capital cost of about 3.5 times the controversial original cost of the Enron project! It should be remembered that Enron’s was a new project, while only an extension work was done at Kuttiady. It is highly significant to note that the Kuttiady extension work contract was awarded to the Canadian firm by a leftist government in the State, which is credited with an open anathema against foreign capital, especially Enron, but has time and again stood in defence of the Canadian firm, sanctioning all their demands of time and cost overruns.

The Cost of Delays

The delay in commissioning a power project invariably involves elements of avoidable cost to society, the most immediate one being cost escalation itself. A direct cost of overruns is in terms of the additional energy realisable were the project commissioned in time, as well as the additional sales revenue thereof. The increased availability of power could reduce the requirement of costly energy import, thus effecting some cost savings in it. In addition to these is the indirect cost of unsatisfied demand corresponding to the additional energy realisable.

Here, we attempt to quantify the cost of time overruns of the projects under study in terms of additional energy and revenue that could be realised if these projects were commissioned in time. The results are shown in Table 3.

We start with the year 1983–84, by when, it is assumed, the four earlier projects, Idukki II and III Stages, Idamalayar, and Sabarigiri Augmentation, could be brought on line, so that the available firm generation capacity in 1983–84 would be 5,554 MU, instead of 3,726 MU. Given the firm power capacity utilisation (98 per cent) and loss (26 per cent) structure in the system, this then yields additional generation of 1,788 MU and additional sales of 1,327 MU, which at an average rate of 35.2 paise per unit would realise additional revenue of Rs.46.7 crores in that year. Additional revenue obtainable in 1984–85 works out to Rs.53.8 crores. The total revenue thus realisable during these seventeen years from 1983–84 to 1999–2000 is estimated at Rs.886.3 crores, or Rs.52 crores per year! This represents one cost of avoidable time overruns of these nineteen projects (excluding the non-starter Pooyankutty project) in Kerala (Table 3). It is distressing to think that the cash-strapped KSEB has been forced to forego revenue of about Rs.52 crores a year on an average account of delays in getting the ongoing projects commissioned.

Such additional generation that could be effected through timely completion of projects could reduce the costly dependence on energy imports.

Timely completion of these projects could avoid the substantial burden of capital cost escalation also (Table 4). Such savings factor highlights the fact that when capital cost is escalated beyond what is planned, it results in a loss of its
### Projects

<table>
<thead>
<tr>
<th>Year</th>
<th>Firm Energy Actual (MU)</th>
<th>Realisable (MU)</th>
<th>Generation Actual (MU)</th>
<th>Realisable (MU)</th>
<th>Extra Energy Saleable (MU)</th>
<th>Extra Revenue Realisable (Rs. Crores)</th>
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<td>1983–84</td>
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<td>5554.13</td>
<td>3643.4</td>
<td>5431.38</td>
<td>1326.69</td>
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<td>8212.07</td>
<td>501.95</td>
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<td>1999–2000</td>
<td>6586.43</td>
<td>6751.13</td>
<td>7655.57</td>
<td>7846.84</td>
<td>158.10</td>
<td>26.16</td>
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<tr>
<td>Total</td>
<td>13593.58</td>
<td>13593.58</td>
<td>13593.58</td>
<td>13593.58</td>
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Alternative uses. Considering the resource constraint of the government, if these resources were used more efficiently, the resultant increased availability of these resources to the government could be used for taking up more projects. To the extent that such cost escalation reflects inefficient resource utilisation, the savings in capital cost that would have been obtained in the absence of cost overruns also represents waste of capital. For example, suppose Kakkad hydroelectric project had been commissioned in time, in 1986 itself, eight years after its construction started. Accounting for the general price inflation during this period, the capital cost of this project by 1986 would be at the most only Rs.39.66 crores, saving as much as Rs.113.86 crores, almost enough to construct three more similar plants, or to add to the system capacity by another 140 MW at the nominal cost of Kakkad project! Thus, the capital waste involved in this case is equivalent to three more similar plants (Table 4) or an installed capacity of 140 MW! Timely completion of the lower Periyar project could save as much as Rs.189 crores, enough for a similar project of more than 200 MW capacity! The second highest savings, after the Lower Periyar project, could come from the Kuttiady extension project to the tune of Rs.158.3 crores, almost enough for four similar or Kakkad-type projects! As already noted, the Kallada project (the only exception), even with five years’ overrun, has not eaten up resources beyond the limits set by general price inflation. Timely
completion of all the other eighteen projects (excluding the non-starter Pooyankutty) could yield a mammoth saving in capital cost of Rs.644.03 crores, almost enough for sixteen Kakkad-type projects of 800 MW capacity! This 800 MW (or Rs.644 crores) represents the capital waste involved in the faulty planning and implementation of power projects in Kerala. In other words, the capital-waste factor involved is sixteen (sixteen Kakkad-type projects)! And with the KSEB still in the red, the government lets such waste and mismanagement pass.

Thus, it is in this light that we should examine the so-called financial ‘inability’ of the SEBs (and the governments) to finance power development in general. The basic argument put up in defence of inviting private sector participation in power development stems from the resource crunch experienced by the governments. However, this defence turned out to be flimsy in the face of the fact that there is overcapitalisation in the case of each project that the government has undertaken; the government could, through efficient performance, save substantial resources, which could be used for taking up additional projects. Behind this inability works the political economy of corruption.

The gravity of the problem of overruns can be gauged by considering the combined effect of both time and cost overruns, a measure of which, called ‘capital x time waste factor’ (also see Morris 1990), is obtained as the difference between the actual capital x time (CaTa) and the originally planned capital x time (CoTo) measures as a percentage of the latter (where Ca and Co are the actual (or latest) and originally planned estimates of capital cost and Ta and To are the corresponding period of commissioning). In estimating this resources waste factor, we assume that expenditure over the course of a project takes place uniformly. Thus, in the case of the Kakkad project, the originally planned resources were Rs.18.6 crores x 10 years = Rs.186 crore years, but the actual resources spent were Rs.153.52 crores x 23 years = Rs.3,530.96 crore years, resulting in a capital x time waste of Rs.3,344.96 crore years or 1,798.4 per cent of the originally planned resources. Thus, it shows that as a result of time and cost overruns, this project has eaten up about 1,800 per cent more capital x time than what was originally expected. In other words, if the Kakkad project could be completed on time as per plans, KSEB could increase the quantum of similar projects by about 1,800 per cent with the same resources it actually spent for a single project.

The capital x time waste factor for the nineteen projects (excluding the non-starter Pooyankutty) ranges from 148 per cent for the Kallada project to 2,766 per cent for the Vazhikkadavu diversion! (Table 4). There are as many as nine projects (six of which are mini or diversion projects) having more than 1,000 per cent waste factor. That each project has eaten up, on average, extra resources worth 1,100 per cent just shows the enormous waste of capital x time resources in power project implementation in Kerala.
### Table 4: Capital Cost Savings

<table>
<thead>
<tr>
<th>Projects</th>
<th>Capital Cost (Rs) per kWh of Energy Potential</th>
<th>Savings in Capital Cost (Rs. Lakhs)</th>
<th>Capital Waste Factor**</th>
<th>Capital x Time Waste Factor (%)</th>
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</thead>
<tbody>
<tr>
<td>Idukki II Stage</td>
<td>0.31</td>
<td>0.68</td>
<td>910.20</td>
<td>0.15</td>
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<tr>
<td>Idukki III Stage</td>
<td>0.11</td>
<td>0.40</td>
<td>844.33</td>
<td>1.27</td>
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<tr>
<td>Sabarigiri Augmentation</td>
<td>0.10</td>
<td>0.90</td>
<td>838.42</td>
<td>2.96</td>
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<tr>
<td>Idamalayar</td>
<td>0.73</td>
<td>2.81</td>
<td>4652.58</td>
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<tr>
<td>Kakkad</td>
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<td>5.86</td>
<td>11386.17</td>
<td>2.87</td>
</tr>
<tr>
<td>Kallada</td>
<td>2.23</td>
<td>3.40</td>
<td>-153.26</td>
<td>-</td>
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<tr>
<td>Lower Periyar</td>
<td>1.79</td>
<td>7.16</td>
<td>18940.91</td>
<td>1.16</td>
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<tr>
<td>Malampuzha</td>
<td>5.27</td>
<td>12.13</td>
<td>339.78</td>
<td>1.00</td>
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<tr>
<td>Madupetty</td>
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<td>7.47</td>
<td>142.23</td>
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<td>Malankara</td>
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<td>3124.06</td>
<td>3.16</td>
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<tr>
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<td>6.54*</td>
<td>26.89*</td>
<td>0.07</td>
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<td>Peppara</td>
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<td>5.92</td>
<td>184.00</td>
<td>0.37</td>
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<tr>
<td>Pooyankutty</td>
<td>3.88</td>
<td>12.71</td>
<td>NAP</td>
<td>-</td>
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<tr>
<td>Azhutha Diversion</td>
<td>0.51</td>
<td>2.54</td>
<td>1027.80</td>
<td>2.46</td>
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<td>Poringalkuth LB Extn</td>
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<td>5.77</td>
<td>3028.05</td>
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<tr>
<td>Kuttiar Diversion</td>
<td>0.58</td>
<td>2.59</td>
<td>696.27</td>
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<td>Vadakkepuzha Diversion</td>
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<td>Vazhikkadavu Diversion</td>
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<tr>
<td>Kuttiady Tail Race</td>
<td>2.65</td>
<td>8.61</td>
<td>744.06</td>
<td>1.36</td>
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<tr>
<td>Kuttiady Extension</td>
<td>4.10</td>
<td>26.40</td>
<td>15825.39</td>
<td>3.98</td>
</tr>
</tbody>
</table>

Note: * = by 1993; NAP = Not Applicable; ** = Equivalent to number of Kakkad-type projects

The Kuttiady power project had been long out of service in the name of extension works going on there. The extension programme, with a time overrun of over four years and a stupendously exorbitant capital cost of Rs. 26.4 per kWh of energy potential, also involved substantial revenue loss for the parent project owing to its closure. The firm generation potential of Kuttiady power station is about 270 MU or 0.74 MU a day, equivalent to sales revenue of about Rs.15 lakhs a day. If the extension scheme were commissioned in time (i.e., in 1995–96), it could fetch sales revenue of about Rs.7.1 lakhs a day. During the last five years, the total loss of sales revenue alone amounts to Rs.399 crores in this case!

### Causes of Delays

Several factors account for the delays — changes in the technical design and feasibility reports, original cost estimates being based on inadequate or incomplete data and unrealistic assumptions, inefficient management, inadequate geological and technical investigations of the projects at the outset, vague and
ambiguous specifications and conditions of contract, sluggish decision-making at various stages of construction, unavailability of materials or lack of transport, infighting and ego clashes among different groups of the bureaucracy and technocracy of KSEB, unwarranted transfer of planning and supervisory staff between projects during their construction, lack of vision about the power needs of the State, labour disputes, court interventions for aggrieved contractors, and so on (Kannan and Pillai 2001a). Nurturing all these is lack of political will to finish the work on schedule, borne and bred of course by high-level corruption and an indifferent public.

Recurring labour militancy is recognised in general as the factor that accounts for the highest cost burden. It cannot be otherwise in a politically surcharged atmosphere of highly pampered unionism of diverse hues peculiar to Kerala. Not a single project in Kerala (including the prestigious major project of Idukki) has been spared from work stoppages. The construction work of the Idukki project was very pompously inaugurated by the then chief minister, EMS Namboothiripad, on February 10, 1966; the very next day a labour strike started, which culminated in the death of two workers in police firing! It might be a cruel irony that the project (Stage I) could be completed and commissioned only under the coercive ‘normality’ during the infamous national emergency!

**The Cost of Labour Militancy**

There are two distressing examples from the recent history of power development in Kerala of the damages caused to the overall power and economic development of the State by the irrational behaviour of organised militant labour. The first is the example of Idukki Stage I, a 390 MW project, which could not be commissioned in the Fourth Five Year Plan (1969–74) and had a long gestation period because of frequent strikes and interruptions of work by labour. This project could be ultimately commissioned only in 1976. The Electricity Board suffered the consequences of delays caused in commissioning this project by way of escalation in costs and revenue foregone as a result of longer gestation period eight years ago. At the time Idukki – I was commissioned in 1976, there were a large number of consumers in all sectors of the State’s economy waiting for power connections. Public memory being proverbially short, people have forgotten the great damage caused to the economy of the State by the long delay in the commissioning of Idukki. We would, however, like to recapitulate a recent experience of Idamalayar hydroelectric project, which unfortunately is yet to be commissioned (at the time this report is being got ready) because of unreasonable and irrational labour militancy. … The strike by the employees in this project started within three months of the commencement of work on the construction of the dam. The first strike was on 8-12-1976. There were a number of strikes between 8-12-1976 and 5-9-1979 by employees working in dam
construction, but these strikes were settled without much loss of time. But there was a long strike which increased the gestation period of the project by 6 months and 15 days (excluding monsoon off) which commenced on 6-6-1979 (ninth month of construction) and ended only on 25-3-1980. The direct financial loss on this account is estimated to be Rs.125 lakhs and it has also escalated the cost of the project by Rs.142.5 lakhs. During the period between 7-5-1977 and 18-1- 1983, there were a number of strikes in the power house resulting in a total financial loss of Rs.15 lakhs. The two strikes in the tunnel work of this project were something unique perhaps without parallel in the history of power development anywhere in the world. Initially the employees engaged in the tunnel work struck work between 9-6-1980 and 20-11-1980 increasing the gestation period by five months. But the most crucial strike, which affected the project and postponed its commissioning, was started on 10-4-1981 and continued till 10-6-1983, thereby postponing the completion of the project by two years and two months. The employees involved in the strike were only 110. The financial commitment for settling the strike was about Rs.125 lakhs… The major issue causing this strike was the demand by the contractor’s employees engaged in this project for an assurance that they would be absorbed as permanent employees of the Electricity Board. We understand that a number of these workers were working as contractor’s labour in earlier hydroelectric projects in Idukki and elsewhere. But we cannot appreciate how this would give any moral or legal rights to these employees to claim permanent employment in the Electricity Board. It is difficult to quantify the losses to the community due to the three strikes (one in the dam construction and two in the tunnel work) extending over a total period of three years and one month. Considering that the total installed capacity of the hydro system in Kerala is only 1,011.5 MW an addition of 75 MW three years earlier would have cushioned to some extent the power famine in Kerala especially in the year 1982–83. The losses to the Electricity Board as a result of the strike during dam construction have been estimated to be Rs.267.5 lakhs. The losses due to the delay in completing the tunnel are estimated to be Rs. 30.98 crores out of which Rs. 29.31 crores is loss of revenue due to delay in commissioning of the project and Rs. 1.67 crores is due to escalation in costs and revision of schedules. The total loss incurred by the project as a result of the delay of three years and one month (1,125 days) is Rs.33.65 crores. The loss per day of delay works out to slightly less than Rs. 3 lakhs. This state of affairs did not stir the conscience of the people of Kerala who remained apathetic. A project being delayed for such a long time and every day’s delay costing Rs. 3 lakhs to the taxpayer did not receive adequate publicity in the Press or political platforms. That this could happen in a State with a vigilant press and politically conscious people is a tragedy. We feel that an in-depth study by one of the all-India management institutions into this strike, especially how and why it was allowed to continue for over three years and how and
why the public opinion in the most literate State of the country was silent, would be very useful to draw appropriate lessons for the future. We strongly recommend issuing an ordinance followed by enactment of appropriate legislation prohibiting strikes under any circumstances in all power projects under construction. .......Those who take part in such strikes, and their leaders should get a minimum punishment of compulsory imprisonment for a specific period prescribed in such a law. In addition, all those who participate in such strikes should be debarred from being eligible for appointments under Government or any other institution owned or controlled by Government. …

— Government of Kerala 1984: 57–61

Idamalayar project was one of the most unfortunate victims of recurring and prolonged labour unrest. Some stories, as told in the Report of the High Level Committee (1984) of Government of Kerala, are given in the box above.

Kakkad project had a long tale of unending woes of corruption and trade union militancy. When construction works started, serious defects in design were found. Initially, the whole construction works were awarded to one contractor who had no pre-qualification but was preferred by the then minister concerned. The contractor was too inexperienced and inefficient to yield any progress in works for quite a long time, and KSEB was forced to terminate the contract in June 1981 and select a fresh one. Construction of the interconnecting tunnel was started in 1980 at an estimated cost of Rs. 5.59 crores. Soon the workers went on strike, as the contractor refused to pay the ruling wage rate. In June 1981, another company was entrusted with the work, but still there was no progress; hence the work was divided and given to three contractors on condition that the work be completed within 41 months, and the cost went up to Rs.11 crores. In due course, three more contractors joined, yet by March 1988, only 30 per cent of the work could be completed—a case of too many cooks spoiling the broth. Reports show that, in all, there were sixteen contractors entrusted with the work in different phases (The New Indian Express, June 20, 2001).

The tortoise continued its pace. Interrupted very often by agitations, the tunnel construction went on and on from two opposite sides, but the two ends never met; the two tunnels from the opposite sides just ran parallel to each other!

Finally after twenty-one-and-a-half years, the tortoise reached its destination, eating away more than Rs.150 crores.

The World Bank-aided Lower Periyar project, visualised in the 1970s and cleared by the Planning Commission in 1983, also tells almost the same story of delays. The public sector National Power Construction Corporation (NPCC), which took up the civil works, just wasted more than four years without any progress. Finally, this contract was terminated in 1993 in an out-of-court settlement and the private sector Hindustan Construction Corporation (HCC) entered the scene. The
same company (HCC) had taken up tunnel works (in February 1984), with the deadline set on October 26, 1989. Later, HCC sought extension of time, citing reasons beyond their control, and the deadline was extended to June 30, 1992. Just a month prior to this date, HCC submitted to KSEB a memorandum giving details of delays as follows: initial troubles: five months; labour problems: ten months and twenty-nine days; climatic problems: ten months and six days; and obstructions/impediments on the part of the KSEB: fifteen months! The company demanded additional payment of Rs.16.33 crores to cover the increased costs due to the time overrun. They had already been allowed a cost increase of about Rs.61.8 crores, against the original estimate of Rs. 23 crores. A committee that was constituted to look into the fresh demand recommended, surprisingly, payment of Rs. 8.5 crores with an immediate disbursement of Rs.2.5 crores to HCC. The alleged bias of the committee towards HCC, which never cared for the loss to KSEB amounting to Rs. 117 crores due to the 47 months’ time overrun, made headlines in the media and the clamour echoed in the legislative assembly for days. The company moved the High Court and the matter went up to the Supreme Court; finally, the KSEB had to eat its heart out! It should be added that the World Bank, which had given aid to the project initially, but reportedly got frustrated over the time and cost overruns, backed out long back.

Another jinxed project is Malampuzha, one of the first projects planned in the State to generate electricity from water let out from an irrigation dam. The contract for the design, supply, and installation works was awarded to a private firm, which allegedly had no previous experience in such projects. The civil work was done by KSEB.

Though the company started the erection work in 1992, it took as long as four years to attempt a trial run. However, during the trial run, some defects were noticed in the butterfly valve. In 1997, another trial run was tried, but again during the run, a valve disc got broken. And the story continues…..

Chimony, on the other hand, locked in a High Court stay obtained by the contractor since 1993, is altogether left out of KSEB reports now!

It is significant to note here that KSEB used to present, in its Annual Administration Report, a detailed report on the progress of each project, which, however, has been missing for quite some time now. Absence of such transparency makes any examination of the causes of delay difficult.

As labour militancy is the principal factor in time overrun of a project, any measure that can tackle this menace could help to improve the situation. The High-Level Committee of the Government of Kerala (1984) went to the extent of recommending enactment of appropriate legislation prohibiting all strikes in the power projects under construction (see the above Box). It should be recognised in this respect that there is a political economy of corruption involving collusion among
union leaders, contractors, bureaucracy and political leadership in inciting labour militancy. Hence, an effective check is required on such collusive power at its formative node, that is through the contract itself: future construction contracts should be so structured as to make it legally binding on the contractor to compensate the Board for any delay.

It should not, however, be construed that every power project in Kerala necessarily falls under the jinx of delay. The NTPC thermal project at Kayamkulam was completed and test-fired on November 1, 1998, four months ahead of schedule. Note that NTPC, famous for its performance efficiency, is, unlike the SEBs, an autonomous corporation, managed by competent professionals, and largely independent of governmental interference in its day-to-day affairs. The contractors were thus made legally bound to complete the entrusted works within the stipulated period. Similarly, the first private sector hydroelectric plant at Maniyar (12 MW) was completed and commissioned within fifteen months in 1994 by the Carborandum Universal Company. In this light, it goes without saying that something is rotten behind the KSEB projects — and it is nothing but the dead political will, dead of corrupt politicians and the indifferent public.

The Political Economy of Corruption

A detailed discussion of this aspect is provided in Kannan and Pillai (2001b); here we sketch the most relevant ones.

In a neoclassical representation of the political process, the relationships among the public, government and utility may be aptly analysed in the light of a three-tier hierarchical model of principal-agent problem. The problem consists in the default and breach of trust (i.e., moral hazard and adverse selection, Arrow 1985), likely on account of the conflicting objectives of self-interest maximisation of the parties concerned and the uncertainty or information asymmetry involved in the relationship. In its simple version, it is assumed that in a regulatory governance structure, the principal’s (i.e., the public’s) objective is to maximise some measure of social welfare, while the agent (the government as supervisor) and the sub-agent (utility) aim to maximise the returns of their respective rent-seeking pursuits. In a complex structure of relationships, the principal may be viewed as a composite set of sectional interests against the background of the general welfare objective; each class in this composite set, such as the contractors, construction workers, bureaucracy, politicians and others, follows its own designs of predatory rent-seeking that dominate, in a particular context, the common objective. Such a structuring facilitates analysis of the political economy of corruption involved in time and cost overruns of power projects in Kerala.

Apart from the usual ‘sales’ procedures of construction contracts and materials purchase orders carried out through collusion between the supervisor
(government) and the sub-agent (bureaucracy in the utility), favouring certain contractors, the practice of allowing for time overruns of projects and sanctioning of the associated cost escalations involves a ‘wide-spectrum collusion’ among the domineering class interests in the composite principal set, viz., the political party in power (i.e., government), bureaucracy, contractors and trade unions. As already highlighted, recurring and unchecked labour militancy is recognised as putting the heaviest burden on the pace of construction works of power projects in Kerala, largely dictated by political rivalry rather than genuine labour demands, as for example, in the construction of Idukki hydroelectric project, to begin with. The time overruns resulting from labour militancy essentially go into the contractors’ demand for cost escalation, which is soon endorsed by the Board and sanctioned by the government. Such rent-sharing is a widely recognised official practice in the power-irrigation sectors. The glaring laxity on the part of the government in fulfilling its responsibility to enforce its authority on the contractors and workers to bind them within the contractual terms they agreed upon is a clear indication of its corrupt collusion. As mentioned above, in Kerala, the time and cost overruns have afflicted only the State power projects; the public sector NTPC thermal and the private sector hydro projects in the State having been completed well within their schedules. In this light, then, the cost escalation sanctioned for each late-run project may rightly be taken to represent the cost of corruption involved in construction contract sales in the power sector of the State. Accounting for the general price inflation during the normal construction period, this amounts to Rs. 644 crores or Rs.35.8 crores per project (Table 4)! Unbelievably, it represents on an average about 60 per cent of the actual project cost! In some cases it is well above 70 per cent; for example, Sabarigiri Augmentation (75 per cent), Kakkad (74 per cent), Malankara (76 per cent), Poringalkuthu left bank extension (71 per cent), Kuttikyad extension (80 per cent) and the diversion projects of Azutha (71 per cent), Kuttiar (73 per cent) and Vazhikkadavu (84 per cent). This is all shared among the four parties involved, at the cost of the helpless majority in the ‘principal’ set of tax payers.

Such lucrative rent-sharing collusion has unfortunately become firmly institutionalised in the political process of the country. A highly individualistic self-interest domineering ethos has come to stay across the social texture only to strengthen this political economy of corruption. It is not that the principal, the public at large, is unaware of all these murky dealings and developments; but they remain largely apathetic, despite being enlightened enough by the Press, true to the rotten spirit of an individualistic utilitarian society, lying moribund but never dying. This, in fact, raises questions as to the validity of the neoclassical apology of imperfect information as leading to the principal-agent problem. At the heart of the malady is lack of a sense of oneness, resulting in the void of an effective platform
of checks and balances, which would have avoided problems arising from moral hazards and adverse selection. And this should point towards the significance of a soul-cleansing cultural revolution, reminiscent of that of the era of liberalism. This may, however, appear a highly idealistic long-term objective. We do recognise the exertion of significant public praxis by a few concerned citizens and their organisations for immediate, palliative results. Strengthening and extending such praxis can go a long way towards imposing the public will for common interests on the political process. For example, there are measures that can effectively be applied to restrain time and cost overruns in the public projects: as already mentioned, the construction contracts can be so structured as to provide for making the contractors liable for stringent penalties in case of non-performance such as time overrun. The previous Left Democratic Front state government (1996–2001) was reported to have taken some steps in this direction in the case of the Athirappally hydroelectric project by initiating the institution of contract penalty provisions for delay —the first of its kind in the history of KSEB, if implemented. It is such ifs that govern the direction and tempo of our development.

Note

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