Background to the largest engineering enterprise in the country

The Ceylon Electricity Board is, I believe, the largest single engineering entity in the country in terms of professional engineers employed and asset capitalisation. It is the guardian of a vital public good, electricity, and one whose delivery involves the most sophisticated technological challenge of all of Lanka's engineering and industrial activities. I had the honour to deliver the 2009 Wimalasurendra Memorial Lecture at the Institution of Engineers (Sri Lanka) on 17 September and I will devote my columns this week and the next to edited and collated extracts chosen to be of public interest. The theme of the material I have chosen for these two pieces (the lecture itself went beyond these themes to deal with environmental and social questions) is reform of the electricity supply industry in the light of the sector's own problems and worldwide advances in this industry.

Why was the CEB formed?

The landmark event in the history of the electricity supply industry in Sri Lanka was the formation of the Ceylon Electricity Board in 1969. The assets and functions of the Department of Government Electrical Undertakings were transferred to the CEB which was charged with all the technical and commercial responsibilities of generation, transmission, distribution and supply. There were, however, more fundamental motives for setting up the CEB. First and most important was to establish an entity which could borrow monies and enter into contracts with the World Bank and other foreign organisations. This was crucial in order to finance the large hydro projects which were in the pipeline. Section 42 of the CEB Act No. 17 of 1969 provides watertight guarantees protecting the interests of the lender and grants exception from taxes and stamp duties. The legal authority to enter into contracts and to buy electricity in bulk has been a cornerstone of CEB activity in the last 40 years.

A second function devolved on the CEB was to fix charges and tariffs, and as stated in Section 38 of the Act, to ensure that revenue was equal to outgoings. In recent years this requirement has been openly violated in order to satisfy the populist aspirations of successive governments. A third most laudable objective was that it was imagined in the early days that the CEB would function independently of ministerial control and political interference, and would adhere to high professional standards of management free from the burdensome constraints of government administrative and financial regulations. Section 8 of the Act in fact strictly limits the powers of the Minister to three aspects - general and specific directives in the national interest, calling for information, accounts, returns and the like, and thirdly to take steps to investigate the affairs of the Board when the necessity arises.

There is no provision of the CEB Act which has been more flagrantly violated than this. I can speak from some personal experience since I was on its Board of Directors (at the tender age of

29) from 1970 to 1974. The Board simply had no independence whatever; it was a creature of the Ministry and I was thankful to escape from reappointment for a second term. And still, in those days, political interference was nowhere near as bad as it was to become in later decades. It can be asserted with little fear of contradiction that of the three basic objectives envisaged in the creation of the CEB, only the first has come to fruition.

We need to frankly address the question why the independence of the CEB from government and political control could not be ensured. To my mind, in order of priority there are four reasons. First, the CEB was too big, too much a centrepiece of national infrastructure policy, its funding too large and too heavily underwritten by government, that it was unrealistic to expect that it could escape the heavy hand of state intrusion. In all developing countries the state is the driver of infrastructure development and the big spender and its writ runs large in the formative years of any vital national infrastructure industry.

The second reason is that the Republican Constitution of 1972 decreed that the political establishment would oversee the public service, thus disabling the independence of the latter from politics; the CEB was caught up in this shift of culture. A third reason that has been suggested is that the simple love of graft and the opportunities for colossal enrichment that multi-billion rupee projects provided was simply too much of a temptation for the political establishment to keep its hands off. Finally it is suggested that the absence of an independent regulator allowed the CEB to be decision maker, regulator producer and seller and that this arrangement became self-destructive.

Political interference and graft have always been closely and inextricably entwined. The social challenge facing the sector is this questionable ethos. The last fifty or so years have been marked by some spectacular successes, the Kelani and Mahaveli projects and the extension of service to 83% of households, for example. But the failures have been of disastrous proportions too. It is not just that we are bleeding dollars into oil and gas wells, but also that a subculture of politicisation and corruption has taken hold.

From a planned to an open economy

From government department days, through the early years of the CEB when big hydro power projects were being set up, finally to the great days of the Mahaveli Scheme under the administration of the Mahaveli Development Authority but requiring liaison with the CEB, these were the halcyon days of planned development. Multilateral funding agencies, foreign consultants, and local engineers in the CEB and Mahaveli Authority produced multi-volume tomes detailing future system development profiles, especially generation expansion programmes, over 20 and 30 year horizons. As a member of the CEB Board I had the opportunity to interact with the bright young minds of the day and share in the excitement of planning this future on a majestic scale.

But two developments brought this phase to a close - first the end of the grand hydro era with the completion of the Mahaveli projects did not leave much to do in terms of sequencing a generation development strategy of the older type. This is not entirely true; from early days the importance of incorporating coal power was understood and worked into the plans but the obstacles were many. This also threw into some disarray the idea of hydro-thermal long term planning to properly sequence thermal additions, as had been done with Kelanitissa, instead of the disorganised and corrupt rush to barges and diesel. The completion of the large hydro projects also reduced the pressure of demand on supply for a period and the urgency to plan for tomorrow was put off for the day after tomorrow.

The second major change that signalled the demise of long-term planning was the global and local turn to market economics. Multilateral agencies (IMF, IBRD, ADB) throughout the world began to sing a new tune after the commencement of the Regan-Thatcher era in the late 1970s. The new tune was; ‘Go to the private sector, open up your economy to international private capital, let investors come in and build your infrastructure projects in a competitive market, let them charge for the goods at unsubsidised prices’. Even the CEB was established in 1969 on IBRD advice.

This ‘market knows best’ philosophy survived a full three decades in the global economy until it collapsed in the Great Crash of 2008. I will not at this point indulge in my favourite pastime of critiquing neo-liberal economics, nor will I deny that this period taught some valuable lessons about competition and paying due attention to efficient resource allocation. I am simply making the point that the international environment, after the late 1970s, was no longer conducive to business as usual planned electricity industry growth.

This global transformation was matched locally by a sharp shift of policy within the country from the so-called mixed economy with a significant role for state enterprises that prevailed up to 1975 if not 1977, to an open to foreign and local investor, privatisation oriented policy that turned its back on state economic involvement. The Mahaveli was the single exception because it was too large to manage except under the aegis of the state. These global and local changes lubricated the transition from a planned power system expansion tradition, to distorted market driven practices.

It is not that market driven competitive power system expansion is inherently bad and bound to end in a debacle. The disastrous delay in introducing coal power was not a failure of market economics but caused by political factors. The same could be said of the panic and rush to oil and gas - the market was never given a chance. Had it been managed carefully, without jettisoning the role of the state sector which is vital in crucial and expensive infrastructure sectors like electric power, then it could have made useful contributions. Had it been managed without monumental graft, public anger at private power would not have run so deep. Sri Lanka, however, failed on both counts and the country haemorrhages hundreds of millions of dollars each year paying for oil and gas to keep our turbines in motion. We now await the arrival of king-coal to stem the haemorrhage.

The next decade will be the decade of coal; that is a foregone conclusion. The economic challenge is what next after that? I believe that it is urgently necessary to begin to look, yes start

looking right now, at innovative alternatives. Small nuclear plant in unit sizes that our system can by then absorb, and the outcome of Obama's $50 billion investment in high technology renewable options will be available to us in the 2020s. The economic challenge will be that by then, having become accustomed to relatively cheap coal power, can we resist the temptation, the addiction, to keep going with coal for another decade? That would be a crucial error we must avoid except if clean-coal technologies (gasification, capture and sequestration) come to the rescue; but then at what price?

But larger than the issue of fuel source diversification is the reorganisation of the whole electricity supply industry.

The crux of the economic challenge

The crux of the economic challenge consists of two contradictory matters; (a) finding investment and (b) meeting the extra costs of a low carbon energy supply. The country is heavily in debt; servicing both the local debt and the foreign debt has become burdensome. The financing arrangements for the $455 million Norochcholi 300MW first stage, and subsequent coal fired plant are not transparent, making it difficult to estimate the real cost of coal fired power though the fuel dependent part will be about Rs6 to 9 per kWh (unit), compared to Rs12 to 18 for oil fired electricity – the price spread is to accommodate fuel price fluctuations. Without firm data, from guess work, between Rs2 and Rs3 per kWh should be added to the fuel cost for repayment of the capital charges on coal fired power. The $455 million is a loan repayable over 20 years inclusive of a 5 year grace period; the interest rates are not known. If another 600 to 900 MW is to be added to the system, the eventual debt servicing commitment may be in excess of $200 million per annum. Sri Lanka's gross annual foreign debt servicing commitment in 2008 already stood at $1.5 billion, $450 million of which was interest payment.

Adequate energy supply is an imperative for the twin strategies of increasing economic output and enhancing productivity. These lie at the heart of poverty reduction, the most urgent task facing developing countries. Electricity is central to fulfilling both strategies, and is crucial to industrial modernisation and productivity enhancement. This leads to a cruel conundrum; how to simultaneously reduce green-house gases, control impact on climate change and hold down the carbon footprint. We must accelerate access to energy supplies but limiting its impact on local and global climate change creates an affordability problem. Alternative energy and clean energy technologies are expensive; period.

The CEB is encouraging renewable energy but the cost is high; it pays Rs. 14.5 per kWh for mini-hydro and Rs23 per kWh for wind power. Almost the entire cost is the writing down capital

investment. As a rule of thumb wind and solar electricity cost two to three times as much as coal fired power. It is not true that the country is economising on foreign currency because the wind and sun are free; the main cost component, the plant, is imported.

A 2006 World Bank study entitled Clean Energy and Development: Towards an Investment Framework reflecting on investment constraints facing developing countries says:

"The IEA estimates that a total capital investment of $8.1 trillion, equivalent to an average of $300 billion per year (in 2005 dollars), is needed from 2003 to 2030 for the developing and transition economies to meet their energy needs, of which electricity comprises roughly 73 percent. Financing for the energy supply sector comes from three sources: internal cash generation, private financing, and public funding. One challenge in the energy sector is the electricity sub-sector where the current levels of investments are about 50 percent of the needs, that is, about $80 billion per year out of $160 billion per year. The extent to which the huge investment gap, especially in the electricity sector, can be funded depends on the pace of policy and regulatory reform including measures to attract private sector investment. End-use efficiency improvements in the transportation, industry, commercial and residential sectors can also have a significant impact on the clean energy investment requirements."

In countries with a history of welfare economics electricity prices are bound up with subsidies. Everybody subsidises the small consumer; commercial and some industrial categories subsidise the residential sector. The welfare oriented tariff subsidy is a mess; there are too many slabs and make no sense. A sudden change will provoke public reaction, hence, transitionally, a first slab can be sold to domestic consumers at a low price, and a fixed tariff applied thereafter.

Restructuring and regulation

We lived through the triumph of hydro and its eclipse by oil and gas; we are now on the brink of a major transition to king-coal and renewable sources may provide 10% within the next decade. Organisationally we have lived through the transition from a government department to a public corporation, and thence efforts at the behest of multilateral agencies to privatise or restructure the sector. These attempts were resisted by political sectors, but eventually the 2002 Act was accepted by most stakeholders. It was sidelined after the change of government in 2004 only to be resurrected in very similar form in 2009.

There is confusion and paralysis on the restructuring and regulatory side. Proposals are made and withdrawn; legislation brought forward and allowed to die. It is an open secret that the purpose of the 2009 Act is to please multilateral agencies and secure loans and grants, not to implement any change. The government has no plans to restructure the sector and the provisions of the Act are merely enabling measures allowing the line ministry to determine, and PUCSL to rubber-stamp changes, at a future date. There is no power supply industry reform

structure contained in the Act, quite unlike the way reforms were legislated in other countries. The challenge has been ducked; the 2009 Act is a fake!

RMB Senanayake writing in the Island newspaper of 2 September (Reform of Political System must take precedence over Reform of the Public Service) takes up the question of whether a better public service will be the mantra to address our national ills. This has a direct bearing on our discussion here whether the principal concern is the quality of the regulatory process. RMB puts it like this:

"There are far more serious problems facing public administration and it is these that require attention first. The winning political party can turn the issue of public goods provision into a redistributive one by ensuring that most of the benefits accrue to their supporters while the others meet the costs. Resources can be used by those in power to benefit only themselves and to discriminate against (others). The practice of political patronage in recruitment to the public service and the framework for allocating money in the budget enabled the politicians of the winning party to turn the allocation of resources into a redistribution of incomes and wealth in society in their favour rather than seek to achieve economic efficiency".

This is a bold statement and a truthful one. Little can be achieved until we make a revolutionary overturn in political culture. The lesson that needs to be learnt is that it is only public vigilance over political transgressions, not appointed agencies or authorities that can protect the public interest. The 2009 Act says that within six months the CEB will submit a 15 year plan for the future of the industry. Why is nothing known as yet? Is it that this provision was plain whitewash for the sake of the ADB, or is it that changes decided upon are being hidden from the public and other stakeholders?

A new structure for the ESI

I conclude with six principles for changing the ownership structure of the sector and six to steer the operating and marketing side.

Ownership Structure

CEB must be vertically "unbundled" into three hierarchies (Generation, Transmission and Distribution) and Generation and Distribution further "unbundled" horizontally into a number of separate competing entities.

The Transmission System is a critical national infrastructure. Its operation, planning and expansion must be vested in an entity accountable to the public – a Transmission and System Control Authority (TSCA).

Significant additional investment in Generation and Distribution must be procured and multilateral agencies and state-to-state aid or bilateral ventures will form the largest component

(vide Norochcholi). This must be supplemented by local and foreign private investment in independent power producer (IPP) projects and BOT projects.

"Unbundled" Distribution may be privatised or franchised to the private sector, vested in local government, or retained by separate regional distribution utilities. These decisions have to be made case by case in relation to the ground realities

Stakeholder participation must be ensured in designing a new structure and incorporated in future operation and management. In designing the new structure the public interest must predominate over employee or investor interests, but once in place the new venture will not be successful unless the participation of workers, engineers and investors is realised. During the transition employment or acceptable retirement guarantees must be offered to the CEB's current labour-force

The restructuring exercise must be informed by worldwide technical and organisational advances and global best practices.

Operational and Market Architecture

Power system control must be vested in the envisaged Transmission and System Control Authority (TSCA).

Hydro plant must have preference in usage timing because it serves downstream irrigation and water supply needs

"Unbundled" state thermal power plant must be made to compete with IPP private plant.

For the foreseeable future all power must be purchased by a Centralised Buyer (CB) - who may be an arm of the TSCA - on a price competitive basis and resold to customers such as distributors and large industries. There should be no restriction on the type of contracts (long and short term, spot and balancing power) that CB can enter into.

Sri Lanka is not ready for Wholesale or Retail markets where power producers and distributors and consumers can directly buy and sell from each without a CB.

There are technical interfaces between the market side and the operations side that must be properly designed.

[Professor David, a retired Dean of Engineering of Hong Kong Polytechnic University, and a former Fellow of the IEEE and IEE, was a Director of the CEB for a four year term from May 1970]

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