

ANNEX I

DEVELOPING FINANCIAL AND ECONOMIC OBJECTIVES, INCLUDING PRICING; THE UNITED KINGDOM EXPERIENCE

The requirement that prices are related to costs raises a number of questions concerning which costs should be taken into account. Given also that financial viability may take sometime to achieve and that rationing of scarce capital resources by Governments will remain a feature of many member countries of the ESCAP region for some time, the experience of the United Kingdom of Great Britain and Northern Ireland in developing financial and economic objectives for nationalized industries has some relevance.

In 1961, 1967 and 1978, three white papers were published, each dealing with the financial and economic objectives of nationalized industries.

*The financial and economic obligations of the nationalized industries (1961)*¹

The first White Paper considers the objectives of the nationalized industries under three main headings: revenue account (financial objectives), capital account (investment and borrowing) and prices and costs (pricing).

Under the revenue account heading, it required that surpluses were at least to cover deficits over a five-year period.

When calculating costs, the following items were to be included:

1. Interest;
2. Depreciation on an historic cost basis;
3. A provision for the excess of replacement cost over historic cost on new investments;
4. A provision to meet premature obsolescence or other unforeseen contingencies.

Under the capital account heading, the Government exercised powers over the industries' investment and borrowing proposals by: reviewing their plans for the next five years annually; fixing upper limits on the level of investment to be undertaken in the following two years; and by requiring approval of proposed borrowing.

The third heading of prices and costs was concerned with impressing on the industries their responsibility to the community; recognizing some of the problems they have in setting prices; and noting that financial performance can be improved not only by increasing prices but also by increasing productivity and reducing costs.

*Nationalized industries: A review of economic and financial objectives (1967)*²

This White Paper noted that a conflict can arise between a financial objective in terms of an overall percentage return on assets, the test discount rate used for new investment and a pricing system that is related to costs at the margin. However, it also recognizes the practical necessity of objectives and obligations. In the face of this conflict, the Paper adopted a flexible approach, whereby general principles were laid down and any conflict arising could be discussed with the Government.

In setting financial objectives (or targets) the Government was to take into account "return on new investment, a soundly based pricing policy, social obligations not covered by a subsidy, efficient operation and national prices and incomes policy". Targets, which had been agreed for the various industries at the time of publishing the Paper, were in terms of income as a percentage of average net assets, income being either gross - before interest and depreciation, or net - before interest but after depreciation at historic cost. The only industry which took into account the replacement cost of assets was the National Coal Board which had the target "to break even after interest and depreciation including £10 million a year to cover the difference between depreciation at historic and replacement cost".

¹ H.M.S.O., *The Financial and Economic Obligations of the Nationalized Industries*, Cmnd 1331, 1961.

² H.M.S.O., *Nationalized Industries: A Review of Economic and Financial Objectives*, Cmnd 3437, 1967.

The Paper's discussion of investment can be conveniently divided into two parts, first, a statement of the reason for control and, second, the vehicle of control. The reason for control "is that the most efficient distribution of goods and services in the economy as a whole can be secured only if investments are made where the return to the economy is greatest" and the vehicle is the use of discounted cash flow (DCF) techniques using the Government's test discount rate (TDR), which was 8 per cent in real terms at the time of publishing the Paper. The Government's flexible approach was again demonstrated when the conditions under which a proposed project, which did not meet the 8 per cent DCF rate of return might be accepted, or which did meet the requirement but might be rejected, are discussed. In the former case, the Paper is mainly concerned with those situations where there are social costs and benefits which are not normally included in a commercial investment appraisal, but which are relevant when considering society as a whole. In the latter case it is recognised that the TDR is a long-term device for ensuring that the public and private sectors' calls on resources do not diverge markedly. However, in the short run the Government may have to take into account competing claims for scarce resources and reject projects which pass the test.

The first statement in the Paper with respect to prices draws attention to the link between sound investment appraisal and pricing policies. In keeping with the general policy of treating the industries as commercial concerns, it then adopted the criteria that not only should prices be set such that revenue covers accounting costs, but also that prices should be related to costs at the margin. While these are the broad principles, the specific aim of pricing policies "should be that the consumer should pay the true cost of providing the goods and services he consumes, in every case where these can be sensibly identified". The section on prices then went on to discuss three reasons why prices may differ from costs and suggested pricing systems which would be applicable in those cases. The first reason was where the cost of providing the goods and services to specific consumers was difficult to identify and therefore difficult to allocate to those consumers. This situation can arise where goods are produced or consumed jointly. The Paper cites the use of two-part or differential pricing systems as attempts to minimize distortions in the allocation of resources. The second reason was where there were "wider economic or social considerations" and the third reason was where excess capacity or excess demand could be minimized by charging prices different from costs.

These two phenomena can be both short and long run in nature. In the short run, it may be that there are peaks in demand, in this case, setting prices so as to encourage the utilization of facilities during the off-peak period (such that the price does not fall below the *variable* cost incurred) and discouraging utilization during the peak was suggested. In the long run, it may be that there was unused capacity, in this case, pricing down to *escapable* cost (if this increased demand) was suggested.

Thus, one could interpret the discussion on pricing as being consumers should pay the true cost, but at the same time the relevant (short- or long-run) marginal cost should be borne in mind when setting the charge.

The nationalized industries (1978)⁵

This White Paper attempted to resolve the conflict between marginal cost pricing, a test discount rate, and financial targets. The principle behind this attempt is shown in figure I.1.

The test discount rate of the 1967 White Paper was replaced by the required rate of return (RRR). This was set at 5 per cent and represented the opportunity cost of capital (broadly reflecting the pre-tax real rate of return in the private sector). The industries were expected to achieve this on *all* new investments, including those which were non-revenue earning (for example, investment in head offices, necessary replacements etc.).

An interpretation of the recommendations is that from the project proposal, the cost of providing the extra tranche of output is estimated. This cost estimate, the RRR and the expected demand are then input into an investment appraisal model which in turn outputs the supply price, the supply price representing that price which is required in order to meet the RRR.

The supply price is then compared with the prices obtained from the demand forecasts. Given that the supply price, and price and quantity obtained from the demand forecast are compatible then the project could be accepted. It is suggested that:

"In the case of industries where the outputs of old and new assets are indistinguishable, total revenue would be derived directly from the price needed to earn the RRR on new investment; where the price which can be

⁵ H.M.S.O., *The Nationalized Industries*, Cmnd 7131, 1978.

charged for the output of old assets is different from that which would be charged for that of new assets, it will be necessary to take account of this in deriving the total revenue figure."

This implied that in cases where the outputs were indistinguishable, price was set such that total revenue would be sufficient to replace those assets for which demand exists (that is, price provides a signal to the producer indicating which assets should be replaced).

The data obtained up to this point are then converted into a financial target in terms of a return on capital employed (ROCE). The total revenue is calculated according to the above quotation. "Costs, including depreciation, would then be deducted and the resultant net profit would be expressed as a return either on assets or some other appropriate base".

Thus, by carrying out the calculations sequentially the three objectives are interrelated.

In practice, however, the Government reserved the right to take into account "social, sectoral and wider economic considerations" when setting financial objectives.

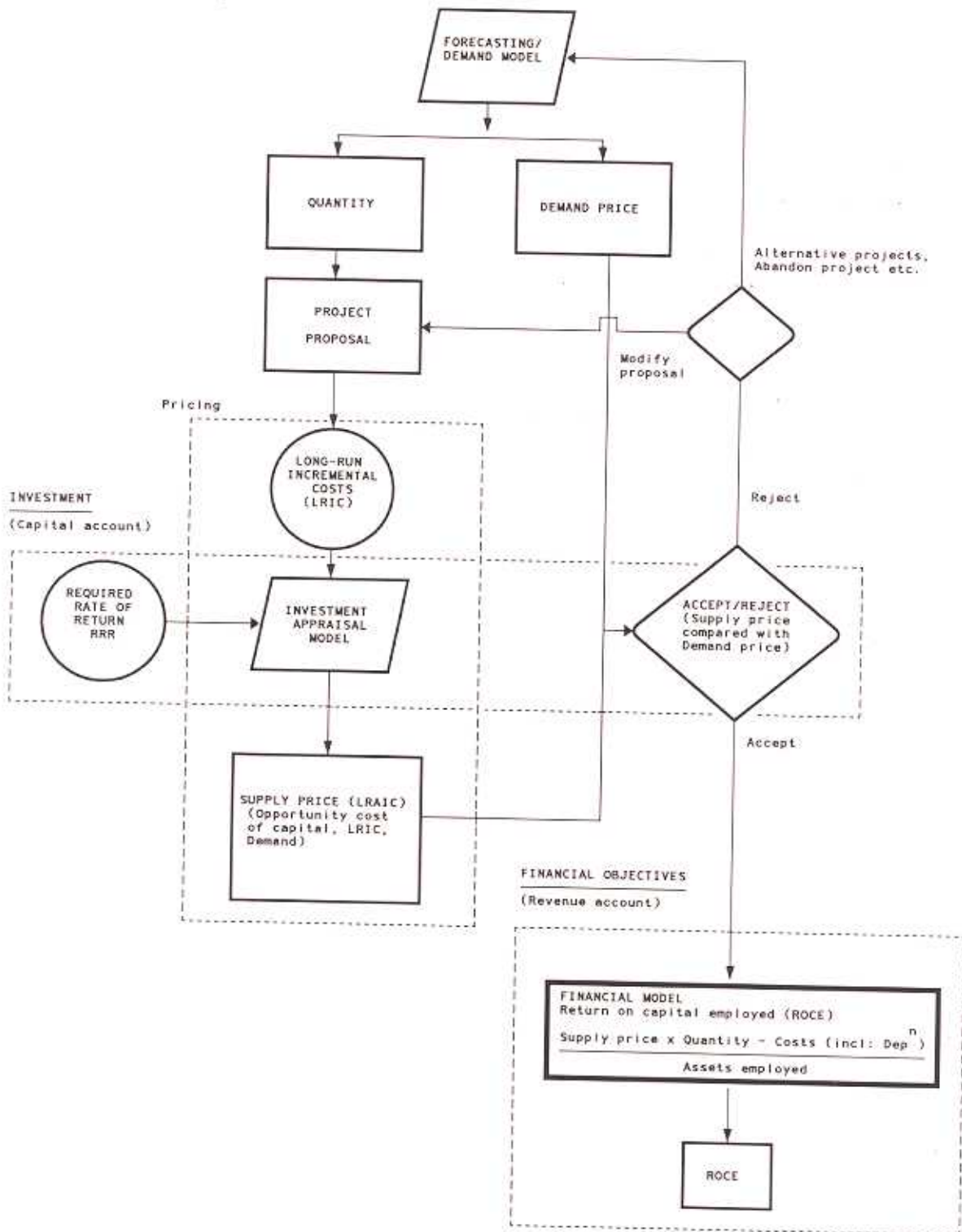
The adoption of the RRR in preference to the TDR was the result of two main factors. First, only a small percentage of investments had been

appraised using the TDR of the 1967 White Paper and second, it represented an attempt to relate the return on investment in the public sector to that in the private sector. In other words, it was attempting to recognize the opportunities foregone when one invests in the public sector (see figure 1.1).

The pricing policy which emerges from the series of calculations is that price is related to long-run average incremental cost (LRAIC). Although this approach does not yield the long-run marginal cost (LRMC) (except in the constant returns to scale case) it does represent a closer approximation to LRMC than long-run average cost (LRAC) and thus was a workable interpretation of the 1967 White Paper's recommendation that prices should cover LRMC. In the section on pricing, the 1978 White Paper does reiterate the importance of the structure of prices, particularly that peak/off-peak rates should be related to the relative costs of supply and also that arbitrary cross-subsidization between different groups of consumers should be avoided.

The financial target as calculated above was to be set for three to five years, and would normally be expressed as a percentage return (before interest) on average net assets. However, in some industries, particularly those which are labour intensive, a more relevant measure would be a percentage return on turnover. The White Paper also recommends that as soon as possible, financial targets should be placed on an inflation adjusted basis.

Figure I.1 Schematic presentation of the recommendations in the 1978 White Paper "The Nationalized Industries"



ANNEX II

SUSTAINABILITY AND ENVIRONMENTAL ASPECTS

Sustainability is a concept which has a number of facets. In common usage it tends to be associated with environmental aspects; however, its scope is much wider than the environment. The Brundtland Commission¹ defined sustainable development as:

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"

This definition embodies the concept of environmental sustainability; it also incorporates project sustainability. In the context of a project, the World Bank describes project sustainability as follows:

The term "Sustainability" describes the ability of a project to maintain an acceptable level of benefit flows through its economic life. While this may often be expressed in quantitative terms involving the internal economic or financial rates of return, benefits may also be qualitatively assessed. For projects in the productive sectors such as industry, the principal measure of performance is output, generally expressed in terms of capacity utilization, but Bank-supported projects normally have other objectives such as subsectoral policies, technology transfer and institution building, which must be assessed qualitatively.²

A. Project sustainability

The tendency of Governments and international lending agencies has been to concentrate on the implementation of projects at the expense of the post implementation issues of management, operation and maintenance. As a consequence many projects are characterized by:³

- (a) An increase in maintenance costs and more rapid deterioration of infrastructure;
- (b) Reduction in the level and duration of project benefits;
- (c) Reduction in the quality of services;
- (d) Reduction in accessibility of certain groups to project benefits;
- (e) Low priority being placed on long-term institutional developments.

The issues associated with these observations are discussed elsewhere in this report under the headings of management, and human resources development aspects of regional economic cooperation.

B. Environmental sustainability

In addition to project sustainability, infrastructure developments can have a significant impact on the environment and health which "compromise the ability of [both the current and] future generations to meet their own needs". Part II of the 1990 *Survey* gave many examples of the effects of different types of infrastructure development on the environment.⁴

The utilization of tubewell irrigation for water supply infrastructure can lower the water table, resulting in land subsidence and deterioration in water quality. Uncontrolled irrigation with inadequate drainage systems and unlined irrigation channels has resulted in waterlogging of irrigated land, causing salinization of soils, thereby rendering the land unfit for cultivation. The construction of large dams for irrigation and hydroelectric power generation alters the hydrological regime of watersheds; can lead to accelerated soil erosion and siltation; impacts on wildlife; increases the incidence of waterborne diseases; reportedly leads to earthquakes by increasing pressure on seismically sensitive zones and presents social problems in the form of displaced communities to be resettled. Thermal power stations and road vehicles produce a wide range of pollution; oil spillages from ships have major effects on coastal wildlife, mangrove swamps, fish stocks and marine resources; and the

¹ Brundtland Commission, *Our Common Future* (Oxford University Press, New York), p. 87.

² World Bank, Operations Evaluation Department (OED), *Sustainability of projects: Review of experience in the fertilizer subsector* (Washington D.C., 26 February 1986).

³ OED, op. cit., p. 6.

⁴ ESCAP, *Economic and Social Survey of Asia and the Pacific 1990* (ST/ESCAP/949/Part II).

construction of roads into forest areas can lead to deforestation and the resulting soil erosion, siltation and floods.

Table II.1 provides a more comprehensive matrix of the environmental effects of various transport modes and energy sources used in power generation under the general headings:

- (a) Air pollution;
- (b) Pollution of the marine environment;
- (c) Consumption of land resources;
- (d) The production of solid waste which is required to be recycled or disposed of during operation or at the end of the project's life;
- (e) Noise and vibration;
- (f) The potential of an accident in the transport mode or power source to have further impacts;
- (g) Other impacts including the impact on local communities, farmland and wildlife, the production of carcinogens, and other external effects of infrastructure development.

There is a spectrum of policies which can be adopted by governments ranging from unconstrained freedom to exploit the environment (do nothing) to a total ban on the offending activity. In the face of the evidence available, the "do nothing" option is untenable. The total ban option can, apart from the problems associated with noncompliance, result in lower social welfare because a resource with low opportunity cost is not used and a resource with a higher opportunity cost has to be used in its place. The case can also arise where a total ban imposes a higher one on society, for example, appropriate management of a forest including fire breaks can reduce the extent of forest fires.

The optimum point in the spectrum is, however, not fixed and will depend upon such variables as income per capita, cost competition, price levels, interest rates, "sovereign rights" and knowledge of risks faced.

To a country with low income per capita the prospect of substantial earnings from the export of

hydro-electric power is likely to divert attention away from the environmental effects of constructing the dam; in a country facing strong cost competition in export markets there will be a tendency to pay less attention to the environmental impact of producing the export commodities; to a country which is struggling to achieve economic growth and development, pressure to improve environmental standards from countries which in the past have polluted their own environments and are currently producing much higher absolute levels of pollution than the struggling country are viewed as infringements on sovereign rights to exploit their own resources; to a country with high real interest rates there is a reduced incentive to take into account the longer-term environmental effects of current activities.

Consequently, there is no agreed basis by which environmental standards can be set. In the face of the evidence available, there is clearly cause for concern and action required. Such concern was expressed and action taken by the Commission in resolution 267(XLIV) "The adoption and implementation of the principle of environmentally sound and sustainable development in the Asian and Pacific region".

Since 1985, ESCAP has published in the Environment and Development Series *Guidelines* for undertaking environmental impact assessments (EIA) in various areas, including transport, water resources, industrial, agricultural and mining development as well as separate publications on tourism and ports.

The primary purpose of these *Guidelines* is to assist government agencies concerned with environmental protection in the developing countries in the planning and carrying out of environmental impact assessments (EIAs) for water resources development (WRD) projects. The *Guidelines* are prepared with the basic assumption that the objective and use of EIA is as a planning tool and that the environmental planning should be incorporated in the initial stages of project planning and integrated with other planning and implementation steps. In other words, the EIA is used for planning, implementing and monitoring environmental management measures to minimize, to an acceptable level, the adverse environmental impacts of a project and, where possible, to enhance beneficial impacts.

Table II.1 Selected environmental effects of infrastructure

Infrastructure item	Air	Water resources	Land resources	Solid waste	Noise	Risks of accidents	Other impacts
TRANSPORT MODE							
MARINE AND INLAND WATER TRANSPORT		Modification of water systems during port construction and canal cutting and dredging	Land taken for infrastructure; dereliction of obsolete port facilities and canals	Vessels and craft withdrawn from service (scrapping of vessels)		Bulk transport of fuels and hazardous substances	
RAIL TRANSPORT			Land taken for rights of way and terminals; dereliction of obsolete facilities	Abandoned lines, equipment and rolling stock	Noise and vibration around terminals and along railway lines	Derailment or collision of freight carrying hazardous substances	Partition or destruction of neighbourhoods, farmland and wild life habitats
ROAD TRANSPORT	Air pollution (CO, HC, NO _x , ¹ and fuel particulates ¹ and fuel additives such as lead)	Pollution of surface water and groundwater by surface run off; modification of water systems by road building	Land taken for infrastructure; extraction of road building materials	Abandoned spoil tips and rubble from road works; road vehicles withdrawn from service; waste oil	Noise and vibration from cars, motorcycles and lorries in cities, and along main roads	Deaths, injuries and property damaged from road accidents; risk of transport of hazardous substances; risks of structural failure in old or worn road facilities	Partition of neighbourhoods, farmland and wild life habitats; congestion
AIR TRANSPORT	Air pollution	Modification of water tables, river courses and field drainage in airport construction	Land taken for infrastructure; dereliction of obsolete facilities	Aircraft withdrawn from service	Noise around airports		
ENERGY SOURCE							
COAL	Air pollution; carbon dioxide release leading to 'Greenhouse' effect	Acid rain; impact on water stocks and soil	Mining impact; land taken for infrastructure, mining, transport, and power generation	Ash waste	Noise associated with mining and transport of coal	Increased exposure from large road, rail, sea freight task out of fire, explosions	Creation of carcinogens, disruption of wild life and habitat

Table II.1 Selected environmental effects of infrastructure (continued)

Infrastructure item	Air	Water resources	Land resources	Solid waste	Noise	Risks of accidents	Other impacts
OIL	Air pollution; carbon dioxide release leading to 'Greenhouse' effect	Acid rain; impact on water stocks and soil	Land taken for drilling, well operators, pipelines, refineries and storage, and power generation		Noise associated with transport of oil	Rules of oil spills and refinery etc. fires	Creation of carcinogens and disruption of wild life and habitat
GAS	Carbon dioxide release leading to 'Greenhouse' effect		Land taken for drilling, well operators, pipelines, refineries and storage, and power generation		Noise associated with transport	Highly explosive	Creation of carcinogens and disruption of wild life and habitat
NUCLEAR			Land taken for uranium mining and infrastructure for power generation	Problem of disposal of radioactive waste and contaminated plant		Catastrophic potential if accident occurs	Potential creation of carcinogens
HYDRO		Modification of river flows and water tables	Land taken for storage purposes			Catastrophic potential if dam breached	Disruption of wild life and habitat; relocation of communities

Source: Organisation for Economic Cooperation and Development (OECD), *Transport and the Environment*, OECD, 1988 and ESCAP secretariat.

¹ Carbon monoxide = CO Hydrocarbons = HC Nitrous oxides = NO_x