

Historical Analysis of Canadian & British Collaboration in the Development of Power Projects in India

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ABSTRACT

India's power project is poised to grow at a fast pace in the coming years. This is a crucial stage for the country's economic growth as it had to stain with the changing world. Measures are being implemented and policy is initiated by the state as well as central government for the betterment of the energy sector of India. This paper presents a survey report of power project in India. There are various renewable energy resources like sun, wind, water, ocean, tidal etc. Since independence, the Indian economy has been in the international background. From the many centuries old national environment also played a significant role in the post independence Indian economy. In this context, a need of foreign collaboration was realized to meet the social economic and political situation of the country. The export earnings of the country were insufficient to cope with the expenditure likely to incur for the development of the country including the energy sector. The acceptance of the foreign assistance was the only option left for the economic development of the country.

Key words: Indian economy, energy sector

INTRODUCTION

India has the fifth largest generation capacity in the world with an installed capacity of 152 GW as on 30 September 2013, which is about 4 percent of global power generation. The top six countries, viz., US, Japan, China, Canada, Britain and Russia together consume about 49 percent of the total power generated globally. The average per capita consumption of electricity in India is estimated to be 704 kWh during 2008-09. However, this is fairly low when compared to that of some of the developed and emerging nations such US (~15,000 kWh) and China (~1,800 kWh). The world average stands at 2,300 kWh². The Indian government has set ambitious goals in the 11th plan for power sector owing to which the power sector is poised for significant expansion. In order to provide availability of over 1000 units of per capita electricity by year 2012, it has been estimated that need-based capacity addition of more than 100,000 MW would be required. The development of economic infrastructure requiring huge investments and longer gestation period is the pre-requisite for industrialization and economic development of the newly developing economies like India. Energy being an important ingredient of economic infrastructure and pre-condition for the accelerated pace of economic development, needs huge capital investment in the initial years. In the context of labour-intensive, capital-scare, technologically deficient and industrially under developed Indian economy, it was conceived by Indian leader even before the independence, that economic development cannot be achieved without resorting to foreign, technical and financial resources for the installation of infrastructural projects, in the country as a basic foundation towards the accelerated economic development. Hence, a study of the cost and benefit of changes of foreign collaboration in the development of energy such in India is of considerable importance. This study attempts to analyse the county-wise financial and technical collaboration towards the development of energy sector in India. The main objective of the study is to pinpoint the terms and conditions of foreign collaboration in the development of energy sector as also to assess their contribution in this respect.

CANADIAN COLLABORATION IN ENERGY PROJECTS

Canada has been an important source of financial and technical assistance towards the establishment of several energy projects in India. One of the outstanding features of Canadian assistance has been its generous economic and technical collaboration in basic areas of our economic efforts, including energy sector. Canada Government is extending financial assistance to India in the form of grants, counterpart funds, and loans. While grants were provided under the Colombo Plan since its inception in 1951, 'Counterpart Funds' were made available out of the sale proceeds of Canadian goods and Commodities in India. Although medium term credits provided by the Export Credit and Insurance Corporation (ECIC) during 1960' s for the purchase of energy generates and electrical equipment from Canada were 'source-tied' and 'hard' credit, yet an overwhelming portion of Canadian assistance was made available to India for energy project in the form of long-term development loans channelised through the Canadian International Development Agency (CIDA) on much softer terms than other Western countries and the U.S.S.R. The CIDA loans were interest free and repayable over a period of 50 years inclusive of grace period of 10 years, while the ECIC credits carried on interest of 6 percent per annum and were repayable over 20 years.'

Canada not only provided financial and technical assistance to India for strengthening the energy base of the economy for its future economic progress but also extended training facilities to Indian personnel responsible for operating the Canadian Collaborated energy projects. Since 1995, when Canada participated in the construction of a hydro-energy station in India, over 1100 Indian engineers have received training in Canada and more than 200 Canadians have worked in India on different project in various parts of the country.

Canadian assistance in energy projects dates back to 1995 when Canada offered technical know-how and financial collaboration for the construction of Mayurakshi Hydra-Electric Energy Project in district Birbhum of West Bengal. Canada extended \$2.3 million (Rs.16 million) grant for the purchase of energy equipment from Canada, and also made available to India \$15 million (Rs. 67 million) as counterpart funds to meet the construction costs of the projects within the country. The Canadian collaborated energy project of 400 KW. Capacity supplies energy to cottage and small scale industries in West Bengal and Bihar. The construction of Mayurakshi Hydro-electric energy project, besides controlling the disasters arising out of floods, has facilitated irrigation of 610 thousand acres of farm land in West Bengal and Bihar.

Canada provided a grant of Rs. 11 million (\$ 1.6 million) for financing the imports of electrical equipment, engineering services and training of technical personnel in Canada in respect of Umtru Electric Energy Project in Meghalaya. This project was financed by Canada under the Colombo Plan. The Montreal Engineering Company Limited, an internationally known Canadian enterprise, provided consultancy services for the Umtra hydroelectric project since its construction be gain in 1995 till its completion in 1968. The Umtra hydro-electric project is located in the United Kashi and Jaintia Hills district and supplies energy to a fruit canning and preserving industry, a beverages factory as well as provides irrigation to agricultural in Meghalaya.

Canada also provided both technical and financial assistance for the construction of Kundah Hydro-Electric Energy Project in Kerala. The project of located on the eastern side of the Nilgiri Hills in Kerala and supplies energy to the industrial economy of Tamil Nadu. The Montreal Engineering Company Limited, a world renowned Canadian enterprise, made feasibility report in 1995 on the Kundah Hydro-Electric project of the then Madras State Electricity Board. The Company continued its consultancy for the construction of all the five stages of this project, which was completed in 1964. Canada extended a grant of \$ 43 million (Rs. 301 million) to India for financing the imports of technical and engineering services, generating and transmission equipment from Canada. The grant also covered the training of technical personnel in Canada. Besides the above grant, Canada also provided long term loan of Rs. 27.6 million to India for financing the import of energy equipment from Canada for the Kundah hydro-Electric project in 1973. This loan was extended on very soft terms, bearing a marginal rate of interest of 3/4 percent and repayable over a period of 50 years. Canada, further provided \$ 51.5 million (Rs. 258 million) in counterpart funds, to be used.

For financing the purchase of indigenous equipment and meeting the local construction costs of the Kundah Hydro-Electric energy project. Before completion of Kundah hydro-electric project in 1964. Tamil Nadu's industrialisation was severely hampered by a energy shortage. Besides speeding up industrialisation and providing employment to millions of people in Kerala and Tamil Nadu, this project has also contributed to the increased agricultural production in these states.

In Idikki Hydro-Electric Energy project in the Periyar Valley in Kerala, is another Canadian collaborated three state energy project with 780 megawatt capacity. The project is located in the Western side of Nilgiri Hills in Kerala, it is biggest hydro-electric scheme in South India. The construction work started in 1966 and was largely financed by Canada. Canada provided two long term development loans to India for financing the imports of energy generating equipment and switch-gears for the stage I and II of the project in question. The first loan of \$ 11.85 million (Rs. 76.3 million and the second loan of Rs. 34.7 million were provided by Canada vide to agreement signed between two countries on October, 1967 and June, 1972. Canada has extended another loan worth (Rs. 360.8 million) in February, 1981, for the construction of the third stage of this project. These loans were free from any interest or service charges and were repayable over a period of 50 years with no payments during the 10 years.

Besides providing these loans, Canada provided a grant of \$ 5 million (Rs. 37.5 million approx) to India for providing the engineering and consultancy services for Canadians, training of operational personnel in Canada and construction equipment.

In addition to these loans and grants, Canada also provided a sum of \$ 43.3 million (Rs. 324.75 million approx.), representing counterpart funds (grants out of sale proceeds of Canadian goods in India) for financing the construction cost and the purchases of equipments in India.

A letter was exchanged with CIDA raising grant assistance regarding Idukki mini hydro-electric project Phase II dated 8 September, 1986 from (\$ 7.3 million to C\$ 8.3 million. On 12th April, 1998 a letter was further exchanged with CIDA raising the grant assistance for Kerala/System improvement project (Idukki-II) from C\$ 8.3 million to C\$ 11.5 million. Idikki Hydro-Electric energy project has benefited Kerala not only in its Spudier industrilisation for increased employment but also irrigates 60,700 hectares of agricultural land for increased agricultural production. Moreover, this project has helped in improving navigation on the Mavottupuzh river and has increased tourist trade in kerala.

Two hydro-electric energy projects were build in collaboration with Canada in Rajasthan. On December 4,1963, Canada provided a loan of Rs. 31.2 million (\$8 million) to cover the imports of Canadian energy plant and substation equipment and engineering services by Canadians for the construction of 172000 KW capacity Rana Pratap Sagar Hydro-electric energy project in Kota district of Rajasthan. This loan was chanalised through the Export Credit and Insurance Corporation (ECIC) and was made available to India at 6 percent interest per annum and was repayable over a period of 20 years, starting four years after it was made. Montreal Engineering Company Ltd. (MEC) of Canada was engaged as consultant for the selection and purchases of equipment for the Rana Pratap Hydro-Electric project.

The Canada, under an agreement signed between India and Canada on February 19,1965, undertook to assist India in the construction of Jawahar Sagar Hydro-Electric Energy Project (erstwhile called Kota Hydro-Electric Energy Project) with an installed generating capacity of 99,00 K.W. Canada provided another export loan of \$ 1.6 (Rs. 24. million) to India for the purchase of hydro-generators, related electrical equipment and engineering services from Canada towards the construction of Jawahar Sagar hydro-electric energy project in Kota in Bundi District. This loan was provided by the Export Credit Insurance Corporation (ECIC) of Canada at 6 percent interest per annum repayable over 20 years, starting four years after it was made. Jawahar Sagar Hydro Electric Energy Project supported the industrial and agricultural requirement of energy in Rajasthan. These two hydro-electric energy project have assisted Rajasthan harness its hydro-electric potential in order to supplement the pace of industrialisation in the state.

Due to irregular rainfall constituting a major limitation on Rajasthan hydro energy resources, the

Government of India decided to set-up its second nuclear energy project comprising of two atomic reactors of 440 thousand Kilowatts on the banks of Rana Pratap Saga Lake near Kota in Rajasthan. For the construction of Rajasthan Atomic Energy project with an installed generating capacity of 440,000 Kilowatts, Canada provided India with nuclear technical know-how and equipment. Montreal Engineering Company Ltd. of Canada provided consultancy services for this project. The company with high engineering capabilities, was entrusted with the responsibility of designing, construction and supervision of the entire project. The company has contributed a lot to India towards the construction of new atomic energy projects in the country. It was this Canadian enterprise which alarmed India against the dependence on imported enriched uranium and advised for the installation of natural uranium fueled heavy water moderated. The nuclear reactors form part of a major venture in Indo-Canadian collaboration which also includes the Canada-India Reactor at the Bhabha Atomic Research Centre, Trombay. For the construction of Unit-I of this project, a credit of Rs. 319 million (\$ 41.5 million) was made available by Canada through the Export Credit and Insurance Corporation. For financing the equipment and technical service from Canada towards the construction of Unit II of this project second credit of Rs. 270 million (\$ 38.5 million) was channelised by Canada through the Export Credit and Insurance Corporation. Both the above two credits of 6 percent interest per annum were repayable over a period of 20 years, no payment during the four years. Out of the total amount of Rs. 59 million under the above mentioned Canadian Credits, Rs. 499.6 million were utilized by India for the construction of this project. Besides the source tied export credits as detailed above, Canada also provided a sum of \$ 29.6 million (Rs. 207 million) by way of counterpart funds to India to meet the local costs of this project.

Canada provides a loan worth Rs. 208.1 million for financing the development of energy projects under construction in India. This loan was channelized through the Canadian international Development Agency (CIDA) on the similar terms and conditions cited above. A peculiar feature of this loan is that it is not tied to a particular energy project, and so it is at the option of India to use it for the development of energy projects being taken up on priority basis.

In the field of nuclear research, Canada's contribution towards the 40 MW Canada-India Reactor (CIRUS) at Bhabha Atomic Research Centre, Trombay was \$ 10.8 million (Rs. 77 million) grant counterpart funds of \$13 million (Rs. 58 million). This is one of the two experimental nuclear reactors, presently in operation at Trombay, the other being of one Megawatt. The Canadian Collaborated experimental reactor has been used for the development of nuclear fuels since it went into operation in 1960. Canada was responsible for the design and supply of this reactor including the containment shell and principal ancillary equipment. Canadian engineer supervised the creation of this reactor. This experimental reactor has helped the Department of Atomic energy to develop two 235 MW nuclear reactors for the Madras Atomic energy to develop two 235 MW nuclear reactors for the Madras Atomic Energy Project at Kalpakham near Madras, and two 235 MW nuclear reactors for the Narora Nuclear Energy Project near Aligarh in Uttar Pradesh. These atomic energy projects would be based on natural uranium available in India. The above mentioned Canadian Collaborated experimental nuclear reactor has contributed tremendously in the development of nuclear fuels and cooling systems for energy reactors in India.

Canada again came forward to collaborate with India towards the establishment of a consultancy enterprise for nuclear energy project in India. Montréal Engineering International Limited (MEIC) incorporated in India in 1967, is a Indian Company with a majority Indian holding and participation by Montreal Engineering Company Limited (MECL) of Canada. The Indian Company is a consultancy for nuclear energy project of the Department of Atomic Energy (DAE) of the Government of India, and provided engineering services for the Rajasthan, the Madras Atomic Energy Project and the Narora Atomic Energy Project as well as for the Heavy water projects.

Table 1.1 : Canadian collaboration in the development of energy projects

Name of Project	District and State	Install capacity (MW)	Canadian Assistance (Million Rupees)				Terms of Loan/Credit (Rate of interest per annum and repayment period)	
			Loan	Grant	Counter Parts funds	Total		
Mayurakshi Hydro-Electric Energy Project (D.V.C.)	Birbhum, West Bengal	4	-	16.0	67.00	83.00	nil	-
Umtru Hydro-Electric Energy Project	United Kashi & Jantia Mills, Meghalaya	54	-	11.0	-	11.0	nil	-
Kundah Electric Energy Project	Nilgiris, Tamil Nadu	555	27.6	301.0	258.00	586.6	nil	50 yrs.
Idikki Hydro-Electric Energy Project	Idiki, Kerala	780	437.1	76.0	324.75	837.75	nil	50 yrs.
Rana Pratap Sagar Hydro-Electric Energy Project	Kota, Rajasthan	172	31.2	-	-	31.20	6%	20 yrs.
Jaahar Sagar Hydro-Electric Energy Project	Bundi, Rajasthan	99	24.7	-	-	24.70	6%	20 yrs.
Rajasthan Atomic Energy Project	Kota, Rajasthan	440	499.6	-	-	449.60	6%	20 yrs.
Nuclear Reactor (CIRVS) at Bhabha Atomic Research Centre, Trombay	Trombay Maharashtra	48	-	770	58.00	131.00	-	
Development Loan for Energy Sector, 1981	-	-	208.1	-	-	208.10	nil	50 yrs.
Chamera Hydro-Electric Energy Project	Chamba, Himachal Pradesh	540	374.3	-	-	374.30	9.5%	16 yrs.

Source: Compiled from RBI Report on currency and finance for 2013-14.

The Table 1.1 indicates that a generous portion of financial assistance for the development of Energy Project came from Canada. As at the end of 1984 Canada extended Rs. 1188.75 million grant for energy projects as against a loan assistance of Rs. 106.6 million, which means that more than 42 percent of Canadian assistance came to India in the form of grants. It is also discernible from Table 1.1 that like the USA, Canadian assistance has also undergone great changes. During the first two plan periods technical and financial assistance from Canada towards the development of hydro-electric energy projects came to India mainly in the form of outright grants, during the 1960' s Canadian assistance for the construction of energy projects in Rajasthan took the form of 'hard' credits. Since mid-1960's it become more generous and softer in terms and conditions that assistance provided by USA and USSR. Canadian Collaboration has contributed much towards the development of hydro-electric and irrigation projects in India, and more specifically, towards the development of indigenously available nuclear fuelled atomic energy project.

BRITISH COLLABORATION IN ENERGY PROJECTS

British is another Western European country collaborating with India in the development of energy projects. The Government of U.K. is extending financial assistance to India in the form of long term loan upto 1975 and thereafter in the form of grants through Aid India Consortium. During the Second Five-Year plan period the terms and conditions of British assistance have been very hard in so far as the rate of interest on British loans to India was very high. The rate of interest varied from 5 to 10 percent per annum while the repayment period varied between 10 to 20 years. Since the beginning of the third Plan, the terms of British loans of India have progressively softened and now they are repayable over a period of 25 years with a grace period of 7 years. Following the consortium meeting held on June 5, 1963, the U.K. Government waived payment of interest for the first seven years for loans made in 1963-64 and thereafter. Commencing with the General Purchase Loan Agreement signed on October 20, 1965, no interest is payable on British Loans. Thus, from June 1965 all British loans to India were interest free and from June 1975 onwards all British assistance came to India in the form of outright grants.

It is evident from Table 1.2, the U.K. extended a loan of Rs. 58 million for the Calcutta Electricity Supply Corporation's Titagarh Thermal Energy Project (240 megawatt of installed energy generating capacity) in Burdwan district of West Bengal.

Table 1.2 : The U.K. Financed Energy Project in India

Name of Project	State	Installed Capacity (M.W.)	Amount Financial Assistance (Rs. Million)	Interest P.A.	Terms of Credititions Amortisation Period	Moratorium Period
1965 Titagarh Thermal Energy Project	West Bengal	240	58.0	6.5	25 years	5 yrs.
1970 Durgpur Thermal Energy Project	West Bngal	350	13.3	6.5	25 years	5 yrs.
1975 Nagar Junasagar Hydrel Energy Project	Andhra Pradesh	810	921.0	Grant	-	-
1980 Bandel Thermal Energy Project	West Bengal	530	361.0	Grant	-	-
1985 Kolaghat Thermal Energy Project	-	420	902.3	Grant	-	-
1990 For the Development of Energy Project	-					
1995 Rihand Energy Project	Uttar Pradesh	1000	290.87	Grant	-	-
2000 Balco Captive Energy Project	N.A.	-	508.53	Grant	-	-
2005 Nagar Junasagar Energy Project	Andhra Pradesh	810	231.0	Grant	-	-
2010 H.B.J. Pipeline-Gas Turbine Compressor	-	-	133.32	Grant	-	-
2013 Uri Hydro-electric Energy Project	J. & K.	480	438.60	Grant	-	-
Total			3721.90			

Source: 1. RBI Report on Currency and Finance 2013-14.

This loan carried on interest of 10 percent per annum and was repayable over a period of 25 years, including a grace period of 7 years. On similar terms U.K. extended a loan of Rs. 13.3 million for financing the imports of gas turbines and boilers for the West Bengal Electricity Board's Durgapur Thermal Energy Project. Besides these two exclusive loans for energy projects provided by U.K. Government in the year 1964, the U.K. has also financed the imports of crucial maintenance items for energy project throughout India, under various 'Maintenance Loans' extended by the U.K. to India so far. Under various Indo-UK Mixed Projects Loans' the U.K. Government extended financial assistance to India for importing energy equipment from the U.K. for Bhakra NagaI Hydel Project (Punjab), Neyeli Thermal Energy Project (Tamil Nadu), Sharavathi Hydro Electric Energy Project (Karnataka) and Ahemdabad Thermal Energy Project (Gujarat). The U.K. Government also extended a total of \$ 50 million (Rs. 925 million) to India in the form of grant assistance for financing the imports of hydro-generating units for the Nagar Junasagar hydro-electric Energy Project in Andhra Pradesh and gas turbines for the Assam State Electricity Board.

Under an agreement signed in 1955, the Associated Electricals Industries Limited of the U.K. were appointed consultants for the construction of Bhopal Heavy Electricals Limited under Bharat Heavy Electricals to meet the domestic needs for electrical equipment. The Associated Electricals Industries Limited (AEIL) was responsible for the design, layout and construction of the Bhopal factory, procurement of initial plant, machinery and equipment and the implementation of a training scheme. Under the advice of the AEIL a training school was set up in Bhopal first step towards the establishment of Heavy Electricals Plant at Bhopal. Several thousands of artisans and engineers of all grades were trained at this school. Besides this about 450 Indian engineers were trained at AEIL's factories in the United Kingdom. The U.K. Government has under the Colombo Plan Technical Cooperation Scheme, also arranged and financed the training of same 30 Indian engineers in Britain for the Bhopal heavy Electricals Plant. The U.K. Government also provided technical assistance to India under the above scheme through the deputation of 11 British engineers to assist the operation of the factory.

For the purchase of plant, machinery and other equipment for the first phase of construction of heavy electricals plants in public sector at Bhopal, a credit of about Rs. 40 million was arranged by five British Banks, viz., Morgan Grenfell, Barchays, Glyn and Company, Midland and Westminster. Besides this, U.K. Government also provided loans totalling over \$29 million (Rs 522 million, at post devaluation rate of exchange) for financing the imports of requisite plant, machinery and other equipment from Britain. British Capital investment in bringing up the Bhopal Heavy Electricals Limited at Bhopal has been over Rs. 700 million.

British Capital investment in bringing up the Bhopal Heavy Electricals Limited at Bhopal has been over Rs. 700 million. Since its commissioning in July 1960, Bhopal Heavy Electricals Limited has emerged as an important Public sector heavy electricals producer and its engaged in the production of hydro and thermal generating plants, transformation and capacitors. It undertook to supply 15000 KV A capacity transformers for Delhi Electric Supply Undertaking, 40,000 KV A capacity transformers for the Dhuvaran Thermal Energy project in Gujarat, 37,50, KV A Capacity transformers for Obra Thermal Energy Project in Uttar Pradesh, 50,000 KV A capacity. transformers for Damodar Valley Corporation and Calcutta Electric Supply Corporation in West Bengal, and 7500 KV A capacity energy transformers for Talcher Thermal Energy Project in Orissa. It also supplied 1,75,000 KV A capacity transformers for the D.V.C.'s Chandrapura Thermal Energy Project in Bihar.

U.K. has also financed some other important projects related to the development of energy sector in India. These include Hindustan Cables Limited and the A.B.V. Boilers Ltd. at Durgapur in West Bengal. U.K. firms entered into financial and technical assistance with public and private sector undertakings engaged in the manufacture of electrical equipment and machinery in India. Table 1.6. shows the Indo-British industrial collaboration in respect of the production of energy generation and transmission equipment in India.

It may be seen from the Table 1.3 that U.K firms of repute are not only providing technical assistance to public and private enterprises engaged in the manufacture of equipment for energy generation, transmission and distribution, but has also provided finance either in the form of Plant and Machinery or in the form of cash. The terms of these industrial assistance have differed from case to case and a full-fledged study to arrive at some specific conclusion in this respect is still required. Certain aspects of foreign industrial collaboration have already been attempted in the proceeding paper.

TABLE -1.3

INDO-BRITISH INDUSTRIAL COLLABORATIONS: ELECTRICAL ENGINEERING INDUSTRY

Name of Indian Firm	Name of British Firm	Item of Manufacture under collaboration	Nature of Collaboration
M/s ACC- Vickers Babcock Ltd., Bombay	M/s Babcock Wilcox Ltd., London	Steam Generating and Ancillary Equipment	F + T
M/s Bharat Heavy Electricals Ltd., Hardware/Bhopal/Hyderabad	M/s English Electric Company Ltd.	Turbogenerating Sets	T
M/s Brent Ford Electric (India) Ltd. Kolkata	M/s Brent Ford Company	Voltage regulator and transformers	T + F
M/s Khirloskar Electric Co. Ltd., Bangalore	M/s Bursh Electric Engg. Ltd.	Large Size alternators	T
M/s Hack Bridge Hewithie & Easum Ltd., Madras	M/s Bursh Electrical Engg. Ltd.	Energy Transformers	T +F
M/s General Electric Co. of India Ltd., Kolkata/Allahabad	M/s General Electric Co., London	Transformers	T + F
M/s Jyoti Ltd., Baroda	M/s Allen (Overseas) Ltd.	Alternators	T
M/s Crompton Greaves Ltd.	M/s Brush Transformer Ltd.	Transformers	T
M/s B.H.E.L., Hyderabad/Bhopal	M/s G.E.C., E.E.C. and A.E.I.	Energy Generating equipment	T

Notes: T = Technical Collaboration, F = Financial Collaboration

Source: Ministry of Industry, D.G.T.D., Handbook of Foreign Collaboration 2014

Under the bilateral assistance, the Government of U.K. also provides on selected project basis, additional tied grant know as Aid and Trade Provision (ATP). Such tied grants are available for projects of special interest to U.K. and covers only a part (about 35%) of the U.K. goods and service. Such grants has been provided by U.K. Government in Uttar Pradesh, Balco Captive Energy Plant' (33 million Pound), Nagrjunasagar Energy Project (12.9 million Pound) in Andhra Pradesh, H.BJ pipeline - Gas Turbine Compressor (6.05 million Pound) Uri Hyro-electric Energy station (17.2 million Pound) in Jammu & Kashmir. Major projects financed under technical assistance are quality assurance and system stabilization for NTPC, commissioning of 500 MW Thermal Energy Station, National Capacity Thermal Energy Station, Kanpur distribution system and Rihand Super Thermal Energy Station. It is, thus, clear that besides the financial and technical assistance made available by the U.K. at the official level, direct British investment have also played an important role in the development of energy project in India.

From the foregoing survey of Indo-British of Indo-British collaboration in the development of energy projects in India. It becomes apparent that while in the early years the U.K. financial assistance energy projects has been on hard term and conditions, it gradually softened its terms of lending until the waiver of interest in June, 1961. From June 1975 the entire economic and technical assistance for the development of energy projects has been in the form of outright grant. This has considerably lessened the perpetuating strain on India's balance of payments position.

CONCLUSION

From the more important findings of the foregoing survey of Indo-Foreign collaboration in the development of energy projects in India, it is unavoidable to conclude that India has substantially gained in terms of economic infrastructure inevitable for her attempts towards rapid industrialization and economic development of the national economy. The USA and West European countries hold a lion's share towards the development of a series of energy projects in India. The USSR and other East European countries have also collaborated in the development of energy project in India on the mutually beneficial basis, while the World Bank and International Development Association substantially contributed in the development of energy projects in India. Among other Asian and Oceanic countries, Japan and the Arabian Oil Producing countries have helped India in the setting up of energy projects. While the terms of the former have been hard, the latter has offered financial assistance on softer terms to meet the imports costs of the related energy project in India.

Most of the USDA and West European financial and technical assistance towards the development of energy projects in India has been repayable in foreign currencies bearing a direct adverse impact on our balance of payments. The same has been the case of Japan and the Arabian Oil producing countries. Conversely, the USSR and other East European countries extended financial and technical assistance to India in respect of energy projects in terms of rupee payment having definite advantage over those repayable in foreign exchange currencies in so far as the former did not exert any strain on our balance of payments.

Another important feature of foreign collaboration in respect of the development of energy projects in India has been that excepting the World bank, the International Development Association, Asian Development bank and the Arab countries, the greater portion of the capital assistance has been source-tied, which imposed restraints of India's freedom to purchase in the cheapest market or in the market chosen by India in accordance to her economic policy. This characteristic feature of foreign collaboration has been a significant cause for distortions or dislocations of our foreign trade. However, it is different to detect source-tying as it operates in a variety or ways like through contract agreements, trade agreement, etc. The most important motive for tying is the collaborating country's desire to penetrate into the Indian market in order to create long-term trade ties. Source-tying has definitely imposed additional costs burden on India in so far as the prices charged by the collaborating countries in respect of electrical and other equipment imports related the development of several energy projects has been higher by 10 to 15 percent compared with prices in open International market. This has but aggravated the mounting debt burden of India. On the whole, foreign collaboration has proved fruitful towards the development of energy projects in India, when viewed in the context of financial and technological gaps that existed in the country and the contribution of these Projects towards the accelerated industrial and economic development of the country.

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