

## CHAPTER-3

# Planning for expansion of Manufacturing Capacity

### 3.1 Planning by BHEL

BHEL took up (2004-06) 18 schemes during X Plan, for expansion including modernisation of its manufacturing capacity from 6,000 MW to 10,000 MW per annum (Phase-I) for completion in December 2007. Recognizing the need for further capacity augmentation of its manufacturing facilities, BHEL constituted (July 2006) a Task Force<sup>11</sup> to reassess the capacity available after implementation of ongoing expansion/modernisation schemes of X Plan and to recommend further capacity augmentation needed as per the requirements of XI and XII Plans. Based on the recommendations of the task force<sup>12</sup>, feasibility reports for 17 capacity augmentation schemes for increase in capacity from 10,000 MW per year to 15,000 MW per year (Phase-II) in XI Plan were approved by the Board of Directors (between January 2007 and September 2008) at a total cost of ₹ 3144.60 crore. The schemes were to be implemented by December 2009. As regards capacity expansion for XII Plan, the Board of Directors, based on the feasibility reports received from units, further approved (June 2009) five capacity expansion schemes of 5,000 MW (*i.e.* Installed Capacity from 15,000 MW per annum to 20,000 MW per annum referred to as Phase-III by BHEL) to be implemented by December 2011 at a total cost of ₹ 1592.81 crore. All the capacity expansion schemes of Phase-II and Phase-III were declared completed by BHEL in March 2011 and March 2012 respectively. Expenditure on these schemes was funded by BHEL from its internal resources.

Audit observed the following relating to the planning of the capacity expansion by BHEL:

**(i) Adequacy of preparedness for capacity expansion in XI and XII Plans**

X Plan (2002-07) envisaged a power generation capacity addition of 41,110 MW in the country.

BHEL, planned the manufacturing capacity addition during X Plan from 6,300 MW per annum to 10,000 MW per annum (Phase-I) during 2004-06 for completion up to December 2007. This capacity addition was declared completed in December 2007.

While CEA had identified power generation capacity addition requirements of 67,439 MW for XI Plan in November 2003 itself, the Task Force was constituted by BHEL only in July 2006. BHEL decided during January 2007 to September 2008 to increase manufacturing

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<sup>11</sup> Task force consisted of 10 AGMs/ Sr. DGMs of HEP-Bhopal, HPEP-Hyderabad, HPBP-Trichy TP-Jhansi, BAP-Ranipet, EDN-Bangalore, Marketing wings (Power Sector, Industry Sector and International Operation) and Corporate office. The GM, HEEP -Haridwar was its Chairperson.

<sup>12</sup> Reviewed by another committee in June 2008.

capacity from 10,000 MW per annum to 15,000 MW (Phase-II) to be completed by December 2009. BHEL declared completion of Phase-II capacity addition programme in March 2011.

Thus, the manufacturing capacity expansion, which was required to be planned and completed in the initial years of XI Plan, was declared to have been completed by BHEL only towards the end of the Plan. A 'White Paper' on Strategy for XI Plan prepared (August 2007) by CEA and Confederation of Indian Industry (CII), stated that dismal performance of 'Thermal Power' segment at 47.6 *per cent* in achievement of X Plan targets of power generation capacity addition was mainly due to the fact that most of the coal based backup projects did not fructify because of supply constraints on the part of power equipment manufacturers, especially BHEL. The 'White Paper' recommended augmentation of existing indigenous manufacturing facilities and creation of additional capacity by new players for main plant equipments. Working Group on Power constituted by Planning Commission for XI Plan also recorded (February 2007) that there was delay in supercritical technology tie-up by BHEL for manufacturing of six units of 660 MW each to be taken up by NTPC Limited. This resulted in non-commissioning of these projects in X Plan as originally envisaged.

The order booking position of BHEL *vis a vis* the available manufacturing capacity to execute orders is summarized in Table 5. This would indicate that BHEL did not have enough capacity to execute the orders available and booked during 2007-11.

**Table 5**

Year	Orders Booked	Available manufacturing Capacity	Orders booked in excess of available capacity
	In MW	In MW	In MW
2007-08	16,639	9,675	6,964
2008-09	19,545	10,632	8,913
2009-10	20,949	10,632	10,317
2010-11	18,367	15,490	2,877
2011-12	3,934	15,490	(-)11,556

Ministry of Power, GOI encouraged supply of power equipments for mega power projects by foreign suppliers by abolishing (October 2009) price preference of 15 *per cent* to CPSEs on tariff based competitively bid power projects. This was in addition to the incentive of 'Nil' customs duty on supplies of power equipment for mega power projects since May 1999. Parallely, a Committee under the chairmanship of Shri Arun Maira, Member (Industry), Planning Commission (Maira Committee) was constituted (October 2009) by Planning Commission to examine and suggest options and modalities to take care of disadvantages suffered by the domestic power manufacturers keeping in view factors like 'Nil' customs duty and withdrawal of 15 *per cent* price preference to CPSUs. Maira committee in its report (February 2010) stated that domestic manufacturers suffered disadvantages to the tune of around 14 *per cent* on account of Sales tax/VAT (5 to 6 *per*

cent), higher financing cost (2.4 to 3.2 per cent), low customs duty on foreign competitors' supplies (5 per cent) and lack of quality infrastructure and dependence on foreign sources for critical raw materials and components. Based on the active initiative taken by BHEL and deliberations in the Committee of Secretaries on the Maira Committee report, a uniform import duty comprising 5 per cent basic customs duty, 12 per cent countervailing duty (CVD) and 4 per cent special additional duty (SAD) was imposed with effect from September 2012 on power equipment imported for mega power projects as well as other power projects. The results of these fresh measures taken by GOI on recommendations of Maira committee remains to be seen. Thus, considering the specific supply constraints on the part of BHEL identified by CEA and changed business environment that facilitated entry of private players in the market, there was a need for BHEL to have a timely relook at its preparedness for XI Plan for capacity augmentation. Further, BHEL also lagged behind its competitors on account of (i) delay in acquiring technology for manufacturing supercritical power equipment, (ii) delivery constraints, and (iii) higher manufacturing cost as discussed subsequently in Chapters 5 and 6.

Management stated (April 2013/ September 2013) that:

- The XI Plan target was firmed up by the Government only in 2007, though certain preliminary indications could have been available in November 2003. The decision for manufacturing capacity expansion was taken by BHEL only after definite policy initiatives and rational indications in the business enhancement were visible to provide sufficient assurance for future opportunity on sustainable basis.
- BHEL's scope of work in a power project is only 45 per cent as it mainly supplies Boiler-Turbine-Generator (BTG) as demanded by the power generation utilities. The other 55 per cent is on account of Balance of Plant (BOP) like ash handling, coal handling plants, etc. and civil works which are in project developer's or others' scope. Invariably delays in the 55 per cent segment are also attributed to BHEL.
- From 2007-08 onwards, there were other private sector organizations which announced the formation of Joint Ventures for setting up additional manufacturing base in this country, such as Alstom-Bharat Forge, L&T-MHI, JSW-Toshiba, etc. Price preference to domestic suppliers was available till December 2009. In spite of such benefits, other domestic suppliers preferred a 'wait and watch' approach as enough opportunities were not available. Only BHEL took initiative of capacity addition to meet country's capacity addition requirement.
- Maira Committee had concluded that the domestic industry conservatively faced a disadvantage of 14 per cent compared to imports. The Committee of Secretaries

had recommended 5 per cent basic customs duty, 12 per cent countervailing duty and 4 per cent special additional duty. The recommendation was implemented only in September 2012. Imposition of customs duty by Government on power equipment, which was required to take place simultaneously with withdrawal of price preference in December 2009, actually took place in September 2012, during which period lot of business was lost to foreign suppliers due to disadvantages faced by BHEL. Further, Maira committee had recommended basic customs duty of 10 per cent, CVD of 'Nil' and SAD of 4 per cent. Therefore, even after the imposition of 5 per cent customs duty, 12 per cent CVD and 4 per cent SAD in September 2012, the disadvantage still continued and the matter was being pursued with the Ministry.

While the calculations provided by the Management indicated that there may be a likely overall disadvantage to domestic manufacturers after considering higher financing cost (2.4 per cent) and Sales Tax (5 per cent), the reply of the Management is to be viewed against the following facts:

- When the issue was discussed in the second exit conference (September 2013) the specific details of definite policy initiatives and rational indications of business enhancement in the country that were considered by BHEL to decide the timing of their capacity expansion plans were not made available to Audit. It is reasonable to assume that professional approach would demand that capacity addition requirement should be identified as early as possible for ensuring smooth convergence with tentative XI Plan targets which were available and known in November 2003 itself.
- This performance audit report is regarding adequacy of planning for capacity augmentation of power equipment (Boiler-Turbine-Generator) manufacturing and delivery by BHEL, which is covered generally within the stated 45 per cent of total scope of work of a project and is well within the control of BHEL. Audit observed delay on the part of BHEL in delivery of equipment even within its scope of work as discussed in para 6.1 subsequently.

**(ii) *Planning excess capacity compared to requirement***

Audit observed that even after considering the targets set by itself, BHEL planned its manufacturing capacity (particularly in thermal sector for XII Plan) much in excess of projected market share as depicted in Table 6:

Table 6

(Figures in MW)

Category of capacity addition	Power equipment manufacturing capacity requirement of country for utility segment as per		Expected BHEL's Market share to utilise manufacturing capacity on the basis of assumption of Task Force/ Committee.			Manufacturing Capacity Planned by BHEL for utility segment <sup>13</sup>		Excess manufacturing capacity planned by BHEL	
	XI Plan	XII Plan	Percentage	XI Plan	XII Plan	XI Plan	XII Plan	XI Plan	XII Plan
Thermal	46,114	44,500	78	35,969	34,710	36,469	62,898	500	28,188
Hydro	17,189	30,000	51	8,766	15,300	11,250	11,250	2,484	(-) 4,050
Nuclear	3,160	12,000	50	1,580	6,000	2,508	3,150	928	(-) 2850
<b>Total</b>	<b>66,463</b>	<b>86,500</b>		<b>46,315</b>	<b>56,010</b>	<b>50,227<sup>14</sup></b>	<b>77,298<sup>15</sup></b>	<b>3,912</b>	<b>21,288</b>

Manufacturing capacity for thermal power equipments planned by BHEL would thus, remain underutilized as orders for thermal power equipments required in the country would be around 44,500 MW during XII Plan against production capacity of BHEL of 62,898 MW. Audit observed that capacity augmentation was planned by BHEL based on the assumption of retaining its existing market share of 78 per cent in thermal sector. The basis of this vital assumption despite mounting competition from private players and capacity addition in joint ventures was not indicated in the proposals for capacity augmentation.

Management stated (September 2013) that BHEL had successfully faced international competitive bids and had demonstrated a capability to garner 78 per cent market share in the past.

However, plans, if any, to ensure optimum utilization of surplus capacity were not furnished to Audit.

**(iii) Inadequate capacity expansion planned in supercritical segment**

CEA constituted a Committee in September 2001 to decide on the optimal size of thermal units based on various techno economic considerations. The Committee which *inter alia* included representatives of CEA, Planning Commission, BHEL, NTPC, and State Electricity Boards recommended (November 2003) that higher unit size from 800 MW to 1000 MW should be adopted in the country with super critical technology<sup>16</sup> depending upon site specific techno-economics for deriving maximum efficiency gains. In the XI Plan, Planning Commission also envisaged generation capacity addition of 8200 MW through

<sup>13</sup> After excluding capacity for (i) captive power plants, (ii) international operations and (iii) Renovation & Modernisation /bunching of orders.

<sup>14</sup> Worked out on the basis of existing capacity of 10,415MW taken into account from 2007-08 to 2009-10 and enhancement of capacity to 15,500 MW taken into account from 2010-11 to 2011-12 as recommended (March 2007) by the Task force i.e. (10415\*3+13950(90% of 15,500MW) \*2).

<sup>15</sup> Worked out on the basis of capacity recommended (June 2008) by Task Force for XII Plan (90%\* 20,215)\*5).

<sup>16</sup> Supercritical Technology means technology with minimum steam parameters at steam turbine inlet with main steam pressure 247 kg/sq cm main, steam temperature as 535 degree Celsius and reheat steam temperature as 565 degree Celsius.

supercritical technology out of total thermal generation capacity addition of 46,114 MW for the country.

Considering the emphasis on development of supercritical technology over the next few years, it was necessary for BHEL to plan commensurate capacity expansion in supercritical segment. Manufacturing capacity planned by BHEL for supercritical and subcritical<sup>17</sup> segments *vis a vis* requirement of XI and XII Plan was, however, as per Table 7.

**Table 7**

(Figures in MW)

Category of capacity addition in thermal segment	Manufacturing capacity requirement <sup>18</sup> for the country as per		Manufacturing capacity planned by BHEL and implemented through expansion schemes	
	XI Plan	XII Plan	XI Plan <sup>19</sup>	XII Plan <sup>20</sup>
Supercritical	8,200	31,860	5,280	18,000
Subcritical	37,914	12,640	31,189	44,898
Total	46,114	44,500	36,469	62,898

Planned manufacturing capacity under thermal category for supercritical segment remained less than the requirement during both the Plans whereas capacity under sub critical segment was planned in excess during XII Plan.

Management stated (April 2013/September 2013) that

(a) BHEL had planned for a particular product mix comprising different ratings covering both supercritical and subcritical thermal, gas, nuclear and hydro sets.

(b) Though CEA had indicated that all thermal sets from XIII Plan should be based on supercritical technology, many small developers with limited requirement would continue to opt for smaller capacity sets in the sub-critical range as also the customers for captive power plants and international markets.

(c) Care has been taken to ensure that new machines were usable for large size supercritical sets also and BHEL had one Test Bed for 800 MW Turbine Generator which was capable of meeting the requirement of 12 supercritical sets of 660/800MW Turbine Generators per annum.

<sup>17</sup> *Subcritical Technology means technology with steam temperature as 235°C to 250°C.*

<sup>18</sup> *Requirement of Equipment and material for development of Power Sector- Generation and Transmission Projects of XI and XII Plan prepared by Central Electricity Authority Planning Wing New Delhi November 2006.*

<sup>19</sup> *As per Report of Task Force- March 2007.*

<sup>20</sup> *As per Report of Committee -June 2008.*

Reply is to be viewed against the facts that:

(a) available product mix assumed by BHEL for manufacturing subcritical and supercritical equipment was not as per the Plan projections and has accordingly resulted in creation of lower capacity in supercritical segment as compared to requirements. This is evident from the position of actual orders booked by BHEL during 2008-12 *vis a vis* its available manufacturing capacity and orders booked by other competitors as summarized in Table 8

**Table 8**

(in MW)

Year	Available manufacturing capacity of BHEL in supercritical segment	Orders for supercritical equipment booked by BHEL	Orders for supercritical equipment booked by other competitors
2008-09	880	1320	6880
2009-10	880	1980	9290
2010-11	1760	6400	15180
2011-12	1760	1320	4380
<b>Total</b>	<b>5280</b>	<b>11020</b>	<b>35730</b>

Thus, actual available manufacturing capacity in the Company during XI Plan was inadequate to meet the orders placed in the market.

(b) With progressively increased emphasis on use of large power generating sets by CEA and total planned capacity addition only through supercritical sets from XIII Plan, it was not clear as to how the Management has assured itself that small developers would be able to provide enough business to BHEL to optimally utilize its subcritical equipment manufacturing capacity. In response to a specific audit query (5 June 2013) requesting for analysis/study, if any, forming of the basis of this assumption, Management forwarded (September 2013) a general response indicating various types of plants that would be using subcritical equipment. The response was not supported by any specific data regarding likely order inflows of such plants that would ensure optimal utilization of the capacity created.

(c) Details of actual utilization of subcritical equipment manufacturing machines for manufacture of supercritical equipment when called for by Audit (6 May 2013) were provided by the Management (September 2013) in respect of two boiler manufacturing machines at Trichy unit. However, in respect of other products like turbines and generators, the Management agreed in second exit conference (September 2013) that there was necessity and more scope for recording/capturing data on inter-usability of machines.