Chapter V Cost Estimation and Competitiveness

5.1 Procedure for cost estimation and pricing approval

The procedure followed for preparation and submission of bids in BHEL included the following steps:

- Receive/collect tenders and wherever required, forward to the manufacturing units and executing agencies concerned for clarification/queries;
- Receipt of cost estimates and other details from manufacturing units/regions; and
- Consolidation of cost estimates and submission of bids by business sector concerned.

Before submission of bids, the price proposed to be quoted by business sector was to be approved by the competent authority as per BHEL's approved Delegation of Power[21] (DOP).

5.2 Cost estimation

Audit examined the process of cost estimation and pricing approval in BHEL vis-a-vis provisions of DOP in three business sectors [22]and observed as under:

5.2.1 Cost estimation not reflective of actual position

Estimated costs submitted by BHEL units to Power Sector (PS)-Marketing included costs under five levels:

- Level-1: Incremental cost;
- Level-2: Direct cost;
- Level-3: Production cost;
- Level-4: Unit level cost; and
- Level-5: Corporate level cost.

Review of the assessed costs and quoted/ ordered prices for orders secured and lost by PS-Marketing revealed that out of 44 PS-Marketing orders, the detailed five-level costing information was made available to Audit for 22 cases. It was seen that BHEL had quoted below Level-3 cost in 13 cases (nine cases between Level 3 and 2; two cases between level 2 and 1 and two cases below Level-1). However BHEL indicated that 11 of these projects were being executed with profit margins. In case of the other nine orders, the ordered prices were above Level-3 costs (by 0.57 to 18.59 *per cent*) though the projects were implemented with higher profit margins. This indicates that the costing information used by manufacturing units/ regional offices of BHEL for bidding was

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[21] *If price to be quoted recover all-in-cost plus 10 per cent margin, then pricing approval would be given by Executive Director; if margin proposed to be recovered was less than 10 per cent, approval of sector chief {i.e. Director (Power) in case of power sector orders, Director (IS&P) in case of industry sector orders and CMD in case of International Operation orders} was to be obtained; and if price below all-in-cost was to be quoted, then approval of both Director (Finance) and CMD was required. As per revised (November 2012) DOP, in respect of International Operations, Head of this business sector had full powers for submitting offers up to ₹500 crore value. Offers exceeding ₹500 crore required approval of all functional Directors and CMD*

[22] *Power Sector, Industry Sector and International Operations*

not reflective of the actual position and that the prices quoted by BHEL in cases of lost tenders could have been further rationalised which in turn would have enhanced competitiveness of BHEL.

Ministry stated (May 2017) that there was well laid down rational procedure for cost estimation which was followed while quoting for tenders. Price for tenders were based on market information, competition level, tender conditions and other strategic considerations, while estimates from Units/Regions were considered as guiding factor. Further, when volume was high, cost got distributed over more orders. Over the period of execution, Management focused on reducing overall cost and efforts were made to improve upon material and other costs.

The reply is not convincing in face of the quoted price for projects being much below the costs estimated by BHEL to execute them and the fact that BHEL made a profit in such projects even where the quoted prices were below direct costs (below Level-2/ Level-1).

5.2.2 Non approval of pricing for bids

During 2012-16, PS-Marketing bid for 62 orders of which it secured 44 and lost 18. Audit noticed that in the 62 orders that PS-Marketing bid for, five cases required approval from Director (Power) while another 51 cases required approval of both Director (Finance) and CMD as per Delegation of Power (DOP) in BHEL. However, approval from Director (Power)/Director (Finance) and CMD was not obtained in these cases before submitting bids. This resulted in violation of the Company's own Delegation of Power.

Management stated (February 2017) that prices were discussed and quoted after obtaining consent of competent authority. However, due care was now being taken to have the approval of the competent authority on record. Ministry added (May 2017) that the Company has taken up the system improvements in this area.

Audit appreciates that management has taken up system improvements, which will be verified though Action Taken Notes.

5.2.3 Lost tender analysis

As per information furnished by BHEL management, business sector-wise success rate in securing orders against competition[23] during 2012-16 are summarised in **Table 5.1**.

Table 5.1: Business sector-wise success rate against competition during 2012-16

Business Sector	Orders secured (₹ crore)	Orders lost (₹ crore)	Success rate (*per cent*)
Power Sector	38602	29797[24]	56.44
Industry Sector	16045	17318	48.09
International Operation	3633	3184	53.29

Though Management carried out lost tender analysis after loss of every tender, details were not available on record. Management furnished broad reasons for losing the tenders. **Table 5.2** summarises them over 2012-16.

***23** Excluding projects secured against nomination basis or projects where BHEL was the only bidder*

***24** Based on evaluated price of L1, except Shongtong Karcham HEP where read out price of L1 was considered and Gongri HEP and Ratle HEP where BHEL's evaluated price was considered as management did not furnish L1 evaluated price stating that bids were opened in camera*

Table 5.2: Reason-wise details of tenders lost by three business sectors during 2012-16

Reasons for lost tenders	Lost Tenders							
	Power Sector		Industry Sector		International Operation		Total	
	No.	Value (₹crore)	No.	Value (₹crore)	No.	Value (₹crore)	No.	Value (₹crore)
Pricing	8	6857	288	13776	14	2633	**310**	**23266**
Delivery	-	-	41	871	-	-	**41**	**871**
Technical	-	-	33	1587	1	80	**34**	**1667**
Price and Delivery/ Technical and Commercial loadings	5	15811	16	925	2	361	**23**	**17097**
Customer preference	3	1219	3	89	1	110	**7**	**1418**
BHEL bid disqualified	2	5910	17	70	-	-	**19**	**5980**
Total	**18**	**29797**	**398**	**17318**	**18**	**3184**	**434**	**50299**

The most significant reasons for losing tenders were pricing followed by price and delivery/ technical and commercial loadings. Together they account for 85.29 *per cent* orders (in terms of value) that were lost. Audit noticed that

- BHEL's price[25] was higher than L1 price by 4.36 to 71.08 *per cent* in 13 out of 18 tenders lost by PS-Marketing. In case of two lost tenders, variation of BHEL quoted price from L1 price could not be computed as BHEL's bid was disqualified in first stage itself. In three cases, orders were not placed on BHEL in spite of it being L1 up to read-out price stage. In these cases, BHEL was not considered due to customer preference.

- In tenders lost by Industry Sector (IS) too, BHEL's price was up to over two and a half times higher than its competitors[26]. In eight cases of lost tenders in IS (listed in ***Annexure 5.1***) though IS-Marketing indicated market level prices to the Manufacturing Units (MUs) concerned, the MUs could not match their estimates with market level prices. It was observed that BHEL's price was higher mainly due to higher material and overhead costs. IS-Marketing lost five tenders (details in ***Annexure 5.2***) due to technological reasons as technology offered by BHEL was either not as per requirement of customer or was outdated one. Six orders (four Captive Power Plant orders and two Transmission Business Group orders) were lost because of shorter delivery period offered by competitors (details in ***Annexure 5.3***).

- In 15 out of 18 lost tenders by International Operations, BHEL's price was higher than L1 by 5.69 to 98.17 *per cent*. In two cases, variation in BHEL's quoted price with reference to L1 price could not be ascertained due to non-availability of L1 price, whereas in one case, price of BHEL and L1 was the same and BHEL lost the tender on techno-commercial ground.

Management /Ministry stated (February/ May 2017) that

[25] ***Evaluated price in 12 cases and read-out price in four case (Shongtong Karcham HEP, Gongri HEP, Ratle HEP and Bajoli Holi HEP) due not non-availability of evaluated price***

[26] ***Difference was 0 to 10 per cent in 93 tenders, 10 to 20 per cent in 86 tenders, 20 to 50 per cent in 85 tenders, 50 to 100 per cent in 30 tenders and more than 100 per cent in 11 tenders***

(i) While working out BHEL's success rate against competition, 2x660 MW RRVUNL Chhabra EPC project was not considered, where BHEL became L1 while the project was placed to L2 bidder. In addition, ICB bids such as 1x800 TANGEDCO North Chennai, 1x500 MW NTPC Vindhyanchal SG & TG etc. have also not been considered. These bids were open for participation by other competitors and BHEL emerged as the sole bidder due to its competitive edge.

(ii) Business sector and manufacturing units had together put best efforts to match cost estimates with market level prices.

The reply is not acceptable as:

(i) Audit has discussed success rate of BHEL where it competed with other parties and secured orders. Though BHEL emerged as L1 for Chhabra project, it could not secure the order as the tender conditions did not allow award of more than one project to BHEL. Hence, Chhabra project was not considered as a 'lost tender' to work out the success rate.

(ii) The contention of Management that best efforts had been put to match cost estimates with market level prices has to be seen against the failure of BHEL units to match the market level prices despite intimation of market level price by concerned Business Sectors. In many cases, the competitors bid for the projects with prices close to the market-level prices indicated by the marketing departments.

5.3 Inaccurate estimation of quantities

Cement and steel are two major materials required for execution of civil works relating to power projects. Power sector regions of BHEL procured these material for issue to civil sub-contractors. It was, however, observed that PS-Northern and Western regions did not realistically estimate quantities of various types of steel (like Steel SS, Liner, Steel STR, Steel Rebar) and cement required for three projects. As a result, actual quantities consumed far exceeded estimated quantities as detailed below:

Table 5.3: Estimated and actual quantities of steel and cement

Name of project	Material	Estimated quantity	Actual quantity	Excess quantity		Rate	Additional expenditure
		MT	MT	MT	%	₹/MT	₹ crore
Anpara D (PS-NR)	Steel SS	0	250	250	-	170000	4.25
	Steel Liner	0	16059	16059	-	38131	61.23
	Steel STR	30500	42500	12000	39	47685	57.22
	Steel Rebar	15500	42400	26900	174	43893	118.07
	Cement	90000	165400	75400	84	4142	31.23
Bawana (PS-NR)	Steel STR	15000	19675	4675	178	41628	19.46
	Steel Rebar	10000	20900	10900	109	41291	45.00
	Cement	75000	92550	17550	23	4099	7.19
Pipavav (PS-WR)	Structural and Reinforced steel	12000	22889	10889	91	46634	50.78
Total							**394.43**

Thus, BHEL incurred additional expenditure of ₹394.43 crore due to inaccurate estimation of quantities. It is pertinent to mention that Anpara-D projects on which BHEL incurred additional expenditure of ₹272 crore, was completed at a loss of ₹210.28 crore.

Management stated (February 2017) that the deviations could not be foreseen as construction of power plant on abandoned ash ponds, up to 13 meters in depth, in Anpara-D was taken up for the first time in India. In Bawana project also, deviations occurred as per actual requirements. Pipavav project was executed with new technology having frame 9FA Gas Turbine in combined cycle mode, which BHEL executed for the first time and Bill of Quantities (BOQ) prepared based on preliminary study could not have been covered all unforeseen challenges. Ministry did not offer any comments.

The difference between BOQ and actual quantities was substantial and ranged between 23 and 178 per cent. Even if the projects were undertaken for the first time, excess consumption of material to such high levels was not expected and it led to losses.

5.4 Bid price lowered without approval benefiting private party

M/s SPEC Power Private Limited (SPEC) invited (28.09.2012) Request for Pre-Qualification (RFPQ) for setting up 1x525 MW thermal power station-Stage IV at Tuticorin on build, own and operate basis. BHEL entered (29.10.2012) into an MOU with M/s Megha Engineering and Infrastructures Limited (MEIL) for manufacture and supply of Boiler, Turbine and Generator (BTG) for the project. M/s MEIL was awarded the project at a total price of ₹2901 crore (18.11.2013).

Audit noticed that in line with the MOU, BHEL had submitted (17.04.2013) its techno-commercial offer for BTG portion to M/s MEIL with firm prices of ₹1473 crore (including taxes and duties). Subsequently, however, BHEL agreed to accept (07.12.2013) a lower price of ₹1108 crore (excluding cost of mandatory spares of ₹42 core), which was 88.62 *per cent* of the cost estimates. As per Delegation of Power (DOP) of BHEL, approval of Director (Finance) and CMD was required in this case which was not found on record.

Ministry stated (May 2017) that the final price was discussed and quoted after obtaining consent of competent authority and formal approval was taken *post-facto.* MEIL was understood to have obtained offer from other (Chinese) manufacturers also. The final quoted price was for reduced scope (excluding electrical packages) and the same was considered in the price approval note dated 26.11.2013.

The reply of Ministry is not acceptable. Approval, not consent, of the competent authority was required as per Company's own DOP. Even the post-facto approval was submitted only up to ED (PS-Marketing) and not submitted to Director (Finance) and CMD as required under DOP. Though MEIL submitted initial RFP with BTG sourced either from BHEL or M/s Doosan, the final bid was submitted indicating BTG tied-up with BHEL, confirming that the price offered (₹1473 crore) by BHEL was competitive compared to M/s Doosan offered price. Moreover, there was no mention of competition from Chinese firm in the price approval note dated 26.11.2013. Thus, the reduction in price was made against non-existent competition. The reduction in scope was also not significant to justify the price reduction, since the 'all-in-cost' estimation of BTG made in August 2015 was ₹1232.08 crore as against initial 'all-in-cost' estimate of ₹1250.26 crore.

5.5 Decreasing competitiveness and inadequate efforts for increasing competitiveness

To maintain growth in a changing business environment, BHEL needed to enhance its competitiveness through cost reduction, faster project deliveries and better management of working capital. It was, however, noticed that:

5.5.1 Capacity addition by a power equipment manufacturer is determined on the basis of MW of Turbine-Generator (TG) supplied and commissioned by that manufacturer. To assess the competitiveness of BHEL, Audit analysed TG orders secured and lost by it during 2012-16 and observed that:

(a) BHEL's overall success rate in securing orders for TG packages was 68.97 *per cent* during 2012-16. However, 40.52 *per cent* TG orders during above period were awarded to BHEL on nomination basis. Success rate of BHEL in securing TG orders against real competition (i.e., where price bids of other bidders were also opened[27]) was 49.66 *per cent.*[28]

(b) Year-wise analysis of BHEL's success rate in securing TG orders against competition revealed that BHEL's success rate during last three years ended 31 March 2016 declined consistently from 80.44 *per cent* in 2013-14 to 43.95 *per cent* in 2014-15 and to zero *per cent* in 2015-16.

(c) BHEL could not secure any of the four tenders (involving TG component), three for thermal projects and one for hydro project, finalised against competition during 2015-16 where BHEL's quoted prices were 4.36 *per cent* to 73.85 *per cent* higher than L1 prices.

Ministry stated (May 2017) that Audit has not considered orders (i) where no other bidders participated although the same were open to all (ii) placed on negotiated basis and (iii) order of Karimnagar project of NTPC (SG package) in order to correctly reflect the success rate of BHEL. Non-participation by other bidders was largely due to low probability of securing orders against competition from BHEL. Developers were placing orders on negotiated basis considering the advantage they had on placing orders on BHEL. It was also stated that success rate in securing TG orders against competition has declined to *zero per cent* in last three years ended 2015-16 was not correct.

The reply, however, has to be viewed against the fact that Audit has considered all the orders secured by BHEL and worked out overall success rate of 68.97 per cent. However, Audit highlighted the declining trend of success rate in tenders where BHEL competed with other bidders. Though orders were secured on negotiated or nomination basis during 2015-16, BHEL could not succeed in any of the four tenders where it actually faced competition from others during this period. Karimnagar order was not considered since it was not a TG package order.

5.5.2 Competitiveness is not only about ability to secure orders; it is also about the capability to execute orders within time comparable to or even faster than competitors and with profit margins. It was, however, observed that orders with anticipated losses (as per AS-7 information[29]) have consistently increased during the last five years ended 31 March 2016 as detailed below:

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[27] Excluding cases where tender was finalised based on single price bid of BHEL.
[28] After including TG orders secured against Bulk tenders where BHEL was not L1, but secured order because of tender conditions
[29] BHEL prepares profitability of projects under construction as per Accounting Standard 7-Accounting for Construction Contracts, issued by the Institute of Chartered Accountants of India

Table 5.4: Number of orders under execution with anticipated loss

Year ended 31 March	Number of orders under execution with anticipated losses	Amount of anticipated losses (₹ crore)
2012	1	2
2013	3	56
2014	14	1115
2015	18	1581
2016	20	2104

It is pertinent to note that the actual losses would be much more as the amount of anticipated losses indicated were without taking into account unit and corporate level overheads. Further, anticipated losses in the same project increased year after year[30], indicating that management's claim (paragraph 5.2.1) that it focused on reducing overall cost and efforts were made to improve upon material and other costs during execution was not correct in all cases.

Ministry stated (May 2017) that in most of the cases, AS-7 factor has improved (profit has increased/losses have come down) as a result of various process improvements, as the execution progressed, except for few cases listed by Audit.

The reply, has to be viewed against the fact that Audit has pointed out cases which were likely to incur significant losses (more than ₹100 crore up to 31 March 2016). Out of 20 loss making projects as on 31 March 2016, 18 projects were under execution for more than two years. While in 12 out of 18 projects (67 per cent) the losses increased year after year, in five projects the losses were reduced marginally and only in one case, loss of ₹ 37 crore in 2014-15 turned to a profit of ₹ 76 crore in 2015-16.

5.5.3 Rationalisation of manpower according to level of operation was essential to maintain margin, competitiveness and business growth. Manpower cost constituted significant part of BHEL's total expenses and the same as percentage of turnover increased consistently from 11.04 *per cent* in 2011-12 to 20.84 *per cent* in 2015-16, as detailed in table below:

Table 5.5: Year-wise turnover and employee cost in BHEL

Year	Turnover (₹ crore)	Manpower* (numbers)	Employee cost (₹ crore)	Turnover per employee (₹crore)	Employee cost to turnover (*per cent*)
1	**2**	**3**	**4**	**5=(2/3)**	**6=(4/2*100)**
2011-12	49510	47546	5466	1.04	11.04
2012-13	50156	48876	5753	1.03	11.47
2013-14	40338	47449	5934	0.85	14.71
2014-15	30947	45537	5450	0.68	17.61
2015-16	26587	42784	5541	0.62	20.84

As on 01 January of the respective financial year.

[30] North Karanpura: anticipated loss increased from ₹256 crore as on 31 March 2014 to ₹465 crore as on 31 March 2015 and to ₹622 crore as on 31 March 2016; Anpara D: anticipated loss increased from ₹151 crore as on 31 March 2014 to ₹195 crore as on 31 March 2015 and to ₹210 crore as on 31 March 2016; NTPC/Mouda: anticipated loss increased from ₹127 crore as on 31 March 2014 to ₹ 343 crore as on 31 March 2015 and to ₹ 378 crore as on 31 March 2016; New Nabinagar SG package: anticipated loss increased from ₹73 crore as on 31 March 2015 to ₹163 crore as on 31 March 2016

In this regard, Audit observed that:

- BHEL management was aware about signs of slowdown in Indian economy and problems in power sector since second half of 2010-11 itself.
- The order book position of BHEL showed the signs of slowdown. Value of average annual orders booked during 2011-16 was ₹31259 crore as against ₹60507 crore during 2010-11. As a result, the order book position declined from ₹135300 crore in 2011-12 to ₹110730 crore in 2015-16. Further, considerable amount of orders were in the nature of 'on-hold' projects and no work was being carried out against these projects. At the end of 2010-11, the value of works to be executed under 'on-hold' projects was ₹5842 crore (5 projects), which consistently increased to ₹8477 crore (7 projects) at the end of 2011-12, ₹17804 crore (15 projects) at the end of 2012-13, ₹18563 crore (17 projects) at the end of 2013-14 and ₹20408 crore (19 projects) at the end of 2014-15 and to ₹50645 crore (25 projects) at the end of 2015-16.
- Though Strategic Plan 2012-17 set to achieve turnover of ₹100000 crore by 2017, Management was not convinced of achieving this target in view of slowdown in power sector. This apprehension was put on record at the time of finalisation of the Strategic Plan.
- Despite slowdown in power sector since 2010-11 and more and more projects becoming 'on-hold' since 2008-09 due to dampening investment sentiments, BHEL inducted 9346 employees in calendar year 2011 and 2012 as against retirement of 5844 employees during this period. Though the intake of new employees was controlled since 2013 compared to the retirements, management initiatives for diversification and innovation was not evident (as discussed in Chapter 3 and 4), which resulted in lower productivity parameters as indicated in the table above. Similarly, increased manpower cost also affected BHEL's competitiveness as it lost considerable number of tenders due to higher cost compared to competitors (as discussed in the preceding paragraphs).

Ministry stated (May 2017) that in 2011-12, there were visible signs of slowdown in power sector, with BHEL registering positive year-on-year turnover growth of 14.20 *per cent* in 2011-12 and 1.30 *per cent* in 2012-13. The manpower intake was cautiously controlled in 2012-13 in view of shrinking thermal business. The manpower intake was further reduced in forthcoming years of plan period 2012-17 despite large scale retirement to the tune of 11100 numbers in order to rationalise manpower in sync with business scenario.

However, the Strategic Plan document itself indicated that the power sector was on a slowdown since second half of financial year 2010-11. Generally, tendering process for a power project takes about 1½ years and the order booked in a particular financial year, therefore, pertains to the projects bid for before 1 to 2 years. The signs of slowdown was evident even before 2010-11 as the orders booked from power sector declined significantly to ₹ 14012 crore in the year 2011-12 from average orders of ₹44143 crore during 2007-08 to 2010-11[31]. Similarly, data relating to finalisation of main plant equipment of utility sets declined from 36478 MW in 2009-10 to 24551 MW in 2010-11 and to 8482 MW in 2011-12.

[31] ***Power Sector orders booked: ₹41069 crore in 2007-08, ₹47167 crore in 2008-09, ₹41982 crore in 2009-10 and ₹46393 crore in 2010-11***

5.6 Acceptance of orders with less than 10 per cent advance in contravention of BHEL corporate finance guidelines

In order to avoid situation of 'cash crisis' in BHEL in the light of prevailing cash crunch across country and mounting debtors and inventory position in BHEL, Corporate Finance, BHEL directed (October 2008) that (i) no order should be accepted with payment terms which did not provide for minimum 10 *per cent* advance; (ii) without receipt of full amount of advance, zero date should not be agreed; and (iii) any deviation from above directives would require specific approval of Director (Finance) and CMD before acceptance of order. To ensure compliance of these directives, responsibility was assigned on respective business sectors. It was, however, observed that orders were accepted by PS-Marketing with less than 10 *per cent* advance or with advance to be received in instalments and accepting a date prior to date of receipt of full amount of advance as 'zero date' (details are in ***Annexure 5.4***). However, approvals of Director (Finance) and CMD were neither found on records made available to Audit nor did management furnish such approvals to Audit separately. Audit also noticed that six out of nine orders listed in the above Annexure 5.4 subsequently had to be put on hold due to payment related issues.

Management stated (February 2017) that based on commercial prudence, certain orders had been accepted by business sector with less than 10 *per cent* advance. Ministry added (May 2017) that the note dated 13.04.2012 conveyed the decision of the competent authority.

The reply, however, has to be viewed against the fact that the note referred to in the reply stated that any such decision should be as per approved Delegation of Power (DOP). As per the DOP approved in October 2008 regarding receipt of advance along with customer orders, approvals of Director (Finance) and CMD was required for accepting orders with less than 10 per cent advance, which were not obtained in the cases indicated in the Annexure 5.4.

5.7 Poor perception about BHEL in customer surveys

As per MOU with the Administrative Ministry, BHEL commissioned customer surveys for evaluating its performance for the years 2012, 2013 and 2014. The surveys indicated Customer Satisfaction Indices (CSI) of BHEL at 65, 67 and 71 *per cent* for 2012, 2013 and 2014, respectively against CSI of 69, 70 and 74 *per cent*, respectively of competitors. While working out CSI, marketing, project engineering management, supplies, project installation and management, service and after sales and brand image aspects were considered. Since 'marketing' and 'project installation and management' were relevant to this performance audit, activity-wise and sub activity-wise scores obtained by BHEL and competitors under these two functions were reviewed in audit.

5.7.1 Marketing function

Activity-wise performance of BHEL and competitors in respect of marketing function during 2012-2014 reflected in customer surveys were as under:

Table 5.6: Activity-wise performance under marketing function of BHEL and competitors

(in per cent)

Activities	Year	BHEL	Competitors (Average)	L&T (Main competitor)
Pre-sales	2012	52	68	79
	2013	54	45	52
	2014	49	68	72
Sales	2012	47	54	48
	2013	55	55	67
	2014	56	70	81
Contract Management	2012	45	56	59
	2013	38	51	54
	2014	55	67	70

In respect of all activities relating to marketing function, BHEL was far behind its competitors. Competitors scored better than BHEL in respect of 11 out of 15 sub-activities of marketing function on a scale of five (where five was the maximum score) in the latest customer survey of 2014 as detailed in ***Annexure 5.5***.

5.7.2 Project installation and management function

Activity-wise performance of BHEL and competitors in respect of project installation and management function reflected in customer surveys of 2012-14 were recorded as under:

Table 5.7: Activity wise performance under Project installation and management function of BHEL and Competitors in three customer surveys

(Figures in per cent)

Project installation and management activity	Year	BHEL	Competitors (Average)	L&T (main competitor)
Project erection	2012	46	61	83
	2013	43	72	78
	2014	45	70	78
Pre-commissioning of project	2012	51	55	77
	2013	42	60	56
	2014	45	65	71
Commissioning of project	2012	51	61	77
	2013	47	65	67
	2014	54	64	69
Project closure	2012	33	45	53
	2013	31	57	60
	2014	39	62	60

Sub-activity wise mean scores on a scale of five scored by BHEL and competitors, as detailed in ***Annexure 5.6***, indicated that BHEL's scores were less than those of its competitors in respect of 24 out of 25 sub-activities as per the latest customer survey of 2014.

From the above it is observed that:

(a) BHEL did not show any improvement in 'project erection' over the period 2012 to 2014;

(b) On the front of Pre-commissioning of project, BHEL's position deteriorated during last two customer surveys as compared to first survey of 2012;

(c) In respect of 'Commissioning of project' and 'Project closure', though customers' liking for BHEL marginally improved during the latest customer survey of 2014, customers' liking in favour of competitors was much higher.

(d) Only in respect of 'technical capability of site engineers' BHEL scored marginally over its competitors in 2014 survey. Sequential supplies by manufacturing units was one sub-activity in respect of which score difference between BHEL and competitors was the maximum.

The results of customer surveys indicated areas where BHEL needed to improve in order to increase overall customer satisfaction. Instead of undertaking measures for improving customer satisfaction indices and monitor them in subsequent years, BHEL failed to carry out customer surveys after 2014.

Ministry stated (May 2017) that BHEL being the largest agency among multiple agencies working on a project, project owner/developer generally turned to pass on the blame to BHEL to cover up their own delays, setting a distorted perception. Project execution had remained a focus area for BHEL and significant improvement had happened over a period of time. As result, it could commission capacity of more than 10000 MW for four consecutive years.