केन्द्रीय विद्युत विनियामक आयोग
CENTRAL ELECTRICITY REGULATORY COMMISSION

नई दिल्ली
NEW DELHI

याचिका संख्या. /Petition No.: 218/GT/2019

कोरम/Coram:

श्री आई. एस. झा ,सदस्य/Shri I. S. Jha, Member
श्री अरुण गोयल, सदस्य/Shri Arun Goyal, Member
श्री पी. के. सिंह, सदस्य / Shri P. K. Singh, Member

आदेश दिनांक /Date of Order: 16th of October, 2023

IN THE MATTER OF:

Determination of project specific levelized tariff 2x10 MW (AC) NLCIL solar PV power project with 8MWhr BESS (battery energy storage system) at Attam Pahad and Dolly Gunj Sites at South Andaman for the period of 25 years from the actual COD of the station i.e. 30.06.2020 under Regulations 7 and 8 of the CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017.

AND IN THE MATTER:

NLC India Limited,
135/73, EVR Periyar Salai,
Kilpauk, Chennai-600010

...Petitioner

Versus

Principal Secretary (Power)
Electricity Department, Secretariat,
Andaman & Nicobar Administration,
Port Blair 744101

…Respondent

Parties Present: Shri M.G.Ramachandran, Senior Advocate, NLCIL
Ms. Poorva Saigal, Advocate, NLCIL
Ms. Anushree Bardhan, Advocate, NLCIL
Ms. Tanya Sareen, Advocate, NLCIL
Shri Anil Kumar Sahni, NLCIL
Shri Nambirajan, NLCIL
Shri Vasughi. P, NLCIL
Shri P. Ravikumar, NLCIL
Shri Srinivasan. A, NLCIL
Ms. Surbhi Kapoor, Advocate, NLCIL
Shri Anukirat Singh, Advocate, NLCIL
Ms. Srishti Khindaria, Advocate, NLCIL
Ms. Deepa Nair, A&N

आदेश/ ORDER

The Petitioner, NLC India Limited (NLCIL) has set up a 20 MW Solar PV Plant with 8 MWh BESS at Dollygunj and Attam Pahad in Andaman & Nicobar Islands. NLCIL has filed the petition for determination of project specific levelized tariff 2x10 MW (AC) solar PV power project with 8MWhr BESS (battery energy storage system) for the period of 25 years from the actual date of commissioning (CoD) of the station i.e. 30.06.2020 under Section 79(1)(a), 62 and 64 of the Electricity Act, 2003 read with Regulations 7, 8 and 85 of the Central Electricity Regulatory Commission (Terms and conditions for tariff determination from renewable energy sources) Regulations, 2017 ("RE Tariff Regulations, 2017") for determination of project specific tariff.

2. The Respondent, Electricity Department (Secretariat, Andaman & Nicobar Administration) is operating and maintaining power generation, transmission and distribution system and networks in the islands for providing electric power supply to general public and also implements various schemes under Plan and Non-Plan Programmes for augmentation of the diesel generating capacity and establishment of new Power Houses and T&D systems.

3. NLCIL made the following prayers in the unamended Petition:
   a) To take on record the subject petition to determine the project specific tariff in terms of Section 79(1)(a) of the Electricity Act, 2003 and Regulation 7 & 8 of the Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017 for the commissioned 2.5 MW

and also Andaman NLC Solar Power Station I (20 MW) (2X10 MW (AC) solar PV power projects integrated with 8MWHr BESS in South Andaman at AttamPahad and Dollygunj);

b) *To permit NLCIL to adopt CUF of 17.97% without battery energy storage system and CUF of 15.33% with BESS and degradation factor 1% for first 10years and 0.70% thereafter in accordance with Detailed Project Report under Regulation 85 "Power to Relax";*

c) *To adopt the tariff as mentioned above for billing of progressive capacity commissioning at Rs. 5.65 per unit till the entire project of 20 MW with BESS is commissioned and Rs. 6.85 per unit with subsidy (Rs. 9.30 without subsidy) upon commissioning of entire project 20 MW with BESS as per PPA;*

d) *To recover Tariff filing fee from the beneficiary and;*

e) *To pass such order (s) as deemed fit by the Hon'ble Commission.*

4. Out of 20 MW Solar Project with BESS (battery energy storage system), 2.5 MW Solar PV was commissioned on 31.12.2018 and the remaining solar capacity including BESS, was commissioned on 30.6.2020. As the entire project was commissioned, NLCIL requested the Commission to allow it to file the amended petition. The Commission allowed NLCIL to amend the Petition. Accordingly, NLCIL, filed the amended petition on 15.06.2021. NLCIL made the following prayers in the Amended Petition:

a) *To take on record the Tariff petition to determine the project specific levellised tariff in terms of Section 79 (1) (a) of the Electricity Act, 2003 and Regulation 7 and 8 of the CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017 for the 20 MW (AC) solar PV power project with total 8MWhr the Battery Energy Storage System (BESS) at Attam Pahad and Dolly Gunj Sites at Port Blair, South Andaman);*

b) *To permit NLCIL to adopt CUF of 17.24% without battery energy storage system for 2.5MW and CUF of 15.33% with BESS for 20MW and degradation factor of 1% for first 10 years and 0.70% per year for balance 15 years in accordance with Detailed Project Report dated April 2018 under Regulation 85 "Power to Relax";*

c) *To adopt the tariff as mentioned above at Rs. 7.41 per unit with 100% CFA and Rs.9.26 per unit with 15% subsidy for the 20 MW (AC) solar PV power project with total 8MWhr Battery Energy Storage System (BESS) at Attam Pahad and Dolly Gunj*

Sites at Port Blair, South Andaman;

d) *To approve the Auxiliary Power Consumption at 8.51 % as stipulated in para 11;*

e) *To approve the O&M expenditure as stipulated in para 17;*

f) *To bill the beneficiary with approved Tariff under CFA already received, till the receipt of full CFA from Government of India;*

g) *To approve the expenditure incurred towards the deployment of CISF/ any other security expenses and recover the same from the respondent at actuals under Power to Relax;*

h) *To permit NLCIL to recover the filing fee of the Petition from the Respondent;*

i) *To permit NLCIL to recover/adjust the difference in tariff from beneficiaries with interest on account of all above;*

j) *To raise any plea, if necessitated, for the present petition conforming to CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017; and*

k) *To pass such order (s) as deemed fit by the Hon'ble Commission.*

Brief Background:

5. The brief detail of the Petition is set out as under:

Events	**Details**
Project	2 X 10 MW (AC) grid interactive Solar PV power Plant integrated with 8 MWhr Battery Storage System (BESS)
Location	Attam Pahad and at Dollygunj, Port Blair, Andaman
Memorandum of Understanding (MOU)	Executed among NLCIL, MNRE and Andaman and Nicobar Administration on 10.05.2016
Execution of Power Purchase Agreement (PPA)	18.08.2016
Execution of Amended PPA	06.01.2021
Issuance of the Letter of Intent (LoI) to Larsen & Toubro Ltd	12.10.2018
The total hard cost and Interest During Construction (IDC) (initially at Rs. 130.77 Cr.) was revised during the mandatory project review, and was approved by the Board of directors in their 479th meeting	28.05.2018
Revised Project Cost	Rs. 132.79 Cr
Details of Capital Cost of the Project:	

Price Break-Up	Amount (Rs.)
Site Preparation	79,60,518
Plant and Equipment (Solar)	62,44,47,485
Plant and Equipment (Bess)	33,85,11,974
Installation & Commission	2,99,64,808
Civil & Structural Works	12,78,62,416
O&M Contract for 10 Years After One Year Warranty Period for Solar Power Plant	14,34,17,404
O&M Contract For 10 Years After One Year Warranty Period for Bess	5,57,73,435
Total Cost	**Rs. 132,79,38,040**

Actual additional capital expenditure incurred/ to be incurred for the Solar PV Project (Rs Lakh):

2020-21	2021-22	2022-23	2031-32
1014.28	1288.08	1132.44	3104.37

The details of total Central Financial Assistance received has been tabulated as below:

CFA release pattern	Amount in Rs.
First Tranche	6,77,24,832
Second Tranche	37,96,68,026
Third Tranche	
Total in Rs.	**44,73,92,858.00**

The revised Levelized Tariff:

Particulars	Claimed in Amended Tariff Petition	With CFA Received as on 31.03.2022
Levelized Tariff Rs. /kWh with BESS	Rs.7.413	Rs. 7.434

Submissions of NLCIL in Amended Petition

6. NLCIL has submitted as under:

   a) A Tripartite Memorandum of Understanding (MOU) was signed between NLCIL, MNRE and Andaman and Nicobar Administration on 10.05.2016 for setting up solar based power plants in Andaman and Nicobar Islands.

   b) The PPA was signed with Electricity Department, Andaman & Nicobar Administration on 18.08.2016 and subsequently the PPA was amended on 06.01.2021. The Detailed Project Report [DPR] for the project was approved by the Board of Directors of NLCIL at its meeting held on 28.05.2018.

   c) The A&N administration has allocated land for the project at Attam Pahad and

Dollygunj aggregating to 41.252 Ha. After the allotment of Land, the tender was initiated to undertake the construction and completion of the Project for 20 MW Solar and 8 MWh BESS, and M/s. Larsen & Toubro Ltd. was selected as the successful bidder. The Letter of Intent dated 12.10.18 was issued to Larsen & Toubro Ltd with time schedule of 17 months from the date of LOA under EPC basis to complete the project.

d) The Government of India, Ministry of New and Renewable Energy (MNRE) on 18.12.2018 sanctioned the Central Financial Assistance of Rs 45,14,98,880 for Solar PV Project (@ 40% of the EPC Cost of Rs. 112,87,47,201). The project was initially sanctioned at Rs.130.77 Cr and subsequently revised to Rs.132.79 Cr. The Subsidy of Rs.6,77,24,832 was received on 10.10.2019. Thereafter, MNRE has released the 2nd and 3rd tranche of CFA of Rs.37,96,68,026/- (@ 40% of incurred expenditure of Rs. 111,84,82,146/-) to NLCIL vide their order dt:30.03.2022 and the same was credited to the account of NLCIL on 31.03.2022.

e) Balance Rs. 41.06 Lakhs may be permitted to be adjusted towards subsidy by means of levelized Tariff adjustment without approaching the Commission.

f) The total hard cost and IDC which was initially at Rs. 130.77 Cr. was revised during the mandatory project review, and the same was approved by the Board of Directors in their 479th meeting held on 28.05.2018. The revised project cost was Rs. 132.79 Cr. including cost of Operation and Maintenance (O&M) for 10 years after one year warranty period at Attam Pahad and Dolly Gunj.

g) The total EPC Cost (excluding O&M Cost) is Rs. 118,71,20,900/-

h) The project cost got increased due to solar PV Modules being imported from China by L&T and the Safeguard Duty which was levied on the modules by the Govt. of India on the said imports. The Sub-Committee approved the Project cost of Rs.138.63 Cr. in its 383rd Board meeting held on 25.06.2020 which is inclusive of post operating contract expenditure.

i) The proposed/actual additional capital expenditure incurred/ to be incurred for the Solar PV Project is as follows:

(Rs in Lakh)

2020-21	2021-22	2022-23	2031-32
1014.28	1288.08	1132.44	3104.37

j) *Justification of Battery replacement:* The Battery cells and modules were supplied by LG Chem, S.Korea and the Battery Energy Storage System (BESS) is integrated and supplied by the EPC contractor M/s. L&T. In the Design Basis of the Plant-parameters of BESS, it is indicated by the L&T that the Cycle life is 4000 cycles. Considering one cycle per day, it works out to 11 years. In view of this, the battery replacement is to be done after 11 years. An amount of Rs.3104.37 lakhs is included as additions in the 12th year for the replacement of 8 MW Battery System and modules.

k) In accordance with the provisions of the CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017, the tariff computed for the 20 MW (2X10 MW (AC) solar PV power project integrated with 8 MWHr BESS in South Andaman at Attam Pahad and Dolly Gunj is tabulated below:

Capacity	**20 MW**	
	With Subsidy 15%	**With Subsidy 100%**
Capital Cost	6.4663 Cr/ MW	4.5475 Cr/MW
Levelised Tariff	Rs. 9.26/KWhr	Rs 7.41 /Kwhr

l) Based on the CFA released to NLCIL by MNRE on 30.03.2022, the revised Levelized Tariff working is submitted as:

Particulars	**Claimed in Amended Tariff Petition**	**With CFA Received as on 31.03.2022**
Levelised Tariff Rs. /KWHr with BESS	Rs.7.413	Rs. 7.434

NLCIL has proposed to deploy Central Industrial Security Force (CISF) at the Project site at Andaman & Nicobar Islands as is being done in all Plants and Project sites of NLCIL. Under Regulation 85 of the RE Tariff Regulations, 2017, NLCIL has requested the Commission to allow the expenses on account of deployment of CISF incurred by NLCIL in relaxation of Regulation 54 of the said RE Tariff Regulations, 2017.

Subsequent proceedings

7. During the hearing held on 27.07.2021, the Commission directed the contracting parties to file the necessary information along with documents. NLCIL filed the additional information on 20.10.2021 and 04.05.2022. The Respondent submitted its submission on 23.05.2022 and thereafter a rejoinder was filed by NLCIL on 08.06.2022. During the hearing held on

20.09.2022, the Commission directed the contracting parties to file the additional information and the petition was reserved for Orders. NLCIL submitted additional information on 17.11.2022. The Respondent filed the reply on 02.12.2022 and NLCIL filed the rejoinder on 12.12.2022.

Submission by the Respondent:

8. The Respondent submitted as under:
    a) NLCIL was able to achieve maximum of 12.91% CUF without BESS and 12.08% with BESS till March 2021, on NLCIL's own showing. There is no justification for relaxing this requirement.
    b) NLCIL wants to revise the tariff to offset the increased project costs due to safeguard duty, but the Respondent opposes further tariff changes beyond the initially petitioned rate of Rs. 6.65/kWhr for 25years.
    c) The claim for CFA by NLCIL is baseless, as it should be addressed with MNRE and is not part of the Power Purchase Agreement (PPA).
    d) The Auxiliary consumption exceeds the 0.25% of gross generation specified by regulations. There is also no evidence of deployment of CISF/any other security agency. In any event, safety and security is concern of the owner of the plant and hence may not be included as an expenditure.
    e) The grid instability issues in South Andaman are primarily caused by the 20 MW NLC Solar PV Power Plant's fluctuating power output due to solar intermittency and insufficient storage solutions.
    f) Additional BESS solutions are meant to ensure a stable power supply and maintain must-run status. The claimed losses and power curtailment are attributable to NLCIL's plant deficiencies rather than actions by the Electricity Department.

Submission by NLCIL

9. NLCIL has submitted that:
    a) the solar plant since commissioning was not allowed to operate at full capacity due to prevailing high frequency condition in the grid. As per the advice of the Electricity Department, Andaman & Nicobar, the BESS logic was redesigned to curtail active power export from NLCIL plant to control grid frequency as the DG sets were not regulated to match with grid frequency. Subsequently, after modification in BESS

logic due to curtailment of active power output NLCIL has suffered loss of generation.

b) The following additions were incorporated in the BESS logic on 14.12.2020 to avoid high frequency conditions:

(i) When grid frequency increases above 51.5 Hz, PV power will be curtailed to 80% of instantaneous generation at that time. When grid frequency increases above 51.7 Hz, PV power will be curtailed to 60% of instantaneous generation at that time. When grid frequency decreases below 51 Hz, PV power will exit the curtailment mode. This is applicable for both 60% & 80% curtailment modes.

(ii) This has resulted in curtailment of active power from NLCIL plant at the rate of 20% and 40% of instantaneous active power during the frequency range from 51.5Hz to 51.8Hz respectively. It is submitted that whenever solar power is injected in to the grid with high frequency, further increase in grid frequency is observed as DG sets are not having any logic for reducing the generation. The load is also not increased correspondingly by the Electricity Department, Andaman.

c) The total loss suffered by NLCIL due to grid failure, high frequency in the grid and consequent inverter tripping and due to curtailment of power comes to Rs.4.85 Crores.

d) Considering battery round trip efficiency, inverter discharge efficiency, BESS auxiliary losses and charging and discharging cycles of two per day, for 8MWHr capacity BESS accounts for 25% of losses. This has led to increase in auxiliary consumption to the level of 8.51% which is in line with the detailed project report.

e) As per the direction of Ministry of Home, NLCIL has deployed CISF personnel in all their Plants and project sites. The expenditure towards CISF personnel has not been included for computation of tariff. On deployment, NLCIL will claim the expenses. Hence, NLCIL requested the Commission to permit NLCIL to claim expenses towards security personnel/CISF on deployment under the RE Regulation, 2017 *to direct* that the expenses may be reimbursed to NLCIL along with monthly invoices.

f) NLCIL submitted that the A&N Electricity Department has not implemented grid discipline measures like scheduling power from other generating stations or efficiently managing diesel power plants to ensure grid stability and frequency control. Grid frequency experienced frequent fluctuations, even when the NLCIL 20

MW Solar Power Plant was forced to shut down. Abrupt changes in grid frequency are attributed to various factors, including feeder shutdowns, distribution feeder faults, changes in power export from other solar plants due to cloud cover, and fluctuations in demand.

g) NLCIL was not allowed to generate and schedule power for the entire period of generation contrary to the claim of A&N Administration. Contrary to claims, the NLCIL solar plant experienced frequent power curtailments since its inception. It is crucial for the A&N Electricity Department to ensure must-run status for the NLCIL 20 MW solar power plant to fulfill the objective of mitigating climate change's adverse effects.

h) *Reasons for not achieving claimed Capacity Utilization Factor (CUF)*: NLCIL plant implemented battery systems and BESS logic to smoothen power generation fluctuations due to cloud movement, using a 15-minute moving average for solar PV generation. Factors like adverse weather conditions, high grid voltage, and frequent inverter trippings contribute to the inability to achieve the designed CUF, which cannot be solely blamed on NLCIL. Whenever the inverter trips due to frequency issues, the response time to restart as designed is approximately 3 to 5 minutes thus causing the solar power plant to lose energy proportional to the Global Horizontal Irradiance (GHI) at that time, which leads to lower CUF. The designed CUF could not be achieved due to power curtailment and inverter tripping at 52 Hz even after curtailment of 20 % and 40% of plant output.

i) Contrary to claim of the Electricity Department the 20 MW Solar Power Plant has achieved an all-time peak export of 15.32 MW on 13.08.2022 and peak solar PV power generation of 15.56 MW on 02.09.2022.

Analysis and Decision

10. We have heard the learned counsels for NLCIL and the Respondents and have carefully perused the records.

11. The determination of project specific tariff is governed by the Regulations 7 & 8 of the RE Tariff Regulations 2017. The relevant extracts of the Regulations are reproduced as under:

"7. Project Specific tariff

a) Project specific tariff, on case to case basis, shall be determined by the Commission for the following types of projects:

i. Solar PV and Solar Thermal;

ii. Wind Energy (including on-shore and off-shore);

iii. Biomass Gasifier based projects; if a project developer opts for project specific tariff;

iv. Biogas based projects; if a project developer opts for project specific tariff;

v. Municipal Solid Waste and Refuse Derived Fuel based projects with Rankine cycle technology;

vi. Hybrid Solar Thermal Power Projects;

vii. Other hybrid projects include renewable–renewable or renewable–conventional sources, for which renewable technology is approved by MNRE;

viii. Any other new renewable energy technologies approved by MNRE.

b) Determination of Project specific tariff for generation of electricity from such renewable energy sources shall be in accordance with such terms and conditions as stipulated under relevant Orders of the Commission.

c) No annual generic tariff shall be determined for the technologies mentioned in Clause (a) of this Regulation. Financial and Operational norms as may be specified would be the ceiling norms while determining the project specific tariff.

Provided that the financial norms as specified under Chapter-2 of these Regulations, except for capital cost, shall be ceiling norms determining the project specific tariff.

8. Petition and proceedings for determination of tariff

(1) The Commission shall determine the generic tariff on the basis of suo-motu petition six months in advance at the beginning of each year of the Control period for renewable energy technologies for which norms have been specified under the Regulations.

(2) A petition for determination of project specific tariff shall be accompanied by such fee as may be determined by regulations and shall be accompanied by:

a) Information in forms 1.1, 1.2, 2.1 and 2.2 as the case may be, and as appended in these regulations;

b) Detailed project report outlining technical and operational details, site specific aspects, premise for capital cost and financing plan etc.

c) A statement of all applicable terms and conditions and expected expenditure for the period for which tariff is to be determined.

d) A statement containing full details of calculation of any subsidy and incentive received, due or assumed to be due from the Central Government and/or State Government. This statement shall also include the proposed tariff calculated without consideration of the subsidy and incentive.

e) Any other information that the Commission requires the petitioner to submit.

(3) The proceedings for determination of tariff shall be in accordance with the Conduct of Business Regulations."

12. The technical and operational norms for Solar PV Projects are specified in Chapter 7 of the RE Tariff Regulations 2017. The relevant extracts are reproduced as under :

"Chapter 7: Technology specific parameters for Solar PV Power Project

51. Technology Aspects

Norms for Solar Photovoltaic (PV) power projects under these Regulations shall be applicable for grid connected PV systems that directly convert solar energy into electricity and are based on technologies such as crystalline silicon or thin film etc. as may be approved by MNRE.

52. Capital Cost

The Commission shall determine only project specific capital cost and tariff based on prevailing market trends for Solar PV projects.

53. Capacity Utilisation Factor

The CUF for Solar PV project shall be 19%.

Provided that the Commission may deviate from above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8.

54. Operation and Maintenance Expenses

The Commission shall determine only project specific O&M expenses based on prevailing market trends for Solar PV project.

55. Auxiliary Consumption

The auxiliary consumption factor shall be 0.25% of gross generation.

Provided that the Commission may deviate from the above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8."

Tariff Design

13. Regulation 9 & 10 of the RE Tariff Regulations state as under:

"9. Tariff Structure

The tariff for renewable energy technologies shall be single part tariff consisting of the following fixed cost components:

(a) Return on equity;

(b) Interest on loan capital;

(c) Depreciation;

(d) Interest on working capital;

(e) Operation and maintenance expenses;

Provided that for renewable energy technologies having fuel cost component, like biomass power projects and non-fossil fuel based cogeneration, single part tariff with two components, fixed cost component and fuel cost component, shall be determined.

10. Tariff Design

(1) The generic tariff shall be determined considering the year of commissioning of the project, on levellised basis for the Tariff Period.

Provided that for renewable energy technologies having single part tariff with two components, tariff shall be determined on levellised basis considering the year of commissioning of the project for fixed cost component while the fuel cost component shall be specified on year of operation basis.

(2) For the purpose of levellised tariff computation, the discount factor equivalent to Post Tax weighted average cost of capital shall be considered.

(3) Levellisation shall be carried out for the 'useful life' of the Renewable Energy project.

(4) The above principles shall also apply for project specific tariff."

14. Accordingly, the Commission shall determine the project specific tariff of NLCIL's project as a single part tariff considering the year of commissioning of the project.

Return on Equity

15. NLCIL claimed Return on Equity in terms of Regulation 16 of the RE Tariff Regulations 2017 as 14% grossed up at MAT rate. NLCIL has submitted the rate of Pre-Tax on Return on Equity as 16.964% based on MAT rate as 17.472%.

16. Regulation 16 of the RE Tariff Regulations 2017 states as under:

> ***"16. Return on Equity***
> *(1) The value base for the equity shall be 30% of the capital cost or actual equity (in case of project specific tariff determination) as determined under Regulation 13.*
> *(2) The normative Return on Equity shall be 14%, to be grossed up by prevailing Minimum Alternate Tax (MAT) as on 1st April of previous year for the entire useful life of the project."*

17. The Commission notes that the project in the instant case was commissioned during 2020-21 (as on 30.06.2020 being the date of commissioning of the last unit of the project). For the FY 2020-21, the MAT rate was 15% and accordingly the effective MAT rate (including 12% surcharge and 4% Health and Education cess) works out to 17.472%. NLCIL has considered the same (17.472%) for the purpose of grossing up of ROE. The normative ROE of 14% grossed up by 17.472% yields the Return on Equity Rate of 16.964%. Accordingly, same has been considered for purpose of tariff determination.

Interest on Loan Capital

18. For the purpose of determination of tariff, NLCIL has considered loan tenure of 13 years in terms of Regulation 14 of the RE Tariff Regulations 2017. The rate of interest for the 20 MW Solar PV Power Project has been computed in terms of Regulation 14 of the RE Tariff Regulations 2017 as 9.68%.

19. Regulation 14 of the RE Tariff Regulations 2017 states as under:-

> ***"(1) Loan Tenure***
> *For the purpose of determination of tariff, loan tenure of 13 years shall be considered.*

(2) Interest Rate

(a) The loans arrived at in the manner indicated in Regulation 13 shall be considered as gross normative loan for calculation for interest on loan. The normative loan outstanding as on April 1st of every year shall be worked out by deducting the cumulative repayment up to March 31st of previous year from the gross normative loan.

(b) For the purpose of computation of tariff, normative interest rate of two hundred (200) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one year tenor) prevalent during the last available six months shall be considered.

(c) Notwithstanding any moratorium period availed by the generating company, the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed."

20. In terms of Regulation 14 of the RE Tariff Regulations, 2017, the Interest on Loan shall be allowed at interest rate equivalent to the normative interest rate of two hundred (200) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one year tenor) prevalent during the last available six months.

21. The monthly data of MCLR for the last available six months (prior to the COD of the project) from the State Bank of India and the average MCLR is shown in following table:

Effective Date	**One Year Tenor MCLR Rates**
01.12.2019 to 09.12.2019	8.00%
10.12.2019 to 09.01.2020	7.90%
10.01.2020 to 09.02.2020	7.90%
10.02.2020 to 09.03.2020	7.85%
10.03.2020 to 09.04.2020	7.75%
10.04.2020 to 09.05.2020	7.40%
10.05.2020 to 31.05.2020	7.25%
Avg. for last Available 6 months	**7.72%**

22. Accordingly, the Commission has allowed the interest rate for loan component as 9.72%. [Avg. of past six months SBI MCLR one-year tenor (7.72%) + 200 bps].

Depreciation

23. NLCIL has claimed the depreciation as 5.28% for the first 13 years of the project life and the remaining depreciation shall be spread over the useful life of the project. The salvage value of the asset has been considered as 10%.

24. Regulation 15 of RE Tariff Regulations 2017 states as under:

> ***"15. Depreciation***
> *(1) The value base for the purpose of depreciation shall be the Capital Cost of the asset admitted by the Commission. The Salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the Capital Cost of the asset.*
>
> *(2) Depreciation rate of 5.28% per annum for first 13 years and remaining depreciation to be spread during remaining useful life of the RE projects considering the salvage value of the project as 10% of project cost shall be considered.*
>
> *(3) Depreciation shall be chargeable from the first year of commercial operation. Provided that in case of commercial operation of the asset for part of the year, depreciation shall be charged on pro rata basis."*

25. Accordingly, in terms of above Regulation the Commission approves the depreciation at 5.28% for the first 13 years and the remaining depreciation spread over the useful life of the project. The salvage value of the asset is considered as 10% and depreciation is allowed upto 90% of the capital cost.

Interest on Working Capital

26. NLCIL claimed the interest on working capital considering 6 months average State Bank of India (SBI) MCLR (1 Year Tenor) of 7.68% plus 300 basis points.

27. Regulation 17 of the RE Tariff Regulations 2017 states as under:

> ***"17. Interest on Working Capital***
> *(1) The Working Capital requirement in respect of Wind energy projects, Small Hydro Power, Solar PV and Solar thermal power projects shall be computed in accordance with the following:*
> *a) Operation & Maintenance expenses for one month;*
> *b) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative Capacity Utilisation Factor (CUF);*
> *c) Maintenance spare @ 15% of operation and maintenance expenses*
> *…*
> *(3) Interest on Working Capital shall be at interest rate equivalent to the normative interest rate of three hundred (300) basis points above the average State Bank of India MCLR (One Year Tenor) prevalent during the last available six months for the determination of tariff."*

28. The Commission has considered the interest on working capital in terms of Regulation 17 of the RE Tariff Regulations 2017. The interest rate has been computed as average of the State

Bank of India MCLR (One Year Tenor) prevalent during the last available six months (prior to the COD of the project) plus 300 basis points. Therefore, the Commission has considered the interest on working capital as 10.72% [Avg. of past six months SBI MCLR one-year tenor (7.72%) + 300 bps].

Discount Rate

29. Regulation 10 (2) of the RE Tariff Regulations 2017 provides as under:

> ***"10 Tariff Design***
>
> *(2) For the purpose of levelized tariff computation, the discount factor equivalent to Post Tax weighted average cost of capital shall be considered."*

30. NLCIL has considered the discount factor as 9.792% for the purpose of Tariff determination.

31. The Commission notes that the discount factor considered for this exercise is equal to the post tax weighted average cost of capital on the basis of normative debt: equity ratio (70:30) specified in the Regulations. Considering the normative debt equity ratio and weighted average of the post-tax rates for debt and equity component, the discount factor is calculated. The Interest Rate considered for the loan component (i.e.70 %) of capital cost is 9.72 %. For equity component (i.e. 30 %), the rate of Return on Equity (ROE) is considered at post tax rate of 14 %. The corporate tax rate is considered as 34.94% (30% IT rate+ 12% surcharge +4% Health and Education cess. The discount factor derived by this method for all technologies works out to 8.63% [(9.72 % x 0.70 x (1 – 34.94%)) + (14.0% x 0.30)]. Accordingly, the Commission allows the discount rate of 8.63 % in the instant case.

Capital Cost of the Project

32. The project was setup under the under the Central Financial Assistance scheme of Government of India, Ministry of New and Renewable Energy (MNRE). EPC cost of the project discovered through competitive bidding process was Rs 11287.47 lakh.

33. Subsidy from MNRE (Central Finance Assistance) sanctioned amount was Rs. 4514.99 lakh out of which Rs.677.25 lakh was received on 10.10.2019. Thereafter, MNRE has released the 2nd and 3rd tranche of CFA of Rs.3796.68 lakh (@ 40% of incurred expenditure of Rs. 11184.82 lakh) to NLCIL.

34. NLCIL submitted that the total hard cost and the IDC which was initially at Rs. 130.77 Cr. was revised to Rs. 132.79 Cr. including the cost of Operation and Maintenance(O&M) for 10 years after one year warranty period at Attam Pahad and Dolly Gunj. Due to safeguard Duty the project Cost has further increased from Rs. 132.79 Cr. to Rs. 138.63 Cr. (including of O&M component for 10 years).

35. The breakdown of the capital cost as submitted by NLCIL is as under:

Sl.No	Description	Cost (Rs lakhs)
1.	EPC Cost of the project	11287.47
2.	Pre Project Activities	357.00
3.	Interest During Construction (IDC)	530.00
4.	Contingency	338.62
5.	Overhead	564.37
6.	Safeguard Duty on SPC Module	583.73
	Total Project Cost without Subsidy	**13661.21**

36. Regulation 52 of the RE Tariff Regulations 2017 states as under:

> ***"52. Capital Cost***
> *The Commission shall determine only project specific capital cost and tariff based on prevailing market trends for Solar PV projects."*

37. NLCIL has submitted the Letter of Intent and the Contract signed with the EPC Contractor for the EPC activities for the entire project (20 MW Solar PV+ BESS) as Rs. 11287.47 lakhs. According to the Auditor's certificate, NLCIL has paid Rs. 9454.15 lakh towards EPC contract as on 30.06.2020 and the balance project cost to be paid as per the EPC contract is Rs. 1833.32 lakh. The Pre-Project Activities, IDC, and Overhead expenses paid by NLCIL as on 30.06.2020 were Rs. 54.79 lakh; Rs 478.72 lakh; and Rs. 187.554 lakh respectively. As per the Auditor's Certificate the balance project cost to be paid/spent by NLCIL towards project cost amounts to Rs. 3434.80 lakh. NLCIL has claimed this liability as an additional capitalisation (Rs in Lakh) in FY 20-21, FY 21-22 and FY22-23 without providing any details, as follows:

2020-21	2021-22	2022-23
1014.28	1288.08	1132.44

38. Upon scrutiny of the documents submitted by NLCIL, the Commission is of the view that the

EPC cost of Rs. 11287.47 Lakhs has been discovered through the competitive bidding process and the same can been considered for determination of tariff. Out of this EPC cost, Rs. 9454.15 lakh has been incurred by NLCIL as on 30.06.2020 i.e. COD of the Project as per Auditor's Certificate. The remaining amount of Rs. 1833.32 lakh has been considered as liability towards EPC contractor and considered to be paid as follows:

Year	Liability towards Contractor	Remark
FY 2020-21	Rs. 430.54 lakh	As per the liability discharged by NLCIL after Auditor's Certificate
FY 2021-22	Rs. 1300.12 lakh	As per MNRE letter dated 30.03.2022, the cost paid by NLCIL towards EPC contractor is Rs. 111,84,82,146 out of total EPC cost of Rs. 112,87,47,201
FY 2022-23	Rs. 102.65 lakh	Remaining cost of the EPC Cost

39. As regards the cost towards pre-project activities, the Commission has considered the cost paid by NLCIL as per the Auditors certificate as Rs. 54.79 lakh against NLCIL's claim of Rs 357.00 lakh. In the absence of any actual data for Project Overheads, the cost estimated in the Auditor's certificate as Rs. 187.45 lakh is considered as against NLCIL's claim of Rs. 564.37 lakh. Further, NLCIL has also claimed the cost of Rs 478.72 lakhs as Interest During Construction (IDC). However, as per the Auditor's Certificate, the IDC incurred is Rs 453.06 lakh. As regards expenditure on account of Contingency, NLCIL has claimed Rs. 338.62 lakh in its petition without any basis. The Auditor's Certificate provided by NLCIL has not shown any cost incurred by NLCIL under this head as on 30.06.2020. Hence the Commission rejects the claim under contingency head by NLCIL.

40. Accordingly, the following table provides approved cost by the Commission under different heads as against those claimed by the Petitioner:

Sl.No	Description	As Claimed by the Petitioner (Rs. Lakh)	As approved by the Commission (Rs. Lakh)
1.	EPC Cost of the project	11287.47	11287.47
2.	Pre-Project Activities	357.00	54.79
3.	Interest During Construction	478.72	453.06
4.	Contingency	338.62	-
5.	Overhead	564.37	187.45
6.	Safeguard Duty	583.74	583.74
7.	**Total Project Cost without Subsidy**	**13609.92**	**12566.62**
8.	MNRE subsidy	4473.93	4473.93
9.	**Project Cost with Subsidy**	**9135.99**	**8092.59**

41. Based on the approved cost of the project, and the Central Finance Assistance (CFA) to be released by the MNRE, the Commission approves the Capital Cost of the project (20 MW Solar PV+ BESS) as Rs 12566.62 lakh without subsidy.

42. As submitted by NLCIL, the total subsidy received in different tranches is Rs. 4473.92 lakh and hence the Capital Cost for the project (20 MW Solar PV+ BESS) after considering the subsidy amount shall be Rs 8092.59 lakh. As submitted in the petition, the 1st tranche of subsidy amount Rs 677.25 lakh was considered before the COD of the Project and the remaining 2nd and 3rd tranche of Rs. 3796.68 lakh are considered after COD of the Project for the purpose of determination of tariff.

Capacity Utilisation Factor (CUF)

43. NLCIL submitted that according to the Detailed Project Report (DPR) prepared for the project, the Capacity Utilisation Factor (CUF) for the 20 MW Solar PV Project is 17.24% without battery energy storage system. On including the BESS, the CUF is arrived as 15.33%.

44. Regulation 53 of the RE Tariff Regulations 2017 states as under:

> ***"53. Capacity Utilisation Factor***
> *The CUF for Solar PV project shall be 19%.*
> *Provided that the Commission may deviate from above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8."*

45. The Commission notes that Regulation 36.1 of the JERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2019 provides as under:

State/UT	***CUF (%)***
Puducherry	*18%*
Dadra & Nagar Haveli	*18%*
Lakshadweep	*17%*
Andaman & Nicobar Islands	***17%***
Daman	*18%*
Diu	*18%*
Chandigarh	*17%*
Goa	*18%*

Provided that the Commission may deviate from the norm in case of project specific tariff determination in accordance with Regulations 9."

46. It is also noted that the project CUF is in line with the norms specified for the Solar PV

Projects for Andaman & Nicobar Islands by the JERC (Goa & UTs), and the Commission is inclined to accept this as a special case given the project specific conditions in the instant case, in deviation of the norm specified in the RE Tariff Regulations, 2017.

47. NLCIL has submitted that the project could not achieve the required CUF due to the curtailment by the Respondent on account of grid fluctuation. The Commission during the hearing took note of this and directed the parties to take appropriate measures to reduce the curtailment of solar power. However, for the purpose of the tariff determination, the Commission has considered the CUF of 17.24% without BESS and CUF of 15.33% with BESS.

Auxiliary Consumption

48. It is submitted by NLCIL that degradation has not been categorically specified in the RE Tariff Regulations 2017. Further, NLCIL has prayed that it may be permitted to adopt degradation factor of 1% per year for the first 10 years and 0.70% per year for the balance 15 years for solar PV modules degradation as per the industry practice in the present project specific tariff determination in exercise of 'Power to Relax' under Regulation 85. In view of the above, the Petitioner has requested to increase auxiliary consumption for 11 months period from June 2020 to March 2021 as 8.51%.

49. Regulation 53 of the RE Tariff Regulations 2017 states as under:

> ***"55. Auxiliary Consumption***
> *The auxiliary consumption factor shall be 0.25% of gross generation.*
> *Provided that the Commission may deviate from the above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8.*

50. The Respondent has argued that the Auxiliary consumption in the present case is much higher than 0.25% of gross generation specified under Regulation 55 of the RE Tariff Regulations 2017.

51. The Commission notes that the RE Tariff Regulations 2017 do not provide any norms for the BESS. After going through the documents submitted by NLCIL, and with due regard to the special circumstances of the project located in Andaman & Nicobar Islands, the Commission considers it necessary to allow deviation and approves the auxiliary consumption of Solar Project with BESS as 8.51% of the gross generation as claimed by NLCIL along with

degradation factor 1.00% for the first ten years and 0.7% for the remaining period.

Operation and Maintenance Expenses

52. NLCIL has submitted that the Operation and Maintenance contract for the entire project (20 MW Solar PV+ BESS) has been signed with the EPC Contractor for a period of 10 years after one year warranty period. The price bases are lumpsum and firm and inclusive of 18% GST. The Operation and Maintenance contract price for the entire project (20 MW Solar PV+ BESS) for the 10-year period is Rs 1991.90 lakhs inclusive of 18% GST.

53. In terms of Regulation 54 and based on the O&M contract for the 10 years after 1st year (guarantee period) for Rs.199.19 lakhs per annum (outsourced to M/s L & T), and also taking into account the cost of NLCIL personnel deputed to site and other establishment charges during the period of Operation and Maintenance, additional O & M Cost of Rs.116.98 lakhs per annum with an escalation of 5.72 % per annum has been claimed by NLCIL.

54. Regulation 54 of the RE Tariff Regulations 2017 states as under:

> ***54. Operation and Maintenance Expenses***
> *The Commission shall determine only project specific O&M expenses based on prevailing market trends for Solar PV project.*

55. Upon scrutiny of the Operation and Maintenance expenses as claimed by NLCIL, the Commission notes that the escalation of 5.72% shall not be applicable for the period of 10 years after the one year warranty period as the Operation and Maintenance contract prices are lumpsum and on firm basis. There is no escalation applicable on such contracted price. In addition, the O&M for the first year after commissioning (warranty period) is the responsibility of the contractor. However, it is observed that an escalation of 5.72% shall be applicable on the departmental O&M expenses as submitted by NLCIL.

56. Accordingly, the Commission approves the Operation and Maintenance expenses as under:

Particulars	**Cost (Rs lakhs)**	**Escalation applicable**
Departmental O&M Expenses	116.98 per annum (1st Year)	Escalation @5.72% per annum for the entire useful life
Contracted O&M Expenses	1991.90 for 10 years beginning 2nd year	No escalation for the contracted period. Post the contracted period, escalation @5.72% per annum for the remaining period of the project life

Battery Replacement Cost

57. NLCIL has submitted the detailed break-up of the battery cost, rationale for replacement cost for battery and note on the methodology for arriving at the battery replacement cost. The total cost of equipment is Rs. 33,85,11,974. In the Design Basis of the Plant- parameters of BESS, it is indicated by the L&T that the cycle life is 4000 cycles. Considering one cycle per day, it works out to 11 years. In view of this, Battery replacement is to be done after 11 years. An amount of Rs.3104.37 lakhs is included as addition in the 12th year for the replacement of 8 MWHr Battery.

58. The methodology of arriving at the battery cost is furnished below:

Battery cost as per DPR 14.4 (Page 70)						0.3		$/whr			
Capacity to be replaced (whr)						8000000		8 MWHr			
Avg. Exchange rate						75.6275		Rs per $ (26.06.2020)			
Escalation on exchange rate & technological changes						5 % (YoY)					
Battery replacement cost at 12th year						3104.3686		Rs. In Lakhs			
1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	11th year	12th year
1815	1906	2001	2101	2206	2317	2432	2554	2682	2816	2957	3104

59. Therefore, NLCIL has sought the battery replacement cost as additional capitalization during the 12th year of the project life. The cost claimed is Rs 3104.37 lakh.

60. The Commission observes that the battery life cycle is 10-12 years based on the technology being used by NLCIL. Therefore, battery replacement is required after its project life.

61. The Commission has considered the battery replacement cost based on two sets of assumptions, viz., (i) the projected BESS cost (declining trend); and (ii) the foreign exchange rate variation (increasing trend). *Firstly*, the cost of battery in the 12th year after the COD has been taken as $ 0.3/Whr as claimed by the Petitioner (which translates to a decline of battery cost by approximately 46% over the period of 12 years from the COD and is considered reasonable based on the information gathered from various reports on BESS cost). *Secondly*, the actual exchange rate for the first four years (January 2020-January 2023) has been taken and after that the exchange rate is escalated on year on year basis at the rate of 5% till the year of replacement. Therefore, based on the above assumptions of technological change and the escalation rate of exchange , the Commission approves the cost of

replacement of BESS as Rs 2951.47 lakh in the 12th year of the project life. However, considering the battery replacement, return on equity towards the old battery has not been allowed since the year of replacement.

62. A summary of the parameters approved by the Commission is as under:

SL. NO	DETAILS	As submitted by NLCIL	As computed
	CAPACITY IN MW	20	20
1	CAPITAL COST (Rs lakhs)		
	EPC Cost (inclusive of PV Modules, Module mounting structures, PCU, Cables and Transformers, Civil & General Works)	11287.47	11287.47
	Pre Project Activities	357.00	54.79
	Interest During Construction	478.72	453.06
	Project Overheads	564.37	187.45
	Contingency	338.62	-
	Safeguard Duty	583.74	583.74
	TOTAL PROJECT COST (RS LAKHS) (without subsidy)	**13609.92**	**12566.52**
2	SUBSIDY FROM MNRE (Rs lakhs)	4473.93	4473.93
	NET CAPITAL COST (Rs lakhs) (after subsidy)	9135.99	8092.59
3	DEBT %	70	70
4	EQUITY %	30	30
5	LOAN TENURE YRS	13	13
6	PROJECT USEFUL LIFE (YRS)	25	25
7	INTEREST ON LOAN %	9.68	9.72%
8	DEPRECIATION		
	SALVAGE VALUE	10%	10%
	RATE (for 1st 13 years)	5.28%	5.28%
	RATE (for remaining life)	Balance useful life	Balance useful life
9	ROE (grossed up by MAT)	14%	14%
10	MAT RATE %	17.472	17.472

11	O & M EXPENSES (LAKH/MW)	O&M expenses per annum (Departmental) Rs 116.98 lakhs per annum O&M expenses per annum (Contractual only Incl. BESS) Rs 199.19 lakhs per year	Departmental O&M Rs 116.98 lakhs per year Contracted O&M Rs 1991.90 lakhs (fixed lumpsum price for 10 years)
	O&M ESCALATION RATE	5.72%	5.72%
12	INTEREST ON WC % (MCLR +300)	10.68	10.72%
13	CUF HOURS	8766	8766
14	CUF %	17.24 without BESS	17.24 without BESS
		15.33(with BESS)	15.33(with BESS)
15	AUX POWER CONSUMPTION	8.51%	8.51%
16	WACC%-DISCOUNT RATE	9.792	8.63%
17	DEGRADATION (first 10 years)	1%	1%
	DEGRADATION (after 10 years)	0.70%	0.70%
18.	BATTERY REPLACEMENT COST PER MW (after 12 year)	3104.37	2951.47

63. Based on the approval of the aforesaid parameters for the 20 MW Solar Project with BESS, the tariff for the project life of the project is determined as Rs 6.99 per kWh as at Annexure-I.

64. Accordingly, the Commission approves the levelized tariff of Rs. 6.99 per kWh as against the Petitioner's claim of Rs. 7.434 per kWh with actual CFA received. NLCIL is hereby directed to raise bills for the energy generated from the project on the basis of the tariff approved as above.

65. The Petition No. 218/GT/2019 is dismissed in terms of the above.

Sd/- **Sd/-** **Sd/-**

पी. के. सिंह **अरुण गोयल** **आई.एस. झा**
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Annexure-I

Unit	**NLC India Limited , Neyveli**
Plant Capacity	**NLCIL 2X10 MW (AC) Grid interactive Solar PV power project integrated with 8 MWhr BESS in South Andaman**
Tariff Requested	**NLCIL 2X10 MW (AC) Grid interactive Solar PV power project in South Andaman**

Sl. No	Assumption Head	Sub Head	Sub Head 2	Unit	Parameter
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	20
			Capacity utilization Factor	%	17.24
			Degradation (1st Year)	%	2.5
			Degradation (2nd Year to 10th Year)	%	1.00
			Degradation (11 th Year inwards)	%	0.66
			Auxiliary Consumption	%	8.51
			Commercial Operation date	DD/MM/YYYY	30-06-2020
			Useful Life	Years	25
2	Project Cost	Capital Cost / MW	Normative Capital Cost	Rs Lakhs	10149.46
			Capital Cost	Lakhs/MW	507.47
			Capital Subsidy, if any	Rs Lakhs	677.25
			Capital Subsidy, if any (Tranche 2 &3)	Rs Lakhs	3796.68
			Net Capital Cost	Rs Lakhs	9472.21
			Sub total Liabilities Discharged after COD Yr1	Rs Lakhs	1014.28
			Liabilities to be discharges during Yr2	Rs Lakhs	1300.12
			Liabilities to be discharges during Yr3	Rs Lakhs	102.65
3	Financial Assumption	Debit/Equity	Tariff Period	Years	25
			Equity	%	30
			Debt	%	70
			Total Debt Amount	Rs lakhs	6630.55
			Total Equity Amount	Rs lakhs	2841.66
		Debt Component	Loan Amount		6630.55
			Moratorium period	Years	NA
			Repayment period (incl. Moratorium)	years	NA
			Interest Rate	%	9.72
		Equity Component	Equity Amount	Rs lakhs	2841.66
			Return on Equity	%	14
			Discount Rate	%	8.63
		Depreciation	Depreciate rate for 1st 13 years	%	5.28
			Depreciate rate for 14th year onwards	%	Balance useful life
			Generation based incentive if any	Rs lakhs	0
4	Operation & Maintenance	Normative O&M Expenses		Rs Lakhs/MW	9.96
		O&M expenses per annum (Contractual only Incl BESS)		Rs lakhs	199.19
		O&M expenses per annum (Departmental)		Rs in lakhs	116.98
		Escalation factor for O&M expenses		%	5.72
5	Working capital	O&M Expenses		Month	1

		Maintenance Spares	**%**	15
		Receivables	**Months**	2
		Interest on Working capital	**%**	10.72
6	**ROE**	**Post Tax ROE**	**%**	14
		MAT Tax Rate	**%**	17.472
		Battery Replacement Cost on 12th Year	**Rs Lakhs/MW**	2951.47

Unit	NLC India Limited , Neyveli FORM 2.1												
Plant Capacity	NLCIL 2X10 MW (AC) Grid interactive Solar PV power project integrated with 8 MWhr BESS in South Andaman												
Tariff required	NLCIL 2X10 MW (AC) Grid interactive Solar PV power project in South Andaman												
Units Generation	**Unit**	**Y-1**	**Y-2**	**Y-3**	**Y-4**	**Y-5**	**Y-6**	**Y-7**	**Y-8**	**Y-9**	**Y-10**	**Y-11**	**Y-12**	**Y-13**
Installed Generation	**MW**	20	20	20	20	20	20	20	20	20	20	20	20	20
Gross Generation	**MU**	30.2252	29.46954	29.1748	28.88309	28.5943	28.3083	28.0252	27.74499	27.4675	27.1929	26.92093	26.74325	26.56675
Degradation (if any)	**MU**	0.75563	0.294695	0.29175	0.288831	0.28594	0.28308	0.28025	0.27745	0.27468	0.27193	0.177678	0.176505	0.175341
Auxiliary (Plant & BESS)	**MU**	2.57216	2.507858	2.48278	2.457951	2.43337	2.40904	2.38495	2.361098	2.33749	2.31411	2.290971	2.275851	2.26083
Net Generation	**MU**	26.8974	26.66699	26.4003	26.13631	25.8749	25.6162	25.36	25.10644	24.8554	24.6068	24.45228	24.2909	24.13058
Revenue	**Rs.Lakhs**	**1675.1**	**1863.33**	**1648.9**	**1646.42**	**1635.6**	**1625.3**	**1615.5**	**1606.25**	**1597.5**	**1589.4**	**1581.89**	**1909.4**	**2256.04**
Tariff Components	**Unit**	**Y-1**	**Y-2**	**Y-3**	**Y-4**	**Y-5**	**Y-6**	**Y-7**	**Y-8**	**Y-9**	**Y-10**	**Y-11**	**Y-12**	**Y-13**
O&M Expenses (Contractual)	**Rs . Lakhs**	0	199.1908	199.191	199.1908	199.191	199.191	199.191	199.1908	199.191	199.191	199.1908	367.2807	388.2891
O&M Expenses (Departmental)	**Rs . Lakhs**	116.981	123.6723	130.746	138.225	146.131	154.49	163.327	172.6694	182.546	192.988	204.0266	215.6969	228.0348
Depreciation	**Rs . Lakhs**	355.664	439.0001	382.121	384.5599	384.56	384.56	384.56	384.5599	384.56	384.56	384.5599	454.6867	524.8136
Interest on Loan	**Rs . Lakhs**	661.71	589.9476	489.936	474.7384	456.049	437.359	418.67	399.98	381.29	362.601	343.9112	422.2223	497.1254
Interest on Work. capital	**Rs . Lakhs**	32.8542	41.36737	37.714	37.8559	37.8611	37.886	37.9319	37.99976	38.091	38.2069	38.34883	48.69677	55.72425
Return on Equity @14%	**Rs . Lakhs**	507.869	470.1514	409.236	411.8481	411.848	411.848	411.848	411.8481	411.848	411.848	411.8481	400.8134	562.0542
Total Fixed Cost	**Rs . Lakhs**	1675.08	1863.33	1648.94	1646.418	1635.64	1625.33	1615.53	1606.248	1597.53	1589.39	1581.885	1909.397	2256.041
Per Unit Componenets	**Unit**	**Y-1**	**Y-2**	**Y-3**	**Y-4**	**Y-5**	**Y-6**	**Y-7**	**Y-8**	**Y-9**	**Y-10**	**Y-11**	**Y-12**	**Y-13**
PU O&M Expenses	**Rs/Kwhr**	0.43492	1.210722	1.24975	1.290985	1.33458	1.38069	1.42948	1.481135	1.53583	1.59378	1.648997	2.399984	2.55412
PU Depreciation	**Rs/Kwhr**	1.3223	1.646231	1.44741	1.471362	1.48622	1.50124	1.5164	1.531718	1.54719	1.56282	1.572695	1.87184	2.174891
PU Interest on Loan	**Rs/Kwhr**	2.46013	2.212277	1.8558	1.816394	1.76251	1.70735	1.6509	1.593137	1.53404	1.47358	1.406458	1.738192	2.060147
PU Interest on Work Capital	**Rs/Kwhr**	0.12215	0.155126	0.14285	0.14484	0.14632	0.1479	0.14957	0.151355	0.15325	0.15527	0.156831	0.200473	0.230928
PU Return on Equity	**Rs/Kwhr**	1.88817	1.763046	1.55012	1.57577	1.59169	1.60776	1.624	1.640408	1.65698	1.67372	1.684293	1.650056	2.32922
PU Total Fixed Cost	**Rs/Kwhr**	6.22766	6.987402	6.24592	6.299351	6.32133	6.34495	6.37037	6.397753	6.42729	6.45916	6.469275	7.860544	9.349305
Levelised Tariff	**Unit**	**Y-1**	**Y-2**	**Y-3**	**Y-4**	**Y-5**	**Y-6**	**Y-7**	**Y-8**	**Y-9**	**Y-10**	**Y-11**	**Y-12**	**Y-13**
Discount Factor	0.0862668	1	0.920584	0.84748	0.780172	0.71821	0.66118	0.60867	0.560331	0.51583	0.47487	0.437154	0.402437	0.370477
Discounted tariff Components	**Rs/Kwhr**	6.22766	6.432492	5.29327	4.914578	4.54007	4.19513	3.87744	3.584857	3.3154	3.06724	2.828072	3.163377	3.463707
Levelized Tariff	**Rs/Kwhr**	**6.99**												

Unit	NLC India Limited , Neyveli FORM 2.1											
Plant Capacity	NLCIL 2X10 MW (AC) Grid interactive Solar PV power project integrated with 8 MWhr BESS in South Andaman											
Tariff required	NLCIL 2X10 MW (AC) Grid interactive Solar PV power project in South Andaman											
Units Generation	**Unit**	**Y-14**	**Y-15**	**Y-16**	**Y-17**	**Y-18**	**Y-19**	**Y-20**	**Y-21**	**Y-22**	**Y-23**	**Y-24**	**Y-25**
Installed Generation	**MW**	20	20	20	20	20	20	20	20	20	20	20	20
Gross Generation	**MU**	26.39141	26.21722	26.04419	25.8723	25.70154	25.53191	25.3634	25.196	25.02971	24.86451	24.70041	24.53738
Degradation (if any)	**MU**	0.174183	0.173034	0.171892	0.170757	0.16963	0.168511	0.1674	0.16629	0.165196	0.164106	0.163023	0.161947
Auxiliary (Plant & BESS)	**MU**	2.245909	2.231086	2.216361	2.201733	2.187201	2.172766	2.15843	2.14418	2.130028	2.11597	2.102005	2.088131
Net Generation	**MU**	23.97132	23.81311	23.65594	23.49981	23.34471	23.19064	23.0376	22.8855	22.73448	22.58444	22.43538	22.28731
Revenue	**Rs.Lakhs**	**2138.44**	**2133.42**	**2129.23**	**1697.37**	**1714.38**	**1732.36**	**1751.4**	**1771.5**	**1792.7**	**1815.16**	**1838.9**	**1864**
Tariff Components	**Unit**	**Y-14**	**Y-15**	**Y-16**	**Y-17**	**Y-18**	**Y-19**	**Y-20**	**Y-21**	**Y-22**	**Y-23**	**Y-24**	**Y-25**
O&M Expenses (Contractual)	**Rs . Lakhs**	410.4993	410.4993	410.4993	410.4993	410.4993	410.4993	410.499	410.499	410.4993	410.4993	410.4993	410.4993
O&M Expenses (Departmental)	**Rs . Lakhs**	241.0783	254.868	269.4465	284.8588	301.1527	318.3787	336.59	355.843	376.1971	397.7156	420.4649	444.5155
Depreciation	**Rs . Lakhs**	392.2407	392.2407	392.2407	392.2407	392.2407	392.2407	392.241	392.241	392.2407	392.2407	392.2407	392.2407
Interest on Loan	**Rs . Lakhs**	478.0625	458.9996	439.9367									
Interest on Work. capital	**Rs . Lakhs**	54.50492	54.76019	55.0499	47.71961	48.43101	49.18309	49.9782	50.8188	51.70745	52.64694	53.64018	54.69023
Return on Equity @14%	**Rs . Lakhs**	562.0542	562.0542	562.0542	562.0542	562.0542	562.0542	562.054	562.054	562.0542	562.0542	562.0542	562.0542
Total Fixed Cost	**Rs . Lakhs**	2138.44	2133.422	2129.227	1697.373	1714.378	1732.356	1751.36	1771.46	1792.699	1815.157	1838.899	1864
Per Unit Componenets	**Unit**	**Y-14**	**Y-15**	**Y-16**	**Y-17**	**Y-18**	**Y-19**	**Y-20**	**Y-21**	**Y-22**	**Y-23**	**Y-24**	**Y-25**
PU O&M Expenses	**Rs/Kwhr**	2.718155	2.794122	2.874313	2.958994	3.048451	3.142984	3.24292	3.34859	3.460366	3.578636	3.703811	3.83633
PU Depreciation	**Rs/Kwhr**	1.636292	1.647163	1.658107	1.669123	1.680212	1.691375	1.70261	1.71392	1.725311	1.736774	1.748313	1.759929
PU Interest on Loan	**Rs/Kwhr**	1.994311	1.927508	1.85973	0	0	0	0	0	0	0	0	0
PU Interest on Work Capital	**Rs/Kwhr**	0.227376	0.229958	0.232711	0.203064	0.20746	0.212082	0.21694	0.22206	0.227441	0.233112	0.239087	0.245387
PU Return on Equity	**Rs/Kwhr**	2.344695	2.360273	2.375954	2.391739	2.40763	2.423626	2.43973	2.45594	2.472254	2.488679	2.505214	2.521858
PU Total Fixed Cost	**Rs/Kwhr**	8.920828	8.959024	9.000815	7.22292	7.343753	7.470066	7.6022	7.74051	7.885372	8.037201	8.196425	8.363504
Levelised Tariff	**Unit**	**Y-14**	**Y-15**	**Y-16**	**Y-17**	**Y-18**	**Y-19**	**Y-20**	**Y-21**	**Y-22**	**Y-23**	**Y-24**	**Y-25**
Discount Factor	0.0862668	0.341056	0.31397	0.289036	0.266082	0.244951	0.225498	0.20759	0.1911	0.175927	0.161956	0.149094	0.137254
Discounted tariff Components	**Rs/Kwhr**	3.042499	2.812869	2.601561	1.92189	1.79886	1.684485	1.57814	1.47924	1.387252	1.301672	1.222038	1.147921

Unit	NLC India Limited , Neyveli	FORM 2.1												
Plant Capacity	NLCIL 2X10 MW (AC) Grid interactive Solar PV power project integrated with 8 MWhr BESS in South Andaman													
Tariff required	NLCIL 2X10 MW (AC) Grid interactive Solar PV power project in South Andaman													
Interest on Loan working	**Unit**	**Y-1**	**Y-2**	**Y-3**	**Y-4**	**Y-5**	**Y-6**	**Y-7**	**Y-8**	**Y-9**	**Y-10**	**Y-11**	**Y-12**	**Y-13**
Gross Opening Loan (Normative)	**Rs . Lakhs**	6630.55	7340.546906	5592.957265	5664.81265	5664.81265	5664.81265	5664.81265	5664.81265	5664.81265	5664.81265	5664.81265	5664.81265	7730.841
Cuml. Repayment up to PY	**Rs . Lakhs**	0	355.6641618	794.6642462	1176.785122	1561.344975	1945.904828	2330.464681	2715.024534	3099.584387	3484.14424	3868.704093	4253.263946	4707.951
Net Loan Opening	**Rs . Lakhs**	6630.55	6984.882744	4798.293019	4488.027528	4103.467675	3718.907822	3334.347969	2949.788116	2565.228263	2180.66841	1796.108557	1411.548704	3022.89
Additions		709.999	910.086541	71.855385	0	0	0	0	0	0	0	0	2066.027982	0
Less: CFA Tranche		0	2657.676182	0	0	0	0	0	0	0	0	0	0	0
Less: Repayment (Dep)	**Rs . Lakhs**	355.664	439.0000844	382.120876	384.559853	384.559853	384.559853	384.559853	384.559853	384.559853	384.559853	384.559853	454.6867457	524.8136
Closing Loan (Normative)	**Rs . Lakhs**	6984.88	4798.293019	4488.027528	4103.467675	3718.907822	3334.347969	2949.788116	2565.228263	2180.66841	1796.108557	1411.548704	3022.889939	2498.076
Average Loan	**Rs . Lakhs**	6807.72	6069.419962	5040.492396	4884.140162	4691.860236	4499.580309	4307.300383	4115.020456	3922.74053	3730.460603	3538.180677	4343.851295	5114.458
Interest on Loan	**9.72**	**661.71**	**589.9476203**	**489.9358609**	**474.7384238**	**456.0488149**	**437.3592061**	**418.6695972**	**399.9799884**	**381.2903795**	**362.6007706**	**343.9111618**	**422.22235**	**497.125**
Interest on Working Capital Loan	**Unit**	**Y-1**	**Y-2**	**Y-3**	**Y-4**	**Y-5**	**Y-6**	**Y-7**	**Y-8**	**Y-9**	**Y-10**	**Y-11**	**Y-12**	**Y-13**
Debtors	**2 Month**	279.18	310.554923	274.8239798	274.4030156	272.6066929	270.889036	269.2545447	267.7079761	266.2543593	264.8990112	263.6475527	318.2327973	376.0069
O&M Expenses	**1 Month**	9.74841	26.90525916	27.49476365	28.1179878	28.77686037	29.47342045	30.20982377	30.98834935	31.8114066	32.68154273	33.60145064	48.58146235	51.36032
Maintenance Spares	**15% O&M**	17.5471	48.42946649	49.49057457	50.61237804	51.79834866	53.05215681	54.37768278	55.77902884	57.26053189	58.82677691	60.48261115	87.44663223	92.44858
Total		306.475	385.8896487	351.809318	353.1333815	353.1819019	353.4146132	353.8420512	354.4753543	355.3262978	356.4073308	357.7316145	454.2608919	519.8158
Interest on Working Cap Loan	**10.72**	32.8542	41.36737034	37.71395889	37.85589849	37.86109988	37.88604654	37.93186789	37.99975798	38.09097912	38.20686586	38.34882908	48.69676761	55.72425
ROE	**Unit**	**Y-1**	**Y-2**	**Y-3**	**Y-4**	**Y-5**	**Y-6**	**Y-7**	**Y-8**	**Y-9**	**Y-10**	**Y-11**	**Y-12**	**Y-13**
Opening Equity	**Rs . Lakhs**	2841.66	3145.948674	2396.981685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	3313.217
Additions		304.285	390.037089	30.795165	0	0	0	0	0	0	0	0	-130.095358	0
Less: CFA Tranche		0	1139.004078	0	0	0	0	0	0	0	0	0	0	0
Closing Equity	Rs . Lakhs	3145.95	2396.981685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2297.681492	3313.217
Average Equity	Rs . Lakhs	2993.81	2771.46518	2412.379268	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2427.77685	2362.729171	3313.217
ROE	**16.964**	**507.87**	**470.1513531**	**409.2360189**	**411.8480648**	**411.8480648**	**411.8480648**	**411.8480648**	**411.8480648**	**411.8480648**	**411.8480648**	**411.8480648**	**400.81338**	**562.054**
Depreciation	**Unit**	**Y-1**	**Y-2**	**Y-3**	**Y-4**	**Y-5**	**Y-6**	**Y-7**	**Y-8**	**Y-9**	**Y-10**	**Y-11**	**Y-12**	**Y-13**
Gross Project Cost	**Rs . Lakhs**	10149.5	10149.45991											
Less CFA Tranche -1	**Rs . Lakhs**	677.248												
Less CFA Tranche - 2 &3	**Rs . Lakhs**		3796.68026											
Net Project Cost	**Rs . Lakhs**	9472.21												
Un-discharged on 30.06.20														
Opening CAPEX	**Rs . Lakhs**	9472.21	10486.49558	7989.93895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	11044.06
Additions		1014.28	1300.12	102.65									2951.468545	
Less: CFA Tranche 2 &3			3796.68026											
Closing	**Rs . Lakhs**	10486.5	7989.93895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	11044.05805	11044.06
Average	**Rs . Lakhs**	9979.35	9238.217265	8041.264225	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	8092.5895	9568.323773	11044.06
Balance Depreciable Amount	**0.9**	9082.18	6396.280809	6106.545428	5721.985575	5337.425722	4952.865869	4568.306016	4183.746163	3799.18631	3414.626457	3030.066604	5231.701548	4706.888
Remaining Period			24	23	22	21	20	19	18	17	16	15	14	13
Depreciation	**0.0528**	**355.66**	**439.0000844**	**382.120876**	**384.559853**	**384.559853**	**384.559853**	**384.559853**	**384.559853**	**384.559853**	**384.559853**	**384.559853**	**454.68675**	**524.814**

Unit		NLC India Limited , Neyveli			FORM 2.1								
Plant Capacity		NLCIL 2X10 MW (AC) Grid interactive Solar PV power project integrated with 8 MWhr BESS in South Andaman											
Tariff required		NLCIL 2X10 MW (AC) Grid interactive Solar PV power project in South Andaman											
Interest on Loan working	**Unit**	**Y-14**	**Y-15**	**Y-16**	**Y-17**	**Y-18**	**Y-19**	**Y-20**	**Y-21**	**Y-22**	**Y-23**	**Y-24**	**Y-25**
Gross Opening Loan (Normative)	**Rs . Lakhs**	7730.8406	7730.8406	7730.84063	7730.8406	7730.8406	7730.8406	7730.841	7730.8406	7730.8406	7730.8406	7730.84063	7730.84063
Cuml. Repayment up to PY	**Rs . Lakhs**	5232.7643	5625.005	6017.24565	6409.4863	6801.727	7193.9676	7586.208	7978.4489	8370.6896	8762.9303	9155.17092	9547.41158
Net Loan Opening	**Rs . Lakhs**	2498.0763	2105.8356	1713.59498	1321.3543	929.11366	536.87301	144.6323	0	0	0	0	0
Additions		0	0	0	0	0	0	0					
Less: CFA Tranche		0	0	0	0	0	0	0					
Less: Repayment (Dep)	**Rs . Lakhs**	392.24066	392.24066	392.240659	392.24066	392.24066	392.24066	144.6323	0	0	0	0	0
Closing Loan (Normative)	**Rs . Lakhs**	2105.8356	1713.595	1321.35432	929.11366	536.87301	144.63235	0	0	0	0	0	0
Average Loan	**Rs . Lakhs**	4918.3381	4722.2178	4526.09748	4329.9771	4133.8568	3937.7365						
Interest on Loan	**9.72**	**478.06247**	**458.99957**	**439.936675**	**420.87378**	**401.81088**	**382.74799**	**0**	**0**	**0**	**0**	**0**	**0**
Interest on Working Capital Loan	**Unit**	**Y-14**	**Y-15**	**Y-16**	**Y-17**	**Y-18**	**Y-19**	**Y-20**	**Y-21**	**Y-22**	**Y-23**	**Y-24**	**Y-25**
Debtors	**2 Month**	356.40664	355.57032	354.871193	282.89542	285.72964	288.72598	291.8937	295.24263	298.78311	302.5261	306.483197	310.666637
O&M Expenses	**1 Month**	54.298132	55.447272	56.6621434	57.946505	59.304332	60.739827	62.25743	63.861844	65.558028	67.351234	69.2470115	71.2512274
Maintenance Spares	**15% O&M**	97.736638	99.80509	101.991858	104.30371	106.7478	109.33169	112.0634	114.95132	118.00445	121.23222	124.644621	128.252209
Total		508.44141	510.82268	513.525194	445.14564	451.78177	458.79749	466.2145	474.05579	482.34559	491.10956	500.374829	510.170074
Interest on Working Cap Loan	**10.72**	54.504919	54.760191	55.0499008	47.719612	48.431006	49.183091	49.9782	50.818781	51.707447	52.646945	53.6401817	54.6902319
ROE	**Unit**	**Y-14**	**Y-15**	**Y-16**	**Y-17**	**Y-18**	**Y-19**	**Y-20**	**Y-21**	**Y-22**	**Y-23**	**Y-24**	**Y-25**
Opening Equity	**Rs . Lakhs**	3313.2174	3313.2174	3313.21741	3313.2174	3313.2174	3313.2174	3313.217	3313.2174	3313.2174	3313.2174	3313.21741	3313.21741
Additions		0	0	0	0	0	0	0	0	0	0	0	0
Less: CFA Tranche		0	0	0	0	0	0	0	0	0	0	0	0
Closing Equity	Rs . Lakhs	3313.2174	3313.2174	3313.21741	3313.2174	3313.2174	3313.2174	3313.217	3313.2174	3313.2174	3313.2174	3313.21741	3313.21741
Average Equity	Rs . Lakhs	3313.2174	3313.2174	3313.21741	3313.2174	3313.2174	3313.2174	3313.217	3313.2174	3313.2174	3313.2174	3313.21741	3313.21741
ROE	**16.964**	**562.0542**	**562.0542**	**562.054202**	**562.0542**	**562.0542**	**562.0542**	**562.0542**	**562.0542**	**562.0542**	**562.0542**	**562.054202**	**562.054202**
Depreciation	**Unit**	**Y-14**	**Y-15**	**Y-16**	**Y-17**	**Y-18**	**Y-19**	**Y-20**	**Y-21**	**Y-22**	**Y-23**	**Y-24**	**Y-25**
Gross Project Cost	**Rs . Lakhs**												
Less CFA Tranche -1	**Rs . Lakhs**												
Less CFA Tranche - 2 &3	**Rs . Lakhs**												
Net Project Cost	**Rs . Lakhs**												
Un-discharged on 30.06.20													
Opening CAPEX	**Rs . Lakhs**	11044.058	11044.058	11044.058	11044.058	11044.058	11044.058	11044.06	11044.058	11044.058	11044.058	11044.058	11044.058
Additions													
Less: CFA Tranche 2 &3													
Closing	**Rs . Lakhs**	11044.058	11044.058	11044.058	11044.058	11044.058	11044.058	11044.06	11044.058	11044.058	11044.058	11044.058	11044.058
Average	**Rs . Lakhs**	11044.058	11044.058	11044.058	11044.058	11044.058	11044.058	11044.06	11044.058	11044.058	11044.058	11044.058	11044.058
Balance Depreciable Amount	**0.9**	4706.8879	4314.6473	3922.40659	3530.1659	3137.9253	2745.6846	2353.444	1961.2033	1568.9626	1176.722	784.481318	392.240659
Remaining Period		12	11	10	9	8	7	6	5	4	3	2	1
Depreciation	**0.0528**	**392.24066**	**392.24066**	**392.240659**	**392.24066**	**392.24066**	**392.24066**	**392.2407**	**392.24066**	**392.24066**	**392.24066**	**392.240659**	**392.240659**

Cost of battery considered in project cost as on COD	(Rs. in lakh)	3,385.12				
Replacement cost of battery claimed by the Petitioner in 12th y	(Rs. in lakh)	3,104.37	as per Working Note - 1			
Replacement cost of battery claimed by the Petitioner in 12th y	(Rs. in lakh)	2,951.47	as per Working Note - 2			
Working Note - 1						
Anticipated cost of battery in dollar terms considered by Petitic	USD/WH	0.30				
Avg. Exchange rate considered by Petitioner in 1st year	Rs./USD	75.63				
Anticipated increase in forex		5%				
Avg. Exchange rate considered by Petitioner in 12th year		129.35				
Capacity of battery to be replaced	MWH	8				
Cost of battery in 12th year		**3,104.37**				
Working Note - 2						
Anticipated cost of battery in dollar terms	USD/WH	0.30	assumed to be same as considered by Petitioner			
Avg. Exchange rate considered in 1st year	Rs./USD	75.63				
Avg. Exchange rate considered in 4th year	Rs./USD	82.81				
Anticipated increase in forex		5%				
Avg. Exchange rate considered in 12th year	Rs./USD	122.35				
Anticipated increase in forex		5%	same as considered by Petitioner			
Cost of battery in 12th year	(Rs. in lakh)	**2,951.47**				