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No. NEPRA/R/TRF-482/ZPNECL-2019/6103-6105
February 21, 2020

Subject: **Determination of National Electric Power Regulatory Authority in the matter of Tariff Petition filed by M/s. Zhenfa Pakistan New Energy Company (Private) Limited for Determination of Generation Tariff in respect of 100 MWp Solar Power Project (Case No. NEPRA/TRF-482/ZPNECL-2019)**

Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annex-I & II (23 pages) in Case No. NEPRA/TRF-482/ZPNECL-2019.

2. The Determination is being intimated to the Federal Government for the purpose of notification in the official gazette pursuant to Section 31(7) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

3. Order of the Authority along with Annex-I & II of the Determination are to be notified in the official Gazette.

Enclosure: As above

Syed Safer Hussain
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(Syed Safer Hussain)

Secretary
Ministry of Energy (Power Division)
'A' Block, Pak Secretariat
Islamabad

CC:

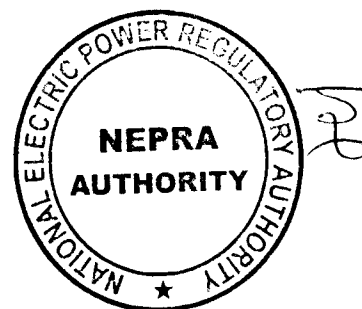
1. Secretary, Cabinet Division, Cabinet Secretariat, Islamabad.
2. Secretary, Ministry of Finance, 'Q' Block, Pak Secretariat, Islamabad.



DETERMINATION OF NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
IN THE MATTER OF TARIFF PETITION FILED BY M/S ZHENFA PAKISTAN NEW ENERGY
COMPANY (PRIVATE) LIMITED FOR DETERMINATION OF GENERATION TARIFF IN RESPECT
OF 100 MWp SOLAR POWER PROJECT

1. M/s Zhenfa Pakistan New Energy Company Private Limited (ZPNECPL or the petitioner/company) filed a tariff petition before National Electric Power Regulatory Authority (NEPRA/the Authority) on October 15, 2019 for determination of generation tariff in respect of its 100 MWp solar power project (project) to be set up at Rakh Chaubara, District Layyah, Punjab. The said petition was filed by ZPNECPL under Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the NEPRA Act) read with NEPRA (Tariff Standards & Procedure) Rules, 1998 (Tariff Rules) and other provisions of NEPRA law. The petitioner has requested for the approval of levelized tariff of US Cents 4.8461/kWh over the tariff control period of 25 years.
2. The petitioner submitted that earlier it filed a tariff petition before NEPRA for the project on September 26, 2017. The Authority issued determination on that petition dated August 13, 2018 whereby the tariff of US Cents 4.7746/kWh was approved (Tariff Determination). Then the petitioner submitted that it filed review motion against Tariff Determination dated September 14, 2018. The decision on review motion was issued by NEPRA on March 1, 2019 whereby, inter alia, the tariff was revised to US Cents 4.9549/kWh (Review Decision).
3. ZPNECPL submitted that NEPRA in the Review Decision allowed it one year time to achieve Financial Close (FC). But that time was reckoned from the date of Tariff Determination i.e. August 13, 2018 instead on March 1, 2019. ZPNECPL submitted that if it had been given one-year time to achieve FC from Review Decision then it would have enough time to obtain Letter of Support (LOS) and achieve the FC before February 29, 2020. Because of the above, ZPNECPL could not achieve FC by August 12, 2019 and the approved tariff expired on August 12, 2019.
4. The petitioner submitted that as per paragraph 60 of the Tariff Determination, the Federal Government was intimated to notify the approved tariff under the NEPRA Act. However, neither the tariff was notified nor ZPNECPL was issued LOS by the relevant agencies, in spite of it being compliant with all the requirements of the Government of Pakistan's Policy for Development of Renewable Energy for Power Generation, 2006 (GOP RE Policy, 2006).

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5. ZPNECPL submitted that as per Cabinet Committee on Energy (CCOE) decision dated April 4, 2019 (CCOE Decision), the renewable energy projects were reactivated. CCOE in the above referred decision divided all the halted renewable energy projects into three categories and the project of ZPNECPL is at Sr.No.20 in category II. The petitioner submitted that paragraph V of aforesaid CCOE Decision states as under:

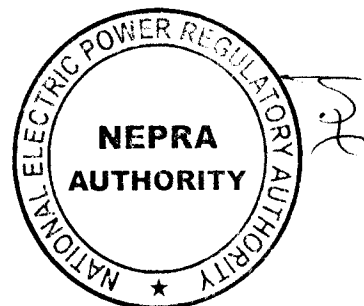
"All projects that have been issued LOIs and have been granted determination of tariff by NEPRA and issued a generation license would be allowed to proceed ahead towards the achievement of their requisite milestones as per the RE Policy 2006. However, if the tariff determination has been done since more than one year or if the tariff validity period has elapsed, NEPRA would be requested for review of the same to make it consistent with the current market environment/conditions and consumer interest. Such review shall include appropriate time extension to reach financial closing."

6. ZPNECPL submitted that the scope of the review on the determination is established under paragraph XI of CCOE Decision which states as under:

"Projects that are going back for review of tariff will be asked to submit their applications on the basis of latest technology and technology related factors."

7. The petitioner submitted that the subject petition only contains information relating to the project that has been required in the aforesaid CCOE Decision or is a consequence of the abovementioned delay faced by the ZPNECPL. The petitioner requested the Authority to consider the change in technology being proposed in the subject petition and resultant impact on capital cost and capacity factor. It has also requested to allow the increased Project Development Cost (PDC) which remained unaccounted for in the Tariff Determination/Review Decision due to resubmission of this tariff petition and extended development time.
8. ZPNECPL also stated that it has filed subject petition for determination of tariff in view of all project approvals including Letter of Intent (LOI), land, environment and interconnection (line construction from MEPCO), in-principal approval of CPPA-G to purchase electricity from ZPNECPL etc. It stated that it has executed Engineering, Procurement and Construction (EPC)

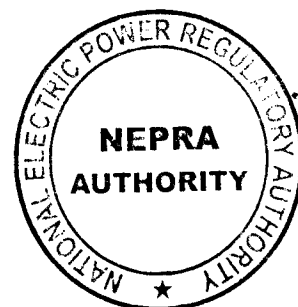
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arrangement for supply, construction, erection and commissioning of the project with Power China Huadong Engineering Company Limited. Further, ZPNECPL submitted that project debt financing has been arranged on the basis of earlier debt equity structure approved by NEPRA in the Tariff Determination and lenders have taken their internal approvals and sponsors have committed the required equity for the project.

9. ZPNECPL submitted a letter of Punjab Power Development Board (PPDB) dated May 14, 2019 with the petition regarding change in consortium partner. The said letter states that PPDB Board in its meeting held on April 15, 2019, in consideration of the comparative technical experience & financial strength of proposed & outgoing member, allowed replacement of existing consortium member (M/s. Zhenfa Energy Science & Technology Co. Ltd.) with new consortium member (M/s. Atlas Power Ltd) with immediate effect.
10. In accordance with Tariff Rules, the tariff petition was admitted by the Authority on October 29, 2019. Notice of Admission & Hearing was published in the daily national newspapers on December 06, 2019 stating the hearing date as December 19, 2019 while also providing salient features of the petition, issues framed for hearing and invitation to file comments/intervention request from the interested parties. Individual Notices of hearing were sent to the stakeholders, considered relevant by NEPRA, and the petitioner on December 18, 2019 for participation. Tariff petition and Notice of Admission & Hearing were also hosted on NEPRA's website for information of general public.
11. Following are the issues which were framed by the Authority for the hearing:
 - Whether the claimed EPC cost is competitive, comparative and based on the firm and final agreement(s)?
 - Whether the NEPRA (Selection of EPC Contractor by IPPs) Guidelines, 2017 have been fully complied with?
 - Whether the details provided for Non-EPC cost are sufficient and claimed Non-EPC cost is justified? Also provide justification for land requirement as claimed by the petitioner?
 - Whether the claimed O&M costs are justified?
 - Whether the claimed insurance during operation cost is justified?
 - Whether the claimed return on equity is justified?

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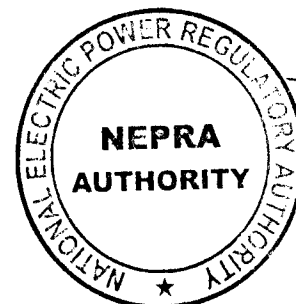




- Whether the claimed financing/debt terms are justified?
 - Whether the claimed annual energy generation and corresponding plant capacity factor are reasonable and justified?
 - Whether the petitioner's proposed solar modules technology satisfies the international standards of quality and operation?
 - Whether the claimed construction period is justified?
 - Whether the project grid interconnection study is approved by the relevant organization(s) and whether NTDC has issued power evacuation certificate?
 - Any other issue with the approval of the Authority
12. The hearing was held on December 19, 2019 (Thursday) at NEPRA Tower, G-5/1, Islamabad which was attended by a number of participants including the petitioner and other stakeholders. In response to Notice of Admission & hearing, no comments or intervention requests were submitted by any party.
13. The issue wise submissions of the petitioner and the Authority's findings and decision thereon are as under:
14. **Whether the claimed EPC cost is competitive, comparative and based on the firm and final agreement(s) and Whether the NEPRA (Selection of EPC Contractor by IPPs) Guidelines, 2017 have been fully complied with?**
- 14.1 The petitioner has claimed USD 65.200 million on account of EPC cost. The Authority noted that in the Tariff Determination, the EPC cost of USD 61.740 million was allowed to ZPNECPL against its claimed cost of around USD 84 million. On a per MW basis, the EPC cost as claimed in the subject petition comes out to be around USD 0.652 million. Break-up of claimed EPC cost as provided by the petitioner is as hereunder:

EPC cost	USD MILLION
PV modules	28.00
PV inverters	4.00

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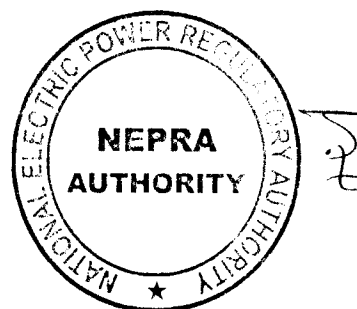


Mounting structure	10.80
Balance of Plant (Civil Works, Cables, Transformer etc.)	22.40
Total	65.20

14.2 The petitioner submitted that the original EPC design was based on 382,440 Nos. PV modules of Si-poly model P6-60 260 Wp & 265Wp. Now the company has opted for the advanced technology (229,884 Nos. Si-Mono modules to be procured from Tier 1 manufacturers) which are of 435 Wp with half cut having more shade tolerance and conversion efficiency. It submitted that the Authority for Siachen Solar Project had allowed the cost of USD 0.27 million/MW for mono crystalline modules including transportation cost till site. It stated that it is requesting module cost of USD 0.28 million/MW keeping in view the transportation cost for additional 1000 km distance from Siachen's site. For inverters, ZPNECPL claimed USD 4.00 million and submitted that the project company has selected inverters from Sungrow (SG 2500HV container type with IP 54 degree of protection) which is one of the leading manufacturers of central inverters globally. The petitioner submitted that previously the inverters were SG 630kW with system voltage of 1000 V and now the same have been upgraded to SG 2500 kW with system voltage of 1500 V. The petitioner has claimed USD 10.80 million on account of mounting structure cost. In this regard, the petitioner submitted that the prices in Tariff Determination were allowed as USD 0.09 million per MW for fixed tilt structures and USD 0.15 million per MW for tracking structures and requested the Authority to keep them same. ZPNECPL submitted that the proportion of single axis tracking and fixed tilt structures remain the same i.e. 30% and 70% respectively. The petitioner has claimed USD 22.40 million under the head of balance of plant including civil works, cables, transformers etc. The petitioner submitted that the design for civil foundations has been revised from screw piles to concrete piles because of enhanced weight of new proposed modules. ZPNECPL submitted that the cost for Electrical Balance of Plant (EBOP) as allowed earlier has been reduced by USD 0.5 million due to decreased quantity of modules.

14.3 During the proceedings, the petitioner submitted a document signed with HDEC Engineering Private Limited stating, inter alia, the agreed EPC cost of USD 65.2 million. On query regarding compliance with the NEPRA Selection of EPC Contractor by IPPs Guidelines, 2017 (NEPRA EPC Guidelines), ZPNECPL during hearing submitted that it has already met the said Guidelines. Later,

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the petitioner vide letter dated January 24, 2020 submitted that the Authority in the Tariff Determination had approved the EPC arrangements with M/s Hydro China (an affiliate of Power China) as Onshore Contractor and M/s Zhangjiagang SEG as Offshore Contractor. ZPNECPL submitted that it has changed the PV modules with advanced technology which are not manufactured by earlier selected offshore contractor, therefore, offshore supplier has been changed to an affiliate of Hydro China which is Power China HDEC.

- 14.4 To evaluate the cost claim of the petitioner, the Authority has relied upon the EPC cost and project cost data in different countries. The prices of different types of modules, inverters and mounting structures in different parts of the world were researched through a number of reports published by credible organizations. Moreover, a number of online sources providing spot prices data of equipment of solar power system were also surfed. Furthermore, the EPC cost that has been allowed recently to other comparable projects were also checked. On the basis of these workings, the Authority is of the view that EPC cost being claimed by ZPNECPL is not reflective of prevailing prices and recent approvals given by NEPRA and therefore requires assessment.
- 14.5 During the hearing the petitioner on a query informed that it is not developing project on 100% tracking as it will increase the cost. The Authority has carried out the detailed analysis and found that increase in energy yield with tracking is higher compared to the corresponding rise in cost which results in reduction of tariff. Therefore, the Authority has decided to compute and approve tariff of the petitioner on 100% single axis tracking.
- 14.6 It has been noted that the average prices of solar modules of different types and brands have gone as low as USD 0.19 million per MW. Those average prices were at the level of USD 0.32-0.34 million per MW back in January, 2018. This shows that there has been a decline of more than 40% in the cost of modules in mere two years' time. The same trend of decreasing module prices is also being forecasted by different credible agencies; however, these sources state that the trend would not be that sharp. The cost of inverters, inclusive of combiner boxes, has been found reported in different sources and has been claimed in other tariff petitions at or below the level of USD 0.04 million per MW. For mounting structures, the price of as low as USD 0.10 million per MW for single axis tracking has been stated by one of the solar projects. It has also been noted that the cost of around USD 0.11 million per MW for tracking mounting structure has been achieved by a solar power project which has recently been commissioned. On these base figures, the factors such as

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transportation cost, existing local market conditions, local manufacturing base, length of time allowed for achieving FC etc. were given due consideration. The costs of civil works and electrical balance of plant equipment have been allowed keeping in view the approvals given on these accounts in the recent tariffs of solar projects. It has also been ensured to provide a reasonable amount of profits to the Contractor(s). Keeping in view all these factors, the Authority has assessed the EPC cost for ZPNECPL as USD 0.5355 million per MW (USD 53.550 million) which is hereby approved. The allowed EPC cost shall be adjusted at Commercial Operations Date (COD) in accordance with the mechanism given in the Order part of this determination. The petitioner is hereby directed to file the request for modification of license for the change in technology (modules, inverters, mounting structures etc.) at the earliest.

15. **Whether the details provided for Non-EPC cost are sufficient and claimed Non-EPC cost is justified? Also provide justification for land requirement as claimed by the petitioner?**

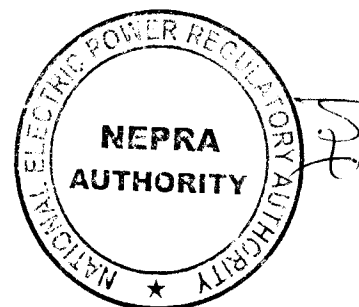
15.1 The petitioner has claimed USD 4.864 million on account of Non-EPC cost. The break-up of cost components as provided by the petitioner is as follows:

Non-EPC cost	USD Million
Insurance during construction	0.326
Project Development Cost	1.902
Financial Charges	1.349
Interest during construction	1.287
Total	4.864

Insurance during construction

15.2 The petitioner has claimed pre-COD insurance cost at rate of 0.5% of the proposed EPC cost i.e. USD 0.326 million. The Authority has noted that NEPRA (Benchmarks for Tariff Determination) Guidelines, 2018 (NEPRA Benchmark Guidelines) issued vide S.R.O. 763(I)/2018 notification dated June 19, 2018 states the provision of insurance during construction at the rate of 0.40% of EPC cost of solar projects. In accordance therewith, the Authority has decided to allow insurance during construction at the rate of 0.4% of the approved EPC cost, inclusive of taxes, charges and/or duties,

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to ZPNECPL. On this basis, the amount being approved under this head works out to be around USD 0.214 million.

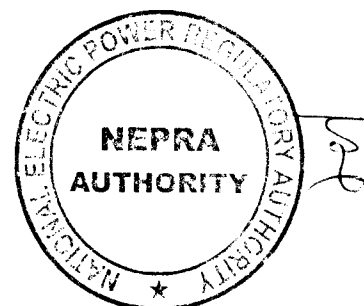
Project Development Cost

15.3 The petitioner has submitted that the Authority had allowed it USD 1.513 million on account of PDC in the Tariff Determination. The petitioner submitted that in addition to earlier allowed amount, additional cost of USD 0.389 million is to be incurred by the project company till FC. Accordingly, the petitioner has requested to allow USD 1.902 million on account of PDC. Following details in respect of claimed PDC amount have been submitted by the petitioner:

Cost	Original Determination	Cost to be incurred	Requested Cost
	(USD million)	(USD million)	(USD million)
Consultancy cost & technical studies – Pre FC	0.587	0.05	0.637
Owner's engineer supervision-post FC	0.250	-	0.250
Independent engineer-as per Energy Purchase Agreement (EPA)	0.100	-	0.100
Permits, permissions and related costs	0.050	0.020	0.070
Site, security and infrastructure	0.206	0.264	0.470
Administration cost	0.120	0.030	0.150
Travelling cost	0.200	0.025	0.225
Total Project Development Cost	1.513	0.389	1.902

15.4 In its petition and during the hearing, the petitioner gave detailed justification of its claim of each cost item. It is noted that the Authority had earlier allowed USD 1.513 million to ZPNECPL while fixing the same in PKR. In the subject petition, the PDC of around USD 1.902 million has been claimed by the petitioner due to change in technology and prolonged development period owing to no fault of the project company. The Authority considered the revised claim of PDC as submitted by the project company while comparing it with the PDC which has been allowed in the comparable solar power projects of different sizes. The factors such as PKR devaluation as well as local inflation that have occurred since the time Tariff Determination was approved have also been considered. In view thereof, the Authority has decided to allow USD 1.70 million to ZPNECPL. This amount is

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being approved on lump sum basis, i.e. the cost incurred on individual heads of PDC may change but should not exceed the overall amount.

Financing Fee and Charges

15.5 The Authority in the earlier tariff determination of ZPNECPL allowed financing fee and charges as 2.5% of the approved debt portion of the allowed capital expenses. The petitioner in the subject tariff petition has requested to allow financial fees and charges based on the same benchmark. It has been noted that NEPRA Benchmark Guidelines states the provision of financing fee & charges not exceeding 2.00% of the approved debt amount. In light of above benchmark, the Authority has decided to allow these fee/charges at the rate of 2% of approved debt portion of allowed capital expenses, as maximum limit, to the petitioner. In accordance therewith, the amount being approved under this head works out to be around USD 0.887 million.

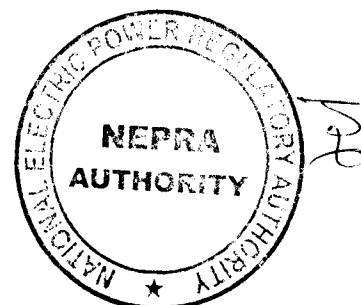
Interest during construction (IDC)

15.6 The petitioner has claimed Interest During Construction (IDC) of USD 1.287 million. It submitted that IDC has been calculated based on 100% foreign debt using LIBOR plus margin of 4.25%. On query, the petitioner informed that the construction period of 10 months as allowed earlier has been used for the computation of claimed IDC.

15.7 Based on the abovementioned approved costs while considering the drawdown schedule as given in the Order part of this determination, the IDC works out to be around USD 1.039 million and is hereby approved. The details of financing terms and construction period that have been used to work out the aforesaid amount of IDC is discussed in the ensuing relevant sections. The allowed IDC shall be re-computed at COD as per the mechanism given in the Order part of this determination.

15.8 Recapitulating above, the summary of the approved project cost under various heads is given hereunder:

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Project Cost	USD Million
EPC Cost	53.550
Project Development Cost	1.700
Insurance during construction	0.214
Financing Fee and Charges	0.887
Interest During Construction	1.039
Total	57.390

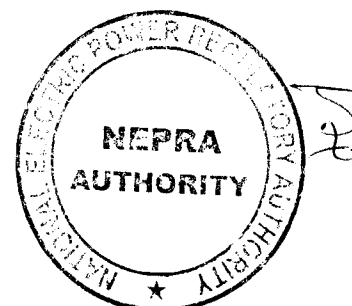
16. **Whether the claimed O&M costs are justified?**

16.1 The petitioner in its current tariff petition has requested to allow the same O&M cost of USD 1.166 million/year as was allowed by the Authority in its earlier tariff determination dated August 13, 2018. That cost had been allowed comprising of 50% each for foreign and local portions.

16.2 To evaluate this claim of ZPNECPL, the O&M cost being allowed in other parts of the world has been referred while keeping in view the local market conditions, required skilled manpower, spare parts, inverters etc. The cost recently being claimed by other solar power projects based on different technologies has also been compared. For that purpose, the change in exchange rate of PKR/USD and local inflation since August, 2018 has also been accounted for. Based on these considerations, the Authority has decided to approve the O&M cost of USD 0.950 million per year to ZPNECPL, i.e. USD 9,500 per MW per year.

16.3 To decide about the proportion of approved O&M cost, the Authority has examined the change in local CPI (allowed on local portion) viz a viz the collective change in both US CPI and exchange rate (allowed for foreign portion) for last nineteen years. It has been noted that the average annual change in indices allowed on foreign component during the last couple of years has been higher relative to local inflation. However, the change in indices applied on local and foreign component has roughly been same when analysis is carried out for the longer term. Further, it has been studied that the majority of O&M cost for solar project consists of administrative expenses (either site or at office) and may be obtained in local currency. The cost of spare parts and replacement of equipment and some services would require procurement from abroad; however, their proportions

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are not very significant and also vary from year to year. In view of these considerations, the Authority has decided to allow whole of approved O&M cost in local currency.

17. **Whether the claimed insurance during operation is justified?**

17.1 The Authority in the earlier tariff determination of ZPNECPL allowed insurance during operations cost at 0.4% of the EPC cost. The petitioner in the current tariff petition has requested to allow the same benchmark for the operation phase insurance. The Authority has noted that in the recently approved solar tariff determinations, insurance during operation at the rate of 0.4% of the approved EPC cost has been allowed. Benchmark Guidelines also provide insurance during operation at the rate of 0.4% of EPC cost for solar projects. In view thereof, the Authority has decided to allow insurance during operation at the maximum limit of 0.4% of the approved EPC cost, inclusive of taxes, charges and/or duties, to the petitioner subject to adjustment on actual basis as per the mechanism given in the order part.

18. **Whether the claimed return on equity is justified?**

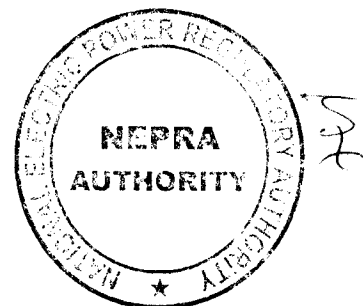
18.1 The Authority in the earlier tariff determination of ZPNECPL allowed Return on Equity (ROE) of 14%. The petitioner in its current tariff petition has requested to allow the same level of return. The Authority has noted that in the most recent comparable cases of renewable technologies, the return on equity of 14% has been allowed, therefore, the Authority has decided to allow same return on equity of 14% to ZPNECPL.

19. **Whether the claimed financing/debt terms are justified?**

19.1 The petitioner submitted indicative term sheet dated October 4, 2019 signed with the lender i.e. Asian Development Bank with the petition. The petitioner has proposed following debt terms in the tariff petition:

Debt	80% (100% foreign)
Interest	3 month LIBOR (2.00088%) + spread of 4.25%
Repayment period	14 years
Repayment basis	Quarterly

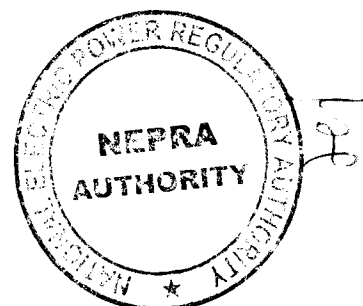
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- 19.2 The Authority has noted that Benchmark Guidelines provides that the debt to equity ratio for all renewable power projects will be 80:20 and in case of change in ratio, the return approved on equity shall be adjusted to maintain cost of capital at the same level as under 80:20 debt to equity ratio capital structure. The debt to equity ratio of 80:20 has also been approved by the Authority in the recent wind and solar tariff determinations. Therefore, the Authority has decided to compute and approve tariff of ZPNECPL at debt to equity ratio of 80:20 as claimed by the petitioner.
- 19.3 Benchmark Guidelines provide that for renewable energy projects availing foreign financing, the spread not exceeding 4.25% over LIBOR shall be allowed. In the earlier tariff of ZPNECPL, the margin of 4.25% was approved. Therefore, the Authority has decided to approve tariff of ZPNECPL at margin of 4.25% over LIBOR. In case of sharing of saving in interest rate, the same shall be shared in the ratio of 60:40 between the power purchaser and power producer respectively.
- 19.4 The petitioner has claimed debt servicing period of fourteen years. The Authority has noted that earlier tariff of ZPNECPL had been approved on debt servicing tenor of fourteen years. It has also been noted that recent tariffs for solar power projects have been approved on debt servicing tenor (commercial financing) of not less than thirteen years. In view thereof, the Authority has decided to compute and approve the debt servicing of fourteen years.
20. **Whether the claimed annual energy production and corresponding plant capacity factor are reasonable and justified? and**
Whether the petitioner's proposed solar modules technology satisfies the international standards of quality and operation?
- 20.1 The petitioner has submitted the following in this regard:

Project capacity	100 MWp
Annual energy generation	173.886 GWh
Net capacity factor	19.85%

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20.2 In its petition and during hearing, the petitioner has submitted that as a result of using the advanced solar panel technology, with the same configuration of 30MW single axis tracking and 70MW fixed tilt, capacity factor of the project has been increased from 19.25% to 19.85% with increase in energy generation from 168,630MWh to 173,886MWh per annum. The petitioner has also submitted the Solar Resource Assessment Report with the petition. ZPNECPL further apprised that the selected PV modules are of 435 Wp with advanced technology of Half-cut with more shade tolerance which shall be procured from some Tier manufacturer. During the hearing, the petitioner informed that the proposed modules are as per International Standards and also comply with SRO 604 dated May 28, 2019 regarding the quality of the solar equipment. The petitioner also informed that that proposed module technology has various product certifications.

20.3 The Authority has considered the modules and inverters proposed by ZPNECPL with respect to their quality and energy yield. The energy yield report as submitted by the petitioner has also been examined. Further, as stated above, the Authority has decided to compute and approve tariff of ZPNECPL on 100% single axis tracking structures. On these bases, the Authority has decided to approve tariff of ZPNECPL on net annual capacity utilization factor of 21.51%. Further, the Authority has decided that the solar resource risk shall be borne by the power producer and a sharing mechanism given in the order part of this determination shall be applied on the energy produced beyond the approved annual capacity utilization factor.

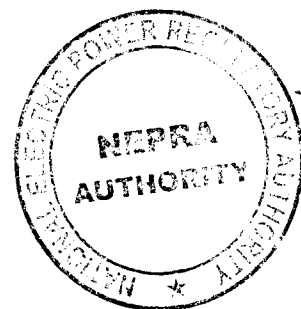
21. **Whether the claimed construction period is justified?**

21.1 The petitioner in tariff petition and during hearing has proposed 10 month construction period for the project. The Authority has considered the submissions of the petitioner and has decided to approve 10 months construction period as allowed in the projects of similar scale by the Authority.

22. **Whether the project grid interconnection study is approved by the relevant organization(s) and whether NTDCL has issued power evacuation certificate?**

22.1 During hearing, the petitioner submitted that the project Grid Interconnection Study (GIS) was approved and power evacuation certificate was given by the relevant authority i.e. MEPCO vide its letter # 2164/CE/MEPCO/CSD/D(MKT)/PP-106/1780.87 dated August 6, 2019. It has been noted that NTDCL vide its letter dated March 31, 2017 had given the approval of GIS of the project.

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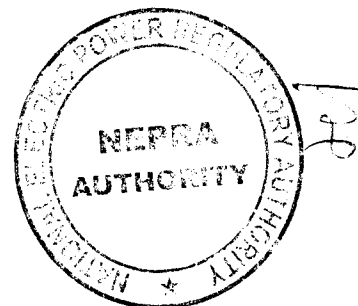
Further, NTDCL had also issued the certificate of approval of system studies on April 6, 2017 while stating that the power be generated by ZPNECL will not have any adverse effect on the National Grid as required under the prevailing Grid Code. These two approvals were submitted by the petitioner during the proceedings of its earlier. The petitioner vide its letter dated January 24, 2019 has submitted NTDCL's letter No. GMPSP/CETP/TRP-380/415-418 dated January 01, 2020 whereby NTDCL has stated, inter alia, that its approval on the interconnection report of the subject solar power plant (Zhenfa) still stand valid in the current scenario. In view of the above, the Authority considers this issue stands settled.

23. **ORDER**

In pursuance of section 7(3)(a) of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 and NEPRA (Tariff Standards & Procedure) Rules, 1998, the Authority hereby determines and approves the generation tariff along with terms and conditions for Zhenfa Pakistan New Energy Company (Private) Limited for its 100 MWp solar power project for delivery of electricity to the power purchaser as follows:

- Levelized tariff works out to be Rs. 5.8085/kWh (US Cents 3.7390/kWh).
- The tariff has been worked out on Build Own and Operate basis.
- EPC cost of USD 53.550 million has been approved.
- Project Development Cost of USD 1.700 million has been approved.
- Insurance during construction at the rate of 0.4% of the approved EPC cost has been approved.
- Financing fee at the rate of 2% of the debt portion of the capital cost has been approved.
- Debt to Equity ratio of 80:20 has been approved.
- Tariff has been computed on 100% foreign financing.
- ROE and Return on Equity during Construction (ROEDC) of 14% has been allowed.
- The cost of debt of 3 month LIBOR (1.90838%) + spread (4.25%) has been used for foreign financing.
- Debt servicing period of 14 years from COD has been used.
- O&M Cost of USD 9,500 per MW per year has been allowed.
- Insurance during Operation has been calculated as 0.40% of the allowed EPC Cost.

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- Construction period of 10 months has been allowed.
- Net Annual Plant Capacity Factor of 21.51% has been approved.
- Degradation factor of 0.5% per year has been approved. The financial impact of the allowed degradation of USD 1.938 million has been taken into account in the approved project cost.
- Reference Exchange Rates of 155.35 PKR/USD has been used.
- IDC and ROEDC have been worked out using following drawdown schedule:

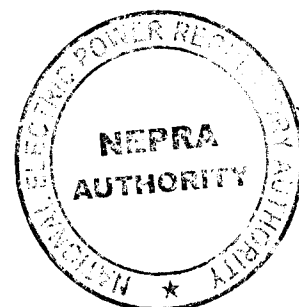
Month 1	5.00%
Month 2	5.00%
Month 3	5.00%
Month 4	15.00%
Month 5	15.00%
Month 6	15.00%
Month 7	6.67%
Month 8	6.67%
Month 9	13.33%
Month 10	13.33%

- Detailed component wise tariff is attached as Annex-I of this decision.
- Debt Servicing Schedule is attached as Annex-II of this decision.

A. One Time Adjustments at COD

- The EPC cost shall be verified and adjusted at actual considering the approved amount as the maximum limit. Applicable foreign portion of the EPC cost will be adjusted at COD on account of variation in PKR/USD parity during the construction period, on production of authentic documentary evidence by the petitioner to the satisfaction of the Authority. The adjustment in approved EPC cost shall be made for the currency fluctuation against the reference parity values.
- PDC, Insurance during construction and Financing Fee and Charges shall be adjusted at actual at the time of COD considering the approved amount as the maximum limit. The amounts allowed on these accounts in USD will be converted in PKR using the reference PKR/USD rate of 155.35 to calculate the maximum limit of the amount to be allowed at COD.

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- Duties and/or taxes, not being of refundable nature, relating to the construction period directly imposed on the company up to COD will be allowed at actual upon production of verifiable documentary evidence to the satisfaction of the Authority.
- The tariff has been determined on debt : equity ratio of 80 : 20. The tariff shall be adjusted on actual debt : equity mix at the time of COD, subject to equity share of not more than 20%. For equity share of more than 20%, allowed return on equity shall be neutralized for the additional cost of debt : equity ratio.
- IDC will be recomputed at COD on the basis of actual timing of debt draw downs (for the overall debt allowed by the Authority at COD) for the project construction period of 10 months starting from the date of FC. IDC shall also be allowed adjustment for change in applicable LIBOR.
- ROEDC will be adjusted at COD on the basis of actual equity injections (within the overall equity allowed by the Authority at COD) during the project construction period of 10 months from the date of FC.
- The savings in the approved spreads shall be shared between the power purchaser and power producer in the ratio of 60:40.

B. Indexations

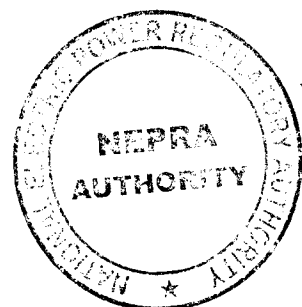
Adjustment of O&M, ROE, ROEDC, Debt Servicing Components shall be made on quarterly basis to be applicable from 1st July, 1st October, 1st January and 1st April. Adjustment of Debt Servicing Component, where applicable, may also be allowed on bi-annual basis depending upon the final terms approved by the Authority at the time of COD. For bi-annual adjustments, the periods shall start from 1st July and 1st January. Insurance component shall be adjusted on annual basis starting from either 1st January or 1st July. The indexation mechanisms are given hereunder:

i) **Operation and Maintenance Costs**

O&M component of tariff shall be adjusted on account of change in local Inflation (CPI) as notified by the Pakistan Bureau of Statistics according to the following mechanism:

L. O&M (REV)	=	L. O&M (REF) * CPI (REV) / CPI (REF)
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Where;		
L. O&M (REV)	=	The revised O&M Local Component of Tariff
L. O&M (REF)	=	The reference O&M Local Component of Tariff
CPI (REV)	=	The revised CPI (General)
CPI (REF)	=	The reference CPI (General) of 263.59 for the month of November, 2019

Note: The reference index of CPI shall be revised for making the required adjustments in O&M component at the time of COD. For the adjustment of O&M component at COD, the revised CPI value for the middle month of preceding quarter prior to the date of COD shall be considered. Thereafter, the CPI value taken at COD shall become reference for subsequent adjustments in the O&M component.

ii) **Insurance during Operation**

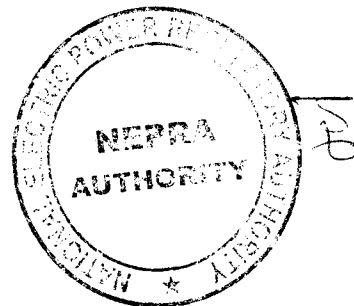
The actual insurance cost for the minimum cover required under contractual obligations with the power purchaser, not exceeding 0.4% of the approved EPC cost, will be treated as pass through. Insurance component of reference tariff shall be adjusted annually as per actual upon production of authentic documentary evidence according to the following formula:

AIC	=	$Ins (Ref) / P (Ref) * P (Act)$
Where;		
AIC	=	Adjusted insurance component of tariff
Ins (Ref)	=	Reference insurance component of tariff
P (Ref)	=	Reference premium @ 0.4% of approved EPC Cost at Rs. 155.35/USD
P (Act)	=	Actual premium or 0.4% of the approved EPC Cost converted into Pak Rupees on exchange rate prevailing on 1 st day of the insurance coverage period whichever is lower

iii) **Return on Equity**

The ROE (ROE + ROEDC) component of the tariff will be adjusted on account of change in PKR/USD parity. The variation relating to these components shall be worked out according to the following formula:

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ROE (Rev)	=	ROE (Ref) * ER (Rev) / ER (Ref)
Where;		
ROE (Rev)	=	Revised ROE Component of Tariff
ROE (Ref)	=	Reference ROE Component of Tariff
ER (Rev)	=	The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan
ER (Ref)	=	The reference TT & OD selling rate of Rs. 155.35/USD

Note: The reference tariff component shall be revised after making the required adjustments at the time of COD.

iv) **Indexations applicable to debt**

For foreign debt, respective principal and interest components will be adjusted on quarterly/bi-annual basis, on account of revised TT & OD selling rate of US Dollar, as notified by the National Bank of Pakistan as at the last day of the preceding period, over the applicable reference exchange rate as approved at COD.

v) **Variations in LIBOR**

The interest part of tariff component for the loan shall remain unchanged throughout the term except for the adjustment due to variation in interest rate as a result of variation in LIBOR according to the following formula:

ΔI	=	$P (REV) * (LIBOR (REV) - 1.90838\%) / 4$
Where;		
ΔI	=	The variation in interest charges applicable corresponding to variation in 3 month LIBOR. ΔI can be positive or negative depending upon whether 3 month LIBOR (REV) per annum > or < 1.90838%. The interest payment obligation will be enhanced or reduced to the extent of ΔI for each quarter under adjustment.

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P (REV)	=	The outstanding principal (as indicated in the attached debt service schedule to this order), at the relevant quarterly calculations date. Quarter 1 shall commence on the commercial operations date (i.e. the first figure will be used for the purposes of calculation of interest for the first quarter after commercial operations date)
LIBOR (REV)	=	Revised 3 month LIBOR as at the last day of the preceding quarter.

Note: The reference tariff component shall be revised after making the required adjustments at the time of COD.

C. Terms and Conditions

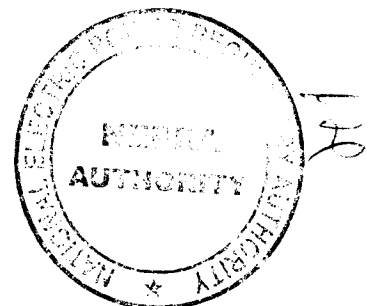
The following terms and conditions shall apply to the determined tariff:

- All plant and equipment shall be new and of acceptable standards. The verification of the plant and equipment will be done by the independent engineer at the time of the commissioning of the plant duly appointed by the power purchaser.
- This tariff will be limited to the extent of net annual energy generation supplied to the power purchaser up to 21.51% net annual plant capacity factor. Net annual energy generation supplied to the power purchaser in a year, in excess of 21.51% net annual plant capacity factor, will be charged at the following tariffs:

<u>Net annual plant capacity factor</u>	<u>% of prevalent tariff allowed to power producer</u>
Above 21.51% to 21.59%	-
Above 21.59% to 22.34%	20%
Above 22.34% to 23.09%	40%
Above 23.09% to 23.84%	60%
Above 23.84%	70%

- The risk of solar resource shall be borne by the power producer.
- The maximum plant PV capacity shall not exceed 100 MWp.

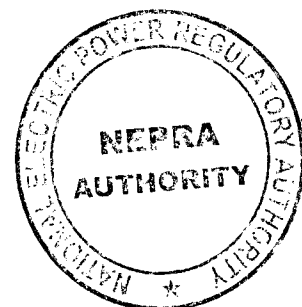
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- In the above tariff no adjustment for certified emission reductions has been accounted for. However, upon actual realization of carbon credits, the same shall be distributed between the power purchaser and the power producer in accordance with the applicable GOP Policy, amended from time to time.
- The petitioner is required to ensure that all the equipment is installed as per the details/specifications given in the generation license and this tariff determination.
- The savings in the approved limit of spread over foreign loan shall also be shared between power purchaser and power producer in the ratio of 60:40 at the time of COD or during any time of loan tenor, as applicable.
- Allowed limit of degradation has been made part of the approved project cost. No extra financial compensation shall be provided in the EPA.
- The company will have to achieve Financial Close within one year from the date of issuance of tariff determination. The tariff granted to the company will no longer remain applicable/valid, if Financial Close is not achieved by the company, for whatever reason, in the abovementioned timeline or its generation license is declined/revoked by NEPRA.
- The targeted maximum construction period from prescribed date/time of FC is 10 months. No adjustment will be allowed in this tariff to account for financial impact of any delay in project construction. However, the failure of the company to complete construction within 10 months will not invalidate the tariff granted to it.
- Pre COD sale of electricity is allowed to the power producer, subject to the terms and conditions of EPA, at the applicable tariff excluding debt servicing and return components. However, pre COD sale will not alter the required COD stipulated in the EPA in any manner.
- In case the company is obligated to pay any tax on its income from generation of electricity, or any duties and/or taxes, not being of refundable nature, are imposed on the company, the exact amount paid by the company on these accounts shall be reimbursed on production of original receipts. This payment shall be considered as a pass-through payment. However, withholding tax on dividend shall not be passed through.

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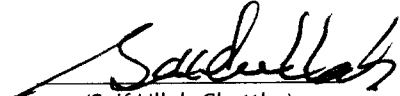



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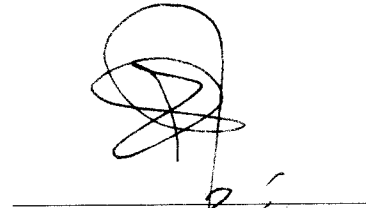
- No provision for the payment of Workers Welfare Fund and Workers Profit Participation has been made in the tariff. In case, the company has to pay any such fund, that will be treated as pass through item in the EPA.
 - The approved tariff along with terms & conditions shall be made part of the EPA. General assumptions, which are not covered in this determination, may be dealt with as per the standard terms of the EPA.
24. The Order part along with 2 Annexures is recommended for notification by the Federal Government in the official gazette in accordance with Section 31(7) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

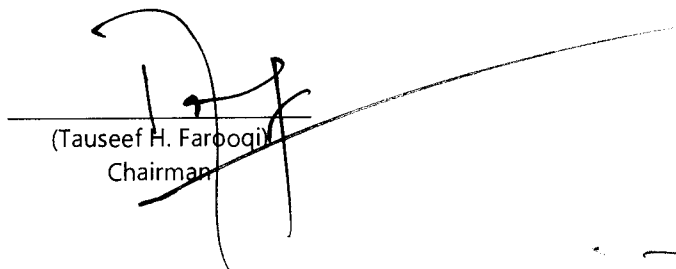
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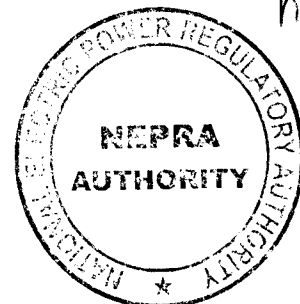

(Saif Ullah Chattha)
Member 21.2.2020


(Rafique Ahmed Shaikh)
Member


(Eng. Bahadur Khan)
Member

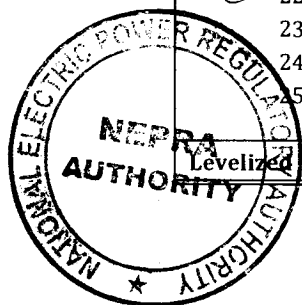

(Rehmatullah Baloch)
Vice Chairman


(Tauseef H. Farooqi)
Chairman



ZHENFA PAKISTAN NEW ENERGY COMPANY (PVT.) LIMITED
REFERENCE TARIFF TABLE

Year	O&M-Local	Insurance during Operation	Return on Equity	Return of Equity during Construction	Principal Repayment	Interest	Tariff
	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh
1	0.7832	0.1766	1.3696	0.0775	1.8230	2.3683	6.5982
2	0.7832	0.1766	1.3696	0.0775	1.9378	2.2534	6.5982
3	0.7832	0.1766	1.3696	0.0775	2.0600	2.1313	6.5982
4	0.7832	0.1766	1.3696	0.0775	2.1898	2.0015	6.5982
5	0.7832	0.1766	1.3696	0.0775	2.3278	1.8635	6.5982
6	0.7832	0.1766	1.3696	0.0775	2.4745	1.7168	6.5982
7	0.7832	0.1766	1.3696	0.0775	2.6304	1.5608	6.5982
8	0.7832	0.1766	1.3696	0.0775	2.7962	1.3951	6.5982
9	0.7832	0.1766	1.3696	0.0775	2.9724	1.2188	6.5982
10	0.7832	0.1766	1.3696	0.0775	3.1597	1.0315	6.5982
11	0.7832	0.1766	1.3696	0.0775	3.3589	0.8324	6.5982
12	0.7832	0.1766	1.3696	0.0775	3.5706	0.6207	6.5982
13	0.7832	0.1766	1.3696	0.0775	3.7956	0.3957	6.5982
14	0.7832	0.1766	1.3696	0.0775	4.0348	0.1565	6.5982
15	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
16	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
17	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
18	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
19	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
20	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
21	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
22	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
23	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
24	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
25	0.7832	0.1766	1.3696	0.0775	-	-	2.4070
Levelized Tariff	0.7832	0.1766	1.3696	0.0775	2.0661	1.3354	5.8085



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ZHENFA PAKISTAN NEW ENERGY COMPANY (PVT.) LIMITED
Debt Servicing Schedule

Relevant Quarters	Amount (USD)	Amount (USD)	Amount (USD)	Amount (USD)	Amount (USD)		
1	47,463,371	540,174	730,744	46,923,197	1,270,917		
2	46,923,197	548,490	722,427	46,374,707	1,270,917	1.8230	2.3683
3	46,374,707	556,935	713,983	45,817,773	1,270,917		
4	45,817,773	565,509	705,408	45,252,263	1,270,917		
5	45,252,263	574,216	696,702	44,678,048	1,270,917		
6	44,678,048	583,056	687,861	44,094,991	1,270,917	1.9378	2.2534
7	44,094,991	592,033	678,884	43,502,958	1,270,917		
8	43,502,958	601,148	669,769	42,901,810	1,270,917		
9	42,901,810	610,403	660,514	42,291,407	1,270,917		
10	42,291,407	619,801	651,116	41,671,606	1,270,917	2.0600	2.1313
11	41,671,606	629,343	641,574	41,042,263	1,270,917		
12	41,042,263	639,033	631,885	40,403,230	1,270,917		
13	40,403,230	648,871	622,046	39,754,359	1,270,917		
14	39,754,359	658,861	612,056	39,095,497	1,270,917	2.1898	2.0015
15	39,095,497	669,005	601,912	38,426,492	1,270,917		
16	38,426,492	679,305	591,612	37,747,187	1,270,917		
17	37,747,187	689,764	581,154	37,057,424	1,270,917		
18	37,057,424	700,383	570,534	36,357,041	1,270,917	2.3278	1.8635
19	36,357,041	711,166	559,751	35,645,875	1,270,917		
20	35,645,875	722,115	548,802	34,923,759	1,270,917		
21	34,923,759	733,233	537,684	34,190,526	1,270,917		
22	34,190,526	744,522	526,396	33,446,005	1,270,917	2.4745	1.7168
23	33,446,005	755,984	514,933	32,690,020	1,270,917		
24	32,690,020	767,623	503,294	31,922,397	1,270,917		
25	31,922,397	779,442	491,476	31,142,955	1,270,917		
26	31,142,955	791,442	479,475	30,351,513	1,270,917	2.6304	1.5608
27	30,351,513	803,627	467,290	29,547,886	1,270,917		
28	29,547,886	816,000	454,918	28,731,887	1,270,917		
29	28,731,887	828,563	442,355	27,903,324	1,270,917		
30	27,903,324	841,319	429,598	27,062,005	1,270,917	2.7962	1.3951
31	27,062,005	854,272	416,645	26,207,733	1,270,917		
32	26,207,733	867,424	403,493	25,340,308	1,270,917		
33	25,340,308	880,779	390,138	24,459,529	1,270,917		
34	24,459,529	894,340	376,578	23,565,189	1,270,917	2.9724	1.2188
35	23,565,189	908,109	362,808	22,657,081	1,270,917		
36	22,657,081	922,090	348,827	21,734,991	1,270,917		
37	21,734,991	936,287	334,631	20,798,704	1,270,917		
38	20,798,704	950,702	320,216	19,848,002	1,270,917	3.1597	1.0315
39	19,848,002	965,338	305,579	18,882,664	1,270,917		
40	18,882,664	980,201	290,717	17,902,463	1,270,917		
41	17,902,463	995,292	275,625	16,907,171	1,270,917		
42	16,907,171	1,010,615	260,302	15,896,556	1,270,917	3.3589	0.8324
43	15,896,556	1,026,175	244,743	14,870,381	1,270,917		
44	14,870,381	1,041,974	228,944	13,828,407	1,270,917		
45	13,828,407	1,058,016	212,901	12,770,392	1,270,917		
46	12,770,392	1,074,305	196,612	11,696,087	1,270,917	3.5706	0.6207
47	11,696,087	1,090,845	180,072	10,605,242	1,270,917		
48	10,605,242	1,107,640	163,278	9,497,602	1,270,917		
49	9,497,602	1,124,693	146,225	8,372,909	1,270,917		
50	8,372,909	1,142,008	128,909	7,230,901	1,270,917	3.7956	0.3957
51	7,230,901	1,159,591	111,327	6,071,310	1,270,917		
52	6,071,310	1,177,444	93,474	4,893,866	1,270,917		
53	4,893,866	1,195,572	75,346	3,698,295	1,270,917		
54	3,698,295	1,213,979	56,939	2,484,316	1,270,917	4.0348	0.1565
55	2,484,316	1,232,669	38,248	1,251,647	1,270,917		
56	1,251,647	1,251,647	19,270	0	1,270,917		

