Registrar

National Electric Power Regulatory Authority

Islamic Republic of Pakistan

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No. NEPRA/R/Addl. Dir(Trf)/TRF-518/ASPL-2020/47527-47529
December 30, 2020

Subject: **Determination of National Electric Power Regulatory Authority in the matter of Tariff Petition filed by M/s. Access Solar (Private) Ld. for Determination of Generation Tariff in respect of 11.52 MWp Solar PV Power Project** (Case No. NEPRA/TRF-518/ASPL-2020)

Dear Sir,

Please find enclosed herewith subject Determination of the Authority along with Annex-I & II (24 Pages) in Case No. NEPRA/TRF-518/ASPL-2020.

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. The Order Part along with Annex-I & II of the Determination are to be notified in the Official Gazette.

Enclosure: As above

30 12 20

(Syed Safeer 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 ACCESS SOLAR (PRIVATE) LIMITED FOR DETERMINATION OF GENERATION TARIFF IN RESPECT OF 11.52 MWp SOLAR PV POWER PROJECT

1. M/s Access Solar (Pvt.) Limited ("ASPL" or "the petitioner" or "the company/project company") filed a tariff petition before National Electric Power Regulatory Authority ("NEPRA" or "the Authority") on March 24, 2020 for determination of generation tariff in respect of its 11.52 MWp Solar PV Power Project ("the Project") to be set up at Pind Dadan Khan, District Jhelum, Punjab. The said petition was filed by ASPL pursuant to the relevant provisions of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ("the NEPRA Act") and in terms of Rule 3 of the NEPRA (Tariff Standards & Procedure) Rules, 1998 ("Tariff Rules"). The petitioner requested for the approval of levelized tariff of US Cents 5.1118/kWh over the tariff control period of 25 years.

2. The petitioner submitted that it is a company incorporated to set up the Project. During the proceedings, ASPL submitted a copy of its incorporation certificate issued by Securities and Exchange Commission of Pakistan ("SECP") dated October 7, 2011.

3. The petitioner submitted that it was issued 02 Letter of Intents ("LOIs") Nos. B/3/2/SPV/LOI-007 and B/3/2/SPV/LOI-008 of 5 MW each by Alternative Energy Development Board ("AEDB") on July 30, 2011 in favour of the sponsor of ASPL i.e. Techaccess FZ LLC, Dubai for the establishment of solar PV power generation projects in the province of Punjab. The said LOIs were issued in accordance with the Government of Pakistan's Policy for Development of Renewable Energy for Power Generation, 2006 ("RE Policy, 2006"). The petitioner also submitted a letter dated September 7, 2012 whereby AEDB granted approval of merger of ASPL's two LOIs of 5 MW each into one LOI of capacity of 10 MW. ASPL submitted that post having the award of upfront tariff by NEPRA on March 28, 2014, the company received the Letter of Support ("LOS") from AEDB on December 22, 2014 for the capacity of 11.52MW. Subsequently, AEDB on August 22, 2019 granted extension in the validity of the said LOS up to November 21, 2019. During proceeding of the subject tariff petition, AEDB vide its letter dated October 7, 2020 granted approval of extension in the validity period of LOS of ASPL up to December 21, 2020.

4. NEPRA granted the Generation License to ASPL on August 22, 2013. Subsequently, the company filed Licensee Proposed Modification for change in technological parameters, which was approved by NEPRA on September 7, 2020.

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5. Summary of the key information as provided in the tariff petition is as follows:

Project Company	:	Access Solar (Pvt.) Ltd	
Main Sponsor	:	TechAccess FZ LLC, Dubai	
Capacity	:	11.52 MWp	
Project Location	:	Pind Dadan Khan, District Jhelum, Punjab	
Land Area	:	~ 51 Acres	
Concession Period	:	25 years from COD	
Purchaser	:	Central Power Purchasing Agency (Guarantee) Ltd.	
PV Modules	:	Mono Crystalline 450 Wp	
Tracking	:	Single Axis	
Plant Capacity Factor	:	20.3505%	
Annual Energy Production	:	20.537 GWh per annum	
Annual Degradation	:	0.5%	
Project Cost		**USD in millions**	
EPC Cost	:	6.854	
Land and Project Development Cost	:	0.620	
Insurance during Construction	:	0.034	
Financing Fee & Charges	:	0.180	
Interest during Construction	:	0.141	
Total Project Cost	:	**7.829**	
Financing Structure	:	Debt: 80% : Equity: 20%	
Debt Composition	:	100% State Bank Pakistan Refinancing Scheme	
Interest Rate	:	SBP Rate of 6%	
Repayment Period	:	10 years	
Return on Equity and Return on Equity during Construction	:	15% per annum	
Annual O&M Cost	:	USD 15,180 per MW	
Annual Insurance Cost	:	0.5% of EPC cost	
Tariff		**PKR/kWh**	**US Cents/kWh**
Levelized Tariff (1-25 years)	:	**7.9412**	**5.1118**
Exchange rate	:	1 USD = PKR 155.35	

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6. The Authority considered the tariff petition on April 23, 2020 and decided to admit the same, subject to submission of prescribed fee. The petitioner submitted the required fee on May 20, 2020. The Authority decided to conduct public hearing on the matter. Accordingly, Notice of Admission & Hearing in the instant case was published in the daily national newspapers on July 3, 2020 stating hearing date as July 14, 2020, to be conducted via Zoom, while also providing salient features of the petition, issues framed for hearing and invitation for filing comments/intervention request from the interested parties. Individual Notices of Admission & Hearing were also sent to the stakeholders, considered relevant by NEPRA, and to the petitioner on July 6, 2020 for participation in the hearing. Tariff petition and Notice of Admission & Hearing were hosted on NEPRA's website (www.nepra.org.pk) for information of general public.

7. Following issues were framed by the Authority for the hearing/proceedings:

- 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?
- 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?
- 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? and
- Whether the project grid interconnection study is approved by the relevant organization(s)?
- Whether the claimed construction period is justified?
- Any other issue with the approval of the Authority

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8. The hearing was held on July 14, 2020 (Tuesday) at 11:30 A.M. via Zoom which was attended by a number of participants including the petitioner, representatives of Central Power Purchasing Agency (Guarantee) Ltd. ("CPPAGL"), AEDB and other stakeholders. In response to Notice of Admission/Hearing, no comments or intervention request were received from any party.

9. The issue wise submissions of the petitioner and the Authority's findings and decision thereon are as under.

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?

10. The petitioner has claimed USD 6.854 million on account of Engineering, Procurement and Construction ("EPC") cost in its tariff petition. In this regard, ASPL has submitted a copy of EPC Term Sheet signed with Csunpower International Limited ("Offshore Supplier/Project Coordinator") on March 15, 2020. As per the EPC Terms Sheet, total EPC contract price agreed is USD 6.796 million, i.e. lower than the amount claimed by ASPL in the tariff petition. The EPC cost as referred in the Term Sheet is considered as the claim of the petitioner.

11. ASPL submitted that the Authority in the earlier tariff decision allowed the EPC cost of USD 0.7035 million per MW based on single axis tracking and poly crystalline modules. During the hearing, ASPL mentioned that the Authority in the recent tariff decisions of solar PV projects has allowed EPC cost up to the level of USD 0.557 million/MW, based on single axis tracking and mono crystalline modules. ASPL submitted that it is claiming slightly higher EPC cost due to (a) smaller size of projects, i.e. 21 MW (11.52 MW for ASPL and 10 MW for its associated company) compared to 150 MW, (b) need of concrete piles as opposed to screw driven piles, and (c) requirement of flood protection embankment.

12. The petitioner stated that NEPRA (Selection of Engineering, Procurement and Construction Contractor by Independent Power Producers) Guidelines, 2017 ("EPC Guidelines, 2017") are not applicable in its case as it has filed the instant tariff petition following expiry of its earlier tariff and based on the provisions of the Cabinet Committee on Energy ("CCOE") decision dated April 04, 2019. ASPL further mentioned that its earlier tariff in 2018 also was approved by NEPRA based on EPC prices, prevailing at that time. Notwithstanding above,

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ASPL submitted that in order to achieve competitive EPC price, the project company approached and obtained quotes from various EPC contractors and following that process, the company has entered into a term sheet with the proposed EPC contractor.

13. It is noted that the EPC Term Sheet is signed for the design, engineering, manufacture, fabrication, procurement of relevant materials and construction of the Project. The Offshore Supply scope of work consists of offshore design, supply and delivery of PV modules, inverters, cables, spare parts, and other imported components. The Onshore works consist of onshore design, supply, installation, construction, testing and commissioning of the complex, in accordance with the technical requirements and relevant terms of the Energy Purchase Agreement ("EPA").

14. As stated above, the petitioner has not followed the EPC Guidelines, 2017 for selection of EPC contractor. It is also noted that tariff determinations of eleven (11) solar PV projects have been issued by NEPRA in last few months. Looking at the EPC costs approved in those determinations and prevailing prices of equipment, it is considered that the EPC cost claim of the petitioner is slightly on the higher side. In view thereof, the Authority has decided to assess the EPC cost to be allowed to ASPL and basis thereof is given in the following paragraph.

15. 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 costs approved recently for other comparable projects were also checked. It has been noted that the average prices of solar modules of different types and brands have gone as low as USD 0.18 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 50% in the cost of modules in two years' time. 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 PV power project which has recently been commissioned. On these base figures, the factors such as transportation cost, existing local market conditions, local manufacturing base, length of time allowed

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for achieving financial close etc. were given due consideration. Further, the cost of civil works as allowed by the Authority in the comparable tariff cases has been rationalized for the size and site specific features of the Project. The cost of electrical balance of plant equipment has been allowed in line with the comparable projects. It has also been ensured to provide a reasonable amount of profits/margins to the companies carrying out above work. Keeping in view all these factors, the Authority has assessed the EPC cost for AEPL as USD 0.5600 million per MW (USD 6.451 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.

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?

16. The petitioner has claimed USD 0.975 million on account of non-EPC cost. The break-up of the cost components as provided by the petitioner is as follows:

Non-EPC Cost	USD Million
Insurance during Construction	0.034
Land & Project Development Cost	0.620
Financing Fee and Charges	0.180
Interest during Construction	0.141
Total Non-EPC Cost	**0.975**

Insurance during Construction

17. The petitioner has claimed USD 0.034 million on account of pre-COD insurance cost at the rate of 0.5% of the claimed EPC cost as allowed by the Authority in its earlier decision. The petitioner requested for due consideration for the size of the Project in this regard.

18. The Authority has noted that NEPRA (Benchmarks for Tariff Determination) Guidelines, 2018 ("Benchmarking 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 for solar PV projects. In accordance therewith, the Authority has decided to allow insurance during construction, inclusive of taxes, charges and/or duties, at the rate of 0.4%

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of the approved EPC cost to ASPL. On this basis, the amount being approved under this head works out to be around USD 0.026 million.

Project Development Cost

19. The petitioner has claimed USD 0.620 million (USD 53,809/MW) on account of Project Development Cost ("PDC") including cost of land. The petitioner submitted that the claimed cost is same as was allowed in its earlier decision dated October 11, 2018. The petitioner submitted that PDC for a project typically remains the same in absolute terms irrespective of different sizes. After excluding land cost, according to the petitioner, the claimed PDC comes out to be around USD 40,000 per MW. The break-up of claimed PDC was not submitted with the tariff petition, however, during the hearing, ASPL submitted that PDC includes the cost of access road, administration cost, regulatory fees, up-dation of grid and other technical studies, independent engineer and advisor costs.

20. In its tariff petition, ASPL stated that earlier the Authority in its tariff decision issued in October, 2018 had decided that the compensation of legitimate cost of the company due to prolonged development period would be given due deliberations on the basis of verifiable documentary evidence at COD. This decision was made while recognizing the fact that the delay in the development of the Project was due to not fault of the company. ASPL requested to reiterate the same in the determination to be issued in respect of instant tariff petition.

21. During the hearing, ASPL informed that it has claimed USD 0.322 million on account of cost of land of 96.70 acres for two solar PV projects namely ASPL and associated company Access Electric (Pvt.) Ltd. ("AEPL"). The petitioner submitted that in 2012, ASPL had purchased a land area of around 96.7 acres. As per the land documents submitted during proceeding, ASPL purchased land against the total proceeds (including stamp and other charges) of Rs. 29.769 million (around PKR 307,800 per acre). The petitioner submitted that average land area used for these two projects is 4.5 acres per MW, includes associated facilities, drainage and flood embankment, which is less than the area allowed by NEPRA in other projects.

22. ASPL submitted that out of 96.7 acres of land purchased by ASPL, 46 acres shall be leased to AEPL for the life of the Project. In this regard, ASPL submitted a copy of Memorandum of Understanding ("MOU") agreed with AEPL dated March 7, 2020 for use of land and access road from public road to the plant sites. As per the MOU, ASPL intends to sale or lease out

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to AEPL 46 acres of land for the purpose of development of a solar PV power plant at either upfront consideration of USD 152,700 or monthly rental of USD 1,403 for a terms of 25 years. ASPL through email communication dated October 14, 2020 confirmed that prior to financial close, AEPL shall be purchasing 46 acres of the land from ASPL under the provisions of the MOU.

23. The Authority considered all the above details and the land cost that has been allowed in the comparable projects and is of the view that the cost of land for ASPL should be the equal to the purchase price thereof as paid by ASPL for both the projects. The documentary evidences shows that ASPL procured land area of 96.7 acres for Rs. 307,800/acre, therefore, the same cost of land is hereby approved for ASPL which comes out to be around Rs. 15.605 million (USD 0.094 million) for 50.7 acres of land.

24. With respect to PDC, the Authority has examined the said cost which has been allowed in tariffs of comparable solar PV projects. Considering the said information while taking into account the size of the Project, the Authority has decided to approve the PDC of USD 0.276 million (Rs. 46 million) for ASPL, inclusive of all the costs to be incurred under this head. This amount is being approved on lump sum basis, i.e. the costs incurred on individual heads of PDC may change but should not exceed the overall amount. The duties and/or taxes as per the criteria given in the Order part of this determination shall be admissible.

25. The Authority also considered the request of the petitioner with respect to allowing prior development cost. It was noted that the petitioner was asked to provide the information about those claims, however, ASPL submitted that it shall be submitting the same at the time of adjustment of tariff at COD. The Authority considered these details and decided that the compensation of legitimate PDC of the project company due to its prolonged development period would be given due deliberations on the basis of verifiable documentary evidence at the time of tariff adjustment request at COD.

Financing Fee and Charges

26. ASPL has claimed financing fees and charges of USD 0.180 million at the rate of 3% of the total debt of the Project. The petitioner requested the Authority for due consideration of the size of the Project in the instant case.

27. It is noted that Benchmarking Guidelines states the provision of financing fee & charges not exceeding 2% of the approved debt amount of the capital expenses. In accordance

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with the said benchmark, the Authority has decided to allow the captioned cost at the rate of 2% of approved debt portion of allowed capital expenses, inclusive of taxes, charges and/or duties, to the petitioner. Accordingly, the amount being approved under this head works out to be around USD 0.110 million.

Interest during construction (IDC)

28. The petitioner has submitted that Interest during Construction ("IDC") has been calculated as USD 0.141 million. This cost has been calculated based on fixed rate of 6% under State Bank of Pakistan Renewable Energy Refinancing Facility ("SBP Scheme") and 8 months construction period.

29. 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 0.083 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.

30. Recapitulating above, the approved project cost is given hereunder:

Project Cost	USD million
EPC Cost	6.451
Project Development Cost	0.276
Land Cost	0.094
Insurance during Construction	0.026
Financing Fee and Charges	0.110
Interest during Construction	0.083
Total	**7.040**

Whether the claimed O&M costs are justified?

31. The petitioner claimed O&M cost of USD 15,180 per MW per year (USD 0.1518 million/year) stating that the same cost was allowed by the Authority in earlier determination. 50% O&M has claimed in local component and 50% O&M has claimed in foreign component. The EPC Term Sheet, as submitted by the petitioner, provides, inter alia, that the Contractor

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shall provide the O&M service at USD 140,000 for first two years of operations. ASPL during the proceedings submitted that the balance amount in the claimed O&M relates to salaries expenses, administration costs and fixed corporate overheads of the company.

32. In the tariff petition, the petitioner requested the Authority for due consideration of the size of the Project for approval of this cost head. During the hearing also, the petitioner highlighted that the all the recent determinations issued by NEPRA are for solar PV projects with a combined capacity of 100-150 MW which are not comparable for the instant case. This is due to the reason that all fixed costs tend to remain in the same range irrespective of the size of the projects. Accordingly, a smaller project would have a higher per MW O&M cost.

33. To evaluate this claim of ASPL, the O&M cost being allowed in other parts of the world has been referred. Local market conditions, required skilled manpower, spare parts etc. have also been deliberated. The cost recently being allowed to other solar PV power projects has also been compared. In view thereof, and considering the smaller size of the project, the Authority has decided to approve the O&M cost of USD 0.115 million per year to ASPL, i.e. USD 10,000 per MW per year.

34. In line with the recent tariffs approved for solar PV projects, the Authority has decided to allow whole of O&M cost in local currency to the petitioner. Additionally, the Authority has decided that it may consider making changes in the approved O&M cost during the tariff control period in line with the related legal framework to be approved by the Authority.

Whether the claimed insurance during operation is justified?

35. ASPL in the petition and during hearing, claimed insurance during operation at the rate of 0.5% of claimed EPC Cost. The petitioner submitted that insurance during operation at the rate of 0.5% of EPC was allowed in the previous tariff determination by the Authority. Further, it stated that given the small size of the Project and additional risk of flooding, provision of insurance cost at 0.5% of EPC is justified.

36. The Authority noted that in the recently approved solar PV tariff determinations, insurance during operation at the rate of 0.4% of the approved EPC cost has been allowed. Benchmarking Guidelines also state the provision of insurance during operation at the rate of 0.4% of EPC cost for solar PV 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,

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including all taxes/charges and/or duties, to the petitioner, subject to adjustment on actual basis as per the mechanism given in the Order part of this determination.

Whether the claimed return on equity is justified?

37. The petitioner has claimed Return on Equity ("ROE"), both during construction and operation of 15% in its tariff petition. During the hearing, ASPL submitted that the Project has faced extreme adversities and impediments in the development over a period 6-9 years, hence, it is justified that the 15% ROE, as allowed earlier, should be retained.

38. The Authority has noted that in the most recent comparable tariff cases of renewable technologies, ROE to the limit of 13% (USD based) has been allowed. Keeping in view its most recent approvals, the Authority has decided to compute the tariff of ASPL while allowing ROE of 13%.

39. During the proceedings, the petitioner confirmed that only foreign equity shall be invested in the Project. The Authority has considered this submission of ASPL and accordingly has decided to approve USD based ROE. However, it is to be noted that ASPL at the time of tariff adjustment at COD shall have to furnish the necessary documents to prove that the foreign equity has actually been invested, otherwise the ROE shall be approved in terms of PKR, i.e. variations due to change in PKR against USD shall not be allowed. However, in that case, the approved ROE shall be increased by 400 basis points over 13%, to be calculated on the equity amount, as established at the time of COD.

40. It is important to highlight here that the components of ROE and Return on Equity during Construction ("ROEDC") have been computed and approved while taking into account the monthly cash flows such that annual rate of equity return comes out as 13%. It is to be noted that the approved amount (ROE + ROEDC) shall be the maximum limit of the annual equity return to be earned by the project company. The amount of equity return of any year, if exceeds by the given limit, shall be shared between the power producer and consumers through claw back formula to be decided by the Authority under the relevant framework.

Whether the claimed financing/debt terms are justified?

41. ASPL in the petition and during hearing submitted that the Project shall be financed under SBP Scheme at the rate of 6% based on a debt repayment period of 10 years post COD. The petitioner submitted that due to the small size of the Project, it is unviable for the

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company to contract foreign loans. However, in case of non-availability of funding under the SBP Scheme, the company requests the flexibility to arrange commercial financing as per parameters stated in NEPRA's determination in other cases. The debt to equity ratio of 80:20 has been claimed by the petitioner.

42. The Authority has noted that Benchmarking Guidelines provide 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 capital structure. The debt to equity ratio of 80:20 has also been approved by the Authority in the recently approved wind and solar tariff determinations. Therefore, the Authority has decided to compute and approve tariff of ASPL using debt to equity ratio of 80:20 as claimed by the petitioner.

43. Benchmarking Guidelines also provide that in case of renewable energy projects eligible for securing debt under SBP Scheme, a flat rate of 6% shall be approved. The size of the Project is 11.52 MW which makes it eligible to avail whole of the required financing under SBP Scheme, hence, the Authority has decided to compute and approve tariff of ASPL at 6% as given in the SBP Scheme. In case the petitioner is not able to secure financing under SBP Scheme then the tariff shall be adjusted on commercial local/foreign financing, or a mix of both, at the time of its COD on the terms as given in the Benchmarking Guidelines. However, the petitioner shall have to prove through documentary evidence issued by SBP/commercial bank that it exhausted the option of availing financing under SBP scheme before availing conventional local/foreign loan.

44. The petitioner has claimed debt servicing period of 10 years for SBP financing. The Authority has noted that in recently approved wind and solar tariff determinations, it has allowed debt repayment period of 10 years for financing under SBP Scheme and therefore decided to allow the same to the petitioner also.

Whether the claimed annual energy production and corresponding plant capacity factor are justified? And Whether the petitioner's proposed solar modules and inverter technology satisfies the international standards of quality and operation?

45. The petitioner has submitted the following in this regard:

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Project Capacity	11.52 MWp
Annual Power Generation	20.537 GWh
Net Annual Capacity Factor	20.3505%

46. According to the petitioner, it plans to develop the Project based on 450Wp mono-crystalline PV modules with single axis tracking system. The petitioner submitted that the estimated plant factor based on the location and Meteonorm data is 20.3505%, i.e. 1st year annual generation of 20,536,704 kWh.

47. During the hearing, the petitioner submitted that the claimed plant factor has been established through a PV Syst simulation based on data from Meteonorm as well as Solar GIS. The petitioner submitted a comparison showing that projects being set up at Pind Dadan Khan, Sukkur, D.I. Khan and Gwadar have similar technology and yield plant factor of 20.30%, 23.27%, 21.04%, 24.15% at solar irradiation of 1677 kWh/m^2, 1936 kWh/ m^2, 1786 kWh/ m^2, 2046 kWh/ m^2 respectively. ASPL submitted that amongst these referred projects, ASPL's project is the most efficient plant based on the location i.e. Pind Dadan Khan. The petitioner further submitted that solar modules being proposed are part of the Tier-1 panel list of Bloomberg and satisfy all applicable international standards.

48. It has been noted that the Generation License for the proposed technology has already been approved for ASPL which actually addressed the issue with respect to the technology. For plant capacity factor, the Authority has considered the modules, inverters and other equipment as proposed by ASPL with respect to their quality and energy yield. The energy simulation parameters as submitted by the petitioner has also been examined. The plant capacity factor that has been allowed for mono crystalline modules in the recent tariff cases of different regions of the country were also checked. Considering these factors, the Authority is of the view that the claimed net plant capacity factor is reasonable and therefore decided to compute and approve the tariff of ASPL on the claimed capacity factor of 20.3505%. 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 annual energy produced beyond the approved annual capacity factor.

Whether the claimed construction period is justified?

49. During the hearing and in its tariff petition, the petitioner has proposed 8 months construction period for the Project. The Authority noted that it has approved construction

period of 10 months (from the date of financial close) in the recently approved tariff cases of solar power projects (50-62 MW). For a 30 MW solar project, approved recently, the Authority allowed construction period of 8 months. Keeping in view these decisions, the Authority has decided to approve construction period of 8 months to ASPL.

Whether the project grid interconnection study is approved by the relevant organization(s)?

50. The petitioner submitted that the Project will feed energy into the 11-kV Grid of the Islamabad Electric Supply Company Ltd. ("IESCO"). During the hearing, the petitioner apprised that the Grid Interconnection Study ("GIS") of the Project has been approved by IESCO on May 28, 2020. A copy of that approval was submitted by ASPL during proceedings which states that the revised GIS for the solar PV plant has been checked and generally found satisfactory with fulfilment of the certain conditions/ observations listed in the said letter.

51. The Authority has noted that during the proceedings of the Generation License as approved to ASPL on September 7, 2020, the matter of interconnection of the Project has already been discussed and addressed. In view thereof, the Authority considers this issue settled.

Degradation Factor

52. ASPL submitted that annual average degradation of 0.50% per year has been assumed. The Authority has noted that degradation factor of modules at 0.5% per year has been taken into account in the recently approved tariff cases of solar PV power projects and decided to approve the same in ASPL's tariff. The Authority has decided to capitalize the impact of allowed degradation in the approved project cost. The amount of USD 0.234 million has been made part of the approved project cost while calculating the same at the levelized rate of 3.62% of the approved EPC cost.

53. **ORDER**

In pursuance of section 7(3)(a) of the 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 Access Solar (Pvt.) Limited (ASPL) for its 11.52 MWp solar PV power project for delivery of electricity to the power purchaser as follows:

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- Levelized tariff works out to be Rs. 6.9124/kWh (US Cents 4.1541/kWh).
- The tariff has been worked out on Build, Own and Operate basis.
- EPC cost of USD 6.451 million has been approved.
- Project Development Cost of USD 0.276 million has been approved.
- Cost of Land of USD 0.094 million has been approved
- Insurance during constriction at the rate of 0.4% of the allowed EPC cost has been approved.
- Financing Fee & Charges 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 using 100% local financing under SBP Scheme.
- The cost of debt of 6% (SBP Scheme) has been used.
- Debt Repayment has been scheduled for 10 years from COD.
- Equity IRR of 13% has been allowed.
- O&M Cost of USD 10,000 per MW per year has been allowed.
- Insurance during Operation has been calculated as 0.40% of the allowed EPC Cost.
- Construction period of 8 months has been allowed.
- Net Annual Plant Capacity Factor of 20.3505% has been approved.
- Degradation factor of 0.5% per year has been approved. The financial impact of the allowed degradation of USD 0.234 million has been taken into account in the approved project cost.
- Reference Exchange Rates of 166.40 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%

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Month 6	15.00%
Month 7	20.00%
Month 8	20.00%

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

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 applicable foreign portion of the approved EPC cost shall be made for the currency fluctuation against the reference parity values.
- PDC including land cost, 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 166.40 to calculate the maximum limit of the amount to be allowed at COD.
- 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 IRR 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 08 months starting from the date of financial close.

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- For full/part of commercial foreign or local loan or a mix of both, if applicable and availed by the company, the IDC shall also be allowed adjustment for change in applicable LIBOR/KIBOR.
- The reference tariff has been worked out on the basis of cost of 6% stated under SBP financing scheme. In case cost negotiated by the company under SBP scheme is less than the said limit of 6%, the savings in that cost shall be shared between the power purchaser and the power producer in the ratio of 60:40 respectively.
- For full or part of commercial local or foreign loan, if any, the savings in the approved spreads shall be shared between the power purchaser and power producer in the ratio of 60:40.
- 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 08 months from the date of financial close.

B. Indexations during operations

Insurance shall be allowed adjustment on yearly basis starting from either 1st July or 1st January. ROE, ROEDC and O&M Components shall be adjusted on quarterly basis to be applicable from 1st July, 1st October, 1st January and 1st April. Adjustment of Debt Servicing Component (if any) shall be made either quarterly/bi-annually/annual, depending upon the final terms approved by the Authority at the time of COD. 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 (N-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)
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

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CPI (REV)	=	The revised CPI (General)
N-CPI (REF)	=	The reference N-CPI (General) of 136.23 for the month of August, 2020

Note: *The reference index of N-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 N-CPI value for the middle month of preceding quarter prior to the date of COD shall be considered. Thereafter, the N-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. 166.40/USD
P (Act)	=	Actual premium or 0.4% of the approved EPC Cost converted into Pak Rupees on exchange rate prevailing on 1st day of the insurance coverage period, whichever is lower

iii) **Return on Equity**

The ROE (ROE + ROEDC) components of the tariff will be adjusted quarterly on account of change in USD/PKR 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 on the last day of the preceding quarter as notified by the National Bank of Pakistan
ER (Ref)	=	The reference TT & OD selling rate of Rs. 166.40/USD

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, duly appointed by the power purchaser, at the time of the commissioning of the plant.
- This tariff will be limited to the extent of net annual energy generation supplied to the power purchaser up to 20.3505% net annual plant capacity factor. Net annual energy generation supplied to the power purchaser in a year, in excess of 20.3505%, will be charged at the following tariffs:

Net annual plant capacity factor	% of prevalent tariff allowed to power producer
Above 20.35% to 20.50%	-
Above 20.50% to 21.25%	10%
Above 21.25% to 22.00%	20%
Above 22.00% to 22.75%	30%
Above 22.75%	40%

- The risk of solar resource shall be borne by the power producer.
- The maximum plant capacity shall not exceed as given in the Generation License.

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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 directed to ensure that all the equipment is installed as per the details/specifications given in the generation license/tariff as awarded by NEPRA.

- The petitioner is hereby directed to secure the maximum available loan under the SBP Scheme. The savings in the cost of financing under SBP Scheme shall be shared between power purchaser and power producer in the ratio of 60:40 at the time of COD or during any time of the loan tenor, as applicable.

- In case the company shall secure full or part of local commercial loan then the tariff of company shall be computed/adjusted at the time of COD at applicable KIBOR + spread of 2.25%. The savings in the approved spreads anytime during the loan tenor shall be shared between the power purchaser and power producer in the ratio of 60:40. The tenor of the debt servicing shall not be less than thirteen years for this loan.

- In case the company shall secure full or part of foreign conventional loan then the tariff of company shall be computed/adjusted at the time of COD at applicable LIBOR + spread of 4.25%. The savings in the approved spreads any time during the loan tenor shall be shared between the power purchaser and power producer in the ratio of 60:40. The tenor of the debt servicing shall not be less than thirteen years for this loan.

- In case the company shall secure foreign loan under any credit insurance (Sinosure etc.) then the cost of that insurance shall be allowed to the maximum limit of 0.6% of the approved yearly outstanding principal and interest amounts. For financing with Sinosure, the spread/margin over LIBOR shall be adjusted to the extent such that the total financing cost (applicable LIBOR + Adjusted Margin + Sinosure) shall not exceed the financing cost without Sinosure (applicable LIBOR + Approved Margin).

- The Authority may consider making changes in the O&M cost while capping the allowed prevailing level, which shall be governed under legal framework to be approved by the Authority in this regard.

- In case the company earns annual profit in excess of the approved return on equity (including ROEDC), then that extra amount shall be shared between the power producer and consumers through claw back formula to be decided by the Authority

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through the relevant framework. For that purpose, the share of producer as given in the bonus energy mechanism shall be taken into account.

- 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 financial close is 8 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 8 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 reference 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 allowed as pass through.

- 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.

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54. 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.

AUTHORITY

(Rafique Ahmed Shaikh)
Member

(Eng. Bahadur Khan)
Member

16/12/2020

(Rehmatullah Baloch)
Member

Saidullah

(Saif Ullah Chattha)
Vice Chairman

16.12.2020

(Tauseef H. Farooqi)
Chairman

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Annex-I

ACCESS SOLAR (PVT.) LIMITED
REFERENCE TARIFF TABLE

Year	O&M Local	Insurance	Return on Equity	Return on Equity during Construction	Principal Repayment	Interest Charges	Tariff
	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh
1	0.9334	0.2091	1.4484	0.0543	3.5539	2.7497	8.9489
2	0.9334	0.2091	1.4484	0.0543	3.7720	2.5316	8.9489
3	0.9334	0.2091	1.4484	0.0543	4.0035	2.3002	8.9489
4	0.9334	0.2091	1.4484	0.0543	4.2491	2.0545	8.9489
5	0.9334	0.2091	1.4484	0.0543	4.5099	1.7937	8.9489
6	0.9334	0.2091	1.4484	0.0543	4.7866	1.5170	8.9489
7	0.9334	0.2091	1.4484	0.0543	5.0803	1.2233	8.9489
8	0.9334	0.2091	1.4484	0.0543	5.3921	0.9115	8.9489
9	0.9334	0.2091	1.4484	0.0543	5.7230	0.5807	8.9489
10	0.9334	0.2091	1.4484	0.0543	6.0741	0.2295	8.9489
11	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
12	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
13	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
14	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
15	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
16	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
17	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
18	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
19	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
20	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
21	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
22	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
23	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
24	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
25	0.9334	0.2091	1.4484	0.0543	-	-	2.6452
Levelized Tariff	**0.9334**	**0.2091**	**1.4484**	**0.0543**	**3.0464**	**1.2208**	**6.9124**

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Annex-II

ACCESS SOLAR (PVT.) LIMITED
Debt Servicing Schedule

Relevant Quarters	Base amount (Rs.)	Principal Repayment (Rs.)	Interest (Rs.)	Balance Principal (Rs.)	Total Debt Service (Rs.)	Annual Principal Repayment (Rs./kWh)	Annual Interest (Rs./kWh)
1	968,195,709	17,841,041	14,522,936	950,354,669	32,363,976	3.5539	2.7497
2	950,354,669	18,108,656	14,255,320	932,246,012	32,363,976		
3	932,246,012	18,380,286	13,983,690	913,865,726	32,363,976		
4	913,865,726	18,655,991	13,707,986	895,209,735	32,363,976		
5	895,209,735	18,935,830	13,428,146	876,273,905	32,363,976	3.7720	2.5316
6	876,273,905	19,219,868	13,144,109	857,054,037	32,363,976		
7	857,054,037	19,508,166	12,855,811	837,545,871	32,363,976		
8	837,545,871	19,800,788	12,563,188	817,745,083	32,363,976		
9	817,745,083	20,097,800	12,266,176	797,647,283	32,363,976	4.0035	2.3002
10	797,647,283	20,399,267	11,964,709	777,248,015	32,363,976		
11	777,248,015	20,705,256	11,658,720	756,542,759	32,363,976		
12	756,542,759	21,015,835	11,348,141	735,526,924	32,363,976		
13	735,526,924	21,331,073	11,032,904	714,195,852	32,363,976	4.2491	2.0545
14	714,195,852	21,651,039	10,712,938	692,544,813	32,363,976		
15	692,544,813	21,975,804	10,388,172	670,569,009	32,363,976		
16	670,569,009	22,305,441	10,058,535	648,263,567	32,363,976		
17	648,263,567	22,640,023	9,723,954	625,623,544	32,363,976	4.5099	1.7937
18	625,623,544	22,979,623	9,384,353	602,643,921	32,363,976		
19	602,643,921	23,324,318	9,039,659	579,319,604	32,363,976		
20	579,319,604	23,674,182	8,689,794	555,645,421	32,363,976		
21	555,645,421	24,029,295	8,334,681	531,616,126	32,363,976	4.7866	1.5170
22	531,616,126	24,389,735	7,974,242	507,226,391	32,363,976		
23	507,226,391	24,755,581	7,608,396	482,470,811	32,363,976		
24	482,470,811	25,126,914	7,237,062	457,343,897	32,363,976		
25	457,343,897	25,503,818	6,860,158	431,840,079	32,363,976	5.0803	1.2233
26	431,840,079	25,886,375	6,477,601	405,953,703	32,363,976		
27	405,953,703	26,274,671	6,089,306	379,679,032	32,363,976		
28	379,679,032	26,668,791	5,695,185	353,010,242	32,363,976		
29	353,010,242	27,068,823	5,295,154	325,941,419	32,363,976	5.3921	0.9115
30	325,941,419	27,474,855	4,889,121	298,466,564	32,363,976		
31	298,466,564	27,886,978	4,476,998	270,579,586	32,363,976		
32	270,579,586	28,305,283	4,058,694	242,274,303	32,363,976		
33	242,274,303	28,729,862	3,634,115	213,544,441	32,363,976	5.7230	0.5807
34	213,544,441	29,160,810	3,203,167	184,383,631	32,363,976		
35	184,383,631	29,598,222	2,765,754	154,785,409	32,363,976		
36	154,785,409	30,042,195	2,321,781	124,743,214	32,363,976		
37	124,743,214	30,492,828	1,871,148	94,250,386	32,363,976	6.0741	0.2295
38	94,250,386	30,950,221	1,413,756	63,300,165	32,363,976		
39	63,300,165	31,414,474	949,502	31,885,691	32,363,976		
40	31,885,691	31,885,691	478,285	(0)	32,363,976		

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