eni new energy pakistan

Eni New Energy Pakistan (Private) Limited 5th Floor, The Forum, G-20, Block-9, Khayaban-e-Jami, Clifton, Karachi-75600, Pakistan PABX : (92-21) 3587 9951 Fax : (92-21) 3583 8394-5



Ref: ENEP-NEPRA-AL-saw-001/19

The Registrar National Electric Power Regulatory Authority (NEPRA) NEPRA Tower, Ataturk Avenue (East) Sector G 5/1, Islamabad

March 13, 2019

Subject: APPLICATION OF ENI NEW ENERGY PAKISTAN (PRIVATE) LIMITED FOR GRANT OF GENERATION LICENCE IN RESPECT OF BHIT 10 MW SOLAR POWER PROJECT

Dear Sir,

I, Angelo Ligrone, Chief Executive Officer, being the duly authorised representative of ENI NEW ENERGY PAKISTAN (PRIVATE) LIMITED by virtue of Board Resolution dated 30th January. 2019, hereby apply to National Electric Power Regulatory Authority for the grant of a Generation Licence to ENI NEW ENERGY PAKISTAN (PRIVATE) LIMITED pursuant to section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

I certify that the documents in support attached with this application are prepared and submitted in conformity with the provisions of the National Electric Power Regulatory Authority Licencing Regulations (Application and Modification Procedures) 1999, and undertake to abide by the terms and provisions of the above-said regulations. I further undertake and confirm that the information provided in the attached documents in support is true and correct to the best of my knowledge and belief.

A Pay Order in the sum of Rupees164,960/-, being the non-refundable licence application fee calculated in accordance with schedule II to the National Electric Power Regulatory Authority Licencing Regulations (Application and Modification Procedure) 1999, is also attached herewith.

I hope this meets all the requirements. Please feel free to contact me for any further queries.

Yours sincerely,

Kunnan A. Muan Angelo Ligrone

Chief Executive Officer

cc: Syed Amjad Wahab, Kamran Mian, Luc



Application for Generation Licence 10 MW Off-grid PV Plant

ANNEXURE 1 – AUTHORIZATION FROM BOARD RESOLUTION



eni new energy

Eni New Energy Pakistan (Private) Limited 5th Floor, The Forum, G-20, Biock-9, Khayaban-e-Jami, Clifton, Karachi-75600, Pakistan PABx: (92-21) 3587 9951 Fax: (92-21) 3583 8394-5

RESOLUTION NO. 1 IN WRITING BY CIRCULATION

WHEREAS the ENI New Energy Pakistan (Private) Limited ("Company") was incorporated on 22 January 2019 under the Companies Act 2017 (XIX of 2017) and registered at Karachi under Corporate Universal Identification No. 0128942.

AND WHEREAS it was noted that, in accordance with Article 34 of the Articles of Association of the Company, Mr. Angelo Ligrone, Mr. Donato Azzarone and Syed Amjad Wahab are the first Directors of the Company.

AND WHEREAS it was noted that Mr. Angelo Ligrone is appointed as the first Chief Executive of the Company for a term up to the conclusion of the first annual general meeting of the Company.

AND WHEREAS certain matters require to be decided by the Directors for the future of the Company.

Accordingly it is:

- (i) **RESOLVED THAT** Mr. Donato Azzarone be and is appointed Chairman of the Board of Directors of the Company.
- (ii) RESOLVED THAT the Mr. Luca Natale be and is appointed Chief Financial Officer of the Company.
- (iii) RESOLVED THAT A. F. Fergusons & Co, Chartered Accountants, be and are appointed auditors of the Company to hold office until the conclusion of the first Annual General Meeting and that the Chief Executive of the Company be and is authorised to fix the fee payable to the auditors.
- (iv) RESOLVED THAT the financial year of the Company shall commence on the 1st day of January in each calendar year and shall end on the 31st day of December of each calendar year

(v) RESOLVED THAT:

(a) a banking account ENI NEW ENERGY PAKISTAN (PRIVATE) LIMITED be opened with Standard Chartered Bank (Pakistan) Limited, main branch located at P.O Box number 5556, 11 Chundrigar Road, Karachi 74000, Pakistan. COL ENI NEW ENERGY PAKISTAN (PVT) LTD

- (b) the following persons be and are authorised to sign and operate the account such that any one of them shall sign singly:
 - i) Angelo Ligrone
 - ii) Luca Natale
- (c) the Bank be and is hereby empowered to honour cheques, bills of exchange and promissory notes, drawn, signed, accepted, or made on behalf of the Company, singly by any one of the following, namely, Angelo Ligrone / Luca Natale, and to act on any instructions given by the person so authorised with regard to any accounts whether in credit or overdrawn or any transactions of the company.
- (d) the Bank be furnished with:
 - (i) An up-to-date copy of the Company's Memorandum and Articles of Association
 - (ii) The Company's Certificate of Incorporation
- (e) the Company give the Bank a list of the names of the Directors, Secretary and other officers of the Company and advise the Bank in writing of any changes that may take place and the Bank shall be entitled to act upon the information so given.
- (f) these Resolutions be communicated to the Bank and shall constitute the Company's Mandate to the Bank to remain in force until revoked by notice in writing to the Bank signed by the Chairman or any Director or the Secretary acting or purporting to act on behalf of the Company and for this purpose any instruction varying or purporting to vary the Mandate contained in these Resolutions shall be deemed a revocation.
- (vi) RESOLVED THAT the Chief Executive be and is authorised to take all such steps as may be necessary to devise design and prepare the common seal of the Company.
- (vii) RESOLVED THAT the Company's Board of Directors, has agreed to appoint Angelo Ligrone a) the role of "Employer" in accordance with HSE regulations covering workers and third-parties, the environment and public safety as well as applicable security issues and b) the responsibility of ensuring compliance with those

2



Application for Generation Licence 10 MW Off-grid PV Plant

regulations for business carried out in Eni New Energy Pakistan (Private) Limited.

(viii) RESOLVED THAT Mr. Angelo Ligrone holding Passport No. YB0371815, Mr. Donato Azzarone holding Passport No. YA6953542, and Syed Amjad Wahab holding Computerised National Identity Card No. 42201-0792478-7, (each the "Authorized Representative"), be and are hereby authorized to represent the company at the Securities & Exchange Commission of Pakistan and its Companies Registration Office, to sign off various forms/ documents for and on behalf of the Company and to do all needful acts in order to complete all procedural and legal formalities incidental and ancillary thereto.

> FURTHER RESOLVED THAT any and all actions of the Authorized Representative pursuant to, or in furtherance of the intent and purposes of the foregoing resolution, are hereby in all respects adopted, approved, confirmed and ratified as the valid and subsisting acts of the Company

(ix) RESOLVED THAT a General Power of Attorney, a copy whereof is annexed hereto, and is for the purposes of identification initialled by Syed Amjad Wahab, a Director of the Company, authorizing Mr. Angelo Ligrone, the Chief Executive of the Company to act for and on behalf of and in the name of the Company in relation to the business and affairs of the Company to the extent stated therein, be issued in favour of the said Mr. Angelo Ligrone, and THAT the seal of the Company be affixed to the said General Power of Attorney in the presence of Mr. Donato Azzarone and Syed Amjad Wahab both Directors of the Company, and that Mr. Donato Azzarone and Syed Amjad Wahab, be and are hereby authorised to sign the said General Power of Attorney for and on behalf and in the name of the Company.

Dated this 30th day of January, 2019.

Donato Azzarone 9 Syed Amjad Wahab

3



Prospectus

Introduction

Eni New Energy Pakistan (Private) Limited (ENEP) has been incorporated by Eni S.p.A. (Eni) to operate in the renewable energy sector in Pakistan. Eni is the ultimate owner of Eni International B.V., Eni Oil Holding B.V. and Eni Pakistan (M) Limited, the three shareholders of ENEP. Eni is one of the world's largest integrated energy company. It is operating in 71 countries worldwide and employing around 33,000 people.

Renewable energy solutions can help in providing energy security at reduced energy costs. In addition, renewable energy addresses environmental concerns regarding carbon emissions and greenhouse gases for the Pakistani Energy sector.

The first project being undertaken by ENEP for which this generation licence is requested is a photovoltaic plant of 10MWp to provide renewable energy to the Bhit Gas Field located in the Sindh Province in southern Pakistan. The installation of the PV plant aims at reducing the employment of the gas fired power turbines, partially shifting the load to solar energy and thus reducing emissions of CO2 and increasing volumes of gas available for sale to domestic market.

Bhit 10MW Photovoltaic Project

ENEP intends to setup 10 MW captive Solar Power Plant to provide electricity under 10-year power purchase agreement to a sole customer, the Kirthar JV, at Bhit gas plant located in the Sindh Province in southern Pakistan. The DC installed capacity corresponds to the maximum power that can be displaced by the existing turbine at the minimum working threshold.

The main objective of this solar plant is to provide clean energy to partially meet energy needs in an affordable and environment friendly way. The partial shifting of load to solar electricity will contribute to:

- Reduce emissions of CO2 and other pollutants;
- Increase sale of commercial gas volumes;
- Reduce O&M expenses linked to the existing generation units.



Key highlights of the project are as follows:

| | <u>集。 推动的 的 推动的 化合金</u> |
|---------------------------------|--|
| Customer | Kirthar JV (Eni Pakistan Ltd - operator) |
| Project Model | BOO |
| System Type | Ground Mounted, island |
| System Size | 10 MWp |
| Total CO ₂ reduction | 242.31 kton |
| Solar PV Type | Poly-crystalline Silicon |

Technical Summary

- Polycrystalline 330W Solar Modules with efficiency 17% are used in the design
- 110 KW grid connected solar inverters, 400V three phase, 98.4% have been considered
- Step up Transformers 0.4 / 11KV are used
- Medium Voltage Switchgears 11KV / 630A
- System will be connected to the auxiliary load of the Existing factory
- Maximum AC output of the system is assumed to be 7920 KW
- Output of the system is based on instantaneous Irradiation values of Solar Energy
- 58 Acres of land area required for the installation of solar plant

eni new energy pakistan



Conceptual Design



Investment

The Project will cost approximately 10 Million USD, all-inclusive.

Social & Environmental Impact of the Project

Based on environmental friendly nature of the project, the environmental aspects related to the project are not so significant. This project will eventually reduce the carbon footprint in the area. The project does not involve any significant negative environmental impacts such as emissions, water contamination, waste management, soil erosion or other pollutants. As per assessment performed during environmental study, severity of most environment impacts observed are low or medium. The main potential impacts related to construction including land leveling and support structure are considered minor and localized for relatively short duration.

The following receptor categories are used for classification of social and environmental impact:

- Land and soil (land and soil resources);
- Air quality (ambient air quality and emissions);



- Water resources (aquifer and surface water resources);
- Ecosystem (vegetation and wildlife) and
- Community (people, their social and cultural values)

Impacts of the environment on the project will be minimized through implementation of effective measures. The operation will have a visible positive impact on the socioeconomic conditions of the local residents of the area, manifested as increased local businesses, local employment opportunities generated during the construction, installations and operations.

A049364 SECURITIES AND EXCHANGE COMMISSION OF PAKISTAN

COMPANY REGISTRATION OFFICE, KARACHI

CERTIFICATE OF INCORPORATION

[Under section 16 of the Companies Act, 2017 (XIX of 2017)]

Corporate Universal Identification No. 0128942

I hereby certify that <u>ENI NEW ENERGY PAKISTAN (PRIVATE)</u> <u>LIMITED</u> is this day incorporated under the Companies Act, 2017 (XIX of 2017) and that the company is <u>limited by shares.</u>

Given under my hand at <u>Karachi</u> this <u>Twenty Second</u> day of <u>January, Two</u> <u>Thousand</u> and <u>Nineteen</u>

Incorporation fee Rs. <u>11,000/=</u>

(Muhammad Naeem Khan)

(Muhammad Naeem Khan) Additional Registrar/Incharge CRO

THE COMPANIES ACT, 2017 (XIX OF 2017

MEMORANDUM OF ASSOCIATION

OF

ENI NEW ENERGY PAKISTAN (PRIVATE) LIMITED

(COMPANY LIMITED BY SHARES)

- 1. The name of the company is Eni New Energy Pakistan (Private) Limited.
- 2. The registered office of the Company will be situated in Sindh.
- 3. (i) The principal line of business of the Company shall be to carry on the businesses of solar energy system, its manufacturing through poly silicon and chemical technology, processing, casting, cell manufacturing, module manufacturing and installation thereof, installing, running, owning and managing biomass/waste-toenergy power plant, waste heat power plant, combined cycle power plant and producing wind, bonaus yes and tidal energy and dealing in all other forms of the generation an efficient use of energy and subject to persission, disputing the conservation an efficient use of energy and subject to persission and subject of electricity. The objects specified above shall be constructed on thereto.
 - (ii) Except for the businesses mention
 (iii) hereunder, the Company may engage in all the lawful businesses and shall be authorized to take all necessary steps and actions in connection therewith and ancillary thereto.
 - (iii) Notwithstanding anything contained in the foregoing sub-clauses of this clause nothing contained herein shall be construed as empowering the Company to undertake or indulge, directly or indirectly in the business of a Banking Company, Non-banking Finance Company (Mutual Fund, Leasing, Investment Company, Investment Advisor, Real Estate Investment Trust management

company, Housing Finance Company, Venture Capital Company, Discounting Services, Microfinance or Microcredit business), Insurance Business, *Modaraba* management company, Stock Brokerage business, forex, real estate business, managing agency, business of providing the services of security guards or any other business restricted under any law for the time being in force or as may be specified by the Commission.

- (iv) It is hereby undertaken that the Company shall not:
 - (a) engage in any of the business mentioned in sub-clause (iii) above or any unlawful operation;
 - (b) launch multi-level marketing (MLM), Pyramid and Ponzi-Schemes, or other related activities/businesses or any lottery business;
 - (c) engage in any of the permissible business unless the requisite approval, permission, consent or licence is obtained from competent authority as may be required under any law for the time being in force.
- 4. The liability of the members is limited.
- 5. The authorized capital of the perintrany, Rs 1,000,000 (Rupees one million) only divided into 100,000 (Rupees one hundred housand) ordinary shares of Rs. 10/- (Rupees ten)



2

We, the several persons whose names and addresses are subscribed below, are desirous of being formed into a company, in pursuance of this memorandum of association, and we respectively agree to take the number of shares in the capital of the company as set opposite our respective names:

| Name and surname (present & former) in full (in Block Letters) | NIC No. (in case of foreigner, Passport No) | Father's/ Husband's Name in full | Nationality (ies) with any former Nationality | Occupation | Usual residential address in full or the registered/ principal office address for a subscriber other than natural person | Number of shares taken by each subscriber (in figures and words) | Signatures |
|--|--|---|---|---|---|---|------------|
| Eni International B.V. | 33264934 | - | Dutch | Services | Strawinskylaan 1725, 1077 XX Amsterdam | 99,980 (ninety-nine thousand nine hundred eighty) | - |
| (acting through its authorised signatory) Mr. Angelo Ligrone | YB0371815 | Raffaele | Italian | Managing Director Eni Pakistan Limited | House no 81, 3 rd Street, Khayaban e Sehar, Phase VI, DHA, Karachi, Pakistan | | |
| Eni Oil Holdings B.V. | 34108494 | - | Dutch | Services | Strawinskylaan 1727, 1077 XX Amsterdam | 10 (Ten) | |
| (acting through its authorised signatory) Mr. Donato | YA6953542 | Matteo Azzaronic 23 ¹¹¹¹²⁸⁵ + Co | Italian Mpany Person | Services - VP RENEWABLE S | Corso Milano 26, Monza (MB) ITALY | | |
| Azzarone | | mac | C III | | | | |
| Eni Pakistan (M) Limited Sàri | B85539 | A STREET | Tuxenboorder | Services | 20 Rue de la Poste, Luxembourg | 10 (Ten) | |
| (acting through its authorised signatory) Syed Amjad Wahab | 42201- 0792478-7 | Syed Abdul Wahab | Pakistani | Services – renewables Business Manager | 78/B/I, 'Q' Street, Phase-7, Defence Housing Authority, Karachi-75500, Pakistan | | |
| | | Total numbe | r of shares taken | (in figures and wor | ds) | 100.000 | |
| - | | | | | | (one hundred thousand) | |

Dated the #th day of January 2019.

1 ÷ť. η.

3

٦

۱

THE COMPANIES ACT, 2017 (XIX OF 2017)

ARTICLES OF ASSOCIATION

OF

ENI NEW ENERGY PAKISTAN (PRIVATE) LIMITED

(COMPANY LIMITED BY SHARES)

PRELIMINARY

1. (1) The Regulations in Table A in the First Schedule to the Companies Act 2017, shall not apply to the Company except in so far as they are repeated or contained in these Articles.

(2) The Company is a Private Company and accordingly:

 the right to transfer shares of the Company is restricted in the manner hereinafter appearing;

(ii) the number of Members for the time being of Company (not including persons who are for the company (not including persons who are for Company in the employment of the Company shall not exceed fifty; but where two increases hold one or more shares in the company pintly, they shall for the purposes of paragraph be treated as a single Member; the provide the public to subscribe for any shares, debenture or debentures-stock of the Company.

2. In these Articles, unless there be something in the subject or context inconsistent therewith:

H

- "Member" means a corporation whose name is for the time being entered in the Register of Members by virtue of his being a subscriber to the Memorandum of Association of the Company.
- "Month" means calendar month according to the Gregorian calendar.
- "Proxy" includes an attorney duly constituted under a power of attorney.
- "Commission" means the Securities and Exchange Commission of Pakistan established under the Securities and Exchange Commission of Pakistan Act 1997.
- "Special Resolution" has the meaning assigned thereto by Section 2(1)(66) of the Act.

"the Act" means the Companies Act 2017.

- "the Chief Executive" means the Chief Executive for the time being of the Company.
- "the Company" means ENI NEW ENERGY PAKISTAN (PRIVATE) LIMITED
- "the Directors" means the Directors for the time being of the Company or the Directors present at a duly convened meeting of Directors at which a quorum is present.

"the Register" means the Register Office for the being of the Company. "the Register" means the pursuant to Section of the Common Section of the common section of the common section the time being of the

"the Seal" means the Common Seal the time being of the Company with the Company's name engraved on it in a legible form. "the Secretary" means the Secretary for the time being of the Company.

- "these Articles" means these Articles of Association as originally framed or as from time to time altered by Special Resolution.
- Words importing the singular number include the plural number and vice versa.
- Words importing the masculine gender include the feminine gender. The marginal notes are inserted for convenience and shall not affect the construction of these Articles.

REGISTERED OFFICE

3. The Office shall be at such place as the Directors shall from time to time determine.

BUSINESS

Any branch or kind of business which the Company is either 4. expressly or by implication authorised to undertake may be undertaken by the Directors (subject to the approval of the Members) at such time or times as they shall think fit, and further may be suffered by them to be in abeyance whether such branch or kind of business may have been actually commenced or not so long as the Directors may deem it expedient not to commence or proceed with such branch or kind of business.



5. In case of shates in the entered as a Member in the session of to receive, within thirty (30, as)s and the signal form, every entity whose name is in oversisted, without payment, be entitled anyments of within fifteen (15) days of the application for registration of tensfer, a certi share or shares held by it and the amount paid a certificate under the seal specifying the thereon:

Provided that if the shares are in book entry form or in case of conversion of physical shares and other transferable securities into bookentry form, the Company shall, within ten days after an application is made for the registration of the transfer of any shares or other securities to a central depository, register such transfer in the name of the central depository.

H

6. The Company shall not be bound to issue more than one certificate in respect of a share or shares in the physical form, held jointly by several entities and delivery of a certificate for a share to one of several joint holders shall be sufficient delivery to all.

7. If a share certificate in physical form is defaced, lost or destroyed, it may be renewed on payment of such fee, if any, not exceeding one hundred rupees, and on such terms, if any, as to evidence and indemnity and payment of expenses incurred by the Company in investigating title as the Directors think fit.

8. Except to the extent and in the manner allowed by section 86, no part of the funds of the Company shall be employed in the purchase of, or in loans upon the security of, the Company's shares.

TRANSFER OF SHARES

9. The instrument of transfer of any share in physical form in the Company shall be executed both by the transferor and transferee, and the transferor shall be deemed to remain holder of the share until the name of the transferee is entered in the register of members in respect thereof.

10. Shares in physical form in the Company shall be transferred in the following form, or in any usual or common form:

Form for Transfer of Shares (First Schedule to the Companies Act, 2017)

| 1 | /o (hereinafter called | | | | |
|---|--|--|--|--|--|
| s/o | on paid to me by preinafter called "the tops county is a second sec | | | | |
| distinctive numbers from the Limited, to hold u administrators and assigns subject to the | Into the said transferee his off the said the | | | | |
| same at the time of the execution hereo agree to take the said share (or shares) si | f, and I, the said vansferee, ereby | | | | |
| As witness our hands this day | of | | | | |
| Signature Transferor | Signature | | | | |
| Full Name, Father's / Husband's Name | Full Name Eather's / Husband's Name | | | | |
| CNIC Number (in case of foreigner, | CNIC Number (in case of foreigner. | | | | |
| Passport Number) | Passport Number) | | | | |
| Nationality | Nationality | | | | |
| Occupation and usual Residential | Occupation and usual Residential | | | | |
| Address | Address | | | | |
| 27 A | Cell number | | | | |
| | Landline number, if any | | | | |
| | Email address | | | | |

Witness 1:

Witness 2:

Bank Account Details of Transferee for Payment of Cash Dividend (Mandatory in case of a listed company or optional for any other company)

It is requested that all my cash dividend amounts declared by the Company, may be credited into the following bank account:

| Tile of Bank Account | |
|-------------------------|--|
| Bank Account Number | |
| Bank's Name | |
| Branch Name and Address | |

It is stated that the above mentioned information is correct and that I will intimate the changes in the above-mentioned information to the Company and the concerned Share Registrar as soon as these occur.

Signature of the Transferee(s)

b)

11. (1) The Directors shall not refuse to transfer any share unless the transfer deed is defective or invalid. The directors may also suspend the registration of transfers during the ten days immediately preceding a general meeting or prior to the determination of entitlement or rights of the shareholders by giving seven days' previous notice in the manner provided in the Act. The Directors may, in case of shares in physical form, decline to recognise any instrument of transfer unless-

- a) a fee not exceeding fifty rupees as may be determined by the directors is paid to the Company in respect thereof; and
 - the duly stamped instrument of transfer is accompanied by the certificate of the shares to which it relates, and such other entence against directors may reasonably require to show the cipht of the transferor to make the transfer

H

(2) If the Difectors retuends to register a transfer of shares, they shall within fifteen (15) days after the state on why the transfer deed was lodged with the Company send to the transferee and the transferor notice of the refusal indicating the defect or invalid (2010) the transferee, who shall, after removal of such defect or invalidity be entitled to re-lodge the transfer deed with the Company.

recog

Provided that the Company shall, where the transferee is a central depository the refusal shall be conveyed within five (5) days from the date on which the instrument of transfer was lodged with it notify the defect or invalidity to the transferee who shall, after the removal of such defect or invalidity, be entitled to re-lodge the transfer deed with the Company.

ALTERATION OF CAPITAL

12. The Company may subject to compliance with the requirements of Section 85 of the Act, alter the conditions of the Memorandum of Association through a Special Resolution, so as to:

- (a) increase the authorized share capital by such sum, to be divided into shares of such amount, as the resolution shall prescribe;
- (b) consolidate and divide the whole or any part of its share capital into shares of larger amount than its existing shares;
- (c) by sub-division of its existing shares or any of them, divide the whole or any part of its share capital into shares of smaller amount than is fixed by the Memorandum of Association;
- (d) cancel any shares which, at the date of the passing of the resolution, have not been taken or agreed to be taken by any person and diminish the amount of its share capital by the amount of the share so cancelled.

13. Subject to the approval and direction of the Members, the Directors may from time to time increase the issued share capital by such sum as they think fit. All shares intended to be issued by the Directors shall, before issue, be offered to the Members strictly in proportion to the amount of the issued shares held by each Member (irrespective of class); provided that fractional shares shall not be offered and all fractions less than a share shall day consolidated and disposed of by the Company and the proceeds from steeler disposition shall be paid to such of the entitled Members as may have aper such offer. Such offer shall be made by notice specifying the number offered, and limiting a time, within which the offer, if not accepted deemed to be declined, and after the expiration of that time, or wither occept an intimation from the person to whom the offer is made that the declines accept the shares offered, the Directors may, as provided in Section 37 Table of the Act, dispose of the same in such manner as they think fit. each such offer of shares, the Directors shall comply with the provise Section 83 of the Act and in particular with the provisions of sub-sections (2), (3) and (7) thereof. Any difficulty in the apportionment of shares amongst the Members, shall, in the absence of any directions given by the Company in General Meeting, be determined by the Directors.

14. Except so far as otherwise provided by the conditions of issue, or by these Articles, any capital raised by the creation of new shares shall be considered part of the original capital, and shall be subject to the provisions herein contained with reference to transfer, transmission, voting, right to dividend, bonus and otherwise.

15. The Company may, by Special Resolution, reduce its share capital, or any share premium account in any manner and with, and subject to, any authorization, and consent required, by law.

GENERAL MEETINGS

16. Except as may be allowed under Section 132(1) of the Act, the Company shall hold a General Meeting, designated as the first Annual General Meeting within sixteen Months from the date of incorporation, and thereafter within a period of one hundred and twenty (120) days following the close of each financial year of the Company, so that an Annual General Meeting is held in every calendar year, and subject as aforesaid each such Annual General Meeting shall be held at such place and at such time as may be determined by the Directors, provided that the Company may, for any special reason and with permission of the Registrar of Companies, extend the time within which such Annual General Meeting, not being the first such meeting, shall be held by a period not exceeding thirty (30) days.

17. All General Meetings other than Annual General Meetings shall be called Extraordinary General Meetings.

18. The Directors may, whenever they think fit, call an Extraordinary General Meeting and Extraordinary General Meetings shall also be called on such requisition, or in default, may be called by such requisitionists, as provided by Section 133 of the Act.



19. The Company may provide video-link facility to its members for attending general meeting at places other than the town in which general meeting is taking place after considering the geographical dispersal of its members.

NOTICE

20. (1) Upon of a contract Meaning shall be sent in the manner hereinafter mentioned at teast work (m, r) as before the date on which the meeting is to be convened to all start, persons as are under these Articles or the Act entitled to receive such notices from the company and shall specify the place and the day and hour company and the nature of the business to be transacted thereat.

RAL MEETINGS

U

11

(2) In the case of an emergency affecting the business of the Company, an Extraordinary General Meeting may, pursuant to section 133(8) of the Act be convened by such shorter notice than that specified in Article 20(1).

(3) Where any special business, that is to say, business other than consideration of the accounts, balance sheet and the reports of the Directors and Auditors, the declaration of dividend, the appointment and fixation of the remuneration of Auditors and the election of Directors (all such matters being herein referred to as ordinary business) is to be transacted at a General Meeting, there shall be annexed to the notice of such meeting a statement setting out all such facts as may be material for the consideration of such business including the nature and extent of the interest (whether direct or indirect) of any Director, and where the item of business involves approval of any document, the time and place appointed for inspection thereof, and to the extent applicable such a statement shall be annexed to the notice also in the case of ordinary business to be transacted at the meeting.

(4) Where a resolution is intended to be proposed for consideration at a General Meeting in some special or particular form, a copy thereof shall be annexed to the notice convening such meeting.

(5) If a Special Resolution is intended to be passed at a General Meeting, the notice convening that meeting shall specify the intention to propose the resolution as a Special Resolution.

(6) A notice for a General Meeting convened for the election of Directors shall state the number of Directors to be elected at that meeting and the names of the retiring Directors.

(7) The notice of every General Meeting shall prominently specify that a Proxy may be appointed who shall have the right to attend, demand and join in demanding a poll and vote on a poll and speak at the meeting in the place of the Member appointing him and shall be accompanied by a form of Proxy acceptable to the Company.

21. The accidental omission to give notic non-receipt of notice of a meeting by, any person entit not invalidate the proceedings at that meeting.

PROCEEDINGS AT GENERAL MEETIN

22. No business shall be transacted at any General Meeting unless a quorum is present at the time when the meeting proceeds to business; save as herein otherwise provided two (2) members present personally, or through videolink who represent not less than twenty-five percent (25%) of the total voting power, either of their own account or as proxies shall be a quorum. 23. If within half an hour from the time appointed for the meeting a quorum is not present, the meeting, if called upon the requisition of Members, shall be dissolved; in any other case, it shall stand adjourned to the same day in the next week at the same time and place, and, if at the adjourned meeting a quorum is not present within half an hour from the time appointed for the meeting, the Members present personally or through video-link or by Proxy, being not less than two persons, shall be a quorum.

24. The Chairman, if any, of the Board of Directors shall preside as chairman at every General Meeting of the Company, or if there is no such Chairman, or if he shall not be present within fifteen minutes after the time appointed for the holding of the meeting or is unwilling to act, the Chief Executive shall preside as chairman of the meeting, or if the Chief Executive is absent or unwilling to act any one of the Directors present may be elected to be chairman of the meeting, or if no Director be present, or if all the Directors present decline to take the chair, the Members present shall choose one of their number to be chairman of the meeting.

25. The chairman may, and shall if so directed by the meeting, adjourn the meeting from time to time, but no business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place. When a meeting is adjourned for ten (10) days or more, notice of the adjourned meeting shall be given as in the case of an original meeting, but it shall not be necessary to specify in such notice the nature of the business to be transacted at the adjournment or of the business to be transacted at a adjournment or of the business to be transacted at an adjournment or of the business to be transacted at an adjournment or of the business to be transacted at an adjournment or of the business to be transacted at an adjourned meeting.

26. Except for the businesses specified under sub-section (2) of section 134 of the Act to be conducted in the Annual General Meeting, the Members may pass a resolution (ordinary or special) by circulation, signed by all the Members for the time being entitled to receive notice of a meeting. The resolution by circulation shall be deemed to be passed on the date of signing by the last of the signatory Members to such resolution.

VOTES OF MEMBERS

27. On a show of hanse every Member present in person shall have one vote. On a poll every Member present in person shall have proxy or through postal ballot shall have part of a present of each share held by him. Provided always that in the provide that is present of a Director, the provisions of Articles 39 and the respectively shall supply.

28. On a poll votes may be group either personally (including without limitation a representative of a company or corporation authorised under Article 32) or through video-link or by Proxy or through postal ballot.

Π

H

29. The instrument appointing a Proxy shall be in writing under the hand of the appointer or of his attorney duly authorised in writing, or, if the appointer is a corporation, either under seal or under the hand of an officer or attorney duly authorised. A Proxy need not be a Member of the Company.

30. The instrument appointing a Proxy and the power of attorney or other authority (if any), under which it is signed or a notarially certified copy of that power or authority, shall be deposited at the Office not less than forty-eight hours before the time for holding the meeting at which the person named in the instrument proposes to vote, and in default the instrument of Proxy shall not be treated as valid.

31. An instrument appointing a Proxy may be in the following form, or in any other form which the Directors shall approve:

ENI NEW ENERGY PAKISTAN (PRIVATE) LIMITED

I, of in the district of...... being a Member of ENI NEW ENERGY PAKISTAN (PRIVATE) LIMITED, hereby appoint of....... as my Proxy to vote for me and on my behalf at the (Annual or Extraordinary, as the case may be) General Meeting of the Company to be held on the day of and at any adjournment thereof.

Signed this day of

32. A Member of the Company may by resolution of its directors or other governing body authorise such person as it thinks fit to act as its representative at any meeting of the Company or of any class of Members of the Company, and the person so authorised shall be entitled to exercise the same powers on behalf of the corporation which he represents as that corporate body could exercise if it were an individual Member of the Company, present in person. The production before or at the meeting of a copy of such resolution purporting to be signed by a director or the secretary of such company or corporate body and certified by him as being a true copy of the resolution that reaching be accepted by the Company as sufficient evidence of the validities of the validities appointment of such representative. A Member of the Company not redent in Pakistan may appoint a representative as aforesaid by facsimile transmission electronic mail which, if purporting to be sent by such corporate body aneat n be certified as a true copy as aforesaid.

DIRECTORS

33. Subject to the provisions of these Articles and the Act the Directors shall all be elected by the Members in General Meeting.

34. (1) The Company shall have at least three (3) but not more than five (5) Directors. Subject to the said limits, the number of Directors that the Company shall have, shall be determined by the Members at the General Meeting. Before every General Meeting at which Directors are to be elected, and

not later than thirty-five days preceding the date of such meeting, the Members shall fix the number of elected Directors that the Company shall have from the effective date of the election at such meeting and the number of such Directors who shall be elected Directors. Except with the prior approval of the Company in General Meeting, the number of Directors so fixed shall not be increased or reduced by the Directors so as to have effect before the effective date of election at the next such General Meeting at which Directors are to be elected.

- (2) The following are the first Directors:
- 1. Mr. Angelo Ligrone
- 2. Mr. Donato Azzarone
- 3. Syed Amjad Wahab

Each of the first Directors named in this Article shall hold office until the dissolution of the first Annual General Meeting unless he earlier resigns, becomes disqualified or otherwise ceases to hold office. At the first Annual General Meeting there shall be an election of Directors and the Directors elected at that meeting shall assume office on the dissolution of the meeting.

35. The remuneration of a Director (other than the Chief Executive and the whole time Director who is an employee of the Company) for attending meetings of the Directors shall from time to time be determined by the Members. A Director shall also be paid all travelling, hotel and other expenses properly incurred by him in attending and returning from meetings of the Directors or General Meetings of the Company or in connection with the business of the Company.

36. A Director elected by the Members in General Meeting shall hold office for a period of three years following the date from which his election is effective unless he earlier resigns, becomes disqualified from being a Director or otherwise ceases to hold office.

37. Any casual vacancy occurring among the elected Directors may be filled up by the Directors, but a person so appointed shall hold office for the remainder of the term of the Director in whose place he is appointed.

38. The Member, in General and ting shall elect the Directors from amongst persons who, not rang ineligible in accordance with Section 153 of the Act, offer themselves for tection as Directors accordance with this Article. Any person claiming to be all the transferred person claiming to be all the transferred person with the Article. Any person claiming to be all the transferred person with the Company not later than fourteen (14) days before free act, or the transferred preeting at which Directors are to be elected, a notice that the bend eligible, is inducted to offer himself for election as a Director at that meeting of a notice of and for so this as the Company shall be a subsidiary of a public company for the transferred meeting his intention to offer himself for election as a Director shall together with the notice aforesaid deliver to the Company in the form prescribed for this purpose his consent and certificate consenting to act as a Director and certifying that he is not ineligible to



U

Н

become a Director and the Company shall file such consent and certificate with the Registrar of Companies as required by Section 167 of the Act. A person offering himself for election as a Director may withdraw his candidature at any time before the holding of the election and may do so by withdrawing the notice in which he offered himself for election. Not later than seven days before the date of the meeting the Company will notify the Members of the persons offering themselves for election as Directors at such meeting and shall so notify the Members in the manner hereinafter mentioned.

39. The provisions of this Article shall apply for the election of Directors by the Members in General Meeting from amongst the candidates eligible for election, namely:

- every Member present in person or by Proxy shall have such number of votes as is equal to the product of the number of shares carrying the right to vote held by him and the number of Directors to be elected;
- (b) the number of votes calculated in accordance with the preceding clause (a) may be given to a single candidate or may be divided between any two or more candidates in such manner as the person voting may choose; and
- (c) the candidate who gets the highest number of votes shall be declared elected as Director and then the candidate who gets the next highest number of votes shall be so declared and so on until the total number of Directors to be elected has been so elected.

40. The Company in General Meeting may remove a Director from office by a resolution passed with the requisite number of votes determined in accordance with the provisions of Section 163 of the Act.

- 41. A Director shall ipso facto cease to hold office to wall
 - (a) he becomes ineligible to be appointed as a part of the grounds specified of the Act, or
 - (b) he absents himself from three consecutives of the Directors without leave of absence from the Directors, or
 - (c) he or any firm of which he is a partner or any private company of which he is a director without the sanction of the Company in General Meeting accepts or holds any office of profit under the Company other than that of a Chief Executive or a legal or technical adviser or a

13

banker, or

(d) he or any firm of which he is a partner or any private company of which he is a director accepts a loan or guarantee from the Company in contravention of Section 182 of the Act.

POWERS AND DUTIES OF DIRECTORS

42. (1) The business of the Company shall be managed by the Directors, who may pay all expenses incurred in promoting and registering the Company, and may exercise all such powers of the Company as are not by the Act or any statutory modification thereof for the time being in force or by these Articles or by a Special Resolution required to be exercised by the Company in General Meeting, subject nevertheless to any regulation of these Articles, to the provisions of the Act, and to such regulations being not inconsistent with the aforesaid regulations or provisions, as may be prescribed by the Company in General Meeting; but no regulation made by the Company in General Meeting; but no regulation made by the Company in General Meeting shall invalidate any prior act of the Directors which would have been valid if that regulation had not been made.

(2) A resolution at a meeting of the Directors duly convened and held shall be necessary for exercising the powers of the Company specified in Section 183(2) of the Act.

(3) The consent of the Company in General Meeting shall be necessary for the Directors to do any of the things as specified in Section 183(3) of the Act.

43. The Directors shall duly comply with the provisions of the Act or any statutory modification thereof for the time being in force, and in particular with the provisions in regard to the registration of the particulars of mortgages and charges affecting the property of the Company or created by it, and to keeping a register of the Directors and Officers of the Company (including the Chief Executive, Secretary, chief accountant, auditors and legal adviser), and to sending to the Registrar of Companies an annual list of Members, and a summary of particulars relating the oto and notice of any consolidation or increase of share capital activity sub division or cancellation of shares and copies of Special Resolutions and a copy of the cesister of the Directors and Officers of the Company and numerations of a copy of the cesister of the Directors and Officers of the Company in regard to the particular of the particular of the commission issued from time to time underpotent of the particular of the Commission issued information and other reports as specified in such orders.

or otistan - 90

44. The Directors may, subject to the approval of the Members, from time to time and at any time by power of attorney appoint any company, firm or person or body of persons, whether nominated directly or indirectly (including any Director or officer of the Company) by the Directors, to be the attorney or attorneys of the Company for such purposes and with such powers, authorities

H

and discretions (not exceeding those vested in or exercisable by the Directors under these Articles) and for such period and subject to such conditions as they may think fit, and any such powers of attorney may contain such provisions for the protection and convenience of persons dealing with any such attorney as the Directors may think fit and may also authorise any such attorney to delegate all or any of the powers, authorities and discretions vested in him; and without prejudice to the generality of the foregoing any such power of attorney may authorise the attorney to institute, conduct, defend, compound or abandon any legal proceedings by or against the Company, whether generally or in any particular case.

45. The Company may exercise the powers conferred by Section 203 of the Act with regard to having an official seal for use abroad, and such powers shall be vested in the Directors.

46. In the matters of granting loans, giving guarantees and providing securities, the Company shall have due regard to the prohibitions and restrictions contained in Section 182 of the Act.

The Directors may authorise any one or more of the Directors or 47. a firm of which such Director(s) are partner(s) or a private company of which such Director(s) are member(s) or director(s) to enter into any contract with the Company for making sale, purchase or supply of goods or rendering services to the Company. No such Director(s) so contracting or being such partner(s) or so interested be liable to account to the Company for any profit realized by any such contract or arrangement by reason of such Director(s) holding that office or of the fiduciary relation thereby established, but the nature of interest must be disclosed by such Director(s) at the meeting of the Directors at which the contract or arrangement is agreed to, if the interest then exists, or in any other case at the first meeting of the Company's Directors after the acquisition of the interest. A general notice that any Director(s) of the Company is a Director(s) or partner(s) of any other named company or firm and is to be regarded as interested in any subsequent transaction with such company or firm shall, as regards any such transaction, be sufficient disclosure under this Article and after such general notice it shall not be necessary to give any special notice relating to any particular transaction with such firm or company.

48. All cheques, promissory notes, drafts, prise other negotiable instruments, and all receipts for money paid shall be signed, drawn, accepted, endorsed, or otherwise exe may be, in such manner as the Directors shall from the determine.

•

MINUTE BOOKS

49. The Directors shall cause minutes to be made in books provided for the purpose and kept at the Office:

(a) of all appointments of officers made by the Directors;

Dany Repir

ext

- (b) of the names of the Directors present at each meeting of the Directors;
- (c) of the names of the Members or their proxies or representatives present at each meeting of the Company;
- (d) of all resolutions and proceedings at all meetings of the Company, and of the Directors;

and the Directors present at any meeting of Directors and all Members and proxies of Members present at any General Meeting shall sign their names in books to be kept for that purpose; provided that in the case of a meeting of the Directors held through audio or video conferencing, a record of such meeting will be retained by the Company; and any such minute of such a meeting if purporting to be signed by the chairman thereof, or by the chairman of the next succeeding meeting of the same body, shall be sufficient evidence without any further proof of the facts therein stated.

THE SEAL

50. The Directors shall provide a Seal for the purposes of the Company and shall have the power from time to time to destroy the same and substitute a new Seal in lieu thereof and the Directors shall provide for the safe custody of the Seal which shall only be used by the authority of the Directors; and every instrument to which the Seal shall be affixed shall either be signed by one Director and countersigned by the Secretary or by a second Director or by some other person appointed by the Directors for the purpose or be signed by the Chief Executive alone, but so that the Directors may by resolution determine either generally or in any particular case, that the signature of the Chief Executive, any Director and/or Secretary may be affixed by some mechanical means to be specified in such resolution including without limitation by printing, lithography or stamping.

PROCEEDINGS OF DIRECTORS

51. The Directors may meet together for the despatch of business, adjourn and otherwise regulate together for the despatch of business, arising at any meeting shall be sociated by a more the the Directors present and voting which reports, present include the Chairman or in the Chairman's absence, the despite chairman's concurring vote, if a chairperson and/or deputy chairperson as seen absorbed outsuant to Article 52 and each Director has one vote. In case, the despite of votes the chairman shall have a second or casting vote. A Director may and the Secretary on the requisition of a Director shall, at any time, transmort on meeting to Directors. A copy of the minutes of Directors meetings with the furnished of each Director within fourteen (14) days of such meeting.

H

IJ

52. (1) If the General Meeting has not appointed a Chairman, the Board of Directors shall elect one of the Directors as Chairman of the Board of Directors. The Directors may elect up to one Director as deputy Chairman so that the elected deputy Chairman may act as the Chairman in the Chairman's absence.

(2) The Chairman or in his absence the deputy Chairman shall preside at all meetings of the Board of Directors.

53. Subject to any rules framed under or any regulations or directives issued pursuant to the Act, the Directors may take part in a meeting of the Directors by using any communication equipment which allows everybody participating in the meeting to speak to and hear each other. Taking part in this way will count as being present at the meeting in person. Meetings will be treated as taking place where the largest group of the participants are or, if there is no such group, where the chairman of the meeting is.

54. The quorum necessary for the transaction of the business of the Directors shall be a majority of the Directors then in office, and the participation of the Directors by video-conferencing or by other audio visual means shall also be counted for the purposes of quorum under this Article.

55. All acts done at any meeting of the Directors, or by any person acting as a Director shall notwithstanding that it shall afterwards be discovered that there was some defect in the appointment or continuance in office of any such Directors or person acting as aforesaid, or that they or any of them were disqualified or had vacated office, or were not entitled to vote, be as valid as if every such person has been duly appointed or had duly continued in office and was qualified and had continued to be a Director and had been entitled to be a Director and had been entitled to vote.

56. Subject to the provisions of Article 42(2), a resolution in writing, signed by all the Directors (or in their absence their Alternate Directors) shall be as valid and effectual as if it had been passed at a meeting of the Directors autive called and constituted. Such resolution may be contained in the document or in several documents in like form each signed by one or more at the Director to the communication sent by a Director shall be deemed to be a document set of the purposes of this Article.

CHIEF EXECUTIVE

Commis

57. (1) The Directors of the Company shall appoint or enter into a contract for the appointment of Chief Executive in accordance with the procedure and manner set out in Sections 186 and 188 of the Act.

(2) Such appointment or contract of appointment of Chief Executive shall not be for a period exceeding three years from the date of appointment.

(3) A retiring Chief Executive shall be eligible for reappointment.

(4) The Chief Executive shall be appointed among the Directors elected by the General Meeting, and be entitled to all the rights and privileges and subject to all the liabilities of the office.

(5) The Chief Executive shall act subject to the restrictions prescribed in Sections 189 and 191 of the Act.

(6) The Chief Executive may be removed from office in accordance with the provisions of Section 190 of the Act

(7) The terms and conditions of appointment of Chief Executive shall be determined by the Directors.

(8) Prior to each such appointment the Company shall secure and shall file with the Registrar of Companies as required by Section 167 of the Act, the consent of the person concerned to act as the Chief Executive of the Company if appointed.

58. A Chief Executive shall receive such remuneration as the Directors may determine and it may be made a term of his appointment that he be paid a pension and/or gratuity and/or other benefits on retirement from his office.

59. The Directors may entrust to and confer upon the Chief Executive any of the powers exercisable by them, except those required by Article 42(2) to be exercised by a meeting of the Directors, upon such terms and conditions and with such restrictions as they may think fit and may from time to time revoke, withdraw, alter or vary all or any of such powers. Upon appointment, Directors shall issue a formal power of attorney to Chief Executive, and the Chief Executive shall strictly perform the powers withing the approved scope of authorization.



60. The Company in General Meeting may declare dividends following the recommendation by the Directory, but no whitends shall exceed the amount recommended by the Directors.

Н

61. The Directors may from time to time pay to the Members such interim dividends as appear to the Directors to be justified by the profits of the Company.

62. No dividends shall be paid otherwise than out of profits of the year or any other undistributed profits and in the determination of the profits available for dividends the Directors shall have regard to the provisions of the Act and in particular to the provisions of Sections 81 and 240 of the Act.

63. The declaration of the Directors as to the amount of the net profits of the Company shall be conclusive.

64. All dividends shall be declared and paid according to the amounts paid on the shares. All dividends shall be apportioned and paid proportionally to the amounts paid or credited as paid on the shares during any portion or portions of the period in respect of which the dividend is paid; but if any share is issued on terms providing that it shall rank for dividend as from a particular date such share shall rank for dividend accordingly.

65. (1) The Directors may before recommending any dividend, set aside out of the profits of the Company such sums as they think proper as a reserve or reserves which shall, at the discretion of the Directors, be applicable for meeting contingencies, or for equalizing dividends, or for any other purpose to which the profits of the Company may be properly applied, and pending such application, at the like discretion, either be employed in the business of the Company or be invested, subject to the provisions of the Act, in such investments as the Directors may from time to time think fit.

(2) The Directors may also carry forward any profits which they may think prudent not to distribute, without setting them aside as a reserve.

66. If several persons are registered as joint-holders of any share, any one of them may give effectual receipt for any dividend payable on the share.

67. Any dividend declared by the company half of the out its? registered shareholders or to their order. The dividend parable to the paid by bank transfer directly into the bank account or in any electrons, note to the shareholders entitled to the payment of the dividend, as the direction of

Commi

68. All dividends unclaimed or unpaid for a period of three years shall be dealt with in accordance with the provisions of Section 244 of the Act.

69. All dividends shall be paid within the periods specified in Section 242 of the Act or as the Commission may, from time to time, by notification, in the official Gazette specify.

70. No dividend payable in respect of a share shall bear interest against the Company.

71. With the sanction of a General Meeting any dividend may be paid wholly or in part by the distribution of paid up shares of any other listed company. Where any difficulty arises in regard to such distribution, the Directors may settle the same as they think expedient, and in particular may issue fractional certificates and may determine that cash payments shall be made to any Members upon the footing of the value so fixed, in order to adjust the rights of all Members, and may vest any such specific shares in trustees upon trust for the Members entitled to the dividend as may seem expedient to the Directors.

ACCOUNTS

72. The Directors shall cause to be kept proper books of account with respect to:

- (a) all sums of money received and expended by the Company and the matters in respect of which the receipts and expenditures take place;
- (b) all sales and purchases of goods by the Company;
- (c) all assets of the Company;
- (d) all liabilities of the Company; and
- (e) where the provisions of Section 220(1) of the Act are applicable, such particulars relating to utilisation of material or labour or to other inputs or items of cost as may be prescribed.

73. The books of account shall be kept at the Office or at such other place in Pakistan as the Directors may decide and shall be open to inspection by the Directors during business hours. If the Directors decide to keep the books of account at a place other than the Office, they shall comply with the directions

determine whether and to 74. The Directors shall what extent and at what times a hat conditions or of them shall be regulations the accounts and book no Member (not open to the inspection of Members ngi bein 3 being a Director) shall have any right inspecting any papers of the Company except as compared by the account or books or or authorised by the Directors or by the Company in General Meet



19

IJ

H

75. The Company shall preserve in good order the books of account of the Company relating to a period of not less than ten financial years immediately preceding a financial year.

76. (1) The Directors shall arrange to place before the Annual General Meeting of the Company in every year a duly audited financial statements, conforming to the requirements of Sections 225, 228 and 229 of the Act and made up to a date not more than the period specified in section 223(1) of the Act, before the date of such meeting and having the auditor's report attached thereto, and a report of the Directors, conforming to the requirements of Section 227 of the Act.

(2) As required by Section 232 of the Act the financial statements shall first be approved by the Directors and when so approved shall be signed by the Chief Executive and at least one Director but if on account of his absence from Pakistan or other reason the signature of the Chief Executive cannot be obtained, the financial statements shall be signed by at least two Directors for the time being in Pakistan.

(3) The Directors may authorize the Chairman or the Chief Executive to sign the report of the Directors which may then be signed accordingly, but in the absence of any such authority the report of the Directors shall be signed as required by Section 227 of the Act in the same manner as the financial statements.

77. A copy of the balance sheet, profit and loss account and the reports of the Directors and auditors shall be sent not less than twenty-one (21) days before the date of the Annual General Meeting to the Members and other persons entitled to receive notices of General Meetings in the manner in which notices are to be given hereunder and a copy thereof shall be kept for a period of at least twenty-one (21) days before the meeting at the Office for inspection by Members.

78. The Directors shall in all respects comply with the provision volcus in Sections 220 to 239 of the Act, or any statutory modification thereof the time raching being in force.

CAPITALIZATION OF PROFITS



79. The Company in General Meeting may upon recommendation of the Directors resolve that it is desirable to capitalise any part of the amount for the time being standing to the credit of any of the Company's reserve accounts or to the credit of the profit and loss account or otherwise available for distribution, and accordingly that such sum be set free for distribution amongst the Members who would be entitled thereto if distributed by way of dividend and in the same proportions on condition that the same be not paid in cash but be applied either in or towards paying up any amounts for the time being unpaid on any shares held by such Members respectively are paying in full unissued shares or debentures of the Company to be allotted and distributed credited as fully paid up to and amongst such Members in the proportion aforesaid, or partly in the one way and partly in the other and the Directors shall give effect to such resolution; provided that a share premium account may, for the purposes of this Article, only be applied in paying up of unissued shares to be allotted to Members as fully paid bonus shares.

80. Whenever such a resolution as aforesaid shall have been passed the Directors shall make all appropriations and applications of the undivided profits resolved to be capitalized thereby, and all allotments and issues of fully paid shares or debentures, if any, and generally shall do all acts and things required to give effect thereto, with full power to the Directors to make such provision by payment in cash or otherwise as they think fit for the case of shares or debentures becoming distributable in fractions and also to authorise any person to enter on behalf of all the Members entitled thereto into an agreement with the Company providing for the allotment to them respectively, credited as fully paid up, of any further shares or debentures to which they may be entitled upon such capitalisation, or (as the case may require) for the payment up by the Company on their behalf by the application thereto of their respective proportions of the profits resolved to be capitalized of the amounts or any part of the amounts remaining unpaid on their existing shares and any agreement made under such authority shall be effective and binding on all such Members.

AUDIT

81. Auditors shall be appointed and their duties regulated in accordance with Sections 246 to 249 of the Act.

NOTICES

82. (1) A notice may be given by the Company to any Member by post or courier service or through electronic means, to his registered address or (if he has no registered address in Pakistan) to the address, if any, within Pakistan supplied by him to the Company for the giving of notices to him.

(2) Where a notice is sent by post, service of the notice shall be deemed to be effected by proper **Augustion**, prepaying and posting a letter containing the notice and, unly so the contract proved, to have been effected at the time at which the letter would be delivered in the ordinary course of post.

83. A notice may be given by the Company to the joint holders of a share by giving the notice to the wort holder names ist in the Register in respect of the share.

И

84. A notice may be given by the Company to the persons entitled to a share in consequence of the death or insolvency of a Member by sending it through the post in a prepaid letter addressed to them by name, or by the title of representatives of the deceased, or assignee of the insolvent or by any like description, at the address (if any) in Pakistan supplied for the purpose by the persons claiming to be so entitled, or (until such an address has been so supplied) by giving the notice in any manner in which the same might have been given if the death or insolvency had not occurred.

85. Notwithstanding anything hereinabove to the contrary in addition to any other notice it or he shall be entitled to receive, a Member which is a foreign corporation a company or individual shall be given notice by telex and or facsimile transmission or electronic mail addressed to such Member at its telex and or facsimile number or electronic mail address by it or him to the Company.

86. Notice of every General Meeting shall be given in some manner hereinbefore authorised to (a) every Member except those Members who (having no registered address within Pakistan) have not supplied to the Company an address within Pakistan for the giving of notices to them, (b) every Member of the Company being a foreign corporation or company which has supplied to the Company a telex or facsimile number or electronic mail address for the sending of notices to it, (c) every person entitled to a share in consequence of the death or insolvency of a Member, who but for his death or insolvency would be entitled to receive, notice of the meeting, and (d) the auditors of the Company.

WINDING UP

87. If the Company shall be wound up, the liquidator may, with the sanction of a Special Resolution of the Company and any other sanction required by the Act divide amongst the Members in specie or kind the whole or any part of the assets of the Company (whether they shall consist of property of the same kind or not) and may, for such purpose, set such value as he deems fair upon any property to be divided as aforesaid and may a length of the property division shall be carried out as between the Members of difference as such ٥f Members. The liquidator may, with the like sanction, v Sthey of such assets in trustees upon such trusts for the benefit of of them as the liquidator with the like sanction shall Think Member shall be compelled to accept any shares of other there is any liability. a.

INDEMNITY

Se Commiss

88. Every Director or officer of the Company and every person employed by the Company as auditor shall be indemnified out of the funds of the Company against all liability incurred by him as such Director, officer or auditor in defending any proceedings, whether civil or criminal, in which judgment is given in his favour, or in which he is acquitted, or in connection with any application under Section 492 of the Act in which relief is granted to him by the Court. We, the several persons whose names and addresses are subscribed below, are desirous of being formed into a company, in pursuance of these Articles of Association, and we respectively agree to take the number of shares in the capital of the company as set opposite our respective names:

+ +

| Name and surname (present & former) in full (in Block Letters) | NIC No. (in case of foreigner, Passport No) | Father's/ Husband's Name in full | Nationality (les) with any former Nationality | Occupation | Usual residential addr ess in full or the registered/ principal office address for a subscriber other than natural person | Number of shares taken by each subscriber (in figures and words) | Signatures |
|---|---|---|---|---|---|---|------------|
| Eni International B.V. | 33264934 | - | Dutch | Services | Strawinskylaan 1725, 1077 XX Amsterdam | 99,980 (ninety-nine thousand nine hundred eighty) | - |
| (acting through its authorised signatory) Mr. Angelo Ligrone | YB0371815 | Raffaele | Italian | Managing Director Eni Pakistan Limited | House no 81, 3 rd Street, Khayaban e Sehar, Phase VI, DHA, Karachi, Pakistan | | - |
| Enì Oil Holdings B.V. | 34108494 | - | Dutch | Services | Strawinskylaan 1727, 1077 XX Amsterdam | 10 (Ten) | |
| (acting through its authorised signatory) Mr. Donato Azzarone | YA6953542 | Matteo Azzarone | Italian | Services - VP RENEWABL ES | Corso Milano 26, Monza (MB) ITALY | | |
| Eni Pakistan (M) Limited Sàrl | B85539 | | Luxembourger | South and a state of the state | Luxeannurg | 10 (Ten) | |
| (acting through its authorised signatory) Syed Amjad Wahab | 42201- 0792478-7 | Syed Abdul Wahab | Pakistani | Se vices Are gwants Business Arithar | Autority, Pakistan | | |
| | | Total numbe | r of shares taken (| in figures and w | vords) | 100,000 (one hundred thousand) | |

Dated the 4th day of January 2019

23

U

Service St.

Sector and

and the second

H



ANNEXURE 6 – PROFILE OF EXPERIENCE OF THE APPLICANT, ITS MANAGEMENT, STAFF AND ITS MEMBERS IN THE POWER SECTOR

Eni New Energy Pakistan Private Limited

The company has been incorporated by Eni to operate in the renewable energy sector in Pakistan. Renewable energy solutions can help providing energy security and reduced energy costs for local businesses. In addition, renewable energy addresses environmental concerns regarding carbon emissions and greenhouse gases for the Pakistani Energy sector.

The first project for which this generation licence is requested is a photovoltaic plant of 10MWp to provide renewable energy to the Bhit Gas Field located in the Sindh Province in southern Pakistan. The installation of the PV plant aims at reducing the employment of the gas fired power turbines, partially shifting the load to solar energy and thus reducing emissions of CO2 and increasing volumes of gas available for sale.

<u>Eni</u>

Eni S.p.A. (Eni) is the ultimate shareholder of Eni International B.V., Eni Oil Holding B.V. and Eni Pakistan (M) Limited, the three shareholders of Eni New Energy Pakistan (pvt) Ltd. Eni is one of the world's largest integrated energy company. It is operating in 71 countries worldwide and employing around 33,000 people. As of March 31, 2018, the company's market capitalisation was calculated at \$64 billion. Eni is consistently ranked among the top 150 companies on the Fortune Global 500 list according to revenue.

Eni is engaged in oil and natural gas exploration, field development and production, as well as in the supply, trading and shipping of natural gas, LNG, electricity and fuels, and operates across the entire energy chain (including Renewable Energy).

Eni places about 25 TWh of production on the Italian market each year with bilateral sales and sales on the energy market. Eni is the second producer of electricity in Italy with a share of 9% of Italian electricity production. Eni is one of the market leaders in the services and dispatching market (MSD), thanks to the flexibility of its generating fleet. As of December 2017, Eni installed operational capacity of electricity production is 4,700 MW.

Eni has been operating in Pakistan since 2000. In 2017 gas production in the country amounted to 128 MScfd. In addition to this, on 2 May 2017, Eni was awarded an international tender for the supply of 11 million tons of LNG over 15 years.

Eni is working closely with all the stakeholder towards improving access to energy in the countries where it operates and making maximum effort to reduce direct emissions of CO2. With these goals in mind Eni launched a new business unit called Energy Solutions Department (DES) in November


2015 to lead the energy transition process of the group towards a low carbon future by introducing renewable energies development at industrial level as part of the company core business.

In this regard, different development projects, both solar and wind, have been identified in countries of strategic interest where Eni already operates, both in Italy and abroad. For instance, in Italy, Eni has 13 PV plant in operation for a total of 35MW, and other renewable projects under development and construction for about additional 60 MW. Abroad Eni is developing a 50MW wind project in Kazakhstan, currently in construction phase, and a 10MW solar project in Algeria that reached the start up in 2018.

Furthermore, a number of cooperation/framework agreements have been executed with the Northern Territory in Australia, Ghana, Angola, Algeria, Tunisia and Egypt, in order to strengthen Eni's historic presence in those territories and to expand the company's sphere of activities in the field of Renewables.

Management of Eni New Energy Pakistan (Private) Limited

• Angelo Ligrone – Managing Director

Angelo Ligrone has joined Eni Pakistan Limited as Managing Director since 18th June, 2018. Having joined Eni in 1990 as a Drilling Engineer, he progressed through a series of assignments in exploration, production and development of international oil and gas fields. He holds a Mechanical Engineering Degree from Salerno University in Italy. In his more than 28 years in the Oil & Gas Sector assignments of special significance include those in Italy, Algeria and China. Before his present assignment he was the Senior Vice President – HSE for Eni HQ in Milan.

Donato Azzarone – Chairman

Nuclear Engineer, MBA. Donato Azzarone is since mid-2016 Vice President for renewable energies for North Africa, Middle East and Central Asia in Eni Energy Solutions Division, based in Milan, Italy. He had more than 15 years of experience in Eni upstream Oil&Gas sector. He covered different responsibility roles mainly in engineering, construction, operations and HSE. He had international experiences in Italy, Algeria, Iran, UK, Turkmenistan and Iraq. He is Vice Chairman of the Energy Transition, Sustainability and Climate Change Committee of the Observatoire Méditerranéen de l'Energie (OME). In 2017, he was SPE Technical Director of "Renewables in Oil & Gas" in the SPE Italian section.

eni new energy pakistan (PVT) LTD

• Syed Amjad Wahab – Director

Amjad is currently managing the Eni Pakistan's portfolio of renewable energy business in Pakistan as the Renewable Business Manager. A seasoned professional having 34 years of experience with leading international oil & gas companies including Eni, LASMO, BP, ARCO & Union Texas Petroleum with demonstrated leadership and success. He is well versed with the entire spectrum of oil and gas operations ranging from technical to legal, commercial, financial, HSE, etc.; highly skilled in managing oil & gas assets. He is a well-known individual in the oil & gas sector for his contributions on numerous business, commercial, technical and strategic matters in a number of joint ventures. He received his Bachelor's in Mechanical Engineering in 1985 from NED University, besides acquiring C.P.M. (Certified Purchasing Manager) title in 1999 from the Institute for Supply Management, USA. In addition, he attained professional training in a number of relevant disciplines from prestigious institutions in USA, Italy, UK, France, Singapore & Malaysia including University of Texas, George Washington University and George Mason University of United States of America.

• Luca Natale – Finance Manager

Luca Natale has joined Eni Pakistan Limited as Finance and Control Manager since 22nd April, 2018. Having joined Eni in 2007 as a Business Analyst, he progressed through a series of assignments in Finance in both headquarter and abroad branches of the Company. He holds a Degree in Economics from Catania University in Italy and a Master Degree from Scuola Mattei part of Eni Corporate University. In his more than 10 years in the Oil & Gas Sector assignments of special significance include those in Italy, Congo, Libya and Iraq.

Nadia Hussain – Company Secretary

Nadia Hussain, Barrister at law and legal advisor Eni Pakistan Limited will be providing company secretarial services to Eni New Energy Pakistan (Private) Limited.



ANNEXURE 14 – TYPE, TECHNOLOGY, MODEL, TECHNICAL DETAILS AND DESIGN OF FACILITY

- Polycrystalline Silicon 330 W Solar Modules with efficiency 17% are used in the design
- Mono-axial tracker system
- Distributed inverters of 110 kW capacity 400V three phase, 98.4% have been considered
- Power stations housing the LV switchboards that collect the energy from the inverters
- Step-up Transformers 0.4 / 11KV are used
- Medium Voltage Switchgears 11KV / 630A
- System will be connected to the Bhit gas plant
- Maximum AC output of the system is assumed to be 7,920 KW
- Output of the system is based on instantaneous Irradiation values of Solar Energy
- 58 Acres of land area required for the installation of solar plant

Bill of Materials:

| S. No. | Components | Qty (No.) |
|--------|--|-----------|
| 1 | Polycrystalline Silicon Solar Modules 345W | 30,320 |
| 2 | Grid Connected Solar Inverters 100KW 3 Phase | 72 |
| 3 | LV switchboards | 4 |
| 4 | Power Stations | 4 |
| 5 | 0.4 / 11KV Step up Transformers | 4 |
| 6 | Medium Voltage Switchgears | 6 |

Energy Generation:

| S. No. | Efficiency Parameters | |
|--------|--------------------------------------|------------|
| 1 | Performance Ratio of the System | 78.24% |
| 2 | Capacity Utilization Factor | 22.3% |
| 3 | Energy Generation Units (First Year) | 19.274 GWh |

Technology used:

| S.No. | Parameters | |
|-------|-------------------------------|--|
| 1 | Technology | Solar Photovoltaic (SPV) |
| 2 | Size of Plant | 10 MWp |
| 3 | Solar Modules | Polycrystalline Silicon Solar Modules 330W |
| 4 | Inverter | 110 kW Distributed Inverter |
| 5 | Transformers | 2500 KVA 0.4 /11 KV Transformers |
| 6 | Medium Voltage Switchgears | 11 KV 630 Amps 50 KA rms |

COL ENI NEW ENERGY PAKISTAN (PVT) LTD

Application for Generation Licence 10 MW Off-grid PV Plant

Conceptual Design

h

Γ





SLD

h





Data Sheet (PV)

6

The modules to be used will be Polycrystalline Silicon Solar Modules 330 W and the manufacturer will be anyone of the top ten sellers in 2018.

| Ranking | Company | Nationality | Technologies |
|---------|--------------------------|------------------|-----------------------|
| 1 | Jinko Solar | Chinese | Mono & Poly Si |
| 2 | Trina Solar | Chinese | Mono & Poly Si |
| 3 | Canadian Solar | Canadian/Chinese | Mono & Poly Si |
| 4 | JA Solar | Chinese | Mono & Poly Si |
| 5 | Hanwa Q-CELLS | Korean/German | Mono & Poly Si & CIGS |
| 6 | GCL-SI | Chinese | Mono & Poly Si |
| 7 | LONGi Solar | Chinese | Mono Si |
| 8 | Risen Energy | Chinese | Mono & Poly Si |
| 9 | Shunfeng (incl. Suntech) | Chinese | Mono & Poly Si |
| 10 | Yingli Green | Chinese | Mono & Poly Si |



Datasheet (Inverter)

Potential supplier with products in line with the basic design. To be defined during the execution phase.

SUNGROW Clean power for al



١

SG110CX New

Multi-MPPT String Inverter for 1000 Vdc System





High Yield 9 MPPTs with max. efficiency 98 7%
 Compatible with bifacial module
 Built-in PID recovery function



Low Cost



Smart 0&M

- Touch free commissioning and remote firmware upgrade • Online IV curve scan and diagnosis • Fuse free design with smart string current monitoring

Proven Safety

P66 and C5 protection
 Type II SPD for both DC and AC
 Compliant with global safety and grid code





© 2019 Sungrew. Power Supply Co., Ltd. All rights reserved. Subject to change without notice. Version 3:3



ABB

ABB string inverters PVS-100/120-TL



01

-11 178-300/120-Ti hree-phase outdoor tring inverter This completely new platform, for extreme high power string inverters with power ratings up to 120 kW, maximizes the ROI for decentralized ground mounted and large rooftop applications. With six MPPT energy harvesting is optimized even in shading situations.

Extreme power with high integration level The extreme high power module up to 120 kW saves installation resources as less units are required. Due to its compact size further savings are generated in logistics and in maintenance. Thanks to the integrated DC/AC disconnection, 24 string connections, fuses and surge protection no additional boxes are required

Ease of installation

The horizontal and vertical mounting possibility creates flexibility for both ground mounted and rooftop installations. Covers are equipped with hinges and locks that are fast to open and reduce the risk of damaging the chassis and interior components when commissioning and performing maintenance actions.

Standard wireless access from any mobile device makes the configuration of inverter and plant easier and faster. Improved user experience thanks to a build in User interface (UI) enables access to advanced inverter configuration settings.

The installer mobile APP, available for Android/IOS devices, further simplifies multi-inverter installations.

The design supports both copper and aluminum

The PVS-100/120-TL is ABB's cloud connected three-phase string solution for cost efficient decentralized photovoltaic systems for both ground mounted and large commercial applications.

cabling even up to 185 mm² cross section to minimize the energy losses.

Fast system integration

Industry standard Modbus/SUNSPEC protocol enables fast system integration. Two ethernet ports enable fast and future proof communication for PV plants.

ABB plant portfolio integration

Monitoring your assets is made easy as every inverter is capable to connect to ABB plant portfolio manager to secure your assets and profitability in long term.

Design flexibility and shade tolerance

The double stage conversion topology and six MPPT guarantee maximum flexibility for the system design on rooftops or hilly ground. With this technological choice energy harvesting is optimized even in shading situations.

Highlights

- 6 independent MPPT
- Transformeriess Inverter
- 120 kW for 480 Vac and 100 kW for 400 Vac - WI-Fi as standard for configuration
- Two ethernet ports for plant level communication
 Large set of specific grid codes available which
- can be selected directly in the field
- Double stage topology for a wide input range
- + Both vertical and horizontal installation
- Separate wiring compartment for fast swap and replacement
- IP66 Environmental protection
- Maximum efficiency up to 98.9%

eni new energy pakistan (PVT) LTD

5

Ľ

Application for Generation Licence 10 MW Off-grid PV Plant

| | 1100 |
|--|--|
| nput (DC) | 5G110CX |
| May DV initiatie | 1100 V |
| Max PY input rollinge Min. PV input voltage / Startup input voltage | 200 V / 250 V |
| Man | SAS V |
| MSP voltage range | 200 - 1000 V |
| MPP voltage range for nom-hal power | 550V 850 V |
| No. of independent MPP inputs | 9 |
| Max, number of PV strings per MPPT | 2 |
| Max PV input ourrent | 26 A ⁴ 9 |
| Max. current for input connector | 30 A |
| Max. DC short-pircuit oument | 40 A * 9 |
| Output IACI | |
| AC output power | 110 KVA Ø 45 °C / 100 KVA Ø 50 °C |
| Max AG output current | 158.8 A |
| Nominal AC voltage | 3 / N / PE, 400 V |
| AC votage range | 320 - 460 V |
| Nominal grid frequency / Grid frequency range | 50 Hz / 45 - 55 Hz, 60 Hz / 55 - 65 Hz |
| тно | < 3 % (at nominal power) |
| DC current injection | < 0.5 % in |
| Power factor at nominal power / Ajustable power factor | > 0.99 / 0.8 leading ~ 0 8 lagging |
| feed-in phases / connection phases | 3/3 |
| Efficiency | |
| Max. efficiency / Euro. efficiency | 98.7 % / 98.5 % |
| Protection | |
| DC reverse connection protection | Yes |
| AC short circuit protection | Y#6 |
| Leakage current protection | Yes |
| Grid monitoring | Yes |
| Ground fault monitoring | Yes |
| DC SWRON / AC SWRON | tes / NO |
| PV String current monitoring | 146 |
| | 125 |
| | Ciptional CPC Turne II / AC Turne II |
| Gvervoringe protection | |
| General Data | 1021-1207-207 E mm |
| umensions (W H U) Weicht | NGET BROUT JRACLE ITETE 855 KG |
| Iniation method | Transformeriess |
| Ingress projection rating | IP66 |
| Night power consumption | < 2₩ |
| Operating ambient temperature range | -30 to 60 °C (> 50 °C derating) |
| Allowable relative humidity range (non-condensing) | 0 - 100 % |
| Cooling method | Smart forced air cooling |
| Max, operating all-tude | 4000 m (> 3000 m derating) |
| Display | LED, BIJetooth+APP |
| Communication | RS485 / Optional. Wi-Fi, Ethernel |
| DC connection type | MC4 (Max 6 mm ²) |
| AC connection type | OT terminal (Max. 240 mm²) |
| Compliance | IEG 62109, IEG 61727, IEG 62116, IEG 60088, IEG 61683, VDE-AR-N |
| | 4110.2018, VDE-AR-N 4120 2018, IEC 61000-6-3, EN 50438, AS/N25 |
| Grid Support | 4777 2:2015, GEI 0-21, VDE 0126-1-1/A1 VFR 2014, UTE C15-712- |
| | 1.2013. DEWA |
| | O at night function, LVRT, HVRT, active & reactive power control and |
| | |

© 2019 Sungrow Power Supply Co., Ltd. All rights reserved. Subject to change without notice. Version 1.1



PRODUCT FLYER FOR PVS-100/120-TL ABB SOLAR INVERTERS

ABB string inverters PVS-100/120-TL 100 to 120 kW



Technical data and types

Ь

| Type code | PV5-100-TL | PVS-120-TL |
|---|---|---------------------------|
| input side | | |
| Absolute maximum DC input voltage (V-+++++) | 1000V | |
| Start-up DC Input voltage (Veri) | 420V (400 500 V) | |
| Operating DC input voltage range (Venes Venes) | 360 1000 V | |
| Rated DC input voltage (Var) | 62 OV | 720V |
| Rated OC input power (Paul | 102 000W | 123 000W |
| Number of independent MPPT | 6 | |
| MPPT IODUL OC VOITAGE LADGE AL (Version Version) AL Per | 480 .850V | 570 850V |
| Maximum DC Input power for each MPPT (Puer and | 17500 W 480VS Vuen \$850V | 20500 W [570V:Vue 1850V |
| Maximum OC loout current for each MPPT (lama) | 36 A | • |
| Maximum input short circuit current (I) for each MPPT | 50 A */ | |
| Number of DC input pairs for each MPPT | 4 | |
| DC connection type | PV quick fit connector * | |
| Input protection | | |
| Reverse polarity protection | Yes from limited current source | |
| Input over voltage protection for each MPPT - | | |
| replaceable surge arrester | type 2 with monitoring | |
| Photovoltaic array isolation control | as per IEC62109 | |
| DC switch rating for each MPPT | 50 A / 1000 V | |
| Fuse rating (versions with fuses) | 15 A / 1000 V * | |
| String current monitoring | 5X2. (24ch) individual string current monitoring; SX. (6ch) Inp MPPT | ut current monitoring per |
| Output side | | |
| AC Grid connection type | Three phase 3W+PE or 4W+PE | |
| Rated AC power (Pau @cos@=1) | 100 000 W | 120 000 W |
| Maximum AC output power (Pare @cos@=1) | 100 000 W | 120 000 W |
| Maximum apparent power (5mm) | 100 000 VA | 120 000 V/ |
| Rated AC grid voltage (Ve.) | 400 V | 480 \ |
| AC voltage range | 320 .480 V 4 | 384 576 |
| Maximum AC output current (lacasi) | 145 A | |
| Rated output frequency (f.) | 50 Hz / 60 Hz | |
| Output frequency range (f-+ - f-+) | 45 55 HZ / 55 65 HZ* | |
| riominal power factor and adjustable range | • 0 995, 0 . 1 inductive/capacitive with maximaximation | mum S _{max} |
| Total current harmonic distortion | < 3% | |
| Maximum AC cable | 185mm2 Aluminum and copper | |
| | Provided bar for lug connections M10, single core cable glands | 4xM40 and M25, multi core |
| | cable gland M63 as option | |
| Output protection | | |
| Anti-Islanding protection | According to local standard | |
| Maximum external AC overcurrent protection | 225 A | |
| Output overvoitage protection - replaceable surge protection device | Type 2 with monitoring | |
| Operating performance | | |
| MAXYDUM efficiency (Deet) | 98.4% | 98 99 |
| weighted efficiency (EURO) | 98.2% | 98 69 |
| Communication | | |
| Embedded communication interfaces | tx RS485, 2x Ethernet (R345), WLAN (IEEE802 11 b/ | g/n @ 2,4 GHz) |
| User interface | 4 LEDs. Web User Interface | |
| Communication protocol | Modbus RTU/TCP (Sunsper complian | E) |
| Commissioning tool | Web User Interface Mobile APP/APP for his | nt level |
| Remote monitoring services | Aurora Visiont monitoring nortal | |
| Advanced features | Embedded logging, direct telemetry data transferri | no to ABB cloud |
| Environmental | C Resided Royany, doect tereneny data italisteri | |
| Ambient temperature range | -25 +60°C /-13 140°F with derating above 40 | *C / 104 *F |
| a second s | | |



ANNEXURE 15 – FEASIBILITY REPORT

Bhit 10 MWp Solar Power Plant

Executive Summary:

ENEP intends to setup 10 MW captive Solar Power Plant to provide electricity under 10-year power purchase agreement to a sole customer, the Kirthar JV, at Bhit gas plant located in the Sindh Province in southern Pakistan. The DC installed capacity corresponds to the maximum power that can be displaced by the existing turbine at the minimum working threshold.

The main objective of this solar plant is to provide clean energy to partially meet energy needs in an affordable and environment friendly way. The partial shifting of load to solar electricity will contribute to:

- Reduce emissions of CO2 and other pollutants;
- Increase sale of commercial gas volumes;
- Reduce O&M expenses linked to the existing generation units.

Key highlights of the project are as follows:

| | 新学校书教教 |
|---------------------------------|---------------------------|
| Customer | Kirthar JV (Eni operator) |
| Project Model | BOO |
| System Type | Ground Mounted, island |
| System Size | 10 MWp |
| Total CO ₂ reduction | 242.31 kton |
| Solar PV Type | Poly-crystalline Silicon |



Introduction:

This part is composed by the following chapters:

- Introduction to Solar
- Solar Potential in Pakistan
- Project Overview
- Conceptual Design
- Technical Summary

h



Introduction to Solar:

Solar power is the conversion of energy from sunlight into electricity, either directly using photovoltaics (PV), indirectly using concentrated solar power, or a combination. Concentrated solar power systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. Photovoltaic cells convert light into an electric current using the photovoltaic effect.

Photovoltaics were initially solely used as a source of electricity for small and medium-sized applications, from the calculator powered by a single solar cell to remote homes powered by an offgrid rooftop PV system.

As the cost of solar electricity has fallen, the number of grid-connected solar PV systems has grown into the millions and utility-scale solar power stations with hundreds of megawatts are being built. Solar PV is rapidly becoming an inexpensive, low-carbon technology to harness renewable energy from the Sun.

The productivity of solar power in a region depends on solar irradiance, which varies through the day and is influenced by latitude and climate.

The locations with highest annual solar irradiance lie in the arid tropics and subtropics. Deserts lying in low latitudes usually have few clouds and can receive sunshine for more than ten hours a day. These hot deserts form the Global Sun Belt circling the world. This belt consists of extensive swathes of land in Northern Africa, Southern Africa, Southwest Asia, Middle East, and Australia, as well as the much smaller deserts of North and South America. Africa's eastern Sahara Desert, also known as the Libyan Desert, has been observed to be the sunniest place on Earth according to NASA.



Solar Potential in Pakistan:

There is an increasing demand for power in the domestic, commercial and industrial sectors as Pakistan's population and its economy continue to expand—with annual GDP growth forecasts averaging 5 percent for the medium term. Currently, electricity consumption is severely suppressed by supply shortfalls and persistent load shedding, and there also exist significant levels of latent demand in the country as rising income levels allow more people to switch to electricity from using traditional fuels. The validity of the assumption that electricity use in Pakistan remains constrained due to availability—rather than access—issues is borne out by the fact that the penetration of the power network in the country is the highest in the South Asian region at 93.6 percent, as compared to 88.7 percent in Sri Lanka, 78.7 percent in India, 76.3 percent in Nepal, and 59.6 percent in Bangladesh.

Pakistan's per capita electricity consumption is currently significantly lower in comparison to other countries in a similar development stage, and much below that of OECD countries. Per capita electricity consumption is strongly correlated with the human development index (HDI), and the current trends of rising incomes and energy supplies, falling poverty levels, and increasing economic activity are predicted to lead to rapid increases in per capita consumption rates in Pakistan, creating a healthy demand for additional power generation.

Even with the projected surplus in power generation capacity by 2020, there will still be sufficient economic feasibility for small and medium-sized (50-100 MW) renewable energy-based power projects in the Pakistan, especially those located near remote and isolated load centers and extremities of the grid network or based on bilateral bulk contracts or for augmenting peak supplies on the grid. The viability of such projects will be further enhanced by the continued decline in technology prices and the emphasis by the government on indigenous energy resources that also help the country meet its environmental objectives and reduce carbon emissions.



Project Overview:

Introduction:

Eni is an Italian Energy Company with a presence in Pakistan since the 2000. According to the new mission, the development of renewable energy in the countries where the Company operates, is a key element in the strategy of evolving the business model towards a low carbon scenario. Eni, through its 100% controlled ENEP, an SPV incorporated under the Pakistan law, intends to build a solar power plant to support the power generation of the existing gas plant in the Bhit/Bhadra concession (Eni operator with a 40% interest).

Project Rationale:

ENEP intends to setup a 10 MW Solar Power Plant to provide electricity under 10-year Power Purchase Agreement to a sole customer, the Kirthar JV, at Bhit gas plant located in the Sindh Province in southern Pakistan. The DC installed capacity corresponds to the maximum power that can be displaced by the existing turbine at the minimum working threshold. The future PV plant will be synchronized with the existing power generation systems feeding the Bhit field load in a hybrid system.

Main objective of this solar plant is to provide clean energy to partially meet energy needs in an affordable and environment friendly way.

The installation of the PV plant aims at reducing the employment of the gas fired power turbines, currently representing the sole power generation source for Bhit field, being not connected to the national grid.

The partial shifting of load to solar electricity will contribute to:

- Reduce emissions of CO2 and other pollutants;
- Increase sale of commercial gas volumes;
- Reduce O&M expenses linked to the existing generation units.

The new SPV will sell the electricity generated by the PV plant under a take or pay Power Purchase Agreement (PPA) to Eni Pakistan as the operator of the Kirthar JV with the formal endorsement of the other JV partners.

Technology:

- Solar based Power Generation System, civil structures and Auxiliaries.
- Complete Solar Based Power Generating Panels with their protection, instrumentation, monitoring, control and synchronizing panels with existing power sources.

ENI NEW ENERGY PAKISTAN (PVT) LTD

Application for Generation Licence 10 MW Off-grid PV Plant



Operations and Maintenance:

The plant is designed to operate unmanned. An O&M contract of 2 years will be performed by the supplier that will be awarded the turn key contract. The contract will include the controlling, monitoring and performing the planned and unplanned maintenance, assuring the maximum reliability and availability of the complete Power Plant and all its related systems and equipment. It shall include but not be limited to the following items and their related costs, inclusive of all importation and local charges, duties, taxes, etc.

- Provision of all manpower as duly approved by the Company.
- Provision of all consumable material and parts.
- Provision of all routine and preventive maintenance parts.
- Full costs relating to any repairs and replacements due to defects in or break down of the equipment and systems strictly in accordance with O&M requirements. The cost shall also include all dismantling, handling, shipment, etc.

At the end of the aforesaid period, the O&M activities will be carried on by the plant owner, using all the possible synergies with the gas plant organization, in terms of personnel, tolls, material and consumables.



Project cost:

The Project will cost approximately 10 Million USD, all-inclusive.

Environmental Benefits:



This system will help curtailing CO2 emissions by 242,31 ktonnes as cumulative at the end of the project life.



Conceptual Design:

Generation Voltage

Solar Power plant produces AC power at Low voltage levels of 400V. Low voltage level will then step up through power transformers to the existing Medium Voltage levels i.e. 11KV that is the Electrical Energy distribution voltage level of Bhit gas plant.

Power Factor & Frequency

The Solar power plant is using solar grid connected string Inverters of 110KW each to convert DC power of solar panels to Alternating Power. The nominal power factor is > 0.995 with a range set from 0 to 1 leading /lagging, making it suitable for absorbing or delivering reactive power. Nominal Frequency of generation is 50Hz with a maximum output range of 45-55Hz.

Automatic Generation Control:

Automation would be added into the solar system to ensure safe synchronization with the existing electrical system of Bhit and the running Gas Turbine Generators. The controller will set in order to inject the energy produced by the Solar Plant as priority. A dedicated study proved that the sudden shut down of the PV plant can be compensated by the fast reaction of the Gas Turbine Generator.

Metering and Protection:

Metering of solar units will be performed at the 11KV delivery point taking into account the possible connecting line losses.

Solar power plant is designed to have the following protections for the line and load side:

- Over and Under voltage protections
- Short Circuit protections
- Earth Fault detection
- Over current protection



Technical Summary:

- Polycrystalline 330W Solar Modules with efficiency 17% are used in the design
- 110 KW grid connected solar inverters, 400V three phase, 98.4% have been considered
- Step up Transformers 0.4 / 11KV are used
- Medium Voltage Switchgears 11KV / 630A
- System will be connected to the auxiliary load of the Existing factory
- Maximum AC output of the system is assumed to be 7920 KW
- Output of the system is based on instantaneous Irradiation values of Solar Energy
- 58 Acres of land area required for the installation of solar plant

Bill of Materials:

| S. No. | Components | Qty (No.) |
|--------|--|-----------|
| 1 | Polycrystalline Silicon Solar Modules 345W | 30320 |
| 2 | Grid Connected Solar Inverters 100KW 3 Phase | 66 |
| 3 | LV switchboards | 4 |
| 4 | Power Stations | 4 |
| 5 | 0.4 / 11KV Step up Transformers | 4 |
| 6 | Medium Voltage Switchgears | 6 |

Energy Generation:

| S. No. | Efficiency Parameters | |
|--------|---------------------------------|-----------|
| 1 | Performance Ratio of the System | 78.24% |
| 2 | Capacity Utilization Factor | 22.3% |
| 3 | Energy Generation Units | 19.274GWh |



ANNEXURE 16 – ESSA (ENVIRONMENTAL AND SOCIAL SOUNDNESS ASSESSMENT)

Executive Summary:

Eni Pakistan Limited (Eni Pakistan) intends to develop a 10 MWp photovoltaic (PV) plant adjacent to Bhit Gas Plant in Taluka Sehwan, Jamshoro district of Sindh Province. The PV plant requires a footprint of 58 acres (24.28 hectares).

The integration of the PV plant in the existing power generation system of the Bhit plant would shift partially the electrical load to the solar energy produced during sunlight hours and this is to be synchronized with the existing power turbines and share plant load in a hybrid system.

This document presents the results of an initial environmental examination (IEE) analyzed for the construction, commissioning and operation of the proposed Project.

Description of Environment:

Physical Environment

Geographically, the project area is located in Deh Kaandhi, UC Jhangara, Taluka Sehwan, in the Jamshoro district of Sindh province. The project area lies on less than one kilometer northeast from the Bhit Gas Field main facilities.

The proposed PV plant area is located in the foothills of Bhit Gas Field. In this area, the nullahs (water channels) cutting vertically the east slope of the project area flow into the Naing Nai non-perennial river which ultimately falls into the Manchar Lake.

Geological & Geotechnical

From the geological point of view, the area is quite stable and homogeneous, so no main geological changes are expected. The area comprises overburden alluvial deposits, such as clayey and silty sandy gravel with some cobbles and boulders.

Project area comprises the following lithological sequence:

- Upper stratum of gravel in sandy clayey/silty matrix with cobbles and boulders;
- A second lithological unit of highly weathered shale/clay;
- Alternate beds of sandstone/siltstone/claystone.

Seismicity

Based on the seismic zoning map of Pakistan developed by Geological Centre Quetta, the entire Kirthar Concession falls under Zone 2B with minor to moderate damage category of earthquakes and a ground acceleration level of 0.16 to 0.24 g, as shown in the map below.





None of the higher damaged category earthquake has been reported from the area in recent times.

Climate & Meteorology

The climate of the area is intensively hot in summer and cold enough in winter. The salient feature of climate is the high variability in temperature of the different areas within the district.

The climate of the area is extreme and is characterized by hot summers and cold winters. Hottest months of the year are May, June and July. According to available meteorological information, the average temperature for the year stands at 26°C whereas, mean annual maximum and minimum temperatures remain above 43°C in June and above 10°C in January respectively. Coldest months of the year are December, January and February.

The average annual rainfall in the project area is about 96 millimetres. Jamshoro district is situated in arid zone of Pakistan and hence, prone to drought.

The area experiences relatively medium humidity. The maximum humidity was recorded during the month of January (29.8% at 0000 UTC) and minimum humidity in the month of May (18.2% at 1200 UTC).

Average wind speed in entire district is very erratic. According to available information, wind speed of the project area could reach up to 20 kmph in the hottest months of the years which ultimately



h

generate high speed gusts; however, in winter months the average wind speed remain in between 5 and 10 kmph.

Available meteorological data (2012 - 2017) in the table below show that average sun hours in January are around 259 whereas, during the peak summer time, in June, they are around 372.

| | Parameters | | | | | | |
|------------|------------|--------------|---------|------------------|-------------|--------------|----------|
| Month/Year | Averag | e Temperatur | e (°C) | Avg. Rainfall in | Humidity in | Avg. Wind in | Avg. Sun |
| | Maximum | Minimum | Average | mm | ۰, | kanph | hours |
| 2012 | | | | | | | |
| Jan | 24 | 12 | 20 | 0 | 31 | 7.9 | 257.5 |
| Feb | 26 | 14 | 22 | 0 | 20 | 10.1 | 288.5 |
| Mar | 36 | 24 | 31 | 0 | 16 | 11.2 | 308.5 |
| Apr | 40 | 32 | 37 | 15.31 | 21 | 13 | 326 |
| May | 46 | 37 | 42 | 10.3 | 16 | 12.2 | 387.5 |
| Jun | 47 | 35 | 42 | 5.73 | 27 | 16.6 | 375 |
| Jul | 46 | 35 | 42 | 2.58 | 34 | 18 | 387.5 |
| Aug | 43 | 34 | 40 | 8.21 | 37 | 15.5 | 340 |
| Sep | 39 | 32 | 37 | 198.17 | - 14 | 13 | 285.5 |
| Oct | 39 | 30 | 36 | 11.9 | 25 | 6.1 | 265 |
| Nov | 33 | 24 | 30 | 0 | 24 | 5.8 | 225 |
| Dec | 27 | 17 | 23 | 0 | 27 | 7.9 | 225 |
| 2013 | | | | | | | |
| Jan | 26 | 14 | 22 | 0 | 25 | 7.9 | 260 |
| Feb | 27 | 17 | 24 | 21.08 | 37 | 9.7 | 274 |
| Mar | 36 | 25 | 32 | 7.31 | 21 | 10.1 | 308.5 |
| Apr | 39 | 31 | 36 | 17.68 | 22 | 11.5 | 326 |
| May | 46 | 36 | 43 | 0.2 | 16 | 14 | 387.5 |
| Jun | 45 | 36 | 41 | 12.61 | 32 | 19.4 | 375 |
| Jul | 45 | 36 | 41 | 5.6 | 36 | 17.6 | 387.5 |
| Aug | 42 | 34 | 39 | 18.19 | 42 | 15.1 | 338.5 |
| Sep | 43 | 35 | 40 | 5.29 | 32 | 11.9 | 300 |
| Oct | 41 | 34 | 39 | 1.39 | 24 | 6.1 | 265 |

Table 5-1: Meteorological Data of Dadu District. 2012 - 2017

h

5

| | Parameters | | | | | | |
|------------|------------|---------------|---------|------------------|-------------|--------------|----------|
| Month/Year | Avera | ge Temperatur | e (°C) | Avg. Rainfall in | Humidity in | Avg. Wind in | Avg. Sun |
| | Maximum | Minimum | Average | nun | 30 | kmph | hours |
| Nov | 33 | 25 | 30 | 0 | 27 | 6.8 | 223.5 |
| Dec | 25 | 18 | 25 | 0 | 26 | 7.6 | 232.5 |
| 2014 | • | | | | | | |
| Jan | 26 | 14 | 22 | 0.4 | 30 | 7.6 | 255.5 |
| Feb | 29 | 17 | 25 | 0.1 | 27 | 10.1 | 280 |
| Mar | 35 | 25 | 31 | 1.3 | 24 | 10.8 | 310 |
| Apr | 42 | 34 | 39 | 12.38 | 19 | 10.8 | 327.5 |
| May | 45 | 37 | 42 | 14.1 | 21 | 14.8 | 387.5 |
| Jun | 48 | 38 | 44 | 0.2 | 27 | 18.4 | 375 |
| Jul | 46 | 36 | 42 | 15 | 36 | 18 | 387.5 |
| Aug | 43 | 35 | 40 | 15.48 | 39 | 16.2 | 347 |
| Sep | 42 | 33 | 39 | 5.1 | 38 | 15.1 | 300 |
| Oct | 41 | 32 | 37 | 0 | 22 | 9 | 265 |
| Nov | 34 | 25 | 31 | 1 | 23 | 7.2 | 225 |
| Dec | 29 | 18 | 25 | 0 | 23 | 7.2 | 232.5 |
| 2015 | | | | | | | |
| Jan | 27 | 16 | 23 | 0 | 33 | 9 | 255.5 |
| Feb | 32 | 21 | 28 | 0.3 | 30 | 11.9 | 262 |
| Mar | 35 | 25 | 31 | 5.41 | 25 | 12.2 | 292 |
| Арг | 43 | 35 | 40 | 3 | 18 | 13 | 327.5 |
| May | 48 | 39 | 44 | 0.7 | 17 | 16.2 | 387.5 |
| Jun | 46 | 37 | 42 | 21.32 | 29 | 20.2 | 367.5 |
| Jul | 45 | 36 | 41 | 52.99 | 39 | 18 | 363.5 |
| Aug | 44 | 34 | 40 | 0 | 41 | 18.7 | 347 |
| Sep | 43 | 33 | 39 | 4.7 | 31 | 15.1 | 300 |

| | Parameters | | | | | | | | |
|------------|------------|--------------|---------|------------------|-------------|--------------|----------|--|--|
| Month/Year | Averag | e Temperatur | e (°C) | Avg. Rainfall in | Humidity in | Avg. Wind in | Avg. Sun | | |
| | Maximum | Minimum | Average | mm | ۰. | kmph | hours | | |
| Oct | 41 | 33 | 38 | 0.41 | 25 | 10.1 | 267.5 | | |
| Nov | 34 | 26 | 31 | 0 | 20 | 9 | 225 | | |
| Dec | 29 | 19 | 26 | 0 | 18 | 7.6 | 229.5 | | |
| 2016 | | | | | | | | | |
| Jan | 29 | 19 | 26 | 0.61 | 27 | 8.6 | 256 | | |
| Feb | 33 | 21 | 28 | 0 | 14 | 10.1 | 287 | | |
| Mar | 36 | 28 | 33 | 6.59 | 27 | 11.9 | 301 | | |
| Apr | 42 | 34 | 39 | 0.3 | 17 | 13 | 318.5 | | |
| May | 49 | 38 | 45 | 1.19 | 20 | 18.4 | 386 | | |
| Jun | 48 | 38 | 45 | 0.5 | 24 | 18 | 370.5 | | |
| Jul | 46 | 36 | 42 | 6.68 | 39 | 18.7 | 387.5 | | |
| Aug | 44 | 36 | 41 | 17.14 | 36 | 15.1 | 343 | | |
| Sep | - 14 | 24 | 40 | 0.59 | 34 | 15.1 | 300 | | |
| Oct | 42 | 34 | 39 | 0 | 18 | 7.2 | 265 | | |
| Nov | 36 | 27 | 33 | 0 | 16 | 7.2 | 225 | | |
| Dec | 32 | 22 | 29 | 0 | 21 | 7.6 | 232.5 | | |
| 2017 | | | | | | | | | |
| Jan | 26 | 16 | 23 | 4.5 | 33 | 10.1 | 249.5 | | |
| Feb | 32 | 21 | 28 | 1.1 | 19 | 9 | 275.5 | | |
| Mar | 37 | 28 | 34 | 2.7 | 17 | 10.4 | 307 | | |
| Apr | 45 | 35 | 41 | 3 | 14 | 13 | 327.5 | | |
| May | 48 | 38 | -11 | 11.6 | 19 | 14 | 387.5 | | |
| Jun | 46 | 37 | 43 | 9.9 | 33 | 19.4 | 370.5 | | |
| Jul | 44 | 37 | 41 | S.1 | 37 | 16.2 | 378.5 | | |
| Aug | 44 | 35 | 41 | 1.3 | 37 | 16.6 | 343 | | |



| | Parameters | | | | | | |
|------------|--------------------------|---------|------------------|-------------|--------------|----------|----------------|
| Month/Year | Average Temperature (°C) | | Avg. Rainfall in | Humidity in | Avg. Wind in | Avg. Sun | |
| | Maximum | Minimum | Average | nun | °° | kmph | hours |
| Sep | 42 | 33 | 39 | 3.5 | 33 | 13 | 2 98 .5 |
| Oct | 42 | 32 | 39 | 0 | 17 | 7.9 | 265 |
| Nov | 34 | 24 | 30 | 0 | 19 | 6.8 | 222 |
| Dec | 28 | 18 | 24 | 1.1 | 20 | 8.6 | 229.5 |
| | | | | | | | |

Source: https://www.worldweatheronline.com/

Biological Environment

The entire Kirthar Concession is located in mountainous/rocky terrain, however a mosaic of microhabitats is present within the proposed project site. The entire project site is located outside any protected area notified under the Sindh Wildlife Protection Ordinance (SWPO). The area can be divided into three major habitat types, each of which supports its own floral and faunal attributes.

These different micro-habitats have been described in detail:

- Stony/Rocky plains
- Seasonal streambeds
- Agriculture lands and human habitation

CAL ENI NEW ENERGY PAKISTAN (PVT) LTD

Environmental Assessment Report

This IEE investigates the impacts likely to arise from the proposed solar power plant project in UC Jhangara, Taluka Sehwan of Jamshoro district, adjacent to Bhit Gas Plant in Sindh province along with other associated development activities by Eni Pakistan and covers the following activities within the project area:

- Construction, installation, operation and decommissioning of Bhit photovoltaic project;
- Laying of transmission cable of approximately 1 km in length from the proposed PV plant to Bhit Gas Plant;
- Other associated activities i.e. establishment of base camp and access roads.

Various steps were undertaken in the IEE preparation included understanding of the proposed operation, review of provincial, national and international legislation and guidelines, collection of secondary data including physical, biological, socioeconomic environmental and heritage aspects, primary field data collection and potential environmental impacts identification yielding recommendations for mitigation and monitoring measures as well as development of Environmental Management Plan (EMP) and reporting.

Field survey for IEE study was carried out by a team of environmental specialists and ecologists in November 2018. Secondary information were collected by Eni Pakistan from in-house sources like previous environmental studies, databases and respective District Census Reports (DCRs). The applicable environmental assessment procedures prepared by the Pakistan EPA (Pakistan Environmental Assessment Procedure, 1997) were followed in the preparation of this IEE.

The scope of the IEE is to:

- Assess the existing environmental conditions in the proposed project area, including the identification of environmental sensitive areas and develop a baseline of their prevalent environmental and socioeconomic conditions;
- Identify and investigate all impacts of the proposed project activities on the physical, biological and socioeconomic environment of the project area;
- To propose mitigation measures that would help Eni Pakistan in carrying out the proposed development activities in an environmental sustainable manner;
- To develop an Environmental Management Plan (EMP) that would assist Eni Pakistan in the effective implementation of the recommendations of the IEE.

The IEE has fully examined the proposed project activities, the background environmental conditions of the project area and assessed project's potential environmental impacts associated with the proposed PV plant. Mitigation measures to help minimizing potential identified impacts have been recommended and an EMP has been provided for effective implementation of these mitigation measures.



PROJECT ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This section of the report identifies and evaluates the potential environmental impacts of the proposed Bhit solar power project on the physical, biological and socioeconomic environment within the area of operation. The likely impacts were assessed for all activities in the construction, installation, operation, maintenance and decommissioning phases of the proposed project development.

The identification and assessment of environmental impacts were based on American Society for Testing of Materials (ASTM) and World Bank Environmental Assessment Sourcebook and ISO 14001/14004 guidelines, which include the following steps:

- Identification of major activities of the project during the establishment of the proposed solar power generating plant;
- Identification of all the potential environmental aspects (hazards or sources of potential impacts) associated with each component of the activity;
- Assessment of the significance of identified environmental impacts.

Based on the above steps, major activities during the construction, operation and post operational phases of the project were identified. The associated environmental aspects were identified based on the project description. All the potential impacts from the proposed project, regarding effluents, ambient air quality, noise, surface and groundwater, geology, ecology and socioeconomics have been evaluated as part of the assessment process. Project specific Environmental Management Plan (EMP) is provided along.

IDENTIFICATION OF POTENTIAL IMPACTS

A screening process of proposed project activities in different phases of the project cycle was carried out for the identification of adverse environmental impacts. The whole project was divided into four broad phases which may pose environmental and social impacts:

- Construction Phase
- Installation Phase
- Operational Phase
- Decommissioning Phase

The main aspects associated with potential impacts are regarding the following compartments:

- Geomorphology and soil
- Water resources (aquifer and surface water quality);
- Air quality
- Project wastes
- Noise
- Greenhouse Gases (GHG) emissions and ozone depleting substances
- Ecology (including flora and fauna)



- Vehicles movement
- Socioeconomic conditions

The potential impacts are classified according to the type of potential receptors. The following receptor categories were used:

- Community
- Land and soil
- Air quality
- Water resources
- Ecosystem

A summary of the impacts potentially recognized for the different phases of this project, along with the recommended mitigation measures, as presented in the IEE document, are reported in the table below.

| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures |
|-------------------------|---|---|
| Pre-Construction Phase | | |
| Air Quality | Dust from land clearing | Ensure sprinkling of stock piles and areas of activity Ensure proper management of the movement/removal of material to minimize dust emissions including vehicles that carry dusty material Vehicles to be covered that carry dusty materials |
| Surface Water Quality | Increased turbidity of surface water due to runoff from stock piles of excavated material | Ensure that excavated materials are stacked properly to reduce turbidity effect on surface runoffs Ensure that cleared materials are stacked properly to reduce turbidity effect on surface runoffs |
| Noise Emissions | Elevated ambient noise levels from machinery and vehicular traffic | Ensure contractors equipment is in good working condition and fitted with noise-reducing devices where necessary Restrict development activities to day-time working hours only however, in case of urgency, night activities will be allowed after reassessing the impact of activity on the environment through a risk assessment and specifying additional mitigation measures if required Conduct noise monitoring in compliance with local legislation Equip workforce with adequate PPEs |
| Vegetation and Wildlife | Potential loss of vegetation | Ensure minimal vegetation losses and re-plant the economic vegetation species at appropriate locations within the area of influence Ensure that land clearing and site grading are well planned to avoid excessive land take beyond requirements. |

ENI NEW ENERGY PAKISTAN (PVT) LTD

I

Ь

0

Application for Generation Licence 10 MW Off-grid PV Plant

| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures |
|-------------------------|--|--|
| Soil and Land Use | Erosion of topsoil that will be exposed during site clearing Soil compaction Change of land use in the project area | Ensure proper storage of excavated material to reduce runoff Ensure that site clearing is limited to acquired boundaries and excessive land uptake should be avoided Ensure backfilling and compaction trenches to minimize the mobilization of highly eroded silt and clay particles |
| Socioeconomic Resources | Strain on social and cultural conditions, access to goods, services and means of livelihood due to influx of workers Disruption of community activities | Ensure adequate recruitment of labor from surrounding communities in accordance to local consent and according to company's competency criteria Implement appropriate operational controls/procedures e.g. external communications Ensure trainings of workers on health, safety and environmental protection measures |
| Visual impacts | Change in existing natural landscape and topography | Ensure site is adequately fenced off Ensure waste generated is transported offsite by an approved waste contractor Ensure adequate plantation to maintain natural landscape in PV plant surrounding |
| Air Quality | Air emissions from construction equipment Dust and gaseous emissions from vehicles movement (VOCs, CO, NOx, SOx, Os, particulates and greenhouse gases) | Routine maintenance of engines, vehicles, equipment to minimize air emissions, avoid idling, cover vehicles transporting dusty material Ensure proper sprinkling/watering on dusty sites to reduce dust emissions Ensure contractor personnel are trained in adequate environmental management |
| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures Implement appropriate operational controls/procedures |
| Noise Emissions | Increased noise levels from generators, heavy equipment and machinery, and vehicular traffic Nuisance to nearby communities due to increased noise level Night time activity and generators will increase noise level within the near settlements Hearing impairment of project workers and neighbors | to ensure compliance Ensure contractor manages construction in hourly shifts and noise levels to external sensitive receptors in the area should be respected, in particular to compliance with local legislation Ensure regular servicing and routine maintenance of all construction and installation equipment Signal the noise areas and ensure provision of ear protective devices to workers at the project site during the land preparation/construction stage and installation of mufflers on heavy equipment Ensure construction and installation activities are restricted to day-time only however, in case of urgency, night activities will be allowed after reassessing the impact of activity on the environment through a risk assessment and specifying additional mitigation measures if required Conduct activities meant the project to the set of the set o |
| Surface Water Quality | Water pollution from surface runoff, Improper disposal of sewage Potential spills of lubricants and oil due to poor handling Increased turbidity of water body from runoff of waste piles | Conduct noise monitoring as per applicable legislation Ensure containment of surface runoffs and storm water through appropriate drainage system at the project site Provide spill containment facilities on site Disposal of waste as per waste management procedure on regular and strict basis Avoid leakages, provide adequate drainage facilities, temporarily store the waste in paved and impervious control to a fact. |
| Groundwater | Accidental discharge of hazardous material | Segregate areas Ensure the contractor handles, stores and disposes of materials and material according with the material |

h

1.

B

| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures |
|--|--|--|
| | Leaching pollution from solid waste disposal | management plan and the environmental management plan developed for this project Ensure provision of temporary storage, in bunded and paved area in a segregated way and handling wastes according to their MSDS in compatible and safe containers Ensure that contractor personnel to handle hazardous wastes are trained on safe practices |
| Project Wastes | Improper management of liquid wastes including hazardous & non-hazardous Improper management of solid wastes including hazardous & non-hazardous | Follow the golden waste management rule i.e. remove, reduce, reuse, recycle, recover, treat and dispose Ensure provision of septic system comprising of septic tank and soak pits for management of domestic effluents All types of solid waste disposal should be through Sindh EPA's approved waste contractor A waste management plan should be developed before the start of the project activities and implemented accordingly Ensure segregation and storage for different types of wastes for appropriate safe disposal |
| Soil | Accidental spill of oil and lubricant during equipment refueling operation | Ensure that contractor handles hazardous materials in accordance with site waste management plan and the project environmental management plan Provide spill containment facilities on site Contaminated soil to be collected and disposed of as per applicable procedure and in compliance with local legislation Ensure temporary storage in bounded and paved areas in a segregated way and handling wastes according to |
| | | |
| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures |
| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures their MSDS in compatible and safe containers |
| Environmental Medium Socioeconomic Resources | Potential Source and Impact Strain on infrastructure, social and cultural conditions, access to goods and services and means of livelihood due to mflux of construction workers Disruption of community activities Loss of livelihood | Recommended Mitigation Measures their MSDS in compatible and safe containers Ensure adequate recruitment of labor from surrounding communities taking local consent into consideration and as per company's competency criteria Ensure presence of workers during working hours only at site and for limited construction period Ensure maintenance of closed construction camp and restriction of access to camp and work locations to authorized personnel only Strive on the improvements of local infrastructure, such as transportation upgrades, in order to improve workers access Minimize disruption to road traffic, farming and other community activities by the project workers and project activities Implement appropriate operational controls/procedures e.g. external communications Ensure the qualified labor from within the project's host communities are given preference in employment opportunities by the project morement |
| Environmental Medium Socioeconomic Resources Health & Safety | Potential Source and Impact • Strain on infrastructure, social and cultural conditions, access to goods and services and means of livelihood due to influx of construction workers • Disruption of community activities • Loss of livelihood | Recommended Mitigation Measures their MSDS in compatible and safe containers Ensure adequate recruitment of labor from surrounding communities taking local consent into consideration and as per company's competency criteria Ensure presence of workers during working hours only at site and for limited construction period Ensure maintenance of closed construction camp and restriction of access to camp and work locations to authorized personnel only Strive on the improvements of local infrastructure, such as transportation upgrades, in order to improve workers access Minimize disruption to road traffic, farming and other community activities by the project workers and project activities Implement appropriate operational controls/procedures e.g. external communications Ensure the qualified labor from within the project's host communities are given preference in employment opportunities by the project proponent Ensure implementation of health related awareness programs for the project workers and the community Respect local cultural norms Develop appropriate stakeholder engagement/management plan, health surveillance and awareness programs to address the local community needs and |



Б

2

| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures |
|-----------------------------|--|---|
| | Risk of increased road accidents Occupational accidents around the construction areas Decreased road quality due to enhanced traffic | operating procedures, training of drivers, shifted delivery of materials according to plan, speed limits, licensed and maintained vehicles) Prepare and ensure the placement of warning and caution signs within and around the project work site as appropriate and for hazard recognition Conduct risk assessment for identification of potential hazards associated with traffic and to take appropriate mutigation measure thereafter |
| Operational & Maintenand | re Phase | |
| Air Quality | No air emissions during operation | |
| Soil | Soil contamination from accidental spills of oil and lubricant during plant maintenance | Ensure that any equipment having hazardous substance is installed on concrete paved floor Ensure that bunds are provided to contain possible oil/lubricant spills Induct project workers through adequate training on proper environmental hygiene. The training will also include proper handling and disposal of liquid wastes to avoid accidental spills Prepare and ensure display of appropriate warning and caution signs to reduce hazards from oil, lubricants and related hazardous chemicals and materials |
| Surface Water | Discharge from cleaning of PV modules Accidental leakage of transformer oils into nearby surface water bodies | Ensure adequate treatment of wastewater before discharge, no additives to the cleaning water Ensure that treated wastewater meet the SEQS standards before discharge Containment basins can be installed to avoid detenoration of surface water quality |



Ь

P

F

| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures |
|--------------------------|--|---|
| Ecology & Wildlife | Permanent displacement of birds and other existing wildlife Biological confusion due to 'Lake effect' | Ensure arrangements for post-construction monitoring to determine the presence of rare or threatened birds species within project area Continuous avifauna monitoring in operation e.g. mylar tape, scare balloons, framed non-reflective panels with minimum vegetation around the project site Monitoring should take into account seasonal variation, ily paths and birds' behavior |
| Socioeconomic Resources | Use of existing local resources around the project area Loss of livelihood | Improve existing infrastructure in affected communities as part of social responsibility Ensure that qualified labor from within the project's host communities are given preference in employment opportunities by the project proponent |
| Traffic | Increased traffic during sub-station and transmission line maintenance | Implement transport management procedures developed for this project Ensure that project drivers are well trained in defensive driving procedures |
| Health & Safety | Public and occupational health and safety risks | Train staff in HSE and security management Maintain first aid clinic within the project site or other appropriate arrangements e.g. Biti Gas Plant Subscribe to the services of appropriate medical facility in nearby town/city to handle health issues that are beyond first aid attention Maintain an ambulance nearby the project site e.g. Bhit Gas Plant for emergency health challenges for quick evacuation of the affected project staff to appropriate medical facility Ensure the provision of fire extinguishers at site Maintain a dedicated telephone line/channel for |
| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures |
| | | emergency Create a mustering point and ensure that it is clearly identified at site Provide a gate to the project site manned by trained personnel to check unauthonzed entries |
| Post-overational & Decom | missioning Phase | |
| Air Quality | Air and dust enussions from equipment and vehicles | Ensure proper sprinkling/watering on dusty sites to reduce dust emissions Routine maintenance of engines, vehicles, equipment to minimize air emissions, avoid idling, cover vehicles transporting dusty material |
| Noise Emissions | Increased noise levels from generators, heavy equipment and machinery, and vehicular traffic Nuisance to nearby communities due to increased noise level Hearing impairment of project workers and neighbors | Ensure contractor manages decommissioning activities with minimal disturbance to community/ies Ensure provision of ear protective devices to workers at the decommissioning project site Ensure activities are restricted to day-time only |
| Water Quality | Water pollution from surface runoff and improper disposal of sewage Potential spills of lubricants and oil due to poor handling Increased turbidity of water body from runoff of waste piles Leaching pollution from solid waste disposal | Ensure containment of surface runoffs and storm water through appropriate drainage system at the project site Provide spill containment facilities on site Disposal of waste as per waste management procedures on regular and strict basis Avoid leakages, provide adequate drainage facilities, temporarily store the waste in paved and impervious segregate areas Ensure that contractor personnel to handle hazardous |

| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures |
|-------------------------|--|---|
| Project Wastes | Improper management of waste effluents Improper management of solid wastes including hazardous & non-hazardous wastes Accidental spill of oil and lubricant during | Follow the golden waste management rule i.e. remove, reduce, reuse, recycle, recover, treat and dispose All types of solid waste disposal should be through Sindh EPA's approved waste contractor Ensure segregation and storage for different types of wastes for appropriate safe disposal Ensure that contractor handles hazardous materials in |
| 301 | equipment refueling operation | accordance with site waste management plan and the project environmental management plan Provide spill containment facilities on site Contaminated soil to be collected and disposed of as per applicable procedures and in compliance with local legislation |
| Socioeconomic Resources | Strain on infrastructure, social and cultural conditions, access to goods and services and means of livelihood due to influx of workers Disruption of community activities | Ensure adequate recruitment of labor from surrounding communities as appropriate Ensure presence of workers during working hours only at site and for limited decommissioning phase Appoint a Community Liaison Officer as focal contact point regarding locals' grievances if any Ensure the qualified labor from within the project's host communities are given preference in employment opportunities by the project proponent |
| Health & Safety | Spread of contagious diseases among workers and community people Effects on local's life style and cultural setting as the local community is not accustomed to a multicultural environment and their perceptions about people of different culture | Ensure implementation of health related awareness programs for the project workers and the community Respect local cultural norms |
| Environmental Medium | Potential Source and Impact | Recommended Mitigation Measures |
| Traffic | Increased level of traffic due to heavy equipment and machinery transport Risk of increased toad accidents Occupational accidents around the construction areas Reduced road quality due to enhanced traffic | Ensure strict compliance to driving policy, transportation operating procedures, training of drivers, shifted delivery of different materials according to a plan, speed limits, licensed and maintained vehicles Prepare and ensure the placement of warning and caution signs within and around the project work site as appropriate and for hazard recognition Conduct risk assessment for identification of potential hazards associated with traffic and to take appropriate mitigation measure thereafter |
| Restoration | Project waste Visual impacts Ecological concerns | Project wastes (hazardous and non-hazardous) will be removed and disposed of according to best industrial guidelines and in compliance with local regulations All concrete structures will be broken and taken offsite for safe disposal Boundary wall will be also demolished to improve the aesthetics of the area Site will be planted with indigenous species Access road will also be restored (locals consent will be given preference) |

For the effective implementation and management of mitigation measures, an Environmental Management Plan (EMP) has been prepared.

The EMP provides a mean to address potential environmental impacts generated by the proposed photovoltaic project activities, to enhance project benefits and to introduce standards of good practice in all the project related activities.



The EMP has been prepared with the objective of:

- Defining legislative requirements, guidelines and best industry practices that apply to the project;
- Defining mitigation measures required for avoiding or minimizing potential impacts assessed by the IEE;
- Defining roles and responsibilities of the project proponent and the execution contractors;
- Defining requirements for environmental monitoring and reporting.

On the basis of the above, the IEE concludes that if mitigation measures for all impacts identified in the IEE are applied as per the prescriptions of the IEE, no significant or unacceptable change in the environmental conditions, in comparison to what assessed in the ante-operam environmental baseline, will occur.

Moreover, the main potential safety risks of the project have been identified in the Risk Register Document:

- Fire event with injuries: possible damages to the photovoltaic panels or plant components and negative effects on the energy production, personnel and environment: in order to mitigate it, adequate maintenance of the panels with a suitable frequency is to be planned as well as the use of adequate PPE; fire &gas detection and alarm system shall be implemented in compliance with best practices of the sector;
- Accident caused by electrocution: this event may cause serious injuries to personnel, hence emergency procedures and a Medical Emergency Response Plan shall be in place; the workforce shall be adequately trained and equipped with the necessary PPEs;

Before the construction phase, a Hazid (Hazard Identification) will be issued to identify potential health, safety, environmental and reputational hazards related with the project and, when necessary, to recognize key areas for further improvement in risk control, risk prevention and mitigation measures in consistency with the adopted Risk Management strategy.



ANNEX 17 – SCHEDULE III

1. LOCATION MAPS, SITE MAPS, LAND

Location Map:

F

h

P

The Solar Plant will be located in the Sindh Province in southern Pakistan.





Site Location:

The Solar site covers an area of 58 acres located close to the Bhit gas plant.

Layout of the PV plant:





2. TECHNOLOGY, SIZE OF PLANT, NUMBER OF UNITS

Technical Summary:

- Polycrystalline 330 Solar Modules with efficiency 17% are used in the design
- 110 KW grid connected solar inverters, 400V three phase, 98.4% have been considered
- Step up Transformers 0.40 / 11KV are used
- Medium Voltage Switchgears 11KV / 630A
- System will be connected to the Bhit gas plant
- Maximum AC output of the system is assumed to be 7920 KW
- Output of the system is based on instantaneous Irradiation values of Solar Energy
- 58 Acres of land area required for the installation of solar plant

Bill of Materials:

| S. No. | Components | Qty (No.) |
|--------|--|-----------|
| 1 | Polycrystalline Silicon Solar Modules 345W | 30320 |
| 2 | Grid Connected Solar Inverters 100KW 3 Phase | 72 |
| 3 | LV switchboards | 4 |
| 4 | Power Stations | 4 |
| 5 | 0.4 / 11KV Step up Transformers | 4 |
| 6 | Medium Voltage Switchgears | 6 |

Energy Generation:

[]

| S. No. | Efficiency Parameters | |
|--------|---------------------------------|------------|
| 1 | Performance Ratio of the System | 78.24% |
| 2 | Capacity Utilization Factor | 22.3% |
| 3 | Energy Generation Units | 19.274 GWh |

Technology & Number of Units:

| S. No. | Components | Qty (No.) |
|--------|--|-----------|
| 1 | Polycrystalline Silicon Solar Modules 345W | 30320 |
| 2 | Grid Connected Solar Inverters 110KW 3 Phase | 72 |
| 3 | LV switchboards | 4 |
| 4 | Power Stations | 4 |
| 5 | 0.4 / 11KV Step up Transformers | 4 |
| 6 | Medium Voltage Switchgears | 6 |


3. FUEL: TYPE, IMPORTED/INDIGENOUS, SUPPLIER, LOGISTICS, PIPELINES, ETC.

- Solar energy based Plant, no fossil fuel will be used for the electricity generation.

4. EMISSION VALUES

- There will be "NO" carbon emission by the generation of Solar Energy.

5. COOLING WATER SOURCES

- Not Applicable in Solar Energy Plant.

6. INTERCONNECTION WITH NATIONAL GRID CO

- Not Applicable: the power generated will be entirely consumed by the Bhit gas plant that is not connected to the National Grid.

7. INFRASTRUCTURES

- The Solar Project is located close to the Bhit gas plant that is served by roads sized to transport the equipment and materials for the industrial purposes. All utilities (electricity, water, boarding lodging and fuel) are available on site exploiting synergies with the gas plant.

8. PROJECT COSTS, INFORMATION REGARDING SOURCES AND AMOUNT OF EQUITY/DEBT

- The project will cost approximately 10 Million USD, all-inclusive.

The sponsor of Eni New Energy Pakistan (Private) Limited have one of the strongest balance sheet among corporations in Pakistan and will finance the project on 100% equity base. Please refer to the 2017 Financial Statements of the sponsor company as given in Annexure 10.



9. PROJECT COOMENCEMENT AND COMPLETION SCHEDULE WITH MILESTONES

This project will be completed in a period of 7 months. Major project activities include Detailed Engineering Design, procurement of Local and Imported Equipment, Construction involving civil, electrical and mechanical works.

Major milestones are:

| S. No. | Major Milestone | Timeline |
|--------|-----------------------------|-----------|
| 1 | Detailed Engineering Design | 5 month |
| 2 | Procurement | 6 months |
| 3 | Construction | 5 months |
| 4 | Commissioning and Testing | 0.5 month |

10. SAFETY PLANS, EMERGENCY PLANS

EMERGENCY RESPONSE PLAN (ERP)

Purpose

To describe responsibilities in preparation for, response to and recovery from any reasonably foreseeable incident.

Priorities

Secure the Health and Safety of all personnel involved. Minimize any impact on the environment Minimize any impact on property and assets.

Roles and Responsibilities

Each role with responsibilities in the ERP, shall be properly trained and certified under the Pakistan laws.

For events deemed to be major, CUSTOMER may be obliged, by its responsibilities under its agreements with the Government, to assume control of emergency response activities. In these circumstances the CUSTOMER Representative shall clearly advise REON that CUSTOMER is assuming control and the REON Emergency Response Team Leader will work under CUSTOMER instruction.

The major event are significant events which demands a response beyond the routine, resulting from uncontrolled developments in the course of the operation of any establishment and transient work activity which may cause (or have the potential to cause) multiple serious injuries, multiple cases of ill health (either immediate or delayed), loss of life, serious disruption, extensive damage to property and to the environment.



For emergency response activities managed by REON, key roles and responsibilities are detailed below. A bridging document and a joint evaluation of the ERP will be done because the holder of the asset property is Eni Pakistan.

Emergency Response Team Leader

The ERT Leader shall be a dedicated resource properly trained and certified. The ERT Leader shall carry overall responsibility for REON emergency response execution. Key responsibilities shall include:

- Providing leadership and direction in the event of an emergency.
- Ensuring that emergency response planning, preparedness and execution is consistent with the CUSTOMER's procedures.
- Ensuring that appropriate emergency response teams are defined and prepared for the various emergency response scenarios identified in this plan.
- Notifying in due time to CUSTOMER Project Manager and competent authorities, if needed or foreseen by law, of any emergency incident. This is a mandatory requirement for all emergencies. Notification of an emergency incident should be made via radio, telephone or messenger to CUSTOMER Operations control room as soon as practicable upon receiving advice of same.
- Following initial notification, liaison with CUSTOMER Project Manager during the execution of any emergency response.
- Mobilizing additional resources, third party assistance etc.

Site Engineer HSE

Reporting to the ERT Leader, the Site Engineer HSE and/or his substitute is responsible for ensuring at site that provisions are in place for emergency response, including:

- Muster points.
- Arrangements for conducting head counts (i.e. T-cards or other means).
- Identification and Mobilization of the Fire Team.
- Setting up drills and exercises, recorded and monitored on the adequate register.
- Procurement of firefighting equipment.

In the event of any emergency the Site Engineer HSE or a member of the HSE team shall take the following actions:

- Shall attend the site of the incident, assess the situation and issue direction to the concerned parties and to the Fire Team.
- Ensure that messages have been communicated to The Emergency Response Team Leader.
- Evaluate the scale of the incident and decide whether additional resources are required to adequately deal with it.
- Liaise with site supervision for withdrawing any permits.



Application for Generation Licence 10 MW Off-grid PV Plant

- Liaise with site supervision for the mobilization of any plant and equipment necessary for dealing with the emergency.
- Limit access to the area with barriers or other means to prevent unauthorized access.
- Co-ordinate the reinstatement measures following stabilization of incident.
- Prepare a full report.

Fire Team

- The fire team will be selected and trained appropriately.
- The Site Engineer HSE shall appoint a Fire Team Leader (and his substitute) who will direct personnel under his control.
- The fire team leader will have had training and preferably previous experience in emergency response actions.
- All the members of the fire team shall report to the Fire Team Leader.
- Appropriate training shall be provided to members of the fire team.
- An electrician or instrument specialist will be included in the fire team. His responsibility the electrical isolation of areas as necessary.

Firefighting appliances shall be maintained in accordance with their specifications. Sufficient redundancy shall be incorporated into the facilities to allow for periodic unavailability during maintenance. A designated member of the HSE Team shall regularly confirm that fire extinguisher and other appliances are recharged and maintained as appropriate.

GENERAL CONSIDERATIONS

Emergency response drills shall be conducted at least monthly for each principal area i.e. camp and the work site, the observations and debrief notes shall be recorded. The Site Engineer HSE shall analyze the findings and identify any remedial actions required.

The emergency procedure shall be updated from time to time to reflect observations made.

- Training shall be conducted on regular basis for emergency response teams.
- The location of emergency facilities e.g. firefighting appliances shall be clearly identified on plans displayed at conspicuous locations.

Raising the alarm and plan activation

Activate the alarm and notify the ERT Leader.

Provide the following details:

- Location of the Incident.
- Natures of incident e.g. fire, number of injuries, etc.
- If it is a fire, state type oil, gas, electric or other and state wind direction and strength.
- Identify yourself giving your name and telephone number or radio channel.



Alarm and Communication

Communication is a critical factor in handling an emergency. To control the situation by the earliest possible action, any employee must be able to act and raise an emergency alarm.

The assembly points shall be clearly indicated.

- On hearing an alarm all personnel shall abandon the work place.
- All personnel shall muster at the assembly point as per the plan. The designated members of the HSE team shall provide guidance and assistance for mustering at the correct assembly point.
- The subcontractor's HSE team members shall take directions from the Site HSE co-ordinator, but they shall anyway have been previously inducted about emergency response procedures.

Emergency Contacts List

List of all emergency services contacts will be displayed at site, including contact numbers of ERT and key persons (Project Manager REON, subcontractor Manager, Site HSE Engineer)

Incident response

Emergency situations occurring at the work site have the potential to cause serious injury, loss of life and property damage.

The following is a list of incidents that may be classed as emergencies for this procedure:

- Scaffold collapse
- Fire involving fuels, gases and other materials
- Medical emergency / Serious Injury
- Failure of lifting equipment
- Collapse of an excavation involving personnel
- Vehicle accidents
- Collapse of structures/steelwork
- Snake Bite

In an emergency, every supervisor shall ensure the following:

- All work is stopped at once.
- All men are evacuated to a pre-determined assembly point in an orderly manner.
- A first aid clinic with a pre-stated minimum inventory shall be foreseen at Temporary Camp Facility with the presence of a doctor/nurse in dependence of the number of the people at the site.
- The doctor/nurse on site arrange patient or injured person for the transfer to hospital.
- Ensure the presence of ambulance 24 hours with driver.
- Anti-Snake Venom must be present at site. The doctor is the sole responsible for its use.
- A roll call is taken, and every man is accounted for, awaiting further instructions.
- Keep the zone affected by the emergency clear and remove any vehicles that could cause a restriction to the emergency team.



Evacuation

Activate the emergency alarm to evacuate the area safely and ensure that unnecessary personnel leave the site by a safe route. The ERP Leader is responsible to advise security to open the Facility main gate for emergency vehicles.

11. SYSTEM STUDIES, LOAD FLOW, SHORT CIRCUIT, STABILITY, RELIABILITY

The PV plant is composed of 30320 modules, divided in 20 modules per string. The number of strings is 1516. The inverters selected for this project, are string distributed type. Considering that each inverter can accept 18 or 19 strings, the number of the inverter is 72.

The system is provided with 4 Power Station, each composed of 4 LV switchboard that collect the energy directly from the distributed inverters, and 4 transformers for stepping up the voltage at the delivery value.

The MV switchboard is equipped with four incomers from the transformers and it will be sized to support the nominal current of the PV plant. About the short circuit current withstand, the design will consider the contribution of the 2 running GTG at gas plant side and the largest electrical motors.

The connection of the solar system to the Bhit gas plant is by a single line.

A preliminary electrical calculation study was performed in order to investigate the feasibility of the connection of a new photovoltaic power plant to the Gas Field Electrical Network. The report is available and it contains the main simulation results obtained by Load Flow, Short Circuit calculations and Transient Stability analyses. The used software is Digsilent.

The main target of this study was the assessment of the Gas Turbine Generators reaction in case of fast transients such as a sudden loss of PV production, and the possible necessity to install some dumper system like batteries. The study proves that the system is stable at the operation condition considered during the design phase.

12. PLANT CARACTERISTICS

Generation Voltage:

Solar Power plant produces AC power at Low voltage levels of 400V. Low voltage level will then step up through power transformers to the existing Medium Voltage levels i.e. 11KV that is the Electrical Energy distribution voltage level of Bhit gas plant.



Power Factor & Frequency:

The Solar power plant is using solar grid connected string Inverters of 110KW each to convert DC power of solar panels to Alternating Power. The nominal power factor is > 0.995 with a range set from 0 to 1 leading /lagging, making it suitable for absorbing or delivering reactive power. Nominal Frequency of generation is 50Hz with a maximum output range of 45-55Hz.

Automatic Generation Control & Ramp Rate:

Automation would be added into the solar system to ensure safe synchronization with the existing electrical system of Bhit and the running Gas Turbine Generators. The controller will set in order to inject the energy produced by the Solar Plant as priority. A dedicated study proved that the sudden shut down of the PV plant can be compensated by the fast reaction of the Gas Turbine Generator.

13. CONTROL, METERING, INSTRUMENTATION AND PROTECTION

Metering of solar units will be performed at the 11KV delivery point taking into account the possible connecting line losses.

Solar power plant is designed to have the following protections for the line and load side:

- Over and Under voltage protections
- Short Circuit protections
- Earth Fault detection
- Over current protection

14. TRAINING AND DEVELOPMENT

ORIENTATION, SITE HSE INDUCTION AND OTHER TRAINING ACTIVITIES

Initial HSE Orientation Program

Each and every person, including subcontractors or people occasionally entering the site will undergo a HSE orientation program. On completion of orientation he will be permitted to enter the site.

REON HSE Site Engineer as per organization chart, with the help of CUSTOMER HSE personnel shall perform the initial orientation based on but not limited to the following:

- Inducting about the HSE procedures in compliance with the National laws and Customer's standards.
- General HSE rules and regulations for working on site including use of Personal Protective Equipment, incident reporting, getting first aid, emergency response (alarm system, escape route, assembly point), HSE inspection, housekeeping, etc.
- Hazards at construction site based upon site risk assessment profile and mitigation measures



• Environmental hazards and mitigation measures.

Note:

This Initial HSE Orientation would also be given to all the workers of the sub-contractors working at site. HSE Site Engineer will keep a record of staff having completed induction.

Specific Induction for Workers (On Job)

Subsequent to the general induction first line supervisor shall conduct a specific orientation for new staff, which would comprise:

- Introduction of the workers on the nature of their jobs.
- Explaining to the workers the work environment of a particular location and specific job hazards depending on the site risk assessment.
- Basic firefighting training.

Permit to Work System Course

- It is mandatory for all work permit recipient and signatories to attend a permit to work course held by CUSTOMER. Work permits will often be required prior to commencement of work.
- Each work, on the base of the job description will require a set of mandatory PPE regulated by procedure; they will be given to workforce and recorder by an on-purpose chart.
- Refresh courses will be scheduled, arranged and recorded by REON HSE function in agreement with CUSTOMER.

Tool Box Talk by Line Supervisors

All supervisors will be trained to deliver daily tool box talk in their respective areas.

- Subjects for "tool box talks" would be selected to reflect the specific hazards of a particular site, feedback from first line supervisors/ HSE inspectors and observations / inputs from any other employee.
- Incidents, which may occur in the site/works, shall also be discussed in "tool box talks".
- Records of "tool box talks" shall be maintained by site HSE supervisor.

Employees Training Program Management

- The employees training program management will be conducted during the project to ensure that all employees are trained and will be object of monitoring.
- Site HSE Engineer will conduct HSE trainings for all staff based on training plan.



Application for Generation Licence 10 MW Off-grid PV Plant

Task Specific Training Courses (Whenever Required)

In addition to the above, specific training courses shall also be provided for staff and workers, if needed. Subjects for the training courses will be identified in the training plan as advised by the CUSTOMER.

15. EFFICIENCY PARAMENTERS

PV power plant efficiency can be judged per its performance ratio, expressed as a percentage. This ratio compares a plant's actual energy production to its theoretical energy-generating potential and describes how efficient a PV power plant is in converting sunlight incident on the PV array into AC energy delivered to the utility grid. AS per IEC definition, Performance Ratio defines as:

Performance Ratio =
$$\frac{Z1}{Z2} \div \frac{Z3}{Z4}$$

Where

- Z1 = Accumulated electricity generated during testing period (KWh)
- Z2 = Total system installed capacity (KWs)
- Z3 = Accumulated irradiation during testing period (Wh/m2)
- Z4 = Intensity of irradiance under STC condition = 1,000W/m2

Energy Generation:

| S. No. | Efficiency Parameters | |
|--------|---------------------------------|-------------|
| 1 | Performance Ratio of the System | 79.20% |
| 2 | Capacity Utilization Factor | 22.3% |
| 3 | Energy Generation Units | 176.627 GWh |

Application for Generation Licence 10 MW Off-grid PV Plant



Loss diagram over the whole year