

**Gold Standard for the Global Goals**  
**Key Project Information & Project Design Document (PDD)**



**Version 1.1 – August 2017**

## KEY PROJECT INFORMATION

Title of Project:	Al-Dibdibah Solar Project
Brief description of Project:	The project activity is a 1500 MW solar power project, promoted by Kuwait National Petroleum Company. The purpose of the project activity is to generate clean electricity with utilization of solar energy.
Expected Implementation Date:	NA
Expected duration of Project:	25 years
Project Developer:	Kuwait National Petroleum Company
Project Representative:	Infinite Solutions
Project Participants and any communities involved:	Kuwait National Petroleum Company
Version of PDD:	01
Date of Version:	14/01/2020
Host Country / Location:	Kuwait
Certification Pathway (Project Certification/Impact Statements & Products)	Impact statements & products
Activity Requirements applied: (mark GS4GG if none relevant)	Renewable Energy activity requirement
Methodologies applied:	Grid-connected electricity generation from renewable sources - Version 20.0
Product Requirements applied:	GHG Emissions Reductions & Sequestration Product Requirements
Regular/Retroactive:	Retroactive
SDG Impacts:	<ul style="list-style-type: none"> <li>1 - SDG 7 Affordable and Clean Energy</li> <li>2 - SDG 8 Decent Work and Economic Growth</li> <li>3 - SDG 13 Climate Action</li> </ul>
Estimated amount of SDG Impact Certified	<ul style="list-style-type: none"> <li>1 - SDG 7- 2,628,000 MWh/year</li> <li>2- SDG 8 - <ul style="list-style-type: none"> <li>• Number (employees): 50 persons</li> <li>• Number(Trainings): Minimum 1 training.</li> <li>• The income to all the unskilled workers are made on day to day basis in line with minimum wage requirements.</li> </ul> </li> <li>3- SDG 13- 1,971,000 tCO2e per annum</li> </ul>

## SECTION A. Description of project

### A.1. Purpose and general description of project

The main purpose of the project activity is to generate electrical energy through sustainable means using Solar power resources, the generated green electricity will contribute to climate change mitigation efforts. This project activity is a large-scale Solar project. Kuwait National Petroleum Company are the project investor for this project activity. The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 1,971,000 tCO<sub>2</sub>e per annum, thereon displacing 2,628,000 MWh/year amount of electricity from the generation-mix of power plants connected to the Kuwaiti National grid, which is mainly dominated by thermal/ fossil fuel-based power plant.

The KNPC has proposed Al-Dibdibah Solar Project as part of phase 2 development of SREP. This Solar Project will be the largest in the world with five photovoltaic solar generation units (SGU), each with a capacity of 300 MW capacity. Each of the SGU will be spread over 6.4 km<sup>2</sup> area.

The project activity is the installation of a new grid-connected renewable power plant/unit and this is not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs.

#### **Scenario existing prior to the implementation of the project activity**

As the project activity is the installation of a new grid-connected renewable power plant/unit. The scenario existing prior to the implementation of project activity is Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system" (Version 07.0, EB 100 Annex 4).

#### **Baseline Scenario**

As per the applicable methodology, a Greenfield power plant is defined as "a new renewable energy power plant that is constructed and operated at a site where no renewable energy power plant was operated prior to the implementation of the project activity".

As the project activity falls under the definition of a Greenfield power plant, the baseline scenario as per applied methodology is the following:

The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

Hence the baseline scenario and Scenario existing prior to the implementation of the project activity are both same.

#### **Sustainable Development**

- **Social well being**

The project activity provided / provides job opportunity to local people during erection, commissioning and maintenance of the Solar power project. Visits by skilled, technical and industrialist has increased due to installation /site visit/operation and maintenance work related to Solar Panels at plant site. This directly and indirectly positively effects the economy of nearby populace.

As per the ESIA assessment approx. 500 personnel shall be employed during construction phase while it is envisaged that during the operational phase approx.. 50 people shall be employed.

- **Environmental well being**

Solar power is one of the cleanest renewable energy powers and does not involve any fossil fuel. There are no GHG emissions. The impact on land, water, air and soil is negligible. Thus, the project activity contributes to environmental well-being without causing any negative impact on the surrounding environment.

- **Economic well being**

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The project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.

- **Technological well being**

The project activity is step forward in harnessing the untapped solar potential and further diffusion of the solar technology in the region. The project activity leads to the promotion and demonstrates the success of solar projects in the region which further motivate more investors to invest in solar power projects. Hence, the project activity leads to technological well-being.

## A.2. Eligibility of the project under Gold Standard

The project activity meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document as described below.

- The project applies methodology ACM0002, which is an approved methodology under Gold Standard.
- The project type is solar which is an eligible project type as it is in accordance with 1.1.1 a) and 1.1.1 b) of the Eligible Project Types & Scope under Renewable Energy Activity Requirements.
- The project activity results in displacement of electricity from thermal power stations while contributing to sustainable development of Kuwait. Hence, the project contributes to the Gold Standard Vision and Mission.
- Solar projects are an approved project type and do not require further approval from Gold Standard.
- This project activity is not associated with geo-engineering or energy generated from fossil fuel or nuclear, fossil fuel switch, nor does it enhances or prolongs such energy generation.

### General Eligibility Criteria under Renewable Energy Activity Requirements

<i>Project Type</i>	: As discussed above, the project type is eligible.
<i>Project Location</i>	: The project is located in Kuwait.
<i>Project scale</i>	: The project activity is a 1500 MW solar project and thus qualifies under large scale projects.

## A.3. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

The project participants Kuwait National Petroleum Company shall be the legal owners of the project or they might form a separate SPV at a later stage. However, they have the legal rights for the credits that shall be generated by this project activity.

## A.4. Location of project

### A.4.1. Host Country

Kuwait

### A.4.2. Region/State/Province etc.

West Kuwait

### A.4.3. City/Town/Community etc.

The proposed solar plant will be established in west Kuwait. The proposed site is located at about 10.1 km north from Route no. 70 (Sabah Al-Salem Al-Sabah road) and 89.7 km west from Kuwait city.

## A.4.4. Physical/Geographical location

Al-Dibdibah Solar Project is part of phase 2 development of SREP (The Shagaya Renewable Energy Park). The location map is given below:

The proposed solar plant will be established in west Kuwait. The proposed site is located at about 10.1 km north from Route no. 70 (Sabah Al-Salem Al-Sabah road) and 89.7 km west from Kuwait City. The coordinates of the Al-Dibdibah Solar Project are approximately 29°13'46.9"N and 47°03'28.5"E.



## A.5. Technologies and/or measures

The project activity involves installation of 1500 MW grid connected solar photovoltaic power plant. The PV system will mainly consists of PV modules, module mounting structures, inverters, regulators, monitoring devices etc.

The project activity is expected to operate at a plant load factor of 20% exporting 2,628,000 MWh of electrical energy to the Regional grid of Kuwait, throughout its entire life span of 25 years. This will result in average annual reduction of 1,971,000 tCO<sub>2</sub> per annum from the project activity. The project activity does not involve any technology transfer.

### Baseline Scenario

As the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following as per applied methodology: *“Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.*

Hence, pre-project scenario and baseline scenario are the same.

### Purpose of the Project

The purpose of the project activity is to generate electrical power using solar energy, there by displacing non-renewable fossil resources resulting to sustainable, economic and environmental development. In the absence of the project activity equivalent amount of power generation would have taken place through fossil fuel dominated power generating stations. Thus the renewable energy generation from project activity will result in reduction of the greenhouse gas emissions.

Positive contribution of the project to the following Sustainable Development Goals:

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1. **SDG13: Climate Action** : The project would lead to reduction of approx. 1,971,000 tCO<sub>2</sub> per annum due to implementation of project activity.
2. **SDG 7: Affordable and Clean Energy** : The project is expected to generate 2,628,000 MWh of clean energy per annum
3. **SDG 8: Decent Work and Economic Growth** : The project is expected to provide direct employment to around 50 persons during operational phase and approx. 500 persons during construction phase. The project leads to at least 1 Training which is conducted for the O&M staff of the PP.

## A.6. Scale of the project

Renewable energy project activities with a maximum output capacity of 15 megawatts (or an appropriate equivalent) are small scale project activity and project activities of more than 15 MW are considered as large-scale CDM project activity.

As the project activity is of 1500 MW capacity, hence clearly it is Large Scale project.

## A.7. Funding sources of project

Private funding and funding from bank. The PP hereby confirms that there is no public funding from Annex 1 countries and no diversion of Official Development Assistance (ODA) involved in the project activity.

## A.8. Assessment that project complies with 'gender sensitive' requirements

**Question 1:** Does the project reflect the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy? Explain how.

**Response:** As per Gold Standard Gender Policy, para 13(i) "*Foundational gender-sensitive requirement - This strengthens Gold Standard's 'do no harm' approach and addresses safeguards to prevent or mitigate adverse impacts on women or men and girls and boys. Such action is mandatory for all projects seeking Gold Standard certification and includes compliance with the gender 'do no harm' safeguards, gender gap analysis and gender sensitive stakeholder consultations.*" The project being a renewable energy project is not gender sensitive project. The project does not adversely impact women or men.

**Question 2:** Does the project align with existing country policies, strategies and best practices? Explain how.

**Response:** Kuwait has accessed to "Convention on the Elimination of All Forms of Discrimination against Women<sup>1</sup>".

**Question 3:** Does the project address the questions raised in the Gold Standard Safeguarding Principles & Requirements document? Explain how.

**Response:** The Project shall complete the following gender assessment questions below:

1. *Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits?* No, the Project being a solar project does not reduce access to or control of resources for women.
2. *Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?* No, there is no impact on any communities as there are no habitations in the region.
3. *Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?* No.
4. *Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?*  
The project land does not have any habitation and is waste land thus it does not have any impact.
5. *Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities?*

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1 <http://hrlibrary.umn.edu/research/ratification-kuwait.html>

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No, on the contrary the project leads to increased availability of electricity in the regional grid thereby uplifting the living standards.

6. *Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?* No, since the project is a renewable electricity generation project, thus it will not have discriminated against women.
7. *Would the Project potentially limit women’s ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?* No, in fact, the project leads to improved electricity in the regional grid thereby leading to less usage of fossil fuel in the country.
8. *Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?* No, in fact, due to improved electricity availability of electricity with a clean source.

**Question 4:** Does the project apply the Gold Standard Stakeholder Consultation & Engagement Procedure Requirements? Explain how.

**Response:** Since the project is applying retroactively for GS registration, a live Stakeholder Feedback round shall be carried out at a later stage.

## SECTION B. Application of selected approved Gold Standard methodology

### B.1. Reference of approved methodology

- Title** : Grid-connected electricity generation from renewable sources.
- References** : Approved Large Scale Consolidated Methodology: ACM0002 “Grid-connected electricity generation from renewable sources” Version 20.0  
<https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>
- Tools:** Tool for the demonstration and assessment of additionality 7.0  
<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.pdf>  
 Tool to calculate the emission factor for an electricity system 7.0  
<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

### B.2. Applicability of methodology

As per ACM0002 (Version 20.0, EB 105 Annex 3), “This methodology applies to project activities that include retrofitting, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant or construction and operation of a Greenfield power plant”. The project activity meets the applicability conditions of the approved consolidated baseline and monitoring methodology ACM0002, Version 20.0, Sectoral Scope 1 for Greenfield projects as described below:

Applicability	Project activity vis-à-vis applicability Conditions
This methodology is applicable to grid-connected renewable energy power generation project activities that: <ol style="list-style-type: none"> <li>a) Install a Greenfield power plant;</li> <li>b) Involve a capacity addition to (an) existing plant(s);</li> <li>c) Involve a retrofit of (an) existing operating plants/units;</li> <li>d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or</li> <li>e) (d) Involve a replacement of (an) existing plant(s)/unit(s).</li> </ol>	The project activity is installation of a new grid connected solar power plant/ unit at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant) and hence this criterion is applicable.
The methodology is applicable under the following conditions:	The proposed project activity is an installation of a new grid connected



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<p>(a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;</p> <p>(b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.</p>	<p>solar power plant/ unit and hence criteria under point (a) is met.</p> <p>The project does not involve any capacity additions, retrofits or replacements and therefore this criteria under point (b) is not applicable.</p>
<p>In case of hydro power plants, one of the following conditions shall apply:</p> <p>(a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or</p> <p>(b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (3), is greater than 4 W/m<sup>2</sup>; or</p> <p>(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m<sup>2</sup>; or</p> <p>(d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m<sup>2</sup>, all of the following conditions shall apply:</p> <p>(i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m<sup>2</sup>;</p> <p>(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;</p> <p>(iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m<sup>2</sup> shall be:</p> <p>a. Lower than or equal to 15 MW; and</p> <p>b. Less than 10 per cent of the total installed capacity of integrated hydro power project.</p>	<p>The proposed project activity is an installation of a new grid connected solar power plant/ unit and not Hydro power plant, therefore this criteria is not applicable for this project activity.</p>
<p>In the case of integrated hydro power projects, project proponent shall:</p> <ul style="list-style-type: none"> <li>• Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or</li> <li>• Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.</li> </ul>	<p>The proposed project activity is an installation of a new grid connected solar power plant/ unit and not Hydro power plant, therefore this criteria is not applicable for this project activity.</p>
<p>The methodology is not applicable to:</p> <p>(a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in</p>	<p>The project activity is installation of a new grid connected solar power project/ unit and does not involve</p>



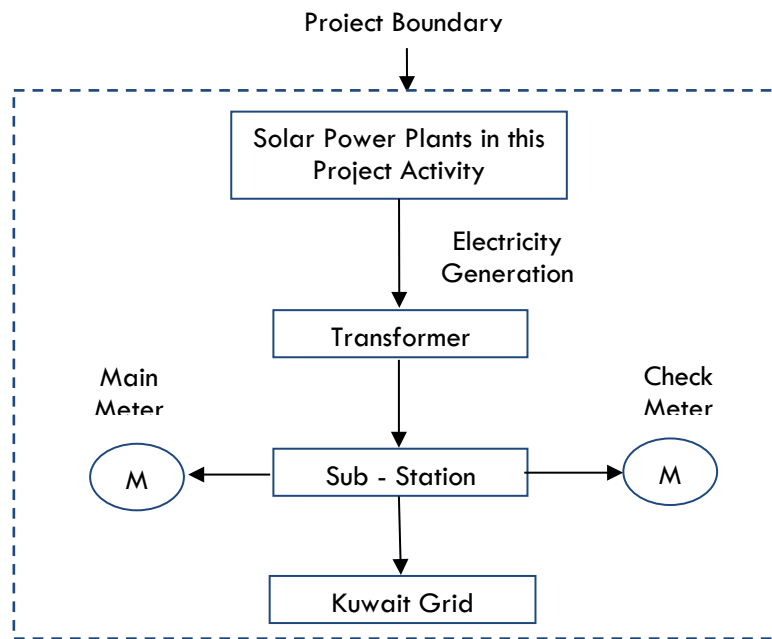
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<p>this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.</p>	<p>switching from fossil fuel to renewable energy, therefore criterion described in point (a) is not relevant to the project activity.</p> <p>This is a solar power plant/ unit and not a biomass fired plant, therefore criterion described in point (b) is not applicable to the project activity.</p>
<p>In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.</p>	<p>The project activity is a new grid connected solar power plant/ unit and not a retrofits, replacement or capacity additions and therefore this criterion is not applicable to the project activity.</p>
<p><b>Applicability conditions of “Tool to calculate the emission factor for an electricity system”, - Version 7.0</b></p>	
<p>This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).</p>	<p>This condition is applicable. OM, BM and CM are estimated using the tool under section B.6.3 for calculating baseline emissions.</p>
<p>Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in “Appendix 2: be met. Namely, the total capacity of off-grid Procedures related to off-grid power generation” should power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.</p>	<p>Since the project activity is grid connected, this condition is applicable and the emission factor has been calculated accordingly.</p>
<p>In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.</p>	<p>The project activity is located in Kuwait, a non-Annex I country. Therefore, this criterion is not applicable for the project activity.</p>
<p>Under this tool, the value applied to the CO2 emission factor of biofuels is zero.</p>	<p>The project activity is a grid connected solar power project/ unit and does not involve emission from biofuels. Therefore, this criterion is not applicable.</p>

## B.3. Project boundary

Project boundary has ascertained using ACM0002 (Version 20.0, EB 105, Annex 3) - “The spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the CDM project power plant is connected to.”

Hence the project boundary includes the Solar Project activity, sub-station, grid and all power plants connected to grid. The proposed project activity will evacuate power to the Kuwaiti grid.



	Source	GHGs	Included?	Justification/Explanation
Baseline scenario	Grid connected electricity generation	CO <sub>2</sub>	Yes	Main emission source
		CH <sub>4</sub>	No	Minor emission source
		N <sub>2</sub> O	No	Minor emission source
Project scenario	Greenfield Solar Power Project Activity	CO <sub>2</sub>	No	No CO <sub>2</sub> emissions are emitted from the project activity
		CH <sub>4</sub>	No	No, Project Activity does not emit CH <sub>4</sub>
		N <sub>2</sub> O	No	No, Project Activity does not emit N <sub>2</sub> O

#### B.4. Establishment and description of baseline scenario

As per the approved consolidated Methodology ACM0002 (Version 20.0, EB 105, Annex 3) “If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in “ Tool to calculate the emission factor for an electricity system” version 7.0.

The project activity involves setting up of Solar panels to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Kuwait National grid, which is fed mainly by fossil fuel fired plants.

The combined margin ( $EF_{grid,CM,y}$ ) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM), in accordance with the Tool to calculate the emission factor for an electricity system - Version 07 Calculations for this combined margin must be based on data from an official source (where available) and made publicly available. In Kuwait, the MEW (Ministry of Energy and Water), provides this data, and accordingly the same has been used.

The combined margin of the Kuwait grid used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
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EF <sub>grid,CM,y</sub>	0.7500 tCO <sub>2</sub> /MWh	Combined margin CO <sub>2</sub> emission factor for the project electricity system in year y	Calculated <sup>2</sup> as the weighted average of the operating margin (0.75) & build margin (0.25) values, as determined based on the data published by MEW.
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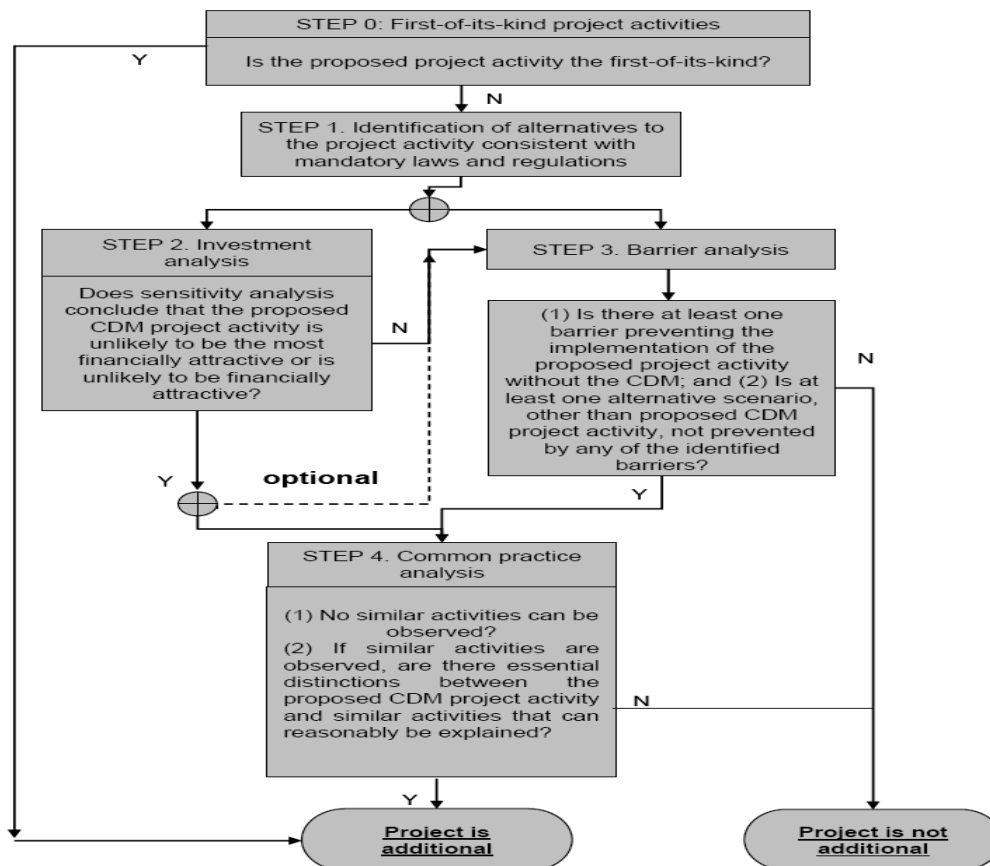
## B.5. Demonstration of additionality

The table below is only applicable if the proposed project is deemed additional, as defined by the applied approved methodology or activity requirement or product requirement.

Specify the methodology or activity requirement or product requirement that establish deemed additionality for the proposed project (including the version number and the specific paragraph, if applicable).	Not Applicable
Describe how the proposed project meets the criteria for deemed additionality.	Not Applicable

The proposed project generates power using solar energy which is a renewable, zero emission source of energy. Baseline considerations for the project are based on approved consolidated baseline methodology ACM0002 (Version 20.0, EB 105, Annex 3).

Thus the project follows section 5.3.2 of the applied methodology which requires the project proponent to determine the additionality based on “Tool for the demonstration and assessment of additionality”, Version 7.0. The step-wise approach to establish additionality of the project activity has been followed, details of which are provided in the following paragraphs:



<sup>2</sup> <https://www.mew.gov.kw/en/about/statistics/>

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## Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

The proposed project activity is not the first of its kind. Hence, this step is not applicable.

## Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

As per the applied methodology ACM0002 version 20.0; Para 41, if the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid connected power plant and by the addition of new generation sources.

As the baseline scenario is prescribed by applied methodology, hence no further analysis is carried out to identify alternatives.

## Step 2: Investment Analysis

### Sub-step 2a: Determine appropriate analysis method

As per "Tool for the demonstration and assessment of additionality" (version 07.0.0), for financial analysis of the project, the following three options are available:

- Option I: Simple Cost Analysis
- Option II: Investment Comparison Analysis
- Option III: Benchmark Analysis

The project will generate revenues from sale of electricity, therefore Option I is not applicable. Option II also does not apply since there is no comparable investment alternative available to the project participant. The most appropriate financial analysis method is therefore option III: the benchmark analysis, where the returns on investment in the project activity are compared to benchmark returns that are available to any investors in the country.

### Sub-step 2b: Option III. Apply benchmark analysis

Project Participants have considered Post-Tax Equity IRR for investment analysis at the time of decision-making. As Project Participants is only interested in the returns project is generating on the portion of investment costs, which is financed by them in the form of equity.

As per Para 16 of EB92, Annex 5 states that Required/expected returns on equity are appropriate benchmarks for an equity IRR. Therefore, the Expected return on equity is considered appropriate benchmark.

Accordingly, the post-tax Equity IRR has been considered as the relevant financial indicator for Investment Analysis.

### **Default Value Benchmark:**

As per para 19 of EB105, Annex 6 the cost of equity is determined by selecting the values provided in the Appendix, i.e. Default values for cost of equity (expected return on equity) is presented below:

Appendix A in EB105, Annex 6 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in Kuwait = 8.29%

### **The Required return on equity (benchmark) was computed in the following manner:**

Nominal Benchmark =  $\{(1 + \text{Real Benchmark}) * (1 + \text{Inflation rate})\} - 1$

Where:

- Default value for Real Benchmark = 8.29% (as per Appendix of EB105, Annex 6)
- Inflation Rate forecast for by IMR (International Monetary Fund)

As a conservative approach, benchmark of 11.00% has been selected for this project activity.

## Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III):

The project is currently at feasibility assessment stage. The EIA assessment has been conducted and financial closure is awaited.

## Sub-step 2d: Sensitivity Analysis

Addressing Guidance 27 & 28 of EB 105, Annex 06, following factors has been subjected to sensitivity analysis:

1. PLF
2. O&M Cost
3. Project Cost
4. Tariff

The rationale of sensitivity is, "The ultimate objective of the sensitivity analysis is to determine the likelihood of the occurrence of a scenario other than the scenario presented, in order to provide a cross-check on the suitability of the assumptions used in the development of the investment analysis."

The results of sensitivity analysis shall be described to demonstrate that even with a variation of +10% & -10% in project cost, O&M cost, PLF. Equity IRR is significantly lower than the benchmark.

### Outcome of Step 2:

This substantiates that the investment is not financially attractive (Equity IRR for the project activity is less than the Benchmark Equity IRR) for any of the investor. Thus it can be easily concluded that project activity is additional & is not business as usual scenario.

### Step 3: Barrier analysis

Barrier analysis has not been used.

### Step 4: Common practice analysis

Stepwise approach for common practice analysis has been carried out as per Methodological tool "Common Practice", version 03.1 EB84, Annex 7:

**Step (1):** Calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.

Range	Capacity	Unit
+50%	2750	MW
Capacity of the proposed project activity	1500	MW
-50%	750	MW

**Step (2):** identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

- (a) The projects are located in the applicable geographical area;
- (b) The projects apply the same measure as the proposed project activity;
- (c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
- (d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
- (e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
- (f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

Identification of the similar projects (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

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- a) As the project is located in Kuwait, therefore, projects in the geographical area of country has been chosen for analysis.
- b) The project activity is a green-field solar power project and uses measure (b) “Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies”.  
Therefore, projects applying same measure (b) are candidates for similar projects.
- c) The energy source used by the project activity is solar. Hence, only solar energy projects have been considered for analysis.
- d) The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects.
- e) The capacity range of the projects is within the applicable capacity range from 750 MW to 2750 MW.
- f) The start date of the project activity.

Numbers of Similar projects identified, which fulfil above-mentioned conditioned are

$$N_{\text{solar}} = 0$$

**Step (3):** within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number  $N_{\text{all}}$ .

CDM project activities, which have got registered or are under validation have been excluded in this step. The list of the power plants identified is provided to the DOE. After excluding the registered and under validation projects the total number of projects,

$$N_{\text{all}} = 0$$

**Step (4):** within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number  $N_{\text{diff}}$ .

As per the tool on Common Practice, the project activities have been separated from the different technologies on the basis of Investment climate on the date of the investment decision.

Hence, projects where this condition is satisfied projects are counted for calculating  $N_{\text{diff}}$  projects.

$$N_{\text{diff}} = 0$$

**Step (5):** calculate factor  $F = 1 - N_{\text{diff}}/N_{\text{all}}$  representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

Calculate  $F = 1 - N_{\text{diff}}/N_{\text{all}}$   
 $F = 1 - (0/0) = 0$

## Outcome of Step 4:

As,

- i.  $F = 1$ ; is not less than 0.2
- ii.  $N_{\text{all}} - N_{\text{diff}} = 0$ ; is less than 3

**As the project activity does not satisfy condition (i) and (ii) both, the proposed project activity is not a “common practice” within a sector in the applicable geographical area.**

The above discussions show that solar power development is not a common practice and the project activity is not financially attractive; hence the project activity is additional.

## Demonstration of Parallel and continuing actions:

Project Timelines	Date
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Prior Notification Sent	1 <sup>st</sup> November 2018
ESIA	April 2019
Purchase order	Expected in 2020

## B.6. Sustainable Development Goals (SDG) outcomes

### B.6.1. Relevant target for each of the three SDGs

Item	Goals and Targets	Indicators
<b>SDG 7: Affordable and Clean Energy</b>	<b>7.2:</b> By 2030, increase substantially the share of renewable energy in the global energy mix	<b>7.2.1:</b> Renewable energy share in the total final energy consumption
	<b>Target:</b> 2,628,000 MWh per annum	
<b>SDG 8: Decent Work and Economic Growth</b>	<b>8.6:</b> By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.	<b>8.6.1:</b> Average hourly earnings of female and male employees, by occupation, age and persons with disabilities.
	<b>Target:</b> <ul style="list-style-type: none"> <li>• Training: 1 nos annually</li> <li>• Employment of 50 staff during operational phase</li> </ul>	
<b>SDG 13: Climate Action</b>	<b>13.2:</b> Integrate climate change measures into national policies, strategies and planning	<b>13.2.1:</b> Number of countries that have communicated establishment or operationalization of an integrated policy/ strategy/ plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)
	<b>Target:</b> 1,971,000 tCO <sub>2</sub> per annum	

### B.6.2. Explanation of methodological choices/approaches for estimating the SDG outcome

The company shall conduct regular surveys during construction as well as O&M phases in the villages near project locations to check the requirement of facilities by the villages. Based on the surveys, PP shall identify and works on several scope(s) of developmental activities such as health camps, distribution of furniture & sports kits in schools, toilet requirements in government schools, drinking water requirements etc. For this project activity, following SDGs are expected to be impacted:

#### **SDG 7 : Affordable and Clean Energy**

The baseline for the project is no project, thus leading to generation in the relevant grid which is dominated by fossil fuel. The clean energy generated by the project is calculated based on the amount of electricity generated by the project per annum. The project is expected to generate 2,628,000 MWh of clean energy per annum.

#### **SDG 8: Decent Work and Economic Growth**

The project leads to Trainings & workshops which are conducted for the O&M staff of the PP. It is expected that a minimum of 1 training (either of the above) would be carried out annually.



The project will also provide employment to approximately 50 persons including O&M staff, management, outsourced jobs as well as security guards during the O&M phase.

## **SDG13 : Climate Action :**

The project leads to mitigation of 1,971,000 tCO<sub>2</sub> per annum.

As per the approved consolidated Methodology ACM0002 (Version 20.0, EB 105, Annex 03), Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

$ER_y$  = Emission reductions in year  $y$  (t CO<sub>2</sub>e/yr)

$BE_y$  = Baseline emissions in year  $y$  (t CO<sub>2</sub>/yr)

$PE_y$  = Project emissions in year  $y$  (t CO<sub>2</sub>e/yr)

### Baseline Emissions:

Baseline Emissions for the amount of electricity supplied by project activity,  $BE_y$  is calculated as

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

Where:

$BE_y$  = Baseline emissions in year  $y$  (t CO<sub>2</sub>/yr)

$EG_{PJ,y}$  = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year  $y$  (MWh/yr)

$EF_{grid,CM,y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year  $y$  calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO<sub>2</sub>/MWh).

Calculation of  $EG_{PJ,y}$

The calculation of  $EG_{PJ,y}$  is different for

- Greenfield plants,
- Retrofits and replacements, and
- Capacity additions

The project activity is the installation of solar projects and it is a green field project. So the formula in option (a) i.e., greenfield plants is used to calculate the value of  $EG_{PJ,y}$ . In accordance with para 44 of the applied methodology:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$  = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year  $y$  (MWh/yr)

$EG_{facility,y}$  = Quantity of net electricity generation supplied by the project plant/unit to the grid in year  $y$  (MWh/yr)

The proposed project activity falls under Kuwaiti grid, which constitutes of fossil fuels. Emission reductions due to the project activity are considered to be equivalent to the baseline emissions, since the solar project would not lead to any project emission and leakage emissions. Emission reductions are related to the electricity exported by the project and the emission coefficient of the grid system.

Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin and build margin factors according to the procedures prescribed in the latest tool for calculating the emission factor for an electricity system. The steps of calculation are as follows:

### **Step 1: Identify the relevant electricity systems**

As described in tool "For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems". It also states that "If the DNA of the host country

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has published a delineation of the project electricity system and connected electricity systems, these delineations should be used.”

Thus the electricity grid of Kuwait has been considered.

## **Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)**

Option I is opted for the project activity i.e. only grid connected power plants are included in the calculation.

## **Step 3: Select a method to determine the operating margin (OM)**

According to the tool, the calculation of the operating margin emission factor is based on one of the following methods:

- a) Simple OM; or
- b) Simple adjusted OM; or
- c) Dispatch data analysis OM; or
- d) Average OM.

Any of the four methods can be used for calculating OM. However, the simple adjusted OM and dispatch data analysis OM cannot be currently applied in Kuwait due to lack of necessary data however, the simple OM method (option a) can only be used if low cost/must-run resources constitute less than 50% of total grid generation in:

- 1) average of the five most recent years, or
- 2) based on long-term averages for hydroelectricity production.

The share of Share of Must-Run (Hydro/Nuclear) (% of Net Generation) is zero in Kuwait.

Thus, the Average OM method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

The simple OM emission factor is calculated as the generation-weighted average CO<sub>2</sub> emissions per unit net electricity generation (t CO<sub>2</sub>/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

- (a) Ex ante option: if the ex-ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required.  
OR
- (b) Ex post option: if the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

PP has chosen ex-ante option for calculation of Simple OM emission factor using a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.

OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the crediting period.

## **Step 4: Calculate the operating margin emission factor (EF<sub>grid,OMSimple,y</sub>) according to the selected method**

<b>Weighted Generation Operating Margin (t CO<sub>2</sub>/MWh)</b>	<b>0.7400</b>
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## **Step 5: Calculate the build margin (BM) emission factor**

The sample group of power units m used to calculate the build margin consists of either:

- a) The set of five power units that have been built most recently, or

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b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use the set of power units that comprises the larger annual generation. Accordingly, the CEA database calculates the build margin as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. The build margin emission factor has been calculated ex-ante based on the most recent information available on units already built for sample group m at the time of PDD submission to the DOE for validation. This option does not require monitoring the emission factor during the crediting period.

The build margin emissions factor is the generation-weighted average emission factor of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = (\sum EG_{m,y} \times EF_{EL,m,y}) / \sum EG_{m,y}$$

Where:

$EF_{grid,BM,y}$	Build margin CO2 emission factor in year y (tCO2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	CO2 emission factor of power unit m in year y (tCO2/MWh)
m	Power units included in the build margin
y	Most recent historical year for which power generation data is available

The CO2 emission factor of each power unit m ( $EF_{EL,m,y}$ ) is determined as per the procedures given in step 4 (a) for the simple OM, using option A1 for y most recent historical year for which power generation data is available, and using for m the power units included in the build margin.

Build margin emission factor is calculated, ex-ante as per the most recent data available. So, build margin emission factor for Kuwait grid for 2017-2018 is 0.7800 tCO2/MWh

*Step 6: Calculate the combined margin (CM) emission factor ( $EF_{grid,CM,y}$ )*

The emission factor  $EF_y$  of the grid is represented as a combination of the Operating Margin (OM) and the Build Margin (BM). Considering the emission factors for these two margins as  $EF_{OM,y}$  and  $EF_{BM,y}$  then the  $EF_y$  is given by:

$$EF_y = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM}$$

Where:

$EF_{grid,BM,y}$	= Build margin CO2 emission factor in year y (t CO2/MWh)
$EF_{grid,OM,y}$	= Operating margin CO2 emission factor in year y (t CO2/MWh)
$w_{OM}$	= Weighting of operating margin emissions factor (per cent)
$w_{BM}$	= Weighting of build margin emissions factor (per cent)

According to “Tool to calculate the emission factor for an electricity system” the weights for OM and BM are 0.75 and 0.25 respectively.

Using the values for generation and fossil fuel consumption provided in the MEW Database and considering their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) is 0.7500 tCO2e/MWh.

## Project Emission

As per the ACM0002 ver-20.0, Project Emission for most renewable energy power generation project activities,  $PE_y = 0$ . However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

$PE_y$	= Project emissions in year y (tCO2e/yr)
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- $PE_{FF,y}$  = Project emissions from fossil fuel consumption in year y (tCO<sub>2</sub>/yr)  
 $PE_{GP,y}$  = Project emissions from the operation of geothermal power plants due to the release of non condensable gases in year y (tCO<sub>2e</sub>/yr)  
 $PE_{HP,y}$  = Project emissions from water reservoirs of hydro power plants in year y (tCO<sub>2e</sub>/yr).

The project activity involves the generation of electricity from the installation of solar projects. Hence, as per ACM0002, Version 20.0, there is no project emission for solar projects. Therefore, project emissions are zero.

## Leakage Emissions

No leakage emissions are considered in the project activity. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). Since the emissions sources are small, it is neglected.

### B.6.3. Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs

Relevant SDG Indicator	SDG13 : Climate Action
Data/parameter	EF <sub>OM,y</sub>
Unit	tCO <sub>2e</sub> /MWh
Description	Operating Margin Emission Factor of Kuwaiti Grid
Source of data	Calculated from MEW Database 2019 <sup>3</sup>
Value(s) applied	0.7400
Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07.0" as 3-year generation weighted average using data for the years for Electricity generation and fossil fuel consumption data has been published by MEW (Ministry of Environment and Water) of Kuwait.
Purpose of data	The data is used to calculate baseline emission reductions.
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Relevant SDG Indicator	SDG13 : Climate Action
Data/parameter	EF <sub>BM,y</sub>
Unit	tCO <sub>2e</sub> /MWh
Description	Build Margin Emission Factor of Kuwaiti Grid
Source of data	Calculated from MEW Database 2019 <sup>4</sup>
Value(s) applied	0.7800
Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07.0" as 3-year generation weighted average using data for the years for Electricity generation and fossil fuel consumption data has been published by MEW (Ministry of Environment and Water) of Kuwait.
Purpose of data	The data is used to calculate baseline emission reductions.
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Relevant SDG Indicator	SDG13 : Climate Action
Data/parameter	EF <sub>CM,y</sub>

<sup>3</sup> <https://www.mew.gov.kw/en/about/statistics/>

<sup>4</sup> <https://www.mew.gov.kw/en/about/statistics/>

<b>Unit</b>	tCO <sub>2</sub> e/MWh
<b>Description</b>	Combined Margin Emission Factor of Kuwaiti Grid
<b>Source of data</b>	Calculated from MEW Database 2019 <sup>5</sup>
<b>Value(s) applied</b>	0.7500
<b>Choice of data or Measurement methods and procedures</b>	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07.0” as 3-year generation weighted average using data for the years for Electricity generation and fossil fuel consumption data has been published by MEW (Ministry of Environment and Water) of Kuwait.
<b>Purpose of data</b>	The data is used to calculate baseline emission reductions.
<b>Additional comment</b>	-

## B.6.4. Ex ante estimation of outcomes linked to each of the three SDGs

**SDG 7: Affordable and Clean Energy y-** Project expected to generate 2,628,000 MWh clean energy every year

**SDG 8: Decent Work and Economic Growth -** Minimum 1 training to be carried out annually, apart from providing employment to approximately 50 persons during operational phase.

**SDG 13 : Climate Action -** The project leads to mitigation of 1,971,000 tCO<sub>2</sub> per annum.

### Calculation of Outcome for SDG13 : Climate Action

#### Baseline emissions

The baseline emissions are the product of electrical energy baseline  $EG_{PJ,y}$  expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

Where,

$EG_{PJ,y}$  = Total quantity of net electricity delivered to the grid.

$EF_{grid,CM,y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year y  
= 0.7500 t CO<sub>2</sub>/MWh.

Project Participant	Capacity	PLF (%)	Generated Power (MWh/year)	Baseline Emission Factor (tCO <sub>2</sub> /MWh)	Baseline emissions (tCO <sub>2</sub> /year)
Kuwait National Petroleum Company	1500 MW	20.00%	2,628,000	0.7500	1,971,000

$$BE_y = 2,628,000 * 0.7500 \text{ t CO}_2/\text{year} = 1,971,000 \text{ tCO}_2/\text{year}$$

#### Project emissions

$$PE_y = 0$$

#### Leakage

No leakage emissions are applicable.

#### Emission reductions

$$ER_y = BE_y - PE_y = 1,971,000 - 0 = 1,971,000 \text{ tCO}_2/\text{year}$$

<sup>5</sup> <https://www.mew.gov.kw/en/about/statistics/>

## B.6.5. Summary of ex ante estimates of each SDG outcome

### SDG 7: Affordable and Clean Energy

Year	Baseline estimate	Project estimate MWh	Net benefit MWh
Year 1	0	2,628,000	280670
Year 2	0	2,628,000	2,628,000
Year 3	0	2,628,000	2,628,000
Year 4	0	2,628,000	2,628,000
Year 5	0	2,628,000	2,628,000
<b>Total</b>	<b>0</b>	<b>13,140,000</b>	<b>13,140,000</b>
<b>Total number of crediting years</b>			
<b>Annual average over the crediting period</b>	0 MWh	2,628,000	2,628,000

The proposed project activity falls under Kuwaiti grid, which constitutes of both fossil fuels and non-fossil fuels sources of electricity generation hence in baseline, the affordable and Clean Energy generated was 0. Since the project is a solar energy project, therefore the Affordable and Clean Energy produced by the project is 2,628,000 MWh per year.

### SDG 8: Decent Work and Economic Growth

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0 Training, 0 Jobs	1 Training, 50 Jobs	1 Training, 50 Jobs
Year 2	0 Training, 0 Jobs	1 Training, 50 Jobs	1 Training, 50 Jobs
Year 3	0 Training, 0 Jobs	1 Training, 50 Jobs	1 Training, 50 Jobs
Year 4	0 Training, 0 Jobs	1 Training, 50 Jobs	1 Training, 50 Jobs
Year 5	0 Training, 0 Jobs	1 Training, 50 Jobs	1 Training, 50 Jobs
<b>Total</b>	<b>0 Training, 0 Jobs</b>	<b>5 Trainings, 50 Jobs</b>	<b>5 Trainings, 50 Jobs</b>
<b>Total number of crediting years</b>			
<b>Annual average over the crediting period</b>	0 Training, 0 Jobs	1 Training, 50 Jobs	1 Training, 50 Jobs

There was no training in the baseline however the training and jobs generated by the project activity is 1 and 50 jobs.

### SDG13 : Climate Action

Year	Baseline estimate tCO2	Project estimate	Net benefit tCO2
Year 1	1,971,000	0 tCO2	1,971,000
Year 2	1,971,000	0 tCO2	1,971,000
Year 3	1,971,000	0 tCO2	1,971,000
Year 4	1,971,000	0 tCO2	1,971,000
Year 5	1,971,000	0 tCO2	1,971,000
<b>Total</b>	<b>9,855,000</b>	<b>0 tCO2</b>	<b>9,855,000</b>
<b>Total number of crediting years</b>			

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<b>Annual average over the crediting period</b>	1,971,000	0 tCO <sub>2</sub>	1,971,000
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The proposed project activity falls under Kuwaiti grid, which constitutes of both fossil fuels hence in baseline, the estimated emission is 1,971,000 tCO<sub>2</sub> per year. Since the project is solar energy project, therefore the project does not emit any GHG.

## B.7. Monitoring plan

### B.7.1. Data and parameters to be monitored

Relevant SDG Indicator	SDG 7.2.1 : Affordable and Clean Energy
<b>Data / Parameter</b>	$EG_{\text{facility},y}$
<b>Unit</b>	MWh
<b>Description</b>	Quantity of net electricity supplied to the grid
<b>Source of data</b>	Statement of net export of power to the grid at the plant site
<b>Value(s) applied</b>	2,628,000 MWh
<b>Measurement methods and procedures</b>	<p>Data Type: Measured            Monitoring equipment: Energy Meters of accuracy class 0.2s            Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually.            Archiving Policy: Paper &amp;/or Electronic            Calibration frequency: Once in 5 years or as per MEW requirements</p> <p>Electricity exported/imported to the grid is in kWh. However for the calculation purpose electricity exported is converted in MWh. The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from Monthly Meter reading reports provided by Grid as per below equation:</p> $EG_{P,j,y} = EG_{\text{Export}} - EG_{\text{Import}}$ <p>Cross Checking:            Quantity of net electricity supplied to the grid will be cross checked from the Invoices/ Monthly Bill raised by the Project Participants to Grid.</p>
<b>Monitoring frequency</b>	Monthly
<b>QA/QC procedures</b>	Calibration of all the meters will be undertaken once in 5 years. The meters will be of accuracy class 0.2s.
<b>Purpose of data</b>	The Data/Parameter is required to calculate the baseline emission
<b>Additional comment</b>	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

Relevant SDG Indicator	SDG 8.5.1: Decent Work and Economic Growth
<b>Data / Parameter</b>	<ul style="list-style-type: none"> <li>Quantitative employment,</li> <li>Quality of employment</li> <li>Income generation</li> </ul>
<b>Unit</b>	<ul style="list-style-type: none"> <li>Number (Trainings)</li> <li>Number (employees)</li> <li>INR (salary)</li> </ul>



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<b>Description</b>	<ul style="list-style-type: none"> <li>• Number of Trainings provided to employees &amp; O&amp;M staff</li> <li>• Number of project employees with Number of male/female, permanent/temporary, age and person with disabilities.</li> <li>• Salary given to the employees of the project.</li> </ul> <p>The income to all the unskilled workers are made on day to day basis in line with the minimum wage requirements. Annual records of income paid to all the employees would be available.</p>
<b>Source of data</b>	Training Records (HSE & HR) Salary Slip of the project employees.
<b>Value(s) applied</b>	<p>The trainings &amp; workshops will be given to the O&amp;M staff are:</p> <ul style="list-style-type: none"> <li>• HSE Training Record</li> <li>• Soft Skill Training</li> </ul> <p>It is expected that a minimum of 1 training (either of the above) would be carried out annually.</p> <p>The training programmes help in making the workforce efficient and skilled at their job. This not only helps the company but adds to growth of individual employees. Thus, the project has a positive impact on the parameter.</p>
<b>Measurement methods and procedures</b>	<ul style="list-style-type: none"> <li>• Training Attendance sheets.</li> <li>• Employee Records</li> <li>• Salary slip of the employees</li> </ul>
<b>Monitoring frequency</b>	Once in a Monitoring period
<b>QA/QC procedures</b>	The number of persons employed would be mentioned in the plant register, which can be crossed checked with daily attendance register. Salary slip can be checked for earnings of employees
<b>Purpose of data</b>	Continuation of regular trainings/workshops for employees & O&M staff
<b>Additional comment</b>	-

<b>Relevant SDG Indicator</b>	<b>SDG13.2.1 : Climate Action</b>
<b>Data / Parameter</b>	Air quality
<b>Unit</b>	tCO2
<b>Description</b>	Reduction in CO2 emission reduction due to implementation of project activity
<b>Source of data</b>	Calculated based on data monitored at site
<b>Value(s) applied</b>	1,971,000 tCO2 emission reductions estimated per annum
<b>Measurement methods and procedures</b>	Calculated from Energy Generation values at site
<b>Monitoring frequency</b>	Calibration and Testing of Meters will be done by the accredited agency as per norms.
<b>QA/QC procedures</b>	A check meter shall be installed near to the export meter to cross check the electricity exported to the grid. The check meter reading would also be used in case of failure of export meter
<b>Purpose of data</b>	Calculation of baseline emissions
<b>Additional comment</b>	The data will be archived for crediting period+2 years

## B.7.2. Sampling plan

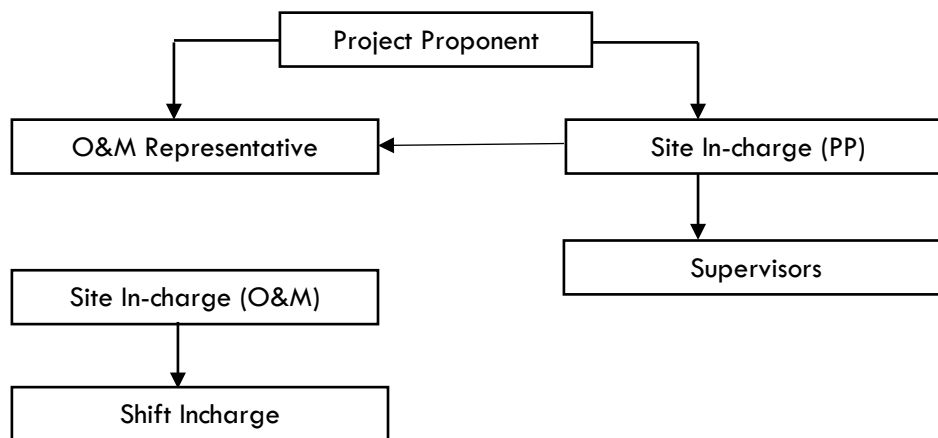
Sampling is not required for the given project activity.

## B.7.3. Other elements of monitoring plan

The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected solar power project/ unit being implemented in Kuwait. The monitoring plan, which will be implemented by the project participant describes about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project participant.

The monitoring team will be composed of the following staff:



**Responsibilities of Site In-charge (PP):** Overall functioning and maintenance of the project activity, the Site in-charge shall coordinate with the O&M operator as well as the site supervisors.

**Responsibilities of O&M Representative:** Co-ordination between Site in-charge of the O&M operator as well as the project participant and further report to PP head office.

**Responsibilities of Site In-charge (O&M Operator):** Responsibility for maintaining the data records, ensures completeness of data, and reliability of data (calibration of equipment) as well as data recording for all the parameters.

**Responsibilities of Shift In-charge:** Responsibility for day to day data collection and maintains day to day monitored data.

**Data archiving policy:** All monitored data will be archived electronically for a period of two years after the end of the crediting period or the last issuance of CERs, whichever occurs later.

**Data Measurement:** Projects activity comprises of installation Energy meters at a Pooling Substation prior to the Delivery point.

The export and import energy will be measured continuously using above mentioned meters installed at Substation. Export & Import readings of meters shall be taken on monthly basis by authorized officer of Grid in the presence of representative(s) of PP. The meter reading will be taken jointly and signed by the representatives of the Grid and representative(s) of PP. Based on the readings, invoices/ monthly bills will be raised by PP. These invoices/ monthly bills can be used for cross checking the meter readings taken for the respective project activity.

In case of pooling of multiple Projects at the same Substation, power from multiple Projects will be pooled at a Pooling Substation prior to the Delivery point and the combined power will be fed at Delivery point through a common transmission line from the Pooling Substation. In such cases, sub-meters also to be set up at pooling substation for individual projects in addition to the meters at Delivery Point.

## Data collection and archiving

Export & Import readings from main and check meters will be collected under the supervision of the O&M Team or authorized representatives of PP. The net electricity supplied to grid would be calculated based on export & import readings. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of CERs for the project activity whichever occurs later.

### Mismatch in Monitoring Period and the Billing Period

In case the dates of a particular monitoring period do not match with the dates of the billing period, the net electricity exported to the grid would be calculated from:

$$D = (A/B)*C$$

A = Difference of number of days which are not matching of billing period and monitoring period.

B = Number of days of the billing period/ month which was not matched with the monitoring period.

C = Net Electricity supplied to the grid for that given billing period/ month.

The calculated value after apportioning would be used for calculation of emission reductions during that period.

## Emergency preparedness

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized.

In the unlikely event of failure of both Main meter &/or Check meter installed at sub-station, where both the faulty meters are required to repair or replaced simultaneously, the meters shall be replaced immediately by the spare meter kept available at the site.

## Personnel training

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff (CDM team) will be trained. The plant helpers will be trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

## SECTION C. Duration and crediting period

### C.1. Duration of project

#### C.1.1. Start date of project

01/07/2020, The start date of the project is proposed to be in July 2020.

#### C.1.2. Expected operational lifetime of project

25 years

### C.2. Crediting period of project

#### C.2.1. Start date of crediting period

01/03/2021 or Date of submission of complete request for registration by the DOE whichever is later.

#### C.2.2. Total length of crediting period

5 years (Renewable twice i.e. 15 years)

### D.1. Analysis of social, economic and environmental impacts

Safeguarding principles	Assessment questions	Assessment of relevance to the project (Yes/potentially/no)	Justification	Mitigation measure (if required)
<b>SOCIAL &amp; ECONOMIC SAFEGUARDING PRINCIPLES</b>				
1. Human Rights	<p>a. The Project Proponent and the Project shall respect Internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights.</p> <p>b. The Project shall not discriminate with regards to participation and inclusion.</p>	No	<p>a. The Project is not in conflict with the economic livelihood or other issue of the local community. Thus, the Project does not cause any human rights abuse and respects internationally proclaimed human rights issue.</p> <p>b. Project activities are not expected to cause any human rights abuse. As a member of United Nations<sup>6</sup> and part of UN Agreement on Human Rights, it is ensured by law in Kuwait that no action can be taken against human rights.</p>	Not Required
2. Gender Equality & Women's Rights	<p>1. The Project shall complete the following gender assessment questions in order to inform Requirements, below:</p> <p>a. Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits?</p> <p>b. Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?</p> <p>c. Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack</p>	NO	<p>1. The project does not decrease women's access to or control of resources.</p> <p>a) No, the Project does not reduce women's access to or control of resources, entitlements and benefits. The project will benefit to local community regardless of gender.</p> <p>b) No, the Project does not create any adverse effect on the local community.</p> <p>c) No, the Project does not consider the gender roles while engaging them and thereby provide rights to men and women.</p>	Not Required

<sup>6</sup> [https://www.ilo.org/dyn/normlex/en/f?p=1000:11110:0::NO:11110:P11110\\_COUNTRY\\_ID:103423](https://www.ilo.org/dyn/normlex/en/f?p=1000:11110:0::NO:11110:P11110_COUNTRY_ID:103423)

	<p>of time, child care duties, low literacy or educational levels, or societal discrimination)?</p> <p>d. Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?</p> <p>e. Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities?</p> <p>f. Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?</p> <p>g. Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?</p> <p>h. Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?</p> <p>2. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women.</p> <p>a. Sexual harassment and/or any forms of violence against women - address the multiple risks of gender -based violence, including sexual exploitation or human trafficking.</p>		<p>d) The project does not discriminate the local community on basis of gender or caste or religion and therefore equally serve to all. Further there is no displacement due to the project activity.</p> <p>e) No, the Project design neither increase women's workload nor prevent them from engaging in other activities.</p> <p>f) There is no room for discrimination against women in this Project<sup>7</sup>.</p> <p>g) The Project will not limit women's ability regarding natural resources. The project is solely utilizing solar power and therefore does not impact natural resources of the region.</p> <p>h) No, the Project will not expose women and girls to further risks or hazards.</p> <p>2. The project does not create any direct or indirect impacts on gender equality and/or the situation of women:</p> <p>a. The project proponent has a grievance cell which would investigate complaints.</p>	
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	<p>b. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls.</p> <p>c. Restriction of women's rights or access to resources (natural or economic).</p> <p>d. Recognise women's ownership rights regardless of marital status - adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources.</p> <p>3. Projects shall apply the principles of non discrimination, equal treatment, and equal pay for equal work, specifically:</p> <p>a. Where appropriate for the implementation of a Project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities.</p> <p>b. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status.</p> <p>c. Ensure that these conditions do not limit the access of women or men, as the case may be, to Project participation and benefits.</p> <p>4. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks.</p>		<p>b. Project participation by women or girls is merely voluntary basis and there is no compulsion on them. The project proponent has a grievance cell which would investigate complaints.</p> <p>c. The Project will not restrict women's rights or access regarding natural resources.</p> <p>d. Marital status is completely irrelevant to the Project.</p> <p>3. The project has applied the principles of non-discrimination and equal treatment, pay &amp; work as follows:</p> <p>a. Yes, project shall appropriate for the implementation of a Project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities.</p> <p>b. The project proponent shall specify the same in the HR policy in line with the local government laws.</p> <p>c. There is no limit on the access to Project participation and benefits from either of these conditions.</p> <p>4. Project does not involve in any form of discrimination in any kind.</p>	
<p>3. Community Health, Safety &amp; Working Conditions</p>	<p>a. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community.</p>	<p>No</p>	<p>a. The project proponent is committed to the employee's workplace health &amp; safety during all phases of the project. All employees will attend health &amp; safety trainings.</p>	<p>Workplace Health &amp; Safety trainings will be conducted</p>

				Regularly during the project operation.
4. Cultural Heritage, Indigenous Peoples, Displacement and Resettlement	<p>a. Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, or practices)?</p> <p>b. Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?</p> <p>c. Does the Project require any change to land tenure arrangements and/or other rights?</p> <p>d. For Projects involving land-use tenure, are there any uncertainties with regards land tenure, access rights, usage rights or land ownership?</p> <p>e. Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?</p>		<p>a. As per the EIA report, there are no protected archeological and cultural heritage sites are reported within the project area”.</p> <p>b. The project does not involve any settlement areas. Thus, this project does not cause the physical or economic relocation of peoples.</p> <p>c. The land for the project is desert site. The project site is a desert land, there is no natural perennial vegetation in the area that can be attributed as an environmentally sensitive receptors. The area is not having an scenic recreational or aesthetic values. No historical land usage (agricultural / residential / commercial) was recorded in the proposed site.</p> <p>d. There are no uncertainties regarding land tenure, access rights, usage rights or land ownership. The Land for the project has been approved by the local Authorities as per EIA report.</p> <p>e. No cultural heritage/ indigenous people are replaced by the project. There was no habitation in the project area.</p>	Not required
1. Corruption	a. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.	No	KNPC does not involve and is not complicit in any kind of corruption. Kuwait has ratified UN convention against Corruption in 2011 <sup>8</sup> .	Not required
2. Economic Impacts	a. The project does not employ and is not complicit in any form of child labor.	No	a. KNPC and their subcontractors complying with all relevant national laws regarding child labor. KNPC will not employ children in any shape or form	Not Required

<sup>8</sup> [https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg\\_no=XVIII-14&chapter=18&clang=en#EndDec](https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XVIII-14&chapter=18&clang=en#EndDec)



	<p>b. The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments.</p> <p>c. The project does not involve and is not complicit in any form of forced or compulsory labor.</p>		<p>for their works. Kuwait has ratified ILO “C138 – Minimum Age Conventions” and “C182 – Worst Forms of Child Labour Convention”<sup>9</sup>.</p> <p>b. The project owner is committed to the safe and healthy working conditions all phases of the project. All employees will attend trainings health &amp; safety.</p> <p>c. KNPC and appointed contractors will not involve in any form of forced or compulsory labour. Kuwait has ratified ILO “C029 – Forced Labour Convention”<sup>10</sup></p>	
<b>ENVIRONMENTAL &amp; ECOLOGICAL SAFEGUARDING PRINCIPLES</b>				
1. Climate and Energy	<p>a. Will the Project increase greenhouse gas emissions over the Baseline Scenario?</p> <p>b. Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?</p>	No	<p>a. The project reduces Greenhouse Gas (GHG) emissions and fossil fuel usage compared to the baseline scenario.</p> <p>b. On the contrary the project generates renewable energy and supplies (except plant’s auxiliary consumption) to the grid. The auxiliary consumption is measured by deduction of power supplied to the grid from the total power generated by the plant. However, it’s to be noted that the auxiliary power consumed by the plant is generated as renewable energy and thereby no emission involved. Hence, it’s not required to be monitored.</p>	Not required
2. Water	<p>a. Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?</p> <p>b. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? If ‘Yes’ or</p>	No	<p>a. The project being a solar power project thus there is no impact of water resources. As per the EIA report, the plant area does not have large rivers and streams or any surface water body.</p> <p>b. No. As per EIA report, the risk of erosion is unlikely by the project.</p>	Not required

<sup>9</sup> [https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200\\_COUNTRY\\_ID:102691](https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102691)

<sup>10</sup> [https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200\\_COUNTRY\\_ID:102691](https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102691)

	<p>'Potentially' proceed to question 2.</p> <p>c. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?</p>		<p>c. No. As per EIA report, the risk of erosion is unlikely by the project.</p>	
3. Environment, Ecology and Land Use	<p>a. Does the Project involve the use of land and soil for production of crops or other products?</p> <p>b. Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?</p> <p>c. Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?</p> <p>d. Could the Project potentially result in the release of pollutants to the environment?</p> <p>e. Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?</p> <p>f. Will the Project involve the application of pesticides and/or fertilisers?</p> <p>g. Will the Project involve the harvesting of forests?</p> <p>h. Does the Project modify the quantity or nutritional quality of food available such as through</p>	NO	<p>a. The project has been established at the desert land which was not used for production of crops and other products.</p> <p>b. The project is susceptible to decreased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme conditions.</p> <p>c. There is no impact of GMOs on the project.</p> <p>d. The project takes a precautionary approach regarding environmental challenges and is not complicit in practices contrary to the precautionary principle. KNPC follows necessary procedures for environmental safety at the project.</p> <p>e. All hazardous and non-hazardous wastes will be disposed as per the local regulations. The methods are categorized for all materials in the EIA report.</p> <p>f. Not applicable for solar power plants.</p> <p>g. No. the project area was deserted before project implementation.</p> <p>h. No. The project does not modify the quantity or nutritional quality of food available.</p>	Not Required

	<p>crop regime alteration or export or economic incentives?</p> <p>i. Will the Project involve animal husbandry?</p> <p>j. Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites[11] identified?</p> <p>k. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?</p> <p>l. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?</p>		<p>i. No. Not applicable for solar project.</p> <p>j. EIA report states that the projected area of the Project is desert land, not located in sensitive ecological zones, biodiversity conservation areas, and there are no rare and valuable plant and animal species.</p> <p>k. No. There were no endangered species found in the project boundary as per EIA report.</p> <p>l. No. The project does not impact other areas where endangered species may be present.</p>	
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## SECTION E. Local stakeholder consultation

### E.1. Solicitation of comments from stakeholders

The Local Stakeholder Meetings shall be carried out at a later stage. The project shall carry out a live SFR round during the validation stage.

### E.2. Summary of comments received

The Local Stakeholder Meetings shall be carried out at a later stage. The project shall carry out a live SFR round during the validation stage

### E.3. Report on consideration of comments received

The Local Stakeholder Meetings shall be carried out at a later stage. The project shall carry out a live SFR round during the validation stage.

## Appendix 1. Contact information of project participants

<b>Organization name</b>	Kuwait National Petroleum Company
<b>Registration number with relevant authority</b>	-
<b>Street/P.O. Box</b>	70, Safat
<b>Building</b>	PD Admin Bldg.
<b>City</b>	Kuwait
<b>State/Region</b>	-
<b>Postcode</b>	13001
<b>Country</b>	Kuwait
<b>Telephone</b>	-
<b>Fax</b>	-
<b>E-mail</b>	<a href="mailto:dm.sharma@knpc.com">dm.sharma@knpc.com</a>
<b>Website</b>	<a href="http://www.knpc.com">www.knpc.com</a>
<b>Contact person</b>	Mr. Divya Mohan
<b>Title</b>	Mr.
<b>Salutation</b>	-
<b>Last name</b>	-
<b>Middle name</b>	-
<b>First name</b>	Divya Mohan
<b>Department</b>	
<b>Mobile</b>	+965 23882056
<b>Direct fax</b>	-
<b>Direct tel.</b>	-
<b>Personal e-mail</b>	-

### Revision History

Version	Date	Remarks
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1	10 July 2017	Initial adoption