

A. Definition of the Project

A.1 Title	Solar Photovoltaic Rural Village Electrification (Shs & Health Centers)
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A.2 Type of project	
Photovoltaic	X

A.3 Stakeholders	<ul style="list-style-type: none"> - New & Renewable Energy Authority – NREA - Egyptian Environment Affairs Agency – EEAA - Rural Electrification Authority – REA - North Sinai Governorate and / or other Egyptian stakeholder
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A.3 Location of the project	
City / Town / Village	Four Egyptian rural communities and remote villages in desert areas.
Brief description of the location	Most of the remote desert rural communities in Egypt (in Bahareya Oases, Wadi Elgadid, Aswan, Matrouh, Sinai and Red Sea) are suffering from the lack of energy services. Due to the dispersed nature of both houses and rural communities, in addition to their low demand, the extension of the grid seems very non-economic. On the other hand, the technical and economic feasibility for PV solar energy provision to those rural communities is proven, besides its environmental friendly performance.

A.4 Forecasted Planning for the project			
Status of the project	Phases	Status	Forecasted timing
	Idea / concept	<input type="checkbox"/>	2 Years (for the whole project)
	Pre feasibility study	<input type="checkbox"/>	
	On going	X	
	Done		

B. Stakeholders

B.1 Main promoters	
Name	<i>New & Renewable Energy Authority</i>
Type of organisation	Public Organization – Under Ministry of Electricity & Energy
Address	Dr. Ibrahim Abou Elnaga St. – Nasr City - Cairo – Egypt
Contact person	Eng. Samir M. Hassan - NREA Executive chairman
Telephone/ fax	Tel.: 00202 2713176
e-mail	nre@idsc.net.eg

B.2 Other partners	
Name	<i>North Sinai Governorate and / or other Egyptian stakeholder</i>
Type of organisation	Official Governorate
Address	
Contact person	
Telephone/ fax	
Name	<i>Italian Ministry for the Environment and Territory</i>
Type of organisation	Public
Address	via C. Colombo n. 44 – 00147, Rome
Contact person	Mr. Mario Lionetti
Telephone/ fax	Tel.: 0039 06 57228115 fax: 0039 06 57228173

Name	<i>Egyptian Environment Affairs Agency</i>
Type of organisation	Public Organization – Under Ministry of State of Environment
Address	Maadi – Cairo - Egypt
Contact person	Mohamed A. El-Shahawy – Head of Climate Change Unit
Telephone/ fax	Tel.: 00202 5256481 Fax: 00202 5256452
e-mail	eeaa@eeaa.gov.eg
Name	<i>Rural Electrification Authority</i>
Type of organisation	Public Organization – Under Ministry of Electricity & Energy
Address	Abbasiya – Cairo - Egypt
Contact person	
Telephone/ fax	
e-mail	

C. Technical description of the project

C.1 Technical description of the project

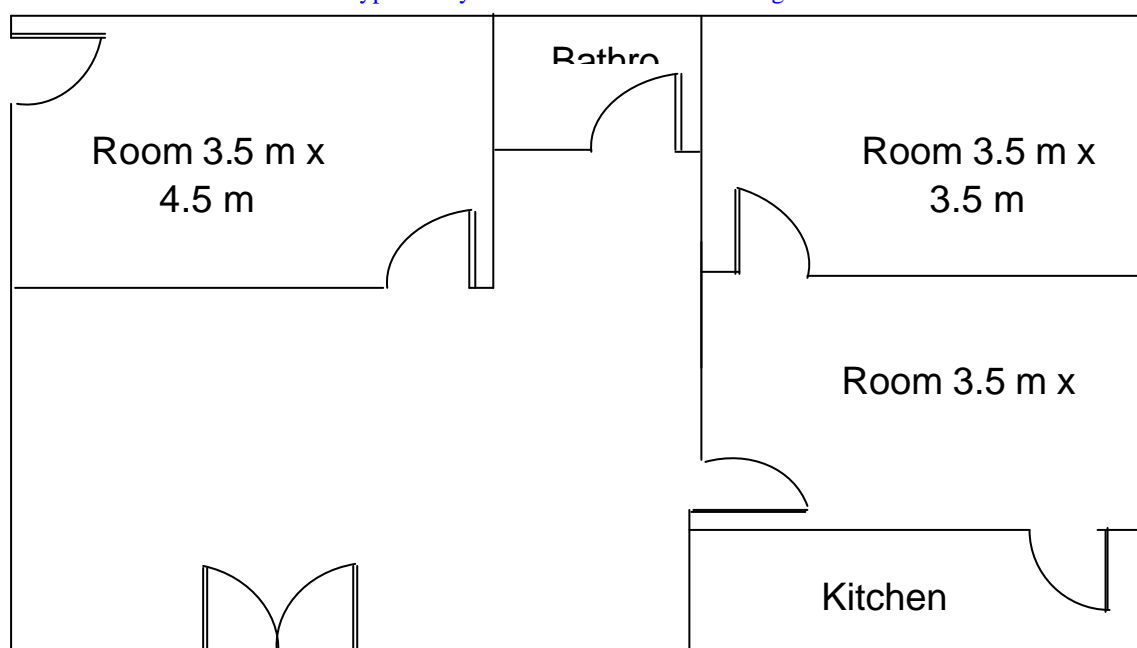
The PV electrification systems are proposed for **four villages** including the following for each village:

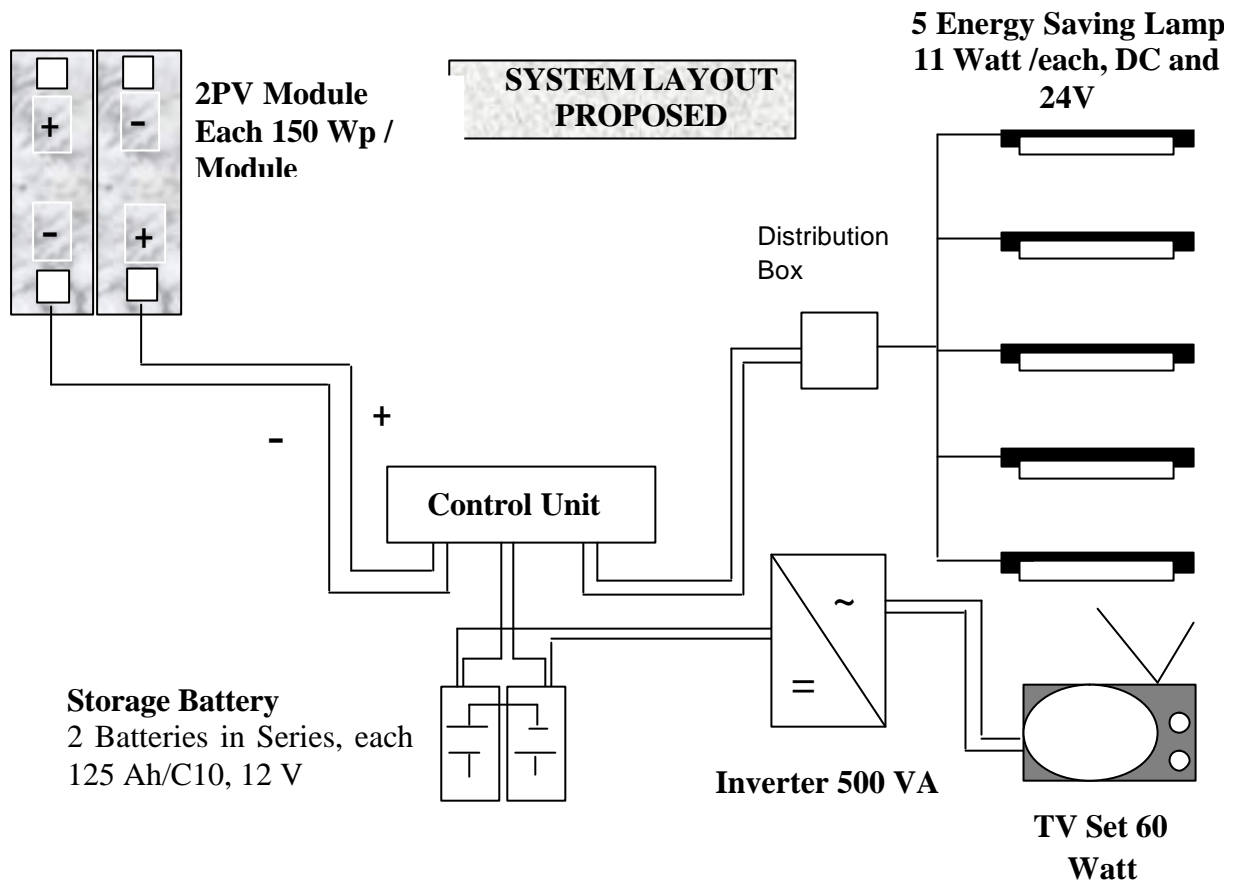
- Households (about 25 household / village)**
PV Lighting Systems (Solar Home Systems – SHS) are needed for each household to meet the total load demand of about 500 Wh/day. The PV size is estimated to be 300 Wp/house with 2 Batteries each 125Ah/C10, 12V, series connected. Charge regulator 10A, 5 energy saving lamps and Inverter 500VA. Powering TV set for 5 hours.
- Street Poles (about 20 poles / village)**
The PV size is estimated to 100 Wp/Pole with battery of 100 Ah/C10,12V.
- School (1 school / village)**
PV systems are needed to meet the total demand of about 1000 Wh/day. The PV size is estimated to be 600 Wp/house with 12 batteries each 480 Ah/C10, 2 V series connected. Charge regulator 30 A, 10 energy saving lamps and inverter 1200 VA. Powering two TV set each 60-watt for 5 hours/day.
- Mosque (1 mosque / village)**
Considered similar to SHS, needing (1) units in size.
- Health Center (1 health center / village)**
Systems are needed to meet the total load demand of about 550 Wh/day. The PV size is estimated to be 300 Wp with 4 batteries each 125 Ah/C10, 12 V series connected. Charge regulator 10 A, 2 energy saving lamps and inverter 500 VA. Powering 1 vaccine refrigerator of 100 liters and 1 sterilizer.

- The overall PV size for the four villages is estimated to be about 43 kWp

C.2 Photo/drawing of the project/building:

Typical Layout of household in the villages





C.3 Typical indicators	Investment – thousand euros	503
	Power installed – MW	43
	Energy produced – MWh / year	78.242 (estimated for Sinai 30.1 N 43.10 E NASAs. Radiation spreadsheet optimized 55° slanted)
	Cost of energy produced from the project - euro cts/kWh	10 over 20 year lifetime
	Cost of conventional energy - euro cts/kWh	10 at desert remote area including cost of diesel generator, fuel, oil, consumables, operation, and maintenance over 20 year lifetime (International fuel prices)
	Price of sold energy – euro cts/kWh	To be estimated
	Fuel saved in toe	29.7 at diesel efficiency 0.25 (average over lifetime)
	Population concerned	1000 inhabitants

C.4 Detailed technical indicators	
M ² installed	430 m ²
Power per m ²	100 watt/m ²

Delivered power	78240 kWh
Reference Yield	$\frac{\text{kWh} / \text{m}^2 \cdot \text{d}}{1 \text{ kW} / \text{m}^2} = \text{h/d}$
Array Yield	$\text{KWh} / \text{kWp} = \text{h/d}$
Final Yield	$\text{KWh} / \text{kWp} = \text{h/d}$
Performance Ratio PR	= Final Yield / Reference Yield

D. GHG emissions: reduced / avoided

D.1 Type of GHG reduced or avoided

CO ₂	96Tons / year at diesel efficiency 0.25 (average)
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D.2 Base line

Description of the level of reference	Small diesel generator units
Other elements	Grid extension (optional)

D.3 Total emission reduction per year

In Tons CO ₂ equivalent	96 Tons / year at diesel efficiency 0.25
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D.4 Estimated CER gains – thousand euros

Estimated price (euros/t)	3	5	10
- Tons CO ₂ equivalent			
Total estimated gain	288	480	960

E. Financial aspects

E.1 Estimated costs - euros

Total investment	503000
Allocation	
Development costs, executing projects	30000
Procurement, CIF Egypt, spare parts for 5 years & supervision of PV installations	322300
Installation and civil manufactures, maintenance and indoor transportation	38500
NREA dissemination activities (final meeting organization and dissemination actions)	9200
NREA activities (tenders preparation, villages selection, data analysis, local coordination and custom clearances.	43000
North Sinai Governorate and/or other Egyptian stakeholder (services, facilities and human resources)	60000

F. Contribution of the project to sustainable development

Natural environment	<ul style="list-style-type: none"> - The average population level per village ranges from 200 to 300 persons constituting 25 to 30 dwellings/families each on average of 8 persons. The main activities of the rural villages are agriculture and / or grazing. Water depth is ranging between 10 -120 meters. The prime source of energy is the Kerosene, which is used in burners for cooking and lighting. In addition to the Kerosene, the agricultural residues and firewood are collected from nearby natural plantation and used for baking, in a simple traditional oven, space heating and sometimes for cooking. - The project will contribute to improving environmental conditions and avoid kerosene high pollution.
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<p>Social (employment, health, education, ...)</p>	<ul style="list-style-type: none"> - Introduction of a better living conditions for the citizens at remote areas. - Raising standard of living of the concerned rural population will contribute to poverty alleviation, assist in birth control, improving health conditions. - Limiting the use of kerosene lamps that is considered the major source of fire hazard and indoor air pollution through helping to reduce risk of fire and help clean the environment. - Extending the period of activities during the day & night. - Women and children will be positively and greatly effected by the project. - Attract the administration staff for village services. - Create job opportunities and help solving the unemployment problem. - Provide a showcase for encouraging the investment in PV industry for feasible commercial applications.
<p>Environmental impact assessment studies</p>	<ul style="list-style-type: none"> - The PV technology is rated Green category with no negative environment effects but positive impact and fuel saving hence environment protection. - Fuel saving 29.7 T.O.E./ y - CO2 emission prevention 96 T/ y

G. Other relevant information	
<p>List of available documents</p>	
<p>Others</p>	