



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE

For the design, supply, delivery, and commissioning of a photovoltaic power plant in Shahid Naseri Refugee Settlement in Saveh, Iran

Project Title: Developing sustainable settlements for Afghan refugees in the Islamic Republic of Iran (UNIDO Project No. 190041)

1. GENERAL BACKGROUND INFORMATION

The United Nations Industrial Development Organization (UNIDO) is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization, and environmental sustainability. The mandate of UNIDO is to promote and accelerate inclusive and sustainable industrial development (ISID) in developing countries and economies in transition.

UNIDO has a country office in Tehran which is responsible for representing the Organization in the host country and promoting UNIDO as an effective partner for development. It is responsible for supporting, inter alia, formulation and monitoring technical cooperation projects and programmes, in collaboration with UNIDO relevant technical departments and other appropriate organizational units.

UNIDO is implementing a three-year project “Developing sustainable settlements for Afghan refugees in the Islamic Republic of Iran” on developing sustainable settlements for 18,000 Afghan refugees living in five of the most populated settlements in Iran. The project is funded by the Republic of Korea. The project has selected the five most populated Afghan refugee settlements in Markazi, Yazd, Semnan, Kerman and Khorasan as pilot project intervention sites.

One of the objectives of the project is to implement sustainable infrastructure technologies to improve refugees’ livelihood through low-carbon energy, waste and water infrastructure. The key target group of the project will be the refugees residing in the settlements (with special attention to youth and women), with a view to strengthen their capacities and access to job opportunities through vocational trainings and appropriate action plans.

The project document can be found in this [link](#).

2. AIM OF THE PROJECT

The project aims at deploying a photovoltaic (PV) power plant in Saveh settlement to improve energy infrastructure in refugee settlement and as well as the livelihoods of refugees by providing them with a sustainable energy source. The PV power plant will create a reliable (even under harsh weather conditions) and low carbon energy source with low maintenance cost for all refugees living in the Saveh settlement.

The project is implemented in close collaboration with BAFIA (Bureau for Aliens and Foreign Immigrants Affairs) in Iran. BAFIA is the governmental agency under the Ministry of Interior of Iran that is in charge of the management of all the refugee settlements in Iran. BAFIA is one of the main project stakeholders of the project. In addition, each settlement has a Refugee Settlement Authority responsible for day-to-day administration.

3. THE SCOPE OF THE PROPOSED CONTRACTED SERVICES

The scope of the services is the implementation of PV power plant in Saveh refugee settlement. At the moment, there is not any PV power plants in this settlement.

The technical drawing of the planned PV power plant is provided in Annex 1.

Following items and services should be included in the proposal:

Turn-key PV Power Plant in Saveh				
Equipment and services				
No	Item	Technical Specification	Quantity	Unit
1	Initial feasibility	Including designing, technical and financial evaluation	-	Lump sum
2	Location and land preparation	Ground leveling, pavement, and access path for maintenance and service.	As required	Lump sum
3	PV Module	Mono-crystalline PERC Modules, min. 390Wp, 72 cells/144 half cells, 3 bypass diodes, min. 40mm aluminium frame. Only positive performance tolerance. Reference Module: JA Solar JAM72S10-395/PR or equivalent (Module Number can be varied by max. 5% to optimize design if necessary for modules with differing electrical properties)	192 (-5/+5%)	kWp
4	Inverter	Fronius Tauro ECO 100-3-D, incl. String fuses, DC SPD Cl. I+II, AC-SPD Cl. I+II, completely configured and installed incl. equipment to connect the second inverter direct) or equivalent	1	Piece
5	Inverter	Fronius Tauro ECO 50.0-3-D, incl. String fuses, DC SPD Cl. I+II, completely configured and installed or equivalent	1	Piece
6	PV Module mounting system	Mounting system for modules Pos.1. Incl. Detailed design and calculations of foundations and/or ballast as required. Incl. ballast and/or foundations and necessary accessories	as per Pos. 1	
7a	Guardhouse	Guardhouse, built in bricks/prefabricated according to sketch in layout drawing, including: - Windows, doors etc. - Insulated roof		

		<ul style="list-style-type: none"> - Septic tank - Water and electrical connection to main lines on the street - Split A/C unit for heating and cooling - Latrine incl. hand washing basin - Furniture (Working desk, 3 chairs, shelves for storage room, Cloth hangers, wardrobe - Kitchenette 		
7b	Inverter rack	Inverter rack as per drawings, installed in guard house niche. Delivered and installed on site.	1	Piece
8	DC wiring	DC-Wiring acc. to plans, 6mm ² PV cables H1Z2Z2-K, incl. Mounting system (closed cable trays, ducts underground, connections and connectors (acc. to module and inverter manufacturer requirements), protection against rodents, UV, and mechanical damage.	2540	Meter
9	AC wiring	Aluminium cable 3x240/120mm ² installed on poles. Suitable for installation on poles outdoor (resistance against temperature, UV, etc.). Incl. Mounting system with all necessary secondary structures. (Poles incl. foundations, cable trays, etc.)	95	Meter
10	Transformer station change	Exchange of the existing transformer station to a 160kVA model in cooperation with the local grid provider, incl. mounting, switchboard, all necessary components, incl. all one-time payments to the grid provider	1	Lump Sum
11	Grounding system	Ring ground installed around the power plant, dimensioning and material to be determined acc. to Iranian standards and ground conductivity.	185	Meter
12	Fence	Metal wire fence to avoid illegitimate access, 2,5 meters high, incl. 1 Gate with a 3m opening. Incl. necessary foundations. Gate lockable.	100	Meter
13	Fire Extinguishers	5 kg CO2 fire extinguisher incl. mounting device 20 kg wheeled CO2 fire extinguisher* 25 kg wheeled Powder fire extinguisher* *Proper shade, signage, and storage area to be provided for the wheeled extinguishers.	1 2 1	Piece
14	Signage	<ul style="list-style-type: none"> - Safety Signs - Instruction Signs - Project Information Board (Stainless Steel) 	<ul style="list-style-type: none"> - As required - As required - 2 (50cm*70cm) 	Piece

15	Lightning protection	Lightning rods to be installed on the PV mounting system and adjacent to the inverter rack acc. To drawing and standards	1	Lump sum
16	Potential Equalization	Connection of all metal, non-conducting components to the grounding system	1	Lump sum
17	Data connections	UV-resistant Cat.6/7-cable connections between components acc. To plan. Including necessary mounting systems and connectors	120	Meter
18	Surge protection device	SPD type 1+2 installed in transformer switchboard	1	Piece
19	Modem	3G/4G modem, IP65 casing, connected to inverters for remote access, incl. Cabling, installation and necessary accessories	1	Piece
20	Provision and installation of CCTV for 24/7 surveillance	<ul style="list-style-type: none"> - 4 outdoor CCTV cameras - DVR and rack - LCD - Cabling and installation 	1	set
21	Detail engineering/technical design	Engineering/technical design of all necessary details, clarification with grid operator and authorities.	1	Lump sum
22	Installation works	Mechanical and electrical installation of all components, incl. the disposal of waste, required incidentals etc. All the necessary equipment for the execution of the works on site.	1	Lump sum
23	Start-up and Commissioning	Start-up of the PV power plant, configuration of all equipment, installation checks, measurement of all required parameters, 2 weeks of monitored operating tests	1	Lump sum
24	Documentation, Instructions, and technical manuals	<ol style="list-style-type: none"> 1. Documentation of installation incl. wiring diagrams, all certificates, and documents, measurement results, module performance list, and conformity reports. Delivered in hard copies (3) and in soft copies on a USB flash drive (3) 2. Present the technical part of the developed documents in the induction session for UNIDO's technical team, training expert, and the operators during the commissioning phase. 	1	Lump sum
25	Training	<p>On-site training on O&M and components of the PV plant to the operators and UNIDO expert</p> <p>Provision of technical knowledge materials for training purposes</p>	As required	Lump sum
26	Insurance at 115% of the total cost of	1. Insurance of the Works and Technical Documentation, Materials, Equipment,	Full coverage	Lump sum

the equipment	Human resources 2. Liability Insurance		
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Other inverter types can be offered if Fronius inverters are not available, but need to be confirmed by UNIDO.

The contractor should provide on-site instructions on the operation of the system, maintenance and control, and workplace safety. All training materials and knowledge management activities will be gender mainstreamed to ensure that men and women equally benefit from the capacity building activities.

The contractor will be responsible to support BAFIA and UNIDO to obtain the national electricity company and SATBA approvals through submitting the required technical documents, (e.g. technical drawings) to the relevant national organizations in Iran, adjusting the designs if required, and implementing the project according to the national and international standards.

The proposed overall schedule for the activities to be undertaken is included in Annex I of this document.

Delivery Terms [INCOTERMS 2020]: Transportation of all listed items is to be **DPU** (Delivered at Place Unloaded).

Language requirements: All documentation and communication including catalogs will be in English, and training curricula, instructions and operating manuals, will be in Farsi.

Taxes: Bids must be inclusive of VAT.

Warranty Requirements

Bidder shall provide standard manufacturers' warranties for all listed items. Following minimum warranties apply:

- PV Modules: 10-year product warranty, 25-year linear performance warranty (max. -3.5% in the first year, max. -0.75% p.a. for the next 24 years)
- Inverter: 10-year product warranty

4. GENERAL TIME SCHEDULE AND DELIVERABLES

The Contractor will report to the UNIDO. All draft and final deliverables are subject to approval by UNIDO.

The deliverables will be:

- 1- **Inception Report** including detailed technical design and work plan. Commencement requires UNIDO approval.
- 2- **Commissioning Report** and trial run including optimization and fault tracking inspection. Photos verifying the mechanically and electrically completed PV power plant in the settlement. Inspection and approval will be done at site.
- 3- **Final Report** including training curricula, instructions and operating manuals on how to operate the PV power plant.

Reports	Tentative Time Schedule*
Inception Report including Detail engineering, specification of components and detailed schedule (work plan)	4 weeks after signing the contract
Commissioning Report including mechanical and electrical installation completion	20 weeks after signing the contract
Final Report including commissioning, training, and operating tests incl. documentation	24 weeks after signing the contract

*Bidders can propose an alternative time plan.

All documents should be provided to UNIDO in one electronic copy, consisting of the following electronic files:

- PDF file (Report, design, drawings, etc.);
- Original work files (DWG, WORD, POWERPOINT, EXCEL, etc.);
- High-quality photographs of the installation in the settlement.

The electronic copy should be provided via e-mail. All deliverables and related documents should be provided in English.

5. QUALIFICATION REQUIREMENTS AND EVALUATION CRITERIA

The bidders should confirm that in case of award of contract they are able to have representatives in Iran and able to visit the site to perform on-the-ground survey and delivery of the turn-key PV power plant system.

Qualification Requirements:

- Recognized and/or registered as a legal entity (copy of Certificate of Incorporation) with at least five (5) years experience in providing services and equipment for turn-key PV power plants, including legal authorization to perform such works, including valid construction license;
- Completed UNIDO Financial Statement Form;
 - Profitability
Profit Margin Ratio or Return on Assets Ratio should be preferably positive. In case of negative profit margin ratio, UNIDO may request additional documents and/or adapt payment terms and conditions.
 - Solvency
A solvency ratio should be preferably more than one (1). In case of negative solvency, UNIDO may request additional documents and/or adapt payment terms and conditions.
 - Turnover
The average annual turnover for the past three (3) years (or for the period of time the bidder has been in business, if it has not yet reached three (3) years) should be at least 1 time more than anticipated value of the contract.
- Audited Financial Statements/Balance Sheets of the past 3 years;
- Completed UNIDO Bank Information Form;
- Completed UNIDO Statement of Confirmation.

Evaluation Criteria:

- Compliance with the technical requirements and delivery terms as specified in Annex II.

The bidders shall confirm that they are aware of the political implications when working in Iran, in particular concerning sanctions, money transfer in USD currency to bank accounts, visa issuance as well as logistical arrangements. The bidders shall also confirm that they are familiar with the political situation in Iran and the region, including applicable national and international laws. In addition, the bidders shall confirm that USD payments are accepted and shall provide a duly completed and signed Bank Information Form along with the proposal. Regardless of the information provided, transactions to the bank account of the bidder may be subject to additional checks and verification.

6. GENERAL CONTRACTOR REQUIREMENTS

Specifications are provided to establish minimum design and construction standards.

The design and selection of materials for the PV power plant shall be appropriate for the environmental conditions of 40+ degrees centigrade ambient temperature, strong winds, high solar exposure, and all the weather conditions including snow, heavy rain and hail.

All materials should be the best quality available within the local market. Materials that are manufactured should have a recognized international certification for manufacturing such as CE markings.

All procured equipment must be installed and commissioned in accordance with all manufacturers: (i) conditions of use, (ii) installation and operational guidelines, and (iii) all applicable safety codes.

During and at completion of ground preparation work, debris shall not be allowed to spread unnecessarily into adjacent areas or to accumulate in the work area itself. All such debris, excess and discarded construction materials shall be cleaned up and removed at the completion of the job and/or at the end of each workday. Final payment will be dependent on the removal of all construction debris, demolition debris and rubbish with proper disposal off-site.

UNIDO and project counterpart officials may inspect the site at various points in the construction process to ensure that work is being conducted in accordance with the drawings.

The Contractor is required to provide a supervisor to supervise all construction works. This supervisor is required to be present, on site, during all working hours and will also be responsible for compiling daily construction reports (with photos).

UNIDO may, AT ANY TIME, suspend work on the project, if necessary. A Suspension of Work Notice may be issued for, but not limited to, non-compliance with any of the above specified requirements or procedures. Contractor consideration for any suspension or stoppage of work shall be evaluated based on the appropriate contract clause.

All work shall meet the standards specified herein and shall conform to approved and accepted standards for the industry, environmental and work safety regulations for construction works and comply with all applicable building codes in the Islamic Republic of Iran.

7. PROJECT MOBILIZATION

The Contractor shall start work at the site no later than one (1) week after signing the contract and permission is granted by BAFIA and Saveh refugee settlement administration.

Prior to commencement of the work, the Contractor and any subcontractors, whose presence is necessary or requested, shall conduct virtual or in-person meeting UNIDO project coordinator to discuss and develop a mutual understanding relative to the details of the execution of this contract. This will include but not limited to the following:

- Updated project schedule to reflect the start date;
- List of project supervisors and foremen with full contact details;
- Establish daily progress reporting system;
- Site safety requirements and other risks;
- Other aspects of this project that warrant clarification and understanding.

Safety & Security:

UNIDO places a very high priority on the safety and security of workers at project-linked work site(s). One area that UNIDO will monitor closely is the efforts made by the Contractor to ensure the safety of workers at the work site covered by this contract. The Contractor shall be solely responsible for risk assessments and managing health and safety issues associated with this project. Based on these risk assessments, Contractors shall provide to each employee Personal Protective Equipment (PPE) that will protect the employee from work related hazards. At a minimum PPE shall consist of eye protection, hard hats, and closed toe shoes. Other PPE such as gloves and dust masks are also recommended. These items must be provided at the Contractor's expense.

Quality Control:

The Contractor is responsible for quality control and shall establish and maintain an effective quality control plan. The quality control system shall consist of plans, procedures, and organization necessary to produce a product, which complies with the contract requirements. The Contractor's site supervisor will be held responsible for the quality of work on the job. The site supervisor is the individual with the responsibility for the overall management of the project on behalf of the Contractor.

Workmanship Guarantees and Warranty Coverage:

The Contractor shall guarantee the quality and completeness of all his work, supplies and services specified in this ToR.

Mechanical, electrical, performance and safety guarantees for the equipment supplied, and processes/technologies transferred should be provided for six (6) months after obtaining the acceptance certificate for installed and commissioned equipment.

The Contractor is responsible for the correction of Defective Materials and Workmanship for twelve (12) months after the date of the Certificate of Acceptance (CoA) of the Work and receipt of the signed project completion letter. Any Work found to be defective or non-conforming to the Contractor shall correct it as soon as possible after receipt of written notice from UNIDO to do so.

8. PROJECT COMPLETION, ACCEPTANCE & SITE RECEIVING/HANDOVER

A Letter of Project Completion, signed by the UNIDO Project Coordinator, will be issued to the Contractor after the following tasks have been completed:

- Final inspection of project by the UNIDO Project Coordinator, UNIDO technical expert, BAFIA expert and settlement authority;
- Resolution and completion of final list of any open items and tasks; and
- Final report.

Responsibility of Contractor:

- The contractor will ensure monitoring of its activities through its technicians and accept UNIDO staffs to participate in any part of the surveying field visits or meeting without obstruction.
- The contractor shall submit UNIDO the inception, commissioning and final reports
- The Contractor must have liability insurance for the works and its workers. The contractor must be insured against damage and loss of property during construction due to various factors such as natural disaster and civil unrest. All workers at the site should also be insured against injury and loss of life.
- The Contractor will be responsible for all activities related to the provision of the services and the acts or omissions of all employees, agents or other representatives, and authorized subcontractors providing the services on its behalf.
- UNIDO will not be held responsible for any accident, illness, loss or damage which may occur during the provision of the services or any claims, demands, suits, judgments, arising there from, including for any injury to the Contractor's employees, or to third parties, or any loss of, damage to, or destruction of property of third parties, arising out of or connected to the Contractor's work or performance under the Contract.
- The Contractor shall make and thereafter maintain, in compliance with national legislation, provision for adequate insurance to cover such risks as damage to property and injuries to persons, as well as third party liability claims.
- The personnel assigned by the contractor to provide the services will not be considered in any respect as being employees or agents of UNIDO. Nothing in the Contract or in any document or arrangement relating thereto shall be construed as conferring any privileges or immunities of UNIDO on the contractor, its personnel or any other persons providing the services on its behalf.
- Nothing in the contract or in any document relating thereto, shall be construed as constituting a waiver of privileges or immunities of UNIDO, or as its acceptance of the jurisdiction of the courts of any country over disputes arising out of the Contract.
- In providing the services, the contractor shall conform to all national laws applicable to its activities and its relations to third parties, including employees. The Contractor shall promptly correct any violations thereof and shall keep UNIDO informed of any conflict or problem arising in relation to national authorities.
- The Contractor shall take all reasonable precautions to avoid any conflict of interest in the implementation of the services and shall inform UNIDO without delay of any situation constituting or likely to entail a conflict of interest including any UNIDO personnel having an interest of any kind in the Contractor's activities.
- Unless authorized in writing by UNIDO, the Contractor shall not advertise or otherwise make public that it has a contractual relationship with UNIDO, nor shall the Contractor, in any manner whatsoever use the name or emblem of UNIDO, or any abbreviation of the name of UNIDO.
- To comply with disclosure requirements and enhance transparency, UNIDO may release and/or publish the following information about this Contract: (i) the name and nationality of the Contractor; (ii) a brief description and location of the Services provided; and (ii) the total value of the Contract. The Contractor specifically consents to the release and/or

publication of such information. UNIDO will not release or publish information that could reasonably be considered confidential or proprietary.

- This Contract is not subject to payment by UNIDO of any levies, taxes, registration duties or any other duties or charges whatsoever. The Contractor shall duly pay taxes, duties and other charges in accordance with prevailing laws and regulations applicable to the Contractor.
- The Contractor will undertake all reasonable efforts to ensure that none of the funds received from UNIDO under this Contract are used to provide support to individuals or entities associated with terrorism.

UNIDO may suspend or cancel all or part of the Contract, obtain the services elsewhere and make corresponding adjustments to any payments that may be due to the Contractor, if the Contractor fails to make delivery, or perform to a standard considered acceptable to UNIDO. Subject to consultation with the Contractor, the determination of UNIDO, relating to this provision, shall be binding

9. LANGUAGE REQUIREMENTS

- All the technical reports and related documents including training should be provided in Farsi. Farsi (Persian) is primarily used for communications with the beneficiaries and governmental stakeholders.
- English must be used for communications with UNIDO. Inception Report and technical design report, Commissioning Report and Final Report should be in English.

10. APPLICATION PROCEDURE

Interested and qualified bidders shall submit their written proposals in English comprising of:

- **Technical proposal** (including proposed approach and methodology, copies of certifications, licenses as well as references of similar projects completed in the past). All deviations including the proposed timeline from the Terms of Reference should be indicated in the proposal.
- **Financial proposal** providing a detailed breakdown of the offered price and including all costs in USD.

DISCLAIMER: All information, figures and data presented in these Terms of Reference are the property of UNIDO and protected by copyrights. No part or parts of this document shall be used for purposes other than preparing the proposal.

Note: A **circular economy** is an economic system that tackles global environmental challenges like climate change, biodiversity loss, waste, and pollution. It is a framework of four principles, driven by design: eliminate waste and pollution, keep products and materials in use, regenerate natural ecosystems and use of renewable energy. **Bidders are encouraged** to display the products' circularity and sustainability compliance with the Economic, Social and Governance (ESG) principles under the UN Compact (<https://www.unglobalcompact.org/take-action/leadership/integrate-sustainability/roadmap/supply-chain>).

The List of Annexes

Annex I: Proposed general time schedule;
Annex II: Technical and financial evaluation;
Annex III: Experience/previous contracts;
Annex IV: Client References;

Annex V: Geographical location and coordinates of the target settlement in Saveh;
Annex VI: Weather and Solar Irradiation in Saveh;
Annex VII: Technical drawings and layout;
Annex VIII: Wiring;
Annex IX: BOQ.

ANNEXES

Annex I: Proposed General Time Schedule*

Activities	Weeks											
	1/2	3/4	5/6	7/8	9/10	11/12	13/14	15/16	17/18	19/20	21/22	23/24
Detail engineering and work plan												
Purchasing												
Mechanical and electrical installation												
Start up, commissioning, trial runs												
Trainings, Documentation hand-over												
Final hand-over												

*Bidders can propose an alternative work-plan along with their technical proposal

Annex II: Technical and financial evaluation

Evaluation of Proposals

Evaluation of the technical proposal will be made based on its responsiveness by applying the evaluation criteria. In the event that only one offer is responsive, UNIDO shall ensure that the price is reasonable and consistent with the market rates for items of a similar nature and represents value for money.

Company submitting proposal		Yes	No
1.1	Qualification requirements, authorisations and financial capacity along with technical compliance of bid documentation (i.e. legally authorized to perform construction works in Iran incl. valid construction license). This may include submission of company profile.	Exclusion criteria – non-compliance or non-response for any factor means not qualified	
Qualified			
Specifications, Supply and Performance		Yes	No
2.1	Understanding of – and conformity to the scope of services: This will include technical proposal including work plan, implementation plan and safety plan complying with the technical needs of the proposed PV power plant in the refugee settlement and project’s aim given in this ToR.		
2.2	Evidence of three (3) turn-key PV power plant projects implemented in the past 5 years proving relevant experience. This can be submitted in different formats such as short summary report, contracts or reference letters with contact details of the client (see Annex III guidelines).		
2.3	Meeting the technical requirements of the equipment and services given in the Section 3 of this ToR and in BOQ.		
Technically acceptable			

The Technical Proposal must also include documentation that will allow a line-by-line verification of the item criteria listed in the RFP descriptions.

Annex III: Experience/previous contracts

No	Name of the Employer/Client (Address and contact details)	Name and location of the work	Contract start and completion Dates		Contract value or Contract Price (USD)	Contract value undertaken by you (USD)	
1							
2							
3							

Note:

1. Bidders to provide documentary evidence of a minimum of 3 reference works awarded and served within the past 5 years proving relevant experience in supplying any of the items/equipment/services/training offered in response to this RFP.
2. Bidders are required to complement the information in the table above with a copy of the respective Contract/purchase order(s) if available.
3. Information provided on each contract shall clearly indicate the type and quantities of items and technical specifications.

Annex IV: Client References

No	Name of the Client	Postal Address	Telephone	Email address	Contact name	Website (if any)
1						
2						

Annex V: Geographical location and coordinates of the target settlement in Saveh

This settlement is located 25 km east of Saveh city in Markazi province. It is built on a land area of about 500 hectares. There is an access road to the city, which has been asphalted.



Figure 1- Geographical location (Source: Google Maps)

Annex VI: Weather and Solar Irradiation in Saveh

Weather: Markazi is one of the coldest regions in Iran with an average daily high temperature of only 22°C. The climate widely corresponds to Central European weather conditions. It is cold, wet, with a few summer months. Several months of the year, it is warm to hot at temperatures continuously above 25°C, sometimes up to 37°C (WorldData, 2020).

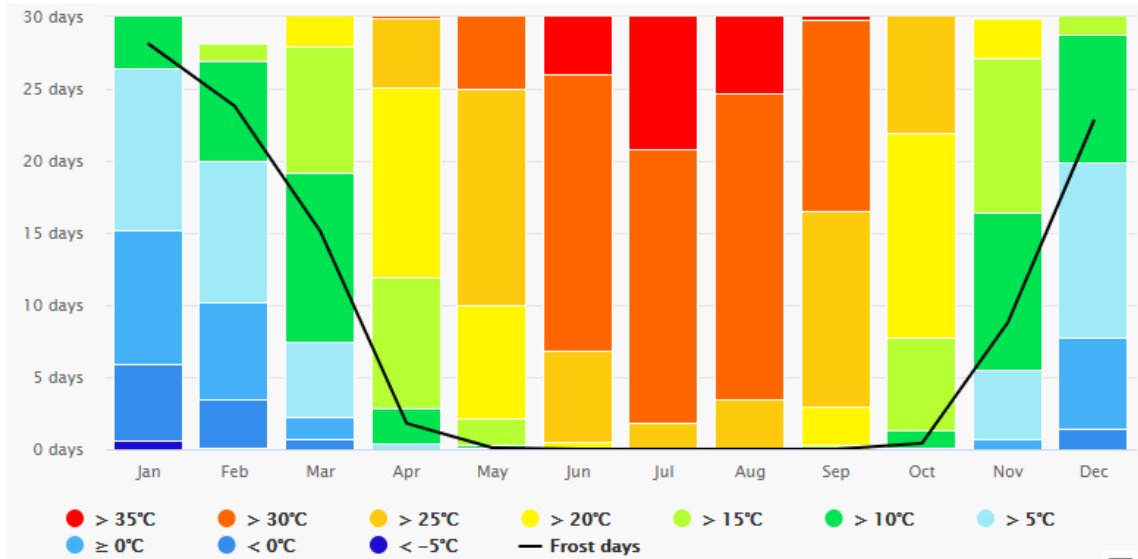


Figure 2- The maximum temperature diagram for Saveh province (Source: Meteoblue, 2020)

The yearly rainy period lasts for around 7.3 months between October – May. In this period, around 30-days-long heavy rain period is observed in November with the average total accumulation of 28 millimeters of rainfall. The rainless period of the year lasts for 4.7 months, from May to October. The least rain falls around mid-July, with an average total accumulation of only 3 millimeters. (Weatherspark, 2020).

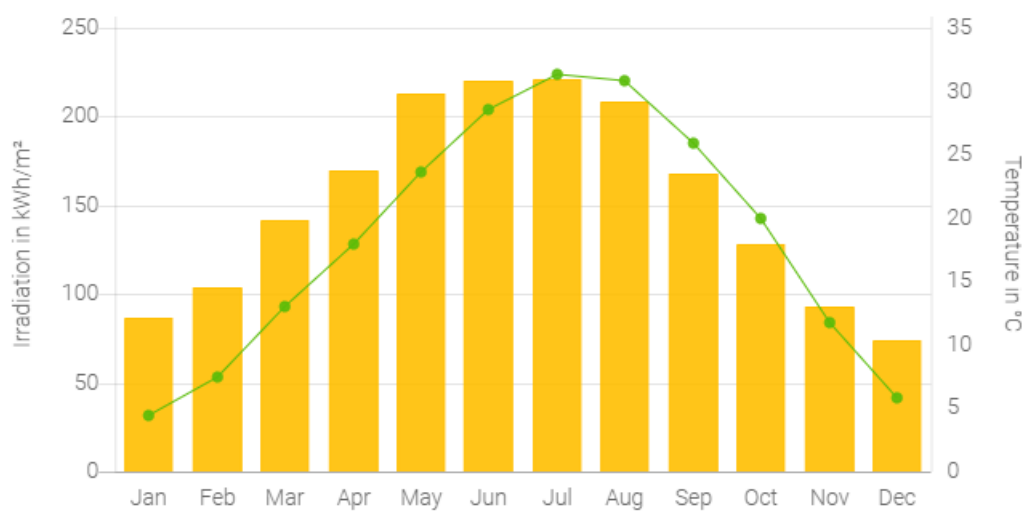


Figure 3- Yearly irradiation (kWh) per m² in Markazi (Source: PVSOL)

The annual global irradiation in giving location is 1.724 kWh/m². On average, during summer months, the irradiation is the highest at the amount of 225 kWh/m² per month.