

7 MW Kvernaki Solar Power Project Feasibility Study Parameters

Project Overview

The project represents USD 3.7 million renewable energy investment for 7 MW Solar power station in the village of Plavi, Gori municipality, Georgia. Developer, LKS Solar LLC is Georgian resident company, established in 2018. It is jointly owned by Georgian and Polish entities, 50–50%, which are involved in the developing and operating of solar and wind power generation. The Polish shareholder company “Polwind” operates in more than 5 countries, has implemented more than 400 projects, with a total installed capacity of over 1000 MW.

Project Outline

Project Size:	7MW
Generation per year:	9,920,000 kWh/year
Tariff per kWh:	USD 0.06
Total Investment Cost:	USD 3.7 M

Project Location Details

Located in Gori municipality, in Shida Kartli region (Coordinates: 41° 58' 47.48" N, 44° 07' 59.51" E). The area of the territory is 15 ha. The transformer connected to the power grid is located in 800 m.



Technical Details

The project involves 7 MW solar farm in Gori municipality. The estimated annual output is 9,920,000 kWh/Year. The estimated lifespan of the project is 25 years. The capacity factor of the project is expected to be 14.50%. The project envisages a connection to the distribution network with 35 kV substation. The initial interconnection conditions were proposed by the distribution system operator “Energo-Pro Georgia”.

Environmental Impacts

Selected site is not within or immediate vicinity of protected area and/or emerald site and/or habitat for threatened or endangered species.

Main impacts of the project in the construction and operation phases include emissions of carbon monoxide, nitrogen oxide, particulate matter, also suspended dust due to transport, construction equipment and generators; land use change and land degradation, soil contamination with oils, petroleum; intensive water use and deterioration of surface water quality; waste generation, including hazardous; noise. All the stated impacts can be mitigated/ minimized with proper measures. The project will reduce carbon emission (CO² equivalent emission reduction) by 77,800 tons.

Permitting and Timing

Memorandum of Understanding is expected to be signed by 2021, planned date of commencement of operation is 2023.

Priority will be given to the employment of local people during the construction phase. During the operation phase, it is expected to employ up to 25 people.

Parameters for Feasibility Study

Technical, Economic and Environmental Parameters		
General Information		
1	Project Name	Kvernaki
2	Project Installed Capacity (MW)	7 MW
3	Project Location (Region)	Shida Kartli, Gori Municipality
4	Investor/Developer (Company Name)	LKS Solar, LLC
5	Estimated Total Initial Investment (USD)	3,732,624 USD
6	Distance to the Transformer (km)	0.8 km.
7	Project Development Stage	Initial
8	Status of Feasibility Study	Pre-feasibility
9	Date of signing MoU/Estimated Date	2021
10	Planned Date of Commencement of Operation	2023
Technical Parameters		
1	Installed PV plant Capacity (kWp)	7,000 kWp
2	Type of PV modules	Same
2.1	Type 1	Monocrystalline Silicone (c-Si)
2.2	Type 2	N/A
3	Type of Mounting System	Fixed Mounting, Free Standing
4	Estimated Annual Output (kWh/Year)	9,920,000 kWh
5	Estimated Lifespan (Years)	25 Years
6	Certification and Tests – Modules and Inverter	N/A
7	Module Warranty (Years)	10 Years
8	End-of-life Recycling	Yes
9	Type of Battery (if any)	N/A
9.1	Battery Storage Total Size (kWAC)	N/A
10	Availability (%)	99%

11	Capacity Factor (%)	14.50%
12	PV modules Conversion Efficiency (Average)	Max 19.3 %
13	Performance Ratio (%)	81.7%
14	Average Annual Irradiation (kWh/m ²)	1721 kWh/m ²
15	Annual Sunlight (hours)	1,417 Hours
16	Type of Inverter	String Inverter
16.1	Inverter Euro Efficiency (%)	97.5%
17	DC/AC Loss (%)	4.5% / 1.0%
18	Access to road (yes/no)	Yes
Grid Connection		
1	Connection	New
2	Preliminary Response of TSO/DSO on availability of free capacity for connection (Yes/No)	Yes
3	Preliminary Response of TSO/DSO on possibility for connection (Yes/No)	Yes
4	Connection to Distribution Network (yes/no)	Yes
4.1	Deep Connection to 110/ 35/ 6-10 kV Line (yes/no)	Yes
4.2	Overall Connection Route Length from Plant to Connection Point (km)	0.8 km.
4.3	Cell Arrangement in 110/ 35/ 6-10 kV Substation	35 kV
5	Connection to Transmission Network (yes/no)	No
5.1	Standard Connection (yes/no)	No
5.2	Deep Connection to 500/ 400/ 330/ 220/ 110/ 35/ 6-10 kV Line	N/A
5.3	Cell Arrangement in 500/ 400/ 330/ 220/ 110/ 35/ 6-10 kV Substation	N/A
5.4	Non-Standard Connection (yes/no)	No
6	Access to road (yes/no)	Yes
Economic Parameters		
1	PV System Cost (USD/kWh)	400 USD/kWh
3	Total Cost of Grid Connection (USD)	15,000 USD
4	Battery Storage Cost (USD)	N/A
5	O&M Cost (% of total capital cost)	3%
6	Land Cost (USD/kW)	2 USD/kW
7	IRR (%)	10%
8	Type of Financing (Loan/Grant/Equity/etc.)	Debt & Equity
9	Debt/Equity Ratio (%)	30%/70%
10	Debt Term (Years)	10 Years
11	Interest Rate (%)	6%
12	PPA Price (USc/kWh)	5.108 USc/kWh / 6 USc/kWh *
13	PPA Term (Years)	10 Years

14	PPA Term (Months in a Year)	12 Months / 8 Months *
Environmental Parameters		
1	Area of the project (m ²)	140,000 m ² (14 ha)
2	GIS coordinates and description of the project area alternatives	X Y 41.981198 - 44.129952 41.982555 - 44.144002 41.978703 - 44.141033 41.977046 - 44.130746 All alternative locations are in Gori region with the nearest settlement within 1km distance, alternative sites are free of forest cover, though land use category prioritization is subject to further analysis
3	Proximity to the Protected Area and/or Emerald Site and/or habitat for threatened or endangered species	Selected site is not within or immediate vicinity of Protected Area and/or Emerald Site and/or habitat for threatened or endangered species
4	Water use (Yes/No)	Yes
4.1	If YES, Specify the Source of Water	Reservoir
5	Environmental impacts for project phases - Construction, Operation and Maintenance and Demolition (Please provide your description)	Main impacts of the project in the construction and operation phases include emissions of carbon monoxide, nitrogen oxide, particulate matter, also suspended dust due to transport, construction equipment and generators; land use change and land degradation, soil contamination with oils, petroleum; intensive water use and deterioration of surface water quality; waste generation, including hazardous; noise. All the stated impacts can be mitigated/minimized with proper measures.
6	Carbon emission reduction (CO ₂ equivalent emission reduction)	77,800 Tons
7	Screening decision	Not Submitted
8	Environmental decision	Not Submitted

*PPA Price and terms: 6 Usc/kWh – offtake for 8 months per year, for 10-year period.
 5.108 Usc/kWh – offtake for 12 months, for 10-year period.