

# 31 ASSEMBLY FOR SOLAR GADGETS



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## 1. INTRODUCTION

The project, "Assembly of Solar Gadgets," presents an opportunity for micro and small-scale investments in the picturesque region of Uttarakhand, India. Uttarakhand's abundant sunlight resources and the growing demand for eco-friendly and renewable energy solutions make it an ideal location for this venture. This profile serves as a valuable reference for potential entrepreneurs interested in harnessing the potential of the solar gadget assembly industry in Uttarakhand.

## 2. PRODUCT & ITS APPLICATION

The primary objective of the "Assembly of Solar Gadgets" project is to manufacture and assemble a range of solar-powered devices and gadgets. These solar gadgets find applications in various sectors, including:

- **Residential Use:** Solar-powered lighting solutions, portable chargers, and home automation systems, offering sustainable and energy-efficient alternatives for homeowners.
- **Rural Electrification:** Providing off-grid and remote rural areas in Uttarakhand with access to solar lanterns and solar home lighting systems, addressing energy poverty.
- **Agriculture:** Solar-powered irrigation systems and agricultural gadgets for enhancing farm productivity and sustainability.
- **Educational and Institutional:** Solar gadgets for educational institutions, including solar-powered calculators, demonstration kits, and solar-powered science projects.
- **Tourism and Outdoor Activities:** Solar gadgets such as solar backpacks with charging ports, solar camping gear, and solar-powered water heaters for tourists and outdoor enthusiasts.

## 3. DESIRED QUALIFICATION FOR PROMOTER

Prospective promoters establishing an "Assembly of Solar Gadgets" venture in Uttarakhand require technical expertise in electronics or electrical engineering, coupled with business acumen for financial management and marketing. They need market knowledge of local trends, sustainable manufacturing practices, and adherence to quality standards. Established local networks with suppliers and distributors are crucial, along with a commitment to delivering high-quality solar gadgets and reliable after-sales service. Additionally, an entrepreneurial spirit and vision for business growth are essential traits for success in the renewable energy sector.

## 4. INDUSTRY OUTLOOK AND TRENDS

The "Assembly of Solar Gadgets" industry in Uttarakhand is set for expansion due to several factors. Rising environmental consciousness and the benefits of renewable energy are driving demand for solar gadgets. Government initiatives promoting solar adoption in rural and off-grid areas provide opportunities. Addressing electricity access in remote regions further boosts the market. Ongoing technological advancements enhance the efficiency and affordability of solar gadgets. Uttarakhand's tourism and adventure sports sectors create a demand for solar-powered outdoor equipment. Additionally, educational efforts promoting renewable energy contribute to increased adoption of solar gadgets among individuals and institutions. These trends collectively propel the growth of the solar gadget assembly industry in Uttarakhand.

Here are some other solar industry statistics:

- In 2021, solar PV led the India Solar Energy Market.
- In 2022, the global solar PV market saw record-breaking installations of around 191 GW. This was the largest annual capacity increase ever recorded.
- In 2022, the global solar power market was valued at US\$170 billion. It is expected to grow to US\$678.81 billion by 2032.
- In India, the solar power market is expected to grow at a CAGR of 34.24% between 2022 and 2027.
- In India, solar module manufacturing capacities were announced to exceed 39 GW at the end of September 2022. This is expected to reach approximately 95 GW by the end of 2025.

## 5. MARKET POTENTIAL AND MARKETING ISSUES; IF ANY

The "Assembly of Solar Gadgets" project in Uttarakhand has promising market potential driven by several factors. The region's ample sunlight and increasing awareness of renewable energy contribute to growing solar adoption. Solar gadgets address rural electrification needs in off-grid areas and cater to tourists and adventure enthusiasts in Uttarakhand's tourism sector. Educational institutions also present a steady market segment for solar gadgets. However, entrepreneurs may encounter marketing challenges, including competition, ensuring quality assurance, distribution logistics, consumer education, seasonal demand fluctuations, regulatory compliance, and cost competitiveness. Overcoming these issues through differentiation, quality control, efficient distribution, consumer education, strategic planning, and cost management is essential for success in the solar gadget industry in Uttarakhand.

Some of existing players in similar business:

- **Bharat Solar System:** 112, salempur industrial area, Ramnagar, Roorkee, Uttarakhand - 247667, India
- **Abhishek Solar Industries Pvt. Ltd.:** Mesra P.O, Vikas Neori, Beside premchand Mahto School, Ranchi, Jharkhand 835217. Call:+91-943-110-3421, +91-651-291-2624
- **Servokon Systems Ltd:** C-13 Servokon House, Radhu Palace Road, Laxmi Nagar, Delhi - 110092 (Near By V3s Mall)
- **B&D Solar:** Kargi Road, Pathribagh Chowk, Kargi Road, Dehradun - 248001 (Opposite Capital Paradise)

## 6. RAW MATERIAL REQUIREMENTS

The "Assembly of Solar Gadgets" project requires various raw materials and components for manufacturing solar-powered gadgets. These include:

- **Solar Photovoltaic Cells (PV Cells):** These are the primary components responsible for converting sunlight into electrical energy. High-quality PV cells are essential for efficient energy generation.
- **Battery Packs:** Rechargeable battery packs store the energy generated by the PV cells for use during non-sunlight hours.
- **Electronic Components:** Various electronic components, including inverters, charge controllers, and voltage regulators, are required to manage and distribute electrical energy efficiently.
- **Solar Panels:** Solar panels, also known as solar modules, provide a platform for mounting PV cells and capturing sunlight.
- **Enclosures and Housings:** Enclosures made of durable materials protect the internal components of solar gadgets from environmental factors.

- **Connectors and Wiring:** Connectors and wiring are necessary for interconnecting various components within the solar gadgets.
- **Casing and Packaging Materials:** Packaging materials and casings are required for the final assembly of solar gadgets, ensuring protection during transportation and use.
- **User Interfaces and Controls:** Depending on the type of solar gadget, user interfaces and control panels may be required for user interaction and monitoring.
- **Solar Gadgets Specific Components:** Components specific to the type of solar gadget being manufactured, such as LED lights for solar lanterns or heating elements for solar water heaters.

#### Some of suppliers of raw materials:

- Lightsun Energy Solution, Chakrata Road, Dehradun KTY, Dehradun - 248001 (Sahaspur, Near Veshno Mata Mandir)
- Pandit G Solar Sales And Service: Inder Road, Dalanwala, Dehradun KTY, Dehradun - 248001 (Near Auto Stand)
- Swastik Group Of Industries: Unit No-229 2nd Floor, Gurgaon Sector 48, Gurgaon - 122001 (Inside Jmd Megapolis)
- Jakson Solar: A-43, Phase II Extension, Noida Phase 2, Noida - 201305

## 7. MANUFACTURING PROCESS

The manufacturing process for assembling solar gadgets involves sourcing high-quality components, assembling solar panels, integrating electronics and batteries, assembling enclosures, conducting quality control checks, packaging, and distributing the gadgets. Components such as solar PV cells and battery packs are procured from reputable suppliers. PV cells are mounted on panels, and electronic components are integrated into the gadget's circuitry. Rechargeable batteries are connected, and components are enclosed for durability. Quality checks ensure performance and safety, followed by packaging and distribution to target markets like rural areas, tourism, education, and adventure sectors.

The Bureau of Indian Standards (BIS) is India's national standards body. Some BIS standards for solar gadgets include:

- **Solar cookers:** Grade A cookers have an F1 of at least 0.12, and Grade B cookers have an F1 of at least 0.11.
- **Solar PV modules:** IS/IEC 61730-2: 2016
- **Inverters:** IS 16169: 2019/IEC 62116: 2014
- **PV modules:** IS/IEC 61730 (Part 1) and IS/IEC 61730 (Part 2)

The BIS Care app can provide information on Indian standards, licenses, and laboratories.

## 8. MANPOWER REQUIREMENT

Sr. No	Particulars	No.	No of month in year	Wages/Salaries per month (Rs. In Lakhs)	Annual Expense (Rs. In Lakhs)
1	Self-employed	1	-	-	-
2	Skilled Person	2	12	0.2	4.8
3	Semi-skilled Person	3	12	0.15	5.4
4	Unskilled	2	12	0.12	2.88
	<b>Total</b>				<b>13.08</b>



## 9. IMPLEMENTATION SCHEDULE

Sr. No.	Activity	Time Required (in months)
1	Acquisition of premises	1
2	Construction (if applicable)	1.5
3	Procurement & installation of Plant & Machinery	2.5
4	Arrangement of Finance	1
5	Recruitment of required manpower	1
6	Total time required (some activities shall run concurrently)	3

## 10. COST OF PROJECT

Sr. No	Particulars	Annual Expenses (Rs. in lakhs)
1	Land	-
2	Building (Rented)	-
3	Plant & Machinery	10.10
4	Equipment and Furniture Exp.	1.55
5	Misc. Fixed Asset	0.02
6	Preoperative & Preliminary Exp.	0.20
7	Working Capital	7.08
	<b>Total Project Cost</b>	<b>18.95</b>

## 11. MEANS OF FINANCE

Bank-term loans are assumed @ 60%

Sr. No.	Particulars	Annual Expenses (Rs. in lakhs)
1	Promoter's contribution	7.58
2	Bank Finance	11.37
	<b>Total</b>	<b>18.95</b>

## 12. LIST OF MACHINERY REQUIRED

### A. Machinery

Sr. No	Particulars	Unit	Price per Unit (Rs. in lakhs)	Total Amount (Rs. in lakhs)
1	Solar Cell Cutting Machine	set	2.00	2.00
2	Battery Testing Equipment	set	0.60	0.60
3	Soldering Stations	set	0.25	0.25
4	Solar Panel Laminator	set	1.50	1.50
5	Inverter Assembly Line	set	0.80	0.80
6	Quality Control and Testing Equipment	set	1.00	1.00
7	Battery Charging and Discharging Machine	set	0.40	0.40
8	Electronics Assembly Equipment	set	0.70	0.70
9	Solar Tracking System Installation Tools	set	0.30	0.30

10	Packaging Machinery	set	0.40	0.40
11	Material Handling Equipment	set	0.45	0.45
12	Workshop Tools and Safety Equipment	set	0.20	0.20
<b>Total Amount</b>				<b>8.60</b>
Tax, Transportation, Insurance etc.				1.00
Electrification Exp.				0.50
<b>Grand Total Amount</b>				<b>10.10</b>

1. Suryam Solar Energy  
Plot No. 1643, G.I.D.C.-2,  
Sabalpur, Rajkot Highway,  
Junagadh-362037, Gujarat, India
2. Akshar Enterprise  
Plot No. 4, Shiv Aradhna Industrial Estate,  
Kathlal Road, Kuha, Ahmedabad - 382433,  
Gujarat, India
3. Indygreen Technologies Private Limited  
B-126, 2nd Floor, Phase 1,  
Mayapuri Industrial Area Phase 1,  
New Delhi-110064, Delhi, India
4. Incisive Web Solution Private Limited  
208,S.F,sharan business,  
Sector-26, D-mart, Pethapur,  
Gandhinagar-382041, Gujarat, India

#### B. Furniture & Equipment

Sr. No	Particulars	Unit	Price per Unit (Rs. in lakhs)	Total Amount (Rs. in lakhs)
1	Office Furniture and Workstations	set	0.50	0.50
2	Storage Cabinets and Shelving Units	set	0.25	0.25
3	Computer Systems and IT Equipment	set	0.80	0.80
	<b>Total Rs.</b>			<b>1.55</b>

#### 13. PROFITABILITY CALCULATIONS

Sr. No	Particulars	Annual Expenses (Rs. in lakhs)
A.	Sales realisation	85.00
B.	Cost of production	
i)	Raw materials	55.25
ii)	Utilities	1.50
iii)	Manpower Cost (Salaries/wages)	13.08
iv)	Administrative expenses	0.70
v)	Packaging Cost	2.76

vii)	Selling & distribution expenses	1.44
viii)	Repairs & maintenance	0.00
ix)	Rent	0.40
x)	Interest	1.29
xi)	Misc. expenses	0.00
	Total (B)	79.19
	Gross profit/loss (A – B)	5.81
	Less: Depreciation	1.09
C.	PBIT	4.72
D.	Income-tax	-
E.	Net profit/loss	4.72
F.	Repayment (Annual)	1.09
G.	Retained surplus (E-F )	3.63

#### 14. BREAKEVEN ANALYSIS

<b>Fixed Cost</b>	
Land & Building Rent	0.40
Depriciation	1.09
Interest	1.29
Manpower	3.92
<b>Total Fixed cost</b>	<b>6.71</b>
<b>Variable cost</b>	
Raw materials	55.25
Utilities	1.50
ManPower	9.16
Administrative expenses	0.70
Selling & distribution expenses	1.44
<b>Total Variable cost</b>	<b>68.05</b>
<b>Contribution margin</b>	<b>20%</b>
Break-Even Point in Value	33.54

#### 15. STATUTORY/GOVERNMENT APPROVALS

To establish and operate an "Assembly of Solar Gadgets" project in Uttarakhand, entrepreneurs must navigate various statutory and government approvals. These approvals are crucial to ensure compliance with local regulations and promote the sustainable growth of the business. Here is a list of key approvals and permits:

- A. Business Registration:** Register the business entity with the appropriate government authorities, such as the Registrar of Companies (ROC) for private limited or LLP registration.
- B. Factory License:** Depending on the scale of operations, acquire a factory license from the State Directorate of Factories and Boilers.
- C. Environmental Clearances:** Ensure compliance with environmental regulations and obtain necessary clearances from the State Pollution Control Board (SPCB) for environmentally friendly operations.

- D. Goods and Services Tax (GST) Registration:** Register for GST with the Goods and Services Tax Network (GSTN) to comply with India's indirect tax system.
- E. Import-Export Code (IEC):** If dealing with international trade, obtain an Import-Export Code (IEC) from the Directorate General of Foreign Trade (DGFT) for importing or exporting solar components.
- F. Quality Standards Compliance:** Ensure that the solar gadgets meet the requisite quality standards and obtain certifications such as the Bureau of Indian Standards (BIS) certification.

## 16. BACKWARD AND FORWARD INTEGRATIONS

### A. Backward Integration

Backward integration in the "Assembly of Solar Gadgets" project involves activities that bring the business closer to the source of raw materials and enhance control over the supply chain. Potential strategies for backward integration include:

- 1. Solar Cell Manufacturing:** Consider investing in or collaborating with solar cell manufacturers to secure a consistent and cost-effective supply of solar photovoltaic cells.
- 2. Battery Production:** Establish or partner with battery manufacturing units to ensure a reliable supply of high-quality battery packs for solar gadgets.
- 3. Electronic Component Production:** Explore the possibility of manufacturing electronic components in-house, including charge controllers and inverters, to control quality and reduce dependency on external suppliers.

### B. Forward Integration

Forward integration focuses on activities that take the "Assembly of Solar Gadgets" business closer to end customers and markets. Potential strategies for forward integration include:

- 1. Retail Outlets:** Establish dedicated retail outlets or showrooms in prominent locations within Uttarakhand to showcase and sell solar gadgets directly to customers.
- 2. Online Sales:** Develop a strong online presence through an e-commerce platform to reach a broader customer base, offering the convenience of online shopping.
- 3. Export Opportunities:** Explore the export market for solar gadgets, capitalizing on Uttarakhand's proximity to major cities and potential export hubs.
- 4. Maintenance and After-Sales Services:** Offer maintenance and after-sales services to ensure the long-term performance and satisfaction of customers, enhancing brand reputation.

## 17. TRAINING CENTERS AND COURSES

For individuals and entrepreneurs interested in entering the solar gadget assembly industry in Uttarakhand, there are training centers and courses available to acquire the necessary knowledge and skills. These resources are instrumental in building expertise and understanding the nuances of solar technology. Here are some training centers and courses:

1. National Institute of Solar Energy (NISE):
  - NISE, an autonomous institution under the Ministry of New and Renewable Energy (MNRE), offers various training programs and courses related to solar energy technology. These programs cover topics such as solar photovoltaics, solar thermal systems, and design and installation of solar systems.
2. Government Industrial Training Institutes (ITIs):
  - ITIs in Uttarakhand provide courses in electrical and electronics engineering. These programs offer a foundational understanding of electrical circuits, components, and systems, which are essential for working with solar gadgets.



### 3. Renewable Energy Training Centers:

- Several renewable energy training centers and organizations conduct workshops and training sessions focused on solar technologies. These programs can range from basic introductions to advanced technical training.

### 4. Solar Equipment Manufacturers' Training:

- Some solar equipment manufacturers and suppliers offer training programs to individuals interested in assembling and maintaining solar gadgets. These programs provide insights into the specifics of the equipment they produce.

### 5. Online Solar Courses:

- Numerous online platforms offer solar energy courses, which are accessible to individuals nationwide. These courses cover a wide range of topics, including solar technology, system design, and installation.
- Swayam portal (link: <https://swayam.gov.in/>) can also be accessed for enhanced learning on business commerce, accounting, production, marketing, and areas of entrepreneurship.

Prospective entrepreneurs and individuals interested in the solar gadget assembly industry should explore these training options to gain the necessary skills and knowledge. These courses can empower individuals to design, assemble, and maintain solar gadgets effectively, contributing to the growth of the renewable energy sector in Uttarakhand.

#### **Disclaimer**

Only few machine manufacturers/institutes are mentioned in the profile, although many machine manufacturers/institutes are available in the market. The addresses given for machinery manufacturers/institutes have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.