

Solar Photovoltaic Module Industry

Solar PV Module

Manufacturing Plant, Detailed Project Report, Profile, Business Plan, Industry Trends, Market Research, Survey, Manufacturing Process, Machinery, Raw Materials, Feasibility Study, Investment Opportunities, Cost and Revenue, Plant Economics, Production Schedule, Working Capital Requirement, Plant Layout, Process Flow Sheet, Cost of Project, Projected Balance Sheets, Profitability Ratios, Break Even Analysis

Introduction

PV IS EMERGING AS A MAJOR POWER RESOURCE, STEADILY BECOMING MORE AFFORDABLE AND PROVING TO BE MORE RELIABLE THAN UTILITIES. THE PHOTOVOLTAIC EFFECT IS THE BASIC PRINCIPAL PROCESS BY WHICH A PV CELL CONVERTS SUNLIGHT INTO ELECTRICITY. WHEN LIGHT SHINES ON A PV CELL, IT MAY BE REFLECTED, ABSORBED, OR PASS RIGHT THROUGH. THE ABSORBED LIGHT GENERATES ELECTRICITY.

A SOLAR PV MODULE IS NORMALLY SERIES CONNECTED SUFFICIENT NUMBER OF SOLAR CELLS TO PROVIDE REQUIRED STANDARD OUTPUT VOLTAGE AND POWER.

THE SOLAR MODULES OR PV MODULES ARE COMMERCIALLY AVAILABLE BASIC BUILDING BLOCK OF A SOLAR ELECTRIC POWER GENERATION SYSTEM. IN A SOLAR MODULE THE SOLAR CELLS ARE CONNECTED IN SAME FASHION AS THE BATTERY CELL UNITS IN A BATTERY BANK SYSTEM. THAT MEANS POSITIVE TERMINALS OF ONE CELL CONNECTED TO NEGATIVE TERMINAL VOLTAGE OF SOLAR MODULE IS SIMPLE SUM OF THE VOLTAGE OF INDIVIDUAL CELLS CONNECTED IN SERIES IN THE MODULE.

A PHOTOVOLTAIC SOLAR MODULE IS A SET OF ELECTRICALLY CONNECTED SOLAR CELLS. ITS PURPOSE IS THE GENERATION OF ELECTRIC CURRENT. SOLAR CELLS CAN BE MANUFACTURED FROM DIFFERENT MATERIALS. MOSTLY MONO-CRYSTALLINE OR POLY-CRYSTALLINE SILICON IS USED.

SOLAR MODULES USE LIGHT ENERGY (PHOTONS) FROM THE SUN TO GENERATE ELECTRICITY THROUGH THE PHOTOVOLTAIC EFFECT. THE MAJORITY OF MODULES USE WAFER-BASED CRYSTALLINE SILICON CELLS OR THIN-FILM CELLS BASED ON CADMIUM TELLURIDE OR SILICON. THE STRUCTURAL (LOAD CARRYING) MEMBER OF A MODULE CAN EITHER BE THE TOP LAYER OR THE BACK LAYER. CELLS MUST ALSO BE PROTECTED FROM MECHANICAL DAMAGE AND MOISTURE. MOST SOLAR MODULES ARE RIGID, BUT SEMI-FLEXIBLE ONES ARE AVAILABLE, BASED ON THIN-FILM CELLS.

SOLAR PV MODULE PANELS COMPRISE THE SOLAR LIST OF A PV SYSTEM WHICH GENERATES AS WELL AS SUPPLIES SOLAR ENERGY IN RESIDENTIAL AND COMMERCIAL APPLICATIONS. MODULES ARE RATED BY DC OUTPUT ENERGY UNDER STANDARD EXAMINE CONDITIONS AS WELL AS USUALLY RANGES FROM 110 - 365 WATTS.

WORLDWIDE GROWTH OF PHOTOVOLTAIC HAS BEEN FITTING AN EXPONENTIAL CURVE FOR MORE THAN TWO DECADES. DURING THIS PERIOD OF TIME, PHOTOVOLTAIC (PV), ALSO KNOWN AS SOLAR PV, HAS EVOLVED FROM A PURE NICHE MARKET OF SMALL SCALE APPLICATIONS TOWARDS BECOMING A MAINSTREAM ELECTRICITY SOURCE. FOR 2015, WORLDWIDE DEPLOYMENT OF ABOUT 55 GW IS BEING FORECASTED, AND INSTALLED CAPACITY IS PROJECTED TO MORE THAN DOUBLE OR EVEN TRIPLE BEYOND 500 GW BETWEEN NOW AND 2020. BY 2050, SOLAR POWER IS ANTICIPATED TO BECOME THE WORLD'S LARGEST SOURCE OF ELECTRICITY, WITH SOLAR PHOTOVOLTAIC AND CONCENTRATED SOLAR POWER CONTRIBUTING 16 AND 11 PERCENT, RESPECTIVELY. THIS WILL REQUIRE PV CAPACITY TO GROW TO 4,600 GW, OF WHICH MORE THAN HALF IS FORECASTED TO BE DEPLOYED IN CHINA AND INDIA.

INDIA'S SUSTAINED GROWTH HAS PLACED ENORMOUS DEMAND ON THE COUNTRY'S NATURAL RESOURCES. TODAY, INDIA IMPORTS SUBSTANTIAL QUANTITIES OF GAS, OIL AND COAL IN ORDER TO MEET ITS GROWING ENERGY DEMAND. THE INCREASING DEPENDENCE ON IMPORTED FUELS CREATES A SERIOUS THREAT TO THE ENERGY SECURITY OF THE COUNTRY. IN ADDITION, THE COUNTRY'S 254 GW OF POWER GENERATION CAPACITY BASED ON CONVENTIONAL SOURCES HAS FURTHER STRAINED THE NATURAL RESOURCES AND DEGRADING THE ENVIRONMENT. INDIA SOLAR CAPACITY FORECAST FOR 2020 RAISED BY 240%.

DOMESTIC DEMAND FOR GRID CONNECTED PV POWER IS EXPECTED TO BE SUPPORTED BY THE SOLAR RENEWABLE PURCHASE OBLIGATIONS OF POWER DISCOMS, OPEN ACCESS CONSUMERS AND CAPTIVE POWER CONSUMERS. DOMESTIC SOLAR PV INSTALLATIONS GREW RAPIDLY IN THE LAST TWO FINANCIAL YEARS BENEFITTING FROM THE FAVOURABLE CENTRAL/STATE GOVERNMENT POLICIES. IN ADDITION, PV POWER TARIFF HAS FALLEN GRADUALLY BECAUSE OF THE AGGRESSIVE TARIFF BIDS OF THE PROJECT DEVELOPERS.

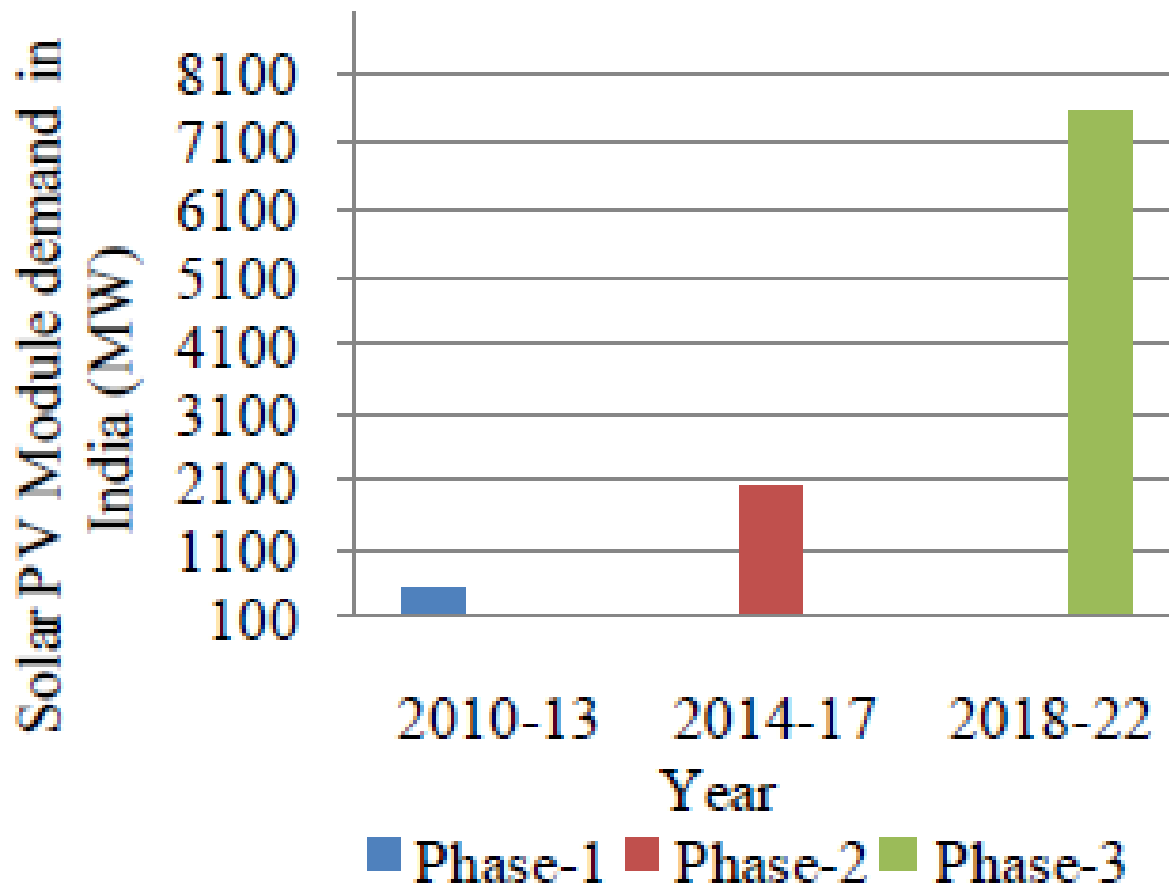
SOLAR PHOTOVOLTAIC IN INDIA – PRESENT STATUS AND FUTURE POSSIBILITIES

INDIA LIES IN A SUNNY TROPICAL BELT (HIGH ISOLATION). ITS TOTAL THEORETICAL AVAILABLE POTENTIAL IS ANNUALLY OVER 5000 TRILLION KWH. EXPLOITED POTENTIAL (PRODUCTION/INSTALLED CAPACITY) IS VERY LITTLE INCLUDING TOTAL INSTALLED CAPACITY (GRID & OFF GRID) OF APPROXIMATE 110MW AND THAT ONLY ABOUT 17.82MW (AS OF DEC 2010) IS GRID CONNECTED (AS OF JAN 2011).

Solar PV Module Demand in India

Phase 1	2010-2013	500 MW
Phase 2	2014-2017	2000 MW
Phase 3	2018-2022	7500 MW

Source: International Journal of Electrical, Electronics and Computer Systems (IJEECS)



Source: International Journal of Electrical, Electronics and Computer Systems (IJEECS)

Solar PV Module Demand in India Phase Wise

2010	2011	2012	2013	2014	2017	2020
13.6GW	20.2 GW	23.8 GW	33 GW	45.3 GW	85 GW	200 GW

Solar PV Module Demand worldwide year wise in GW

Source: International Journal of Electrical, Electronics and Computer Systems (IJECS)

Application Segments	Target for phase 1 2012-2013	Cumulative target for phase 2 2013-2017	Cumulative target for phase 3 2018-2022
Grid solar power includes roof top & small solar project	1100MW	4000MW	20000MW
Off grid solar applications includes rural solar lights	200MW	1000MW	2000MW
Solar collector	7 million sq. metre	15 million sq. metre	20 million sq. metre

Target of installed solar systems in the year 2012-2022[Figure 3.(a) & (b)]

Source: International Journal of Electrical, Electronics and Computer Systems (IJEECS)

Decade	Total capacity (GW)	Capacity Factor (%)	Operation Time (hrs./yr)	Output (TWh)	% of Global Electricity Production
By 2020	148	32	2800	414	1.3
By 2030	337	39	3400	1140	3.8
By 2040	715	45	3900	2790	8.3
By 2050	1089	50	4380	4770	11.3

Growth Forecast for Solar Power

Source: International Journal of Electrical, Electronics and Computer Systems (IJEECS)

State	MW	%
Andhra Pradesh	23.5	1.6
Chhattisgarh	4.0	0.2
Delhi	2.53	0.1
Gujarat	824	57
Haryana	7.8	0.54
Jharkhand	16	1.11
Karnataka	14	0.97
Madhya Pradesh	11.75	0.81
Maharashtra	34	2.35
West Bengal	2	0.13
Orissa	13.0	0.90
Punjab	9.33	0.6
Rajasthan	442.25	30
Tamil Nadu	17.06	1.17
Uttar Pradesh	12.38	0.86
Uttarakhand	5.05	0.35

State wise solar energy capacity in India in
2013

Source: International Journal of Electrical, Electronics and Computer Systems (IJECS)

SOLAR PV MODULES ARE BECOMING POPULAR THESE DAYS AND MORE PEOPLE ARE GETTING THE ELECTRICITY GENERATED FROM THESE PV MODULES. THIS HAS BEEN DISPLAYED TO BE PROFICIENT OF INCREASING EFFICIENCY BY 50 %. WHEN YOU CAN GET THE SOLAR PV MODULE CONNECTED THEN YOU SHOULD NOT WASTE ANY TIME AS THIS IS THE MOST EFFICIENT POWER SAVING MODULE THAT SAVES ELECTRICITY.

Project at a Glance

COST OF PROJECT				MEANS OF FINANCE			
Particulars	Existing	Proposed	Total	Particulars	Existing	Proposed	Total
Land & Site Development Exp.	0.00	135.00	135.00	Capital	0.00	213.05	213.05
Buildings	0.00	248.00	248.00	Share Premium	0.00	0.00	0.00
Plant & Machineries	0.00	278.00	278.00	Other Type Share Capital	0.00	0.00	0.00
Motor Vehicles	0.00	12.00	12.00	Reserves & Surplus	0.00	0.00	0.00
Office Automation Equipments	0.00	39.00	39.00	Cash Subsidy	0.00	0.00	0.00
Technical Knowhow Fees & Exp.	0.00	20.00	20.00	Internal Cash Accruals	0.00	0.00	0.00
Franchise & Other Deposits	0.00	0.00	0.00	Long/Medium Term Borrowings	0.00	639.16	639.16
Preliminary & Pre-operative Exp	0.00	5.00	5.00	Debentures / Bonds	0.00	0.00	0.00
Provision for Contingencies	0.00	27.00	27.00	Unsecured Loans/Deposits	0.00	0.00	0.00
Margin Money - Working Capital	0.00	88.22	88.22				
TOTAL	0.00	852.22	852.22	TOTAL	0.00	852.22	852.22

Project at a Glance

Year	Annualised		Book Value	Debt	Dividend	Retained Earnings		Payout	Probable Market Price	P/E Ratio	Yield Price/ Book Value
	EPS	CEPS	Per Share		Per Share	Per Share				No. of Times	
	`	`	`	`	`	%	`	%	`		%
1-2	5.88	9.54	15.88	24.00	0.00	100.00	5.88	0.00	5.88	1.00	0.00
2-3	8.91	12.10	24.79	18.00	0.00	100.00	8.91	0.00	8.91	1.00	0.00
3-4	11.90	14.68	36.69	12.00	0.00	100.00	11.90	0.00	11.90	1.00	0.00
4-5	14.77	17.21	51.47	6.00	0.00	100.00	14.77	0.00	14.77	1.00	0.00
5-6	17.50	19.63	68.97	0.00	0.00	100.00	17.50	0.00	17.50	1.00	0.00

Project at a Glance

Year	D. S. C. R.			Debt / - Depos its Debt	Equity as- Equity	Total Net Worth	Retur n on Net Worth	Profitability Ratio					Assets Turnov er Ratio	Curre nt Ratio
	Individ ual	Cumulat ive	Overa ll					GPM	PBT	PAT	Net Contri bution	P/V Ratio		
	(Number of times)			(Number of times)		%	%	%	%	%		%		
Initi al				3.00	3.00					a				
1-2	1.38	1.38		1.51	1.51	3.03		8.17%	4.55%	3.16%	847.24	21.35 %	2.95	1.06
2-3	1.71	1.54		0.73	0.73	1.85		9.27%	6.26%	4.10%	984.05	21.25 %	3.11	1.23
3-4	2.10	1.71	2.09	0.33	0.33	1.19		10.01%	7.47%	4.79%	1124.52	21.25 %	3.11	1.44
4- 5	2.56	1.89		0.12	0.12	0.81		10.49%	8.32%	5.29%	1264.99	21.25 %	3.02	1.66
5- 6	3.11	2.09		0.00	0.00	0.57		10.79%	8.91%	5.64%	1405.46	21.25 %	2.87	2.20

Project at a Glance

BEP	
BEP - Maximum Utilisation Year	5
Cash BEP (% of Installed Capacity)	54.79%
Total BEP (% of Installed Capacity)	58.02%
IRR, PAYBACK and FACR	
Internal Rate of Return .. (In %age)	28.94%
Payback Period of the Project is (In Years)	2 Years 3 Months
Fixed Assets Coverage Ratio (No. of times)	13.975

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See more

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Major Queries/Questions Answered in the Report?

- 1. What is Solar PV Module industry ?**
- 2. How has the Solar PV Module industry performed so far and how will it perform in the coming years ?**
- 3. What is the Project Feasibility of a Solar PV Module Plant ?**
- 4. What are the requirements of Working Capital for setting up a Solar PV Module plant ?**

- 5. What is the structure of the Solar PV Module Business and who are the key/major players ?**
- 6. What is the total project cost for setting up Solar PV Module plant ?**
- 7. What are the operating costs for setting up a Solar PV Module plant ?**
- 8. What are the machinery and equipment requirements for setting up a Solar PV Module plant ?**

- 9. Who are the Suppliers and Manufacturers of Plant & Machinery for setting up a Solar PV Module plant ?**
- 10. What are the requirements of raw material for setting up a Solar PV Module plant ?**
- 11. Who are the Suppliers and Manufacturers of Raw materials for setting up a Solar PV Module plant ?**
- 12. What is the Manufacturing Process and Formulations of a Solar PV Module plant ?**

- 13. What is the total size of land required for setting up a Solar PV Module plant ?**
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- 17. What is the Built up Area Requirement and cost for setting up a Solar PV Module Business?**

- 18. What are the Personnel (Manpower) Requirements for setting up a Solar PV Module Business?**
- 19. What are Statistics of Import & Export for Solar PV Module ?**
- 20. What is the time required to break-even?**
- 21. What is the Break-Even Analysis of a Solar PV Module plant?**
- 22. What are the Project financials of a Solar PV Module plant?**

- 23. What are the Profitability Ratios of a Solar PV Module plant?**
- 24. What is the Sensitivity Analysis-Price/Volume of a Solar PV Module plant?**
- 25. What are the Projected Pay-Back Period and IRR of a Solar PV Module plant?**
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Reasons for buying our report:

- **This report helps you to identify a profitable project for investing or diversifying into by throwing light to crucial areas like industry size, market potential of the product and reasons for investing in the product**
- **This report provides vital information on the product like it's characteristics and segmentation**
- **This report helps you market and place the product correctly by identifying the target customer group of the product**

- **This report helps you understand the viability of the project by disclosing details like machinery required, project costs and snapshot of other project financials**
- **The report provides a glimpse of government regulations applicable on the industry**
- **The report provides forecasts of key parameters which helps to anticipate the industry performance and make sound business decisions**

Our Approach:

- **Our research reports broadly cover Indian markets, present analysis, outlook and forecast for a period of five years.**
- **The market forecasts are developed on the basis of secondary research and are cross-validated through interactions with the industry players**
- **We use reliable sources of information and databases. And information from such sources is processed by us and included in the report**

Scope of the Report

The report titled “Solar PV Module”: Market Survey cum Detailed Techno Economic Feasibility Report provides an insight into the Solar PV Module market in India with focus on uses and applications, Manufacturing Process, Process Flow Sheets, Plant Layout and Project Financials of Solar PV Module project. The report assesses the market sizing and growth of the Indian Solar PV Module Industry. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line. And before diversifying/venturing into any product, they wish to study the following aspects of the identified product:

- **Good Present/Future Demand**
- **Export-Import Market Potential**
- **Raw Material & Manpower Availability**
- **Project Costs and Payback Period**

We at NPCS, through our reliable expertise in the project consultancy and market research field, have demystified the situation by putting forward the emerging business opportunity in the Solar PV Module sector in India along with its business prospects. Through this report we have identified Solar PV Module project as a lucrative investment avenue.

Tags

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Who are we?

- *One of the leading reliable names in industrial world for providing the most comprehensive technical consulting services*
- *We adopt a systematic approach to provide the strong fundamental support needed for the effective delivery of services to our Clients' in India & abroad*

We at NPCS want to grow with you by providing solutions scale to suit your new operations and help you reduce risk and give a high return on application investments. We have successfully achieved top-notch quality standards with a high level of customer appreciation resulting in long lasting relation and large amount of referral work through technological breakthrough and innovative concepts. A large number of our Indian, Overseas and NRI Clients have appreciated our expertise for excellence which speaks volumes about our commitment and dedication to every client's success.



We bring deep, functional expertise, but are known for our holistic perspective: we capture value across boundaries and between the silos of any organization. We have proven a multiplier effect from optimizing the sum of the parts, not just the individual pieces. We actively encourage a culture of innovation, which facilitates the development of new technologies and ensures a high quality product.

What do we offer?

- *Project Identification*
- *Detailed Project Reports/Pre-feasibility Reports*
- *Market Research Reports*
- *Business Plan*
- *Technology Books and Directory*
- *Industry Trend*
- *Databases on CD-ROM*
- *Laboratory Testing Services*
- *Turnkey Project Consultancy/Solutions*
- *Entrepreneur India (An Industrial Monthly Journal)*

How are we different ?

- *We have two decades long experience in project consultancy and market research field*
- *We empower our customers with the prerequisite know-how to take sound business decisions*
- *We help catalyze business growth by providing distinctive and profound market analysis*
- *We serve a wide array of customers , from individual entrepreneurs to Corporations and Foreign Investors*
- *We use authentic & reliable sources to ensure business precision*

Our Approach

Requirement collection

Thorough analysis of the project

Economic feasibility study of the Project

Market potential survey/research

Report Compilation

Who do we serve?

- *Public-sector Companies*
- *Corporates*
- *Government Undertakings*
- *Individual Entrepreneurs*
- *NRI's*
- *Foreign Investors*
- *Non-profit Organizations, NBFC's*
- *Educational Institutions*
- *Embassies & Consulates*
- *Consultancies*
- *Industry / trade associations*

Sectors We Cover

- *Ayurvedic And Herbal Medicines, Herbal Cosmetics*
- *Alcoholic And Non Alcoholic Beverages, Drinks*
- *Adhesives, Industrial Adhesive, Sealants, Glues, Gum & Resin*
- *Activated Carbon & Activated Charcoal*
- *Aluminium And Aluminium Extrusion Profiles & Sections,*
- *Bio-fertilizers And Biotechnology*
- *Breakfast Snacks And Cereal Food*
- *Bicycle Tyres & Tubes, Bicycle Parts, Bicycle Assembling*

- *Bamboo And Cane Based Projects*
- *Building Materials And Construction Projects*
- *Biodegradable & Bioplastic Based Projects*
- *Chemicals (Organic And Inorganic)*
- *Confectionery, Bakery/Baking And Other Food*
- *Cereal Processing*
- *Coconut And Coconut Based Products*
- *Cold Storage For Fruits & Vegetables*
- *Coal & Coal Byproduct*

- *Copper & Copper Based Projects*
- *Dairy/Milk Processing*
- *Disinfectants, Pesticides, Insecticides, Mosquito Repellents,*
- *Electrical, Electronic And Computer based Projects*
- *Essential Oils, Oils & Fats And Allied*
- *Engineering Goods*
- *Fibre Glass & Float Glass*
- *Fast Moving Consumer Goods*
- *Food, Bakery, Agro Processing*

- *Fruits & Vegetables Processing*
- *Ferro Alloys Based Projects*
- *Fertilizers & Biofertilizers*
- *Ginger & Ginger Based Projects*
- *Herbs And Medicinal Cultivation And Jatropha (Biofuel)*
- *Hotel & Hospitality Projects*
- *Hospital Based Projects*
- *Herbal Based Projects*
- *Inks, Stationery And Export Industries*

- *Infrastructure Projects*
- *Jute & Jute Based Products*
- *Leather And Leather Based Projects*
- *Leisure & Entertainment Based Projects*
- *Livestock Farming Of Birds & Animals*
- *Minerals And Minerals*
- *Maize Processing(Wet Milling) & Maize Based Projects*
- *Medical Plastics, Disposables Plastic Syringe, Blood Bags*
- *Organic Farming, Neem Products Etc.*

- *Paints, Pigments, Varnish & Lacquer*
- *Paper And Paper Board, Paper Recycling Projects*
- *Printing Inks*
- *Packaging Based Projects*
- *Perfumes, Cosmetics And Flavours*
- *Power Generation Based Projects & Renewable Energy Based Projects*
- *Pharmaceuticals And Drugs*
- *Plantations, Farming And Cultivations*
- *Plastic Film, Plastic Waste And Plastic Compounds*
- *Plastic, PVC, PET, HDPE, LDPE Etc.*

- *Potato And Potato Based Projects*
- *Printing And Packaging*
- *Real Estate, Leisure And Hospitality*
- *Rubber And Rubber Products*
- *Soaps And Detergents*
- *Stationary Products*
- *Spices And Snacks Food*
- *Steel & Steel Products*
- *Textile Auxiliary And Chemicals*

- *Township & Residential Complex*
- *Textiles And Readymade Garments*
- *Waste Management & Recycling*
- *Wood & Wood Products*
- *Water Industry(Packaged Drinking Water & Mineral Water)*
- *Wire & Cable*

Contact us

Niir Project Consultancy Services

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#StreetView**

<https://goo.gl/VstWkd>

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