

#### **Investment Opportunities & Business Ideas of**

# Solar Panel

Solar Panel is One of the Fastest-Growing and the Most Reliable Renewable Energy Source in the World.

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#### Introduction

A solar panel, also known as a photovoltaic (PV) module, is an installation of photovoltaic cells arranged in a framework. Solar panels generate direct current electricity using sunlight as a source of energy. A PV panel is a collection of PV modules, while an array is a group of panels. A photovoltaic system's arrays provide solar energy to electrical equipment. Solar panels are light-to-electricity conversion devices.

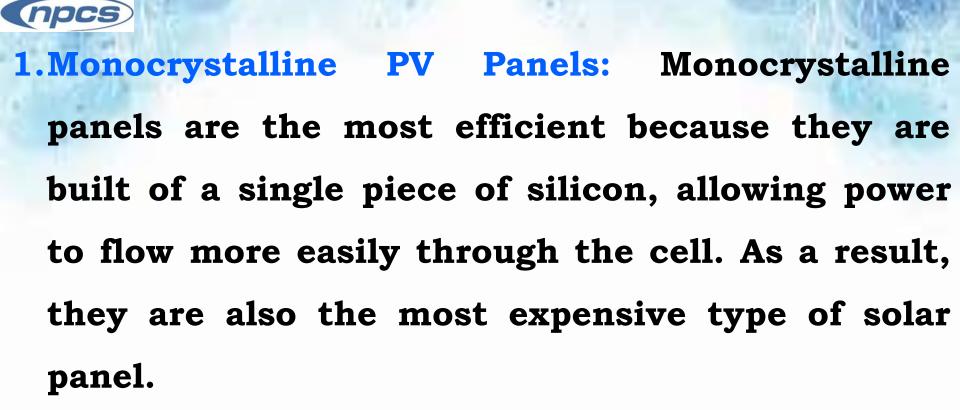


They're termed "solar" panels because the Sun, also known as Sol by astronomers, is the most powerful source of light available most of the time. Some scientists refer to them as photovoltaics, which is short for "lightelectricity." Solar panels can be divided into three types: household solar PV panels, commercial solar PV panels, and industrial solar PV panels.





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2.Thin-Film PV Panels: Thin-film PV panels are the most affordable yet inefficient type of PV panel. Thin-film solar panels are a wonderful option for those looking for flexible solar panels.



**3. Polycrystalline PV Panels: Polycrystalline PV** panels are less efficient than monocrystalline panels because polycrystalline panels are manufactured by fusing together many portions of silicon, making electricity flow through the silicon more difficult. **Polycrystalline panels are cheaper because** they are easier to manufacture.

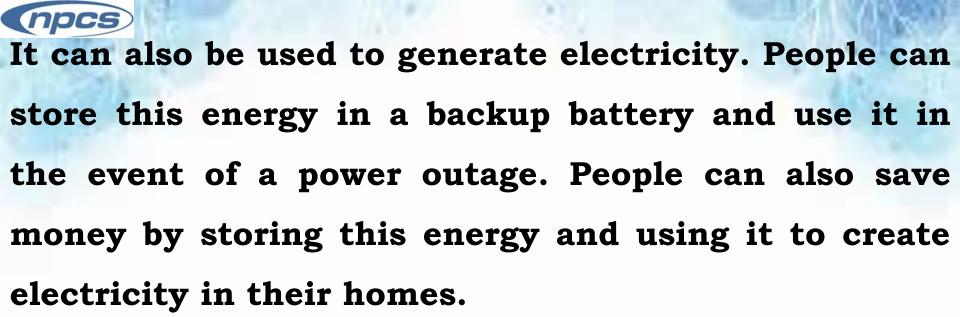


## **Uses of Solar Panel**

- Solar cells are lightweight, long-lasting, and lowmaintenance. It was originally used in communication satellites in 1950, when it was discovered. Here are some examples of solar cell applications for various purposes:
- **1.Transportation with Solar Cells:** Solar energy is employed in automobiles. Photovoltaic cells generate this solar energy. This electricity is either stored in a battery or used to run a motor.



- 2. Photovoltaic Cells in Calculators: Photovoltaic cells are used in solar-powered calculators. Solar energy is used in these calculators. The sun's light provides the necessary energy for calculators to function. Solar calculators aren't very accurate.
- **3.Solar Cell Panels:** Solar panels are kept on the roof. It is used to heat the water as a sun heater. This water is suitable for bathing.



3. Benefits of Solar Cells: Solar energy is a renewable source of energy. It saves money by lowering the electric bill. Maintenance is straightforward and inexpensive, therefore the overall cost of ownership is cheap. It is one of the best nonrenewable energy alternatives.

# **Manufacturing Process**

**1.Cell Cutting:** Cells are carved out using a laser cutting machine. The size of a cell is governed by the wattage that the panels require. This step is avoided for modules with a full cell size. **2.Stringing Procedure:** The stringing process is totally automated. The upper (Blue/Black) Sunfacing side is negative, whereas the lower (White) side is positive.

3. Solar Glass: After the cells are strung together, the machine transfers them to tempered glass with an ethylene vinyl acetate (EVA) encapsulation layer.
4. Visual Inspection: A technician examines the

cells for any faults or errors in the strings.

**5. Taping:** A technician tapes the cells into a matrix alignment during taping.

**6.Soldering:** After that, the connections are soldered together. Any extra material is removed.

7. Insulate Module Connections: The next step is to use a back sheet and EVA encapsulation to insulate the connections. This procedure safeguards the module against dust and moisture.

8.Mirror Inspection: The module is visually inspected once more for dust particles, color mismatches, and other issues.



Testing: EI Testing, also known as **9. EI** Electroluminescence Testing, is the actual testing of the module. It's a kind of scanning technique in which the module is scanned in an EI machine.

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**10.Lamination:** The module is laminated at a temperature of 140 degrees Celsius. This procedure takes about 20 minutes. After lamination, the modules are allowed to cool for 10-15 minutes until they reach room temperature. www.entrepreneurindia.co

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- 11. Trimming the Back Sheet: To manufacture correctly shaped modules, this step entails cutting off the surplus material from the back sheet.
- **12. Frame Cutting:** Frames of various widths are carved out for bordering the panels in this stage.
- 13. Punching Holes in the Frames: Holes are punched in the frames for mounting and grounding the panels.



14.Filling/Framing with Sealant: A sealant protects the panels from air, dust, and moisture while also assisting the module's secure attachment to the frame. After the frame has been mounted to the module, it is sent back to the framing machine to be punched to ensure that it is permanently attached to the frame.





(npcs) **15.Attaching the Junction Box:** A junction box is fastened to the module using sealant to keep it firmly in place. The connections are then soldered and let to cure for 10-12 hours, ensuring that the structures are completely dry and correctly bonded.

**16.Wipe Outside the Module:** The module is wiped outside to remove any dust, foreign particles,

or excess sealant.





**17. Module Testing:** The module is attached in order to examine the output current, voltage, and power, among other things. For each module's output data, a report is generated. For the benefit of the users, a black label (with full details) is pasted behind the module. **18.** Packing: This is the last phase in the module production process, after Final Quality Assurance (FQA), when the modules are safely packed into huge boxes for shipping and storage.



### **Market Outlook**

The global market for solar PV panels was estimated at USD 115.2 billion in 2019, with a compound annual growth rate (CAGR) of 4.3 percent expected from 2020 to 2027. Increased environmental degradation and government incentives and tax refunds to install solar panels are driving the growth of the solar energy business.



Furthermore, the reduced water footprint of solar energy systems has boosted their demand in the power generation sector. The market for solar cells has grown significantly as a result of an increase in rooftop installations, followed by an increase in architectural applications. The solar panel market will be driven by rising electricity prices combined with lower-cost solar panels.



Rising demand for solar panels in the residential rooftop solar industry, as well as cheap prices for polysilicon and silver used in solar cell manufacture, will help the market accelerate in the coming years. Furthermore, the falling cost of solar panels has prompted governments in a number of countries to take more initiatives and provide subsidies, which is projected to aid the growth of the residential solar panel market.

### **Renewable Energy Industry in India**

In the early 1980s, India became the first country in the world to establish a ministry of nonconventional energy resources (Ministry of New and Renewable Energy (MNRE)), and the Solar Energy Corporation of India, one of its public sector organizations, is responsible for the development of the solar energy industry in India. India is one of the countries that produces a significant amount of renewable energy.



As of November 27, 2020, renewable energy sources account for 38% of India's installed electricity producing capacity (136 GW out of 373 GW). India's renewable energy business is the world's fourth most appealing renewable energy market. India came in fifth place in wind power, fifth place in solar power, and fourth place in renewable energy. This is the world's greatest renewable energy expansion strategy.



Renewable power generation capacity has grown at a rapid pace in recent years, with a CAGR of 17.33% from FY16 to FY20. The sector has grown more appealing to investors as a result of increasing government assistance and improved economics. The country has set a lofty goal of achieving 175 GW of renewable energy capacity by the end of 2022, with the goal of increasing to 450 GW by 2030. Renewable energy will play an essential part as India attempts to fulfill its own energy demand, which is anticipated to reach 15,820 TWh by 2040.



- 1. A M P L Cleantech Pvt. Ltd.
- 2. Aatash Power Pvt. Ltd.
- 3. Brightsolar Renewable Energy Pvt. Ltd.
- 4. Cial Infrastructures Ltd.

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- 5. Cleansolar Renewable Energy Pvt. Ltd.
- 6. Dhursar Solar Power Pvt. Ltd.
- 7. Divine Solren Pvt. Ltd.
- 8. Ind Renewable Energy Ltd.
- 9. Indira Power Pvt. Ltd.

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## **Machinery Photographs**



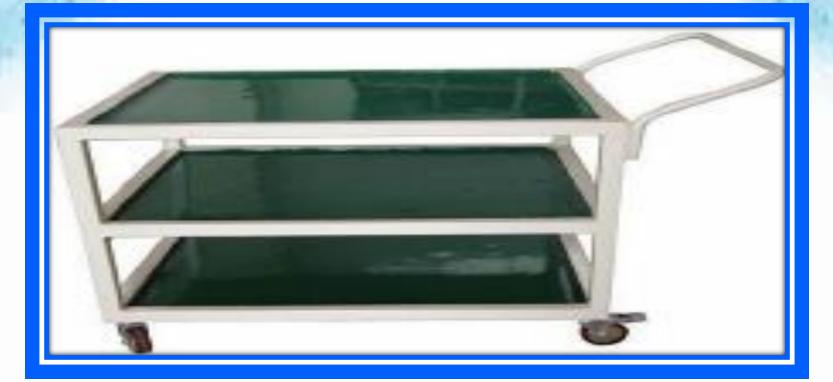
#### **Auto Tabber and Stringer**

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#### **Solar Cell Trolley**

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# Project at a Glance



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COST O	F PROJEC	т	MEANS OF FINANCE						
Particulars	Existing	Proposed	Total	Particulars	Existing	Proposed	Total		
Land & Site Development Exp.	0.00	135.00	135.00	Capital	0.00	166.94	166.94		
Buildings	0.00	192.00	192.00	Share Premium	0.00	0.00	0.00		
Plant & Machineries	0.00	181.90	181.90	Other Type Share Capital	0.00	0.00	0.00		
Motor Vehicles	0.00	10.00	10.00	Reserves & Surplus	0.00	0.00	0.00		
Office Automation Equipments	0.00	44.50	44.50	Cash Subsidy	0.00	0.00	0.00		
Technical Knowhow Fees & Exp.	0.00	25.00	25.00	Internal Cash Accruals	0.00	0.00	0.00		
Franchise & Other Deposits	0.00	0.00		Long/Medium Term Borrowings	0.00	500.82	500.82		
Preliminary& Pre-operative Exp	0.00	5.00		Debentures / Bonds	0.00	0.00	0.00		
Provision for Contingencies	0.00	15.20		Unsecured Loans/Deposits	0.00		0.00		
Margin Money - Working Capital	0.00	59.17	59.17						
TOTAL	0.00	667.77	667.77	TOTAL	0.00	667.77	667.77		
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Year	Annu	alised	Book Value	Debt	Dividend	Retained Earnings		Payout Probable Market Price		P/E Ratio	Yield Price/ Book Value
	EPS	CEPS	Per S	Share	Per Share	Per Share				No.of Times	
	<b>_</b> . <b>v</b>	02.0									
	`	`	`	`	``	%	•	%	`		%
1-2	6.73	10.14	16.73	24.00	0.00	100.00	6.73	0.00	6.73	1.00	0.00
2-3	9.42	12.42	26.15	18.00	0.00	100.00	9.42	0.00	9.42	1.00	0.00
3-4	12.12	14.75	38.27	12.00	0.00	100.00	12.12	0.00	12.12	1.00	0.00
4-5	14.74	17.06	53.01	6.00	0.00	100.00	14.74	0.00	14.74	1.00	0.00
5-6	17.27	19.31	70.28	0.00	0.00	100.00	17.27	0.00	17.27	1.00	0.00



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Year	D	. S. C. R.		Debt / - Deposits Debt	Equity as- Equity	Net	Return on Net Worth	Profitability Ratio				Assets Turnov er Ratio	Curre nt Ratio	
		Cumulat ive	Ove rall					GPM	PBT	ΡΑΤ	Net Contri bution			
	(Number of times) (Number of times)			%	%	%	%	%		%				
Initial				3 00	2.00									
Initial				3.00	3.00							17.83		
1-2	1.47	1.47		1.43	1.43	2.82		8.77%	5.59%	3.78%	529.67		2.85	1.06
2-3	1.79	1.62		0.69	0.69	1.71		9.64%	6.98%	4.54%	617.39	17.82 %	2.98	1.25
3-4	2.16	1.79	2.15	0.31	0.31	1.11		10.23 %	7.98%	5.11%	705.57	17.82 %	2.98	1.46
4-5	2.59	1.96		0.11	0.11	0.76		10.62 %	8.70%	5.52%	793.76	17.82 %	2.89	1.69
E C	2 00	0 1 E		0.00	0.00	0 5 4		10.88 %	0 240/	E 000/	001 04	17.82		2.24
0-C	3.09	2.15		0.00	0.00	0.54		%	9.21%	<b>J.0</b> 2%	001.94		2.76	2.24



#### BEP

BEP - Maximum Utilisation Year	5
Cash BEP (% of Installed Capacity)	44.45%
Total BEP (% of Installed Capacity)	48.32%
IRR, PAYBACK and FACR	
Internal Rate of Return ( In %age )	28.30%
Payback Period of the Project is (In Years)	2 Years 3 Month
Fixed Assets Coverage Ratio ( No. of times )	12.753
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	C.PO3



Major Queries/Questions Answered in the Report?

**1. What is Solar Panel Manufacturing industry ?** 

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

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



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



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# 13. What is the total size of land required for setting up Solar Panel Manufacturing plant?

**14. What will be the income and expenditures for Solar Panel Manufacturing Business?** 

**15. What are the Projected Balance Sheets of Solar Panel Manufacturing plant ?** 

16. What are the requirement of utilities and overheads for setting up Solar Panel Manufacturing plant?

**17. What is the Built up Area Requirement and cost for setting up Solar Panel Manufacturing Business?** 



18. What are the Personnel (Manpower) Requirements for setting up Solar Panel Manufacturing Business?

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- IS 7025: 1973 GUIDANCE ON SOLAR RADIATION TESTING
- IS 9001: PART 11: 1973 (REAFFIRMED YEAR: 2016)GUIDANCE FOR ENVIRONMENTAL TESTING-PART 11 SOLAR RADIATION TEST
- IS 13736: PART 2: SEC 4: 1993 (REAFFIRMED YEAR: 2018)CLASSIFICATION OF ENVIRONMENTAL CONDITIONS: PART 2 ENVIRONMENTAL CONDITIONS APPEARING IN NATURE, SEC 4 SOLAR RADIATION AND TEMPERATURE
- IS 10236: Part 16: 1988(Reaffirmed Year: 2014)Procedure for Basic Climatic and Durability Test for Optical Instruments: Part 16 Solar Radiation Test
- IS 12933: PART 5: 2003 (REAFFIRMED YEAR: 2019)SOLAR FLAT PLATE COLLECTOR-PART 5: TEST METHODS



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- 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

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- 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 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

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### **Scope of the Report**

The report titled "Market Survey cum Detailed Techno Economic Feasibility Report on Solar Panel." provides an insight into Solar Panel market in India with focus on uses and applications, Manufacturing Process, Process Flow Sheets, Plant Layout and **Project Financials of Solar Panel project.** The report assesses the market sizing and growth of the Indian Solar Panel Industry. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of on a suitable product/line. And zeroing in 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 Panel sector in India along with its business prospects. Through this report we have identified Solar Panel project as a lucrative investment avenue.



# Tags

**#DetailedProjectReport #businessconsultant #BusinessPlan #feasibilityReport #NPCS #entrepreneurindia #startupbusiness #ProjectReport #startup #projectconsultancy #SolarPanel #businessopportunity #SolarPanelMarket #SolarEnergy #SolarPanelIndustry #SolarCellManufacturing #SolarSector #SolarMarket #RenewableEnergy #solarEnergyBusiness #photovoltaicsystems** 



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- NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.
- Our Market Survey cum Detailed Techno Economic Feasibility Report provides an insight of market in India. The report assesses the market sizing and growth of the 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.

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- 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**

The detailed project report covers all aspect of business, from analyzing the market, confirming availability of various necessities such as 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,

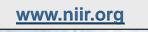


Working Capital Requirement, uses and applications, Plant Layout, Project Financials, Process Flow Sheet, Cost of **Project, Projected Balance Sheets, Profitability Ratios, Break** Even Analysis. The DPR (Detailed Project Report) is formulated by highly accomplished and experienced consultants and the market research and analysis are supported by a panel of experts and digitalized data bank. 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 India along with its business prospects.....Read more



## **Contact us** Nir Project Consultancy Services

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- New Delhi-110007, India.
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- Fax: +91-11-23845886
- Website : <u>www.entrepreneurindia.co</u> , <u>www.niir.org</u>
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# NIR PROJECT CONSULTANCY SERVICES

### AN ISO 9001: 2015 CERTIFIED COMPANY

<u>www.niir.org</u>



### 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 npcs

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.

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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?

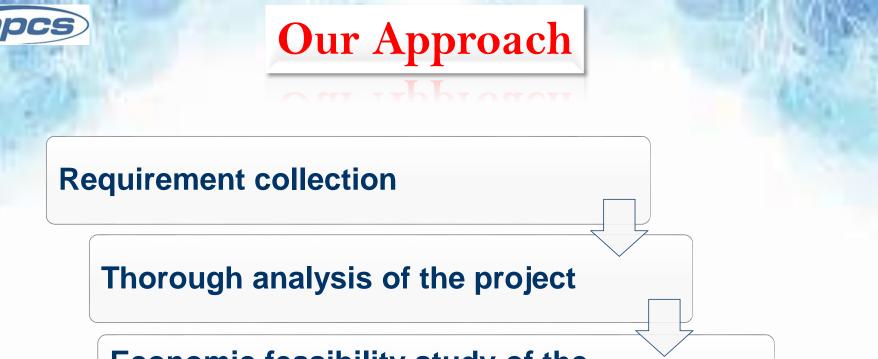
- Project Identification
- Detailed Project Reports/Pre-feasibility Reports
- Market Research Reports
- > Business Plan
- > Technology Books and Directory
- Industry Trend
- Databases on CD-ROM
- Laboratory Testing Services
- Turnkey Project Consultancy/Solutions
- Entrepreneur India (An Industrial Monthly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

How are we different ?

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- 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



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
- Sectional 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
- Sio-fertilizers And Biotechnology
- Breakfast Snacks And Cereal Food
- Bicycle Tyres & Tubes, Bicycle Parts, Bicycle
   Assembling

- Samboo And Cane Based Projects
- Suilding Materials And Construction Projects
- Siodegradable & 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,
- Sectorical, Electronic And Computer based Projects
- Sessential 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
- Singer & Ginger Based Projects
- Herbs And Medicinal Cultivation And Jatropha
   (Biofuel)
- \* Hotel & Hospitability Projects
- \* Hospital Based Projects
- \* Herbal Based Projects
- Inks, Stationery And Export Industries

### (npcs)

- ✤ 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.



Sectors We Cover cont...

- 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.



#### Sectors We Cover cont...

- 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



## MARKET

## RESEARCH

## REPORT

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## Objective

- To get a detailed scenario of the industry along with its structure and classification
- To provide a comprehensive analysis of the industry by covering aspects like:
  - Growth drivers of the industry
  - Latest market trends
  - □ Insights on regulatory framework
  - SWOT Analysis
  - Demand-Supply Situation
  - □ Foreign Trade
  - Porters 5 Forces Analysis





- To provide forecasts of key parameters which helps to anticipate the industry performance
- To help chart growth trajectory of a business by detailing the factors that affect the industry growth
- To help an entrepreneur/manager in keeping abreast with the changes in the industry
- To evaluate the competitive landscape of the industry by detailing:
  - □ Key players with their market shares
  - □ Financial comparison of present players





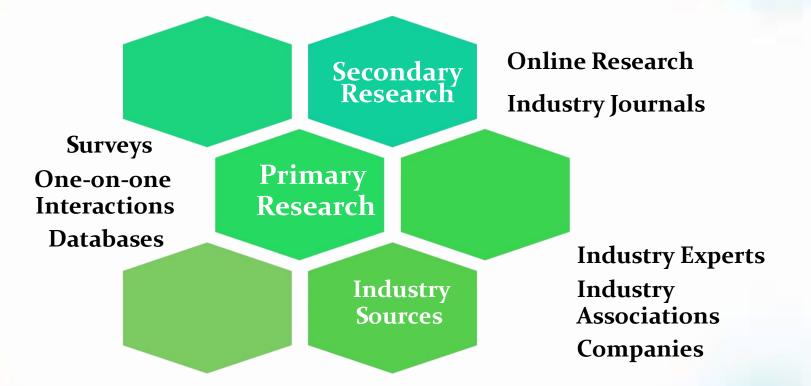
- Venturist/Capitalists
- Entrepreneur/Companies
- Industry Researchers
- Investment Funds
- Foreign Investors, NRI's
- Project Consultants/Chartered Accountants
- Banks
- Corporates

### Click here for list









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## Scope & Coverage



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- **Our research team comprises of experts** 
  - from various financial fields:
- □ MBA's
- □ Industry Researchers
- Financial Planners
- **Research** veterans with decades of experience



### Structure of the Report Structure of the Bebort

**1.** Overview

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- 2. Market Analysis
  - **2.1** Growth Drivers
  - **2.2** Emerging Trends in the Industry
  - **2.3** Regulatory Framework
  - 2.4 SWOT Analysis
  - **2.5** Herfindahl–Hirschman Index (HHI)
- **3. Market Forecasts**
- 4. Key Players



### Structure of the Report **Structure of the Bebort**

- **5.** Key Financials and Analysis
  - **5.1** Contact Information
  - **5.2 Key Financials**
  - **5.3** Financial comparison
- **6.** Industry Size & Outlook



Take a look at NIR PROJECT CONSULTANCY SERVICES on #Street View

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