

Handbook on Electric Vehicles Manufacturing (E- Car, Electric Bicycle, E- Scooter, E-Motorcycle, Electric Rickshaw, E- Bus, Electric Truck with Assembly Process, Machinery Equipments & Layout)

Author:- P.K. Tripathi

Format: paperback

Code: NI332

Pages: 488

Price: Rs.3695US\$ 250

Publisher: NIIR PROJECT CONSULTANCY SERVICES

Usually ships within **5** days

Handbook on Electric Vehicles Manufacturing (E- Car, Electric Bicycle, E- Scooter, E- Motorcycle, Electric Rickshaw, E- Bus, Electric Truck with Assembly Process, Machinery Equipments & Layout)

An electric vehicle (EV) is one that is powered by an electric motor rather than an internal-combustion engine that burns a mixture of gasoline and gases to generate power. As a result, such a vehicle is being considered as a potential replacement for current-generation automobiles in order to solve issues such as:-

- a) Growing Pollution
- b) Global Warming,
- c) Natural Resource Depletion, and so on.

Despite the fact that the concept of electric vehicles has been around for a long time, it has garnered a lot of attention in the last decade as a result of the rising carbon footprint and other environmental implications of gasoline-powered vehicles.

The global electric vehicle market is expected to increase at a CAGR of 21.7 percent. Increased government investments in the development of electric vehicle charging stations and hydrogen fuelling stations, as well as buyer incentives, will provide chances for OEMs to increase their revenue stream and regional footprint. The EV market in Asia Pacific is expected to develop steadily due to increasing demand for low-cost, low-emission vehicles, whereas the market in North America and Europe is expected to rise quickly due to government initiatives and the growing high-performance passenger vehicle segment.

India's flagship plan for boosting electric mobility is FAME, or Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles FAME Scheme has been authorized by the government, with 86 percent of overall budgetary support has been set aside for the Demand Incentive, which aims to increase demand for EVs throughout the country. This phase will support e-buses, e-3 wheelers, e-4 wheeler passenger cars and e-2 wheelers in order to build demand.

The book covers a wide range of information related to the manufacture of electric vehicles. It includes E- Car, Electric Bicycle, E- Scooter, E-Motorcycle, Electric Rickshaw, E- Bus, Electric Truck with Assembly Process, contact information for machinery suppliers, Directory Section & Factory Layout.

A detailed guide on the manufacturing and entrepreneurship of electric vehicles. This book

serves as a one-stop shop for everything you need to know about the Electric Vehicle Manufacturing industry, which is rife with opportunities for startups, manufacturers, merchants, and entrepreneurs. This is the only book on the production of commercial electric vehicles. It's a veritable feast of how-to information, from concept through equipment acquisition.

TABLE OF CONTENTS

1. INTRODUCTION

- 1.1. Electricity Sources
 - 1.1.1. Connection to Generator Plants
 - 1.1.2. Onboard Generators and Hybrid EVS
 - 1.1.3. Onboard Storage
- 1.2. Lithium-Ion Battery
- 1.3. Electric Motor
- 1.4. Vehicle Types
 - 1.4.1. Ground Vehicles
 - 1.4.2. Pure-Electric Vehicles
 - 1.4.3. Hybrid EVs
 - 1.4.4. Plug-In Electric Vehicle
 - 1.4.5. Range-Extended Electric Vehicle
 - 1.4.6. On-and Off-Road EVS
 - 1.4.7. Rail Borne EVs
 - 1.4.8. Airborne EVs
 - 1.4.9. Seaborne EVs
- 1.5. Electrically Powered Spacecraft
- 1.6. Energy and Motors
- 1.7. Properties
 - 1.7.1. Components
 - 1.7.2. Energy Sources
 - 1.7.3. Batteries
 - 1.7.4. Efficiency
- 1.8. Charging
 - 1.8.1. Grid Capacity
 - 1.8.2. Charging Stations
 - 1.8.3. Battery Swapping
 - 1.8.4. Dynamic Charging
- 1.9. Other in-Development Technologies
 - 1.9.1. Safety
 - 1.9.2. Environmental
 - 1.9.3. Socio-Economic
 - 1.9.4. Mechanical
 - 1.9.5. Energy Resilience
 - 1.9.6. Energy Efficiency
 - 1.9.7. Total Cost
 - 1.9.8. Range
 - 1.9.9. Heating of EVs
 - 1.9.10. Electric Public Transit Efficiency
 - 1.9.11. Polluter Pays Principle
- 1.10. Costs and Emissions
 - 1.10.1. Electricity Costs
 - 1.10.2. End of Life
 - 1.10.3. CO2 Emissions

- 1.10.4. Emissions
- 1.11. Formula-e
- 1.12. Future
 - 1.12.1. Environmental Considerations
 - 1.12.2. Improved Batteries
 - 1.12.3. Electric Trucks
 - 1.12.4. Hydrogen Trains
 - 1.12.5. Infrastructure Management
 - 1.12.6. Stabilization of the Grid
- 2. E-VEHICLE BUSINESS IDEAS AND OPPORTUNITIES
- 3. FUTURE OF ELECTRIC VEHICLES IS BRIGHT
 - 3.1. Experts Predicting Strong Sales Growth
 - 3.1.1. Reason #1: Battery Costs are Dropping Fast
 - 3.1.2. Reason #2: Longer Range, Affordable Electric Cars are Coming
 - 3.1.3. Reason #3: More Charging Stations are Coming
 - 3.1.4. Reason #4: Auto Industry is Embracing EVS
 - 3.1.5. Reason #5: The Global Imperative to Cut Carbon Pollution and Oil Dependency
- 4. HOW TO START E-VEHICLE MANUFACTURING BUSINESS
 - 4.1. EV Market
 - 4.2. Business Opportunities in Electric Vehicles Sector
 - 4.3. Battery Recycling Business
 - 4.4. Battery Swapping Technology
 - 4.5. Solar Electric Vehicle Charging
 - 4.6. Home Charging Stations
 - 4.7. EV Equipment Manufacturing
 - 4.8. Battery Manufacturing Business
 - 4.9. Fabrication Electric Vehicle Charger
 - 4.10. Solar Energy Powered Electric Vehicle Charger
- 5. ELECTRIC VEHICLE MARKET OUTLOOK
 - 5.1. Global Progress and Forecast
 - 5.2. EVs in Regional Markets
 - 5.2.1. Europe
 - 5.2.2. China
 - 5.2.3. United States
 - 5.2.4. Rest of the World
 - 5.3. Four Factors Driving Growth
 - 5.3.1. Factor 1 – Changing Consumer Sentiment
 - 5.3.2. Factor 2 – Policy and Legislation
 - 5.4. Fuel Economy and Emission Targets
 - 5.5. City Access Restrictions
 - 5.6. Financial Incentives
 - 5.6.1. Factor 3 – OEM Vehicle Strategy
 - 5.7. Availability of Models
 - 5.8. Affordability of Models
 - 5.8.1. Factor 4 – The Role of Corporate Companies
 - 5.9. Part 2: New landscape, New Approach
 - 5.10. Segmenting the Market
- 6. ELECTRIC VEHICLE TECHNOLOGY
 - 6.1. Electric Vehicle Layouts
 - 6.1.1. Identifying Electric Vehicles
 - 6.1.2. Single Motor

- 6.1.3. Wheel Motors
- 6.2. Hybrid Electric Vehicle Layouts
 - 6.2.1. Introduction
 - 6.2.2. Classifications
 - 6.2.3. Operation
 - 6.2.4. Configurations
 - 6.2.5. Hybrid with a 48-V System
 - 6.2.6. Hybrid Control Systems
- 6.3. Cables and Components
 - 6.3.1. High-Voltage Cables
 - 6.3.2. Components
 - 6.3.3. ECE-R100
 - 6.3.4. Other Systems
- 7. ELECTRIC CAR
 - 7.1. Types
 - 7.2. Benefits
 - 7.3. Downsides
 - 7.4. Automatic
 - 7.5. Usage of Batteries
 - 7.6. Safety
 - 7.7. Better for the Environment
 - 7.8. Environmental Aspects
 - 7.9. Public Opinion
 - 7.10. Performance
 - 7.10.1. Acceleration and Drivetrain Design
 - 7.10.2. Electric Cars Cost
 - 7.10.3. Charging Costs
 - 7.10.4. Cost Per Mile
 - 7.10.5. The Sums
- 8. HOW ELECTRIC CARS WORK?
- 8.1. Components
- 9. CONSTRUCTION OF ELECTRIC CAR
- 9.1. Electric Car Safety
- 10. E-CAR MANUFACTURING
 - 10.1. Components
 - 10.2. Raw Materials
 - 10.3. Design
 - 10.4. The Manufacturing Process
 - 10.4.1. Body Shop
 - 10.4.2. General Assembly
 - 10.4.3. Quality Control
 - 10.4.4. Byproducts/Waste
 - 10.5. The Future
- 11. E-CAR ASSEMBLY LINE
 - 11.1. Application
 - 11.2. Production Process
- 12. ELECTRIC BICYCLE
 - 12.1. Classes
 - 12.2. Pedal-Assist Only
 - 12.3. Pedelecs
 - 12.4. S-Pedelecs
 - 12.5. Power-on-Demand and Pedal-Assist
 - 12.6. Power-on-Demand only

- 12.7. Technical
 - 12.7.1. Motors and Drivetrains
- 12.8. Batteries
- 12.9. Design Variations
- 12.10. Folding E-Bikes
- 12.11. Health Effects
- 12.12. Environmental Effects
- 12.13. Advantages of E-Bike- How it Differs from other Bikes
 - 12.13.1. Eco-Friendliness
 - 12.13.2. Health and Keeping Active
 - 12.13.3. Speed
 - 12.13.4. Battery Range
 - 12.13.5. Climbing
- 13. E-BICYCLE PARTS
- 14. HOW E-BIKES WORK?
 - 14.1. Pros and Cons
 - 14.2. Growth Prospects
 - 14.3. Worth Money
 - 14.3.1. Speed
 - 14.3.2. Appearance and Motor
 - 14.3.3. Experience in Riding
 - 14.3.4. Longer Distances
 - 14.4. Ebikes vs Regular Bikes: What's the Difference?
 - 14.4.1. Appearance and Mechanics
 - 14.4.2. Maintenance and Repairs
 - 14.4.3. Riding Experience
 - 14.4.4. Speed
 - 14.4.5. Rules and Regulations
 - 14.5. Objective
 - 14.6. Limitations
 - 14.7. Theory
 - 14.7.1. Power Calculation
 - 14.7.2. Motor
 - 14.7.3. Motor Controlling
 - 14.7.4. MOSFET transistor
 - 14.7.5. Half-Bridge
 - 14.7.6. NAND-gate
 - 14.7.7. PWM
 - 14.8. Arduino
 - 14.9. Three-Phase Gate Driver
 - 14.10. Bootstrap Operation
 - 14.11. Experimental Details
 - 14.11.1. Planning Process/Design
 - 14.11.2. Electronic assembly
 - 14.11.3. Programming
 - 14.12. PWM
 - 14.13. Results
 - 14.13.1. Power Calculation
 - 14.13.2. Subsystems
 - 14.14. Assembled System
 - 14.15. Discussion
 - 14.15.1. MOSFET vs IGBT
 - 14.15.2. Wheel and Motor

- 14.15.3. Components
- 14.15.4. Testing of the System
- 15. HYBRID ELECTRIC CAR PLUG-IN HYBRID ELECTRIC VEHICLES (PHEVS)
 - 15.1. Powered by Electric Motor and Combustion Engine
 - 15.2. Help from an Electric Motor
 - 15.3. Regenerative Braking
 - 15.4. Fuel Cell for Electric Vehicle
 - 15.5. Fueling and Driving Options
 - 15.6. Fuel-Efficient System Design
 - 15.7. Key Components of a Hybrid Electric Car
- 16. ELECTRIC SCOOTER
 - 16.1. Popularity
 - 16.2. Benefits of E-Scooter Use
 - 16.2.1. A Reduction in Carbon Emissions
 - 16.3. Cheaper and More Accessible Travel
 - 16.3.1. Reduced Congestion in Cities
 - 16.4. Power Source
 - 16.4.1. Charging
 - 16.4.2. Battery Swapping
 - 16.4.3. Hybrid
 - 16.4.4. Fuel Cell
 - 16.5. Safety
- 17. ELECTRIC SCOOTER PARTS
 - 17.1. Batteries
 - 17.2. Types of Batteries
 - 17.2.1. Lithium Ion
 - 17.2.2. Lithium Manganese (INR, NMC)
 - 17.2.3. Lead-Acid
 - 17.3. Battery Life
 - 17.4. Brakes
 - 17.4.1. Types of Brakes
 - 17.4.2. Disc Brakes
 - 17.4.3. Hydraulic Disc Brakes
 - 17.4.3. Drum Brakes
 - 17.5. How Do Drum Brakes Work?
 - 17.5.1. Foot Brakes
 - 17.5.2. Regenerative Brakes
 - 17.5.3. Electronic Brakes
 - 17.6. Controller
 - 17.7. Deck
 - 17.8. Handlebars
 - 17.9. Lights
 - 17.10. Motor
 - 17.11. Motor Types
 - 17.11.1. Brushless DC Motors
 - 17.11.2. Brushed DC Motors
 - 17.12. Stem
 - 17.13. Tires
- 18. ELECTRIC HYBRID VEHICLE (E- SCOOTER)
 - 18.1. Basic Design of HEV
 - 18.2. Advantages
 - 18.3. Objectives

- 18.4. CAD Model of HEV
- 18.5. Block Diagram of HEV
- 18.6. Working of HEV
- 19. HOW DO ELECTRIC SCOOTERS WORK
- 19.1. Electric Scooter Components
- 19.2. Electric Scooter Work
- 19.3. Electric Scooter Motors Work
- 19.4. Electric Scooters Batteries Work
- 19.5. Controllers
- 19.6. Brakes
- 19.7. Wheels
- 19.8. Suspension
- 19.9. Screen and Controls
- 19.10 Deck
- 19.11. Handlebars
- 19.12. Lights
- 19.13. Optional Scooter Parts
- 19.14. Seats
- 19.15. Baskets or Trunks
- 19.16. How do Electric Scooters Get Charged?
- 19.17. Are Electric Scooters Foldable?
- 19.18. What are Electric Scooters made of?
- 19.19. How to Perform Electric Scooter Maintenance?
- 20. DESIGN AND DEVELOPMENT OF ELECTRIC SCOOTER
- 20.1. Introduction
- 20.2. System Development
- 20.2.1. The Key Components in Electric Scooter
- 20.3. Battery Charger
- 20.4. Battery
- 20.4.1. Battery Management Systems
- 20.5. Motor Controller
- 20.6. BLDC Hub Motor
- 20.7. DC-DC Controller
- 20.8. Performance Analysis
- 20.8.1. Hub Motor Calculation
- 20.8.2. Rolling Resistance
- 20.8.3. Gradient Resistance
- 20.8.4. Aerodynamic Drag
- 20.8.5. Battery Calculation
- 20.8.6. System Operation
- 21. ELECTRIC TWO WHEELER & ITS MANUFACTURING
- 21.1. Need of Electric and Hybrid Two Wheelers
- 21.2. Working Principle
- 21.3. Principal
- 21.3.1. Battery
- 21.3.2. Battery Up Gradation
- 23.4. Alternator
- 23.4.1. Wiring Harness
- 23.4.2. Controllers
- 23.5. Production Line
- 22. E-SCOOTER ENVIRONMENTAL IMPACTS
- 22.1. Impact Estimation Methodology

23. E-BICYCLE ASSEMBLY PRODUCTION LINE

23.1. Cycle Nipple Machine

23.2. Tyre Mounting Console

23.2.1. Benefits

23.3. Truing Machine Obelisk E Bike Wheels

23.4. Lacing Machine E Bike Wheels

23.5. Brake-Test Machine

24. ELECTRIC RICKSHAW

24.1. Types

24.1. Load Carriers

24.2. Solar

24.2.1. Features

24.3. Evolution of business

24.4. Benefits

24.4.1. Low Maintenance

24.4.2. Suitable for Connectivity

24.4.3. Opportunities for Employment Creation

24.5. Advantages

24.5.1. E-Rickshaws Contribute to Zero Contamination

24.5.2. A Better and Affordable Maintenance

24.5.3. A Low Running Expense

24.5.4. Smoother and Prominent Turning Sweep

24.5.5. Earning High Wages through Less Consumption

24.6. Design and Construction

24.7. How Electric–Rickshaw Works

24.8. Spare Parts

24.8.1. Controller

24.8.2. Axle

24.8.3. Motor

24.8.4. Battery

24.8.5. Rim

25. HYBRID SOLAR E-RICKSHAW

25.1. Solar Hybrid E-Rickshaw

25.2. Methodology

25.3. Technical Specifications

25.4. Solar E-rickshaw with Heterogeneous Battery Packs

26. E-RICKSHAWS MANUFACTURING

26.1. Procedure

26.2. Wheel and Vehicle Body

26.2.1. Body

26.2.2. Wheel

26.2.3. Gear Box

26.2.4. DC Motor

26.2.5. Thermal Port

26.2.6. Thermal Sensor

26.2.7. DC Motor with Controller

26.2.8. H-Bridge

26.3. Controlled PWM Voltage

26.3.1. Controlled Voltage Source

26.3.2. Electrical Reference

26.3.3. Current Sensor

26.4. Battery System and SOC

26.4.1. Controller

- 26.4.2. PID Controller
- 26.4.3. Manufacturing Process
- 27. ELECTRIC VEHICLE TESTING
 - 27.1. Benefits
 - 27.2. Factors
 - 27.3. Testing and Certifying Electric Vehicles
- 28. HOW TO GET E RICKSHAW APPROVED FROM ICAT
- 29. ELECTRIC RICKSHAW CHARGING STATIONS
 - 29.1. Introduction
 - 29.2. Objective
 - 29.2.1. Electric Rickshaw and Relevant Issues
 - 29.2.2. Renewable Energy
 - 29.2.3. Rationale
 - 29.3. Technology
 - 29.3.1. Battery Energy Storage System (BESS) for Integrating Renewable Energy (RE) Sources
 - 29.3.2. Community Energy Storage (CES)
 - 29.3.3. Battery Swapping Station (BSS)
 - 29.3.4. Micro Grid and Smart Energy Systems
 - 29.3.5. Potential Application of Existing Technologies for EVs/E-Rickshaws
 - 29.4. Approach
 - 29.4.1. Formulation
 - 29.4.2. Simulation Software
 - 29.4.3. Defining System Demands
 - 29.4.4. Solar Resource
 - 29.4.5. System Components and Costs
 - 29.5. Key Assumptions
 - 29.5.1. Battery DOD and Capacity Selection
 - 29.5.2. Local Grid
 - 29.5.3. Control Logic of Grid-Connected Solar PV
 - 29.5.4. Operational Strategy and Control Logic of CBESS
 - 29.5.5. Economic Assumptions
 - 29.6. Results
 - 29.6.1. Solar PV Integration
 - 29.6.2. An Opportunity for Reducing Battery Disposal
 - 29.6.3. An Opportunity for Creating a Sustainable and Circular Value Chain for E-Rickshaw Batteries
 - 29.6.4. Economies of Scale
 - 29.6.5. Microgrid and Smart Snergy Systems in Rural Areas
 - 29.6.6. Implementation Pathway and Business Opportunities
 - 29.6.7. Challenges and Outlook
- 30. LIST OF APPROVED E-RICKSHAW MODELS AS PER GSR 709 (E) AND SO 2590(E)
- 31. ELECTRIC BUS
 - 31.1. Range
 - 31.2. Electric Buses Charge
 - 31.3. Battery Electric Buses More Popular
 - 31.4. Electric Buses Cheaper
 - 31.5. Principles

- 31.5.1. Battery
- 31.6. Electric Bus Work
- 31.7. Benefits
 - 31.7.1. Eco-Friendliness
 - 31.7.2. Quiet Operation
 - 31.7.3. Minimal Maintenance
 - 31.7.4. Affordability
- 31.8. Invented
- 31.9. Carbon Footprint
- 31.10. Use Electricity
- 31.11. Use of Batteries
- 31.12. How Far Electric Bus Go
- 31.13. Type of Charging Station
- 31.14. Long Take to Charge
- 31.15. Life Expectancy
- 31.16. Healthier
- 31.17. Not More Common
- 32. MANUFACTURING PROCESS OF E-BUS
 - 32.1. Making Pre-Manufactured Components
 - 32.2. Making the Chassis
 - 32.3. Making the Body
 - 32.4. Assembling
 - 32.5. Quality Control
 - 32.6. The Future
- 33. E-BUS AND E-TRUCK MANUFACTURING
 - 33.1. Automotive Seat Manufacturing Line
 - 33.2. Welding Lines for Automotive Component
 - 33.2.1. Automatic Part Welding Line
 - 33.2.2. Associate Operators
 - 33.2.3. Chain Management
 - 33.2.4. Assemble System and Instruction
 - 33.3. Truck Welding Line
 - 33.4. Bus and Coach Welding Line
 - 33.4.1. Standard Equipment on the Bus Manufacturing Line
 - 33.5. Engines and Transmission Assembly Line
 - 33.6. Automotive Paint Shop
 - 33.6.1. Plan
 - 33.6.2. Chain management
 - 33.6.3. Assemble System and Instruction
 - 33.7. Automotive Assembly Line
 - 33.7.1. Plan
 - 33.7.2. Chain Management
 - 33.7.3. Assemble System and Instruction
 - 33.7.4. Conveyor System
 - 33.8. Truck Manufacturing Assembly Line
 - 33.8.1. Chassis Line
 - 33.9. Cab Trim Line
 - 33.9.1. Final Assembly Line
 - 33.9.2. Features
 - 33.9.3. Task
 - 33.10. Bus Assembly Line
 - 33.11. Automotive Testing and Inspection Line

- 33.11.1. Plan
- 33.11.2. Chain Management
- 33.11.3. Assemble System and Instruction
- 33.11.4. Vehicle Testing Pickup Truck Inspection
 - Line / Truck Production Testing Line / Bus Testing Line
- 34. BATTERIES
 - 34.1. Battery Range
 - 34.2. Battery Life and Recycling
 - 34.3. Types of Battery
 - 34.3.1. Lead–Acid Batteries (Pb–PbO₂)
 - 34.3.2. Alkaline (Ni–Cad, Ni–Fe and Ni–MH)
 - 34.3.3. Sodium–Nickel Chloride (Na–NiCl₂)
 - 34.3.4. Sodium–Sulphur (Na–S)
 - 34.3.5. Lithium-Ion (Li-ion)
 - 34.3.6. Fuel Cells
 - 34.3.7. Super-Capacitors
 - 34.3.8. Flywheels
- 35. BATTERY ASSEMBLY LINE
 - 35.1. Uses of Making Battery Pack
 - 35.1.1. Lithium Battery Automatic Highland Barley Paper Pasting Machine
 - 35.1.2. Lithium Battery Sorting Machine
 - 35.1.3. Lithium Battery Spot Welding Machine
 - 35.1.4. Battery Pack Comprehensive Tester
 - 35.1.5. Battery Pack Aging Machine
- 36. BIS SPECIFICATIONS
- 37. ISO STANDARDS
- 38. EV STANDARDS IN CHINA
- 39. BRITISH STANDARDS (BS)
- 40. APPROVAL FOR E VEHICLE
 - 40.1. To Get ARAI Approval
 - 40.2. Importance for EVs
 - 40.3. Standards and Regulations
 - 40.4. Type of Approval Testing Under CMVR
 - 40.4.1. Category and Type of Approval Required for EVs
 - 40.4.2. Government Regulation Framework for Electric Vehicles
 - 40.4.3. For L Category Vehicles, AIS156 (in line with UN R136) covers the following points
 - 40.4.4. Type Approval
 - 40.4.5. Type Approval requirements are broadly segregated for
 - 40.4.6. Contact Details
- 41. AUTHORIZATIONS REQUIRED FOR SETTING UP OF EVS/ BATTERY MANUFACTURING UNIT
 - 41.1. Land Acquisition and Manufacturing Unit Placement
 - 41.2. E-waste (Management and Handling) Rules ("E-waste Rules")
 - 41.3. Battery (Management and Handling) Rules ("Battery Management Rules")
 - 41.4. Workplace Regulations
 - 41.4.1. Factories Act of 1948 ("Factories Act")

- 41.4.2. Employees' State Insurance Act
- 41.5. Manufacturing EVs and EV Batteries Standards and Criteria
 - 41.5.1. A general framework for EV and EV Battery Standards and Specifications
 - 41.5.2. Process of Testing and Certifications
 - 41.5.3. Testing Agencies and Applicable Standards
- 41.6. Conclusion
- 42. E-VEHICLE PARTS
 - DC Motors
 - Electric DC Motor
 - Induction Motors
 - Traction Batteries
 - EV Traction Motor
 - Inverter ARC Welding Machine
 - Motor Controller
 - E Rickshaw Motor
- 43. E-MOTORCYCLE ASSEMBLY LINE
 - 43.1. Assembly Line for Motorcycle Battery
 - 43.1.1. Automatic Short Circuit Testing M/C KV-20M(R)
 - 43.1.2. Automatic Electric Welding M/C KS-3AM(R)-A
 - 43.1.3. Automatic Weld Condition Checking M/C KVD-10AM(R)
 - 43.1.4. Automatic Heat Sealing M/C KH-3AM
 - 43.1.5. Automatic Air Leak Testing/Coding M/C KAC-20AM(2R)
 - 43.1.6. Automatic Aluminum Foil Sealing M/C KAH-30M(2S)
- 44. PHOTOGRAPHS OF PLANT AND MACHINERY WITH SUPPLIERS CONTACT DETAILS
 - Motorcycle Assembly Conveyor Machine
 - Car Battery Welding Machine
 - Automatic Pole Burning Machine
 - Battery Heat Sealing Machine
 - Cycle Rim Nipple Tightening and Spoke Positioning Machine
 - Tyre Mounting
 - CO2 Welding Machine
 - CO2 Welding Machine
 - High Voltage Tester VHT
 - Automatic High Voltage Tester AC/DC
 - LED Display Manufacturing Machine
 - LED Panel Bonding Machine
 - Truck, Bus Tyre Uniformity Test Machine
 - Tyre Changer
 - Automatic Battery Assembling Plant
- 45. LAYOUT, PROCESS FLOW CHART & DIAGRAMS
- 46. ASSOCIATIONS
- 47. ELECTRIC VEHICLE OEM & EQUIPMENT MANUFACTURERS DIRECTORY

About NIIR

NIIR PROJECT CONSULTANCY SERVICES (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. 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.

NIIR PROJECT CONSULTANCY SERVICES, 106-E, Kamla Nagar, New Delhi-110007, India.
Email: npcs.india@gmail.com **Website:** NIIR.org

Wed, 06 Aug 2025 08:09:37 +0000