
प्रकृतिः रक्षति रक्षितः
Nature Protects if She is Protected
सत्यमेव जयते
Environmental Information System
India
GREEN
SKILL
DEVELOPMENT
PROGRAMME
(GSDP)
Report on Course:
Laboratory Technicians / Technical Assistants for Energy Efficiency, Star Labelling and Other Electrical Testing for Environmental Criteria
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE (MoEF&CC), NEW DELHI
SAVE ENVIRONMENT TODAY FOR BETTER TOMORROW
GREEN SKILL INDIA

A report on Course: Laboratory Technicians /Technical Assistants for Energy Efficiency, Star Labeling and Other Electrical Testing for Environmental Criteria.

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To build a low carbon future and curb climate change, the Indian government has committed to deploying expansive solar and wind energy capacity and adopting an array of ambitious climate actions.

India has made significant progress on energy efficient appliances. Ten home appliances of mass consumption fall under mandatory certification for star labeling. India successfully implemented sustainable LED lights programme and super efficient air conditioning programme through EESL (Energy Efficiency Standards and labeling).Six of India's largest air conditioner manufacturers announced plans to leapfrog from outdated R-410A refrigerant to more climate friendly and lower global warming potential refrigerants such as R-32 and R-290[61].
Sustainable consumption and production can only be possible with the active support and participation of all stakeholders such as producers, sellers, waste managers and consumers with their consumption and disposal patterns.
In today`s context of Green Technology, design, raw material, manufacturing and testing have become closely integrated. Industries can make a big difference in global competitions with skilled workforce. Many open positions in industry require specialized skills that require specific training.

Government is showing increased interest in education for sustainable development (ESD) as the key for behavior change under climate action component. CERC has developed holistic customized training programme of264 hrs for developing green skills of youth on sustainable products, lifestyles and sustainable consumer behavior.

Technically qualified youth was trained in its NABL accredited, BIS recognized Electrical product testing laboratory on the concepts of star labeling criteria and eco friendly practices adopted by the industry for sustainable future.

The first batch of the GSDP course was successfully conducted in 2018-19. The trainees either got jobs or went for higher studies. Second Batch of this course started from 7th January 2020 and completed successfully on 6th March 2020.

Selection of Candidates:
An advertisement is given in local newspaper and social media. Advertisement is also released in http://www.gsdp-envis.gov.in/. Large numbers of application were received for this course. Candidates with relevant qualifications were shortlisted and called for written test and personal interviews at CERC-ENVIS Centre. Out state candidates were interviewed on Skype/phone on. A selection committee comprising of subject experts selected candidates by judging their technical and core capabilities.

Inauguration of the Training programme:
It was held in conference hall at CERC campus on 07/01/20. Shri Dilipbhai Thakkar, Vice president and business head, LA-GAJJAR Machineries Pvt.Ltd was the chief guest and Shri D.L Parmar, controller legal metrology, Director Consumer affairs office was the guest of honor. Presidential speech was delivered by CERC's chairman trustee Shri Prafulbhai Amin and welcome address by CEO & board secretary, Shri Udaybhai Mawani. All invitees encouraged trainees with their inspirational speeches.

The programme was attended by CERC's management, staff members, prominent industry & academic experts and consultants.

Training:
Training programme was commenced from 7/1/2020 with orientation to various sections of CERC and the state of the art Product testing laboratories.All candidates were given bags with course material (training manual, important formulas useful for testing and calculations for deriving results, methods of analysis & solutions under various test conditions) stationary items, testers and safety helmets.

Training manual was given to each candidate with details on every aspect of testing. It covers introduction of laboratory tools required for preparation of test setup, introduction of instruments and equipments required for performing testing, consumables required during testing, knowledge on calibration of instruments, inspection of test system, primary maintenance and standardized formats for keeping records of every analysis including intermediate checks/cross verifications. It also covers mandatory safety requirements for electrical testing & laboratory operations and quality system for laboratory accreditation with simplified test procedures.

In manual, concepts of star labeling criteria and eco friendly practices adopted by the industry for sustainable future are simplified with methods of identifying eco-friendly star labeled electrical products, details on electrical products covered under energy star labeling criteria by Bureau of Energy efficiency, testing techniques for environmental criteria, green skills for sustainable development with tips & habits to be cultivated to save energy to contribute towards global challenges of climate change.

All details are explained in a creative way with photographs for ease of understanding.

Another manual on cleaner production and waste minimization was given by Gujarat Cleaner Production Centre, Gandhinagar.

Training schedule:
'Training Schedule' prepared was given to all the candidates for the month of January and February 2020.

Internal and external faculty members:

Following Internal and External faculty members/experts have made the training programme interesting and successful with their presentations.

Internal Faculty: Ms. Shweta Mahajan

External Faculty:
1. Dr. Chetan Upadhyay (Subject experts).
2. Mr. Mihir Vasavada (Subject experts).
3. Mr. Karjan Kulshrestha (Industry Expert).
4. Mr. Lakshman Agalawe (Industry Expert).
5. Mr. G.T. Panchal (Industry Expert).
6. Mr. Govind Zala (Industry Expert-for demonstrations).

Major topics covered:

The syllabus is designed keeping in mind the expectations industry has from job seekers. Suggestions were taken from industry experts and subject experts to make it comprehensive, which covers a broad category of competence levels in terms of professional knowledge, professional skills, core skills, responsibility and process.

1. Recent trends in electrical machines.
2. Renewable energy for green future (Types & basics).
3. Restructuring of power system for green power.
4. Design aspects of energy efficient induction motors.
5. Process of manufacturing of energy efficient motors for submersible pumps, calculation of losses and finding efficiency
6. Electrical safety & energy saving with switch-gears.
7. Maintenance of switch-gears & power quality solutions.
8. Environmental pollution due to noise created by electrical products, home appliances and accessories.
9. Measurement of noise & methods of reduction of noise.
10. Green practices observed by manufacturers.
11. Products covered under voluntary & mandatory labeling schemes of BEE.
12. Varieties of labels used on appliances as energy saving guides.
13. Sustainable consumption of electrical products.

Demonstration of tests /practicals on Electrical products and Home appliances: Ms. Shweta Mahajan

Practical training was systematically carried out according to the topics lined out in the course module. Various aspects of product testing including environmental criteria were covered in details as per the descriptions given in the training manual. Trainees benefitted from learning comprehensive testing techniques and hands-on experience on the instruments.

They were given exposure to the tests for Sound level measurement, air flow

measurement, energy consumption and derivations for star label with demonstration on electrical products; LED lamps, LED fluorescent tubes, LED night lamps, star rated cooling fans, fan regulators, exhaust fans, fresh air fans, refrigerators ,hand blenders, mixers/grinders & food processors.

They were given training on power consumed by unsustainable products and power saved with energy efficient & star labeled products with green technology. They were also given hands on experience for testing, analysis and reporting of test results as per NABL guidelines. Candidates gained clear knowledge on how reduction in carbon foot prints is linked with reduction in power consumption which further causes reduction in demand of power and automatically reduces demand for fossil fuels (coal) which helps in saving the environment. Thus, clear understanding was given on natural philosophy of engineering including mathematical and scientific knowledge constituting the pure theory of engineering operations and philosophy of maintenance and attitude.

Demonstrations on testing of Submersible Pump sets by the following:

Mr. Govind zala (External),
Mr. Arvind Sotha and Mr Ranadeep Karmakar (Internal)

Candidates were explained about the methodology of interpretation of Indian standards on submersible pump sets with other relevant references of main specification and amendments.
They were introduced to test systems, equipments, instruments & test setup required for performing the tests.

Basic knowledge was given on operation of instruments as per standard operating procedure (SOP) and conducting analysis as per standard operating test procedures (SOTP).
They were made well versed with instrumental analysis to obtain quantitative scientific data, spread sheets and graphs. They were given exposure to sequential type tests & D-section of products

Trainees were evaluated for competency on the basis of everyday interactions with them on learning capabilities, ability for working in groups, capacity of performing the tests independently and presentation of conclusion of test results with remarks.

Faculty members invited to give exposure to entrepreneurship:

1. Mr. Chandramauli Pathak
2. Mr. Kashyap Vachcharajani (Expert on finances for startups)

Presentation on consumer complaints and role of CERC was given by the Complaints department and presentation on Misleading Advertisements was given by Education &Research Department.

Visit to Kirloskar Brothers Ltd, Sanand on 23/1/2020

Candidates received very good exposure to the company which is completely running on solar plant (150Kw) with standby supply from UGVCL. Pump sets manufactured in this unit have sizes ranging from 3inch to 10inch (V3 to V10).

The company uses bi-directional meter. Solar energy is used for running all the automatic machines. When machines do not run, stored energy goes to UGVCL. For running the plant they have used IGBT Inverter (DC-AC).[Inverter ratings are 50KW (2 no) and 30 KW of (1 no)]. Inverter has inbuilt harmonic filters to maintain harmonic losses within ±5%.It is automated unit with comparatively low noise.

They have ISO, ISCE certification and Green Co. Award (for adopting solar and LED Lighting).
They also have energy conservation awards from last 3 years for achieving excellence in sustainability.(2014-15,2015-16, 2016-17).They are assembling solar pump sets. For testing of solar pumps, separate solar panel of 15 KW capacities is used.

Trainees learnt the construction of motor supplied with electrical power and motor supplied with solar power.

All trainees were shown CED Department (Cathode Electro Deposition Process).Rotors used in Kirloskar motors are electroplated by cathode electro deposition process which was very interesting. Rotor is de greased 3 times in ion-phosphate solution. Then it is dipped in distilled water when DC supply is given from cathode to Anode and base coating is done on rotor. For rotors, they have huge vertical storage device manufactured by Kardex Remster.

Visit to M/S LA-GAJJAR MACHINERIES PVT. LTD. ON 20-1-2020

Visited three different factories of LA-GAJJAR.One for V6 pump sets (Agricultural Application), second for magnet based motors for solar pump sets and third for domestic pump sets (V3 & V4 type).Company follows 5-S system in their manufacturing process. [SORT: when in doubt, move it out, SET in order - place for everything in its place, SHINE: Clean and inspect or inspect through cleaning, STANDARDISE: Make rules, follow these and enforce them, SUSTAIN: Make it as part of daily work and it becomes a habit].

Trainees learnt the detailed manufacturing process of

energy efficient submersible pump sets. They also had interactions with factory officers on quality aspects maintained at factory level.

Site 1: Visit to factory at Amraiwadi:
Trainees gained detailed knowledge on manufacturing process for rotors used in V6 pump sets. They learnt about rotor stamping process, bracing of coil fixture, balancing of rotor(Brass ring application),polishing and finishing (Inner & Outer) with rough file, shot blasting of rotor shaft ,powder coated painting process, oven heating at 90 degree Centigrade for drying the coating and final balancing (with drilling management). They also gained knowledge on manufacturing process of stator used in V6 pump sets. They learnt about stamping process for stator (24 slots & 0.5 mm thickness),welding process for stamping [MIG welding (metal Insert Gas)],finishing of stator slots with filing process ,buffing and cleaning process of stator body, inserting of slot paper in stator slots ,winding of motor (manual process),crimping of winding wires with monoplast, omega and PVC tape. All were shown the assembling of motor body with fitting process of upper & lower housing after insertion of rotor and fitting of bearing with segment (4 segment carbon-Pressure cup, oil seal , upper cap, flange and circlip process).

Site 2: Solar Panel on Roof top:
Manufacturing of solar based pump sets with Magnet based motor (BLDC - Brush Less DC motors) was explained. Magnet is imported from TAIWAN for motor PMSM (permanent Magnet synchronous Motor). PV cells are manufactured as per European Standards which gives best Performance at 25$\pm$1 degrees Centigrade.

Site 3: Visit to factory site at Rakhiyal.
This factory is manufacturing stators. All candidates were shown the manufacturing process for stators including, filing process, ultrasonic cleaning process to remove burrs and slot paper filling/insertion. Manual winding process was shown with coil filling.Different machineries used in the factory were shown with processes like coil lapping process with starting and running coil machine, slot paper inserting machine, shaping machine, lacing machine, crimping machine,Panel for final testing to check the quality of winding, winding resistance, IR, Surge test etc. Varnish process on winding, Heating in oven at temp of 150 to 175 degrees centigrade C (10 min),cable checking area, Epoxy mixing area, stacking press area, Rotor press area ,Oil filled area (V4 motor),oil seal process ,air leakage tester and Cable fitting.

Visit to MBH Pumps (Guj) Pvt. Ltd on 24/01/2020
MBH pumps are manufactures of wide verities of pump sets including domestic and industrial pumps (Monoset, Borewell, Open well & Industrial).During the visit, Candidates were explained about LEAN manufacturing practices adopted by factory. They have 170 pump sets models with five star labeling.They are regularly supplying industrial pump sets to BHEL, Reliance, NTPL and Govt. of Gujarat. Radial pump models of the factory are widely sold in north Gujarat & mixed flow pump set in south Gujarat

Trainees were explained about stampings ,spray gun painting, stator press , lamination ring, welding, lathe machine finishing, cable joining in stator area ,rotor pressing & brazing, machining, filing, grinding, assembling & testing in rotor area.

Visit to Sabar engineering pvt.ltd on 11/02/2020

Sabar engineering manufactures three phase squirrel cage induction motors used in air compressors, textile, pharmaceuticals and chemical machineries, cranes & hoists, blowers material handling equipments, geared motors etc. Hence, visit to this factory was a great learning experience to candidates on induction motors with rating of 0.37KW to 22KW.

Trainees were shown FIFO system (First in First out) followed by QC/QA department for selection of all types of raw materials including rubber, paints, varnishes, silicon stampings etc used for manufacturing of energy efficient sustainable motors. They were explained about the operation of automatic milling machine (software programmed) used for preparing key way in rotor and operation of CNC machines used for finishing of all components of rotor. They learnt the best practices followed for manufacturing of motors such as use of class F insulation system, IP55 protection, use of pre lubricated bearings, rotor designing with rectangular fins for heat dissipation & circular fins for balancing, use of external bidirectional centrifugal fan conforming to the requirements of IS 6362 & IEC 60031-6 respectively.

Visit to waterman industries Pvt. Ltd. on 05/03/2020

Waterman Industries is India's first pump manufacturing company to receive ZED MARK (zero defect zero effect) certificate with silver rating.During visit, candidates were shown all sections including purchase, design, quality, store and compete factory premises. They were explained about quality management system of factory [as per ISO 9001- 2015,ISO 14001-2015 and BS OHSAS 18001-2007]and SHEQ policy observed by company on conservation of energy & natural resources, raw material, use of efficient & environment friendly technology, wherever possible and effective waste management.

Final evaluation

Trainees were assessed for skills acquired by them through written test (100 marks) and practical of 100 marks(75 marks of practical & 25 marks of Viva - Voce).
Final evaluation of candidates was made on the basis of assessment criteria for level 6 NSQF qualifications.

Successful candidates were awarded with certificates during valedictory function held at AMA(Ahmedabad management association) hall on 06-03-2020.

Career counseling and placement of candidates:
A placement brochure was prepared with the detailed bio-data of all the trainees and it was circulated to prospective employers such as medium and small scale industries.

Career counseling sessions were held on professionalism and ethics, interpersonal interactions, quality consciousness, accountability and needs of industry for competence levels with professional skills and leadership qualities.

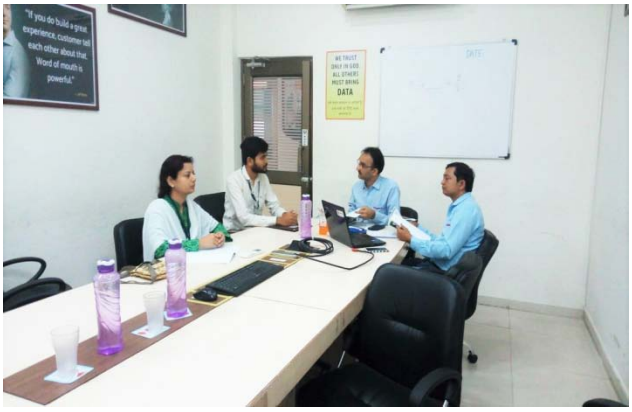
For giving opportunities and experience of company interviews, HR departments of following companies were requested.

1. MBH pumps (Guj) Pvt.Ltd.
2. Bhagvati industries, Ahmedabad
3. LA-GAJJAR machineries Pvt. Ltd. Ahmedabad.
4. Kirloskar Brothers Ltd, Sanand.
5. Service center of L & T, Ahmedabad.
6. Nirma industries, Ahmedabad.
7. Royal electricals, Surat.
8. Angel pumps, Rajkot.
9. Waterman industries Pvt.Ltd, Changodar.

More than 60 member companies under Indian pumps manufacturing association were requested to provide interview opportunities to candidates.

Interviews of candidates were conducted by following companies:

1. Angel pumps, Rajkot on 15/2/20.
2. Kirloskar Brothers ltd on 4/3/20 at CERC campus.
3. Waterman industries Pvt.Ltd. Ahmedabad on 05/03/20.
4. Service stations of L&T, Ahmedabad on 05/03/20.



Interview Session by Kirloskar Brothers ltd on 4/3/20 at CERC campus.

Interview Session by Waterman industries Pvt.Ltd. Ahmedabad on 05/03/20.

Success Stories:
11 candidates successfully completed the course and awarded with Certificates. Following

Six candidates got job in following companies:

- 1 trainee placed with Waterman Pumps Industry as trainee
- 1 trainee employed in Indian Oil Corporation as Technical Apprentice at Gujarat Refinery
- 1 trainee selected by WATAIR consultancy Firm
- 1 trainee placed with Maxxis Rubber Industry Pvt Ltd as Assistant Executive.
- 1 trainee placed with Shreenathji Electricals and Infrastructure, Bhavnagar
- 1 trainee (Mr Meet Soni) joined his batch mate's startup company named D Solutions Pvt. Ltd

Start-up

1 Trainee has started Start up name of firm is D Solutions Pvt Ltd

Government Competitive Exams
1Trainee is preparing for Government Competitive Exams

Higher Studies
1 Trainee has cleared GATE exam for Masters Degree.

Testimonials

- Through this course I learnt more about BIS standards and performed many test on Pumpsets, Lighting appliances and other home appliances for their eco friendliness.

  - Sunil Tareteeya

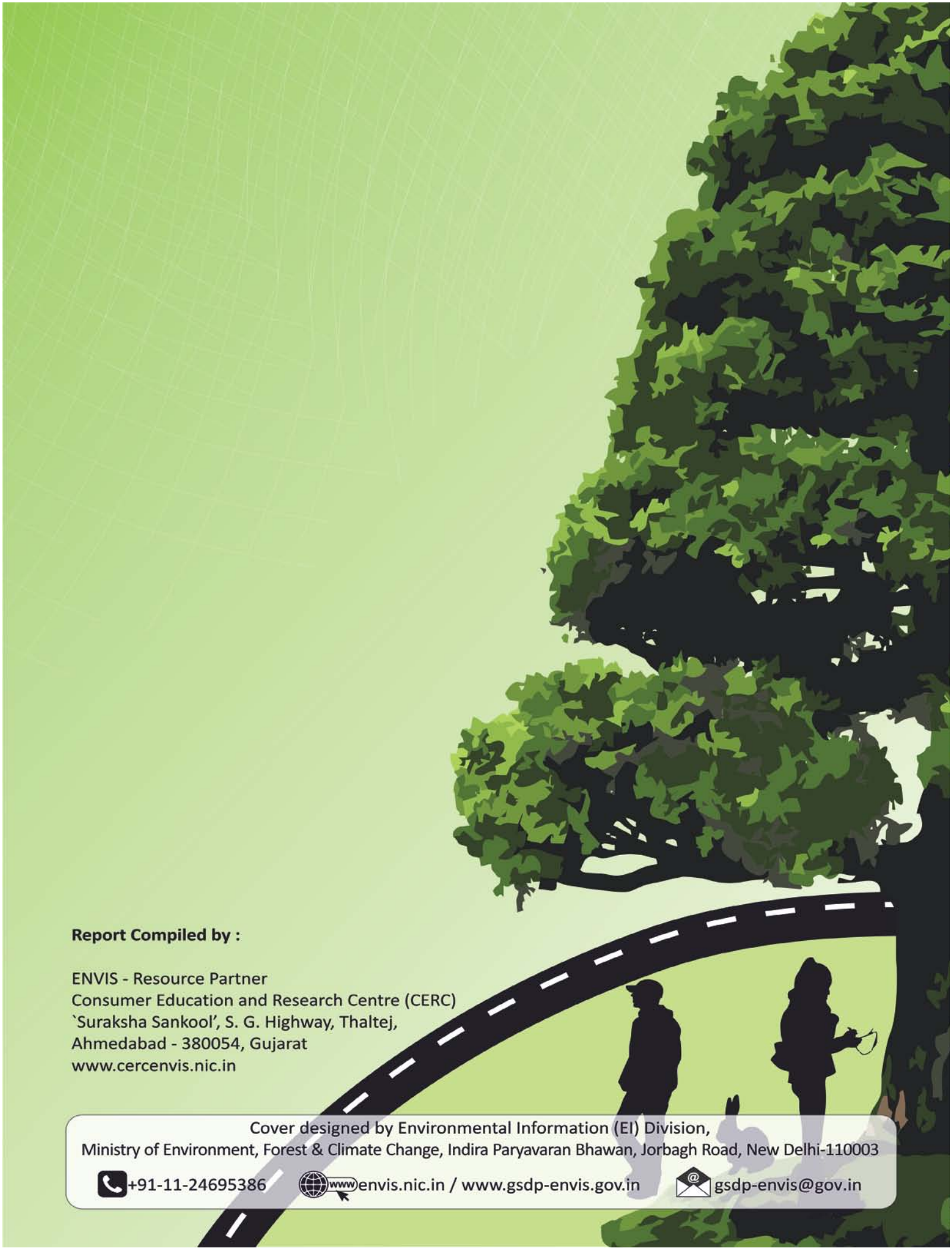
- Such a good Platform created by MoEF&CC which bridges the reference book knowledge of students to industry requirements for sustainable development. At CERC, I learnt more about submersible pumps, Importance of calibration, safety requirements, design considerations of motor for better efficiency etc. Thank you.

  - Vatsalkumar Prajapati

- I got to learn new things such as star labelling, about BIS and BEE, Environmental criteria for energy efficient appliances etc. I had an opportunity to visit a number of industries, wherein i gained practical knowledge and got to know more about industrial processes.

  - Pal Dhiraj RamewshwarBhai

Group Photo of GSDP 2019-20 Batch of “Laboratory Technicians /Technical Assistants for Energy Efficiency, Star Labeling and Other Electrical Testing for Environmental Criteria” Course



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