Azadi Ka Amrit Mahotsav

ANNUAL REPORT
2022-23

Sardar Swaran Singh National Institute of Bio-Energy, Kapurthala

(An Autonomous Institution of Ministry of New and Renewable Energy)

Annual Report
2022-23

SARDAR SWARAN SINGH

NATIONAL INSTITUTE OF BIO-ENERGY

An Autonomous Institution of
Ministry of New and Renewable Energy
Kapurthala – 144603, India

INSIDE THE REPORT

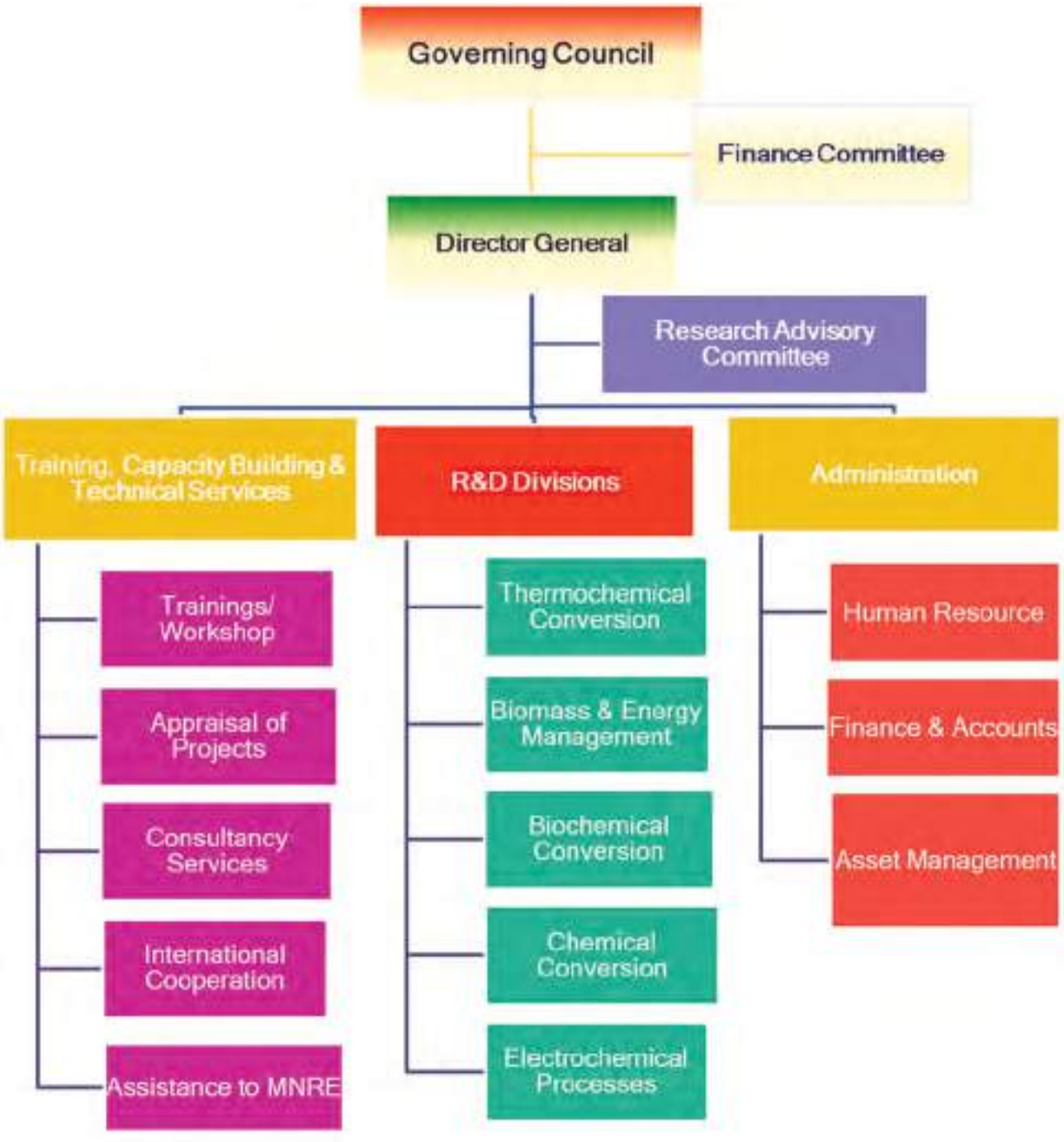
PREAMBLE

- Functional Structure
- Message from the Chairman Governing Council
- Message from the Director General
- The Charter
- SSS NIBE's Committees

'India's future development would be based on three pillars for green growth and energy transmission'

- Hon'ble PM Shri Narendra Modi

FUNCTIONAL STRUCTURE



Message from the Chairman Governing Council

भूपिन्दर सिंह भल्ला, भा.प्र.से.
सचिव
Bhupinder S. Bhalla, IAS
Secretary

भारत सरकार
नवीन और नवीकरणीय ऊर्जा मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY

As Chairman of the Governing Council of Sardar Swaran Singh National Institute of Bio-Energy (SSS NIBE), Kapurthala, Punjab, it is my privilege to reflect on the activities of the institute for the year 2022–23.

At the outset, I would like to appreciate the R&D and related activities undertaken by SSS NIBE, as they align with the programs of MNRE in the promotion of bioenergy in the country. Biomass, in our country's context, is a major and very relevant renewable resource for various energy applications, including power, cooking and heating, and transportation. SSS NIBE, through its five divisions covering the entire spectrum of biomass and bioenergy, has been at the forefront of research on topics such as biomass resource management, biogas, biohydrogen, 2G ethanol, biorefinery, clean cook stoves, biomass pellets/briquettes characterization, value added products and utilization prospects, among other avenues.

Apart from R&D, the institute has been supporting all activities relating to the bioenergy division of the ministry and also successfully conducting a M.Tech. program in renewable energy in association with NIT Jalandhar. During the last year, two national-level trainings and outreach programs have been successfully conducted, with participation from government bodies, NGOs, farmers, entrepreneurs, and academia.

I am optimistic that SSS NIBE, with its well-established infrastructure and state-of-the-art R&D facility, accompanied by well-qualified scientific staff and research fellows, will play a significant role in the years to come and contribute towards the development of indigenous technological products for the benefit of the country.

(Bhupinder S. Bhalla)
Chairman
Governing Council &
Secretary, MNRE

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Atal Akshay Urja Bhawan, Opp. Gate No. 2, CGO Complex, Lodhi Road, New Delhi-110003
Tel. : 011-20849010, 20849011 • E-mail : secy-mnre@nic.in

Message from the Director General

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महानिदेशक
Dr. G. Sridhar
Director General

Bioenergy is poised to become a major stakeholder in meeting our country's energy needs in the future. In fact, biomass is currently the only renewable source that is partially replacing fossil fuels in all energy markets: production of electricity, heat for the domestic and industrial sector, and fuels for the transportation sector. However, sustainable and economic production of bioenergy still remains a big challenge. Therefore, interventions both at the technology level and Government policies, are required, which are expected to lead to positive transformation.

Our Hon'ble Prime Minister in his address on the Biofuels Day in 2022 said "Biofuel is the need of the hour as it will help reduce our dependency for fuel and energy on other countries. This will not only check the flow of money from the country but also generate additional income for our farmers." With MNRE notifying the National Bioenergy Programme (NBP) in November 2022, for FY 2021-22 to 2025-26, biomass is once again destined to become a major player in increasing its share of contribution among other forms of renewable energy. The NBP primarily facilitates the enhanced use of bioenergy in the form of biomass briquettes/pellets for power generation and also in gaseous form – biogas, BioCNG, and biogas for domestic applications and strengthening energy access in rural areas.

With a boost being received for the bioenergy sector from the Government, Sardar Swaran Singh National Institute of Bioenergy (SSS NIBE), Kapurthala with its dedicated focus on the biomass and bioenergy sector is certain to play a major role in times to come. With new scientists coming on board at SSS NIBE, all the five R&D divisions have been assigned with trained scientific staff to pursue research activities. A technology roadmap which was duly prepared in consultation with the Research Advisory Committee has been adopted for furthering the R&D activities. In brief, the Technology Roadmap has primarily two components: Pilot/technology validation/demonstration and Applied research. The technology validation/demonstration is aimed to pilot the in-house technologies from

lab scale (TRL 3) to pilot scale (TRL 6). Towards this goal, efforts are on in identifying suitable industrial partners both in the state of Punjab and the rest of the country. On the applied research front, topics such as biohydrogen, and biorefineries are being vigorously pursued. One point that stands out is the contribution from the youngest R&D division – Biomass and energy management division, which is focused on generating a static national biomass atlas, with a potential to upgrade to dynamic biomass atlas in near future. Likewise, topics such as modelling of biomass supply chain management is being addressed.

On the academic front, I am glad to share that the Second batch of M. Tech - Renewable Energy students has graduated and successfully placed in industry/academics. Similarly, on the capacity building and outreach front, the institute has successfully conducted training programmes on biogas and renewable energy. The institute has made modest contribution to publications, which includes over 35 journal or conference papers including book chapters that have been published, along with 3 patents.

The institute also actively participated in contributing to technical programmes and meetings relating to bio-energy entrusted by MNRE. The prominent ones are the related preparation of standards and guidelines for biogas and the development of standards and guidelines for densified biomass, as well as my role as a sub-committee member under the SAMARTH mission of the Ministry of Power.

In the coming years, the institute aims to focus on building our core research strength in developing technologies and solutions that have societal relevance and thereby enhance the contribution of bio-energy to India's attainment of the net zero target by 2070.

I appreciate the efforts of all the staff at the institute for successfully completing their tasks and am delighted to release the annual report for 2022–23.

Dr. G. Sridhar
Director General
(SSS NIBE)

THE CHARTER

The Sardar Swaran Singh National Institute of Bio-Energy (SSS NIBE), Kapurthala was established in 1998 as an autonomous R&D institute under MNRE, Government of India. SSS NIBE is managed by a Governing Council headed by Secretary, MNRE and the Director General is the head of the institute. The Institute is situated in a campus of 75 acres with a unique solar passive structure office building at the 12th km Milestone, Jalandhar-Kapurthala national highway.

SSS NIBE was established to serve as a focal point of excellence for carrying out R&D, testing, evaluation, and training in bio-energy. The Institute has five research divisions, which are Biomass and Energy Management, Thermochemical, Biochemical, Chemical, and Electrochemical conversion, and all the divisions are working on approaches to enhance the usage of biomass, creating the right awareness and technology demonstrations. The institute is well equipped with the research infrastructure and an eco-friendly research environment. The broad spectrum of these divisions includes biomass resource assessment & management, biomass characterization, gasification, combustion, pyrolysis, solid waste/solid-state bio-methanation, biohydrogen production, compressed bio gas, municipal solid waste (MSW) to power generation, hybrid biomass systems, testing & standardization, and training for skill development in the bio-energy sector.

MISSION

SSS NIBE, a knowledge-based R&D institution of high quality and dedication, offers services and seeks to find optimum solutions for the major stakeholders across the entire spectrum of the bio-energy sector. It will support bio-energy sector in developing the knowledge for promoting new technologies. It will develop Human Resources for the bio-energy sector at all levels by imparting the training and allied activities to professionals of bio-energy sector

OBJECTIVES

To establish "Sardar Swaran Singh National Institute of Bio-Energy" as an apex R&D institution responsible for conducting state-of-the-art research and development activities in all the areas relating to renewable / bio-energy sources, including human resource development at all levels, post-doctoral research and research leading to commercialization of bio-energy technologies and the activities entailing:

1. Technology assessment, resource surveys and potential assessment.
2. In-house R&D in all emerging bio-energy areas.
3. Sub-contracting of R&D activities.
4. Joint technical programmes with other national institutions and testing centres.
5. Setting up of specialized centres at SSS NIBE and in different parts of the country for specific bio-energy areas.
6. Testing and certification of devices and systems.

7. Techno-economic evaluation of bio-energy equipment and systems.

8. Creating database for bio-energy including information on patents.

9. Compiling and dissemination of information on resources, technologies, products and applications.

10. Providing technical support to industry on new product design and development, and upgradation of product and manufacturing process.

11. Organizing training programs, seminars and workshops.

12. Cooperation with scientific and technical institutions abroad under bilateral and multilateral agreements.

13. Economic studies on bio-energy technologies and their environmental impact.

14. Assistance in curriculum development in bio-energy and undertaking concrete programmes for human resource development.

15. Consultancy services in the renewable energy sector with specialization in Bio-energy.

16. Providing technical support to MNRE in policy, planning and implementation.

To promote and develop requisite expertise and capabilities in regard to such technologies and applications, as may be deemed appropriate, to improve applied R&D skills and provide, organize, manage scientific, technical, engineering, management and other related assistance in promotion, development, demonstration, dissemination, and adoption of appropriate environment friendly technologies.

To provide various services including:

1. Planning, formulation, appraisal and monitoring.

2. Assessment, evaluation, implementation and management.

3. Development of projects, products, technology, management, reliability, maintenance, testing, design and other scientific technical and engineering inputs.

4. Management service, training, information, market development, etc.

5. Organizing training, study tours, seminars, workshops, etc.

6. Applied research & development.

7. Technical, scientific, managerial and engineering consultancy services.

SSS NIBE Committees

Governing Council

PRESIDENT OF THE SOCIETY & CHAIRMAN

Secretary
Ministry of New and Renewable Energy, New Delhi

MEMBERS

Joint Secretary, (Bio-Energy)
Ministry of New and Renewable Energy, New Delhi

Joint Secretary & Finance Advisor
Ministry of New and Renewable Energy, New Delhi

Secretary,
Department of Bio Technology, New Delhi

Secretary,
Department of Science & Technology, New Delhi

Principal Secretary,
Department of Science, Technology & Environment, Govt. of Punjab

Chief Executive Officer,
Punjab Energy Development Agency, Chandigarh

Scientist-in-Charge,
Centre of Excellence for Farm Machinery, CSIR-CMERI, Ludhiana

Chief Executive Officer,
Skill Council for Green Jobs, New Delhi

Director,
Dr B. R. Ambedkar National Institute of Technology, Jalandhar

Prof (Dr.) S. Dasappa,
Center for Sustainable Technologies, IISc Bangalore

Chairman,
Indian Biogas Association, Gurugram

MEMBER SECRETARY

Director General,
SSS NIBE

SSS NIBE Committees

Finance Committee

CHAIRMAN

Joint Secretary & Finance Advisor
Ministry of New and Renewable Energy, New Delhi

MEMBERS

Chief Controller of Accounts
Ministry of New and Renewable Energy, New Delhi

Joint Secretary (Bio-Energy)
Ministry of New and Renewable Energy, New Delhi

Director General
Sardar Swaran Singh National Institute of Bio-Energy

Director, PEDA
Punjab Energy Development Agency, Chandigarh

Director (Bio-Energy)
Ministry of New and Renewable Energy, New Delhi

Deputy Secretary, IFD
Ministry of New and Renewable Energy, New Delhi

Head of Department
Center for Energy and Environment
Dr B R Ambedkar National Institute of Technology, Jalandhar

MEMBER SECRETARY

Scientist
Sardar Swaran Singh National Institute of Bio-Energy

Building & Works Committee

CHAIRMAN

Director General
Sardar Swaran Singh National Institute of Bio-Energy

MEMBERS

Director, (Bio-Energy)
Ministry of New and Renewable Energy, New Delhi

Executive Engineer (Civil)
CPWD, Jalandhar Circle

Assistant Engineer (Electrical)
CPWD, Jalandhar Circle

MEMBER SECRETARY

Assistant Engineer (Civil)
Sardar Swaran Singh National Institute of Bio-Energy

SSS NIBE Committees

Research Advisory Committee

CHAIRMAN

Director General
Sardar Swaran Singh National Institute of Bio-Energy

MEMBERS

Joint Secretary (Bio-Energy)
Ministry of New and Renewable Energy, New Delhi

Prof. Ashok Gadgil
Lawrence Berkeley National Laboratory, USA

Prof. Ajay K Dalai
University of Saskatchewan, Canada

Prof Rajesh K Sani
South Dakota School of Mines, USA

Prof. K. A. Subramanian
HoD ESE, IIT Delhi

Director (Technical)
NISE, Gurugram

Director (Technical)
NIWE, Chennai

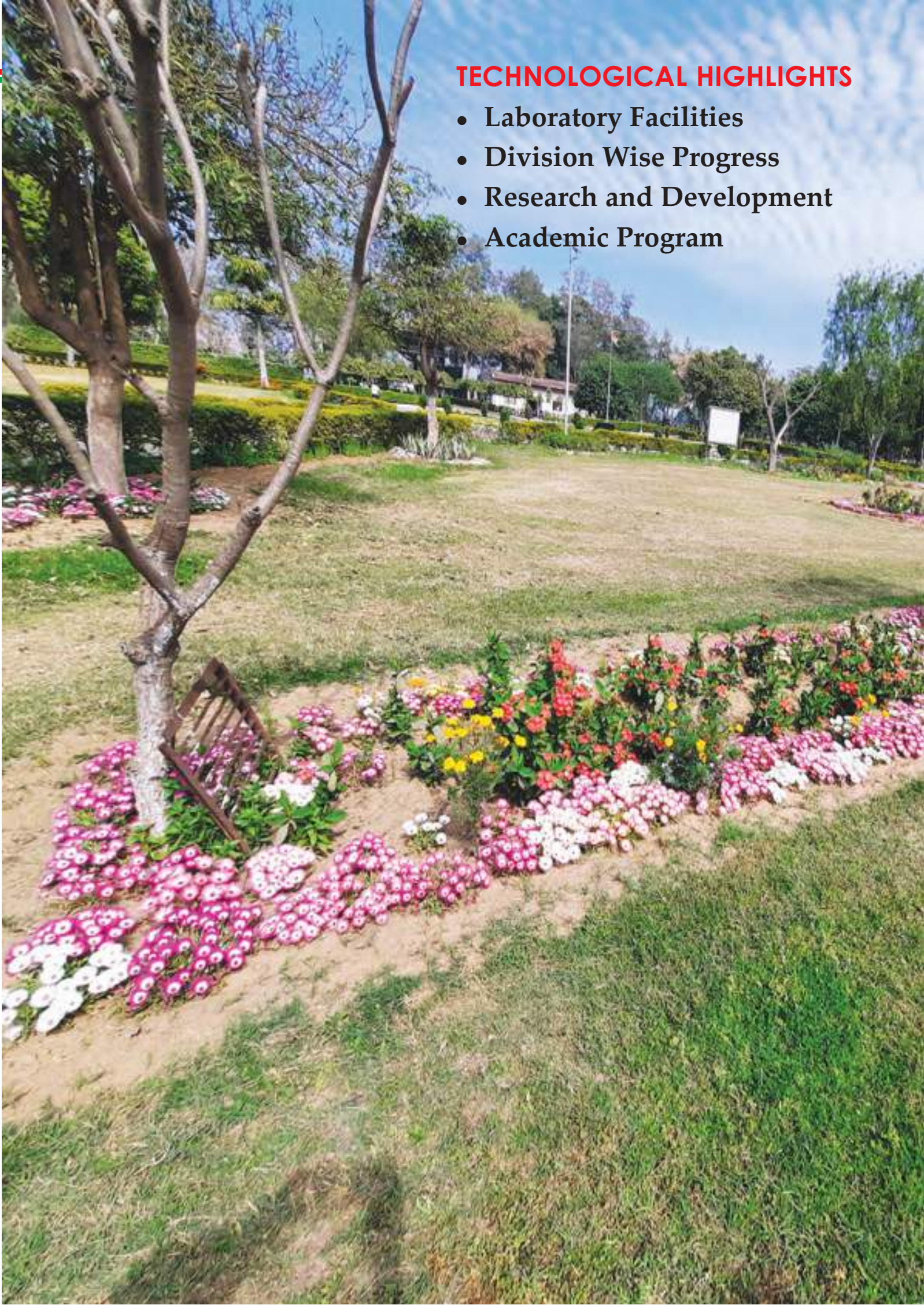
Industry Representatives, Nominated by DG SSS NIBE

Representative from DBT

Representative from Science & Technology Dept.
Govt. of Punjab

MEMBER SECRETARY

Scientist
Sardar Swaran Singh National Institute of Bio-Energy



TECHNOLOGICAL HIGHLIGHTS

- Laboratory Facilities
- Division Wise Progress
- Research and Development
- Academic Program

LABORATORY FACILITIES

A. Facilities available in Chemical Conversion Division & Electrochemical Division (R&D-I)

The equipment facilities available in Chemical Conversion& Electrochemical Divisions are:

Gas Chromatograph	Electrochemical Work Station
Automatic Density Meter	Infrared Lamp
True Boiling Point Distillation Apparatus	pH & Conductivity Meter
Rams bottom Carbon Residue	Flashpoint apparatus (automatic open cup)
Oxidation Stability Apparatus	Rotary Vacuum Evaporator
Radleys Reactor	Computerized Diesel Engine Test Rig
FTIR Spectrometer	Exhaust gas analyzer
High-Pressure High-Temperature Reactor	Fuel analyser for diesel index/Cetane No.




Researchers working in R&D-I Division

B. Facilities available in Biochemical Conversion Division (R&D-II)

The Biochemical Conversion Division has been established in R&D-II with the facilities of Analytical, Bioprocess, Microbiology, and Molecular Biology Laboratories. The equipment facilities available in Biochemical Conversion division include:

High Pressure Liquid Chromatography	Microscope with a camera
Gas Chromatography	Incubator
UV-vis spectrophotometer	CO_2 Incubator-cum-shaker
Fibertech	BOD Incubator
Bioreactor (3.0 & 7.5 L)	Hot Air Oven
Refrigerated Centrifuge	Horizontal Laminar Flow
Water Purification System	Automatic Colony Counter
Lyopholizer	Deep Freezer
Micro-disintegrator	Refrigerators
Water Bath	Gradient PCR
Autoclaves	Real-Time PCR
Environmental Shaker	Horizontal Gel Electrophoresis
Bio photometer	Gel Documentation
SDS-PAGE	Electroporation Unit

Researchers working in R&D-II Division

C. Facilities available in Thermo-chemical Conversion Division (R&D-III)

The Thermochemical Conversion Division has been established in R&D-III with the facilities for biomass characterization, biomass gasification, and Cookstove testing, etc. The available equipment facilities:

CHNS analyzer	TG-DTA
Online Gas Analyzer	Bomb Calorimeter
Stack Monitoring System (for SPM measurement)	Muffle Furnace
Testing Hood for biomass Cookstove	Multi Gas Analyser
Solar Concentrator Training System (Parabolic Trough Collector Based)	Solar PV Emulator
Solar PV Grid-Tied Training System	Solar PV Training & Research System (Stand Alone System)
Solar Thermal Training System (Flat Plate Collector Based System)	Wind Turbine Emulator
Differential Scanning Calorimeter	Wind Energy Training System

*Detailed specification on SSS NIBE'S website




Researchers working in R&D-III Division

DIVISION WISE PROGRESS

1. Biomass and Energy Management Division

The Biomass and Energy Management Division at SSS NIBE has initiated new activities in the last one year with the induction of two new scientists dedicatedly working along the objectives of this division. New work has been initiated in the following areas:

- Development of a static National Biomass Atlas for exploration of the State-wise and Crop-wise surplus biomass availability for the different important crops in different parts of the country. This work is based on the study conducted by ASCI for MNRE on the "Evaluation Study for Assessment of Biomass Power and Bagasse Cogeneration Potential in the Country".
- New collaborations are being explored with renowned institutions in the country like the Indian Institute of Management (IIM) - Amritsar for joint work on Biomass Supply Chain Management which is a critical issue for the techno-economic feasibility of bioenergy projects. A pre-liminary meeting in this regard was organized between the Director General, NIBE and Director, IIM Amritsar.

In the coming times, the division also intends to start new work on relevant topics like crop yield forecasting to assess the biomass availability scenarios in the future considering several parameters.

2. Biochemical Conversion Division

During FY 2022-23, several in-house R&D projects were developed by scientists and the research team in the division. The major focused area includes the Scaling up of integrated biorefinery using paddy straw, Upgradation of biogas to BioCNG via microbial electromethanogenesis, sequential dark and photo fermentation for hydrogen generation from paddy straw and exploration of novel lignocellulolytic enzymes for biorefinery applications etc. The details of these projects are discussed below.

2.1 Thermophilic anaerobic consortium enrichment for enhanced biogas/biomethane Production

A research work has been carried out to enhance the biogas production from Napier grass using thermophilic consortium at 52ÚC using 5-10%, w/v solid loading and 10-30% (w/w) developed thermophilic consortium. The daily biogas production was measured by supplementing with varying concentration of different minerals. An enhanced biogas production by up to 20% was observed with some of the minerals. It has been observed that the samples amended with minerals showed increased biogas yield than control by increasing the metabolic activity of the microorganisms inside the digester. However, no significant change was observed in the methane content from minerals-supplemented biogas plants.

2.2 Biogas production from different feedstocks

Biogas potential of different agricultural residues was studied by using in-house developed consortium THERMI-NIBE V.1. Feedstocks of banana pseudostem, kans grass, mustard stalk, corn cob, corn stover were analysed and lab scale biogas plants were set up by using THERMI-

NIBE V.1 providing thermophilic conditions. Banana Pseudostem and corn stover have a very good biogas potential and hence these could be used to produce biogas on large-scale. Likewise, biogas potential of potato waste (peel & flesh) obtained from chips industry was investigated using THERMI-NIBE V.1. Overall, it could be concluded that suchwasteshavea good potential for H_2/CH_4 production.

2.3 Upgradation of biogas to BioCNG via microbial electromethanogenesis

Different techniques such as Water Scrubbing, Pressure Swing Adsorption, Chemical absorption, Cryogenic Separation, Membrane Separation, Biological Techniques etc. are being used for the upgradation of the biogas to BioCNG. The division has selected Microbial Electromethanogenesis technique for the upgradation of biogas on the basis of the advantages of the technique over the others. In this process, methane is produced by reducing carbon dioxide by the biocatalysts in the presence of imposed potential. The system consists of an anodic and cathodic chamber typically divided by a proton exchange membrane (PEM) for the transport of ions i.e., protons. The protons are generated in the anodic chamber and are carried to the cathodic chamber through PEM where reduction reaction takes place leading to the production of methane. In this way, CO_2 present in the raw biogas is utilised for upgradation.

A jacketed double chambered bioreactor has been designed for the upgradation of biogas via microbial electromethanogenesis and is under the process of fabrication.

2.4 Integrated approach of Sequential dark and photo fermentation for hydrogen generation from paddy straw

Enhancement of H_2 yield using approach of dark and photo fermentation is being explored by researchers, however, the reported level of H_2 production using dark and photo fermentation is still insufficient as a commercially competitive energy resource. Moreover, some studies support the use of integrated dark and photo fermentation to produce bio-hydrogen continuously with high yield. This study aims to develop an efficient method for the conversion of lignocellulosic waste in biohydrogen via utilization of with sequential dark and photo fermentation using *Enterobactersp.* and *Rhodobactercapsulatus*. Currently, establishment the process of dark fermentation with paddy straw biomass is going on with different parameters. Pretreatment of paddy straw was done by different concentrations of NaOH and these samples were further treated by the enzymatic saccharification process. The effect of saccharification was analysed by the amount of reducing sugar present in the samples. Lab-scale biohydrogen plants were setup in a controlled environment of 37°C and hydraulic retention time (HRT) of 15 days. All the plant setups containing *Enterobacter aerogenes* showed hydrogen generation. It was observed that the *E. aerogenes* could be a successful strain for the dark fermentation process and enhance the yield of hydrogen generation.

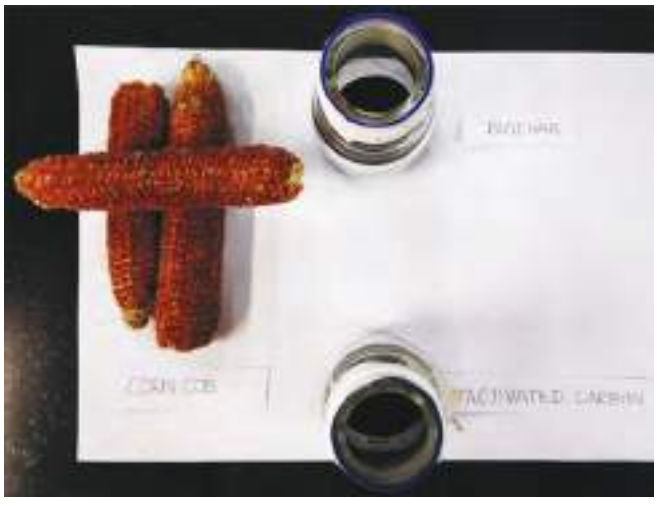
2.5 Exploration of lignocellulolytic enzymes producing thermophiles from hot springs of Western Himalayan region for biorefinery applications

The project "Exploration of lignocellulolytic enzymes producing thermophiles from hot springs

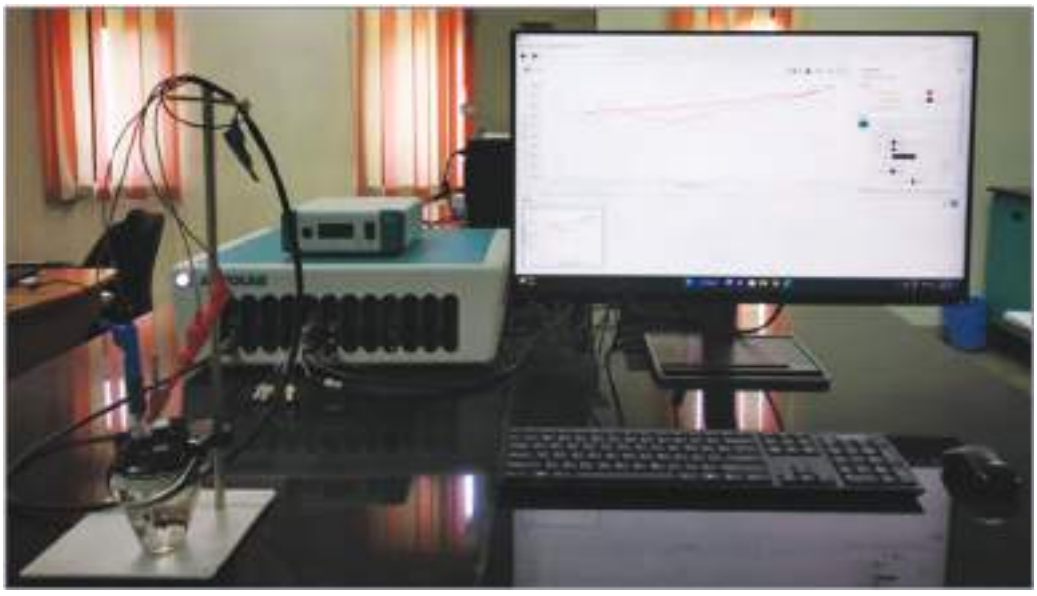
of Western Himalayan region for biorefinery applications" is funded by DST under KIRAN scheme. In the current project, a total of twenty-three lignocellulolytic enzymes producing bacterial strains were isolated from different hot-springs of Western Himalayan Range (Manikaran, Kasol, Tattapani). Based on experiments, five bacterial strains (NIBE 9, NIBE 10, NIBE 11, NIBE 13 and NIBE 23) showed cellulose-solvent zones around colonies in cellulose agar plate after incubating 24 h at 55°C.The characterization of cellulase producing bacterial strains was done on the basis of biochemical and 16S rDNA molecular typing at the species level. The strain NIBE 9, NIBE 11, NIBE 13 and NIBE 23 showed 99.86%, 100%, 99.86% and 99.93% similarity with Bacillus licheniformis. The isolate NIBE 10 showed 100% similarity with Bacillus smithi. The phylogenetic tree of all the bacterial isolates was constructed on the basis of neighbor-joining algorithm. Growth and cellulase production profile of B. licheniformis NIBE23 and B. smithi NIBE10 were studied and it was found that the production broth when inoculated with 1%, (v/v) of inoculum of B. licheniformis NIBE 23 produced optimal amount (enzyme activity: 20.3 U/ml, DCW 3.5 g/l) of cellulase at 24 h post in oculation at 55°C under continuous shaking. For the production profile of B. smithi, the production broth was inoculated with 1%, (v/v) of inoculum of B. smithi at 55°C under continuous shaking (150 rpm) upto 36 h. The maximum amount of cellulase production (14. 57 U/ml) and DCW (2.9 g/l) was observed at 22 h. Optimization of different conditions for maximum cellulase production from B. licheniformis NIBE23 was carried out. The culture conditions like pH, temperature, carbon sources, and nitrogen sources were optimized.

3. Chemical & Electrochemical Conversion Division

During FY 2022-23, in order to curb the problem of utilizing noble metal electrocatalyst in energy devices such as fuel cell, supercapacitor, batteries and water electrolyser research is oriented towards developing biomass based electrocatalyst as an alternative to conventional material. Electrochemical Division at SSS NIBE developed some biomass-derived carbon materials i.e., Biochar and activated Carbon from a variety of biomass such as Rice Straw, Corn Cob, and Potato Peels.



Developed Carbon material from Rice Straw Developed Carbon material from Corn Cob



Testing of developed Activated Carbon from variety of biomass for Energy Device application in Electrochemical Division, SSS NIBE

Other than the above, there are three concurrent projects sponsored by CPRI under the aegis of Biomass Mission, Subgroup I. The total cost of the three projects is Rs. 374 lakhs. The detailed research analysis and findings as follows:

3.1 Projects for National Mission on Use of Biomass in Thermal Power Plant sponsored by CPRI, Bangalore

The first project (Rs. 37 Lakhs, 1 year duration) titled "Composition analysis of different types of pellets/briquettes received from unknown sources" is of one year duration and is mainly concerned with forming a regression-based method to obtain the composition of an unknown pellet or briquette. Proximate and ultimate values of different mixtures of three, five and seven biomass varieties were obtained. A regression method is being developed for three samples which can accurately determine the content of an unknown mixture of rice, wheat and mustard pellet based on the proximate and ultimate values of the pellet. Further studies will be done to extrapolate the study to five and more sample mixture.

Automatic proximate Analyzer

The second project (Rs. 67 Lakhs, 2.5 years duration) titled "Complete heating and emission analysis of raw biomass and pellets during combustion", and is concerned with the burning rate, thermal efficiency and emission analysis with the pellets during combustion and to generate a database and recommendation for appropriate thermo and environmental analysis for meeting the desired standards. Biomass samples native to Punjab, Jammu and Kashmir and Himachal Pradesh and Uttarakhand (wheat stalk, rice stalk, pine etc.) were collected to determine the burning rate, thermal efficiency etc. of the biomass samples. Basic characterization (Proximate, ultimate and calorific value) of the pure biomass samples has been completed. Further progress of the project is presented in Section 4.3.

The third project (Rs. 270 Lakhs, 3 years duration) titled "Complete ash analysis of biomass pellets and co-combusted fuels" is concerned with studying the ash fusion behaviour and obtaining the various metallic oxides, halides and sulphur present in the ash. Also in this project, work will be done to generate a database and to recommend appropriate blending proportion of biomass pellets with coal to meet the desired standards. Biomass samples eg. variety of rice stalk, variety of wheat stalk, mustard stalk, groundnut stalk, bagasse, corn stalk, cotton stalk, saw dust, sweet sorghum, etc. from various parts of Punjab and Haryana have been collected. Ash was prepared using BS EN ISO 18122: 2015 standards and SEM-EDS and XRD studies were done to observe their morphology and composition.

Biomass samples from Punjab and Haryana, and their respective ash samples

Some of the equipment sanctioned under these projects are already commissioned (Automatic Proximate Analyser) and the rest are in the process of procurement. Also, 26 different varieties of bamboo species native to the state of Tripura were collected to study their potential as fuel source and to study their ash properties. North-eastern states of India account for around 28% of the India's bamboo stock and Tripura has 23% of its geographical area covered with bamboo forests. There is immense scope for utilizing waste bamboo and unused bamboo of Tripura and northeast India for charcoal production and subsequent use in coal-based powerplants. A MoU was signed between Tripura Forest Department and SSS NIBE for knowledge exchange. Proximate analysis of the bamboo samples were performed and ultimate analysis will be performed shortly. Calorific values of the bamboo samples will also be obtained. A study shall be carried out to check the suitability of bamboo species for combustion, gasification, pyrolysis etc.

Various bamboo species sourced from Tripura: solid and powdered form

3.2 Impact of torrefaction on thermal behaviour of biomass agro residues

Knowledge of emission profiles contributes significantly to the design of emission control technologies, thereby aiding in environmentally friendly bioenergy production. The literature lacks comprehensive research that compares the physicochemical properties and emission patterns of raw and torrefied agro residue for their bioenergy application. Considering this research gap, the impact of torrefaction on the physicochemical characteristics of mustard straws as fuel substitutes and emission patterns during combustion was investigated in this approach. Mustard is one of the most widely consumed oilseeds producing massive quantities of agricultural biomass residues. Globally, mustard is produced at a rate of 68.19 MMT every year, with the most harvested in European Union, Canada, China, and India. In terms of production, India contributes 11.61% globally, which results in the generation of 1.85 tons of agricultural waste per metric ton of mustard seed. In addition to the fact that mustard straws cannot even be used as fodder for cattle feed due to their glucosinolate content, it is necessary to implement a fool-proof and sustainable technique to dispose of the residue for use as a clean energy source post few thermo-chemical changes.

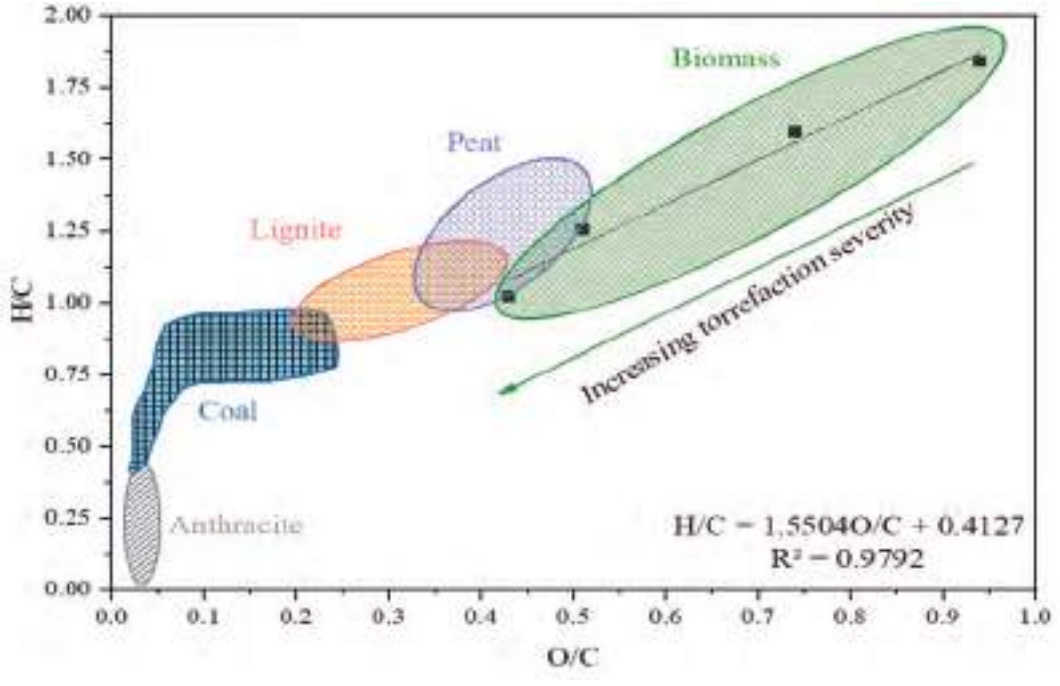
In the present study, torrefaction experiments were conducted using heating temperatures of 200°C, 250°C, and 300°C for 60 minutes. Afterward, NOx, SO_2, CO_2, CO, and dust emissions were evaluated from the combustion of raw/torrefied mustard straws. The outcome of this research is expected to provide practical insight into how raw mustard straw can be upgraded into densified solid biofuels suitable for industrial and thermal power plant applications. The results would help make an accurate analogy between torrefied mustard straws and other previously reported torrefied agro residues.

Torrefaction enhances the properties of biomass fuels which add to their suitability as energy sources. Due to the abundance availability of mustard straw in the northern region of India and throughout the globe, raw and torrefied mustard straws were investigated for the present study. The torrefaction experiments were conducted on mustard straw using heating temperatures of 200°C, 250°C, and 300°C for 60 minutes. The biomass characterization was carried out using proximate analysis, ultimate analysis, and high heating values (HHV). Afterward, NOx, SO_2, CO_2, CO, and dust emissions were evaluated from the combustion of

raw/torrefied mustard straws. After the experimentation, the results were compared with the literature. It was observed that during torrefaction, the carbon content of biomass increased from 40% to 55%, while the hydrogen (6% to 5%) and oxygen content (42% to 29%) decreased with the increase in temperature. Further, the lignin content increased while hemicellulose content decomposed with the increase in temperature. It was seen that energy yield for a torrefied mustard straw at 200 °C, 250 °C, and 300 °C was 76.24%, 88.98%, and 94.75%, respectively. The process of torrefaction, increases the bulk density (139 to 244 kg/m3), decreased the mass yield (100% to 64%), and improves the ignitability index (35% to 51%) of the mustard straw. The outcomes of this research are expected to provide practical insight into how raw mustard straw can be upgraded into densified solid biofuels suitable for industrial and thermal power plant applications.

RM (mustard color) | **RM-200 (light brown color)** | **RM-250 (dark brown color)** | **RM-300 (black color)**

Color variation in raw and torrefied mustard straw



Van Krevelen diagram of raw and torrefied mustard straw with different types of coal (Gajera, B., Datta, A., Gakkhar, N. et al.; https://doi.org/10.1007/s12155-023-10600-y**)**

3.3 Extraction of SiO_2 nano particles from the agro residue ash

The biomass is considered the most valuable feedstock in the power generation industry. Due to high moisture content, low energy densities, presence of a significant amount of SiO_2, and

a variety of inorganic compounds (potassium, sodium, and alkali earth metals), biomass cannot be widely applied in thermal conversion processes. Combustion of biomass for power generation produces biomass fly ash (BFA) and biomass bottom ash (BBA). In a recent study, it has been found that herbaceous biomass residues ash contains silicon oxide (SiO_2) in the range of 60-97 by weight percentage. Based on these values, the use of biomass residues for silica extraction is an interesting alternative for obtaining a product with higher added value. Nano silica can be used in various areas, such as cosmetics, electronics, refractories, medicine, and dentistry. The applications of Nano silica have been growing over the years, and the research aimed at its extraction and use has been receiving increasing attention.

Extracted SiO_2 Nano particles from Rice straw (PB 126), Industrial coal fly ash, and Biomass fired fly ash with size ranging from 80-90 nm

4. Thermo-Chemical Division

During the FY 2022-23, research has been carried out in the areas of biomass cookstoves to improve their thermal performance and emission characteristics. The performance of different improved cookstove models have been investigated in the cookstove testing laboratory. Performance of biomass-based dryers systems was also evaluated experimentally. Work has been initiated to address major ash related issues such as corrosion, agglomeration, ash fusion due to silica melting, alkali induced slagging biomass co-firing. Different biomass samples including but not limited to paddy straw, biomass pellets, briquettes, mustard, cotton stalk, municipal solid waste pellets etc. have been characterized to determine their elemental composition and calorific value. Work on the bio-char production, characterization and development of lab scale bio-char production unit has also been initiated.

4.1 Improved biomass cookstove testing and certification

SSS NIBE have a well-equipped improved biomass cookstove test center, to cater cookstove manufacturers in Northern India and especially for Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir and Uttrakhand region. Pictorial depiction of the existing facility is given below. The test facility is due for upgradation and this activity will be taken up in the next financial year.

Biomass cookstove testing facility at SSS NIBE

Various cookstove models were received for testing and certification purpose at the laboratory in 2022-23. This activity was carried out as part of testing services being offered to the industry. The testing was carried out followed as per BIS 2013 protocol. The details of the cookstove models tested are given below.

Details of various biomass cookstove models tested at SSS NIBE

S. No.	Name and address of manufacturer & cookstove specifications/type	Status of completion
1.	**M/s Green Tangents Pvt Ltd.** Jaipur, Rajasthan Details of Cookstove Model i) Domestic size Biomass Cookstove (Metal body)– 1 kg/hr	Aug-Sept, 2022
2.	**M/s Seerat Pvt Limited** Address: Nalagarh, Himachal Paradesh-174101 **i)** Seerat Forced Draft, Domestic size, gasifier type biomass cookstove (Metal body without insulation, Top feeding)– 1.2 kg/hr	Oct-Nov, 2022
1.	**ii)** Seerat Forced Draft, Domestic size, gasifier type biomass cookstove (Metal body without insulation, Top feeding), **(Modified design)**– 1.2 kg/hr	Feb-March, 2023
3.	**SRC Natura Product Ltd.** Address: Karol Bagh, New Delhi-110005	

	i) Natural Draft, Domestic size, Single pot, Biomass cookstove (Metal body with glass wool insulation, Side feeding)– 1.5 kg/hr	Jan-Feb, 2023
	ii) Natural Draft, Two pot, Domestic size Biomass Cookstove (Material of Construction: Mud/clay, Side feeding) – 1.5 kg/hr	March, 2023
4.	**Fire and Combustion Research Center (FCRC), Jain (deemed to be) University Bengaluru** Address: JAIN Global Campus, NH 209, Jakkasandra Post, Bengaluru-Kanakapura Main Road, Ramanagar District - 562 112	
	i) Advance Biomass Cookstove Device (ABCD) – 1.5 kg/hr (Vertical forced draft)	Nov-Dec, 2022
	ii) Advance Biomass Cookstove Device (ABCD) – 3.5 kg/hr (Vertical forced draft)	Feb-March, 2023
	iii) Advance Biomass Cookstove Device (ABCD) – 15 kg/hr (Vertical forced draft)	In Process
	iv) Advance Biomass Cookstove Device (ABCD) – 3.5 kg/hr (Horizontal forced draft) Jan, 2023(In Process after modification)	

4.2 Advance biomass cookstove testing, demonstration and dissemination in collaboration with Fire and Combustion Research Center (FCRC), Jain University, Bengaluru

A MoU between SSS NIBE and Jain University was signed in Sept, 2022, involving activities such as demonstration of advanced and fuel-efficient biomass stoves/combustors for multiple end user application, initially in the state of Punjab and subsequently in other states in India. This is essentially to popularize the use of waste biomass/agro residue for economically meeting the energy/heat requirements both at domestic and industrial level. For the same, the initial design of biomass stoves/combustors that has been developed and patented by FCRC, Jain University shall be adopted. Based on the requirement analysis in Punjab, the stove/combustor design would be suitably modified/scaled-up to suit end application. FCRC, Jain University shall act as the knowledge partner in this project and provide the technology of biomass stove/combustor and also supply these devices by themselves or through their authorized manufacturer. FCRC would also support SSS NIBE in disseminating knowledge through public outreach programmers such as training, workshop, demonstrations, consultations, seminars, etc. As a consequence of this collaboration between the two parties, SSS NIBE's scientific staff would be beneficiary to the know-how on advanced stove design, scale-up and its implementation/operation.

(a): Size: 1.5 kg/hr, Type: Vertical, Forced draft cookstove

(b): Size: 3.5 kg/hr, Type: Vertical, Forced draft cookstove

(c): Size: 15 kg/hr, Type: Vertical, Forced draft cookstove

(d): Size: 3.5 kg/hr, Type: Horizontal, Forced draft cookstove

Advance biomass cookstoves received from FCRC, Jain University Bengaluru

In continuation with above work agenda of the MoU, five nos. of improved biomass cookstoves of different capacities (1.5 kg/hr, 3.5 kg/hr and 15 kg/hr) and types (horizontal and vertical) has been received from FCRC. Before dissemination of the cookstove models in the field, the testing of different cookstove models under laboratory conditions is underway. Also, the potential end users for field demonstration are being identified. Based on the satisfactory performance report of laboratory testing, cookstove models of appropriate capacity will be disseminated among the identified end users.

4.3 Complete heating and emission analysis of raw biomass and pellets during Combustion (CPRI, Bangalore funded project)

Significant progress was made in the procurement of biomass from five states: Haryana, Punjab, Uttarakhand, Himachal Pradesh, and Jammu & Kashmir. Different types of biomasses procured from various state can be found in the below mentioned Table. This successful

procurement has provided us with a diverse range of biomass resources for further analysis and utilization.

Characterization analysis was a key focus during this period. Calorific value analysis was conducted on biomass samples obtained from all five states, encompassing various biomass species such as wheat straw, paddy straw, mustard, corn, bajra, jowar, pine, and cotton. Proximate analysis was performed on biomass samples collected from all states, aiming to determine the percentage composition of moisture, volatile matter, fixed carbon, and ash content. Additionally, ultimate analysis was conducted specifically for biomass samples obtained from Punjab, focusing on determining the elemental composition, including carbon, hydrogen, nitrogen, sulphur, and oxygen content.

Biomass procured from various states of India

S. No.	State	Month of biomass procurement	Biomass
1.	Punjab	July-August 2022	Wheat, Paddy, Mustard, Bagasse, Groundnut, Maize, Bajra
2.	Haryana	Oct 2022	Wheat, Paddy, Bajra, Cotton
3.	Uttarakhand	Nov 2022	Wheat, Mustard, Bagasse, Bajra, Pine, Kasturi Basmati, Corn cob
4.	Jammu & Kashmir	Feb 2023	Wheat, Paddy, Mustard, Bagasse, Bajra
5.	Himachal Pradesh	March 2023	Wheat, Paddy, Mustard, Bagasse

In line with these analyses, a comprehensive documentation report work is in process. Report will include an estimation of the higher heating values using the proximate and ultimate analysis values obtained from the biomass samples. This documentation will serve as a valuable reference tool for future analysis, decision-making processes, and potential energy applications.

4.4 Densification of agro-waste and assessment for its applications in the gasifier

During 2022-23, significant work has been done for completion of objectives of the project entitled 'Densification of agro-waste and assessment for its applications in the gasifier'. The objectives of the project include: -

- To characterize different agro-wastes like paddy straw, corn stover, sweet sorghum, millet, cotton stick, and mustard crop residue for briquetting machine.
- To investigate the size of milled biomass and binders on briquettes characteristics.
- To investigate fuel efficiency of briquettes for its potential use in gasifier.
- Techno-economic study of briquettes for its application in gasifier.

The biomass which are included in the project were procured during the last year Samples of the biomass collected can be found in picture below.

Samples of different biomass collected of densification

Detailed characterization of six agro-waste viz. paddy straw, corn cob, sweet sorghum, millet, cotton stick and mustard crop residue has been carried out. The physio-chemical characterization i.e., ultimate analysis (C, H, N, S, O), proximate analysis (moisture, VM, fixed carbon & ash) and gross calorific value of the biomass have been done. The result for the same are provided in the below Table.

Properties of biomass samples

Biomass	Proximate Analysis (%)				Ultimate Analysis (%)GCV*					
	Moisture	Volatile Matter	Fixed Carbon	Ash	C	H	N	S	O	HHV* (MJ/kg)
Paddy Straw	8.08	67.46	8.53	16.94	37.05	5.15	0.84	0.16	56.80	12.43
Corn Stover	8.65	72.22	13.49	6.65	41.82	5.31	1.15	0.13	51.58	16.28
Sweet Sorghum	8.92	72.26	12.59	7.24	37.63	4.88	1.34	0.34	55.80	17.57
Pearl millet	9.78	74.51	10.78	5.94	41.87	5.33	0.93	0.11	51.76	15.74
Cotton Stick	7.42	75.73	12.26	5.60	39.26	4.73	0.76	0.10	55.14	17.59
Mustard Crop residue	8.90	73.88	8.02	10.20	40.47	5.55	0.98	0.54	52.46	16.69

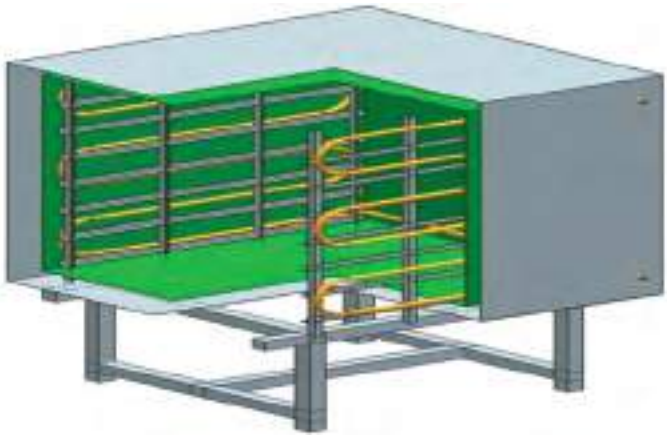
GCV*= Gross Calorific value, HHV*= High Heating Value

A few organic binders have been identified viz. molasses, press mud, water hyacinth, cow dung, poultry waste etc. for their characterization. The further work is focused on the investigation of effects of size of the biomass and influence of binders and their characteristics and properties on biomass. The work for the other objectives is under progress aligned with the timeline of the project.

With relevance to this project, in the 'CHEMSMART 22'conference held at NIT Rourkela, the project staff presented a paper titled, 'Theoretical Process Design of a Gasifier Using Mixed Biomass Variety', which got published in the proceedings of Materials Today.

4.5 Advancing Drying Technologies: Water-Based and Air-Based Dryers

The biomass hybrid dryer has been designed and developed by SSS NIBE in collaboration with Bharat Heavy Electronics Ltd (BHEL). The dryer utilizes a biomass-based cookstove to provide thermal energy to the drying chamber. During this financial year, the testing of water-based dryers for agricultural products, industrial goods and loose biomass has showcased superior performance, by carefully regulating temperature and humidity. During the testing, four individual agro products were selected for drying, namely Onion, Spinach, Curry leaves and Bitter gourd. The initial moisture content of Onion, Spinach and Curry leave samples was 87.38%, 88.60%, 65.13% (wet basis) respectively. The percentage of weight reduction of these samples was 89.04%, 89.03%, and 74.88%. The testing and drying process demonstrated that moisture reduction for Onion, Spinach, and Curry leaves was achieved in under 10% in 26.5 hours, 11.5 hours, and 8.5 hours. Whereas, in the case of bitter gourd experiments were conducted for 6 hours where the moisture content was reduced from 91.78% to 56.23%.The findings from these studies have inspired further to engineer an air-based drying system that is capable of delivering new levels of efficiency. Our goal is to scale up and implement these innovative technologies in industrial installations, offering sustainable and efficient drying solutions that reduce energy consumption and enhance product quality.



3-D sketch of the drying chamber

Water-based dryer during working

Loaded trays in dryer chamber

Dried Onion flakes in dryer

Advanced drying technology for industrial and domestic applications

RESEARCH AND DEVELOPMENT

SSS NIBE is playing a key role in research and development of bio-energy sector in the country. Both in-house and sponsored projects were continued or freshly initiated, the major ones are listed below:

1. New Sponsored Projects

- Hydrogen-Methane production from pulp & paper sludge though anaerobic co-digestion; Funded by MoEF & CC; Project Cost: INR 8.9 Lakhs, Duration: 2 years.
- Advanced microalgal biorefinery approach for recycling of domestic sewage/wastewater for cleaner and greener Himalayan region; Funded by MoEF & CC; Project cost: INR 96.75 Lakhs, Duration: 3 years.

2. Ongoing Sponsored Projects

- Exploration of lignocellulolytic enzymes producing thermophiles from hot springs of Western Himalayan region for biorefinery applications. (Mentor); Under DST Women Scientist Scheme: WOS-B (KIRAN Division). Project Cost: INR 32.16 Lakhs; Duration: 3 years.
- Projects for National Mission on Use of Biomass in Thermal Power Plant sponsored by CPRI, Bangalore.
  - Composition analysis of different types of pellets/briquettes received from unknown sources; INR 37 Lakhs, Duration: 1 year.
  - Complete heating and emission analysis of raw biomass and pellets during combustion; INR 67 Lakhs, Duration: 2.5 years.
  - Complete ash analysis of biomass pellets and co-combusted fuels; INR 270 Lakhs, Duration: 3 years.
- Densification of Agro waste and assessment for its application in gasifier; Funded by MNRE; INR 40.45 Lakhs, Duration: 2.5 years.

3. In-house projects/studies

- Integrated approach of Sequential dark and photo fermentation for hydrogen generation from paddy straw
- Identification and characterization of algal species for power generation
- Development of yeast strain with enhanced xylose utilization for ethanol production
- Studies on efficient pre-treatments for cellulosic ethanol production from paddy straw
- Process development for bioethanol production from multi-lignocellulosic feedstocks (paddy straw, maize husk, sugarcane bagasse)

- Synthesis and characterization of membrane for biogas upgradation
- Thermophilic anaerobic consortium enrichment of enhanced biogas/ biomethane production
- Upgradation of biogas to BioCNG.
- Advancing Drying Technologies: Water-Based and Air-Based Dryers.
- Extraction of SiO_2 nano particles from the agro residue ash.
- Impact of torrefaction on thermal behaviour of biomass agro residues.
- Field version Torrefaction system

ACADEMIC PROGRAM

The institute commenced an academic program -M. Tech (Renewable Energy), in collaboration with Dr. B. R. Ambedkar National Institute of Technology (NIT) Jalandhar in September, 2020. This program has provision for National Renewable Energy fellowship for the GATE qualified students, which is formally approved by Hon'ble Minister, MNRE. The course offered by Centre for Energy and Environment, NIT Jalandhar, has an intake capacity of 30 students, which includes15 industry sponsored / self-sponsored candidates.

The first batch of students graduated in May 2022 and got successfully placed in academic and industry. The second and third batches are in progress. Broad features of the program are as follows:

- Course work is jointly taught by Scientists from SSS NIBE and Faculty of NIT, Jalandhar.
- The program covers the important aspects of renewable energy, bioenergy, biofuels, waste to energy, solar thermal, solar PV, wind, hydro sectors with relevant electives offering.
- The students have a choice to work on final semester project at NIBE/ NISE/ NIWE or Industry.
- Opportunities for internship in industry

There is also opportunity for students to pursue doctoral research degree, which is offered jointly with NITJ and other universities in the country. The Institute also offers limited post-doctoral fellowship for researchers holding a PhD who wish to carry out their research activities in the field of bioenergy, acquire new skills and develop their careers.

SKILL DEVELOPMENT AND OUTREACH

- Training program
- Collaboration
- Events
- Publication

TRAINING PROGRAM

The SSS NIBE is committed for promotion of bio-energy. With this mandate, the institute is organizing outreach programs and events on various aspects of bio-energy. During 2022-23, the institute had organized two National Training Programs:

1. "National Hands-on training program on Bio-Gas Technology and its implementations"
2. "National Training Programme on Renewable Energy Technologies: Recent advancements & Techno Economics"

One week National hands-on training program on Biogas was organized between 17th-21st October 2022. The event was inaugurated by Dr. G. Sridhar, Director General, SSS NIBE and Guest of Honour being Dr. V K Garg, Dean, Central University of Punjab, Bathinda.

Likewise, the National Training Program on Renewable Energy Technologies was organized between 28th November to 1st December 2022.The program was designed to introduce the importance of different applications of renewable energy including solar, wind and bioenergy, off-grid and grid power generation, financing for industrial projects, and techno-economics and policies for renewable energy. Prof. Manoj Kumar, Vice Chancellor DAV University was invited as the chief guest. Participants were from diverse backgrounds including state nodal agencies, academia, KVIC, and industry etc.

COLLABORATION

In 2022-23, SSS NIBE signed MoU with two institutions to facilitate collaborative research and exchange of students for academic work. The two MoUs signed are:

1. MoU between **SSS NIBE and FCRC Jain University, Bengaluru** was signed on 16/09/2022, where both the parties have come to an understanding to promote the research and development, testing, scale-up, demonstration and training in area related to advanced biomass cookstoves or combustors for domestic, institution and industrial application. In near future, these devices will be demonstrated at select locations in the state of Punjab.

2. MoU between **SSS NIBE and Panjab University, Chandigarh (PUC)** was signed on 09/02/2023, where both the parties have come to an understanding to form a nucleus for promoting excellent quality manpower in the field of Renewable energy technology and Science with special emphasis on Bio-Energy. Both SSS NIBE and PUC shall encourage interaction between the Scientists, Research Fellows, Faculty members and Students, and sharing of research/lab facilities. Also, there is provision for students to enrol for PhD at PUC and carry out the research work at SSS NIBE.

EVENTS

1. Hindi Divas and Pakhwada

The Institute observed Hindi Pakhwada between 14th and 28th September 2022. The program was coordinated by the Hindi Office of the Institute. Official banners and posters were displayed at all primary locations of the institute, to disseminate the importance of Hindi language for official communication. Activities were conducted to enhance the Hindi language skills and make learning more enjoyable. Quiz, Essay and Debate competitions were held during Hindi Divas Week. Also, Kavi Sammelan was organized on the concluding day of Hindi Pakhwada, wherein two accomplished Hindi poets, namely Shri. Rajesh Chetan and Shri. Rajesh Aggarwal were the performers of the evening.

2. SSS NIBE Participation at PAU- Kisan Mela-2022

SSS NIBE exhibited a strategic stall at the Kisan Mela-2022 (23rd - 24th September 2022) organized by Punjab Agricultural University (PAU), Ludhiana. Kisan mela at PAU is mega event, which offers opportunity for farmers, agro-industry, academicians and other relevant stakeholders to showcase latest developments that is relevant to farming community. A team of Scientist and Researchers represented the institute at PAU Kisan Mela-2022 and showcased the work/products. The products/

indigenous technologies which are being developed in our institute from agricultural waste were the core area of interest for the farmers.

3. Cyber Jagrookta Divas

The institute celebrated the first anniversary of "Cyber Jaagrookta Diwas" on 6th October, 2022, as directed by Ministry of Home Affairs. With the deeper penetration of the internet and the dependence on cyber activities in our daily lives, cyber security has become a major concern. Therefore, to generate more awareness in our institute on cyber hygiene and cyber safety issues an expert talk was organized at the institute. Mr Sanjeev Kumar Gaba, District Informatics Officer/Technical Director, NIC Kapurthala, was invited to deliver the talk.

4. Fire Training Program

The EHS committee of institute organised the fire training program on 07th October, 2022 for all the staff members. In this regard, Mr. Harwinder Singh, Fire Officer, Fire Department, Kapurthala was invited to bestow fire training to staff and students.

5. Vigilance Week

Vigilance Awareness Week was observed/celebrated in the institute during 31st October, 2022 to 6thNovember, 2022. In this week following different events were scheduled and performed; Quiz Competition; Debate Competition; Slogan Competition; Guest Lecture on vigilance awareness. On this occasion, Sh. R K Verma (Chief Vigilance Officer), Rail Coach Factory, Kapurthala was invited to deliver a lecture on vigilance awareness and all the officials attended and interacted with him.

6. Women's Day Celebration

On the occasion of the celebration of International Women's Day Week, Dr. Neelima Jerath, Director General, Punjab Govt. Science City was the invited guest. She spoke on the topic "Women in Science and their contributions to Energy and Environment".

7. Advanced combustors/cook Stove Demonstration

A live demonstration of Advanced Biomass Combustion Devices was organized at SSS NIBE on 26th and 27th September, 2022. During the event, the in-house technologies/products, such as biogas, ethanol, biodiesel, bio-crude, biochar, cook stoves were showcased. More than 15 different stakeholder organizations/individuals witnessed the demonstration, which included participants from Gurudwaras, sweet shops, Integral Rail Coach Factory (RCF), faculty and students from different institutes, industry officials, etc.

8. 34th Governing Council Meeting

The 34th Governing Council Meeting of Sardar Swaran Singh National Institute of Bio-Energy (SSS NIBE), Kapurthala, Punjab was held on 12th August 2022. The meeting was held at the office of The Secretary, MNRE, New Delhi in Hybrid mode.

9. 1st RAC Meeting

The first Research Advisory Committee (RAC) meeting was held on 22 September, 2022, at 1900 hrs (IST) at SSS NIBE in a hybrid mode under the Chairmanship of Dr. G Sridhar, DG SSS NIBE. The meeting was attended by committee members from India, USA and Canada. The achievement of SSS NIBE was presented and inputs sought from RAC members for future R&D direction.

10. 21st Finance Committee Meeting

The 21st Finance Committee meeting of SSS NIBE was held on 13th December 2022 in hybrid mode. In the meeting the financial audit reports for FY 2021-22 was placed for discussion.

11. 35th Governing Council Meeting

The 35th Governing Council meeting and 4th Annual General Meeting (AGM) in hybrid mode were held on 21/12/2022 at MNRE. In the meeting the Annual report for FY 2021-22 was placed for discussion.

12. 22nd Finance Committee Meeting

The 22nd Finance Committee meeting was held on 13th January 2023 in hybrid mode.

13. 36th Governing Council Meeting

The 36th Governing Council meeting was held in hybrid mode on 7th March, 2023 at MNRE, New Delhi under the chairmanship of Secretary, MNRE.

14. 7th Building Works Committee Meeting

The 7th building works committee meeting was held under the chairmanship of Director General on 17-11-2022. Sh. Ram Anuj Singh (AE-Civil) was the member secretary of this meeting. During the meeting, various agenda points were briefly discussed.

15. Social Activities

Swachchta Pakhwada (1st-15th June 2022)

International Yoga Day (21st June 2022)

National Unity Day (31st October 2022)

76th Independence Day Celebration (15th August 2022)

Republic day Celebration (26th January 2023)

PUBLICATIONS

During 2022-23, there has been large contribution of scientists and researchers in publishing their research findings in various journals, conferences, books etc., including patents. A sample list is given below:

Patents:

- Sachin Kumar and Meenu Hans, Integrated biorefinery for renewable biochemicals; (Application No.: TEMP/E-1/24588/2023-DEL (Ref. No.: 202311021226); Dated: 24.03.2023; Country: India).
- Sachin Kumar and Jagdish Gabhane, Process for pretreatment of crop residues for enzymatic saccharification; (Application No.: TEMP/E-1/15930/2023-DEL (Ref. No.: 202311013508); Dated: 28.02.2023; Country: India).
- Sachin Kumar, Meenu Hans, Richa Singh, Nidhi Sahni and Pratibha Dheeran, Method of producing biogas from lignocellulosic biomass; (Application No.: TEMP/E-1/27176/2022-DEL (Ref. No.: 202211024777); Dated: 27.04.2022; Country: India).

Papers:

Hans M, Pellegrini VO, Filgueiras JG, de Azevedo ER, Guimaraes FE, Chandel AK, Polikarpov I, Chadha BS, Kumar S (2023) Optimization of Dilute Acid Pretreatment for Enhanced Release of Fermentable Sugars from Sugarcane Bagasse and Validation by Biophysical Characterization. BioEnergy Research 16 (1), 416-434. (IF: 3.852)

Singh R, Hans M, Kumar S, Yadav YK (2023) Thermophilic Anaerobic Digestion: An Advancement towards Enhanced Biogas Production from Lignocellulosic Biomass. Sustainability 15(3), 1859. (IF: 3.889)

Arora R, Singh P, Sarangi PK, Kumar S and Chandel AK (2023) A critical assessment on scalable technologies using high solids loadings in lignocellulose biorefinery: challenges and solutions. Critical Reviews in Biotechnology (In-press). (IF: 9.062)

Behera, S, Sharma NK and Kumar S (2023) Augmentation of Bio-butanol Production Through Isolation, Screening and Optimization of Growth and Fermentation Parameters Using Response Surface Methodology. Sugar Tech 25, 531-541. (IF: 1.872)

Garg S, Behera S, Ruiz HA and Kumar S (2022) A Review on Opportunities and Limitations of Membrane Bioreactor Configuration in Biofuel Production. Applied Biochemistry and Biotechnology (In-press). (IF: 3.094)

Gajera, B., Datta, A., Gakkhar, N. Sarma, A.K.,Torrefied Mustard Straw as a Potential Solid Biofuel: a Study with Physicochemical Characterization and Thermogravimetric and Emission Analysis. Bioenerg.Res. (2023).

Dogra, Gaurav, Anil Kumar Sarma, Ranjit Singh, AnupamDewan, and Kamal Tewari. "Synthesis of Green Diesel Derived from Waste Cooking Oil Using Waste Egg Shells as Catalyst." In Fluid

Mechanics and Fluid Power (Vol. 1) Select Proceedings of FMFP 2021, pp. 243-247. Singapore: Springer Nature Singapore, 2023.

Graham, Neal T., Nikhil Gakkhar, Akash Deep Singh, Meredydd Evans, Tanner Stelmach, Siddarth Durga, Rakesh Godara, Bhautik Gajera, Marshall Wise, and Anil K. Sarma. "Integrated analysis of increased bioenergy futures in India."Energy Policy 168 (2022): 113125.

Gajera, Bhautik, Uplabdhi Tyagi, Anil Kumar Sarma, and Mithilesh Kumar Jha. "Impact of torrefaction on thermal behavior of wheat straw and groundnut stalk biomass: Kinetic and thermodynamic study." Fuel Communications 12 (2022): 100073.

Kumar, Himansh, Mohammad Aslam, Anil K. Sarma, and Pramod Kumar. "Performance, Combustion, and Emission Analysis of Green Diesel Derived from Mesuaferrea L. Oil on a CI Engine: An Experimental Investigation." In Green Diesel: An Alternative to Biodiesel and Petrodiesel, pp. 325-338. Singapore: Springer Nature Singapore, 2022.

Kaur, Jaspreet, Mohammad Aslam, M. K. Jha, and Anil K. Sarma. "Green Diesel: Integrated Production Processes, Future Perspectives and Techno-Economic Feasibility." In Green Diesel: An Alternative to Biodiesel and Petrodiesel, pp. 205-217. Singapore: Springer Nature Singapore, 2022.

Tyagi, Uplabdhi, Mohammad Aslam, and Anil K. Sarma. "Characterization of Green Diesel: Existing Standards and Beyond." In Green Diesel: An Alternative to Biodiesel and Petrodiesel, pp. 249-263. Singapore: Springer Nature Singapore, 2022.

Aslam, Mohammad, Himansh Kumar, Anil K. Sarma, and Pramod Kumar. "Current Status of the Green Diesel Industry." In Green Diesel: An Alternative to Biodiesel and Petrodiesel, pp. 265-283. Singapore: Springer Nature Singapore, 2022.

Gajera, Bhautik Vinubhai, Anil Kumar Sarma, and Mithilesh Kumar Jha. "Assessment of thermal behavior and pyrolytic kinetics of selected agro-residues through thermogravimetric analysis." (2022).

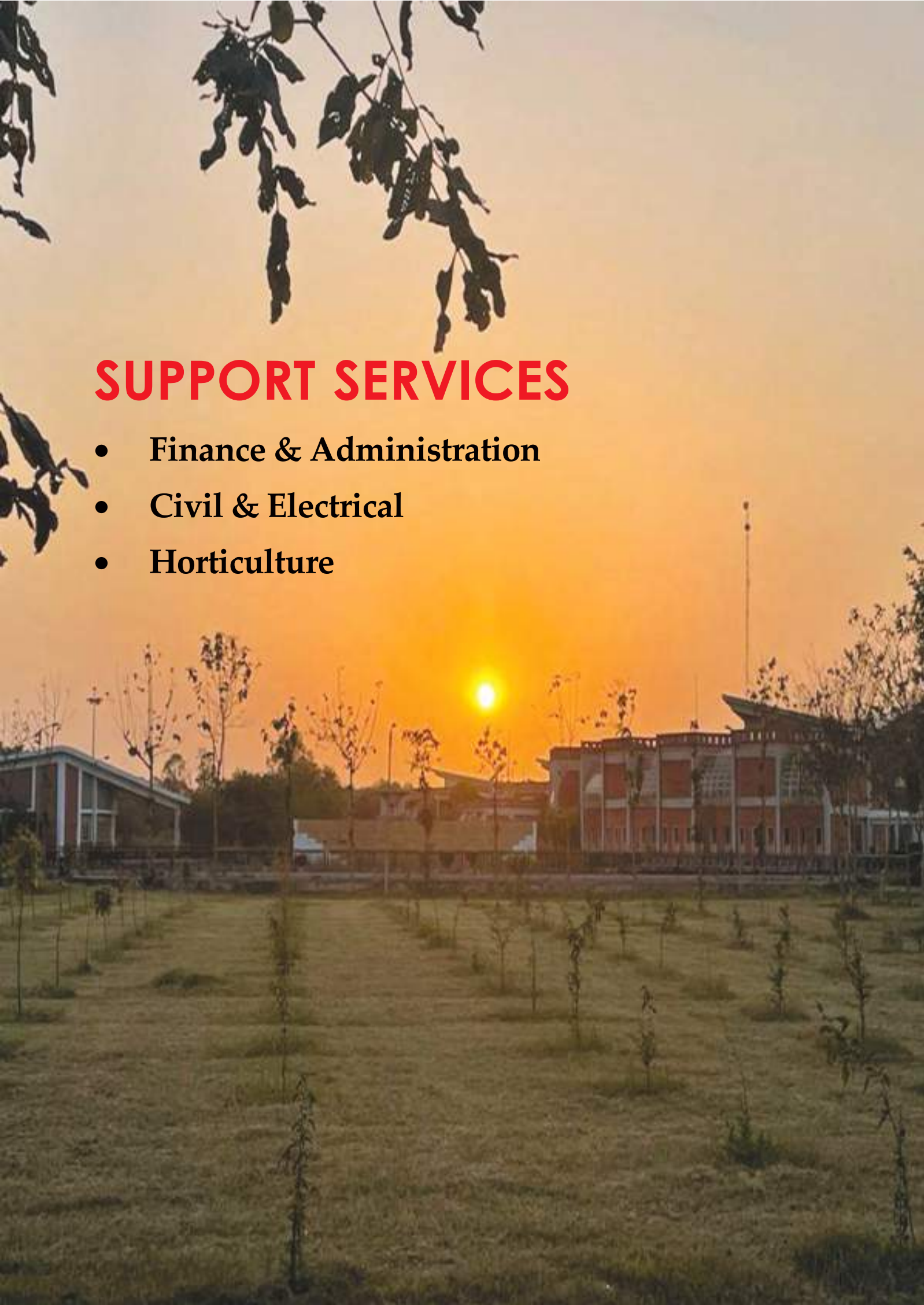
Singh, Akash Deep, Bhautik Gajera, and A. K. Sarma. "Appraising the availability of biomass residues in India and their bioenergy potential."Waste Management 152 (2022): 38-47.

Aslam, Mohammad, Shrikant Shivaji Maktedar, and Anil Kumar Sarma, eds. Green Diesel: An Alternative to Biodiesel and Petrodiesel. Springer Nature Singapore, 2022.

Awasthi, Deepanshu, Arghya Datta, and Nikhil Gakkhar. "Theoretical process design of a gasifier using mixed biomass variety." Materials Today: Proceedings (2023).

Graham, Neal T., Nikhil Gakkhar, Akash Deep Singh, Meredydd Evans, Tanner Stelmach, Siddarth Durga, Rakesh Godara, Bhautik Gajera, Marshall Wise, and Anil K. Sarma. "Integrated analysis of increased bioenergy futures in India." Energy Policy 168 (2022): 113125.

Rakesh Godara, Nikhil Gakkhar, Mithilesh Kumar Jha. "ANSYS simulation of anaerobic digester temperature gradients, mass flow rates, and ambient temperatures", In Proc. 56th Annual Convention of Indian Society of Agricultural Engineers, 9-11 November 2022.



SUPPORT SERVICES

- Finance & Administration
- Civil & Electrical
- Horticulture

FINANCE AND ADMINISTRATION

Serving as the artery connecting the scientific divisions of the institute, the activities of Finance and Administrative divisions are briefed as under:

- Budget & revised estimates for grant-in-aid, allocation & re-appropriation of funds, expenditure management & budget control, project financial management.
- Statutory compliances on GST and income tax etc., dealing with audits, drawing up balance sheet, laying of audited accounts on the table of Parliament.
- Framing of rules, schemes and grievance redressal, management of outsourcing agency, legal issues, court cases & RTI, recruitment, hiring of research staff and promotions.
- Statutory compliances on EPF, societies registration, bills of establishment, facility management, activities related to the official language, maintenance of vehicle, security, horticulture activities, and housekeeping.
- Store & purchase, procurement of goods and services, GEM, contracts etc.
- Serving as the Central Nodal Agency for biogas implementation program of MNRE.

CIVIL & ELECTRICAL

Over the past year, the Institute has made significant strides in various civil works projects aimed at enhancing our infrastructure and ensuring a conducive environment for the Institute. The scope of these activities spanned maintenance, renovation, and expansion initiatives, all of which contributed to the overall growth and development of our facilities.

Key Highlights:

1. **Campus Renovation:** The Institute underwent a major renovation work that encompassed key areas such as Housing, hostel block, Technical and administrative buildings. This effort resulted in modernized spaces that are not only visually appealing but also technologically advanced.

2. **Infrastructure Expansion:** In response to the increasing demands for our programs and services, we initiated an infrastructure expansion project i.e., furnishing of computer centre, refurbishment of conference hall and construction of briquette shade etc. This included state-of-the-art facilities, accommodating the growing needs of our academic and research endeavors. With a commitment to inclusivity, we focused on improving accessibility across our campus.

3. **Energy Efficiency Initiatives:** The division just had completed automation and up-gradation work of 2 Nos. 200 KVA Generator Sets. As part of our sustainability goals, we implemented energy-efficient solutions in our Institute. This included the installation of LED lighting systems at the institute.

4. **Future Plans:** Looking ahead, we remain committed to maintaining the high standards we've set for our infrastructure. We are going to outline a roadmap for ongoing maintenance, periodic upgrades, and further 10-year expansion based on projected growth. Our aim is to provide an environment that fosters creativity, learning, and collaboration for all members of our community.

HORTICULTURE

The Horticulture section occupies a unique place in the SSS NIBE as campus looks green, clean and flawless with a well-maintained outdoor landscape. The large rectangular patches of land flanking both the sides of the main buildings provide an aesthetic face to the institution. The campus also houses a water body where migratory birds thrive throughout the year. The water body with the flora and fauna has a combined effect of lowering the campus temperature by 2 to 3^0 C compared to the neighborhood.

Mission of the horticulture section is to make a real and visible difference alongside delivering tangible results for SSS NIBE. All of this has been driven by our commitment to put the bio-energy at the heart of everything we do. More challenge lies ahead for us but thanks to the hard work and dedication of our entire team we have now restored our focus, energy and sense of direction.

Objectives of Horticulture Section:

- Supporting energy plantation to provide biomass for ongoing research activities in the field of bio-energy.
- Growing local tree varieties so as to create a sustainable and thriving environment for animal and bird species within research settings.
- Development of lawns in identified plots or belts and make such areas vibrant with seasonal flower beds.
- Coming to tree diversity, NIBE campus is home to approximately 1,000 mature different trees primarily Arjun, Kachnaar, Eucalyptus, Tahli, Sagwan, Pipal, Banyan, Mango, Hared, Bahera, Plum, Pears, Guava, Kadipatta, Ashoka, Jamun, Amla, Alastonia, Indian Mahogany, Bottlebrush are few to mention here.
- Rich flora of campus supports fauna and NIBE is home to many local bird varieties like Peacocks, Parrots, Hoopies, Woodpeckers, Kingfishers, Egrets, Lapwings, Owls and animals like warthogs, Indian mongoose, Indian monitor lizards etc.

SSS NIBE'S TEAM

Director General Office

Dr. G. Sridhar	DG NIBE

Chemical & Electro Chemical Conversion Division

Dr. Anil K Sarma	Scientist E
Dr. Rawel Singh	Scientist D
Dr. A. Senthil Nagappan	Scientist D
Dr. Sandeep Kumar	Scientist B
Mr. Vijay Bajala	Technical Assistant
Dr. Arghya Datta	Research Associate
Dr. Gurkamal Nain Singh	Research Associate
Mr. Akash Deep Singh	Senior Research Fellow
Mr. Bhautik Gajera	Senior Research Fellow
Mr. Yogesh Kumar	Junior Research Fellow
Mr. Amrik Lal	Multi-Tasking Staff

Biochemical Conversion Division

Dr. Sachin Kumar	Scientist C
Dr. Sanjeev Mishra	Scientist D
Dr. Shivika Sharma	Women Scientist
Dr. Mamta Pal	Research Associate
Ms. Gaganpreet Kaur	Senior Research Fellow
Ms. Nisha Yadav	Senior Research Fellow
Mrs. Parminder Dutta	Lab Assistant
Mr. Ajay Kumar	Multi-Tasking Staff
Smt. Shuchi Sahu	Technical Assistant

Biomass & Energy Management Division

Dr. Ashish Bohre	Scientist D
Dr. Vandit Vijay	Scientist C
Dr. Santosh Saraswat	Research Associate
Mr. Rakesh Godara	Senior Research Fellow
Ms. Deepti Hooda	Junior Research Fellow
Mr. Gaurav Singh	Junior Research Fellow

Thermochemical Conversion Division

Dr. Tapas Kumar Patra	Scientist C
Dr. Kunwar Pal	Scientist C
Dr. Himanshu	Research Associate
Mr. Gopal Sharma	Technical Assistant
Mr. Deepanshu Awasthi	Junior Research Fellow
Mr. Manjeet Singh	Lab Technician
Mr. Arshdeep Singh	Multi-Tasking Staff

Civil and Maintenance Division

Mr. Ram Anuj Singh	Assistant Engineer (Civil)
Mr. Puneet Sharma	Technician
Mr. Manpreet Singh	Technician
Mr. Baljit Singh	Technician
Mr. Avtar Singh	Technician
Mr. Baljeet Singh	Technician

Administrative Division

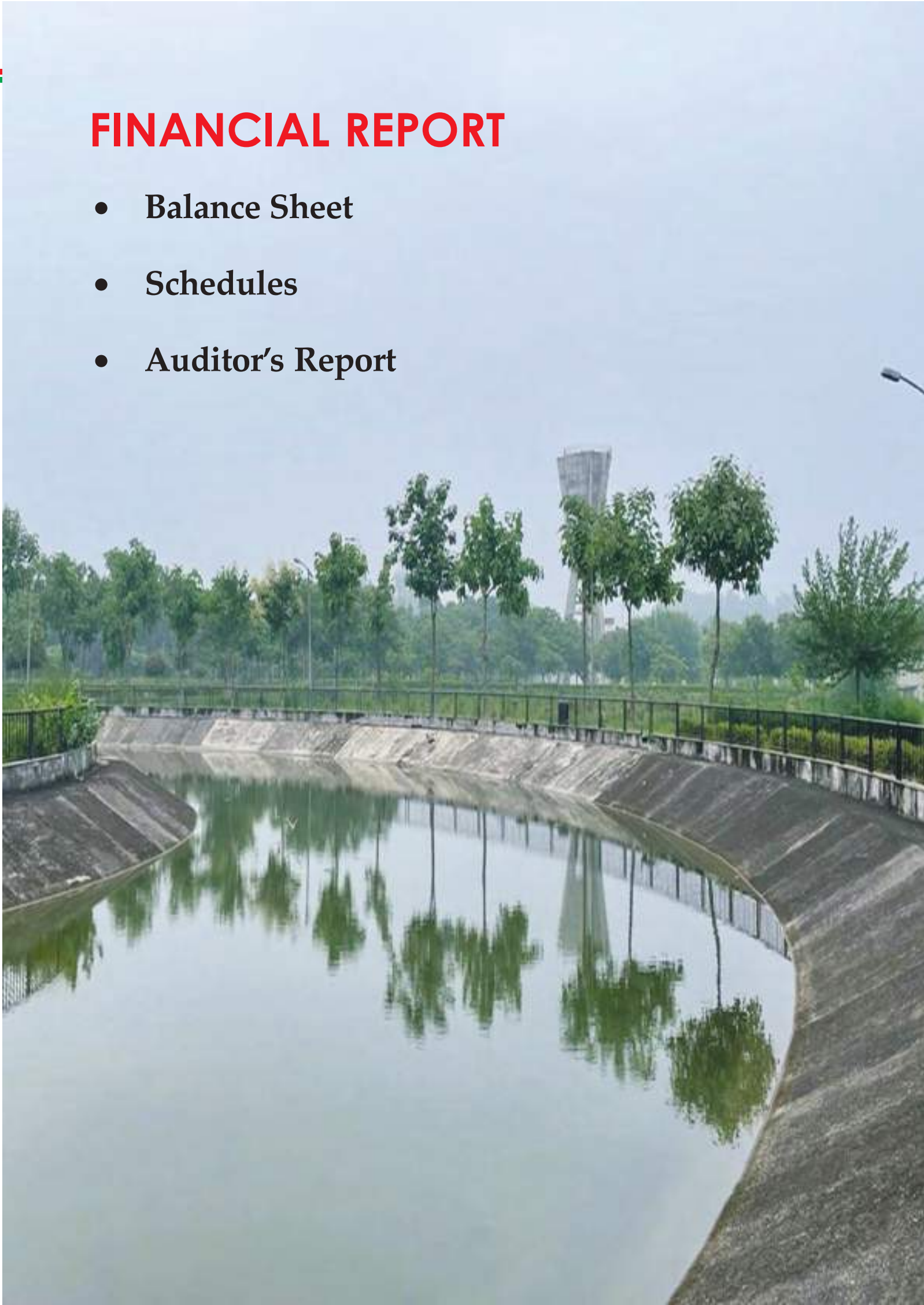
Dr. Abhishek Gupta	Deputy Director
Mr. Rupesh K Verma	Junior Executive Assistant
Mr. Hitesh Sharma	Admin. PA to DG, NIBE
Mr. Mukesh Banga	Admin. IT Assistant
Mr. Gurpreet Singh	Admin. Assistant
Ms. Jatinderpreet Kaur	Librarian
Ms. PurnimaMr. Sanju	Multi-Tasking Staff
Mr. Parminder Singh	Multi-Tasking Staff Driver
Mr. Amarjit Singh	Tractor Driver

Finance Division

Mr. Sanjay Chauhan	Junior Executive Assistant
Mr. Aman Deep	Admin. Accounts Assistant

FINANCIAL REPORT

- Balance Sheet
- Schedules
- Auditor's Report



BALANCE SHEET

The annual audited account of the Institute for the year 2022-23 has been prepared and duly audited by Anand Tarun& CO Chartered Accountants, Jalandhar. The detailed Auditor's Report, Balance Sheet, Income, Expenditure, Receipts & Payment Accounts Schedules are attached herewith.

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

BALANCE SHEET AS AT 31st MARCH, 2023

(Amount in Rs.)

FUND AND LIABILITIES	Schedule	31st March, 2023	31st March, 2022
CAPITAL ASSET FUND	1	374,272,365.78	345,876,152.31
RESERVES AND SURPLUS	2	190,931,375.72	187,391,361.18
CURRENT LIABILITIES AND PROVISIONS	3	4,220,564.76	10,687,726.61
TOTAL		**569,424,306.26**	**543,955,240.10**
ASSETS			
FIXED ASSETS			
(a) Created out of Central Governments Grants	4	175,152,385.58	178,708,485.86
(b) Out of Internal Generation Grants		0.00	0.00
INVESTMENTS		303,844,611.00	302,944,611.00
CURRENT ASSETS, LOANS AND ADVANCES	5	90,427,309.68	62,302,143.24
TOTAL		**569,424,306.26**	**543,955,240.10**
SIGNIFICANT ACCOUNTING POLICIES	13		
NOTES ON ACCOUNTS	14		

For Sardar Swaran Singh National Institute of Bio Energy

Finance & Accounts Officer

सरदार स्वर्ण सिंह राष्ट्रीय जैव ऊर्जा संस्थान
12 कि.मी पत्थर, जालंधर-कपूरथला रोड,
बडाला कलाँ, कपूरथला (पंजाब) 14460
Sardar Swaran Singh National Inst. of B
12 K Stone,Jalandhar-Kapurthala Ro

Director General

सरदार स्वर्ण सिंह राष्ट्रीय जैव ऊर्जा संस्थान
12 कि.मी पत्थर, जालंधर-कपूरथला रोड,
बडाला कलाँ, कपूरथला (पंजाब) 144601
Sardar Swaran Singh National Inst. of Bio-E
12 Km. Stone, Jalandhar-Kapurthala Road
Badala Kalan Kapurthala (Punjab) 144601

As per our Report attached
Anand Tarun & Co
Chartered Accountants
Chartered Accountants

CA Anand M Chopra
Partner
M. No. 094257

Place: Kapurthala Date : 03/08/2023

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH 2023

(Amount in Rs.)

INCOME	Schedule	IE	31/03/2023	31/03/2022
Income from Services	6	786,217.00	786,217.00	753,625.00
Income from publication	7	-	-	-
Interest Earned	8	5,902,472.69	5,902,472.69	9,855,702.69
Other Income	9	6,476,374.81	6,476,374.81	847,780.57
Interest Earned & Other Income (Grant)	3.1		-	-
Grants from Government of India allocated		50,000,000.00	50,000,000.00	32,600,000.00
for Revenue expenditure during the year				
Grants - Adjustment previous year payment		-	-	
Add: EMD, SD, PG Received		-	-	
Closing stock			-	-
TOTAL (A)		**63,165,064.50**	**63,165,064.50**	**44,057,108.26**
EXPENDITURE		-	-	
Opening stock		-	-	-
Establishment Expenses	10	19,929,418.00	19,929,418.00	9,271,228.00
Consultancy Project Expenses	11 (b)	-	-	-
Other Administrative Expenses	11 (a)	32,627,798.53	32,627,798.53	26,418,721.10
Expenditure from Grants		-	-	
On Advances/Deposits/ Prepaid /EMD, SD, PG's etc.,	-	-		
Refunded to Ministry/Bharat Kosh		-	-	
Depreciation		22,349,440.43	22,349,440.43	20,853,915.00
In house project expenditure		-	-	
Expenditure out of Previous Year Advance		-	-	
TOTAL (B)		**74,906,656.96**	**74,906,656.96**	**56,543,864.10**

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH 2023

(Amount in Rs.)

INCOME	Schedule	IE	31/03/2023	31/03/2022
Balance being excess of Income over Expenditure (A-B)		(11,741,592.46)	(11,741,592.46)	(12,486,755.84)
EMD,PerformencGuarnatee,Security Deposit Returned		-	-	-
Add: Opening Balance B/F (C)	3.1	-	-	-
Prior period adjustment	12	(6,642,471.00)	(6,642,471)	-
Transfer to Capital Asset Fund (D)	4	-	-	-
Transfer to Welfare Fund			-	-
BALANCE BEING SURPLUS TRANSFERRED TO GENERAL RESERVE FUND {A- (B+D)}		**(18,384,063.46)**	**(18,384,063.46)**	**(12,486,755.84)**
UN-UTILIZED GRANTS OUT OF GOVT. GRANTS FOR REVENUE EXPENDITURE { (C+A)-B}		-	-	-
SIGNIFICANT ACCOUNTING POLICIES	13	-	-	-
NOTES ON ACCOUNTS	14	-	-	-

For Sardar Swaran Singh National Institute of Bio Energy

Finance & Accounts Officer

सरदार स्वर्ण सिंह राष्ट्रीय जैव ऊर्जा संस्थान
12 कि.मी पत्थर, जालंधर-कपूरथला रोड,
बडाला कलाँ, कपूरथला (पंजाब) 144601

Director General

सरदार स्वर्ण सिंह राष्ट्रीय जैव ऊर्जा संस्थान
12 कि.मी पत्थर, जालंधर-कपूरथला रोड,
बडाला कलाँ, कपूरथला (पंजाब) 144601

As per our Report attached
Anand Tarun & Co
Chartered Accountants
Chartered Accountants
CA Anand M Chopra
Partner
M. No. 094257

Place: Kapurthala
Date: 03/08/2023

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MAR'2023

(Amount in Rs.)

SCHEDULE 1 - CAPITAL ASSET FUND	IE	31.03.2023	31.03.2022
Opening Balance	-	-	-
Balance as at the beginning of the year	332,353,752.31	332,353,752.31	311,385,520.00
ADD: Prior period adjustment	-	-	-
ADD: Addition from Capital Grant	20,000,000.00	20,000,000.00	17,000,000.00
Add: Addition from Internal Revenue Generation prior years	-	-	-
Add: Addition from Interest on FDR (CORPUS)	10,270,771.31	10,270,771.31	3,968,232.31
Add: IREDA NIBE Award	13,522,400.00	13,522,400.00	12,872,400.00
Add: Interest on IREDA Fund	900,000.00	900,000.00	650,000.00
Less: Deletion from Capital Grants	-	-	-
Less: Deletion from Internal Revenue Generation	-	-	-
Less: Deletion from Capital Grants SRRA	-	-	-
Less: Depreciation on assets purchased out of Grants MNRE	2,774,557.84	2,774,557.84	-
Less: Depreciation on assets purchased out of Internal generation	-	-	-
Less: Depreciation on assets purchased out of Grants SRRA	-	-	-
TOTAL	**374,272,365.78**	**374,272,365.78**	**345,876,152.31**

As per our Report attached

Anand Tarun & Co.
Chartered Accountants
CA Anand M Chopra
Partner
M. No. 094257

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2023

(Amount in Rs.)

SCHEDULE 2 - RESERVES AND SURPLUS	31st March, 2023	31st March, 2022
General Reserve Fund		
Balance at the beginning of the year	**170,191,772.48**	226,369,621.32
Less during the year being deficit	18,384,063.46	12,486,755.84
Less : Grant Refunded	-	43,691,093.00
Sub total	**151,807,709.02**	**170,191,772.48**
RESERVE & SURPLUS- COMPLETED PROJECTS		
Bio Diesel Project	4,472,153.00	4,472,153.00
ICRISAT Project	13,929.00	13,929.00
Bio Crude Project	2,383,061.00	2,383,061.00
National Renewable Energy Program Project	50,415.00	50,415.00
Bio Ethenol Project	5,441,996.70	5,441,996.70
Bio Gas Project	59,929.00	59,929.00
Sub Total	**12,421,483.70**	**12,421,483.70**
Opening Biorefinery Approach for generation of platform chemicals and bioethanol	153,075.00	153,075.00
Add: Grant Received from MNRE during the year	-	-
Less: Expenses Biorefinery Approach for generation of platform chemicals and bioethanol	-	-
Sub Total	**153,075.00**	**153,075.00**
Fellowship Grant Dr. Sachin Kumar	220,300.00	220,300.00
Less: Advance Given to Dr. Sachin Kumar	-	-
Sub Total	**220,300.00**	**220,300.00**
Opening Balance Indo Brazil project	1,581,051.00	2,333,003.00
Add: Grant Received from MNRE during the year	0.00	(751952.00)
Add: Advance Recovered from Meenu Hans	-	-
Less: Expenses for Project (Excluding Fixed Assets)	-	-
Less: Advance to GNDU	-	-
Add: Advance Recovered from GNDU	-	-
Sub Total	**1,581,051.00**	**1,581,051.00**
RESERVE & SURPLUS - ON GOING PROJECTS		
Opening balance of Project MNRE(GIA)	-	-
Add: Grant Received from MNRE during the year	601,760.00	601,760.00
Less Expenditure	603,212.00	
Add: Interest Earned	25,020.00	
Sub Total	**23,568.00**	**601,760.00**

Opening balance of Project MNRE (Capital)		-	-
Add: Grant Received from MNRE during the year		1,263,400.00	**1,263,400.00**
Less: Refunded back non utilised		1,263,400.00	
Add : Interest earned		54,880.00	
	Sub Total	**54,880.00**	**1,263,400.00**
Opening balance of Project WOS		958,519.00	-
Add: Grant Received from MNRE during the year		1,022,963.00	**1,337,800.00**
Less : Expenses of Project		1,415,096.00	**379,281.00**
Add: Interest Earned		59,489.00	
	Sub Total	**625,875.00**	**958,519.00**
Cpri 270 L			
Opening balance		-	
Grant Received		**22,907,000.00**	
Less : Expenditure		**3,000,588.00**	
Add : Interest earned		**842,510.00**	
	Sub Total	**20,748,922.00**	
Cpri 37 L			
Opening balance			
Grant Received		**3,700,000.00**	
Less : Expenditure		**3,280,516.00**	
Add : Interest earned		**18,340.00**	
	Sub Total	**437,824.00**	
Cpri 66 L			
Opening balance			
Grant Received		**3,716,000.00**	
Less : Expenditure		**974,462.00**	
Add : Interest earned		**115,150.00**	
	Sub Total	**2,856,688.00**	
Grand Total		**190,931,375.72**	**187,391,361.18**

As per our Report attached

Anand Tarun & Co.

Chartered Accountants

CA Anand M Chopra
Partner
M. No. 094257

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2023

(Amount in Rs.)

SCHEDULE 3 - CURRENT LIABILITIES AND PROVISIONS:	SCHEDULE	IE	31st March, 2023	31st March, 2022
A. CURRENT LIABILITIES				
Sundry Creditors for expenses:		1,164,900.00	1,164,900.00	6,835,902.00
Expenses payable		136,864.00	136,864.00	1,483,686.00
Salary Payable		1,838,162.00	1,838,162.00	628,225.00
Security Deposit, EMD & PG		527,895.00	527,895.00	559,075.00
Advances Received on Projects		-	-	-
Statutory Liabilities		394,190.76	394,190.76	422,531.60
Other Current Liabilities		158,553.00	158,553.00	758,307.01
Other Payables		-	-	-
NIWE-IREDA Award Fund		-	-	-
Welfare Fund Payable		-	-	-
Branch Division Payables		-	-	-
	TOTAL (A)	**4,220,564.76**	**4,220,564.76**	**10,687,726.61**
UN UTILISED GRANTS				
a) Central Finance Assistance MNRE (Grants-in-Aid)	**3.1**	**-**	-	-
Earmarked Projects SRRA USP		**-**	-	-
IREDA NIBE FUND		**-**	-	-
	TOTAL (B)	**-**	**-**	**-**
	TOTAL {(A)+(B)}	**4,220,564.76**	**4,220,564.76**	**10,687,726.61**
B. PROVISIONS				
Gratuity		-	-	-
Leave Encashment		-	-	-
Bonus & Ex-gratia		-	-	-
	TOTAL (C)	**-**	**-**	**-**
	GRAND TOTAL {(A)+(B)+(C)}	**4,220,564.76**	**4,220,564.76**	**10,687,726.61**

As per our Report attached
Anand Tarun & Co.
Chartered Accountants

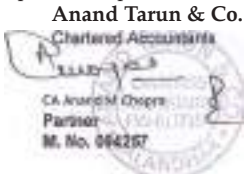
SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2023

(Amount in Rs.)

SCHEDULE 3.1 - UNUTILISED GRANT - CFA	CFA-CAPITAL	CFA REVENUE	As on 31.03.2023	As on 31.03.2022
Funds				
Balance as at the beginning of the year	-	-	-	-
Add: Grants received during the year (GIA Capital)	20,000,000.00		20,000,000.00	17,000,000.00
Add: Grants received during the year (GIA General)	-	34,000,000.00	34,000,000.00	21,600,000.00
Add: Grants received during the year (GIA Salary)	-	16,000,000.00	16,000,000.00	11,000,000.00
Add:Misc. Income on Grants	-	-	-	-
Add: Interest Earned on Grants	-	-	-	-
Add: Interest Accrued on Grants	-	-	-	-
Add: Profit on Sale of Assets	-	-	-	-
Add: Transferred from Earmarked Projects	-	-	-	-
Add: SNA Refund	-	-	-	-
Add:EMD, SD, PG Received	-	-	-	-
Total (A)	**20,000,000.00**	**50,000,000.00**	**70,000,000.00**	**49,600,000.00**
Less: Refunds				
Interest earned on Grants refunded to Ministry	-	3,446,571.00	**3,446,571.00**	-
Other Income Earned refunded to Ministry	-	-	-	-
Refund of Unutilized Grants	-	1,728,772.00	1,728,772.00	-
Total (B)	**-**	**5,175,343.00**	**5,175,343.00**	**-**
Total Fund Available (C= A-B)	**20,000,000.00**	**44,824,657.00**	**64,824,657.00**	**49,600,000.00**
Less: Expenditure				
Grants from Government of India allocated for Capital	-	-	-	-
Grants from Government of India allocated for Revenue expenditure	-	-	-	-
Grants from Government of India allocated for NER	-	-	-	-
Grants from Government of India allocated for SRRA	-	-	-	-
Expenditure relating to Grants from Government of India for the inhouse projects during the year	-	-	-	-
Transfer to capital asset fund	20,000,000.00	-	20,000,000.00	17,000,000.00
Transfer to Income & Expenditure	-	50,000,000.00	50,000,000.00	32,600,000.00
Excess of Expenditure out of Previous Year Advance	-	-	-	-
EMD,PerformencGuarnatee,Security Deposit Returned	-	-	-	-
Sub Total (i)	20,000,000.00	50,000,000.00	70,000,000.00	49,600,000.00
Less: Payables				
Expenses Payable	-	-	-	-
Security Deposits & Performance Guarantee	-	-	-	-
Sundry Creditors	-	-	-	-
Other Current Liabilities	-	-	-	-
Advances received	-	-	-	-
Salary Payable / EPF Payable	-	-	-	-
Sub Total (ii)	-	-	-	-
Less: Advances & Deposits				
Less: Advances paid	-	-	-	-
Less: Deposits	-	-	-	-
Less: Prepaid Expenses	-	-	-	-
Sub Total (iii)	-	-	-	-
Total (D) [i+ii+iii]	**20,000,000.00**	**50,000,000.00**	**70,000,000.00**	**49,600,000.00**
UNUTILIZED GRANT (Refundable to Ministry)	-	-	-	-
UNUTILIZED GRANTS (Receivable from Ministry)	-	-	-	-
UNUTILIZED GRANTS / Funds (Others)	-	-	-	-

As per our Report attached
Anand Tarun & Co.



SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

SCHEDULES FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2023

(Amount in Rs.)

SCHEDULE 5 - CURRENT ASSETS, LOANS & ADVANCES	IE	31st March, 2023	31st March, 2022
A. CURRENT ASSETS:			
Sundry Debtors	145,480.00	145,480.00	145,037.00
Inventories	-	-	-
Stock of Stationery	-	-	-
Stock of Stores and Spares	-	-	-
Stock of Wind Atlas Book	-	-	-
Cheques in hand	-	-	-
Stamps in hand	-	-	3,356.00
Closing Stock	-	-	-
Bank Balances:			
With Scheduled Banks:			
In Current Account	27,443,890.60	27,443,890.60	2,387,229.70
In Savings Bank Account	17,567,422.43	17,567,422.43	11,474,865.05
In Cash	19,437.00	19,437.00	2,880.00
In Deposit Account	32,446,824.00	32,446,824.00	37,633,764.00
Branch Division Receivables	-	-	-
TOTAL (A)	**77,623,054.03**	**77,623,054.03**	**51,647,131.75**
B. LOANS, ADVANCES AND OTHER ASSETS			
Advances and other amounts recoverable in cash or in kind or for value to be received:			
a) On Capital Account	-	-	-
a) Prepayments	371,430.00	371,430.00	68,364.00
b) Interest accrued on term deposits	1,277,108.38	1,277,108.38	650,991.00
c) Advances	3,108,111.49	3,108,111.49	6,882,579.49
d) Interest accrued on security deposit	392,403.00	392,403.00	330,618.00
e) Balance with Govt. Authority - TDS	7,655,202.78	7,655,202.78	2,722,459.00
TOTAL (B)	**12,804,255.65**	**12,804,255.65**	**10,655,011.49**
GRAND TOTAL {(A)+(B)}	**90,427,309.68**	**90,427,309.68**	**62,302,143.24**

As per our Report attached
Anand Tarun & Co.
Chartered Accountants

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2023

Amount in Rs.

	IE	31st March, 2023	31st March, 2022
SCHEDULE 6 - INCOME FROM SALES / SERVICES			
Income from Services			
Testing Fee	100,140.00	100,140.00	97,000.00
Training Fee	8,352.00	8,352.00	12,450.00
NIT Course Fee	328,725.00	328,725.00	602,175.00
Registration Fee	349,000.00	349,000.00	42,000.00
TOTAL	**786,217.00**	786,217.00	753,625.00
SCHEDULE 7 - INCOME FROM PUBLICATION			
Sale of Books & Reports	0	-	-
TOTAL	**0**	**-**	**-**
SCHEDULE 8 - INTEREST EARNED			
On Term Deposits with Scheduled Banks (Corpus)	5,143,800.69	5,143,800.69	6,843,912.69
On Savings Bank account/MOD with Scheduled Banks	758,672.00	758,672.00	3,011,790.00
TOTAL	**5,902,472.69**	**5,902,472.69**	**9,855,702.69**
SCHEDULE 9 - OTHER INCOME			
Rent Received	20,338.97	20,338.97	27,966.07
Sponsorship fee	0.00	0.00	235,170.00
Overhead Income	2,942,000.00	2,942,000.00	80,000.00
Hostel fee	50,346.00	50,346.00	30,708.50
Discount/Rebate	61,408.00	61,408.00	5,673.00
Other Misc Income	416,470.00	416,470.00	403,763.00
Licence fee	111,254	111,254.00	64,500
Evaluation Fee	100,000.00	100,000.00	0.00
Grant Amortised/ Deferred income Related to Fixed Asset	2,774,557.84	2,774,557.84	
TOTAL	**6,476,374.81**	**6,476,374.81**	**847,780.57**
SCHEDULE 10 - ESTABLISHMENT EXPENSES			
ADMINISTRATION AND R&D STAFF			
Salaries and Allowances	17,501,166.00	17,501,166.00	7,955,643.00
Bonus & Ex-gratia	**-**	**-**	**-**
Contribution to Provident Fund (EPF)	1,933,752.00	1,933,752.00	867,474.00
Contribution to Pension	160,000.00	160,000.00	90,111.00
Leave travel concession	-	-	45,699.00
Children Education Allowance	297,000.00	297,000.00	216,000.00
Medical reimbursement	17,500.00	17,500.00	42,000.00
LTC Leave Encashment	-	-	54,301.00
Honorarium to staff	**20,000.00**	**20,000.00**	**-**
TOTAL	**19,929,418.00**	**19,929,418.00**	**9,271,228.00**

As per our Report attached
Anand Tarun & Co.
Chartered Accountants

CA Anand M Chopra
Partner
M. No. 094257

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH, 2023

(Amount in Rs.)

SCHEDULE 11 - OTHER ADMINISTRATIVE EXPENSES	IE	31st March, 2023	31st March, 2022
Advertisement and Publicity	304,350.00	304,350.00	130,588
Audit & Legal fee	262,114.97	262,114.97	159,853
Consumable laboratory workshop exp	302,701	302,701.00	484,384
Electricity and Power	3,966,904.00	3,966,904.00	3,373,262.00
Expenses on Books, Data & Periodicals	0.00	0.00	4,920.00
Stipend	4,665,068.00	4,665,068.00	4,037,291.00
Expenses on Seminar, Meetings, workshop & conference	1,200,638.00	1,200,638.00	1,226,996.00
Hospitality Expenses (other)	190,018.11	190,018.11	517,099.88
Computer software exp	200,227.00	200,227.00	9,109.00
Insurance Exp	7,469.00	7,469.00	0.00
Other Expenses	10,270.00	10,270.00	90,083.66
Computer hardware exp	200,730.00	200,730.00	113,925.00
Late Fee (CGST/SGST/TDS)	188,044.00	188,044.00	0.00
Printing and Stationery	211,562.00	211,562.00	53,337.99
Repair & maintenance	308,004.00	308,004.00	1,086,230.93
Newsletter/Newspaper exp	45,127.00	45,127.00	4,203.00
Refreshment	242,202.00	242,202.00	144,283.00
Machinery & Equipment Exp	1,801,456.27	1,801,456.27	3,625,534.72
Research & Development Exp	76,400.00	76,400.00	5,650.00
Contingency exp	7,103.78	7,103.78	3,821.00
Telephone and Communication Charges	1,718,026.00	1,718,026.00	464,250.00
Manpower & hiring of professional services	15,158,845.00	15,158,845.00	10,426,754.12
Reports exp	142,170.00	142,170.00	127,241.00
Travel & Conveyance and Taxi hire	939,547.00	939,547.00	93,534.00
Vehicles Running and Up Keeping	248,447.60	248,447.60	115,635.00
Horticulture exp	230,373.80	230,373.80	120,734.80
TOTAL (A)	**32,627,798.53**	**32,627,798.53**	**26,418,721.10**
CONSULTANCY PROJECT EXPENSES			
Expenses on In Consultancy Projects (B)	-	-	-
GRAND TOTAL {(A)+(B)}	**32,627,798.53**	**32,627,798.53**	**26,418,721.10**

As per our Report attached
Anand Tarun & Co.

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

SCHEDULES FORMING PART OF INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH, 2023

(Amount in Rs.)

SCHEDULE 12 - PRIOR PERIOD ADJUSTMENT	IE	31st March, 2023	31st March, 2022
Prior Period Expenses			
Internet Charges Railtel Corporation	1,467,128	1,467,128	-
Grant Refunded to Bharat Kosh of FY 2021-22	5,175,343	5,175,343	
TOTAL	**6,642,471**	**6,642,471**	**-**

As per our Report attached
Anand Tarun & Co.
Chartered Accountants
CA Anand M Chopra
Partner
M. No. 094257

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY

(An Autonomous Institution of Ministry of New & Renewable Energy)
Kapurthala (Punjab) - 144601

	PARTICULARS		31st MARCH, 2023	31st MARCH, 2022
VI.	**INVESTMENTS (Corpus Fund)**		-	-
	A	Fixed Deposits with Banks	289,422,211.00	289,422,211.00
	B	IREDA- NIBE Award Sweep Account	13,522,400.00	12,872,400.00
		Interest under MOD of NIBE Award *(Transferred from Deposit A/c)*	900,000.00	650,000.00
		TOTAL	**303,844,611.00**	**302,944,611.00**

As per our Report attached
Anand Tarun & Co.
Chartered Accountants
CA Anand M Chopra
Partner
M. No. 094257

SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY
(A Society Registered Under the Registration of the Societies Act, 1860)

IV: Fixed Assets and Depreciation Schedule as on 31.03.2023

RATE OF DEP	PARTICULARS	WDV AS ON 31.03.2022	ADDITIONS MORE THAN 180 DAYS	LESS THAN 180 DAYS	DEDUCTIONS/ ADJUSTMENT	WDV AS ON 31.03.2023	Depreciation	W.D.V. AS ON 31.03.2023
-	Land	75,00,000.00	-	-	-	75,00,000.00	-	75,00,000.00
-	Land & Site Related Dev Works	12,85,066.00	-	-	-	12,85,066.00	-	12,85,066.00
0.15	Plant Mach &Equp. Office-I	34,507.00	-	-	-	34,507.00	5,176.00	29,331.00
FURNITURE, FIXTURE,OFFICE & HOSTEL EQUIPEMENTS								
0.4	Computer & Printer	5,35,175.93	23,999.00	99,997.40	0	6,59,172.33	2,43,669.00	4,15,503.33
0.1	Furniture & Fixtures	1,452.00	4,51,435.00		-	4,52,887.00	45,289.00	4,07,598.00
0.15	Office Equipments	7,56,135.00				7,56,135.00	1,13,420.00	6,42,715.00
0.15	Refrigerator	26,618.00				26,618.00	3,993.00	22,625.00
Project Bio Crude Assets								
0.15	TBP Bio-Crude project	4,94,198.00			-	4,94,198.00	74,130.00	4,20,068.00
0.15	Gas Regulator	6,464.00			-	6,464.00	970	5,494.00
0.15	Hydrogen Gas Cylinder	5,092.00		-	-	5,092.00	764	4,328.00
Project Bio Diesel Assets								
0.15	Diesel Engine Test Rig	3,20,940.00			-	3,20,940.00	48,141.00	2,72,799.00
0.15	Foundation Stone	18,292.00			-	18,292.00	2,744.00	15,548.00
0.15	Oxyen Gas Cylinder	1,714.00			-	1,714.00	257	1,457.00
0.15	Flash Point Apparatus	97,010.00			-	97,010.00	14,552.00	82,458.00
0.15	Kinematic Viscometer	72,578.00			-	72,578.00	10,887.00	61,691.00
0.15	Mechanical Stirrer	10,580.00			-	10,580.00	1,587.00	8,993.00
0.15	Petroleum Density Meter	1,94,890.00			-	1,94,890.00	29,234.00	1,65,656.00
0.15	Rotary Vaccume Evaporator	91,799.00			-	91,799.00	13,770.00	78,029.00
0.15	Soxhelt	15,220.00			-	15,220.00	2,283.00	12,937.00
Project Bio Ethonal Assets								
0.15	Bio reactor	7,11,755.00			-	7,11,755.00	1,06,763.00	6,04,992.00
0.15	Gel Electrophoresis	54,218.00			-	54,218.00	8,133.00	46,085.00
0.15	Real Time PCR	3,08,514.00			-	3,08,514.00	46,277.00	2,62,237.00
0.15	SDS Page Electrophoresis	68,751.00			-	68,751.00	10,313.00	58,438.00
0.15	Gas Cylinder	3,175.00			-	3,175.00	476	2,699.00
0.15	Water Jacket Vessel	29,719.00				29,719.00	4,458.00	25,261.00
Prroject Bio Gas Assets								
0.15	Infrared Thermometer	2,563.00	-		-	2,563.00	384	2,179.00
0.15	Equipments	17,177.00				17,177.00	2,577.00	14,600.00
Project Bio Mass Cookstove Assets								
0.15	Gas Cylinder	25,038.00	-		-	25,038.00	3,756.00	21,282.00
0.4	Computer &Printrer	113				113	45	68
0.15	Office Equipments	25,371.00				25,371.00	3,806.00	21,565.00
Project Indo Brazil Assets								
0.15	Equipments	8,02,900.00				8,02,900.00	1,20,435.00	6,82,465.00
Scientific & Laboratory Equipments (12-13)								
0.15	Cook Stove	103			-	103	15	88
0.15	Fume Hood	19,037.00			-	19,037.00	2,856.00	16,181.00
0.15	Photo Bioreactor	2,998.00			-	2,998.00	450	2,548.00
0.15	Weight Scale 100 kg	1,567.00			-	1,567.00	235	1,332.00
0.15	Weight Scale 30 kg	1,119.00			-	1,119.00	168	951

Plant & Machinery Equipments								
0.15	Air Compresser Machine	4,965.00			-	4,965.00	745	4,220.00
0.15	Fixed Drill Machine R/f 20mm	6,391.00			-	6,391.00	959	5,432.00
0.15	Gas cutting Set	7,088.00			-	7,088.00	1,063.00	6,025.00
0.15	Grinder Angle 100mm(Hand Grinder)	847			-	847	127	720
0.15	Hydrolic Power Hacksaw Machine	9,780.00			-	9,780.00	1,467.00	8,313.00
0.15	Lath Machine	67,113.00			-	67,113.00	10,067.00	57,046.00
0.15	Pana Machine(Arc Welding Set)	15,519.00			-	15,519.00	2,328.00	13,191.00
0.15	Pedestal Grinder 300mm	6,090.00			-	6,090.00	914	5,176.00
0.15	Tractor,Trolly&Equipments	1,53,224.00	-	8,53,358.00	-	10,06,582.00	86,985.00	9,19,597.00
0.15	Borewell with 2HP Submersible Pump	9,069.00			-	9,069.00	1,360.00	7,709.00
0.15	Drill Machine (GBM 10 MM Heavy)	741			-	741	111	630
0.15	Fire Extinguishar	25,083.00			-	25,083.00	3,762.00	21,321.00
0.15	Grass Moving Machine	318			-	318	48	270
0.15	Hmpv Fitting Lamp	11,878.00			-	11,878.00	1,782.00	10,096.00
0.15	Leveller	1,766.00			-	1,766.00	265	1,501.00
0.15	Projector	61,405.00			-	61,405.00	9,211.00	52,194.00
0.15	Tiller	2,459.00			-	2,459.00	369	2,090.00
0.15	Vehicle Car Ambessador (New)	96,359.00			-	96,359.00	14,454.00	81,905.00
0.15	Workshop Tools	88,651.00			-	88,651.00	13,298.00	75,353.00
0.15	Drill Hammer Rotary 26(hand Grinder)	2,938.00			-	2,938.00	441	2,497.00
0.15	Gas & Four Cylinders	2,064.00			-	2,064.00	310	1,754.00
0.15	Electrical Equipments	74,659.00			-	74,659.00	11,199.00	63,460.00
0.1	Guest HouesAssest/ Office Equipment.	54,241.00			-	54,241.00	5,424.00	48,817.00
0.1	Leddger	10,639.00			-	10,639.00	1,064.00	9,575.00
0.1	Plant Mach &Equp Office-II	2,555.00			-	2,555.00	256	2,299.00
0.1	Fins Room Heater	-	-	1,74,080.00		1,74,080.00	8,704.00	1,65,376.00
0.15	Lab Scale Anaerobic Digester	-	13,71,988.00	-	-	13,71,988.00	2,05,798.20	11,66,189.80
0.15	Vehicle Staff Car	-	-	10,37,809.57	-	10,37,809.57	77,835.72	9,59,973.85
Scientific & Laboratory Equipments								
0.15	Air Oven (250 degree)	7,907.00			-	7,907.00	1,186.00	6,721.00
0.15	Bomb Calorimeter	99,524.00			-	99,524.00	14,929.00	84,595.00
0.15	Circ,Refrig,6Lt,STD(Auto Clave)	21,626.00			-	21,626.00	3,244.00	18,382.00
0.15	Data Acquisition System	69,769.00			-	69,769.00	10,465.00	59,304.00
0.15	Digital Ph.Meter	9,742.00			-	9,742.00	1,461.00	8,281.00
0.15	Incubator Bacteriological	8,227.00			-	8,227.00	1,234.00	6,993.00
0.15	Kern Analytical Balance (220gm)	9,622.00			-	9,622.00	1,443.00	8,179.00
0.15	Laboratory Refrigerator	1,17,730.00			-	1,17,730.00	17,660.00	1,00,070.00
0.15	Laminar Airflow Horizontal	10,233.00			-	10,233.00	1,535.00	8,698.00
0.15	Megnetic Stirrer	6,382.00			-	6,382.00	957	5,425.00
0.15	PlatormScale(Platform Balance)	3,012.00			-	3,012.00	452	2,560.00
0.15	Precision Laboratory Balance(610gm)	5,494.00			-	5,494.00	824	4,670.00
0.15	Water Bath	23,822.00			-	23,822.00	3,573.00	20,249.00
0.15	Automatic Sieve	58,793.00			-	58,793.00	8,819.00	49,974.00
0.15	Bio-Diesel Preparation Unit(England)	1,36,383.00			-	1,36,383.00	20,457.00	1,15,926.00
0.15	Biomass Gassifier	1,79,610.00			-	1,79,610.00	26,942.00	1,52,668.00
0.15	CHN Analyzer (Germany)	3,70,494.00			-	3,70,494.00	55,574.00	3,14,920.00
0.15	FibretechApparatur	42,754.00			-	42,754.00	6,413.00	36,341.00
0.15	Incubator Shaker(USA)	1,43,396.00			-	1,43,396.00	21,509.00	1,21,887.00
0.15	Micropipette	10,812.00			-	10,812.00	1,622.00	9,190.00
0.15	Portable Biogas plant	16,368.00				16,368.00	2,455.00	13,913.00

0.15	2 Gel Electrophrosis	2,03,946.00				2,03,946.00	30,592.00	1,73,354.00
0.15	Automatic Colony Counter	2,87,909.00				2,87,909.00	43,186.00	2,44,723.00
0.15	Bio Photometer	1,06,037.00				1,06,037.00	15,906.00	90,131.00
0.15	Co2 Incubator Shaker	2,50,584.00				2,50,584.00	37,588.00	2,12,996.00
0.15	Gas Flow Meter	2,15,432.00				2,15,432.00	32,315.00	1,83,117.00
0.15	Dry Bath	16,933.00				16,933.00	2,540.00	14,393.00
0.15	Electroporation Unit	50,660.00				50,660.00	7,599.00	43,061.00
0.15	Filter Paper Type SMP Sysytem	58,549.00				58,549.00	8,782.00	49,767.00
0.15	Flue Gas Analyser	4,90,161.00				4,90,161.00	73,524.00	4,16,637.00
0.15	FTIR Spectometer (FTIR 660)	4,63,393.00				4,63,393.00	69,509.00	3,93,884.00
0.15	Gradient PCR (Mastercycler Nexus GX2)	1,33,440.00				1,33,440.00	20,016.00	1,13,424.00
0.15	Hot Plate Cum Magnetic Stirrer	13,869.00				13,869.00	2,080.00	11,789.00
0.15	Precision Microbalance	41,465.00				41,465.00	6,220.00	35,245.00
0.15	Ultrasonic Cleaner	9,572.00				9,572.00	1,436.00	8,136.00
0.15	Refrigerated Centrifuge (Germany)	90,375.00		-		90,375.00	13,556.00	76,819.00
0.15	TG DTA (STA6000)Singapore	2,05,455.00				2,05,455.00	30,818.00	1,74,637.00
0.15	Ultra Low Freezer(Deep Freezer)(USA)	78,137.00				78,137.00	11,721.00	66,416.00
0.15	U V Vis Spectrophotometer(Singapore)	1,20,039.00				1,20,039.00	18,006.00	1,02,033.00
0.15	Autoclave	32,439.00				32,439.00	4,866.00	27,573.00
0.15	Auto Emission Analyzer	78,777.00				78,777.00	11,817.00	66,960.00
0.15	BOD Incubator	1,07,552.00				1,07,552.00	16,133.00	91,419.00
0.15	Carbon Monoxide Indicator	3,205.00				3,205.00	481	2,724.00
0.15	Circulatory Water Bath	39,064.00				39,064.00	5,860.00	33,204.00
0.15	Gas Chromatography	6,75,226.00				6,75,226.00	1,01,284.00	5,73,942.00
0.15	Microscope	36,256.00				36,256.00	5,438.00	30,818.00
0.15	Muffle Furnace 1200 (1400)	9,225.00				9,225.00	1,384.00	7,841.00
0.15	Muffle Furnance 1100 (1400)Degree	6,852.00				6,852.00	1,028.00	5,824.00
0.15	Vaccum Oven	34,746.00				34,746.00	5,212.00	29,534.00
0.15	Gas Regulator	1,770.00				1,770.00	266	1,504.00
0.15	Water Purificati0n System	1,85,035.00				1,85,035.00	27,755.00	1,57,280.00
0.15	Equipments (Scientific and laboratory)	14,552.00				14,552.00	2,183.00	12,369.00
0.15	Automatic cell counter	1,38,163.00			-	1,38,163.00	20,724.00	1,17,439.00
0.15	Fluorescence Microscope	4,56,351.00				4,56,351.00	68,453.00	3,87,898.00
0.15	Hot air oven	1,69,633.00				1,69,633.00	25,445.00	1,44,188.00
0.15	incubator 104	33,264.00				33,264.00	4,990.00	28,274.00
0.15	irox diesel	7,38,169.00				7,38,169.00	1,10,725.00	6,27,444.00
0.15	Micro balance	5,94,010.00				5,94,010.00	89,102.00	5,04,908.00
0.15	Moisture analyzer	1,87,772.00				1,87,772.00	28,166.00	1,59,606.00
0.15	Muffle Furnance 1400	1,34,167.00				1,34,167.00	20,125.00	1,14,042.00
0.15	phase contrastmicroscope	3,07,315.00				3,07,315.00	46,097.00	2,61,218.00
0.15	Shaking Water Bath	1,22,875.00				1,22,875.00	18,431.00	1,04,444.00
0.15	Staked Enviroment Shaker	8,03,966.00				8,03,966.00	1,20,595.00	6,83,371.00
Scientific & Lab. Equipments (For Bio-Dieseal Project)								
0.15	Circular Saw Ma chine	5,357.00				5,357.00	804	4,553.00
0.15	Differntail Scanning Calormiter	7,14,155.00				7,14,155.00	1,07,123.00	6,07,032.00
0.15	Gel Documents	2,34,340.00				2,34,340.00	35,151.00	1,99,189.00
0.15	High Mast Light	9,48,037.00				9,48,037.00	1,42,206.00	8,05,831.00
0.15	Homogenizer	1,07,300.00				1,07,300.00	16,095.00	91,205.00
0.15	HPLC	4,15,856.00				4,15,856.00	62,378.00	3,53,478.00
0.15	Lyophilizer	1,89,529.00				1,89,529.00	28,429.00	1,61,100.00
0.15	Oxidation Stabilty Apparatus	2,40,387.00				2,40,387.00	36,058.00	2,04,329.00
0.15	Ramsbotton Carbon Residue Apparatus	2,09,228.00				2,09,228.00	31,384.00	1,77,844.00

0.15	Street Light	10,47,232.00				10,47,232.00	1,57,085.00	8,90,147.00
0.1	Furniture & Fixture	81,83,254.00	19,06,856.00			1,00,90,110.00	10,09,011.00	90,81,099.00
0.4	Computer/Peripherals	12,535.06				12,535.06	5,014.00	7,521.06
0.15	Library Books	8,42,237.00	32,291.00	-	-	8,74,528.00	1,31,179.00	7,43,349.00
0.15	Cycle	55				55	8	47
	Misc Eqiupments (Cellphone)					-		
0.1	Misc Fixed Assets	35,201.00				35,201.00	3,520.00	31,681.00
0.1	Guest House Misc Assets	16,895.00				16,895.00	1,690.00	15,205.00
0.15	Guest House Equip Mach-I	2,752.00				2,752.00	413	2,339.00
0.1	Guest House Equip Mach-II	49				49	5	44
0.15	Land Site Related Dev Tubewell	1,79,024.00				1,79,024.00	26,854.00	1,52,170.00
0.1	Civil Works Building & Built Up Space	12,20,76,241.00	5,78,000.00	22,62,000.00	0	12,49,16,241.00	1,23,78,524.00	11,25,37,717.00
0.15	Mobile	901				901	135	766
0.1	Inaugration of Gate	5,811.00				5,811.00	581	5,230.00
0.15	Air Conditions	5,84,936.00	-	4,09,534.00		9,94,470.00	1,18,455.00	8,76,015.00
0.15	Hair refrigerator 601 Ltr	15,054.00				15,054.00	2,258.00	12,796.00
0.15	Digital Electronic Balance ML 204	23,127.00				23,127.00	3,469.00	19,658.00
0.15	Helium Gas Cy0linder with Regulator	7,032.00				7,032.00	1,055.00	5,977.00
0.15	Online UPS 15KVA	53,417.00				53,417.00	8,013.00	45,404.00
0.1	Development of Gate	10,12,577.00				10,12,577.00	1,01,258.00	9,11,319.00
0.15	Panasonic Fax	1,941.00				1,941.00	291	1,650.00
0.15	Washing Machine	6,201.00				6,201.00	930	5,271.00
0.15	Gas Purification	17,765.00				17,765.00	2,665.00	15,100.00
0.15	Liquid Nitrozen	18,627.00				18,627.00	2,794.00	15,833.00
0.15	Bike Passion	13,705.00				13,705.00	2,056.00	11,649.00
0.15	Machinery (Assets)	1,08,59,109.87	13,77,408.00	37,86,550.72	0	1,60,23,068.59	21,19,469.00	1,39,03,599.59
0.15	Process Equipment	82,365.00				82,365.00	12,355.00	70,010.00
0.15	LG refrigerator	**18,646.00**				18,646.00	2,797.00	**15,849.00**
0.1	Sign Board	40,893.00	-	3,65,550.43	-	4,06,443.43	22,367.00	3,84,076.43
0.15	Water Purifiers	35,808.00				35,808.00	5,371.00	30,437.00
0.1	Stainless steel Doors	1,20,081.00				1,20,081.00	12,008.00	1,08,073.00
0.15	Rear Disk Rod	1,988.00				1,988.00	298	1,690.00
0.15	Sheet Cutting Machine	11,255.00				11,255.00	1,688.00	9,567.00
0.1	Water tank	9,720.00				9,720.00	972	8,748.00
0.15	Sheet Rolling Machine	16,874.00				16,874.00	2,531.00	14,343.00
0.1	Construction	6,73,104.00				6,73,104.00	67,310.00	6,05,794.00
0.15	Audio Video Conferencing Sys	8,95,764.00	1,21,236.00			10,17,000.00	1,52,550.00	8,64,450.00
0.4	Scanner	119				119	48	71
0.1	Office Buildings (W	20,37,973.00				20,37,973.00	2,03,797.00	18,34,176.00
0.15	Plant Assets	7,732.00				7,732.00	1,160.00	6,572.00
0.15	CCTV Camera	666925	498000	0	0	11,64,925.00	1,74,738.75	9,90,186.25
0.4	Software	2653640	2309725.03	0	0	49,63,365.03	19,85,346.01	29,78,019.02
0.4	Computers/printers	0	991113	89999	0	10,81,112.00	4,14,445.00	6,66,667.00
0.25	Patent	0	0	46000	0	46,000.00	5,750.00	40,250.00
0.15	Telephone	0	0	6410	0	6,410.00	480.75	5,929.25
	Sub-Total	17,87,08,485.86	96,62,051.03	91,31,289.12	-	19,75,01,826.01	2,23,49,440.43	17,51,52,385.58

Schedule 3 Security Deposit, EMD, PG

Sr No	Particulars	Amount
1	Avon Corporation Ltd (EMD)	4,000
2	Eppendort India Ltd	50,000
3	ISS Hicare Pvt Ltd	5,000
4	Labmate Asia Pvt Ltd	20,000
5	M/s Bharat Instruments	6,000
6	M/s Hysel India Pvt Ltd	20,000
7	M/s Metrohmindia Pvt Ltd	59,000
8	M/s Namco National Medicine Co	4,000
9	M/s Punjab Ex Servicemen Corporation	125,000
10	M/s Radical Scientific Equipment	30,000
11	M/s Saggu Tubewell Co	7,500
12	M/s Sandeep Builders	17,000
13	M/s Scientific Imporium	20,000
14	M/s TCI Chemicals Pvt Ltd	20,000
15	M/s Vinny Scientific Store	20,000
16	M/s Wipro GE Healthcare	40,000
17	Shankar Book Agency Pvt Ltd	7,500
18	EMD	2,000
19	M/s K Bhagat & Co.	1,545
20	Security Deposit Payable	69,350
	Total	**527,895**

Schedule 3
Salary Payable

Sr No	Particulars	Amount
1	Salary & Allowances Payable	1,630,251
2	EPF Payable	207,911
	Total	**1,838,162**

Schedule 5
Prepayments

Sr No	Particulars	Amount
1	Prepaid Expenses	367,673
2	Prepaid Insurance	3,757
	Total	**371,430**

Schedule 5
Sundry Debtors

Sr No	Particulars	Amount
1	Dr Anand Pandey	3,540
2	Dr Savita Vyas	900
3	M/s Ecosense Sustainable Solutions Pvt Ltd	29,500
4	M/s Jageribag Phool Pvt Ltd	108,000
5	Punjab Technical University	3,540
	Total	**145,480**

Schedule 5
Advances

Sr No	Particulars	Amount
1	Gas Security	7,100.00
2	CASA New Delhi	300,000.00
3	Deposit with CPWD	68,685.00
4	Jain University	200,000.00
5	M/s Deejay Corporation	63,279.00
6	Security Deposit Recievable	800.00
7	Sundry Advance	41,055.49
8	Comptroller PAU Ludhiana	59,000.00
9	Executive Engineer PWD	1,684,962.00
10	M/s BN Construction	500,000.00
11	National Informatics Centre Services	42,283.00
12	Punjab State Power Corporation	140,947.00
	Total	**3,108,111.49**

NOTES TO ACCOUNTS

1. Accounting Convention

The Financial Statements are prepared on the basis of historical cost convention in accordance with the generally accepted accounting principles and on the accrual method of accounting.

2. Significant Accounting Policies

2.01 Basis of preparation and presentation

The financial statements of the institute have been prepared in accordance with generally accepted accounting principles in India (Indian GAAP). These financial statements have been prepared to comply in all material respects with the accounting standards issued by ICAI.

2.02 Use of estimate

The preparation of these financial statements in conformity with the recognition and measurement principles of AS requires the management of the Institute to make estimates and assumptions that affect the reported balances of assets and liabilities, disclosures relating to contingent liabilities as at the date of the financial statements and the reported amounts of income and expense for the periods presented. Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimates are revised and future periods are affected. The management believes that the estimates used in preparation of financial statements are prudent and reasonable. Future results could differ due to these estimates and differences between actual results and estimates are recognized in the periods in which the results are known/ materialize. Key source of estimation of uncertainty at the date of the financial statements, which may cause a material adjustment to the carrying amounts of assets and liabilities within the next financial year, is in respect of useful lives of property, plant and equipment, valuation of deferred tax liabilities and provisions and contingent liabilities.

Interest on Corpus

Institute has received interest on corpus fund which has been kept in FDR with bank. The total amount of interest received during the FY 2022-23 on FDR is Rs.1,54,14,572 out of which Rs. 51,43,800.69 has been transferred to income & expenditure account under the head interest on FDR (Corpus Fund) & the same has been utilized for expenses of institute.

3. Fixed Assets

Fixed Assets are valued at cost of acquisition inclusive of inward freight, duties and taxes, incidental & direct expenses related to acquisition.

4. Depreciation

Depreciation on Fixed Assets has been provided on written down value method as per rates specified in the Income Tax Act 1961.

5. Revenue recognition

During the year, Provisions are recognized on accrual basis of accounting when the services provided under the contract are completed. Interest income received on account of government grants is passed through revenue account.

6. Government Grants

I. Government of India, Ministry of New & Renewable Energy has sanctioned the establishment of Sardar Swarn Singh National Institute of Renewable Energy (SSS-NIRE) as an autonomous Institute of Ministry under the Societies Registration Act 1860. During the year 2022-23, Rs 1,60,00,000/- has been received for Salary, Rs 2,00,00,000/- has been received for creation of Capital Asset and Rs 3,40,00,000/- has been received as a Grant for General Expenses. Total Grant Received during the year Rs 7,00,00,000/-. This makes a total grant of Rs 101,91,13,874/- received from ministry. Year wise Grants received along with Interest earned which had been converted from Capital Fund to Grant-In-Aid has been given in following table:

YEAR WISE DETAILS GRANT RELEASED FROM MNRE TO SSS-NIRE

Financial Year	Grant Received in Rs.	Cummulative Grant in Rs.
1998-99	7,50,00,000	7,50,00,000
1999-20	20,00,000	7,70,00,000
2000-01		7,70,00,000
2001-02	1,00,00,000	8,70,00,000
2002-03	2,00,00,000	10,70,00,000
2003-04	3,00,00,000	13,70,00,000
2004-05	2,83,00,000	16,53,00,000
2005-06		16,53,00,000
2006-07		16,53,00,000
2007-08	3,67,00,000	20,20,00,000
2008-09	3,50,00,000	23,70,00,000
2009-10	7,00,00,000	30,70,00,000
2010-11	4,00,00,000	34,70,00,000
2011-12	5,00,00,000	39,70,00,000
2011-12 (Intt. Utilized)	1,50,47,499	41,20,47,499
2012-13	15,00,00,000	56,20,47,499

Financial Year	Grant Received in Rs.	Cummulative Grant in Rs.
2013-14 (Intt. Utilized)	74,66,375	56,95,13,874
2013-14	8,00,00,000	64,95,13,874
2014-15	12,00,00,000	76,95,13,874
2015-16	4,68,58,799	81,63,72,673
2016-17	91,41,201	82,55,13,874
2017-18	1,00,00,000	83,55,13,874
2018-19	1,00,00,000	84,55,13,874
2019-20	7,00,00,00	85,25,13,874
2020-21	4,70,00,000	89,95,13,874
2021-22	4,96,00,000	94,91,13,874
2022-23	7,00,00,000	101,91,13,874

II. During the Year 2022-23 the Institute has received the grant of Rs 2,29,07,000/- for the Project CPRI 270L, Rs 37,00,000/- for the Project CPRI 37L & Rs 37,16,000/- for the Project 66L. Amount spent on these projects were Rs 30,00,588/-, Rs 32,80,516/- & Rs 9,74,462/- for Project CPRI 270L, CPRI 37L & CPRI 66L respectively. Such amount was deducted from the Grant received using the Capital approach.

7. Balance Confirmation from Vendors

Balance confirmation from the various vendors is not available. To avoid the unnecessary incidences, it is essential to get the account statements of all the vendors at regular intervals. Submission of the account's statements should be made mandatory for all the vendors in the future.

8. Prior Period Adjustments

During the course of audit, it was observed that internet charges amounting Rs 15,24,560/- paid on 08/02/2023 & Rs 3,81,140/- paid on 08/02/2023 pertains to the period July 2021 to June 2022. As substantial portion of such expense was related to previous year, hence amount of Rs 11,73,702/- & Rs 2,93,426/- is deducted from Telephone & Communication charges of current year in schedule 11 & simultaneously shown as Prior period expense in Schedule 12.

An amount of Rs 17,28,772/- & Rs 34,46,571/- returned to Bharat Kosh on 03/10/2022 & on 14/10/2022 respectively. Such amount pertains to the grant received for FY 2021-22. Hence such amount is shown as Prior period item in Schedule 12.

9. Employee Benefits

The Employees of the institute is entitled to certain benefits like Leave Encashment & Leave Travel Concession. They are also entitled to Gratuity to be received at the time of retirement of

Employee. No provision is made by institute w.r.t Gratuity, Leave Encashment & Leave travel Concession. Institute claim expenditure of gratuity, leave Encashment, etc in its books of accounts when it is actually paid. However, Institute should make provision of these expenditure every year in its books of accounts.

10. <u>Contingent liabilities</u>

There are no contingent liabilities as on 31-03-2023.

For Sardar Swaran Singh National Institute of Bio Energy

Finance & Accounts Officer

सरदार स्वर्ण सिंह राष्ट्रीय जैव ऊर्जा संस्थान
12 कि.मी पत्थर, जालंधर-कपूरथला रोड,
बड़ाला कलाँ, कपूरथला (पंजाब) 144601
Sardar Swaran Singh National Inst. of B
12 Km Stone,Jalandhar-Kapurthala Ro

Director General

सरदार स्वर्ण सिंह राष्ट्रीय जैव ऊर्जा संस्थान
12 कि.मी पत्थर, जालंधर-कपूरथला रोड,
बड़ाला कलाँ, कपूरथला (पंजाब) 144601
Sardar Swaran Singh National Inst. of Bio-E
12 Km. Stone, Jalandhar-Kapurthala Road

As per our Report attached
Anand Tarun & Co
Chartered Accountants
Chartered Accountants
CA Anand M Chopra
Partner
M. No. 094257

Place: Kapurthala
Date: 03/08/2023

ANAND TARUN & CO.
CHARTERED ACCOUNTANTS

ATC
Chartered Accountant

UDIN No : 23094257BGVOBH2484 Ref. No. : ..... Dated : 03/08/23.

INDEPENDENT AUDITOR'S REPORT

To
The Directors of
Sardar Swaran Singh Institute of Bio-Energy
Kapurthala

1. We have audited the attached Balance Sheet of Sardar Swaran Singh Institute of Bio-Energy, Kapurthala as at March 31, 2023 and also the Income and Expenditure Account for the year ended on that date annexed thereto. These financial statements are the responsibility of the management. Our responsibility is to express an opinion on these financial statements based on our audit.

2. We conducted our audit in accordance with auditing standards generally accepted in India. Those Standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

3. Further to our comments in the Annexure-A attached, we report that:

   i. We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purposes of our audit;

   ii. The balance sheet, income and expenditure account are in agreement with the books of account;

   iii. In our opinion, and to the best of our knowledge and according to the explanations given to us and subjects to our observations annexed here with we report that:

      a. The Balance Sheet, gives a true and correct view of the state and affairs of the Sardar Swaran Singh Institute as on 31.3.2023.

      b. The Income and Expenditure Account gives a true and correct view of excess of income over expenditure for the period ended 31.03.2023.

FOR ANAND TARUN & CO
CHARTERED ACCOUNTANT

CA ANAND MOHAN CHOPRA
PARTNER

Head Office : 14, Shop Cum Flat, First Floor, New Grain Market, Jalandhar (Punjab), INDIA-144 008
Phone : +91-181-4622300, 75087-95099 E-mail : caatcjal@gmail.com, Web : www.anandtarun.com

Annexure -A

- During the course of audit, it was observed that amount of Rs 12,63,400/- received for MNRE (Capital) Project. Due to Non-Utilisation the amount received was refunded back to NISE Goregaon on 28/03/2023.It was observed that during the period under consideration Interest of Rs 54,880/- was earned on that amount which should have also been refunded. As this amount is still lying with the Institute, it is shown as liability in financial statements as amount unutilized.

- An amount of Rs 2,00,00,000/- received as grant for purchase of capital asset against which Rs 1,87,93,340.15/- was spent on acquisition of capital asset. As per AS 12 Issued by ICAI Related to Government Grant, grants pertaining to depreciable assets are treated as deferred income. Such a deferred income is recognized in the P&L statement over the useful life of the asset on a systematic and rational basis. In addition to this, the allocation of such deferred income is made over the periods and in proportions in which depreciation on related assets is charged. An Amount of Rs 27,74,557.84/- is charged as Depreciation on Capital Asset acquired in FY 2022-23. Hence such amount is shown as deferred income related to Fixed Asset in Schedule 9 simultaneously deducting the same amount from Grant in Schedule 1.

- During the Year 2022-23 the Institute has received the grant of Rs 2,29,07,000/- for the Project CPRI 270L, Rs 37,00,000/- for the Project CPRI 37L & Rs 37,16,000/- for the Project 66L. Amount spent on these projects were Rs 30,00,588/-, Rs 32,80,516/- & Rs 9,74,462/- for Project CPRI 270L, CPRI 37L & CPRI 66L respectively. Such amount was deducted from the Grant received using the Capital approach and shown as grant utlised for the purpose specified.

- Balance with the Government Authorities includes Advance Income Tax amounting to Rs. 4,28,395/- which belongs to previous years. As explained to us, this amount had been claimed as refund in the Income Tax Return filled for previous years. However, Refund of this amount is yet not issued by income tax authorities, thus this amount remains stand still.

- The Employees of the institute is entitled to certain benefits like Leave Encashment & Leave Travel Concession. They are also entitled to Gratuity to be received at the time of retirement of Employee. No provision is made by institute w.r.t Gratuity, Leave Encashment & Leave travel Concession. Institute claim expenditure of gratuity, leave Encashment, etc in its books of accounts when it is actually paid. However, Institute should make provision of these expenditure every year in its books of accounts.

- Some of the purchases made in cash does not reflect in Inventory records. Hence the management should install proper system of inventory control so that each & every purchase should be properly recorded in stock register.

- Following is the List of Debtors/ Loans & Advances where in advances have been given for more than a year and have not been adjusted during the years.

(In Rs)

Particulars	Date of Advance	Balance as on 31-03-2023
CASA, New Delhi	17/07/2003	3,00,000
Sundry Advances	31/03/2015	41,055.49
M/s Deejay Corporation	2012	63,279
M/s B.N Construction	21/10/2014	5,00,000
Dr Savita Vyas	9/01/2022	900
M/s Ecosense Sustainable Solutions	16/03/2022	29,500
National Informatics Centre Services	-	21,275

The above advances are outstanding since long time, we recommend that proper action should be taken up for recovery from above parties and there should be regular review of all the advances to ensure that vendors are fulfilling their commitments as per the terms of work orders.

- Following is the list of creditors which are not paid for more than a year

(In Rs)

Particulars	Detail	Bal as on 31-03-2023
Arora Vikram & Associates	16/12/2019	18,880
CA Manmohan Puri	23/10/2021	3,600
M/s Chemicot Scientific gases	31/03/2016	3,810
M/s Puri & Gupta	31/03/2022	59,000
Statutory Audit Fees Payable	31/03/2022	19,513

The above liabilities are outstanding for more than a year, we recommend proper action should be taken to settle the liabilities.

- **Statutory liabilities: -**

In view of there being no taxable income under Income Tax Act, 1961, provision for Income Tax has not been considered necessary. However, it is found from Income Tax Portal that the organization has pending outstanding liability of Income Tax is as under:

(In Rs)

Sr No.	Assessment Year	Amount
1	2015-16	3,05,65,450
2	2016-17	5,47,460

Appeal for the AY 2015-16 has been filed before Commissioner of Income Tax (Appeals) decision of which is still pending. In connection to AY 2016-17 assessment has been made under Section 143(3) vide order 27.11.2018 with Nil demand but demand of Rs 5,47,460/- has been still reflected in Income Tax Portal.

- The amount of expenditure has exceeded the amount of Grants received this time hence the amount of Interest earned out of corpus fund has been utilized this time for funding these expenditures. While amount of Rs. 1,09,408.15 has been utilized out of Interest for Capital (2,00,00,000-2,01,09,408.15). With respect to GIA General Expenses the amount of Grant received is Rs 3,40,00,000, the amount expended is Rs 3,51,04,974.54. The same amount of Rs 11,04,974.54 has been utilized from interest of Corpus Fund. Similarly, with respect to GIA Salary Expenses the amount of Grant received is Rs 1,60,00,000, the amount expended is Rs 1,99,29,418. The same of Rs 39,29,418 has been utilized from interest of Corpus Fund.

FOR ANAND TARUN & CO

Chartered Accountants

CA Anand M Chopra
Partner
M. No. 094257

ONLINE PRESENCE


Women's
Day

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