

**Unique/innovative ideas of the problems are invited from the following areas:**

**1. Climate Change Issues :**

- i. Modular Renewable Power Generation: Power outage from grid in critical facilities like hospital, defence establishments, cold storages in the remote areas of the NE region. A possible solution may be onsite power generation from renewables (solar, wind, mini hydel power units)
- ii. Agrovoltic Farming: Farming under solar canopy or PV panels can resolve many climate issues. Farmers can minimize evaporation of water from fields under solar canopy, generate power to inject in the grid and reduce land required for setting up solar farms.
- iii. Drainage with rainwater harvesting: Design of urban drainage system with rainwater harvesting system to arrest flash flood in the neighbourhood.
- iv. Micro Weather Station Network: Monitoring of local weather in the city and **regulate traffic** to reduce SOX, NOX, SPM near major healthcare facilities.
- v. Solar water heating solution for high rise apartments: Minimize use of commonly used electric geysers in apartments.
- vi. CO<sub>2</sub> capturing, sequestration and use: CO<sub>2</sub> capturing from furnace stacks, its storage and use for different application is another area where many startups are working.

**2. Renewable Energy**

- i. Pumped Storage Hydropower (PSH): Pumping water into a reservoir during peaking of renewable generation in and using the water to run turbines when demand of power is high.
- ii. Intelligent Power Demand Management: AI / ML based solution for power demand management like advancement of power demand when generation is more and switching off the demand when generation is less.
- iii. Production of H<sub>2</sub>/Methanol/Ammonia: Use of renewable for production of H<sub>2</sub>, Methanol or Ammonia and storage for future consumption. H<sub>2</sub>, Methanol and Ammonia are identified as future fuel in many sectors.
- iv. Demand management for EV charging: Normally EV charging is carried out in the night hours which farther increase the demand of peak power. Innovative business models to promote charging of EVs during the daytime when power demand is less is one area where startups will operate.
- v. Design & manufacturing of EV components: Many startups are engaged in design and manufacturing of EVs and their components. Govt. of India provides Production Linked Incentive (PLI) for Automobile and Auto component industry with a budgetary outlay of ₹ 25,938 crore, to boost domestic manufacturing of Advanced Automotive Technology products including electric vehicles and their components.

### 3. Green Hydrogen Economy:

- i. Storage of H<sub>2</sub>: Storage of H<sub>2</sub> is a challenge in terms of volume and safety of handling. Conversion of H<sub>2</sub> immediately to Methanol or Ammonia partly solves the problem.
- ii. Fuel Cell Electric Vehicles: Design, develop and use of FCEVs for urban mobility and manufacturing of FCEV components including storage tanks.
- iii. Electrolyser & Electrolyser Components: Design and development of Electrolyser for H<sub>2</sub> generation from electricity. Solar Energy Corporation of India (SECI) has invited RFP from interested electrolyser manufacturers for setting up plants in India for manufacturing of electrolyser and components under Strategic Intervention for Green Hydrogen Transition (SIGHT) scheme.
- iv. H<sub>2</sub> from CBG: Production of H<sub>2</sub> from compressed biogas generated from municipal waste is another area where startups are engaged today. In Assam already one startup is setting up a CBG plant primarily for production of biogas.

### 4. Tea garden:

- i. Drone based surveillance of garden areas – Tea gardens are very big in size and cost of manual labour to oversee the garden is going up. A drone-based system which can reduce this manual supervision cost is required. A system which is easy to operate and uses computer vision helps control the issues in garden management.
- ii. Better quality control in the factory thru automation / Data Analytics: The process of tea factory needs extensive control of quality of leaves and its processing steps. Assam tea is losing its quality status as most of the garden are now buying leaves from outside their garden areas. Quality control of leaves is a manual process. Some has tried to import some machines which can do a computer vision-based analysis of leaves and raise alarms.

5. **Bamboo based products**: Innovative Bamboo-based building materials are becoming popular due to their sustainability benefits. An example is Bamboo based Wooden flooring. An innovative Bamboo based product idea for the building material industry is required to be showcased. The idea should showcase some original thinking and problem-solving aptitude

6. **Precast technologies**: NE region has a huge infrastructure gap. Conventional Construction time is much longer due to the shorter window to do fieldwork. Precast-based structures can solve this problem. Precast can be used in lots of different ways. Specific segments and products where it can generate huge business can be identified by the startup and some pilots can be demonstrated.

## 7. Edutech:

- (1) Rural education: Rural education is a particularly challenging area in India due to its size and spread. An Innovative idea for solving any one identified problem in this segment is required to be showcased. The idea should demonstrate some original thinking and problem-solving aptitude.
- (2) Improvement of Technical Skill Training thru AR/VR – Technical education and training needs a combination of Expert teachers and study content. There is a huge market for such AR/VR solutions which can improve the delivery of technical education. The Edutech startup is expected to develop an innovative idea for solving any one identified problem in the field of technical education. The idea should showcase some original thinking and problem-solving aptitude.

**8. Agriculture:** The ideas should be firmly based on the agricultural challenges, issues faced by Agri Industry and Progressive Farmers. Its main aim is to solve the current Agricultural problems through technologies and bring forward all the enthusiastic start-ups, entrepreneurs, Researchers and students to come forward and show up their technical potential.

**9. Future Technologies:** The idea model should showcase original thinking and problem-solving aptitude using technologies like AI, Social Media, 5G, Internet of Things, Machine Learning, Robotics, networking infrastructure and collaboration to address global issues related to education, healthcare, water conservation, environment and sustainability.

**10. Cyber security:** It refers to every aspect of protecting an organization and its employees and assets against cyber threats. As cyberattacks become more common and sophisticated and corporate networks grow more complex, a variety of cyber security solutions are required to mitigate corporate cyber risk.

**11.** Conversion of drilling waste into environment friendly usable wealth.

**12.** Exploring alternative flow assurance measure(s) for transporting high pour point crude oil through pipeline.

**13.** Modelling emissions from a Gas based power plant under varying load conditions.

**14.** Design of an intelligent integrated green energy storage system with a Gas based power plant.

**15.** Estimation of fugitive emissions in oil and gas processing installations.

**16.** Conversion of household and municipal waste to wealth.

**17.** Design of a modern sustainable residence for urban areas in Assam.

**18.** Developing solar powered attendance management system for employees working at remote operational areas of OIL INDIA LIMITED.

**19.** Generation of real time Surface Plan and Key Plan for installations as per statutory requirement using solar powered GPS.

**20.** Developing mechanisms for carbon capture, utilization, and storage in energy value chain.

**21.** Cost effective solution for production of green hydrogen, transportation, storage and distribution.

**22.** Adaptive Air and Water Quality Monitoring: (Leveraging Autonomous Drones, AI, Multi-Sensor Technology, onboard Data Processing, 3D Mapping, IoT, Processing for Real-Time Pollution Detection

and Analysis.)

23. Enhanced Waste Systems: (AI-Based efficient Sorting, Forecasting and Monitoring, IoT-Enabled Smart Bins, Dynamic Route Optimization etc.)
24. AI Chat bots for Public Awareness.
25. Development of sustainable eco friendly packaging materials.
26. Low cost Liquid waste management system.
27. Sustainable Food Waste management Innovative solutions for Environmental, Economical and social impacts of food waste.
28. Plastic Waste Management - Sorting and recycling of post-consumer Plastic waste.
29. Domestic Hazardous Waste Management system.
30. Smart building automation and IoT gadgets
31. Operational Technology/Information Technology of power sector utilities (protection & safety, loss
32. Reduction methodology by application of IOT, AI, ML etc. /residual life assessment technique to
33. Maintain quality power with minimal interruption.
34. Sustainability and reducing carbon footprints.
35. Waste management systems with IoT applications.
36. Renewable energy solutions and green tech innovations.
37. Net-zero carbon footprint strategies.
38. Digital solutions for employment generation
39. **Project suggestions from ONGC, Jorhat**

1. Biofuels production

Objectives:

a.) Upscaling biofuel production: it involves enhancing the efficiency and sustainability of processes that convert biomass into fuels. There are various lab methods where biofuels have been successfully extracted from organic materials. However, most of the methods prove uneconomical once scale up to industrial level is done. Hence, there is a need for the development of methods which can prove economic viability once they are upscaled to an industrial level.

b.) Instrument development and process engineering for acid digestors: it should aim at the development of acid digestors required for the acid hydrolysis or digestion of the biomass to sugars which must have the potential of having great load capacity, less reaction time, least toxin generation, temperature and pressure controllers etc.

c.) Acid recovery unit: development of an indigenous acid recovery unit which has the capacity to recover the catalyst widely used for acid hydrolysis of biomass to produce biofuels and in the transesterification of oils to produce biodiesel. Recovery of acid will have both economical and environmental impact.

## 2. Recovery of crude oil from oily sludge

Recovering crude oil from oil sludge generated during oil production in oil fields is vital for environmental sustainability and resource management. This project should focus on employing extraction techniques to efficiently separate oil from sludge. The method should not only recycle valuable hydrocarbons but also be environmentally sustainable.

## 3. Green hydrogen production, storage and transportation

This project should focus on the production of hydrogen by using electrolysis of water by using electrolytic cell via green electricity. It should also focus on the development of new storage and transportation alternatives for highly flammable hydrogen gas.

Key activities for green hydrogen production through electrolytic cell includes:

- a) Less cold start time
- b) Flexibility in feedwater usage like distilled water, seawater, effluent and wastewater
- c) Longer life and durability.
- d) Material used for forming electrolytic cell should be process efficient, cost effective and anticorrosive.
- e) Economic analysis

Key activities for hydrogen storage and transportation:

- a) Development of storage units for hydrogen which can cater the high pressure and low temperature requirement of hydrogen.
- b) Hydrogen have corrosive effect on metals, hence material designing should be done that can hold highly pressurised hydrogen for a longer period of time.
- c) Material designing and process designing for flowlines that can be effectively used to transport hydrogen

## 4. Use of Drones to survey oil spills and bioremediation

The project should aim to explore the potential of drone technology in monitoring crude oil spillage in water and soil pits. By utilizing unmanned aerial vehicles (UAVs), the project should seek to gain a better understanding of oil spill characteristics, including thickness, penetration, and spread. The

data collected from drone-mounted sensors should be able to analyse and develop a comprehensive model for monitoring crude oil spillage during bioremediation. The project will contribute to improved environmental monitoring, enhanced spill response, and reduced ecological impact of crude oil contamination in water and soil pits.

#### 5. Water treatment procedures

##### Problem:

1. There is observance of yellowish colour in treated drinking water even though iron content at permissible limit.
2. Even after treatment with recommended dosage of Sodium Hypochlorite and Bleaching powder, no residual chlorine concentration is observed in treated water.

##### Solution required:

1. Suggested design of filter media and system that can help solve the problem of drinking water colouration.
2. Suggested changes in dosing system/proposed dosing design to achieve the desired residual chlorine concentration level in drinking water (0.2-0.5 ppm).