LIST OF ONGOING S&T PROJECTS (As on 01.07.2026)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
1.	**Design and development of an AI-enabled Dust Suppression System for Opencast Mines** [Project Code- MT-181] **Implementing Agency:** Central Mechanical Engineering Research Institute (CMERI), Durgapur, Centre for Development of Advanced Computing (C-DAC), Thiruvananthapuram, Unyrshapa Corporation Lord Tech. (UCLT), Ranchi and ECL, Sanctoria **Objectives**: • Design and development of a dust suppression system on a vehicle along with a storage water tank; PTO or electrically operated pump; pipe-valve-nozzle network for spraying the water mixed with special additive in the form of jet or mist; mechanism for collection of waste water and re-use it • Development of AI-enabled control system for optimized operation of the water spraying system and sensor suite for collection of environmental data; AI/ML-based optimization algorithm for spraying of water mixed with special additives in the form of jet or mist; control system for operation of the complete system • Development of IoT based on-board and remote dashboard for dust-data visualization and monitoring; tracking of the most polluted sites and performance of the system against dust suppression	08.01.2024	07.07.2026	340.84 (CMERI, Durgapur – 139.71, CDAC, Thiruvananthapuram – 151.57, UCLT, Ranchi- 49.56 & ECL, Sanctoria - Nil

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
2.	**Development of Indigenous technology for extraction of critical minerals including Rare earth elements from overlying strata of Northeastern coalfields** [Project Code- CP- 53] **Implementing Agency:** Indian Institute of Technology, Guwahati, Panjab University, Chandigarh and NEC, Margherita **Objectives**: • Physical separation of critical metals: To develop enrichment technique of critical metals (REEs, Li Sc, Y, Rb, Ni, Sr, V) from non-coal strata by physical separations • Ion Exchange Resin separation of critical metals: To develop extraction technique of critical metals (REEs, Li Sc, Y, Rb, Ni, Sr, V) from non-coal strata and Acid mine drainage by Ion-Exchange Resin. • Leaching of critical metals. • Electro-winning extraction of critical metals	15.01.2024	14.12.2026	581.05 (IIT, Guwahati – 365.75, PU:215.30, NEC: Nil)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
3.	**Development of an Indigenous Ground Vibration Monitoring and Analysis System using IoT Enabled Devices and AI-ML Techniques** [Project Code- MT-184] **Implementing Agency:** CMPDI, Ranchi, IIT, Kharagpur, NCL, Singrauli & SCCL, Kothagudem **Objectives**: • Development of indigenous IoT enabled continuous monitoring system for measuring ground vibrations, peak particle velocity (PPV), peak particle accelerations (PPA) and damage frequency in an opencast mine. • A blasting dashboard will be developed for easy access/query of geometry of the bast design, information of explosives and the measured vibration data. • The dashboard will be designed to display the timing delays of each blast hole, as well as identify any delays below 8 milliseconds between successive blast holes. In the event of such a delay, the dashboard will indicate an error in the delay sequence and provide an alert to adjust the delay sequence for improved fragmentation and reduced ground vibrations.	01.03.2024	31.08.2026	Rs. 209.77 lakh (CMPDI: Rs. 61.36 lakh, IIT, KGP: Rs. 148.41 lakh, NCL, Singrauli : Nil, and SCCL, Kothagudem: Nil)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
	• The dashboard will include a feature that allows access to blast fragmentation analysis software, which is used for the purpose of analyzing the fragmentation of blasted material. • The compliance of vibration and air-overpressure intensity levels with the impact assessment on the nearby surface structures. • Effect of dominant frequency and peak intensitieson surface structures due to cyclical blast vibrations conducted at different elevations (benches). • Classification and comparison of blast and traffic-induced vibration signatures (such as PPV, frequency, PPA, and duration of vibration) using AI-ML techniques			

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
4.	**Payload monitoring of loading equipment (Hydraulic Excavators) displayed in operator's cabin** [Project Code- MT- 185] **Implementing Agency:** Gainwell Commosales Private Limited (GCPL), Kolkata, Eastern Coalfields Limited, Sanctoria **Objectives**: • Accurate weighing of the loading material • Optimize the loading performance such as cycle time, working hour Real-Time Data Reporting: Capture and transmit the KPIs in real-time displayed on the dashboard.	01.08.2024	31.01.2027	266.34 (GCPL – 266.34 ECL-Nil)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
5.	**Technology to Detect the Effect of Blasting on Propagation of Cracks in Structures** [Project Code-MT-186] **Implementing Agency:** Indian Institute of Technology (Banaras Hindu University), Varanasi, Techno Wave Solutions Private Limited (TWSPL), Ranchi, NCL, Singrauli **Objectives**: • Develop a universal blast damage prediction model for building crack prediction, incorporating all relevant input parameters through machine learning techniques. • Design a user-friendly map-enabled interface and an online adaptable system to facilitate the practical application of the model for building damage prediction.	01.08.2024	31.10.2026	116.79 lakh [(IIT (BHU) - 80.27 lakh, TWSPL, Ranchi – 36.52 lakh NCL, Singrauli - Nil)]

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
6.	**Coal Derived Value-Added Carbonaceous Nanomaterials for Energy Harvesting and Gas Detection-Based Sensor Applications** [Project Code- CU-62] **Implementing Agencies**: Central Mechanical Engineering Research Institute, Durgapur, Bharat Coking Coal Limited, Dhanbad **Objectives**: • Process technology establishment for porous activated carbon and CNT production derived from coal samples. • Use of porous carbon/CNT-based nanocomposites as mechanical energy harvesters and conversion into electrical energy in the form of sensors. • Use of porous carbon/CNT-based nanocomposites in developing CO gas sensors	01.08.2024	31.12.2026	Rs. 189.54 lakh (CMERI- 189.54 lakh BCCL, Dhanbad - Nil)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
7.	**AI-ML cloud-based real-time comprehensive autonomous system for monitoring & suppression of dust particles & hazardous gases in coal mines using UAV** [Project Code- EE- 54] **Implementing Agencies**: Jaypee Institute of Information Technology (JIIT), Noida, GarudaUAV Soft Solutions Private Limited (GSSPL), Noida, MCL, Sambalpur **Objectives**: • Minimizing human intervention: Implementing automation, Internet of Things (IoT), and remote-controlled systems to reduce the need for human involvement in hazardous or repetitive tasks. • Mitigating environmental impact: Focus on reducing air pollution and greenhouse gas emissions related to coal mining operations. • Promoting sustainable practices: Encourage the adoption of environmentally friendly techniques and technologies to minimize the negative impact of coal mining on the environment and surrounding communities.	01.08.2024	31.07.2026 (Termination to be deliberated in the next SSRC Meeting)	Rs. 146.90 lakh (JIIT, Noida - 146.90 lakh, GSSPL, Noida – Nil MCL, Sambalpur - Nil)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
8.	**Development of a novel NDT instrument using 3d Asymmentric Giant Magnetoimpedance Sensors for coal mines** [Project Code- MT-187] **Implementing Agencies**: Centre for Advanced Studies in Electronics Science and Technology (CASEST), School of Physics, University of Hyderabad, Hyderabad, Gandhi Institute of Technology and Management (GITAM), Visakhapatnam, SCCL, Kothagudem and M/s Ananth Technologies Pvt. Ltd., Hyderabad **Objectives**: • Simulate 3d sensor and eddy current analysis using Ansys Maxwell software • Develop a single 3d circular magnetic sensor • Use the eddy current method to detect and fabricate a complete electronic circuit	01.08.2024	31.11.2026	91.77 lakh (CASEST, University of Hyderabad - Rs. 91.77 lakh, GITAM, Visakhapatnam – Nil and SCCL, Kothagudem – Nil)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
9.	**Reusability assessment of Coal Tailing Extracts (CTE) for large-scale geotechnical fill applications** [Project code: CU-63] **Implementing Agency:** Indian Institute of Technology, Dharwad BCCL, Dhanbad **Objectives:** • The major objective of the study is to evaluate the suitability of coal tailing extracts (CTE) as backfill materials in geotechnical structures. In order to qualify as the engineered fill, CTE should satisfy two different criteria, namely, strength criteria and drainage criteria. Both the aforesaid criteria will be assessed using various laboratory tests. • To explore the possibilities of enhancing the strength properties of CTE by using the geogrid reinforcements. To perform various laboratory tests to compare and quantify the effect of geogrids. • To perform finite element simulation of the prototype Mechanical Stabilized Earth (MSE) wall with CTE backfill to assess the practical performance. • To investigate the possibilities of utilizing CTE as a soil conditioner.	01.12.2024	30.11.2026	Rs. 27.74 lakh (IIT, Dharwad - Rs. 27.74 lakh, University of Agricultural Sciences, Dharwad – Nil and BCCL, Dhanbad - Nil

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
10.	**Coal to Chemical Sensors: Conversion of low-grade coal to carbon dots-based smart sensing strips for on-site monitoring of heavy metals in water bodies around the coal fields** [Project code: CU-64] **Implementing Agency:** National Institute of Technology (NIT), Srinagar, National Institute of Technology (NIT), Jamshedpur, BCCL, Dhanbad **Objectives:** • Collection of low-grade coal from coal fields and optimization of experimental conditions for converting it into fluorescent carbon dots, ensuring desirable properties for heavy metal detection. • Surface functionalization of the prepared carbon dots to develop selective sensors. Characterization of their size, shape, surface morphology and stability. • To Confirm the sensor's efficiency by selective and sensitive detection of desired heavy metals (Al, Fe, Mn, Ni, Pb, and Cu) at the laboratory level. • Development of carbon dot-based sensing strips at field trails to assess their applicability for the detection of heavy metals in water samples of water bodies around the coal fields (Jharia and other coal fields of BCCL)	01.04.2025	31.03.2027	Rs. 53.21 lakh (NIT, Srinagar – Rs. 53.21 lakh, NIT, Jamshedpur – Nil and BCCL, Dhanbad – Nil) (Change of implementing agency to be deliberated in next TSC)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
11.	**Development of Value-Added Abrasion Resistant Ceramic Tiles and Insulation Refractories using Coal Mine Overburden** [Project code: MT-188] **Implementing Agency:** Government College of Engineering and Ceramic Technology, Kolkata, SCCL, Kothagudem and ECL, Sanctoria **Objectives:** • Development of value-added low cost high performance abrasion resistant ceramics tiles using coal mine overburden (OB) having application potentialities in different sections of iron and steel industry, cement industries, mining industries as well as in the thermal power plants. • The targeted specifications of the fabricated coal mine over burden (OB)based abrasion resistant ceramic tiles are as Apparent porosity ~0, Bulk density >3.0 g/cc, Hardness ~8, Modulus of Rupture (MOR) >400 kg/cm2 , Cold Compressive Strength (CCS) >6000 kg/cm2 , Acceptable chemical resistant properties, Abrasion loss, 60mm3. • Development of low cost value-added high performance insulation refractories using coal mine overburden clay suitable for application in kiln, furnaces, incineration chimney etc.	01.04.2025	31.03.2027	Rs. 111.67 lakh (Govt. College of Engineering and Ceramic Technology (GCECT), Kolkata - Rs. 111.67 lakh, SCCL, Kothagudem –Nil and ECL, Sanctoria - Nil)

	• The targeted specifications of the fabricated coal mine over burden clay-based insulation refractories are as Apparent porosity >60 %, Bulk density 20 kg/cm2 , Thermal conductivity < 1.0 Wm-1K -1 etc. • Development of value-added low cost high performance abrasion resistant ceramics tiles using Clay of SCCL which is being generated during processing of OB to Sand production plant of SCCL, Kothagudem having application potentialities in different sections of iron and steel industry, cement industries, mining industries as well as in the thermal power plants • The targeted specifications of the fabricated Clay of SCCL based abrasion resistant ceramic tiles are as Apparent porosity ~0, Bulk density >3.0 g/cc, Hardness ~8, Modulus of Rupture (MOR) >350 kg/cm2 , Cold Compressive Strength (CCS) >5000 kg/cm2 , Acceptable chemical resistant properties, Abrasion loss , 60mm3.			

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
12.	**CO_2 Methanation over Green Bifunctional Metallic Catalyst to maximize the CH_4 production with stability** [Project code: CE-37] **Implementing Agency:** CIMFR Dhanbad, SRM, Noida **Objectives:** a. SRM, Noida • Development of bimetallic bifunctional mixed oxide catalysts for CO_2 methanation. • Effect of metallic nano particles distribution over support and rich surface oxygen over high surface area catalyst. • Effect of particle size on deactivation of catalyst with long time on stream. b. CSIR-CIMFR • Performance evaluation of the catalysts towards CO_2 Methanation and process parameter optimization • Performance evaluation of the potential catalysts in higher scale • Studies on regeneration and reuse of the catalyst	01.07.2025	30.06.2027	Rs. 90.27 lakh (CIMFR Dhanbad- Rs. 36.48 lakh and SRM, Noida -Rs. 53.79 lakh)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
13.	**An AI Enabled Platform for Diagnosis, Prognosis and Health Management of Mining Electrical Systems: A Case Study on the Drag Line.** [Project code: MT-189] **Implementing Agency:** IIT Kharagpur & NCL Singrauli. **Objectives:** Modelling: Conducting a comprehensive study of the system and creating a detailed model for the system on the basis of electromagnetics, thermal, strain-field and statistical models to generate data. Hardware Design: Design and implementation of the sensors and the communication network and deploying a signal processing strategy to gather and analyze data from the system. • Software Design: Developing AI and machine learning algorithms for event detection, diagnosis, prognosis and RUL prediction of faults"	15.10.2025	14.10.2027	Rs. 340.38 lakh (IIT Kharagpur- Rs. 340.38 lakh & NCL, Singrauli-Nil)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
14.	**Design and development of low-cost indigenous imaging RADAR system for automatic slope monitoring and failure prediction in opencast coal mines** [Project code: MT-190] **Implementing Agency:** NIT, Rourkela, CMPDI, Ranchi, IIT Kharagpur, Vellore Institute of Technology (VIT), MCL Sambalpur **Objectives:** • Design and development of low-cost RADAR system for land deformation data acquisition. • Development of MIMO-SAR imaging system for pixel level deformation measurement and visualization. • Development of long-short-term-memory (LSTM)-based deep learning model for early prediction of deformation level and slope failure.	15.10.2025	14.04.2028	Rs. 361.46 lakh (NIT, Rourkela- Rs. 299.21 lakh, IIT, Kharagpur- Rs. 22.13 lakh, CMPDI, Ranchi- Rs. 40.12 lakh, VIT, Chennai – Nil & MCL, Sambalpur- Nil)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
15.	**Indigenous Development of Hand-held Multigas Detector for underground coal mining for real time monitoring** [Project code: MT-192] **Implementing Agency:** NaCCER, IIT (ISM), Dhanbad, Symbica Pvt. Ltd., Guwahati, BCCL, Dhanbad, and Uniphos Envirotronic Pvt Ltd, Valsad **Objectives:** • To develop an ultra-low-power, intrinsically safe multigas detector capable of accurately monitoring CH4, CO, CO2, H2S, and O2 levels in underground coal mines to ensure real-time alert mechanisms (visual, audible, and vibrator) for gas threshold breaches, enhancing miner safety and situational awareness.	26.03.2026	25.03.2028	Rs. 339.85 lakh (NaCCER- Rs. 38.58 lakh, IIT (ISM), Dhanbad - Rs. 44.63 lakh, Symbica Pvt. Ltd., Guwahati- Rs. 90.38 lakh, BCCL, Dhanbad - NIL, Uniphos Envirotronic Pvt. Ltd, Valsad - Rs. 166.26 lakh)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
16.	**Indigenous Development of Intelligent Monitoring and Control System for Ventilation and Fire Detection in Underground Coal Mines.** [Project code: MT-191] **Implementing Agency:** Indian Institute of Technology, Ropar, National Centre for Coal and Energy Research (NaCCER), IIT, Kharagpur, IIT, Delhi, Ingenisys Integrations LLP, Kolkata and ECL, Sanctoria . **Objectives:** • To develop Real-Time Environmental Monitoring and fire detection system by Deployment of IoT sensors in underground coal mine to monitor key parameters such as temperature, humidity, methane levels, carbon monoxide levels, and dust concentration, in compliance with DGMS statute. He added that this would be done by Calibration of infrared gas detection camera and the development of algorithms to detect spontaneous heating around coal pillars, Monitoring of index gas CO, CH4 and temperature using hand held infrared gas detection camera around coal pillars, profiling of gas indices like Grahams ratio CO/O2 around coal pillars to understand the heating and different states of mine fire and development of machine learning algorithms to analyze collected data, detect anomalies, predict hazardous conditions, and optimize ventilation operation.	26.03.2026	25.03.2028	Rs. 398.13 lakh (IIT, Ropar- Rs. 172.91 lakh, IIT, Kharagpur- Rs. 36.91 lakh, IIT, Delhi- Rs. 35.18 lakh, Ingenisys Integrations LLP, Kolkata- Rs. 111.84 lakh, NaCCER- Rs. 41.30 lakh, ECL- Nil)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
17.	**Remote Demonstration of QREC-MRT for Enhancing Calorific Value & Reducing Moisture in Indian RoM Coal.** [Project code: CP-54] **Implementing Agency:** CMP dept., CMPDI, Ranchi, Tree of Life Biotechnology (TOL Biotech, USA), NaCCER and MCL Sambhalpur . **Objectives:** • To achieve a statistically significant increase in GCV & reduction in inherent moisture on treated piles versus blind controls under identical conditions. It aims to validate remote-only feasibility - no on-site technology hardware or proponent personnel, using lat-long targeting, pre-treatment imagery, & daily accredited lab testing and produce a deployment SOP for coal yards, including sampling, data integrity, & safety, suitable for scale-up.	01.04.2026	31.07.2026	Rs. 35.02 lakh (TOL Biotech USA- NIL, CMP Division, CMPDI- Rs. 25.37 lakh, NaCCER- Rs. 9.65 lakh and MCL, Sambhalpur- NIL)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
18.	**Direct Air Capture (DAC) of GHGs.** [Project code: CE-38] **Implementing Agency:** CED, CMPDI, Ranchi, NaCCER, UrjanovaC Pvt Ltd, Mumbai and ECL, Sanctoria. **Objectives:** • To expand the ambient air carbon capture prototype to a daily capacity of 10 kg CO2, showcasing its performance in polluted environments and proving its scalability for gigaton-level deployment and develop and optimise the conversion of captured CO2 into high-value chemicals like calcium carbonate, demonstrating a sustainable waste-to-value model aligned with circular economy goals.	26.03.2026	25.03.2027	Rs. 531.00 lakh (UrjanovaC, Mumbai- Rs. 470.30 lakh, NaCCER- Rs. 24.20 lakh, CED, CMPDI, Ranchi- Rs. 36.50 lakh and ECL, Sanctoria- NIL)

Sl. No.	Name of the project, Implementing Agency(s) & Objective(s)	Date of Start	Date of Completion	Approved Outlay (Rs.in lakh)
1	*2*	*3*	*4*	*5*
19.	**Near-Time Flash Flood Forecasting in Mining-Affected Catchments: Integrating Hydrological Models, Altered Topography & Weather Data.** [Project code: EE-55] **Implementing Agency:** ISM- Dhanbad, IIT- Bombay, Mumbai, Regional Institute - III, Central Mine Planning and Design Institute (CMPDI), Ranchi, Central Coalfields Limited (CCL) and National Centre for Coal and Energy Research (NaCCER) **Objectives:** • To improve the preparedness of emergency services to flash floods specifically focusing on the mining region of North Karanpura coalfield, with the specific goal of near time forecasting the flash flood along with the flood inundation by development of a comprehensive hydrological model for flash flood forecasting, high-resolution and highly accurate field data is essential. The key inputs for the model include high-resolution topographic data (DEM), land use/land cover (LULC), soil characteristics, rainfall data, and streamflow data for model calibration and validation.	01.04.2026	30.09.2028	Rs. 323.58 lakh (NaCCER- Rs. 40.38 lakh, IIT (ISM)- Dhanbad- Rs. 229.17 lakh, RI-3, CMPDI- Rs. 54.03 lakh, IIT Bombay & CCL- NIL)