

**List of completed R&D projects ; since inception of R&D scheme of CIL i.e. 1996 till 20th Sep 25**

Sl.No.	Title of the Project	Implementing	Project Code	Approved Outlay (Rs. in lakh)	Date of start	Date of completion
1	Liquidation of standing pillars at W-4 Panel in Jhanjra ECL	ECL	CIL/R&D/1/01/97	10.90	Feb. 1996	Aug. 1996
2	Resource survey characterisation and blending studies of low volatile coking coal for their use in steel industry	CMPDIL	CIL/R&D/1/03/97	457.00	Jul. 1997	Sep. 2002
3	Depillaring with cable bolting using LHD at Madhusudanpur Colliery, ECL	ECL	CIL/R&D/1/06/98	40.75	Oct. 1997	Jan. 2001
4	Development of computerised continuous mining equipment condition monitoring system for maximum machine available time of working machines in mines	SECL/CMRI	CIL/R&D/1/07/99	29.00	Jul. 1999	Dec. 2002
5	Strata control, roof support design for development and depillaring operations at andsProject, Kanhan Area WCL with detailed geotechnical study including measurement of in-situ stress and its effect	WCL/CMPDI	CIL/R&D/1/08/99	249.90	Aug. 1999	Dec. 2002
6	Geomining statistical database of South Karapura Coalfields, CCL	CCL	CIL/R&D/1/09/99	215.93	Aug. 1999	Mar. 2004
7	Establishment of Longwall starta control services	CMPDI	CIL/R&D/1/10/01	62.50	Jun. 2001	Mar. 2004
8	Introduction of shortwall technology for extraction of standing pillars with power roof support in pillars of Passang seam of Balmampur underground project.	SECL	CIL/R&D/1/11/01	3513.05	Jun. 2001	Dec. 2006
9	Flyash hydraulic stowing at Jarangdi colliery, Kathara area, CCL near Bokaro Thermal Power Station	CCL	CIL/R&D/1/13/02	20.37	Feb. 2002	Jul. 2002
10	Characterisation of cleats in coal from Raniganj and Jharia coalfield	CMPDI	CIL/R&D/1/14/02	240.35	Jun. 2002	Mar. 2006
11	Capacity building for creation of an e-information centre on coal & lignite	CMPDI	CIL/R&D/1/15/04	82.50	Feb. 2004	Aug. 2005
12	Interactive Geo-Mining and Hydro-Geological Models for Augmentation of coking coal and ground water resources at West Bokaro Coalfields	CCL	CIL/R&D/1/17/04	239.49	Feb. 2005	Aug. 2007
13	Development of accurate and rapid method of correlation survey of UG Mines	CMPDIL	CIL/R&D/1/20/04	181.85	Feb. 2005	Oct. 2007
14	Application of chemical treatment & centrifugation in environment friendly disposal of coal washery tailings / effluent slurry	CMPDI/CCL	CIL/R&D/2/01/99	798.41 R&D-289.52	Jul. 1999	Aug. 2004
15	Restoration of bio-diversity of OB dump and backfilled areas using integrated bio-technology	WCL / NEERI	CIL/R&D/4/01/97	21.43	Aug. 1997	Dec. 2001
16	Optimisation of ambient air quality monitoring network and application of mathematical models of air pollution control at North Karanpura Coalfields	CMPDI / BIT	CIL/R&D/4/02/97	29.94	Jul. 1997	Mar. 2002
17	Utilisation of OB materials through modification of physico-mechanical properties for the construction of haul road.	BIT/CMPDI	CIL/R&D/4/03/98	41.87	Apr. 1998	Mar. 2004
18	Determination of the efficacy of soil sediment etc for prevention of spontaneous heating in coal stock pile at Samleshwari OCP, MCL	MCL	CIL/R&D/4/04/99	4.28	Jul. 1999	Oct. 2001
19	Assessment of qualitative impacts of dust on the agriculture crops around Padampur OCP, WCL	WCL/NEERI	CIL/R&D/4/05/02	12.32		
20	Assessment of assimilative capacity and resource apportionment analysis of air pollution in ambient air in Wardha Valley Coalfields	WCL	CIL/R&D/4/06/02	13.51	Jul. 2002	Jun. 2004
21	Resource Assessment and characterisation study of non-coking coals for sponge iron industries	CMPDIL	CIL/R&D/1/18/04	295.00	Feb. 2005	Sep. 2008
22	Application of high precision satellite imaging and DGPS Technology for online wide area subsidence monitoring study in Raniganj area, ECL	ECL/ IIT KGP	CIL/R&D/1/19/04	242.42	Feb. 2005	Jan. 2008
23	Technical study for old & active OB dumps of open cast mines in WCL to determine stability characteristics and dimensional parameters	IIT Kgp.	CIL/R&D/1/21/05	359.65	Nov. 2005	Oct. 2010
24	Development of methodology for rapid volumetric analysis of excavated insitu overburden integrating high resolution satellite, air borne laser scanner data supported with ETS through digital photogrammetric technique	CMPDIL	CIL/R&D/1/24/06	388.00	Aug. 2006	Apr. 2009
25	Exploration and determination of coal fire hot spots to prepare the strategy to put off the fire in Nimcha & Samdih mines	ECL / Ms DMT-Avantika, Hyderabad	CIL/R&D/1/29/08	444.23	Feb. 2009	Apr. 2009
26	Development of CIL/CMPDI's capacity for pursuing exploration of CBM in deep seated coal deposits of Jharia/Raniganj coalfields	CMPDI & ONGC	CIL/R&D/1/16/04	1991.91	Feb. 2004	Jan. 2011
27	Inventory and monitoring of underground and surface coal mine fire for modelling fire dynamics and rate of fire movements, Jharia Coalfields, Jharkhand using satellite thermal remote sensing data	Presidency College, Kolkata & BCCL	CIL/R&D/1/23/06	138.4	Aug. 2006	Jun. 2010
28	Investigation on augmentation of life of dump truck tyres through the improvement of tyre retreading compound and development of an optimum road maintenance management system.	IIT Kgp/ECL/NCL	CIL/R&D/1/22/05	148.69	Nov. 2005	May. 2009
29	Indigenous development of PLC based integrated control and monitoring system for conveyors and other equipment of underground	RDCIS(SAIL) & CMPDI	CIL/R&D/1/26/06	182.00 RDCIS-151.50 CMPDI-31.50	Aug. 2006	Feb. 2011
30	Delineation of workings below railway lines near Ratibati colliery, stability analysis by numerical modeling and possible remedial measures	CIMFR & ECL	CIL/R&D/1/31/08	20.90518		
31	Development of immediate roof fall prediction system in U/G mines using wireless network	IIT, KGP and ECL	CIL/R&D/1/27/08	216.98	May. 2008	Feb. 2011
32	An investigation on Adsorption Characteristics of Indian coal and to ascertain recoverability of CBM from deep	CMPDI & IIT, KGP	CIL/R&D/1/40/10	CMPDI- 8.05 IIT, KGP- 90.07	Jun. 2010	Dec. 2011
33	Establishment of co-relation between physico-mechanical properties, chemical properties and bonding strength of cement & resin capsule used in roof bolting.	UMD Deptt, CMPD	CIL/R&D/1/37/10	126.98	Feb. 2010	Jan. 2012
34	GPS based production reporting system in OCP	Systems Department CIL (HQ), Kolkata/ BCCL	CIL/R&D/1/33/09	54.00	Sep. 2009	Jun. 2012
35	Development of CMPDIL capacity for delineation of viable coal mine methane (CMM)/ Abandoned mine methane (AMM) blocks in the existing and would be mining areas having partly de-stressed coal in virgin coal seams	CMPDI, Ranchi	CIL/R&D/1/28/08	522.00	Jun. 2008	Mar. 2012
36	Generation/analysis of coalfield wise database of physico-mechanical characteristics of rock/coal and representative numerical models for appropriate solution to strata control problems	UMD Deptt, CMPDI	CIL/R&D/1/36/10	241.8	Feb. 2010	Jan. 2013
37	Development of guidelines for safe dragline dump profile under varying geo-engineering condition in opencast coal mines of Coal India	BIT, Mesra and CMPDI, Ranchi	CIL/R&D/1/38/10	75.60 BIT, Mesra-59.00 CMPDI-16.60	Feb. 2010	Jan. 2013

38	Eliminating the possibility of ignition of gas and incidences of explosion in underground coal mines due to electrical faults by application of innovative technology of fault diversion.	Safety & Rescue Division (S&R), CIL, Kolkata & Society for Mining Research Sustainable Development and Environment , Kolkata	CIL/R&D/1/44/10	11.022	Dec. 2010	Feb. 2012
39	Development of Indigenous tool for carrying out Random Sampling & Testing of Explosives and Accessories used in mines of Coal India Limited.	Blasting Cell, CMPDI(HQ), Ranchi and IIT, KGP	R&D/1/50/2012	428.06 CMPDI - 130.00, IIT, KGP-298.06	Feb. 2012	Jan. 2013
40	Analysis of in-situ stress for CBM exploration in Jharia Coalfield	CMPDI & ISM , Dhanbad	CIL/R&D/1/32/09	168.59700 ISM- 126.00 CMPDI-42.597	Mar. 2009	Feb. 2013
41	Effective utilization of low rank and low volatile high rank Indian coking coals for Blast Furnace (BF) coke making	CMPDI, Ranchi and (SAIL), Ranchi	CIL/R&D/3/1/09	265.00 CMPDI-245.00 RDCIS - 20.00	Sep. 2009	Feb. 2011
42	Assessment of performance of explosives/ blast results based on explosive energy utilisation	Blasting Cell, CMPDIL & NITK, Surathkal	CIL/R&D/1/41/10	236.35 CMPDI- 107.44 NITK- 128.91	Jun. 2010	Mar. 2014
43	Investigations of Bolt Behaviour in Development and Depillaring Panels under Blast Induced Dynamic Loading.	CMPDI, Ranchi , IIT, Kharagpur, and RDCIS, Ranchi	CIL/R&D/1/42/10	491.08 CMPDI-198.50 IIT KGP-229.54 RDCIS(SAIL)-63.04	Dec. 2010	Dec. 2013
44	Feasibility study of High Angle Conveying System (HAC) in Open Cast Coal Mines by Computer Modeling and Simulation.	Open cast Division CMPDI, Ranchi and E&M Department , CMPDI , Ranchi	CIL/R&D/1/43/10	211.5	Dec. 2010	Sep. 2013
45	Investigation on augmentation of life of dump truck tyres through the improvement of the tyre retreading compound and development of an optimum road maintenance management system-Phase-II	IIT, Kharagpur and BCCL, Dhanbad	CIL/R&D/1/45/10	64.37	Mar. 2011	Dec. 2013
46	Development of a notch cutting machine to facilitate construction of stoppings in underground coal mines	Safety and Rescue (S&R)Division, CIL, Kolkata & Society for Mining Research Sustainable Development and Environment , Kolkata	CIL/R&D/1/47/11	11.15	Oct. 2011	Feb. 2013
47	Studies on determination of free silica( $\alpha$ -quartz) content in respirable air borne dust in coal mines and preparation of data bank of free silica and other minerals present in dust as well as in coal	CIMFR, Dhanbad and S&R Deptt., CIL, Kolkata	CIL/R&D/1/39/10	353.82 CIMFR- 353.82 S&R(CIL)- Nil	Feb. 2010	Jan. 2015
48	Assessment of prospect of shale gas in Gondwana basin with special reference to CIL areas	CBM(Cell), CMPDI(HQ), Ranchi and Advance Resources International, Washington, DC, USA	CIL/R&D/1/46/11	512.20 For CMPDI- 424.90 For ARI, USA- 87.30	Apr. 2011	Dec. 2014
49	Indigenous development of Integrated Dumper Collision Avoidance system for opencast mines	Mine Electronics Deptt, CMPDI(HQ), Ranchi and BEL, Panchkula, Haryana	CIL/ R&D/1/51/2012	354.51 CMPDI - 60.00, BEL, Panchkula-294.51	Feb. 2012	Jul. 2014
50	Studies on shrinkage swelling characteristics of some Indian coals to ascertain recoverability of CBM from deep seated coal and shale resources.	CBM Cell, CMPDI, Ranchi and IIT, Kharagpur	CIL/ R&D/1/53/2013	182.60 CBM, Cell, CMPDI- 55.70 IIT, Kharagpur- 126.90	Mar. 2013	Feb. 2015
51	Research and development on efficient energy management pilot study and action plan	Indian Institute of Social Welfare and Business Management (IISWBM), Kolkata and DFIC Management Consultants Pvt. Ltd., Kolkata	CIL/ R&D/1/55/2013	66.19 IISWBM-21.94 DFIC-44.25	Mar. 2013	May. 2014
52	Construction of quick setting stopping in case of fire in underground mines using expansion foam agent	S&R Division CIL (HQ), Kolkata, NIT, Rourkela and M/s Trans Marketing, Kolkata.	CIL/R&D/1/48/11	51.34		
53	Green House Gas Recovery from Coal Mines and Coal Beds for Conversion to Energy (GHG2E)	CBM Cell, CMPDI(HQ), Ranchi and European Union Research Commission, London	CIL/ R&D/1/49/2012	165.30 R&D-80.00 EU Cont.-85.30	Feb. 2012	Jul. 2015
54	Development of Dynamic GIS enabled Forward Cost Modeling (FCM) of land reclamation , control and monitoring of acid mine drainage problems in the context of continuation and expansion of the coal mining in Assam – an ICT based Environment Management Approach.	Birla Institute of Technology, Mesra, Kolkata Campus, Southern Conclave, Kolkata.	CIL/R&D/4/07/2013	95.68	Oct. 2011	Feb. 2013
55	Development of Rubber Compound and Repair Techniques for Trailing Cables of Underground Mining Machines.	IIT,Kharagpur and ECL	CIL/ R&D/1/54/2013	204.07	Mar. 2013	Feb. 2016
56	Design, Develop and Demonstrate a Micro-Grid system for optimization and control of Multiple source of power supply.	E&M Department, CMPDIL, Ranchi and Gujarat Energy Research and Management Institute (GERMI), Gandhinagar, Gujarat	CIL/R&D/1/56/2013	351.30 For CMPDI-33.80 GERMI, Gujarat-317.50	Aug. 2013	Aug. 2016
57	Development of guidelines to predict distance between toe of the Shovel-Dumper dump and that of Dragline dump with consideration of safety and economical design of both Shovel-Dumper dump and Dragline dump.	Civil Engineering Deptt. , BIT, Mesra, Ranchi	CIL/R&D/1/57/2013	26.58	Sep. 2013	Aug. 2016
58	To find a methodology of safe liquidation in thick seams of Raniganj Coalfields: Design & Development & show-casing demonstrative trials at Khottadih colliery, ECL.	CIMFR, Dhanbad & ECL	CIL/ R&D/1/58/2014	41.066 13.856 CIMFR- ECL- 27.21	Jul. 2014	Jun. 2016
59	Studies of techno-commercial efficacy of ANFO with low density porous prilled Ammonium Nitrate for blasting overburden in Coal mines	CMPDI, Ranchi / DFPCL, Pune and WCL, Nagpur	CIL/R&D/1/34/09	206.8	Sep. 2009	31st March 2020
60	An integrated geo-physical approach for tectonic study in main coal basin of Singrauli coalfield using 3D inverse modeling of Gravity, Magnetic and AMT data.Implementing agencies.	IIT-ISM, Dhanbad and CMPD, Ranchi	CIL/ R&D/1/59/2015	364.50 IIT-ISM, Dhanbad-317.00 CMPDI-47.5	Mar. 2015	Dec. 2019
61	Dry Beneficiation of High Ash Indian Thermal Coal.	National Metallurgical Laboratory (NML), Jamshedpur; CMPDI, Ranchi and MCL, Sambalpur	CIL/R&D/02/08/2017.	216.77 NML -197.87 CMPDI-18.90	Sep. 2017	Nov.2019
62	Seismic data processing, interpretation and identification of thin coal seams using Inverse Continuous Wavelet Transform Deconvolution (ICWT-Decon) for resource estimation.	Gujarat Energy Research and Management Institute(GERMI), Gandhi Nagar and CMPDI, Ranchi	CIL/R&D/01/69/2018	249.02 GERMI: 197.18 CMPDI-51.8	May-18	Dec. 2019
63	Optical fiber based solar illumination of pit bottom and underground mine roadways and working face	IIT, Kharagpur and ECL	CIL/R&D/1/66/2017	155.53	Aug. 2017	Jan. 2021

64	Indigenous Development of Through The Earth (TTE) Two- Way Voice Communication System for Underground Mines.	Indian Institute of Technology(IIT), Bombay and CMPDIL, Ranchi	CIL/R&D/01/62/2016	129.56 IIT, Bombay- 111.56 CMPDI-18.00	Oct. 2016	Oct. 2021
65	Requirement of air in mine for Mass Production Technology.	UMD, CMPDI(HQ), Ranchi	CIL/R&D/01/63/2016	491.27	Nov. 2016	Sept. 2021
66	Design of cost effective process flowsheet for improved washing efficiency of Indian Coking and Non-coking coals.	IIT-ISM, Dhanbad and CMP Division, CMPDI (HQ), Ranchi , Washery Division,BCCL, Dhanbad.	CIL/R&D/02/07/2017	238.65 IIT-ISM-223.65 CMPDI-15.00	Apr. 2017	Oct. 2021
67	Development of guidelines for design of all tiers of shovel-dumper dump above dragline dump, with delineation of phreatic surface, within dragline dump, throughout the year and validation study on two dragline mines of Coal India Limited (CIL)	BIT, Mesra S&R Division, CIL(HQ), Kolkata	CIL/R&D/01/68/2018	75.3 BIT: 75.30	May. 2018	Jan. 2022
68	Restoration of Orchid flora of Makum Coalfield areas of Digboi Forest Division.	Rain Forest Research Institute (RFRI), Jorhat & N E C, Margherita	CIL/R&D/04/09/2018	Rs.45.14 lakh RFRI, Jorhat - Rs.45.14 lakh .NEC, Margherita - Nil	Jan. 2019	Jan. 2022
69	Development of Guidelines for Increasing the Height of Overburden Dumps at Opencast Coal Mines in India.	Environment Division,CMPDI(HQ), Ranchi and IIT, Delhi.	CIL/R&D/01/64/2017	428.08 CMPDI-378.45 IIT, Delhi-49.63	Jun. 2017	Jan. 2022
70	Bench Scale Study on reducing ash content (mineral matter) from Washery Grade Coking coal and high ash non-coking coal through oil agglomeration.	NML, Jamshedpur CED Deptt., CMPDI	CIL/R&D/02/09/2020	53.62 NML - 36.16 CMPDI- 17.46	Oct. 2020	Jan. 2022
71	Multiple layer trial blasting for better recovery with less diluted coal.	IIT-ISM, Dhanbad, Blasting Division, CMPDI (HQ), Ranchi	CIL/R&D/1/61/2016	496.24 IIT-ISM, Dhanbad: 431.24 CMPDI: 65.00	Sept. 2016	Jan. 2021
72	Development of a methodology for regional air quality monitoring in coalfield area using satellite data and ground observations.	Geomatics Department, CMPDI (HQ), Ranchi National Remote Sensing Centre (NRSC), ISRO, Hyderabad.	CIL/R&D/04/08/2017	709.82 NRSC, Hyderabad: 589.87 CMPDI: 119.95	Mar. 2017	Jan. 2023
73	To develop an Artificial Intelligence (AI) based machine learning solutions to enable prediction of occurrence of fire in Open cast mines extracting locked coal pillars with safety.	IIT-ISM, Dhanbad	CIL/R&D/05/01/2021	25.99 IIT-ISM, Dhanbad - 25.99	Feb. 2021	Feb. 2023
74	Development of an indigenous optical fiber based instrument for measuring in-the-hole Velocity of Detonation [VOD] and analyze the performance of explosive in field condition	Innovation Cell, Mine Electronics Division, Blasting Division, CMPDI, Ranchi :	CIL/R&D/01/72/2021	495.97	Feb. 2021	Aug.. 2023
75	Development and adoption of Real-Time Prognosis System (RTPS) for cost-effective safe operation of mobile machinery: show-cased demonstration of dumper fleet	IIIT, Kharagpur , CIMFR, Dhanbad, Lulea Technological University (LTU), Sweden and ECL, Sanctoria	CIL/R&D/01/71/2019	440.30	Dec 2019	Mar. 2023
76	Effect of Blasting on Opencast Mine Dump and Development of Relationship between Blast Induced Vibration and Dump Design.	Blasting Division, CMPDI (HQ), Ranchi, BIT, Mesra and IIT-ISM, Dhanbad :	CIL/R&D/01/73/2021	344.22	Feb. 2021	Aug.. 2023
77	Design of Protective Barrier Pillar against Large Water Head in Underground Coal Mines	IIIT-BHU, Varanasi & ECL, Sanctoria	CIL/R&D/01/75/2021	87.47	May 2021	Oct.. 2023
78	Appraisal of Gondwana Sediments (Coal, Clay, Shale, Sandstone) for Trace Elements & REE concentration in the Singrauli coalfield	Exploration Division, CMPDI (HQ), Ranchi & NCL :	CIL/R&D/04/13/2021	210.81	Oct. 2021	Dec.. 2023
79	Design and deployment of Ventilation Fan Wind Power Recovery System as an alternate source of Electrical Energy in Underground Coal Mines.	IIT-ISM, Dhanbad & ECL, Sanctoria	: CIL/R&D/04 /12/ 2021	66.7	Feb. 2021	Feb. 2024
80	Study on performance improvement of coking coal washery under coal india Ltd through modelling and simulation analysis	NML, Jamshedpur,CMP, Deptt. CMPDI (HQ), Ranchi & BCCL, Dhanbad	CIL/R&D/02/10/2021	264.04 NML, Jamshedpur – 169.54 CMPDI, Ranchi - 94.50 BCCL, Dhanbad - Nil	Oct,2021	Dec,2023
81	Effective utilization of middlings and fines of coking coal washery for recovery of carbon values	NML, Jamshedpur ;CMP, Deptt. CMPDI (HQ), Ranchi & BCCL, Dhanbad	CIL/R&D/02/11/2021	Rs.141.02 NML, Jamshedpur – Rs.126.52 CMPDI, Ranchi - Rs.14.50 lakh BCCL, Dhanbad - Nil	Oct,2021	Feb,2024
82	Design and development of knee and spinal smart protective devices for improving the health and safety of miners	IIT-ISM, Dhanbad;BCCL, Dhanbad	CIL/R&D/01/76/2021	Rs. 72.06 lakhs	Nov,2021	March,24
83	Prediction of particulate matter and gaseous pollutants concentration through Artificial Neural Network [ANN], Probabilistic Neural Network [PNN] and Classification and Regression Tree [CART] models and comparison with CALPUF and AERMOD in Singrauli coal mines	BIT, Mesra ;Environment Division, CMPDI(HQ), Ranchi	CIL/R&D/5/02/2021	Rs. 85.25 lakh BIT, Mesra - Rs. 61.14 lakh CMPDI, Ranchi- Rs. 24.11 lakh	May,2021	April,2024
84	Separation and recovery of fine particles from coal washery effluents using bio-coagulant	IIT-ISM, Dhanbad; BCCL, Dhanbad	CIL/R&D/02/13/2022	Rs. 54.87 lakh	March,22	June,24
85	Design and Development of Drop Test Facility for Pit Bottom Buffer, used in Underground Coal Mines	CMERI, Durgapur;ECL, Sanctoria	CIL/R&D/01/74/2021	Rs. 248.61 lakh CMERI, Durgapur - Rs.248.61 lakh ECL, Sanctoria – NIL	Feb,2021	Nov,2023
86	Highwall Mining Feasibility Assessment and Layout Design.	Underground Mining Division (UMD), CMPDI (HQ), Ranchi;Commonwealth Scientific and Industrial Research	CIL/R&D/01/78/2022	493.53 76.06 CMPDI, Ranchi- CSIRO-417.47	Jul-22	Jan-25
87	Forensic investigation related to Geo-technical aspects in order to stabilize the foundation soil of expansive nature and implement suitable ground improvement technology to sustain and enhance the optimum overburden dump height	Civil Engineering Division, CMPDI(HQ) Ranchi and RI-IV, CMPDI, Nagpur;VNIT, Nagpur and WCL, Nagpur	CIL/R&D/04/11/2021	Rs.492.26 lakh RI-IV, CMPDI, Nagpur – Rs.359.33 lakh VNIT, Nagpur - Rs.132.93 lakh	Feb,21	Jan-25

88	Development of Virtual Reality Mine Simulator (VRMS) for improving safety and productivity in coal mines.	IIT-ISM, Dhanbad & CMPDI (HQ), Ranchi.	CIL/R&D/01/67/2017	1410.4 lakh	2017	Apr-24
89	Real-time energy efficient cyber-physical intelligent system for mine slope health monitoring.	IIT-ISM, Dhanbad	CIL/R&D/01/77/2022	Rs.273.75 lakh IIT-ISM, Dhanbad - Rs.248.97 lakh CMPDI, Ranchi- Rs.24.78 Lakh	Feb-22	Jan-25
90	Indigenous Development of Monolithic Perov-skite Module Manufacturing by Printing	IIT Bombay	CIL/R&D/04/15/2021	Rs.1317.62 lakh IIT – Bombay– Rs.1285.97 lakh CMPDI, Ranchi-Rs. 31.65 lakh	Oct-21	Jun-25
91	A Pilot Project on Underground Coal Gasification (UCG) to establish the technology in Indian geo-mining conditions-(Phase-1)	Clean Energy Deptt., CMPDI(HQ), Ranchi, ECL, Sanctoria	CIL/R&D/04/20/2023	Rs.2466.37 lakh (EETI, Canada; Rs.2046.24 lakh; CMPDI- Rs.116.23 lakh; ECL, Sanctoria-Rs.24.78 lakh;	Mar-24	May-25
92	Development of guidelines for delineation of water stressed area and designing of environ-mental friendly water storage structure for meeting the water needs in mining areas.	IIT-ISM, Dhanbad	CIL/R&D/04/16/2022	Rs.107.84 lakh IIT-ISM, Dhanbad - Rs.107.84 lakh	Feb-22	Jan-25
93	Up gradation of high ash Indian coal through physical and chemical beneficiation.	IIT-Kharagpur	CIL/R&D/02/12/2021	Rs.144.30 lakh IIT-KGP – Rs.121.89 lakh CMPDI, Ranchi- Rs.22.41lakh	Oct-21	Dec-24
94	Development of guideline for prevention & mitigation of explosion hazard by risk assess-ment and determination of explosibility of Indian coal incorporating risk based mine emer-gency evacuation and re-entry protocol.	CIMFR, Dhanbad and IIT-ISM, Dhanbad	CIL/R&D/01/60/2016	Rs.2413.21 lakh IIT-ISM, Dhanbad: Rs.1617.07 lakh CIMFR, Dhanbad: Rs.796.14 lakh	Apr-16	Apr-24