

Performance Targets Achieved in 2020 - 2021

	Objectives	Planned	Achieved
1.	Total External Cash Flow (ECF)*	32 Crores	22.06 Crores
A.	Grant-in-Aid		1.99 Crores
2.	Industrial ECF (a part of ECF)	24 Crores	20.08 Crores
	a. Foreign Sponsored		0.1 Crore
	b. Public Sector Units (PSUs)		14.83 Crores
	c. Private Industries including Testing		5.15 Crores
3.	Customer Satisfaction Index	4.8	4.8
4.	SCI Publications (no.)	130	124
5.	Patents (no.)	25	20
6.	Copyrights (no.)	5	1
7.	Technologies Developed# (no.)	5	8
8.	Technologies Transferred* (no.)	5	3

*Cash flow generated from sponsored projects of industrial, PSU and government agencies.

#Technologies Developed:

1. Zincometer: A sensing device for real-time Zinc weight measurement in galvanized wire lines
2. Indigenous Sodium metal production technology
3. Technology for beneficiation of low-grade Limestone containing finely disseminated Silica grains for utilization in the cement making industry
4. Energy-efficient production of low/medium Carbon Ferromanganese
5. Conversion of Hematite fines to Magnetite using Compressed Natural Gas (CNG)
6. Technology for production of Tungsten metal powder from plant tailings or waste sample
7. Low cost work hardenable Hadfield steel for heavy impact gouging wear-resistant application
8. Know-how for preparation of hydrogen standard (CRM) in steel

*Technologies Transferred:

1. Transfer of Know-How (Lab scale) for extraction of valuable and precious metals (Cu, Au, Ag & Co, Mn) from scrap of electronic waste & waste Li-Cobalt Batteries (Walle Infotech, Ranchi)
2. Transfer of Know-How for extraction of cobalt metal/salt from Black Powder of Lithium Batteries (UNQ IND PVT. LTD. Firozabad)
3. Transfer of technological KNOW-HOW for the extraction of Cu, Al and Au from waste PCBs (KNOW HOW) (Metaore Recycler Pvt Ltd)

Major Administrative & Business Targets Planned and Achieved in 2020-2021

Major Administrative & Business Targets Planned	Major Administrative & Business Achieved
<ul style="list-style-type: none"> ● Recruitments: <ul style="list-style-type: none"> ○ Gr (IV) scientists: 10 nos. ○ Gr III, Gr II: 15 nos. ● Training & development of higher and advanced skills of scientists/employees <ul style="list-style-type: none"> ○ Workshop & conference: 30 scientists and 10 employees ○ In-house: 15 employees ○ Through HRDC: 10 employees 	<ul style="list-style-type: none"> ● Formalities for advertising recruitment of Scientists has been completed ● Finalization of Gr.III/II requirement is in the progress ● Advertisement for recruitment of Security Officer has been made. ● 27 Scientist/Technical staff attended Conferences/ Seminars/Workshops ● 12 persons attended skill development/ capacity building programme

Major Technological & Scientific Targets Planned and Achieved in 2020-2021

Major Technological & Scientific Targets Planned	Major Technological & Scientific Targets Achieved
<ul style="list-style-type: none"> ● Development of coatings to control the corrosion behavior of Mg-alloys in simulated body fluid for application as degradable bioimplants ● Technology for on-board spacecraft life detection for ISRO ● Sensor & device for damage assessment of components exposed to high temperature ● Development of biodegradable alloys for orthopedic implants ● Development of process for MAX phase synthesis for large application of metal carbides/ nitrides based 2D materials 	<ul style="list-style-type: none"> ● Proof of concept established, process being optimized ● Device fabrication is in-progress. Expected to be delivered for testing by May 2021. ● Eddy current Sensor susceptible to 750°C has been designed and characterized ● Mg and Zn based alloys are developed with required mechanical strength. However, degradation rate needs to be controlled. ● Process for layered Ti_3AlC_2 is established with phase purity of 80%. Efforts are on to improve the purity of the desired material
<ul style="list-style-type: none"> ● Holistic utilization of red mud ● Li extraction technology from end-of-life batteries on 1 kg scale. 	<ul style="list-style-type: none"> ● The detailed project proposal has been finalized and agreed by all six partners. MoU between all parties has been signed. ● The project on Li extraction from end of the life batteries has been started and is progressing well. The technology at 1kg scale will be established.
<ul style="list-style-type: none"> ● Q&P processed steel for higher Ms ● Material data base for Fatigue crack propagation characteristics of Ti-6Al-4V under cyclic loading 	<ul style="list-style-type: none"> ● Technical part of the project is cleared; some terms and conditions are being worked out. The project approval letter is expected in first quarter of 2021-22.

Major Technological & Scientific Targets Planned	Major Technological & Scientific Targets Achieved
<ul style="list-style-type: none"> ● Advanced Gravity Concentration of Chromite Beneficiation Plant Tailings ● Identifying the Enablers to Reduce K_2O and SiO_2 in Dolomite Samples ● Studies on Beneficiation of Low-grade Manganese ore Samples 	<ul style="list-style-type: none"> ● Concentrate with an assay of 40% Cr_2O_3 was produced and around 32% of chromite was recovered ● Detailed characterization studies were completed for all the three dolomite samples. Developed a froth flotation studies for the reduction of K_2O and silica contents in concentrate to desired levels. ● Beneficiation involving gravity, magnetic and reduction-roasting was carried out. Process route for upgradation of low-grade manganese ore for application in production of ferro-manganese was developed.
<ul style="list-style-type: none"> ● Analysis of 10,000 refereed sample and 5000 core coal sample ● Determination of trace and rare earth elements in Indian soil and sediment samples (3000 no) ● Coal sampling, preparation and quality assessment of CCL coal washeries ● 3 new CRMs of Brass, Alloy cast iron and H_2 pin standards ● Development of Ceramic Coating and Self healing coating 	<ul style="list-style-type: none"> ● Analyzed almost 15000 refereed samples and 5000 band by band coal core samples ● Not achieved, Samples not received ● Coal sampling work at Rajrappa, Kedla, Kathara and Swang are continuing effectively ● 5 new CRMs have been developed which includes Coal, H_2 Standards, Ferroalloys and Alloy cast iron ● Developed technology to impart corrosion resistance to brass ammunitions
<ul style="list-style-type: none"> ● Installation and Commissioning of 200 tones per day flotation column for fine coal flotation at Belatinda Coal Preparation Plant ● Industry (plant) scale trials (5 tones per hour) of newly developed environment friendly flotation reagents for sillimanite at M/s Kerala Minerals and Metals Ltd., Kerala ● Pilot plant scale trials (1 ton per hour) of newly developed environment friendly flotation reagents for limestone beneficiation at M/s Vedam Calcimin Pvt. Ltd., Telangana 	<ul style="list-style-type: none"> ● Erection and dry run completed. Commissioning with coal slurry is pending. Delayed due to Covid-related restrictions. Will be completed in 2021-22. ● Reagent in bulk is ready. However, trials at commercial plant scale operations at M/s Kerala Minerals and Metals Ltd., Kerala were delayed due to Covid-related restrictions. Will be completed in 2021-22 ● Completed