CAPACITY BUILDING COMMISSION

Annual Capacity Building Plan FY 2023-24

Ministry of New and Renewable Energy (MNRE) Government of India

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Abbreviations

Abbreviation	Description
ADB	Asian Development Bank
AIR	All India Radio
ASCI	Administrative Staff College of India
ASO	Assistant Section Officer
ATR	Action Taken Report
CASE	Commission for Additional Sources of Energy
CBC	Capacity Building Commission
CBMU	Capacity Building Management Unit
CBP	Capacity Building Plan
CCDC	Concessional Custom Duty Certificates
CFA	Central financial assistance
CIC	Central Information Commission
CNG	Compressed Natural Gas
COP 27	Conference of Parties 27
CPGRAMS	Centralised public grievance and redress and monitoring system
CPSU	Central Public Sector Undertaking
CSI	Civil Services of India
CVO	Central Vigilance Officer
DAVP	Directorate of Advertising & Visual Publicity
DBT	Direct Benefit Transfer
DDG	Deputy Director General
DEA	Department of Economic Affairs
DG	Director General
DNES	Department of Non-conventional Energy Sources
DO	Demi Official
DOPT	Department of Personnel and Training
DRE	Decentralised Renewable Energy

DS	Deputy Secretary
EA	Economic Adviser
EPS	Emergency planning sub-committee
EV	Electric Vehicle
FAQ	Frequently Asked Question
FDI	Foreign Direct Investment
GBI	Generation based incentive
GEF	Global Environment Facility
GeM	Government e-Marketplace
GFR	General Financial Rules
GST	Goods and Services Tax
GW	Gigawatt
HRD	Human Resource Development
ICCE	International Council for Circular Economy
IFD	Integrated Finance Division
iGOT	Integrated Government Online Training
IIM	Indian Institute of Management
IISc	Indian Institute of Science
IIT	Indian Institute of Technology
IMAC	Integrated Monitoring and Advisory Council
IREDA	Indian Renewable Energy Development Agency Limited
IREP	Integrated Rural Energy Programme
ISA	International Solar Alliance
ISPP	Indian School of Public Policy
ISTM	Institute of Secretariat Training and Management
IT	Information Technology
ITEC	Indian Technical and Economic Cooperation
J&K	Jammu and Kashmir
JS	Joint Secretary

KPI	Key Performance Indicator
KSTA	Knowledge and Support Technical Assistance
kW	Kilowatt
kWh	Kilowatt hour
LMS	Learning Management System
M&E	Monitoring and Evaluation
MDO	Ministry, Department, Organisation
MEA	Ministry of External Affairs
MMT	Million Metric Tonne
MNES	Ministry of Non-conventional Energy Sources
MNRE	Ministry of New and Renewable Energy
MW	Megawatt
NAPCC	National Action Plan for Climate Change
NBMMP	National Biogas and Manure Management Programme
NEMMP	National Electric Mobility Mission Plan
NE	North East
NIBE	National Institute of Bio Energy
NICF	National Institute of Communication Finance
NIP	National Infrastructure Pipelines
NISE	National Institute of Solar Energy
NITI Aayog	National Institution for Transforming India Commission
NIWE	National Institute of Wind Energy
NNBOMP	New National Biogas and Organic Manure Programme
NPCSCB	National Program for Civil Services Capacity Building
NSM	National Solar Mission
NTPC	National Thermal Power Corporation Limited
NRSE	New and renewable sources of energy
OOMF	Output-Outcome Monitoring Framework
OP	Operational Priority

PFMS	Public Financial Management System
PIB	Press Information Bureau
PM	Prime Minster
PM-KUSUM	Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan Scheme
PV	Photovoltaic
R&D	Research and Development
RBI	Reserve Bank of India
RE	Renewable Energy
REC	Renewable Energy Certificate
RPM	Review Progress Meeting
RTI	Right to Information
SECI	Solar Energy Corporation of India Limited
SO	Section Officer
SOP	Standard Operating Procedure
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation
US	Under Secretary
UT	Union Territory
VGF	Viability Gap Funding

Weights and measures

Units	Description
%	Percentage
^{o}	Degree
^{o}C	Celsius
A	Ampere
ft	Feet
h	Hour
Hz	Hertz
I_{mp}	Current at maximum power
I_{sc}	Short Circuit currentγ
kg	Kilogram
Kg-f	Kilogram -force
km	Kilometre
km/hr	Kilometre per hour
kV	Kilovolt
kVA	Kilovolt Ampere
kW	Kilowatt
kWh	Kilowatt Hour
kW_p	Kilo Watt peak
m	Meter
m/s	Meter per second
m^2	Square meter
m^3	Cubic meter
mm	Millimetre
mm^2	Square millimetre
MW	Megawatt
MW_p	Megawatt peak
V	Voltage
V_{mp}	Voltage at Maximum Power
V_{oc}	Open Circuit Voltage
W	Watt
W_p	Watt peak

Glossary

Terms	Definition
Behavioural competency	These are a set of benchmarked behaviours displayed (or observed/felt) by individuals across the range of roles within the MDO.
Capacity building	Capacity building is developing and strengthening the skills, instincts, abilities, processes, and resources that organizations and communities need to survive, adapt, and thrive in a fast-changing world.
Central Financial Assistance (CFA)	Financial assistance is any monetary help or aid that a central government provides to a person, organization, or institution receives. The financial assistance may be guarantees, loans, cost-sharing arrangements, subsidies, or welfare payments.
Centralized Public Grievance and Redress and Monitoring System (CPGRAMS)	Centralized Public Grievance and Redress and Monitoring System is an online platform available to the citizens 24*7 to lodge their grievances to the public authorities on any subject related to service delivery.
Citizen-centricity	Citizen-centricity to ensure citizens' welfare and citizens' satisfaction, is critical for any government, local, state, or national, which aims to provide good governance.
Cloud-based library	Cloud-based library refers to a software program or application stored, managed, and available through the cloud. To access such a library, users must have an internet connection. It is generally stored on shared computing resources, such as cloud servers.
Competency gaps	Competency gaps refer to the difference between the competencies required for a position and those that an individual official possesses.
Conventional Energy	Conventional energy sources are natural energy resources that are in a limited quantity and have been used for a long time. They are exhaustible like coal, petroleum, etc.
COP 26	COP is an international climate meeting held annually by the United Nations. COP is short for "Conference of the Parties," meaning those countries who joined are "party to," in legal terms—the international treaty called the U.N. Framework Convention on Climate Change (UNFCCC).
Detailed Project	DPR is a very detailed and elaborate plan for a project indicating the overall

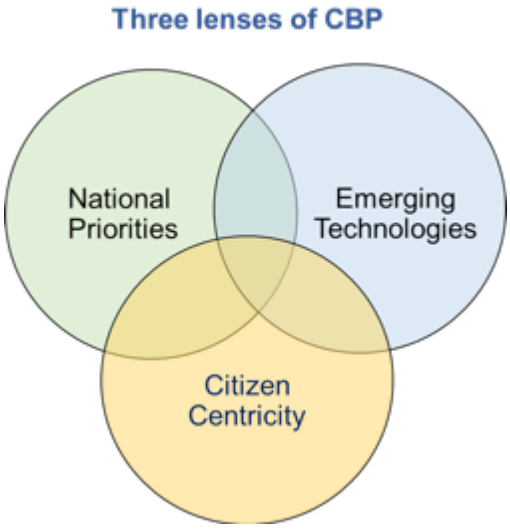
Terms	Definition
Report (DPR)	programme, different roles and responsibilities, activities, and resources required for the project.
Direct Benefit Transfer (DBT)	DBT aims to transfer subsidy benefits from various Indian welfare schemes directly into the beneficiaries' bank accounts.
Disbursement	Disbursement means paying out money from a fund. Disbursement may be used to describe money paid into a business' operating budget, the delivery of a loan amount to a borrower, or the dividend payment to shareholders.
Domain Competency	Domain competencies refer to those that enable individuals to effectively perform roles within a specialised discipline or field. Domain competencies generally apply to the core work of an MDO or set of related ministries /departments.
Electricity Act, 2003	An Act to consolidate the laws relating to the generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to the development of the electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies, constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal and for matters connected therewith or incidental thereto.
Emerging technologies	The term commonly refers to technologies that are currently developing or are expected to be available within the next five to ten years and is usually reserved for technologies that are creating or are expected to create significant social or economic effects.
Energy Efficiency	Energy efficiency is using less energy to perform the same task or produce the same result.
Energy Equity	Energy equity refers to the condition in which energy is provided to all in a consistent and systematically fair, just, and impartial manner regardless of religion, caste, geography, social standing, or economic position.
Energy Security	Energy security is defined as accessibility, affordability, and availability. Long-term energy security involves making timely investments to meet energy needs while keeping up with the needs of the environment and the economy.
Energy Transition	The energy transition is the change in the composition (structure) of primary energy supply, the gradual shift from a specific pattern of energy provision to

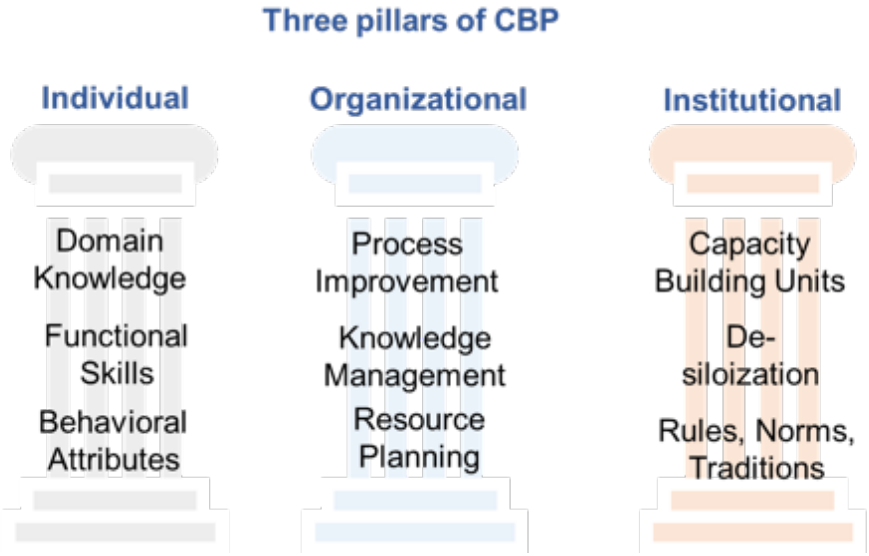
Terms	Definition
	a new state of an energy system.
Functional Competency	Functional competencies refer to those that help cater to the operational requirements of an MDO such as administration, procurement, financial management, and so on. Functional competencies are applicable across a wide range of ministries/departments of the government.
FRACing Process	The FRACing process enables government MDOs to build an accurate picture of the relationships and the full list of positions, roles, activities, competencies and knowledge resources relevant to them.
Incentives	Governmental Incentives means the benefits afforded or available through any economic incentive program sponsored, offered, or otherwise provided by any nation or government, any state or other political subdivision thereof, any agency, authority, instrumentality, regulatory body, court, central bank or other entity.
Individual Capacity	Individual government officials with the competencies required to perform their assigned roles effectively.
Induction Training	Type of training undertaken when an individual is newly appointed to an organisation. The training is aimed at orienting the officials towards the working of the organisation and the roles they are expected to undertake as part of the organisation. These training are competencies-specific to the organisation and the position.
Institution Capacity	Institutional capacity building refers to changes made in the norms, policies, and regulations that guide the functioning of individuals and organisations.
Joint Working Group (JWG)	Joint Working Group (JWG) means a group jointly constituted by governments of two countries for facilitating cooperation in the field of renewable energy among the two countries.
Key Performance Indicators (KPIs)	A quantifiable measure of performance over time for a specific objective. KPIs provide targets for teams to shoot for, milestones to gauge progress, and insights that help people across the organization make better decisions.
Knowledge Management	The process of identifying, organizing, storing and disseminating information within an organization.
Learning Management System (LMS)	A learning management system is a software application or web-based technology used to plan, implement and assess a specific learning process. It's used for e-learning practices and, in its most common form, consists of two

Terms	Definition
	elements: a server that performs the base functionality and a user interface (UI) that is operated by instructors, students and administrators.
Mandate	A mandate is the authority conferred on an organization to carry out certain tasks.
National Priority	National Priorities means those essential actions and activities in which the government and the private sector must become engaged in the interests of national survival and recovery.
Nodal Agency/ Ministry	Nodal Agency means an entity that is designated by the Central Government to act as the agency to deal with issues related to coordinated development of renewable energy; subsidy approval and disbursement to persons developing distributed energy projects, etc.
Non-Conventional Energy	Non-conventional energy also called, renewable energy sources, that are continuously replenished by natural processes. These cannot be exhausted easily, can be generated constantly so can be used again and again, e.g. solar energy, wind energy, tidal energy, biomass energy and geothermal energy etc.
Organisation Capacity	This refers to the capacity of collective and shared aspects of the organisation such as existing processes, digital and physical infrastructure, and technological capabilities that enable the organisation to achieve its goals.
Organisational interventions	Organisational interventions are the initiatives that improve the shared aspects within which officials operate (systems and processes, technology and data, resources and assets, etc.) for improving the collective capacity of the MDO.
Output-Outcome Monitoring Framework (OOMF)	Output-Outcome Monitoring Framework is an outcome-based monitoring framework that provides measurable indicators for achievement of scheme objectives.
Policy	The policy is a deliberate system of guidelines to guide decisions and achieve rational outcomes. Policies are generally adopted by a governance body within an organization.
Production-Linked Incentives (PLI)	Production Linked Incentive or PLI scheme is a scheme that aims to give companies incentives on incremental sales from products manufactured in domestic units.
Public Financial Management System	Public Financial Management System (PFMS) is a web-based online software application that provides a real-time, reliable, and meaningful management

Terms	Definition
(PFMS)	information system. It was started with the objective of tracking funds released under all Plan schemes of Government of India.
Resource Assessment	A resources assessment is the process of gathering information about the resources available to address a particular need or risk.
Responsibility Allocation Matrix	The matrix defines clear roles and responsibilities for individual taking part in a project.
Quality Control	Quality Control refers to a planned & deliberate activity which determines the quality of a product eventually accepting it. If it is not in compliance with the requirements then remedial measure are required to be taken to correct the activity/process.
Up-skilling	Upskilling is the process of acquiring new and relevant competencies needed today and in the near future.
Vigilance	The basic objective of the Vigilance Cell is to promote Integrity and Transparency in the entire functioning of Council including the areas of Procurement of Goods and Services. It also helps in empowering the compliance towards the directions and requirement of Central Vigilance Commission, Government of India.

Guiding principles of capacity building plan





I. Organisational Overview

The Ministry of New and Renewable Energy (MNRE) is the nodal Ministry of the Government of India for all matters relating to new and renewable energy. The broad aim of the Ministry is to develop and deploy new and renewable energy to supplement the energy requirements of the country [1]. The Government of India recognized energy self-sufficiency as the major driver for new and renewable energy and set up the Commission for Additional Sources of Energy (CASE) within the Department of Science & Technology in March 1981. The commission was charged with the responsibility of formulating policies and their implementation, programmes for the development of new and renewable energy apart from coordinating and intensifying R&D in the sector. In 1982 CASE was converted into a full-fledged department – the Department of Non-Conventional Energy Sources (DNES) in the then Ministry of Energy. A decade later in 1992, on the back of increased recognition of the importance of Renewable Energy, DNES became an independent Ministry – Ministry of Non-conventional Energy Sources - MNES. In October 2006, MNES was re-named as Ministry of New and Renewable Energy (MNRE) [1].

A. Mandate

MNRE's mandate has widened gradually over the four decades and currently includes:

- **Energy Security:** Development and deployment of alternative fuels like hydrogen, biofuels and synthetic fuels and their applications to contribute towards bridging the gap between domestic oil supply and demand; lesser dependency on oil imports
- **Increase the share of clean power:** Renewables like wind, hydro, solar, geothermal, bio & tidal power supplement fossil fuel-based electricity generation.
- **Energy Availability and Access:** Supplement energy needs of cooking, heating, motive power and captive generation in rural, urban, industrial and commercial sectors
- **Energy Affordability:** Cost-competitive, convenient, safe, affordable and reliable energy supply options
- **Energy Equity:** Per-capita energy consumption at par with the global average level by 2050, through a sustainable and diverse fuel-mix
- **Facilitate** research, design, development, manufacture, and deployment of new and renewable energy systems/devices for transportation, portable and stationary applications in rural, urban, industrial and commercial sectors

B. Goals and priorities

The primary goals of the ministry are to facilitate research, design, development, manufacture, and deployment of new and renewable energy systems/devices for transportation, portable and stationary applications in rural, urban, industrial and commercial sectors through:

- Technology Mapping and Benchmarking
- Identify Research, Design, Development and manufacturing thrust areas and facilitate the same
- Lay down standards, specifications and performance parameters at par with international levels and facilitate the industry in attaining the same
- Align costs of new and renewable energy products and services with international levels and facilitate industry in attaining the same
- Appropriate international-level quality assurance accreditation and facilitate the industry in obtaining the same
- Provide sustained feedback to manufacturers on performance parameters of new and renewable energy products and services with the aim of effecting continuous upgrades so as to attain international levels in the shortest possible time span
- Facilitate industry in becoming internationally competitive and a net foreign exchange earner Resource Survey, Assessment, Mapping and Dissemination
- Identify areas in which new and renewable energy products and services need to be deployed in keeping with the goal of national energy security and energy independence
- Resource Survey, Assessment, Mapping and Dissemination.
- The deployment strategy for various indigenously developed and manufactured new and renewable energy products and services
- Provision of cost-competitive new and renewable energy supply options

1) Alignment with National Priorities

India's import dependency on oil and gas was 87.3% in 2022-23 with an oil import bill of US$158 billion which was 26.3% of the total imports [2] [3]. Similarly, the country has imported 237.67 million tonnes of coal with an import bill of US$51 billion [4]. Continuing to rely on imports would put the country's energy security, vital for the country's ambitious economic growth, under serious threat arising from unexpected and prolonged supply disruptions, high prices and huge outflow of foreign exchange.

Besides the Energy Security concern, climate security concerns are also rising. With rising economic activities and expectations of the citizens, electricity generation has risen rapidly over the last eight years from 1110.458 billion Units in 2014-15 to 1624.465 billion units in 2022-23 [3]. India is the third largest electricity producer in the world and generates 49% of its 417.67 GW of power by burning Coal [5]. India's

power sector and transport sector together contributes about 69% of its GHG [6]. As per the sixth assessment report of IPCC India is the fourth largest GHG emitter and the country will be affected economically by climate change impacts [7].

India recognized climate impacts early and launched the National Action Plan on Climate Change (NACC) in 2010. Included among the action plans was to promote solar energy through the National Solar Mission- installing 20 GW of Solar by 2022. This solar target was upwardly revised in 2015 to 100 GW with a total RE target of 175 GW by 2022. In May 2023, the total installed capacity of renewable energy-based power generation was 126.77 GW (excluding 46.85 GW of large hydro) which is 34.19% of the total generation capacity. Within renewables, the installed capacity of solar power projects in India was 67.82 GW [8]. The Prime Minister of India at the COP26 Summit in Glasgow announced a target of 500 GW of non-fossil energy capacity by 2030 [8] out of which 450 GW will be contributed by renewable energy.

2) Vision

The vision of the Ministry is to develop new and renewable energy technologies, processes, materials, components, sub-systems, products & services at par with international specifications, standards and performance parameters in order to make the country a net foreign exchange earner in the sector and deploy such indigenously developed and/or manufactured products and services in furtherance of the national goal of energy security.

3) Medium-term objectives

The Indian Prime Minister in his National Statement at COP 26 held in Glasgow on 1st November 2022 announced India's five nectar elements to combat Climate Change [9]:

(1) India will reach its non-fossil energy capacity of 500 GW by 2030.
(2) India will meet 50% of its energy requirements from renewable energy by 2030.
(3) India will reduce the total projected carbon emissions by one billion tonnes from now onwards till 2030.
(4) By 2030, India will reduce the carbon intensity of its economy by less than 45%.
(5) By the year 2070, India will achieve the target of Net Zero.

MNRE's long term and medium term objective is driven by the Nationally Determined Contributions (NDC) announced at COP26. MNRE announced a target of 450 GW renewable energy installation capacity by 2030. In general, tenure of MNRE major schemes are 5 – 10 years.

The following are the target of MNRE major schemes until 2026:

- Support domestic company for manufacturing of 39,600 MW high efficient PV modules through

Production Linked Incentive (PLI) Scheme

- Development of 40 GW Ultra-Mega Solar Power Projects
- Support Central Public Sector Undertaking (CPSU) to instal 12,000 MW solar power plants for self-consumption
- Support residential customers and DISCOMs to achieve 40 GW target under Grid Connected Solar Rooftop Programme
- Support farmers to achieve 30,800 MW target under Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM)
- Implement National Green Hydrogen Mission
- Implement National Bioenergy Programme
- Implement Intra-state transmission systems Green Energy Corridor Phase II

4) Annual targets

During the financial year 2023-24, a sum of ₹10,222 crores was allocated to the Ministry of New and Renewable Energy. This is a 45% hike from the allocation of ₹7,033 crores in the previous year. The table below presents major schemes of MNRE with Implementation year, budget, target and objectives.

Table 1: Major schemes of MNRE with Implementation year, budget, target and objective

Sl. No.	Major Schemes & year of implementation	Budget	Target	Objective
1	Production Linked Incentive (PLI) Scheme for High Efficiency Solar PV Modules (2021-26)	Trench-I: 4,500 crores Trench-II: 19,000 crores	Trench-I: 8,737 MW Trench-II: 39,600 MW	The objective of the Production Linked Incentive (PLI) Scheme for the National Programme on High-Efficiency Solar PV Modules is to achieve domestic manufacturing capacity for Solar PV modules and solar PV cells.
2	Development of Solar Parks and Ultra-Mega Solar Power Projects (2014-26)	8,100 crores	40,000 MW	Objective is to develop 40,000 MW Ultra Mega Solar Power Projects by 2026. A capacity of 10,027 MW has been commissioned. Other approved parks are at various stages of implementation.
3	The Central Public Sector Undertaking (CPSU) Scheme phase-II (Government producer scheme) (2019 - 2024)	8,580 crores	12,000 MW	The objective of this scheme is to set up solar PV projects through Government Producers using domestic cells & modules to facilitate national energy security and environmental sustainability. MNRE provides viability gap funds to implement these projects by PSUs.
4	Grid Connected Solar Rooftop Programme (2015 - 2026)	5,676 crores	40,000 MW	MNRE provides Central Financial Assistance (CFA) to the residential electricity

Sl. No.	Major Schemes & year of implementation	Budget	Target	Objective
				consumers and DISCOMs for installation of Grid Connected Roof Top Solar (GCRTS).
5	Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) (2017-2026)	34,422 crores	30,800 MW	Objective of PM-KUSUM is to provide energy and water security, de-dieselise the farm sector and also generate additional income for farmers by producing solar power by installing 10,000 MW of Decentralized Grid Connected Solar Power Plants; setting up of 20 lakh standalone Solar Powered Agriculture Pumps, and solarisation of 15 Lakh existing Grid-connected Agriculture Pumps.
6	National Green Hydrogen Mission (2023 -30)	19,744 crores	5 MMT per year	The objective of the Mission is to make India the Global Hub for production, usage and export of Green Hydrogen and its derivatives. The Mission will lead to a significant decarbonisation of the economy, reduced dependence on fossil fuel imports, and enable India to assume technology and market leadership in Green Hydrogen.
7	Biomass Programme under the Umbrella scheme of National Bioenergy Programme for duration (2021-2026)	585 crores	Waste to Energy: 600 Cr. Biomass: 158 Cr. Biogas: 100 Cr.	The National Bioenergy Programme will comprise of (i) Waste to Energy Programme (Programme on Energy from Urban, Industrial and Agricultural Wastes /Residues); ii) Biomass Programme (Scheme to Support Manufacturing of Briquettes & Pellets and Promotion of Biomass (non-bagasse) based cogeneration in Industries (iii) Biogas Programme
8	Intra-state transmission systems Green Energy Corridor Phase II in the states of Gujarat, Himachal Pradesh, Karnataka, Kerala, Rajasthan, Tamil Nadu and Uttar Pradesh (2021-2026)	3,9780 crores	10,753 circuit kilometer	The GEC Phase II will create transmission line infrastructure with 27,546 MVA capacity of sub-stations in seven states for evacuation of 20 GW renewable energy power.

C. Organogram

An organisational structure of MNRE has been drawn in *Figure 1* below based on data provided by the administrative section of MNRE. Staff position structure and line of recruitment of MNRE is presented in *Figure 2*. MNRE administers three autonomous institutes and two public sector undertakings which are not covered under this ACBP.

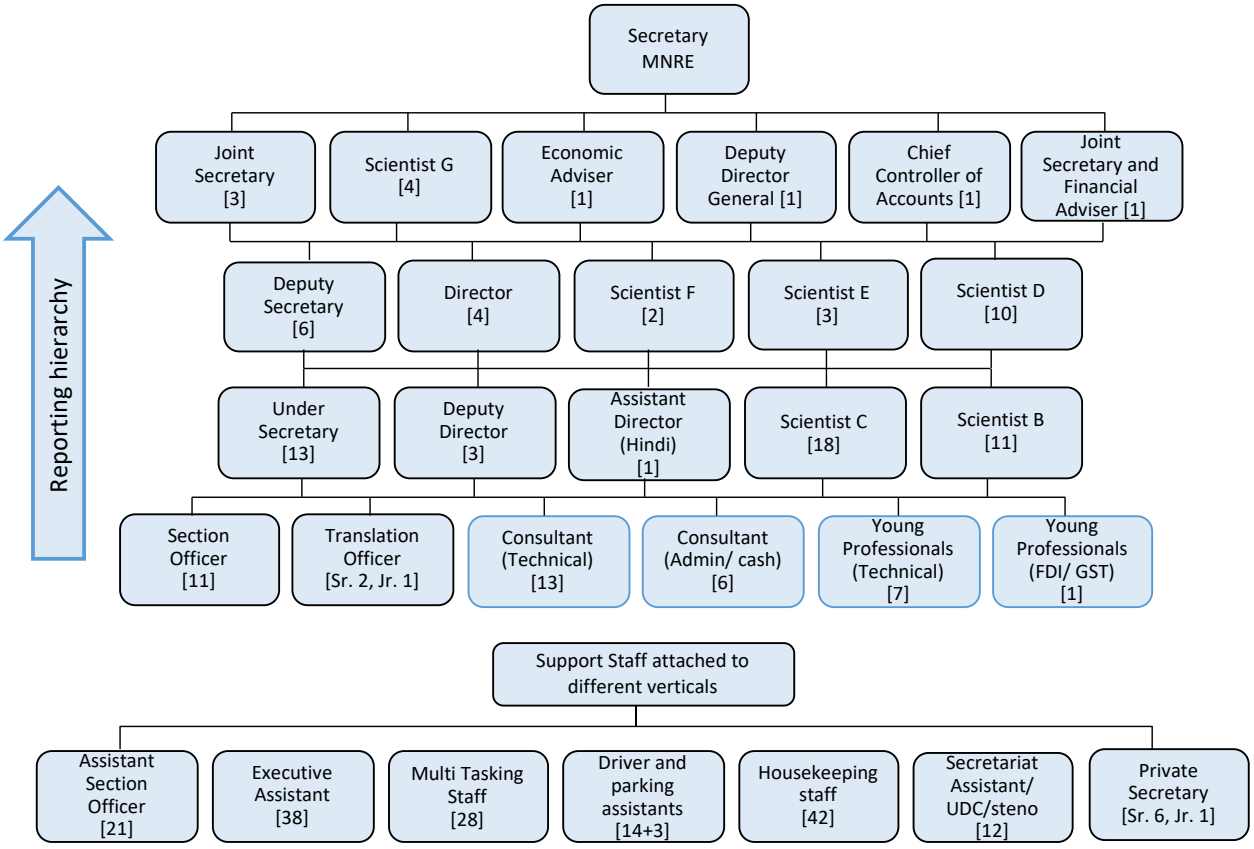


Figure 1: Organisational structure of MNRE

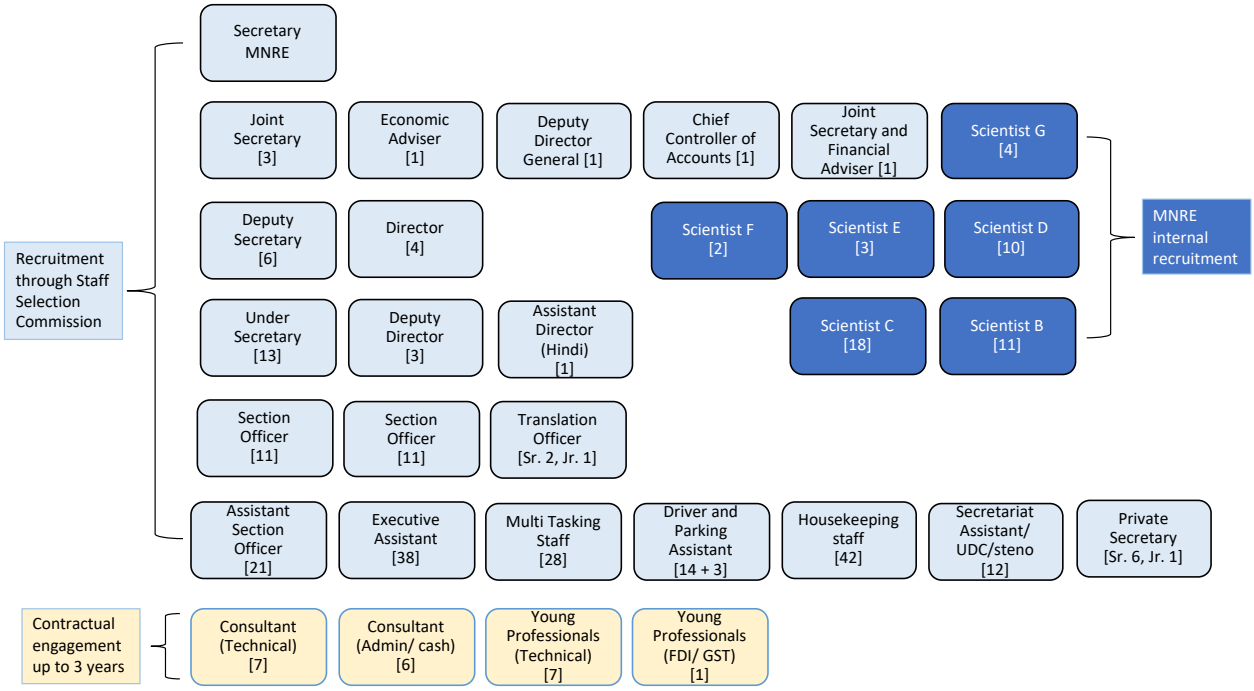


Figure 2: Staff position structure and line of recruitment of MNRE

D.Individual Pillar

1) Human Resource Mapping

There are twelve leadership positions in the ministry that directly report to the Secretary MNRE. In the technology domains, each leadership position constitutes a team to deliver different activities across technologies. Allocation of activities are interchangeable and placement of team members changes from one leadership to another. Therefore, it is evident that all scientists and senior executives must have knowledge and competency across the renewable energy sector. To evaluate the desired competency for respective positions, the present roles and responsibilities of all the officials and staff have been analysed. Activities are mapped for all senior positions in the Ministry to understand the existing duties and responsibilities to dispose of their duties, the hierarchy, the process of information flow, as well as the reporting structure as shown below:

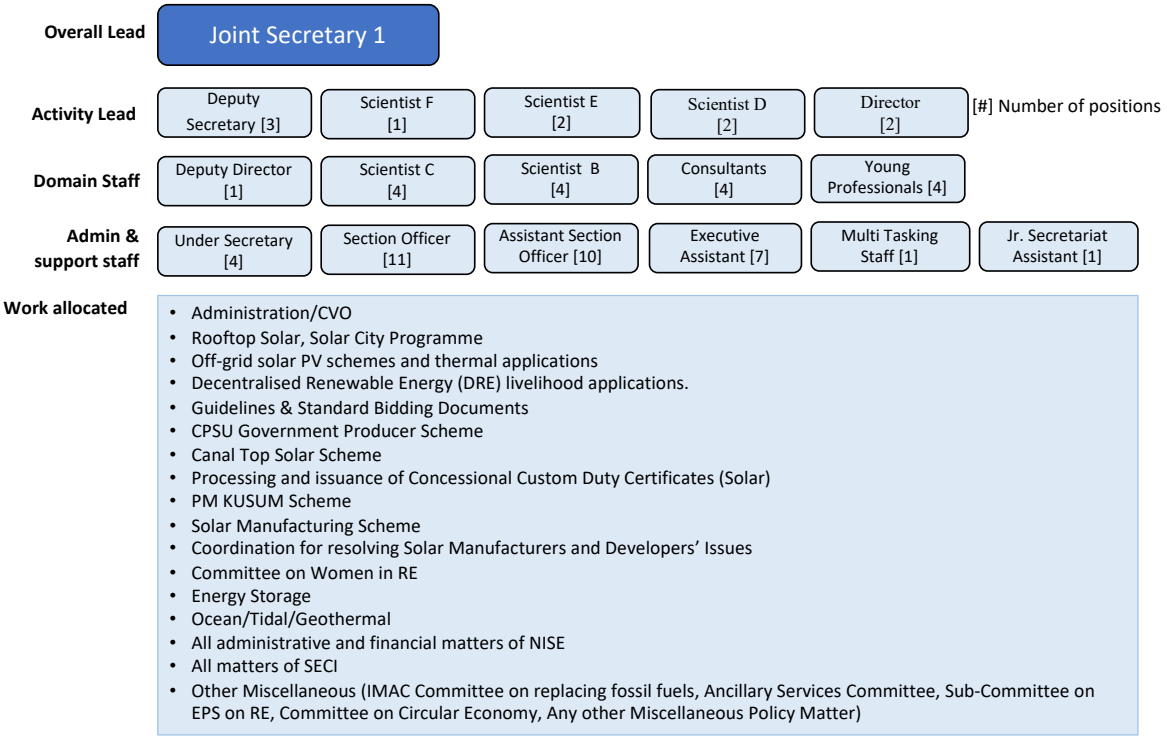


Figure 3: Leadership position and team structure for solar energy, administration, CVO

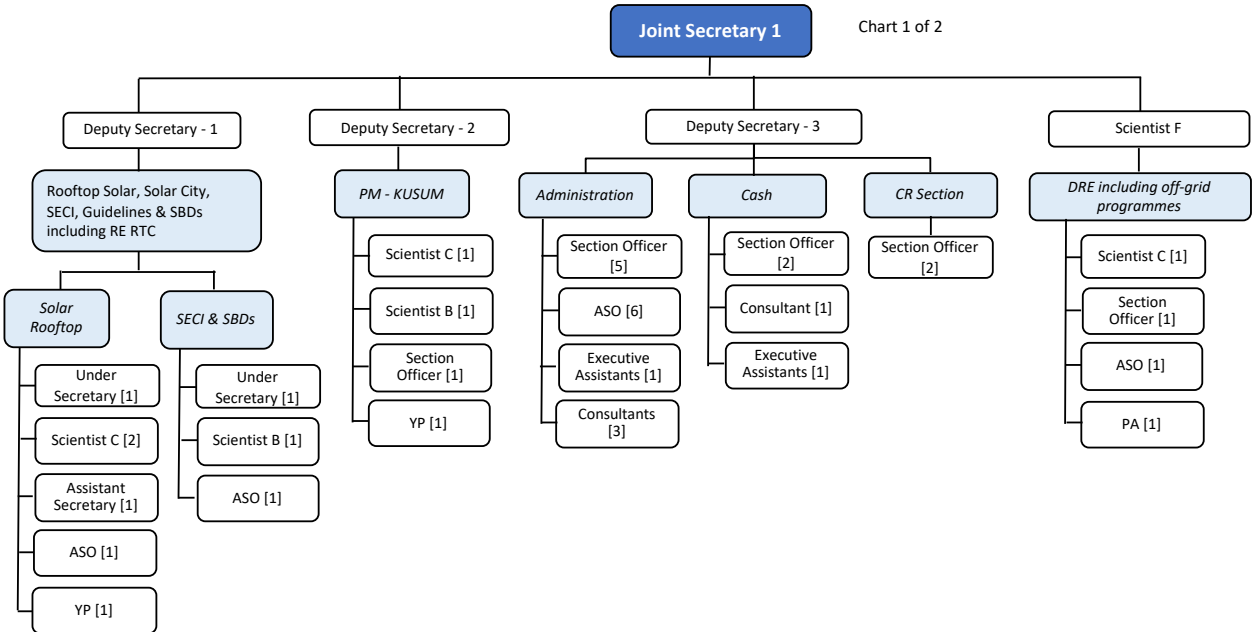


Figure 4: Activity lead positions and team structure for solar energy, administration, CVO (chart 1 of 2)

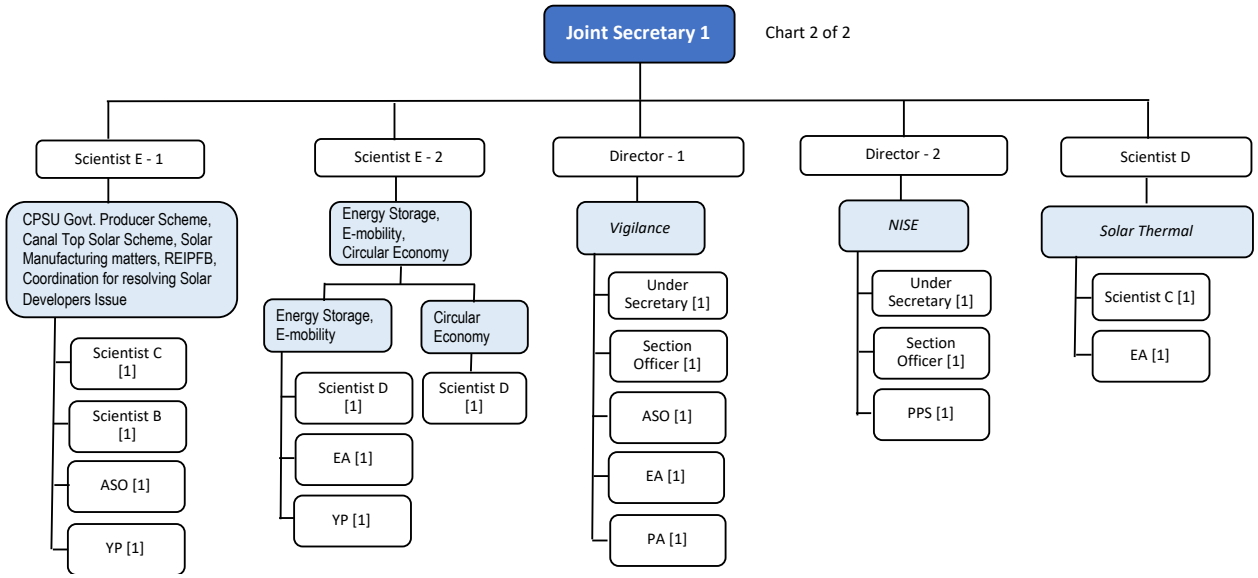


Figure 5: Activity lead positions and team structure for solar energy, administration, CVO (chart 2 of 2)

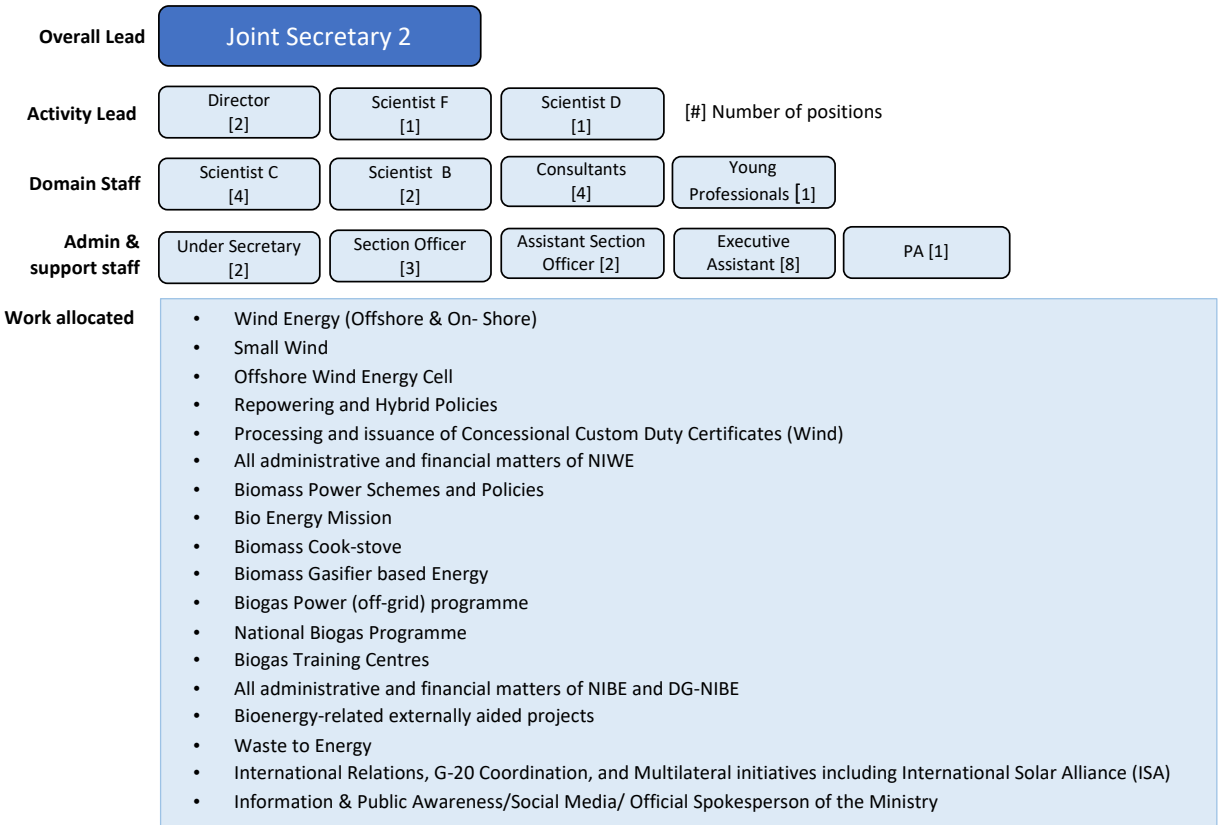


Figure 6: Leadership position & team structure for wind energy, bio energy and international relations

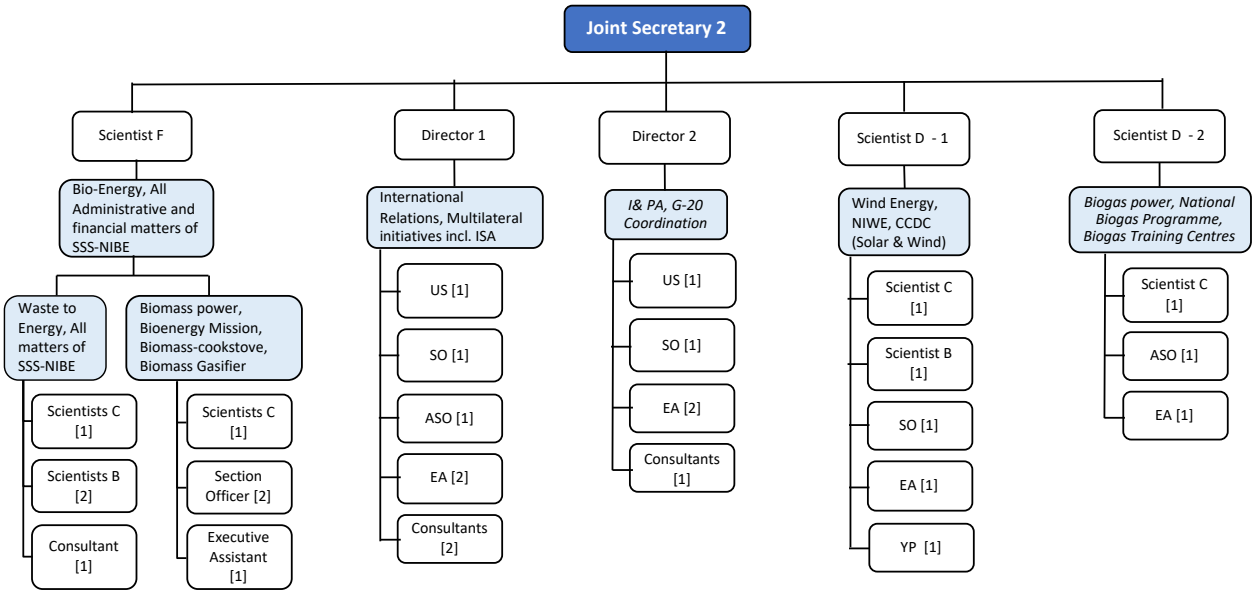


Figure 7: Activity lead positions and team structure for wind energy, bio energy and international relations

Overall Lead	Joint Secretary 3				
Activity Lead	Deputy Secretary [2]	Scientist F [3]	Scientist D [1]	[#] Number of positions	
Domain Staff	Dy. General Manager [1]	Dy. Manager [1]	Scientist C [2]	Scientist B [2]	Young Professionals [1]
Admin & support staff	Under Secretary [1]	Section Officer [1]	ASO [3]	Executive Assistant [5]	PSO/PPS/PA [6]

Work allocated

- National Green Hydrogen Mission
- Electric Mobility
- Climate Change and Coordination with the Ministry of Environment, Forest and Climate Change (MoEFCC)
- Transmission, Green Energy corridor
- Coordination work with the Ministry of Power
- Policy and Regulatory matters (Electricity Act, Tariff Policy National Electricity Plan, National Electricity Policy etc.)
- All matters of IREDA

Figure 8: Leadership position and team structure for Green Hydrogen Mission, EV and inter-ministerial coordination

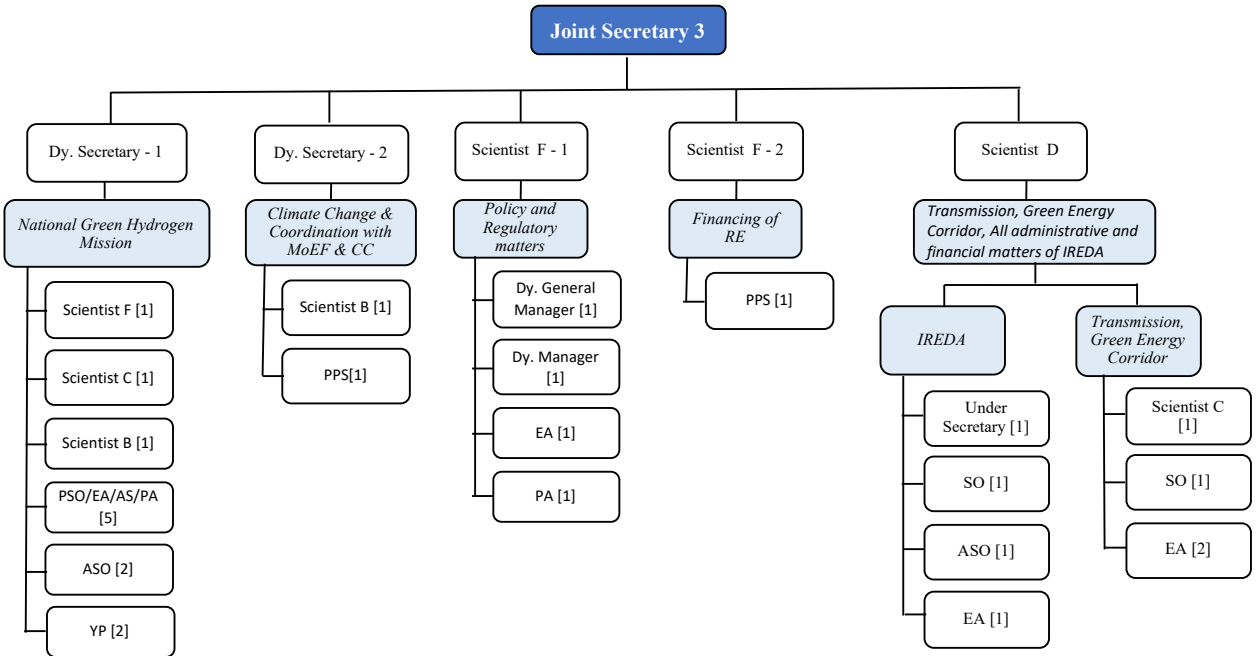


Figure 9: Activity lead positions and team structure for Green Hydrogen Mission, EV and inter-ministerial coordination

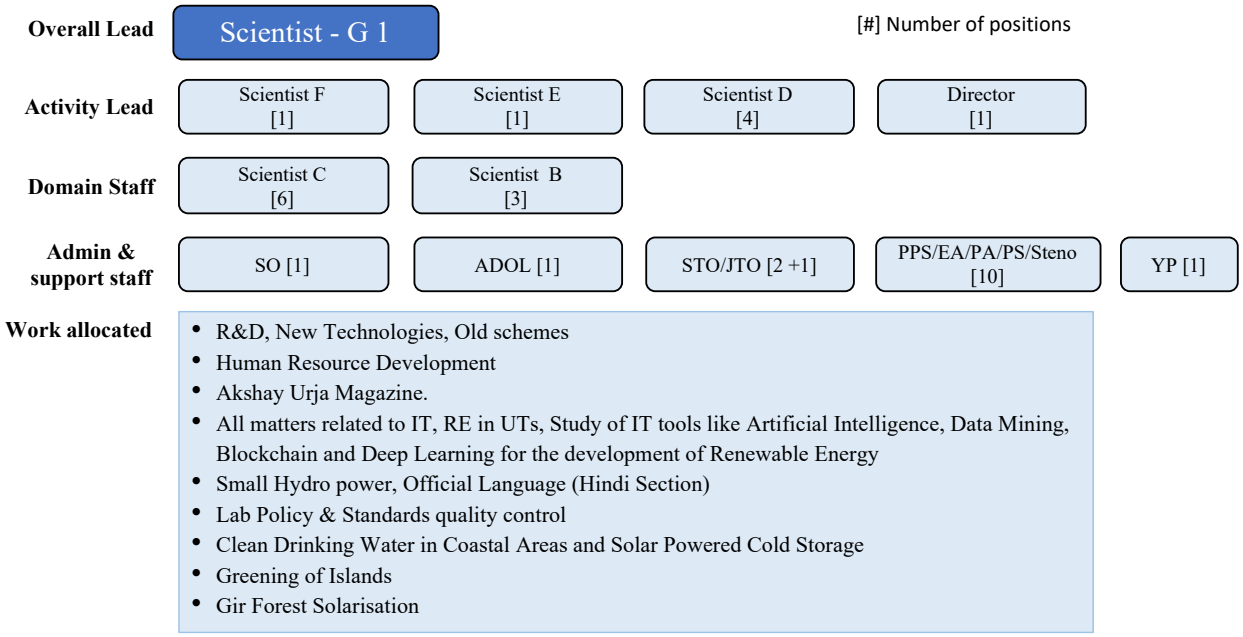


Figure 10: Leadership position and team structure for solar thermal, R&D, IT, new technologies

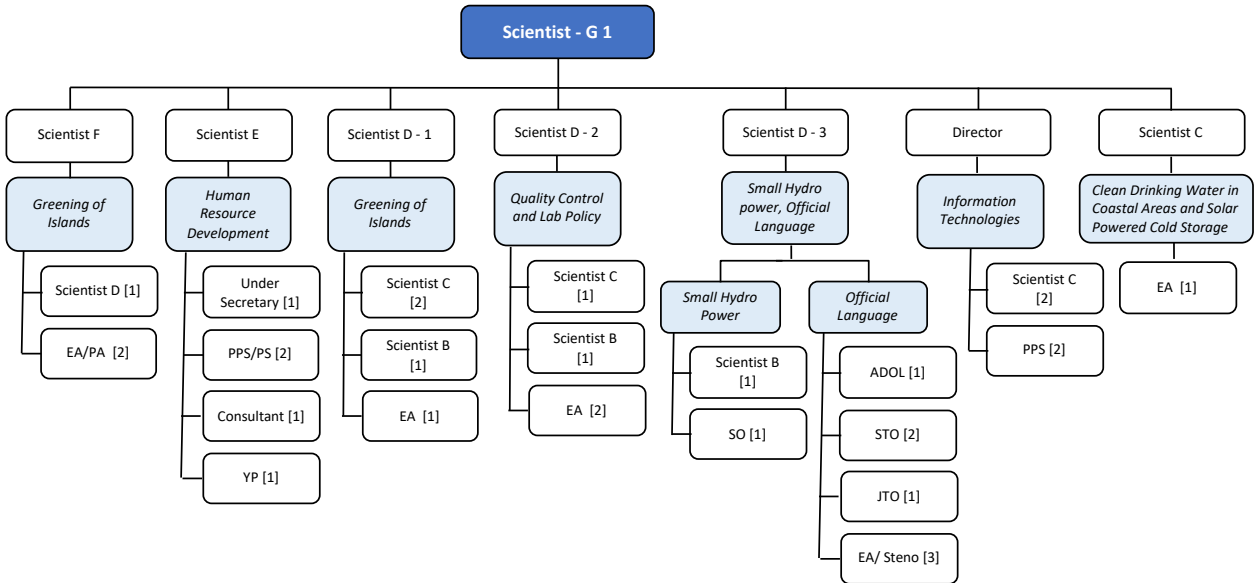
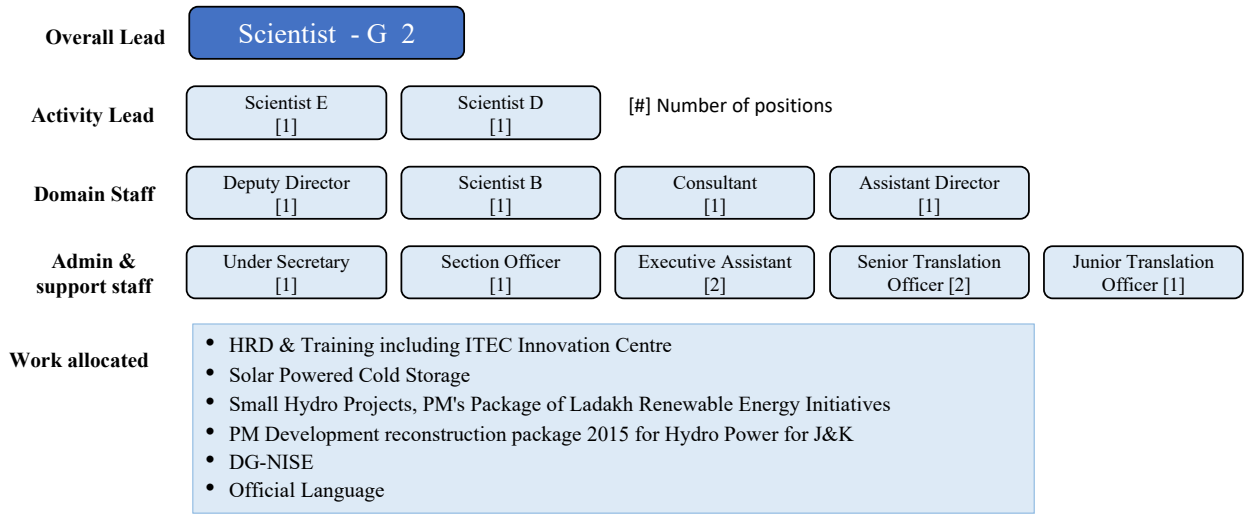
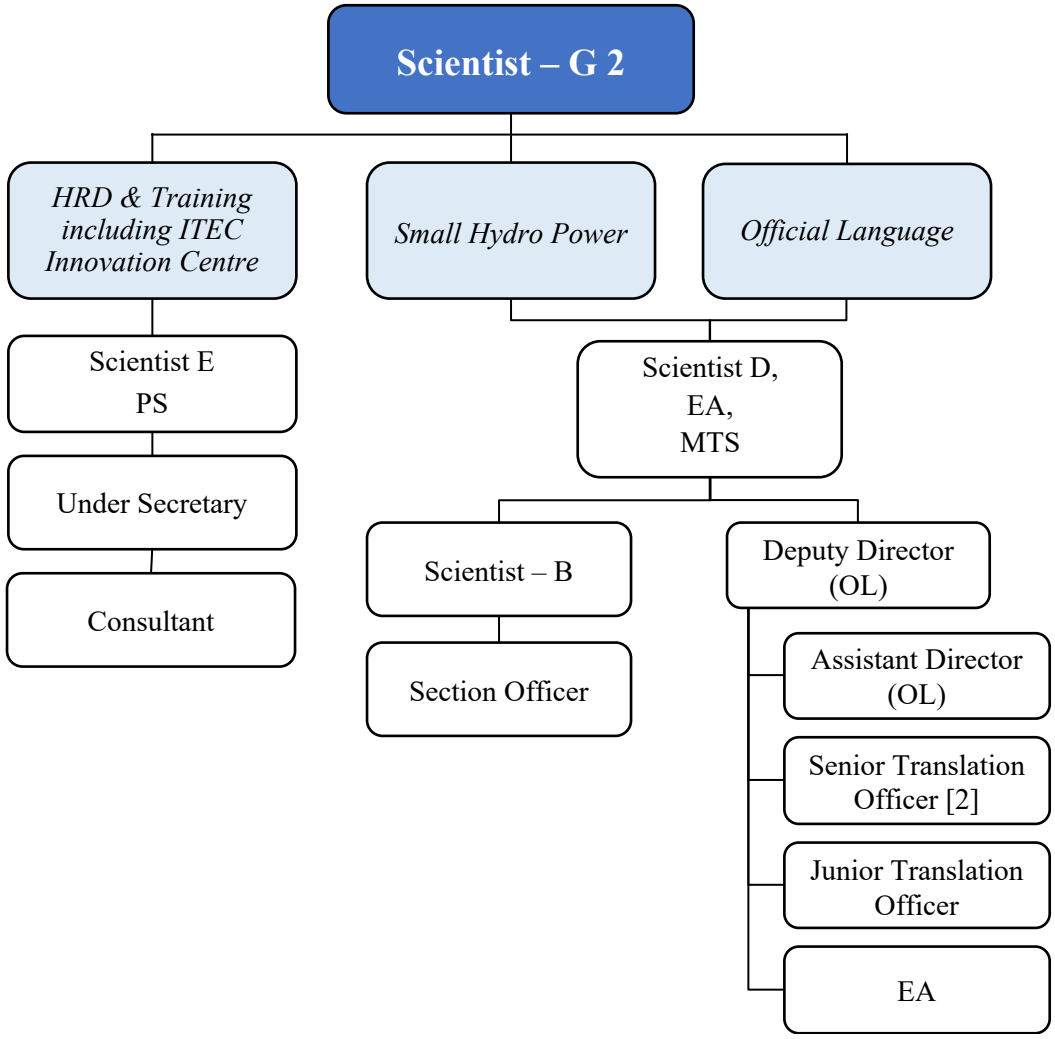


Figure 11: Activity lead positions and team structure for R&D, IT, New technologies, HRD, Small Hydro



Note: This position is currently vacant and works allocated are looked after by Scientist G 1

Figure 12: Leadership position and team structure for small hydro, HRD, official language



Note: This position is currently vacant and works allocated are looked after by Scientist G 1

Figure 13: Activity lead positions and team structure for small hydro, HRD, official language

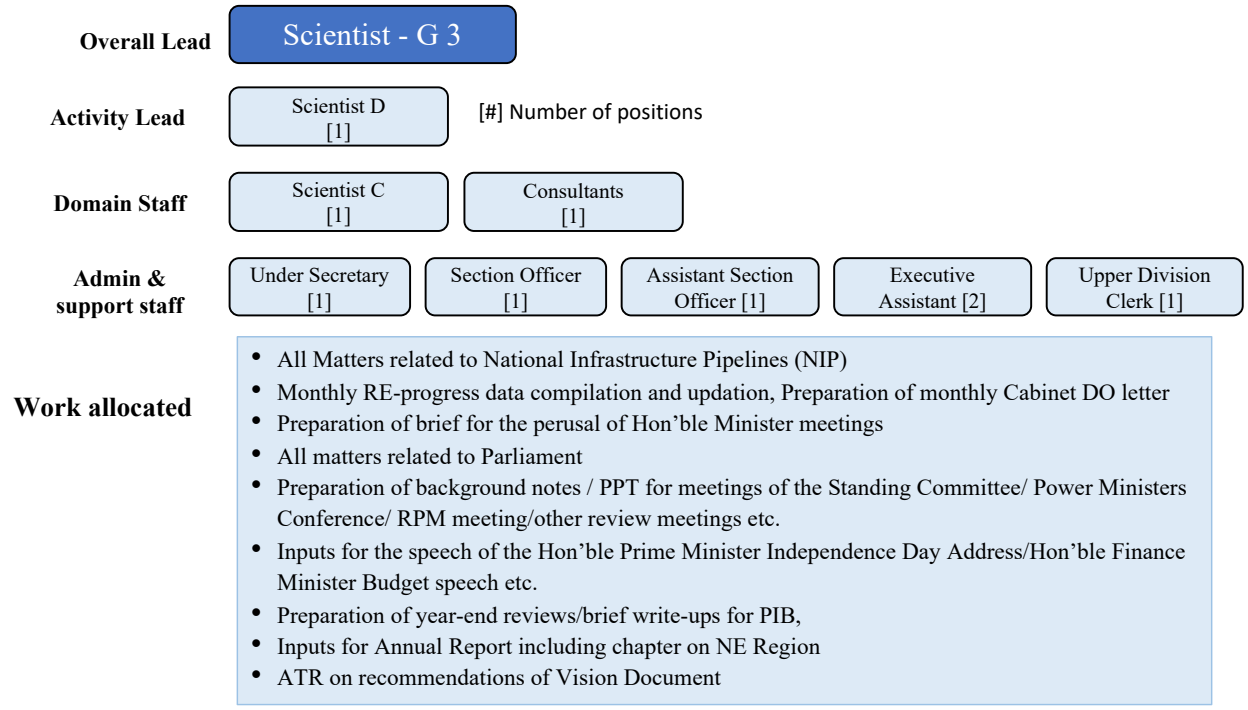


Figure 14: Leadership position and team structure for NIP, parliament, data compilation

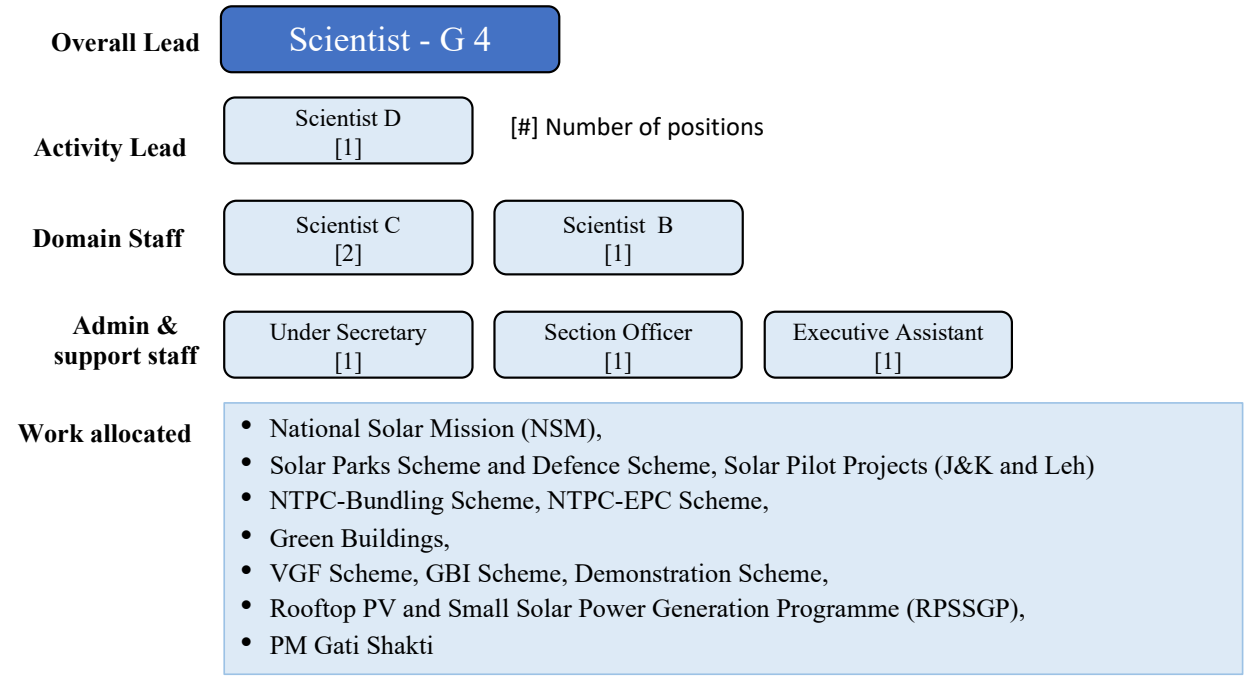


Figure 15: Leadership position & team structure for solar park scheme, PM Gati Shakti, Green building

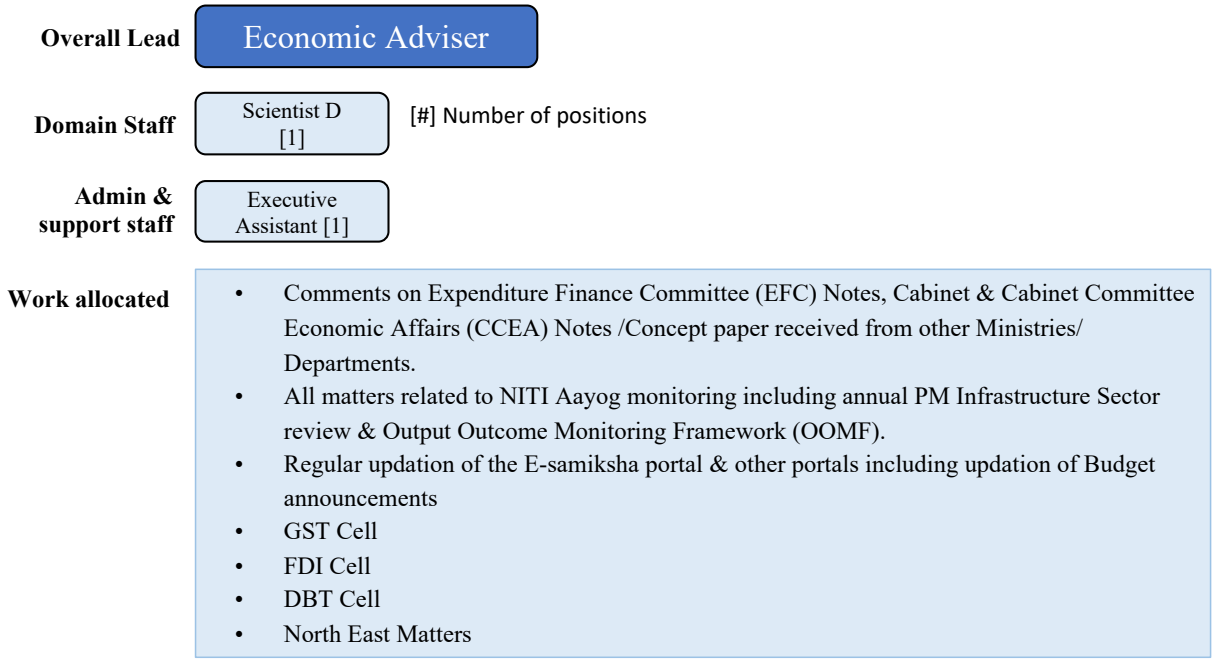


Figure 16: Leadership position and team structure for budget and economic matters

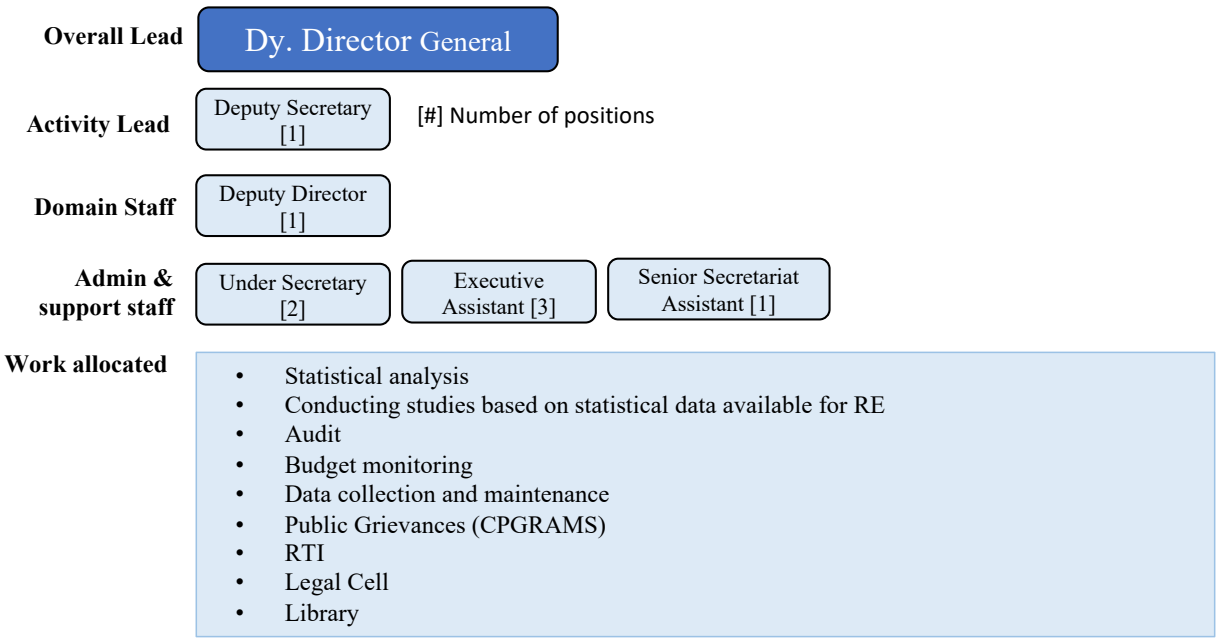


Figure 17: Leadership position and team structure for statistical analysis, Legal cell, Library

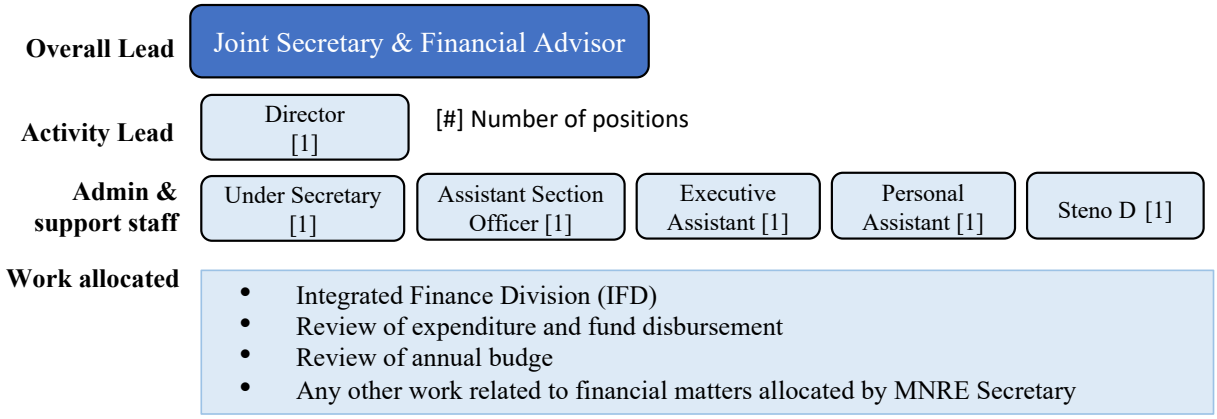


Figure 18: Leadership position and team structure for IFD

E. Organisational Pillar

1) Functional Mapping

There are five functional areas of MNRE as described below.

a) Functional Areas

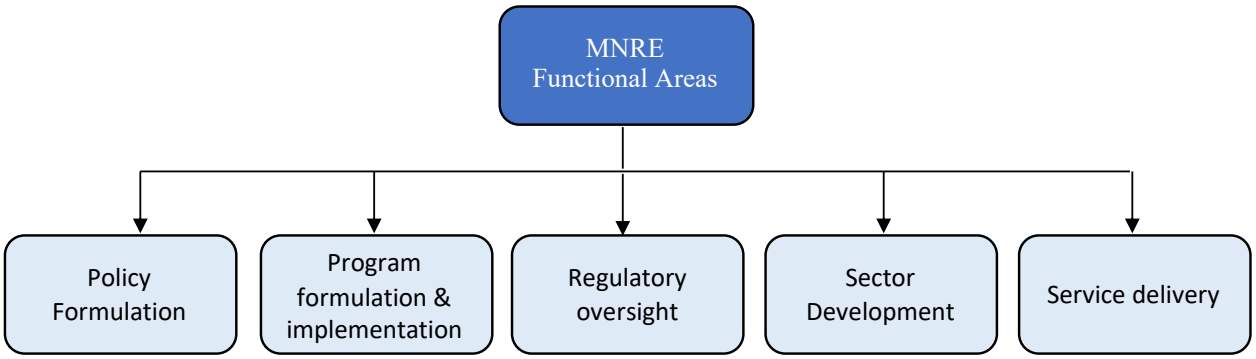


Figure 19: MNRE functional areas

(i) Policy formulation

The primary function of the ministry is to formulate national policy and plan to fulfil its mandate on energy security; increase the share of clean power; energy availability and access; energy affordability; energy equity and facilitate research design, development, manufacture and deployment of new and renewable energy systems/ devices. As on May 2023, the share of renewable energy generation capacity in India's power sector is 34.19% excluding large hydro. The total installed capacity of renewable energy-based power generation was 126.77 GW excluding 46.85 GW of large hydropower projects. Within renewables, the installed capacity of solar power projects in India was 67.82 GW. During COP-26 Summit in Glasgow, India announced the target of 500 GW of non-fossil energy capacity by 2030 out of which 450 GW will be from renewable energy.

Policies framework for the development of new and renewable energy in the country is primarily driven by the National Action Plan for Climate Change (NAPCC) which was launched by the government of India in 2008. NAPCC outlines a national strategy that aims to enable the country to adapt to climate change and enhance the ecological sustainability of India's development path. Electricity Act, 2003 opens up the utilization of renewable resources for power generation in the country. Similarly, the National Electricity Policy 2005 recommends the exploitation of non-conventional energy resources to create additional power generation capacity in the country.

MNRE launched National Solar Mission in 2010 as one of the eight missions under NAPCC to "promote ecologically sustainable growth while addressing India's energy security challenge". National Green Hydrogen Mission was launched in 2020 with aims to make India the Global Hub for the production, usage and export of Green Hydrogen and its derivatives and "lead to significant decarbonisation of the economy, reduced dependence on fossil fuel imports, and enable India to assume technology and market leadership in Green Hydrogen". MNRE has been implementing several programmes and schemes for the development of the wind energy sector, small hydro, bioenergy and energy from wastes.

MNRE is one of the inter-Ministerial steering committee members of the National Mission on Transformative Mobility and Battery Storage chaired by the CEO of NITI Aayog. The Mission recommends and drives strategies for transformative mobility and phased manufacturing programs for EVs, EV components and batteries.

(ii) Program formulation & implementation

The following are the main schemes and activities under the solar energy domain.

- Development of Solar Parks and Ultra Mega Solar Power Projects (40,000 MW),
- PM KUSUM Scheme (10,000 MW grid-connected solar, 20 lakh off-grid solar pumps and 15 lakh grid-connected solar pumps in the agriculture sector),
- NTPC-Bundling Scheme, NTPC-EPC Scheme,
- CPSU Government Producer Scheme (12,000 MW solar through CPSU),
- VGF Scheme, GBI Scheme, Demonstration Scheme,
- Rooftop PV (40,000 MW distributed rooftop and small solar power projects)
- Solar City and Canal Top Solar Scheme

The following are the main activities and schemes of MNRE under the wind energy domain.

- Generation-based incentive (GBI) scheme for wind power generation,
- Development of National off-shore wind energy policy,
- Development of National wind-solar hybrid Policy,
- Development of policy for repowering of the wind power projects,
- Small Wind energy and hybrid system scheme,
- Policy for waving off the inter-state transmission charges and losses for wind and solar projects,
- Processing and issuance of Concessional Custom Duty Certificates (Wind),
- Issue of guidelines for competitive-based bidding processes.

(iii) Regulatory oversight

For the promotion of renewable energy in India, a congenial eco-system is being built. Various policy initiatives are already in place in the form of missions, acts, policies, and regulations. A few of them are mentioned below:

- Electricity Act, 2003
- National Action Plan for Climate Change
- National Solar Mission
- National Electricity Plan
- National Electricity Policy
- Tariff Policy
- Renewable Energy Certificate (REC) Policy

While formulating policy and implementing programmes, MNRE has to oversee the policy and regulatory requirements under different laws and regulations to protect the interest of project developers and investors.

(iv) Sector development

One of the key mandates of MNRE is to facilitate the development of the new and renewable energy sector through which it will fulfil other mandates such as energy security, increased share of clean power, energy availability, energy affordability and energy equity. The ministry's policies and programmes are formulated around this mandate.

Support to project developers

The ministry has been formulating policies and programmes to bring the renewable energy sector to the mainstream of the power sector by providing central financial assistance, infrastructure development, fiscal benefits, tax benefits etc. for the development of renewable energy projects. These measures are formulated separately for different renewable energy technologies based on the global market scenario, technology status and investment interest of public and corporates.

Support to Manufacturers

MNRE has been implementing Production Linked Incentive (PLI) Scheme to increase domestic production capacity of high efficiency solar PV modules. Under this scheme, the ministry will support 8,737 MW manufacturing capacity in the phase 1 and 39,600 MW manufacturing capacity in the phase 2.

Concessional Customs Duty Certificate (CCDC)

In order to promote the local manufacturing of renewable energy equipment and its components, the Ministry of New and Renewable Energy is issuing concessional custom duty exemption certificates

(CCDCs) to the recognized manufacturers as approved by the Ministry of Finance. At present concessional custom-duty benefit is available for wind turbine manufacturing.

Human resource development

The renewable sector, solar and wind energy sector in particular, is growing very fast at an average CAGR of about 30%. There is a huge shortage of human resources to coup up with the fast growth. MNRE is implementing a comprehensive Human Resource Development Programme to institutionalise renewable energy education and training in the country to meet up the human resource gap in the country.

Quality Control and Lab Policy

MNRE lab policy aims to adopt, update, and develop standards for all renewable energy systems, components, and devices, strengthen test labs in accordance with international practices, and make performance certification mandatory to ensure quality and reliability in the renewable energy supply chain. The policy is designed to enforce regulatory measures to control quality in the field, encouraging manufacturers to ensure the quality of their products according to test reports and instilling confidence in users regarding the expected performance of products throughout their lifetimes. The policy also mandates periodic testing by accredited test labs to measure and document product performance degradation over time.

The objectives of the policy are as follows:

- To adopt International Standards and develop/update Indian Standards and make performance testing and certification mandatory for all RE systems and components;
- To affirm government commitment and support for the organization and management of quality, efficient, cost-effective and sustainable performance testing services of all RE Systems and components;
- To strengthen test labs for developing test protocols and standards for ensuring quality of products;
- To establish national standards for laboratory quality systems and performance testing and certification;
- To empower the establishment, implementation and monitoring of the national testing and standardization plan;
- To ensure adequate financial and human resources to meet the requirements of testing, standardization and certification services;
- To encourage research and collaboration to inform and improve the quality and consistency of performance testing and certification services;
- To ensure that the Quality Management Systems of all labs are in line with the requirements of the International Standards of ISO/IC 17025.

Research and Development

The Ministry of New & Renewable Energy (MNRE) supports research, design, technology development and demonstration for renewable energy to develop new and renewable energy technologies, processes, materials, components, subsystems, products & services, standards and resource assessment so as to indigenously manufacture new and renewable energy systems and devices. The objective of the programme is to make the industry globally competitive and renewable energy generation supply, self-sustainable/profitable and thereby contribute to increasing share in the total energy mix in the country. The objectives and achievements of various sectors in Research and Development are as follows:

- Research, design, development, standardization and demonstration
- To lower the cost of solar energy systems/devices
- Development of new applications
- Implementation of innovative concepts and applications
- Implementation of R&D projects for unexplored renewable resources
- To improve the efficiency, performance and reliability of systems/devices
- To strengthen the domestic manufacturing base
- Support to establish R&D and testing facilities in research and educational institutes

(v) Service delivery

MNRE delivers its services through state nodal agencies (SNA), state DISCOMs, two public sector undertakings namely Solar Energy Corporation of India (SECI) and Indian Renewable Energy Development Agency (IREDA) and three autonomous institutes namely National Institute of Solar Energy (NISE), National Institute of Wind Energy (NIWE) and National Institute of Bio-Energy (NIE).

In January 2013, MNRE started Direct Benefit Transfer (DBT) with the aim of reforming the government's delivery system by re-engineering the existing process for a simpler and faster flow of information/funds and to ensure accurate targeting of the beneficiaries, de-duplication and reduction of fraud.

The ministry currently running seven schemes under the DBT as shown below:

- National Renewable Energy Fellowship Programme and National Solar Science Fellowship Programme
- New National Biogas and Organic Manure Programme (NNBOMP)
- Off-grid and Decentralized Solar PV Applications Programme
- Grid-connected Roof-top Solar Projects implemented on an individual house of a capacity of 3 kW to 10 kW
- Fellowship component of R and D projects sponsored by the Ministry
- Short-Term Training Programme component of the HRD Programme

- Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan Schem (PM-KUSUM)

b) Operational Areas

There are nine operational areas of MNRE as described below.

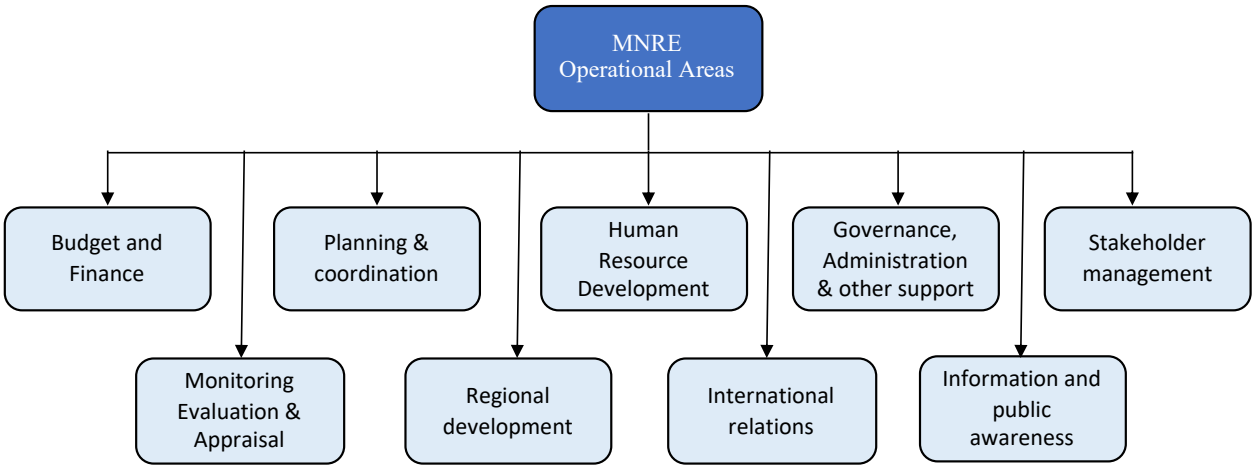


Figure 20: MNRE operational areas

(i) Budget and Finance

The ministry is responsible for the preparation of the annual budget to meet its general expenditure for salary and administrative activities, funding its programmes and schemes and funding support to the PSUs and autonomous institutes.

(ii) Monitoring, Evaluation and Appraisal

As the ministry provides central financial assistance to project developers, manufacturers and end users, it is responsible for monitoring, evaluation and appraisal of such projects for the effective utilisation of funds and to achieve the desired outcome of the programmes and schemes.

(iii) Planning and coordination

MNRE Planning and Coordination Division is responsible for overall planning and budgeting plans schemes/programmes of the Ministry and matters related to Reforms, Policy measures, Fiscal concessions, etc. Its work involves maintaining a close liaison with different Programme Divisions of the Ministry and with other concerned Ministries/Departments/States, State Nodal Agencies, etc. on a regular basis. To attain the Ministry's goal for national priorities, policy priorities are to be met through coordinated actions of various ministries of the government of India. Several ministries and institutions

are working together to form these policies and regulations and modifying these policies as and when required. Some of them who closely worked with MNRE are the Power Ministry, the Ministry of Environment and Forests, the Ministry of Finance, the Ministry of Heavy Industries, the Ministry of Agriculture, the Ministry of Consumer Affairs, Food and Public Distribution, NITI Aayog, the Central Electricity Authority, the Central Electricity Regulatory Commission to name a few.

(iv) Regional development

The Ministry has a separate budgetary allocation for the northeast region which is 10% of the total budget. This budget is used for the development and installation of grid & off-grid Solar Energy Systems, Wind Energy Systems, Small Hydro Projects and Bio-gas plants. MNRE supports the following activities in NE states:

- Support to develop Solar Park projects.
- CFA for solar study lamps, solar street lights and off-grid solar power plants (up to 25 kW)
- CFA under the "PM-KUSUM" Scheme
- 20% of additional CFA over and above the standard CFA for the bioenergy programme
- CFA for Wind Resource Assessment

Under the "Greening of Islands" MNRE aims to develop Carbon Free Islands by phasing out the use of diesel for the generation of electricity and to contribute to the National Action Plan on Climate Change and Greening of Islands by setting up Distributed Grid-Connected Solar PV Power of an aggregated capacity of 40 MW in different Islands of Andaman & Nicobar (about 40 MW at 4-5 location in Port Blair, 2-3 MW at Havelock & Neil) and 5 MW floating solar in different Islands of Lakshadweep. This initiative will help in reducing the cost of electricity generation (currently, Rs. 25 per kWh). The estimated Central Finance Assistance (CFA) is about Rs. 192.20 crores for the span of 3 years. The Ministry will provide 40% of the project cost and Capital Subsidy will be released in 3 tranches.

(v) Human Resource Development

Ministry has been implementing a comprehensive Human Resource Development Programme with the objective of institutionalizing renewable energy education and training in the country with the following overall goals:

- To update the professionals working in the field of renewable energy on technological, economic and social issues and management of the science and technology and public administration through the infusion of scientific temper and accountability;
- To infuse commitment towards building of partnerships and participatory decision-making;
- To be responsive to the challenge of changing framework needs in policy, institutional, legal, trade, IPR, knowledge management, organizational and technological development;

- To strive for improved performance and efficiency of renewable energy systems and devices to make them cost-competitive;
- To provide adequate knowledge of the technical issues that are essential to help executives in Government, banking and financial sector with non-technical backgrounds about renewable energy;
- To bring about attitudinal changes among the renewable energy professionals and those working in the mainstream power sector to enhance the use of renewable energy for the energy security of the country; and
- To act as a facilitator for improving the skill sets of professionals and executives in the renewable energy industry and also in research and development institutions.

(vi) International Relations

Over the years, Ministry has taken several initiatives to promote New & Renewable Energy through multiple bilateral activities and the highest level of policy-making and implementation. The Ministry also initiated several multilateral/trilateral cooperation frameworks like the South Asian Association for Regional Cooperation (SAARC), Association of South-East Asian Nations (ASEAN), Brazil-Russia-India-China-South Africa (BRICS), India-Brazil-South Africa (IBSA) etc.

The Ministry also works very closely with various international/multinational funding agencies, like World Bank, New Development Bank, KfW, African Development Bank (AfDB), United Nations Development Programme (UNDP), Asian Development Bank (ADB), United Nations Industrial Development Organization (UNIDO), GIZ and Global Environment Facility (GEF), who are providing technical and financial assistance for renewable energy projects in India.

The Ministry has been engaging with DEA, MEA, Missions of India abroad, Embassies of other countries, multilateral international organizations etc. for cooperation in the field of New & Renewable Energy. The notable initiatives of the Ministry are:

- Collaboration with Ministries and organisations from other countries for the promotion of New & Renewable Energy.
- Convene Bilateral / Multilateral / Joint Working Group (JWG) Meetings through physical and Video Conference modes.
- Collaboration under various multilateral/trilateral cooperation frameworks like the South Asian Association for Regional Cooperation (SAARC), Association of South-East Asian Nations (ASEAN), Brazil-Russia-India-China-South Africa (BRICS), India-Brazil-South Africa (IBSA) etc.
- Engagement with various international/multinational funding agencies, like World Bank, New Development Bank, KfW, African Development Bank (AfDB), United Nations Development Programme (UNDP), Asian Development Bank (ADB), United Nations Industrial Development

Organization (UNIDO), GIZ and Global Environment Facility (GEF), who are providing project-based assistance for renewable energy projects in India.

International Solar Alliance

The International Solar Alliance (ISA) is an inter-governmental treaty-based international organization headquartered in India with a global mandate to catalyse global solar growth by helping to reduce the cost of financing and technology for solar. Over 115 countries have signed the ISA Framework Agreement and 93 countries have also ratified the Framework Agreement of ISA. The International Solar Alliance is an observer of the United Nations Framework Convention on Climate Change (UNFCCC) and actively participated at COP27. ISA has also been granted observer status at the UN General Assembly. MNRE is actively engaged with the International Solar Alliance and supports hosting its general assembly and standing committee meetings.

The Group of Twenty (G20)

India received the G20 Presidency position for one year (2022-2023) from Indonesia in October 2022. The focus areas of India under the Energy Transition Working Group (ETWG) regarding renewable energy will be:

- Energy Transition through addressing technology gaps
- Low-cost Financing for Energy Transition
- Energy Security and Diversified Supply Chains
- Energy Efficiency, Industrial Low Carbon Transitions and Responsible Consumption
- Fuels for Future (3F)
- Universal Access to Clean Energy and Just Transition Pathway

The MNRE is working with the Ministry of Power on essential sectors such as low-cost finance, green hydrogen, offshore wind, decentralized renewable energy, supply chain diversification etc.

(vii) Information and Public Awareness

The objective of the "Information & Public Awareness Programme" is to disseminate information on new and renewable sources of energy (NRSE) systems/devices through a variety of media like electronic, print & exhibition as well as outdoor media, thereby popularizing and creating awareness about such systems and devices. It also brings to the fore benefits, technological developments and promotional activities taking place in the renewable energy arena from time to time. The Programme is implemented mainly through State Nodal Agencies, the Directorate of Advertising & Visual Publicity (DAVP), Doordarshan, All India Radio (AIR), and the Department of Posts, etc. MNRE also publish a magazine Akshay Urja Magazine.

(viii) Governance, administration & other support

Right to Information (RTI)

The Ministry is implementing the Right to Information (RTI) Act, 2005 as per the guidelines of the Department of Personnel and Training (DoPT) and the Central Information Commission (CIC). A Deputy Director General (DDG) level officer is leading the RTI cell of MNRE. The Ministry has designated Central Public Information Officers (CPIOs) and First Appellate Authorities (FAAs) to reply to RTI applications and First Appeals in accordance with the subjects assigned to them. The RTI Nodal Officer coordinates all physical and online applications and persuades CPIOs and FAAs to respond within the timeframe specified.

Foreign Direct Investment (FDI)

The Ministry of New and Renewable Energy (MNRE) had set up an FDI cell for taking care of the foreign direct investment entering the renewable energy sector in June 2020. The cell is headed by two members - a joint-secretary solar and a director. The function of the cell will be to process FDI proposals.

Integrated Finance Division (IFD)

IFD works between the MNRE and the Ministry of Finance. The primary responsibility of the IFD personnel is to check all proposals at the time of disbursement of any fund and ensure that the proposal is as per the scheme guidelines and the GFR. IFD examines all disbursements in the light of the program/scheme document and GFR and gives their concurrence.

The secondary role of IFD is to give their views at the time of preparation of the annual budget by respective departments/sections and any work allocated to IFD by the Secretary, MNRE on matters of finance is performed by IFD.

Vigilance cell

The vigilance cell is responsible for taking anti-corruption and preventive measures according to the rules, regulations, guidelines and instructions issued by the Government of India and the Central Vigilance Commission. The cell also looks after the vigilance work of SECI, IREDA, NISE, NIWE and NIBE. Vigilance Division is also entrusted with the task of the upkeep and scrutiny of Annual Performance Appraisal Reports (APARs) and Immovable Property Returns (IPRs) of officials of the Ministry. As the division is responsible for preventive vigilance, a list of sensitive and non-sensitive posts of the Ministry is prepared and the list is supervised by CVO.

Legal Cell

The Legal Cell of MNRE provides legal support in the drafting of affidavits, replies, reports, and correspondence, as well as in the compilation of legal opinions, reports, and correspondence, as needed, with the approval of the appropriate authorities. For all legally relevant matters (court cases), the legal

cell releases notifications and regulations. Additionally, by properly coordinating with Regional Offices & Advocates, keeps an eye on the development of court cases at the regional level.

(ix) Stakeholder management

The programmes and schemes of MNRE are implemented by the state nodal agencies (SNAs), state distribution companies (DISCOMs), two public sector undertakings namely Solar Energy Corporation of India (SECI) and Indian Renewable Energy Development Agency (IREDA) and three autonomous institutes namely National Institute of Solar Energy (NISE), National Institute of Wind Energy (NIWE) and National Institute of Bio-Energy (NIE). MNRE directly deals with these partners and the success of its programmes and schemes largely depends on these implementation partners. Apart from these programme implementation partners, MNRE closely works with several national and international institutions, and multilateral and bilateral organisations for financial and technical collaboration. The ministry coordinates with several other central government ministries and organisations such as the Power Ministry, the Ministry of Environment and Forests, the Ministry of Finance, the Ministry of Heavy Industries, the Ministry of Agriculture, the Ministry of Consumer Affairs, Food and Public Distribution, NITI Aayog, the Central Electricity Authority, the Central Electricity Regulatory Commission etc.

2) Knowledge Mapping

MNRE maintains a digital library where recommends the books, periodicals, newspapers and scientific publications and reports etc. are available for the members. The library is currently subscribing to 37 periodicals in Hindi and English languages. Besides, 23 newspapers in Hindi and English languages are also being subscribed. The library is using cloud-based library software e-Granthalaya version 4.0 for accessing the Library Catalogue to library users, Circulation (issue-return) Membership Management etc. The library has subscribed to the online Scientific Journals of Elsevier on Energy subject collection for all scientists and officers of the Ministry. In addition, the MNRE website has a section named ‘knowledge centre’ which contains information regarding the activities under the ministry.

- Reports of projects under several programmes.
- MNRE Annual reports from the year 2016 to 2022.
- ‘Akshay Urja’ magazine issues from January-February 2016 to March-April 2019.
- Articles regarding emerging technologies in the renewable energy sector.
- Videos made by MNRE for creating awareness about various renewable energy schemes and subsidies.
- Knowledgeable infographics related.
- Presentations regarding schemes and programmes conducted by the ministry.

3) Technology/ Infrastructure Mapping

MNRE working spaces are fully digitalised with local area network, server and digital devices and internet connection. MNRE uses e-HRMS tool for personnel management activities like leave, posting, promotion, transfer, maintenance of service book among others. With an aim of paperless work in office space, the Ministry has fully implemented e-Office which is meant for effective processing and online movement of files and receipts/ letters. The effectiveness and usefulness of e-Office was particularly visible during the Covid-19 pandemic and during "work from home" periods where the Ministry's work continued without disruption.

To support the Digital India Initiative of the Government of India, the MNRE has made different web portals and Mobile apps for transparency in operations and better service delivery to stakeholders. MNRE has signed an MoU with NIC for complete digitization of the implementation of various schemes and programmes of renewable energy sector in February 2022. The Operation & Maintenance, enhancement and upgradation of existing applications, development of new applications along with a data centre will be covered in this joint effort. A team of NIC experts work from the MNRE office.

MNRE's Web Portals and Mobile Apps are :

a) Ministry's Official Website (https://mnre.gov.in): Ministry's official website was updated and re-designed for better dissemination of information to stakeholders. Information at the website is available both in Hindi and English languages.
b) SPIN Portal (https://solarrooftop.gov.in/): This portal was developed for submission of online applications and project completion reports by implementing agencies for availing the financial assistance for installation of solar roof top projects. The portal is also synchronised with UMANG portal.
c) HRD Portal (https://hrd.mnre.gov.in): This Portal is developed for online submission of application under following HRD of the Ministry:
    i. National Renewable Energy Internship Scheme;
    ii. National Renewable Energy Fellowship Programme;
    iii. National Renewable Energy Science Fellowship Programme; iv. Short Term Training Programme in Renewable Energy;
d) CCDC Solar (https://scms.gov.in/): This portal is for facilitating issuance of concessional custom duty certificate for import of components required for setting up of new solar power projects.
e) CCDC Wind (https://ccdcwind.gov.in/): This portal is for issue of concessional custom duty certificate for import of components required for manufacturing of wind turbines.
f) Biourja Portal (https://biourja.mnre.gov.in/): This is for online submission of application for the following schemes:
    i. Energy from Urban, Industrial, Agricultural Wastes/Residues and Municipal Solid Waste

ii. Promotion of Biomass-based Co-generation in Sugar Mills and Other Industries in the Country

g) Biogas Portal (https://biogas.mnre.gov.in/): This Portal is for implementation of New National Biogas and Organic Manure Programme (NNBOMP) scheme. This is also available on mobile App platform. (https://play.google.com/store/apps/details?id=com.app.biogas).

h) R&D Portal (https://serviceonline.gov.in/dbt/): This is for online submission of RE related R&D proposals.

i) Solar Off-grid Portal (https://solaroffgrid.mnre.gov.in/): This portal was developed for online submission of proposals by implementing agencies for installation of off-grid and decentralized solar PV applications.

j) PM KUSUM Portal (https://pmkusum.mnre.gov.in/landing.html): This portal was developed for monitoring of implementation of PM KUSUM scheme, which is meant for farmers.

k) Solar Street Light Portal (https://ssl.mnre.gov.in/): This was developed for monitoring of installation of solar street lights which is also available through a mobile app: (https://play. google.com/store/apps/details?id=com.mnre.streetlightingapp).

l) Investment Portal (https://investment.mnre.gov.in/): This portal is to provide one-stop assistance and facilitation to the Industry and Investors for addressing the grievances of RE developers.

m) Akshay Urja Portal (https://akshayurja.gov.in): This portal provides information about overall potential of renewable which is available, total capacity addition and monthly generation for each energy including grid connected and off grid. These data are available state wise.

n) IRIX (Indian Renewable Energy Idea Exchange) portal (https://irix.gov.in): IRIX is a multistakeholder collaborative platform to exchange and catalyse ideas on Renewable Energy.

4) Training and capacity building

At present, there is no specific capacity development programme for officers of the Ministry. Scientists and officers working under technical work domains are generally deputed for short duration training sessions on adhoc basis and attend non-training activities such as short duration exposure visits, conference, seminars, trade fairs and site visits as a part of their job role. Administrative staff recruited through the staff selection commission generally undergo functional and competency training under DOPT. There is a budget allocation of INR200 crores for the five-year period (2021- 2026) for human resource development under the ministry. This budget is primarily to support human resources development activities outside the ministry as follows.

- Grant for short-term training and skill development in renewable energy
- Grant for Fellowships for higher studies and research in renewable energy
- Grant for enhancement of Renewable Energy education and training infrastructure
- Grant for Renewable Energy Chair

- Grant for National Renewable Energy Internship Programme

An amount of INR2.5 crores is kept in this budget under the heading "Others (support for the preparation of course structure for ITI or any other RE course, review of projects, remuneration of interns, seminars/workshops conducted by MNRE and its institutions for RE promotion, other Administrative expenses, Professional Charges for evaluation/ assessment/ survey studies/ reports, MNRE/SNA officers training fees for National/International training)". Therefore, a provision is made for national and international training for MNRE/ SNA officers. This will allow the Ministry to depute its officers for specialised training as and when required however, the allocated budget appears to be very minimum.

F. Institutional Pillar

1) Policy and regulatory environment

The activities of the Ministry of New and Renewable Energy are broadly driven by a broad set of legal and regulatory frameworks and some of the important ones are:

- Electricity Act, 2003 [12] provides for the "development of the power system based on optimal utilization of resources" that includes renewable resources.
- National Electricity Policy 2005 [13] "seeks to address" many issues including generation. It recommends "creating new generation capacities, appropriate technology" to meet the "widening of the difference between peak demand and the base load" and "non-conventional energy resources need to be exploited fully to create additional power generation capacity" [10].
- National Action Plan for Climate Change (NAPCC) [14] which was launched by the government of India on 30th June 2008 outlines a national strategy that aims to enable the country to adapt to climate change and enhance the ecological sustainability of India's development path. There are eight National Missions which form the core of the National Action Plan. They focus on promoting an understanding of climate change, adaptation and mitigation, energy efficiency and natural resource conservation. The National Solar Mission is one of the eight missions under NAPCC which is being implemented by MNRE.
- National Solar Mission [15] aims to "promote ecologically sustainable growth while addressing India's energy security challenge". As a part of the NAPCC the mission "constitutes a major contribution by India to the global effort to meet the challenges of climate change".
- National Green Hydrogen Mission [16] aims to make India the Global Hub for the production, usage and export of Green Hydrogen and its derivatives and "lead to significant decarbonisation of the economy, reduced dependence on fossil fuel imports, and enable India to assume technology and market leadership in Green Hydrogen".

- National Mission on Transformative Mobility and Battery Storage [17] is a multi-disciplinary mission that will "transform the mobility landscape". MNRE is one of the inter-Ministerial steering committee members of this Mission chaired by the CEO of NITI Aayog. The Mission recommends and drives strategies for transformative mobility and phased manufacturing programs for EVs, EV components and batteries.

2) Technology/ sector roadmap

a) Solar Energy

MNRE is the nodal Ministry to implement the National Solar Mission to implement 100 GW of solar in the country. There are multiple schemes formulated to achieve this target. The total installed capacity of solar as on 30th May 2023 is 67.82 GW. The Ministry supports the promotion of solar energy by formulating favourable policies and guidelines, providing central financial assistance and viability gap funding to selected schemes, and supporting R&D, skill development and quality control.

b) Wind Energy

India currently has the fourth largest wind installed capacity in the world with a total installed capacity of 43.20 GW (as of 30th May 2023). Capacity addition in the first quarter of 2023-24 is 565.85 MW [8].

The following are the main activities and schemes of MNRE under the wind energy domain.

- Generation-based incentive (GBI) scheme for wind power generation,
- Development of National off-shore wind energy policy,
- Development of National wind-solar hybrid Policy,
- Development of policy for repowering of the wind power projects,
- Small Wind energy and hybrid system scheme,
- Policy for waving off the inter-state transmission charges and losses for wind and solar projects,
- Processing and issuance of Concessional Custom Duty Certificates (Wind),
- Issue of guidelines for competitive-based bidding processes.

c) Small Hydro

In India, hydropower plants with a capacity of 25 MW or below are classified as small hydro. At present MNRE is looking after hydropower plants of up to 25 MW capacity. The estimated potential of small hydropower in India is 21,133 MW from 7,133 sites as assessed by the Hydro and Renewable Energy Department (HRED) of IIT Roorkee. The Ministry, being the nodal Ministry for the development of the small hydro sector in the country provides a broad framework by way of incentivizing the sector development through various measures. These include assistance for the assessment of SHP potential

including micro siting, developing testing and standardization and training facilities, support for survey and investigation, Detailed Project Report (DPR) preparation, capital subsidy for projects, support for renovation and modernization etc.

d) Bio Energy

As per MNRE sponsored study, the current availability of biomass in India is estimated at about 750 million metric tonnes per year. The study indicated estimated surplus biomass availability at about 230 million metric tonnes per annum covering agricultural residues corresponding to a potential of about 28 GW. This apart, about 14 GW of additional power could be generated through bagasse-based cogeneration in the country's 550 Sugar mills.

The following are the main activities and schemes of MNRE under the bio-energy domain.

- Development of Biomass Power Schemes and Policies
- Provide CFA for biomass power/co-generation projects
- Formulate policies for fiscal incentives for biomass power/co-generation projects
- Implement National Bio Energy Programme
    - To support the setting up of large biogas, BioCNG-based power plants from agriculture waste
    - To support the manufacturing of briquettes and pellets for power generation
    - To support the setting up of family and medium size biogas in rural areas
- Provide CFA under National Biogas and Manure Management Programme (NBMMP),
- To support Biogas Training Centres
- Manage bioenergy-related externally aided projects
- To support Biomass Cook-stove promotion activities
- All administrative and financial matters of NIBE and DG-NIBE

e) Waste to Energy

The Ministry is promoting all the technology options available for setting up projects for the recovery of energy in the form of Biogas/Bio-CNG/Electricity from agricultural, Industrial and urban wastes of renewable nature such as municipal solid wastes, vegetable and other market wastes, slaughterhouse waste, agricultural residues and industrial/STP wastes & effluents. The Waste to Energy division of MNRE has taken a proactive approach to addressing the issue of waste management in India.

The following are the main activities and schemes of MNRE under the waste-to-energy domain.

- Development of policies and guidelines aimed at encouraging the conversion of waste into energy.

- Provide a framework and roadmap to adopt best practices in waste management.
- Provide Central Financial Assistance for -
    - Installation of plants of Biogas production from Industrial Waste, Sewage Treatment Plants, Urban & Agricultural Waste/ Residue through Bio-methanation.
    - Installation of plants of Power generation or production of Bio-CNG/enriched Biogas from Biogas produced from Industrial Waste, Sewage Treatment Plants, Urban & Agricultural Waste/ Residue.
    - Installation of Biomass Gasifier for feeding power into the grid or meeting captive power and thermal needs of rice mills/other industries and villages.
    - Installation of Plants for the recovery of energy/power from Municipal Solid Waste.
- Issuance of Concessional Custom Duty Certificates (CCDCs) for setting up projects for the generation of Compressed bio-gas (Bio-CNG) using Urban and Industrial wastes of a Renewable Nature.
- Development of GIS Waste Mapping Tool in collaboration with GEF, IREDA and UNIDO.

f) Emerging Technologies

Green hydrogen, energy storage and electric mobility are emerging technologies globally and India is taking leading initiatives to adopt and promote these technologies. MNRE plays a critical role in the promotion and adoption of these technologies in India.

(i) Hydrogen

MNRE announced the National Green Hydrogen Mission in January 2023 with the following aims and objectives:

- Making India a leading producer and supplier of Green Hydrogen in the world
- Creation of export opportunities for Green Hydrogen and its derivatives
- Reduction in dependence on imported fossil fuels and feedstock
- Development of indigenous manufacturing capabilities
- Attracting investment and business opportunities for the industry
- Creating opportunities for employment and economic development
- Provide financial assistance for the manufacturing of electrolysers and the production of green hydrogen
- Supporting R&D projects

The mission outcomes projected by 2030 are:

- Development of green hydrogen production capacity of at least 5 MMT (Million Metric Tonne) per annum with an associated renewable energy capacity addition of about 125 GW in the country

- Over Rs. Eight lakh crore in total investments
- Creation of over Six lakh jobs
- The cumulative reduction in fossil fuel imports over Rs. One lakh crore
- Abatement of nearly 50 MMT of annual greenhouse gas emissions

(ii) Energy Storage

Energy storage can play a very important role in grid integration and balancing of variable generation sources. By increasing the system's overall flexibility, it can improve power quality, reduce peak demand, enhance the capacity of distribution/transmission grids, avoid/reduce deviation penalties etc. The use of energy storage systems by residential, commercial or industrial consumers, in conjunction with renewable energy has the potential to improve power quality and reliability for such consumers. This would also allow for the minimization of diesel consumption from backup power applications. Energy storage is the main component of EVs both in terms of cost and performance determination. The thrust for electric mobility utilizing indigenous modern and reliable energy storage would significantly reduce the country's dependence on imported fossil fuels and energy storage systems. The NITI Aayog is coordinating the work relating to energy storage. MNRE provides inputs and technical advice for policy formulation on energy storage and supports the implementation of round-the-clock renewable energy projects through SECI. Presently MNRE is formulating a policy for production-linked incentives (PLI) for the manufacturing of battery storage technologies for grid applications.

(iii) Electric Mobility

In 2012, the Ministry of Heavy Industry launched the National Electric Mobility Mission Plan (NEMMP) 2020 with a target to achieve 6-7 million sales of hybrid and electric vehicles year on year from 2020 onwards. The main objectives of this Mission are:

- Reduce primary oil consumption in transportation.
- Facilitate customer adoption of electric and clean energy vehicles.
- Encourage cutting-edge technology in India through adoption, adaptation, and research and development.
- Improve transportation used by the common man for personal and goods transportation.
- Reduce pollution in cities.
- Create EV manufacturing capacity that is of global scale and competitiveness.
- Facilitate employment growth in the sector.

MNRE provides inputs and technical advice for policy formulation for the promotion of electric mobility and EV charging infrastructure in the country.

g) New Technologies

The Ministry has taken up the following programs on various new technologies, As part of these programs, research, development and demonstration projects have been initiated at various research, scientific and educational institutes, universities, national laboratories, industry, etc. These projects are helping in the development of indigenous research and industrial base, expertise, trained manpower and prototypes/devices/systems in the country.

(i) Geo-Thermal Energy

Geothermal resources in India have been mapped by the Geological Survey of India (GSI). A broad estimate suggests that there could be a 10 GW geothermal power potential in India. Present efforts are towards establishing cost-competitive geothermal potential in India.

(ii) Ocean Energy

As per a study conducted by the Indian Institute of Technology, Chennai in association with CRISIL Risk and Infrastructure Solutions Limited in December 2014, the tidal power potential in India is estimated at around 12,455 MW. The potential areas with low/medium tidal wave strength are in the Gulf of Khambat, Gulf of Kutch & southern regions in Gujarat, Palk Bay- Mannar Channel in Tamil Nadu, and Hoogly river, South Haldia & Sunderbans in West Bengal. Tidal energy is still in Research & Development (R&D) phase and has not been implemented on a commercial scale in India.

II. Gap Assessment

1) Competency gap assessment

The capacity gaps at the individual level have been assessed for behavioural, functional and work domain areas based on the desired competency required for a position. The capacity gaps have been assessed by analysing the (a) responses received through online surveys from all categories of officials (b) in-person interviews with group heads, senior, mid-level and junior officers/scientists and (c) in-person focused group discussions with non-technical officials and young professionals.

Responses analysed for this assessment are as below:

(1) Senior officers and Scientists: Response received from 23 out of 29
(2) Mid-level and junior officers and Scientists: Responses received from 31 out of 44
(3) Non-technical officers and staff: Responses received from 24 out of 58

a) Functional and behavioural competency gaps assessment

The level of functional competencies in day-to-day work has been assessed from the responses to the questions on present competency in e-office, Program Management, MS Office, Public Financial Management System (PFMS), Right to Information Act, Government e-Marketplace (GeM), General Financial Rules, Human Resource Management Rules, Procurement and tender writing, Establishment Rules & General Administration Matters of Government Departments, Budgeting, Bookkeeping and accounting, Financial management, Vigilance, drafting cabinet note, office order, parliamentary questions, digital applications, Stakeholder management, Quantitative and analytical skills and Scheme rules and guidelines.

Similarly, the level of behavioural competencies in day-to-day work has been assessed from the responses to the questions on present competency in Leadership and teamwork, Communication Skills, Empathy to colleagues, Analytical Thinking, Time management, Negotiation, Managing stress, Conflict resolution, Attention to citizen needs and Gender sensitivity.

Responses were sought in the following level of competency:

1) None - No knowledge and no experience
2) Awareness (A) - Basic knowledge and limited or no experience
3) Working (W) - Working knowledge and practical experience
4) Practitioner (P) - Detailed knowledge and significant experience
5) Expert (E) - Expert knowledge and experience

Respondents were also asked if they require any specific functional and behavioural competency apart from the ones mentioned above. Responses are summarised in two broad categories – (1) responses with no or basic knowledge and (2) responses with working, practitioner or expert knowledge. Responses as no or basic knowledge mean there are immediate requirements of training for those officials in the responded areas.

Figure 24 to *Figure 29* in Appendix 1 (A) present graphical representations of capacity gaps in functional and behavioural competencies of MNRE officials at different levels.

b) Capacity gaps assessment in work domain areas

The capacity gaps at the individual level have been assessed for the intended work domain areas based on the requisite up-skilling required for a position. The following work domains have been assessed based on the responses received through online surveys, in-person interviews and focused group discussions.

1) Solar Energy
2) Wind Energy
3) Hydro Energy
4) Bio Energy
5) Waste to Energy
6) New and emerging technologies
7) Research & development
8) Finance & Accounts
9) Public Relations
10) International relations
11) Human Resource Development
12) IT & Administration
13) Implementation of official language
14) Planning & Coordination
15) Project financing

For each work domain, multiple options were given to the responded to choose up-skilling requirement as per their current position and job roles. Option was also given to suggest any other areas for up-skilling which is not mentioned in the given options.

Figure 30 to *Figure 40* of Appendix 1(B) present graphical representations of up-skilling requirements in different work domain areas of MNRE.

(i) Competency assessment of leadership positions in core domain areas (Jt. Secretary and Scientist - G) and team

There are seven leadership positions in MNRE core domain areas led by three joint Secretaries and four Scientist – G. These positions report to the Secretary MNRE. Roles and responsibilities across these positions are similar with the allocation of work for different technology areas. Organogram for these positions with activity leads, domain and admin staff with roles and responsibilities of the team are presented in the figure below.

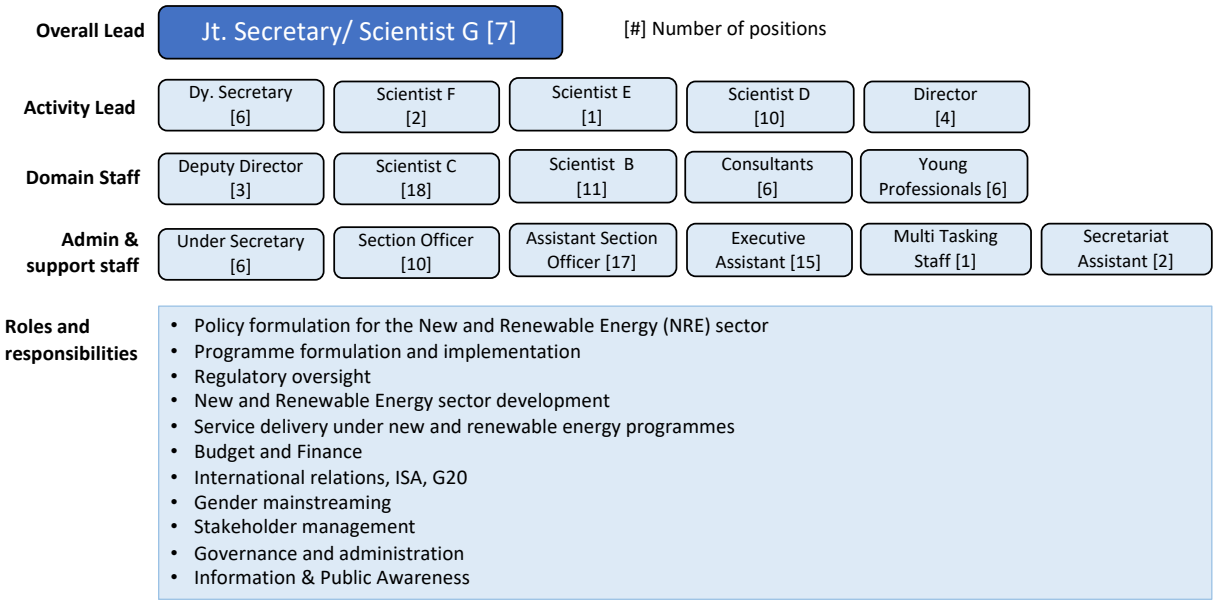


Figure 21: Organogram of leadership positions (Joint Secretary & Scientist G)

FRAC analysis has been carried out for each position with their roles, activities across three pillars of competencies i.e. domain knowledge, functional skill and behavioural attributes. The tables below presented the same for all positions presented in the organogram.

Table 2: Competency assessment of leadership positions (Joint Secretary & Scientist G)

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Joint Secretary/ Scientist G	Policy formulation & implementation for the New and Renewable Energy sector	• Identify national interest and citizen centricity • Understanding NRE potential and market dynamics • Agenda and goal setting • Review various policy options and develop preferred options • Stakeholder consultations • Policy adoption • Policy implementation • Policy evaluation	• National priority on energy security and climate change • Insight of technologies, economics, market dynamics and geopolitics • Policies and laws related to NRE	• Policy making process • Stakeholder management	• Strategic thinking • Goal setting • Citizen-Centricity • Leadership • Decision making • Analytical thinking • Communication • Gender sensitivity • Innovation
	Programme formulation and implementation	• Scoping of national priority and citizen centricity • Defining the objectives • Assessment of options • Stakeholder consultation • Setting targets & strategy • Budgeting & Finance • Formulation of implementation guidelines • Programme implementation • Monitoring & Evaluation	• National priorities • Knowledge on technologies and economics • Understanding of relevant policies, laws and regulations • Quality and standards	• Programme formulation process • Programme management • Stakeholder management • Budgeting • OOMF	• Strategic thinking • Goal setting • Citizen-Centricity • Leadership • Decision making • Analytical thinking • Communication • Gender sensitivity • Innovation

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	NRE sector development	• Financial & fiscal support to industry and end users • NRE resource mapping • Planning & coordination • Institution development • Capacity building • Standard and quality • R&D support • Regional development • Information & public awareness	• National priority • Domain knowledge	• Project management • Budgeting • Stakeholder management	• Strategic thinking • Citizen-Centricity • Leadership • Decision making • Analytical thinking • Communication • Gender sensitivity • Innovation
	International relations	• Understanding global affairs • Coordination with bilateral and multilateral organisations • Trade and economic relations • Technology transfer • Foreign direct investment	• National priority • Understand geo-politics • UNFCCC affairs • Knowledge on emerging technologies	• Foreign policy • Drafting of bilateral and multilateral treaty and agreement	• Strategic thinking • Negotiation • Decision making • Communication • Collaboration

Table 3: Competency assessment of activity leads (Dy. Secretary, Director, Scientist D/E/F)

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Dy. Secretary, Director, Scientist D/E/F	Assisting policy formulation & implementation for the NRE sector	• Identify national interest and citizen centricity • Understanding NRE potential and market dynamics • Agenda and goal setting • Review various policy options and develop preferred options • Stakeholder consultations • Policy adoption • Policy implementation • Policy evaluation	• National priority on energy security and climate change • Insight of technologies, economics, market dynamics and geopolitics • Policies and laws related to NRE	• Policy making process • Stakeholder management	• Strategic thinking • Goal setting • Citizen-Centricity • Leadership • Delegation • Decision making • Analytical thinking • Communication • Gender sensitivity • Innovation

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	Assisting programme formulation and implementation	• Scoping of national priority and citizen centricity • Defining the objectives • Assessment of options • Stakeholder consultation • Setting targets & strategy • Budgeting • Formulation of implementation guidelines • Programme implementation • Monitoring & Evaluation	• National priorities • Knowledge on technologies and economics • Understanding of relevant policies, laws and regulations • Quality and standards	• Programme formulation process • Programme management • Stakeholder management • Budgeting • OOMF	• Strategic thinking • Conceptual thinking • Goal setting • Citizen-Centricity • Leadership • Delegation • Decision making • Analytical thinking • Communication • Gender sensitivity • Innovation
	Assisting NRE sector development	• Financial & fiscal support to industry and end users • NRE resource mapping • Institution development • Capacity building • Standard and quality • R&D support	• National priority • Domain knowledge	• Project management • Budgeting • Stakeholder management	• Strategic thinking • Citizen-Centricity • Leadership • Delegation • Decision making • Analytical thinking • Communication • Gender sensitivity • Innovation
	Assisting International relations	• Understanding global affairs • Coordination with bilateral and multilateral organisations • Trade and economic relations • Technology transfer • Foreign direct investment	• National priority • Understand geo-politics • UNFCCC affairs • Knowledge on emerging technologies	• Foreign policy • Drafting of bilateral and multilateral treaty and agreement	• Strategic thinking • Negotiation • Decision making • Communication • Collaboration

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	Service delivery	• Need assessment • Resource allocation • Provisioning of services • Technology adoption • Capacity building • Outreach • Monitoring & evaluation • Grievance redressal	• Domain knowledge for monitoring and evaluation	• Auditing • Data management • Project appraisal • Financial management	• Citizen-Centricity • Empathy • Ethics and accountability • Communication • Gender sensitivity

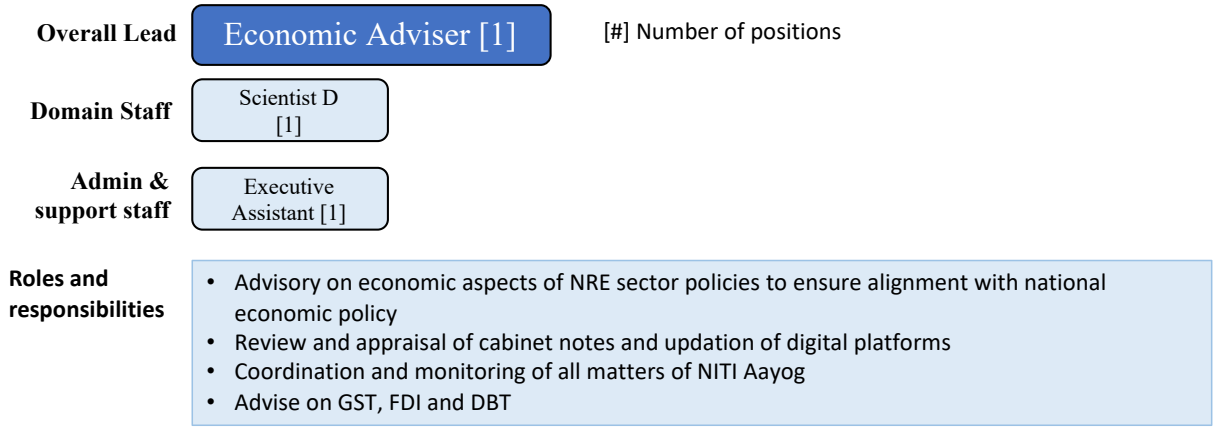
Table 4: Competency assessment of domain staff (Dy. Director, Scientist B/C, Consultants, Young Professionals)

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Dy. Director, Scientist B/C, Consultants, Young Professionals	Support policy formulation & implementation for the NRE sector	• Understanding NRE potential and market dynamics • Review various policy options and develop preferred options • Policy implementation • Policy evaluation	• National priority on energy security and climate change • Knowledge of technologies, economics and market dynamics • Policies and laws related to NRE	• Policy making process • Stakeholder management • Data analysis	• Attention to detail • Information seeking • Citizen-Centricity • Analytical thinking • Communication • Gender sensitivity • Innovation
	Support programme formulation and implementation	• Research • Assessment of options • Stakeholder consultation • Budgeting • Formulation of implementation guidelines • Programme implementation • Project management • Monitoring & Evaluation	• National priorities • Knowledge on technologies and economics • Understanding of relevant policies, laws and regulations • Quality and standards	• Programme formulation process • Programme management • Stakeholder management • Budgeting • OOMF	• Citizen-Centricity • Information seeking • Analytical thinking • Communication • Gender sensitivity • Innovation

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	Support NRE sector development	• Research on technology and market trends • NRE resource mapping • Capacity building • Standard and quality • R&D support	• National priority • Domain knowledge	• Project management • Budgeting • Stakeholder management	• Citizen-Centricity • Information seeking • Analytical thinking • Communication • Gender sensitivity • Innovation
	Support International relations	• Research • Technology transfer	• National priority • UNFCCC affairs • Knowledge on emerging technologies	• Foreign policy	• Citizen-Centricity • Information seeking • Analytical thinking
	Support Service delivery	• Need assessment • Provisioning of services • Capacity building • Outreach • Monitoring & evaluation	• Domain knowledge for monitoring and evaluation	• Data analysis • Data management	• Citizen-Centricity • Empathy • Ethics and accountability • Communication • Gender sensitivity

(ii) Competency assessment of leadership positions (Economic Adviser) and team

There is one Economic Adviser position in MNRE supported by one Scientist D and one Executive Assistant. The EA reports to Secretary MNRE. Organogram of this position with domain and admin staff with roles and responsibilities of the team are presented in the figure below.



FRAC analysis has been carried out for each position with their roles, activities across three pillars of competencies i.e. domain knowledge, functional skill and behavioural attributes. The tables below presented the same for all positions presented in the organogram.

Table 5: Competency assessment of Economic Adviser

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Economic Adviser	Advisory on economic aspects of NRE sector policies to ensure alignment with national economic policy	• Identify national interest and citizen centricity • Understanding economic aspects of NRE • Policy evaluation	• National priority on energy security and climate change • Economic insight of NRE sector • Policies and laws related to NRE	• Policy making process •	• Strategic thinking • Citizen-Centricity • Decision making • Analytical thinking • Communication • Gender sensitivity
	Review and appraisal of cabinet notes and updation of digital platforms	• Review Expenditure Finance Committee (EFC) notes, Cabinet & Cabinet Committee Economic Affairs (CCEA) Notes /Concept paper received from other Ministries/ Departments.	• National priorities • Knowledge on technologies and economics • Understanding of relevant policies, laws and regulations	• Economic appraisal	• Decision making • Analytical thinking • Communication • Gender sensitivity
	Coordination and monitoring of all matters of NITI Aayog	• Planning & coordination • Regional development • Monitoring and evaluation	• National priority • Domain knowledge	• Stakeholder management • OOMF	• Decision making • Analytical thinking • Delegation • Communication • Gender sensitivity

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	administration of GST, FDI and DBT cells	• Overall administration of GST cell, FDI cell and DBT cell	• National priority • Domain knowledge • Policies and laws related to RE	• General Financial Rules	• Decision making • Citizen centricity Gender sensitivity

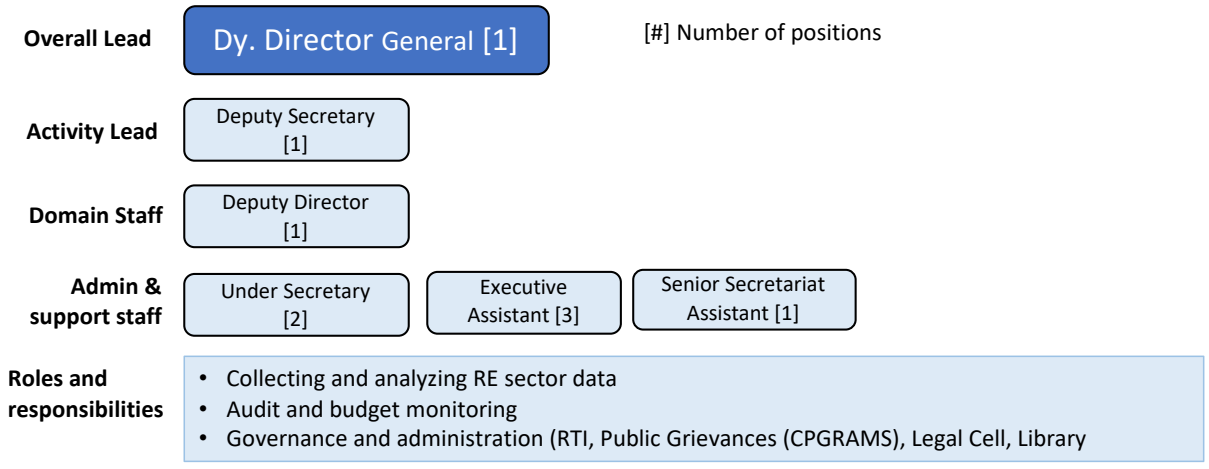
Table 6: Competency assessment of Scientist D assisting Economic Adviser

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Scientist D	Assisting EA to Advising on economic aspects of NRE sector policies to ensure alignment with national economic policy	• Identify national interest and citizen centricity • Understanding economic aspects of NRE • Policy evaluation	• National priority on energy security and climate change • Economic insight of NRE sector • Policies and laws related to NRE	• Policy making process •	• Strategic thinking • Citizen-Centricity • Decision making • Analytical thinking • Communication • Gender sensitivity
	Assisting EA in reviewing and appraisal of cabinet notes and updation of digital platforms	• Review Expenditure Finance Committee (EFC) notes, Cabinet & Cabinet Committee Economic Affairs (CCEA) Notes /Concept paper received from other Ministries/ Departments.	• National priorities • Knowledge on technologies and economics • Understanding of relevant policies, laws and regulations	• Economic appraisal	• Decision making • Analytical thinking • Communication • Gender sensitivity

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	Assisting EA in coordination and monitoring of all matters of NITI Aayog	• Planning & coordination • Regional development • Monitoring and evaluation	• National priority • Domain knowledge	• Stakeholder management • OOMF	• Decision making • Analytical thinking • Delegation • Communication • Gender sensitivity
	Assisting EA on administration of GST, FDI and DBT cells	• Overall administration of GST cell, FDI cell and DBT cell	• National priority • Domain knowledge • Policies and laws related to RE	• General Financial Rules	• Decision making • Citizen centricity • Gender sensitivity

(iii) Competency assessment of leadership positions (Dy. Director General) and team

There is one Deputy Director General (DDG) position in MNRE supported by one Deputy Secretary, one Deputy Director, one Under Secretary and Scientist D and three Executive Assistants and one senior Secretariat Assistant. The DDG reports to Secretary MNRE. Organogram of this position and team members with roles and responsibilities of the team are presented in the figure below.



FRAC analysis has been carried out for each position with their roles, activities across three pillars of competencies i.e. domain knowledge, functional skill and behavioural attributes. The tables below presented the same for all positions presented in the organogram.

Table 7: Competency assessment of Deputy Director General

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Deputy Director General	Collecting and analyzing NRE sector data	• Data collection and maintenance • Statistical analysis • Periodic data driven analysis of schemes	• Research technics • Advanced data collection and management technics • Data security • Emerging technologies	• Use of advanced statistical tools • Data analytics • Reporting techniques	• Citizen-Centricity • Decision making • Analytical thinking • Communication • Gender sensitivity
	Audit and budget monitoring	• Audit • Monitoring of budget	• Budget of NRE programmes and schemes	• Knowledge of audit process	• Ethics and values • Analytical thinking • Communication • Gender sensitivity
	Governance and administration (RTI, Public Grievances (CPGRAMS), Legal Cell, Library	• Managing RTI queries • Litigation management • Grievance redressal • Library management	• Domain knowledge	• RTI process • Legal process • CPGRAMS • Digital knowledge management tools	• Attention to details • Citizen centricity • Decision making • Analytical thinking • Delegation • Communication

Table 8: Competency assessment of Dy. Secretary and Dy. Director reporting to Dy. Director General

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Dy. Secretary and Dy. Director	Assist DDG for collecting and analyzing NRE sector data	• Data collection and maintenance • Statistical analysis • Periodic data driven analysis of schemes	• Research technics • Advanced data collection and management technics • Data security • Emerging technologies	• Use of advanced statistical tools • Data analytics • Reporting techniques	• Citizen-Centricity • Decision making • Analytical thinking • Communication • Gender sensitivity
	Assist DDG for audit and budget monitoring	• Audit • Monitoring of budget	• Budget of NRE programmes and schemes	• Knowledge of audit process	• Ethics and values • Analytical thinking • Communication • Gender sensitivity
	Assist DDG for Governance and administration (RTI, Public Grievances (CPGRAMS), Legal Cell, Library	• Managing RTI queries • Litigation management • Grievance redressal • Library management	• Domain knowledge	• RTI process • Legal process • CPGRAMS • Digital knowledge management tools	• Attention to details • Citizen centricity • Decision making • Analytical thinking • Delegation • Communication

(iv) Competency assessment of leadership positions (Jt. Secretary & Financial Adviser) and team

There is one Joint Secretary and Financial Adviser position in MNRE supported by one Director, one Under Secretary and one Assistant Section Officer, one Executive Assistant, one Personal Assistant and one Steno. The Joint Secretary and Financial Adviser reports to the Secretary, Ministry of Finance. Organogram of this position and team members with roles and responsibilities of the team are presented in the figure below.

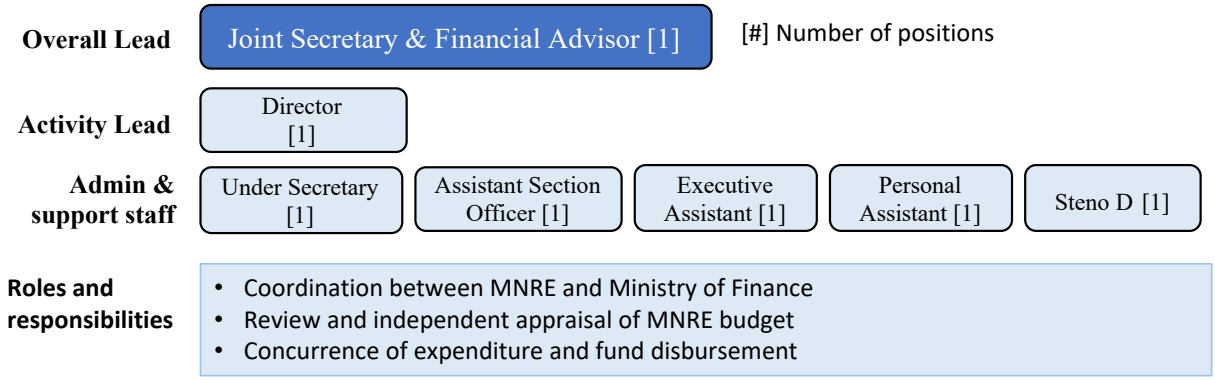


Table 9: Competency assessment of Jt. Secretary and Financial Advisor

FRAC analysis has been carried out for each position with their roles, activities across three pillars of competencies i.e. domain knowledge, functional skill and behavioural attributes. The tables below presented the same for all positions presented in the organogram.

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Jt. Secretary and Financial Advisor	Coordination between MNRE and Ministry of Finance	• Coordination with Ministry of Finance for MNRE financial matters	• Finance and Accounting • Administrative approval and guidelines of NRE programmes and schemes	• General Financial Rules • Budget control	• Citizen-Centricity • Decision making
	Review and independent appraisal of MNRE budget	• Advising MNRE officials for budget preparation	• Economics of NRE technologies	• Government budget preparation process	• Analytical thinking • Communication

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	Concurrence of expenditure and fund disbursement	• Critical scrutiny of disbursement proposal	• Finance and Accounting • Administrative approval and guidelines of NRE programmes and schemes	• General Financial Rules • Budget control	• Decision making • Analytical thinking • Communication

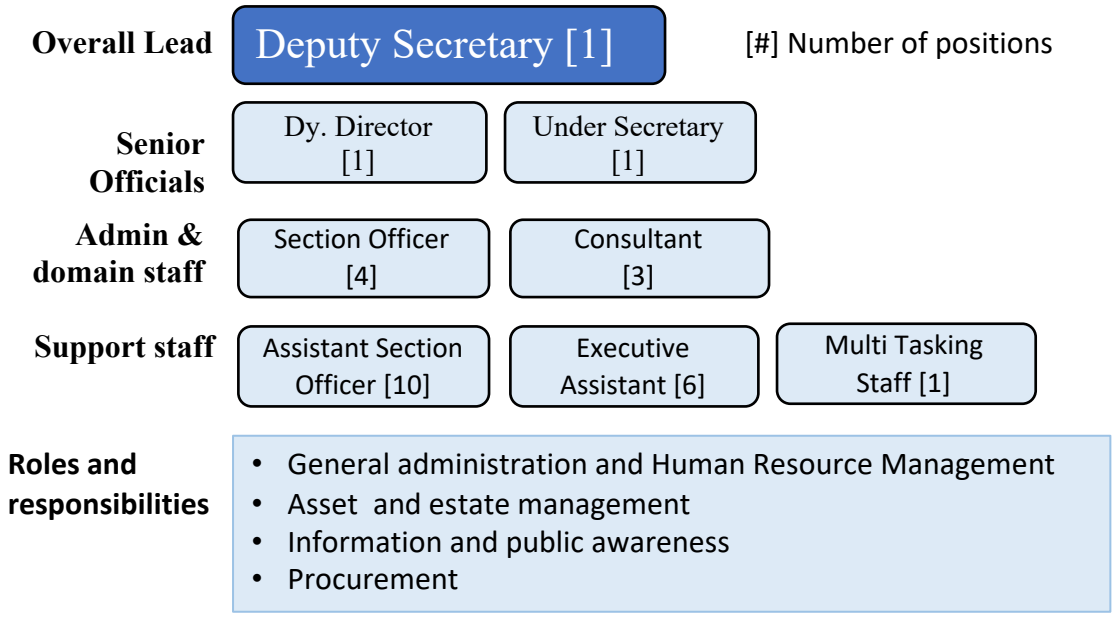
Table 10: Competency assessment of Director reporting to Jt. Secretary and Financial Advisor

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Director reporting to Jt. Secretary and Financial Advisor	Assist FA in coordination between MNRE and Ministry of Finance	• Coordination with Ministry of Finance for MNRE financial matters	• Finance and Accounting • Administrative approval and guidelines of NRE programmes and schemes	• General Financial Rules • Budget control	• Citizen-Centricity • Decision making
	Assist FA in review and independent appraisal of MNRE budget	• Advising MNRE officials for budget preparation	• Economics of NRE technologies	• Government budget preparation process	• Analytical thinking • Communication

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	Assist FA in concurrence of expenditure and fund disbursement	• Critical scrutiny of disbursement proposal	• Finance and Accounting • Administrative approval and guidelines of NRE programmes and schemes	• General Financial Rules • Budget control	• Decision making • Analytical thinking • Communication

(v) Competency assessment of senior administration officials (Dy. Secretary, Dy. Director & Under Secretary) and team

The general governance and administration matters at MNRE are looked after by one Deputy Secretary, supported by one Deputy Director, one Under Secretary and a team of Section Officers, Consultants, Assistant Section Officers, Executive Assistant multi-tasking staff. These positions reports different leadership positions based on the work allocation. Organogram of these positions and team members with roles and responsibilities of the team are presented in the figure below.



FRAC analysis has been carried out for each position with their roles, activities across three pillars of competencies i.e. domain knowledge, functional skill and behavioural attributes. The tables below presented the same for all positions presented in the organogram.

Table 11: Competency assessment of senior administration officials (Dy Secretary, Dy. Director and Under Secretary)

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Dy. Secretary, Dy. Director and Under Secretary	General administration and human resource management	• General administrative work • Human Resource Management • Recruitment • Appraisal	• Human resource management rules	• Recruitment process • Use of digital tools and applications • Data management	• Ethics and values • Empathy • Decision making • Communication • Gender sensitivity
	Asset and estate management	• Asset inventory management • Monitor and rating of asset conditions • Tracking asset depreciation • Determine asset value and replacement/ repair cost • Office building & facilities maintenance and repair • Interior planning and augmentation	• Asset management • Facility management • Depreciation and asset valuation rules • Auction process	• Asset management process • Inventory management • Logbook management	• Ethics and values • Decision making • Analytical thinking • Communication • Gender sensitivity
	Information and public awareness	• Release of press note and press briefing • Release of advertisement • Release of social media contents • Organize press meet • Organize events	• Knowledge on NRE technologies • Knowledge on MNRE programmes and schemes	• Use of digital tools and applications • Effective communication strategies • Event management technics	• Citizen centricity • Decision making • Communication • Gender sensitivity

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	Procurement	• Tender preparation • Tender evaluation • Purchase order • Quality check • Payment	• Procurement rules • General financial rules • GST rules • Audit compliance	• Government e-marketplace • Payment process • Use of digital tools	• Attention to details • Ethics and values • Decision making • Analytical thinking • Negotiation

Table 12: Competency assessment of secretarial staff (Section Officers, Consultants and Assistant Section Officers)

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
Section Officers, Consultant and Assistant Section Officers	Assist in general administration and human	• General administrative work • Human Resource Management • Recruitment • Appraisal	• Human resource management rules	• Recruitment process • Use of digital tools and applications • Data management	• Ethics and values • Empathy • Decision making • Communication • Gender sensitivity
	Assist in asset and estate management	• Asset inventory management • Monitor and rating of asset conditions • Tracking asset depreciation • Determine asset value and replacement/ repair cost • Office building & facilities maintenance and repair • Interior planning and augmentation	• Asset management • Facility management • Depreciation and asset valuation rules • Auction process	• Asset management process • Inventory management • Logbook management	• Ethics and values • Decision making • Analytical thinking • Communication • Gender sensitivity

Position	Role	Activities	Competencies		
			Domain	Functional	Behavioural
	Assist in information and public awareness	• Release of press note and press briefing • Release of advertisement • Release of social media contents • Organize press meet • Organize events	• Knowledge on NRE technologies • Knowledge on MNRE programmes and schemes	• Use of digital tools and applications • Effective communication strategies • Event management technics	• Citizen centricity • Decision making • Communication • Gender sensitivity
	Assist in procurement	• Tender preparation • Tender evaluation • Purchase order • Quality check • Payment	• Procurement rules • General financial rules • GST rules • Audit compliance	• Government e-marketplace • Payment process • Use of digital tools	• Attention to details • Ethics and values • Decision making • Analytical thinking • Negotiation

c) Summary of competency gaps assessment

The gap assessment is performed based on online survey, in-person interview, group discussion, consultation with the group heads and the HR team of the Ministry. The roles and responsibilities of each position in the Ministry has been mapped and the desired knowledge, skills and attitudes are identified.

The competency gap at individual, organizational and institutional level has been assessed based on the desired competency required under the three capacity building pillars. These capacity requirements are grouped under three competency lenses i.e. national priority, citizen centricity and emerging technologies.

Summary of findings are presented in the tables below:

Table 13: Lenses and Pillars of capacity building for leadership positions (Joint Secretary & Scientist G)

3 Competency Lenses	***Competency requirement in 3 Capacity Building Pillars***		
	Individual	***Organisational***	***Institutional***

National priorities	• Policy formulation and planning for national interest (D) • Programme development for national interest (D), • Utility-scale NRE power project planning & development (D) • Project financing (D)	• Technology and Data, • Digital Tools, • Online Collaboration Tools • Filling up of vacant positions	• Inclusion of national priorities in KPI formation for OOMF • Human resource succession plan
Citizen centricity	• Government e- Marketplace (F), • Stress management (B), • Conflict resolution (B), • Citizen centricity (B), • Gender sensitivity (B), • Ethics and Values in Public Governance (B)	• Stakeholder Feedback mechanism, • Citizen Charter, • Learning Management System for Stakeholders	• Citizen-centric programme development (D) • Incorporation of gender mainstreaming in all RE programmes
Emerging Technologies	• Emerging and smart NRE energy technologies & applications (D), • Technological development and market trends (D) • End-of-life NRE project waste management (D)	• Partnership with technology premier institutions, • Knowledge Bank, • Learning Management System for officers/staff,	• Policy for wider engagement between government, academia and industries

Table 14: Lenses and Pillars of capacity building for Senior Director/Director/Scientist F/E/D/Deputy Secretary Deputy Director

3 Competency Lenses	Competency requirement in 3 Capacity Building Pillars		
	Individual	Organisational	Institutional
National priorities	• Policy formulation and planning for national interest (D) • Programme development for national interest (D) • Utility-scale NRE power project planning & development (D) • Project financing (D) • Budgeting and financial management (F) • Negotiation (B) • Procurement management (F) • Responding parliamentary questions (F)	• Technology and Data, • Digital Tools, • Online Collaboration Tools • Filling up of vacant positions	• Inclusion of national priorities in KPI formation for OOMF • Human resource succession plan
Citizen centricity	• Government e- Marketplace (F) • Stakeholder management (F) • Conflict resolution (B) • Stress management (B) • Conflict resolution (B) • Citizen centricity (B) • Gender sensitivity (B) • Ethics and Values in Public Governance (B)	• Stakeholder Feedback mechanism, • Citizen Charter, • Learning Management System for Stakeholders	• Citizen-centric programme development (D) • Incorporation of gender mainstreaming in all RE programmes
Emerging Technologies	• Emerging and smart NRE energy technologies & applications (D), • Technological development and market trends (D) • End-of-life NRE project waste management (D)	• Partnership with technology premier institutions, • Knowledge Bank, • Learning Management System for officers/staff,	• Policy for wider engagement between government, academia and industries

Table 15: Lenses and Pillars of capacity building for Scientist C/B, Young Professionals, Consultants

3 Competency Lenses	Competency requirement in 3 Capacity Building Pillars		
	Individual	Organisational	Institutional
National priorities	• Project financing (D) • Budgeting and financial management (F) • Negotiation (B)	• Technology and Data, • Digital Tools, • Online Collaboration Tools • Filling up of vacant positions	• Inclusion of national priorities in KPI formation for OOMF

3 Competency Lenses	Competency requirement in 3 Capacity Building Pillars		
	Individual	Organisational	Institutional
	• Procurement management (F) • Responding to parliamentary questions (F) • Public Financial Management System (PFMS) (F) • General Financial Rules (F) • Establishment Rules & General Administration Matters of Government Departments (F) • Leadership and teamwork (B)		• Human resource succession plan
Citizen centricity	• Government e- Marketplace (F) • Stakeholder management (F) • Conflict resolution (B) • Stress management (B) • Conflict resolution (B) • Citizen centricity (B) • Gender sensitivity (B) • Ethics and Values in Public Governance (B) • Communication Skills (B)	• Stakeholder Feedback mechanism, • Citizen Charter, • Learning Management System for Stakeholders	• Citizen-centric programme development (D) • Incorporation of gender mainstreaming in all RE programmes
Emerging Technologies	• Emerging and smart NRE energy technologies & applications (D), • Technological development and market trends (D) • End-of-life NRE project waste management (D)	• Partnership with technology premier institutions, • Knowledge Bank, • Learning Management System for officers/staff,	• Policy for wider engagement between government, academia and industries

Table 16: Lenses and Pillars of capacity building for Group Heads (EA/DDG/CCA)

3 Competency Lenses	Competency requirement in 3 Capacity Building Pillars		
	Individual	Organisational	Institutional
National priorities	• Budget & Fiscal Policies (D) • Direct & Indirect Taxes (D) • Statutory & Audit Compliances (D) • RE Project Finance & Investment (D) • Policies & Laws related to Renewable Energy (D)	• Technology and Data, • Digital Tools, • Online Collaboration Tools	• Inclusion of national priorities in KPI formation for OOMF

3 Competency Lenses	Competency requirement in 3 Capacity Building Pillars		
	Individual	Organisational	Institutional
	• Appraisal and Evaluation of RE Projects (F)		
Citizen centricity	• Public Relations (D) • Stress management (B) • Citizen centricity (B) • Gender sensitivity (B) • Ethics and Values in Public Governance (B) • Stakeholder management (D)	• Stakeholder Feedback mechanism, • Citizen Charter, • Learning Management System for Stakeholders	• Citizen-centric programme development (D) • Incorporation of gender mainstreaming in all RE programmes
Emerging Technologies	• Latest technological development in the NRE sector (D) • Budgeting and Financing of emerging NRE technologies (D) • Energy Trading (D)	• Partnership with technology premier institutions, • Knowledge Bank, • Learning Management System for officers/staff,	• Policy for wider engagement between government, academia and industries

Table 17: Lenses and Pillars of capacity building for Deputy Secretary/ Director/Deputy Director/Under Secretary

3 Competency Lenses	Competency requirement in 3 Capacity Building Pillars		
	Individual	Organisational	Institutional
National priorities	• Budget & Fiscal Policies (D) • Direct & Indirect Taxes (D) • Statutory & Audit Compliances (D) • RE Project Finance & Investment (D) • Policies & Laws related to Renewable Energy (D) • Appraisal and Evaluation of RE Projects (F) • Public Financial Management System (PFMS) (F) • Human Resource Management Rules (F) • General Financial Rules (F)	• Technology and Data, • Digital Tools, • Online Collaboration Tools	• Inclusion of national priorities in KPI formation for OOMF
Citizen centricity	• Public Relations (D) • Stress management (B) • Citizen centricity (B) • Gender sensitivity (B)	• Stakeholder Feedback mechanism, • Citizen Charter, • Learning Management System for Stakeholders	• Citizen-centric programme development (D) • Incorporation of gender

	• Ethics and Values in Public Governance (B) • Stakeholder management (D)		mainstreaming in all RE programmes
Emerging Technologies	• Latest technological development in the NRE sector (D) • Budgeting and Financing of emerging NRE technologies (D) • Energy Trading (D)	• Partnership with technology premier institutions, • Knowledge Bank, • Learning Management System for officers/staff,	• Policy for wider engagement between government, academia and industries

2) Root-cause analysis

Root-cause analysis was performed based on information and suggestions collected from online survey, in-person interview with senior officers/ scientists and focus group discussion junior officials. The following table summarises the key issues and the root causes in different operational areas of the ministry.

Table 18: Summary of root-cause analysis

Areas	Key Issues	Root Cause
Structural	• Divisions are not structured based on a technology domain • Work allocation to employees is not based on core competencies and areas of interests	• Shortage of human resource • Not filling up vacant positions

Areas	Key Issues	Root Cause
Organizational/ Institutional	• Challenge in policy formation for cutting-edge emerging technologies • Lack of awareness among beneficiaries • Lack of effective SOP on feedback/ grievance management of beneficiary/ stakeholder • Delay in the transition of Monitoring & NITI Aayog's OOMF • Inadequate gender parity	• Shortage of human resource with core competency on emerging technologies domain areas • Lack of credible Knowledge Bank/ planned capacity building programme on technical, economic and policy aspects of emerging technologies • Lack of structured partnership and adequate engagement with premier technology institutions for solutions • Non-inclusion of beneficiary training/awareness during the formulation of the programmes/ schemes • Not having MNRE CPGRAMs portal • Non-inclusion of KPIs as per OOMF framework for programme M&E at the time of programme formulation • Non-incorporation of gender mainstreaming in internal HRD and NRE programmes
Operating model	• Interchangeability of job role between the work domains • Reporting to multiple positions	• Shortage of human resource • Not having adequate capacity building plan to cope up with the fast changing technical, commercial and regulatory aspects of NRE technologies • Delay in updation of government processes to cope up with changes in technical, commercial and regulatory changes of NRE
Decision making process	• Delay in administrative approval/decision making	• Shortage of human resources/lack of timely filling up vacant sanctioned posts • Lack of digital online collaboration tool for consensus building • Lack of training to fully utilize digital tools (e-office, MS-Excel, etc.)
Capacity gaps	• Delayed learning and acquisition of skill in fast growing NER sector • Lack of training in functional and domain areas • Lack of field and industry exposure	• Lack of planned capacity building programme • No defined budget provision for capacity building of MNRE officials • Inadequate refresher/ upskilling /advanced level training

Areas	Key Issues	Root Cause
		• Lack of transition to digital E-Learning Management System (both for employees and beneficiaries) • Lack of partnership and adequate engagement with premier technology institutions for solutions
Technology barriers	• Underutilization of existing digital tools • Lack of adequate digitization/IT infrastructure/IT manpower	• Inadequate regular refresher/upskilling training in digital tools • Lack of Technology and Data (Online Collaboration Tools, LMS, Knowledge bank, Grievance Management) • Lack of adequate manpower to manage IT infrastructure.

III. Enabling Environment Assessment

"Organisational capacity" refers to an organisation's ability to perform its tasks' or 'enabling conditions' to carry out its duties and achieve its objectives. It also refers to the organization's knowledge, resources, and processes. This report reviews the existing enabling environment at the individual and organizational level and assesses the capacity gaps. A consultative approach has been followed to assess the enabling environment for different business processes of MNRE. Programme vertical heads as well as HR department in the Ministry were consulted and different processes, functions, and current infrastructure were reviewed/analysed to assess organizational processes and functions. That includes:

1. Policy formulation, planning, and public relation
2. Budgeting and Financial Management
3. Service delivery and citizen-centric
4. Emerging technologies - regulation and adoption
5. Research and sector development
6. Programme management
7. Governance and administration
8. Performance management & evaluation - programmes & schemes

The Figure below shows a common structure to operate business processes in MNRE.

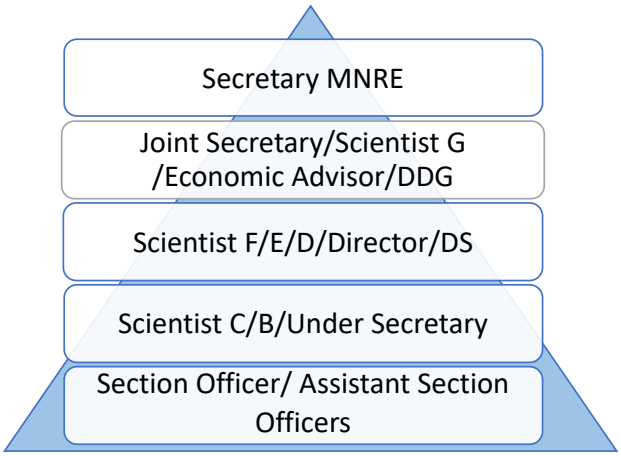


Figure 22: Process diagram/mapping for MNRE policy formulation, planning and public relation

Table 19: Summary of capacity building recommendations for individuals under different KPIs

Business Processes	Capacity Building Recommendations under different KPIs – Individual						
	Workflow & accountability	Documentation	Data Analysis	Risk Management	Compliance	Stakeholder Engagement	Performance Management
Policy formulation, planning, and public relation	• Process for public policy formulation (F) - Agenda Setting - Policy Formulation - Policy Adoption • Strategic Thinking (D) • Leadership (B) • Innovation (D) • Output-Outcome Monitoring Framework (OOMF) (F)	• Process for public policy implementation & management (F)	• Process for data collection, data analysis, and management (D)	• Risk Assessment in PESTEL (Political, Economic, Social, Technological, Environmental, and Legal) (D) • Framework for Risk Management in Public Policy	• OOMF process (F)	• Empathy, Communication (B)	• OOMF Process (F)
Budgeting and Financial Management	• Budgeting Process, Financial Management, Procurement Process (F) • OOMF (F)	• Financial Management (D) • Attention to Details (B)	• Process for data collection, analysis and management (D) • Attention to detail (B)	• Financial Risk Assessment (D)	• Financial Compliance Mechanism (D/F) • OOMF process (F)		• OOMF Process (F)
Service delivery and citizen-centric	• Project Management (D) Right to Public Service Act (D) • Induction Training (B, D, F)		• Data collection, data analysis and management (D)	• Risk Management in Public Policy (D) • Risk Management in Programme implementation (D)		• Empathy, Communication (B)	• OOMF Process (F)
Emerging technologies - regulation and adoption	• Technology Overview (market readiness, economics, standards, strategic advantage, policy and regulations, funding, case studies) (D)		• Data collection, data analysis and management (D)	• Framework for Risk Management in Public Policy	• OOMF	• Empathy, Communication (B)	• OOMF Process (F)
Research and sector development	• Technology Overview (market readiness, economics, standards, strategic advantage, policy and regulations, funding, case studies) (D)	• Data collection, data analysis and management (D)	• Framework for Risk Management in Public Policy	• Framework for Risk Management in Public Policy	• OOMF	• Empathy, Communication (B)	• OOMF Process (F)
Programme management	• Induction Training (B, D, F) • Project Management Tool (D) • Negotiation Techniques (D) • Procurement Process (F) • Risk Management Process (F)		• Data collection, data analysis and management (D)	• Framework for Risk Management in Public Policy	• OOMF (F)	• Empathy, Communication (B) • Contract Management (F)	• OOMF Process (F)
Governance and administration	• Project Management Tool (D) • Financial Rules (F) • Procurement Rules (F) • Asset Management (D)		• Data collection, data analysis and management (D)		• OOMF (F)	• Empathy, Communication, Negotiation (B)	• OOMF Process (F)
Performance management & evaluation - programmes & schemes	• Good governance • Performance management		• Data collection, data analysis and management (D)		• OOMF (F)	• Empathy, Communication (B) • Citizen's charter (D)	• Citizen's Report Card (D) • Community Report Card (D) • Social Audit • OOMF Process (F)

Table 20: Summary of organisational capacity building recommendations under different KPIs

Business Processes	Capacity Building Recommendations under different KPIs – Organisational						
	Workflow & accountability	Documentation	Data Analysis	Risk Management	Compliance	Stakeholder Engagement	Performance Management
Policy formulation, planning, and public relation	• Knowledge Bank • Partnership with institutions in Public Policy Making • LMS	• Knowledge Bank • LMS	• Technology and Data	• LMS	• LMS	• Stakeholder Feedback mechanism • Data Tools	• Online Collaboration Tools • Stakeholder Feedback Mechanism • LMS
Budgeting and Financial Management	• Knowledge Bank • LMS	• Knowledge Bank • LMS	• Technology and Data • Online Collaboration Tool • LMS	• LMS	• LMS	• Stakeholder Feedback mechanism • Data Tools	• Online Collaboration Tools • Stakeholder Feedback Mechanism • LMS
Service delivery and citizen-centric	• Knowledge Bank • Partnership with institutions in Project Management, Citizen Charter • LMS	• Technology and Data	• Technology and Data	• LMS	• LMS	• Stakeholder Feedback mechanism Data Tools	• Online Collaboration Tools • Stakeholder Feedback Mechanism • LMS
Emerging technologies - regulation and adoption	• Knowledge Bank • Partnership with Technology Institutions • LMS	• Technology and Data	• Technology and Data	• LMS	• LMS	• Online collaboration tool • Stakeholder Feedback mechanism • Data Tools	• Online Collaboration Tools • Stakeholder Feedback Mechanism • LMS for stakeholders
Research and sector development	• Knowledge Bank • Partnership with Technology Institutions • LMS	• Technology and Data	• Technology and Data	• LMS	• LMS	• Online collaboration tool • Stakeholder Feedback mechanism	• Data Tools • Online Collaboration Tools • LMS for stakeholders
Programme management	• Knowledge Bank • Partnership with Management Institutions • Online Collaboration Tool • LMS	• Technology and Data	• Technology and Data	• LMS	• LMS	• Online collaboration tool • Stakeholder Feedback mechanism	• Data Tools • Online Collaboration Tools • LMS for stakeholders
Governance and administration	• Online Collaboration Tool • Onboarding to IGOT • Employee Management System (To have all information about employees for Job Fit, seniority, and promotion to reduce HR delay, and motivate employees) • LMS	• Technology and Data	• Technology and Data		• LMS	• Online collaboration tool • Stakeholder Feedback mechanism	
Performance management & evaluation - programmes & schemes	• Partnership with Institutions (Centre for Good Governance) • Onboarding to IGOT • LMS		• Performance Information System	•	• LMS	• Online collaboration tool • Stakeholder Feedback mechanism	

IV. Action Plan

The Ministry's existing and future capacity needs have been assessed. Based on feedback from surveys and interaction with Ministry personnel at various levels, gap assessment as detailed in previous chapters has been carried out.

The Ministry's capacity-building action plan entails a methodical framework to improve the skills, knowledge, and capabilities of the Ministry's staff and leadership. The below action plan for the Ministry is in line with the strategic targets and objectives of the Ministry of New and Renewable Energy (MNRE). It is also built on three pillars (individual, organizational, and institutional) while keeping the needs of the country in mind (national priorities, emerging technology, and citizen centricity).

A. Capacity Building Goals and Objectives

The capacity-building aims and objectives listed below may be considered by the ministry as they are linked with the ministry's needs and strategic priorities based on the responses mapped after the survey and the consultations with the Ministry's officials and staff as well as the national priorities.

Table 21: Capacity building goals and objectives for the Ministry of New and Renewable Energy

Sl. No.	Goals and objectives	Action to achieve goals
1	***Enhance Leadership and Management Skills*** to develop a more effective and adaptable leadership team within the ministry.	• Provide leadership training and coaching to senior managers in line with national priorities. • Foster a culture of strategic thinking, innovation, and change management in line with emerging technologies and national priorities.
2	***Strengthen Domain Expertise*** to improve the domain skills and knowledge of staff in key emerging and new technology areas.	• Implement specialized training programs for scientific staff for policy formation, project planning, implementation, and monitoring. • Encourage staff to pursue continuous knowledge enhancements relevant to their roles.
3	***Promote Effective Communication and Collaboration*** to facilitate better communication and collaboration among ministry departments and teams.	• Conduct training on effective communication within and outside the organization keeping in mind new-age communication like social media. • Establish cross-functional project teams to encourage collaboration.

Sl. No.	Goals and objectives	Action to achieve goals
4	***Increase Digital Literacy and Technology Adoption*** to enable staff to leverage technology for improved efficiency and service delivery.	• Provide digital literacy training like e-office, online collaboration tools, cyber security, data security etc. to all staff. • Identify and implement technology solutions to streamline processes.
5	***Enhance Regulatory Compliance and Governance*** to ensure that the ministry adheres to all relevant regulations and maintains strong governance practices.	• Conduct regular compliance training for staff. • Establish robust internal controls and reporting mechanisms.
6	***Foster Inclusivity and Diversity*** to promote diversity and inclusion within the ministry's workforce.	• Provide diversity and inclusion training and awareness programs, particularly gender equity. • Implement inclusive hiring practices and policies.
7	***Improve Financial Management and Budgeting*** to enhance financial stewardship and budget management capabilities.	• Train finance and budgeting teams in RE financing, RE taxation, and best practices. • Establish financial transparency and compliance measures.
8	***Enhance Public Outreach and Stakeholder Engagement*** to strengthen the ministry's relationship with the stakeholders and the public at large to enhance citizen-centricity in service delivery.	• Develop a comprehensive communication and engagement strategy, particularly in the new age communication methodology and social media. • Train staff in effective public relations and stakeholder engagement.

B. Theory of Change

The Theory of Change (ToC) of the Ministry is a comprehensive framework that defines the causal route via which the ministry's activities and interventions are expected to result in the targeted short- and long-term outcomes and impacts. It will assist in the clarification of the ministry's objectives, strategies, and assumptions about how change will occur. The Theory of Change (ToC) for MNRE is prepared based on the responses gathered from the above-mentioned survey and consultation.

The Theory of Change for the Ministry is illustrated in the diagram below:

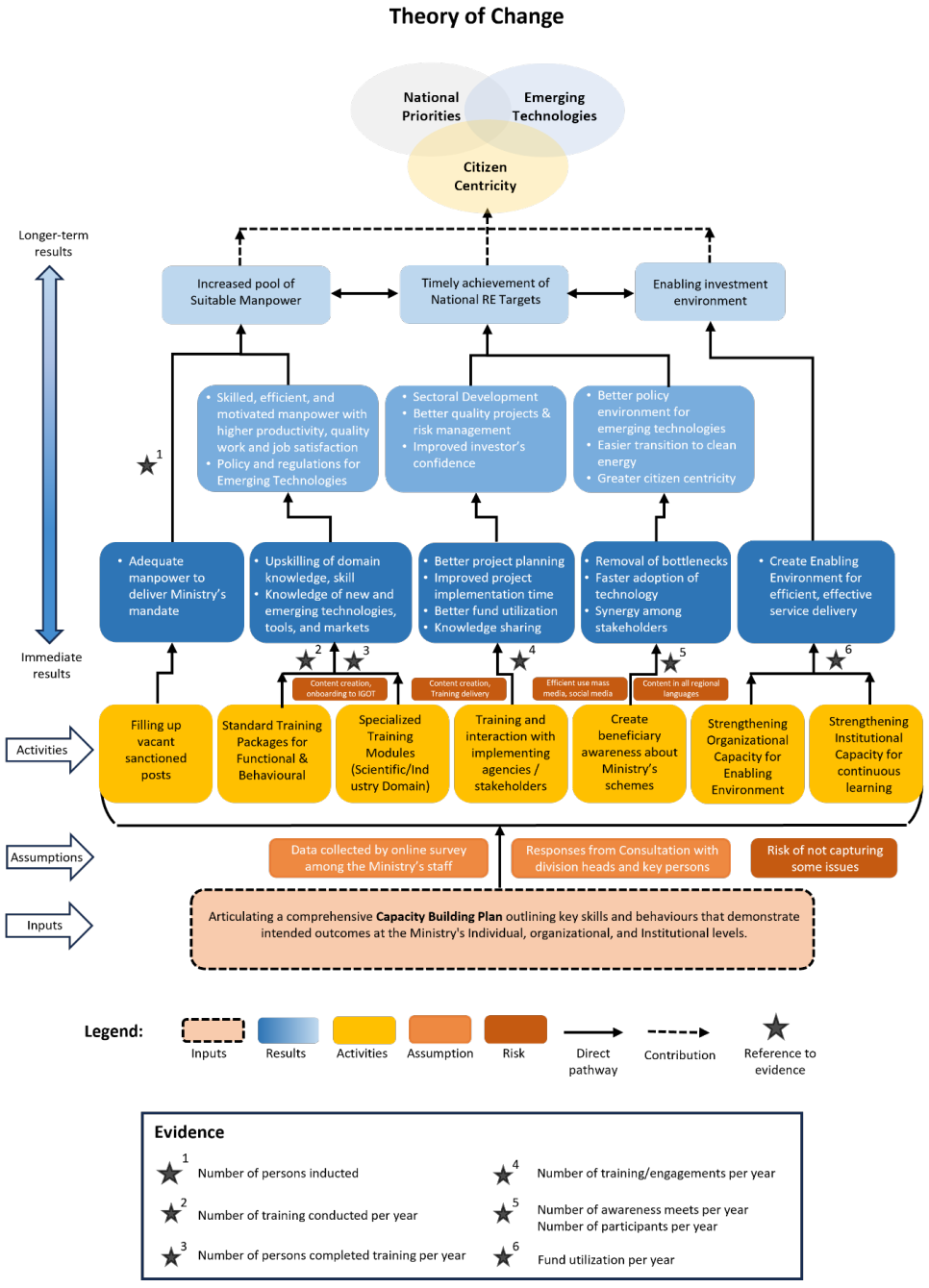


Figure 23: Theory of Change for the Ministry of New and Renewable Energy

C. Capacity Building Interventions

The recommended capacity-building interventions include a diverse set of actions and initiatives aimed at improving the skills, knowledge, capacities, and resources of individuals, organizations, and institutions. These interventions strive to improve performance, effectiveness, and sustainability in order to satisfy the three objectives of emerging technologies, national priorities, and citizen centricity.

The below table summarises the types of capacity-building interventions planned for the Ministry:

Table 22: Information Roadmap for implementing of Capacity Building Plan

INDIVIDUAL PILLAR	
Trainings	• Detailed list of main training topics on domain areas, functional, and behavioural competencies for all levels of employees of the Ministry is listed in the section (2) Training plan below. • Curriculum/sub-topics for all main training topics of domain areas are presented in Appendix 3.
Training Delivery	• The training delivery institutions that include the Ministry's own institutions, prospective academic institutions, and industry associations are included in the section (2) Training plan below.
ORGANIZATIONAL PILLAR	
Business process efficiencies	• The capacity interventions to be implemented at the organizational level are detailed in the "Enabling Environment" section mentioned above in this report. These interventions will enhance the capacity of the organization building the capacity of collective and shared aspects of the organization such as existing processes, digital and physical infrastructure, and technological capabilities that enable the organization to achieve its goals. • Resources and dependencies for the capacity-building interventions at the organizational level are captured in the section (1) Action Plan below
INSTITUTIONAL PILLAR	
Sustainability and Policy Support	• Policy and regulations required to maintain the continuous learning environment, building motivation and sustainability towards the three objectives (national priorities, emerging technologies and citizen centricity) of service delivery is mapped in "Enabling Environment section above and Action Plan below.

(1) Action Plan

Current roles and capacity needs of all staff, business processes, SOPs, HR rules, current physical and digital infrastructure are captured by conducting online surveys and consultations based on which the problem statements and their root causes are identified. The Capacity-Building interventions, their dependencies, resource requirements, and expected outcomes are mapped in the below table.

Table 23: Summary of Action Plan

Problem statement	Root cause analysis	Capacity building interventions/ activities	Dependencies	Resource requirement	Outcomes/ key results
Shortage of Manpower: Out of 328 sanctioned posts, current employee strength is 210.	• Retirement of senior employees • Vacant sanctioned posts	**Individual:** None	None	**Budget:** None **Training Calendar:** N/A **Delivery mode:** N/A **Training Partner Institution:** N/A **Certification:** N/A	• Stress reduction • Timely completion of tasks • Time for upskilling
		Organizational: Filling up the sanctioned posts	None	None	• Higher productivity • Easy problem solving • Improved efficiency • Motivated workforce
		Institutional: None	None	None	• Long-term efficiency improvement • Increased agility
Lack of training (Domain area): Technical Domain, Legal issues, electricity grid, latest R&D, IT	• Manpower shortage • Lack of CBP • Lack of Training Calendar	**Individual:** Active participation in training	Availability of Co-workers/staff to deliver tasks during training period	**Budget:** None **Training Calendar:** Yes **Delivery mode:** Both online and in-person	• Upskilling work domains • Knowledge of new and emerging technologies • Job satisfaction

Problem statement	Root cause analysis	Capacity building interventions/ activities	Dependencies	Resource requirement	Outcomes/ key results
tools, market trend.					• Motivation
		Organizational: • Training Calendar • Content development • Establish Knowledge Bank • Establish LMS	• Resource person • Partner Training Institutes • Learning Management System • Knowledge Bank	**Training Partner Institution:** Please refer section below (2) training plan **Certification:** Required	• Faster and informed decision making • Motivated workforce • Faster adoption of emerging technologies
		Institutional: Internal Skilling Policy	Budget approval and funding	None	• Effective Policymaking • Citizen centricity • Innovation capability
Lack of training (Functional Area): GEM and PFMS	• Lack of CBP • Lack of Training Calendar	**Individual:** Active participation in training	Availability of Co-workers/ staff to deliver tasks during training period	**Budget:** None **Training Calendar:** Yes **Delivery mode:** Both online and in-person	• Improved functional efficiency.
		Organizational: • Training Calendar for Refresher/ups killing Training • Onboarding IGOT platform	• Resource person (external) • Partner Training Institutes • Learning Management System	**Training Partner Institution:** IGOT/ISTM **Certification:** IGOT/ISTM	• Higher productivity • Improved efficiency
		Institutional: Internal Skilling Policy	Budget approval and funding	None	
Lack of Field Training: Visit	• Lack of CBP	**Individual:** Active	Availability of Co-workers/ staff to deliver	**Budget:** TBD **Training Calendar:** Yes	• Practical knowledge &

Problem statement	Root cause analysis	Capacity building interventions/ activities	Dependencies	Resource requirement	Outcomes/ key results
Project sites, Visit to Industry	• Lack of Training Calendar	participation in training	tasks during training period	**Delivery mode:** Field visit	Industry perception • Confidence building
		Organizational: • Training Calendar for Field visits • Strategic partnerships with Institutions and industries	• Resource person (external) • Partner Training Institutes	**Training Partner Institution:** Please refer section below (2) training plan **Certification:** Required	• Understanding the critical aspects • Improved decision making •
		Institutional: Internal Skilling Policy	Budget approval and funding	None	• Creating expertise
Not Leveraging Technology: Full functionality of E-Office, Collaborative tool, Spread Sheets, Presentation tools	• Lack of CBP • Lack of Training Calendar	**Individual:** Active participation in training	Availability of Co-workers/ staff to deliver tasks during training period	**Budget:** None **Training Calendar:** Yes **Delivery mode:** Both online and in-person	• Improved functional skill • Stress reduction • Time management • Time for upskilling
		Organizational: • Acquire and implement ITC tools	• Resource person • Partner Training Institutes	**Budget:** IT tools **Training Partner Institution:** IGOT/ISTM **Certification:** IGOT/ISTM	• Higher productivity
		Institutional: Internal Skilling Policy	Budget approval and funding	None	
Lack of capacity building at the	• Lack of CBP	**Individual:** Creating resources to	None	**Budget:** None	• Stress Management

Problem statement	Root cause analysis	Capacity building interventions/ activities	Dependencies	Resource requirement	Outcomes/ key results
level of implementing agencies	• Lack of budget provision	aggregate, validate and provide knowledge to implementing agencies		**Training Calendar:** None **Delivery mode:** Both online and in-person	• Effective project management • Timely completion of projects
		Organizational: • Repository for policy, technology, and financial knowledge • Organize regular webinars • Create online Knowledge Bank	Experts, Practitioners, Resource Persons, Researchers	**Budget:** TBD **Training Calendar:** Yes **Delivery mode:** Both online and offline	• Project planning • Improved project implementation time • Better project risk management • Better fund utilisation
		Institutional: Internal policy for knowledge acquisition, validation, and dissemination	Budget Approval from appropriate authority	International/ multilateral agencies	• Meet or exceed National Targets
Lack of awareness among citizen/ beneficiaries: About the schemes and programs of the Ministry	Lack of adequate outreach	**Individual:** Content creation and presentation – social media, blogs, videos	None	**Budget:** TBD **Training Calendar:** Yes **Delivery mode:** Both online and offline	• Public awareness • Effective outreach • Effective feedback
		Organizational: • Develop citizen corner in the website • Calendar for the citizen engagements activities	• Resource person (external) • PR experts	None	• Improved public participation • Better fund utilisation

Problem statement	Root cause analysis	Capacity building interventions/ activities	Dependencies	Resource requirement	Outcomes/ key results
		Institutional: Budget provision for beneficiary awareness	Budget Approval from appropriate authority	None	• Meet or exceed National Targets
Delay in administrative approval	• Manpower shortage • Lack of time management	**Individual:** Training on time management and consensus building	Availability of Co-workers/ staff to deliver tasks during training period	**Budget:** None **Training Calendar:** Yes **Delivery mode:** Both online and offline	• Stress reduction • Timely completion of tasks
		Organizational: • Filling up vacant posts • Training on Time Management	• Resource person (external) • Partner Training Institutes	**Training Partner Institution:** IGOT/ ISTM **Certification:** IGOT/ISTM	• Higher productivity • Improved efficiency • Higher citizen centricity
		Institutional: Set SOP for administrative approval with the timeline	None	None	• Increase citizen centricity

(2) Training Plan

Training plans for the financial year 2023-24 and 2024-25 have been prepare in consultation with MNRE senior officers. These plans include training and non-training activities for all domain competencies, behavioural competencies and functional competencies covering all categories officers and staff.

The following tables summarise (1) training areas, (2) main topic of the training for up-skilling, (3) training format, (4) non-training activities, (5) training duration and target group of participants, (6) timeline and (7) list of potential training providers/institutes.

The Number of training participants for each domain area for training programmes to be conducted during FY 2023-24 and 2024-25 is presented in the

Table 35.

Table 24: Training Plan for Domain Competency: Domain Area - Solar Energy

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Grid-connected solar power	• Utility Scale Solar Power plants • Rooftop Solar PV • Grid-connected Distributed Solar Power System • Solar-BESS -DG Hybrid Systems for C&I consumers • Floating Solar (FPV) • Agrivoltaics or Agri Photovoltaic	In-person Online	Exposure visits to operational projects Expert seminar/ presentation /conference/ seminars	2 -3 days of training for senior and mid- level officers 5 - 6 days of training for junior officers and young professionals	Q4 of 2023-24 Q1 of 2024-25	National: NISE IIT Bombay International: GSES RENAC SEI

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Off-grid, minigrid and hybrid solar power	• Small Off-grid PV Systems • Mini-grid and Hybrid System • Solar Wind Hybrid System • Solar Water Pumping system • Solar energy-based livelihood applications	In-person Online	Exposure visits to operational projects Expert seminar/ presentation	2 -3 days of training for senior and mid-level officers 5 – 6 days of training for junior officers and young professionals	Q1 of 2024-25 Q2 of 2024-25	NISE IIT Bombay
Solar project development and management	• Solar PV Fundamental • Solar Resource Assessment & Forecasting • Solar PV Design & Installation • Standards, Quality and Safety aspects of solar projects • Solar PV Manufacturing • Solar Project Asset Management • End of life Waste Management	In-person Online	Expert seminar/presentation conference/ seminars Exposure visits to operational projects and manufacturing plants	2 -3 days of training for senior and mid-level officers 5 - 6 days of training for junior officers and young professionals	Q4 of 2023-24	National: NISE IIT Bombay International: GSES (AU) RENAC (G) SEI (US)
Solar thermal power and heat	• Solar Thermal for Power • Solar Thermal for Heat • Solar Thermal Manufacturing	In-person Online	Exposure visits to operational projects and manufacturing plants Expert seminar/presentation conference/ seminars	2 -3 days of training for senior and mid-level officers 5 - 6 days of training for junior officers and young professionals	Q1 of 2024-25	National: NISE IIT Bombay IIT Jodhpur International: IT Power Thermal (AU) ANU (AU)

Table 25: Training Plan for Domain Competency: Domain Area - Wind Energy

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Wind project development and management	• Wind Energy & Turbine Technologies • Wind Resource Assessment & Forecasting • Wind power project planning and implementation • Standards, Quality and Safety aspects of wind projects • Wind turbine manufacturing • Wind Project Asset Management • End of life Waste Management • Off-shore wind project development • Wind and solar hybrid project development	In-person Online	Expert seminar/ presentation conference/ seminars Exposure visits to operational projects and manufacturing plants	2 -3 days training for senior and mid-level officers 5 – 6 days of training for junior officers and young professionals	Q1 of 2024-25	National: NIWE International: DNV (Net) DTU (Den) Tonex (USA)
Green Energy Corridor	• Planning of green energy corridor • Renewable Energy Management Centres (REMC)	In-person Online	Expert seminar/presentation Exposure visits to operational projects	2 -3 days training for senior and mid-level officers	Q3 of 2024-25	National: NIWE International: Fraunhofer (G)

Table 26: Training Plan for Domain Competency: Domain Area – Small Hydro & pump storage

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Small Hydro project development and planning	• Resource assessment • Small hydropower project planning and implementation • Standards, Quality, Safety and environmental aspects of small hydro projects • Small hydro turbine manufacturing • Small hydro Project Asset Management	In-person Online	Expert seminar/ presentation conference/ seminars Exposure visits to operational projects and manufacturing plants	2 -3 days training for senior and mid-level officers 5 – 6 days of training for junior officers and young professionals	Q1 of 2024-25	National: IIT Roorkee International: The Renewable Energy Institute, UK
Pump storage systems	• Technologies • Policies and regulations • Approach for site selection and techno-economic feasibility • Planning and implementation • Case studies of pumped storage	In-person Online	Expert seminar/presentation on Exposure visits to operational projects	2 -3 days training for senior and mid-level officers	Q1 of 2024-25	National: IIT Roorkee International: The Renewable Energy Institute, UK

Table 27: Training Plan for Domain Competency: Domain Area – Bio Energy

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Bio-Energy	• Bio- CNG • Supply chain management of biomass • Biomass pellets and briquets • National biogas programme • National bio manure programme • Municipal and industrial waste to energy	In-person Online	Expert seminar/ presentation conference/ seminars Exposure visits to operational projects and manufacturing plants	2 -3 days training for senior and mid-level officers 5 – 6 days of training for junior officers and young professionals	Q4 of 2023-24	National: IIT Delhi IISc Bangalore International: The Renewable Energy Institute, UK

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
	• Standards, Quality, Safety and environmental aspects of biomass-based projects					

Table 28: Training Plan for Domain Competency: Domain Area – Green Hydrogen

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Green Hydrogen	• Green Hydrogen Production, Storage and Transportation • Production of green hydrogen derivatives- Methanol and Ammonia • Hydrogen for Mobility and Fuel Cell Technology • Hydrogen Supply Chain and Economics • Electrolyser Technology and Manufacturing	In-person Online	Expert seminar/ presentation conference/ seminars Exposure visits to operational projects and manufacturing plants	2 -3 days of training for senior and mid-level officers 5 – 6 days of training for junior officers and young professionals	Q4 of 2023-24	National: NISE to collaborate with IOCL R&D IISc Bangalore IIT Delhi International: The Renewable Energy Institute, UK DNV, Netherlands PetroEdge, Singapore IFP School (France)

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
National Green Hydrogen Mission Implementation	• Objectives of the mission • Green hydrogen sourcing strategies • Mission phases and timeline • Detailed component observation • Risk management and mitigation • Governance and oversight framework • Expected outcomes and KPIs • Financial planning and management • Implementation roadmap • International cooperation and partnerships	In-person	A workshop with national and international experts to be organised	2 -3 days of workshop for senior and mid-level officers	Q4 of 2023-24	NISE to collaborate with IOCL R&D IISc Bangalore IIT Delhi International Experts to be invited

Table 29: Training Plan for Domain Competency: Domain Area – Energy Storage

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Energy Storage	• Different Energy Storage Technologies • Battery Energy Storage Technologies • Energy Storage for round-the-clock supply from Renewable Energy Sources • National Framework for Promoting Energy Storage Systems • End of life Waste Management of energy storage	In-person Online	Expert seminar/ presentation conference/ seminars Exposure visits to operational projects and manufacturing plants	2 -3 days training for senior and mid-level officers 5 – 6 days of training for junior officers and young professionals	Q1 of 2024-25	National: NISE India Smart Grid Forum (ISGF) IIT Bombay International: GSES (AU) Tonex (USA) Energy Storage World Forum, Singapore

Table 30: Training Plan for Domain Competency: Domain Area – Smart Energy Technologies

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Smart Energy Technologies	• Smart grid technologies • Virtual Power Plant Technologies • Round-the-clock RE supply planning • Internet of Energy (IoE) • Artificial intelligence in renewable energy	In-person Online	Expert seminar/ presentation conference/ seminars Exposure visits to operational projects	2 -3 days training for senior and mid-level officers 5 – 6 days of training for junior officers and young professionals	Q3 of 2024-25	National: NISE India Smart Grid Forum (ISGF) IIT Bombay International: GSES (AU) Tonex (USA) Energy Institute, UK

Table 31: Training Plan for Domain Competency: Domain Area - Electric Mobility

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Electric Mobility	• Transition from conventional to e-mobility in India and abroad • Evolution of mobility and current technology • Electric Vehicle – technologies, market, policies • Electric vehicle charging infrastructure • Effective interface and renewable electricity integration for e-mobility	In-person Online	Expert seminar/ presentation conference/ seminars Exposure visits to operational projects and manufacturing plants	1 -2 days training for senior and mid-level officers 4 – 5 days of training for junior officers and young professionals	Q4 of 2023-24	National: NISE India Smart Grid Forum (ISGF) IIT Bombay International: Energy Institute, UK

Table 32: Training Plan for Domain Competency: Domain Area - New Technologies

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
New Technologies	• Potential & Techno-economic Feasibility of Ocean Energy • Recent Technological Development in Ocean Energy • Geothermal Technologies • Geothermal Resource Assessment	In-person Online	Expert seminar/ presentation conference/ seminars Exposure visits to operational projects and manufacturing plants	1 -2 days training for senior and mid-level officers 3 – 4 days of training for junior officers and young professionals	Q4 of 2023-24	National: National Institute of Ocean Technology, Chennai NIWE International: UNESCO GRÓ Geothermal Training Programme, Iceland Energy and Climate Academy (Denmark)

Table 33: Training Plan for Domain Competency: Other domain-related topics

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Other domain related topics	• Carbon Market and Carbon Trading • Energy Economics • Net Zero Economy • Circular Economy • Climate Finance • Carbon Capture and Sequestration • Environmental, Social and Governance (ESG) • RE Project Finance & Investment	In-person Online	Expert seminar/ presentation conference/ seminars	1 - 2 days training for senior and mid-level officers 3 – 4 days of training for junior officers and young professionals	Q3 of 2024-25	National: IIM Ahmedabad IIM Lucknow International: The Renewable Energy Institute (REI), UK

Table 34: Training Plan for Domain Competency: Human Resource Development in the RE sector

Training areas	Main topic of the training for up-skilling	Training format	Non-training Activities	Training duration and target group of participants	Timeline	Training providers
Human Resource Development	• Capacity Building/skill Development in the RE sector • Knowledge Management • HR Analytics and Training Need Analysis	In-person Online	Expert seminar/ presentation conference/ seminars	1 - 2 days training for senior and mid-level officers 3 – 4 days of training for junior officers and young professionals	Q4 of 2023-24	National: IIM Ahmedabad IIM Bangalore

Table 35: Number of participants for Domain Competency training and non-training activities

Sl. No.	Domain Competency	Q4 of 2023-24	Q1 of 2024-25	Q2 of 2024-25	Q3 of 2024-25	Q4 of 2024-25
1	*Domain Area - Solar Energy*	JS, Scientist G: 2 Director, Scientist F/E: 1 US, Dy. Director, Scientist D: 2 Scientist C/B, YP: 7	JS, Scientist G: 2 Dy. Secretary: 1 Director, Scientist F/E: 1 US, Dy. Director, Scientist D: 2 Scientist C/B, YP: 6 Consultants: 1	JS, Scientist G: 3 Dy. Secretary: 1 Director, Scientist F/E: 1 US, Dy. Director, Scientist D: 1 Scientist C/B, YP: 6		
2	*Domain Area - Wind Energy*		JS, Scientist G: 1 US, Dy. Director, Scientist D: 1 Scientist C/B, YP: 3		JS, Scientist G: 1 US, Dy. Director, Scientist D: 1 Scientist C/B, YP: 1	
3	*Domain Area – Small Hydro & pump storage*		JS, Scientist G: 1 US, Dy. Director, Scientist D: 1 Scientist C/B, YP: 1			
4	*Domain Area – Bio Energy*	JS, Scientist G: 1 Director, Scientist F/E: 1 US, Dy. Director, Scientist D: 1 Scientist C/B, YP: 4 Consultants: 1				
5	*Domain Area – Green Hydrogen*	JS, Scientist G: 1 Dy. Secretary: 1 Director, Scientist F/E: 1 Scientist C/B, YP: 3				
6	*Domain Area – Energy Storage*		JS, Scientist G: 1 Director, Scientist F/E: 1 US, Dy. Director, Scientist D: 1 Scientist C/B, YP: 1			
7	*Domain Area – Smart Energy Technologies*				JS, Scientist G: 1 Director, Scientist F/E: 1 Scientist C/B, YP: 2	
8	*Domain Area - Electric Mobility*					JS, Scientist G: 1 Director, Scientist F/E: 1 US, Dy. Director, Scientist D: 1 Scientist C/B, YP: 1

Sl. No.	Domain Competency	Q4 of 2023-24	Q1 of 2024-25	Q2 of 2024-25	Q3 of 2024-25	Q4 of 2024-25
9	*Domain Area - New Technologies*					JS, Scientist G: 1 US, Dy. Director, Scientist D: 1 Scientist C/B, YP: 3
10	*Other domain-related topics*				JS, Scientist G: 3 EA, DDG: 2 Dy. Secretary: 3 Director, Scientist F/E: 5 US, Dy. Director, Scientist D: 5 Scientist C/B, YP: 2 Consultants: 3	
11	*Human Resource Development in the RE sector*					JS, Scientist G: 1 Director, Scientist F/E: 1 US, Dy. Director, Scientist D: 1 Scientist C/B, YP: 1 Consultants: 1
	Total for all domain areas	JS, Scientist G: 5 Dy. Secretary: 1 Director, Scientist F/E: 3 US, Dy. Director, Scientist D: 3 Scientist C/B, YP: 14	JS, Scientist G: 5 Dy. Secretary: 1 Director, Scientist F/E: 2 US, Dy. Director, Scientist D: 5 Scientist C/B, YP: 11	JS, Scientist G: 3 Dy. Secretary: 1 Director, Scientist F/E: 1 Scientist C/B, YP: 6	JS, Scientist G: 5 EA, DDG: 2 Dy. Secretary: 3 Director, Scientist F/E: 6 US, Dy. Director, Scientist D: 6 Scientist C/B, YP: 5 Consultants: 3	JS, Scientist G: 3 Director, Scientist F/E: 2 US, Dy. Director, Scientist D: 3 Scientist C/B, YP: 5 Consultants: 1

Table 36: Training Plan for Behavioural Competency

Competency Addressed	Name of Course/ Training/ Module/ Intervention	Duration (Hours or Days)	Mode of delivery	Training Institute/ Partner Organization	Target Group of Participants/ Designation	Timeline
Citizen- Centricity	Citizen- Centricity	1 - 3 days	Online In-person	iGOT ISTM	All Participants	To be decided
Communication skill	Communication skill	7.5 hrs	Online in-person	ISTM	All participants	To be decided
Conflict Resolution	Conflict Resolution	5 days	In-person	Administrative Staff College of India (ASCI), Delhi	JS, Sci-G: 7 DS, Sci-E/F, Dir: 10 Sci-D, Dy. Dir: 10	To be decided
Critical Thinking	Critical Thinking	2 days	In-person	ISTM	All participants	To be decided
Decision Making	Decision Making	5 days	In-person	Administrative Staff College of India (ASCI), Hyderabad	JS, Sci-G: 7 DDG, EA: 2 DS, Sci-E/F, Dir: 10 Sci-D, Dy. Dir: 10	To be decided
Empathy to Colleagues	Empathy to Colleagues	1 - 2 days	Online	iGOT ISTM	Sci. C/B, YP: 33 SO, ASO: 43	To be decided
Ethics & Value in Public Governance	Ethics & Value in Public Governance	3 days	Online In-person	ISTM	All Participants	To be decided
Gender Sensitivity	Gender Sensitivity	1 - 3 days	Online In-person	iGOT ISTM	All Participants	To be decided
Leadership & Teamwork	Leadership & Teamwork	2-3 days	In-person	ISTM	Sci-C/B, YP: 33 SO, ASO: 43	To be decided
Leadership & Project Management	Leadership & Project Management	2-3 days	Online In-person	iGOT ISTM	Sci-D, Dy. Dir: 10 Sci-C/B, YP: 33	To be decided
Negotiation	Negotiation	5 days	In-person	Administrative Staff College of India (ASCI), Hyderabad	Sci-G: 4 DS, Sci-E/F, Dir: 10 Sci-D, Dy. Dir: 10	To be decided
Stress Management	Stress Management	1 - 2 days	Online	iGOT ISTM	All Participants	To be decided
Time Management	Time Management	1 hr 15 min	Online	iGOT	Sci-C/B, YP: 33 SO, ASO: 43	To be decided

Table 37: Training Plan for Functional Competency

Competency Addressed	Name of Course/ Training/ Module/ Intervention	Duration (Hours or Days)	Mode of delivery	Training Institute/ Partner Organization	Target Group of Participants/ Designation	Timeline
Book keeping and accounting	Bookkeeping and accounting	2 - 3 hours	Online	iGOT	Sci-C/B, YP: 30 US: 11 SO, ASO: 43	To be decided
Budgeting	Budgeting	2 days	In-person	ISTM	EA: 1 Director: 2 Sci-D/US: 18 Sci-C/B, YP: 22 SO, ASO: 15	To be decided
Drafting Cabinet note, office order, parliamentary questions	Drafting Cabinet note, office order, parliamentary questions	1- 2 days	Online	iGOT ISTM	Sci-C/B, YP: 30 DS, Dir: 7 Sci-D, Dy. Dir, US: 20 SO, ASO: 40	To be decided
e-office	e-office	6 - 8 hours	Online	iGOT	US: 11 SO/ASO: 43	To be decided
Establishment Rules & General Administration Matters	Establishment Rules & General Administration Matters	2 - 3 days	In-person	ISTM	DDG: 1 Director, DS: 7 Sci-C/B, YP: 30 Sci-D, Dy. Dir: 10	To be decided
Financial management	Financial management	3 - 5 days	In-person	ISTM	EA:1 Director, DS: 7 Sci-C/B, YP: 33 Sci-D, Dy. Director: 10	To be decided
General Financial Rules 2017	General Financial Rules 2018	1 - 2 days	Online	iGOT	Director, DS: 7 Sci-C/B, YP: 33 Sci-D, Dy. Director: 10 SO, ASO: 43	To be decided
Government e-Marketplace (GeM)	Government e-Marketplace (GeM)	1 - 2 days	Online In-person	iGOT ISTM	Director, DS: 7 Sci-C/B, YP: 33 Sci-D, Dy. Director: 10 SO, ASO: 43	To be decided
Human Resource Management Rules	Human Resource Management Rules	3 days	Online	ISTM	Director, DS: 7 Sci-C/B, YP: 33 SO, ASO: 43	To be decided
NIC applications	NIC applications	1 - 2 days	Online	ISTM	US: 11 SO, ASO: 43	To be decided

Competency Addressed	Name of Course/ Training/ Module/ Intervention	Duration (Hours or Days)	Mode of delivery	Training Institute/ Partner Organization	Target Group of Participants/ Designation	Timeline
Procurement & Tender Writing	Procurement & Tender Writing	1 -2 days	Online	ISTM	Director, DS: 7 Sci-C/B, YP: 33 Sci-D, Dy. Director: 10 SO, ASO: 43	To be decided
Project Management	Project Management	5 days	In-person	IIM Indore	Director, DS: 7 Sci-C/B, YP: 33 Sci-D, Dy. Director: 10	To be decided
Public Financial Management System (PFMS)	Public Financial Management System (PFMS)	2 days	Online In-person	ISTM NICF, Delhi	EA: 1 Sci-E, Director, DS: 8 YP: 5 Sci-D, Dy. Director: 10 SO, ASO: 43	To be decided
Right to Information	Right to Information	1 - 3 days	Online In-person	iGOT ISTM	Sci-E, Director, DS: 8 Sci-D, Dy. Director, US: 20 YP: 8 SO, ASO: 43	To be decided
Stakeholder management	Stakeholder management	1 - 3 days	Online In-person	iGOT IIM Indore	Sci-E/F, Director, DS: 10 Scientist C/B: 25 Sci-D, Dy. Director, US: 10	To be decided
Vigilance	Vigilance	3 - 5 days	Online In-person	ISTM	Sci-E/F, Director, DS: 10 Scientist C/B: 25 Sci-D, Dy. Director, US: 10	To be decided

Table 38: Training Plan for Functional Competency: Drivers and Parking Assistants

Competency Addressed	Name of Course/ Training/ Module/ Intervention	Duration (Hours or Days)	Mode of delivery	Training Institute/ Partner Organization	Target Group of Participants/ Designation	Timeline
Improvement of driving ability and efficiency in terms of Health, safety, behaviour,	• Basics of defensive driving with examples • Operation and application of Vehicle • Different types of hazards related to vehicle movements	1-2 days	In-person	Institute of Road Traffic Education College of Traffic Management, Aravali Hills, Surajkund Badhkal Road,	Drivers: 14 Parking Assistants: 3	To be decided

Competency Addressed	Name of Course/ Training/ Module/ Intervention	Duration (Hours or Days)	Mode of delivery	Training Institute/ Partner Organization	Target Group of Participants/ Designation	Timeline
hygiene, Vehicle maintenance, hazards, failure, traffic regulations	• Importance of the physical & mental well-being of drivers • Hazards and implement control measures • Safe site, safe vehicle conditions & safe journey • Vehicle safety devices help protect the vehicle occupants • Motor Act and Traffic Regulations			Sector 43, Faridabad, Haryana – 121010 Tel: 0129 2477000 | +91-7428795287 safety@irte.com, ctm@irte.com		

Table 39: Training Plan for Functional Competency: Housekeeping staff

Competency Addressed	Name of Course/ Training/ Module/ Intervention	Duration (Hours or Days)	Mode of delivery	Training Institute/ Partner Organization	Target Group of Participants/ Designation	Timeline
Improvement of all housekeeping activities related to public areas and room cleaning	• Performing pre-cleaning activities • Performing cleaning operation • Attending the room and performing housekeeping activities • Use of tools and equipment for housekeeping • Maintain health and hygiene • Office etiquettes • Maintaining cleaning record • Giving attention to details • Read and interpret instructions, procedures, information and signs in the workplace. • Handling and disposal of wastes • Workplace health and safety	1-2 days	In-person	Skill Council for Green Jobs DPMI B-20, New Ashok Nagar, Delhi-110096	House-keeping staff: 42	To be decided

Table 40: Training Plan for Functional Competency: Multi-tasking staff (MTS)

Competency Addressed	Name of Course/ Training/ Module/ Intervention	Duration (Hours or Days)	Mode of delivery	Training Institute/ Partner Organization	Target Group of Participants/ Designation	Timeline
Improvement of MTS performance	• Roles & Responsibilities of MTS, • Office etiquettes, • Conduct Rules, • Interacting with superiors and colleagues, • Office file (physical) management, • Record management, • Leave Rules • Health and Hygiene • Workplace safety	1-2 days	In-person	ISTM customised course	Muti-tasking staff: 28	To be decided

(3) Monitoring and Reporting

Monitoring and reporting is an integral part of the capacity-building plan to ensure that the plan is on track, achieving its objectives, and delivering the intended results. The action points of monitoring and reporting on the capacity-building plan of the Ministry are as follows.

Monitoring:

- Establish Key Performance Indicators (KPIs)
- Set Baselines
- Regular Data Collection
- Setting the frequency of monitoring
- Data Analysis, Data management and documentation
- Collecting Feedback

For Reporting:

- Determining the objective of reporting
- Develop Reporting Formats
- Regular Reporting
- Impact and Outcomes analysis and lessons learned
- Continuous improvement

Key Performance Indicators:

The key performance indicators (KPIs) of the Action Plan for performance (outputs) and results (outcomes) are identified for activities to be performed for the capacity building plan. Following table shows the detailed KPIs for each activity to be per

Table 41: Key performance indicators for different activities

Activities	Individual		Organizational	Institutional
Activity 1	Filling up vacant posts	**Objective:** Adequate manpower to deliver Ministry's mandate **Time required:** Two quarters **Budget:** TBD	- Planning for recruitment as per guidelines - Budget Allocation for the recruitment	None
	KPI (Output): Number of persons inducted	**KRI (Outcome):** - Number of filled up of post - Male-female ratio in employees	**KRI:** Percentage of amount spent	
Activity 2	Training Packages for Functional, Behavioural & Domain areas	**Objective:** - Upskilling of functional, behavioural & domain knowledge/ skill - Knowledge of new and emerging technologies, tools, and markets - Continuous learning/upskilling **Courses, Delivery Methods, Training Partner/Institutions, Time required, Target Staff:** As per Training Calendar attached **Certification**: Provided by training organization **Budget:** TBD	Planning & execution of training as per ACBP	None
	KPI (Output): - Number of training conducted - Number of persons completed training	**KRI (Outcome):** Number of persons attended and number of successful completions	**KRI:** Number of training organized	

Activities	Individual		Organizational	Institutional
Activity 3	Training and interaction with implementing agencies / stakeholders	**Objective:** - Better project planning - Improved project implementation time - Better fund utilization - Knowledge sharing **Target Audience:** Implementing agency **Course/ Publicity content:** to be created **Delivery method:** Online and offline/ social media **Time required:** 4 quarters **Budget:** TBD	Planning & execution of training programme for implementing agencies / stakeholders	None
	KPI (Output): Number of training/engagements per year	**KRI (Outcome):** - Number of attendees - Satisfaction of attendees/ agency by feedback	**KRI:** - Number of training organised	
Activity 4	Create beneficiary awareness about Ministry's schemes	**Objective:** - Removal of bottlenecks - Faster adoption of technology - Synergy among stakeholders **Time required:** 1 year **Budget:** TBD	- Develop beneficiary awareness plan - Allocation of fund - Execution of beneficiary awareness plan	None
	KPI (Output): - Number of awareness meets - Number of participants	**KRI (Outcome):** - Number of attendees	**KRI:** - Number of awareness programmes	

Activities	Individual		Organizational	Institutional
Activity 5	- Strengthening Organizational Capacity for Enabling Environment - Strengthening Institutional Capacity for continuous learning	**Objective:** Create Enabling Environment for efficient, effective service delivery **Time required:** 2 year **Budget:** TBD	- Develop of Knowledge Bank - Strategic alliances with training institutions / experts - Develop Learning Management System - Procure technology (hardware & software) - Online collaboration tool, Stakeholder feedback mechanism	
	KPI (Output): - Amount of fund utilized	**KRI (Outcome):**	**KRI (Outcome):** - Amount of budget spent	
Activity 6	Budget	**Objective:** to properly function and implement all the required activities **Time required:** 6 - 12 months	- Budget estimation for implementation of ACBP - Expenditure and control of fund	
	KPI (Output): Number of allocation of financial support	**KRI (Outcome):** - Rate of implementation of projects/activities - Profit Margin - Ratio of utilised and non-utilised financial assistance	**KRI:** Amount of fund spend	

Monitoring and Reporting Format for the Ministry:

Table 42: The sample Monitoring and Reporting format is shown below.

Secretary	JS / Sci-G	EA/ DDG/ CCA/ JS&FA	DS/ Dir/ Sci F/ E	US/ Sci D/ Dy Dir	Sci C/B/ YP	Assistant Dir / TO	SO/ASO	Executive Asistant	Multi-Tasking staff (MTS)	Driver & Parking Assistants (D&P)	Housekeeping Staff (HKS)
1	7	4	14	21	33	5	43	38	28	17	42

Training Areas	Target Participants	Target/ Achievement	Total	Q4 of 2023-24	Q1 of 2024-25	Q2 of 2024-25	Q3 of 2024-25	Q4 of 2024-25
Domain Areas	JS, Scientist G	Target	21	5	5	3	5	3
		Achievement						
	EA, DDG, CCA, FA	Target	2	0	0	0	2	0
		Achievement						
	Dy. Secretary	Target	6	1	1	1	3	0
		Achievement						
	Director, Scientist F/E	Target	14	3	2	1	6	2
		Achievement						
	US, Dy. Director, Scientist D	Target	17	3	5	0	6	3
		Achievement						
	Scientist C/B, YP	Target	41	14	11	6	5	5
		Achievement						
	Consultants	Target	10	6	0	0	3	1
		Achievement						
Functional Areas	JS, Scientist G	Target	0	0	0	0	0	0
		Achievement						
	EA, DDG, CCA, FA	Target	3	1	1	0	1	0
		Achievement						
	Dy. Secretary	Target	25	5	5	5	5	5
		Achievement						
		Target	24	5	2	7	5	5

Training Areas	Target Participants	Target/ Achievement	Total	Q4 of 2023-24	Q1 of 2024-25	Q2 of 2024-25	Q3 of 2024-25	Q4 of 2024-25
	Director, Scientist F/E	Achievement						
	US, Dy. Director, Scientist D	Target	70	18	11	20	10	11
		Achievement						
	Scientist C/B, YP	Target	132	33	33	33	33	0
		Achievement						
	Consultants	Target	0	0	0	0	0	0
		Achievement						
	SO/ASO	Target	215	43	43	43	43	43
		Achievement						
	Executive Assistant	Target	0	0	0	0	0	0
		Achievement						
	MTS	Target	60	60	0	0	0	0
		Achievement						
	Drivers & Parking Assistant	Target	21	21	0	0	0	0
		Achievement						
	House-keeping Staff	Target	45	45	0	0	0	0
		Achievement						
Behavioural Areas	JS, Scientist G	Target	28	7	7	0	7	7
		Achievement						
	EA, DDG, CCA, FA	Target	16	4	4	0	4	4
		Achievement						
	Dy. Secretary	Target	20	5	5	0	5	5
		Achievement						
	Director, Scientist F/E	Target	36	9	9	0	9	9
		Achievement						
	US, Dy. Director, Scientist D	Target	94	21	21	10	21	21
		Achievement						
	Scientist C/B, YP	Target	165	33	33	33	33	33
		Achievement						

Training Areas	Target Participants	Target/ Achievement	Total	Q4 of 2023-24	Q1 of 2024-25	Q2 of 2024-25	Q3 of 2024-25	Q4 of 2024-25
	Consultants	Target	16	4	4	0	4	4
		Achievement						
	SO/ASO	Target	215	43	43	43	43	43
		Achievement						

D.Gender and Other Specific Themes

The objective to provide gender training to the Ministry's employees are as follows:

- To provide gender perspective and how it impacts national development,
- To build and strengthen participant's skills in gender analysis and mainstreaming processes,
- To build participants' capacity to plan, conduct and evaluate issues in the Ministry's program/ scheme.

The Gender Action Plan (GAP) prepared for the Ministry includes gender-specific components to be considered in program design and implementation of program measurements and activities. The goal of this GAP is to create opportunities, change agents, and positive gender dynamics within the Ministry's Capacity Building Plan. The GAP assures adherence to the CBC's priority and promotion of gender equity by implementing gender-disaggregated data collecting, gender budgeting, and gender mainstreaming.

(1) Section 1: Gender-Disaggregated Data

In scaling up women's participation in renewable energy, the following interventions are considered crucial:

1) Formation of gender-sensitive programs and policies, that impact women beneficiaries and increase women's participation,
2) Access to finance and green funds for women entrepreneurs especially for micro-enterprises in rural areas, disadvantaged sections of the society,
3) Skill development, training, certification, and capacity building related to climate-friendly technologies for women,
4) Planning for inclusion of women beneficiaries in a programs/schemes,
5) Collection of gender-disaggregated data for all existing policies and programs. That means data of all the beneficiaries is to be collected and tabulated separately for different genders.

The objectives for gender-disaggregated data collection are as follows:

1) This is the pre-requisite for gender analysis,
2) Keep gender mainstreaming in the planning and formation of the Ministry's program within clean and affordable energy access,
3) Planning for gender budgeting within and outside the Ministry,
4) Achieving gender parity in all the categories of staff within the Ministry.

As the collection of gender-disaggregated data is necessary for gender equality and gender mainstreaming, training on gender-disaggregated data collection for the Ministry's staff is listed below:

Table 43: Gender dis-aggregated data collection format for capacity building programs

	Individual	Organization	Institutional
Training and capacity building measure	Gender disaggregated data and its importance in the planning process	Partnerships with institutes/ organizations/ experts for training on gender issues	Policy for gender equality, gender mainstreaming
Target	Number of trainees attending the session [women / men]: [23/104] Baseline: [0/0]	Number of institutes/ organizations/ experts for training on gender issues: [3] Baseline: [0]	Number of policies gender equality, gender mainstreaming: [1] Baseline: [0]
Achievement			
Training and capacity building measure	Methods of Collecting gender-disaggregated data among beneficiaries in all RE schemes (wherever possible)	Partnerships established with academic institutes for regular training on gender-disaggregated data collection	Policy to collect gender-disaggregated-data in all MNRE schemes wherever possible
Target	Number of trainees attending the session [women / men]: [23/104] Baseline: [0 / 0]	Number of schemes that are producing gender-disaggregated data on beneficiaries: [10] Baseline: [0]	Number of training conducted by training partner: [10] Baseline: [0]
Achievement			

It is recommended that exposure visits are organised for MNRE officials to national and international organizations working on gender issues. The exposure visits to any such institutes or organizations, programme sites, enable participants from different regions to interact with and learn from each other, allowing them to view practical examples of the successful integration of practices in collecting gender disaggregated data.

(2) Section 2: Gender Responsive Budgeting (GRB)

It is recommended that MNRE employs the budget as a starting point for any policy-making or program-development process for gender mainstreaming. The key initiatives to be undertaken by the Ministry are:

1) Identify the gender aspects and set gender disaggregated targets across programmes,
2) Estimate the gender-disaggregated expenditure requirements for various schemes,
3) Report gender-disaggregated expenditure requirements for the Ministry as a whole.

The objectives of training Gender Responsive Budgeting are as follows:

1) To develop a basic understanding of GRB and
2) To become familiar with the GRB process and tools to make it more equitable
3) To enhance skills in gender expenditure analysis, estimating expenditure requirements for different gender groups, etc.

Training on gender responsive budgeting for the Ministry's staff is listed below:

Table 44: List of training required for Gender Responsive Budgeting

	Individual	Organisation	Institutional
Training and capacity building measure	Gender Responsive Budgeting, objectives, benefits, and GRB stakeholders	Submission of detailed inputs into the gender budget statement	Strengthen gender budgeting cell to advise officials on inclusion of gender elements across schemes
Target	Number of trainees attending the session [women / men]: [23/104] Baseline: [0/0]	Quantum reported in the Gender Budget Statement of the Union Budget: [INR] Baseline: [INR]	Number of schemes included in the Gender Budget Statement: [10] Baseline: [0]
Achievement			
Training and capacity building measure	Budget approach, process, steps, and tools	Collaborate with MoWFW, ISTM, IGOT for courses, resource persons.	Organise training programmes on budget process and tools
Target	Number of trainees attending the session [women / men]: [23/104 Baseline: [0 / 0]	Number of courses for GRB: [6] Baseline: [0]	Number of schemes included in the Gender Budget Statement: [10] Baseline: [0]
Achievement			

(3) Section 3: Gender Mainstreaming in Scheme Design

The goal of gender mainstreaming is to ensure that the needs, interests, and priorities of all genders, especially women, are considered and addressed in a more equitable and inclusive way. The main objective of the training and capacity-building scheme design is to provide awareness among scheme implementers about gender - how to plan, set scheme goals, gender-responsive communication, formulate schemes, stakeholder consultation before scheme formulation, define key performance indicators, scheme implementation, getting feedback and adaptation in gender mainstreaming scheme design and implementation.

Below are some of the key steps/considerations for gender mainstreaming scheme design:

1) **Gender aggregated data analysis:** Conduct a thorough gender-disaggregated data collection and analysis. This should include data on gender roles, responsibilities, access to resources, decision-making power, etc.
2) **Set gender equality goals:** Establish clear goals for gender.
3) **Target groups:** Identify specific target groups and beneficiaries, paying attention to any potential gender imbalances, paying attention, particularly to the most marginalized.
4) **Stakeholder consultation:** Involve all genders from different backgrounds and communities in the scheme design process.
5) **Gender-responsive indicators:** Develop gender-sensitive indicators to monitor and evaluate the scheme's impact on gender equality.
6) **Budget Allocation:** Allocate resources in a way that addresses gender disparities and promotes gender equality goals.
7) **Capacity building:** Provide training and capacity-building to those involved in implementation to understand and address gender-specific challenges.
8) **Gender-responsive communication:** Ensure that all communication materials related to the scheme are gender-sensitive and inclusive.
9) **Regular review and adaptation:** Continuously assess the progress in achieving objectives and make necessary adjustments based on feedback.

The following are the training topics envisaged for the Ministry officials for the Gender Mainstreaming scheme design.

Table 45: Training required for the Ministry for Gender mainstreaming in scheme design

	Individual	Organisational	Institutional
Training and capacity building measure	Gender mainstreaming issues in various NRE sectors (Solar PV, Wind, Hydro, Biomass, Solar Thermal etc.)	Creating data base and updating statistics on gender issues in NRE sectors in India	Collaborations with national and international institutions, experts, and practitioners to provide training
Target	Number of trainees attending the session [women / men]: [23/104] Baseline: [0 / 0]	Number of data bases created/number of statistical reports: [1] Baseline: [0]	Number of institutions/experts collaborated: [3] Baseline: [0]
Achievement			
Training and capacity building measure	How to set gender equality goals, set targets, and set KPIs for performance evaluation	Create/curate content specific to NRE sectors and region-specific	Collaborations with national and international institutions, experts, and practitioners to provide training
Target	Number of trainees attending the session [women / men]: [23/104] Baseline: [0 / 0]	Number of courses created: [6] Baseline: [0]	Number of institutions/experts collaborated: [3] Baseline: [0]
Achievement			

The exposure visits to institutes, organizations, programme sites that are actively working on gender mainstreaming, especially in policy making and programme design for the NRE sector for diverse sections of society will expose them to real-world situations. That will enable the Ministry personnel to quickly understand the critical elements and issues in the scheme design process, implementation stages, risk mitigation, and continuous improvement.

Appendixes:

Appendix 1 (A): Survey responses on Functional & behavioural competency of MNRE officials

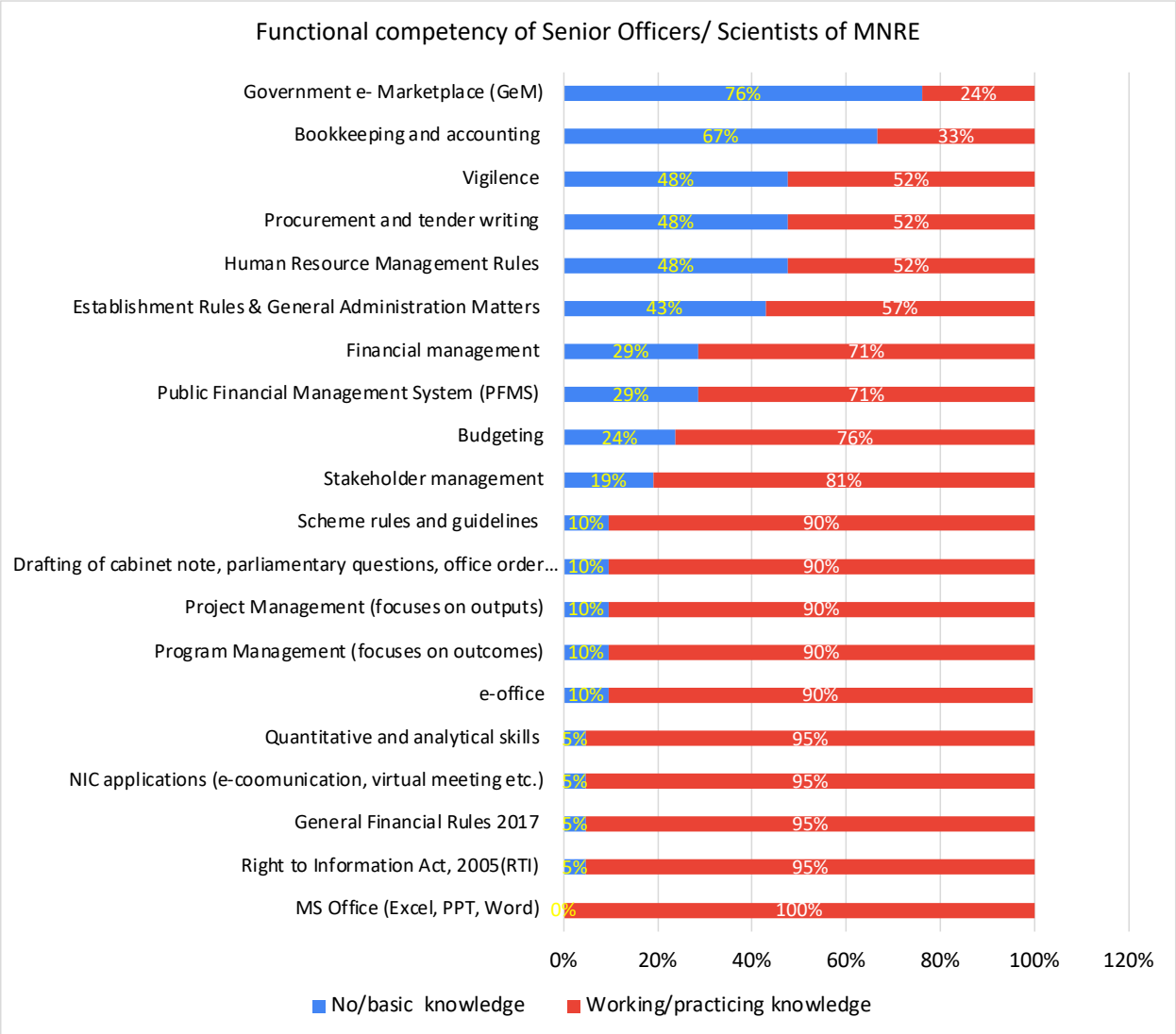


Figure 24: Functional competency of Senior Officers/Scientists of MNRE

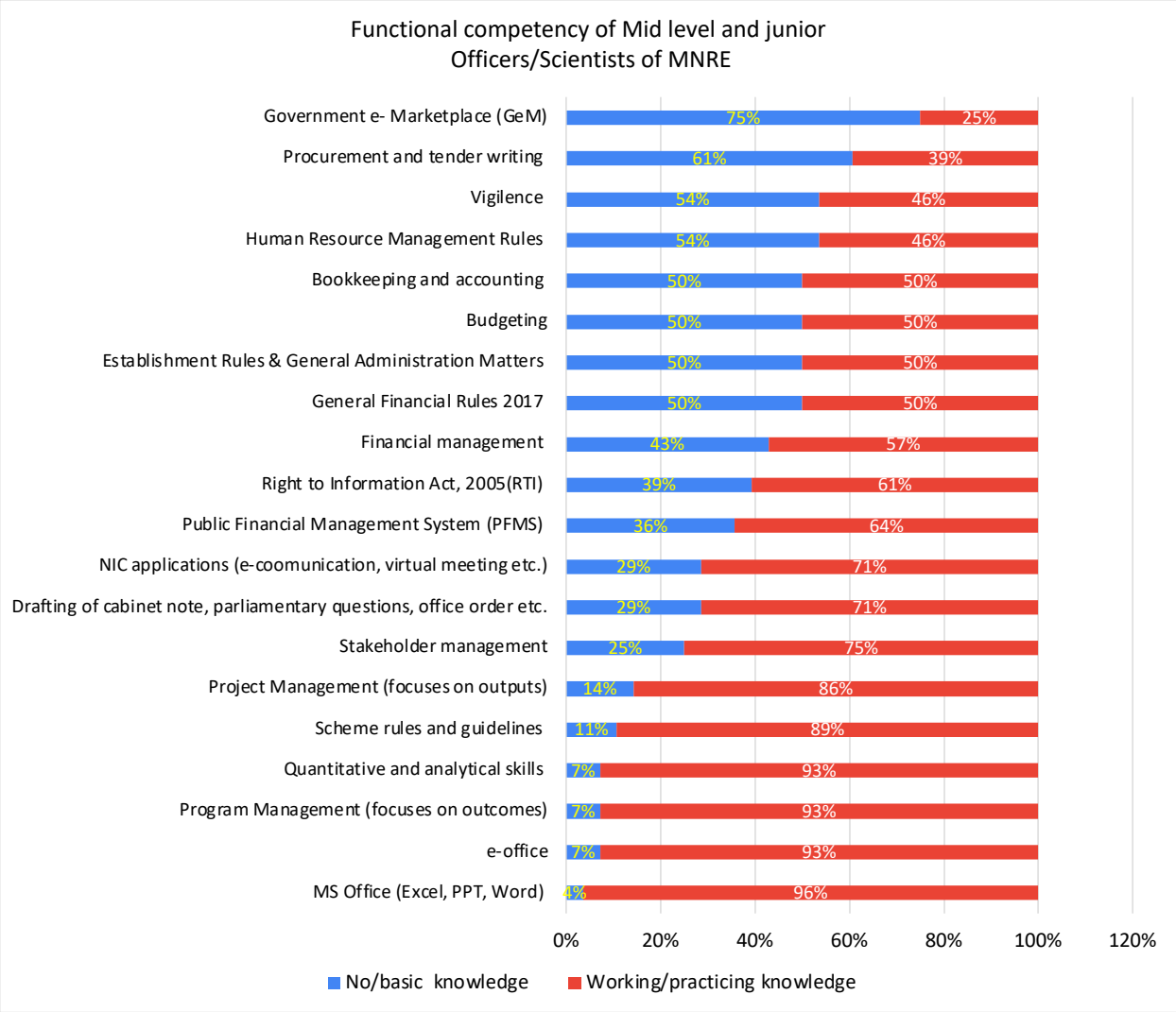


Figure 25: Functional competency of Mid-level and Junior Officers/Scientists of MNRE

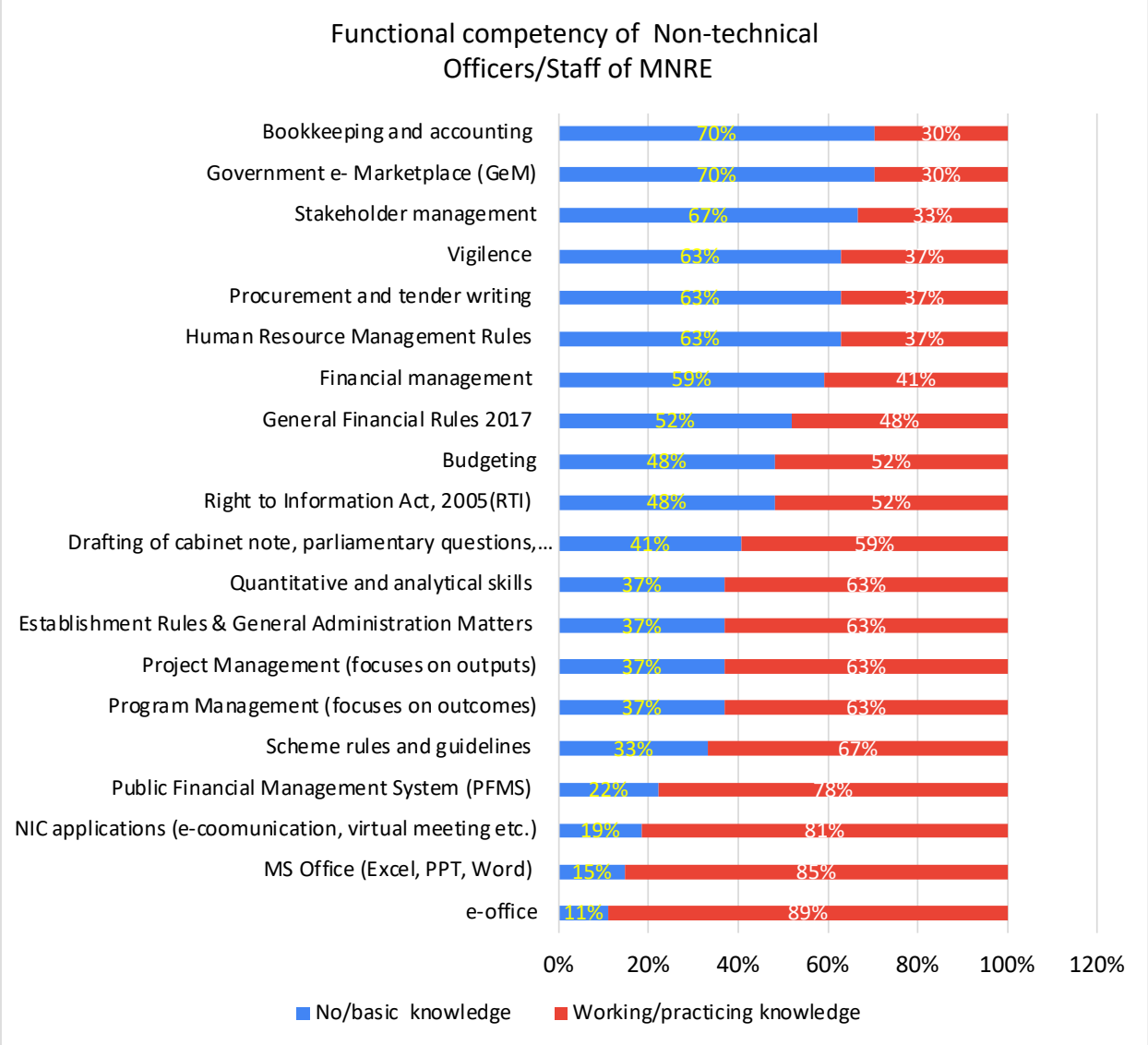


Figure 26: Functional competency of Non-technical Officers/Staff of MNRE

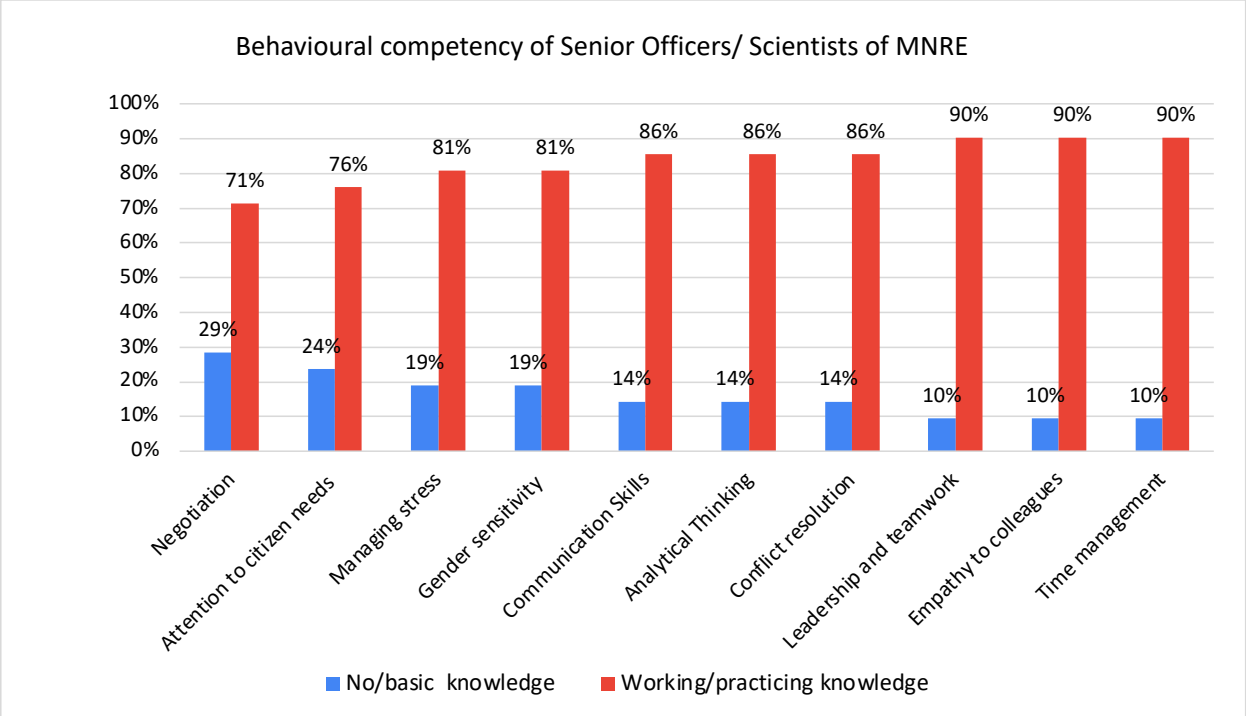


Figure 27: Behavioural Competency of Senior Officers/Scientists of MNRE

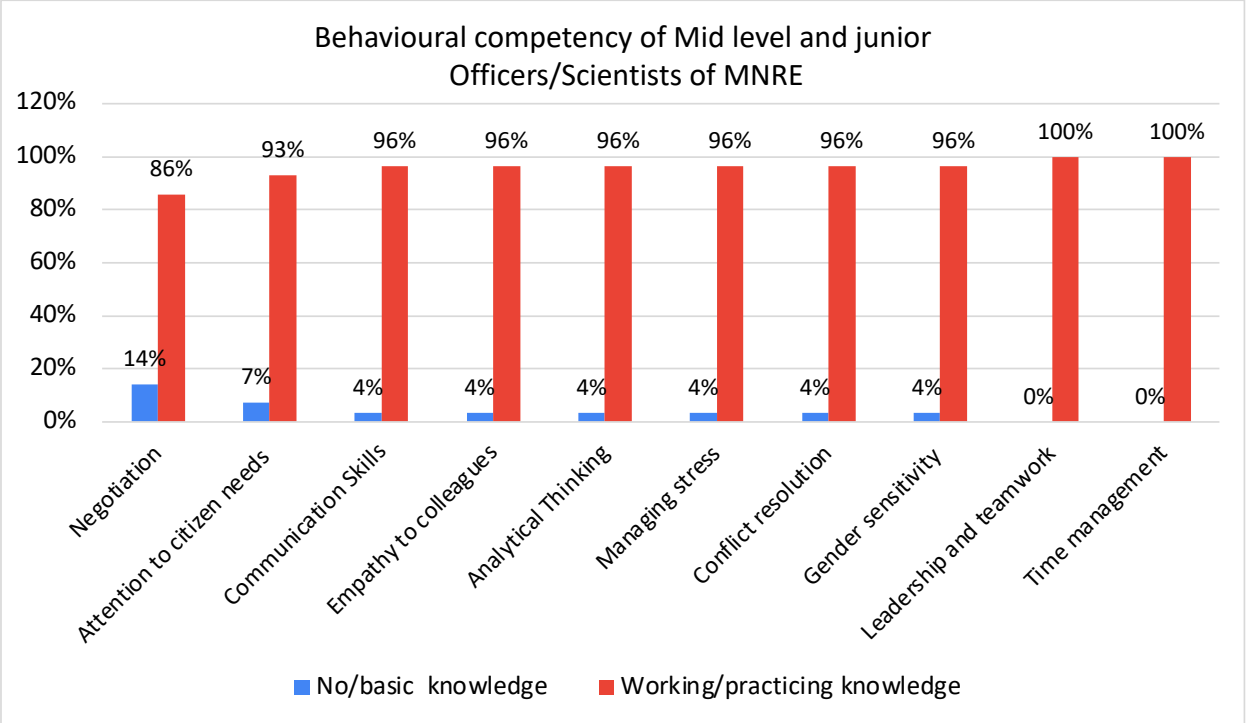


Figure 28: Behavioural competency of Mid-level and Junior Officers/Scientists of MNRE

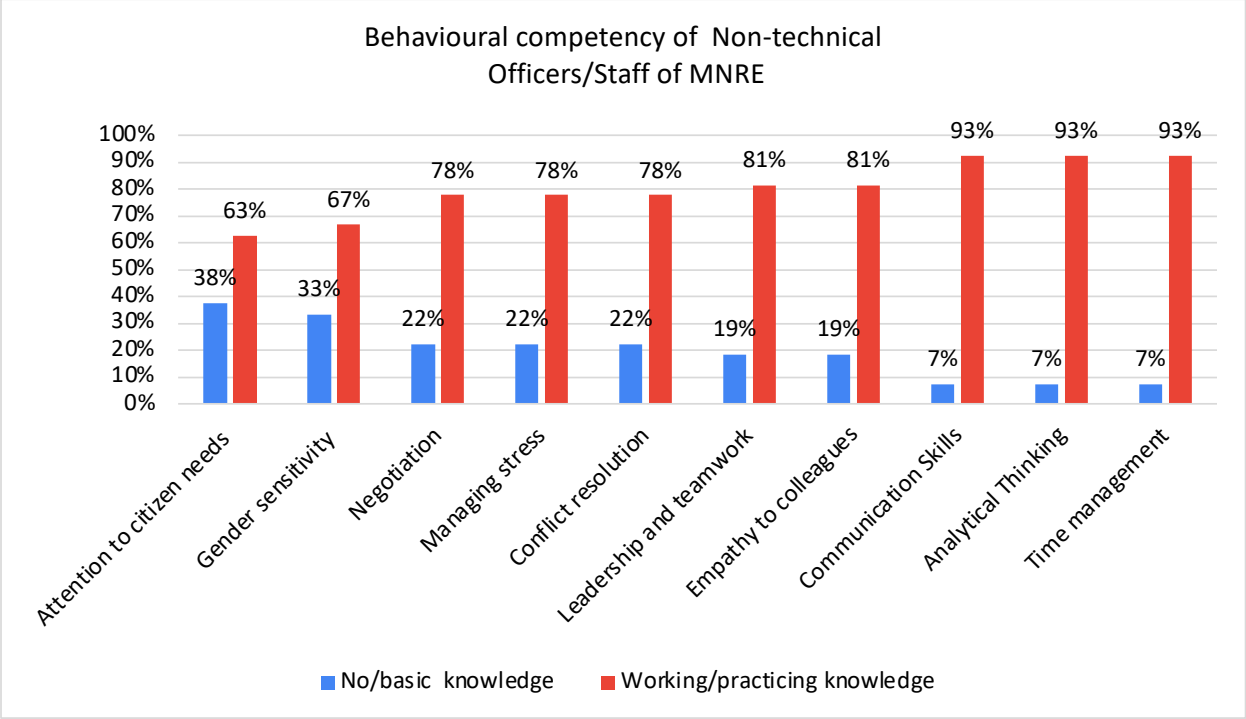


Figure 29: Behavioural competency of Non-technical Officers/Staff of MNRE

Appendix 1 (B): Survey responses on requisite up-skilling for intended work domain

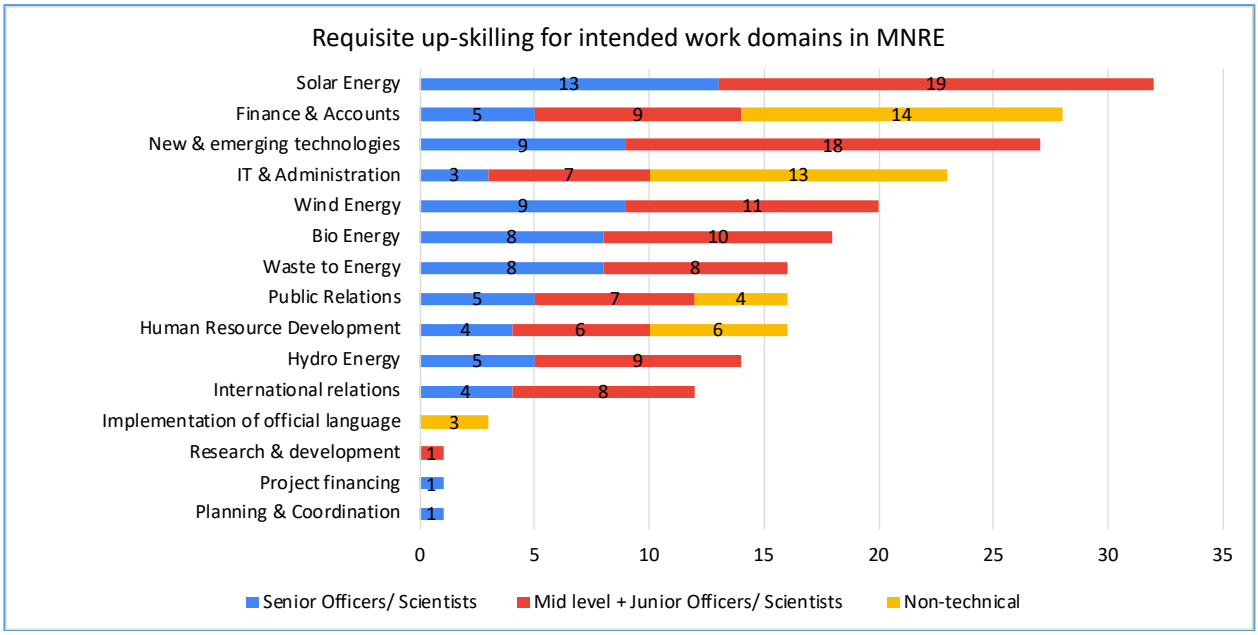


Figure 30: Requisite up-skilling for intended work domain at MNRE

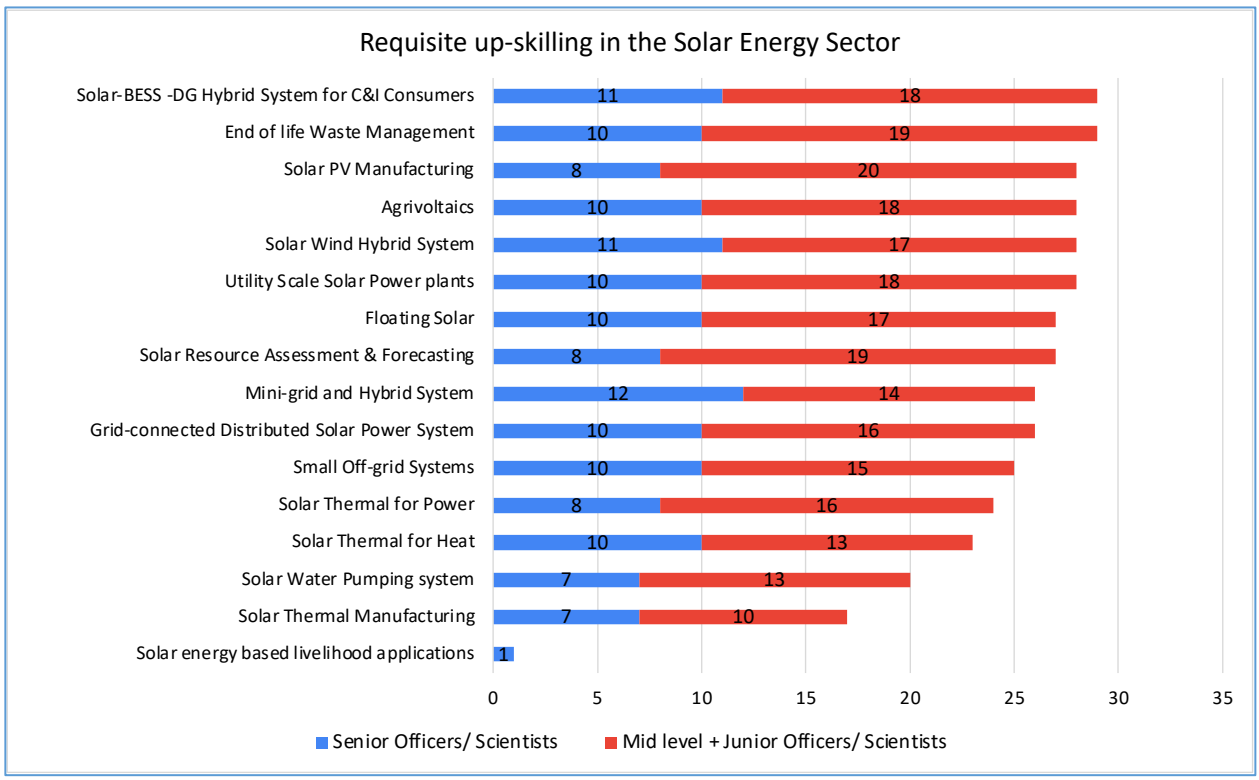


Figure 31: Requisite up-skilling of MNRE officials in the solar energy sector

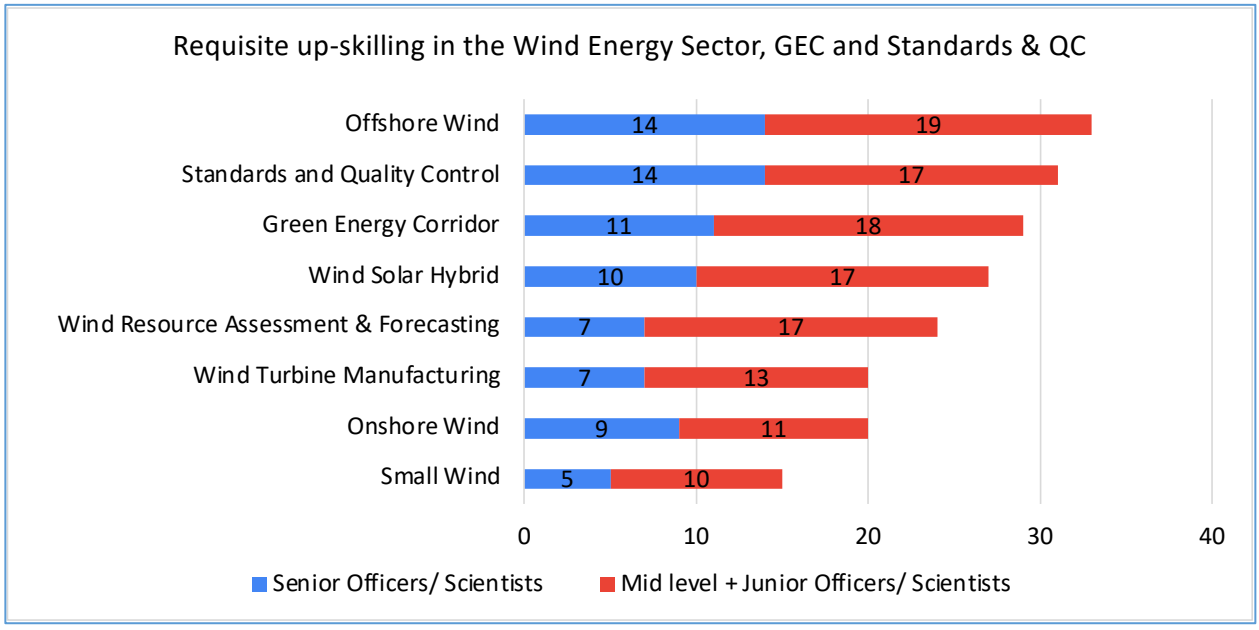


Figure 32: Requisite up-skilling of MNRE officials in the wind energy GEC and standards and QC

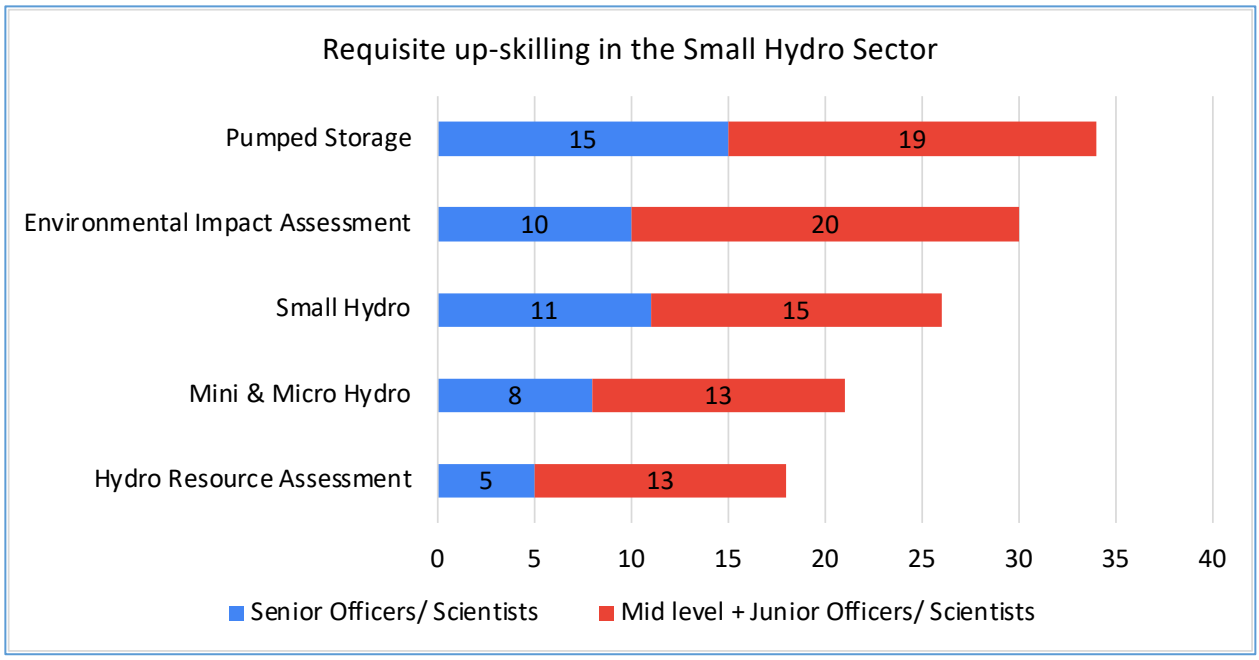


Figure 33: Requisite up-skilling of MNRE officials in the small hydro sector

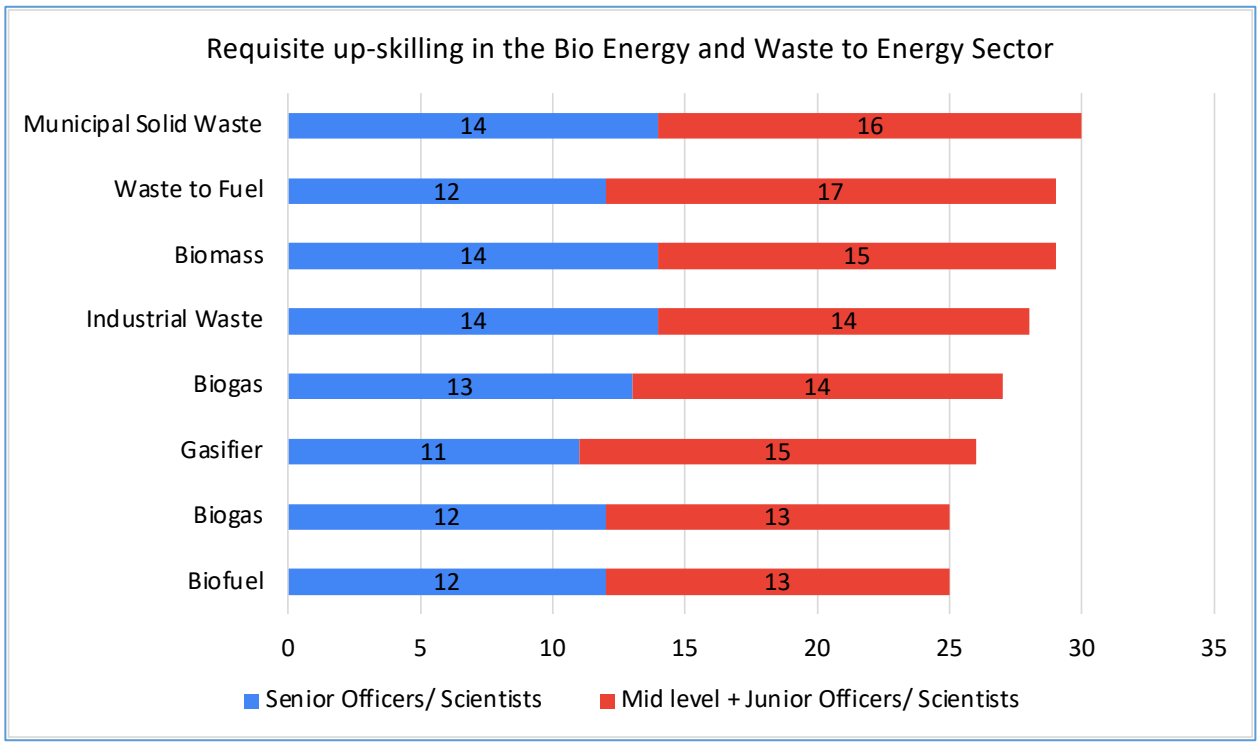


Figure 34: Requisite up-skilling of MNRE officials in the bio energy and waste-to-energy sector

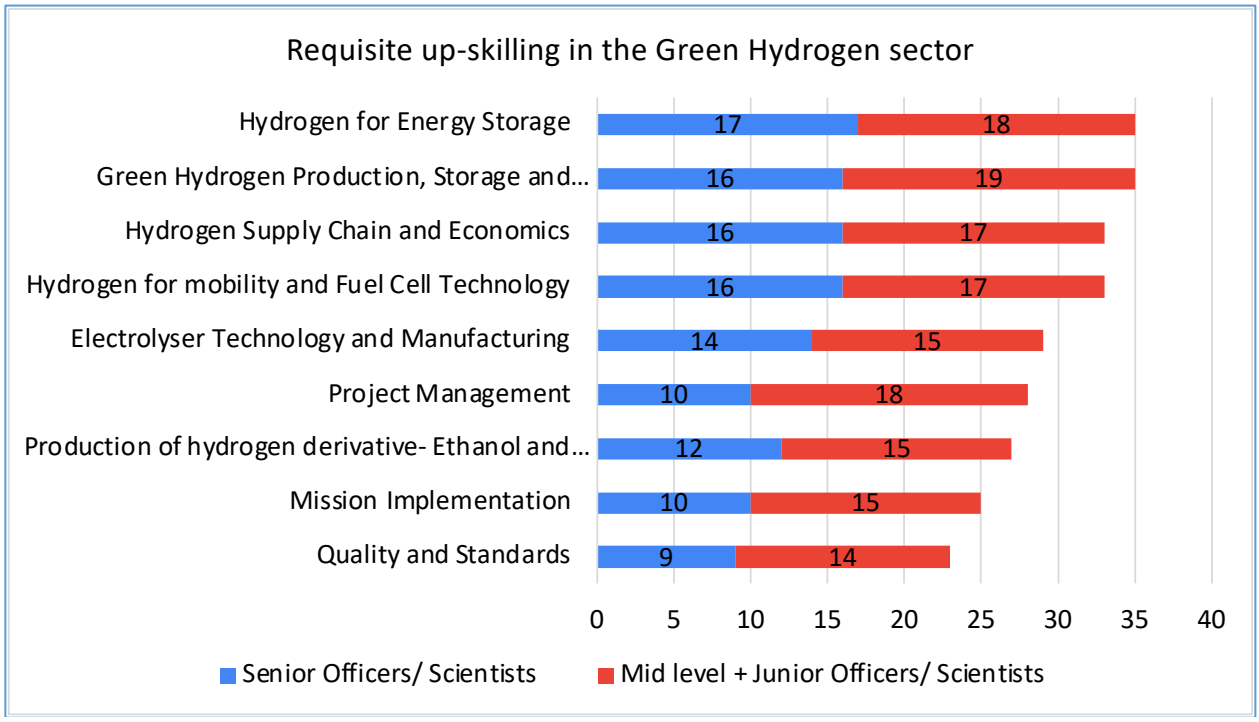


Figure 35: Requisite up-skilling of MNRE officials in the Green hydrogen sector

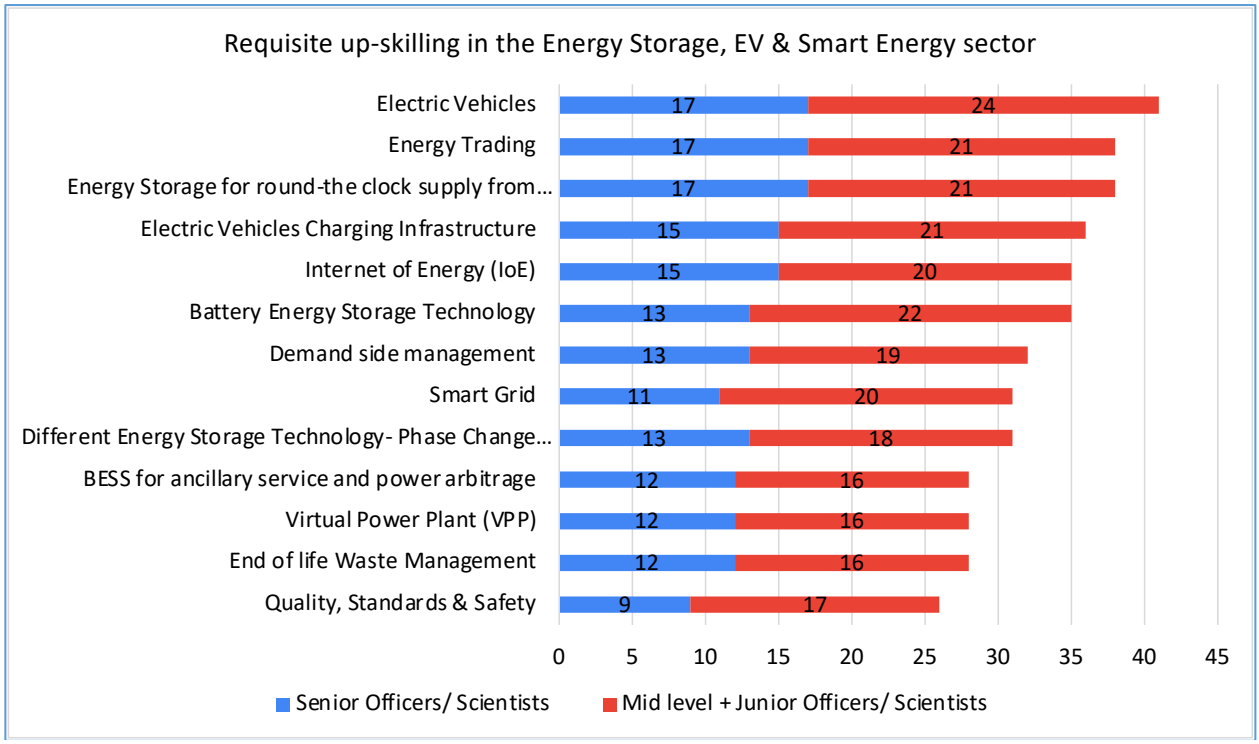


Figure 36: Requisite up-skilling of MNRE officials in the energy storage, EV & smart energy sector

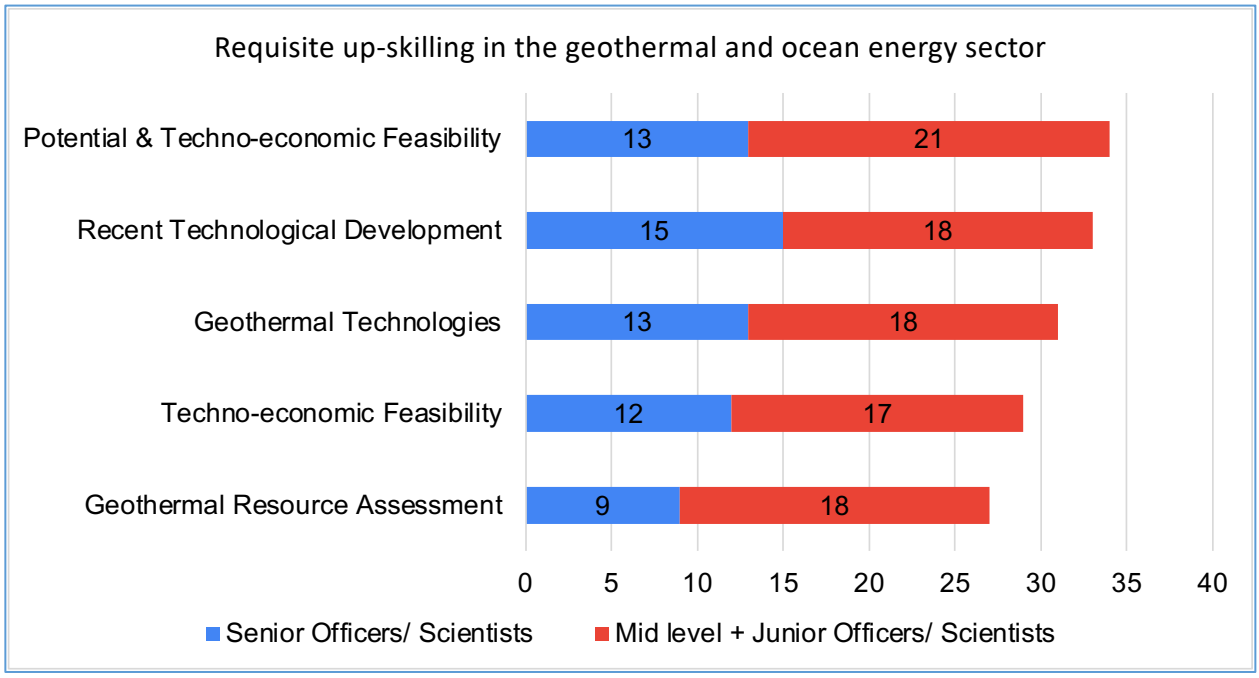


Figure 37: Requisite up-skilling of MNRE officials in the geothermal and ocean energy sector

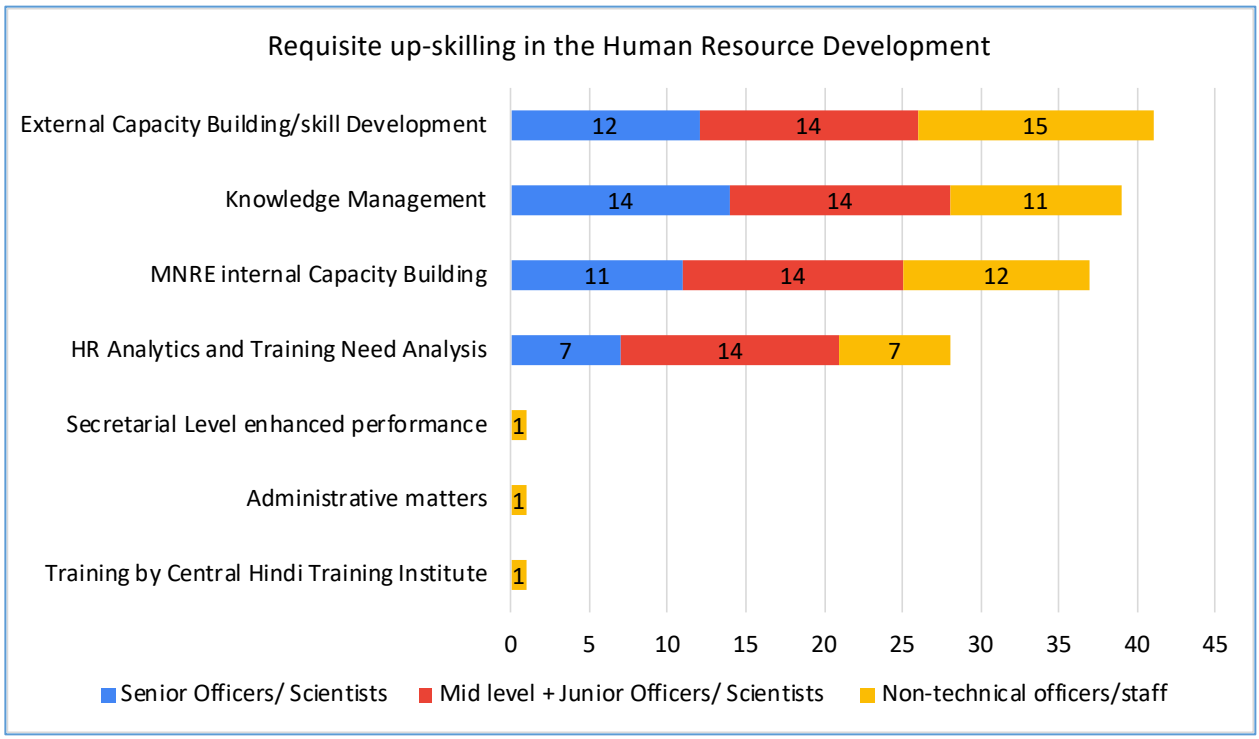


Figure 38: Requisite up-skilling of MNRE officials in the human resource development sector

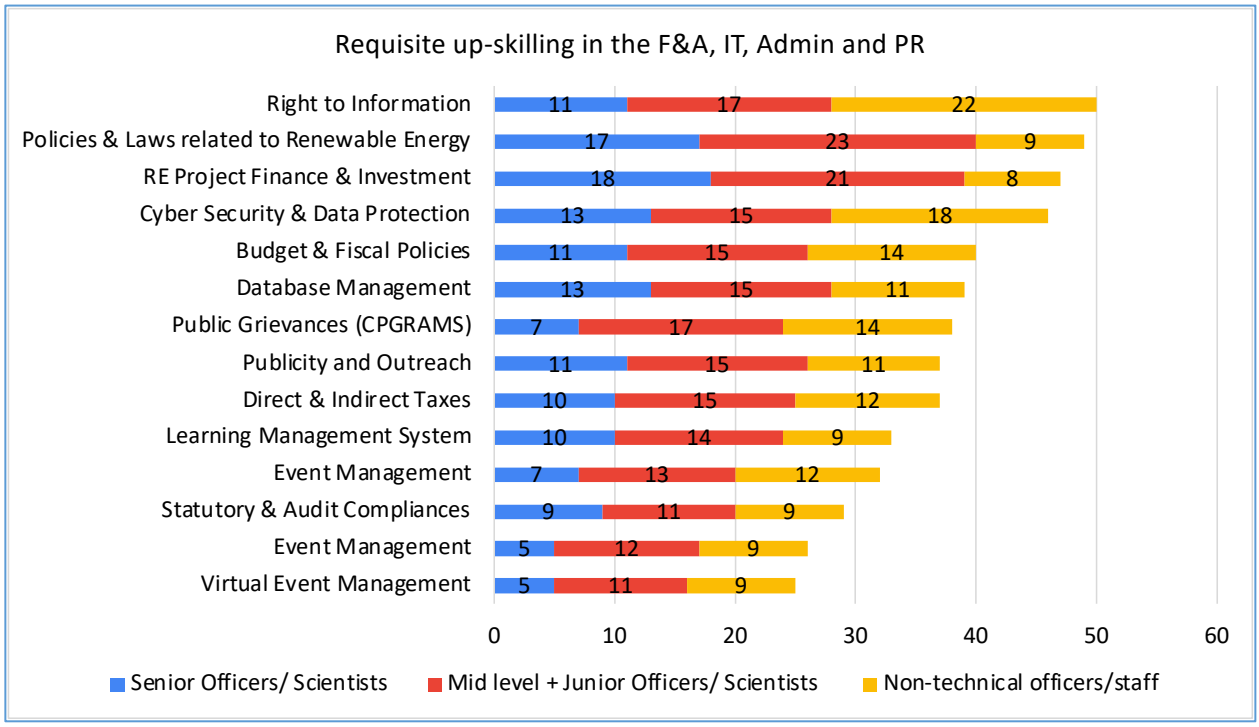


Figure 39: Requisite up-skilling of MNRE officials in F&A, IT, Admin and public relations

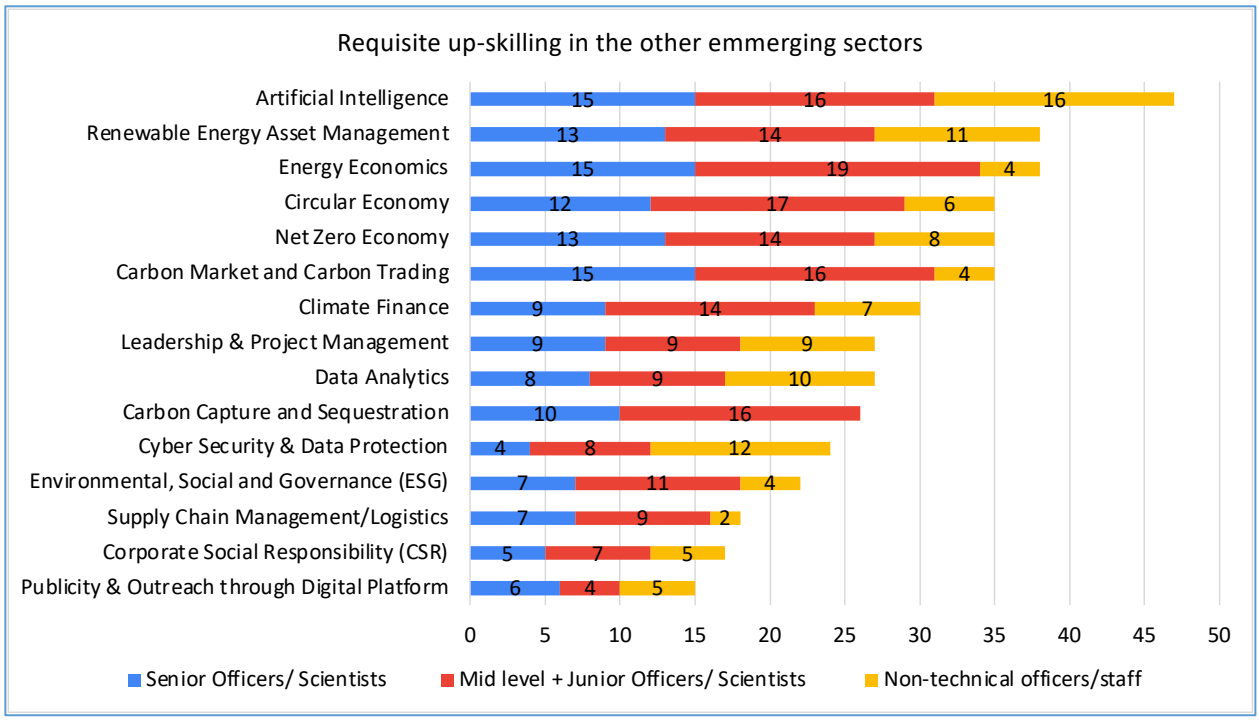


Figure 40: Requisite up-skilling of MNRE officials in the domain-related emerging technologies

Appendix 2: **Business process evaluation**

1) Business process for policy formulation, planning and public relation

Table 46: Business process evaluation for policy formulation, planning and public relations

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Workflow & accountability	End-to-end management systems in place?	Y	Process for public policy formulation (F) - Agenda Setting - Policy Formulation - Policy Adoption Strategic Thinking (D) Leadership (B) Innovation (D) Output-Outcome Monitoring Framework (OOMF) (F)	Knowledge Bank Partnership with institutions in Public Policy Making (ISPP) LMS	
	Is it generic?	N			
	Is it project specific?	Y			
	Online/offline/hybrid management tools?	Y			
	Are the PM tools integrated with other processes and systems of the MDO?	Y			
	Clear well-defined processes?	Y			
	Covers all aspects of scheme/program?	Y			
	Is there SOP/manual/guide/ FAQs for process?	N			
	Are all concerned staff well versed with process?	N			
Documentation	Are process documentation up-to-date and easily accessible to all concerned staff?	Y	Process for public policy implementation & management (F)	Knowledge Bank LMS	
Data Analysis	Is performance data collected and analyzed throughout project/scheme period?	Y	Process for data collection, data analysis and management (D)	Technology and Data	
	Is the analysis “owned”?	Y			
	Is such data used to inform/support decision-making of ongoing and future projects/schemes?	Y			
	Are staff well versed with data analysis tools?	Y			
	Are senior staff well versed with using such analysis/evidence to make decisions?	Y			

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Risk Management	Are risks associated with the process identified and managed appropriately?	Y	Risk Assessment in PESTEL (Political, Economic, Social, Technological, Environmental, and Legal) (D) Framework for Risk Management in Public Policy	LMS	
	Does the SOP/manual/guide/ FAQs cover risk?	Y			
	Are staff well versed with risk management procedures?	Y			
Compliance	Are there compliance/reporting requirements in place?	Y	OOMF process (F)	LMS	
	Is accountability for each step defined?	Y			
	Does the SOP/manual/guide/ FAQs comprehensively cover compliance requirements?	Y			
	Are staff well versed with compliance requirements?	Y			
Stakeholder Engagement	Does the project management system cover all stakeholders?	Y	Empathy, Communication (B)	Stakeholder Feedback mechanism	
	Does the SOP/manual/guide/ FAQs comprehensively cover stakeholder engagement?	Y			
	Are stakeholders involved and consulted throughout the process as per requirement?	Y			
Performance Management	Are there clear performance indicators to define success, effectiveness and efficiency of the process?	Y	OOMF Process (F)	Data Tools Online Collaboration Tools Stakeholder Feedback Mechanism LMS	
	Is there a timeline for completing each step of the process?	Y			
	Are there bottleneck steps/tasks in the process that pose high risk in terms of timeline for completion?	N			
	Is accountability for completing the step/task assigned?	Y			
	Are there time/labour redundancies in the process?	N			

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
	Is there a functional performance monitoring system for the process?	Y			
	Is there regular evaluation of the effectiveness of the process in delivering planned outcomes?	Y			
	Are staff aware of performance indicators for the process?	Y			
	Do staff participate in the evaluation and provide feedback?	Y			

2) Business Process for Budgeting and Financial Management

Table 47: Business process evaluation for budgeting and financial management

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Workflow & accountability	End-to-end management systems in place?	Y	Budgeting Process, Financial Management, Procurement Process (F) OOMF (F)	Knowledge Bank LMS	
	Is it generic?	Y			
	Is it project specific?	N			
	Online/offline/hybrid management tools?	Y			
	Are the PM tools integrated with other processes and systems of the MDO?	Y			
	Clear well-defined processes?	Y			
	Covers all aspects of scheme/program?	Y			
	Is there SOP/manual/guide/FAQs for process?	Y			
	Are all concerned staff well versed with process?	Y			
Documentation	Are process documentation up-to-date and easily accessible to all concerned staff?	Y	Financial Management (D) Attention to Details (B)	Knowledge Bank LMS	

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Data Analysis	Is performance data collected and analyzed throughout project/ scheme period?	Y	Process for data collection, data analysis and management (D) Attention to details (B)	Technology and Data Online Collaboration Tool LMS	
	Is the analysis "owned"?	Y			
	Is such data used to inform/ support decision-making of ongoing and future projects/ schemes?	Y			
	Are staff well versed with data analysis tools?	Y			
	Are senior staff well versed with using such analysis/evidence to make decisions?	Y			
Risk Management	Are risks associated with the process identified and managed appropriately?	Y	Financial Risk Assessment (D)	LMS	
	Does the SOP/manual/guide/ FAQs cover risk?	Y			
	Are staff well versed with risk management procedures?	Y			
Compliance	Are there compliance/reporting requirements in place?	Y	Financial Compliance Mechanism (D/F) OOMF process	LMS	
	Is accountability for each step defined?	Y			
	Does the SOP/manual/guide/ FAQs comprehensively cover compliance requirements?	Y			
	Are staff well versed with compliance requirements?	Y			
Stakeholder Engagement	Does the project management system cover all stakeholders?	Y		Stakeholder Feedback mechanism	
	Does the SOP/manual/guide/ FAQs comprehensively cover stakeholder engagement?	Y			
	Are stakeholders involved and consulted throughout the process as per requirement?	Y			
Performance Management	Are there clear performance indicators to define success, effectiveness and efficiency of the process?	Y	OOMF Process (F)	Data Tools Online Collaboration Tools	
	Is there a timeline for completing each step of the process?	Y			

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
	Are there bottleneck steps/tasks in the process that pose high risk in terms of timeline for completion?	N		Stakeholder Feedback Mechanism LMS	
	Is accountability for completing the step/task assigned?	Y			
	Are there time/labour redundancies in the process?	N			
	Is there a functional performance monitoring system for the process?	Y			
	Is there regular evaluation of the effectiveness of the process in delivering planned outcomes?	Y			
	Are staff aware of performance indicators for the process?	Y			
	Do staff participate in the evaluation and provide feedback?	Y			

3) Business process for service delivery and citizen-centric

Table 48: Business process evaluation for service delivery and citizen-centric

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Workflow & accountability	End-to-end management systems in place?	Y	Project Management (D) Right to Public Service Act (D) Induction Training (B, D, F)	Knowledge Bank Partnership with institutions in Project Management, Citizen Charter LMS	
	Is it generic?	Y			
	Is it project specific?	N			
	Online/offline/hybrid management tools?	Y			
	Are the PM tools integrated with other processes and systems of the MDO?	Y			
	Clear well-defined processes?	Y			
	Covers all aspects of scheme/program?	Y			
	Is there SOP/manual/guide/ FAQs for process?	Y			
	Are all concerned staff well versed with process?	Y			
Documentation	Are process documentation up-to-date and easily accessible to all concerned staff?	Y		Technology and Data	

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Data Analysis	Is performance data collected and analyzed throughout project/scheme period?	Y	Data collection, data analysis and management (D)	Technology and Data	
	Is the analysis "owned"?	Y			
	Is such data used to inform/support decision-making of ongoing and future projects/schemes?	Y			
	Are staff well versed with data analysis tools?	Y			
	Are senior staff well versed with using such analysis/evidence to make decisions?	Y			
Risk Management	Are risks associated with the process identified and managed appropriately?	Y	Framework for Risk Management in Public Policy	LMS	
	Does the SOP/manual/guide/ FAQs cover risk?	Y			
	Are staff well versed with risk management procedures?	Y			
Compliance	Are there compliance/reporting requirements in place?	Y		LMS	
	Is accountability for each step defined?	Y			
	Does the SOP/manual/guide/ FAQs comprehensively cover compliance requirements?	Y			
	Are staff well versed with compliance requirements?	Y			
Stakeholder Engagement	Does the project management system cover all stakeholders?	Y	Empathy, Communication (B)	Stakeholder Feedback mechanism	
	Does the SOP/manual/guide/ FAQs comprehensively cover stakeholder engagement?	Y			
	Are stakeholders involved and consulted throughout the process as per requirement?	Y			
Performance Management	Are there clear performance indicators to define success, effectiveness and efficiency of the process?	Y	OOMF Process (F)	Data Tools Online Collaboration Tools	
	Is there a timeline for completing each step of the process?	Y			

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
	Are there bottleneck steps/tasks in the process that pose high risk in terms of timeline for completion?	N		Stakeholder Feedback Mechanism LMS	
	Is accountability for completing the step/task assigned?	Y			
	Are there time/labour redundancies in the process?	N			
	Is there a functional performance monitoring system for the process?	Y			
	Is there regular evaluation of the effectiveness of the process in delivering planned outcomes?	Y			
	Are staff aware of performance indicators for the process?	Y			
	Do staff participate in the evaluation and provide feedback?	Y			

4) Business process for emerging technologies - regulation and adoption

Table 49: Business process evaluation for emerging technologies – regulation and adoption

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Workflow & accountability	End-to-end management systems in place?	Y	Technology Overview (market readiness, economics, standards, strategic advantage, policy and regulations, funding, case studies) (D)	Knowledge Bank Partnership with Technology Institutions LMS	
	Is it generic?	N			
	Is it project specific?	Y			
	Online/offline/hybrid management tools?	Y			
	Are the PM tools integrated with other processes and systems of the MDO?	Y			
	Clear well-defined processes?	N			
	Covers all aspects of scheme/program?	Y			
	Is there SOP/manual/guide/FAQs for process?	N			
	Are all concerned staff well versed with process?	N			

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Documentation	Are process documentation up-to-date and easily accessible to all concerned staff?	Y		Technology and Data	
Data Analysis	Is performance data collected and analyzed throughout project/scheme period?	Y	Data collection, data analysis and management (D)	Technology and Data	
	Is the analysis "owned"?	Y			
	Is such data used to inform/support decision-making of ongoing and future projects/schemes?	Y			
	Are staff well versed with data analysis tools?	Y			
	Are senior staff well versed with using such analysis/evidence to make decisions?	Y			
Risk Management	Are risks associated with the process identified and managed appropriately?	Y	Framework for Risk Management in Public Policy	LMS	
	Does the SOP/manual/guide/FAQs cover risk?	Y			
	Are staff well versed with risk management procedures?	Y			
Compliance	Are there compliance/reporting requirements in place?	Y	OOMF	LMS	
	Is accountability for each step defined?	Y			
	Does the SOP/manual/guide/FAQs comprehensively cover compliance requirements?	Y			
	Are staff well versed with compliance requirements?	Y			
Stakeholder Engagement	Does the project management system cover all stakeholders?	Y	Empathy, Communication (B)	Online collaboration tool	
	Does the SOP/manual/guide/FAQs	Y			

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
	comprehensively cover stakeholder engagement?			Stakeholder Feedback mechanism	
	Are stakeholders involved and consulted throughout the process as per requirement?	Y			
Performance Management	Are there clear performance indicators to define success, effectiveness and efficiency of the process?	Y	OOMF Process (F)	Data Tools Online Collaboration Tools Stakeholder Feedback Mechanism LMS for stakeholders	
	Is there a timeline for completing each step of the process?	Y			
	Are there bottleneck steps/tasks in the process that pose high risk in terms of timeline for completion?	N			
	Is accountability for completing the step/task assigned?	Y			
	Are there time/labour redundancies in the process?	N			
	Is there a functional performance monitoring system for the process?	Y			
	Is there regular evaluation of the effectiveness of the process in delivering planned outcomes?	Y			
	Are staff aware of performance indicators for the process?	Y			
	Do staff participate in the evaluation and provide feedback?	Y			

5) Business process for research and sector development

Table 50: Business process evaluation for emerging technologies – regulation and adoption

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Workflow & accountability	End-to-end management systems in place?	Y	Technology Overview (market readiness, economics, standards, strategic advantage, policy and regulations, funding, case studies) (D)	Knowledge Bank Partnership with Technology Institutions LMS	
	Is it generic?	N			
	Is it project specific?	Y			
	Online/offline/hybrid management tools?	N			
	Are the PM tools integrated with other processes and systems of the MDO?	Y			
	Clear well-defined processes?	N			
	Covers all aspects of scheme/program?	Y			
	Is there SOP/manual/guide/ FAQs for process?	N			
	Are all concerned staff well versed with process?	N			
Documentation	Are process documentation up-to-date and easily accessible to all concerned staff?	Y		Technology and Data	
Data Analysis	Is performance data collected and analyzed throughout project/scheme period?	Y	Data collection, data analysis and management (D)	Technology and Data	
	Is the analysis “owned”?	Y			
	Is such data used to inform/support decision-making of ongoing and future projects/schemes?	Y			
	Are staff well versed with data analysis tools?	Y			
	Are senior staff well versed with using such analysis/evidence to make decisions?	Y			
Risk Management	Are risks associated with the process identified and managed appropriately?	Y	Framework for Risk Management in Public Policy	LMS	
	Does the SOP/manual/guide/ FAQs cover risk?	Y			
	Are staff well versed with risk management procedures?	Y			

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Compliance	Are there compliance/reporting requirements in place?	Y	OOMF (F)	LMS	
	Is accountability for each step defined?	Y			
	Does the SOP/manual/guide/ FAQs comprehensively cover compliance requirements?	Y			
	Are staff well versed with compliance requirements?	Y			
Stakeholder Engagement	Does the project management system cover all stakeholders?	Y	Empathy, Communication (B)	Online collaboration tool Stakeholder Feedback mechanism	
	Does the SOP/manual/guide/ FAQs comprehensively cover stakeholder engagement?	Y			
	Are stakeholders involved and consulted throughout the process as per requirement?	Y			
Performance Management	Are there clear performance indicators to define success, effectiveness and efficiency of the process?	Y	OOMF Process (F)	Data Tools Online Collaboration Tools LMS for stakeholders	
	Is there a timeline for completing each step of the process?	Y			
	Are there bottleneck steps/tasks in the process that pose high risk in terms of timeline for completion?	N			
	Is accountability for completing the step/task assigned?	Y			
	Are there time/labour redundancies in the process?	N			
	Is there a functional performance monitoring system for the process?	Y			
	Is there regular evaluation of the effectiveness of the process in delivering planned outcomes?	Y			
	Are staff aware of performance indicators for the process?	Y			
	Do staff participate in the evaluation and provide feedback?	Y			

6) Business process for programme management

Table 51: Business process evaluation for programme management

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Workflow & accountability	End-to-end management systems in place?	Y	Induction Training (B, D, F) Project Management Tool (D) Negotiation Techniques (D) Procurement Process (F) Risk Management Process (F)	Knowledge Bank Partnership with Management Institutions Online Collaboration Tool LMS	
	Is it generic?	N			
	Is it project specific?	Y			
	Online/offline/hybrid management tools?	Y			
	Are the PM tools integrated with other processes and systems of the MDO?	Y			
	Clear well-defined processes?	Y			
	Covers all aspects of scheme/program?	Y			
	Is there SOP/manual/guide/FAQs for process?	Y			
	Are all concerned staff well versed with process?	N			
Documentation	Are process documentation up-to-date and easily accessible to all concerned staff?	Y		Technology and Data	
Data Analysis	Is performance data collected and analyzed throughout project/scheme period?	Y	Data collection, data analysis and management (D)	Technology and Data	
	Is the analysis “owned”?	Y			
	Is such data used to inform/support decision-making of ongoing and future projects/schemes?	Y			
	Are staff well versed with data analysis tools?	Y			
	Are senior staff well versed with using such analysis/evidence to make decisions?	Y			
Risk Management	Are risks associated with the process identified and managed appropriately?	Y	Framework for Risk Management in Public Policy	LMS	
	Does the SOP/manual/guide/ FAQs cover risk?	Y			
	Are staff well versed with risk management procedures?	Y			

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Compliance	Are there compliance/reporting requirements in place?	Y	OOMF (F)	LMS	
	Is accountability for each step defined?	Y			
	Does the SOP/manual/guide/ FAQs comprehensively cover compliance requirements?	Y			
	Are staff well versed with compliance requirements?	Y			
Stakeholder Engagement	Does the project management system cover all stakeholders?	Y	Empathy, Communication (B) Contract Management (F)	Online collaboration tool Stakeholder Feedback mechanism	
	Does the SOP/manual/guide/ FAQs comprehensively cover stakeholder engagement?	Y			
	Are stakeholders involved and consulted throughout the process as per requirement?	Y			
Performance Management	Are there clear performance indicators to define success, effectiveness and efficiency of the process?	Y	OOMF Process (F)	Data Tools Online Collaboration Tools LMS for stakeholders	
	Is there a timeline for completing each step of the process?	Y			
	Are there bottleneck steps/tasks in the process that pose high risk in terms of timeline for completion?	N			
	Is accountability for completing the step/task assigned?	Y			
	Are there time/labour redundancies in the process?	N			
	Is there a functional performance monitoring system for the process?	Y			
	Is there regular evaluation of the effectiveness of the process in delivering planned outcomes?	Y			
	Are staff aware of performance indicators for the process?	Y			
	Do staff participate in the evaluation and provide feedback?	Y			

7) Business process for governance and administration

Table 52: Business process evaluation for governance and administration

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Workflow & accountability	End-to-end management systems in place?	Y	Project Management Tool (D) Financial Rules Procurement Rules Asset Management	Online Collaboration Tool Onboarding to IGOT Employee Management System (To have all information about employees for Job Fit, seniority, and promotion to reduce HR delay, and motivate employees) LMS	
	Is it generic?	Y			
	Is it project specific?	N			
	Online/offline/hybrid management tools?	Y			
	Are the PM tools integrated with other processes and systems of the MDO?	Y			
	Clear well-defined processes?	Y			
	Covers all aspects of scheme/program?	Y			
	Is there SOP/manual/guide/ FAQs for process?	Y			
	Are all concerned staff well versed with process?	N			
Documentation	Are process documentation up-to-date and easily accessible to all concerned staff?	Y		Technology and Data	
Data Analysis	Is performance data collected and analyzed throughout project/scheme period?	Y	Data collection, data analysis and management (D)	Technology and Data	
	Is the analysis “owned”?	Y			
	Is such data used to inform/support decision-making of ongoing and future projects/schemes?	Y			
	Are staff well versed with data analysis tools?	Y			
	Are senior staff well versed with using such analysis/evidence to make decisions?	Y			
Risk Management	Are risks associated with the process identified and managed appropriately?	Y			
	Does the SOP/manual/guide/ FAQs cover risk?	Y			
	Are staff well versed with risk management procedures?	Y			
Compliance	Are there compliance/reporting requirements in place?	Y	OOMF (F)	LMS	

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
	Is accountability for each step defined?	Y			
	Does the SOP/manual/guide/ FAQs comprehensively cover compliance requirements?	Y			
	Are staff well versed with compliance requirements?	Y			
Stakeholder Engagement	Does the project management system cover all stakeholders?	Y	Empathy, Communication, Negotiation (B)	Online collaboration tool Stakeholder Feedback mechanism	
	Does the SOP/manual/guide/ FAQs comprehensively cover stakeholder engagement?	Y			
	Are stakeholders involved and consulted throughout the process as per requirement?	Y			
Performance Management	Are there clear performance indicators to define success, effectiveness and efficiency of the process?	Y	OOMF Process (F)		
	Is there a timeline for completing each step of the process?	Y			
	Are there bottleneck steps/tasks in the process that pose high risk in terms of timeline for completion?	N			
	Is accountability for completing the step/task assigned?	Y			
	Are there time/labour redundancies in the process?	N			
	Is there a functional performance monitoring system for the process?	Y			
	Is there regular evaluation of the effectiveness of the process in delivering planned outcomes?	Y			
	Are staff aware of performance indicators for the process?	Y			
	Do staff participate in the evaluation and provide feedback?	Y			

8) Business process for performance management & evaluation - programmes & schemes

Table 53: Business process evaluation for performance management and evaluation

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
Workflow & accountability	End-to-end management systems in place?	Y	Good governance Performance management	Partnership with Institutions (Centre for Good Governance) Onboarding to IGOT LMS	
	Is it generic?	N			
	Is it project specific?	Y			
	Online/offline/hybrid management tools?	Y			
	Are the PM tools integrated with other processes and systems of the MDO?	Y			
	Clear well-defined processes?	Y			
	Covers all aspects of scheme/program?	Y			
	Is there SOP/manual/guide/ FAQs for process?	Y			
	Are all concerned staff well versed with process?	N			
Documentation	Are process documentation up-to-date and easily accessible to all concerned staff?	Y			
Data Analysis	Is performance data collected and analyzed throughout project/scheme period?	Y	Data collection, data analysis and management (D)	Performance Information System	
	Is the analysis "owned"?	Y			
	Is such data used to inform/support decision-making of ongoing and future projects/schemes?	Y			
	Are staff well versed with data analysis tools?	Y			
	Are senior staff well versed with using such analysis/evidence to make decisions?	Y			
Risk Management	Are risks associated with the process identified and managed appropriately?	Y			
	Does the SOP/manual/guide/ FAQs cover risk?	Y			
	Are staff well versed with risk management procedures?	Y			
Compliance	Are there compliance/ reporting requirements in place?	Y	OOMF (F)	LMS	

KPI	Evaluation criteria	Rating Y/N	Capacity Building Recommendations		
			Individual	Organizational	Institutional
	Is accountability for each step defined?	Y			
	Does the SOP/manual/guide/ FAQs comprehensively cover compliance requirements?	Y			
	Are staff well versed with compliance requirements?	Y			
Stakeholder Engagement	Does the project management system cover all stakeholders?	Y	Empathy, Communication(B)	Online collaboration tool Stakeholder Feedback mechanism	
	Does the SOP/manual/guide/ FAQs comprehensively cover stakeholder engagement?	Y			
	Are stakeholders involved and consulted throughout the process as per requirement?	Y			
Performance Management	Are there clear performance indicators to define success, effectiveness and efficiency of the process?	Y	Citizen's charter Citizen's Report Card, Community Report Card, Social Audit OOMF Process (F)		
	Is there a timeline for completing each step of the process?	Y			
	Are there bottleneck steps/tasks in the process that pose high risk in terms of timeline for completion?	N			
	Is accountability for completing the step/task assigned?	Y			
	Are there time/labour redundancies in the process?	N			
	Is there a functional performance monitoring system for the process?	Y			
	Is there regular evaluation of the effectiveness of the process in delivering planned outcomes?	Y			
	Are staff aware of performance indicators for the process?	Y			
	Do staff participate in the evaluation and provide feedback?	Y			

Appendix 3: Course ourline based on job roles/responsibilities of MNRE officials

(A) Domain: Solar Energy | Training Area: Grid-connected solar power

The main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Utility Scale Solar Power plants	• Overview of utility scale solar power plants & concept of solar park • Overview of business models for utility scale solar power projects • Different phases of development of utility scale solar projects • Policy and regulatory framework for development of utility scale solar power projects in India • Site selection and techno-economic feasibility for development of utility scale solar power projects • Solar resource assessment & energy generation estimation approach • Critical design considerations for utility scale solar plants • Key considerations for installation and operation & maintenance of solar power projects • Key considerations for grid integration of solar power projects • Associated risks identification and mitigation techniques for solar power projects • Environmental and social impact assessment approach • Approach for technical & economical due-diligence and appraisal of solar power projects
Rooftop Solar PV	• Solar rooftop programmes in India and present status & challenges • Policies and regulatory framework for solar rooftop in India • Business model and metering regulations for solar rooftop projects in India • Different implementation model of rooftop solar such as captive, group captive, open access, etc. • Overview of group net metering and virtual power plant platform for solar rooftop projects • Key consideration for design aspects of rooftop solar including grid integration • Benefits and challenges of integration of battery energy storage with grid connected rooftop solar • Human resources and skills requirement for design, installation and O&M • Importance of standards and quality control measures on procurement, design & installation • Users' awareness and training on safety and operation and maintenance
Grid-connected Distributed Solar Power System	• Overview of grid-connected distributed solar power systems: - Different types and configurations - Suitability, benefits & challenges • Policies & incentives for grid-connected distributed solar systems • Cost and source of funding for grid-connected distributed solar power system • Regulatory framework for grid-connected solar power systems • Human resources and skills requirement for design, installation and O&M • Business models for implementation of grid-connected distributed solar power systems

The main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Importance of standards and quality control measures on procurement, design & installation • Users' awareness and training on safety and operation and maintenance • Approach for technical & economical due-diligence and appraisal of solar power projects
Solar-BESS -DG Hybrid Systems for C&I consumers	• Overview of Battery Energy Storage - Emerging BESS technologies, applications & market • BESS applications for renewable energy and grid management • Relevance & demand for solar-BESS -DG Hybrid Systems in Indian C&I sector • Solar-BESS-DG hybrid systems for energy savings, power outage management, peak demand management & energy arbitrage in Indian C&I sector • Techno-economic feasibility of solar-BESS-DG hybrid systems • Operational case studies of solar-BESS-DG hybrid system
Floating Solar (FPV)	• An overview of floating photovoltaic (FPV) technology • FPV - Present status and growth trends • Policy and regulatory considerations for FPV projects • Techno-economic feasibility of FPV projects • Key considerations for selection of sites and implementation of FPV projects • Social and environmental impact assessment of FPV projects • Case studies of FPV projects • Approach for technical & economical due-diligence and appraisal of FPV projects
Agrivoltaics or Agri Photovoltaic	• Development of agrivoltaic projects in India and abroad • Critical characteristics of crops considered for agrivoltaic projects • Different design approach and selection of crops for brownfield and greenfield agrivoltaic projects • Critical design and O&M considerations for agrivoltaic plants • Economics and business models for developing agrivoltaic projects • Environmental health and safety aspects of agrivoltaic projects • Approach for technical & economical due-diligence and appraisal of solar power projects

(B) Domain: Solar Energy | Training Area: Grid-connected solar power

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Small Off-grid PV Systems	• Overview of technologies, products and applications of small off-grid PV systems • Indian market for small off-grid PV systems • Small off-grid PV systems for livelihood support • Policies & incentives of small off-grid PV systems • Skills requirement for design, installation and O&M • Standards and quality control measures on small off-grid products and components • Users' awareness and training on safety and operation and maintenance

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Approach for technical & performance due-diligence of small off-grid PV systems
Mini-grid and Hybrid System	• Overview of solar PV mini-grid systems: introduction and applications • Different types and configurations of mini-grid systems • Policies & incentives for mini-grid projects • Standards and regulations applicable to mini-grid systems • Key considerations for planning, design & implementation of mini-grid projects • Economics and funding aspects of mini-grid projects • Approach for technical & economical due-diligence and appraisal of solar power projects
Solar Wind Hybrid System	• Overview of solar wind hybrid systems: - Small distributed solar wind hybrid systems - Large solar & wind park hybrid projects • Advantages and challenges of solar wind hybrid projects • Approach for development of solar-wind hybrid projects • Approach for site selection and techno-economic feasibility study for developing solar-wind hybrid projects • Methodology for energy generation estimation • Approach for optimization of solar wind hybrid systems • Key considerations for installation and O&M of solar wind hybrid systems • Associated risks identification and mitigation techniques for solar wind hybrid systems • Environmental and social impact assessment approach for large solar wind hybrid projects • Approach for technical due-diligence and appraisal of solar wind hybrid projects
Solar Water Pumping system	• Overview of solar PV water pumping systems, technologies and applications • Types of motors and pumps used for solar water pumping system • Source of water and approach for water demand assessment based on applications • Economic aspects of solar water pumping system • Approach for selection of water pumping system based on applications and source of water • Key considerations for design, installations and O&M of solar PV water pumping system • Policies & incentives for solar water pumping system in India • Skills requirement for design, installation and O&M • Standards and quality control measures on solar water pumping systems design and installation • Users' awareness and training on safety and operation and maintenance • Approach for technical & performance due-diligence of solar water pumping systems
Solar energy-based livelihood applications	• Potential livelihood sectors and activities to implement solar energy applications • Potential livelihood sectors for use of photovoltaic based technologies • Potential livelihood sectors for use of solar thermal based technologies • Specific livelihood applications and case studies utilizing solar energy: - agriculture and horticulture activities of small and marginal farmers - small and micro weaving and textile processing units

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	- small livestock and poultry farming - aquaculture and pisciculture - micro-enterprises and self-help groups - eco-tourism - handicrafts and potteries - small bamboo and cane industries

(C) Domain: Solar Energy | Training Area: Solar project development and management

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Solar PV Fundamental	• Overview of photovoltaic technologies and applications: - Different types of PV cell technologies & applications - Historical perspective of technological development - Recent & emerging PV technologies - Types & configurations of PV systems - grid-connected, off-grid, hybrid, etc. • Different components of PV systems based on types of applications • Indian and global market scenario of solar PV - current status and growth trends • Economic aspects of solar PV - historical perspective and current trends • Standards and certification of PV modules and system components • Different programmes and schemes of solar PV implemented by MNRE
Solar Resource Assessment & Forecasting	• Overview of solar radiation • Different sources of solar data: - Ground data vs satellite data - Sourcing of solar data and accuracy (P-50, P-90, etc.) - Solar radiation data for India - MNRE Solar resource assessment project for PAN India • Forecasting of solar power generation in different time periods • Scheduling of solar power • Solar resource data due diligence
Solar PV Design & Installation	• Design approach and key considerations for: - Off grid systems - Grid connected distributed and rooftop systems - Utility scale projects - Hybrid and mini-grid systems - Solar water pumping system - Agrivoltaic systems • Standards and regulations to follow in designing of solar PV systems • Introduction to different software used for PV system design simulation
Standards, Quality and Safety aspects of solar projects	• Need of standard and quality control policy for implementation of solar energy programmes

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Requirements of testing and certification infrastructure for different solar energy technologies • Human resource and skill required for testing and certification • Policy and regulatory framework for implementation/adherence of quality and standards • Different international/BIS standards and quality control guidelines/manuals applicable to solar energy • Adoption of IEC standards by the Bureau of Indian Standards (BIS) • The role & terms of reference of Standardisation, Testing and Quality Certification Committee (STQCC) • The role & terms of reference of Quality Control Regulatory Committee (QCRC) • Safety aspects for solar energy projects
Solar PV Manufacturing	• Overview of solar cell technologies - historical perspective, recent development & emerging technologies • Overview of PV cell and module manufacturing processes - Crystalline & thin film-based technologies • Indian and Global market overview - Present status and growth trends • Present status of solar manufacturing in India • Infrastructure, equipment and utilities required for solar manufacturing • Human resource and skill requirement for solar manufacturing • Investment required for establishment of solar manufacturing • Policies and incentives to support solar manufacturing in India • Regulatory, environment and waste management aspects of solar manufacturing facilities
Solar Project Asset Management	• Solar energy project development and implementation phases • Operation, maintenance, troubleshooting and risk assessment of solar energy assets • Impact of asset management on performance, life and financial return of solar energy projects • Key aspects of solar energy asset management • Asset management tools and techniques • Application of AI for solar energy asset management • Case examples on different solar energy project asses management
End of life Waste Management	• Operating life of solar energy projects & life cycle assessment of different components • Types and characteristics of different waste materials generated from Solar energy projects: - During the Operational life - At the end of operational life • Environment, health and safety aspects of wastes generated from Solar energy projects • Regulatory & compliances requirements • Methods of recovery, handling & storage of waste • Methods of Treatment, recycle, reuse and disposal of waste • Economics of Solar energy project waste management

(D) Domain: Solar Energy | Training Area: Solar thermal power and heat

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Solar Thermal for Power	• Types and working principles of solar collectors used for power generation • Innovations and emerging applications in solar thermal power generation • Methods and technologies for storing thermal energy • Current status of solar thermal power generation in India and abroad • Policy and regulatory framework for development of solar thermal power projects in India • Site selection and techno-economic feasibility for development of solar thermal power projects • Solar resource assessment & energy generation estimation approach • Associated risks identification and mitigation techniques for solar thermal power projects • Environmental and social impact assessment approach • Approach for technical & economical due-diligence and appraisal of solar thermal power projects
Solar Thermal for Heat	• Types and working principles of solar collectors used for heat • Common industrial and commercial heating applications suitable for solar thermal heating • Different types of Concentrating Solar Thermal (CST) technologies in India • Innovations and emerging CST technologies • Current status of solar thermal heating applications in India and abroad • Policy and regulatory framework for deployment of solar thermal heating applications in India • Techno-economic feasibility for deployment of solar thermal heating applications • Approach for technical & economical due-diligence and appraisal of solar thermal heating projects
Solar Thermal Manufacturing	• Government policies, incentives, and regulations for solar thermal manufacturing. • Size, growth, and segmentation of the solar thermal market, and regional trends. • Solar thermal component manufacturing, supply chain, and quality control. • Cost factors, economics, and strategies for cost reduction in solar thermal manufacturing. • Advanced technologies and collaborations driving innovation in solar thermal manufacturing. • Strategies, business models, and case studies for entering the solar thermal manufacturing market. • Life cycle assessment, sustainability practices, and circular economy in solar thermal manufacturing. • Barriers, trade policies, and policy recommendations for solar thermal manufacturing.

(E) Domain: Wind Energy | Training Area: Wind power project development and management

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Wind Energy & Turbine Technologies	• Overview of small wind turbine, applications and emerging technologies • Global and local market trends for small wind turbine systems • Human resource and skill requirement for installation and O&M • Site selection and techno-economic feasibility for the deployment of small wind energy projects • Solar wind hybrid system with battery storage • Standards, quality control and safety measures for small wind projects • Case examples • Approach for technical due-diligence and appraisal
Wind Resource Assessment & Forecasting	• Global Wind Energy Resources and Development • Wind energy resource, energy generation Potential and wind Map of India • Current Status of Wind energy Development • Wind Resource Assessment methods and techniques, • Different software tools and data analysis method used for wind resource assessment • Wind Monitoring and resource assessment status in India (On-shore and Off-shore) • Forecasting of wind power generation in different time periods • Scheduling of wind power
Wind power project planning and implementation	• Overview of onshore wind energy: - historical perspective and market growth trends - Recent development and emerging technologies • Site selection and techno economic feasibility for developments of onshore wind projects • Cost and source of funding for onshore wind energy projects • Human resource and skills required for design, installation and O&M of onshore wind projects • Policies and regulatory framework for deployment of wind energy applications • Standards and safety consideration for wind energy projects • Post installation activities - grid integration and management
Standards, Quality and Safety aspects of wind projects	• Need of standard and quality control policy for implementation of wind energy programmes • Requirements of testing and certification infrastructure for different wind energy technologies • Human resource and skill required for testing and certification • Policy and regulatory framework for implementation/adherence of quality and standards • Different international/BIS standards and quality control guidelines/manuals applicable to wind energy • Adoption of IEC standards by the Bureau of Indian Standards (BIS) • The role & terms of reference of Standardisation, Testing and Quality Certification Committee (STQCC) • The role & terms of reference of Quality Control Regulatory Committee (QCRC)

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Safety aspects for wind energy projects
Wind turbine manufacturing	• Wind Energy technologies • Development of wind energy turbines - Historical Perspective • Established wind turbine technologies • Recent development & emerging wind turbine technologies • Indian and global market potential for wind energy turbines • Status of Indian and global wind turbine manufacturing • Infrastructure and equipment required for wind turbine manufacturing • Human resource and skill requirement for wind turbine manufacturing • Investment Required for establishment of wind turbine manufacturing • Policies and incentives to support wind turbine manufacturing in India • Regulatory, environment and waste management aspects of Wind turbine manufacturing facilities
Wind Project Asset Management	• Wind energy project development and implementation phases • Operation, maintenance, troubleshooting and risk assessment of wind assets • Impact of asset management on performance, life and financial return of wind projects • Key aspects of wind energy asset management • Asset management tools and techniques • Application of AI for wind energy asset management • Case examples on different wind project asset management
End of life Waste Management	• Operating life of wind energy projects & life cycle assessment of different components • Types and characteristics of different waste materials generated from wind energy projects: - During the Operational life - At the end of operational life • Environment, health and safety aspects of wastes generated from wind energy projects • Regulatory & compliances requirements • Methods of recovery, handling & storage of wastes • Methods of Treatment, recycle, reuse and disposal of wastes • Economics of wind energy project waste management
Off-shore wind project development	• Overview of offshore wind turbine technologies and floating turbines • Current regional and global market and growth trends • Assessment of wind resource and site conditions • Offshore grid connections and energy islands • Policy and regulatory framework for developing offshore wind energy projects • Techno-economic feasibility of offshore wind power projects • Structural integrity management for subsea and offshore structures • Condition-based monitoring, maintenance, and performance enhancement • Environmental impact assessment of offshore wind projects • Health and safety standards in offshore wind industry

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Future trends and innovations in offshore wind energy • Case examples
Wind and solar hybrid project development	• Overview of solar wind hybrid systems: - Small distributed solar wind hybrid systems - Large solar & wind park hybrid projects • Advantages and challenges of solar wind hybrid projects • Approach for development of solar-wind hybrid projects • Approach for site selection and techno-economic feasibility study for developing solar-wind hybrid projects • Methodology for energy generation estimation • Approach for optimization of solar wind hybrid systems • Key considerations for installation and O&M of solar wind hybrid systems • Associated risks identification and mitigation techniques for solar wind hybrid systems • Environmental and social impact assessment approach for large solar wind hybrid projects • Approach for technical due-diligence and appraisal of solar wind hybrid projects

(F) Domain: Green Energy Corridor | Training Area: Green Energy Corridor

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Planning of green energy corridor	• Purpose of creating Green Energy Corridor (GEC) and examples from India and other countries • Role of GEC on increased RE capacity on grid and generation forecasting • Policies, regulatory measures, and technical standards for Green Energy Corridors • Planning and planting for the development of green energy corridors
Renewable Energy Management Centers (REMC)	• Key roles and functions of Renewable Energy Management Centers (REMC)

(G) Domain: Small Hydro | Training Area: Small hydro project development and planning

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Hydro resource assessment	• Overview of hydro energy resources • Hydro energy resource in India and energy generation potential • Approach and methodologies for hydro resource assessment and data collection

	• Use of tools and techniques for modelling and analysis of small/mini/micro hydro power projects • Forecasting of hydro power generation in different time periods • Approach for assessing economic viability of hydro resource • Environmental and social considerations
Small hydropower project planning and implementation	• Overview of small, mini and micro hydro energy projects • Approach and methodology for techno-economic feasibility study • Policies and regulatory framework for the development of small, mini and micro hydro power projects • Human resource and skills required for deployment of small, mini and micro hydro power projects • Social and environmental impacts of small, mini and micro hydro power projects • Quality control and safety measures for small, mini and micro hydro power projects • Approach for technical & economical due-diligence and appraisal of small, mini and micro hydro power projects • Small hydro turbine manufacturing • Case studies
Standards, Quality, Safety and environmental aspects of small hydro projects	• Quality control and safety measures for small, mini and micro hydro power projects • Approach and methods to conduct Environmental and Social Impact Assessment (ESIA) • Public participation and stakeholder engagement in ESIA • Legal, policy and regulatory framework of ESIA, • Approach for mitigation strategies and environmental and social management plan • Approach for implementation & monitoring of Environmental Management Plans (EMP's) • Environmental and safety aspects of small hydro projects
Small hydro Project Asset Management	• Small hydro project development and implementation phases • Operation, maintenance, troubleshooting and risk assessment of small hydro assets • Impact of asset management on performance, life and financial return of small hydro projects • Key aspects of small hydro asset management • Asset management tools and techniques • Application of AI for small hydro asset management • Case examples on different small hydro project asset management

(H) Domain: Small Hydro | Training Area: Pump Storage

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Pump Storage	• Overview of pumped storage and hybrid hydropower projects • Policies and regulations for development of pumped storage hydropower systems • Approach for site selection and techno-economic feasibility study of pumped storage • Social & environmental impact and mitigation measures • Case studies of pumped storage

(I) Domain: Bio Energy | Training Area: Bio Energy

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Biogas	• Overview of Biogas: - composition, types and production processes - applications of biogas for heat and power generation - recent development and emerging technologies - potential benefits and challenges • Global and local market trends of biogas • Feedstock of various types of biogas and production technologies • Policies, incentives and regulations for biogas plants • Design, construction and O&M of biogas plants • Purification, storage and transportation of biogas • Viability of biogas projects from the technological and economical perspective • Public perception, stakeholder engagement and acceptance of biogas • National Biogas Programme • National Bio Manure Programme
Supply chain management of biomass	• Supply chain management/logistics: practices and strategies • Integration of customer lifecycle, demand, and supply chain management/logistics • Techniques and tools for supply chain forecasting • Key processes: procurement, transportation, inventory, and operations • Integration across supply chain processes • Risk and cost optimization through supply chain systems • Lean and agile models in supply chain management • Green initiatives in supply chain management • Role of analytics and blockchain in supply chain management • Interplay between supply chain systems, enterprise resource planning, and customer relationship management
Biomass to energy/fuel	• Different conversion techniques and processes of biomass into energy/fuel • Advancement in biomass technologies for second generation biofuel • Potential of biomass energy/fuel production in India

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Social, environmental and sustainability aspects of biomass resources • Government policies, regulations and incentives for biomass energy/fuel production • Economic feasibility and market analysis • Case studies on different conversion processes and techniques • Biomass pellets and briquets
Biomass Gasifier	• Overview of gasifier: - types and configuration of commercial gasifiers - benefit & drawbacks of gasification systems - O&M aspects of gasifiers • Feedstock selection and preparation • Techno-economic feasibility of gasifiers • Need for R&D gasifier optimisation and plant supporting system • Standards, quality control and safety aspects for gasifier • Bio - CNG
Municipal and industrial waste to energy	• Different types of wastes generated by municipalities and industries which can potentially be converted to energy/fuel • Municipal/industrial waste to energy/fuel conversion: processes, technologies and challenges • Policies, regulations and legal aspects of municipal/industrial waste to energy • Potential of municipal/industrial waste to energy/fuel production in India • Community engagement, awareness and public involvement • Social, environmental and sustainability aspects of municipal/industrial wastes • Waste collection and logistic methods • Case studies of municipal/industrial waste to energy/fuel
Standards, Quality, Safety and environmental aspects of biomass-based projects	• Need of standard and quality control policy for implementation of biomass-based programmes • Requirements of testing and certification infrastructure for different biomass-based technologies • Human resource and skill required for testing and certification • Policy and regulatory framework for implementation/adherence of quality and standards • Different international/BIS standards and quality control guidelines/manuals applicable to biomass-based projects • Adoption of IEC standards by the Bureau of Indian Standards (BIS) • The role & terms of reference of Standardisation, Testing and Quality Certification Committee (STQCC) • The role & terms of reference of Quality Control Regulatory Committee (QCRC) • Environmental and safety aspects of biomass-based projects

(J) Domain: Green Hydrogen | Training Area: Green Hydrogen

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Green Hydrogen Production, Storage and Transportation	• Overview of green hydrogen: production techniques, applications, opportunities and challenges • Present status and initiative of green hydrogen production in India and abroad • Policies, incentives and regulatory framework for green hydrogen production • National Green Hydrogen Mission (NGHM) • Economic feasibility and levelized cost of green hydrogen production • Purification, storage and transportation of green hydrogen • Green hydrogen storage: methods, materials and applications • Safety consideration related to green hydrogen production, storage and transportation
Production of green hydrogen derivatives- Methanol and Ammonia	• Overview of hydrogen derivatives: types and characteristics - Ammonia (green & blue) - Green methanol and synthetic hydrocarbons • Global and local market scenario of hydrogen derivatives • Hydrogen derivatives production & purification pathways • Future role of hydrogen derivatives • Economic opportunities and risks for hydrogen derivatives • By product utilisation and waste management
Hydrogen for Mobility and Fuel Cell Technology	• Understanding hydrogen as energy carrier • Overview of Fuel cell: principles, types, components and applications • Environmental and energy advantages of fuel cells • Hydrogen economy and hydrogen as a fuel for mobility • Identifying main developments constraints and future markets • Pros and cons of a fuel cell vehicle and a hydrogen combustion vehicle
Hydrogen Supply Chain and Economics	• Understanding current hydrogen market status and recent developments • Supply chain framework to support the hydrogen economy • Major drivers and inhibitors influencing the growth of the market • Supply chain opportunities and associated economic impact • SWOT and Political, Environmental, Social, Technological, Economical and Legal (PESTEL) analysis of the Indian hydrogen supply chain • Challenges in transport, distribution and storage of hydrogen • Business case studies
Electrolyser Technology and Manufacturing	• Overview of electrolyzers and other manufacturing technologies • Established hydrogen manufacturing plants: electrolyzers and other techniques • Future trends and goals in electrolyser technology development • The impact of electrolyser capex on green hydrogen project economics • Present status, infrastructure and equipment required for manufacturing of hydrogen in India • Site identification and project design for utility and industrial scale electrolysis plants

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Investment and techno-economic feasibility required for establishment of electrolysers or other manufacturing technologies • Policy and fiscal incentives for electrolyser manufacturing
National Green Hydrogen Mission Implementation	• Objectives and scope of National Green Hydrogen Mission (NGHM) • Green hydrogen sourcing strategies • Mission phases and timeline • Detailed component observation • Risk management and mitigation • Governance and oversight framework • Expected outcomes and key performance indicators • Financial planning and management • Implementation roadmap • International cooperation and partnerships

(K) Domain: Energy Storage | Training Area: Energy Storage

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Different Energy Storage Technologies	• Overview of energy storage technologies: - Electrochemical energy storage - battery technology - Chemical energy storage - (green) production of chemical fuels - Mechanical storage - gas, liquid, solid storage methods - Thermal storage - sensible, latent, thermochemical technologies • Energy storage performance metrics: efficiency, life cycle, safety, etc. • Policies, finance and regulations for energy storage systems • Risk analysis and mitigation measures • Chemical, physical, engineering and economic aspects of energy storage • Role of energy storage in power grid • Approach for ESS sizing, • National Framework for Promoting Energy Storage Systems • End of life waste management - reuse & recycling
Battery Energy Storage Technologies	• Overview of Battery Energy Storage - types, technologies and recent development, market status • BESS application for transmission and distribution services (voltage support, frequency regulation, peak demand management etc.) • Behind the meter BESS applications • Application of BESS to stabilize variable RE generation • BESS standards & technical comparisons • Approach for BESS sizing for different applications • BES applications for renewable energy and grid management • End of life waste management of BESS
Energy Storage for round-the-clock	• Overview of round-the-clock power supply • Benefits and challenges of round-the-clock power supply

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
supply from Renewable Energy Sources	• Roles of energy storage technologies and trends in round the clock power supply • Viability of different energy storage applications in round the clock power supply • Initiatives of round the clock power supply projects in India • Bidding and project management criteria for the development of round the clock RE project • Policies and regulations for round-the-clock power supply • Economic aspects of round-the-clock power supply • Case example of SECI/ Indian Railway round-the-clock power supply tenders
End of life Waste Management of energy storage	• Energy storage systems: - Definition and purpose - Importance of end-of-life waste management. • Potential risks to human health and the environment. • Existing regulations and guidelines for end-of-life waste management. • Practicing 3R's: reduce, reuse and recycle • Techniques and challenges for the 3R's in energy storage system components. • Second-life applications and repurposing • Sustainable Disposal and Treatment Options. • Mitigation strategies for minimizing hazards. • Emerging technologies and innovations in waste management.

(L) Domain: Smart Energy Technologies | Training Area: Smart Energy Technologies

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Smart grid technologies	• Smart grid overview: applications and market • Smart grid technologies: management and communication • Policies and regulatory framework for the deployment of smart grids • Smart Grid architecture, design and implementation • Smart Grid standards, protocols and legislation • Security and data protection in Smart Grids • Smart energy subsystem: - smart power generation system - smart storage system - smart transmission, distribution and utilization • Key market drivers for implementing the emerging technologies • Controlling, operating and monitoring the smart grid • Emerging ICTs for smart energy systems • Seamless integration of renewables using smart grid technologies • Economic viability, incentives and investments for smart grid
Virtual Power Plant (VPP) Technologies	• Overview of how virtual power plants (VPPs) operate • Identification of VPP aggregation products and services

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Digitalisation of energy sector by VPPs • Design, system integration and utility modeling requirements for the distribution and large-scale VPP grid applications • Flexibility brought by VPPs in power market • Techno-economic feasibility of VPPs
Internet of Energy (IoE)	• Overview of IOE systems: components, architecture and applications • IoE and smart management of renewable energy • Understanding cyber security in IoE • Networking and communication protocols for IoE environments • IoE business analysis and strategy, • Technological advancements in IoE • Regulatory and policy aspects of IoE • Platforms for smart energy metering systems • Smart uses and management of renewables energies
Artificial intelligence in renewable energy	• Introduction to AI and its applications in the energy sector • Data driven smart utilities • Introduction to programming languages and tools • Applications of AI for scheduling, forecasting and network management • Applications of AI for data collection and customer management • Applications of AI for monitoring, data collection and loss reduction • AI for renewable energy asset management • AI for virtual power plant management • Case studies on use of AI in power sector with respect to renewable energy

(M) Domain: Electric Mobility | Training Area: Electric Mobility

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Electric mobility	• Overview of Electric mobility: - evolution of mobility and current technology - applications, benefits and challenges - current market and growth trends • Framing the foundation of e-mobility: policies, innovations and awareness • Economics and ecosystem in e-mobility • Transition from conventional to e-mobility in India and abroad • Effective interface and renewable electricity integration for e-mobility • Future discourse for promoting e-mobility
Electric Vehicle – technologies, market, policies	• Overview of EV technologies and application • Electric vehicle market current status, target and growth trends in India and abroad • Electric vehicle charging technologies • EV policies, incentives and regulations (e-AMRIT incentive scheme)

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Overview of EV manufacturing • Ownership cost of electric vehicle
Electric vehicle charging infrastructure	• EV charging stations - types and technologies available at present • Battery swapping infrastructure • Charging station Internet Protocol (IP) networking • Regulations and guidelines for EV charging • Potential impact of EV charging stations on distribution grid • Safety and environment aspects • Future charging technologies • Vehicle-to-Grid systems • Integration of EV infrastructure with distributed generation

(N) Domain: New Technologies | Training Area: New Technologies

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Potential & Techno-economic Feasibility of Ocean Energy	• Overview of ocean energy: - basic principles, types and characterization - conversion techniques, emerging technologies and applications • Understanding international and national framework for ocean governance • Design consideration, challenges in harnessing and grid integration of ocean energy • Modelling of tidal energy plants: CAPEX, OPEX and LCOE • Financial viability, funding and return on investment (ROI) for ocean energy • Environmental impact assessment and management strategies
Recent Technological Development in Ocean Energy	• Overview of recent technologies: - wave energy: concepts, power conversion mechanisms and characterisation - tidal energy conversion - ocean thermal energy conversion • Modelling an ocean energy farm and predicting energy yield • Grid integration with offshore wind energy • Future prospects and alternative applications of ocean energy
Geothermal Technologies	• Overview of geothermal technologies and techniques: - Techniques: dry steam, flash steam and binary cycle - Technologies: Heat pumps and desalination • Introduction to geothermal reservoir engineering • Approach for design, installation and O&M of geothermal plants • Geothermal policy, economics and regulations • Techno-economic feasibility of geothermal project • Social and environmental aspects of geothermal energy • Integration with other renewable sources

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Geothermal Resource Assessment	• Global geothermal resources and development • Geothermal energy resource assessment, energy generation potential mapping using GIS • Different software tools and data analysis method used for geothermal resource assessment • Geothermal monitoring and resource assessment status in India • Temporal and spatial forecasting of geothermal power generation

(O) Domain: Other domain related topics | Training Area: Other domain related topics

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Carbon Market and Carbon Trading	• Carbon market and trading: - Principles, mechanism, and climate change context - Carbon credits and voluntary markets • Carbon emissions tracking as a lucrative opportunity • UNFCCC, Kyoto protocol, and Paris agreement: background and relevance • National regulatory framework and global commitments • Future and potential of carbon markets in India • Scopes of carbon emissions and trading mechanisms • Environmental, social & governance (ESG) factors & carbon accounting • Global carbon markets and green bonds • Case studies and carbon mitigation strategies
Energy Economics	• Key principles of energy economics • Green energy finance • Market dynamics and pricing in the energy sector • Economic feasibility of renewable energy projects • Policy implications and economic incentives for renewable energy • Economic impact of climate change on energy production
Net Zero Economy	• Net-zero economy: principles, implications and challenges • Pathways to a net-zero economy: technologies, policies and opportunities • Macroeconomics of climate change and investment for net-zero transition • Role of renewable energy in a net-zero economy • Government planning and commitment towards net zero • Economic and societal impact of a net-zero transition • Roadmap for decabonisation across energy sector • Collaboration with federal government towards net-zero
Circular Economy	• Circular economy: Emergence, characteristics, benefits and challenges • The transition to circular economy: financing, workforce building, and supply chain management • Circular economy practices in the energy sector and case studies

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
	• Greenhouse gas emissions and life cycle assessment • Policy, standards, and regulations in circular economy • Design, technologies and innovations for circular economy
Climate Finance	• Climate finance: sources, international agreements and applications • Understanding global climate initiatives • Climate change implications on business decisions • Carbon pricing and accounting • Role of climate finance in renewable energy development • Public and private sector roles in climate finance • Key principles for effective implementation of green public financial management strategy
Carbon Capture and Sequestration	• Carbon capture: Introduction, types, storage technologies and geological aspects • Synergy of carbon capture with other sectors and developments • Exploration of carbon markets • Industrial applications and industry scale for CO2 capture, transport, and storage • Monitoring and safety measures in CO2 storage • Economic and environmental considerations in CCS/CCUS • Navigating regulatory frameworks and public acceptance in CCS/CCUS projects • Risk assessment in CCS/CCUS projects • Carbon credit offtake, trade, and its future perspectives
Environmental, Social and Governance (ESG)	• Definition, importance and components of ESG • ESG risks and opportunities • Management of ESG in organizations • Building an ESG-sensitive organizational culture • ESG reporting techniques and necessities • Formulating resilient ESG strategies • Examination of ESG through industrial case studies • ESG impact on climate change and environmental stewardship • Identification and assessment of ESG risks • The role of ESG in increasing investor and stakeholder confidence
RE Project Finance & Investment	• RE projects development phases, sustainable development, financing & investment • Approach for financial modeling and analysis for renewable energy projects • Risk assessment and mitigation in renewable energy investments • Sources of funding and financing options for renewable energy projects • Global experience in catalysing renewable energy finance and investment • Role of PPP in multilateral banks in RE financing • Fiscal and financial policy instruments for promoting investment in RE sector

(P) Domain: Human Resource Development in RE sector | Training Area: Human Resource Development

Main topic of the training for up-skilling	Course outline based on job roles/responsibilities of MNRE officials
Capacity Building/skill Development in the RE sector	• Identification of areas and topics for which capacity building is required for overall development of NRE sector • Identification of key areas for capacity building and skill development based on national priorities • Identification of targeted stakeholders for capacity building and skill development in the NRE sector • Human resource and skill gap in the emerging NRE sector based on market growth • Planning & strategy for capacity building and skill development to fulfill human resource and skill gap • Strategy for implementation of capacity building and skill development programmes • Strategy for quality control of training and skill development programmes
Knowledge Management	• Knowledge management: Origin, principles, types, and their implications. • Building collaborative environments: Enhancing communication for knowledge management. • Organizational transformation: Designing fast-learning, KM-centric structures. • Knowledge mapping approaches: Innovations in knowledge mapping. • KM vision and strategy: Strategy development considering knowledge types. • Communities of practice: Using communities for collaboration and innovation. • Knowledge protection and IPR: Addressing intellectual property rights in KM. • KM effectiveness measurement: Evaluating ICT's role in KM. • KM experiences and case studies: Studying practical Indian-context examples. • Challenges and future of KM: exploring difficulties in potential advancements
HR Analytics and Training Need Analysis	• Introduction to HR analytics and data management methods & tools • Training need analysis and competency gap assessment: methods and processes • Approach for evaluation of training courses based on training need analysis • Approach for selection of non-training activities based on work domain activities • Methods for monitoring and evaluation of training effectiveness and non-training activities

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