

**GOVERNMENT OF INDIA
MINISTRY OF COMMERCE & INDUSTRY
DEPARTMENT FOR PROMOTION OF INDUSTRY AND INTERNAL TRADE
LOK SABHA**

**UNSTARRED QUESTION NO. 87.
TO BE ANSWERED ON WEDNESDAY, THE 2ND FEBRUARY, 2022.**

IP APPLICATIONS

87. SHRI ASADUDDIN OWAISI:

Will the Minister of **COMMERCE AND INDUSTRY** be pleased to state:

वाणिज्य एवं उद्योग मंत्री

- (a) whether there is any increase in the number of IP applications for green technology in the last five years;
- (b) if so, the details thereof, sector-wise;
- (c) whether the Ministry has initiated any action to encourage innovation in new green technology development in the country;
- (d) if so, the details thereof and if not, the reasons therefor;
- (e) whether the Ministry has taken any steps or plans to implement any measure to encourage consumers to favour products and services which integrate green technologies; and
- (f) if so, the details thereof and the consumers' reaction thereto?

ANSWER

वाणिज्य एवं उद्योग मंत्रालय में राज्य मंत्री (श्री सोम प्रकाश)

**THE MINISTER OF STATE IN THE MINISTRY OF COMMERCE & INDUSTRY
(SHRI SOM PARKASH)**

- (a) & (b):** Yes, Sir. The sector and sub-sector wise statistical data of patent filing from FY 2016-17 to FY 2021-22 (up to 26.01.2022) in accordance with the International Patent Classification (IPC) Green Inventory is enclosed in Annexure-1.
- (c) to (f):** Government of India has taken various initiatives regarding use of Green technology for boosting economy and making positive impact on various aspects of society, so that consumers can be encouraged to use products produced through use of green technology. Some of the initiatives are placed at Annexure-II.

ANNEXURE-I

**ANNEXURE REFERRED TO IN REPLY TO PARTS (a) & (b) OF THE LOK
SABHA UNSTARRED QUESTION NO. 87 FOR ANSWER ON 02.02.2022.**

SECTOR	SUB SECTOR	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22
ADMINISTRATIVE, REGULATORY OR DESIGN ASPECTS	COMBUSTION OF WASTE GASES OR NOXIOUS GASES	0	1	1	2	1	0
ADMINISTRATIVE, REGULATORY OR DESIGN ASPECTS	SOLID FUELS	7	5	11	15	17	9
AGRICULTURE / FORESTRY	FOR WALLS	5	13	9	18	18	28
AGRICULTURE / FORESTRY	OTHER PRODUCTION OR USE OF HEAT, NOT DERIVED FROM COMBUSTION, E.G. NATURAL HEAT	0	1	1	1	0	1
AGRICULTURE / FORESTRY	SILICON; SINGLE-CRYSTAL GROWTH	7	6	11	14	15	13
ALTERNATIVE ENERGY PRODUCTION	ALTERNATIVE IRRIGATION TECHNIQUES	5	7	6	5	6	7
ALTERNATIVE ENERGY PRODUCTION	ANAEROBIC DIGESTION OF INDUSTRIAL WASTE	0	1	0	2	0	0
ALTERNATIVE ENERGY PRODUCTION	ARRANGEMENTS OF DEVICES FOR TREATING SMOKE OR FUMES FROM COMBUSTION APPARATUS	0	2	0	2	2	2
ALTERNATIVE ENERGY PRODUCTION	ASSEMBLIES OF A PLURALITY OF SOLAR CELLS	17	10	24	25	33	35
ALTERNATIVE ENERGY PRODUCTION	BIODIESEL	186	207	202	235	276	241
ALTERNATIVE ENERGY PRODUCTION	BIOETHANOL	33	32	73	76	69	82
ALTERNATIVE ENERGY PRODUCTION	CHARGEABLE MECHANICAL ACCUMULATORS IN VEHICLES	0	1	5	4	4	1
ALTERNATIVE ENERGY PRODUCTION	CHARGING STATIONS FOR ELECTRIC VEHICLES	0	0	0	0	0	0
ALTERNATIVE ENERGY PRODUCTION	COSMONAUTIC VEHICLES USING SOLAR ENERGY	0	1	0	3	3	4
ALTERNATIVE ENERGY PRODUCTION	DEVICES ADAPTED FOR THE CONVERSION OF RADIATION ENERGY INTO ELECTRICAL ENERGY	64	45	81	82	108	78
ALTERNATIVE ENERGY PRODUCTION	DUST-LAYING OR DUST-ABSORBING MATERIALS	0	2	2	1	1	2
ALTERNATIVE ENERGY PRODUCTION	DYE-SENSITISED SOLAR CELLS (DSSC)	1	3	1	2	2	1
ALTERNATIVE ENERGY PRODUCTION	ELECTRIC LIGHTING DEVICES WITH, OR RECHARGEABLE WITH, SOLAR CELLS	4	5	9	15	10	14
ALTERNATIVE ENERGY PRODUCTION	ELECTROMAGNETIC CLUTCHES	2	3	5	7	7	8
ALTERNATIVE ENERGY PRODUCTION	FOR CEILINGS	2	2	2	5	9	3
ALTERNATIVE ENERGY PRODUCTION	FOR ROOFS	2	1	3	1	1	2

ALTERNATIVE ENERGY PRODUCTION	FOR SPACE HEATING	4	4	3	4	4	1
ALTERNATIVE ENERGY PRODUCTION	FOR STEAM GENERATION BY EXPLOITATION OF THE HEAT CONTENT OF HOT HEAT CARRIERS	0	0	0	1	2	1
ALTERNATIVE ENERGY PRODUCTION	FOR SWIMMING POOLS	0	1	5	1	0	0
ALTERNATIVE ENERGY PRODUCTION	FORESTRY TECHNIQUES	0	4	1	2	2	4
ALTERNATIVE ENERGY PRODUCTION	FROM GENETICALLY ENGINEERED ORGANISMS	138	167	167	198	179	122
ALTERNATIVE ENERGY PRODUCTION	FUSION REACTORS	4	8	9	12	9	8
ALTERNATIVE ENERGY PRODUCTION	GAS TURBINE POWER PLANTS USING SOLAR HEAT SOURCE	0	1	0	0	0	0
ALTERNATIVE ENERGY PRODUCTION	GEARINGS THEREFOR	36	27	56	72	55	54
ALTERNATIVE ENERGY PRODUCTION	GEOTHERMAL ENERGY	0	2	4	7	5	2
ALTERNATIVE ENERGY PRODUCTION	HEAT PUMPS IN CENTRAL HEATING SYSTEMS USING HEAT ACCUMULATED IN STORAGE MASSES	1	2	2	5	1	0
ALTERNATIVE ENERGY PRODUCTION	HEAT PUMPS IN DOMESTIC HOT-WATER SUPPLY SYSTEMS	0	0	0	1	1	1
ALTERNATIVE ENERGY PRODUCTION	HUMAN-POWERED VEHICLE	183	158	194	280	347	240
ALTERNATIVE ENERGY PRODUCTION	HYBRID VEHICLES, E.G. HYBRID ELECTRIC VEHICLES (HEVS)	10	4	4	2	2	1
ALTERNATIVE ENERGY PRODUCTION	INCINERATORS FOR FIELD, GARDEN OR WOOD WASTE	0	0	2	2	0	0
ALTERNATIVE ENERGY PRODUCTION	INSULATING BUILDING ELEMENTS	1	2	7	7	10	13
ALTERNATIVE ENERGY PRODUCTION	INTEGRATED GASIFICATION COMBINED CYCLE (IGCC)	1	1	1	0	0	0
ALTERNATIVE ENERGY PRODUCTION	LANDFILL GAS	14	30	33	46	69	56
ALTERNATIVE ENERGY PRODUCTION	LIQUID FUELS	15	16	23	39	35	37
ALTERNATIVE ENERGY PRODUCTION	OBTAINING METALS FROM SCRAP	22	22	28	34	40	35
ALTERNATIVE ENERGY PRODUCTION	OCEAN THERMAL ENERGY CONVERSION (OTEC)	3	0	1	0	0	0
ALTERNATIVE ENERGY PRODUCTION	OF COMBUSTION ENGINES	2	6	10	5	8	2
ALTERNATIVE ENERGY PRODUCTION	OF GASIFICATION PLANTS	0	1	0	0	1	0
ALTERNATIVE ENERGY PRODUCTION	OF GAS-TURBINE PLANTS	0	2	3	0	2	3
ALTERNATIVE ENERGY PRODUCTION	POWER SUPPLY CIRCUITRY	538	570	563	740	920	905

ALTERNATIVE ENERGY PRODUCTION	PRODUCTION OF LIQUID HYDROCARBONS FROM RUBBER WASTE	0	1	7	5	0	0
ALTERNATIVE ENERGY PRODUCTION	PROPULSION BY MUSCLE POWER	0	0	1	0	0	0
ALTERNATIVE ENERGY PRODUCTION	PROPULSIVE DEVICES DIRECTLY ACTED ON BY WIND	0	0	2	0	0	0
ALTERNATIVE ENERGY PRODUCTION	PULP LIQUORS	1	1	4	2	2	4
ALTERNATIVE ENERGY PRODUCTION	RECOVERY OR WORKING-UP OF WASTE MATERIALS	13	15	35	40	51	20
ALTERNATIVE ENERGY PRODUCTION	RECUPERATION OF HEAT ENERGY FROM WASTE INCINERATION	0	0	2	0	0	0
ALTERNATIVE ENERGY PRODUCTION	REGENERATIVE BRAKING SYSTEMS	2	3	7	13	15	19
ALTERNATIVE ENERGY PRODUCTION	REGENERATIVE HEAT-EXCHANGE APPARATUS	11	8	26	27	16	22
ALTERNATIVE ENERGY PRODUCTION	REGULATING TO THE MAXIMUM POWER AVAILABLE FROM SOLAR CELLS	1	1	6	12	4	6
ALTERNATIVE ENERGY PRODUCTION	REMOVING POLLUTANTS FROM OPEN WATER	1	1	3	3	2	3
ALTERNATIVE ENERGY PRODUCTION	SEPARATING DISPERSED PARTICLES FROM GASES OR VAPOURS	69	60	103	187	219	186
ALTERNATIVE ENERGY PRODUCTION	SEPARATION OF COMPONENTS	29	25	59	95	93	112
ALTERNATIVE ENERGY PRODUCTION	SOIL IMPROVEMENT	2	2	2	2	6	5
ALTERNATIVE ENERGY PRODUCTION	SOLAR CONCENTRATORS	0	0	0	0	2	1
ALTERNATIVE ENERGY PRODUCTION	SOLAR ENERGY	96	205	329	349	384	412
ALTERNATIVE ENERGY PRODUCTION	SOLAR UPDRAFT TOWERS	15	13	34	22	9	1
ALTERNATIVE ENERGY PRODUCTION	STATIC STRUCTURE DESIGN	0	0	3	10	5	5
ALTERNATIVE ENERGY PRODUCTION	STORAGE OF THERMAL ENERGY	6	11	19	32	21	20
ALTERNATIVE ENERGY PRODUCTION	STRUCTURAL ASPECTS OF WIND TURBINES	1	5	5	17	7	8
ALTERNATIVE ENERGY PRODUCTION	THERMAL BUILDING INSULATION, IN GENERAL	5	4	14	18	20	17
ALTERNATIVE ENERGY PRODUCTION	TIDE OR WAVE POWER PLANTS	0	0	1	1	1	0
ALTERNATIVE ENERGY PRODUCTION	USE OF ADDITIVES IN FUELS OR FIRES TO REDUCE SMOKE OR FACILITATE SOOT REMOVAL	4	4	3	4	11	11
ALTERNATIVE ENERGY PRODUCTION	USE OF GEOTHERMAL HEAT	208	380	234	154	119	119
ALTERNATIVE ENERGY PRODUCTION	USE OF WASTE MATERIALS AS FILLERS FOR MORTARS, CONCRETE	7	2	10	15	20	10

ALTERNATIVE ENERGY PRODUCTION	USING ORGANIC MATERIALS AS THE ACTIVE PART	9	11	14	25	20	46
ALTERNATIVE ENERGY PRODUCTION	USING TOP GAS IN BLAST FURNACES TO POWER PIG-IRON PRODUCTION	9	0	2	2	1	1
ALTERNATIVE ENERGY PRODUCTION	USING WAVE OR TIDE ENERGY	8	9	8	10	8	0
ALTERNATIVE ENERGY PRODUCTION	WASTE DISPOSAL	27	29	46	76	117	107
ALTERNATIVE ENERGY PRODUCTION	WATER-POWER PLANTS	0	1	1	4	1	0
ENERGY CONSERVATION	CARBON CAPTURE AND STORAGE	13	19	43	43	69	54
ENERGY CONSERVATION	ELECTRICAL CONTROL OF EXHAUST GAS TREATING APPARATUS	6	4	13	26	19	12
ENERGY CONSERVATION	EXHAUST APPARATUS FOR COMBUSTION ENGINES WITH MEANS FOR TREATING EXHAUST	69	56	131	159	174	166
ENERGY CONSERVATION	FOR DOMESTIC HOT WATER SYSTEMS	4	4	4	12	6	7
ENERGY CONSERVATION	FOR DOOR OR WINDOW OPENINGS	0	0	0	1	2	4
ENERGY CONSERVATION	FOR FLOORS	2	0	1	0	2	0
ENERGY CONSERVATION	FOR TREATMENT OF WATER, WASTE WATER OR SLUDGE	0	0	0	0	0	0
ENERGY CONSERVATION	INDUSTRIAL WASTE	0	2	3	2	2	0
ENERGY CONSERVATION	MATERIALS FOR TREATING LIQUID POLLUTANTS	0	1	0	3	1	0
ENERGY CONSERVATION	POLLUTION ALARMS	1	2	3	8	16	16
ENERGY CONSERVATION	RECLAMATION OF CONTAMINATED SOIL	7	11	9	21	23	38
ENERGY CONSERVATION	STEAM GENERATION USING SOLAR HEAT	4	2	8	4	2	5
ENERGY CONSERVATION	STORAGE OF ELECTRICAL ENERGY	13	24	362	619	90	22
ENERGY CONSERVATION	STRUCTURAL ASSOCIATION OF ELECTRIC GENERATOR WITH MECHANICAL DRIVING MOTOR	10	13	16	18	27	22
NUCLEAR POWER GENERATION	FUEL CELLS	53	59	96	88	98	95
NUCLEAR POWER GENERATION	MECHANICAL TREATMENT OF WASTE PAPER	0	0	3	3	3	2
NUCLEAR POWER GENERATION	NUCLEAR (FISSION) REACTORS	34	26	32	20	30	36
NUCLEAR POWER GENERATION	NUCLEAR ENGINEERING	71	64	47	40	41	33
TRANSPORTATION	BIOGAS	14	8	9	23	21	30
TRANSPORTATION	CHARGING BATTERIES	0	0	0	0	0	0
TRANSPORTATION	COMBUSTION APPARATUS USING RECIRCULATION OF FLUE GASES	5	2	0	1	1	1
TRANSPORTATION	CONSUMING WASTE BY COMBUSTION	20	23	36	21	37	30
TRANSPORTATION	CONTROL SYSTEMS	14	17	20	52	68	49
TRANSPORTATION	DISINTEGRATING FIBROUS MATERIALS FOR REUSE	0	0	2	1	1	0
TRANSPORTATION	ELECTRIC PROPULSION OF VEHICLES USING WIND POWER	5	6	1	5	2	9

TRANSPORTATION	ELECTROLUMINESCENT LIGHT SOURCES (E.G. LEDS, OLEDS, PLEDs)	66	69	72	143	195	232
TRANSPORTATION	GASIFICATION	5	0	1	3	1	0
TRANSPORTATION	HEAT PUMPS IN OTHER DOMESTIC- OR SPACE- HEATING SYSTEMS	0	0	0	0	0	0
TRANSPORTATION	HYBRID SOLAR THERMAL- PV SYSTEMS	0	1	1	0	0	0
TRANSPORTATION	PRODUCTION OF MECHANICAL POWER FROM GEOTHERMAL ENERGY	1	2	2	4	1	1
TRANSPORTATION	PROPULSION OF VEHICLES USING WIND POWER	2	1	1	5	5	3
TRANSPORTATION	PYROLYSIS OR GASIFICATION OF BIOMASS	38	29	39	32	34	47
TRANSPORTATION	REFUSE SEPARATION	4	0	4	9	12	9
TRANSPORTATION	WIND ENERGY	259	303	364	354	394	378
WASTE MANAGEMENT	ARRANGEMENTS FOR USING WASTE HEAT FROM FURNACES, KILNS, OVENS OR RETORTS	4	7	8	11	7	12
WASTE MANAGEMENT	BRUSHLESS MOTORS	2	2	4	8	7	6
WASTE MANAGEMENT	CHEMICAL WASTE	11	4	6	6	9	0
WASTE MANAGEMENT	COMBUSTION ENGINES OPERATING ON GASEOUS FUELS, E.G. HYDROGEN	14	16	28	30	29	24
WASTE MANAGEMENT	COMMUTING, E.G., HOV, TELEWORKING, ETC.	1734	2206	2710	4198	4702	5104
WASTE MANAGEMENT	DEVICES FOR PRODUCING MECHANICAL POWER FROM MUSCLE ENERGY	2	0	1	2	1	0
WASTE MANAGEMENT	DISASSEMBLY OF VEHICLES FOR RECOVERY OF SALVAGEABLE PARTS	0	1	1	0	0	0
WASTE MANAGEMENT	DISINFECTION OR STERILISATION	1	1	6	6	10	6
WASTE MANAGEMENT	DRAG REDUCTION	15	7	20	16	20	22
WASTE MANAGEMENT	DUST REMOVAL FROM FURNACES	0	0	0	0	1	0
WASTE MANAGEMENT	ELECTRIC PROPULSION WITH POWER SUPPLY EXTERNAL TO VEHICLE	0	2	1	0	4	1
WASTE MANAGEMENT	ENERGY RECOVERY IN AIR CONDITIONING	4	3	10	7	10	7
WASTE MANAGEMENT	MACHINES OR ENGINES FOR LIQUIDS	57	92	69	78	102	76
WASTE MANAGEMENT	MANAGEMENT OF SEWAGE	49	35	41	83	52	38
WASTE MANAGEMENT	MANUFACTURE OF ARTICLES FROM WASTE METAL PARTICLES	0	0	0	0	1	0
WASTE MANAGEMENT	MEASUREMENT OF ELECTRICITY CONSUMPTION	338	418	445	606	665	714
WASTE MANAGEMENT	NUCLEAR POWER PLANT	3	2	6	3	4	3
WASTE MANAGEMENT	PESTICIDE ALTERNATIVES	328	368	622	780	1041	883
WASTE MANAGEMENT	PLUMBING INSTALLATIONS FOR WASTE WATER	1	2	3	4	3	2
WASTE MANAGEMENT	PRODUCING MECHANICAL POWER FROM SOLAR ENERGY	3	6	7	5	2	3

WASTE MANAGEMENT	PRODUCTION OF FERTILISERS FROM WASTE OR REFUSE	51	63	85	122	133	142
WASTE MANAGEMENT	PRODUCTION OF HYDRAULIC CEMENTS FROM WASTE MATERIALS	0	1	4	1	4	5
WASTE MANAGEMENT	RAIL VEHICLES	197	194	254	249	256	175
WASTE MANAGEMENT	RECLAIMING SALVAGEABLE COMPONENTS OR MATERIAL FROM ELECTRIC DISCHARGE TUBES OR LAMPS	0	0	0	0	0	1
WASTE MANAGEMENT	RECLAIMING SERVICEABLE PARTS OF WASTE CELLS, BATTERIES OR ACCUMULATORS	3	0	6	3	12	11
WASTE MANAGEMENT	RECOVERING MECHANICAL ENERGY	7	4	5	14	10	7
WASTE MANAGEMENT	RECOVERY OF PLASTICS MATERIALS FROM WASTE	1	4	10	30	25	21
WASTE MANAGEMENT	REFRIGERATION OR HEAT PUMP SYSTEMS USING SOLAR ENERGY	3	4	5	12	4	7
WASTE MANAGEMENT	REGULATING, CONTROLLING OR SAFETY MEANS OF MACHINES OR ENGINES	1	0	0	0	0	0
WASTE MANAGEMENT	REMOVAL OF WASTE GASES OR DUST IN STEEL PRODUCTION	1	1	0	0	0	0
WASTE MANAGEMENT	ROOF COVERING ASPECTS OF ENERGY COLLECTING DEVICES	4	0	4	6	3	1
WASTE MANAGEMENT	TORREFACTION OF BIOMASS	3	2	8	4	5	11
WASTE MANAGEMENT	TREATING RADIOACTIVELY CONTAMINATED MATERIAL; DECONTAMINATION ARRANGEMENTS THEREFOR	1	1	1	3	0	0
WASTE MANAGEMENT	TREATING WASTE-WATER OR SEWAGE	337	497	603	1023	1459	1107
WASTE MANAGEMENT	TREATMENT OF HAZARDOUS OR TOXIC WASTE	1	0	1	1	2	0
WASTE MANAGEMENT	TREATMENT OF WASTE GASES	85	87	125	206	212	227
WASTE MANAGEMENT	USE OF SOLAR ENERGY FOR DRYING MATERIALS OR OBJECTS	1	4	1	3	4	3
WASTE MANAGEMENT	VEGETABLE OILS	2	4	5	4	7	8
WASTE MANAGEMENT	WITH POWER SUPPLY FROM FUEL CELLS, E.G. FOR HYDROGEN VEHICLES	1	3	23	17	145	214
WASTE MANAGEMENT	WORKING-UP WASTE PAPER TO OBTAIN CELLULOSE	0	3	2	3	2	3
	Grand Total	5816	6959	8995	12362	13758	13296

ANNEXURE REFERRED TO IN REPLY TO PARTS (c) to (f) OF THE LOK SABHA UNSTARRED QUESTION NO. 87 FOR ANSWER ON 02.02.2022.

Initiatives taken by Government to encourage use of green technology

- i. Indian entered into Green Strategic Partnership (GSP) with Denmark aimed at boosting cooperation in green technologies and management of natural resources, such as groundwater. Focus sectors identified under the partnership include water, urban development, renewable energy, climate action, sustainable and smart cities, cooperation in intellectual property rights, maritime cooperation, food and agriculture, and health and life science. Working groups for each of the identified sectors have been instituted in both the countries.
- ii. A Statement of Intent (Sol) was signed between Atal Innovation Mission (AIM), NITI Aayog, and Embassy of Denmark to India as a part of the GSP with objective to encourage collaboration and work towards the promotion of innovation and entrepreneurship.
- iii. National Programme on High Efficiency Solar PV Modules, a Production Linked Incentive Scheme with an outlay of Rs. 4,500 crores to support and promote manufacturing of high efficiency solar PV modules including the upstage vertical components like cells, wafers, ingots and polysilicon in India and thus reduce the import dependence in Solar Photo Voltaic (PV) sector, is implemented by Ministry of New and Renewable Energy (MNRE).
- iv. Preference to 'Make in India' in Public Procurement in Renewable Energy Sector: Ministry of New & Renewable Energy vide its Order No. 283/22/2019-GRID SOLAR dated 09.02.2021, has inter-alia, prescribed that in public procurement of items in respect of which there is sufficient local capacity and local competition, only Class-I local supplier shall be eligible to bid. Class-I local supplier means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%. Solar PV modules are one of the products identified as having sufficient local capacity and competition.
- v. Launch of National Green Hydrogen Mission on 15th August, 2021, to scale up Green Hydrogen production and utilisation and to align India's efforts with global best practices in technology, policy and regulation.
- vi. Ministry of New & Renewable Energy is also implementing schemes like PM-KUSUM (Kisan Urja Suraksha evam Utthaan Mahabhiyan) scheme with objective to provide clean energy to more than 35 lakh farmers by solarising their agriculture pump, Solar rooftop scheme for residential as well as commercial sector with the objective of ensuring reliability of Solar PV manufacturers and to protect the consumer interests and ensure larger energy security of the country, Approved List of Models and Manufacturers

(ALMM) of solar photovoltaic cells & modules, Green Energy Corridor Project which aims at synchronizing electricity produced from renewable sources, such as solar and wind, with conventional power stations in the grid.

- vii. To encourage use of locally available materials and of Green Technologies for construction of road under Pradhan Mantri Gram Sadak Yojana (PMGSY), Ministry of Rural Development has issued guidelines, wherein the State Governments are required to propose minimum 15% of total length of annual proposals under New technologies such as Cement stabilization, Lime stabilization, Cold mix, Waste plastics, Cell filled concrete, Paneled cement concrete pavement, Fly ash etc. Further, specifications are relaxed as regards to grading of materials for Granular Sub Base layer in order to encourage the usage of locally available/naturally occurring material/marginal materials.
- viii. Ministry of Railways is manufacturing 12000 Horse Power Electric Locomotives of Insulated Gate Bipolar Transistor (IGBT) Technology having regenerative braking feature. Bio-toilets, based on the indigenously developed design/technology in association with Defence Research and Development Organisation (DRDO) are adopted by Indian Railways.
- ix. The Ministry of Road Transport and Highway has taken various initiatives like issuance of notification for exempting Battery Operated Vehicles for permit, use of ethanol mixed fuels, issuance of Advisory on Linking of Pollution Under Control (PUC) data (emission related data) with the VAHAN database, advisory to States/ UTs to comply with the guidelines and facilitate electronic uploading of emissions test data to VAHAN database, Issuance of Notification regarding Registration Mark of Battery Operated Vehicles, Allowing M 15 (15%) Methanol blending with Gasoline, Methanol can be used as an alternative transportation fuel thereby reducing Import dependence to some extent, Notifying Emission Standards for Construction Equipment Vehicles and Tractors which would help in ensuring environment friendly construction / mining activities, Notifying regarding inclusion of Quadricycles as Non-Transport Vehicles.
- x. The Department of Science and Technology has also initiated various Clean Energy Research Initiative (CERI) like Technology Development Scheme which aims to develop national research competence to drive down the cost of clean energy through pre-competitive translational research, oriented research led disruptive innovations & human and institutional capacity development. CERI is akin to a nursery keeper, who intends to nourishing as many seeds and saplings as feasible, hoping for a fruit yielding tree one day. CERI intends to nurture S&T led breakthroughs to feed in national mission on solar energy.
- xi. The Department of Telecommunications has issued the various directions to the Telecom Service Providers (TSPs) for use of Renewable Energy Technologies (RETs) including the following:

- The TSPs should voluntarily adopt the RET solutions, energy efficient equipments and high capacity fast charging storage solutions etc. to meet the target for reduction of Carbon Footprint.
- The Service Providers would adopt a Voluntary Code of Practice encompassing energy efficient Network Planning, infra-sharing, deployment of energy efficient technologies and adoption of Renewable Energy Technology (RET).
- Service providers should evolve a 'Carbon Credit Policy' in line with carbon credit norms with the objective of achieving the reduction in carbon footprint target. The ultimate objective of achieving a maximum 50% over the carbon footprint levels of the base year in rural areas and achieving a maximum of 66% over the carbon footprint levels of the Base Year in urban area.
