Chapter · 13

Environment

S.No.	Particulars	Pg. No.	Remarks
(1)	Importance of Env.		
(2)	Importance of Env. conservation		
(3)	Major regulatory body entrusted with env. related matters.		
(4)	Policy related aspects of env.		
(5)	Env. permits		
(6)	Environmental Impacts		
(7)	IPAT Equation		
(8)	Exemplary approach of Indian Co.'s in creating positive environment.		
	(a) Infosys		
	(b) Marico		
	(c) Dr. Reddy's Lab		
	(d) Mind Tree		
	(e) Ultra Tech. Cement		
	(f) welspun Group		
(9)	Energy Consumption		
(10)	Classification of energy		
(11)	Energy Consumption Statistics & Data		
(12)	Energy Conservation Cases		
	(a) Mahindra Group		
	(b) ITC		
	(c) HDFC		
	(d) Godrej & Boyce		
	(e) TCS		
(13)	Awareness on Environmental protection energy conservation & management.		
	(a) Getting the message right		
	(b) Getting the message across		

(c) Combining info". with behavioural insights
(d) Campaign for crises context

(14) Objectives of ECA, 2001.
(15) Significant features of ECA
(16) Significant changes in amendment act
(17) Bureau of Energy Efficiency Background
(18) Objective of BEE
(19) Powers & functions of BEE.
(20) Energy Accounts & Energy Audit
(21) India's Environmental improvement scenario
(22) Budgetary Allocation & Goals in 2023.
(23) ICMA green project categories

→ Major Regulatory Body

Ministry of Environment, Forest & Climatic Change

Central Pollution Control Board (CPCB)

Nodal Agency
↓
Ministry to act as link b/w govt. & UNEP

Objective
↓
Planning, Promotion, Overseeing

Environmental & Forestry Program

Functions
↓
(RACIST-PP)
R Research
A Awareness
C Conservation
I Info^n.
S Survey
T Training

P Prevention
P Protection

Water Act, 1974
↓
Constituted Statutory body

Air Act 1981
↓
Entrusted power

Info^n. & Tech^l. services
↓
It serves as a field formation & also provide technical services

Environmental Protection Policy
↓
It would be of academic interest to explore policy

National Council for environm^l. Policy & Planning
↓
1972 - National Council.
1985 - MOEFCC

→ ~~Policy Related Aspects of~~ Environmental Permits

Ministry of Environment, Forests & Climate Change

↓

5th March, 2016

↓

4 Categories

Red Category	Orange Category	Green Category	White Category
↓	↓	↓	↓
PI → 60 or ↑	PI → 41 to 59	PI → 21 to 40.63	PI → upto 20
↓	↓	↓	↓
Asbestors, nuclear power plants, shipbreaking, oil & gas extraction, etc	Food processing, printing ink manufacturing, paint blending & pharmaceutical formulations.	Sawmills, tyre/ tube retreating, polythene & plastic products	Solar photo-voltaic cells, wind power, & mini hydro-electric power less than 25 megawatts.

→ Classification of Energy

Based on Source		Based on Price		Based on Availability	
Primary	Secondary	Commercial	Non-Commercial	Renewable	Non-Renewable
Directly available by nature Eg → Coal, Oil	Other than primary Eg → Thermal Power. Energy	Available in market for a definite price. Eg → Coal, electricity, petroleum.	Not available in the commercial market for price Eg → Fire-wood, Solar energy.	Exhaus-tible Eg → Wind Power, Solar energy	Deplete over a period of time Eg → Coal, Oil & gas.

→ Awareness regarding environment protection, energy conservation & effective management :-

Focus on the following points

- Getting the message right
- Getting the message across
- Combining info". with behavioural insights
- Campaign for crisis context.

① Getting the message across :- a) Using impactful visuals to attract attention & increases shareability Via → Social media
b) Engaging with Key industrial players.
c) Dedicated website with a catchy names.
d) Using social media to spread the message more widely
e) Building on previous experience & gathering data.

② Getting the message right :-

Focus the narrative around 3 approaches

- **Saving money**
  - Save energy
  - Save money
  - Campaign gives home owners energy tips (America)
- **Environmental approach**
  - Campaign directly links climate change to threatened extinction of polar bears & recommends energy efficiency action.
- **Social Approach**
  - message relating to being a good citizen, appealing to social norms or the general good.

Narratives should be based on following factors

- **Targeted Audience**
  - Different messages work with different audiences
  - GOI tapped into the potential for children to possitively influence the adults behaviour in the save energy, make India campaign
- **Relatable**
  - **Actionable**
    - Messages should be understandable about what is being expected & it is easy to implement
  - **Hitting the correct tone**
    - Different tones connect with different categories of people, & can help to convey the message more clearly.

→ Environment Impacts on 6 Indian Co.'s :-

① Marico :-

a) Initiative :- a) Reduction in lamination based paper packaging.
b) Eliminating the use of single plastic.
c) Usuage of recyclable packing material.
d) Water conservation.

b) Jalashay :- a) More water for the community.
b) Created 263 crore litres of water conservation capacities (FY22).
c) Aim to build 412 crore litres of total water harvesting capacity (FY24).

c) ESG 2.0 Framework :- a) Phase out hazardous substances such as PVC's
b) Introducing atleast 30% r-PER in the packaging portfolio.
c) 100% recyclable, reusable or compostable packaging portfolio.

② Mindtree :-

a) ESG Goal :- a) High score on ESG goal & has won several awards for the same.
b) Zero discharge locations.

b) WOW Initiative :- a) Recycling waste is scientifically disposed & sent for recycling.

b) 3R Strategy → Reduce, Reuse, Recycle → minimal freshwater usage.

c) Rainwater harvesting & installation of recharging pit initiative at Bengaluru reduced private water purchase by 12.370 KL in FY 22.

c) Other initiative :- a) Invest in green new building.
b) Increase EV vehicle.
c) Large scale data command centre.

d) Future Goal :- a) 100% renewable energy for internal operation by 2030.
b) 30% reduction in scope 1 & scope 2 emission
c) 20% reduction in scope 3 by 2025.

(3) Ultratech Cement :-

a) Cement Industry :- Massive CO_2 emitter.

b) Steps for lower emmission :- a) Solar & wind power generating capacities.
b) Water heat recovering system (WHRS).
c) Blend cement to reduce ~~by 22%~~ clinker ratio to reduce emmission.
~~d)~~

c) Future Goal :- a) Net zero concrete by 2050.
b) SBTi - Scope 1 reduce its intensity by 27% by 2032.
~~c)~~

d) Action :- a) 9.1% reduction of scope 1 CO_2 Intensity against SBTi target.
b) Rain water harvesting.
c) Water recharge within manufacturing unit.

d) Give back 73+ million M3 of water to nature in FY 22.

(4) Infosys :-

a) Achievement :- a) Crisil's ESG ranking for 2nd year
b) Place in Dow Jones sustainability index (Assess ESG performance of companies globally)

b) Climate Action Journey :- a) Started in 2008
b) Co. turned carbon neutral in 2020
c) 30 years ahead of the timeline set up by the Paris agreement.

c) Scope 1, 2, 3 (by 2030) :- a) Reduce scope 1, 2, emission by 75%.
b) Reduce scope 3 emission by 30%.
c) Recycling 100% used water.
d) Zero waste to landfill

(5) Dr. Reddy's Labs :-

a) 2010 :- Identified first set of ESG goals.

b) 2020 :- a) Met three goals fully → Water, Consumption, waste reduction, shopping hazardous waste
b) Met 3 goals partially → Water neutrality, energy consumption, renewable energy.

c) SBTI (Science Based Target Initiative) :-
1st in India, 3rd in Asia → Join SBTI
↓
Reduce Carbon Footprint

d) Bloomberg Gender Quality Index:- Only Indian Pharma Co. to be featured on.

e) ESG goals 2030:- a) 100% renewable power.
b) Carbon neutral in direct emission (scope 1 & 2)
c) 12.5% reduction in scope 3.
d) Water positive by 2025.

⑥ Welspun Group:-

a) Type of Industry:- Textile

b) Initiative:- a) Ecological balance in the domain of air, water & land.
b) Reduce energy & carbon footprints.
c) Monitor scope 1 & 2 emission.
d) Reporting in public domain.
e) Initiated scope 3 emission calculation & reporting.

c) Project at Anjar:- a) Unique project in the area of water management.
b) Establishment of 30 MLD sewage treatment plant to meet water requirement.

→ Regulation for Energy Accounting & Auditing of DISCOM

(1) Regulation :- Bureau of energy efficiency (Manner & Internal for conduct of Energy Audit in Electricity Distribution Companies) Reg^{n}. 2021

(2) Effective Date :- 6/Oct/2021.

(3) Amendment :- 20/Oct/2022.

(4) Timeline of Energy Accounting & Energy Audit

(1) Energy Accounting → 60 days of completion of respective quarter.
(Quarterly Report)

(2) Energy Audit → within 4 months of completion of F.Y.

(5) Certification & Auditor :-

(1) Quarterly Reports → Certified Energy Manager

(2) Audit → Independent accredited energy auditor.

(6) Key aspects of energy Accounting & Audit :-

(1) Pre-requisite
(2) Reporting requirement
(3) Interval of time
(4) Manner
(5) Prioritization & preparation of action plan.
(6) Structure of Annual Energy Audit Report.

DM

(7) Benefits of Energy Accounting :-

It will help to identify areas of high losses & thereafter, focused efforts can be made by the companies to take corrective action.

→ Powers & Function of BEE :-

→ Memory Technique → PLANT FC³

P Promotion activities :- Awareness campaign, capacity building program & training initiative

L Label :- for appliances, equipment to make consumer energy efficient choices & creating market demand.

A Awareness :- about energy efficiency through various measures.

N Norms :- for processes & energy consumption standards notified by CG.

T Transforming :- the market for energy efficiency by creating mechanism.

F Financing :- mechanisms for energy efficiency projects, and green bonds, to mobilize fund.

C Consumer list :- industries or establishments that are identified as high energy consumers & req? to comply energy comp. norms

C Certificate :- issuance of energy savings certificates by CG.

C ESCO :- Energy service companies provide energy efficiency services & solution to consumers.

→ IPAT Equation :-

→ Proposed by :- Commoner, Ehrlich, Holdren

$I = P \times A \times T$

① Impact = Population × Affluence × Technology

② $\text{Impact} = \text{Population} \times \frac{\text{GDP}}{\text{Person}} \times \frac{\text{Impact}}{\text{GDP}}$

③ $\text{Impact} = \text{Population} \times \frac{\text{Economic goods}}{\text{Population}} \times \frac{\text{Pollutant}}{\text{Economic goods}}$

$I = P \times A \times T$

④ $I = P \times A \times (M \times D \times H)$

Environmental Impact = Population × $\frac{\text{GDP}}{\text{Population}} \times \frac{\text{Unit of Pollution}}{\text{Unit of material}} \times \frac{\text{Impact}}{\text{Unit of Pollution}}$

M = Material intensity
D = Dissipation factor
H = Hazard factor

(14) Climate Investment :-

→ Union Budget 2022-23 announced sovereign green bonds under the govt's overall market borrowings in 2022-23, which will be used to raise funds for climate-friendly infrastructure.

→ This is a great milestone accomplished to attract scalable capital for green projects in India.

→ In Union budget 2023-24 the Ministry of Environment, Forests & Climate change has been alloted

₹ 3079 (24% increased over 2022-23)

₹ 2,934 cr. [revenue exp. (95%)]

₹ 145 cr. [capital exp. (5%)]

Key allocation of budget is as follows :-

(1)	Establishment Expenditure of the Centre	41%
(2)	Env., Forestry & Wildlife	30%
(3)	Pollution Control	26%
(4)	Autonomous Bodies	0%
(5)	Statutory & Regulatory bodies	6%
(6)	Env. Knowledge & Capacity building	7%
(7)	National Coastal Mission	213%
(8)	Others	-

→ Budget Allocation and Goals in 2023 :-

Environmental & Social Goals in 2023 Indian Budget :-

Total Outlay = US $ 122 Billion

(1) Food security & Sustainable food system
(2) Affordable housing
(3) Employment generation
(4) Affordable basic infrastructure
(5) Socio economic advancement & empowerment
(6) Sustainable water & waste water management
(7) Health & Education
(8) Circular economy
(9) Clean Transportation
(10) Environmentally sustainable mangement of living and land use.
(11) Terrestrial & aquatic biodiversity
(12) Renewable Energy.

→ Analysis & statistics of Energy Consumption in India :-

(1) Table 1 :- Consumption of energy resources in India :-

(a) The growth rate of ~~20~~ 21-22 over 20-21 is highest in case of lignite which is 27.49% and lower in case of natural gas which is 5.08%.

(b) CAGR is highest for electricity i.e, 5.16% and lowest for lignite 0.65%.

(2) Table 2 :- Year wise consumption of energy :-

(a) Coal is the highest contributor of total energy consumption, i.e, 46.4% & the lower contributor is lignite, i.e, 1.04%.

(b) CAGR is highest for electricity i.e, 5.16% and lowest for lignite 0.65%.

(3) Table · 3: Industry Wise Coal Consumption :-

(a) Coal consumption is highest in case of electricity i.e, 69.04% and lowest in case of bricks i.e, 0%.

(b) CAGR is highest in electricity, i.e, 5.20% and negative in case of bricks - 39.43%.

(4) Table · 7: Purpose of natural gas into various sector :-

It is highest in case of fertilizer industry i.e, 28.29% and lowest in case of agricultural Tea Plantation, i.e, 0.24%.

(5) Table · 8: Consumption of electricity (sector wise)

(a) Electricity is highest in industry, i.e, 41.16% and lowest in railways, i.e, 1.53%.

(b) CAGR is more in case of domestic sector i.e, 6.87% & less in case of railways i.e, 3.84%.

(6) Table · 5: Consumption of Petroleum products

(a) The highest utilisation of petroleum product is of high speed diesel oil, i.e, 37.55% and lowest in case of light diesel oil (0.50%) and Kerosene 0.73%.

(b) CAGR is highest in case of light diesel oil i.e, 11.05%. it is negative in case of Kerosene, i.e, -16.42%.

Table. 6 : Consumption of petroleum product (sector wise)

(a) High Speed Diesel Oil → The growth rate has increased in transport sector, i.e, 25.55%. & it is negative growth rate in private imports i.e, -14.29%.

(b) Light Diesel Oil → It is highest growth rate in relais & resale sector, i.e, 64.99%.
and it is negative growth rate in private imports i.e, -35.91%.

→ Energy Conservation scenario - Cases of selected Indian Co.'s

① Mahindra Group :-

(a) Carbon Neutrality 2040 :- 4 big drivers

- Energy Efficiency
- Renewable Energy
- Electric Mobility
- Electric offsetting

(b) SBTi :- 20 Mahindra Co.'s have committed to SBTi

(c) Other group institute :- ① Adoption of technology for energy-efficient lighting, air conditioning, motor appliance
② Business process re-engineering to reduce energy requirements.
③ Heat recovery projects to re-use waste energy.
④ Construction to reduce the need of energy.

(d) Key initiative & success :- (1) Mahindra holidays, Mahindra heavy engineers ltd. (MHEL) becoming India's first & world ~~third~~ manufacturing unit to double its energy production is 2020.

(2) Deployed more than 100 energy efficiency projects within auto group alone.

(2) HDFC Bank :-

(a) Goal :- Become carbon neutral by 2031-32

(b) Initiative :- Reduce emission, energy & water consumption. ~~Consumption~~ ~~Conservation~~.

(c) Various Initiative :-
- 3 star & above appliances used
- Replacement of tubelight with LED
- Implementation of switch room at 3 & 4 branches resulting into reduced AC usage.
- Replacement of UPS with energy efficient device.
- Replacement of bottled drinking water with water purifier.
- Installation of sensor tap.

(3) ITC Group :-

(a) Renewable Energy :- 41% of co's total energy consumption is from renewable energy.

(b) Target :- Co. has a target of achieving 50% of the share of renewable energy in total energy & 100% electricity from renewable energy.

(c) Bifurcation of renewable energy :- 41.03% energy requirement was met from renewable sources like, biomass, wind and solar

(d) 2020-21 :- (1) Co. invested in energy conservation equipment.
(2) There was decrease in energy consumption by 6.02%.
(3) It also reduce the green house gas emission 21,460 tonnes.

(e) Various energy conservation measures :-

(1) Installation of new energy efficient electric boilers.
(2) Installation of Vapour Absorption Machine (VAM)
(3) Installation of air loss moisture removal traps from for compressed air system.
(4) Advanced dirt seperator system in chilled water line of HVAC.
(5) Replacement of cooling tower AHUs chillers, compressors, motors, fans, pumps & agitators.

(4) Godrej & Boyce :-

(a) Outlook :- They believe that energy is vital gear for driving a cleaner & greener future.

(b) Energy efficient culture :- (1) improved operational efficiencies.
(2) energy conservation mechanism.
(3) Increased focus on inclusion of renewable sources into the energy mix.

(c) Goal :- To improve energy productivity by 100% by 2030.
To use 40% renewable energy in manufacturing over next 3 years.

(d) Revenue :- generated 23% from Good & Green products.

(e) Sources of energy :- Fuel consumed includes high speed diesel, piped natural gas, liquefied petroleum gas, furnance oil, biomass energy, energy from grid electricity & solar energy.

(f) Co. Investment & saving of electricity :- ₹. 6.7 cr. during the reporting period in various energy efficiency initiatives that resulted in savings of over 21 lakh KWh of electricity per annum.

(5) Tata Consultancy services :-

(1) **Year on year reduction :-** TCS saw a year on year reduction in absolute energy use by 46.6% and absolute carbon footprint reduction by 48.0%.

(2) **Roof top solar & purchase of solar :-** 15.6% of the total electricity consumption is coming from roof top solar power plants & power purchase agreement

(3) **Situation in Pandemic :-** GHG has been declined 53% but there was increase by 0.23% in the FTE (working out of TCS office)

→ ICMA Green Product Categories :-

(1) Renewable Energy

Transition & Net Zero	Green Hydrogen	Battery Energy storage system	GOBAR-dhan
↓	↓	↓	↓
Outlay	• Budget outlay INR. 197.44 Billion	Goal is to set up capacity of 4000 MWh, supported by Viability Gap funding.	• 5% compressed biogas mandate is to be introduced for all org marketing natural & bio gas
↓	• Annual production of 5 MMT by 2030		
• INR. 350 B. for energy security, transition and net zero objective	• Meet atleast 10% of the global demand for green hydrogen by 2030.		
• INR. 207 B. for renewable energy from Ladakh.	• Mission → India become energy		

② Circular Economy (GOBAR dhan) :-

- Establishment of 500 new 'waste to wealth' plants.
- Total investment of INR. 100 Billion.
- 200 compressed biogas plants (75 in urban areas) and 300 community plants.

③ Clean Transportation :-

Exemption of custom duties for import of capital goods & machinery required to manufacture lithium ion cells for batteries used in EV's.
Market is expected to grow to INR. 400 billion with CAGR of 17.23% over 2022 - 27.

④ Environmentally Sustainable Management of living natural resources & land use :-

Atmanirbhar Clean Plant Program	PM PRANAM	GOBAR dhan	Green Credit Program
Allocation of INR. 22 billion for high value horticultural crops.	Incentivize States & UT to promote alternative fertilizers & balanced use of chemical fertilizers	Assist 10 million farmers to adopt natu-ral farming setting up 10K centres to create national pesticide	To inculculate green & sustainable practices within individuals & local bodies.

(5) Terrestrial & Aquatic Biodiversity :-

MISHTI
↓
Mangrove Initiative for Shoreline habitats & Tangible Incomes
↓
To conserve mangroves & preserve landscapes

Amrit Dharohar Scheme
↓
To encourage optimal ~~usuage~~ usage of wetlands & generate income for local communities.

(6) Sustainable Water & wastewater management :-

- Transition from man-made holes to machine-made holes and undertaking 100% mechanical & de-sludging of septic tanks & sewers.