

Class-x ch-5 [Geography] Minerals and Energy Resources

• Introduction

→ Minerals, energy resources and we.

→ Minerals are an indispensable part of our lives. [Pin to ship]

“Homogenous naturally occurring substance with a definable internal structure”

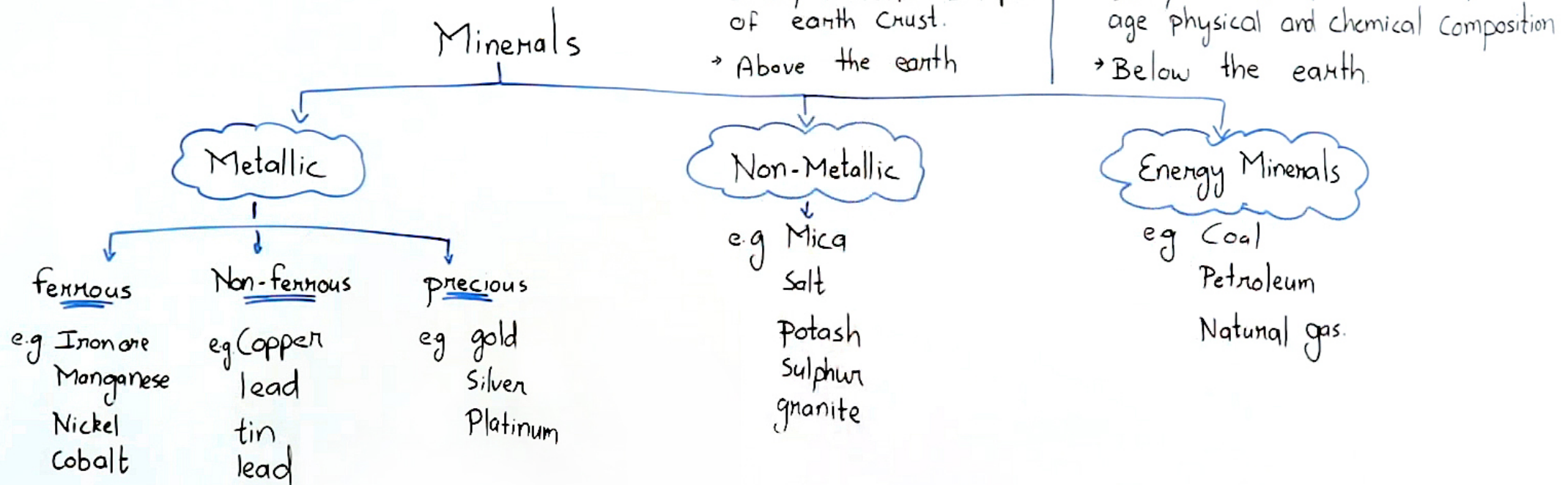
Rocks → Minerals [one or more than one]

↑
Depends upon the physical
and chemical conditions.

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Classification of Minerals

Minerals



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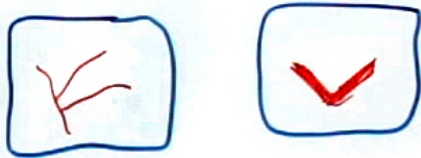
Mode of Occurrence of Minerals

→ found in "ores" → [Minerals mixed with other element]

↓
Commercially
viable extraction

(v). Ocean water e.g. [salt, magnesium and bromine]

(i) Veins and lodes



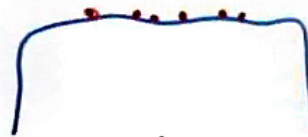
e.g. Tin, Copper
Zinc and lead.

(ii). Beds and layers



e.g. Coal, gypsum
potash etc

(iii). Residual mass
of weathered Material



e.g. Bauxite

(iv) Alluvial deposits



e.g. Gold, Silver, tin
[Minerals not Corroded]
By water

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Types of Mining and Distribution of Minerals

i). open pit Mining



ii). quarrying



iii). Underground Mining with Shaft



→ Some facts:

- Minerals are nationalised
- Mining by tribal group [Rat hole]

→ Peninsular rocks

- Coal, Metallic minerals, Mica and many other non-Metallic Minerals

→ East and west of Peninsula

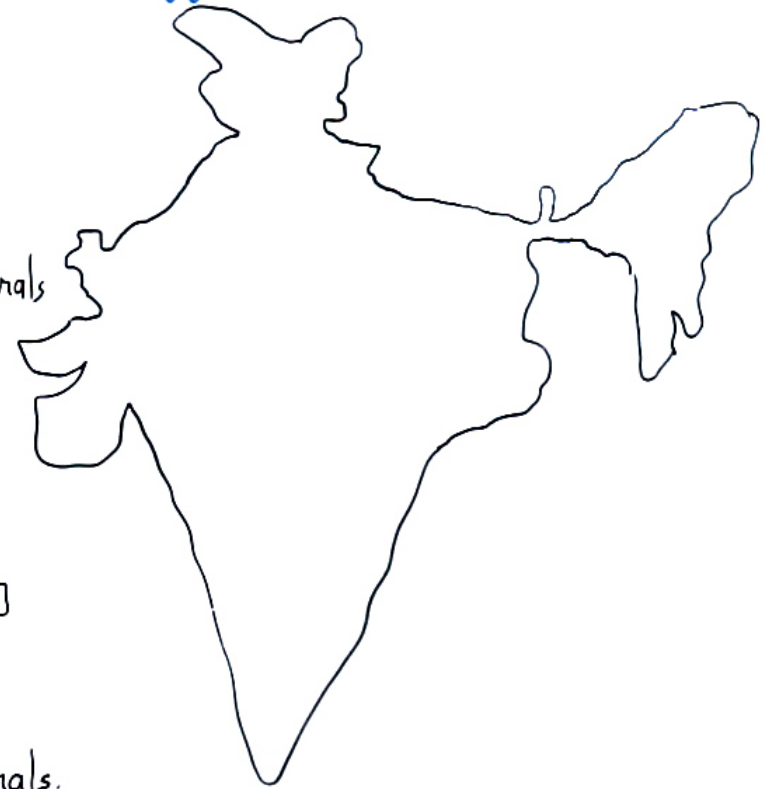
- Petroleum

→ Rajasthan

- Non-ferrous Minerals [Copper]

→ North India

- Devoid of Economic Minerals.



⌘ How a "deposit" or "Reserve" turn into Mine ??

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Ferrous Minerals

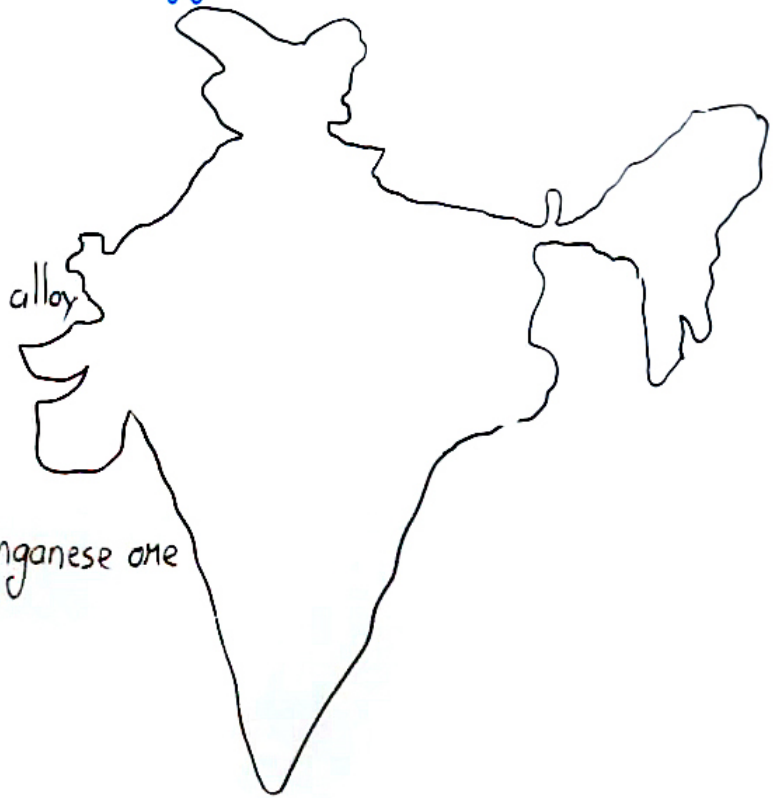
→ 3/4 of total metallic minerals, Base for Metallurgical industries

Iron ore

- Back bone of Industrial Development.
- Magnetite [70% of Iron content]
 - Excellent magnetic qualities
- Hematite [50-60% of Content]
 - Industrial iron

Manganese

- used in making steel and ferro-manganese alloy
- 10 kg in 1 tonne of Steel
- used in manufacturing bleaching powder, Insecticides and paints
- Orissa is the largest producer of manganese ore



⚡ How a 'deposit' or 'Reserve' turns into Mine??

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Major iron ore belts in India

(i) Orissa - Jharkhand belt

- Hematite ore found in Badampahar, Gua and Noamundi
- Port → Paradwip port

(ii) Durg - Bastar - Chandrapur

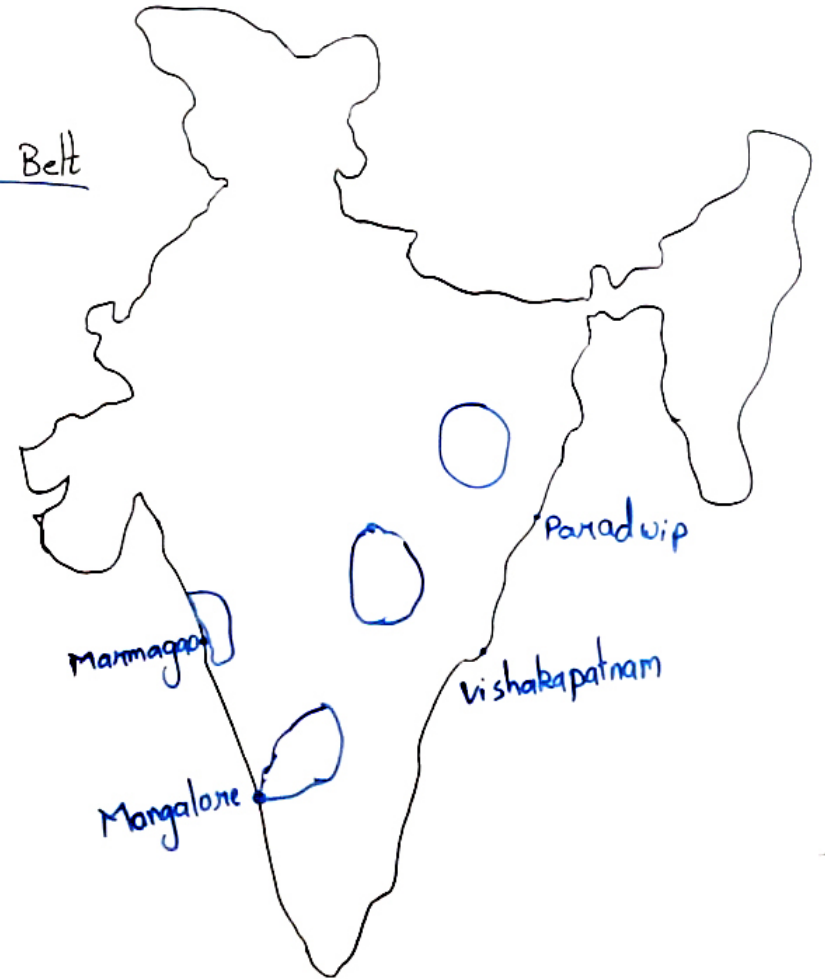
- Chhattisgarh and Maharashtra
- Hematite ore found in Bailadila range of Bastar district
- Port → Vishakapatnam [Japan and South Korea]

(iii) Bellary - Chitradurga - Chikmagalur - Tumkur

- Kudremukh Mines is 100% export unit
- Port - Mangalore [Through Pipe line]

(iv) Maharashtra - Goa Belt

- Goa and Ratnagiri District of Mah.
- Port - Mormugao



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Non-ferrous Minerals

- Not Sufficient
- Minerals such as Copper, bauxite, lead, Zinc and gold
- Used in metallurgical, engineering and electrical Industries.

(i) Copper

- India is critically deficient in Copper production
- Malleable, ductile and a good Conductor. Therefore have high demand.
- Balaghat Mine produces 52% of total Copper
- Singhbhum district and Khetri mines

(ii) Bauxite

- Bauxite → alumina → aluminium
- Strength of metals eg iron with Extreme lightness, Good Conductivity and great malleability.
- Amarkantak plateau, maikal hills plateau region of Bilaspur - Katni
- Orissa → largest Bauxite producing state.



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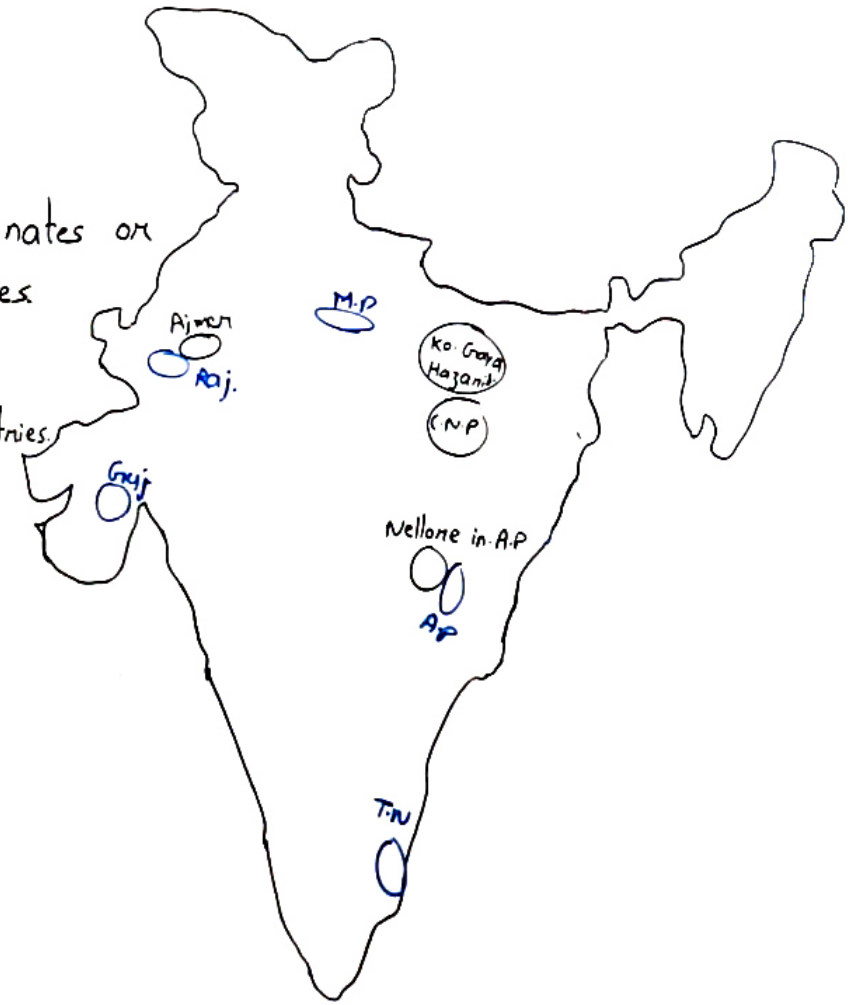
Non-Metallic Minerals and Rock Minerals

(i) Mica

- Made of Series of plates.
- used in electronic industries due to di-electric strength, low power loss factor, insulating properties and resistance to high voltage.
- Chota nagpur plateau, Koderma, Gaya-Hazaribagh, Ajmer, Rajasthan and Nellore Mica belt of A.P

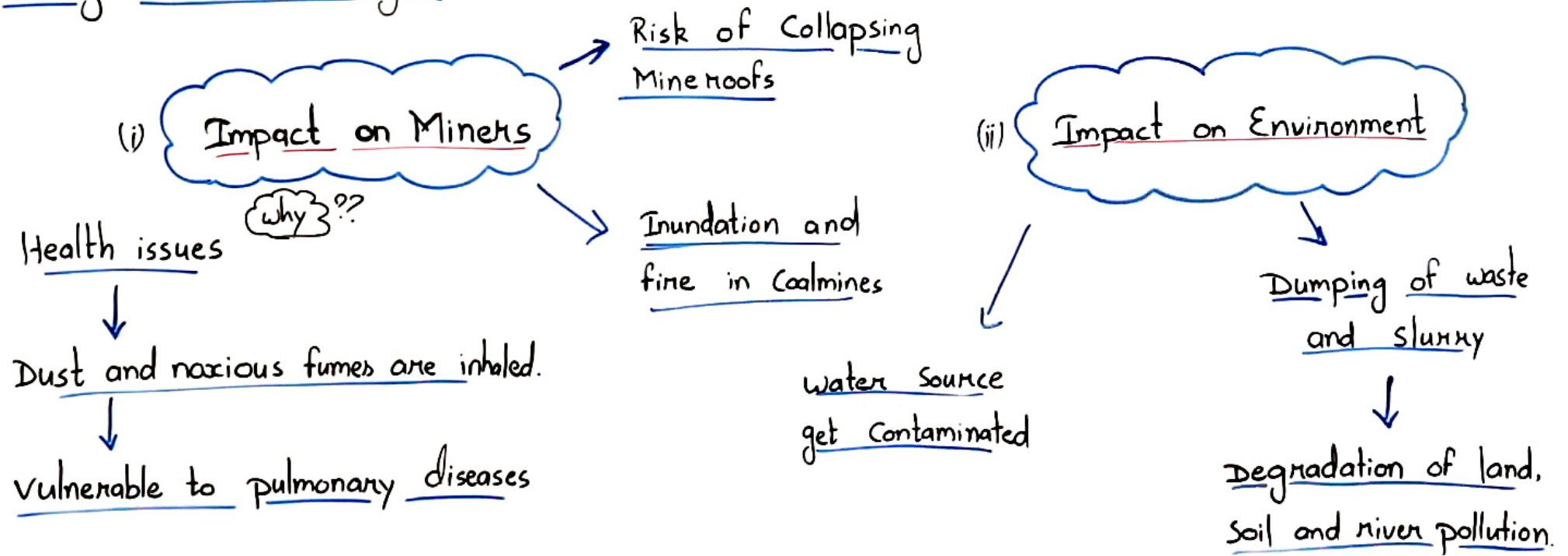
(ii) Limestone

- Rock Composed of Calcium Carbonates or Calcium and magnesium Carbonates
- Essential for Smelting iron ore in Blast furnaces and Cement Industries.
- A.P, M.P, Rajasthan, Gujrat, T.N and Many more.



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Hazards of Mining:



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Conservation of Minerals

→ Our dependence on minerals and its availability to us.

• 1% of the earth's crust.

→ Replenishment and mineral formation $\downarrow$ = $\uparrow$ Consumption

$\therefore$ finite and non-renewable

→ Continued extraction = $\uparrow$ Costs $\left[\begin{array}{l} \text{Greater Depths} \\ \downarrow \text{Decreased quality} \end{array} \right]$

→ Step for Conservation

• Improved technology, Recycling of Metals, using other alternatives and Substitutes.

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Energy Resources:

→ Necessity of energy ??

e.g. fuel Minerals like coal, petroleum, natural gas, uranium and electricity.

• Conventional Source •

• Ordinary, following the traditional way

e.g. ÷ firewood
cattle dung cake } ✱
coal
petroleum

• Non-Conventional Source •

• Not ordinary, other than traditional way

e.g. ÷ solar
wind
tidal
geothermal.

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Conventional Sources of Energy : Natural Gas

- Source of Energy as well as an industrial raw material.
- found in association with or without petroleum.
- Environment friendly → low Carbon dioxide emissions
- Krishna - Godavari basin, Mumbai High, Gulf of Cambay.
- HVJ Pipeline [Hazira - Vijaipur - Jagdishpur] = Artery to Indian Gas production
- Power and fertilizer Industries are key users.
- CNG [Compressed Natural Gas] is used in vehicles is replacing liquid fuels.

~~non-P~~
Non-P

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Conventional Sources of Energy : Coal

→ formation??

• Degree of Compression, Depth and time of burial.

coal → Bulky

∴ Industries are near Coal fields.

• On the basis of quality

(i) Peat

↓ Low Carbon

↑ High Moisture

∴ Low Heating Capacity

(ii) Lignite

• Low grade brown Coal

• Soft with high moisture content.

(iii). Bituminous

↓ Deep Inside the Earth

↑ Temperature

∴ Commercial use, Smelting

(iv). Anthracite

• Highest quality

• Hard Coal.

• On the basis of age :

(i) Gondwana Coal

→ 200 Million Coal

→ Damodar valley, Jharkhand, Raniganj, Bokaro

ii Tertiary Coal

→ 55 Million years ago

→ North eastern states.

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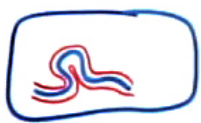
Conventional Sources of Energy : Petroleum

→ Petroleum Industry as a "Nodal Industry".

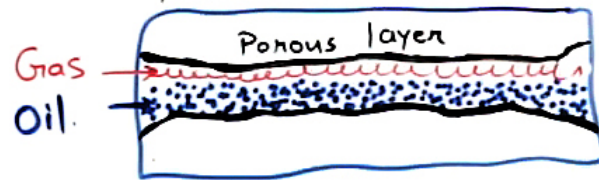
- Synthetic textile, fertiliser and numerous chemical Industries

→ Occurrence ??

- Anticlines and fault traps in
Rocks ↓ formed during ↓ tertiary age.



- Porous and non-porous layer and Gas being lighter usually occurs above the oil.



→ found In : Mumbai High, Gujarat [Ankeleshwar], Assam [Digboi].

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Conventional Sources of Energy : Electricity

→ It's Importance ??

- Per Capita Consumption is considered as index of development

Hydro Electricity

- Produced by running water.
- use renewable resources
- Multipurpose river projects like Bhakra nangal, Damodar valley Corp.

Thermal electricity

- By Burning Coal, petroleum and natural gas
- use non-renewable fossil fuels.

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Non-Conventional Source of Energy : Nuclear or Atomic Energy

→ Need for it ??

- (↑) Consumption of fossil fuels



Depletion of Resources

↓
(↑) Price Rise

→ uncertainties in future and
Environmental problems.

- (••) we must use renewable source of energy
e.g solar energy, wind energy, tide and biomass.



→ obtained by altering the structure of atoms

- Uranium and thorium are used.
- found in Jharkhand, The Aravalli ranges of Rajasthan and The monazite sand of Kerala [rich in Thorium].

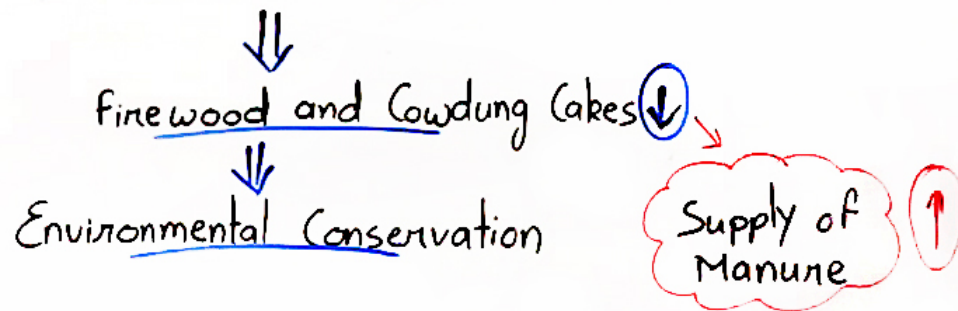
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Non-Conventional Source of Energy : Solar Energy & Wind Energy

→ Photovoltaic technology Converts Sunlight directly into electricity.

→ The largest solar plant of India is located at Madhopur, near Bhuj [Sterilising milk Cans]

→ Relief for rural households



→ Potential of wind.

→ largest wind farm cluster
Nagarcoil to madurai [T.N]

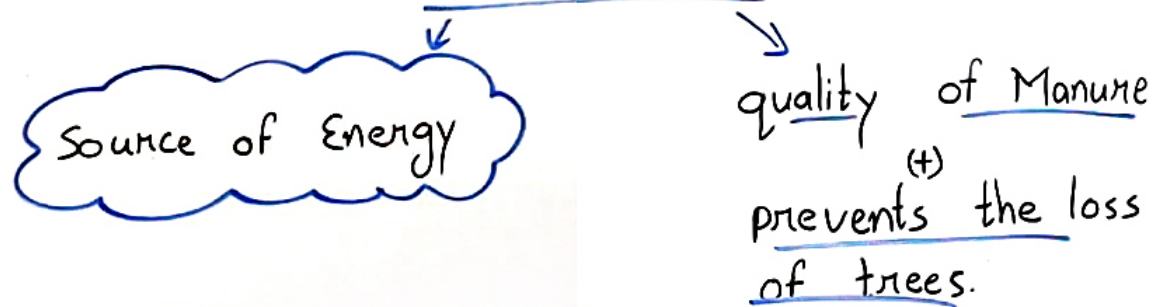
→ A.P, karnataka, Gujrat, kerala
Maharashtra etc.

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Non-Conventional Sources of Energy: Bio gas

- Shrubs, farm waste, animal and human waste is used to make biogas.
- Decomposition of organic matter → Gas → Higher efficiency as compared to kerosene, dung cake and charcoal.
- Plants using cattle dung are known as "gobar gas plants".

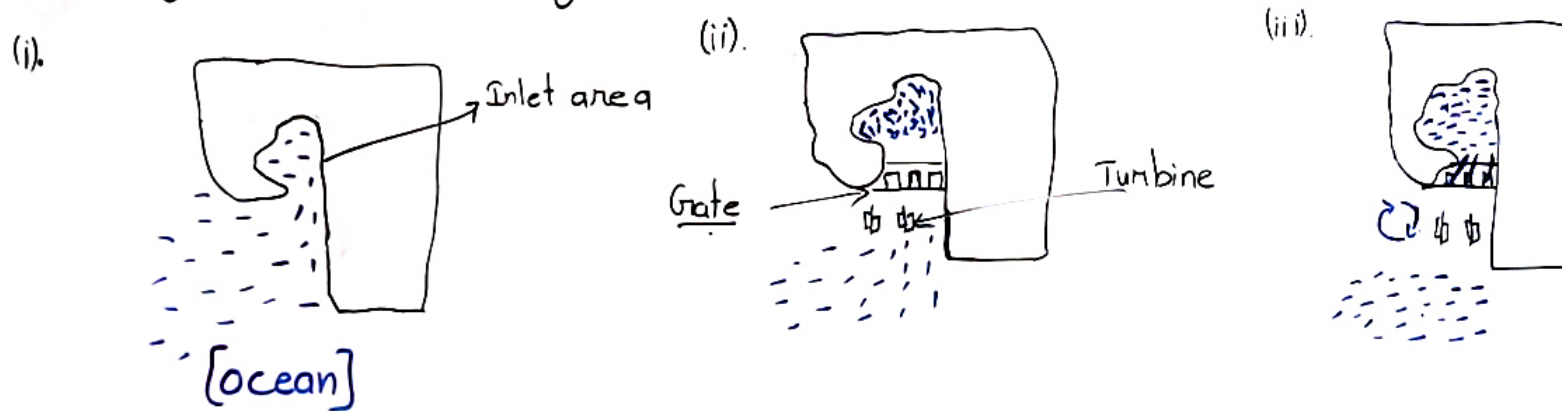
Twin Benefits



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Non-Conventional Sources of Energy : Tidal Energy

→ Energy produced by tides.

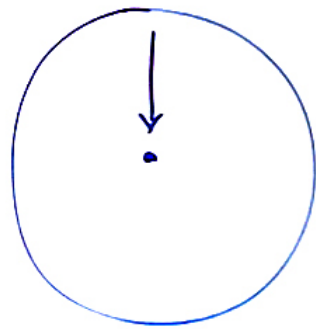


→ Gulf of Kutchh, provides ideal condition for utilising tidal energy.

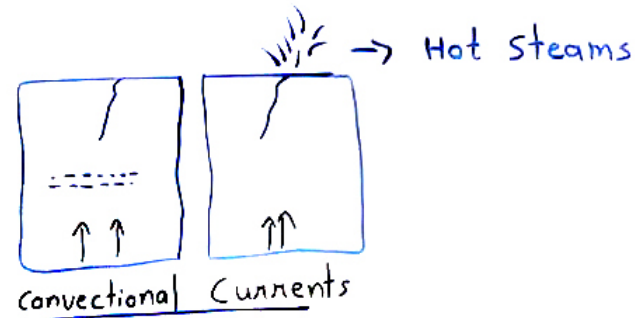
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Non-Conventional Sources of Energy : Geothermal Energy

→ Electricity produced by the heat from the Interior of the earth.



Temperature ↑
[Increase in temp.
with depth]



• Two Experimental Projects :-

1. Puga valley, Ladakh

2. Parvati valley near Manikaran, H.P.

→ Water turns into steam and steam is used to rotate turbine and generate electricity

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→ Conservation of Energy resources

① Development = Need for the energy ①

∴ Consumption of Energy is also Increasing.

→ we should use Sustainable energy.

- use public transportation.
- Switch off electricity when not in use.
- Using power saving devices.
- using non-Conventional Sources of Energy.

∴ Energy Saved is
Energy produced

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Frequently asked questions

- various mode of occurrence of Minerals? [specific]
- ferrous and non ferrous Minerals?
- Iron ore? Magnetite and Hematite? Iron ore belt?
- specific Minerals? [Bauxite, Copper, Manganese and others]
- Hazards of Mining? Conservation of Minerals?
- Energy Resources? [specific Resources - Petroleum, Natural Gas, Electricity, Solar, wind etc]
- Coal? on the basis of quality? on the basis of Age?
- Conventional and Non-Conventional source of energy?
- Conservation of Energy?