Environmental Pollution from Power Plants, Vehicles, Open Burning of Solids, Fire Crackers

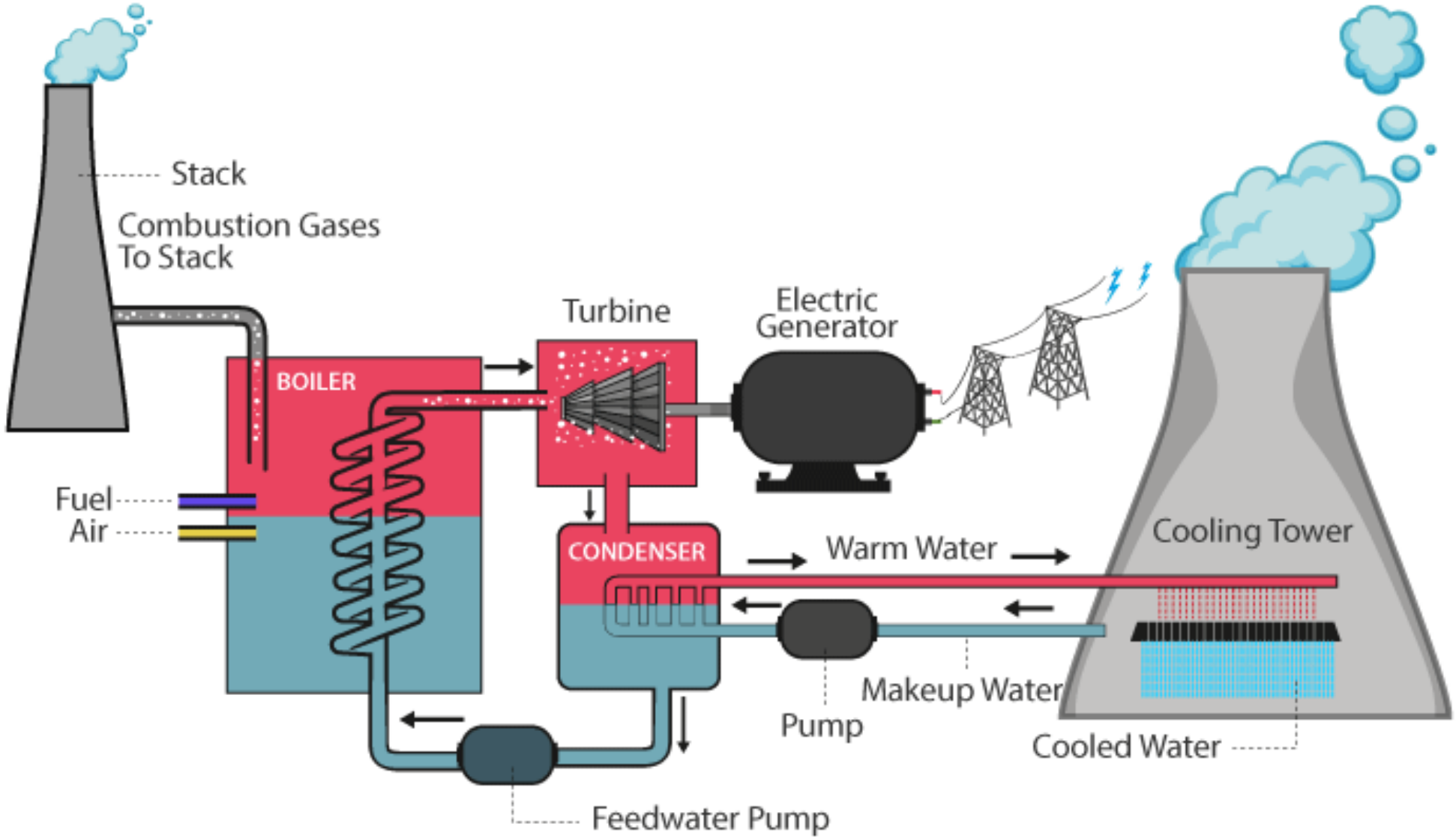
Power Plants

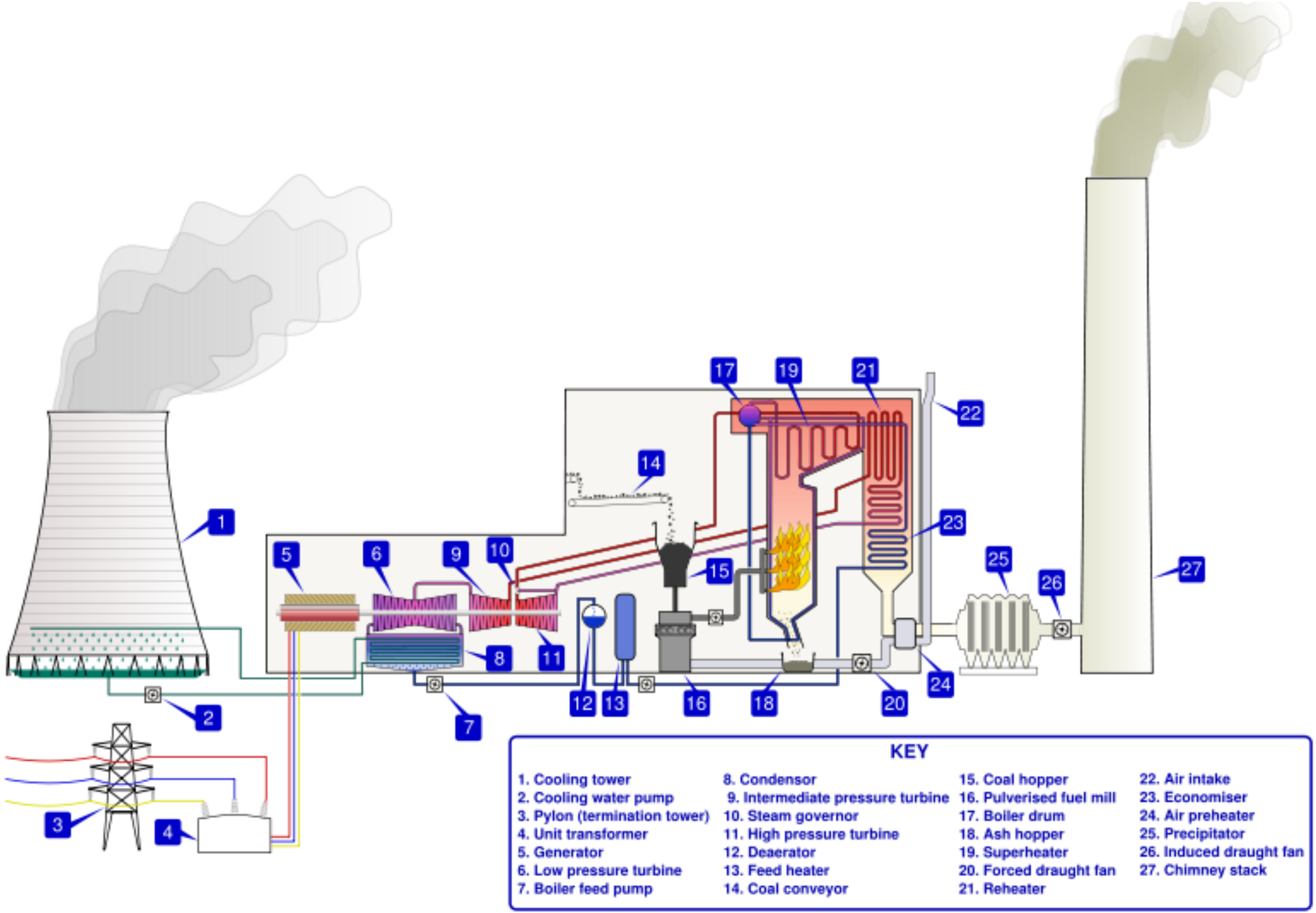
The environmental problems directly related to energy production and consumption include air pollution, climate change, water pollution, thermal pollution, and solid waste disposal.

1. Coal fired Thermal Power Plant
2. Diesel fired Power Plant
3. Nuclear Power Plant
4. Non-Conventional Power Plants (Hydel, Solar, Wind, etc)

The emission of air pollutants from fossil fuel combustion is the major cause of urban air pollution.

THERMAL POWER PLANT BLOCK DIAGRAM

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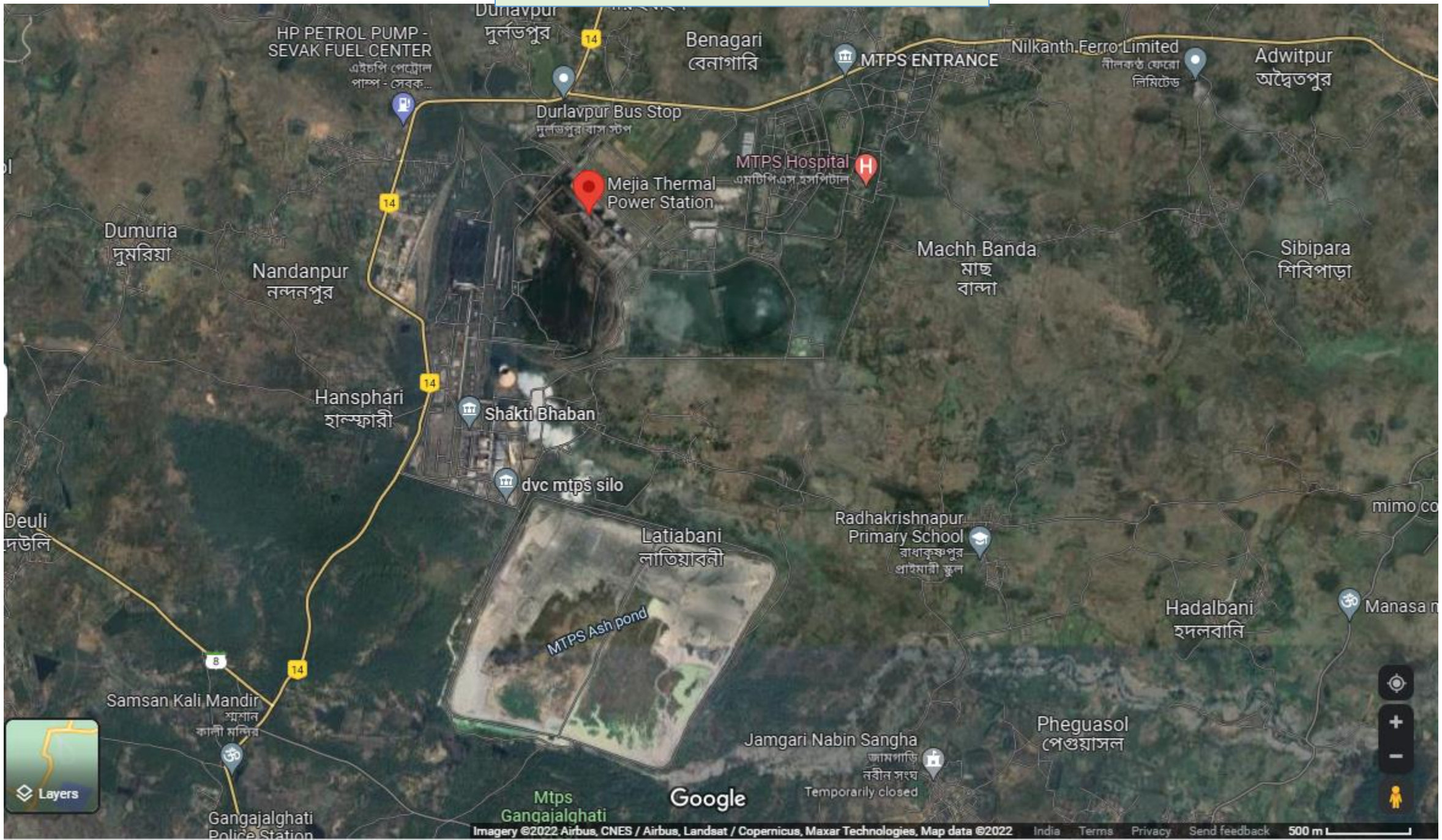
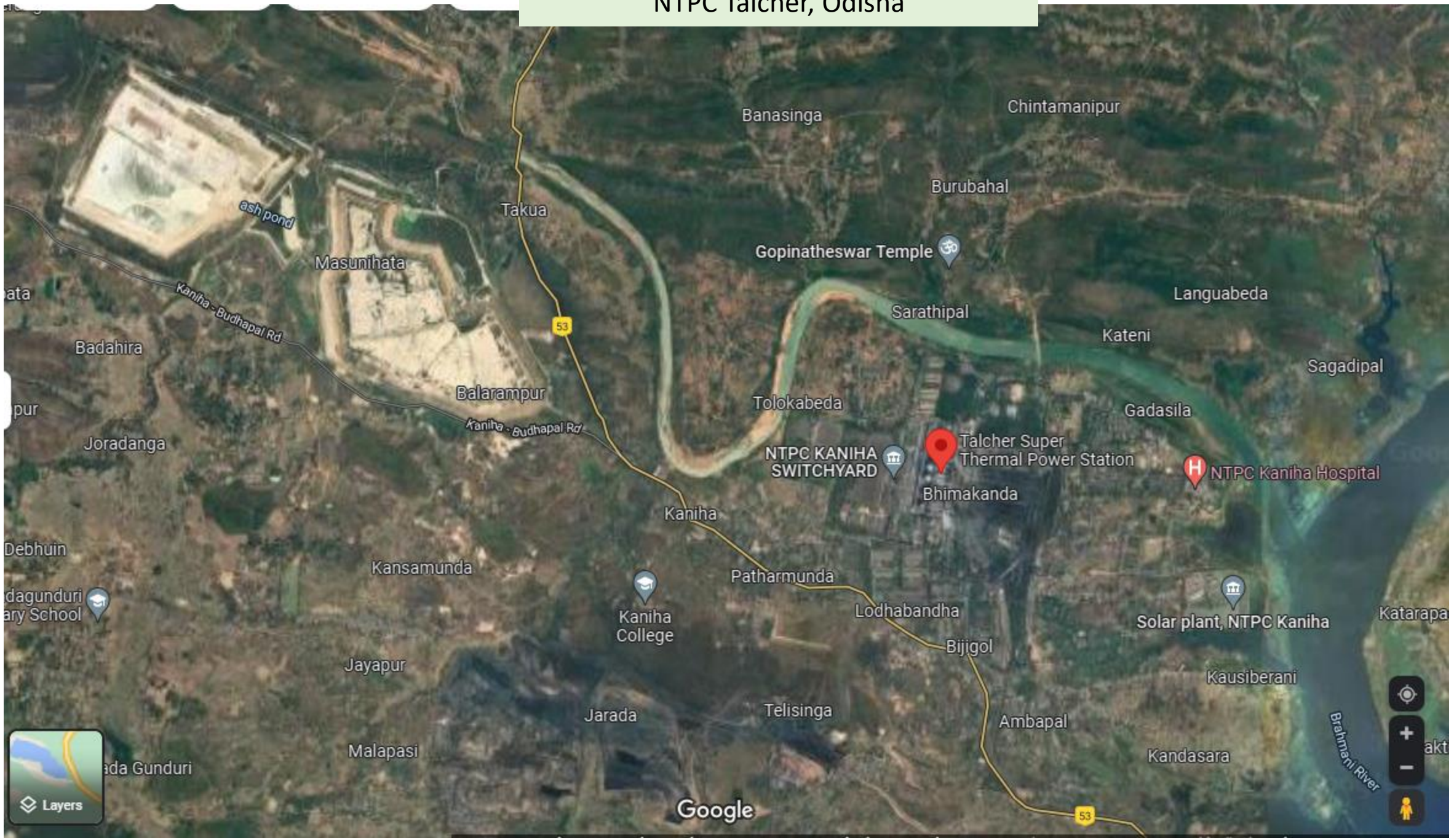
KEY
1. Cooling tower
2. Cooling water pump
3. Pylon (termination tower)
4. Unit transformer
5. Generator
6. Low pressure turbine
7. Boiler feed pump
8. Condensor
9. Intermediate pressure turbine
10. Steam governor
11. High pressure turbine
12. Deaerator
13. Feed heater
14. Coal conveyor
15. Coal hopper
16. Pulverised fuel mill
17. Boiler drum
18. Ash hopper
19. Superheater
20. Forced draught fan
21. Reheater
22. Air intake
23. Economiser
24. Air preheater
25. Precipitator
26. Induced draught fan
27. Chimney stack

MEJIA THERMAL POWER PLANT , WB



NTPC Talcher, Odisha

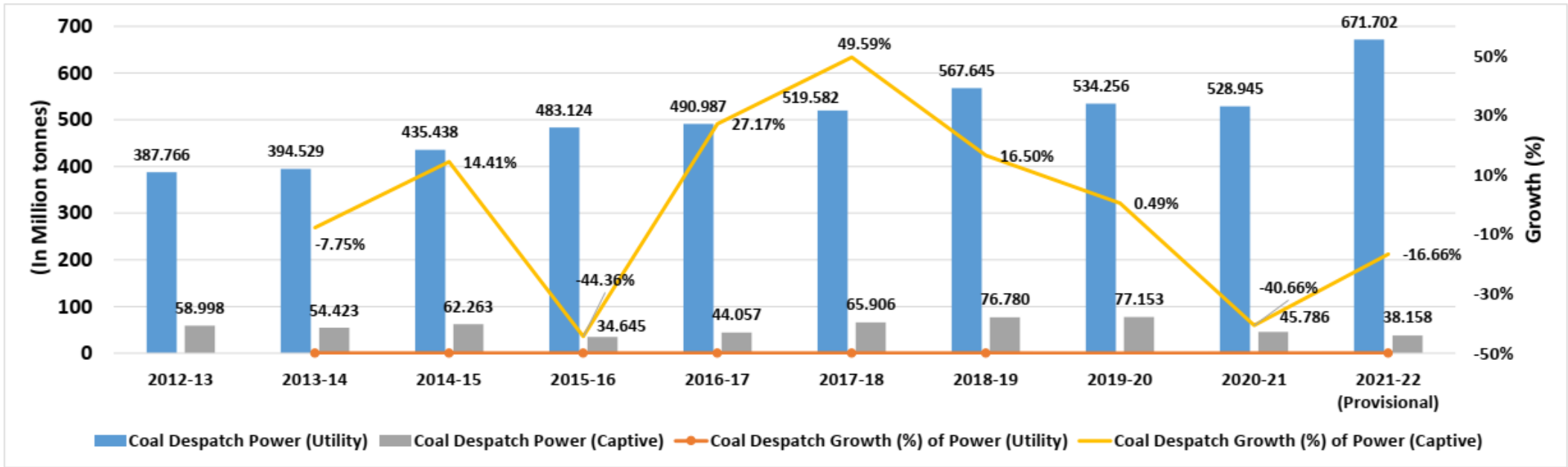


Power Plants at Singrauli, MP/UP Border

Despatch of Coal to thermal power and coal consumption/off-take during last ten years

(Quantity in Million Tonnes)

Year	Coal Despatch				Total Offtake/Cosumption	Growth (%)
	Power (Utility)	Growth (%) of Power (Utility)	Power (Captive)	Growth (%) of Power (Captive)		
2012-13	387.766		58.998		567.136	
2013-14	394.529	1.74%	54.423	-7.75%	572.060	0.87%
2014-15	435.438	10.37%	62.263	14.41%	603.772	5.54%
2015-16	483.124	10.95%	34.645	-44.36%	632.442	4.75%
2016-17	490.987	1.63%	44.057	27.17%	645.978	2.14%
2017-18	519.582	5.82%	65.906	49.59%	690.003	6.82%
2018-19	567.645	9.25%	76.780	16.50%	732.794	6.20%
2019-20	534.256	-5.88%	77.153	0.49%	707.176	-3.50%
2020-21	528.945	-0.99%	45.786	-40.66%	690.884	-2.30%
2021-22 (Provisional)	671.702	26.99%	38.158	-16.66%	818.997	18.54%



Central Pollution Control Board Norms

(i). Standards for discharge of liquid effluents

S. No.	Source	Pollutants	Concentration
(i)	Condenser cooling water (once through cooling system)	pH	6.5-8.5
		Temperature	More than 10°C than the intake water temperature
		Free available Chlorine	0.5 mg/l
(ii)	Boiler blow down	Suspended solids	100 mg/l
		Oil and grease	20 mg/l
		Copper (total)	1.0 mg/l
		Iron (total)	1.0 mg/l
(iii)	Cooling tower blow down	Free available Chlorine	0.5 mg/l
		Zinc	1.0 mg/l
		Chromium	0.2 mg/l
		Phosphate	5.0 mg/l
		Other corrosion inhibiting materials	Limit to be established on case by case basis
(iv)	Ash pond effluent	pH	6.5-8.5
		SS	100 mg/l
		Oil & grease	20 mg/l
			No limits for heavy metals are given at present

(a). Existing Emission Standards

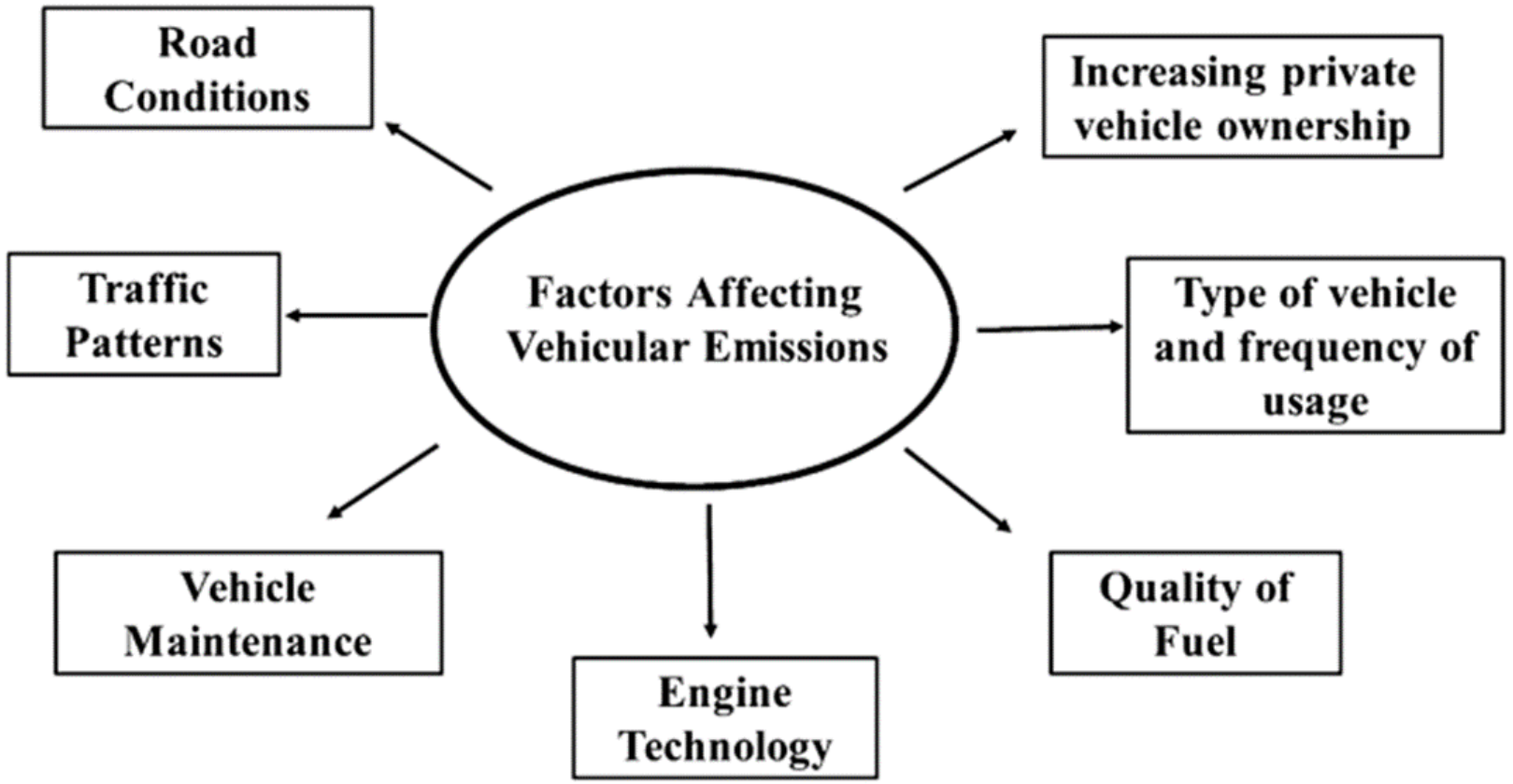
Power generation capacity (MW)	Particulate matter emission
Less than 210 MW	350 mg/Nm^3
210 MW or more	150 mg/Nm^3

TPPs (units) to be installed from 1st January, 2017**	
Particulate Matter	30 mg/Nm^3
Sulphur Dioxide (SO2)	100 mg/Nm^3
Oxides of Nitrogen (NOx)	100 mg/Nm^3
Mercury (Hg)	0.03 mg/Nm^3

Use of beneficiated/blended coal containing ash not more than 34 percent.

Sl. No.	Building Materials or Products	Minimum % of Fly Ash by weight
1.	Fly Ash bricks, blocks, tiles, etc. made with Fly Ash, lime, gypsum, sand, stone dust, cement, etc. (without clay).	50% of total raw material.
2.	Paving blocks, paving tiles, checker tiles, mosaic tiles, roofing sheets, pre-cast elements, etc. wherein cement is used as binder.	Usage of PPC (IS-1489: Part 1) or PPC (IS-455) or 15 % of OPC (IS-269/8112/12269) content.
3.	Cement.	15% of total raw materials.
4.	Clay based building materials such as bricks, blocks, tiles, etc.	25% of total raw materials.
5.	Concrete, mortar and plaster.	Usage of PPC (IS-1489: Part 1) or PPC (IS-455) or 15 % of OPC (IS-269/8112/12269) content.

Vehicular Pollution



Bharat stage emission standards (BSES)

BSES are emission standards instituted by the Government of India to regulate the output of air pollutants from Petrol & Diesel Engines. The standards, based on European regulations were first introduced in 2000. Euro-1, 2, …6.

Fuel Type	Pollutant Gases	BS6 (BSVI)	BS4 (BSIV)
Petroleum Distillate Vehicle	Nitrogen Oxide (NOx) Limit	60 mg	80 mg
	Particulate Matter (PM) Limit	4.5 mg/km	-
Diesel Fuel Vehicle	Nitrogen Oxide (NOx) Limit	80 mg	250 mg
	Particulate Matter (PM) Limit	4.5 mg/km	25 mg
	HC + NOx	170 mg/km	300 mg

Norms	CO(g/km)	HC+ NOx(g/km)
1991Norms	14.3-27.1	2.0(Only HC)
1996 Norms	8.68-12.40	3.00-4.36
1998Norms	4.34-6.20	1.50-2.18
India stage 2000 norms	2.72	0.97
Bharat stage-II	2.2	0.5
Bharat Stage-III	2.3	0.35(combined)
Bharat Stage-IV	1.0	0.18(combined)

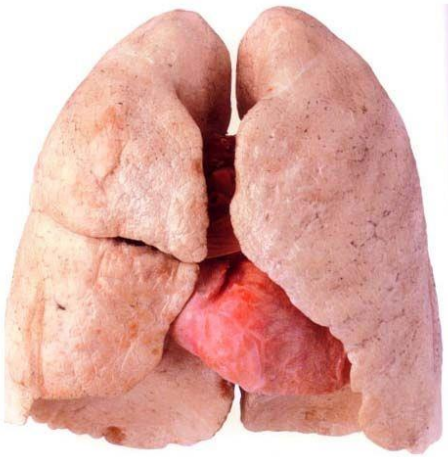
Open Burning

ENVIRONMENTAL IMPACTS OF SMOKE

Burning prohibited materials, such as garbage, plastic and painted or treated wood, is harmful to the environment because these materials release toxic chemicals that pollute our air. Polluted air can be inhaled by humans and animals, and deposited in the soil and surface water and on plants.

IMPACTS OF BURNING PLASTIC

Some of the most dangerous chemicals created and released during burning are those from burning plastics, such as dioxins, which are byproducts formed when chlorine-containing products are burned. Dioxins tend to adhere to the waxy surface of leaves and enter the food chain in this way.



Fire Cracker

G.S.R..in exercise of the powers conferred by Rule 6 of the Explosives Rules, 2008, the Central Government hereby declares the following explosives as Authorized Explosives for export, transport, manufacture, possession, use and sale. List of Authorized fireworks Item

Class 7 Explosive

(a) **Sound Emitting Crackers** sound level not exceeding 125 dB(AI) or 145 dB (C) pk at 4 meters distance from the point of bursting.

1. **Amorces** in the form of caps or tapes for toy pistol, 2. **Atom Bomb,** 3. **Chinese cracker** 4. **Maroons,** 5. **Palm Leaf Crackers,** 6.**Garland Cracker,** 7. **Combination Fireworks** , 8.**Parachute, …..10 Practice Hand Grenade, etc**

(b) **Color and Light Emitting Crackers** Color and light emitting cracker (fireworks) having sound level Not exceeding 90 dB (AI).

12. **Torches/pencils,** 17. **Flower pot or Fountain,** 18. **Rockets…**24. **Sparklers, etc..**

https://peso.gov.in/web/authorized-fireworks

1. Bombs

Contains Charcoal, Sulphur, Potassium Nitrate. Metals are added to brighten the colour.

2. Sparklers

Contains Charcoal, Sulphur, Aluminium perchlorate or barium nitrate, power (Iron, Aluminium, Zinc, Magnesium, etc for coloured sparks).

Health hazards of chemicals and metals present in firecrackers

Aluminium: High levels could cause toxicity. People with kidney problems and older people are more vulnerable.

Effects: It can cause skeletal and neuromuscular problems, apart from weakness, bone pain, digestive problems, confusion, headache, heartburn, emotional instability, disturbed sleep.

Sulphur dioxide: Exposure to very high levels can be life-threatening

Effects: It can cause heart, eye, hearing, liver and kidney damage, stomach disorder, suffocation and disturb blood circulation.

Barium: Certain compounds like barium acetate are highly poisonous

Effects: Mild exposure can cause muscle fatigue or weakness, difficulty in breathing, blood pressure changes, facial numbness, gastrointestinal disorders.

Potassium nitrate: It can irritate respiratory tract

Effects: It can cause shortness of breath, gastric and stomach pain, dizziness, bloody diarrhoea, convulsions, mental impairment, redness or itching of skin or eyes.