

A photograph of an industrial facility with several tall smokestacks emitting thick, dark smoke that rises into the sky. In the foreground, there are residential houses and a street, suggesting a close proximity of industry to homes. The sky is filled with the smoke, and the overall tone is somber and polluted.

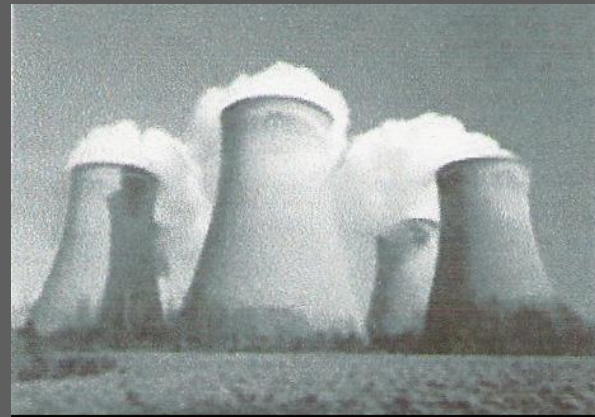
Environmental Issues

Air Pollution

Air pollution

⇒ Human Activity:

- Motorised vehicles
- Burning of fossil fuels
- Industrial emissions
- Waste disposal
- Dust from construction



Air Pollution Current situation-

- ⇒ Road traffic biggest culprit
- ⇒ Majority car journeys in UK less than 3 miles
- ⇒ Greater proportion of pollutants within the first mile
- ⇒ Growing number of cars – problem is increasing



Air pollution

⇒ Petrol and diesel motor vehicles emit a wide variety of pollutants:

- Carbon monoxide (CO)
- Nitrogen oxides (NO_x)
- Volatile organic compounds (VOC's)
- Particulates (PM₁₀)

What is air pollution

⇒ Photochemical reactions

- NO_x , VOC's and sunlight → ozone
- Long – ranging secondary pollutant
- Impacts rural communities – far from original source
- Collectively, road traffic, industrial and domestic emissions produce the following major pollutants:

– Sulphur Dioxide (SO_2)	Particulate matter
– Carbon Monoxide (CO)	Nitrogen Dioxide (NO_2)
– Ozone (O_3)	Hydrocarbons
– Benzene	1,3-Butadiene
– Toxic Organic Micropollutants	Lead

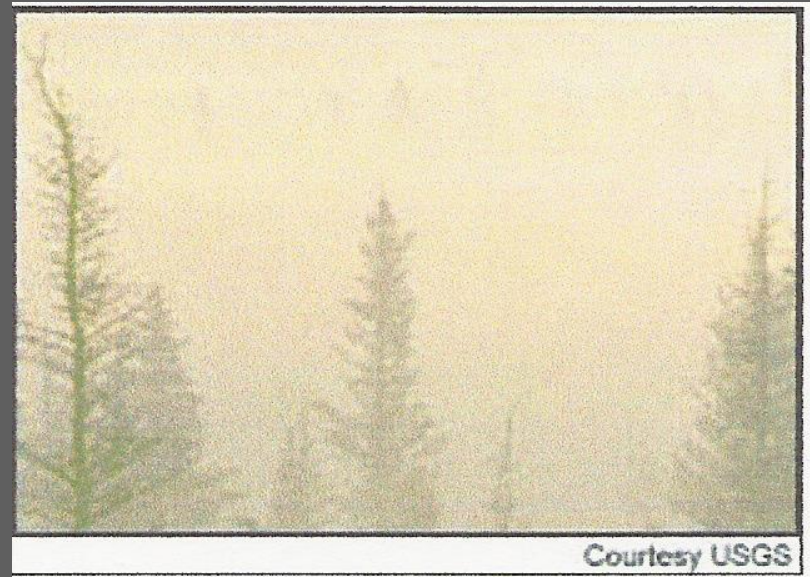
■ Consequences of air pollution:

- Acid rain
- Domestic smoke
- Smog
- Particulates
- Radionuclides
- Greenhouse Effect
- Ozone Layer Depletion

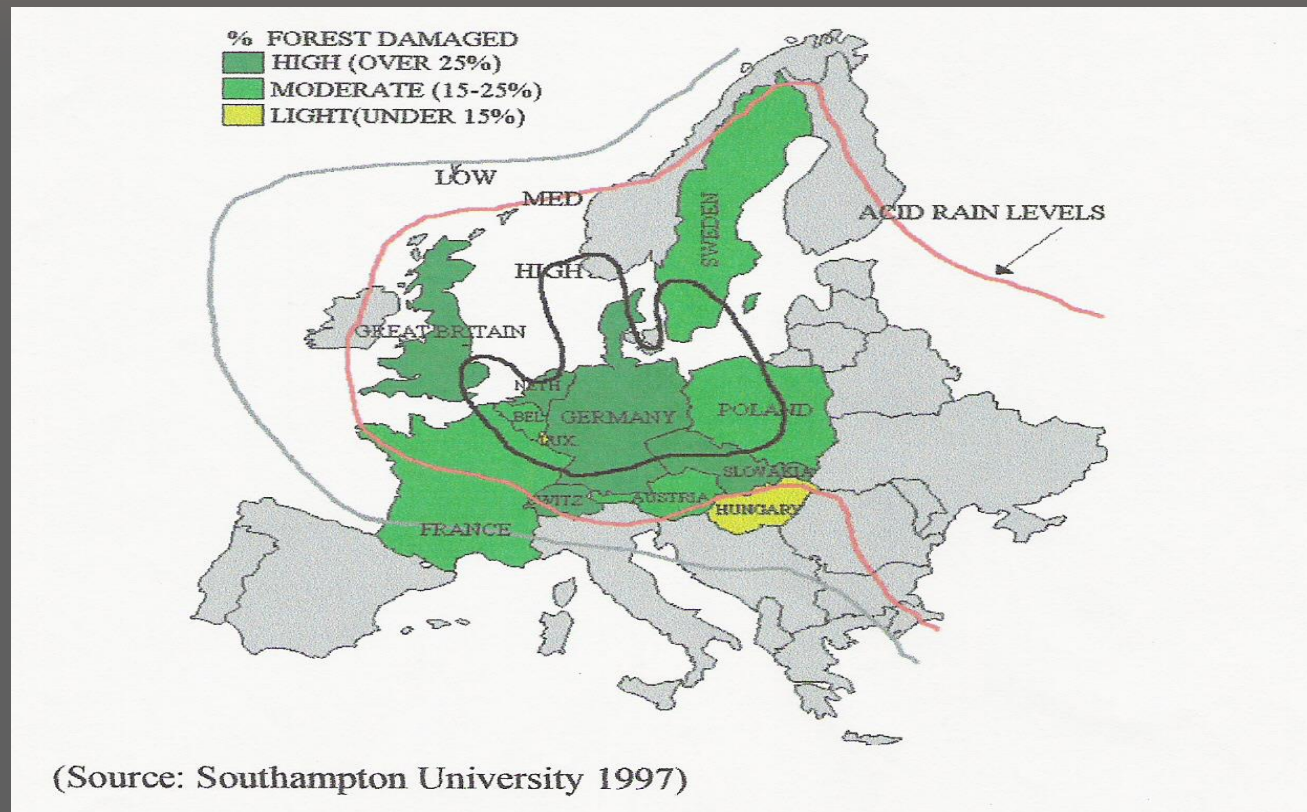


Acid Rain

- ⇒ 70% in Scandinavia comes from SO_2 → rest from nitrogen oxides
- ⇒ In 2014, EU cited Norway for exceed limits stipulated by the EU Air Quality Directive
- ⇒ UK largely unpolluted – prevailing Westerly winds from Atlantic
- ⇒ 87% SO_2 in the air is produced here
- ⇒ Europe → imported pollution from neighbours



Acid Rain



- ➡ There are no boundaries for air pollution
- ➡ A global problem needing a global solution

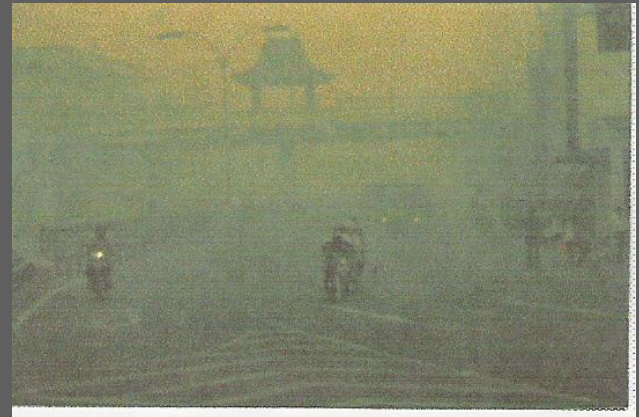
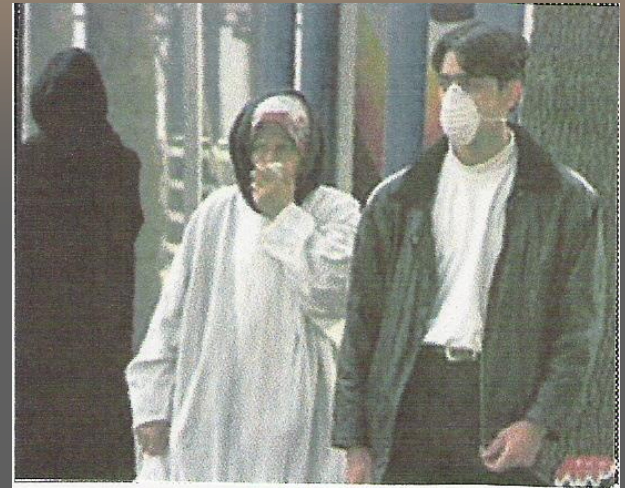
Acid Rain - impacts

- ⇒ Tree reproduction
- ⇒ Acidifies watercourses –
Minnesota and Norway
- ⇒ Mobilises toxicity –
Aluminium toxicity
- ⇒ Liver and kidney damage
- ⇒ Buildings



Domestic Smoke

- ⇒ 37% smoke in atmosphere is generated in people's homes – coal fires
- ⇒ More tar and hydrocarbons are produced than in an equivalent-sized industrial furnace
- ⇒ Clean Air Act – smokeless fuels in *Smoke Control Areas*



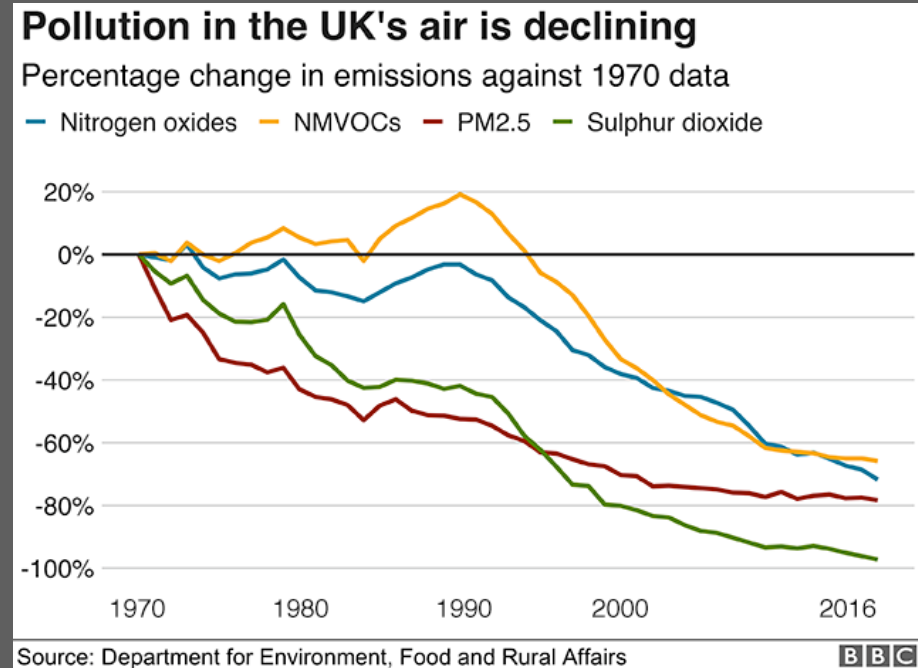
UK's New Clean Air Strategy

- ⇒ Focus on domestic wood burners/fires
- ⇒ Farms – ammonia
- ⇒ 30% preventable deaths p.a due to air pollution (NHS England, 2019)
- ⇒ PM_{2.5}
- ⇒ “cleanest” woodburners on sale after 2022
- ⇒ Traditional house coal phased out
- ⇒ Restrictions on sale of wet wood



UK's air pollution

- ⇒ 1.5 million households have wood burner
- ⇒ More particulates per hour than a diesel truck



(McGrath, 2019)

Particulates – Health impacts

- ⇒ Lung impacts
- ⇒ 5-20% various sulphates in urban areas linked to asthma, heart & lung problems
- ⇒ Plant damage
- ⇒ Incinerators
- ⇒ Thunderstorms (IES, 2001)



Smoke (Other)

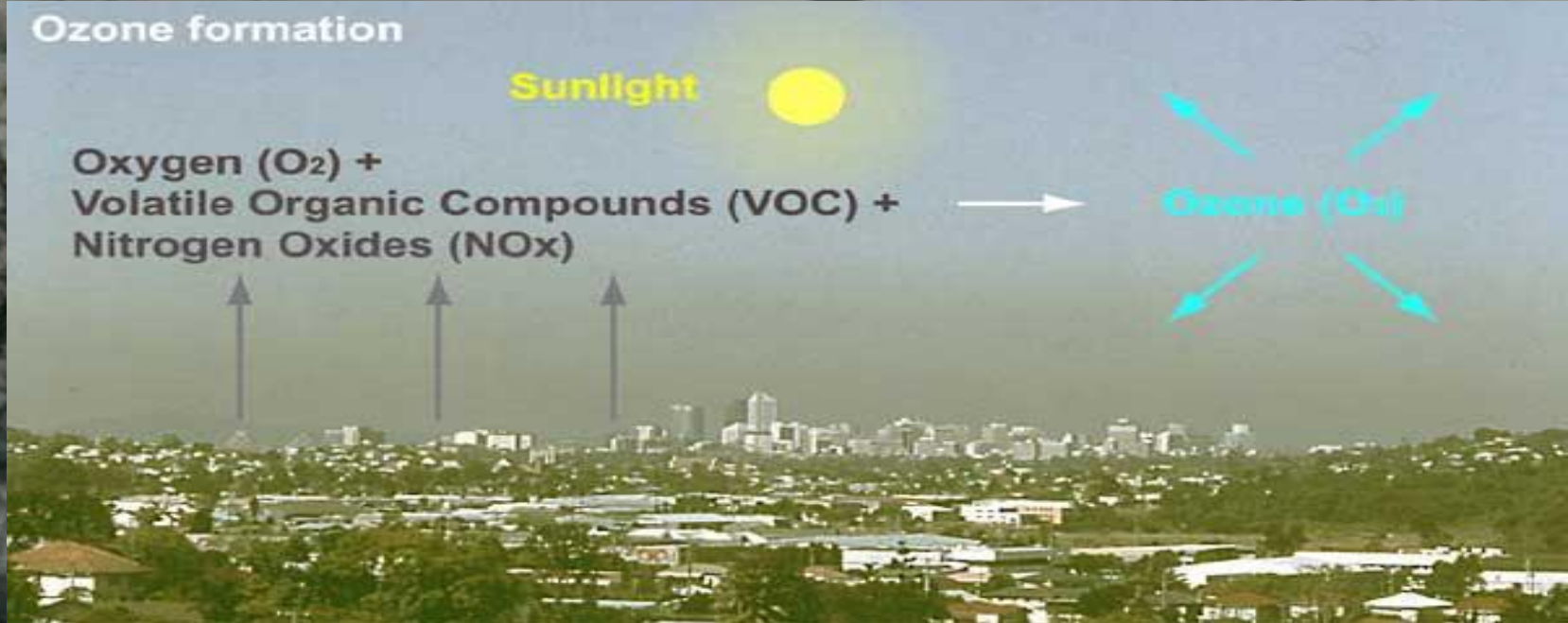
- ⇒ Forest fires
- ⇒ *Slash and Burn* farmers
- ⇒ Indonesian forests frequently hitting headlines
- ⇒ October 2001 – 400km² of spruce, fir, oak and birch forest in Siberia destroyed – 618,000 inhabitants forced to breathe through respirators and masks



Wild Fire in San Francisco



Smog / Ozone



- ➡ Mixture of smoke and fog
- ➡ Urban areas – high traffic levels and stagnant air preventing dispersal
- ➡ Made up of particulates – reactions between NO_x, hydrocarbons and sunlight

Smog & Ozone

- ⇒ Summer – road pollutants ,industrial vapours etc react with sunlight to produce low-level O_3
- ⇒ Winter – pollutants build up at ground level – cold air traps pollutants close to ground
- ⇒ Threshold level
- ⇒ Yield declines

Smog

⇒ Indonesia (1997)

- – forest fires created smog – visibility reduced to less than 50m – two ship collisions, a plane crash, collapse tourism industry, huge ecological damage
- 70 million people affected for several months
- Health costs exceeded US\$1 billion – money allocated for sanitation, water and sewage services for over 40 million Indonesians
- In Malaysia – US\$300 million; US\$75 million in Singapore

Smog

⇒ In 2000, Indonesia suffered again:

- *On July 27, the air pollution index for Riau in Sumatra reached 978 – well beyond the ‘hazardous’ 300-point limit. A day’s exposure of 300 or more is the equivalent to smoking a packet of cigarettes a day (Brandon, 2000)*

Dust storm in Texas

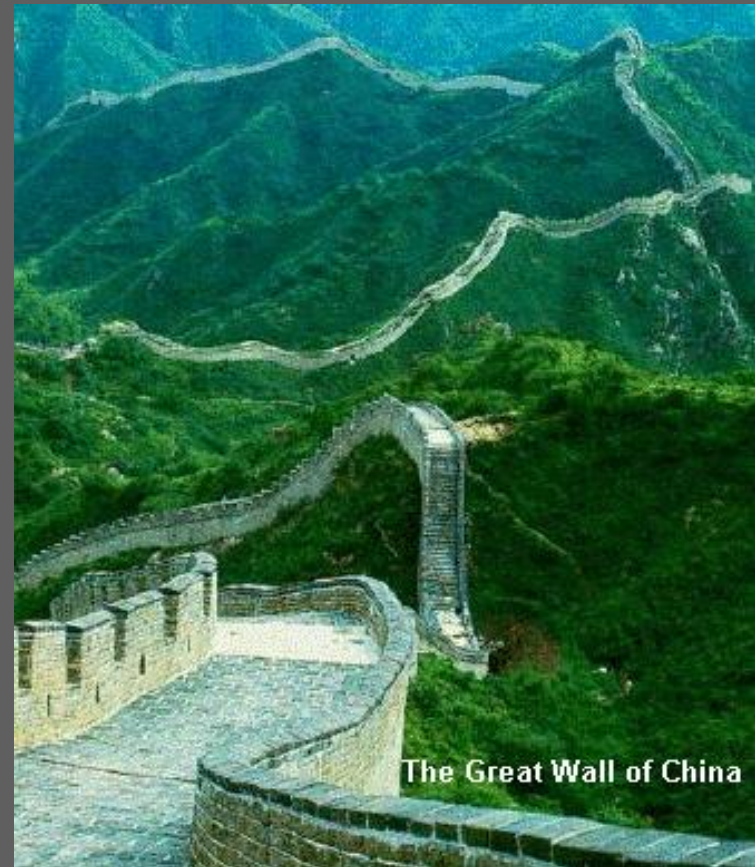


Radionuclides

- ⇒ Ionising radiation
- ⇒ Damaging to living tissue
- ⇒ Cancer and DNA mutation
- ⇒ Natural sources- from the sun and rocks containing radon
- ⇒ Man-made – medical uses
- ⇒ Chernobyl

China: Environmental Issues

- ⇒ Fast growing economy
- ⇒ Increased incomes
- ⇒ Reduced poverty – 235 mill cars in 2018
- ⇒ Environmental pollution
- ⇒ Of the ten most polluted cities globally, three are found in China (China Daily, 2018)
- ⇒ India



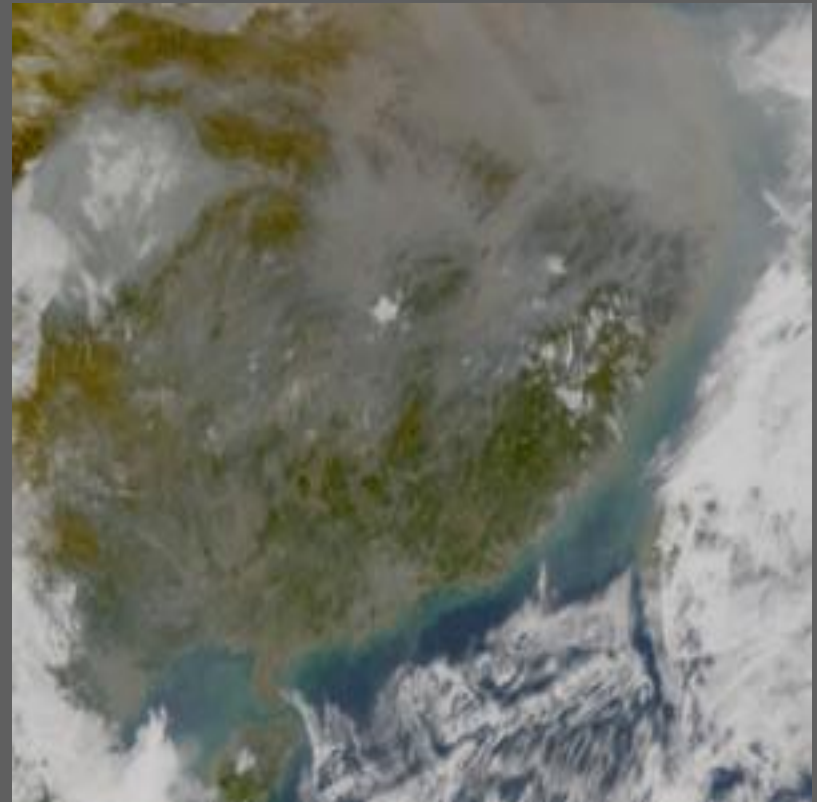
China: Environmental Issues

- ⇒ SO₂ and soot – coal combustion
- ⇒ Acid rain – 30% China's land area
- ⇒ Industrial boilers and furnaces use half of China's coal
- ⇒ Car ownership – growing year on year
- ⇒ Atmospheric pollutants ↑ by 50% over last 10 yrs
- ⇒ 400,000 premature deaths pa

Asia's Air Pollution

- ⇒ 'rising industrialisation in Asia is discharging millions of tonnes of contaminants into the winds that travel across the Pacific Ocean..... may be polluting American waters....'

(Watts, 2005: 2)

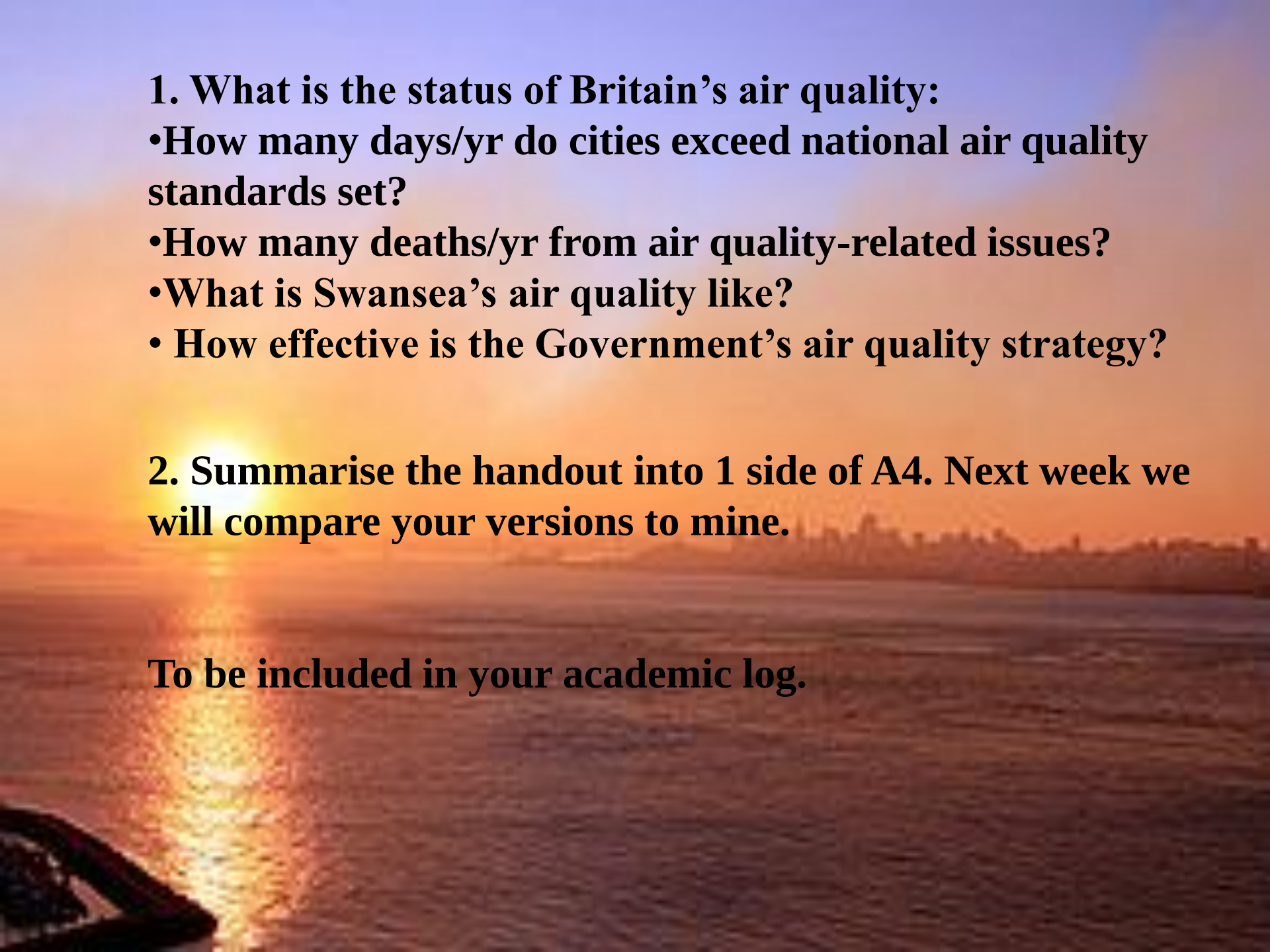


Legislation

- ⇒ Air Quality Strategy — reducing pollution
- ⇒ Headline Indicators — standards set
- ⇒ Montreal Protocol on Substances that Deplete the Ozone Layer
- ⇒ Clean Air Act — control domestic and industrial smoke
- ⇒ Integrated Pollution Prevention and Control Directive (Env Agency) — where practicable reduces emissions to air, land and water
- ⇒ Pollution monitoring zones — informing public — Scores 1-10

Summary

- ⇒ 50 yrs ago, London far worse – 1952 the worst smog in UK history - > 4,000 people
- ⇒ 12,000 and 24,000 deaths in UK pa
- ⇒ 9% infant mortality 1995-7
- ⇒ Developed countries now addressing the problem.. What of developing nations?
- ⇒ Trans-boundary problem
- ⇒ Transport biggest threat > Sustainability?

The background of the slide is a photograph of a sunset. The sun is low on the horizon, creating a bright, golden glow that reflects on the water. The sky is a mix of orange, yellow, and blue. In the distance, a city skyline is visible, with several buildings silhouetted against the bright sky. The water in the foreground is dark, with some ripples visible.

1. What is the status of Britain's air quality:

- **How many days/yr do cities exceed national air quality standards set?**
- **How many deaths/yr from air quality-related issues?**
- **What is Swansea's air quality like?**
- **How effective is the Government's air quality strategy?**

2. Summarise the handout into 1 side of A4. Next week we will compare your versions to mine.

To be included in your academic log.