

Course Code: CE 447

Course Title: Climate change and sustainable development

Course teacher: Saurav Barua

Email: saurav.ce@diu.edu.bd

Phone: 01715334075

LECTURE: 10

2

Lecture plan

- Measures taken in industrial sector to protect environment
- Impacts of transportation sector in environment
- Biodiversity changes due to transportation sector

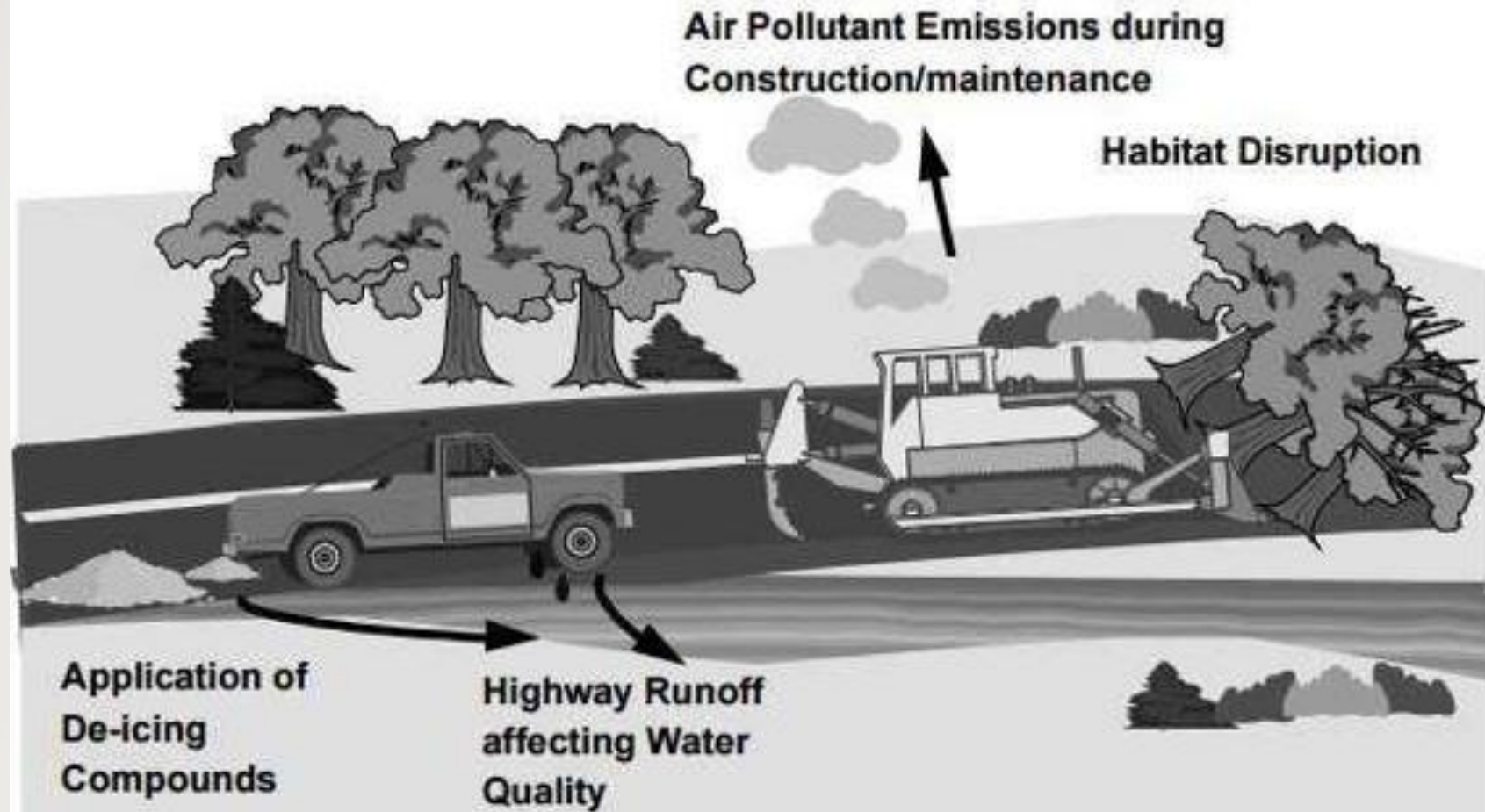
What measures can be taken in Industrial sector to protect the environment?

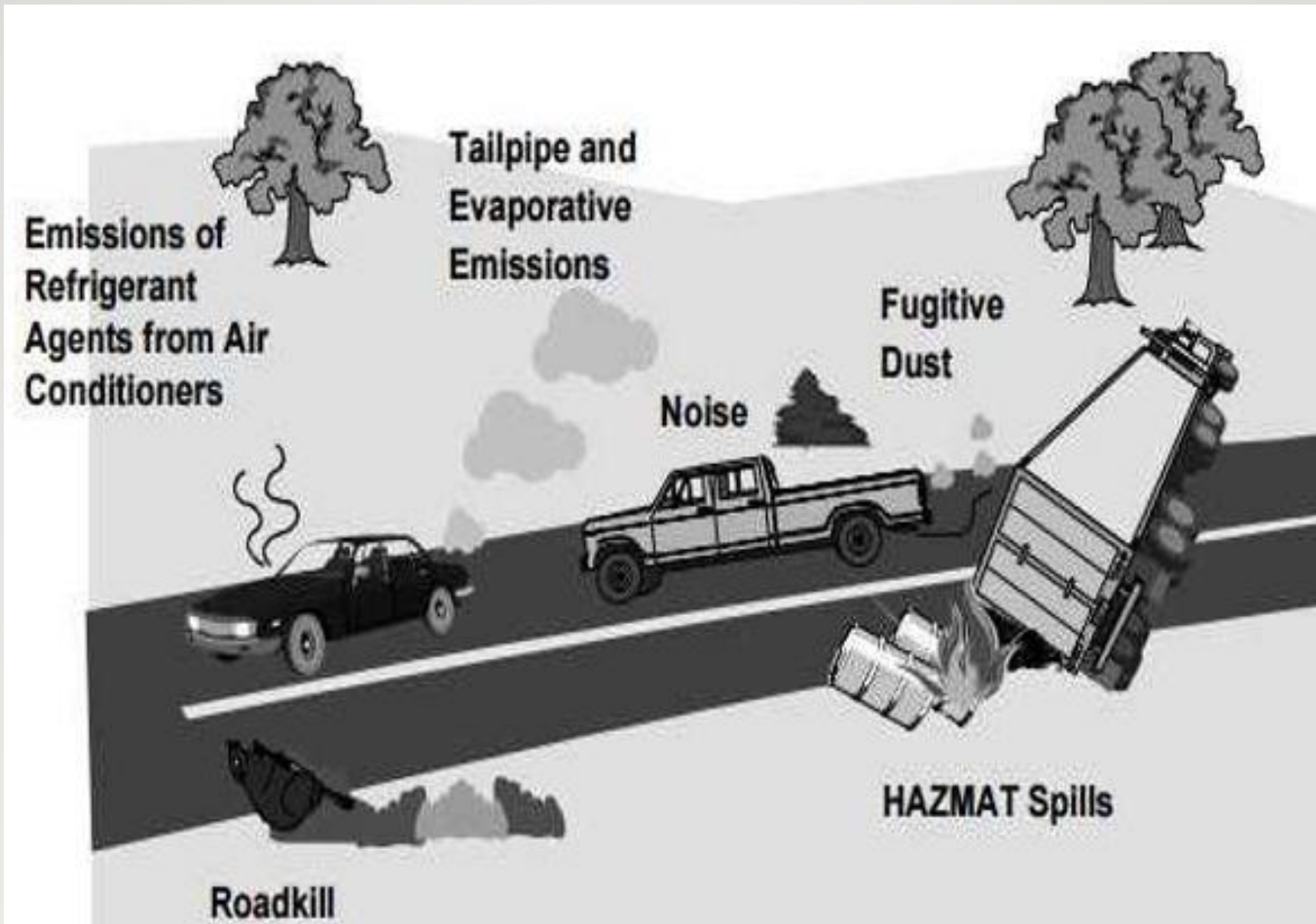
- Ensure EIA in all new industries both public and private
- Encourage development of environmentally sound and appropriate technologies and initiative on research and foundation in the field of industry.
- Prevent wastage of raw material and ensure their sustainable use in industry.
- Promote cleaner production processes.
- Industries that are potential polluters will make provision to introduce pollution control measures
- 4R policy should be encouraged

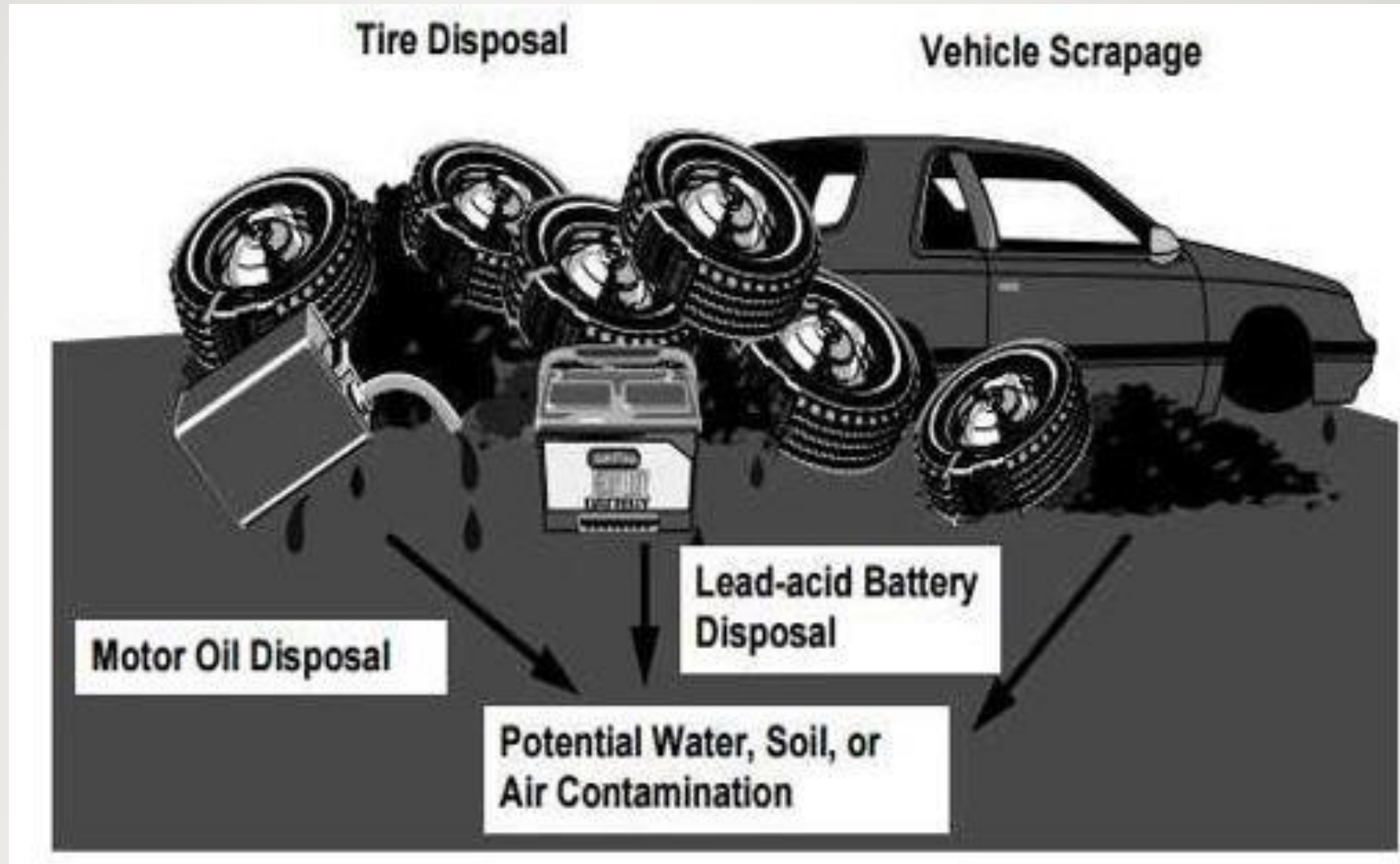
Tourism Industry

- Resource use
 - Energy
 - Water
 - land
- Pollution and waste outputs
 - Water quality
 - Air quality
 - Noise
 - Solid waste generation
- Transportation
- Development & land use
- Economy
- Education
- Eco-system alteration
 - Impacts on wildlife
 - Aesthetic & cultural impacts

Impacts in Transport sector







Impacts of Transportation sector on Environment

How Transportation sector change the quality of air?

- Emission of carbon-dioxide (CO_2) from the burning of fossil fuels is a major contributor. For the transport sector, the greenhouse gas emissions are dominated by the CO_2 emissions from burning fossil fuels. These are strongly related to transport energy use.
- Release of Particulate matter (PM_{10} , $\text{PM}_{2.5}$), Nitrogen oxides (NO_x), Sulphur oxide (SO_2), Ozone (O_3), Volatile organic compounds (VOC).
- Health impacts such as aspiration diseases due to the fine particles ($\text{PM}_{2.5}/\text{PM}_{10}$, other air pollutants). Exhaust emission particles are hereby considered as the most important pollutant. In addition, Ozone (O_3) has impacts on human health.

Impacts of Transportation sector on Environment

How Transportation sector affects other sectors?

- **Building and material damages:** Impacts on buildings and materials from air pollutants. *Mainly two effects are of importance:* soiling of building surfaces/facades primarily through particles and dust. The second, more important impact on facades and materials is the degradation through corrosive processes, due to acid air pollutants like NO_x and SO₂.
- **Crop losses in agriculture and impacts on the biosphere:** crops as well as forests and other ecosystems are damaged by acid deposition, ozone exposition and SO₂
- **Impacts on biodiversity and ecosystems (soil and water/groundwater):** the impacts on soil and groundwater are mainly caused by eutrophication and acidification due to the deposition of nitrogen oxides, as well as contamination with heavy metals (**from tire wear and tear**).

Impacts of Transportation sector on Environment

– Noise

- Traffic noise has a variety of adverse impacts on human health. The World Health Organization (WHO) has recognized community noise, including traffic noise, as a serious public health problem.
- Traffic noise has various adverse effects. The most widespread effect is simply **annoyance**. In addition, there is substantial evidence for serious health problems caused by traffic noise. The main problem is disturbance of sleep patterns, which affects cognitive functioning (especially in children) and contributes to certain cardiovascular diseases. There is also increasing evidence for an impact of noise raising blood pressure (Den Boer & Schroten, 2007).

Impacts of Transportation sector on Environment

– Land Use

- Transportation facilities have an impact on the urban landscape. The development of port and airport infrastructure is significant features of the urban and peri-urban built environment. Social and economic cohesion can be severed when new transport facilities such as elevated train and highway structures cut across an existing urban community. Arteries or transport terminals can define urban borders and produce segregation. Major transport facilities can affect the quality of urban life by creating physical barriers, increasing noise levels, generating odors, reducing urban aesthetic and affecting the built heritage

Impacts of Transportation sector on Environment

How Transportation sector change the quality of water?

- Water quality
 - Transport activities have an impact on hydrological conditions. Fuel, chemical and other hazardous particulates discarded from aircraft, cars, trucks and trains or from port and airport terminal operations, such as de-icing, can contaminate rivers, lakes, wetlands and oceans.
 - The main effects of marine transport operations on water quality predominantly arise from dredging, waste, ballast waters and oil spills.
 - Waste generated by the operations of vessels at sea or at ports cause serious environmental problems. Besides, various types of garbage containing metals and plastic can persist on the sea surface for long periods of time and can threaten the ecosystem.

Impacts of Transportation sector on Environment

How Transportation sector affects other sectors?

- **Building and material damages:** Impacts on buildings and materials from air pollutants. *Mainly two effects are of importance:* soiling of building surfaces/facades primarily through particles and dust. The second, more important impact on facades and materials is the degradation through corrosive processes, due to acid air pollutants like NO_x and SO₂.
- **Crop losses in agriculture and impacts on the biosphere:** crops as well as forests and other ecosystems are damaged by acid deposition, ozone exposition and SO₂
- **Impacts on biodiversity and ecosystems (soil and water/groundwater):** the impacts on soil and groundwater are mainly caused by eutrophication and acidification due to the deposition of nitrogen oxides, as well as contamination with heavy metals (**from tire wear and tear**).

Impacts of Transportation sector on Environment

Biodiversity changes

- Transportation also influences natural vegetation.
- The need for construction materials and the development of land based transportation has led to deforestation.
- Transport routes have required draining land, thus reducing wetland areas and driving-out water plant species.
- The need to maintain road and rail right-of way or to stabilize slope along transport facilities has resulted in restricting growth of certain plants or has produced changes in plants with the introduction of new species different from those which originally grew in the areas.
- Many animal species are becoming extinct as a result of changes in their natural habitats and reduction of ranges

Impacts of Transportation sector on Environment

- Resource use
 - Large amounts of oil based resources used for transport
 - Materials are extracted for infrastructure construction
- Wastes production
 - Vehicles contain materials such as lead, mercury, cadmium, hexavalent chromium and other environmentally harmful substances.
 - Existing cars by weight, about three-quarters of a car is steel and aluminium, which is recycled. The rest, which is mainly plastics, is disposed of by incineration or in landfills. Cars also contain dangerous liquid substances (anti-freeze, brake fluid, oil, etc.) that are harmful to the environment if not handled properly (EEA, 2003).
 - Vehicles, fluid, tyres, spent oil, scrap materials etc. are produced

Some measures in Transport Sector

- Development of alternative fuels and ensure greater energy efficiency
- Set demanding targets for the reduction of greenhouse gas emissions from transports
- Behavioural change and adaptation polices are also needed which ensure that the transport system is more resilient to the effects of climate change.
- Continued action is needed to make vehicles more recyclable and to require the industry to recycle used vehicles.
- development of more efficient engine and fuel technologies should be needed to reduce the emissions of air pollutants
- Greater emphasis is needed on the design of vehicles and infrastructure which are fit for purpose, use recyclable and low density materials and help improve the life-cycle sustainability of the transport system.