Lab 9: Home Assignment

Environmental Impact Assessment in Transport Projects

Module: Transport Research and Analysis

Lab Title: Introduction to Environmental Impact Assessment

Due Date: One week from the date of assignment release

Contents

1 Objective

This assignment provides students with applied experience in Environmental Impact Assessment (EIA) within transport planning. It combines real-world scenario development, indicator mapping, emissions data analysis, and evidence-based policy recommendation—all critical skills for sustainable engineering practice.

2 Learning Outcomes

By completing this assignment, students will:

- Understand the scope and role of EIA in transport systems.
- Analyze key environmental indicators in infrastructure projects.
- Conduct emission analysis using Excel datasets.
- Communicate data-driven policies through memo writing.
- Reflect on practical EIA challenges and stakeholder dynamics.

3 Dataset Description

The provided dataset `transport_emissions_dataset.csv` contains 20 vehicle entries with the following columns:

- **Vehicle ID, Vehicle Type, Fuel Type**
- **Average Distance per Day (km), Days Operated per Month**
- **Monthly CO2 Emissions (kg)**

Concepts:

- *Emission Factor*: Estimated CO2 emissions per km by vehicle and fuel type.
- *Electric Vehicles*: Zero tailpipe CO2 but may have grid impact.
- *Diesel Vehicles*: Generally higher NOx and CO2 emissions.

4 Assignment Tasks

Task 1: Define a Project Scenario (10%)

Describe a real or hypothetical transport infrastructure project in 300 words. Include:

- Purpose and geographic context
- Potential environmental sensitivity
- Stakeholders involved

Hint

You can choose projects like metro line expansion, airport development, or rural highways. Look for conflicts between economic benefits and environmental trade-offs.

Task 2: Environmental Indicator Mapping (20%)

Identify 5 relevant environmental indicators. For each:

- Define and explain its relevance
- Describe how it would be measured
- Anticipate its expected impact

Hint

Use indicators like CO2, PM2.5, noise levels, biodiversity loss, or visual impact. Tailor them to your chosen project.

Task 3: Emissions Analysis in Excel (30%)

Use the dataset to:

- Analyze monthly emissions by fuel and vehicle type
- Visualize insights via PivotTables and charts
- Simulate replacing diesel vehicles with electric and recalculate emissions

Hint

Use formulas like `=SUMIF()` and features like conditional formatting. Highlight your main observations using annotated charts.

Task 4: Policy Recommendation Memo (20%)

Write a 400-word memo addressed to decision-makers. It should:

- Summarize the emissions problem
- Recommend 2–3 mitigation strategies
- Justify proposals using data insights

Hint

A policy memo is concise and persuasive. Use bullet points, avoid jargon, and be solution-focused. Back your claims with visual evidence.

Task 5: Critical Reflection (20%)

Write a 300-word reflection on the practical challenges of conducting an EIA.

- Data limitations or uncertainty
- Forecasting future environmental impacts
- Balancing stakeholder interests

Hint

Reflect honestly. What would be difficult in real life? What could go wrong or delay the EIA process?

5 Submission Format

- A structured PDF report, with headings for each task
- An Excel workbook including all computations, PivotTables, and charts
- File names:
  - `Lab9_EIA_Report_YourName.pdf`
  - `Lab9_Emissions_YourName.xlsx`
- Submit via LMS or email by the given deadline

6 Grading Criteria

Task	Weight
Task 1: Project Scenario	10%
Task 2: Indicator Mapping	20%
Task 3: Excel Emission Analysis	30%
Task 4: Policy Memo	20%
Task 5: Critical Reflection	20%

7 Appendix: Sample Submission Template

Title: Environmental Impact Assessment of Proposed Metro Line Expansion in Vienna, Austria

Student Name: Jane Doe
Student ID: 1234567
Date: August 5, 2025

Structure:

- **Task 1 – Project Scenario:** Describes purpose, location, and stakeholders
- **Task 2 – Indicator Mapping:** Lists and explains five relevant indicators

- **Task 3 – Emission Analysis:** Includes pivot tables and charts with insights
- **Task 4 – Policy Memo:** Recommends electrification and route optimization
- **Task 5 – Reflection:** Discusses forecasting and stakeholder challenges

Attached Files:

- `Lab9_EIA_Report_JaneDoe.pdf`
- `Lab9_Emissions_JaneDoe.xlsx`

Use this sample to format your submission correctly and ensure all deliverables are included.

8 Appendix B: Student Report Structure Template

Students must follow this structure for preparing their final PDF report submission. Proper formatting, headings, and clarity are part of the grading.

Title Page

- Report Title (e.g., *Environmental Impact Assessment of Rural Highway in Salzburg Region*)
- Student Name
- Student ID
- Course Name: Transport Research and Analysis
- Assignment: Lab 9 – Environmental Impact Assessment
- Date of Submission

Table of Contents

- Use an auto-generated TOC with correct section headings
- Ensure page numbers are accurate

Main Sections

Your report should follow the same task structure as defined in the assignment brief:

1. **Task 1 – Project Scenario**
   - Description of selected transport project
   - Maps or visuals if applicable
2. **Task 2 – Environmental Indicator Mapping**
   - Each indicator as a subheading (e.g., *2.1 CO Emissions*)
   - Explanation, measurement method, and expected impact

3. **Task 3 – Emissions Analysis**
    - Explanation of method used
    - Screenshots or exported images of Excel tables and graphs
    - Interpretation of findings
4. **Task 4 – Policy Memo**
    - Format as a professional memo with header
    - Clear bullet points and concise recommendations
5. **Task 5 – Critical Reflection**
    - Structured discussion (use paragraphs and optionally subheadings)

References (if used)

- Use IEEE style
- Include articles, websites, or reports used

Appendices (Optional)

- Additional charts, tables, or supplementary notes

All sections must be clearly labeled. Visual clarity, formatting, and coherence will be assessed.