

# SEMMERING BASE TUNNEL

Fundamentals on Environment and Sustainability  
Environmental Impact Analysis

Vera Dejakum  
Silas Christopher Honerkamp  
Lara Madison Neise  
Selina Tockner



# Table of Contents



**01**

**Overview**

**02**

**Water-  
Related  
Impacts**

**03**

**Earth-  
Related  
Impacts**

**04**

**Air-  
Related  
Impacts**

**05**

**Socio-  
Economic  
Impacts**

**06**

**Sustainability  
Tools**

**07**

**Final  
Recommen-  
dations**

# Overview

## Project Goals

- Aims to **decarbonise transport** by shifting freight and passengers from road to rail
- Enhances sustainable European connectivity

## Sustainability Features

- **30x less CO<sub>2</sub> emissions** per tonne-km compared to road transport
- Expected to offer a **compelling alternative** to road traffic and short-haul flights

## Project Description

- **27.3 km** twin-tube rail tunnel in Austria
- Project cost: approx. **€4.2 billion**
- Designed for high-speed trains
- Expected to be **operational by 2030**

## Company Description

- Led by ÖBB-Infrastruktur AG, a division of the Austrian Federal Railways
- Part of its commitment to modern, **sustainable rail transport** in Austria and the EU

# Impact Assessment



**Water-Related Impacts**



**Earth-Related Impacts**



**Air-Related Impacts**



**Socio-Economic Impacts**





# Water-Related Impacts

## Construction-Phase Impacts

Groundwater Drawdown

Hydrological Disruption

Contamination Risk

Surface Water Alteration

Sealed Surfaces

## Long-Term Impacts

Reduced Recharge

Hydrological Barriers

Climate Pressure

Mitigation Measures

Environmental Upside





# Earth-Related Impacts



## Construction-Phase Impacts

Soil Compaction

Erosion and Vegetation Loss

Spoil Generation and Contamination

Noise, Vibration & Light Disturbance

## Long-Term Impacts

Habitat Fragmentation

Ongoing Soil Degradation

Soil Fauna Disruption

Reduced Infiltration & Ecosystem Services



# Air-Related Impacts

## Construction-Phase Impacts

Emissions from Machinery

Dust from Spoil Handling

Poor Dispersion in Valleys

Health Risks from Pollutants

→ Some Mitigation Measures

## Long-Term Impacts

Emission Reduction

Improved Air Quality

Supports EU air quality targets

Benefits Public Health





# Socio-Economic Impacts

## Construction-Phase Impacts

- + 46,000 Jobs Created
- + Local Economic Stimulation
- + Public infrastructure Upgrades
- + Workforce skill Enhancement
- Community Disruption
- Land use and Settlement Alterations
- Compensation for Affected Parties
- Tourism Decline near Construction

## Long-Term Impacts

- + 12,000 Jobs Created
- + Emissions Avoided
- + Tourism Boost
- + Improved Public Health
- Risk of Gentrification
- Economic Marginalization
- Budgetary Pressure
- Dependence on Adequate Use



# Application of Sustainability Tools

## EIA

### Key Contributions:

- Identified environmental risks prior to construction
- ensuring early mitigation strategies

### Limitations:

- Focused on short-term impacts
- No socio-economic analysis
- Weak post-construction monitoring
- Climate risks overlooked

## SIA

### Potential Contributions:

- Assesses long-term impacts
- Captures trade-offs
- Addresses regional equity
- Could have prevented NGO litigation

### Suggested Tools:

- Scenario analysis
- Multi-criteria decision analysis
- Public consultation mechanisms

# Final Recommendations

## Groundwater Protection



- Adopt Hydrogeological Excavation Code (HEC)
- Real-time monitoring & adaptive water management

## Emission Control



- Electrify Equipment
- Expand conveyor belt systems
- Implement real-time IoT monitoring for PM<sub>10</sub>, NO<sub>x</sub>, CO

## Soil Restoration



- Launch long-term soil restoration program
- Monitor carbon content, compaction, and erosion risks

## Mitigation Fund



- Support for affected residents & businesses
- Promote regional equity
- Cultural heritage preservation

# THANK YOU!

