SEMMERING BASE TUNNEL

Fundamentals on Environment and Sustainability Environmental Impact Analysis



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Overview

Project Goals

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

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

Sustainability Features

- 30x less CO₂ emissions per tonnekm compared to road transport
- Expected to offer a compelling alternative to road traffic and shorthaul flights

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

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



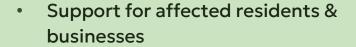
• Implement real-time IoT monitoring for PM_{10} , NO_x , CO

Soil Restoration



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

Mitigation Fund





- Promote regional equity
- Cultural heritage preservation



THANK YOU!



