

Engineering Sustainability: Exploring Infrastructure Choices for a Stronger, Greener Laguna Beach

Background & Significance

- Sustainable infrastructure uses long-term, environment-conscious solutions for modern demands.
- Infrastructure must evolve to a model emphasizing resilience and efficiency.
- Globally \$90 trillion investment by 2030 (The New Climate Economy).
- Can improve:
 - 🌱 Environmental outcomes (carbon reduction, air/water quality)
 - 🏗️ Economic growth (jobs, local industry support)
 - 👤 Social equity (equal access to resources & safety)

Key Objectives

- Run a cost-benefit analysis of **sustainable vs. traditional** building methods.
- Examine **comparative advantages** and **supply chain inefficiencies** (“last mile” emissions).
- Review **post-wildfire rebuilding** efforts in Southern California (like the Palisades & Eaton Fires, Jan 2025).
- Map out ways for Laguna Beach to **adopt** sustainable infrastructure **at scale**.

Local Context

- Coastal environment: exposed to saltwater corrosion.
- Wildfire-prone: requires fire-resilient materials.
- Tourism & community infrastructure: vital to economic stability.
- Goal: Explore solutions that balance durability, sustainability, and feasibility for Laguna Beach’s unique climate and terrain.



Urban areas = 70% of all greenhouse emissions¹