Economic Analysis of a District Heating System

Classroom Case Study: Energiburg Retrofit Scenario

Background Scenario

- The city of Energiburg (pop. 150,000) operates a 30-year-old DH network.
- - 60% building coverage
- - Fuel: 70% gas, 30% coal
- - High supply temperature

- Refurbishment goals:
- - Improve energy efficiency
- - Lower temperature DH
- - Integrate renewables
- - Explore viable business models

Learning Objectives

- - Understand DH economic drivers
- - Compare business models
- - Design effective tariff structures
- - Analyze funding and stakeholder roles

Technical & Economic Overview

- Current demand: 600 GWh/year
- Supply temp: 110°C → 60°C
- Fuel mix: 70% gas, 30% coal → 40% biomass, 30% waste heat, 30% heat pumps
- CAPEX: €85M, Grants: €25M
- Carbon savings: 45,000 tons CO_2/year
- Tariff: €80/MWh (flat)

Group Task: Business Model Evaluation

- Public, Private, PPP, or Cooperative?
- Consider risk, control, and funding
- Discuss local engagement and long-term viability

Group Task: Tariffs & Financing

- Propose energy-efficient tariff (fixed vs variable)
- Explore:
  - Motivational tariffs
  - Dynamic pricing

- Cover €60M gap:
- Loans, bonds, taxes, service fees

Group Task: Stakeholders & Sensitivity

- Identify key stakeholders and their incentives
- Analyze impact of fuel price, demand fluctuation, and new connections
- Prepare debate or role-play

Deliverables & Instructor Notes

- Group presentation or poster
- 2–3 page summary
- Optional role-play debate

Instructor tips:

- Use real-world examples
- Offer spreadsheet models
- Discuss policy frameworks (EU Green Deal, etc.)