

Oregon Energy Planner Investigation

Build a 50-year energy plan and evaluate tradeoffs among demand, reliability, cost, land use, environmental impact, and climate/air quality.

NGSS: HS-ESS3-2 - evaluate competing energy-resource solutions using costs and benefits; HS-ETS1-3 - evaluate solutions using prioritized criteria, constraints, and tradeoffs.

Name: _____

Class / Period: _____

Date: _____

Driving Question

How can Oregon meet growing energy demand while balancing reliability, cost, environmental impacts, and climate goals?

Before You Begin

1. What is a tradeoff? Give one example of a tradeoff you expect in a long-term energy plan.

2. Predict which energy sources or technologies you expect to increase and which you expect to decrease by the 2070s. Explain.

Planning Criteria

As you plan, monitor four model scores and the supply-demand balance. Write the criterion you will prioritize most and explain why.

Criterion	What the model measures	My priority (1-4)
Reliability	Dependability of the energy system	
Land use / environment	Effects on land, water, wildlife, and habitat	
Climate / air quality	Greenhouse-gas and air-quality impacts	
Lifetime cost	Build, operation, and maintenance costs	

3. Which criterion did you rank highest, and why?

Build the 50-Year Plan

Lock in each decade before moving forward. Record the system-level results from the summary. Demand rises from 105 units in the 2020s to 130 units in the 2070s.

Decade	Required	Supplied	Renewable %	Fossil %	Non-emitting %	Reliability	Key change
2020s							
2030s							
2040s							
2050s							
2060s							
2070s							

Compare the Starting and Final Mix

Source / technology	Starting or early mix	Final 2070s mix	Main reason for change
Hydroelectric			
Coal			
Natural gas			
Nuclear			
Biomass			
Wind			
Geothermal			
Solar			
Wave			
Smart-grid technology			
Energy storage			

Evaluate the Plan

4. Did your plan meet energy demand in every decade? If not, identify the decade(s) and explain what limited the plan.

5. Which change improved reliability the most? What tradeoff came with it?

6. Which change improved climate / air quality the most? What tradeoff came with it?

7. How did the coal and natural-gas phaseout constraint affect your choices by the 2040s?

8. Compare your 2070s plan with your original prediction. What changed in your thinking after seeing the model scores and constraints?

Claim - Evidence - Reasoning

Claim: Is your final 50-year Oregon energy plan a strong solution to the model's competing goals and constraints?

Claim: State your answer in one clear sentence.

Evidence: Use at least three specific observations, measurements, or data values from the model.

Reasoning: Explain why your evidence supports the claim using the science ideas from the investigation.

Critique the Model

Choose one real-world factor simplified by the model - transmission, weather variability, regulations, market prices, environmental justice, public priorities, technology change, or another factor. Explain how including it could change the plan.
