

What if power plants could run without pumps?

- Most geothermal plants waste energy running pumps.
- What if gravity could do the work for free?
- This project tests that idea.

Problem

- Geothermal systems use pumps
- Pumps consume energy (5–15%)
- Reduces efficiency

Hypothesis

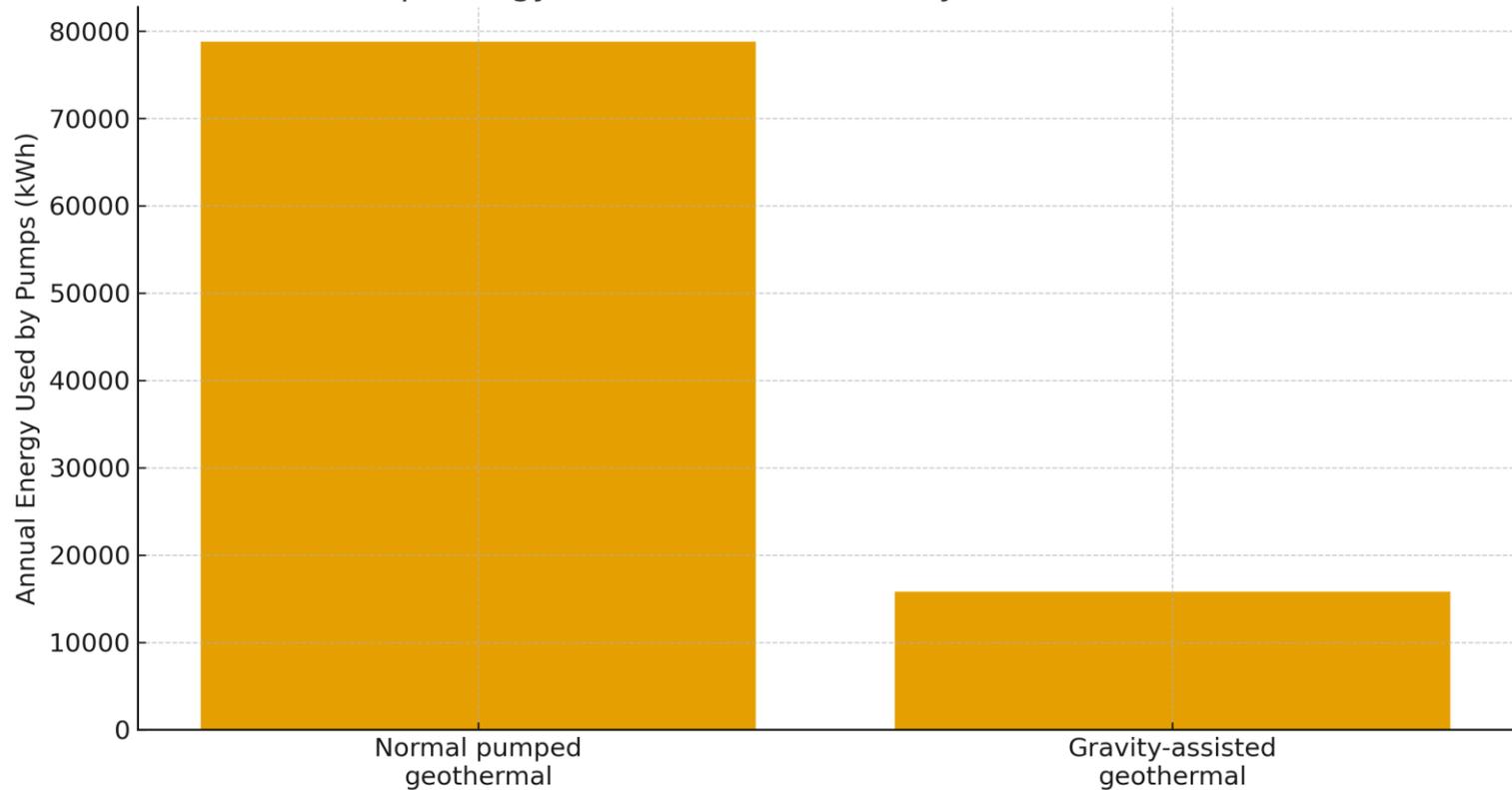
- Using gravity instead of pumps
- Will reduce energy loss
- And improve efficiency

Method

- Water flows down by gravity
- Heat turns water to steam
- Steam rises and spins turbine
- Electricity is generated

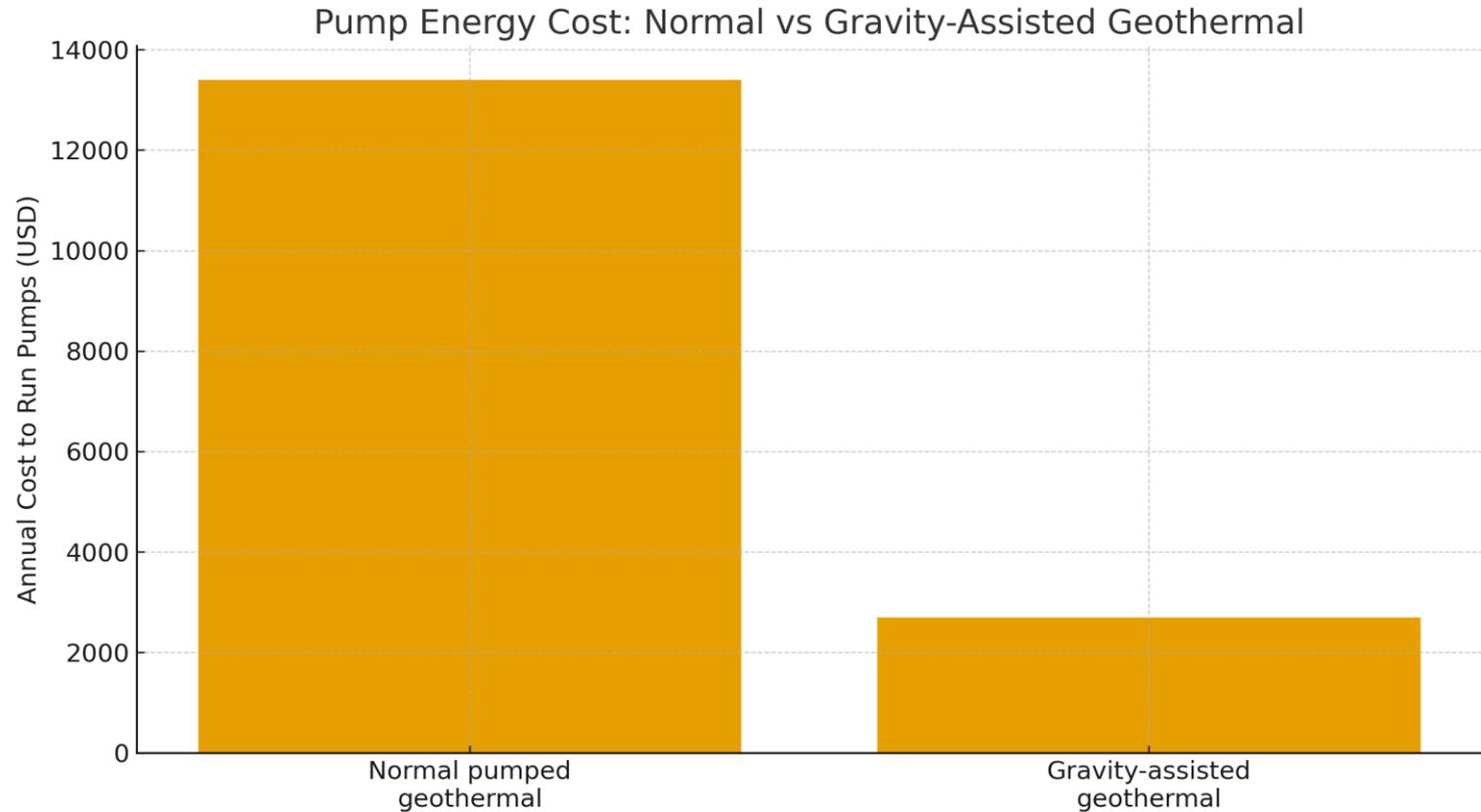
Energy Loss Comparison

Pump Energy Use: Normal vs Gravity-Assisted Geothermal



Assumptions: 100 kW plant, 90% capacity factor; normal parasitic load \approx 10% vs 2% gravity-assisted.
Parasitic load range based on published geothermal plant studies; electricity price \approx \$0.176/kWh from 2025 U.S. EIA data.

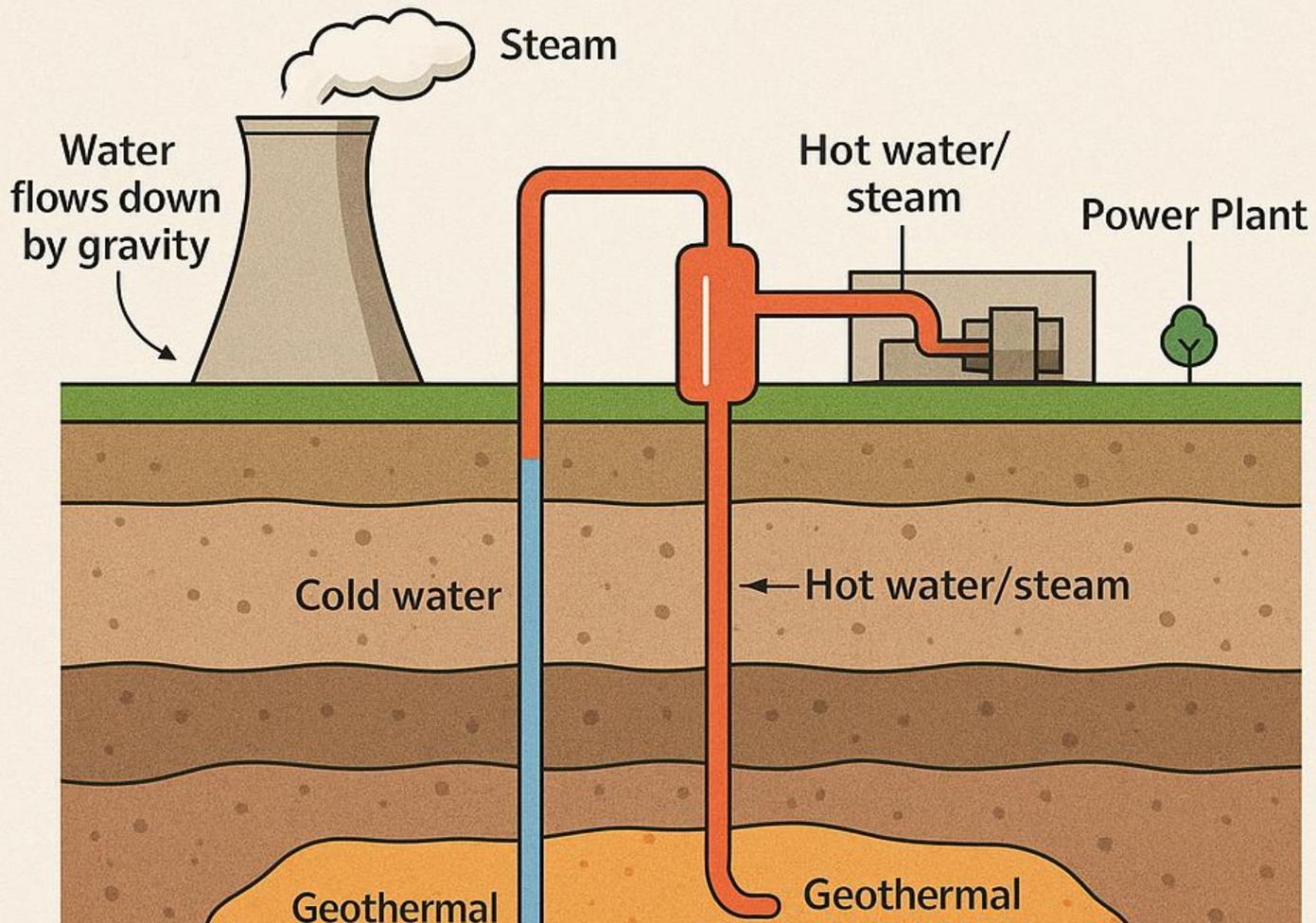
Cost Comparison



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System Design

Gravity-Assisted Geothermal System



Results

- Steam flow worked
- Turbine spun
- Electricity generated without pumps

Conclusion

- Gravity-assisted systems reduce energy loss
- Increase efficiency
- Lower cost

Future Improvements

- Scale system
- Improve turbine efficiency
- Study pressure and depth