

# Cost Considerations with GEO-FLUXES

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## A Reproducible Framework for Subsurface Flow, Transport, and Reactive Modeling

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### Overview

GEO-FLUXES projects combine **physics-based subsurface simulation**, **custom scientific workflow development**, **reproducible computational execution**, **automated postprocessing**, and **audit-ready technical reporting**. Cost structures reflect not only model development, but also the **scientific expertise**, **risk management**, and **review readiness** required for high-stakes subsurface decision-making.

In the U.S. consulting and research-services market, pricing for work of this nature is driven primarily by:

- Technical and numerical complexity
- Domain expertise across flow, transport, and geochemistry
- Compliance, traceability, and reproducibility requirements
- Iterative scenario development and stakeholder review cycles

Pricing is therefore based on **effort, expertise, and risk mitigation**, rather than code volume alone.

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### Typical Independent Consultant Rate Bands (USD)

Indicative hourly rate ranges for comparable GEO-FLUXES-style work include:

- **Generalist scientific modelers / early-career developers:**  
**\$75–\$125 per hour**
- **Senior subsurface modelers and scientific software developers**  
(PFLOTRAN, FEHM, MODFLOW, reactive transport, uncertainty analysis):  
**\$150–\$250 per hour**
- **Specialized boutique consultants or high-compliance, fast-turnaround projects:**  
**\$250–\$350+ per hour**

Actual rates depend on project urgency, regulatory exposure, and review burden.

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### Common Fixed-Bid Cost Ranges

For projects similar in scope to GEO-FLUXES deliverables, fixed-bid engagements commonly fall within the following ranges:

#### Rapid Screening and Feasibility Studies

**\$15k–\$40k**

- Screening-scale flow and transport models
  - First-order plume and pressure response
  - Targeted sensitivity analysis
  - Concise, decision-focused technical report
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## Site-Scale Conceptual and Operational Modeling

**\$40k–\$120k**

- Site-scale conceptual and numerical models
  - Multiple operational scenarios and constraint checks
  - Pressure envelopes, plume diagnostics, and containment metrics
  - Reproducible model package with standardized plots and tables
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## Reactive Transport and Long-Term Performance Assessment

**\$80k–\$250k+**

- Coupled flow–transport–reaction simulations
  - Mineralization and transformation processes
  - Time-resolved partitioning and permanence indicators
  - Explicit uncertainty framing and assumption documentation
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## MRV-Ready, Audit-Grade Modeling Frameworks

**\$150k–\$400k+**

- Versioned scenario libraries
  - Standardized QA/QC workflows
  - Monitoring and data-value assessment
  - Updateable, regulator-facing documentation packages
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## Practical Pricing Approach

A defensible and transparent pricing strategy for GEO-FLUXES projects typically includes:

### 1. Effort estimation

- Commonly **150–400 hours** depending on scope, physics, and review cycles

### 2. Agreed hourly rate

- Based on expertise level and compliance expectations

### 3. Contingency allocation (15–30%)

- Numerical stability and solver tuning
- Scenario refinement and scope evolution
- Stakeholder feedback and review iterations
- Documentation and QA/QC refinement

#### 4. Optional post-delivery support

- Typically **\$2k–\$8k per month**
  - Covers model updates, reruns, data assimilation, and technical support
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## Cost Drivers and Scaling Factors

Key drivers influencing GEO-FLUXES project cost include:

- Number of modeled scenarios and operational strategies
- Dimensionality (2D vs 3D) and grid resolution
- Degree of heterogeneity and geologic complexity
- Coupling of flow, transport, and geochemistry
- Extent of sensitivity, calibration, and uncertainty analysis
- Frequency of sponsor review and revision cycles

Transparent cost scaling ensures sponsors understand how added rigor translates into added value.

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## Value Proposition

GEO-FLUXES pricing reflects more than simulation execution. It includes:

- **Deep domain expertise** across multiple subsurface simulators
- **Risk reduction** through reproducible, traceable, and auditable workflows
- **Decision-ready outputs** suitable for engineering, risk, and regulatory contexts
- **Consistency across scales and modeling approaches**

GEO-FLUXES delivers **defensible science**, not just model outputs.

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## Competitive Positioning

Compared to ad hoc modeling or solver-specific consulting, GEO-FLUXES offers:

- Integrated multi-physics workflows
- Consistent QA/QC across tools and scenarios
- Faster iteration with reduced rework
- Clear uncertainty communication

This reduces downstream decision risk and long-term project cost.

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## Summary

GEO-FLUXES enables sponsors to invest in **transparent, reproducible, and scientifically defensible subsurface modeling**. Funding scales naturally with project ambition, physics complexity, and uncertainty-management needs—allowing organizations to balance **cost, rigor, and decision confidence**.

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