

# GRCResponder

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# GRCResponder: AI-Driven Optimization of General Rate Cases

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## The Problem

Utility companies regularly undergo General Rate Case (GRC) proceedings with the California Public Utilities Commission (CPUC) to justify the rates they charge their customers. GRC teams must manually sift through thousands of pages of documents to craft responses, which is tedious, repetitive, and inefficient.

## Our Approach

The GRCResponder is an A.I. chatbot that leverages modern semantic search technology to revolutionize this process. Using vector database embeddings, we can retrieve the most relevant documents to address user queries and generate responses to regulatory inquiries.

## Project Goals

### Streamline Legal Preparation

- Reduce workload for target users by automating document retrieval

### Improve Document Search Efficiency

- Quick retrieval of relevant filings and rulings from large collection of stored documents

### Ensure Consistent Response Output

- Generate standardized and uniform answers to regulatory inquiries across all submissions

## Challenges

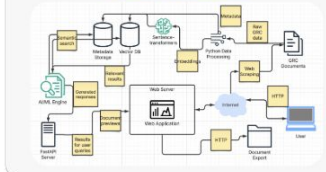
### Document Ingestion

- Navigating the CPUC Website & processing data from thousands of proceedings

### Search Optimization

- Narrowing relevant search results combining semantic and structured filtering

## System Architecture



## Innovation

### 1: Prompt Engineering



### 2: LLM-as-a-Judge Evaluation



## User Interaction & Design



## Software Tools



# Research Updates

## Current Outline

## Part 1 and 2 done

### 1. Introduction

- 1.1 Context and Motivation
- 1.2 Research Problem & Contributions

### 2. Related Work

- 2.1 Expert Systems in Regulatory / Compliance Domains
- 2.2 Semantic Search & RAG with LLMs
- 2.3 Gaps GRC Addresses

### 3. System Architecture

- 3.1 High-Level Block Diagram
- 3.2 Data Flow
- 3.3 Component Descriptions

### 4. Implementation Details

- 4.1 Embedding pipeline & vector store
- 4.2 LLM orchestration & prompt templates
- 4.3 Back-end & front-end
- 4.4 Performance optimizations

### 5. Experimental Setup

- 5.1 Dataset (CPUC filings used)
- 5.2 Baselines (keyword search)
- 5.3 Metrics
- 5.4 Participant details (developer lab study)

### 6. Results

- 6.1 Quantitative results (tables/graphs)
- 6.2 Usability findings

### 7. Discussion

- 7.1 Interpretation & practical implications
- 7.2 Limitations (lab vs. field)
- 7.3 Lessons learned

### 8. Conclusion

Recap contributions + Next steps

### 9. Glossary

### 10. References

# Search Engine

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Document insertion → proceeding ID and attribute information

Fully implemented proceedings from:

- Jan 1, 2020 - Present

Experimenting with Cron scheduler

- Specified interval?

## Current Status:

- Improved LLM retrieval

### Preliminary Metrics w/ K=8 & Citations:

Average relevance score: 1.86/5  
Average usage score: 1.83/5  
Average answer accuracy: 1.65/5

#### Metrics by difficulty:

##### Easy (30 questions):

Relevance: 2.03/5  
Usage: 2.00/5  
Accuracy: 1.03/5

##### Medium (18 questions):

Relevance: 0.83/5  
Usage: 0.83/5  
Accuracy: 1.61/5

##### Hard (12 questions):

Relevance: 2.92/5  
Usage: 2.92/5  
Accuracy: 3.25/5

### Current Metrics w/ K=8:

Average relevance score: 4.57/5  
Average usage score: 4.52/5  
Average answer accuracy: 2.57/5

#### Metrics by difficulty:

##### Easy (30 questions):

Relevance: 4.20/5  
Usage: 4.07/5  
Accuracy: 2.47/5

##### Medium (18 questions):

Relevance: 4.89/5  
Usage: 4.94/5  
Accuracy: 2.50/5

##### Hard (12 questions):

Relevance: 5.00/5  
Usage: 5.00/5  
Accuracy: 2.92/5

# Database Setup

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## Document DB setup

- **Scope:** Documents from proceedings filed between Jan 1, 2020 and April 25, 2025
- **Volume:** ~50 GB of documents downloaded

## Embedding Pipeline Status

- **Current Setup:** Attempting to process embeddings on VM
- **Challenge:** File transfer bottlenecks to virtual machine

## Current Status:

- LLM returns citation links based on context

Previous Metrics w/ K=8:		Preliminary Metrics w/ K=8 & Citations:
Metrics by difficulty:		Metrics by difficulty:
Easy (30 questions):		Easy (30 questions):
Relevance: 2.13/5		Relevance: 2.03/5
Usage: 2.00/5		Usage: 2.00/5
Accuracy: 0.90/5		Accuracy: 1.03/5
Medium (18 questions):		Medium (18 questions):
Relevance: 1.67/5		Relevance: 0.83/5
Usage: 1.67/5		Usage: 0.83/5
Accuracy: 1.94/5		Accuracy: 1.61/5
Hard (12 questions):		Hard (12 questions):
Relevance: 2.33/5		Relevance: 2.92/5
Usage: 2.08/5		Usage: 2.92/5
Accuracy: 2.50/5		Accuracy: 3.25/5

GRC Assistant: Okay, I can help you with information regarding PG&E's Non-Tariffed Products and Services (NTP&S) based on the documents I have.

### Overview of PG&E's Non-Tariffed Products and Services

PG&E offers Non-Tariffed Products and Services (NTP&S) primarily using underutilized PG&E assets or capacity to generate incremental revenues by marketing products and services to third parties (PG&E GRC A.21-06-021, [Ex-06 at 2-17](#)). These services are consistent with the Affiliate Transaction Rules, Rule VII, adopted by the Commission in D.06-12-029 (PG&E GRC A.21-06-021, [Ex-06 at 2-17](#)).

### Examples of Non-Tariffed Products and Services

Typical transactions under this program include (PG&E GRC A.21-06-021, [Ex-06](#)):

- Joint use pole attachment arrangements
- Short-term use of conference facilities by third-parties
- Customer emergency transformer loans

### Financial Aspects and Regulatory Oversight

PG&E requested an expense forecast for 2023 of \$49.851 million for the New Revenue Development Department's provision of Non-Tariffed Products and Services (NTP&S) (PG&E GRC A.21-06-021, [520114360.PDF](#)). PG&E's forecasted revenues for 2023 were \$60.5 million (PG&E GRC A.21-06-021, [520114360.PDF](#)).

PG&E presents minimal information about the utility assets relied upon and other financial aspects of its Non-Tariffed Products and Services (PG&E GRC A.21-06-021, [520114360.PDF](#)). PG&E states that its request of \$49.851 million supports "PG&E's efforts to offer additional services 'non-utility



# Research Paper

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## Current Status:

- Working on draft of research paper to submit to journal
- Is there a specific timeline for completion?

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# Questions?

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