

**NATIONAL LAB
DISCOVERY SERIES**

PermitAI™: Using Artificial Intelligence to Accelerate Environmental Reviews and Permitting

Pacific Northwest National Laboratory

PNNL-SA-223229

Featured Speaker(s)



Sameera Horawalavithana, Ph.D.
Senior Data Scientist and Principal Investigator

Sameera Horawalavithana is a senior data scientist at Pacific Northwest National Laboratory (PNNL) and a researcher of AI and natural language processing (NLP). He is the principal investigator for the PermitAI™ project, and other AI projects funded by DOE ASCR, CMEI, and NNSA. He authored more than 40 peer reviewed papers including publications at premier AI conferences and workshops.

Sameera received his Bachelor of Science in Computer Science from University of Colombo, Sri Lanka in 2015 and Ph.D. in Computer Science and Engineering from University of South Florida in 2021 specialized in AI and NLP. He also serves as an Associate Editor for the Institute of Electrical and Electronics Engineers (IEEE) Transactions on Artificial Intelligence journal and Nature Humanities and Social Sciences Communications, and an Area Chair for Empirical Methods in Natural Language Processing (EMNLP).



Sai Munikoti, Ph.D.
(Co-PI)



Bethel Tarekegne, Ph.D.
(Project manager)

AGENDA

Environmental Reviews and Permitting

Project History

PermitAI™ Platform Deep Dive

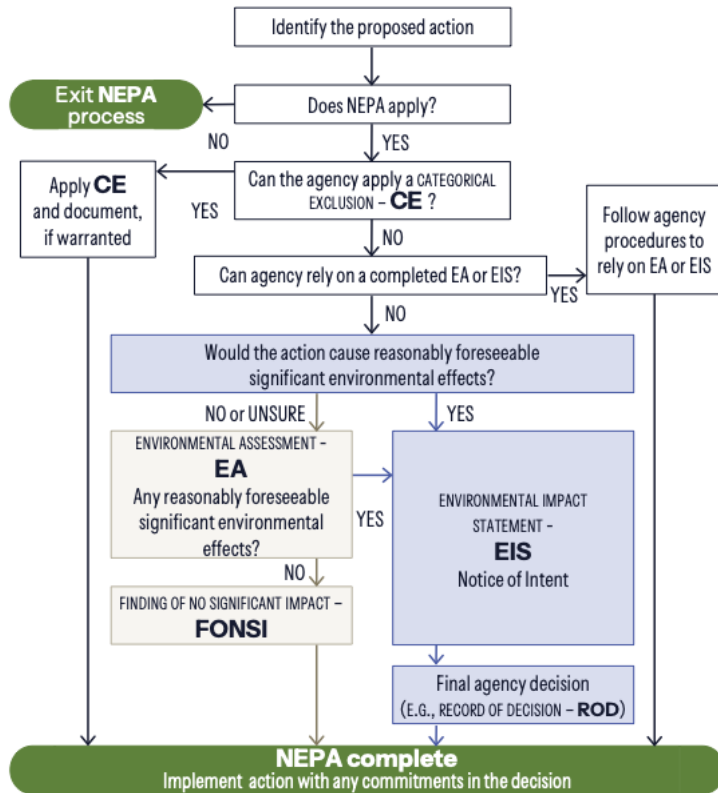
PermitAI™ Impact and Success

Partnership and Licensing

Federal Environmental Reviews and Permitting

THE NEPA PROCESS

NATIONAL ENVIRONMENTAL POLICY ACT, as amended through July 22, 2025



This flowchart is a supplemental tool providing a visual overview of the NEPA process. For more details, visit [NEPA.gov](https://ceq.doe.gov/guidance/guidance.html)
JANUARY 2026

Clearing the path for critical infrastructure

For over 50 years, the National Environmental Policy Act (NEPA) has required agencies to conduct environmental reviews and document the potential impacts of major federal actions.



AGENCIES ARE UNDER INCREASING PRESSURE TO COMPLETE HIGH-QUALITY REVIEWS FASTER & CHEAPER

PermitAI™ is building a one-stop data platform and a powerful suite of artificial intelligence (AI) tools to streamline and accelerate the environmental review process for critical federal infrastructure projects.

<https://ceq.doe.gov/guidance/guidance.html>



DOE's Office of Policy (OP) initiated the PermitAI™ project with PNNL

Winning the Race, America's AI Action Plan promote PermitAI™ pilot testing across agencies

CEQ's Permitting Innovation Center highlighted PermitAI™ data platform

Seeking commercial partner(s) and/or funding for technology maturation

Updating Permitting Technology for the 21st Century, Presidential Memorandum and Council on Environmental Quality (CEQ)'s Permitting Technology Action Plan

DOE's Office of Critical Minerals and Energy Innovation (CMEI) supported PermitAI project expansion

2023

2024

2025

Present

PermitAI™ Advances Permitting Technology and Augments Important SME Tasks

PermitAI™ platform **collects, enriches, and standardizes** legacy public NEPA documents, accelerates **rote and repetitive tasks** in NEPA reviews (e.g., research, public-comment processing, and drafting document sections) with custom built AI tools, and delivering efficiency gains of up to 50% for federal NEPA subject-matter experts.



NEPA Data Collection,
Enrichment, Management, and
Governance



NEPA AI Model Development
and Evaluation



NEPA Application
Development and Deployment

PermitAI™ Advances Permitting Technology and Augments Important SME Tasks

NEPATEC

NEPA Text Corpus (NEPATEC).

A corpus of legacy NEPA documents with standard metadata aligned with [CEQ's NEPA and Permitting Data and Technology Standard](#).



SearchNEPA/ ChatNEPA.

- Find environmental review documents using filters and keyword searches.
- Chat with NEPA documents for fact finding, summarization, and comparisons.



CommentNEPA.

Delineate comments from public correspondence, organize those comments in (pre) defined bins.



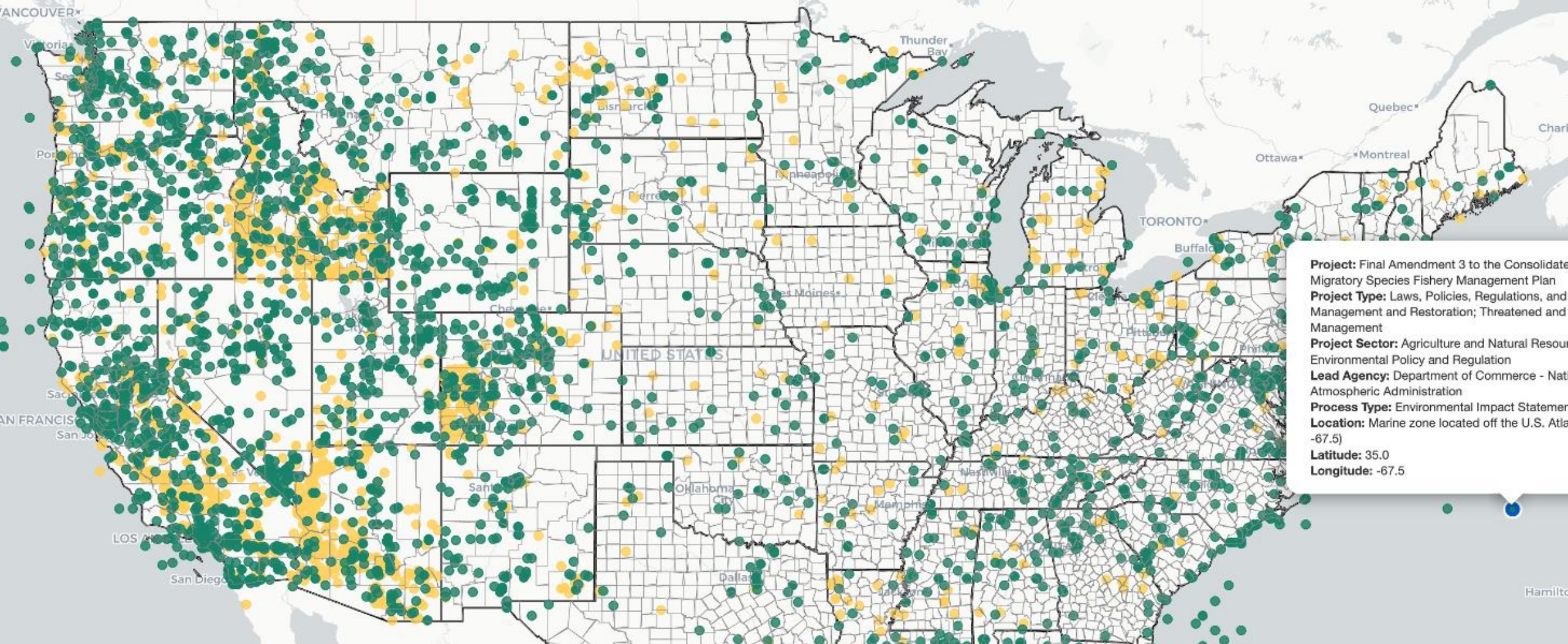
WriteNEPA.

Drafting tool to assist subject matter experts with initial drafts of content for EIS and EAs.



EngageNEPA.

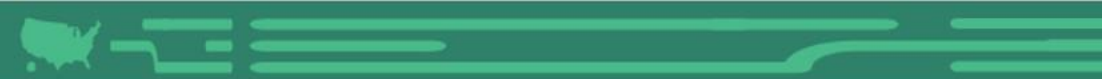
Centralizes discovery and tracking of public engagement opportunities for NEPA actions.



NEPA Text Corpus (NEPATEC)



PERMITTING TECHNOLOGY



Welcome. What permitting documents do you need? Type keywords to begin.

🔄 Sources

Our Data Mission:

PROJECTS TRACKED
43,902

DOCUMENTS TRACKED
119,609

EIS DOCUMENTS
54,952

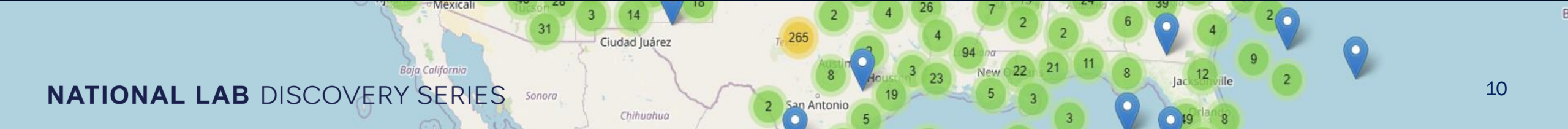
EA DOCUMENTS
14,396

CE DOCUMENTS
49,584

🕒 November 19, 2025



SearchNEPA for AI-Driven NEPA Research



SearchNEPA for AI-Driven NEPA Research

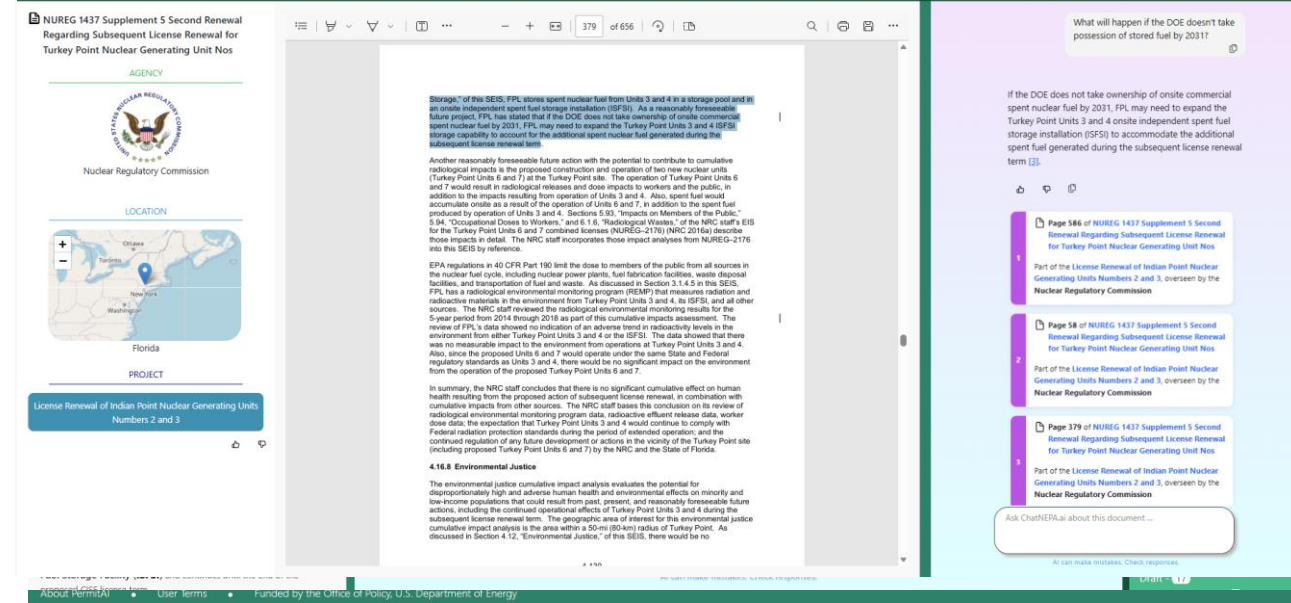
SearchNEPA and ChatNEPA speed up NEPA research and discovery with more than 140,000 NEPA documents (CX, EA, EIS, others).

SearchNEPA allows users to search, filter documents with keywords, topic, etc.

ChatNEPA is a conversational AI assistant for NEPA fact finding, integrated with SearchNEPA.

Beta Testing Feedback Summary

- Users want to leverage these tools to identify NEPA documents with specific focus areas, highlighting their value for rapid research, comparison, and SME support across projects and states.
- Praising for “ability to view all projects in a specific state”, “Overall great impression”, “Inter-agency searches is good”, “Easy to navigate and use”



700+ User Testers Onboarded

More than 200K+ page visits

Around 50% efficiency gains in NEPA research

PROJECTS	Letter from Solectria Renewables, LLC	OPPOSING TAX CREDITS
Project A	163 comments Posted: Jun 24, 2024	"While the 45X production tax credit solves part of this problem, it is not sufficient."
Project B	Letter from Ingeteam Inc. 57 comments Posted: Jun 6, 2024	"The new Safe Harbor method enables Project Developers to qualify for the 10% Bonus Credit without purchasing U.S. manufactured Utility PV inverters. [...] In our opinion, this should not be permitted." "In our opinion, this should not be permitted."
Project C	Letter from Construction Innovations LLC 54 comments Posted: July 22, 2024	"We are concerned that rigid domestic content requirements could delay the timely deployment of renewable projects." "We believe that streamlining the tax credit process and eliminating unnecessary administrative hurdles is crucial to accelerating the clean energy transition while keeping costs manageable for customers."
PROGRESS	Letter from Edison Electric Institute 21 comments Posted: July 15, 2024	"As partners in the energy transition, utilities are committed to helping design policies that support the growth of renewables while maintaining reliable and affordable service for customers." "The clean energy economy will benefit from a diversified supply chain, and we urge policymakers to consider the global nature of energy markets."
Agency Scoping ✓	Letter from Solar Energy Manufacturers for America Coalition 12 comments Posted: July 16, 2024	"The current patchwork of tax credits and incentives can be difficult to navigate for utilities and developers. Simplifying these programs would make it easier to deploy renewable energy projects quickly." "We must be cautious about implementing policies that could inadvertently slow down renewable energy deployment or increase costs to ratepayers."
Comment Ingestion ✓	Letter from Trane Technologies 11 comments Posted: July 16, 2024	FAVORING TAX CREDITS "From our perspective, the domestic content bonus credit is designed to incentivize PV project developers to purchase U.S. manufactured products instead of low-cost foreign sourced items."
Comment Binning ✓	Letter from Allico Renew. Energy Limited	
Comment Analysis		
Report Out		
Review		

Call

Domestic Content Bonus Credit Amounts under the Inflation Reduction Act of 2022: Expansion of Applicable Projects for Safe Harbor in Notice 2023-38 and New Elective Safe Harbor to Determine Cost Percentages for Applicable Percentage Rule (Notice 2024-41)

Letter 06/21/2023 7:31 PM colorado

Subject: Comment from Solectria Renewables, LLC

U.S. Treasury Department & Internal Revenue Service

Dear Solar Industry Supporters,

Solectria Renewables, LLC (Solectria) is a leading U.S. PV Inverter manufacturer with headquarters in Lawrence, Massachusetts. Our company was founded in 2004 and has been in business continuously for the past twenty years. In the early 2010's, the majority of domestic inverter manufacturers were driven out of business due to intense pricing competition from Asian imports. Solectria is the only survivor. In 2014, Solectria was acquired by Yaskawa America, Inc. (YAI), and we now operate as a wholly owned subsidiary of YAI.

- Construction - 3
 - Residential - 3
 - Solar thermal - 2
 - Photovoltaic solar - 1
- COMMENT STATES**
- Colorado - 6
 - Nevada - 1
 - Oregon - 1
 - Texas - 1

CommentNEPA for Public Comment Processing

Posted: July 12, 2024

we support policies that enable both utilities and independent power producers to deploy renewable generation at scale, while also ensuring grid reliability and resilience against extreme weather events.

of low-cost foreign sourced items. The program is meant to enable U.S. manufacturers to rapidly scale-up production and employment for long-term success in the PV market. Ideally,

CommentNEPA for Public Comment Processing

CommentNEPA is an AI application that can

- autonomously summarize,
- delineates public comments,
- extracts concerns, and
- bins comments in multiple categories.

Across 10+ real-world use cases from DOE, NRC, FWS, and BLM, CommentNEPA extracted and classified comments generally similarly to SMEs in record time.

Beta Testing Feedback Summary

- Time savings in AI-assisted comment management, pre-processing and summarization before comment responses.
- Potential generalizability of the solution across various comment use cases (e.g., NEPA public scoping/drafting use cases, RFI, Rulemaking).

The screenshot displays the CommentNEPA interface for the project 'Palisades Nuclear Plant Unit 1 Scoping for Draft EA'. On the left, a sidebar lists various bins with their respective comment counts: Accidents (85), Alternatives-No-Action (49), Alternatives-Other (91), Cooperating Agency (16), Cumulative Impacts (36), Decommissioning (27), Ecology-Aquatic Resources (11), and Ecology-Terrestrial Resources. The main content area shows a list of comments with their bin assignments and confidence scores. For example, one comment is assigned to 'Accidents' with 100% confidence. The right-hand panel provides a 'Bin Summary' for 'Accidents', a 'Comment Context' section, and a 'Correspondence' section with a link to 'NRC-2024-0076-0001-0164'. The interface also includes a 'DOWNLOAD DATA' button and a 'BINS 38' indicator.

94% on average time savings

50-100x cost savings

Processed 2500+ comments per hour



3.10.2 Regional Economic Characteristics

Goods and services are needed to operate [FACILITY_NAME] [UNIT_DESCRIPTION]. Although procured from a wider region, some portion of these goods and services are purchased directly from within the socioeconomic region of influence (ROI). These transactions sustain existing jobs and maintain income levels in the local economy. This section presents information about employment and income in the [FACILITY_NAME] socioeconomic ROI.

3.10.2.1 Regional Employment and Income

According to the U.S. Census Bureau's (USCB's) [ACS_YEAR_RANGE] American Community Survey 5-Year Estimates, [LARGEST_EMPLOYMENT_SECTOR] represented the largest employment sector in the socioeconomic ROI, followed by [SECOND_LARGEST_SECTOR] (USCB [USCB_REFERENCE_ID]). The [ROI_COUNTY_LIST] civilian labor force consisted of [ROI_LABOR_FORCE_TOTAL] individuals, and the number of employed individuals was [ROI_EMPLOYED_TOTAL] (USCB [USCB_REFERENCE_ID]). Estimated income information for the socioeconomic ROI is presented in Table 3-19.

Table 3-19 Estimated Income Information for the [FACILITY_NAME] Socioeconomic Region of Influence ([ACS_YEAR_RANGE], 5-Year Estimates)

Metric	[ROI_COUNTY_1_NAME]	[ROI_COUNTY_2_NAME]	[ROI_COUNTY_3_NAME]	[STATE_NAME]
Median household income (dollars)(a)	[ROI_COUNTY_1_MEDIAN]	[ROI_COUNTY_2_MEDIAN]	[ROI_COUNTY_3_MEDIAN]	[STATE_MEDIAN_HH_IN]
Per capita income (dollars)(a)	[ROI_COUNTY_1_PER_CA]	[ROI_COUNTY_2_PER_CA]	[ROI_COUNTY_3_PER_CA]	[STATE_PER_CAPITA_]

Review Skeleton Template

Review this skeleton template. Add, remove, or update data fields you want populated.


Fill Placeholders


Looks good? When you're ready, click the "Select Reference Documents" button below to select and upload Reference Documents with the data needed to fill the placeholders in your view.

Connected Tools

We will connect to the tools listed below as needed to populate the placeholders.

 Economic Indicators: Income, poverty, unemployment ([U.S. Census Bureau](#), ACS 5-Year Estimates).

 Labor Statistics: Civilian labor force and employed counts ([Bureau of Labor Statistics](#)).

 Industries and Occupations: Leading sectors and occupation distribution ([U.S. Census Bureau](#)).

Select Reference Documents

← Cancel

WriteNEPA for Drafting NEPA Document Sections

Map interface showing the United States and parts of Canada. A purple dot is located near Washington, D.C. The map includes a search bar with a 'CLEAR ALL' button, a 'keyword' input field, and several dropdown menus for filtering. A date range selector is also visible, showing '026' and '026'.

189 Notices

Privacy Act of 1974; System of Records

Department of Housing and Urban Developmen...

Issued 04/2

Scheduled Comments Close Date 05/2

Scheduled Public Meeting

Agency Information Collection Activities; C...

Department of the Treasury +1

Issued 04/2

Scheduled Comments Close Date 06/2

Scheduled Public Meeting

EngageNEPA for Public Engagement Tracking

Map interface showing Central and South America. A purple dot is located near Dominican Republic. The map includes labels for Ciudad de Guatemala, Honduras, Nicaragua, Kingston, Maracaibo, Caracas, and Panama.

Draft Environmental Impact Statement for t...

National Aeronautics and Space Administratio...

Issued 04/2

EngageNEPA for Public Engagement Tracking

EngageNEPA is a web tool that centralizes discovery and tracking of public engagement opportunities for NEPA actions.

- Near time document ingestion from Federal Register and DOE website for collecting and organizing notices.
- Exploration of NEPA public engagement opportunities is enabled by extracted metadata like meeting address, comment mailing address, project location, project type, etc.

Intended Stakeholder Groups

EngageNEPA acts as a hub for interested **tribal communities, the public, and agency staff** to increase their participation in the commenting process.

The screenshot shows the EngageNEPA web interface. At the top, there is a navigation bar with the EngageNEPA logo and a user profile icon. Below the navigation bar, there is a breadcrumb trail: < BACK. The main heading is 'National Forests and Grasslands in Texas; Oil and Gas Leasing Availability Analysis Environmental Impact Statement; Revised'. Below the heading, there is a table with the following information:

Comment period closes in	0 days	Summary
Agency	Forest Service, U.S. Department of Agriculture +1	<p>The U.S. Forest Service is revising its Notice of Intent to prepare an Environmental Impact Statement (EIS) for the National Forests and Grasslands in Texas to determine which federally managed lands (about 500,000 acres where both surface and minerals are federal) should be available for future oil and gas leasing and what protective stipulations should apply. The Under Secretary for Natural Resources and Environment is now the responsible official. The analysis will consider a No Action alternative, a Proposed Action, and a No Leasing alternative, and may update or add stipulations to protect resources such as wilderness, special status species (including red-cockaded woodpecker), water, wetlands, slopes, and other sensitive areas. Existing valid leases and outstanding/reserved mineral rights are not affected; changes would only apply to new federal leases. The Bureau of Land Management (New Mexico State Office) is a cooperating agency. Public comments on the scope are due by April 28, 2026, and can be submitted via the CARA portal or mailed to the Lufkin, Texas address provided.</p>
Project Sector	Mining and Extraction	
Project Areas	Texas	
Posted	04/23/2026	
Scheduled Comments Close Date	04/28/2026	
Action	Notice: revised.	
Meeting Address	Not available	

At the bottom of the page, there are two buttons: 'VIEW IN FEDERAL REGISTER' and 'GO TO COMMENT SUBMISSION'.

EngageNEPA is currently being tested with federal agency users

PermitAI™ Project Impact and Success

Onboarded & In-progress Agency Testers
 NIST/ USACE/ USDA/ DOI/ NTIA/ NRC/ EPA



SearchNEPA



CommentNEPA



WriteNEPA



EngageNEPA

More than 170 unique users downloaded the NEPATECv2.0 HuggingFace dataset 1000+ times.

- AI/startups (e.g., Google, Anthropic) (5%)
- Government and DOE Labs (15%)
- Academia (20%)
- Industry/consulting (20%)
- Individual (45%)

20 Testers



100 Testers

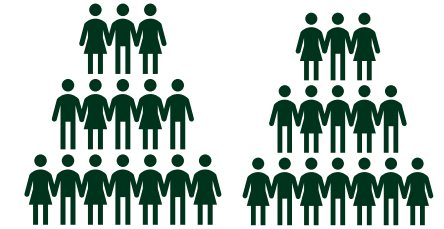


NEPA Document Coverage
 28K Documents across
 ~3K NEPA EIS projects



NEPATECv2.0 Public Release
 140K Documents, across 60K
 NEPA EIS/EA/CE projects

750 Testers



20x more projects covered

40x more testers

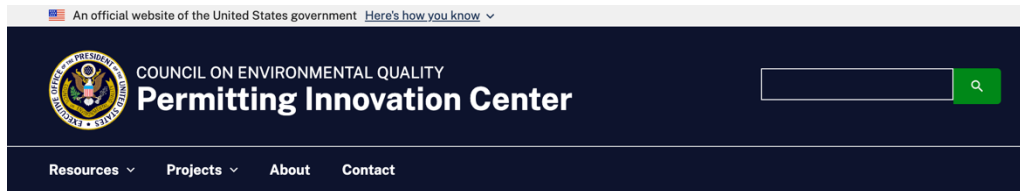
2023/24 FY

2024/25 FY

2025/26 FY

2026/27 FY

PermitAI™'s Existing Public-Private Partnerships



Developer Tools

Developer Resources

NEPA and Permitting Data and Technology Standard
example Swagger OpenAPI Page

CE Explorer - Categorical Exclusion Data

NEPATEC 2.0

OPEN API documentation

Developer Resources

The following tools provide information, data, or other support for developers working with environmental review and permitting systems.

Disclaimer

This CE Explorer tool is not an authoritative source and creates no rights or obligations.

NEPATEC 2.0

The Department of Energy's PermitAI project has released a large dataset of environmental review documents, called [NEPATEC 2.0](#). This dataset of ~80,000 NEPA documents has been enriched using AI with metadata matching CEQ's data standard and includes categorical exclusion determinations, environmental assessments, and environmental impact statements.

NEPATECv2.0 was highlighted by the CEQ's Permitting Innovation Center.

OpenAI Research Products Business Developers Company Foundation Log in Try ChatGPT

February 26, 2026 Global Affairs

Pacific Northwest National Laboratory and OpenAI partner to accelerate federal permitting

New benchmark shows potential to reduce infrastructure permitting timelines

Active collaboration with Frontier AI companies in building permitting technology.

“Our collaboration with PNNL is powering this critical project with cutting-edge technology and AI capabilities that are helping to transform environmental permitting with accessible and secure data,”
said Cameron Groves, Director, Google Public Sector.

Partnering with PNNL



TECHNOLOGY TRANSFER AGREEMENTS



SPONSORED RESEARCH



RESEARCH COLLABORATIONS

Let's explore what's possible together!
Contact collaboration@pnnl.gov to discuss partnership opportunities

PermitAI™ Team

PermitAI™ has more than 100 PNNL staff with technical contributors (AI, Cloud, UX) and subject matter experts (NEPA, and other permitting)



Mike Parker



Dan Nally



Sadie
Montgomery



Ann
Miracle



Leah
Hare



Jim
Jackson



Dave
Goodman



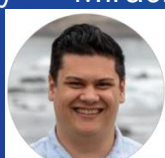
Anastasia
Bernat



Tim Vega



Sridevi Wagle



Derek
Lilienthal



Sarthak
Chaturvedi



Reilly Raab



Alex
Buchko



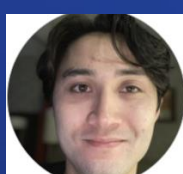
Kaustav
Bhattacharjee



Mahantesh
Halappanavar



Sid Das



Koby
Hayashi



Anurag
Acharya



Rounak Meyur



Sai Koneru



Sameera
Horawalavithana
(PI)

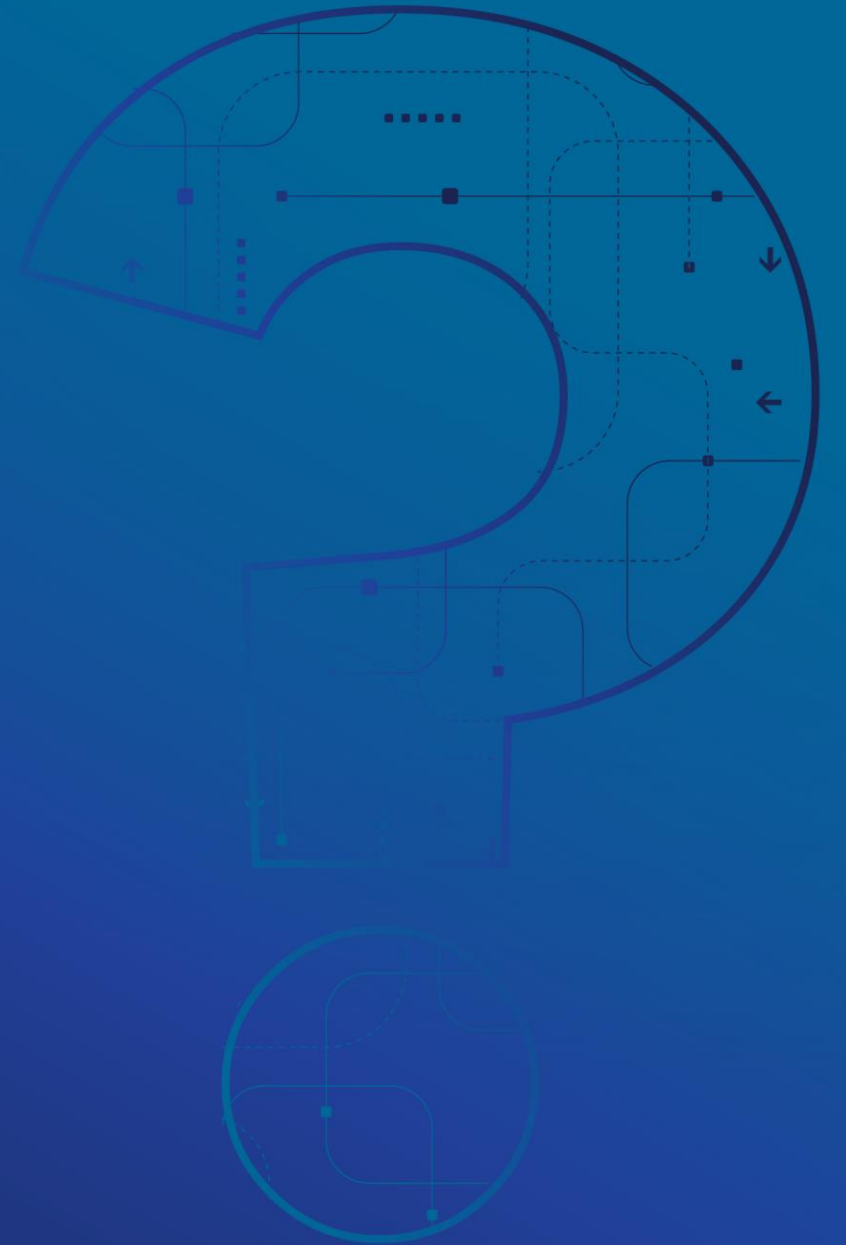


Sai Munikoti
(Co-PI)



Bethel Tarekegne
(Project Manager)





Questions?

permitai@pnnl.gov

<https://www.pnnl.gov/projects/permitai/stay-engaged>