

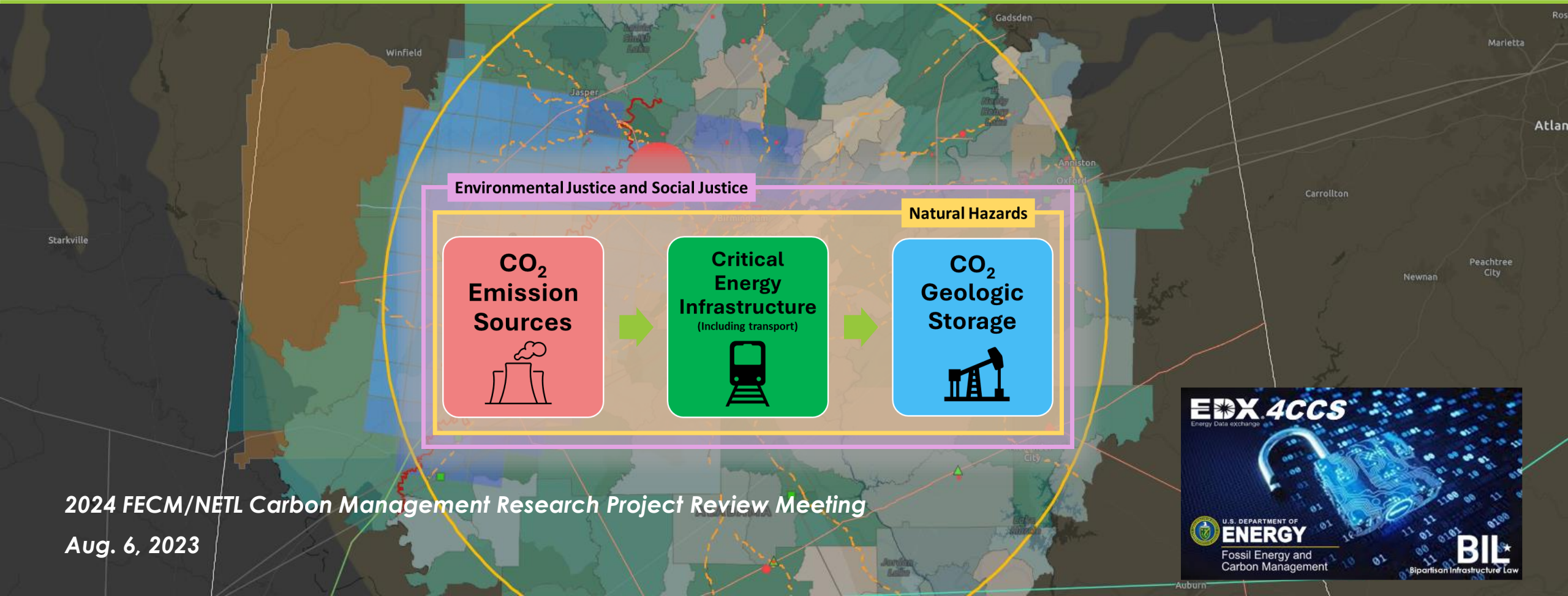
Carbon Storage Planning Inquiry Tool (CS PlanIT)



Providing Data and Insights for Accelerating Carbon Transport & Storage Deployment

Devin Justman

Geology/Geospatial Research Scientist



2024 FECM/NETL Carbon Management Research Project Review Meeting

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Disclaimer



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*Devin Justman^{1,2}; Scott Pantaleone^{1,2}; Maneesh Sharma^{4,5}; Lucy Romeo¹; Araceli Lara^{1,3};
Mackenzie Mark-Moser¹; Paige Morkner¹*

¹National Energy Technology Laboratory, 1450 Queen Avenue SW, Albany, OR 97321, USA,

²NETL Support Contractor, 1450 Queen Avenue SW, Albany, OR 97321, USA,

³Oak Ridge Institute for Science and Education, 1450 Queen Avenue SW, Albany, OR 97321, USA

⁴National Energy Technology Laboratory, 3610 Collins Ferry Road, Morgantown, WV 26505, USA,

⁵NETL Support Contractor, 3610 Collins Ferry Road, Morgantown, WV 26505, USA

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Overview

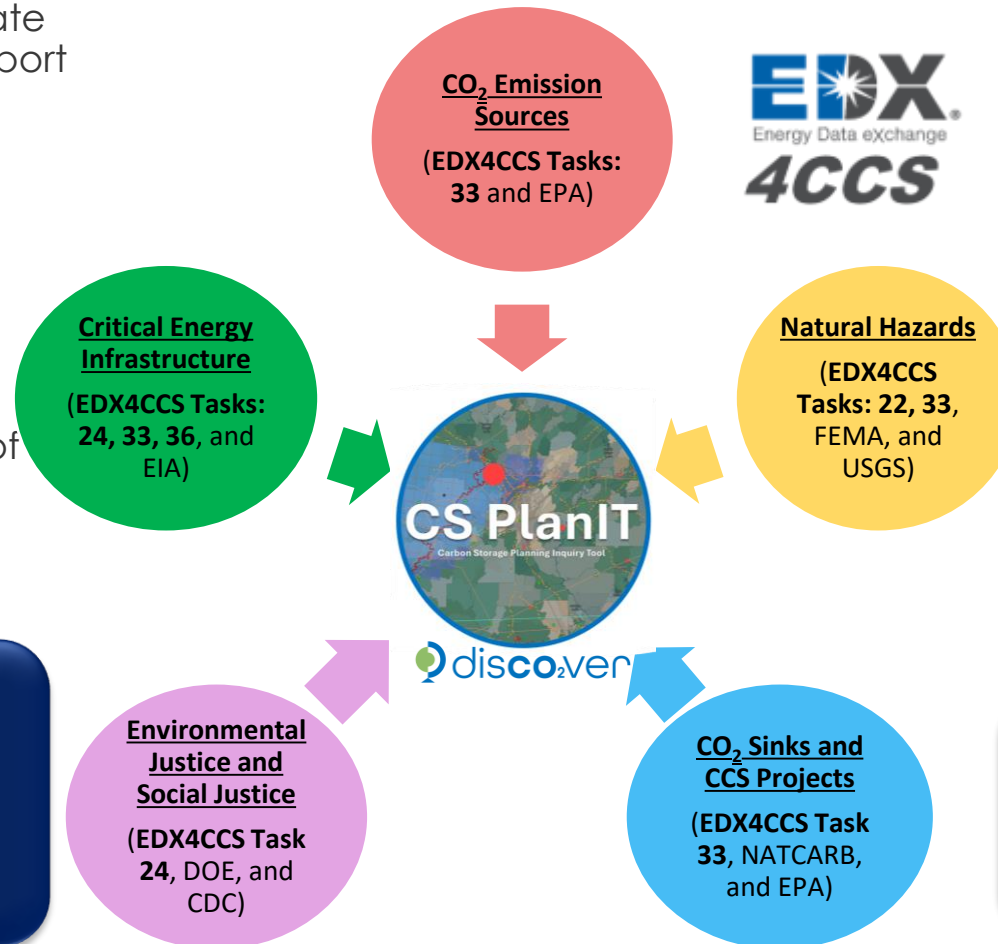
Purpose:

- Provides easy access to explore, query, and evaluate multiple data layers to support and accelerate carbon storage resource feasibility assessments and planning efforts

Problem:

- CS planning requires the consideration of multiple factors linked to a variety of disparate, multi-sourced datasets that require integration

Data Types (Data Source)



EDX- Energy Data eXchange
CCS- Carbon Capture and Storage
DOE- Department of Energy
USGS- United States Geological Survey
FEMA- Federal Emergency Management Administration
EPA- Environmental Protection Agency
EIA- Energy Information Administration
CDC- Center for Disease Control
NATCARB- National Carbon Sequestration Database

User community:

- Potential stakeholders include well/plant operators, policy makers, researchers, public communities

Potential insights for a given area...

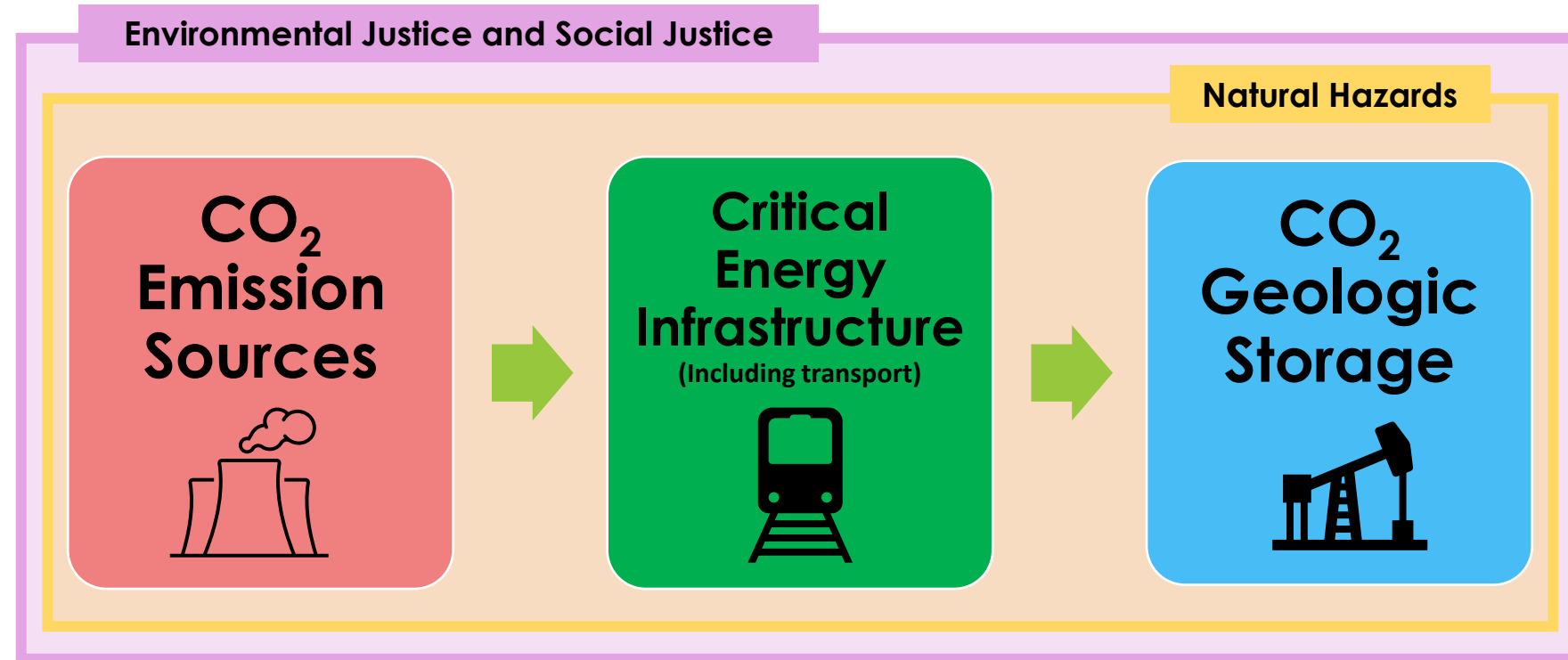
- What are the population/community impacts?
- What are the potential natural hazards?
- What are the CO₂ emissions sources and amounts?
- Are there candidate infrastructure for reuse?
- Are there potential CO₂ reservoirs?
- What are current storage estimates?
- What are the current carbon storage projects?

- CS PlanIT v1.0 publicly accessible via EDX 6/30
- Continuing work through EY24- incorporating data from EDX4CCS task 21
- Ultimately to be deployed on EDX DisCO₂ver

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Design Focus

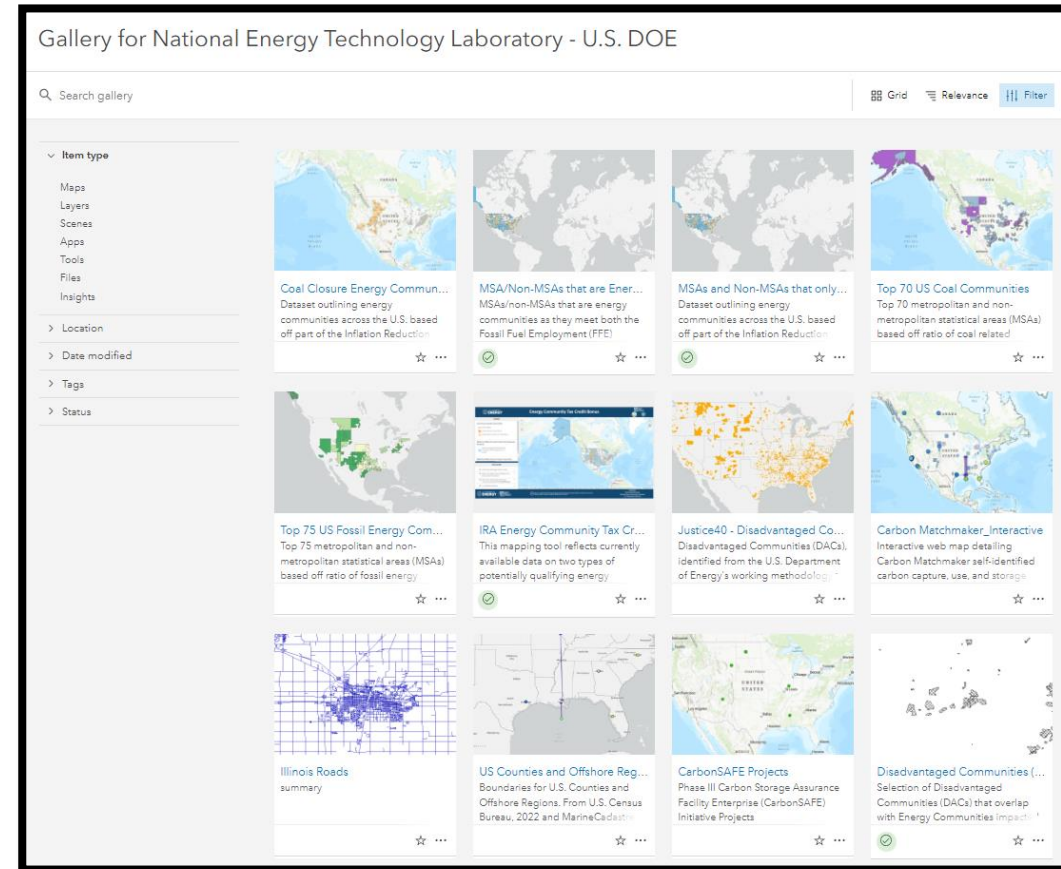
- The goal of reaching large-scale CS deployment starts with informed planning
- Discover and acquire publicly available data for each stage of the CCS supply chain (**Source** -> **Critical Energy Infrastructure** -> **Storage**)
- Evaluate impact on the **community** and **environment** at each stage in the CCS supply chain



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Approach

- Identified the need for a user-defined, radial-based query functionality
 - Leverage ArcGIS Enterprise web applications
- Identified, prioritized, and cataloged priority datasets across the EDX4CCS and other CS data research most relevant to CS planned efforts
 - Incorporated data services where possible to streamline data updates
- Designed the layout, functionality, and documentation of the dashboard to be user-friendly



Example data, tools, application on NETL's ArcGIS Enterprise platform.

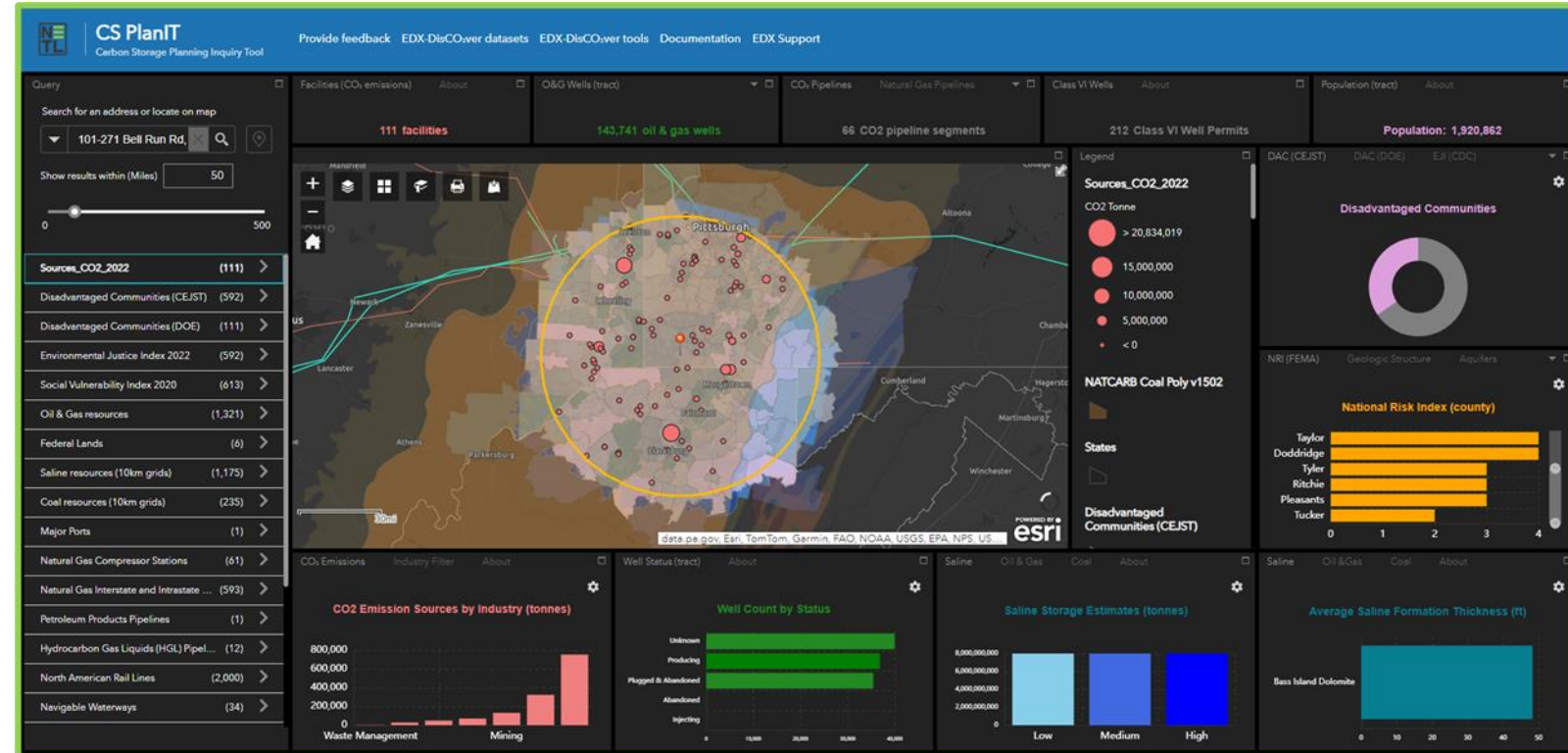
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Accomplishments to Date

- Identified, cataloged, integrated ~40 **datasets** across the EDX4CCS & CS data portfolios
- Organized data/stats into key categories:
 - Carbon dioxide (CO₂) emission sources
 - Critical energy infrastructure
 - CO₂ sinks/CCS (Carbon Capture & Storage) projects
 - Natural hazards
 - Environmental & Social Justice
- Successfully developed and tested the **Alpha and Beta versions** (Year 1 and 2, respectively) of CS PlanIT
- Public release of CS PlanIT** on the EDX (Energy Data eXchange) by **6/30/2024**

CS PlanIT v1.0



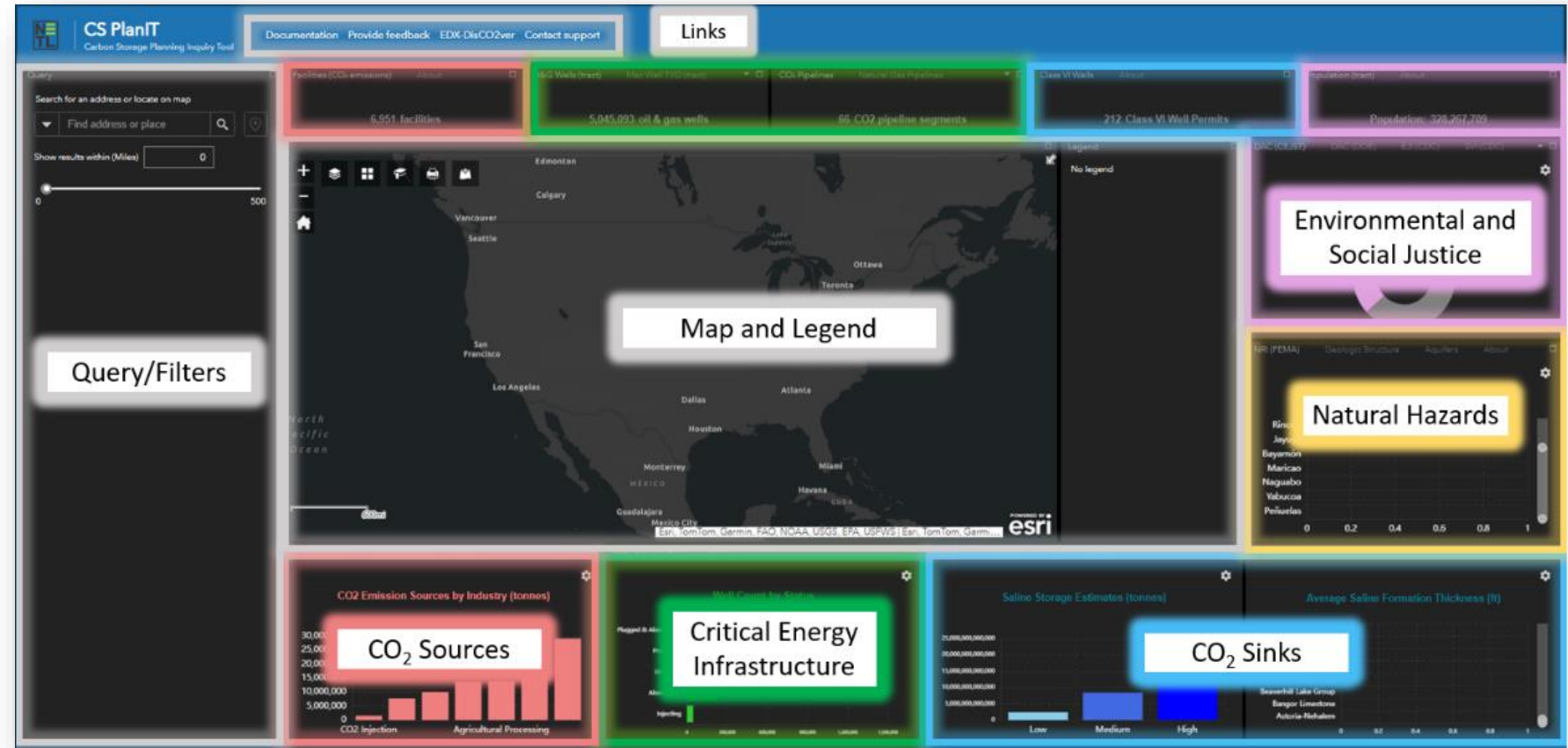
Example spatial data query within CS PlanIT, yellow circle on map represents user defined area of interest.

<https://edx.netl.doe.gov/dataset/cs-planit-carbon-storage-planning-inquiry-tool>

Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

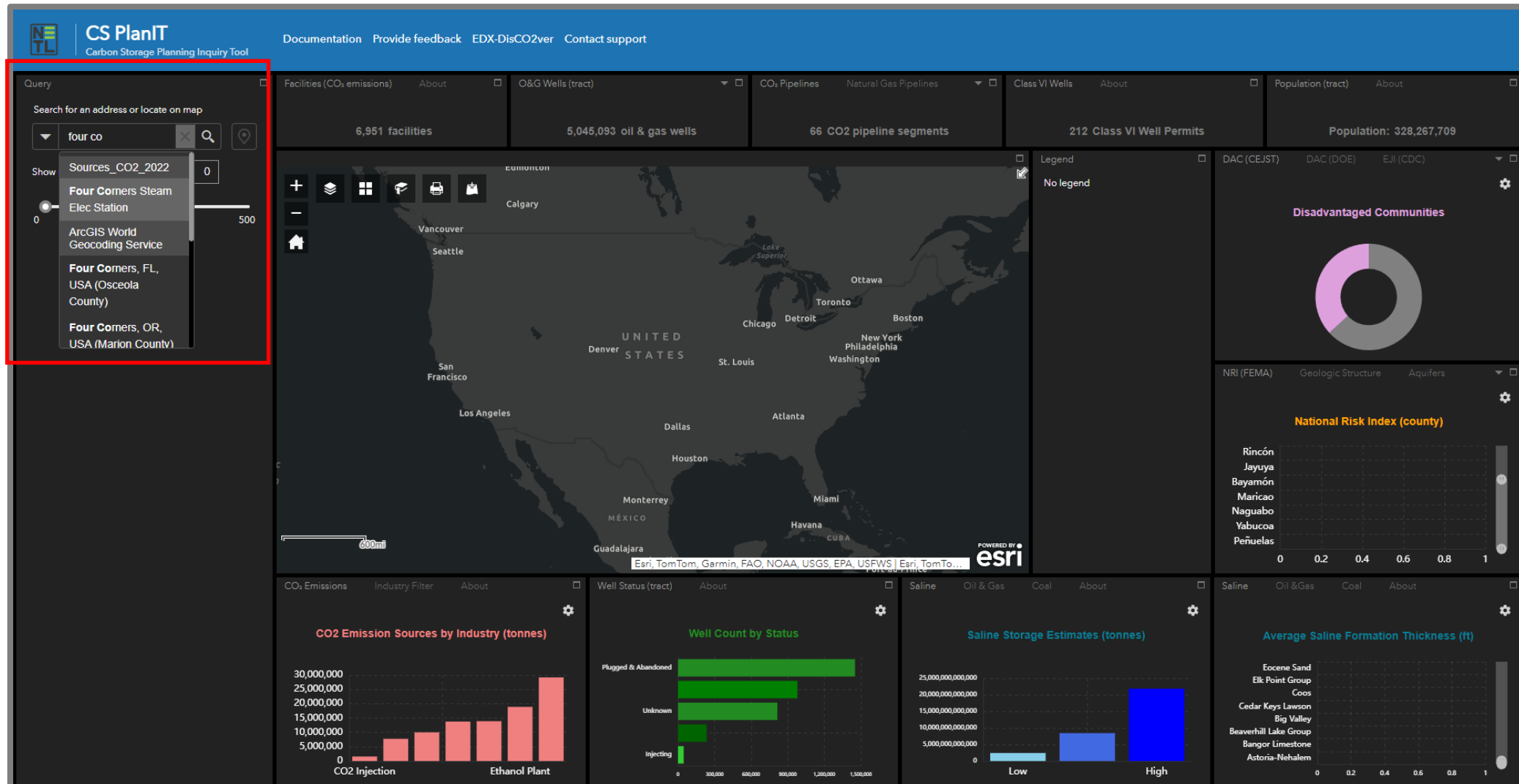
General Layout

- Data querying/filtering
- Charts and statistics
- Map and legend
- External links



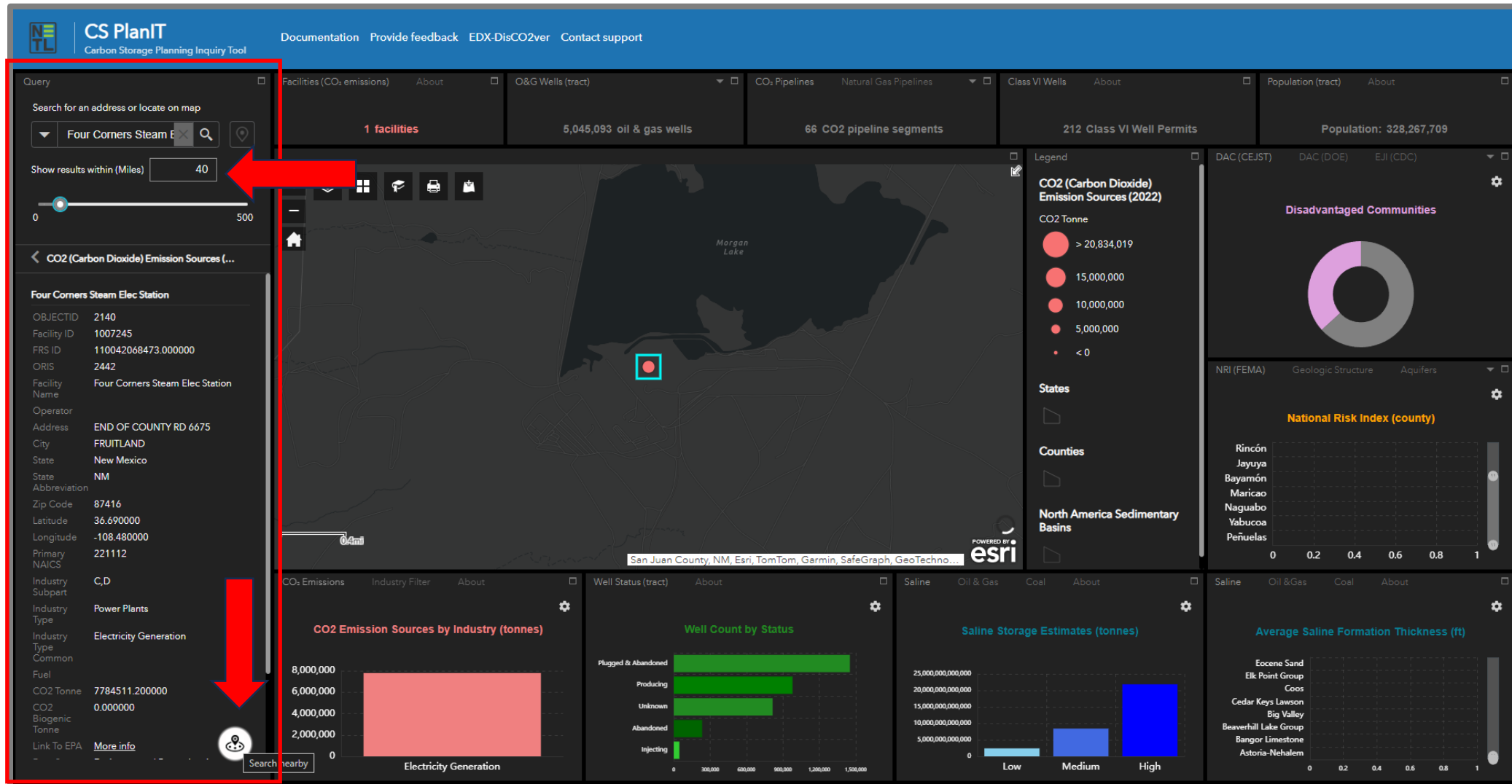
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Walkthrough - Query Location



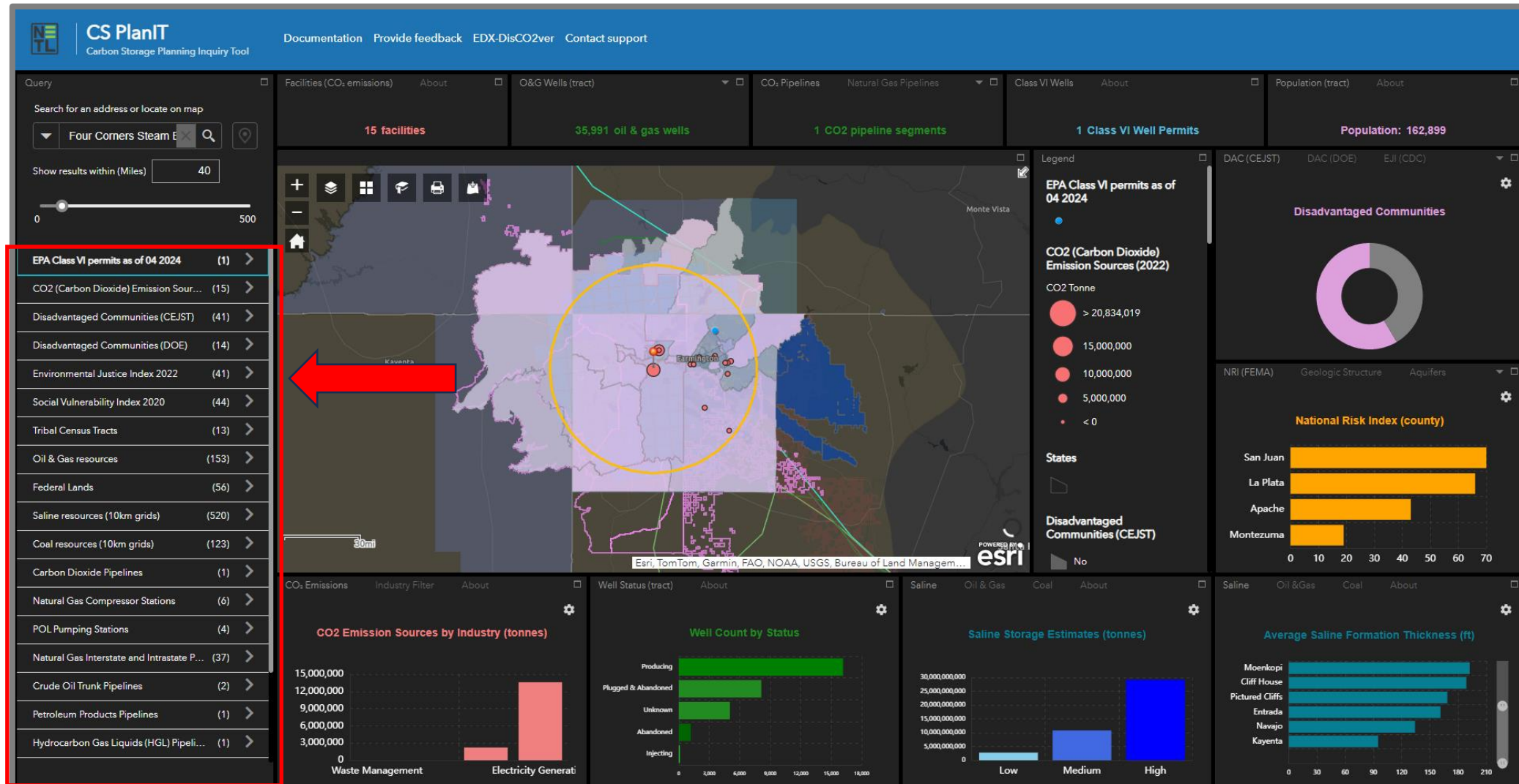
Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - Query Location



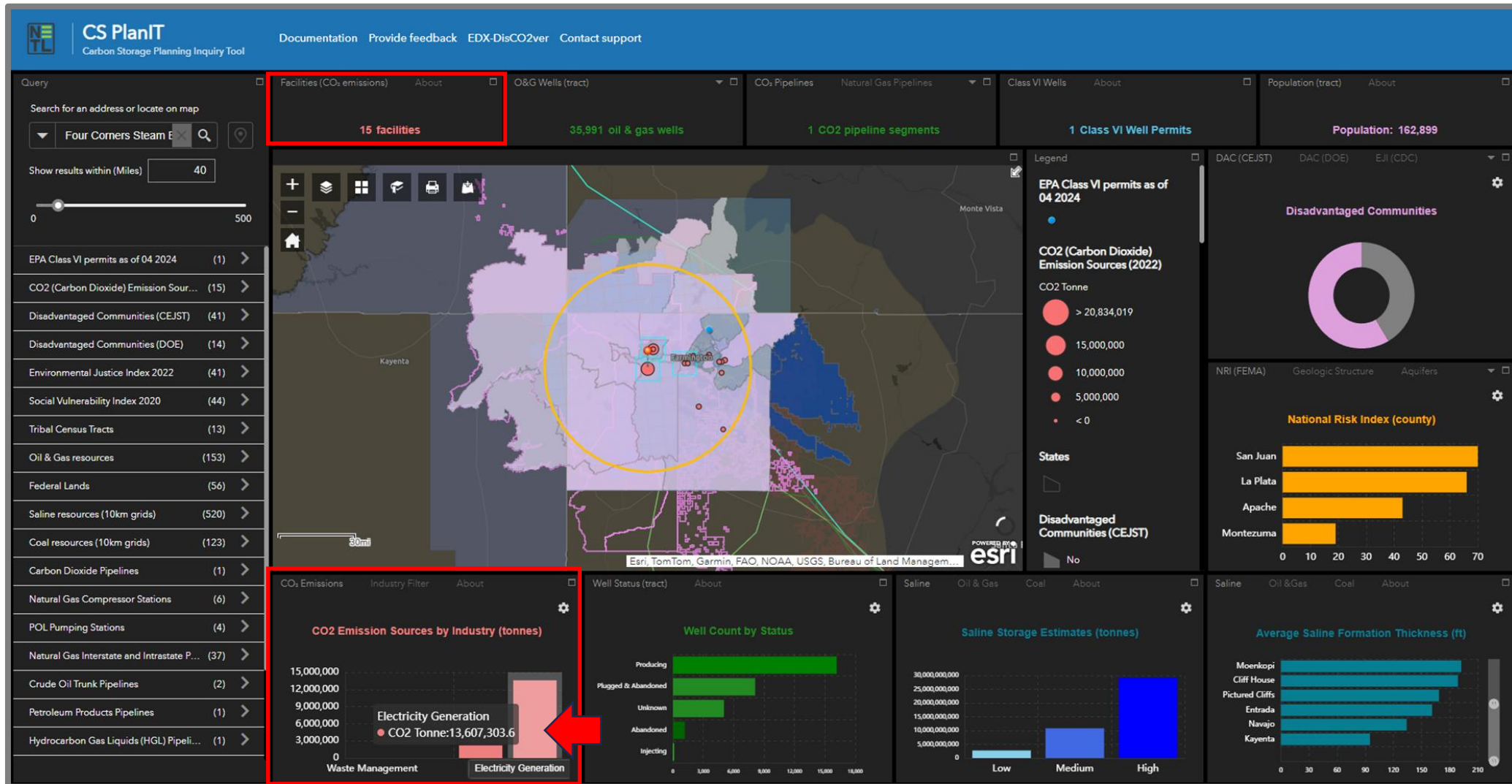
Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - Charts and Statistics



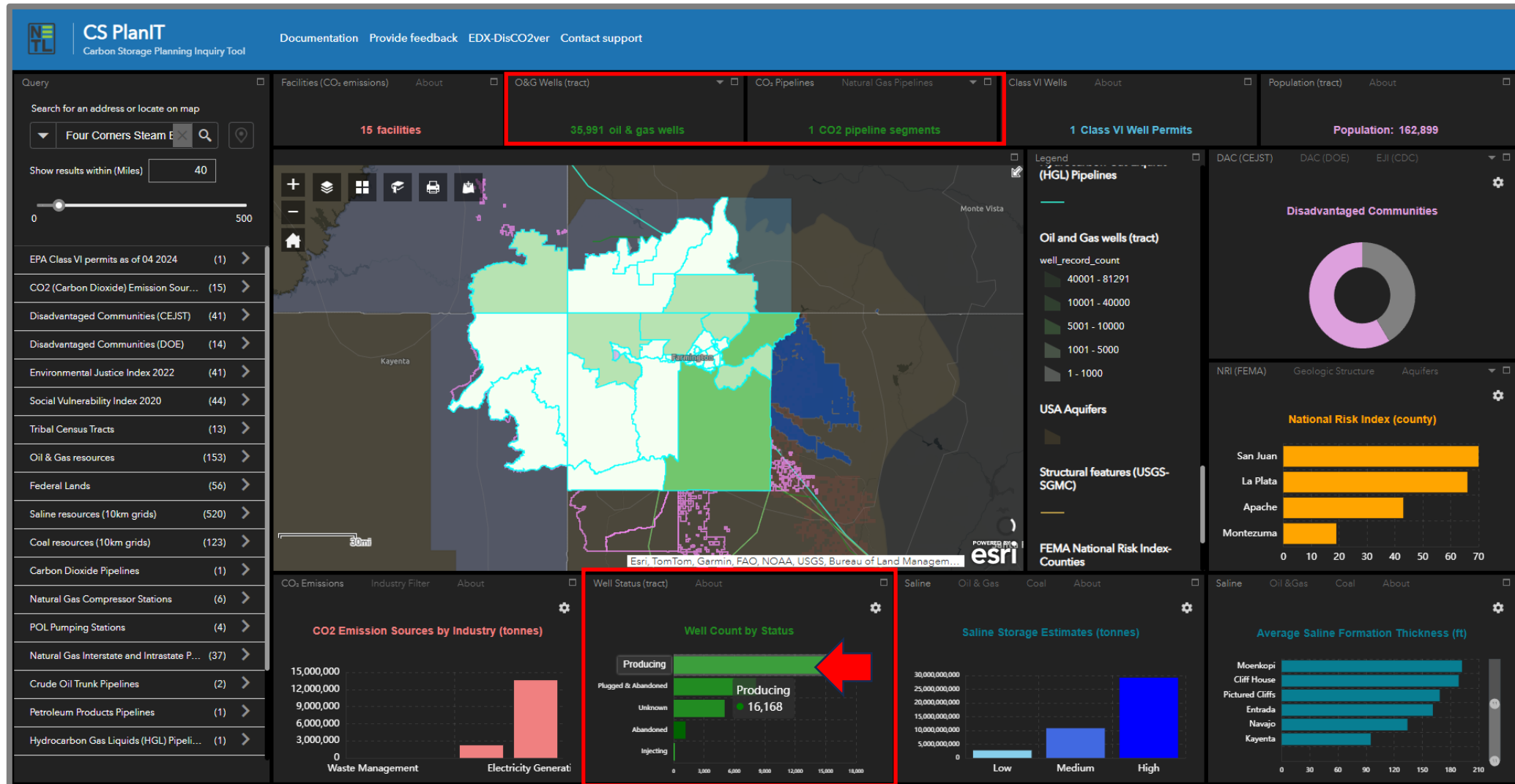
Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - Charts and Statistics



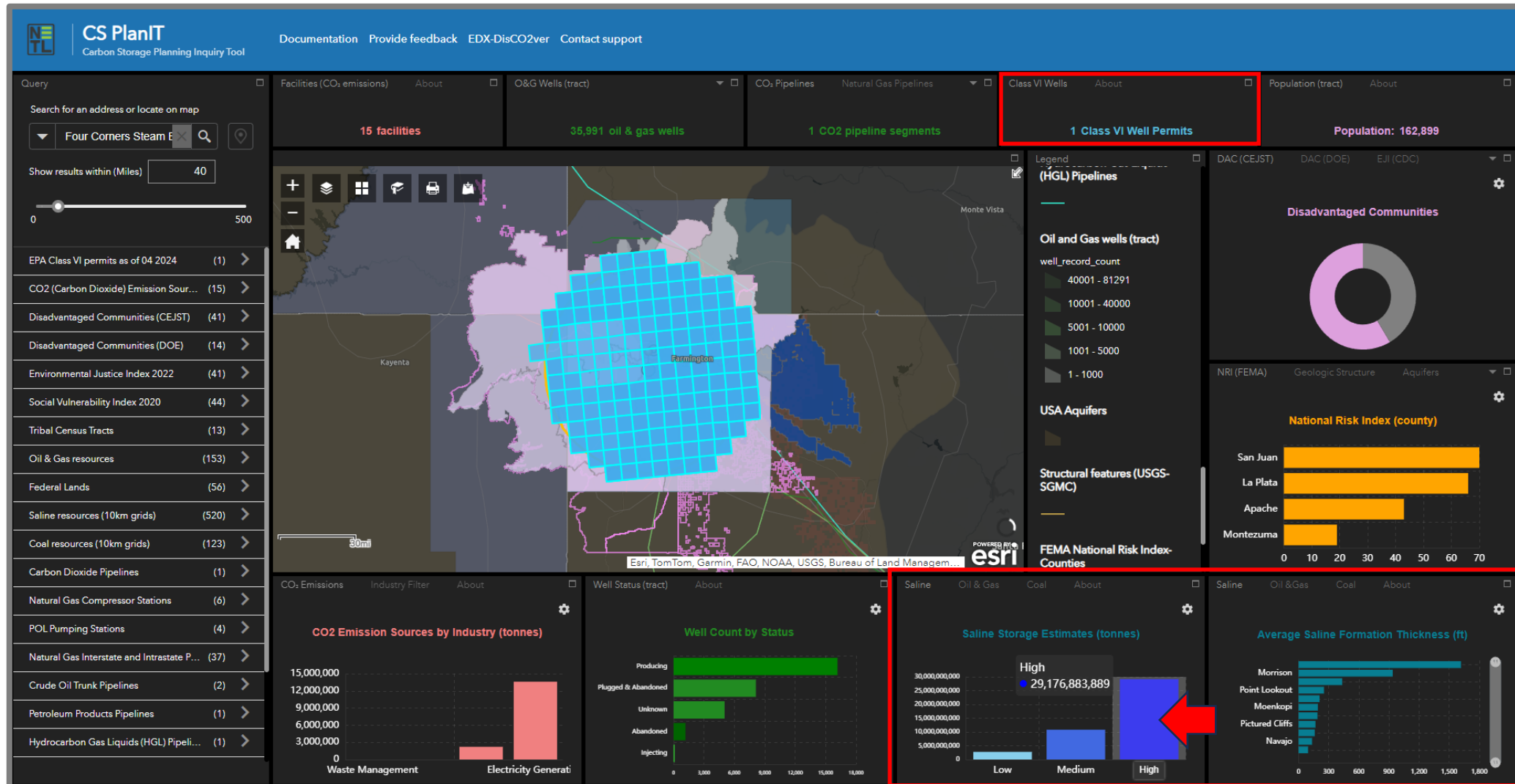
Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - Charts and Statistics



Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - Charts and Statistics



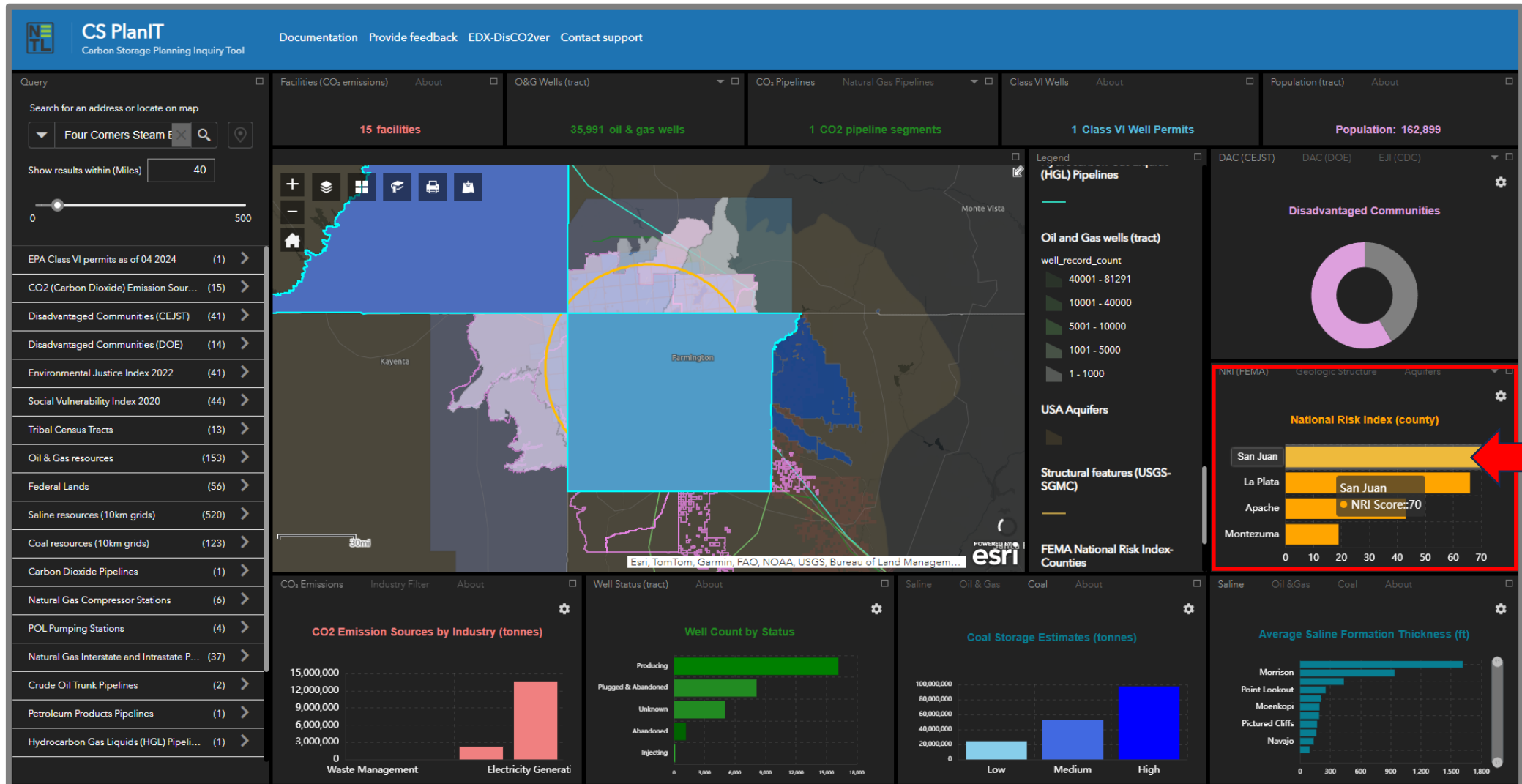
Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - Charts and Statistics



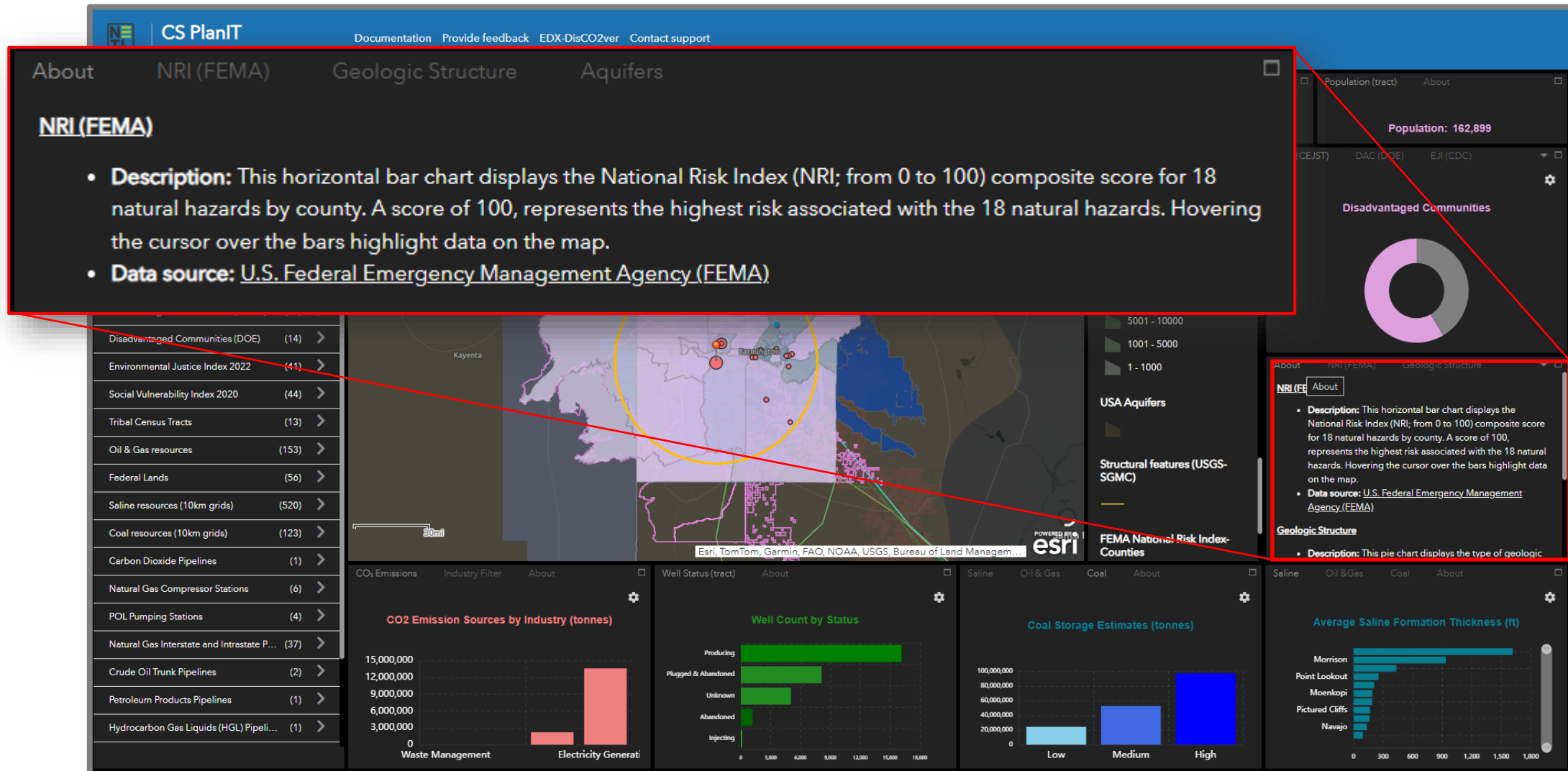
Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - Charts and Statistics



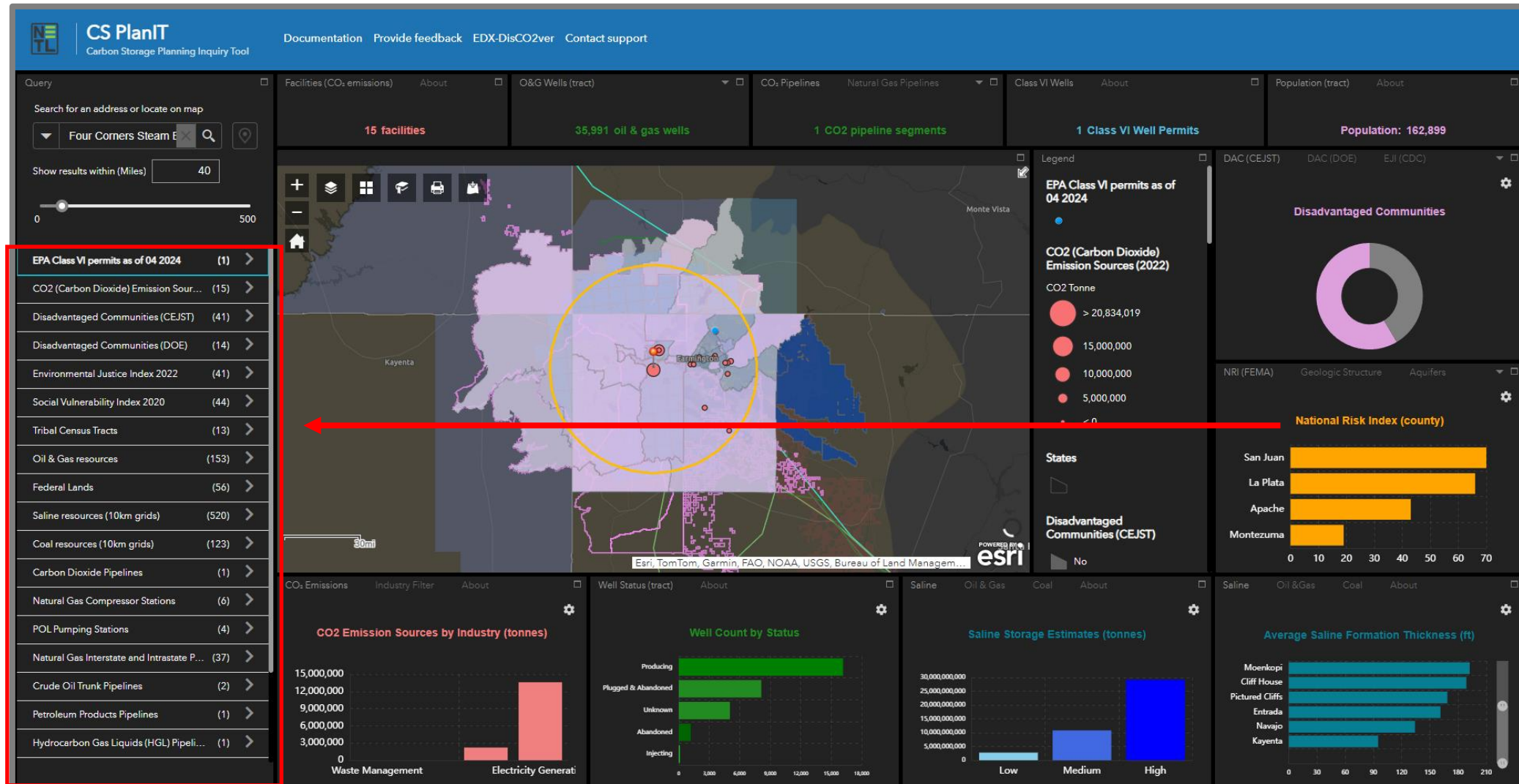
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Walkthrough - Charts and Statistics “About” Tabs



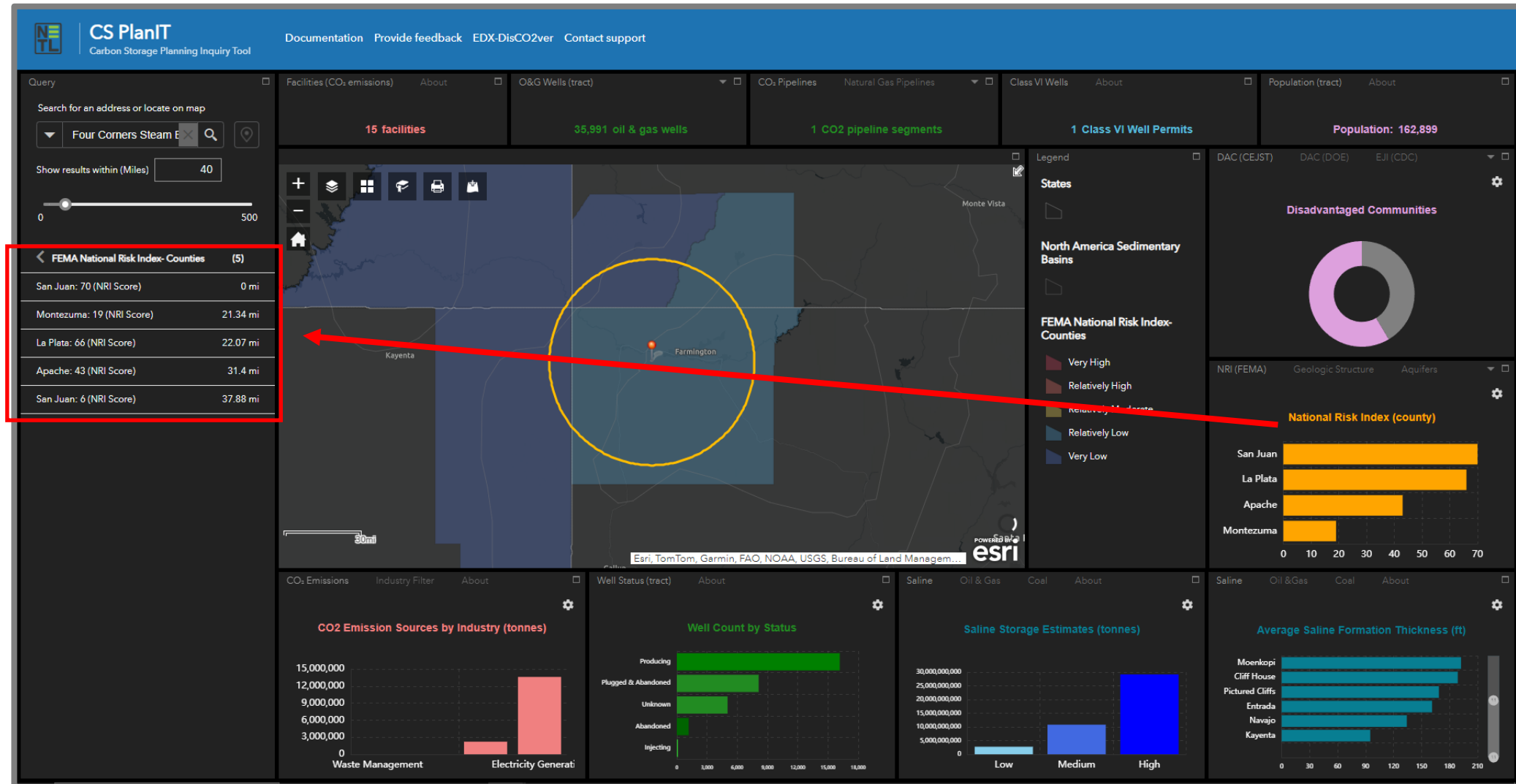
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Walkthrough - Data Filtering/Interrogation



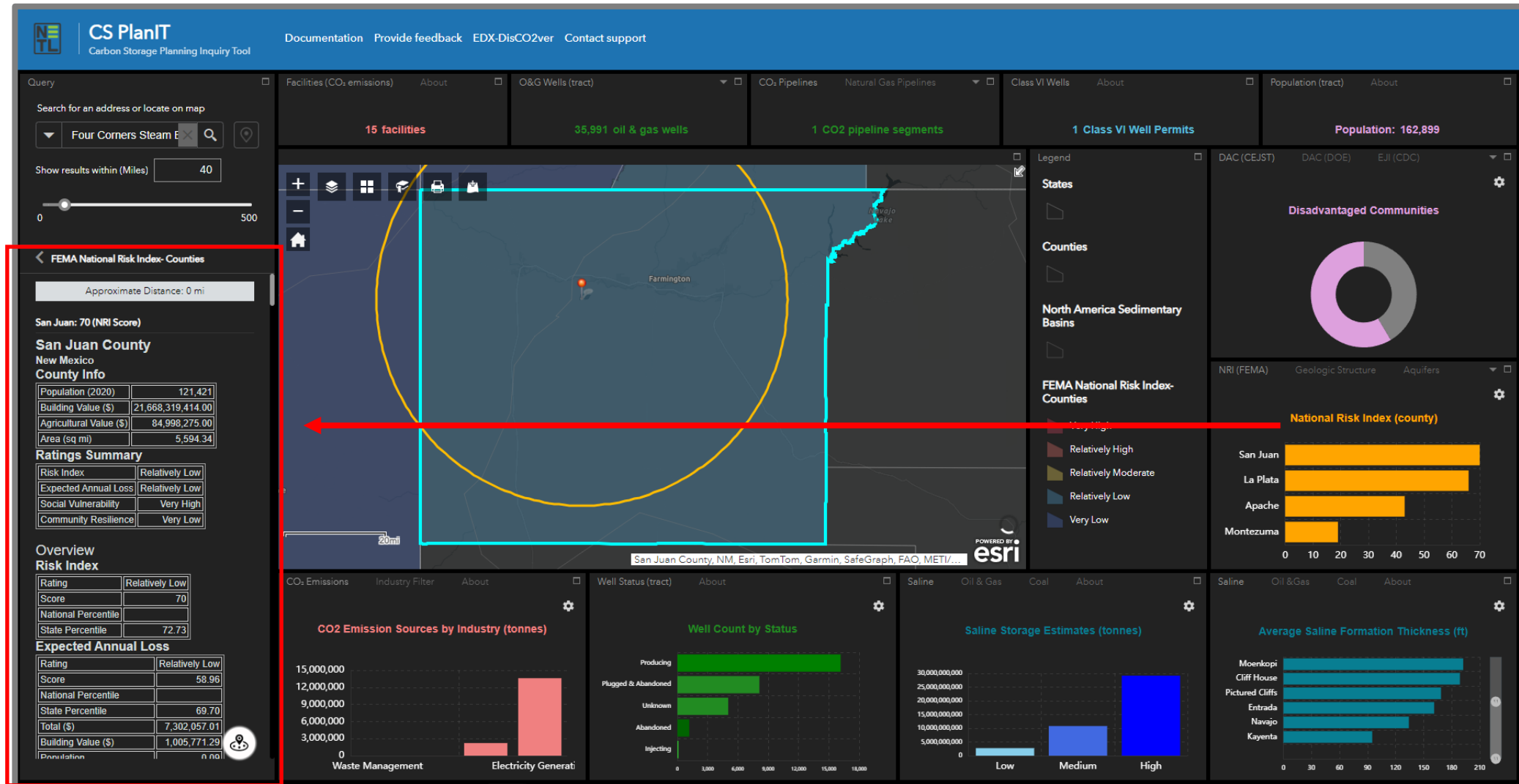
Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - Data Filtering/Interrogation



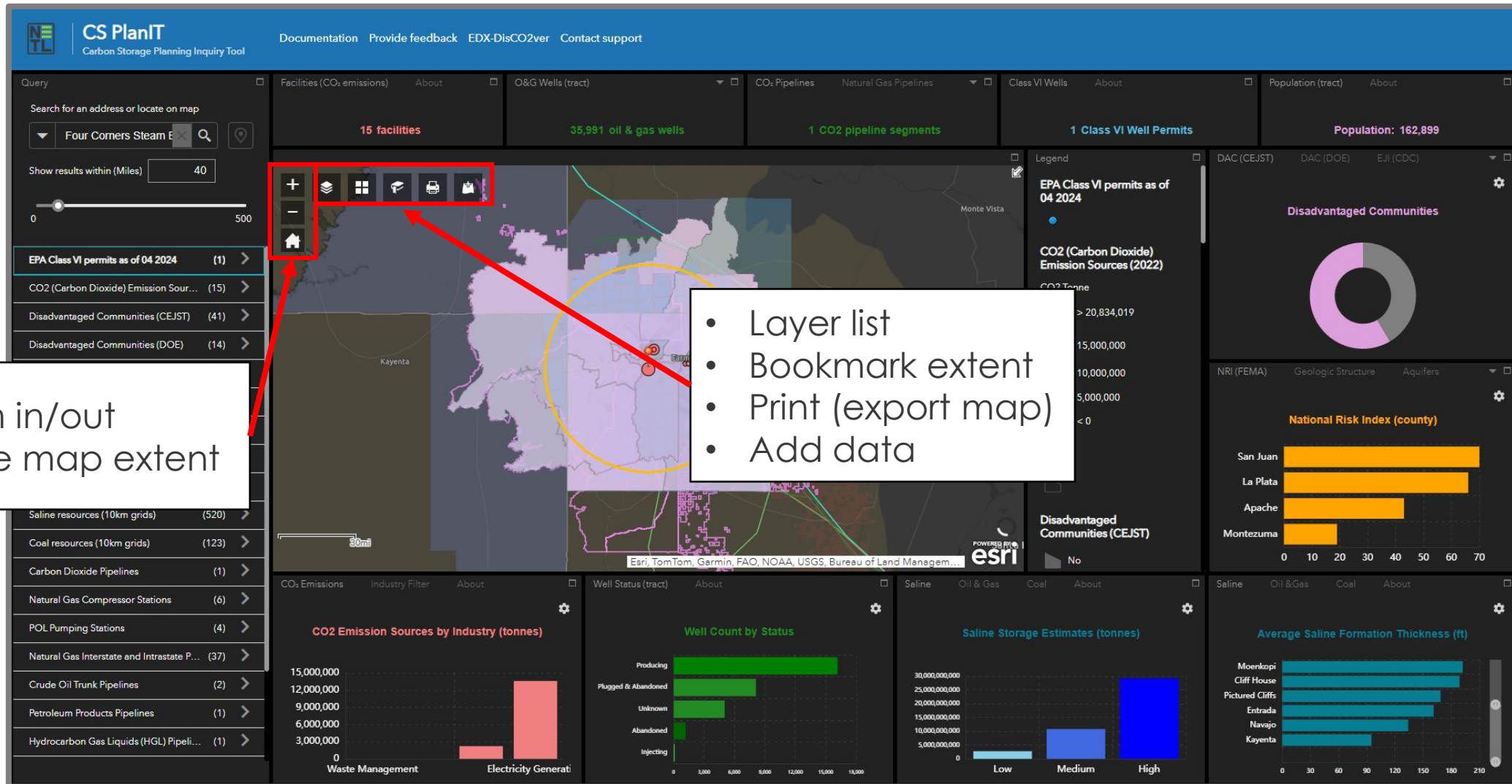
Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - Data Filtering/Interrogation



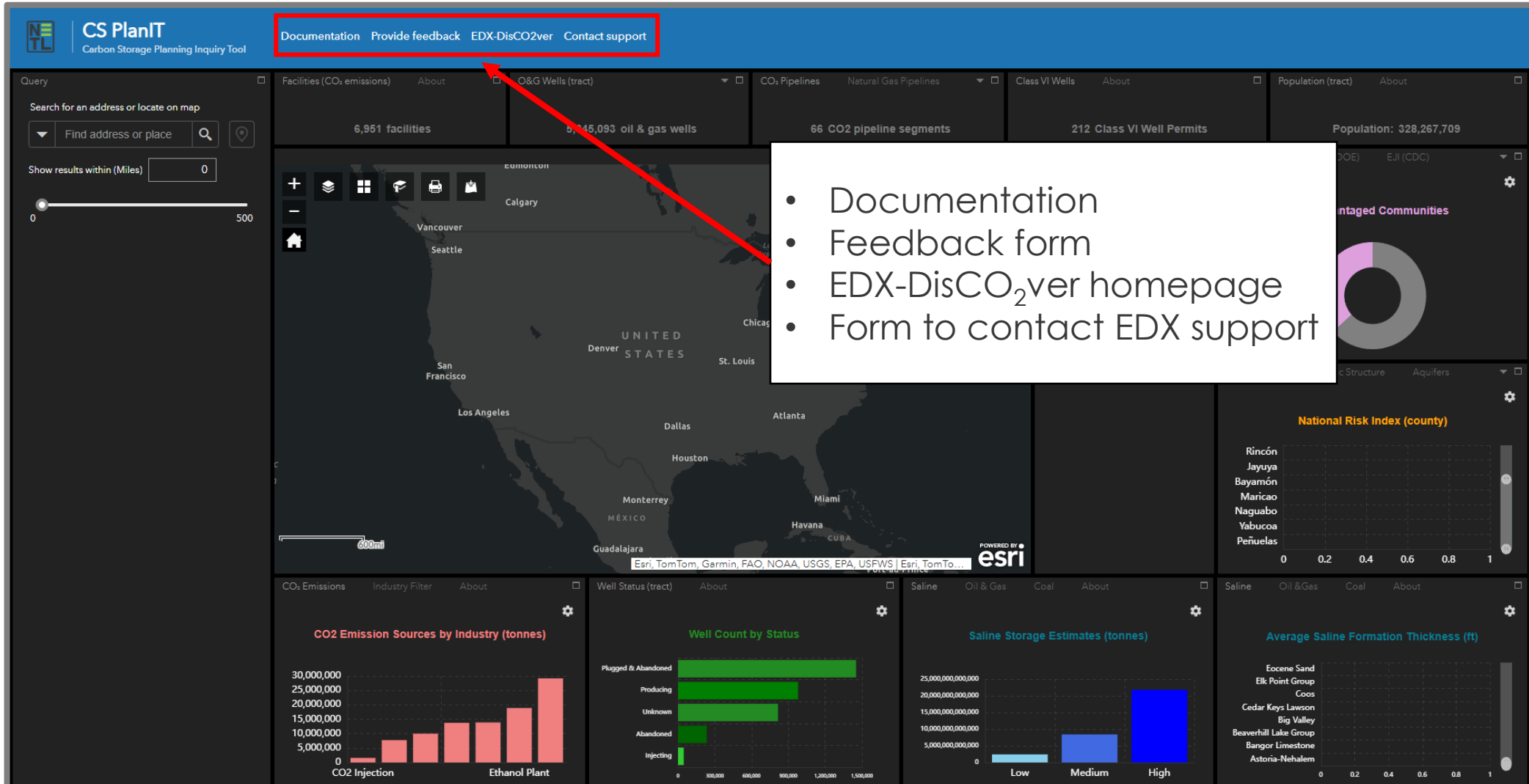
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Walkthrough - Map Controls/Widgets



Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

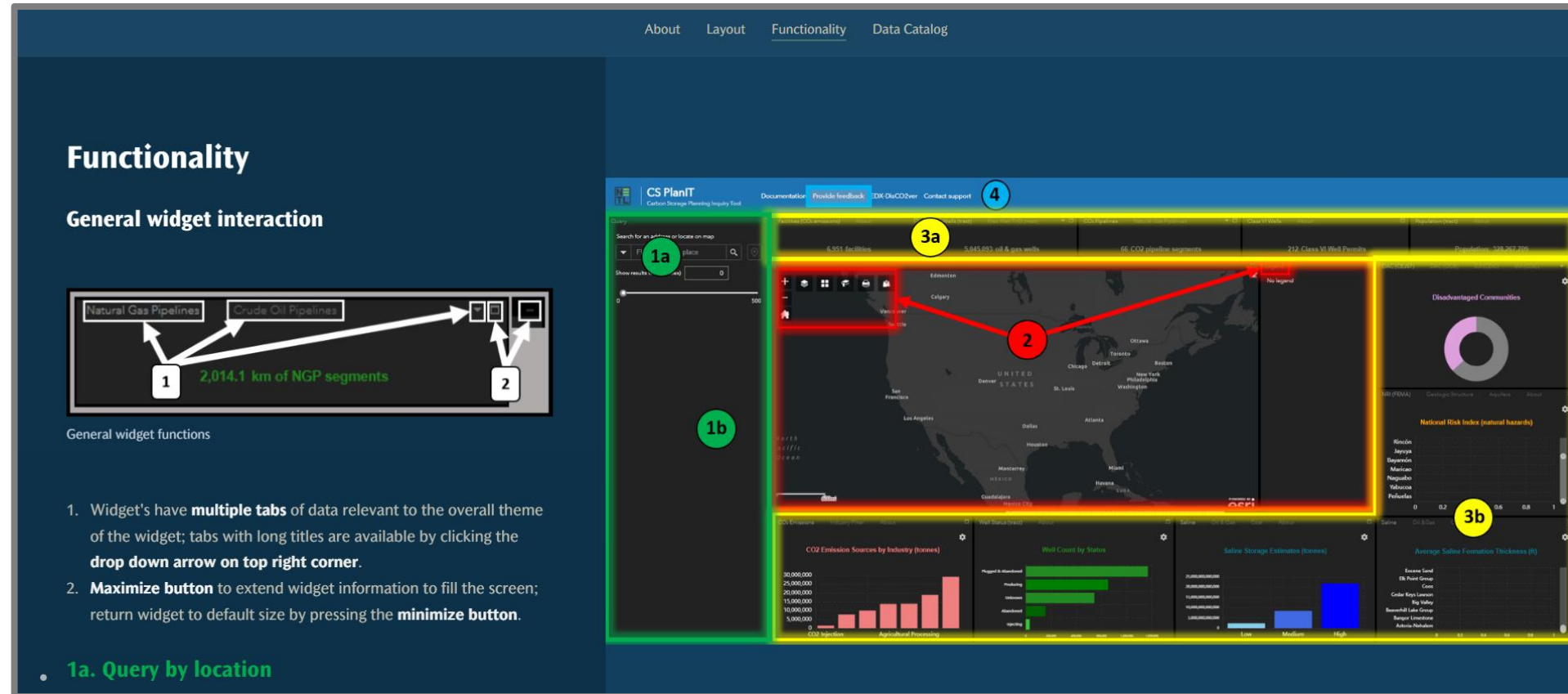
Walkthrough - External Links



Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - External Links

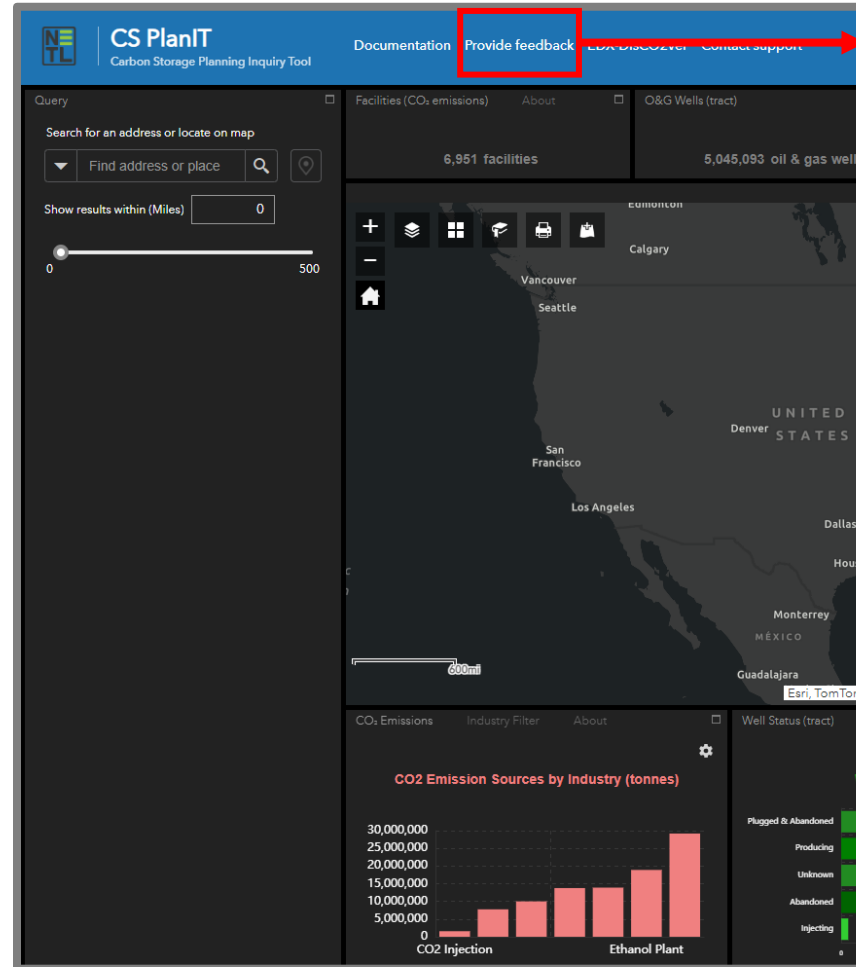
- CS PlanIT documentation web page
- ArcGIS Story map with 4 sections:
 - About
 - Layout
 - Functionality
 - Data Catalog



Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Walkthrough - External Links

- CS PlanIT Feedback Form
- Users can rate and comment on aspects of the tool



CS PlanIT Feedback Form

Name*

Organization*

Date*

8/6/2024

List or describe data/statistics preferences*

1000

Responsiveness

☆☆☆☆☆

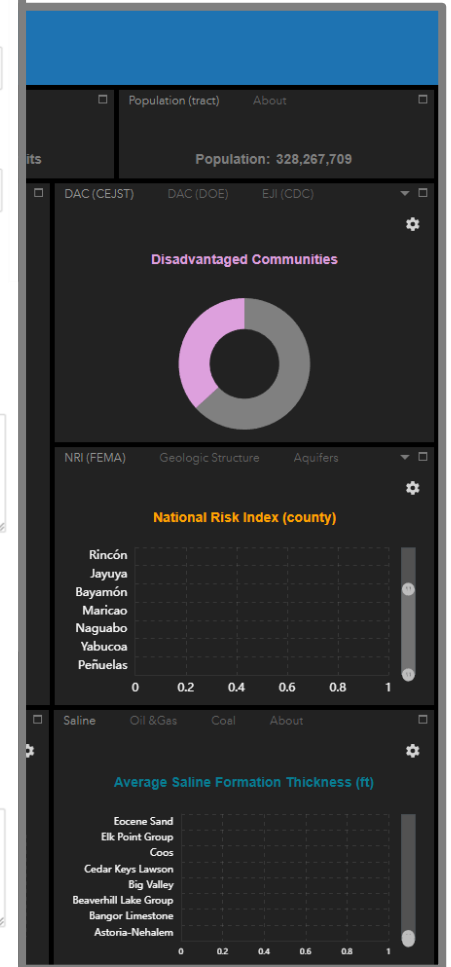
Layout

☆☆☆☆☆

General comments/issues/suggestions*

1000

Submit



Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0



Walkthrough - External Links

The screenshot displays the CS PlanIT v1.0 interface, which includes a search bar, a map of the United States, and various data overlays. A red box highlights the 'EDX-DisCO2ver' and 'Contact support' links in the top navigation bar. Red arrows point from these links to the 'disco2ver alpha' and 'EDX' external links respectively.

disco2ver alpha

The U.S. DEPARTMENT OF ENERGY

NETL NATIONAL ENERGY TECHNOLOGY LABORATORY

EDX Energy Data exchange

The EDX-hosted disCO2ver platform connects the carbon transport and storage community to publicly available data resources in support of the U.S. Department of Energy (DOE), Office of Fossil Energy and Carbon Management's (FECM) mission and goals.

EDX disCO2ver is a central hub for all things carbon storage, making it easier for stakeholders to execute diverse carbon capture and storage (CCS) projects. Funded by the bipartisan infrastructure law (BIL), disCO2ver host tools, datasets, geospatial data, dashboards, and search capabilities (both within and outside EDX) to support users across disciplines and backgrounds find the right resources to meet their needs within carbon storage research.

The U.S. DOE FECM's Carbon Transport and Storage Program has been supporting the preservation and public availability of CCS data products, such as data, models, and tools, for over a decade on the EDX system. This has resulted in the preservation and publishing of millions of dollars worth of research project products, ensuring their present availability for validation and reuse to accelerate the Program's present objectives and goals by federal researchers, academia, and industry.

EDX, first launched in 2011, now curates an ever-growing collection of FECM products from many programs. disCO2ver aims to help Carbon Transport & Storage (CTS) program stakeholders connect to the resources most relevant to them by increasing visibility of CTS research products available to the public. disCO2ver also includes links to publicly available resources from authoritative resources outside DOE FECM's program products.

CONTACT US

EDX NETL's Energy Data eXchange

Find data products on EDX...

Contact Us

The EDX web application was developed and is maintained by NETL. We welcome your comments or feedback on the EDX. Specific questions on this EDX application and suggested corrections or revisions should be submitted to the EDX Team by:

- Filling out the form on this page (recommended)
- Sending an Email to: EDXSupport@netl.doe.gov
- Mail to: Attn: EDX Support, 3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507-0880

Email EDX Support

Fill out the following form to contact EDX Support.

*** Reason for Contact:**

Please Select

*** Full Name:**

John Doe

*** Position:**

Energy Researcher

*** Organization:**

National Energy Technology Laboratory

*** Your email address:**

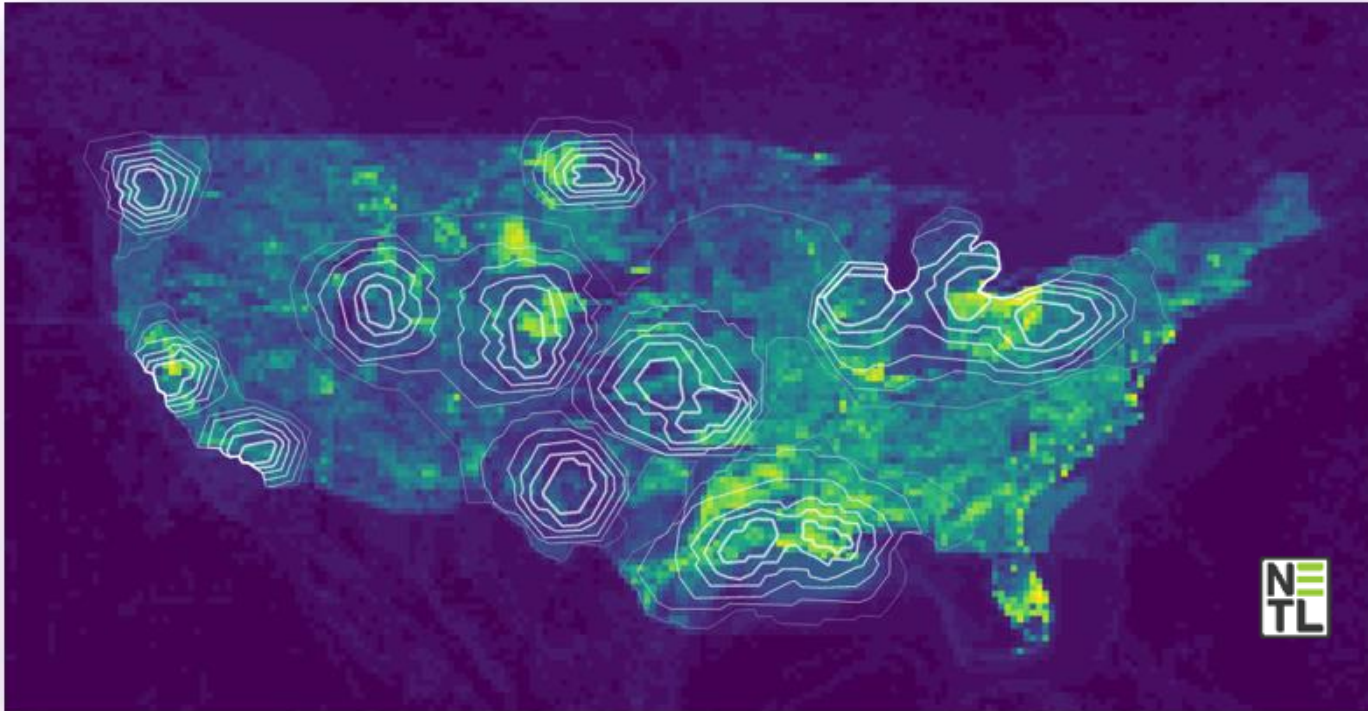
me@example.com

*** Comments:**

Leave your feedback

Email EDX Support

Next Steps and Challenges



Carbon Storage Technical Viability Assessment (CS TVA) data density analysis (brighter green, higher data density) overlain by white contour lines highlighting Great Plains Institute Carbon Storage Hub locations (Abramson, 2022). Analysis performed using the CSIL (Cumulative Spatial Impact Layers) tool (Romeo et al., 2019).

- Next steps/Challenges:
 - Evaluating and integrating key data from CS TVA (Carbon Storage Technical Viability Assessment) database (EDX4CCS portfolio)
 - Build out and adjusting tool layout and functionality
 - **Release of CS PlanIT v2.0 (April 2025)**

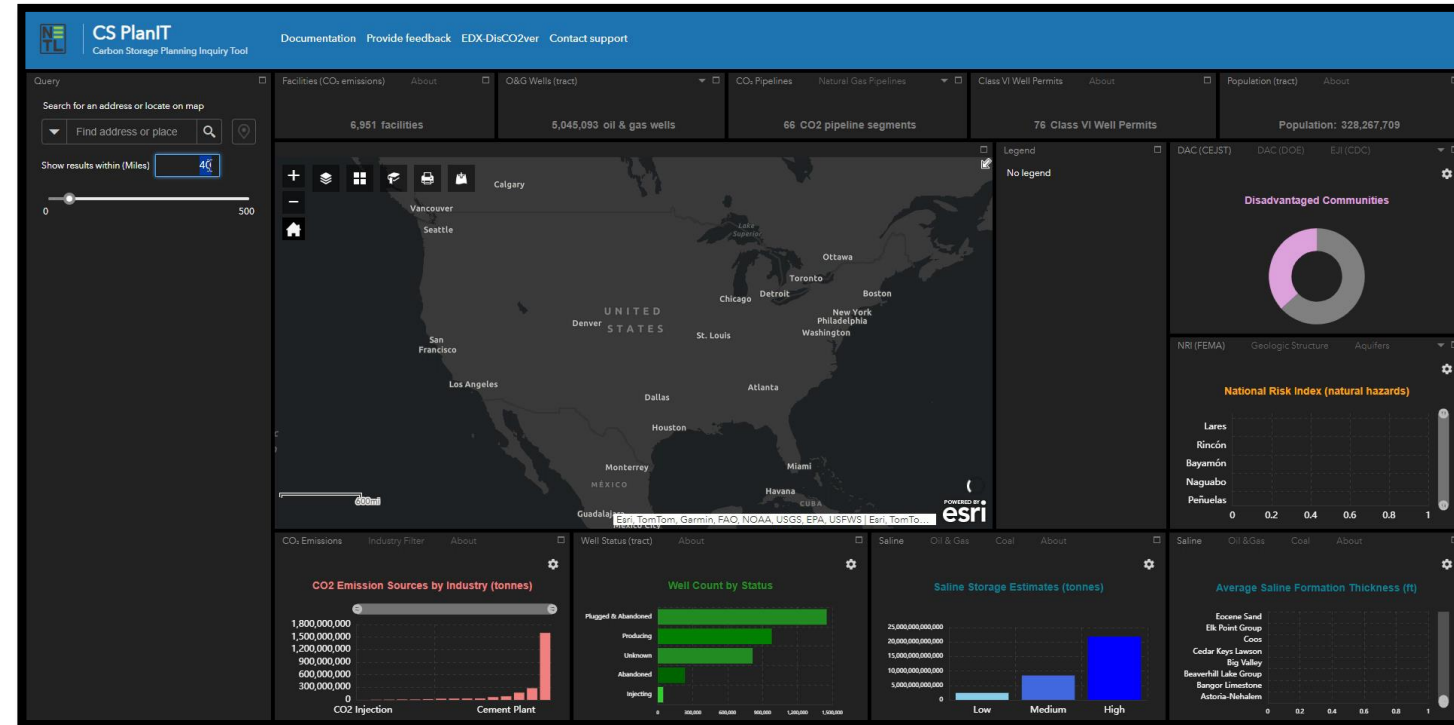
Carbon Storage Planning Inquiry Tool (CS PlanIT) v1.0

Ultimate Outcomes

- Version 1 available as of 6/30/2024
- Version 2 with data integrated from the CS TVA (Carbon Storage Technical Viability Assessment) database (release April 2025)

Stakeholder Benefit

- Quick and efficient access and insights into key CS datasets (including geologic, technical, environmental, social) to support CCS planning, feasibility, and resource assessment efforts
- Results can be leveraged to inform carbon storage resource and feasibility assessments



<https://edx.netl.doe.gov/dataset/cs-planit-carbon-storage-planning-inquiry-tool>



Live Tool Demos on Tuesday Evening

What: EDX4CCS and other
carbon storage data and tool
demos

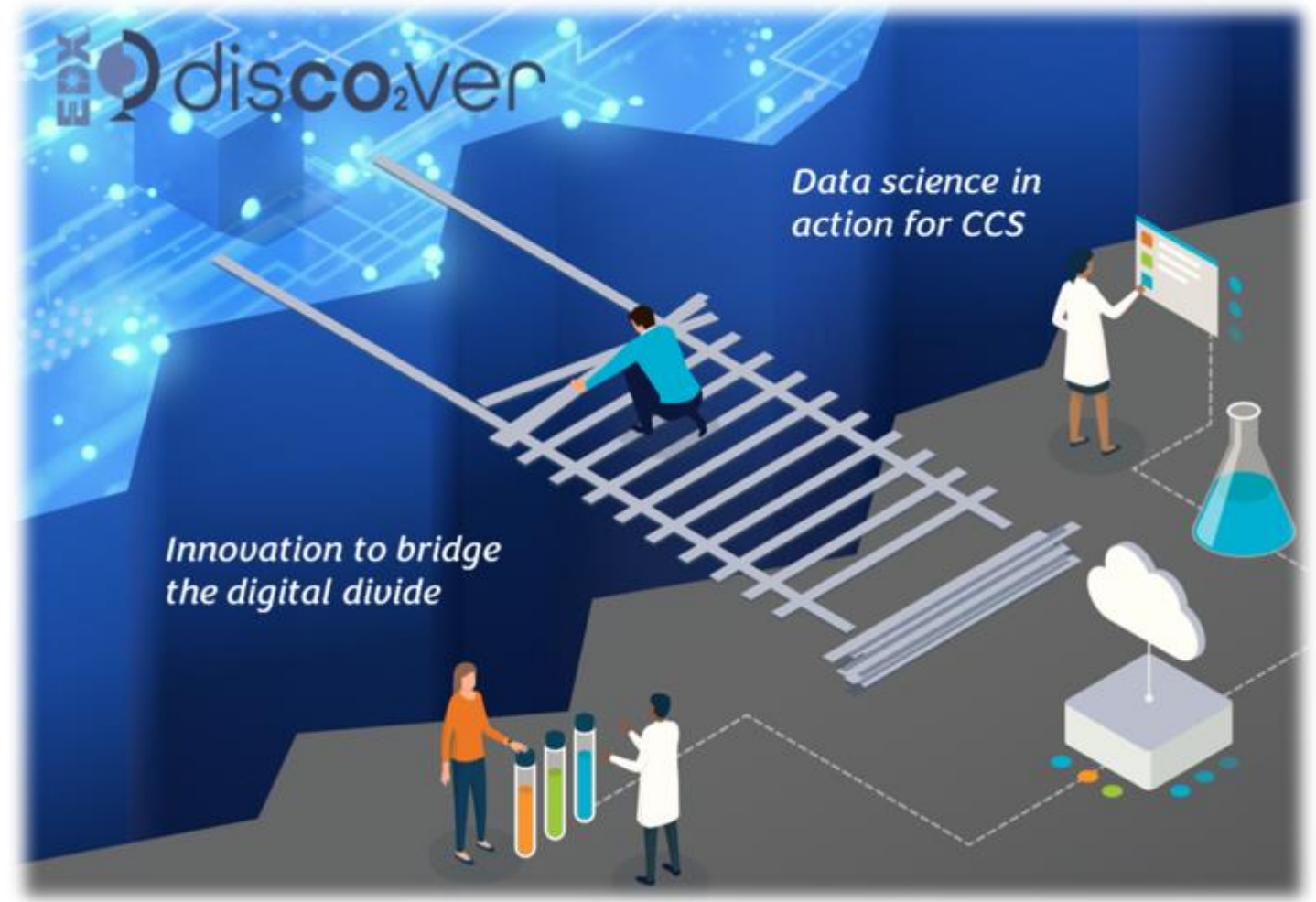
When: 5:45 - 7:45 p.m.

Where: The Ballroom Foyer
and East/West Atriums

 In demo "theater room"
team will offer in person demos & Q&A



support
demos & Q&A



Abramson et al. (2022) An Atlas of Carbon and Hydrogen Hubs for United States Decarbonization. Great Plains Institute,
https://scripts.betterenergy.org/CarbonCaptureReady/GPI_Carbon_and_Hydrogen_Hubs_Atlas.pdf

Romeo, L., Nelson, J., Wingo, P., Bauer, J., Justman, D., & Rose, K. (2019). Cumulative spatial impact layers: A novel multivariate spatio-temporal analytical summarization tool. Transactions in GIS, 23(5), 908-936.

Justman, D., Pantaleone, S., Sharma, M., Romeo, L., Morkner, P. (2024) CS PlanIT (Carbon Storage Planning Inquiry Tool) , 6/28/2024, <https://edx.netl.doe.gov/dataset/cs-planit-carbon-storage-planning-inquiry-tool>, DOI: 10.18141/2377953

Acknowledgments



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CONTACT:

Devin Justman

Devin.Justman@netl.doe.gov

Paige Morkner

Paige.Morkner@netl.doe.gov

