Carbon Storage Planning Framework Dashboard

Rapid insights into carbon storage data

NATIONAL ENERGY TECHNOLOGY LABORATORY

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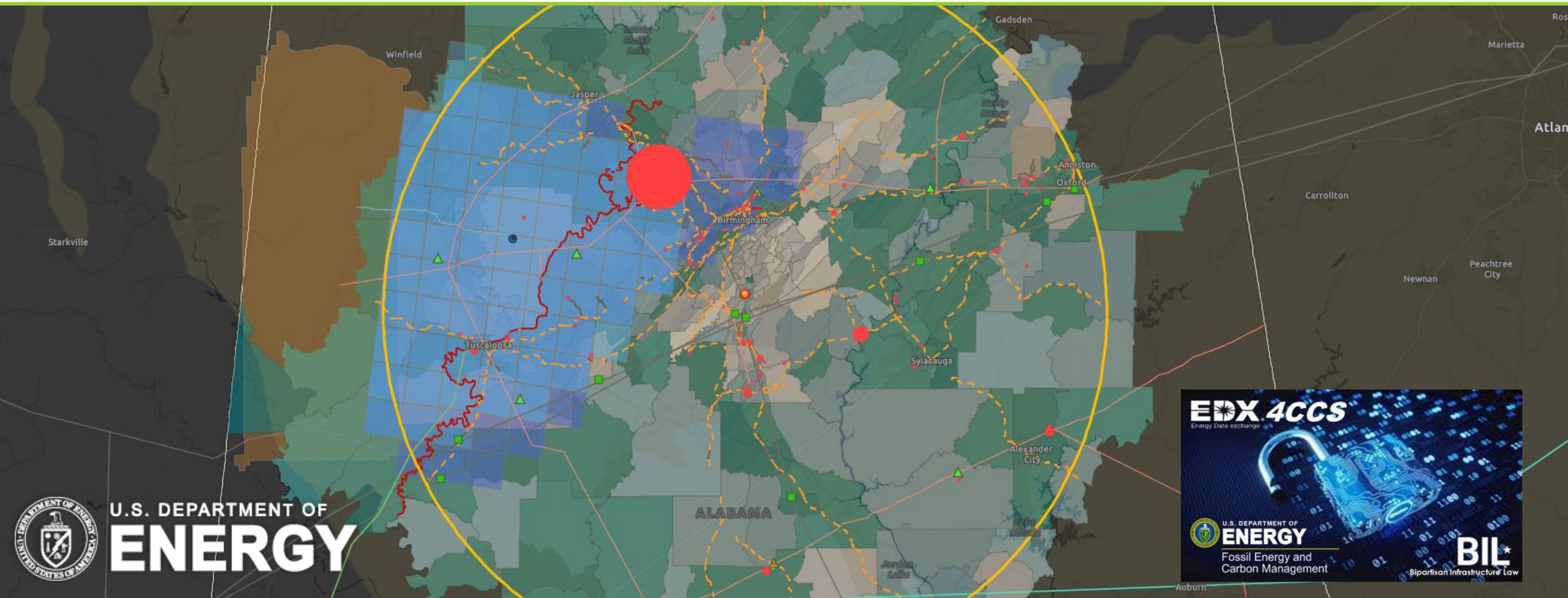
Geology/Geospatial Research Scientist/NETL Support Contractor

2023 FECM/NETL Carbon Management Research Project Review Meeting

Aug. 28, 2023



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Carbon Storage (CS) Planning Framework Dashboard

Overview

Ultimate Product

- Deploy and host the Carbon Storage Planning Framework Dashboard on the **EDX DisCO$_2$ver platform.**

Challenge

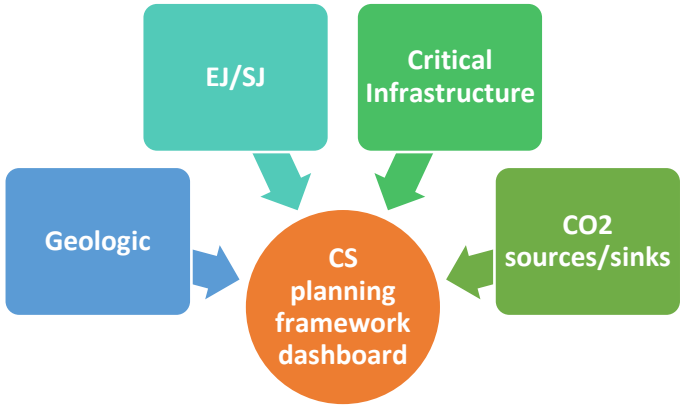
- CS planning requires careful consideration of many geologic, technical, social, and environmental factors.
- Integrate disparate, multi-sourced data into a user-friendly, interactive dashboard web application.

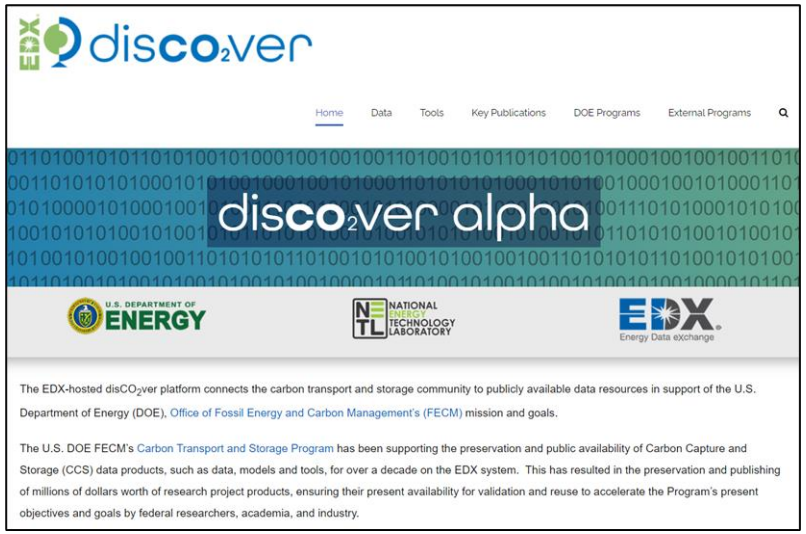
Objective

- One-stop shop for visualizing, interrogating, and analyzing relevant datasets.
- Develop, test, and deploy on the EDX DisCO$_2$ver platform.

Value

- Provide quick, efficient access and key insights into CS datasets.
- Support CS planning, feasibility, and resource assessment efforts.





EDX DisCO$_2$ver (Alpha) Website

Carbon Storage (CS) Planning Framework Dashboard

Rapid insights for a variety of stakeholders

For any 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 CS projects?

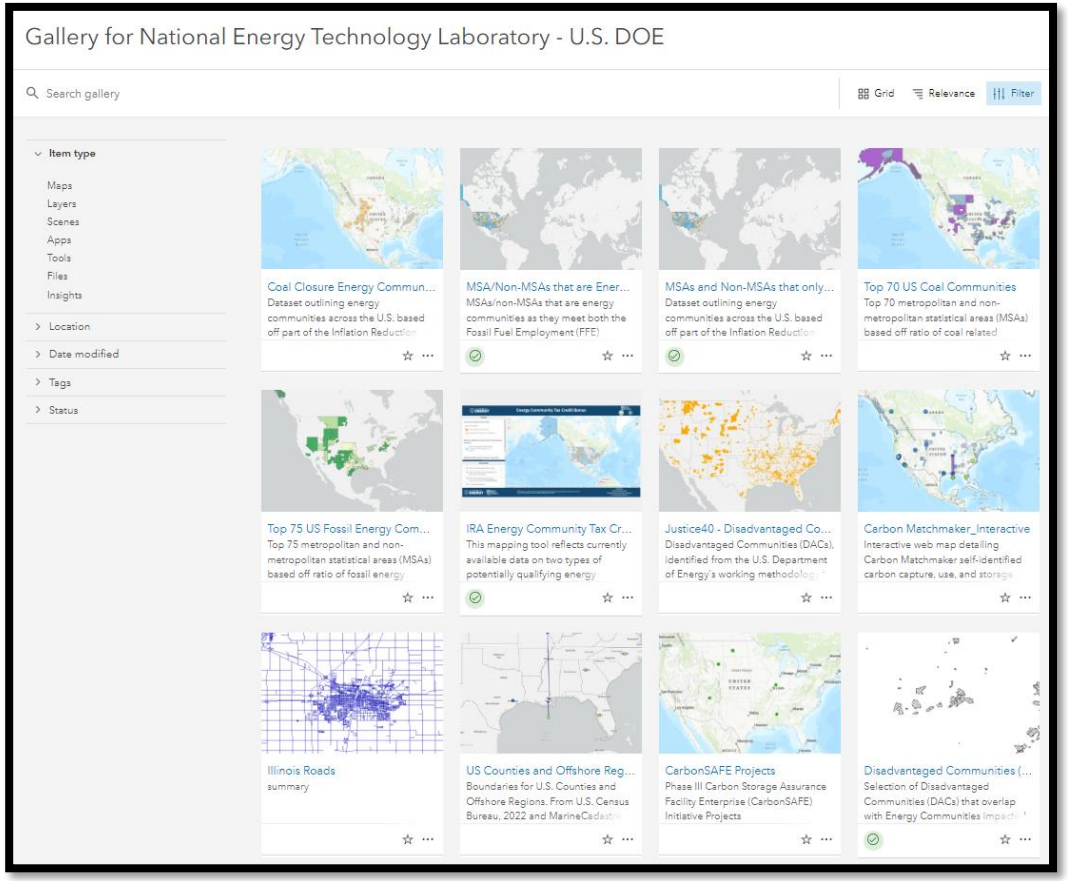
Potential stakeholders include well operators, policy makers, researchers, public, etc..

Example buffer query (yellow circle) of dashboard datasets

Carbon Storage (CS) Planning Framework Dashboard

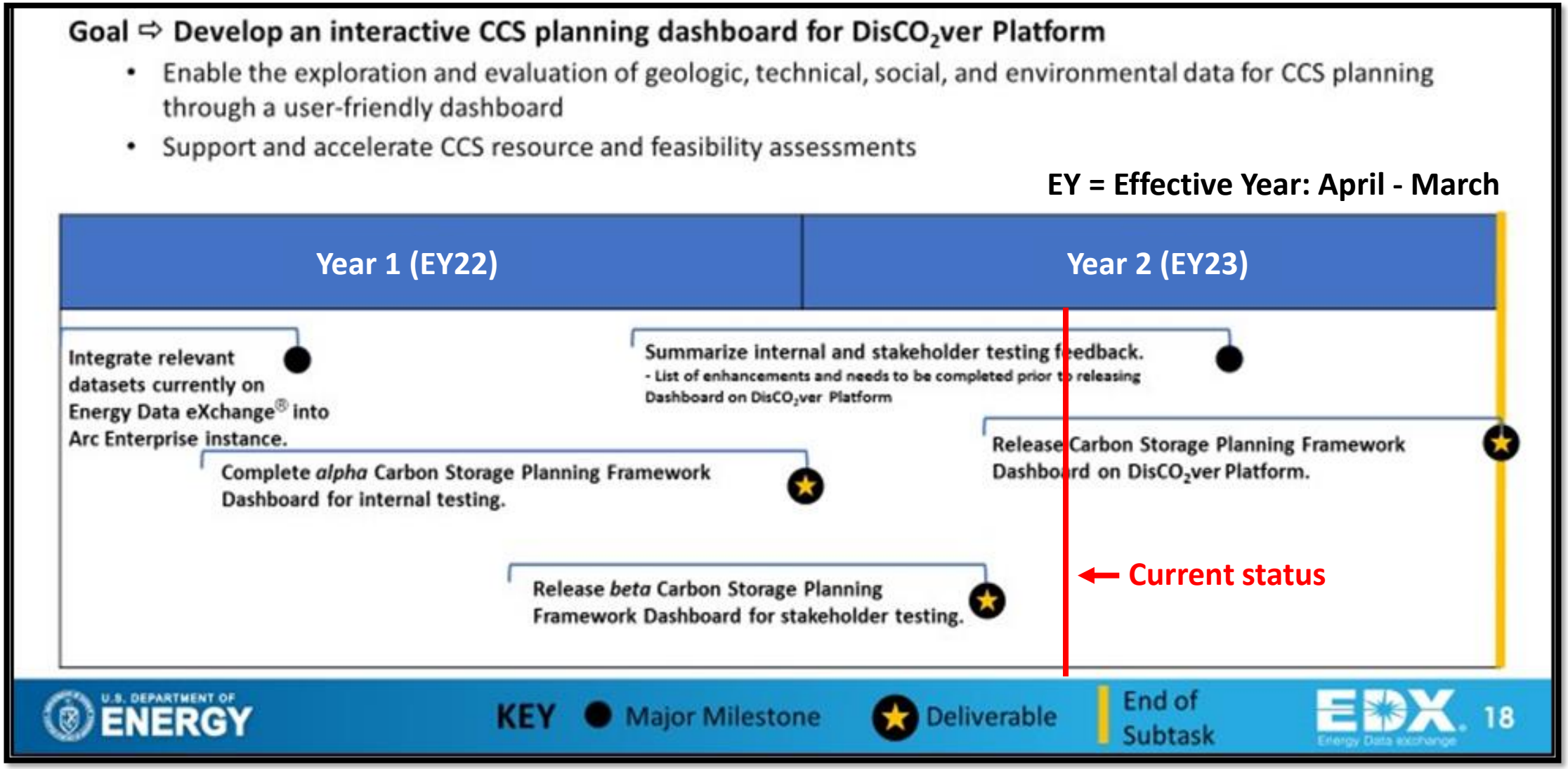
Approach

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



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

Project Timeline



Carbon Storage (CS) Planning Framework Dashboard

Year 1 accomplishments

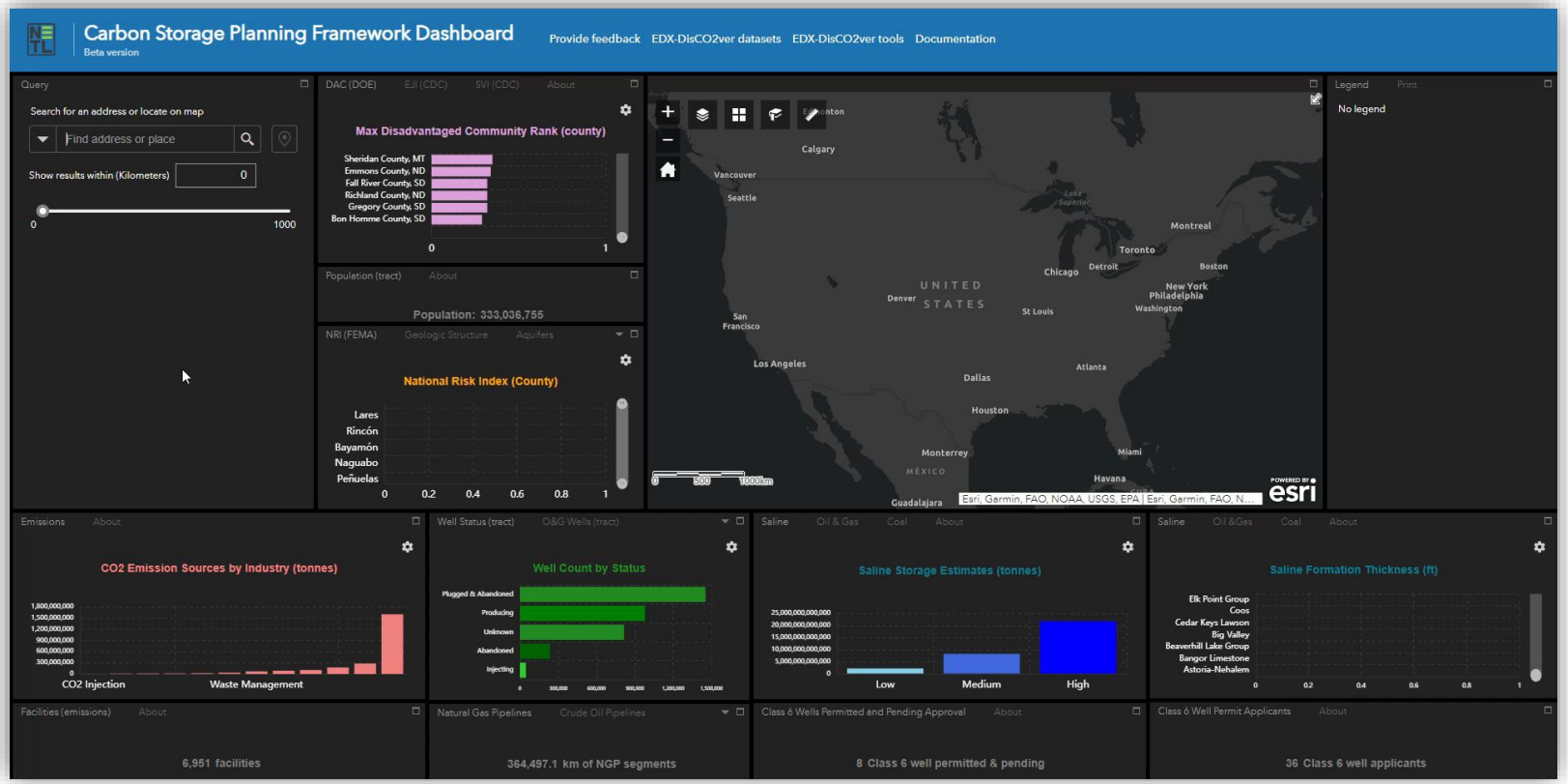
- Developed the **Alpha version** of the dashboard within the **EDX multi-cloud ecosystem** for internal testing
- Identified, cataloged, integrated **> 40 datasets** across the EDX4CCS & CS data portfolio
- Data/statistics are grouped into key categories in layout:
  - CO2 sources, Critical energy infrastructure, CO2 sinks/CCS projects, Natural hazards, EJ/SJ
- Incorporates buffer query functionality

Alpha version undergoing internal testing

Carbon Storage (CS) Planning Framework Dashboard

Year 2 accomplishments & tasks

- **Beta version** released on **EDX-DisCO2ver (7/31/2023)**
- Further integrate EDX4CCS data/products as they become available
- Obtain feedback from stakeholder user testing to develop list of enhancements
- Implement enhancements and **full public release on EDX DisCO2ver (3/2024)**

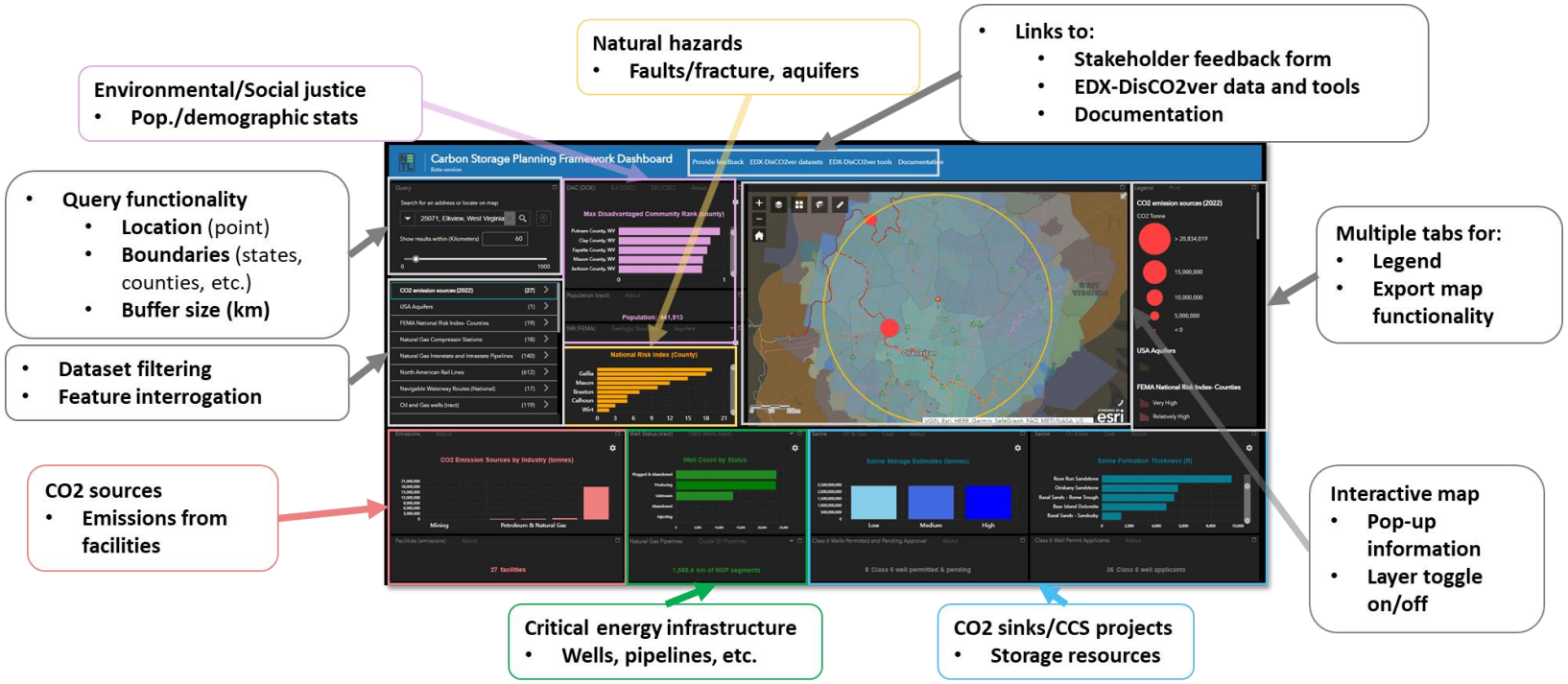


Current version in beta testing

Carbon Storage (CS) Planning Framework Dashboard

Layout & Functionality

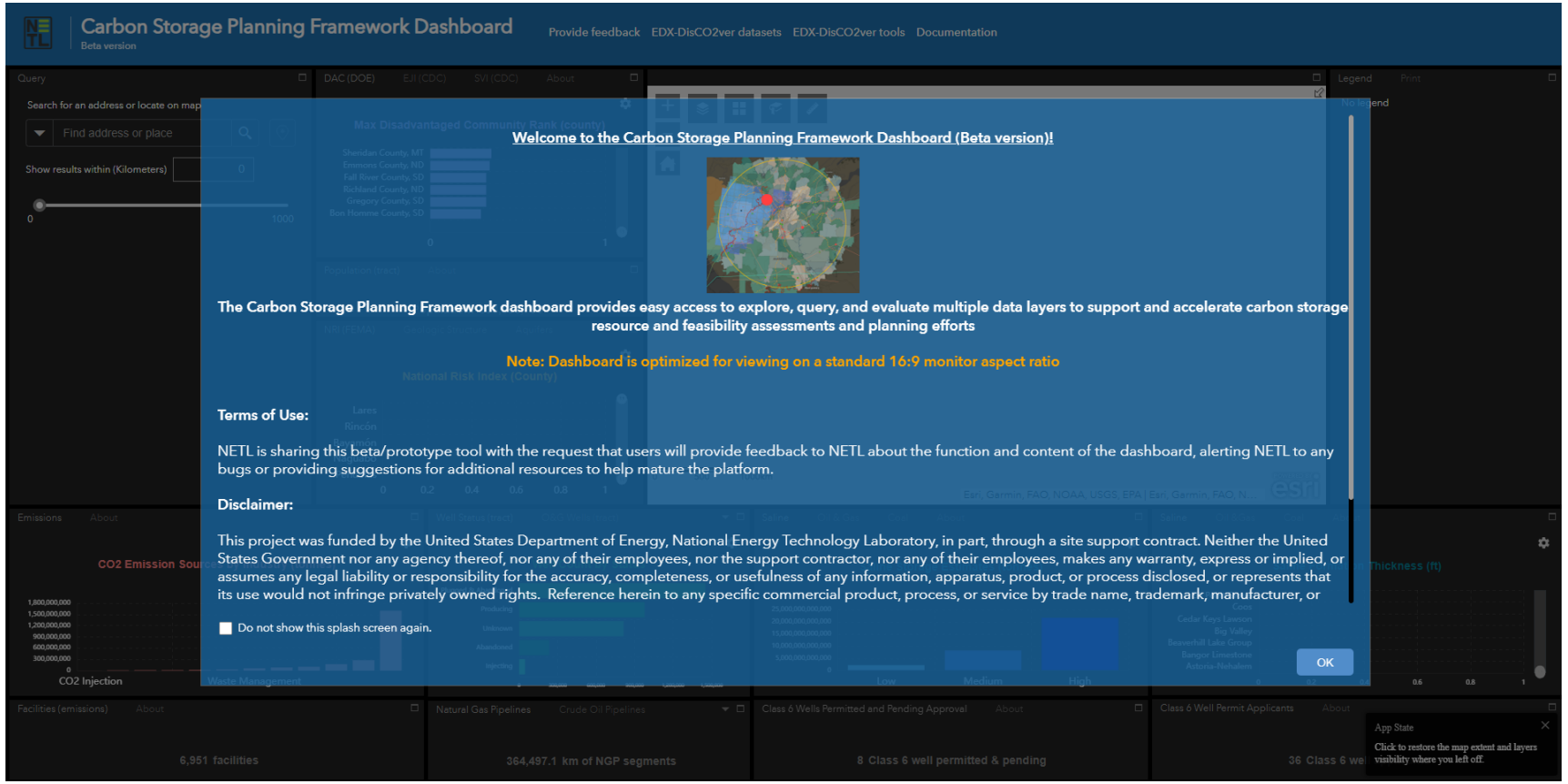
- Splash page
- Data querying/filtering
- Charts and statistics
- Map and legend
- External links



Carbon Storage (CS) Planning Framework Dashboard

Splash page

- Introduction/description
- Terms of Use
- Disclaimer
- Acknowledgements

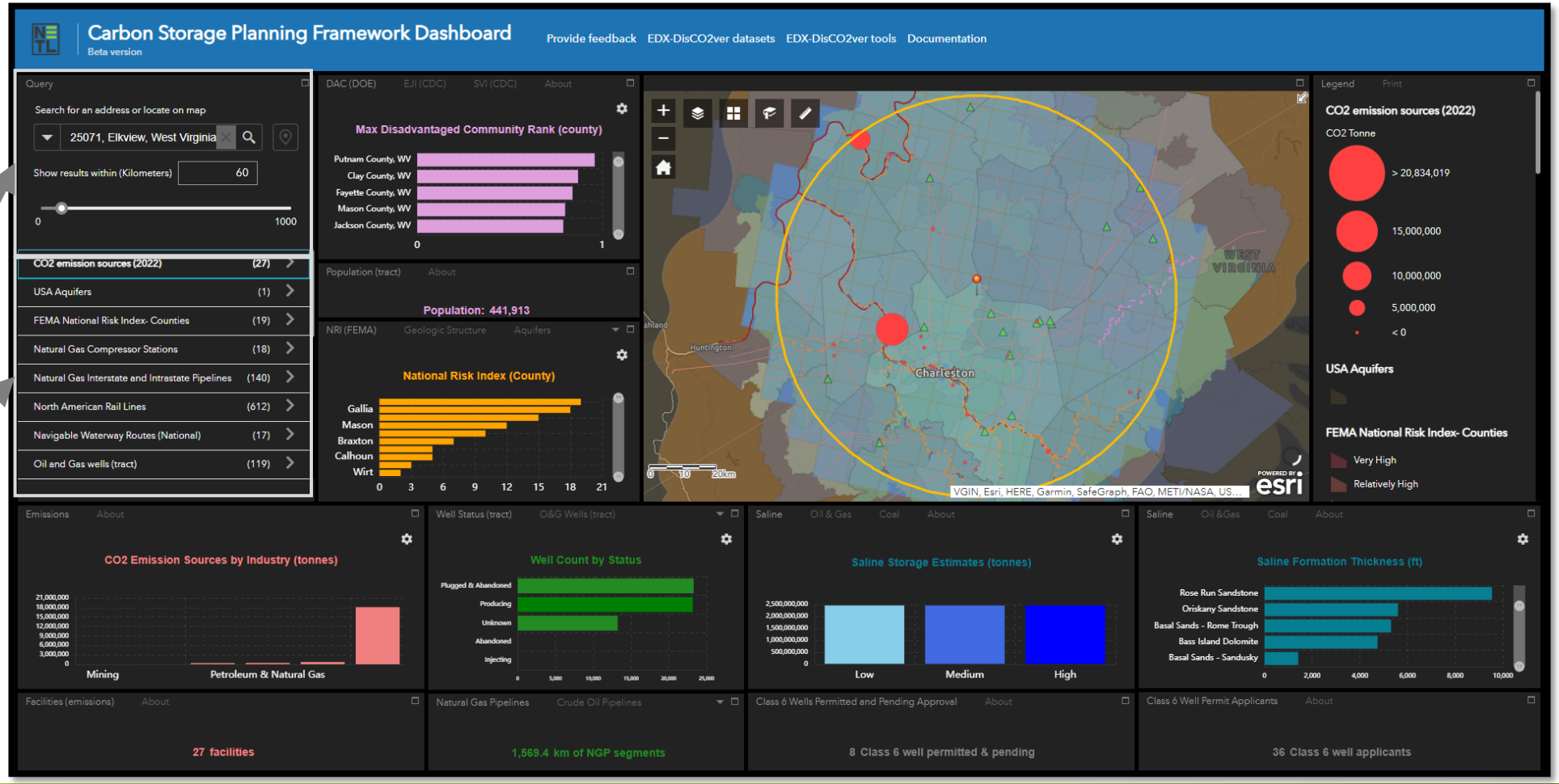


Carbon Storage (CS) Planning Framework Dashboard

Data Querying/Filtering

- **Query functionality**
  - **Location** (point)
  - **Boundaries** (states, counties, etc.)
  - **Buffer size (km)**

- **Dataset filtering**
- **Feature interrogation**



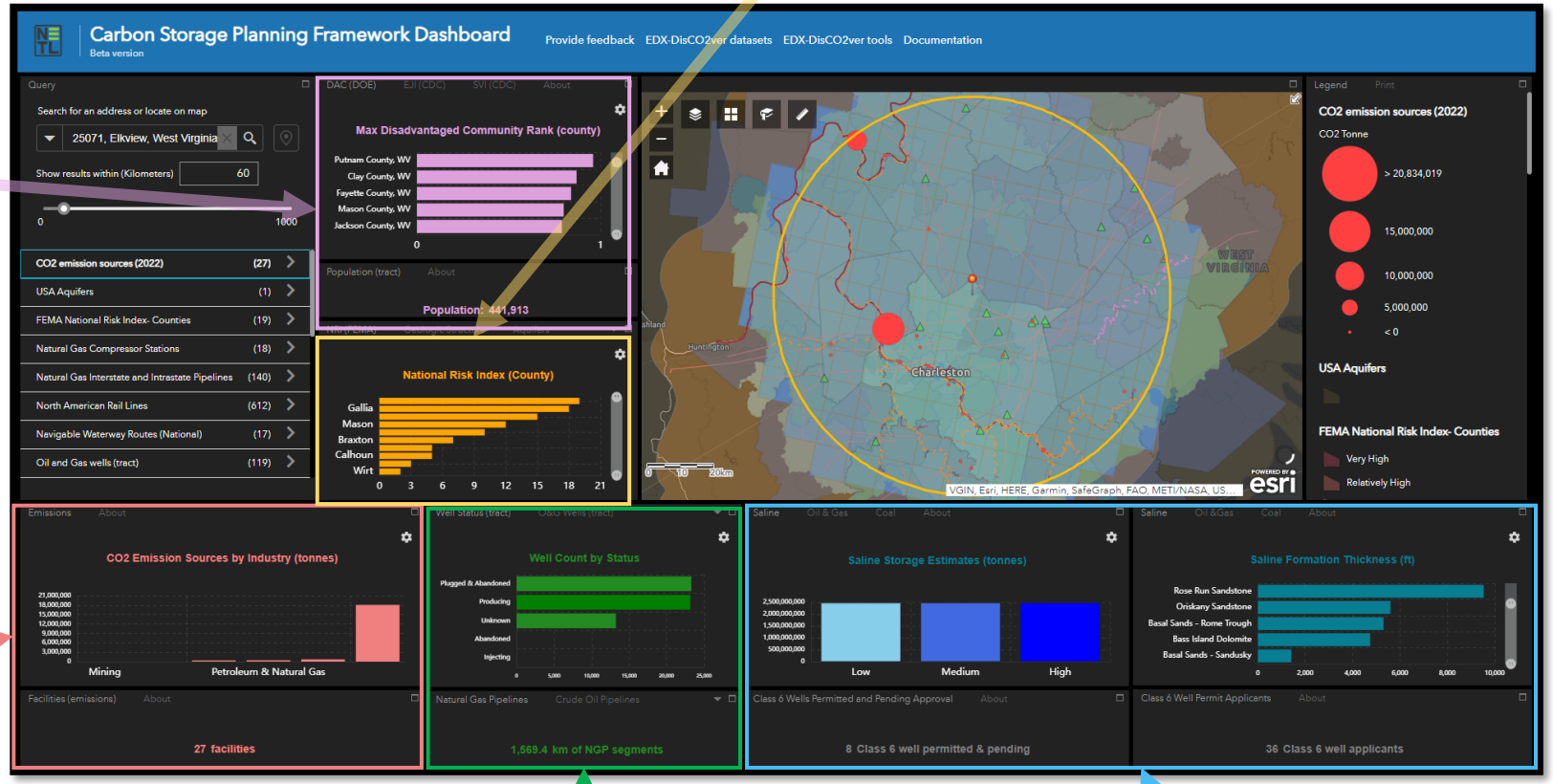
Carbon Storage (CS) Planning Framework Dashboard

Charts and Statistics

Natural hazards
- Faults/fracture, aquifers

Environmental/Social justice
- Pop./demographic stats

CO2 sources
- Emissions from facilities

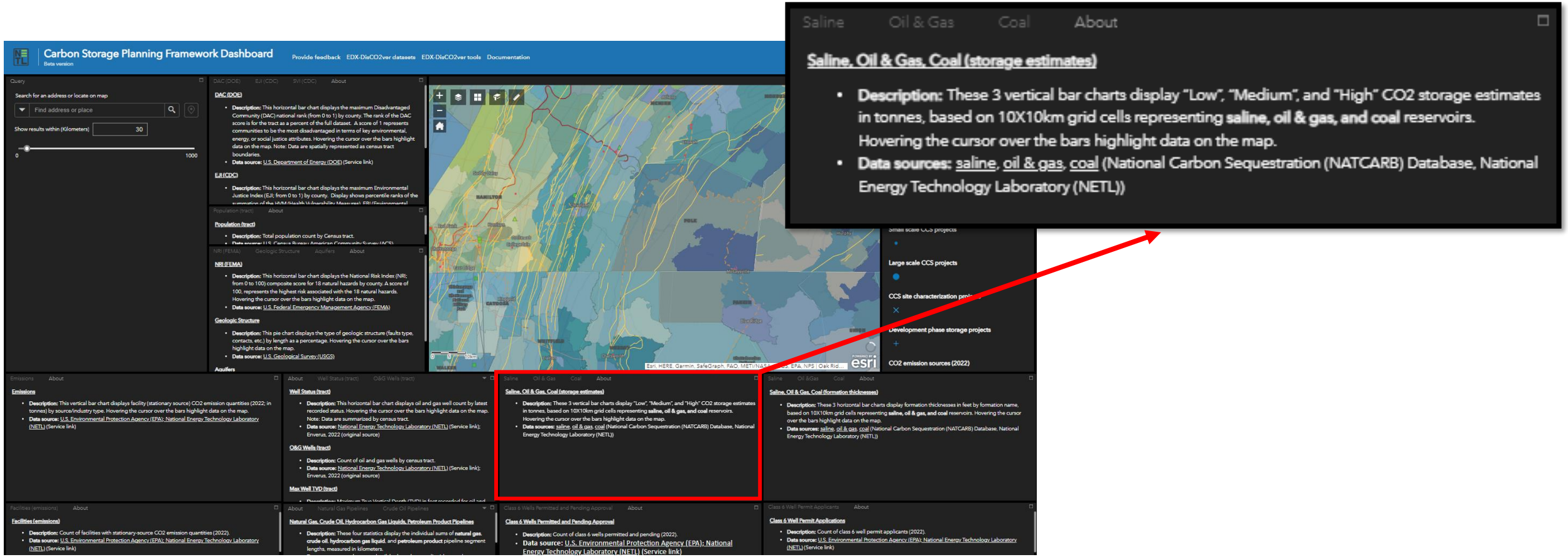


Critical energy infrastructure
- Wells, pipelines, etc.

CO2 sinks/CCS projects
- Storage resources

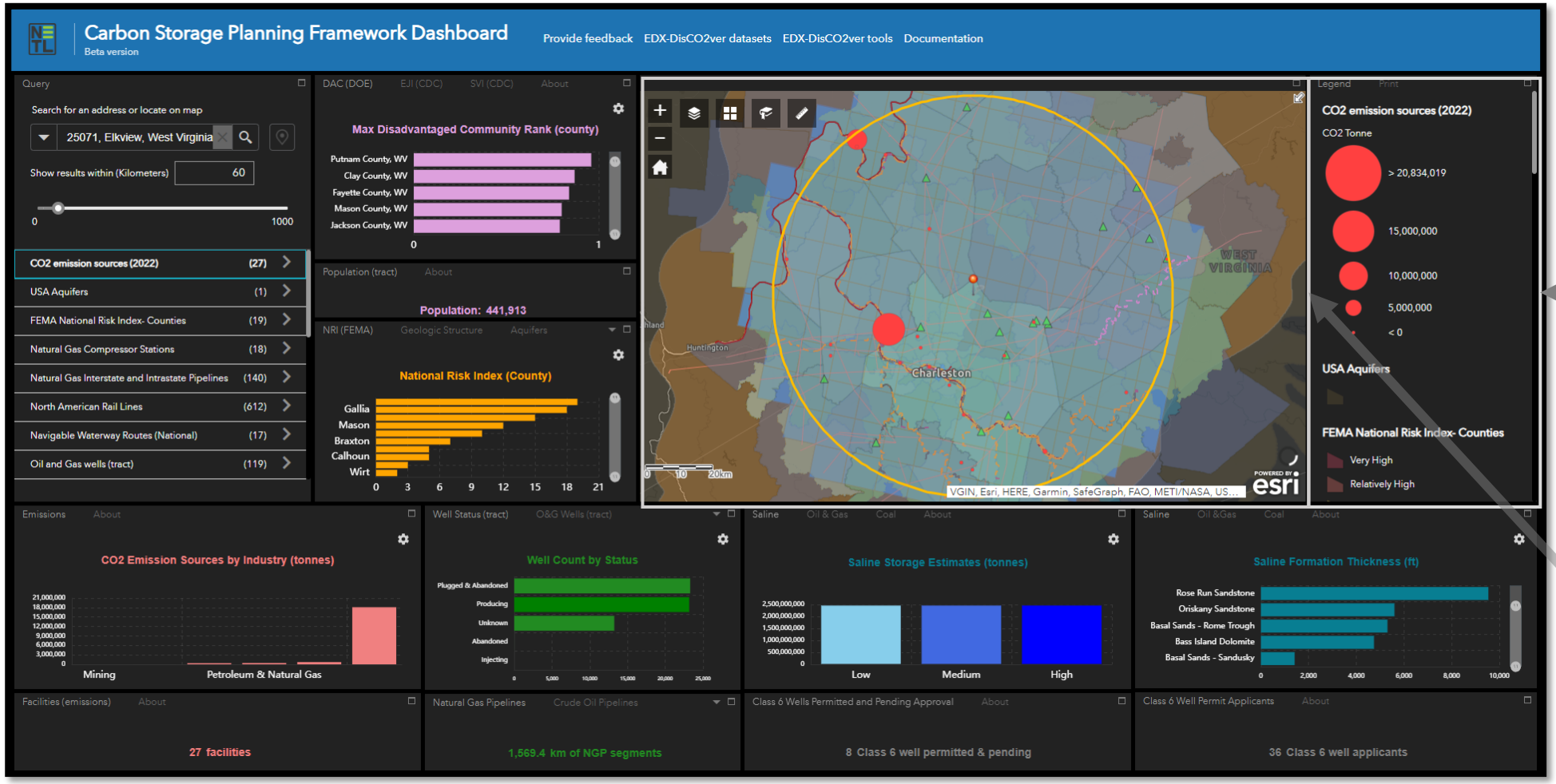
Carbon Storage (CS) Planning Framework Dashboard

Charts and Statistics- "About" tabs



Carbon Storage (CS) Planning Framework Dashboard

Map and Legend

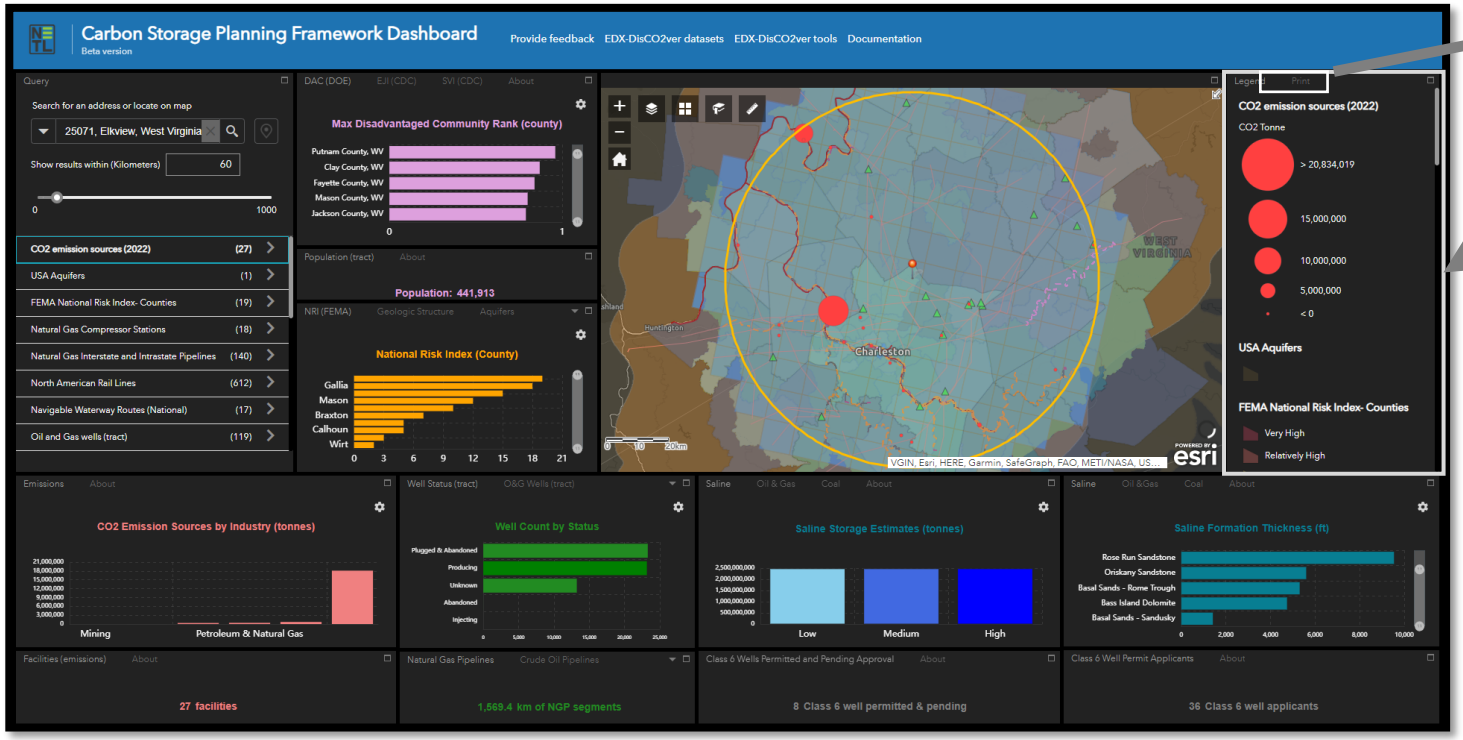


Multiple tabs for:
- **Legend**
- **Export map functionality**

Interactive map
- **Pop-up information**
- **Layer toggle on/off**

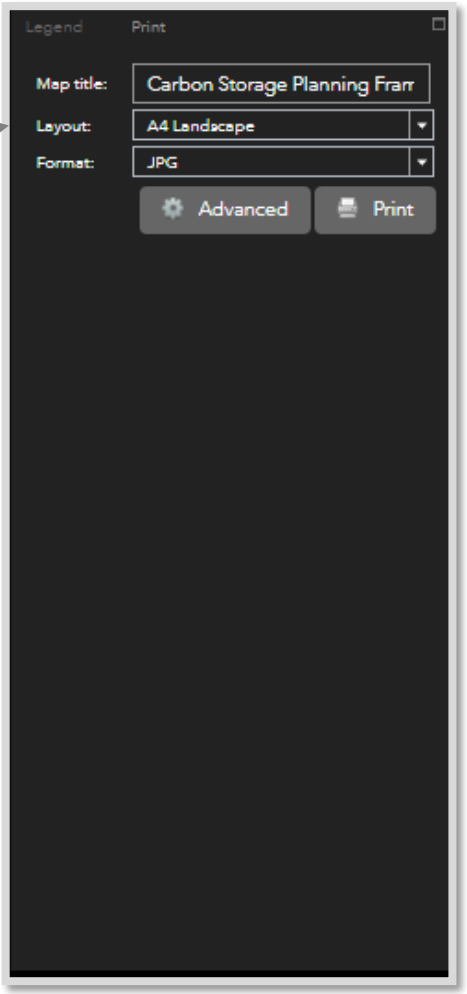
Carbon Storage (CS) Planning Framework Dashboard

Map and Legend- Export Map Functionality



Multiple tabs for:

- **Legend**
- **Export map functionality**



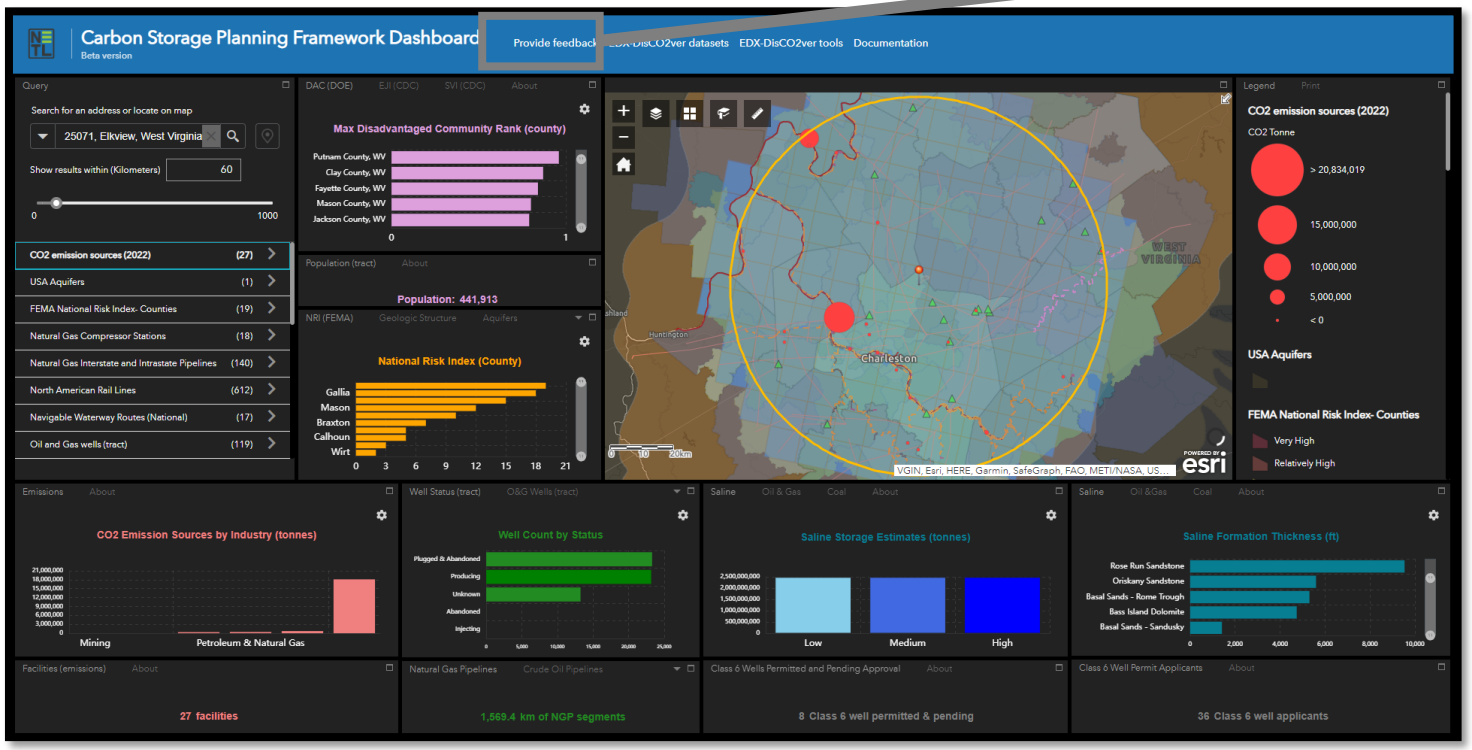
Carbon Storage (CS) Planning Framework Dashboard

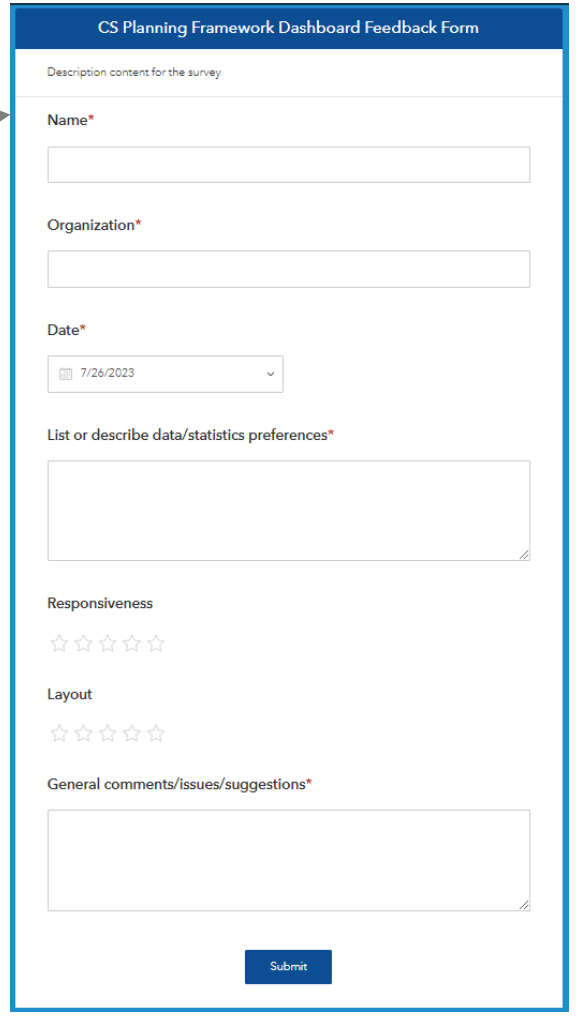
External Links

- **Links to:**
  - **Stakeholder feedback form**
  - **EDX-DisCO2ver data and tools**
  - **Documentation**

Carbon Storage (CS) Planning Framework Dashboard

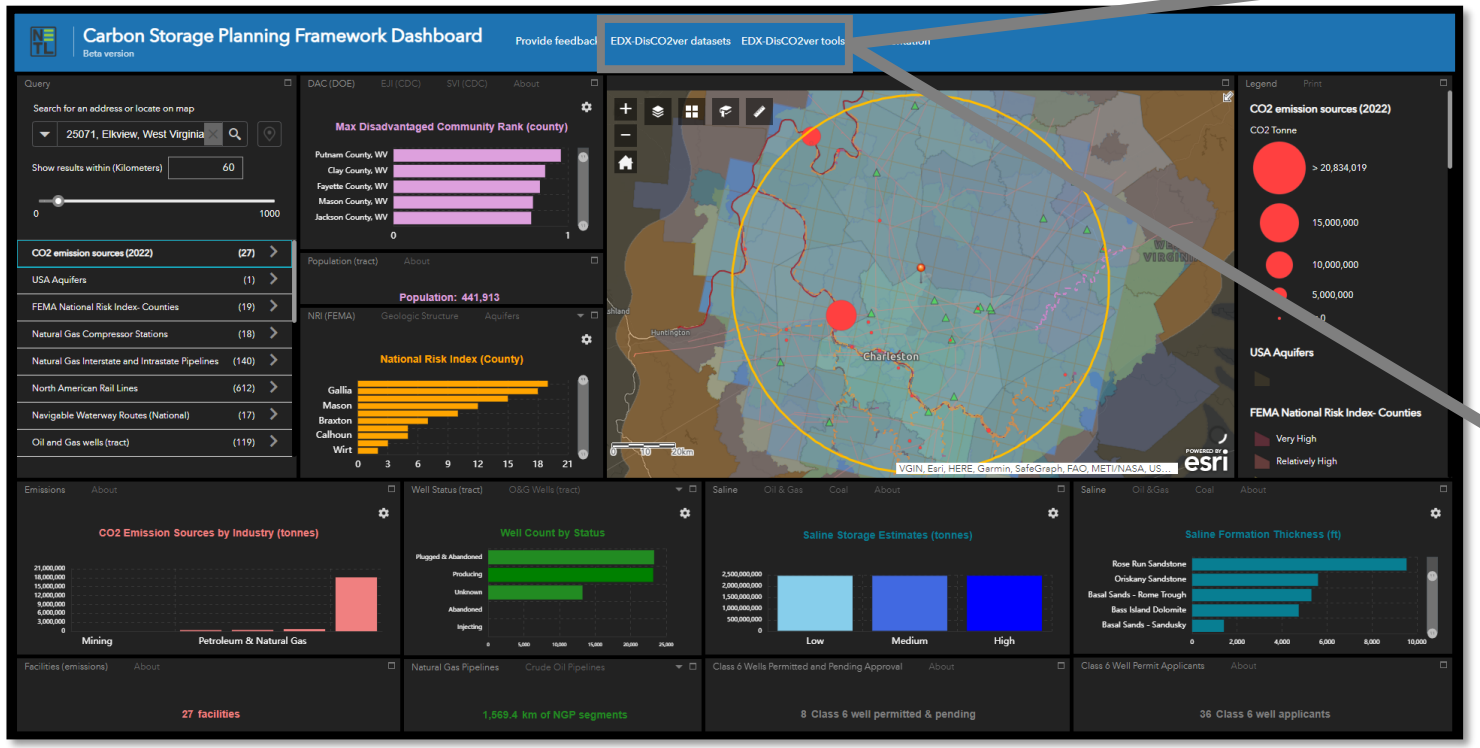
External Links- Feedback Form

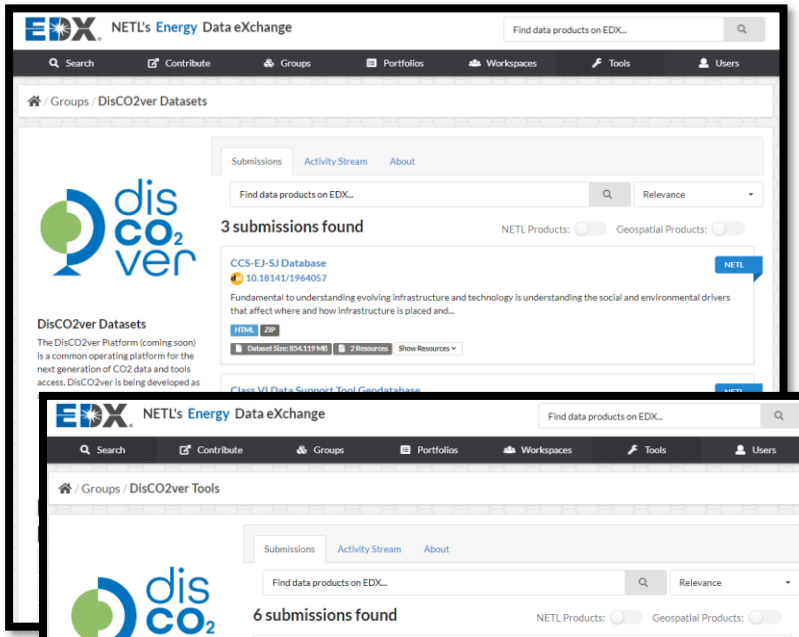


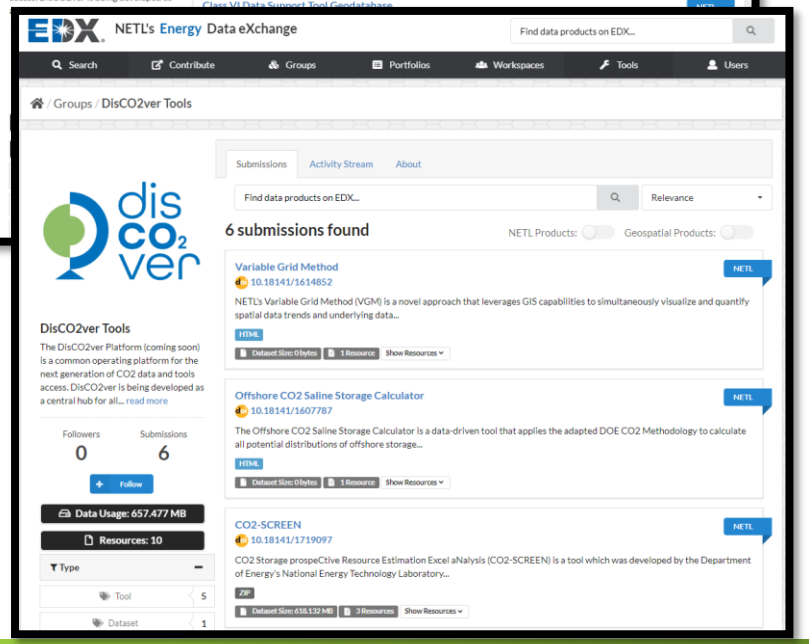


Carbon Storage (CS) Planning Framework Dashboard

External Links- EDX-DisCO2ver

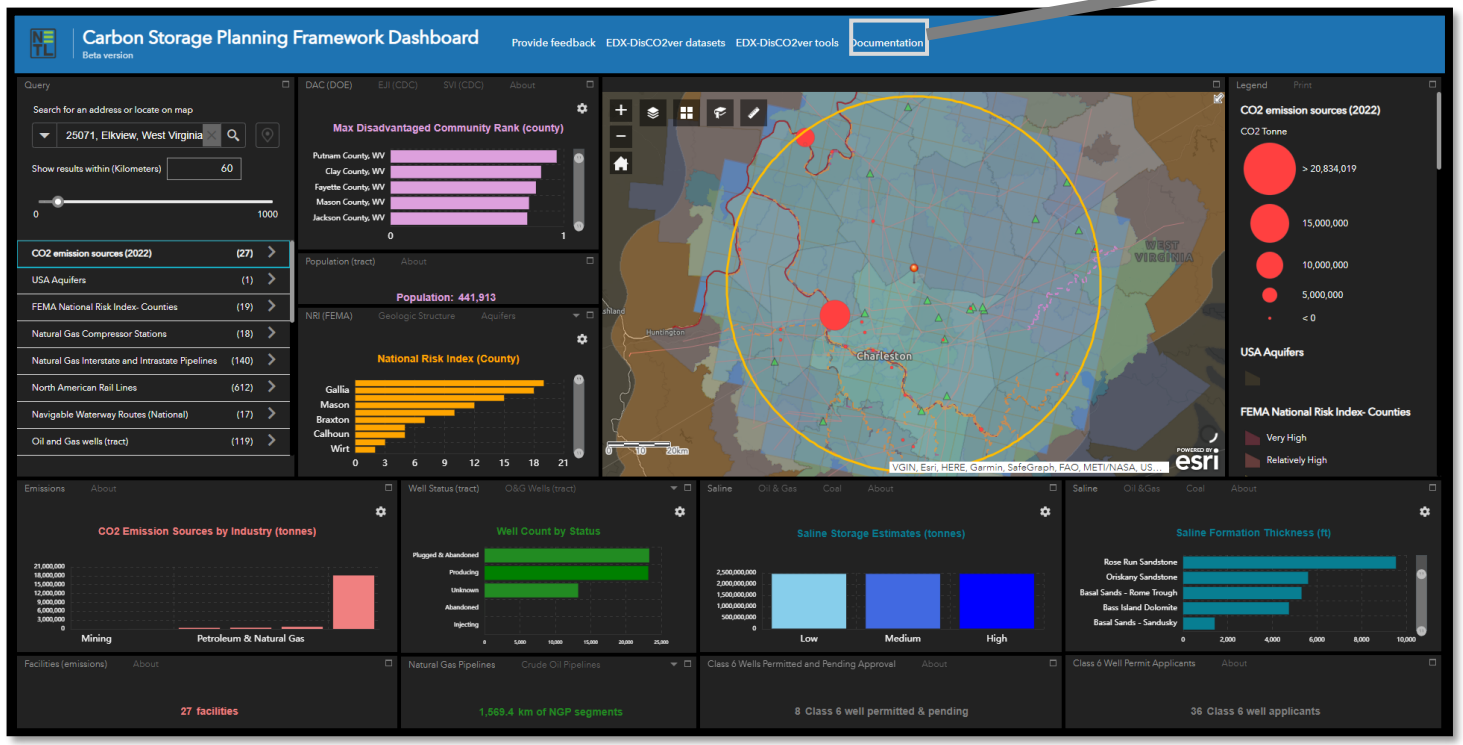


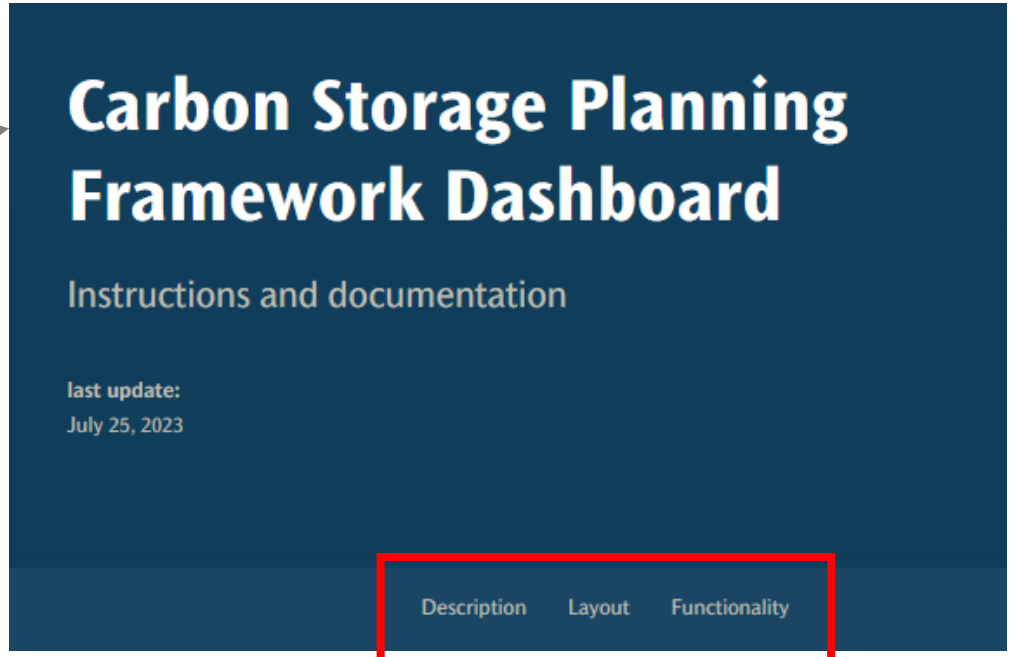




Carbon Storage (CS) Planning Framework Dashboard

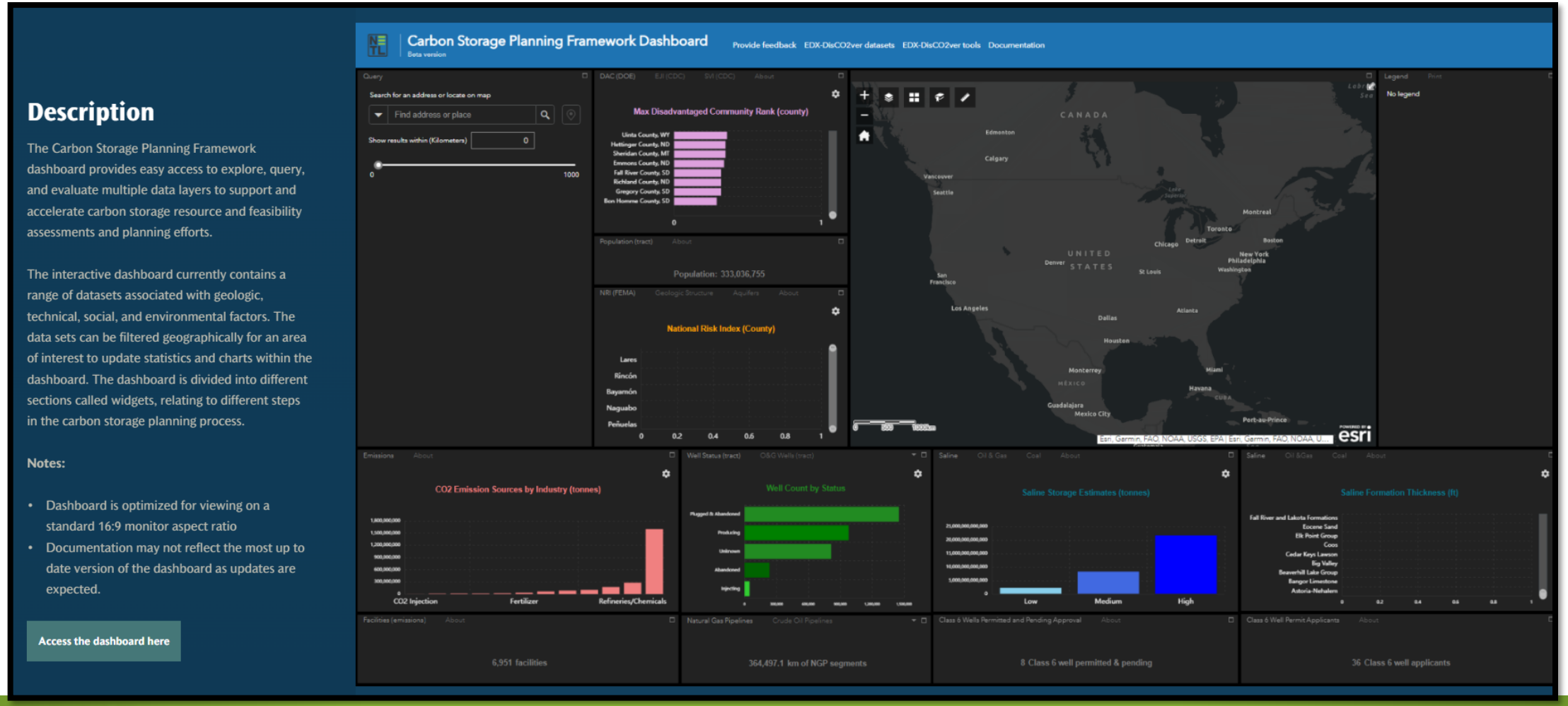
Documentation (External Links)





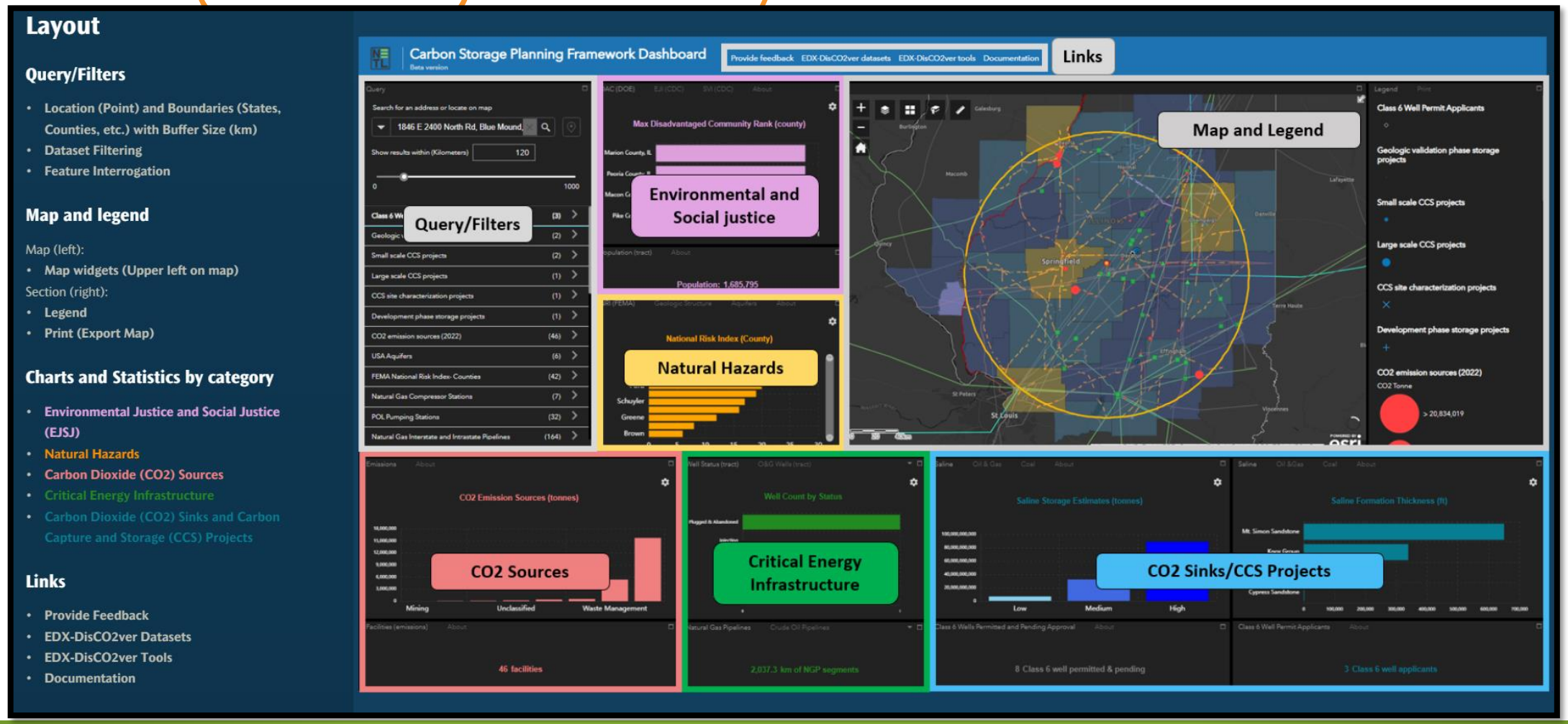
Carbon Storage (CS) Planning Framework Dashboard

Documentation (External Links)- Dashboard Description/About



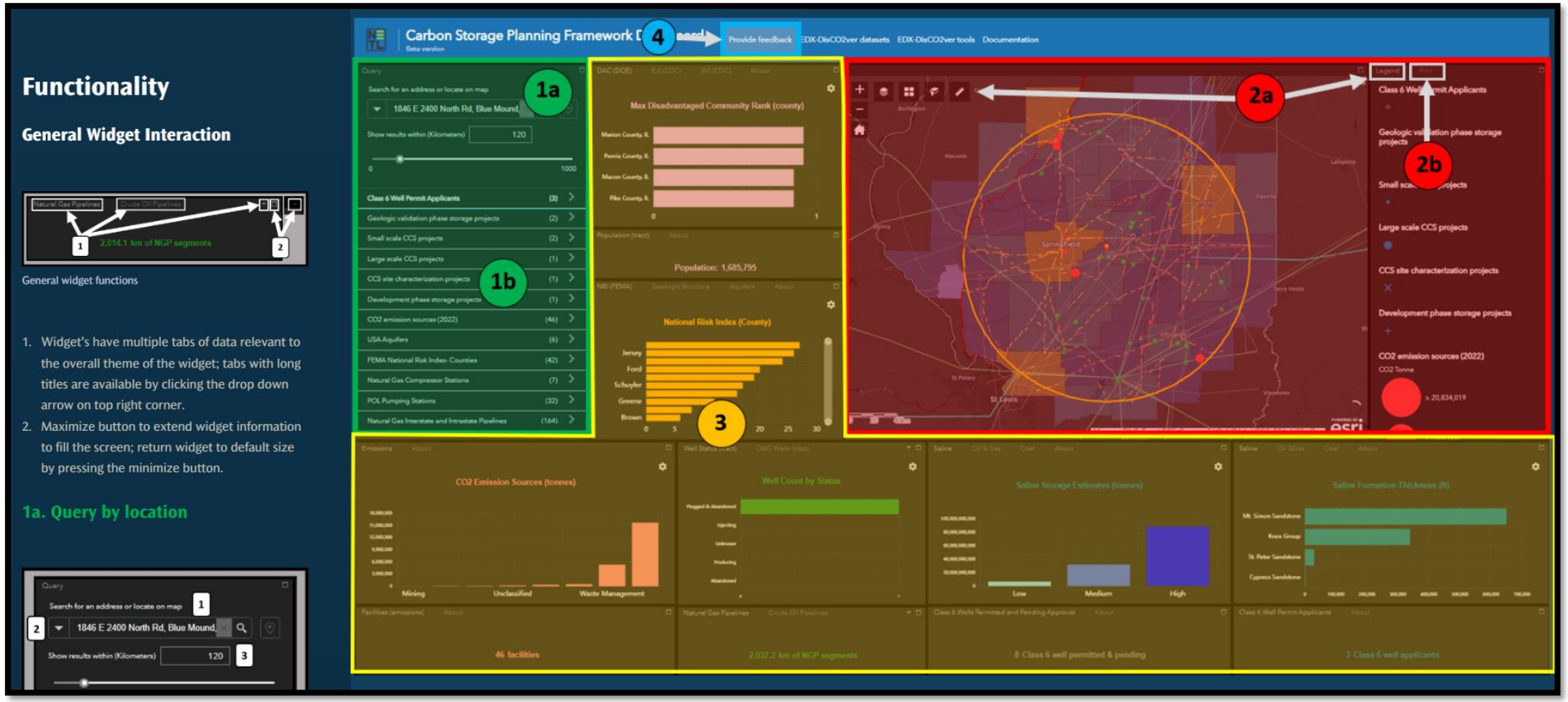
Carbon Storage (CS) Planning Framework Dashboard

Documentation (External Links)- Dashboard Layout



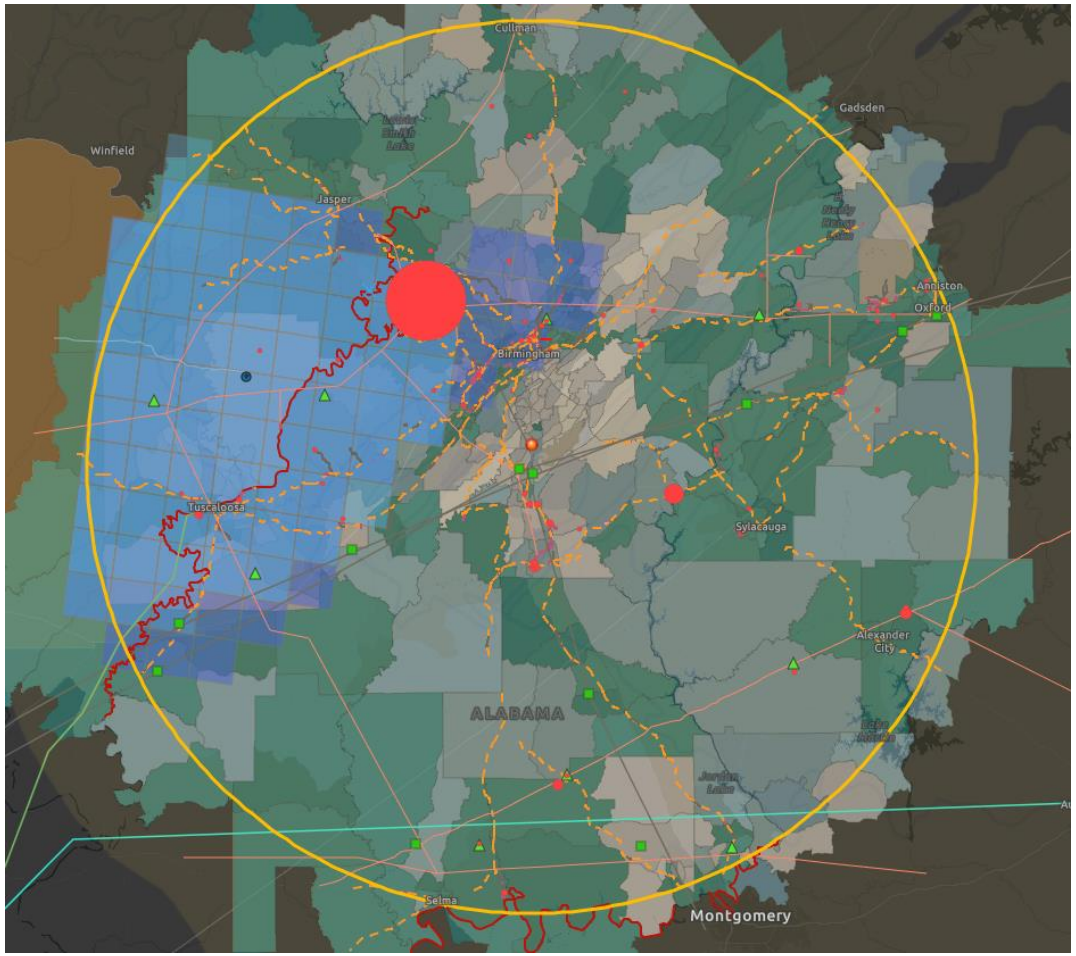
Carbon Storage (CS) Planning Framework Dashboard

Documentation (External Links)- Dashboard Functionality



Carbon Storage (CS) Planning Framework Dashboard

Progress and Next Steps



Example radial buffer query of dashboard datasets

- **Progress to date:**
  - Key datasets integrated
  - beta version developed
- **Next steps/Challenges:**
  - Integrate relevant data as they are identified and become available
  - Adjusting/testing layout and functionality
  - **Beta version available for stakeholder testing/feedback- sign up for testing!**
  - Identification of gaps, data, needs

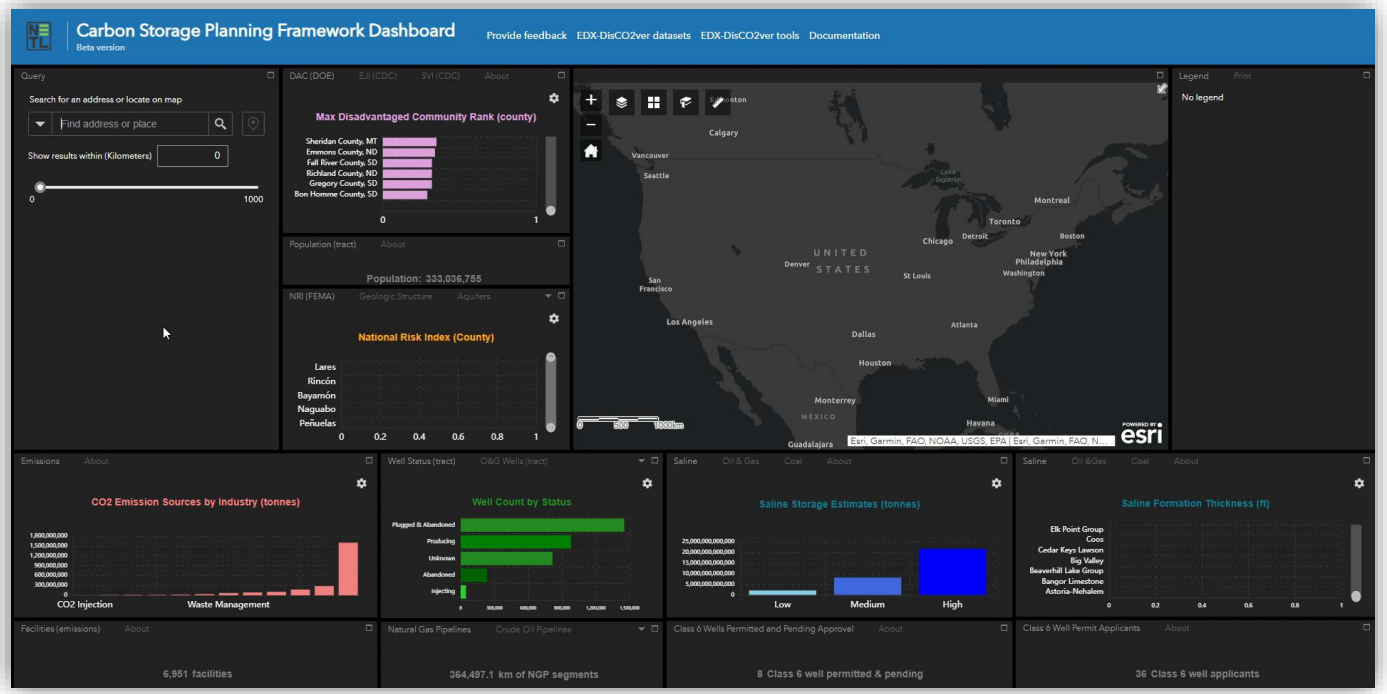
Carbon Storage (CS) Planning Framework Dashboard

Ultimate Outcomes

- Deploy and host the **Carbon Storage Planning Framework Dashboard** on the **EDX DisCO2ver** platform.
    - Anticipated public release of dashboard- **3/2024**

Stakeholder Benefit

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



Join us Tuesday evening for live Tool Demos!

NATIONAL ENERGY TECHNOLOGY LABORATORY

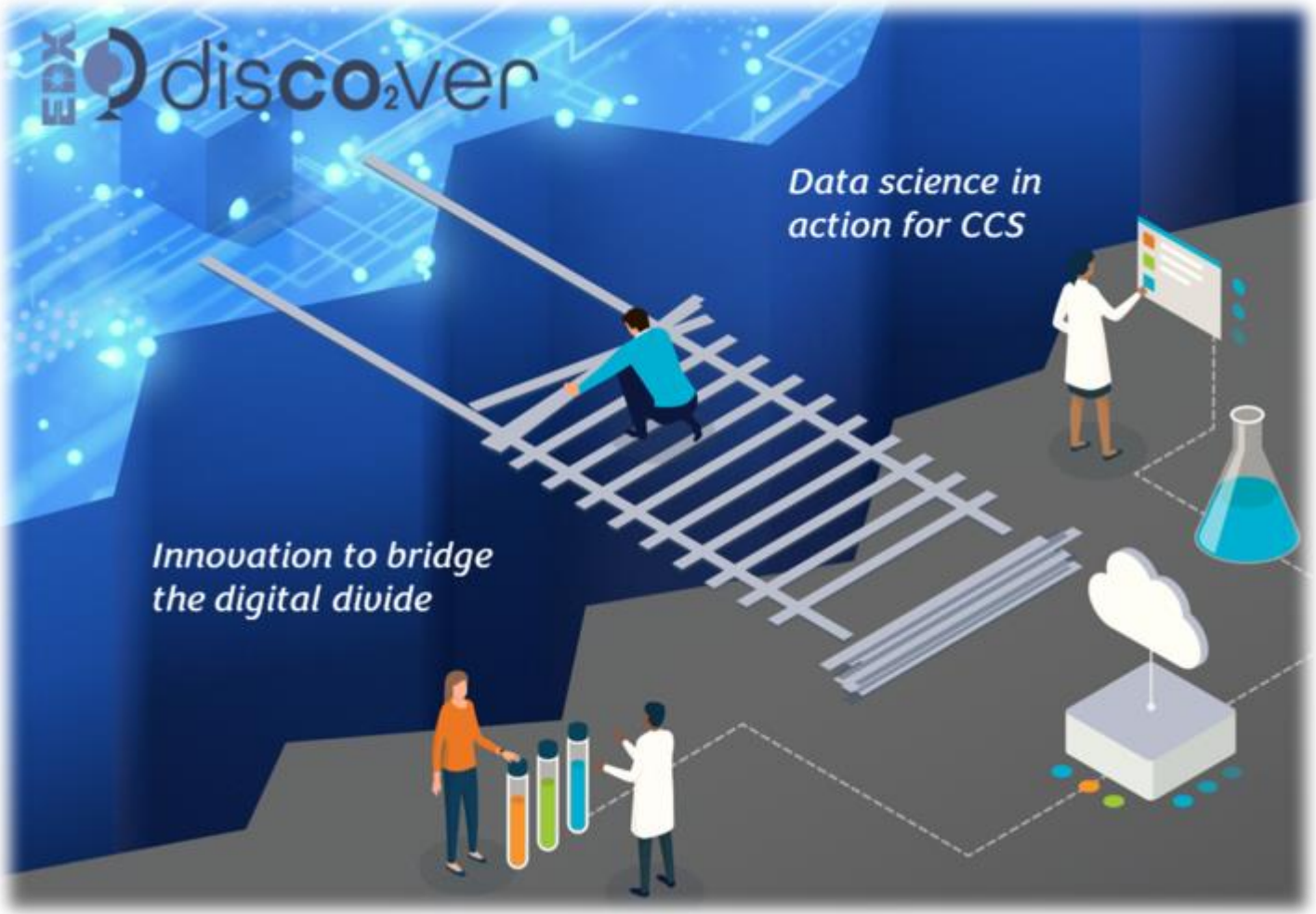
When: **5:45 - 7:45 p.m.**

Where: **The Ballroom Foyer and East/West Atriums**

What:

- **Environmental Justice and Social Justice** for CS Systems
- The **international offshore CS** and web-database and tool
- RokBase, Virtualizing **CS Rock Property Data** platform
- **Class VI Data Support Tool** for regulatory requirements
- **CO2 Pipeline Routing** Smart Tool
- Co2Locate - **Class II Well Reuse and Regional Evaluation Tool**
- **Carbon Storage Planning Framework Dashboard**
- **3D Data Viewer** and Preview Capability
- AIIM Model, **Assessing Infrastructure Reuse Potential** for CS
- **EDX disCO2ver,** a one-stop tool for CO2 digital resources

In demo "theater room" EDX Energy Data eXchange **support team** will offer **in person demos & Q&A**



Acknowledgments

This work was performed in support of the U.S. Department of Energy's Fossil Energy and Carbon Management's Geo-Analysis and Monitoring Team and was developed jointly through the U.S. DOE Office of Fossil Energy and Carbon Management's EDX4CCS Project (DE-FE 1025007), in part, from the Bipartisan Infrastructure Law.

This research was supported in part by an appointment to the U.S. Department of Energy (DOE) Postgraduate Research Program at the National Energy Technology Laboratory (NETL) administered by the Oak Ridge Institute for Science and Education (ORISE).

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