

# State Energy Data Use Best Practices

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KENYA STUMP

KENTUCKY OFFICE OF ENERGY POLICY



# Office of Energy Policy's Mission

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To support the utilization of Kentucky's energy resources for the betterment of the Commonwealth while protecting and improving our environment.



*“Knowing where things are, and why, is essential to rational decision making”*

**~ Jack Dangermond, Environmental Systems Research Institute (ESRI)**

*“Maps are like campfires – everyone gathers around them, because they allow people to understand complex issues at a glance, and find agreement about how to help the land.”*

**~ Sonoma Ecology Center**



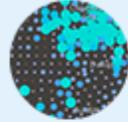
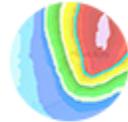
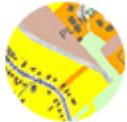
# What is GIS?

A geographic information system (GIS) is a framework for gathering, managing, and analyzing data.

GIS integrates many types of data.

It analyzes spatial location and organizes layers of information into visualizations using maps and 3D scenes.

GIS reveals deeper insights into data, such as patterns, relationships, and situations—helping users make smarter decisions.

 Identify problems	 Monitor change
 Manage & respond to events	 Perform forecasting
 Set priorities	 Understand trends

<https://www.esri.com/en-us/what-is-gis/overview>

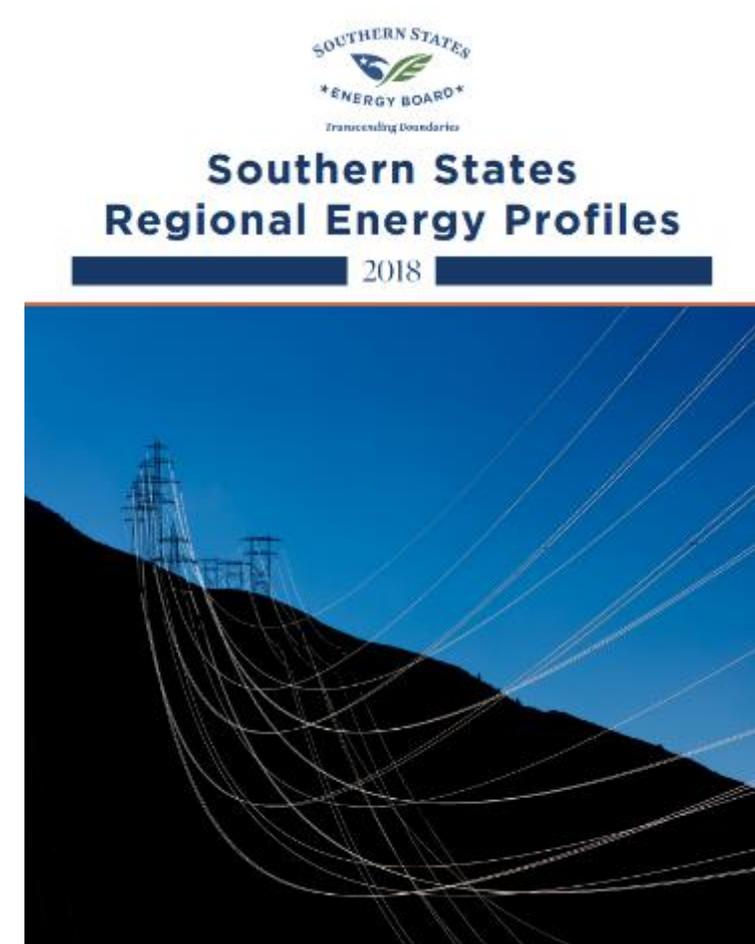
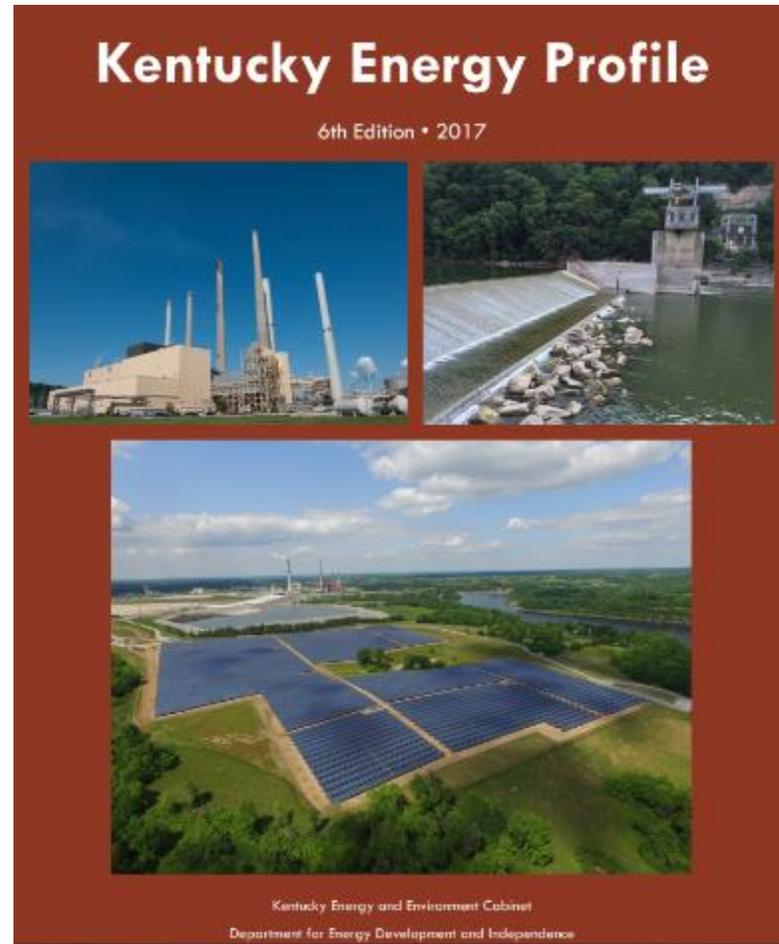
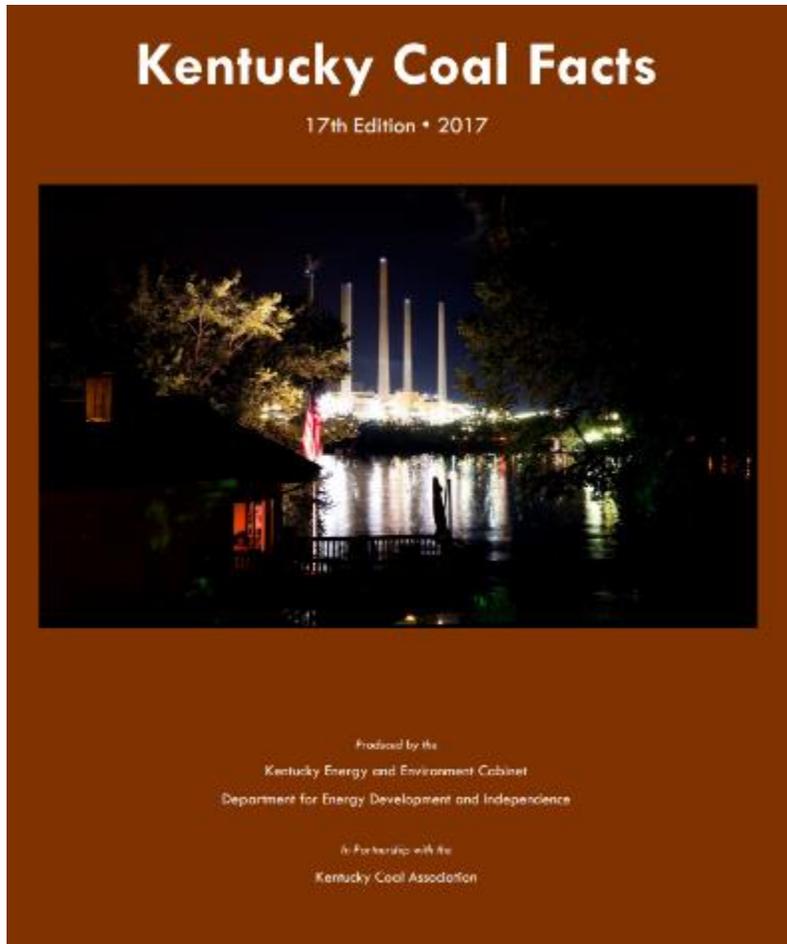


# Energy Data @ Work

KENTUCKY



# Cornerstone Publications



# QUARTERLY COAL DASHBOARD

Home / Energy / Quarterly Coal Dashboard

- Overview
- Eastern Kentucky
- Western Kentucky
- Coal Mine Employment
- Coal Production Reference Table
- Employment Reference Table

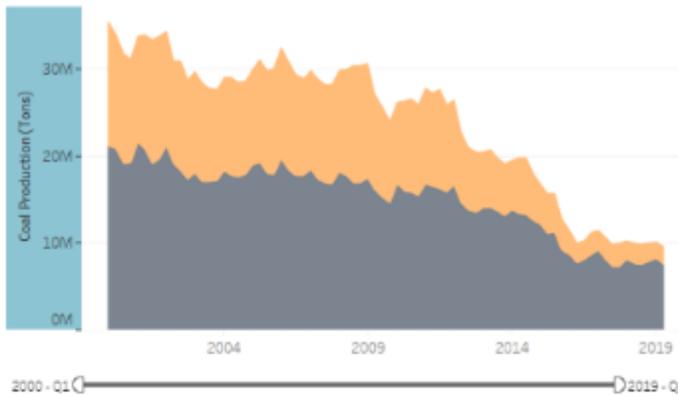
2019 - Q2



Surface	2,097,037
Underground	7,416,649
Grand Total	9,513,686

Mine Type  
■ Surface  
■ Underground

Coal Production by Mine Type (2000 - Q1 to 2019 - Q2)



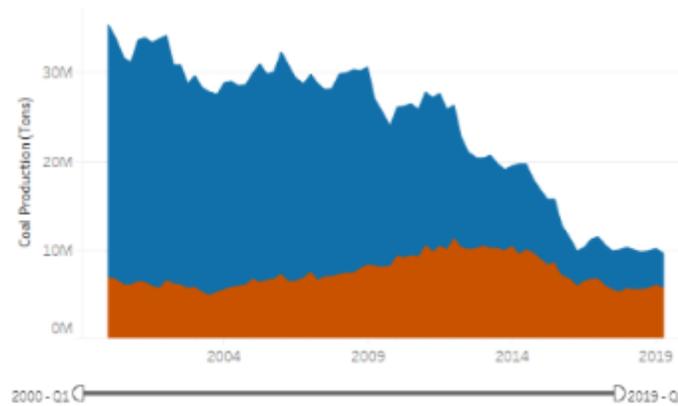
2019 - Q2



East	3,752,321
West	5,761,365
Grand Total	9,513,686

Region  
■ East  
■ West

Coal Production by Region (2000 - Q1 to 2019 - Q2)



# Identifying Resilience Hubs

Home ▾ Critical Facilities

New Map ▾ Create Preset

Details Add ▾ Edit Basemap Analysis

Save ▾ Share Print ▾ Directions Measure Bookmarks

About Content Legend

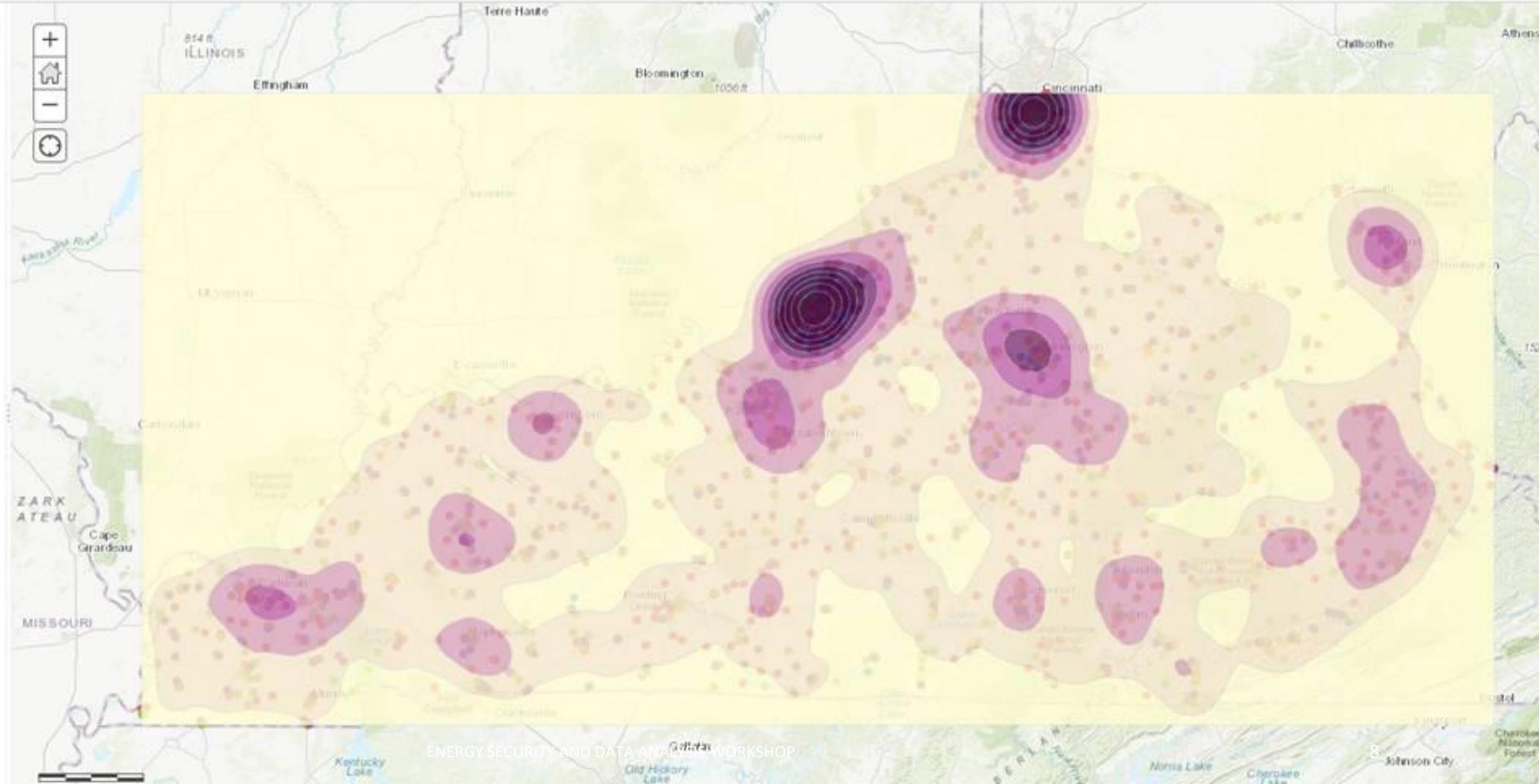
Legend

Critical\_Facilities\_Master\_Density\_Final



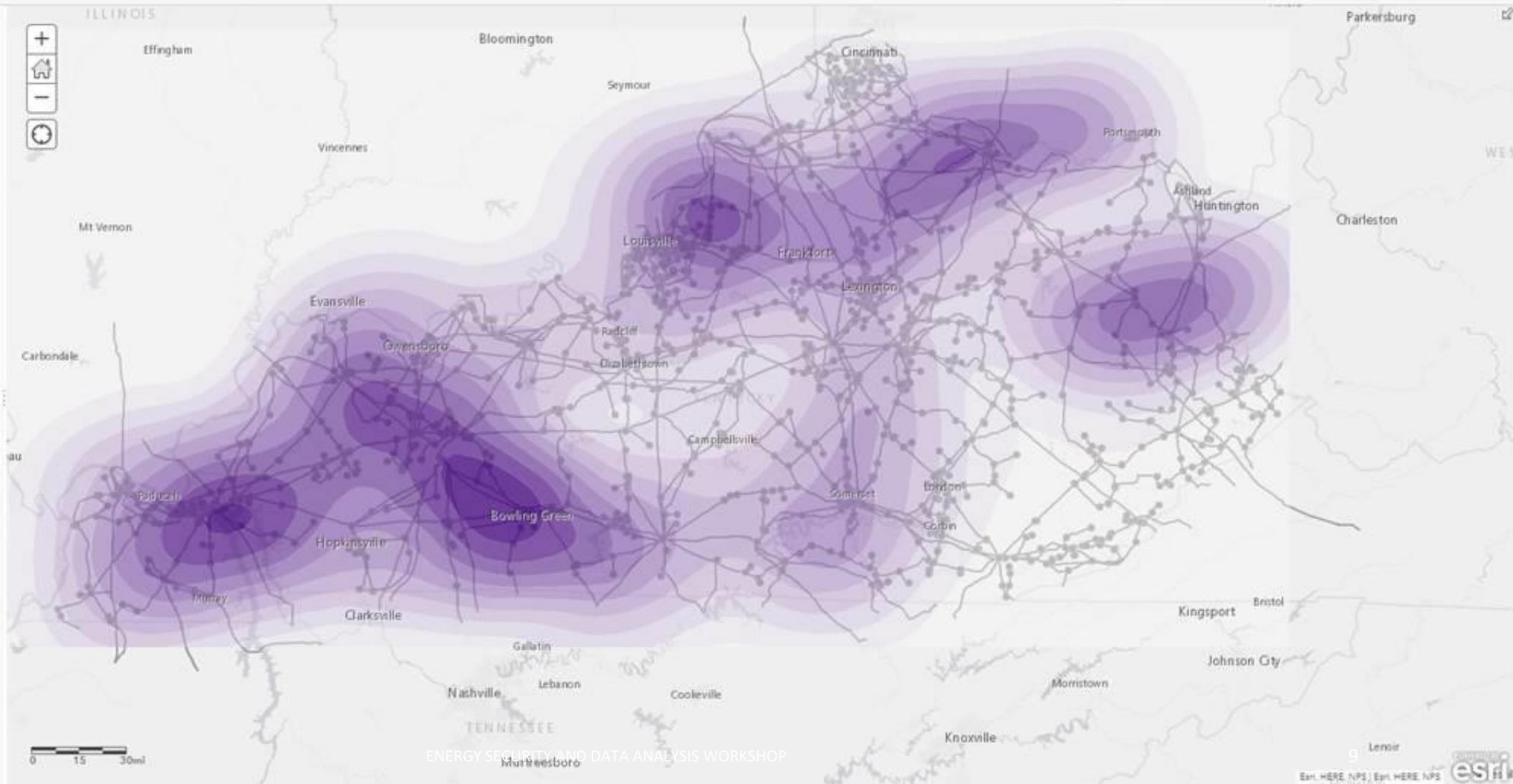
Critical Facilities-Master

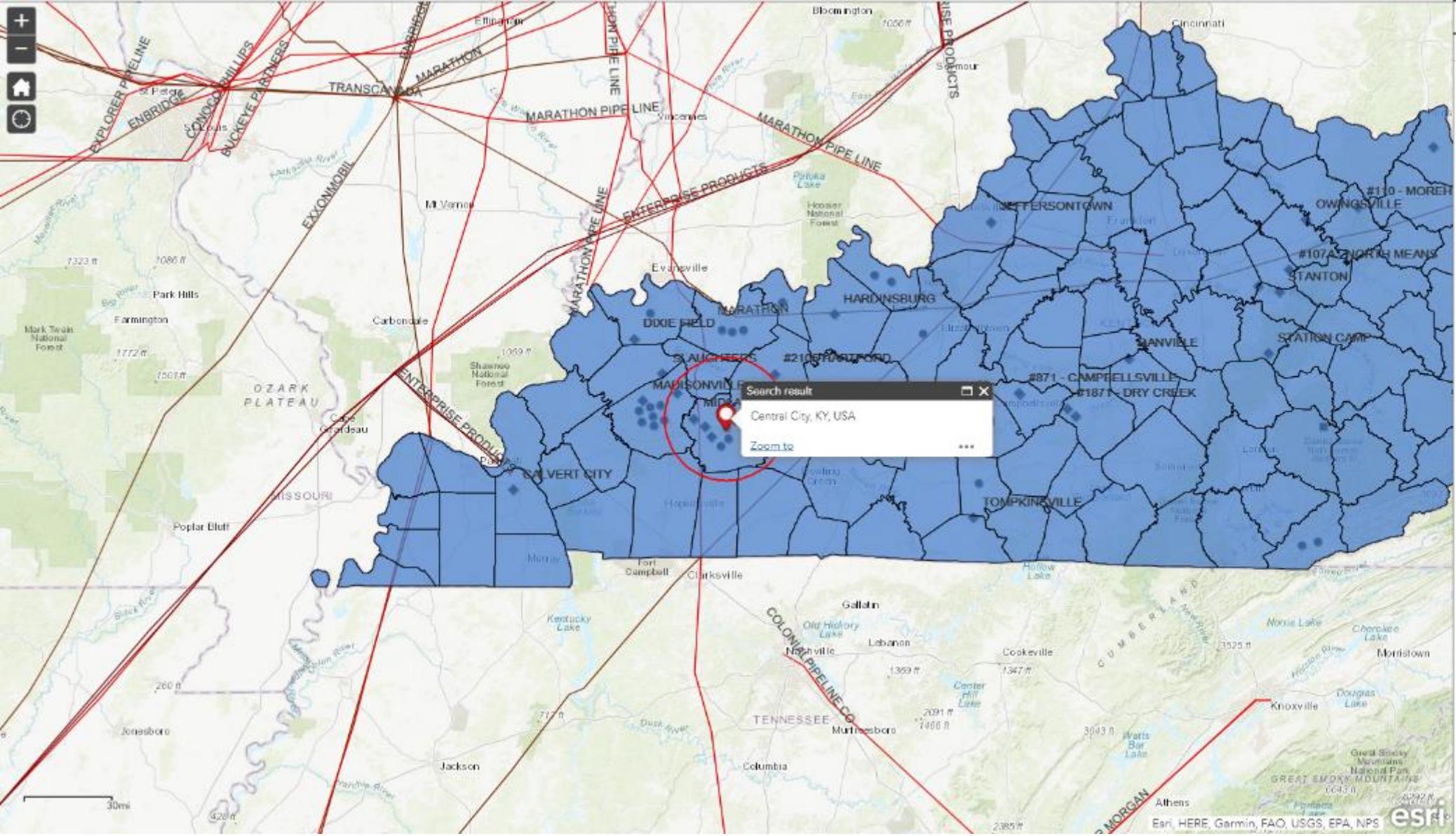
- Fire Rescue
- Law Enforcement
- Water Supplier
- Municipal Wastewater
- Healthcare
- Correction



# Identifying Energy Infrastructure Risk

- About Content Legend
- Contents
- Ky Tornado tracks Density
  - Ky Tornado tracks
  - KY Substations
  - KY Transmission
  - Light Gray Canvas





**Infrastructure Screening**

AOI

Placename  Draw

Search for a location

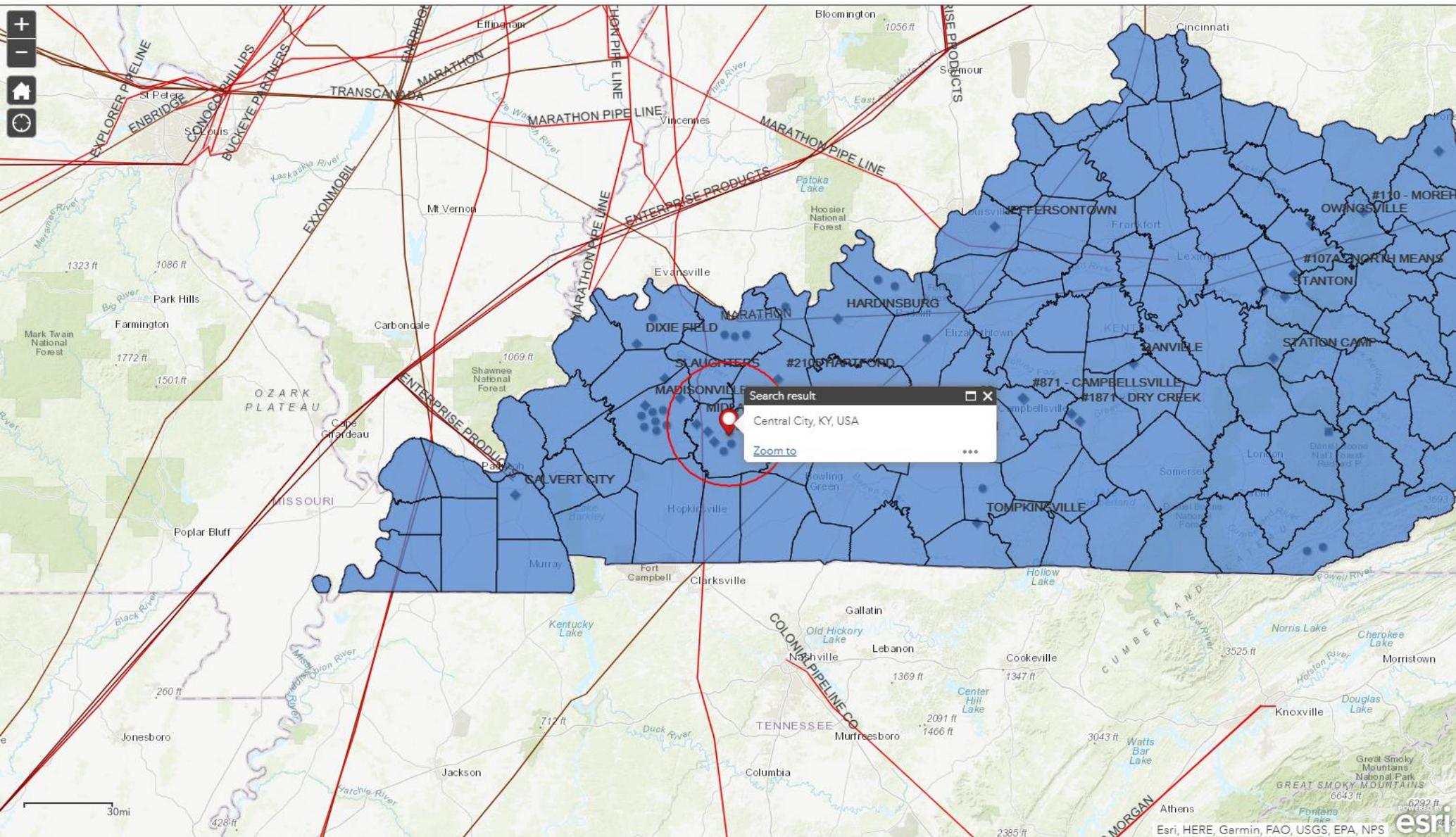
X Q

Buffer distance (optional)

Show results within

Miles

**Report** **Start Over**



### Infrastructure Screening

Report

Area : 35,020,853,477.49 ft²

- Critical Facilities (69)
- Natural Gas Storage Areas (3)
- Natural Gas Compressor Stations (4)
- Natural Gas Processing Facilities (0)
- Hydrocarbon Gas Liquids Pipeline (0)
- Petroleum Pipelines (1)
- Crude Oil Pipelines (0)
- Airports (15)
- Active Railroads (45)
- Kentucky Public Schools (33)
- Kentucky Higher Education (3)
- Electric Substations (71)
- Electric Transmission (103)
- Kentucky Roads (2,555)

# GIS Data for Energy Emergency Response

## Kentucky Energy Dashboard

A Story Map    

Kentucky Energy Profile

Kentucky Energy Maps

Electricity Outage Information

Electricity Generation

Electricity Pricing

Natural Gas Pricing

Natural Gas Production and Storage

Coal Information

Residential Propane Prices

Transportation



## Kentucky Energy Maps

A Story Map    

### 1 Kentucky Electric Service Areas

### 2 Kentucky Power Plants

### 3 Kentucky Electricity Infrastructure

### 4 Kentucky Natural Gas Service Areas

### 5 Kentucky Natural Gas Storage and Pipelines

### 6 Petroleum Pipeline and Infrastructure

December 3, 2019

ArcGIS ▼ Kentucky Electric Service Areas

Modify Map  Sign In

Details | Basemap

Share | Print ▼ | Measure



#### Legend

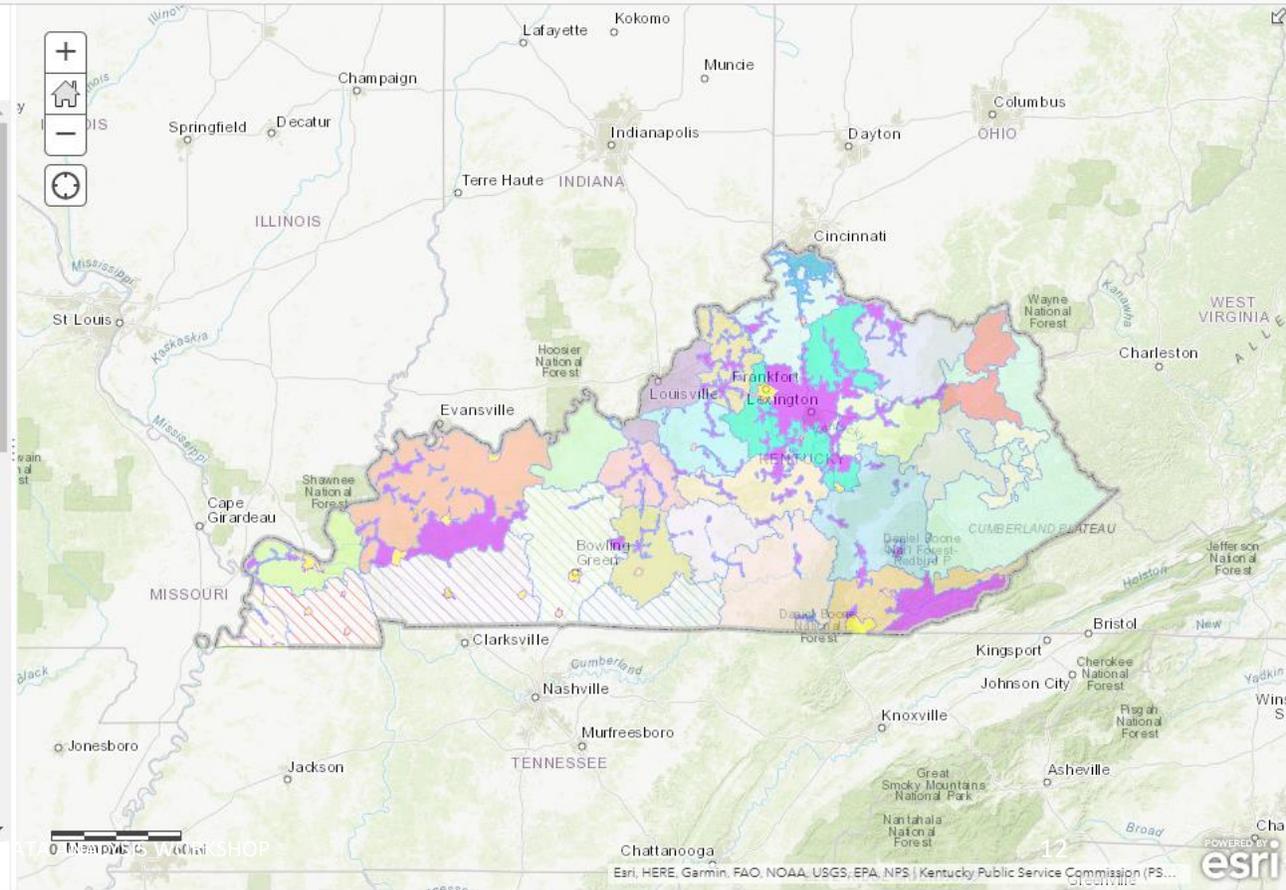
##### Kentucky Electric Service Areas

Electric Service Area Boundary Lines

- PSC Regulated Line
- Municipal Line not Regulated by PSC
- Unofficial Boundary
- State Boundary
- Problem Data
- Missing Data

##### Electric Service Areas

- Municipal Utilities
- Kentucky Power Company (KPC)
- Duke Energy Kentucky, Inc.
- Kentucky Utilities Company (KU)
- Louisville Gas and Electric Company (LG&E)
- Jackson Energy Cooperative & KU
- Meade County RECC & LG&E
- Big Sandy RECC
- Blue Grass Energy Cooperative

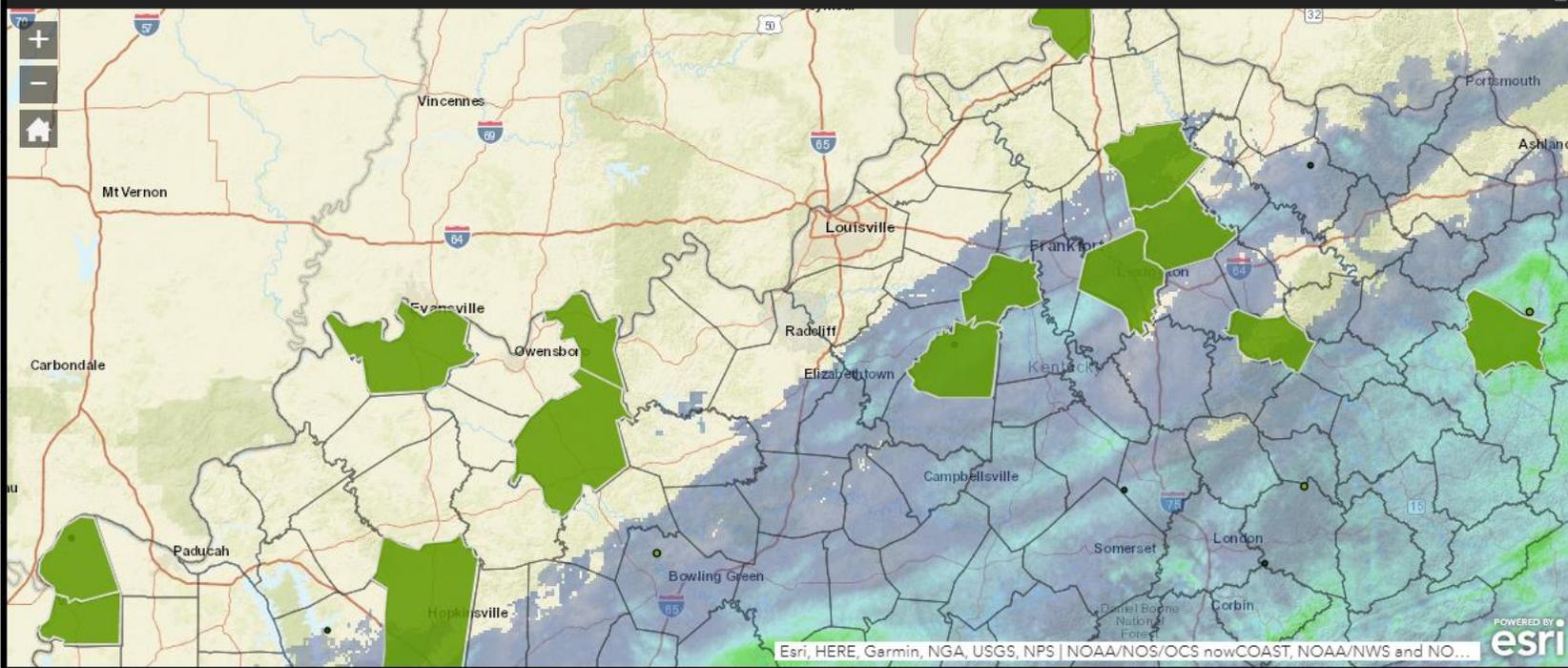


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Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | Kentucky Public Service Commission (PS... 

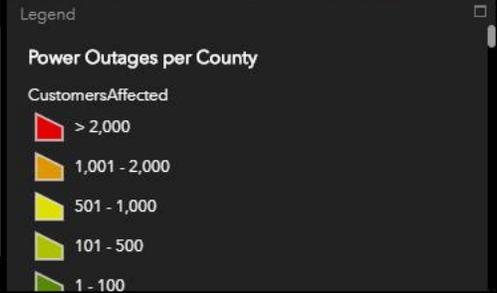
Electric Utility Outage Maps

- 1 Kentucky Electric Cooperatives
- 2 Duke Energy
- 3 LG&E KU ODP
- 4 Kentucky Power
- 5 Kentucky Public Service Commission Outage Incidents as Reported



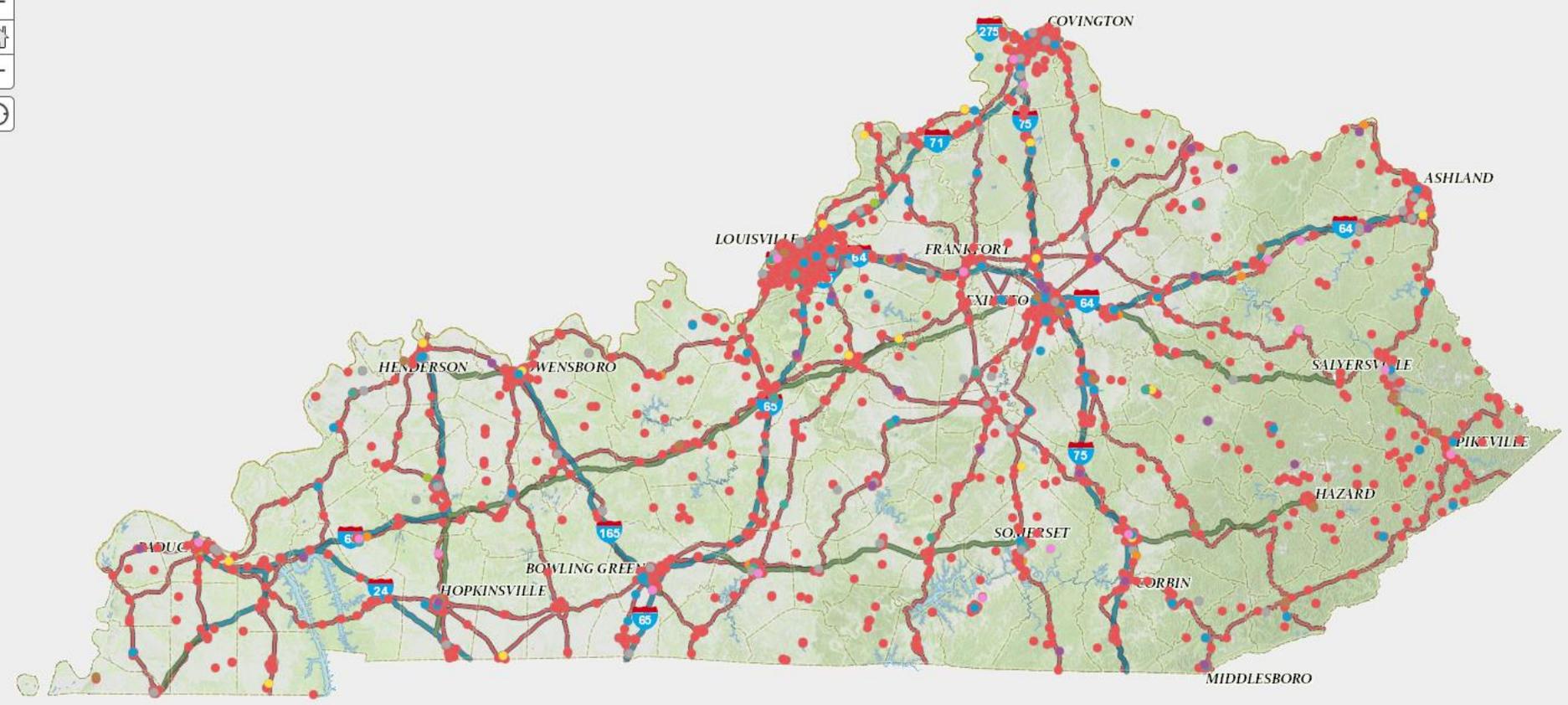
**KENTUCKY ELECTRIC COOPERATIVES**

[kyelectric.coop](http://kyelectric.coop)  
 Representing Kentucky's Electric Cooperatives the statewide association provides several services for the 24 local, consumer-owned electric distribution utilities in the state, as well as the two "generation and transmission" cooperatives that produce power for those distribution co-ops. Those services include representation before the Legislature, Congress, and regulatory bodies; safety training; coordination of management training; and public relations support including publication of Kentucky Living magazine. Kentucky Electric Cooperatives is governed by a board consisting of one

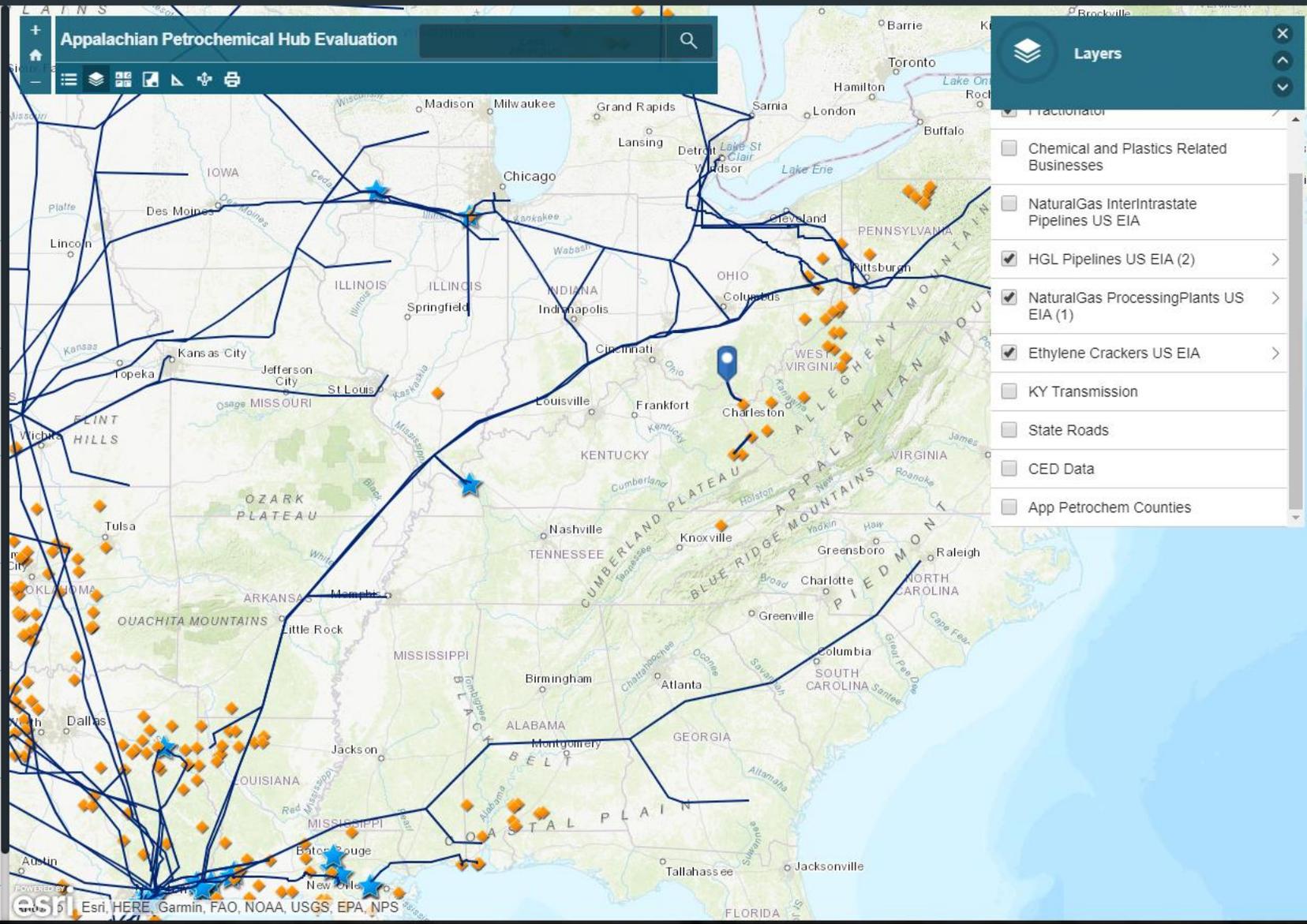


Fuel Infrastructure Master

- Gasoline Service Stations
- Oils-Fuel (Whls)
- Gas-Liquefied Petro-Bttld/Bulk (Whls)
- Propane-Bulk & Bottle-Delivery
- Gas Companies
- Oil & Gas Producers
- Propane (Lp) Gas
- Petroleum Products (Whls)
- Oils-Petroleum-Manufacturers
- Gasoline & Oil-Wholesale
- Other



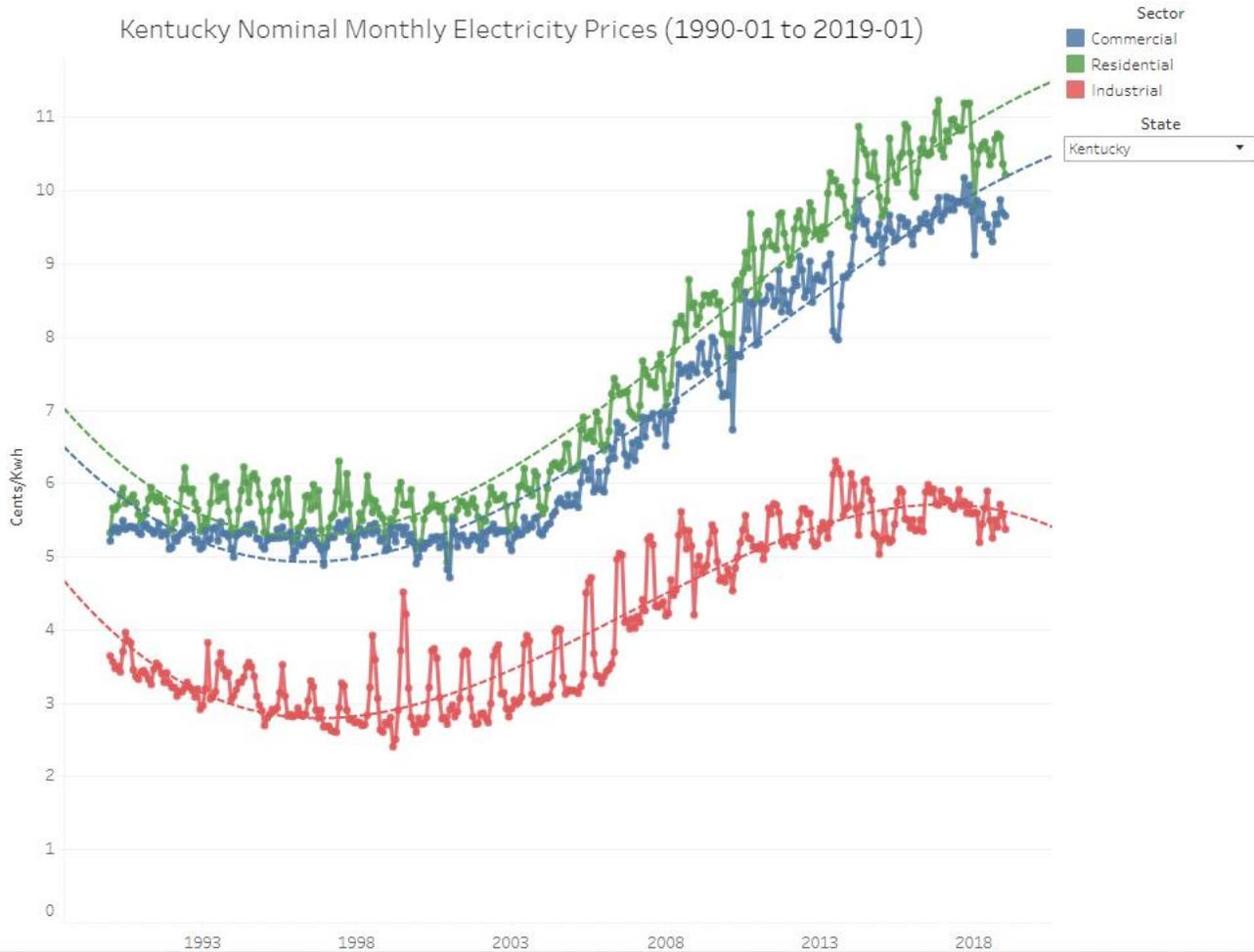
- 1 What is a petrochemical hub?
- 2 Kentucky Perspective of the Appalachian Petrochemical Hub
- 3 Mark West and the Ranger Pipeline
- 4 Bluegrass Pipeline\_NGL (Failed Project)
- 5 Tennessee Gas Pipeline Conversion\_NGL (Abandoned)
- 6 NGL Production
- 7 Ethane Exports
- 8 Ethane Primer



# Interactive Dashboard Link

- Nominal Electricity Prices
- Real Electricity Prices
- Monthly Electricity Sales
- Monthly Generation by Fuel

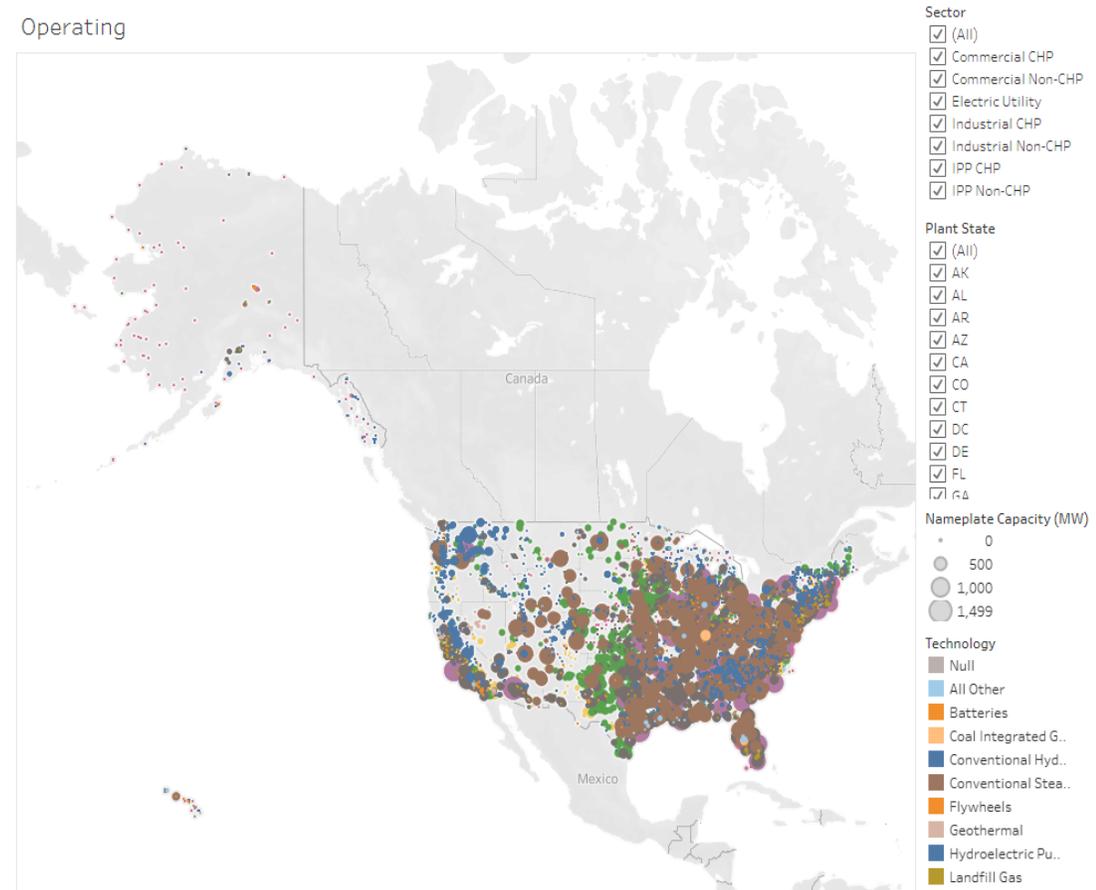
Kentucky Nominal Monthly Electricity Prices (1990-01 to 2019-01)



# Electricity Generation in the U.S.

- Operating Electricity Generation
- Operating Electricity Generators by Date of First Operation
- Retired Electricity Generators
- Retirements by Date
- Planned Electricity Generation Additions

## Operating



# Best Practices

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GETTING IT DONE



#1

# Making Data a Priority

BEST PRACTICE: ALLOCATING RESOURCES AND STAFF



# Office Goals

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Be the customer-driven recognized State Energy Policy Authority.

Enhance the economic opportunities and benefits to Kentucky citizens and industry through **expansion of current markets and the development of market opportunities for Kentucky.**

Effectively implement federal and state energy programs to leverage federal State Energy Program funding and other funding sources by identifying and working with partners who can deliver cost-effective and credible energy programs that reduce energy costs, enhance resilience, and increase emergency preparedness.

**Enhance the energy resilience and security of the Commonwealth by identifying opportunities to increase our ability to respond effectively to an energy disruption and to recover quickly and to maintain the uninterrupted supply of energy resource to the Commonwealth at affordable prices.**



# Office Functional Areas

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Provide policy and technical assistance to the Commonwealth and leadership on energy issues.

Administer grant programs across the Commonwealth to support the state's energy goals.

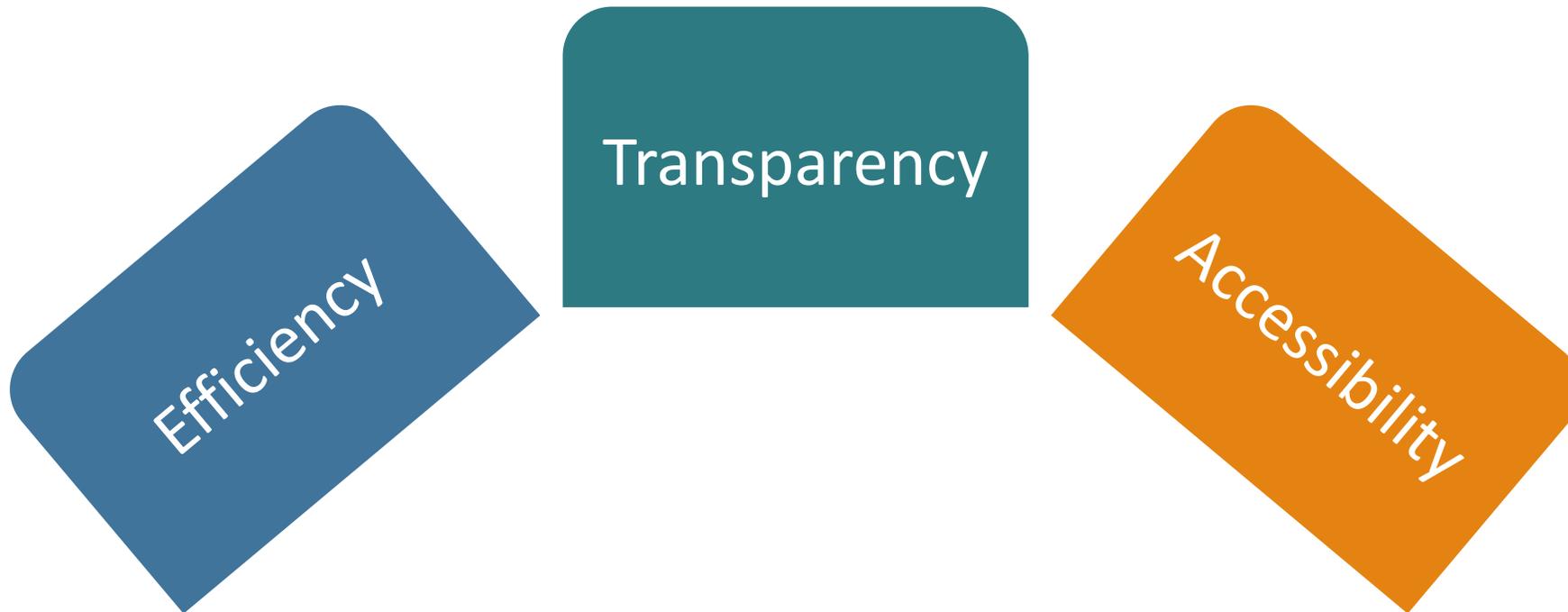
**Monitor, track, and analyze energy data and policies nationwide and in Kentucky to proactively identify trends, opportunities, and potential issues affecting the Commonwealth's energy sector.**

Increase energy literacy by proactively leveraging communication pathways and a variety of stakeholders to deliver relevant and reliable energy information across the Commonwealth.



# Three Principles Driving Data Use

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# Tools and Staff Time

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The Office utilizes a number of statistical and data visualization tools including:

- ArcGIS
- Tableau,
- STATA,
- R and Python.

These tools allow the Office to work with datasets that are too large for conventional tools like Microsoft Excel to process in a timely manner.

The Office pulls economic and energy data from a variety of public sources, aggregating the data into a central location.



A woman with long dark hair, wearing a white t-shirt, stands in a meeting room pointing at a whiteboard covered in colorful sticky notes. Other people are seated around a table in the foreground, looking towards the whiteboard. The room has large windows in the background.

# #2

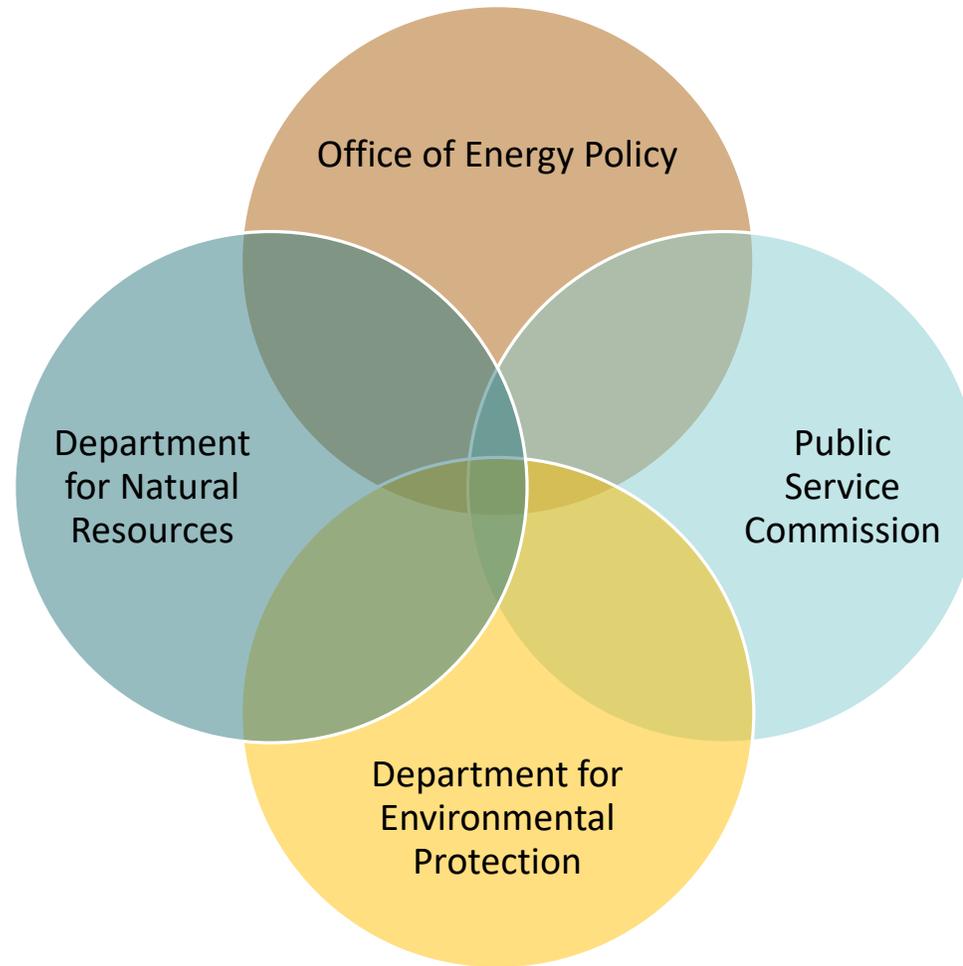
# Knowing the Right People

BEST PRACTICE: FINDING THE DATA AND DEVELOPING PARTNERSHIPS



# Organizational Structure

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# Data Resources

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U.S. Energy Information Administration

U.S. Census Data

Reference USA and the Kentucky Library and Archives

Kentucky Environmental Agency Data

Kentucky Economic Development Data

NOAA Data

Kentucky Center for Statistics

Kentucky Corrections & Health and Family Services Agency data

Homeland Infrastructure Foundation-Level Data

International Energy Agency

U.S. Bureau of Economic Analysis

Kentucky Emergency Management

ArcGIS Living Atlas

Environmental Protection Agency

U.S. Department of Transportation

U.S. Census Trade Data

National Laboratories



# Partnerships

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**Cabinet works collaboratively with the Kentucky Geological Survey**

**Energy Office partners with the Kentucky Center for Statistics on Tableau implementation and development of interactive dashboards.**

**Together, We Create!**

**Partnership with Kentucky Cabinet for Economic Development on geographic information system (GIS) products**

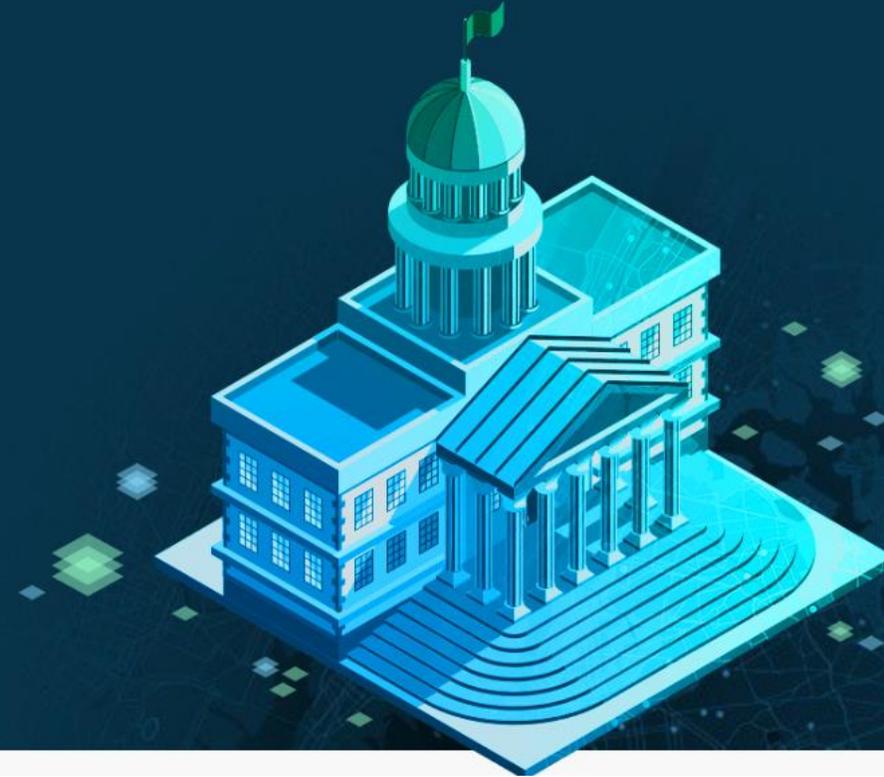
**Works collaboratively with the Kentucky PSC on utility GIS information**

**Relationship with Esri enables robust GIS work in the Cabinet**



# State & Local Government

Working with government to deliver better solutions for tomorrow



A background image showing several hands shaking in a circle, symbolizing collaboration and teamwork. The hands are of different skin tones and are wearing various accessories like watches and bracelets. The scene is set in a professional environment with a desk, a water bottle, and a jar of snacks visible in the foreground.

#3

# Creating a Data Culture

BEST PRACTICE: DATA VISUALIZATION FOR EVERY PROBLEM



# GIS Across Agencies

EEC GIS Workgroup spans all agencies (PSC, environment, natural resources, conservation, and energy)

GIS Workgroup integrates the IT Divisions and the Commonwealth Office of Technology.

EEC GIS Day and week long training.

New Employee Orientation includes GIS 101 and 102 Training.

Cabinet encourages GIS Self Paced Learning through ESRI.

We work to have a GIS Point of Contact (GPOC) in every EEC agency.



# WELCOME TO THE KENTUCKY GEOGRAPHY NETWORK

The KyGeoNet is the Geospatial Data Clearinghouse for the Commonwealth of Kentucky. A variety of datasets can be located and downloaded, static map products can be viewed, and many web mapping applications and services are easily accessible. Use the powerful search capabilities of the [KyGeoPortal](#) to find downloadable data, explore Kentucky using the web maps found on the [KyGovMaps](#) page or connect directly to our [Web Mapping Services](#) using ArcGIS for Desktop.

### KyGeoPortal

Use the KyGeoportal to Download GIS Data



### KyStoryMaps

Tour Kentucky with Interactive Story Maps



### KyFromAbove

Ky's Aerial Photography & Elevation Data Program



### KyGovMaps

Explore Kentucky with Web Maps and Apps





# Best Practices Review

1. Data analysis is an emphasis within our established goals and functional areas and in our strategic plan.
2. Our organizational structure enables data sharing and analysis across agencies.
3. Geographic Information System (GIS) utilization is embedded in our agency's culture.
4. We use a variety of tools for data visualization and analysis and we pull from multiple data resources.

**ENERGY**  
OFFICE OF ENERGY POLICY

Office of Energy Policy Newsletter, October 2019

**Staff Notes and Reads**

UTILITY DIVE article, *Madison, Wisconsin, cash flow is first in nation to go all-Texas*, is shared by Kenya Stump.

Kenya Stump is reading, *REopt: Renewable Energy Integration & Optimization* - an explanation about the REopt Lite web tool for commercial building managers, a tool developed by NREL, a national laboratory of the U.S. Department of Energy.

Medium's *Bridging the gap between data scientists and management* is an insightful article shared by Greg Bone.

*The future of energy storage is here: An inside look at Rocky Mountain Power's 600-battery DR project*, published by UTILITY DIVE is shared by Lona Brewer.

UTILITY DIVE Brief, *Arizona regulator floats new RFP process to reduce reliance on APS; other utility local forecasts* is shared by Kenya Stump.

Check out the *Emergency Power Facility Assessment Tool* from the U.S. Army Corps of Engineers. The tool is a secure, web-based tool for emergency power assessment for critical public facility owners/operators and emergency response agencies.

Eileen Hardy is sharing blog article, *Taking IEEE 1547 on a Road Show*, about DEP-sponsored workshop.

KY Public Service Commission Net Metering Act Comment period is now closed. Comments may be reviewed under Case No 2019-00256.

**About Us**

We believe in our mission to utilize Kentucky's energy resources for the betterment of the Commonwealth while protecting and improving our environment.

**Updates on Green Tariff Filing**  
Kentucky Power and Louisville Gas & Electric/Kentucky Utilities already have Ky. Public Service Commission (PSC) approved Green Tariffs in place. Now, **Duke Energy Kentucky and East Kentucky Power Cooperative** have Green Tariff filings before the Commission.

Utility Green Tariffs are optional programs in regulated electricity markets offered by utilities and approved by the state PSC. This means the Green Tariff allows larger commercial and industrial customers to buy bundled renewable electricity from a specific project through a special utility tariff rate.

**Partner Spotlight**

**Viz of the Month**

**NATURAL GAS STORAGE DASHBOARD**  
Published by the U.S. Energy Information Administration and updated weekly, the Natural Gas Storage Dashboard offers national and regional statistics and commentary. [Learn more.](#)

<https://lp.constantcontact.com/su/EV7HEss>



# More Work To Do

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Transition publications to interactive dashboards through Tableau and ArcGIS.

Streamlining hardcopy reports.

Enhancing capabilities around forecast and model evaluation to better assist policy makers.

Data automation in terms of downloads, updates, and chart updates.

Move data collection into ArcGIS (Ex. Distributed Renewable Interconnection Data)

Grow capabilities to conduct spatial analysis to find optimal locations.

Cabinet level GIS Architecture and work with Data Security and QA of data.

Map and evaluate fuel pathways in the Commonwealth.

Continue to communicate program activities and successes via story maps and other GIS tools.

Encourage federal agencies to make data accessibly via REST Services and Machine Readable Documents.

SOPs and making sure we don't have single point of failure with institutional knowledge.



Thank  
you!



# Contact

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502-782-7083

Data has a better idea

