NRIC TECH TALKS

Collaborative NRIC Siting Tool for Advanced Nuclear Development (STAND)

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January 26, 2021

FASTEST PATH TO ZERO
UNIVERSITY OF MICHIGAN

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Siting Tool for Advanced Nuclear Development - STAND

What is it?:

- An integrated tool used to help identify and compare possible siting locations inside the continental U.S. for advanced nuclear facilities based on factors related to Socioeconomics, Proximity, and Safety

A tool to help answer the question of "Where?" and "Why there?"

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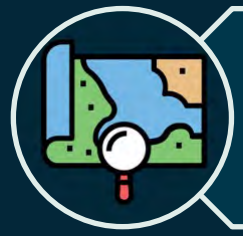
Siting Tool for Advanced Nuclear Development - STAND

Provides a systematic way based on user siting preferences and priorities to:

Discover areas that may be a good fit



Explore areas to identify specific sites

Compare sites to identify an optimal option

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Siting Tool for Advanced Nuclear Development - STAND

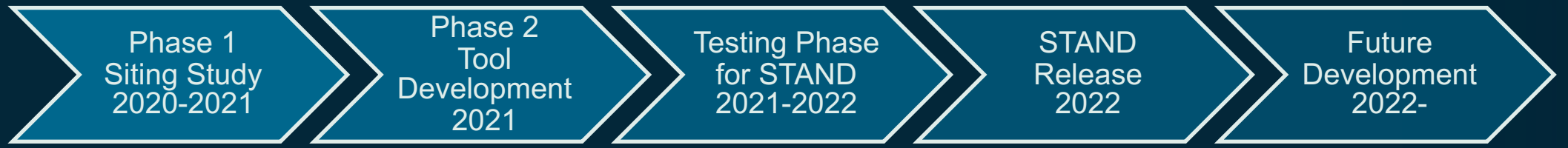
Factors

- 3 categories of factors are considered based on user priorities and preferences

Factors	Definition
Socioeconomic	Social, economic, and local energy policy factors that could potentially influence state and local acceptance of construction and operation of the facility.
Proximity	Environmental and regulatory exclusion zone criteria, distances to infrastructure that could facilitate or support construction and operation of the facility.
Safety	Regulatory guidelines for environmental and geologic safety factors, safety risks, mitigation approaches.

Siting Tool for Advanced Nuclear Development - STAND

Timeline



Timeline	Notes
Phase 1	• Individual tools from participating organizations were utilized for select sites for demonstration • Public report available on OSTI (https://publications.anl.gov/anlpubs/2021/04/167516.pdf)
Phase 2	• Integrated tool development • Meeting and input from social science academics and industry members
Testing Phase	• Internal and beta testing • Issues and bugs resolved
STAND Release	• Tech Talk • STAND training sessions
Future Development (possible)	• Expansion of the tool to include more areas • Updates and improvements based on user needs and input

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Siting Tool for Advanced Nuclear Development - STAND

Team

NRIC Project Management *Trina Davis*		
University of Michigan Integrated Tool Development *Gabrielle Hoelzle* *Kevin Daley* *Todd Allen* *Barbara Peitsch* *Denia Djokić*	ORNL OR-SAGE Integration *Randy Belles* *Olufemi Omitaomu*	Argonne Project Coordination & Comparison Models *Matthew Bucknor* *Michael Samsa* *John Hummel*

Site Discovery

- Set Priorities
- County Analysis

Site Exploration

- Zoom to County
- View Reference Map
- Add Points

Site Comparison

- Process Overview
- Review Sites
- Relevance Form
- Significance Form
- AR-RS Matrix
- Results

Meet STAND

Siting Tool for Advanced Nuclear Development

Use STAND to identify and examine potentially feasible sites where advanced nuclear facilities might be welcomed by host communities. STAND is designed to explore and provide insight on socioeconomic, proximity, and safety data, generate county reports, review regulatory data, and complete a comparative analysis across multiple sites. However, STAND is not a substitute for the in-depth studies required to qualify a site for hosting a nuclear facility, nor is it a substitute for the necessary community engagement to build trust and seek consent.STAND is best used for the contiguous United States. Data availability is limited in Alaska and Hawaii. STAND does not currently support analysis of U.S. Territories.

Get Started

Site Discovery

Start here if you want to identify counties or states that may be candidates for reactor deployment.

Site Exploration

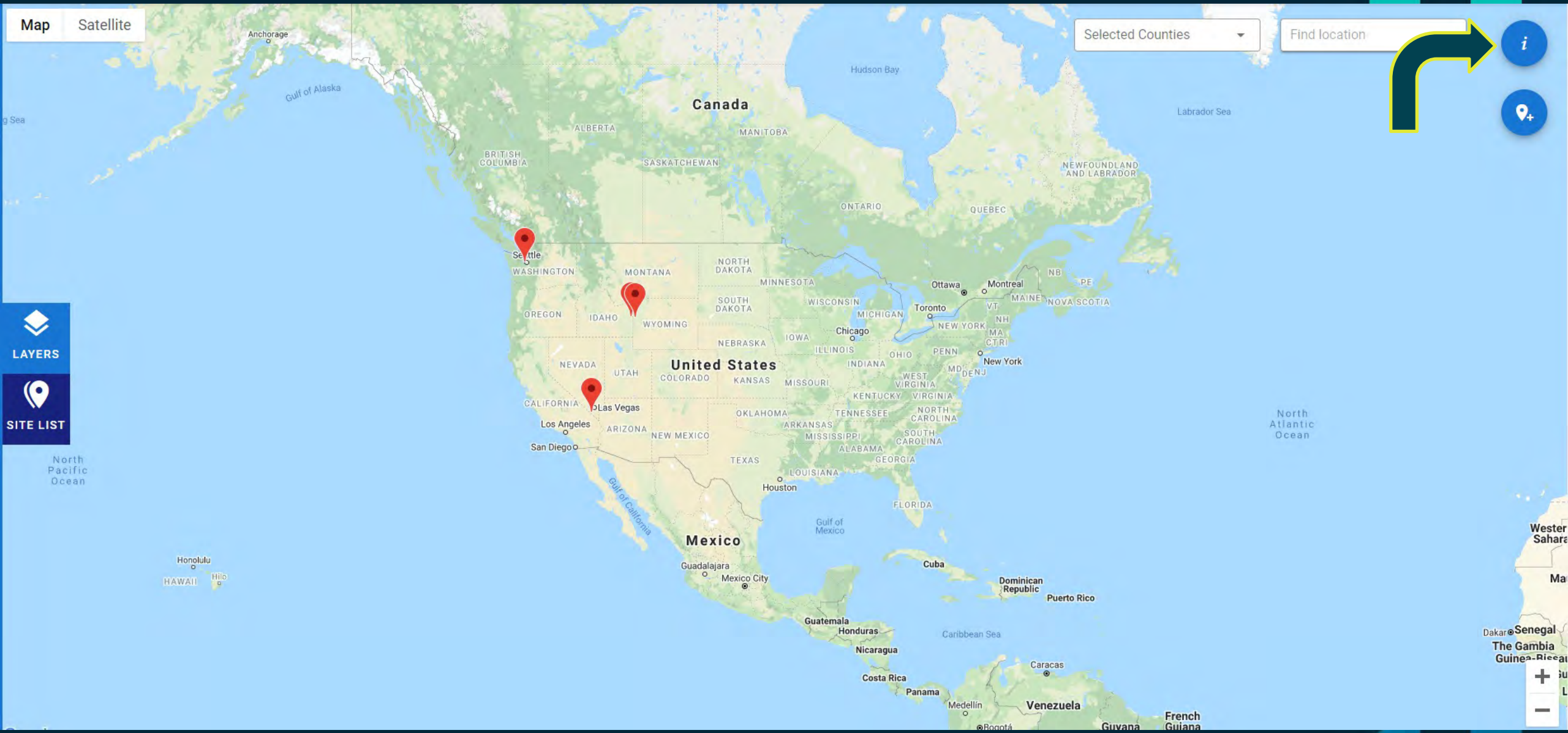
Start here if you have already identified general areas for deployment but would like to explore regulatory data or drop points.

Site Comparison

Start here if you have identified site coordinates for deployment and would like to compare them against each other.

User-friendly Guidance Features

- Page Level Information Boxes
- Indicator Level Information Boxes
- Reference Maps


Map
Satellite
Selected Counties
Find location
LAYERS
SITE LIST
Canada
United States
Mexico
Anchorage
Gulf of Alaska
Hudson Bay
Labrador Sea
North Atlantic Ocean
North Pacific Ocean
Gulf of Mexico
Caribbean Sea
Gulf of California
Seattle
Las Vegas
Los Angeles
San Diego
Houston
Chicago
Toronto
Ottawa
Montreal
New York
Guadalajara
Mexico City
Honolulu
Cuba
Dominican Republic
Puerto Rico
Guatemala
Honduras
Nicaragua
Costa Rica
Panama
Caracas
Medellín
Venezuela
Guyana
French Guiana
Senegal
The Gambia

Site Exploration

Site Exploration displays a web GIS which can be used to explore regulatory and/or infrastructure data and select locations for Site Comparison.

How To Use This Section:

1. Choose locations for exploration:
    a. If counties have been selected in Site Discovery, these counties can be accessed in the dropdown titled “Selected Counties” in the upper right of the map frame. This will zoom the map to the selected counties.
    b. The “Find Location” box in the upper right of the map frame will zoom to any user defined location. User defined locations can be; states, counties,cities or addresses.
    c. Adjust the zoom with the +/- icon on the left of the map. Reposition by clicking and dragging.
2. View data layers:
    a. Click on the “Layers” tab on the left side of the screen to open the layers drawer. Use the dropdowns to display the available layers for each category.
        i. Use checkboxes to display layers in the map. Multiple layers can be selected and viewed simultaneously. Layers that display "Zoom in" below the layer name require the map to be zoomed further in in order to be displayed.
        ii. Click the information boxes to display layer information.
3. Add sites for Site Comparison:
    a. Click the add sites icon on the right side of the map frame to add sites:
        i. Once the icon has been clicked, it will turn red to indicate it is active. Click it again to deactivate or the next click on the map will add a new site.
        ii. If a new site is added, a dialog box will appear. Input the name of the site and submit by clicking save to list.
    b. Once sites have been added, click on the “Site List” tab on the left side of the screen to open the site list drawer.
        i. Click the blue site name to zoom to that site in the map pane.
        ii. Use the garbage can icon to remove the site from the list.
        iii. Once all sites have been added, click the green “Compare Sites” button to proceed to Site Comparison where all sites added will be automatically displayed.

Fault Lines

High

31 35 40

Reference Map Not Available

Landslide Hazard

High

31 35 40

Reference Map Not Available

Safe Shutdown Earthquake

High

31 35 40

Peak ground acceleration:

0.3g 0.4g 0.5g 0.6g

Reference Map Not Available

Safe Shutdown Earthquake

Land with safe-shutdown earthquake (SSE) peak ground acceleration (2% chance in a 50 year return period) between .1g -.6 g. The SSE peak ground acceleration (2% chance in a 50-year return period) greater than the selected threshold parameter value is flagged. This value is variable within the database and can be adjusted based on technology. SSE =0.3 g is suggested for LWRs. SSE =0.5 g is suggested for SMRs.

WHY IT MATTERS

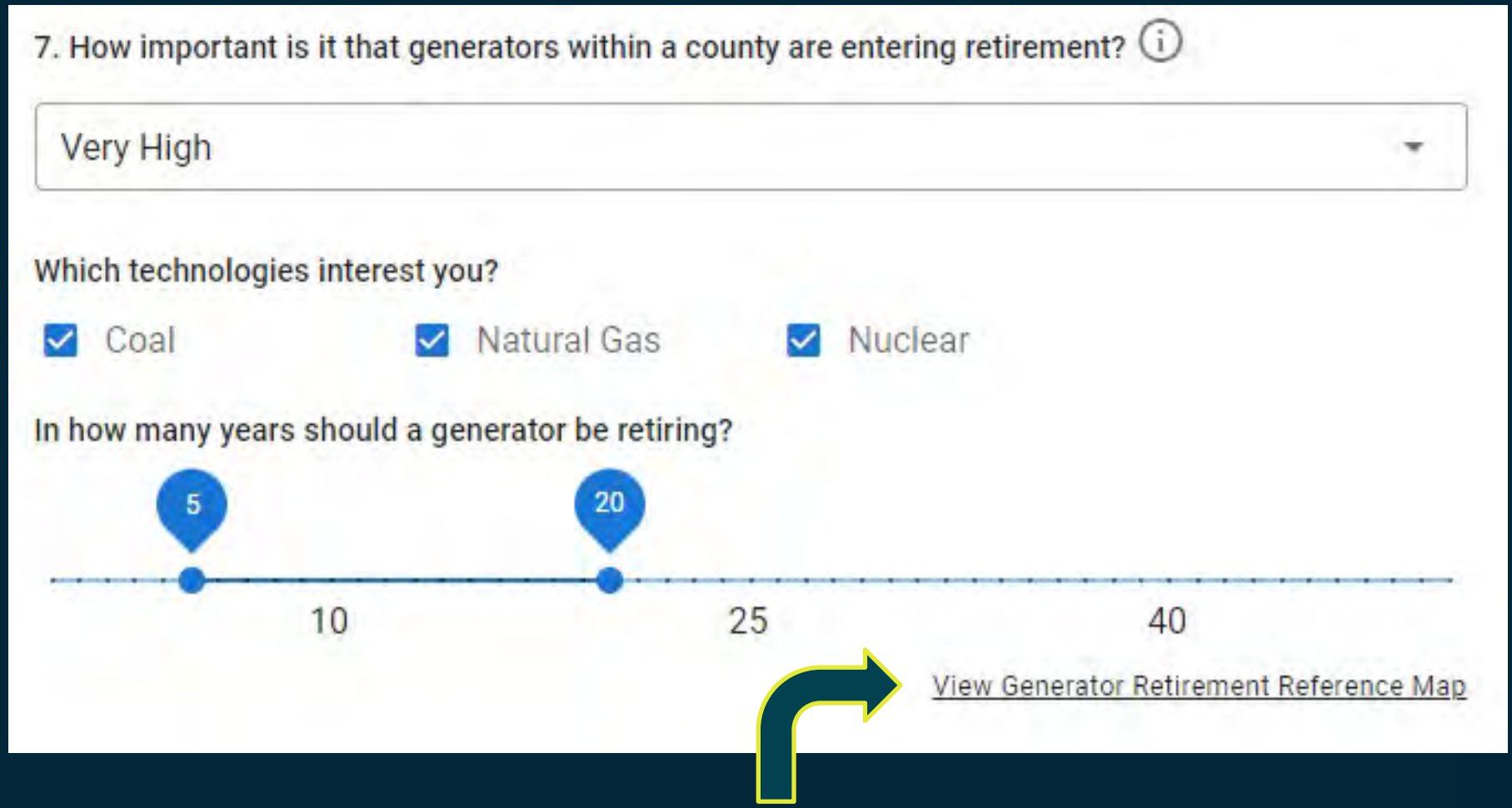
The 2002 EPRI siting guidance recommended limiting large LWR technologies to less than 0.3 g safe shutdown earthquake peak ground acceleration. As SMRs and advanced reactor technologies allow for more seismic mitigation through design, the OR-SAGE threshold parameter for seismic activity has been set slightly higher at 0.5 g safe shutdown earthquake peak ground acceleration. Mitigating design features may include smaller footprints, smaller piping systems, passive safety systems, underground installation, and improved seismic isolation

REFERENCES

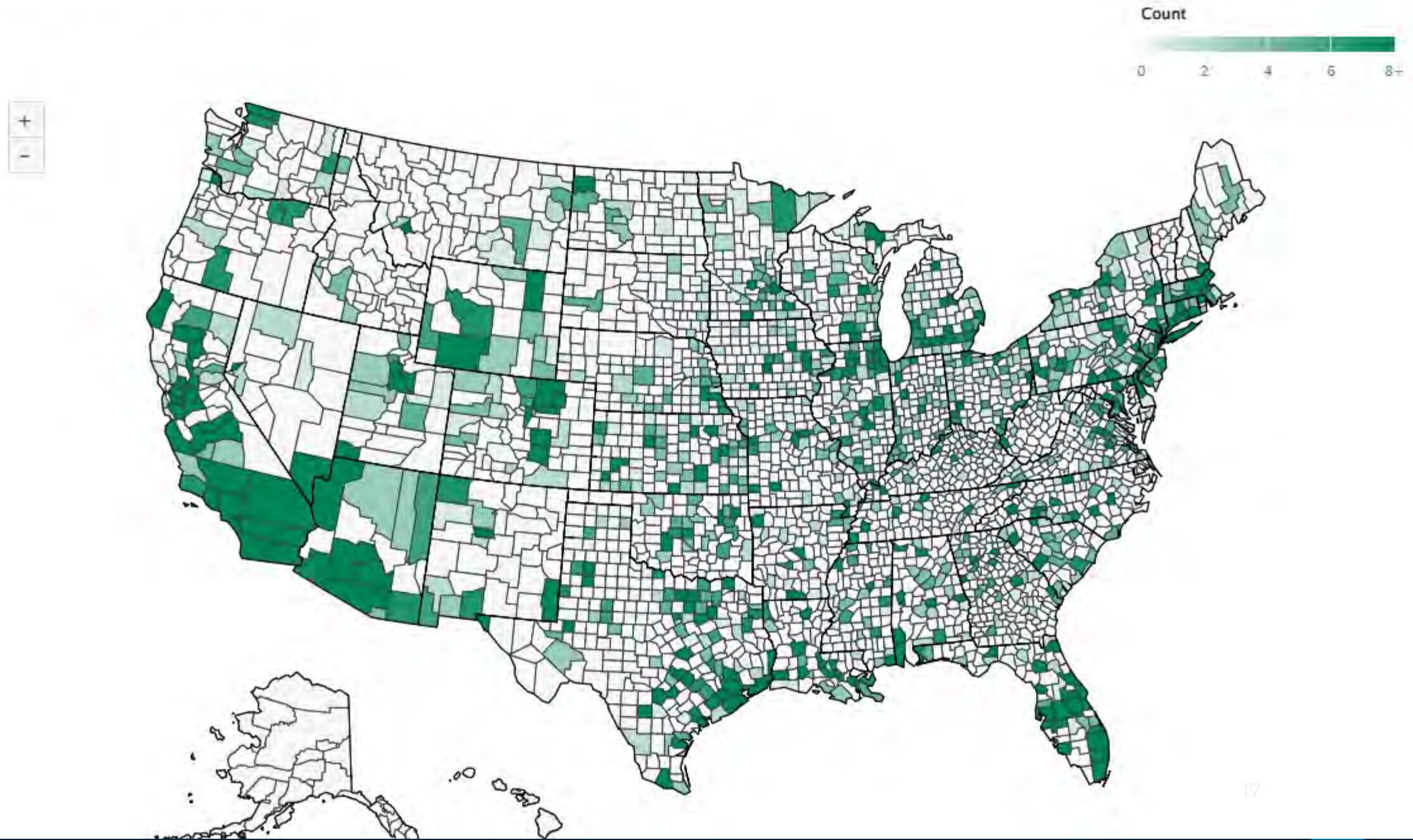
2002 EPRI Siting Guide

USGS National Seismic Hazard Mapping data

No update plan for this dataset


7. How important is it that generators within a county are entering retirement?
Very High
Which technologies interest you?
Coal
Natural Gas
Nuclear
In how many years should a generator be retiring?
5
20
10
25
40
View Generator Retirement Reference Map

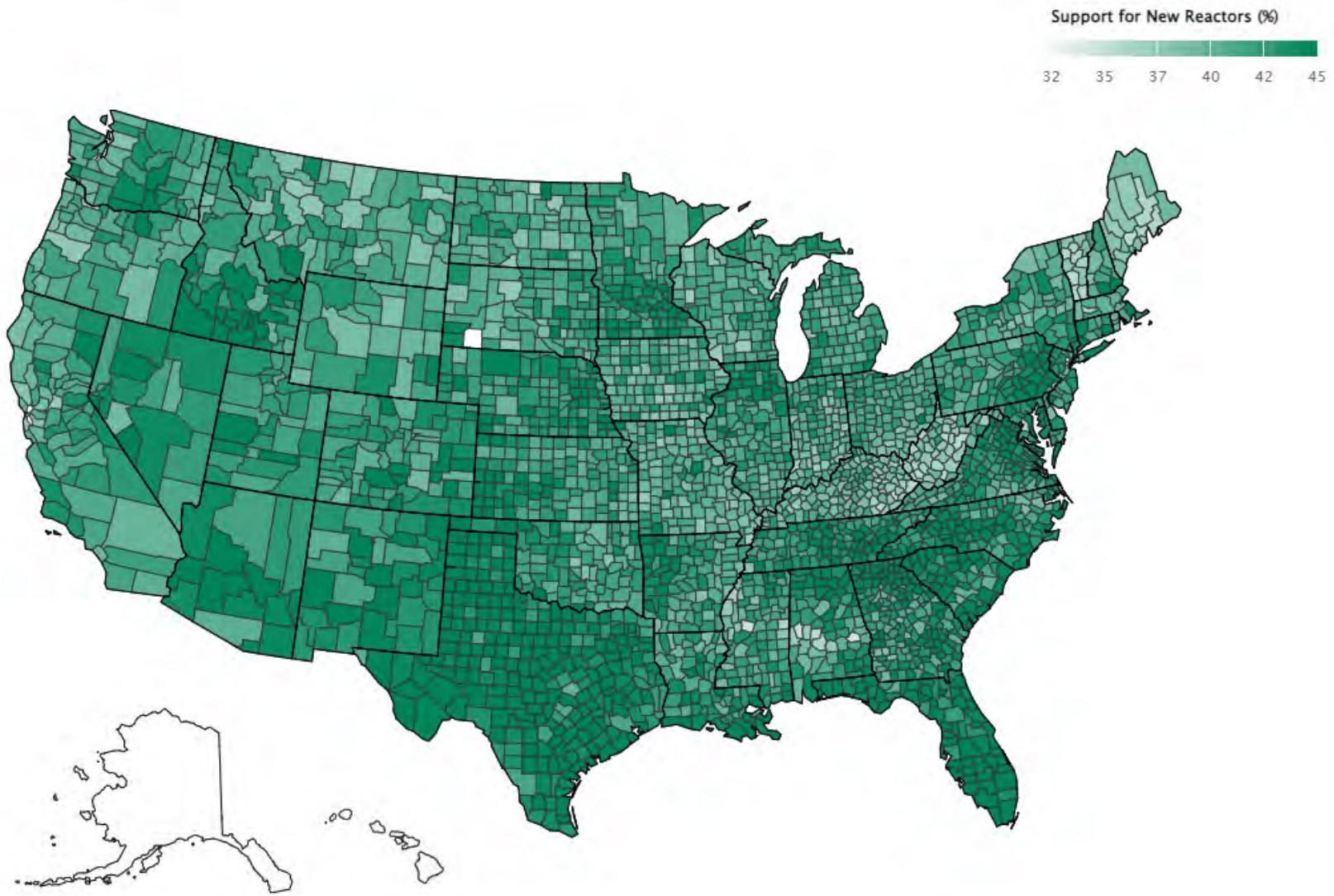
Generator Retirement

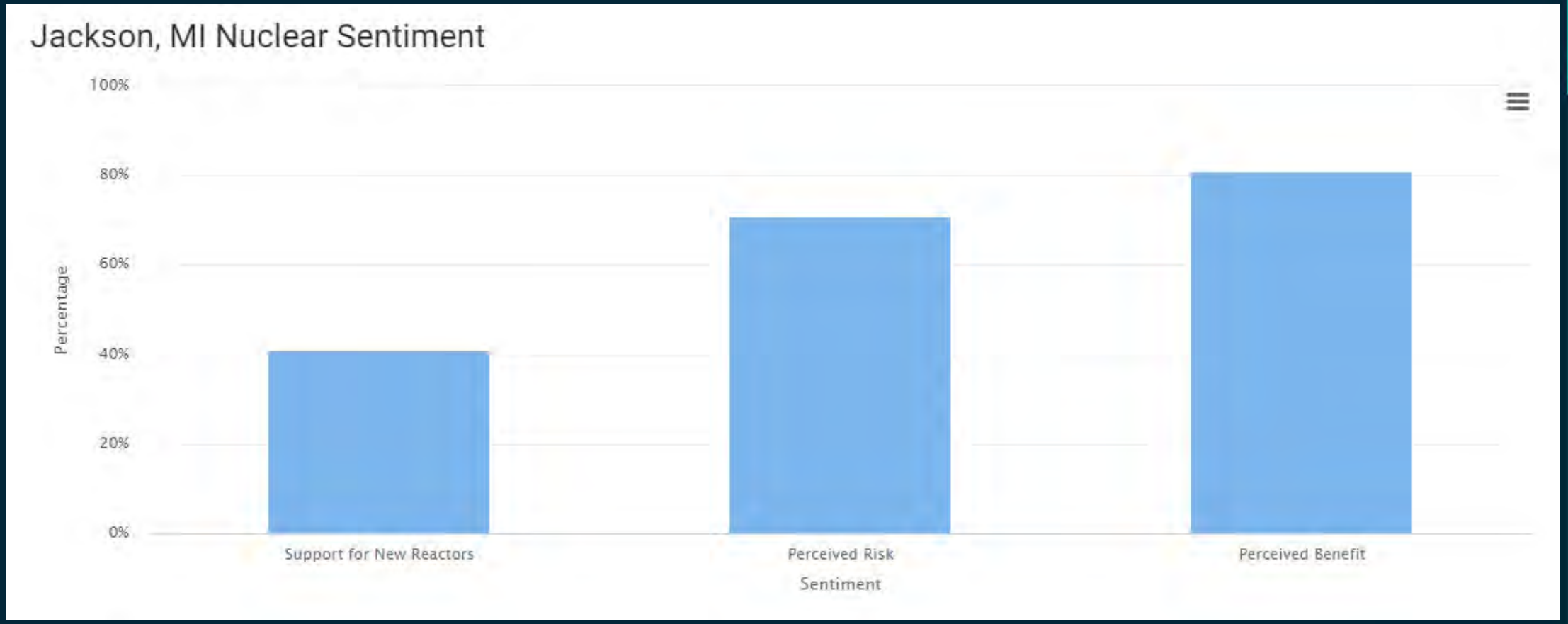


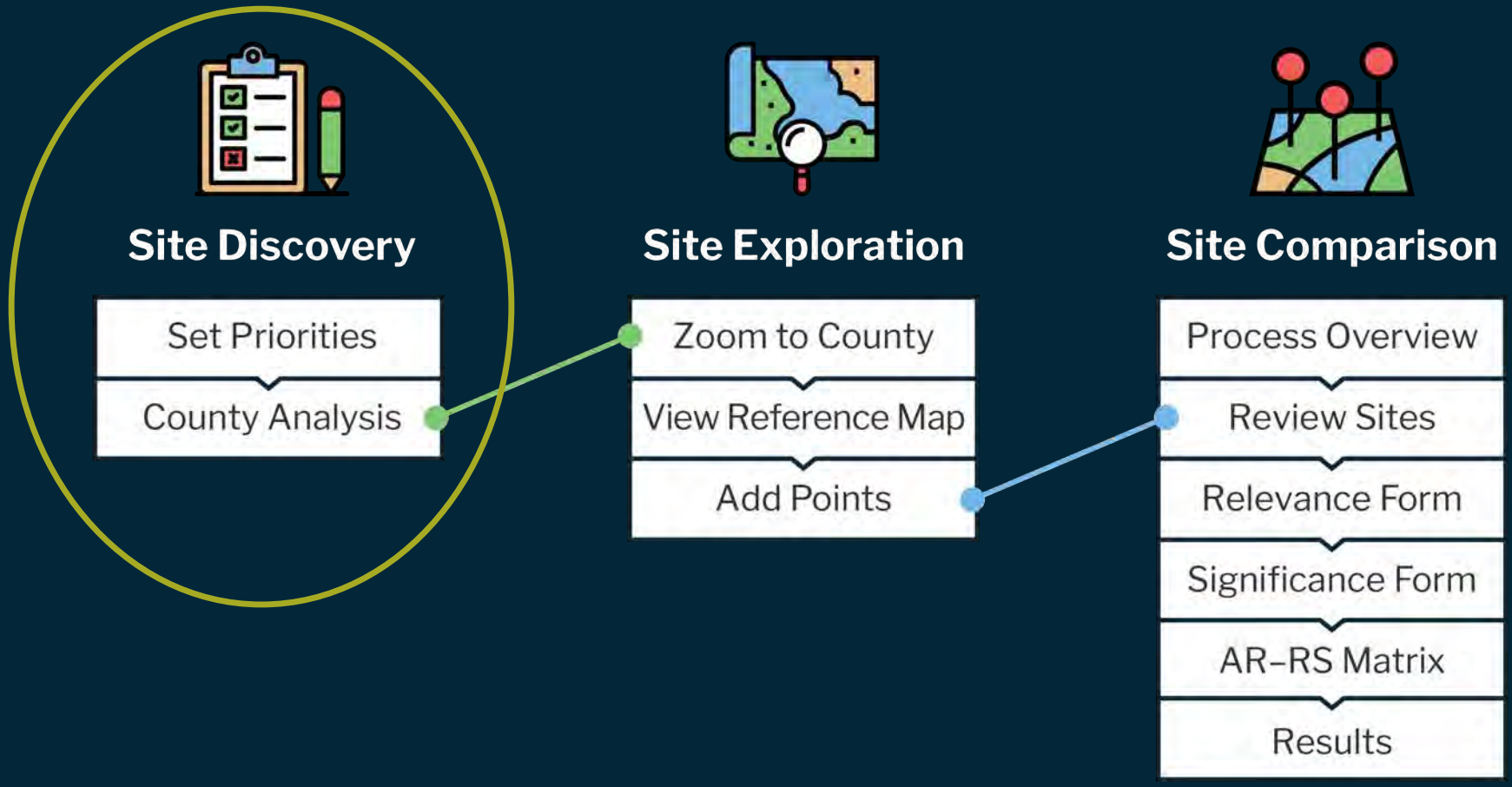
Washtenaw, MI Retiring Generators

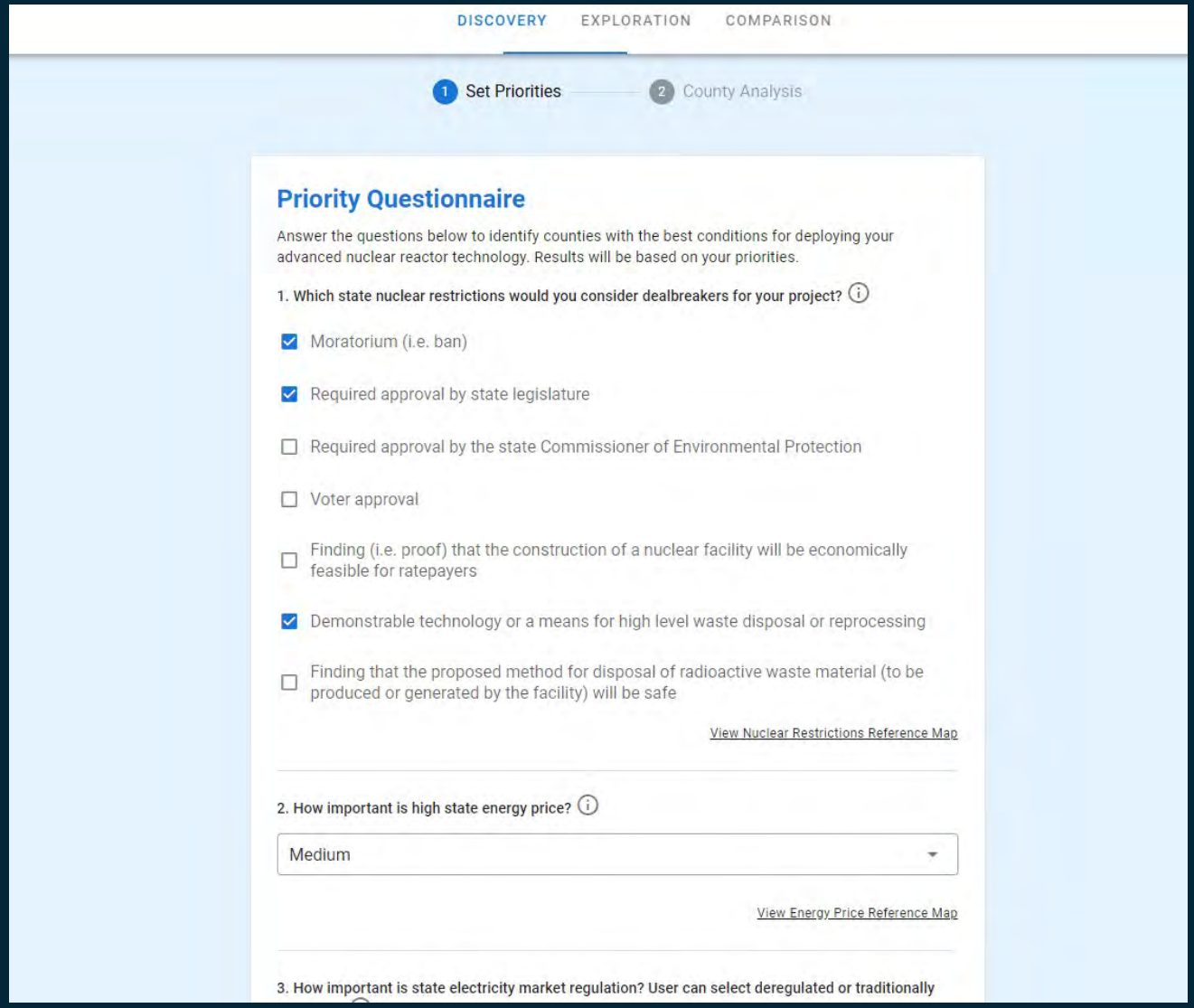
Utility	Facility	Generator ID	Technology	Retirement Status	Retirement Year	Nameplate Capacity (MWh)
East. Michigan Univ. Heating Plant	East. Michigan Univ. Heating Plant	COGN2	Natural Gas Fired Combustion Turbine	Planned Retirement		8
University of Michigan	University of Michigan	TG1	Natural Gas Fired Combined Cycle	Planned Retirement		13
University of Michigan	University of Michigan	TG10	Natural Gas Fired Combined Cycle	Planned Retirement		4
University of Michigan	University of Michigan	TG7	Natural Gas Fired Combined Cycle	Planned Retirement		13
University of Michigan	University of Michigan	TG8	Natural Gas Fired Combined Cycle	Planned Retirement		13
University of Michigan	University of Michigan	TG9	Natural Gas Fired Combined Cycle	Planned Retirement		4
University of Michigan NCampus Research	Warner Lambert	5164	Natural Gas Fired Combustion Turbine	Planned Retirement		3

Nuclear Sentiment




Jackson, MI Nuclear Sentiment
100%
80%
60%
40%
20%
0%
Percentage
Support for New Reactors
Perceived Risk
Perceived Benefit
Sentiment


Site Discovery
Set Priorities
County Analysis
Site Exploration
Zoom to County
View Reference Map
Add Points
Site Comparison
Process Overview
Review Sites
Relevance Form
Significance Form
AR–RS Matrix
Results

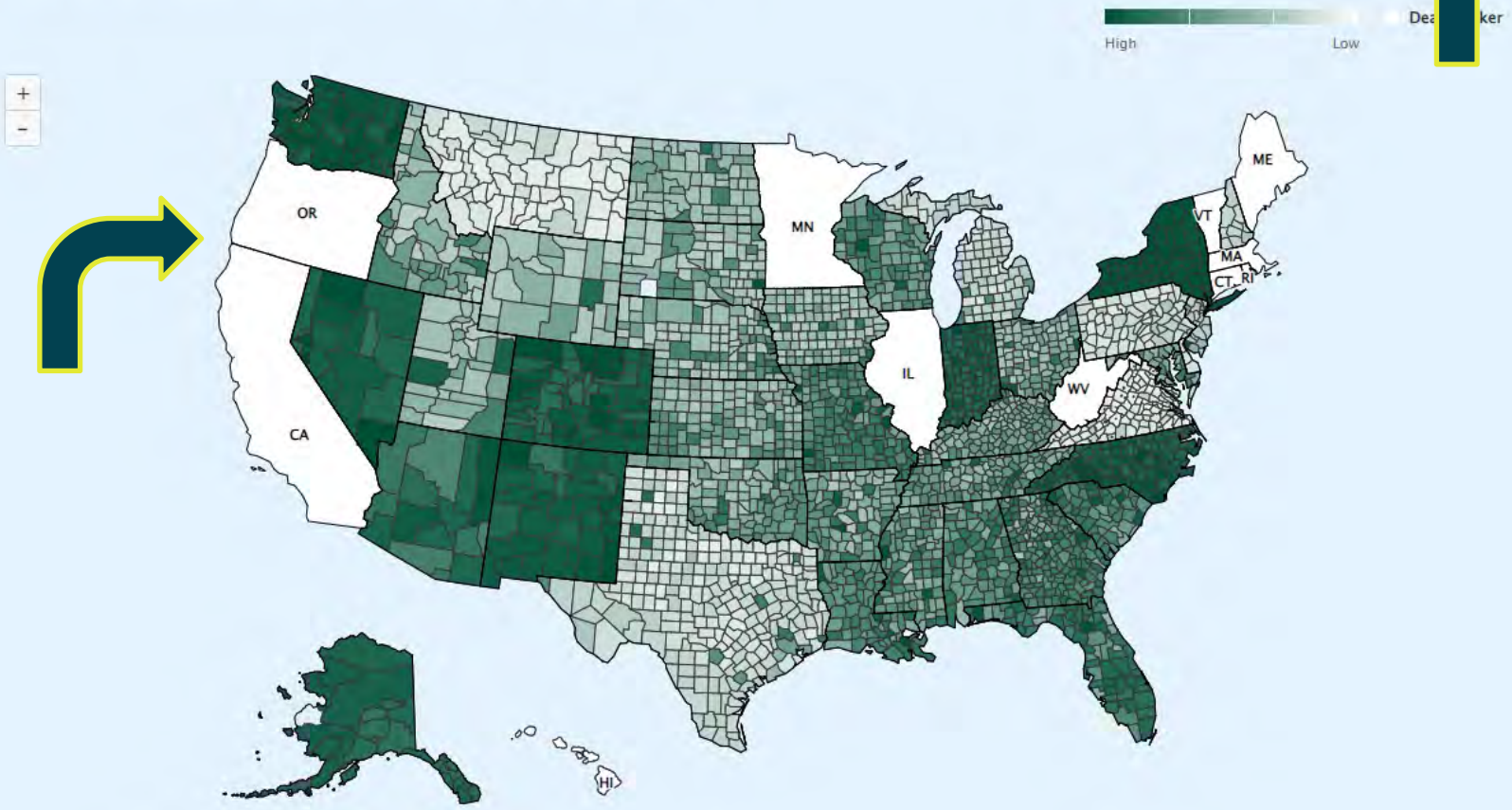

DISCOVERY
EXPLORATION
COMPARISON
1 Set Priorities
2 County Analysis
Priority Questionnaire
Answer the questions below to identify counties with the best conditions for deploying your advanced nuclear reactor technology. Results will be based on your priorities.
1. Which state nuclear restrictions would you consider dealbreakers for your project?
Moratorium (i.e. ban)
Required approval by state legislature
Required approval by the state Commissioner of Environmental Protection
Voter approval
Finding (i.e. proof) that the construction of a nuclear facility will be economically feasible for ratepayers
Demonstrable technology or a means for high level waste disposal or reprocessing
Finding that the proposed method for disposal of radioactive waste material (to be produced or generated by the facility) will be safe
View Nuclear Restrictions Reference Map
2. How important is high state energy price?
Medium
View Energy Price Reference Map
3. How important is state electricity market regulation? User can select deregulated or traditionally

Set Priorities — 2 County Analysis

Priority Match Map

This custom heat map shows the Development Rank for each county based on your priorities.
Click a county to see ranking details, select a county to analyze, or download a report.

MODIFY PRIORITIES



Top Matches

These are the top-ranking counties based on your priorities. Click a county name for details about its rank. Select up to five locations to analyze.

	County	State	Rank ↑ 1
☐	Lewis	Washington	1
☐	Alamosa	Colorado	2
☐	Lea	New Mexico	3
☐	San Juan	New Mexico	4
☐	Pueblo	Colorado	5
☐	Cleveland	North Carolina	6
☐	Clark	Nevada	7
☐	Mesa	Colorado	8
☐	Adams	Colorado	9
☐	Gaston	North Carolina	10

Rows per page: 10 1-10 of 2742

Selected Counties:

Teton, ID ⊗ Kitsap, WA ⊗ Nye, NV ⊗

PROCEED TO SITE EXPLORATION

Washtenaw, MI

DEVELOPMENT RANK: 2196

Attribute	Priority	Value
Relatively high energy price	Medium	12.767¢/kwH
Preferred market regulation (Traditionally Regulated)	Very High	false
Energy policy is nuclear inclusive	High	false
Positive nuclear sentiment	Medium	0.399%
Home to operating nuclear facilities	Low	false
Home to retiring/retired generators (Coal, Nuclear, Natural Gas 5-20 years from now)	Very High	false
Low mean annual wage for construction labor (five year average)	Medium	$39690
Served by a utility that has nuclear experience	Low	true
Net importer of electricity	Not Important	false
Home to nuclear research and development	Very Low	
Has a low social vulnerability index	Medium	0.2236

☐ Select County

DOWNLOAD COUNTY REPORT

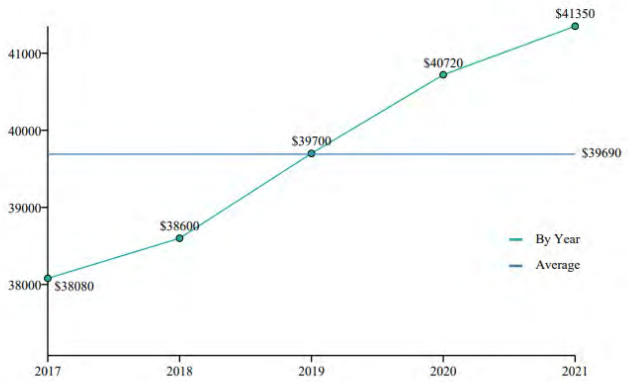
NRIC STAND

Nuclear Development Readiness Report

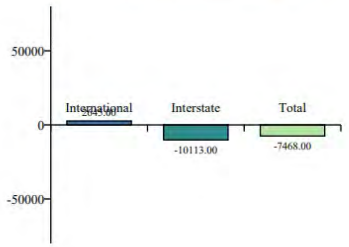
Washtenaw County, MI

NRIC STAND

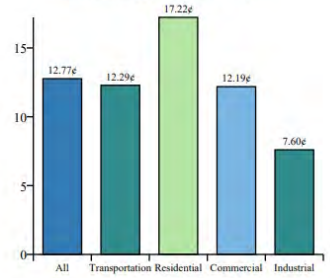
State Construction Labor Rate (Mean Annual Wage)[6]



Net Electricity Imports (Million kWh)[7]



Retail Energy Price (¢/kWh)[8]

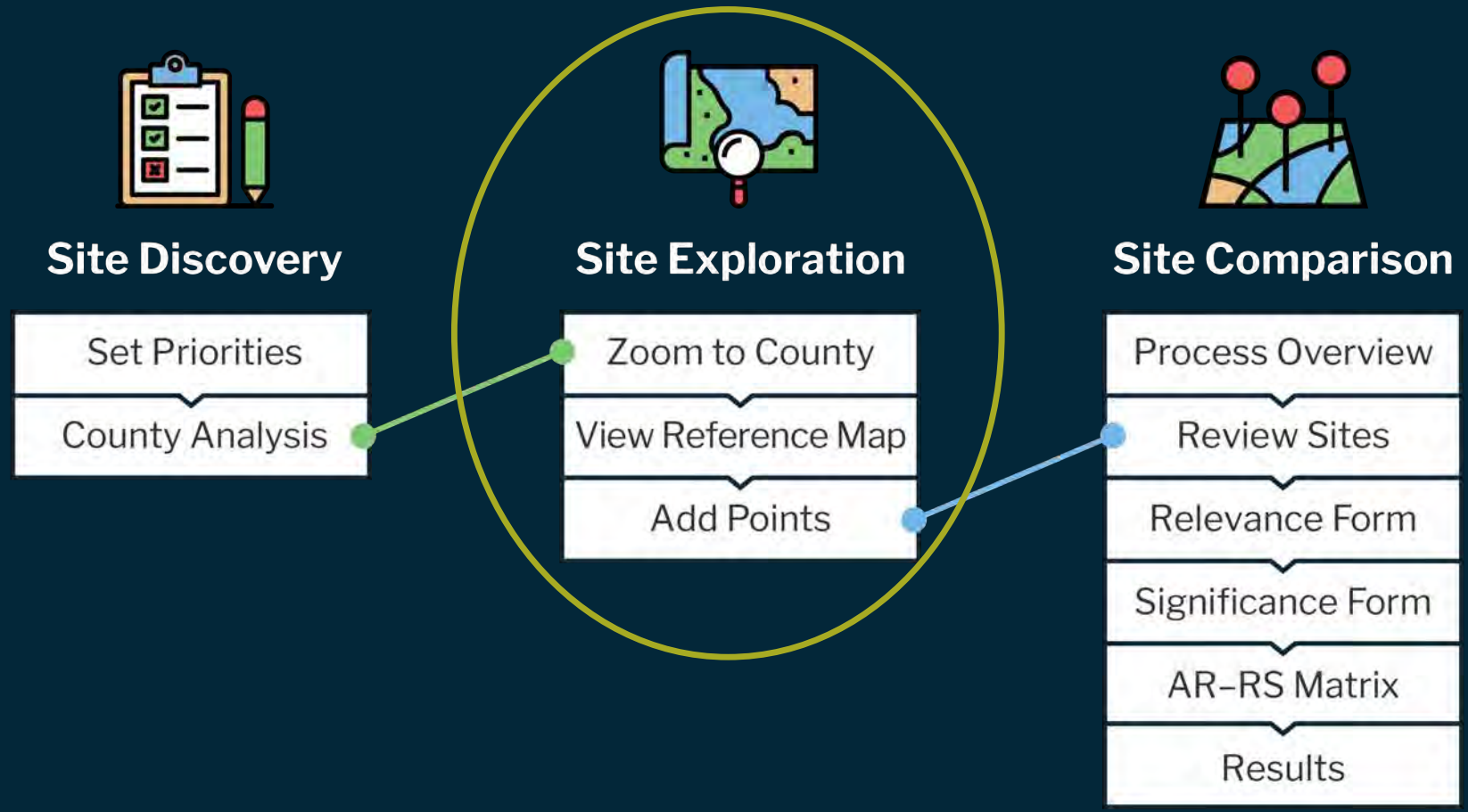


Facilities[9]

Facility	Utility	Balancing Authority	Is Nuclear
Superior	DTE Electric Company	MISO	False
Domino Farms Solar	DTE Electric Company	MISO	False
University of Michigan	University of Michigan	MISO	False
GRS Arbor Hills	Gas Recovery Systems Inc	MISO	False
Warner Lambert	University of Michigan NCampus Research	MISO	False
East. Michigan Univ. Heating Plant	East. Michigan Univ. Heating Plant	MISO	False

Select Generator Retirement[9]

Utility	Facility	Generator	Milestone	Year	Technology	Nameplate Capacity MWh
University of Michigan	University of Michigan	TG1	Planned Retirement	None	Natural Gas Fired Combined Cycle	13
University of Michigan	University of Michigan	TG10	Planned Retirement	None	Natural Gas Fired Combined Cycle	4
University of Michigan	University of Michigan	TG8	Planned Retirement	None	Natural Gas Fired Combined Cycle	13
University of Michigan	University of Michigan	TG9	Planned Retirement	None	Natural Gas Fired Combined Cycle	4
University of Michigan NCampus Research	Warner Lambert	5164	Planned Retirement	None	Natural Gas Fired Combustion Turbine	3
East. Michigan Univ. Heating Plant	East. Michigan Univ. Heating Plant	COGN2	Planned Retirement	None	Natural Gas Fired Combustion Turbine	8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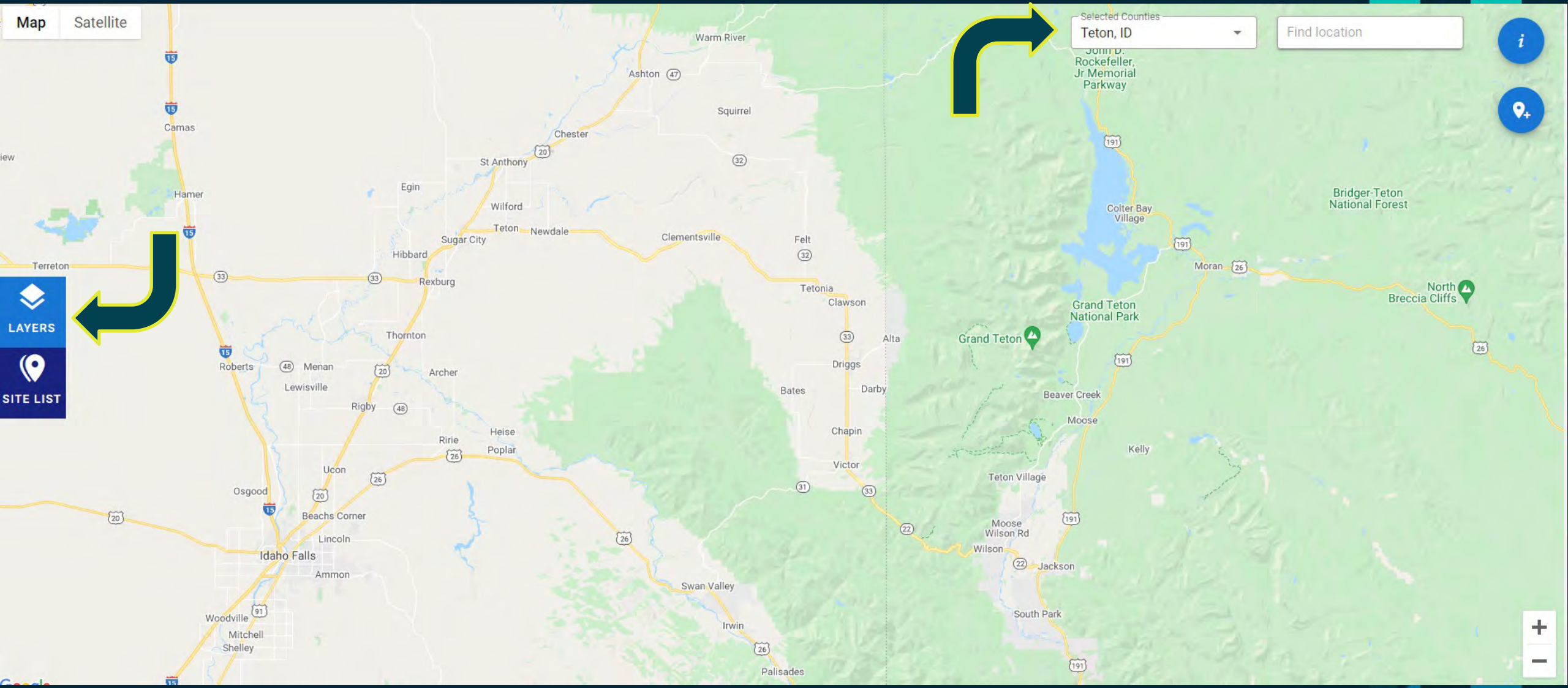
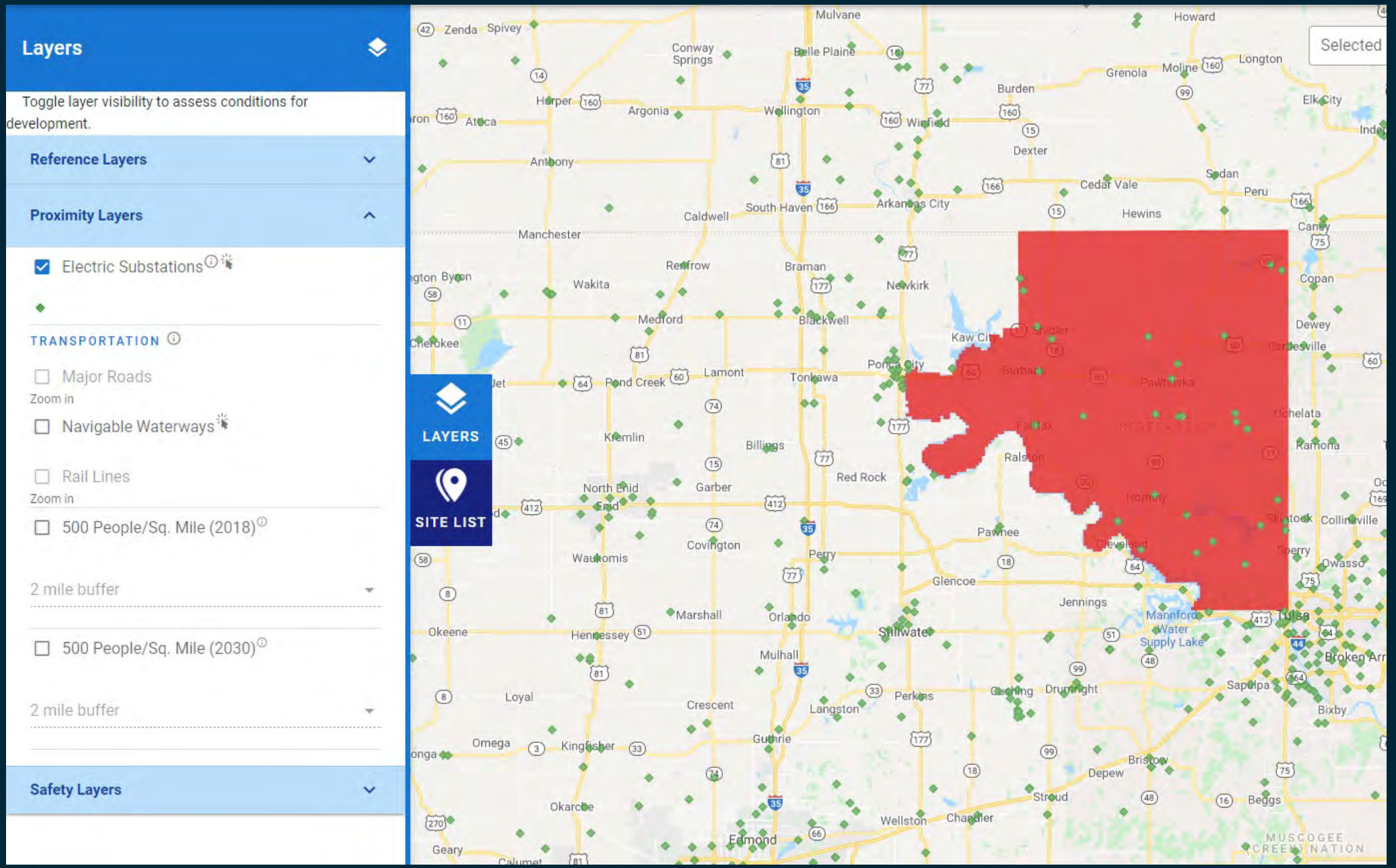
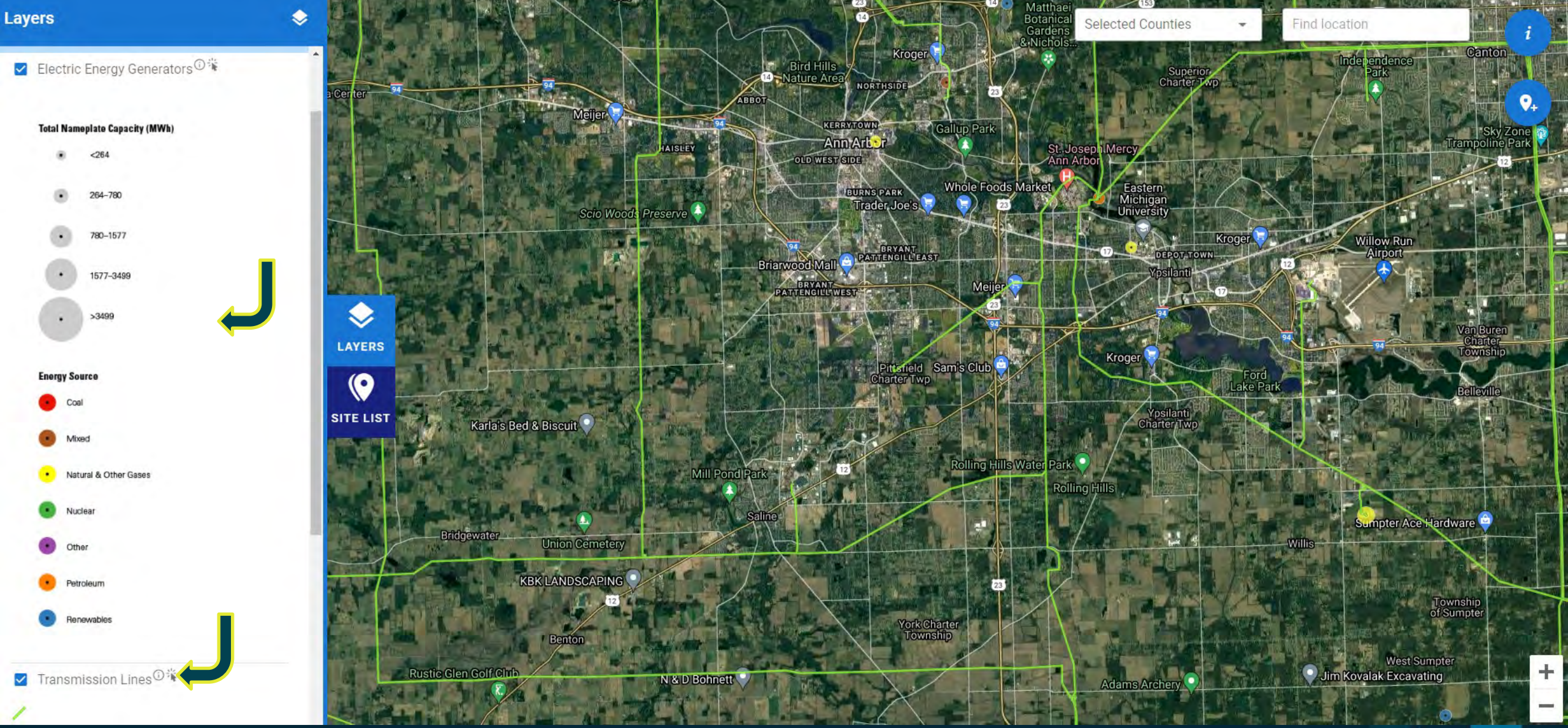

Map
Satellite
LAYERS
SITE LIST
Selected Counties
Teton, ID
Find location
Warm River
Ashton
Squirrel
Chester
St Anthony
Egin
Hamer
Wilford
Teton
Newdale
Sugar City
Clementsville
Felt
Hibbard
Terreton
Rexburg
Tetonia
Clawson
Thornton
Alta
Roberts
Menan
Archer
Driggs
Lewisville
Bates
Darby
Rigby
Beaver Creek
Heise
Moose
Chapin
Ririe
Poplar
Kelly
Victor
Ucon
Teton Village
Osgood
Beachs Corner
Moose
Wilson Rd
Lincoln
Wilson
Idaho Falls
Jackson
Ammon
Swan Valley
South Park
Woodville
Irwin
Mitchell
Shelley
Palisades
John D. Rockefeller, Jr Memorial Parkway
Colter Bay Village
Bridger-Teton National Forest
Moran
Grand Teton National Park
North Breccia Cliffs
Grand Teton


Layers
Toggle layer visibility to assess conditions for development.
Reference Layers
Proximity Layers
Electric Substations
TRANSPORTATION
Major Roads
Zoom in
Navigable Waterways
Rail Lines
Zoom in
500 People/Sq. Mile (2018)
2 mile buffer
500 People/Sq. Mile (2030)
2 mile buffer
Safety Layers
LAYERS
SITE LIST
Selected
Mulvane
Howard
Zenda
Spivey
Conway Springs
Belle Plaine
Grenola
Moline
Longton
Burden
Harper
Argonia
Wellington
Winfield
Elk City
Attica
Dexter
Anthony
Sedan
Cedar Vale
Peru
South Haven
Arkansas City
Caldwell
Hewins
Manchester
Caney
Renfrow
Braman
Newkirk
Copan
Wakita
Medford
Blackwell
Dewey
Kaw City
Shidler
Bartlesville
Cherokee
Ponca City
Burbank
Pawhuska
Lamont
Tonkawa
Pond Creek
Ochelata
Kremlin
Billings
Ralston
Ramona
Red Rock
North Enid
Garber
Hominy
Skiatook
Collinsville
Pawnee
Covington
Waukomis
Perry
Cleveland
Sperry
Owasso
Glencoe
Jennings
Marshall
Orlando
Mannford Water Supply Lake
Tulsa
Okeene
Hennessey
Stillwater
Mulhall
Broken Arr
Loyal
Perkins
Cushing
Drumright
Sapulpa
Crescent
Langston
Bixby
Omega
Kingfisher
Guthrie
Bristow
Depew
Okarche
Stroud
Beggs
Wellston
Chandler
Edmond
Geary
MUSCOGEE (CREEK) NATION

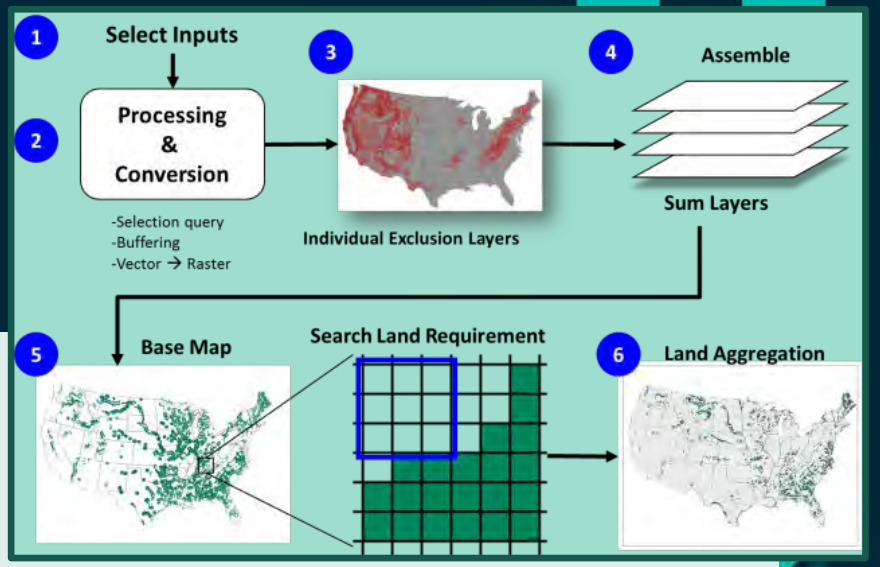

Layers
Electric Energy Generators
Total Nameplate Capacity (MWh)
<264
264–780
780–1577
1577–3499
>3499
Energy Source
Coal
Mixed
Natural & Other Gases
Nuclear
Other
Petroleum
Renewables
Transmission Lines
LAYERS
SITE LIST
Selected Counties
Find location
Ann Arbor
Kroger
Meijer
Whole Foods Market
Trader Joe's
Briarwood Mall
Eastern Michigan University
Ypsilanti
Willow Run Airport
Sam's Club
Ford Lake Park
Rolling Hills Water Park
Rolling Hills
Saline
Mill Pond Park
Union Cemetery
Bridgewater
KBK LANDSCAPING
Benton
York Charter Township
Ypsilanti Charter Township
Sumpter Ace Hardware
Willis
Township of Sumpter
Jim Kovalak Excavating
Adams Archery
N & D Bohnett
Rustic Glen Golf Club
Karla's Bed & Biscuit
Scio Woods Preserve
Gallup Park
Bird Hills Nature Area
Independence Park
Sky Zone Trampoline Park
Canton
Van Buren Charter Township
Belleville

ELECTRIC ENERGY GENERATORS | **TRANSMISSION LINES**

Owner	Status	Substation 1	Substation 2	Type	Voltage Class	Voltage
NOT AVAILABLE	IN SERVICE	SUPERIOR	COVENTRY	AC; OVERHEAD	100-161	120
NOT AVAILABLE	IN SERVICE	SUPERIOR	WAYNE	AC; OVERHEAD	100-161	120
NOT AVAILABLE	IN SERVICE	SUPERIOR	PIONEER	AC; OVERHEAD	100-161	120
NOT AVAILABLE	IN SERVICE	SUPERIOR	TAP137299	AC; OVERHEAD	100-161	120
NOT AVAILABLE	IN SERVICE	SUPERIOR	COVENTRY	AC; OVERHEAD	100-161	120
NOT AVAILABLE	IN SERVICE	SUPERIOR	TAP138716	AC; OVERHEAD	100-161	120
NOT AVAILABLE	IN SERVICE	COLLINS	SUPERIOR	AC; OVERHEAD	100-161	120
NOT AVAILABLE	IN SERVICE	MILAN	MCAULEY	OVERHEAD	100-161	120
NOT AVAILABLE	NOT AVAILABLE	SUPERIOR	NOT AVAILABLE	OVERHEAD	NOT AVAILABLE	-999999
NOT AVAILABLE	IN SERVICE	MCAULEY	SUPERIOR	AC; OVERHEAD	100-161	120

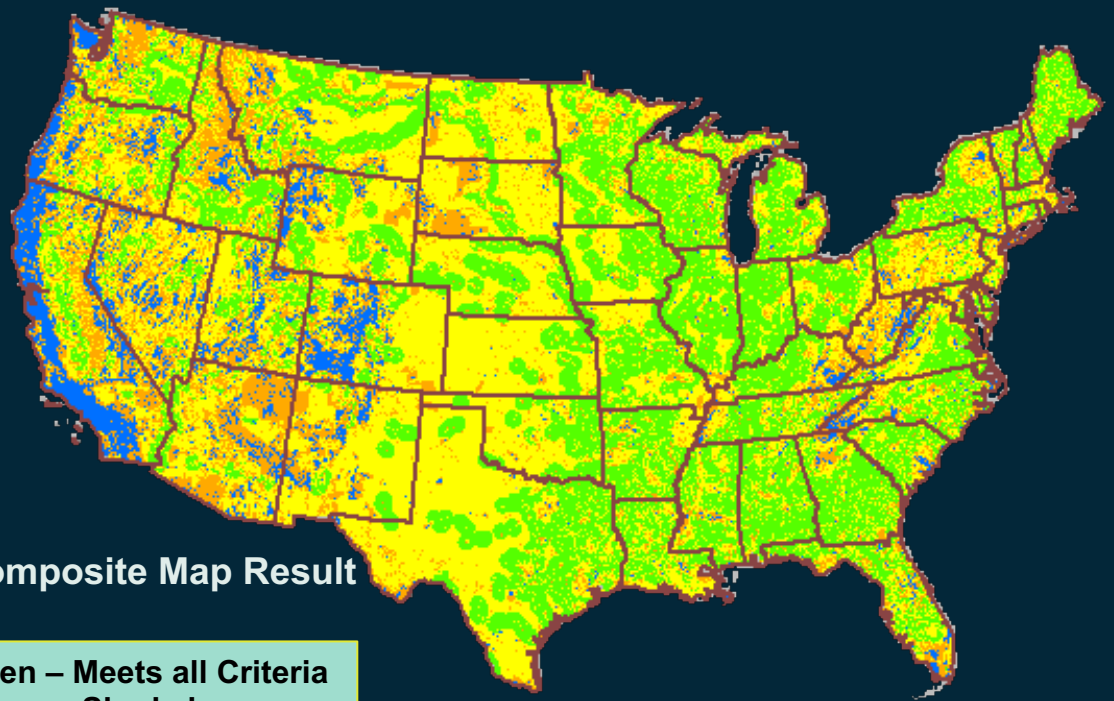
Rows per page: 10 1-10 of 10

OR-SAGE: Oak Ridge Siting Analysis for Power Generation Expansion is a geographical information system (GIS) process tool



- **Objectives:**
  - Use industry-accepted parameters for screening
  - Use array of GIS data sources and spatial modeling capabilities at ORNL
- **Approach:**
  - Adapted 10 CFR 100 requirements (through application of NRC RG 4.7 siting guidance and 2002 EPRI Siting Guide screening criteria) for nuclear power plants to GIS technology
  - Use ~ 50 datasets to scan the contiguous U.S. (~1.8 billion acres) using 100 m by 100 m grid cells (2.5 acres)
  - Results in a searchable land database of ~ 700 million cells

OR-SAGE is typically used to provide informative visual results on a national, regional, or local scale



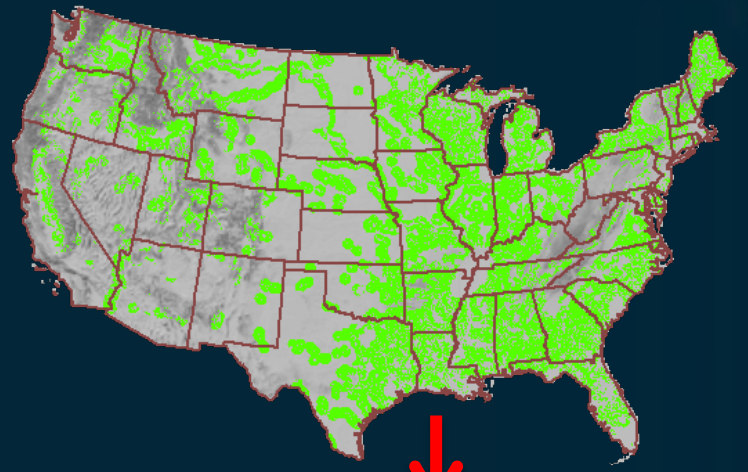
Composite Map Result

Green – Meets all Criteria
Yellow – Single issue
Orange – Two issues
Blue – 3+ issues

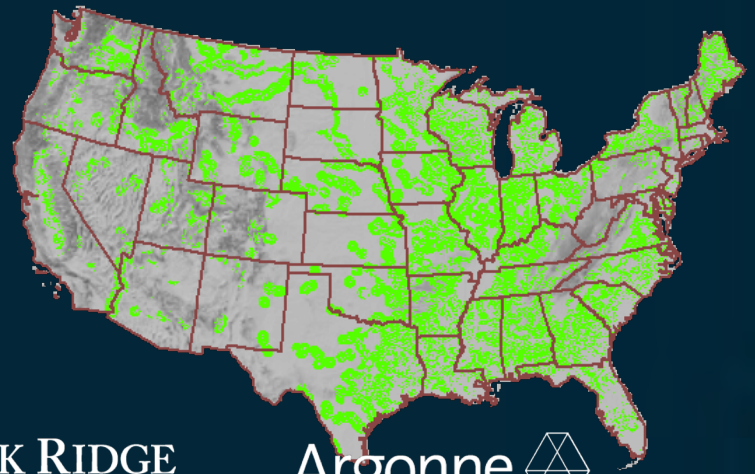
Single issue potential:
Yellow + Green = 74.7%
potentially meets criteria

OR-SAGE provides capability to interrogate any cell to evaluate status.

Base Map – 33.4% of US meets all criteria



Aggregate for 50-acre sites – 26.9% of US meets all criteria



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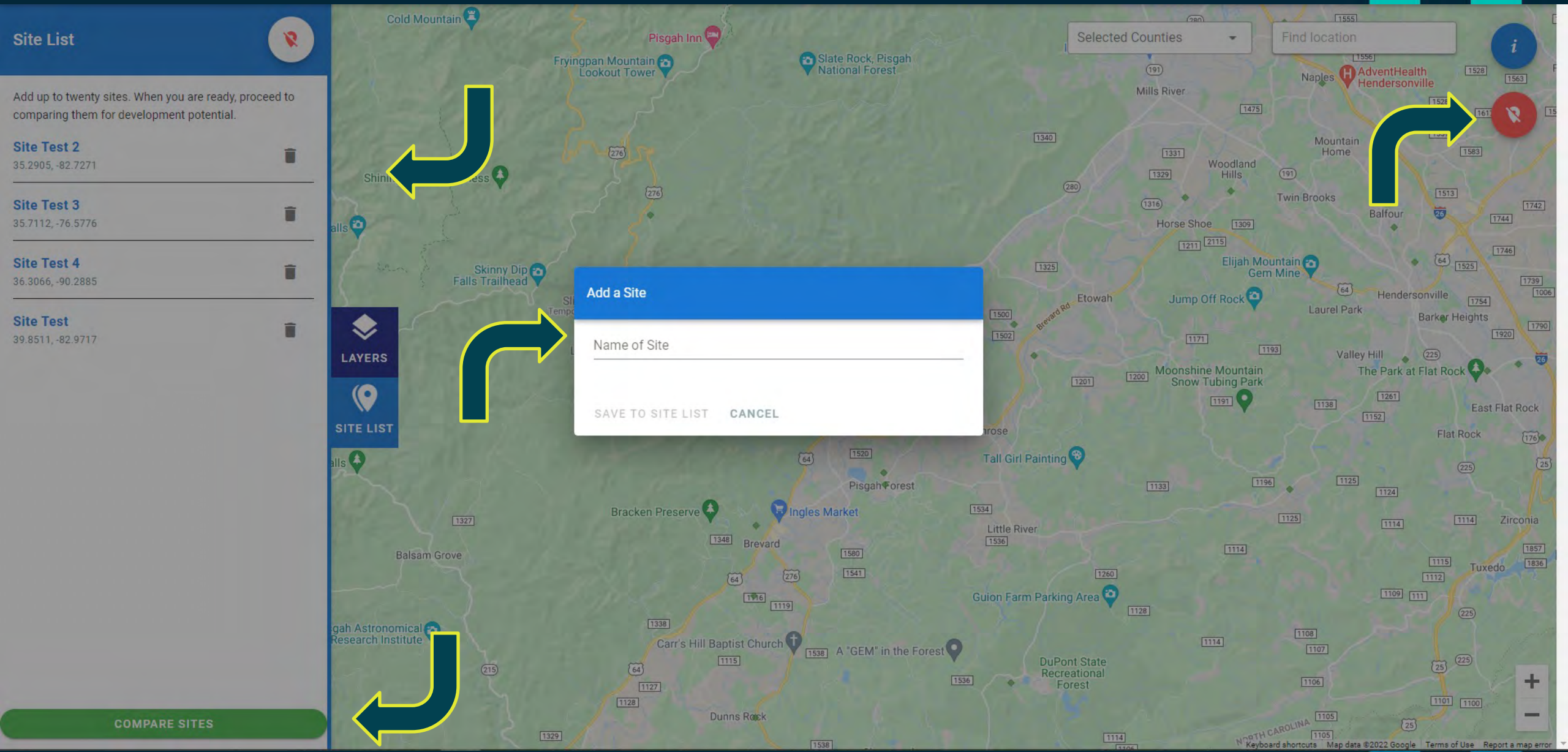
OR-SAGE provides pre-processed data to STAND for use in the Exploration and Comparison phases

OR-SAGE Screening Parameters Available in STAND	Values Offered
Population density (people/square mile)	Area > 500 ppsm within **2, 5, or 10** miles (**2018** data or **2030** projection)
Protected Lands (roll-up layer)	Wide variety of subsets to select from
Proximity to hazards (roll-up layer)	Airports; military facilities; chemical and energy facilities that pose a fire, missile, or toxic gas hazard
Landslide hazard (moderate or high)	Area flag based on USGS soil risk data
Proximity to surface faults	Set buffer distance based on fault length as determined by 10 CFR 100, Appendix A, Table 1
Safe shutdown earthquake (peak ground acceleration)	Area > **0.3**, **0.4**, **0.5**, or **0.6** g
Slope	Area > **12%** or **18%** grade
100-year floodplain	Area in floodplain
Wetlands/Open water	Area in designated wetland and in open water

Summary of OR-SAGE - STAND interaction

- In the Exploration phase of STAND, the impact and sensitivity of various siting parameters can be explored around sites of interest
  - Only parameters of interest at values of interest need be selected
- In the Comparison phase of STAND, the relevance of the available siting parameters based on user weighting can be assessed across sites of interest


Site List
Add up to twenty sites. When you are ready, proceed to comparing them for development potential.
Site Test 2
35.2905, -82.7271
Site Test 3
35.7112, -76.5776
Site Test 4
36.3066, -90.2885
Site Test
39.8511, -82.9717
COMPARE SITES
LAYERS
SITE LIST
Add a Site
Name of Site
SAVE TO SITE LIST
CANCEL
Selected Counties
Find location
Cold Mountain
Pisgah Inn
Fryingpan Mountain Lookout Tower
Slate Rock, Pisgah National Forest
Skinny Dip Falls Trailhead
Mills River
Naples
AdventHealth Hendersonville
Mountain Home
Woodland Hills
Twin Brooks
Balfour
Horse Shoe
Elijah Mountain Gem Mine
Jump Off Rock
Etowah
Laurel Park
Hendersonville
Barker Heights
Moonshine Mountain Snow Tubing Park
Valley Hill
The Park at Flat Rock
East Flat Rock
Flat Rock
Tall Girl Painting
Pisgah Forest
Bracken Preserve
Ingles Market
Brevard
Little River
Zirconia
Balsam Grove
Guion Farm Parking Area
Tuxedo
Carr's Hill Baptist Church
A "GEM" in the Forest
DuPont State Recreational Forest
Dunns Rock
Keyboard shortcuts
Map data ©2022 Google
Terms of Use
Report a map error

Site Discovery

- Set Priorities
- County Analysis

Site Exploration

- Zoom to County
- View Reference Map
- Add Points

Site Comparison

- Process Overview
- Review Sites
- Relevance Form
- Significance Form
- AR–RS Matrix
- Results

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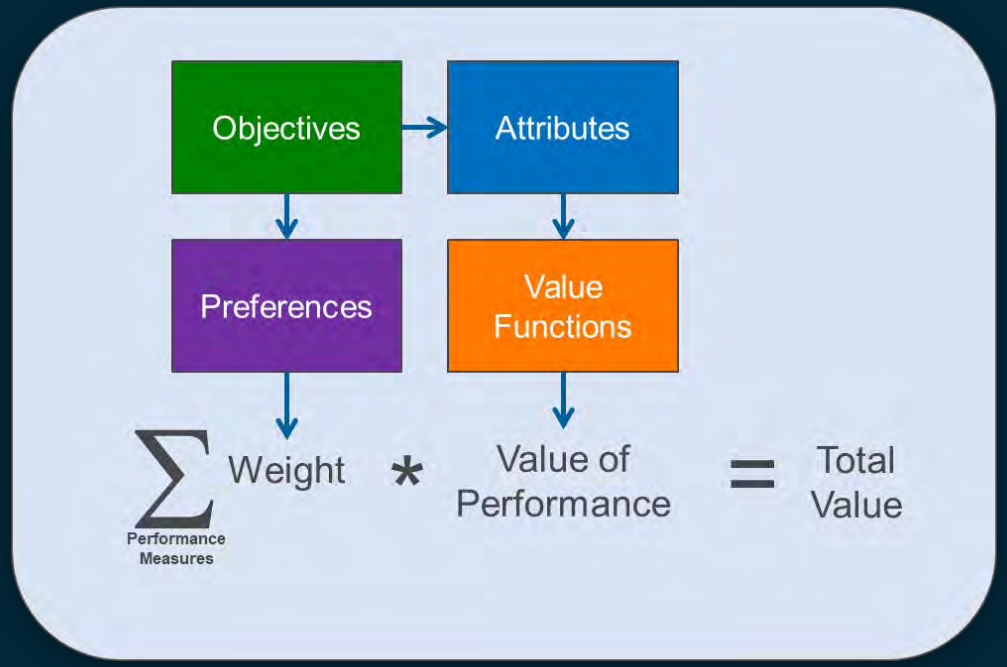
Site Comparison

Site comparison uses a multi-objective evaluation model as a structured framework for identifying which proposed sites best maximize the attributes that the user values.



Objectives and Performance Characteristics

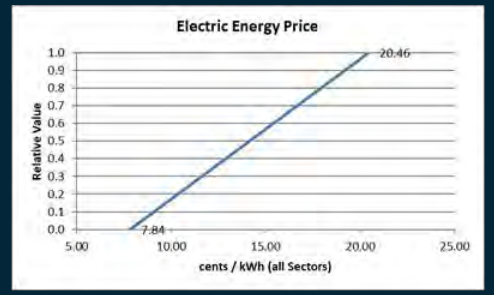
Objectives | Attributes | Preferences | Value Functions

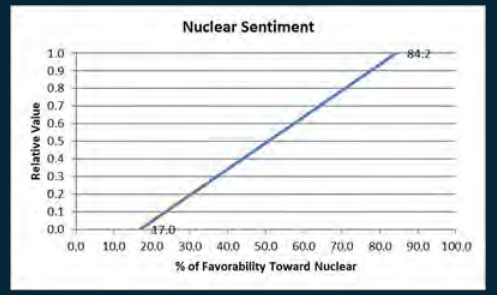
Site comparisons are structures around three objectives, each of which contains multiple attributes that describe the performance characteristics of the sites.

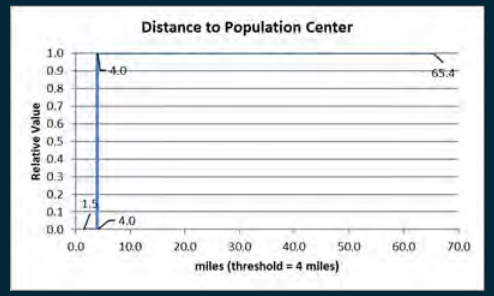
Objective	Attribute	Units
Socioeconomic	Electric Energy Price	cents/kWh
	Net Electricity Imports	million kWh/yr
	State Energy Policy	Positive; Neutral; Negative
	Nuclear Sentiment	% Fav. Toward Nuclear
	Construction Labor Index	Index
	etc.…	
Proximity	Proximity to Nuclear R&D	Number within 100 miles
	Distance to Major Road	miles
	Distance to Rail Transport	miles
	Distance to Cooling Water	miles
	Distance to Transmission Substation	miles
	etc.…	
Safety	Max Ground Acceleration > 0.5 g	No = not present; Yes = present
	Proximity to Fault Lines	No = not present; Yes = present
	100-Year Floodplain	No = not present; Yes = present
	Landslide Hazard	No = not present; Yes = present
	Open Water or Wetlands	No = not present; Yes = present
	etc.…	

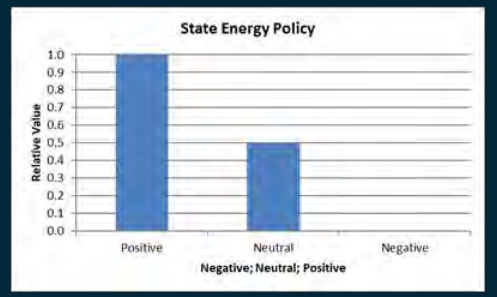
Value Functions

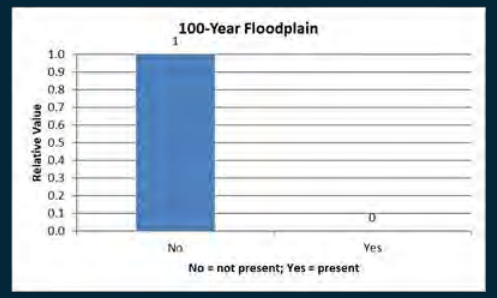
"Value functions" convert performance characteristics, in many different units, to a single measure of relative value so they can be weighted and summed to give an overall measure of site performance.











It is customary to assign the worst performance a relative value of 0 and the best performance a relative value of 1.

Objectives | Attributes | Preferences | Value Functions

User Preferences are Reflected in "Weights"

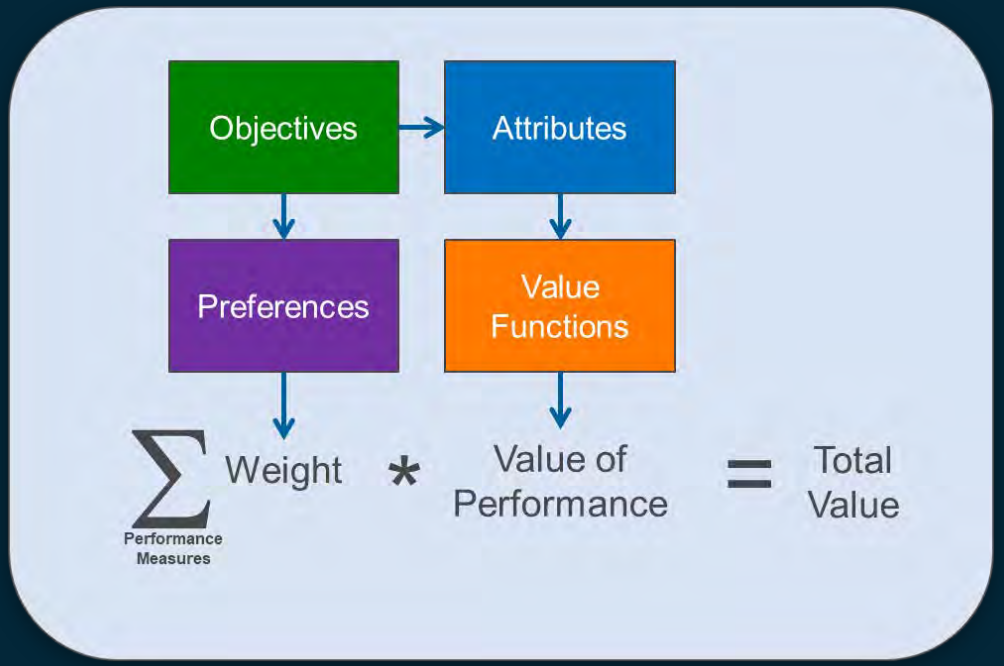
Weights reflect how relevant (important) each site characteristic is to site selection and how significant (sensitive) the performance difference is across the alternative sites.

Relevance - Significance Matrix (Showing highest cell weight)		*Measure Relevance (intuitive)*					Not Relevant
		Very High	High	Medium	Low	Very Low	
Performance Range Significance (factual)	Very High	100	90	80	70	60	
	High	90	80	70	60	50	
	Medium	80	70	60	50	40	
	Low	70	60	50	40	30	
	Very Low	60	50	40	30	20	
	Not Significant						

Decreasing Weight (influence)

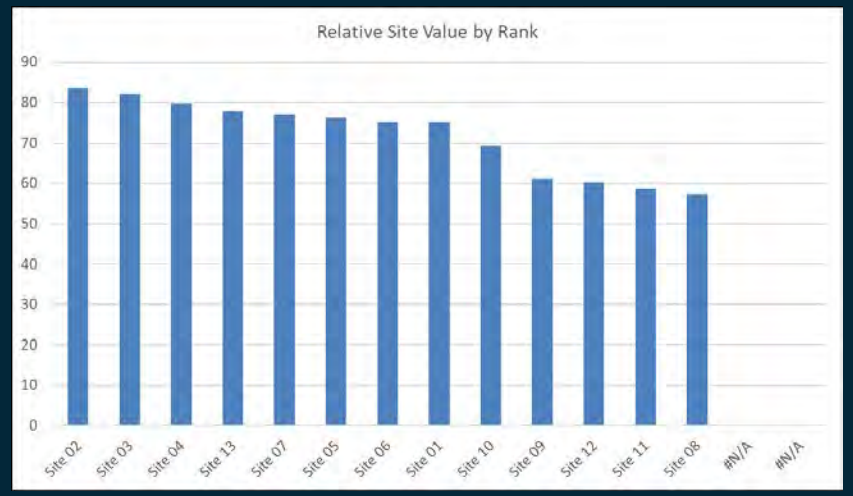
- Measure Relevance
  - How important is the measure in your selection of a site?
  - How much do you care about the measure?
- Range Significance
  - How great is the measure difference between the best and worst cases?
  - If the measure is the same for all sites, Range Significance = 0

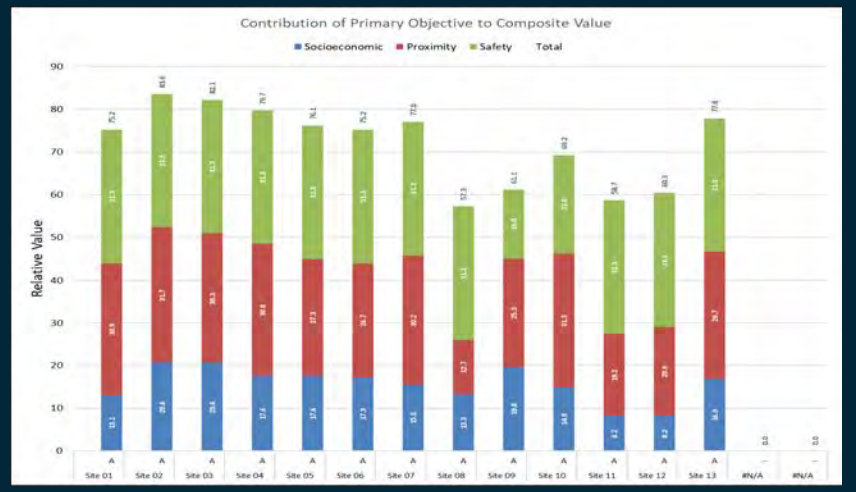
Site Comparison



Site Comparison Results

Site comparison results are displayed in various graphical forms that enable the user to easily understand the results.





Process Overview | Review Sites | 2 Relevance Form | 3 Significance Form | 4 AR–RS Matrix | 5 Results

SOCIOECONOMIC

SAFETY

PROXIMITY

SUBMIT

Nuclear Restrictions

Moratorium	Very High	41 45 50
Required approval by state legislature	Medium	21 25 30
Required approval by the state Commissioner of Environmental Protection	Low	11 15 20
Voter approval	High	31 35 40
Finding (i.e. proof) that the construction of a nuclear facility will be economically feasible for ratepayers	Very Low	1 5 10
Demonstrable technology or a means for high level waste disposal or reprocessing	High	31 35 40
Finding that the proposed method for disposal of radioactive waste material (to be produced or generated by the facility) will be safe	High	31 35 40

View Nuclear Restrictions Reference Map

SOCIOECONOMIC

SAFETY

PROXIMITY

SUBMIT

	Best	Worst	Site Avg	National Avg	|Best - Worst|	
Nuclear Restrictions	0 relevance sum	35 relevance sum	8.75 relevance sum	10.384 relevance sum	35 relevance sum	Not Significant View Nuclear Restrictions Reference Map
Energy Price	19.186 cents/kWh	8.075 cents/kWh	11.073 cents/kWh	11.502 cents/kWh	11.11 cents/	Very Low 1 5 10 View Energy Price Reference Map
Net Electricity Imports	75504 million kWh/year	-23073 million kWh/year	12638.5 million kWh/year	765.509 million kWh/year	98577 million kWh/year	High 31 35 40 View Net Electricity Imports Reference Map
Nuclear Sentiment	0.443 percentile	0.392 percentile	0.413 percentile	0.422 percentile	0.05 percentile	High 31 35 40 View Nuclear Sentiment Reference Map
Nuclear Inclusive Policy	Yes	No	N/A	N/A	N/A	Very High 41 45 50

Process Overview — Review Sites — Relevance Form — Significance Form — 4 AR–RS Matrix — 5 Results

Range Significance	Measure Relevance: Very High	High	Medium	Low	Very Low	Not Relevant
Very High			Cdc Svi 13.462 Nuclear Inclusive Policy 13.462	Nuclear R And D 11.538	Hazardous Facilities 9.615	
High			Net Electricity Imports 11.538 Nuclear Sentiment 11.538	Labor Rate 9.615		
Medium				Open Water And Wetlands 7.692		
Low				Transportation 5.769		
Very Low			Energy Price 5.769			
Not Significant	Protected Lands 0.000	Electrical Substations 0.000 Fault Lines 0.000 Landslide Hazard 0.000 Population 0.000 Safe Shutdown Earthquake 0.000	Generator Retirement 0.000 Nuclear Restrictions 0.000 One Hundred Year Flood 0.000 Operating Nuclear 0.000	Market Regulation 0.000		Slope 0.000

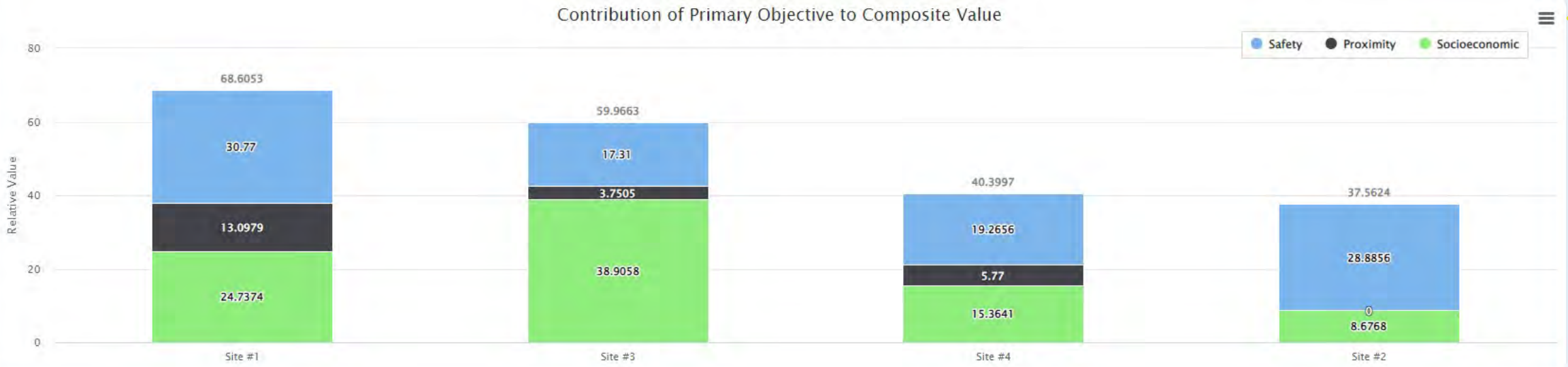
SUBMIT

Process Overview — Review Sites — Relevance Form — Significance Form — AR–RS Matrix — 5 Results

Download Result Data

Result Data (CSV)

Download the objective values for each of your sites.



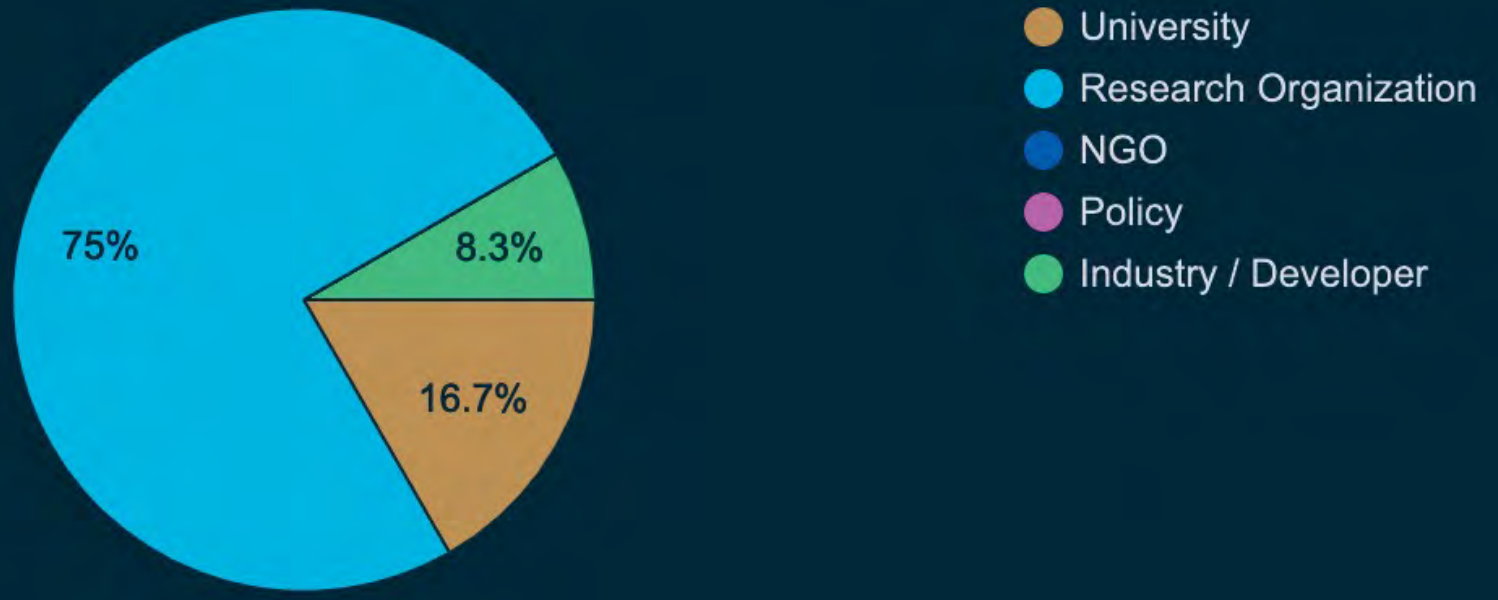
Normalized Weights
Nuclear Restrictions 0.00
Energy Price 5.77
Net Electricity Imports 11.54
Nuclear Sentiment 11.54
Nuclear Inclusive Policy 13.46
Market Regulation 0.00
CDC SVI 13.46
Operating Nuclear 0.00
Nuclear R And D 11.54
Safe Shutdown Earthquake 0.00
Fault Lines 0.00
Landslide Hazard 0.00
Electrical Substations 0.00
Labor Rate 9.62
Population 0.00
Generator Retirement 0.00
Hazardous Facilities 9.62
Protected Lands 0.00
Transportation 5.77
One Hundred Year Flood 0.00
Open Water And Wetlands 7.69
Slope 0.00
0 2 4 6 8 10 12 14 16
Values

Beta Testing

- There were 13 testers in the testing pool
- Conducted over two weeks in November and December 2021
- Testing was conducted 1:1 via video conference.
- Both facilitators and testers completed a survey after the beta test

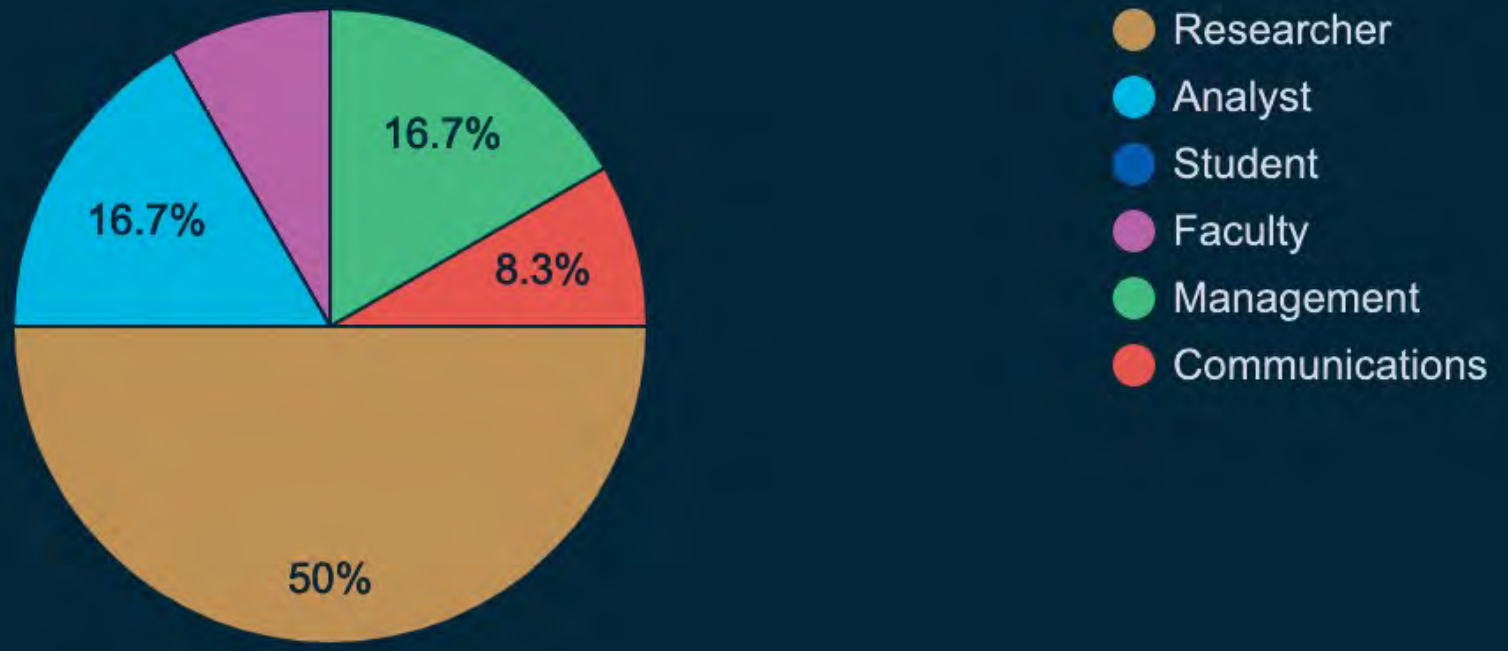
What type of organization do you represent?

12 responses



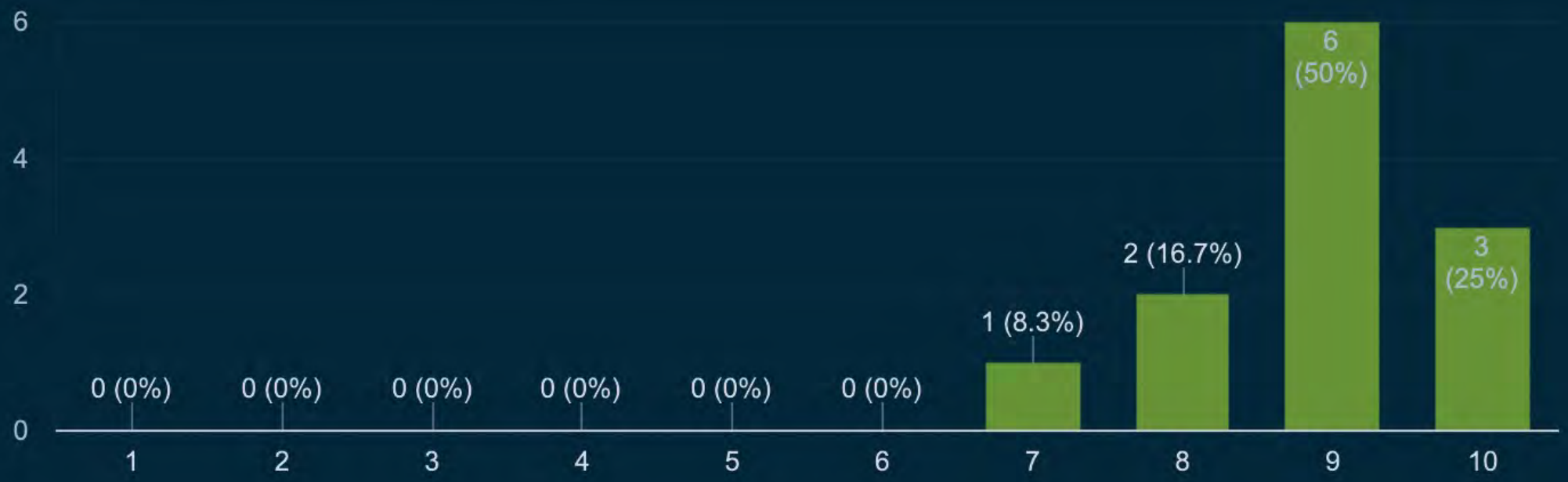
Which of the following best represents your job role?

12 responses



How likely are you to refer this tool to a colleague?

12 responses



Potential Upgrades

Expand current coverage of Alaska and Hawaii

Add Puerto Rico

Add environmental justice indicators such as: existing nuclear waste sites, energy burden, and EJSCREEN data

Small Group Training Sessions

- Additional Small Group Training Session for STAND will be offered in mid to late February
- Please email Emily Nichols at Emily.nichols@inl.gov with a list of personnel from your organization interested in small group training no later than February 4th 2022
- Training sessions quantity and duration will vary depending on interest and availability.

NRIC TECH TALKS

Q&A

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NRIC TECH TALKS

Thank you!

All proceedings from this webinar will be posted under Resources on the NRIC website.

Contact: NRIC@inl.gov

Website: nric.inl.gov

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OR-SAGE Reference materials and database sublayers:

- (2012 EPRI Study) Application of Spatial Data Modeling and Geographical Information Systems (GIS) for Identification of Potential Siting Options for Various Electrical Power Generation Sources, ORNL/TM-2011/157/R1, May 2012, https://info.ornl.gov/sites/publications/files/Pub30613.pdf
- (2012 DOE Study) Updated Application of Spatial Data Modeling and Geographical Information Systems (GIS) for Identification of Potential Siting Options for Small Modular Reactors, ORNL/TM-2012/403, September 2012, https://info.ornl.gov/sites/publications/Files/Pub39008.pdf
- Protected lands include:
  - National parks, national monuments, state parks, local parks
  - National forests, wilderness areas, scenic waterways, wildlife refuges
  - Universities, schools, hospitals, prisons
  - Indigenous (tribal) lands, Bureau of Land Management land
- Hazards Include:
  - Commercial airports with a 10-mile buffer
  - Military bases with a 1-mile buffer
  - Chemical facilities that pose a fire, missile, or toxic gas hazard with a 5-mile buffer (e.g., explosives manufacturing)
  - Energy facilities that pose a fire, missile, or toxic gas hazard with a 5-mile buffer (e.g., gas compressor stations)