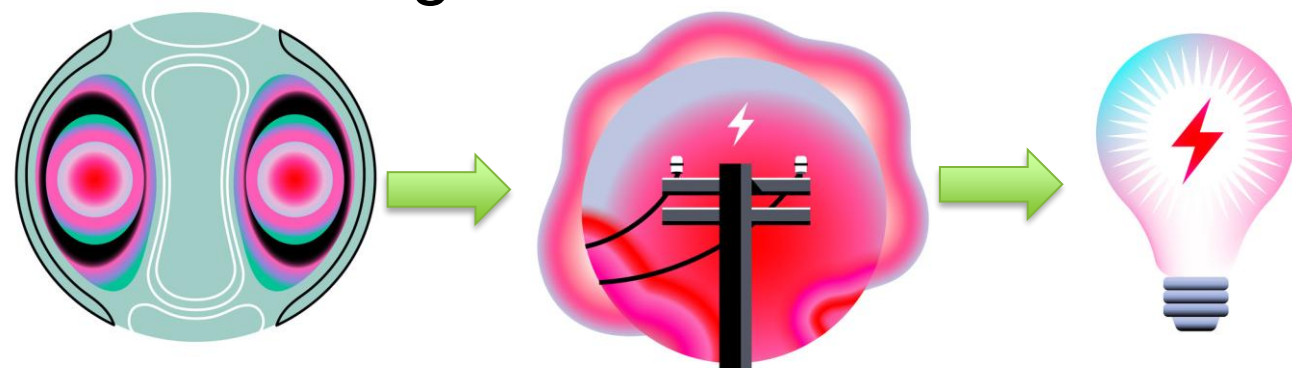


Abiodun Adeniyi, Gale Hauck, Femi Omitaomu

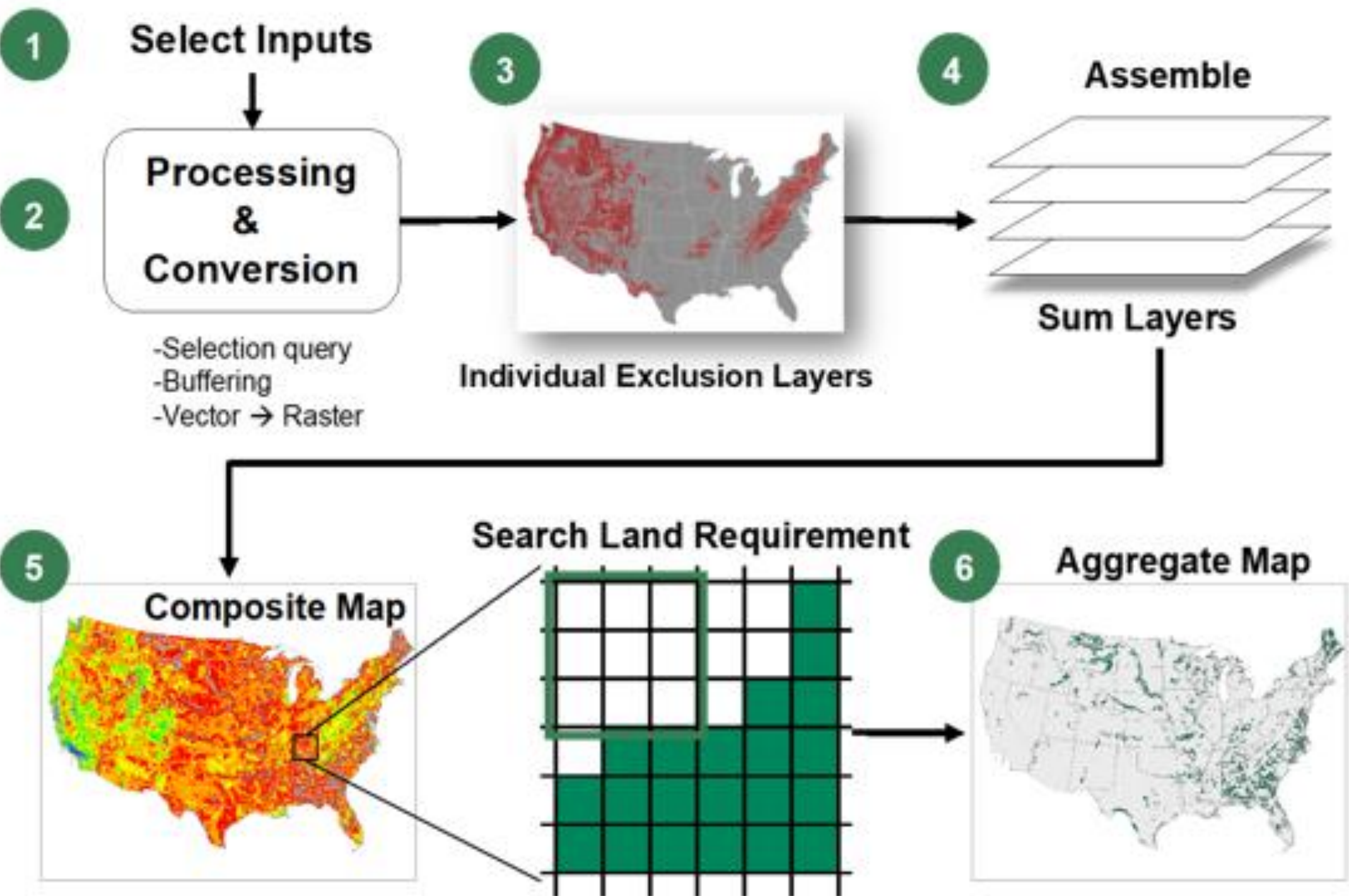
Introduction

GIS-based multicriteria screening can provide a practical, transparent workflow for **commercial fusion** siting



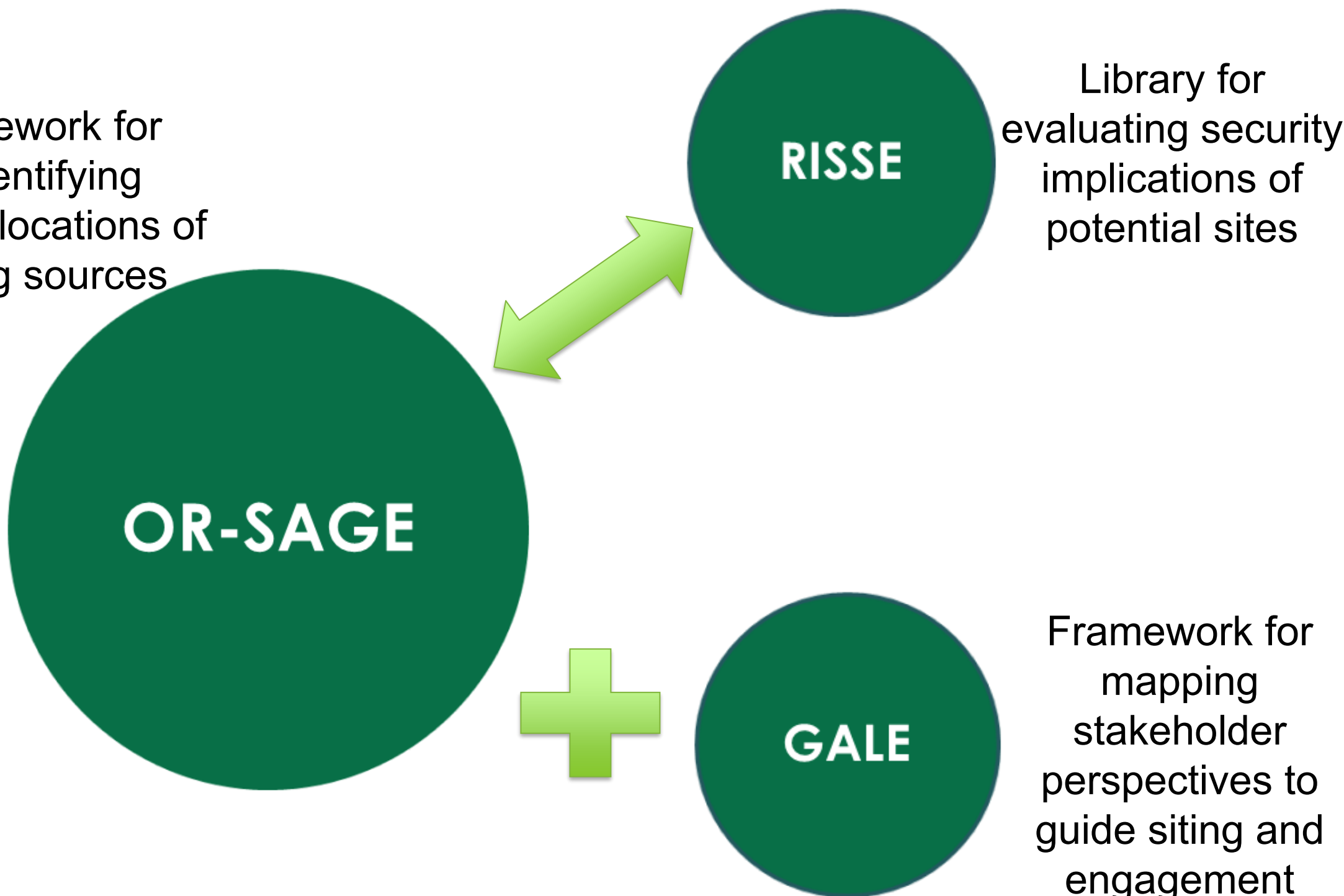
Adapted from DOE's 2024 Fusion Strategy

Optimized OR-SAGE workflow for Energy Technologies Siting



The OR-SAGE Framework Building Blocks

ORNL siting framework for evaluating and identifying suitable potential locations of energy-generating sources



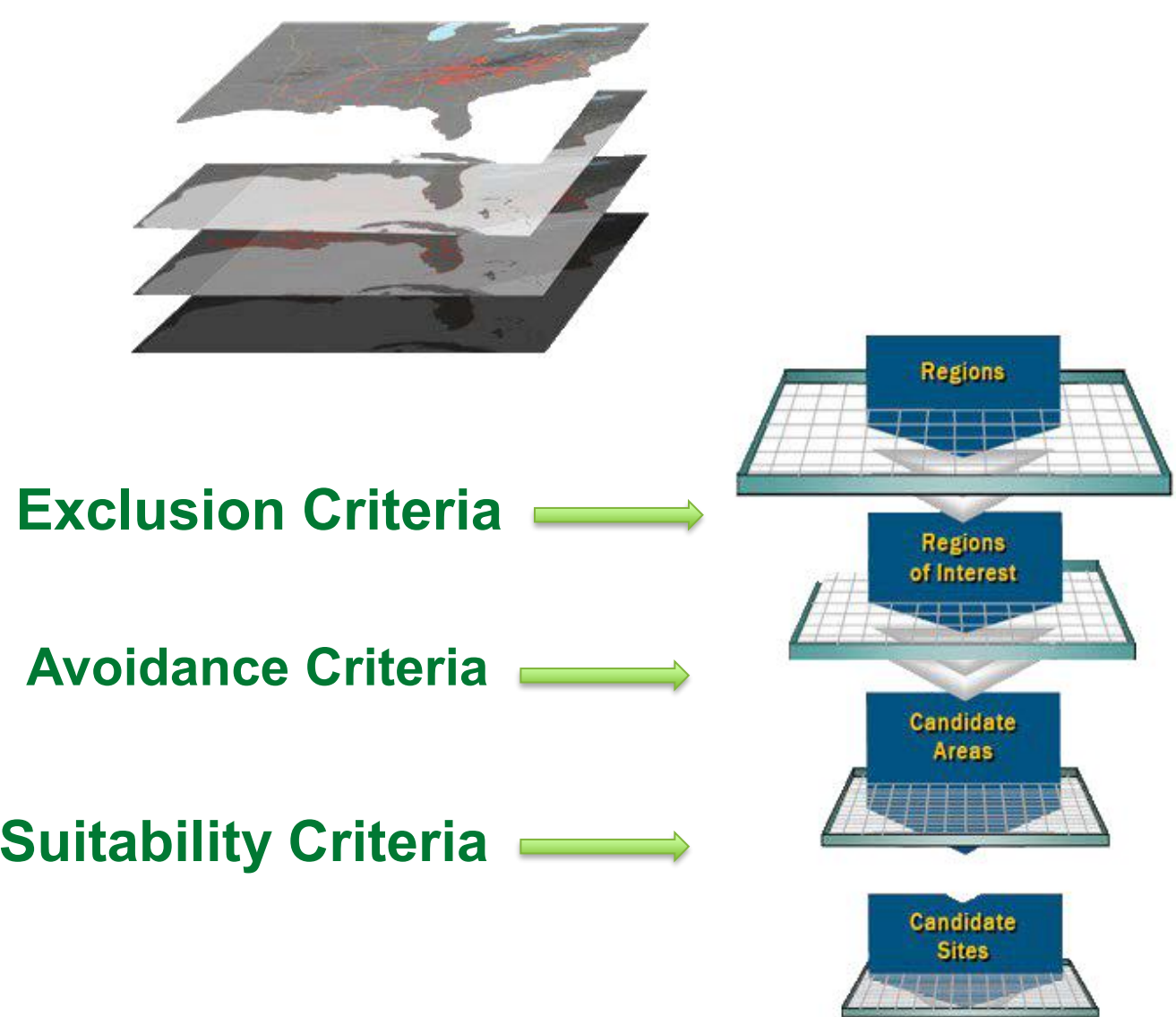
Reactor Impact Siting and Security Evaluation (RISSE)

- Identify features posing security challenges during the siting phase.
- Highlight vulnerabilities around potential nuclear facilities sites.
- Facilitate site design modifications.
- Widely applicable to other critical infrastructure siting analysis.

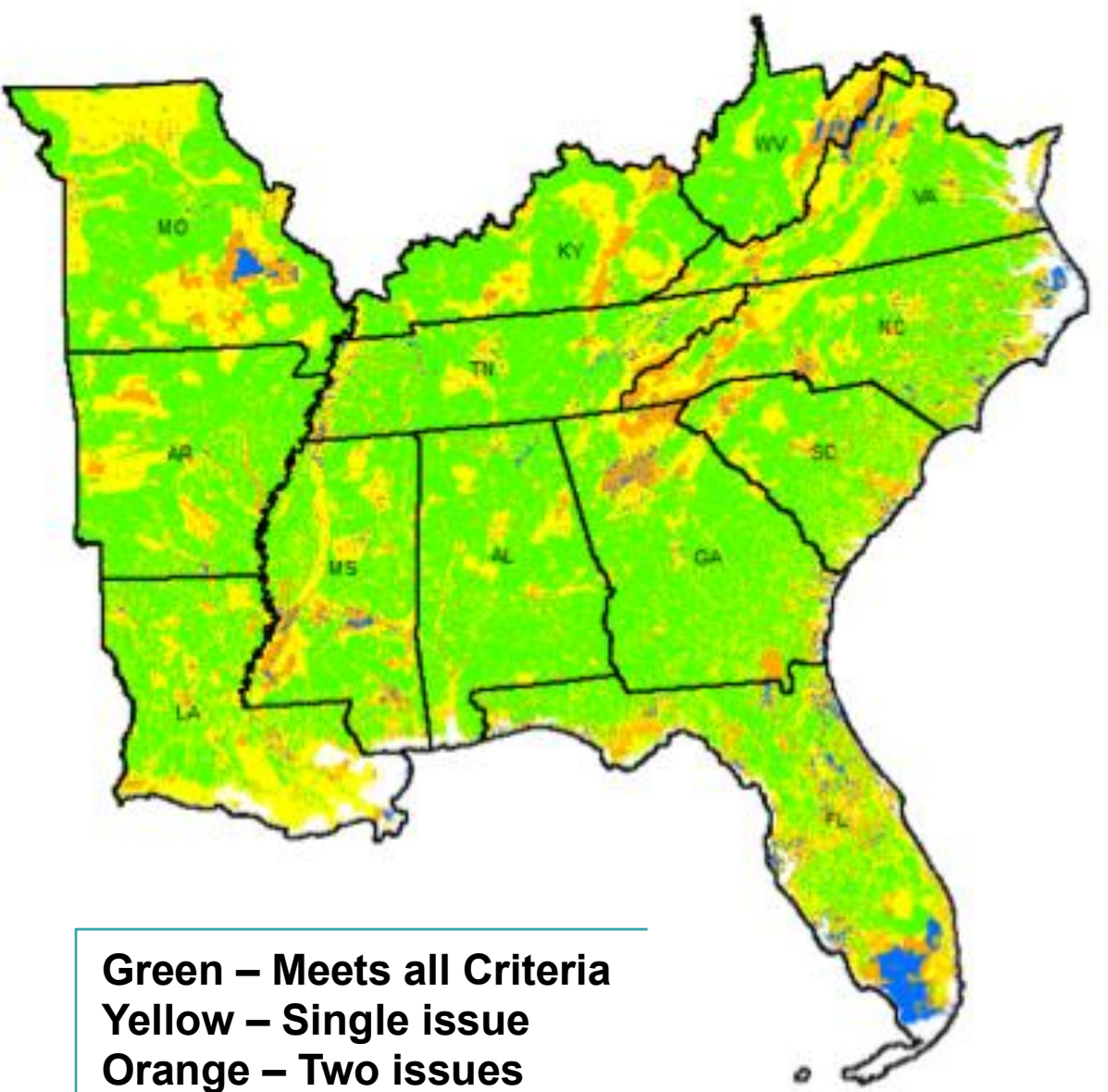
Geospatial Analysis of Local Engagement (GALE)

- Maps stakeholder perspectives by location, sentiment, topics, and provides GIS-based visualizations.
- Complements OR-SAGE technical screening to reveal alignment/conflict zones—prioritize sites and target early engagement.
- Continuously updateable using secondary sources (news, records, selected social feeds) to track shifts over time and across regions
- Broadly applicable to multiple energy technologies such as fusion, fission, and data centers.

Framework for Fusion Energy Facility Siting – Pilot Results



Technologies →	Type One Fusion
	Fusion - Stellarator
Siting Parameters ↓	
Population Density	>500 ppm within 1 mile
Safe Shutdown Earthquake	No requirement for EPZ
Makeup Cooling Flow	No requirement
Air-Cooled Option	Direct cooling flow is 150,000 gpm, with 1,000 gpm makeup
	Yes with 10,000 gpm makeup
Slope	
Wetlands/Open Waters	Not Allowed
100-year floodplain	Not Allowed
Protected Lands	Not Allowed
Landslide Hazard	Flag High
Proximity to Hazards	Flag 1-10 miles
Proximity to Fault Lines	No requirement
Footprint	30 acres
Output	350MWe
Technology	Stellarator



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

References

- Belles, R., Mays, G., Blevins, B. R., Hadley, S., Harrison, T. J., Jochem, W. C., Neish, B. S., Omitaomu, O., & Rose, A. N. (2012). Application of Spatial Data Modeling and Geographical Information Systems (GIS) for Identification of Potential Siting Options for Various Electrical Generation Sources. <https://doi.org/10.13140/RG.2.1.3566.0881>
- DOE Fusion Energy Strategy 2024
- Adeniyi I. A.; Omitaomu, O. A. 2024. "Development of a Robust Framework for Security Assessment of Safety-Informed Siting Decisions under Uncertainty." International Conference on Small Modular Reactors and their Applications (SMR2024). International Atomic Energy Agency, Vienna, Austria.