

# DEVELOPING DIGITAL TOOLS FOR ENGAGEMENT



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# DIGITAL TOOLS IN DEVELOPMENT



CURIE, a public-facing resource portal



Integrated waste management (IWM) StoryMaps, a digital storytelling tool



Land-area Identification, Tagging, and Exploration (LITE) Tool



Other IWM Tools:

- Stakeholder Tool for Assessing Radioactive Transportation (START)
- Next Generation System Analysis Model (NGSAM)



# CURIE OVERVIEW



*CURIE Homepage*

- Initially released in 2013, CURIE is a public-facing resource portal that provides easy access to documents, data, and maps related to nuclear waste management through disposal.
- Recent improvements:
  - Modernization of the user interface to make CURIE more user friendly, intuitive, and appealing to diverse audiences,
  - Enhancement of document curation with updated taxonomies, workflow, and document searching and tagging functions,
  - Modernization and continuous improvement of maps.
- Providing ongoing development support for consent-based siting (e.g., capacity building with consent-based siting Consortia).

# CURIE FEATURES

The screenshot displays the CURIE Resource Portal for DOE Nuclear Waste Management Information. The header includes the CURIE logo and navigation links for Home, About, Siting Experience, Map, Document Library, and Events. A search bar is located at the top left. The main content area shows a list of documents, each with a video thumbnail icon. The first document is titled "Consent-Based Siting: Social Science & Nuclear Waste Management at the U.S. Department of Energy" by the American Anthropological Association, published on December 8, 2022. The second document is "Spending Time on Spent Nuclear Fuel" by the American Nuclear Society, published on January 10, 2023. The third document is "Consent-Based Siting Q&A With Dr. Kathryn Huff" by the DOE Office of Nuclear Energy, published on December 13, 2021. A sidebar on the left provides a "Category of Content" filter with options like Articles, Books and Reports, Technical Reports, Correspondence, Data, Graphic, Internet Content, Procedures and Process Req., Software/Models, and Video / Audio. Below the sidebar, there is a "Siting Experience Documents Only" section and a "Publication Date" filter set to 01/01/2018 to 04/30/22.

## *CURIE Consent-Based Siting Resource Library*

- Home
- About
- Siting Experience
- Spent Nuclear Fuel Interactive Information Map (open and advanced maps)
- Document Library (view and upload documents)
- Events (public meetings and conferences)
- Access and roles (public and authenticated users)
- **Consent-Based Siting Resource Library**
- Ongoing efforts to improve user experience:
  - Enhancing accessibility
  - Maturing document management workflow
  - Curated content in private communities
  - Updating user documentation (e.g., FAQs)
  - Diversification of resources available

# IWM STORYMAPS OVERVIEW

- ArcGIS StoryMaps is a digital storytelling tool.
- StoryMaps provides a multi-media user experience through a guided, sequential narrative, in this case, about integrated waste management (IWM).
- As an ArcGIS product, the StoryMaps platform is ideal for sharing geospatial information (i.e., via interactive maps, infographics).

Consent-Based Siting Working Version  
for the interim storage of the nation's spent nuclear fuel

Last Updated: June 24, 2020

Introduction | Integrated Waste Management | Storage Design and Operation | Potential Benefits and Effects | Consent-Based Siting | Contact Us | 453/10/2020

U.S. DEPARTMENT OF ENERGY | Office of NUCLEAR ENERGY | CONSENT-BASED SITING

## Introduction

Consent-based siting is an approach to siting facilities that prioritizes the participation and needs of people and communities and asks their informed consent to accept a project in their community. The U.S. Department of Energy (DOE) is using a consent-based siting approach to find an interim storage location for the nation's spent nuclear fuel as part of its overall approach to integrated waste management.

Read on for general information about integrated waste management, interim storage facilities, and DOE's consent-based siting approach.

## What is spent nuclear fuel?

Spent nuclear fuel refers to nuclear fuel that is removed from reactors after it is no longer efficient in producing nuclear energy. Nuclear energy is a key element of the U.S. response to climate change and reducing greenhouse gas emissions.

Nuclear power is the **largest source of clean energy** in the United States.

Source	Percentage
Nuclear	50.4%
Wind	10.6%
Hydro	10.3%
Solar	2.2%
Geothermal	1%

# IWM STORYMAPS CONTENT

- StoryMaps will allow broad audiences to learn about technical information related to IWM in an interactive way.
- Appeals across the spectrum of five attention types: sustained, selective, alternating, divided, and focused.
- IWM StoryMaps will include content on the consent-based siting process, among other related topics (e.g., consolidated interim storage facility siting considerations).
- IWM StoryMaps can be a resource for the consent-based siting Consortia as they engage in capacity building activities.



A variety of events and activities may support interaction with stakeholders throughout the process of identifying and evaluating a potential location for a storage facility. These activities may include public meetings, workshops, site visits, community events, one-on-one interviews, surveys, and more.

Many adverse effects may be prevented by selecting a site with low potential conflicts or through applying specific features or controls during the design, construction, and operation of the facility. For effects that cannot be prevented, actions can be taken at the local level to restore the quality or integrity of resource or as a more regional effort to offset these effects.

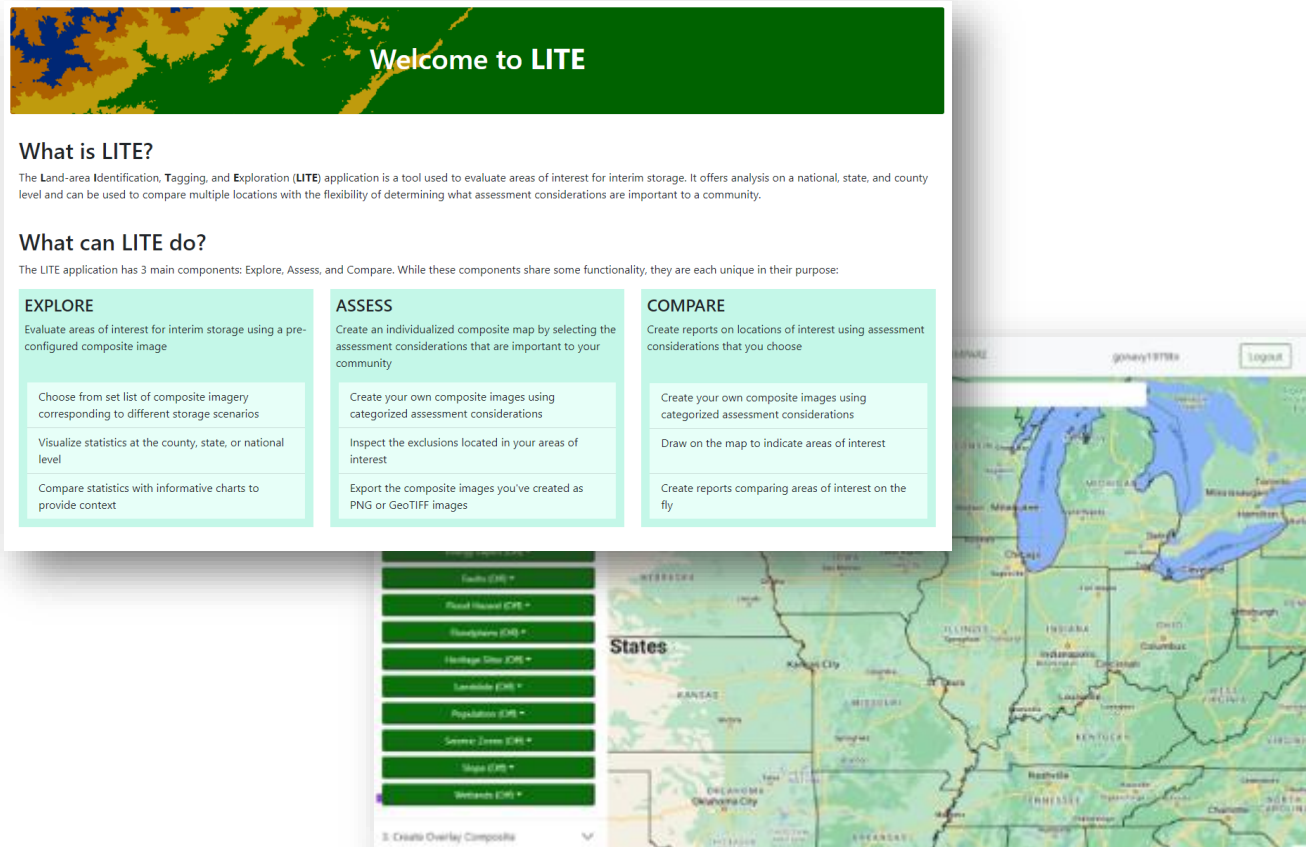
Stakeholders play an important role in determining how to avoid, minimize, or offset effects based on their needs and values. Before a facility is constructed, DOE will involve stakeholders in conducting comprehensive analyses of potential environmental, socioeconomic, and cultural effects of construction, operation, and decommissioning an interim storage facility at a specific location. DOE will also explore ways to avoid or reduce potential effects. This analysis will be conducted in accordance with requirements of the National Environmental Policy Act.

The illustration below shows an approach that can be taken to reduce adverse effects of constructing and operating a storage facility. The approach starts with steps taken to avoid effects and then to minimize, restore, or offset effects that cannot be avoided. Examples provided represent just a few types of actions that can be taken.



Efforts to prevent adverse effects fall in the avoidance and minimization categories. Efforts to restore resource quality and integrity fall in the restoration and offset categories. This illustration provides examples of actions that can be taken to avoid, minimize, restore, or offset adverse effects. By applying these actions, the

# LITE TOOL OVERVIEW



Screenshots of the LITE tool homepage (top image) and map (bottom image)

- Land-area Identification, Tagging, and Exploration (LITE) tool that enhances community/stakeholder engagement.
- LITE tool provides interested parties the interactive opportunity to evaluate interim storage facility siting from a spatial perspective, including siting considerations and potential impacts.
- Tool is intended to support a phased approach to consent-based siting, including the capacity building stage of the process.

# LITE TOOL POTENTIAL APPLICATIONS



## Phase 1

### High-level siting considerations

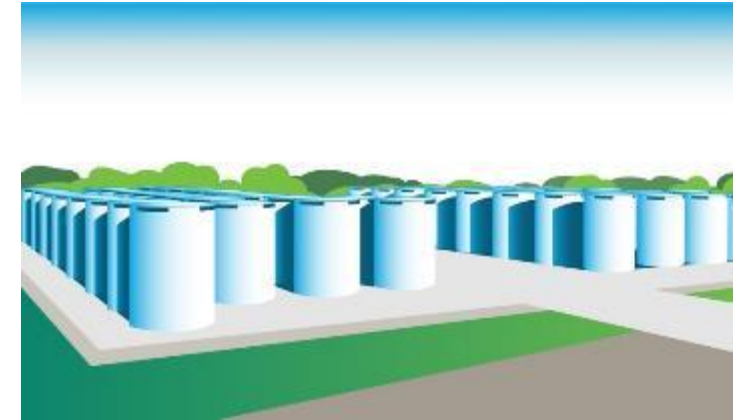
- Consider basic information about ISF siting and potential impacts and opportunities
- Proximity to population centers
- Proximity to protected areas and other areas of special significance
- Awareness of social and cultural factors



## Phase 2

### Feasibility considerations

- Population distribution
- Sufficient land area
- Natural hazards (e.g., seismicity, soil instability)
- Infrastructure constraints
- Health, safety, environmental, social, economic, and cultural impacts and opportunities



## Phase 3

### Detailed siting considerations

- All factors that can determine whether the facility can be licensed
- Health, safety, environmental, social, economic, and cultural opportunities and mitigation
- Equity and environmental justice concerns
- Environmental law



# OTHER IWM TOOLS: START

- START is the Office of Integrated Waste Management's web-GIS transportation decision-support tool.
- It was developed to enable visualization and analyses of geospatial data relevant to planning and operating large-scale spent nuclear fuel and high-level radioactive waste transport to storage and/or disposal facilities.
- Potential utilizations: routing options and risk attributes, training preparations along DOE transport routes, communications, environmental analyses, and integration with system analysis (e.g., NGSAM).
- START supports communication and information exchange in an inclusive, transparent and customized manner (e.g., consent-based siting Consortia activities).



START homepage

# OTHER IWM TOOLS: START GIS DATA LAYERS

## **Shipment origin and transfer points**

Potential transload sites, nuclear reactors, shutdown sites, DOE and other facilities

## **Emergency response assets**

Fire departments, TEPP-trained personnel, police, hospitals, state EOCs, advance notification designees

## **Mass gathering places**

Theme parks and zoos, casinos, performing arts centers, stadiums and arenas, malls, national monuments/icons, places of worship, airports

## **Educational and elderly care facilities**

Schools, colleges/universities, day care centers, nursing homes

## **Existing routes**

Highway Hazmat Route Registry, DOE WIPP highway routes, U.S. Navy spent fuel rail routes

## **Transportation infrastructure and operations**

Rail network, freight stations, junctions, crossings, yards, bridges, tunnels; highway - network, bridges; navigable waterway network, locks/dams, water terminals, Coast Guard districts, Captain of Port zones

## **Environmental land uses**

Parks, national forests, federal lands, military bases, hazard threat urban areas, surface water

## **Political jurisdictions**

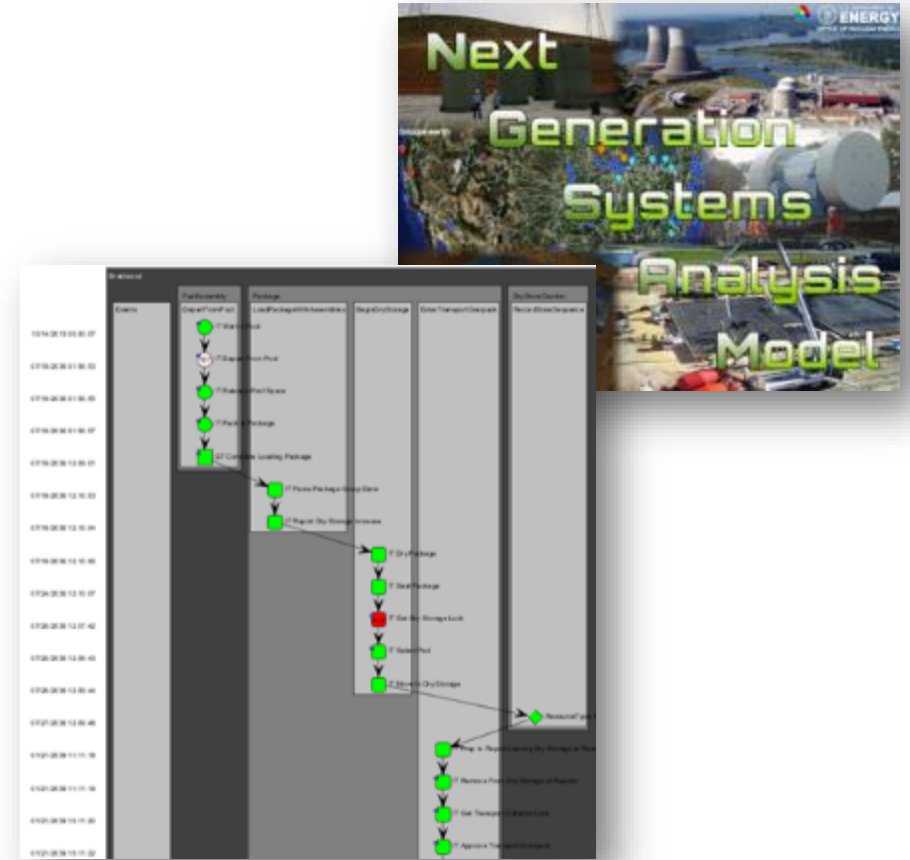
Tribal lands, congressional districts, States, State legislative districts, counties, city limits, urban areas

## **Other**

Social vulnerability index, transportation infrastructure photos

# OTHER IWM TOOLS: NGSAM

- Next Generation System Analysis Model (NGSAM) is an agent-based discrete event simulation tool based on the Process Analysis Tool framework developed at Argonne National Laboratory.
- NGSAM allows analysts to:
  - Generate custom reports (e.g., storage facilities, costs),
  - Analyze wide range of integrated waste management system configurations, approaches, and scenarios.
- For the capacity building stage of the consent-based siting process, NGSAM can help answer questions related to:
  - Consolidated interim storage within an integrated waste management system (IWMS),
  - Impacts of varying key consolidated interim storage facility (CISF) parameters,
  - Scenarios for multiple CISFs within an IWMS.
- NGSAM analyses can inform IWM StoryMaps content (e.g., socioeconomic impacts of a CISF) and aid in capacity building activities (via consent-based siting Consortia).



Sample NGSAM analyses (left) and NGSAM logo (right)

# INCORPORATING LESSONS LEARNED

## Current considerations

- Improvements to existing tools resulting from collaborations within DOE NE (e.g., GIS tools working group led by Sara Hogan, PhD).
- Adapting existing tools (e.g., LITE) to meet current and prospective program needs, broadly (i.e., resulting from consent-bases siting Consortia engagements).

## Potential future considerations

- International experiences from the Forum on Stakeholder Confidence Webinar on nuclear symbols and visual storytelling.
- Coordinating with other programs that have similar digital tools and incorporating feedback to improve IWM NE tools.

# CONSORTIA COLLABORATION

Digital tools, such as CURIE, will be used to promote information sharing between DOE and the consent-based siting Consortia members, as well as information sharing among the Consortia members.

- Though, the digital tools were not designed to expressly promote or track collaboration across the consent-based siting consortia members.
- The tools will be one way to inform Consortia activities for resource and planning purposes.



# THANK YOU

For more information, visit us at  
[energy.gov/consentbasedsiting](https://energy.gov/consentbasedsiting)

