



U.S. DEPARTMENT OF
ENERGY

Integrated Waste Management
Office of Spent Fuel and Waste Disposition
Nuclear Energy

DOE's Consolidated Storage Program

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This presentation does not consider limitations imposed by the standard contracts. Where there is a conflict, the standard contract prevails.



Request for Information on Private Initiatives

■ On 10/27/2016

- DOE NE released a Request for Information (RFI) on Private Initiatives (PIs) for Consolidated Interim Storage Facilities.

■ The goal

- Gather input on the role of PIs for private consolidated interim storage facilities services as part of an integrated waste management system.

■ Input is requested on

- Questions related to the role PIs could play in an integrated waste management system.
key factors / benefits / involvement / drawbacks / assurances / business models / authorizations and approvals / alternative approaches

■ Audiences

- Potential host/neighboring communities, potential ISF operators and existing nuclear waste facility operators, among others, may be interested in responding to this RFI.

■ Written comments and information

- Requested on or before January 27, 2017.

The RFI is available on the DOE-NE Web site at: www.energy.gov/ne/downloads/Private-ISF at <https://federalregister.gov/d/2016-26018>, and on FDsys.gov

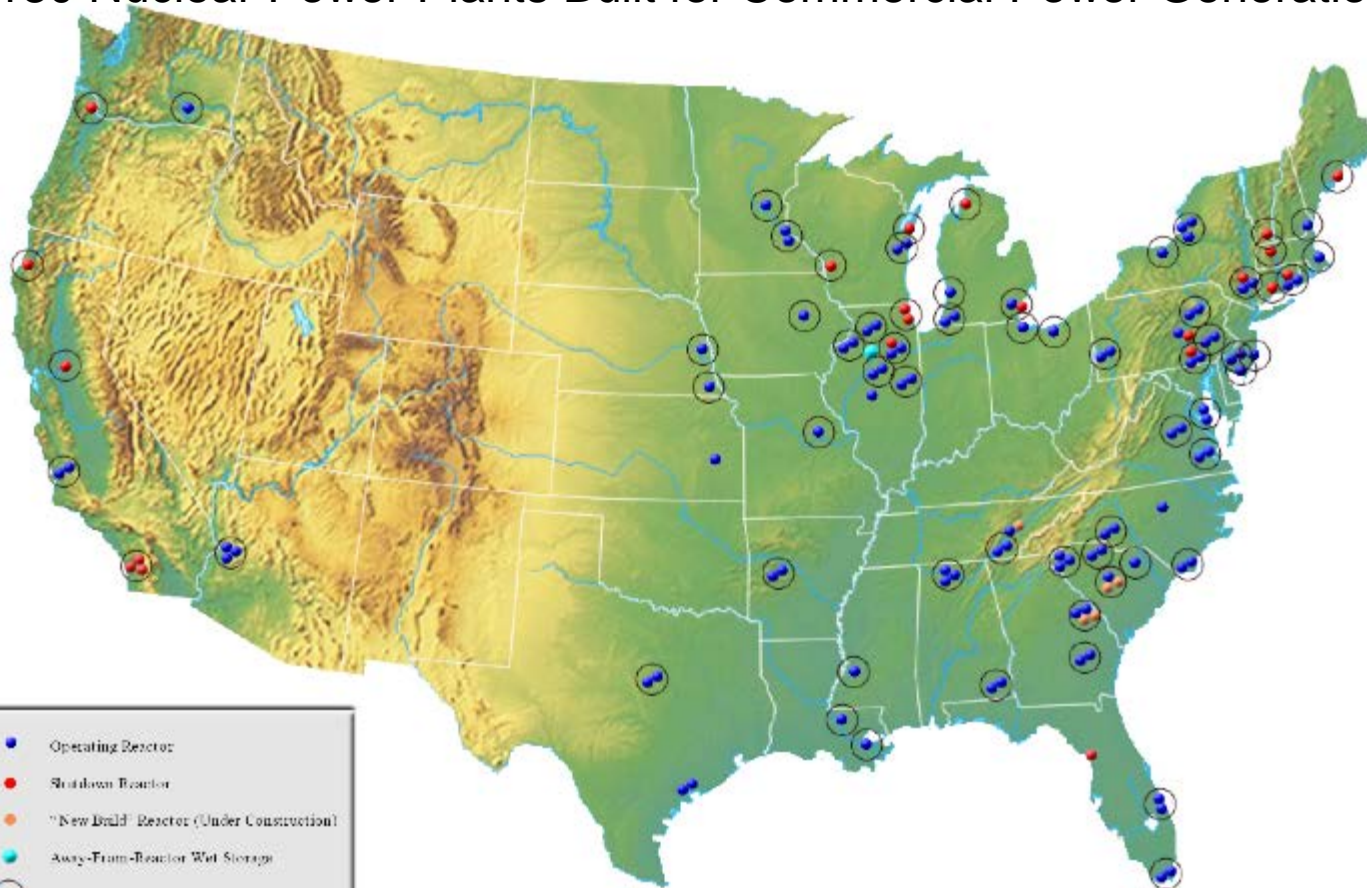
The Objective

With the appropriate authorizations from Congress, the Department of Energy currently plans to implement a program that:

- Sites, designs and licenses, constructs and begins operations of a **pilot interim storage facility** with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a **larger interim storage facility** that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository

US History of Commercial Power Reactors

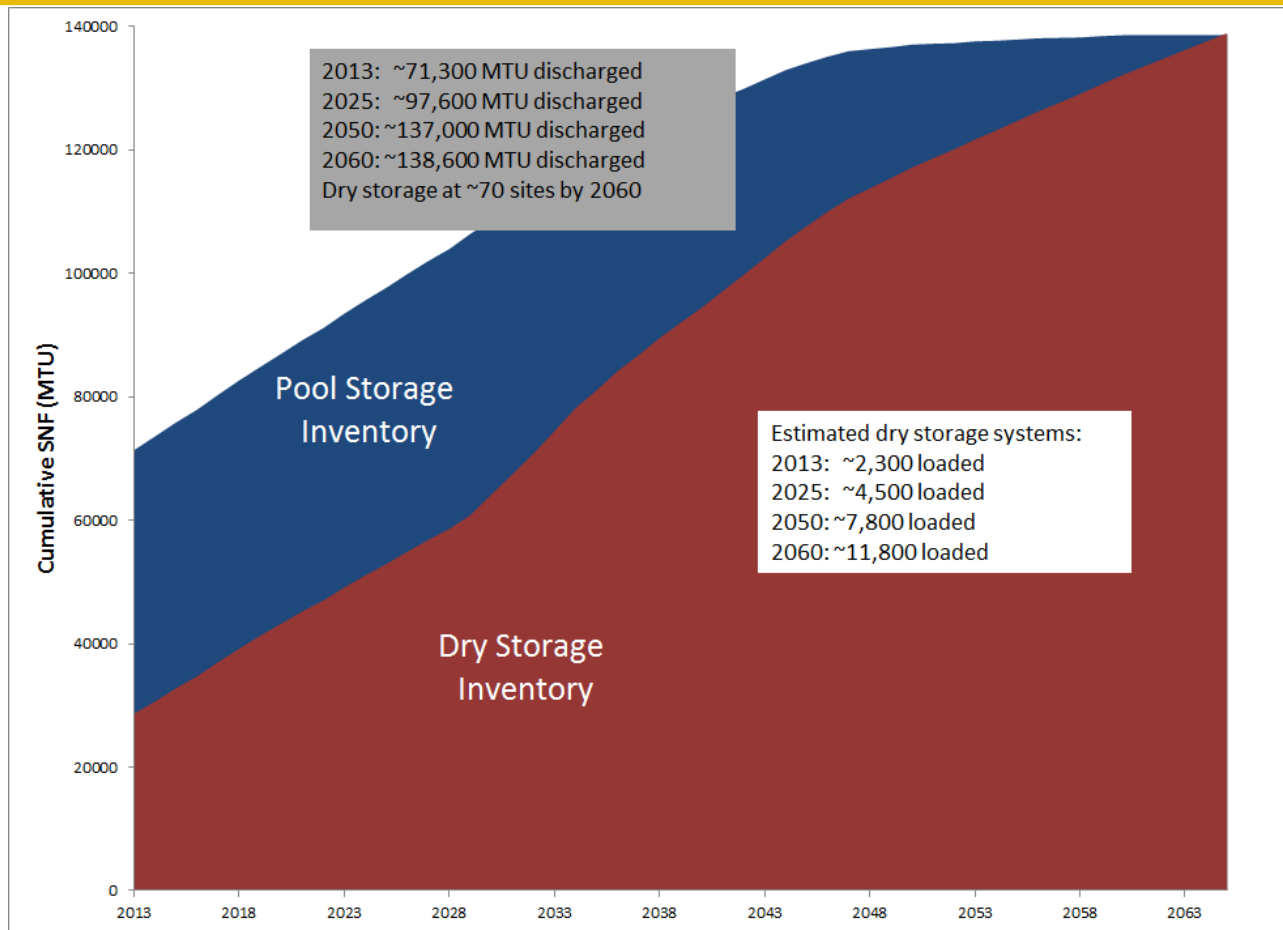
130 Nuclear Power Plants Built for Commercial Power Generation



- **9 Early Prototypes**
 - No fuel on site
- **1 Never Operated**
- **1 Disabled**
 - Fuel managed by DOE
- **1 High Temperature Gas Reactor**
 - Fuel managed by DOE
- **19 Ceased Operations**
 - Fuel on site
 - 3 reactors on sites with on going nuclear operations
 - 16 reactors on 13 sites with no other nuclear operations
- **99 Operating Reactors**
 - 9 w/ Announced Shutdown dates
- **5 New Units Under Active Construction**

Source: "Commercial Spent Nuclear Fuel and High-Level Radioactive Waste Inventory Report", FCRD-NFST-2013-263, Rev. 4, June 30, 2016

Commercial SNF in Storage Continues to Increase by ~2,000 MTHM Annually; 150 – 200 Dry Storage Canisters are Loaded Annually

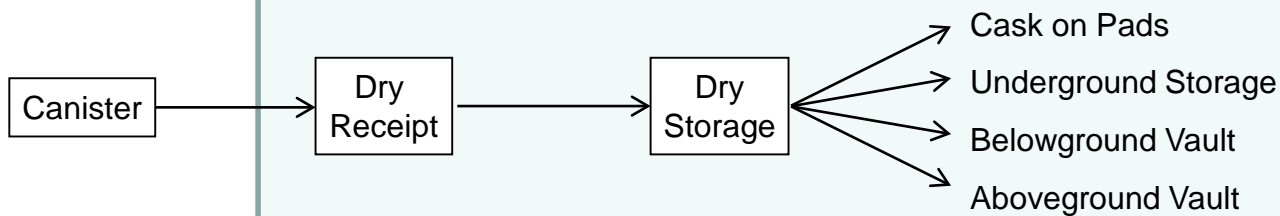


Current Reactors Licensed to Operate 60 Years Unless Announced Shutdown Date, 5 New Builds Operate 40 Years, Current ISFSI Practices

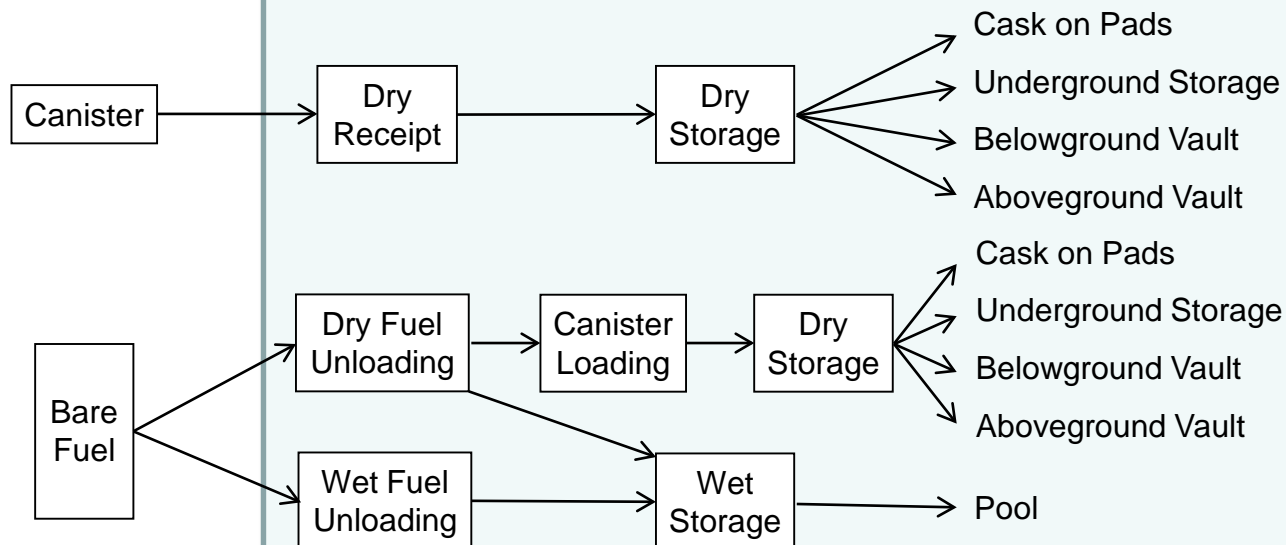
Source: Derived from Data in "Commercial Spent Nuclear Fuel and High-Level Radioactive Waste Inventory Report", FCRD-NFST-2013-263, Rev. 4, June 30, 2016

Systematic Approach Multiple Design Concepts

Pilot ISF – focus on SNF and GTCC waste from shutdown reactors



Larger ISF - balance of SNF and GTCC waste



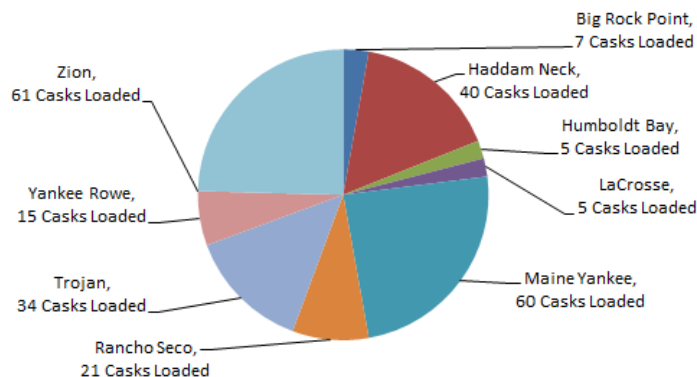


Shutdown Reactor Sites are Increasing in Number

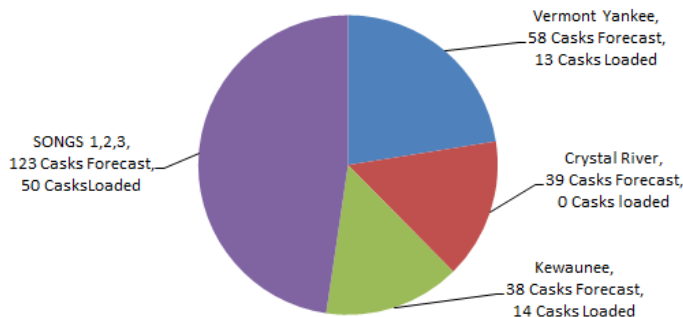
Source: "Commercial Spent Nuclear Fuel and High-Level Radioactive Waste Inventory Report", FCRD-NFST-2013, Rev. 4, June 30, 2016

Four Categories of Shutdown Reactor Fuel

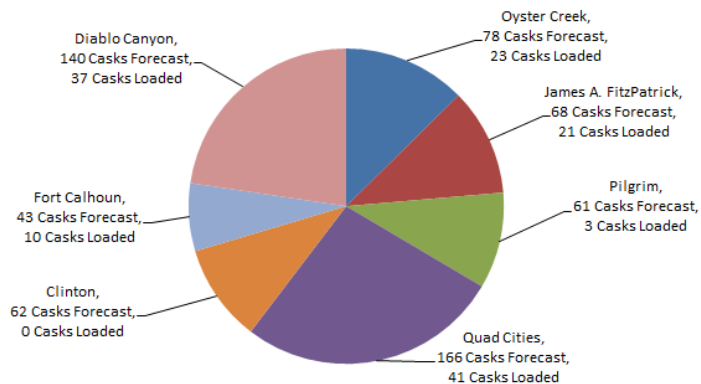
"Stranded" Reactors 248 Fuel Casks, 15 GTCC Casks, 2,815 MT, 7,660 Assemblies



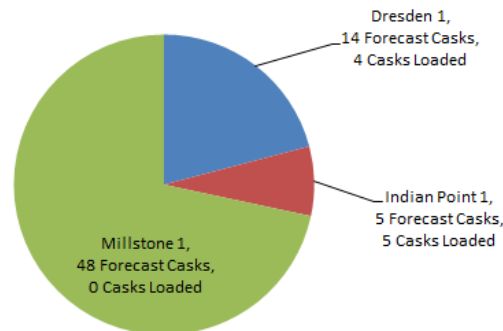
Early Shutdown Reactors 258 Fuel Casks, ~11 GTCC Casks, 3,495 MT, 10,310 Assemblies



Announced Shutdown Reactors by 2025 618 Fuel Casks, ~18 GTCC Casks, 7,536 MT, 34,646 Assemblies



Shutdown Reactors at Operating Sites 67 Fuel Casks, ~6 GTCC Casks, 647 MT, 3,933 Assemblies



Pilot Storage Facility Concept

- **5,000 to 10,000 MT capacity with a design receipt rate of 1,500 MT/year**
 - Accept dry storage canisters (DSC) from shutdown reactors,
 - Accept Greater-Than-Class C Low Level Waste from decommissioned power reactors, and other approved contents in canisters
 - Receive fuel in dual purpose canisters (DPC) in associated transportation casks
 - Deployed in modules for storage capacity and additional functional capability
- **Fully developed facilities will include:**
 - Shielded cask-handling building for transfer of the canister from transportation casks to storage overpacks
 - Storage pads with multiple vertical and horizontal storage overpack designs
 - Infrastructure and balance of plant facilities
- **Designed to Meet:**
 - 10CFR72
 - 10CFR73
 - Associated Regulatory Guides (e.g. RG 3.60, 3.48 & 3.62)
 - Guidance from NUREG – 1567 and 1927

Larger ISF Concept

■ 70,000 MT capacity with a receipt rate of 3,000 MT/year

- Receive both canistered fuel and bare fuel
- Store up to 40,000 MT of SNF in dry storage canisters (4X Pilot ISF)
- Store up to 30,000 MT of bare fuel using pool or other storage

Basis: Historical Repository receipt rate of 3,000 MT/year

Relative Larger ISF and Repository Operational Dates (2048-2025=23 years)

23 years @ 3,000MT/yr = 69,000MT rounded to 70,000MT

24,000 MT in dry storage (May 2016) + 9 years at 2,000 MT/year being loaded =
42,000MT in dry storage, rounded to 40,000MT, balance received from pools

■ Potential additional process support facilities

- Fleet Maintenance Facility
- Cask Maintenance Facility
- Canister Inspection and Remediation Facility
- Packaging for Disposal Facility
- R&D Facility

Dry Storage Design Concepts (Flexible, Adaptable, and Expandable)

DOE Task Order 16 – Dry Storage Concepts

■ Dry Storage Alternatives

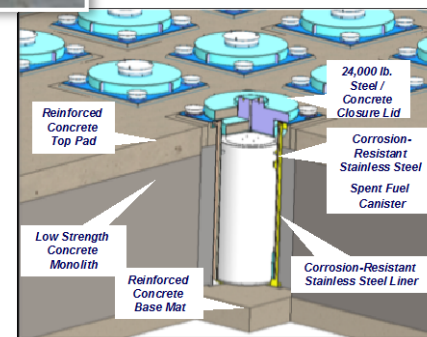
- Pad storage using currently licensed storage overpacks
 - New concrete overpacks
- Underground vertical silo configurations
- Vault configurations
 - Horizontal, vertical
 - Above and below grade

■ Canister Receipt

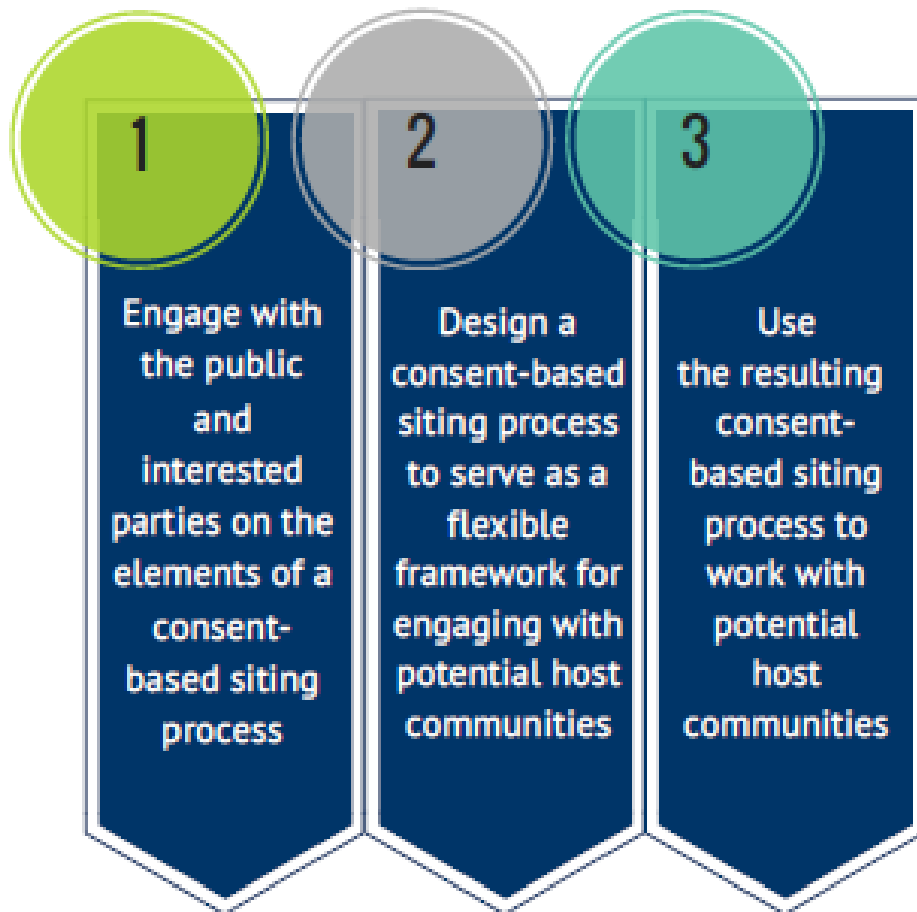
- Commercially available transfer systems
 - Mobile cranes, no weather enclosure
 - Installed cranes, weather enclosure
- Canister transfer building
- Canister transfer building with remote operations

■ Tradeoffs associated with each concept

■ Input to Security Assessment



Steps in Consent-Based Siting



Ensure Safe and Secure Operations

Earn Trust Among Stakeholders

Adapt Operations Based on Lessons Learned



Consent-Based Siting

■ Public Comment Period: 23-Dec-15 to 31-Jul-16

- Five key questions in Federal Register Notice
 1. How can the Department ensure that the process for selecting a site is fair?
 2. What models and experience should the Department use in designing the process?
 3. Who should be involved in the process for selecting a site, and what is their role?
 4. What information and resources do you think would facilitate your participation?
 5. What else should be considered?
- Comments submitted to consentbasedsiting@hq.doe.gov



Participants at the consent-based siting public meeting in Chicago.

■ Eight Public Meetings + Kick-off Meeting and Close-out Meeting

- Washington, DC, Chicago, Atlanta, Sacramento, Denver, Boston, Tempe, Boise, Minneapolis, Washington, DC
- 8 keynotes, 40 panel members, small group discussions and meeting summary reports, 80+ public comments, leading to 40 hours of meeting transcripts

■ DOE Invited to Meet w/ Stakeholders and Tribes

- SONGS, WM 2016, Wiscasset, Prairie Island, Shoshone-Bannock, etc.

■ Received over 10,000 comments

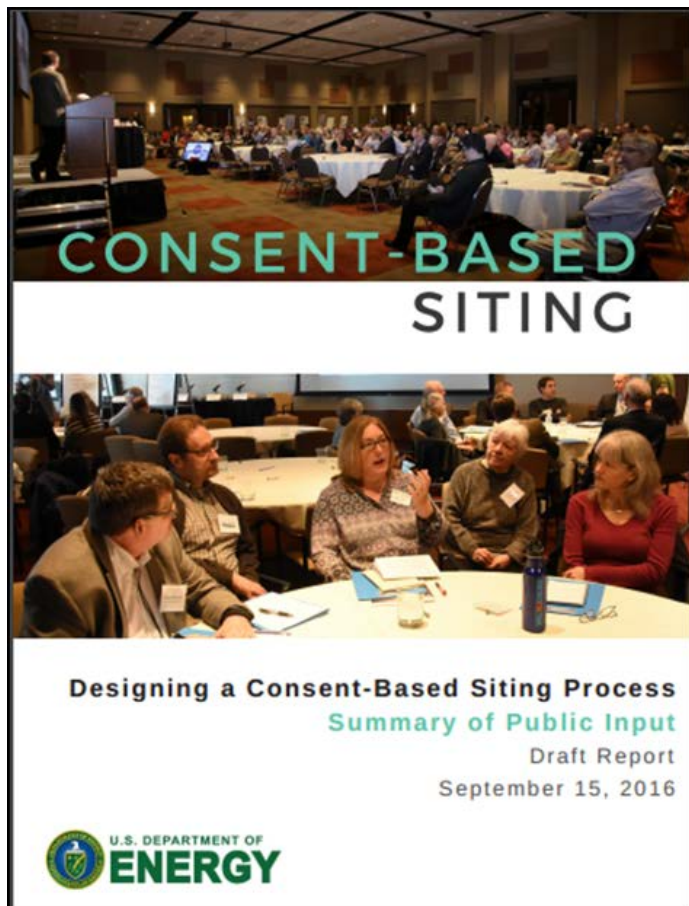
- Available at www.energy.gov/consentbasedsiting



Participants at the consent-based siting public meeting in Boston.



Consent-Based Siting Next Steps



Public webinars or conference calls



Opportunities to discuss consent-based siting at recurring, annual, or previously scheduled meetings and conferences



Citizen forums



Draft a consent-based siting process based on public input



Issue preliminary siting considerations (as part of the draft siting process) to provide a baseline for siting discussions



Proposed funding opportunity announcement for interested communities to seek information on consent-based siting



Questions & Discussion

