

# Moving Forward With Consent-Based Siting

Where We Stand

How We Got Here

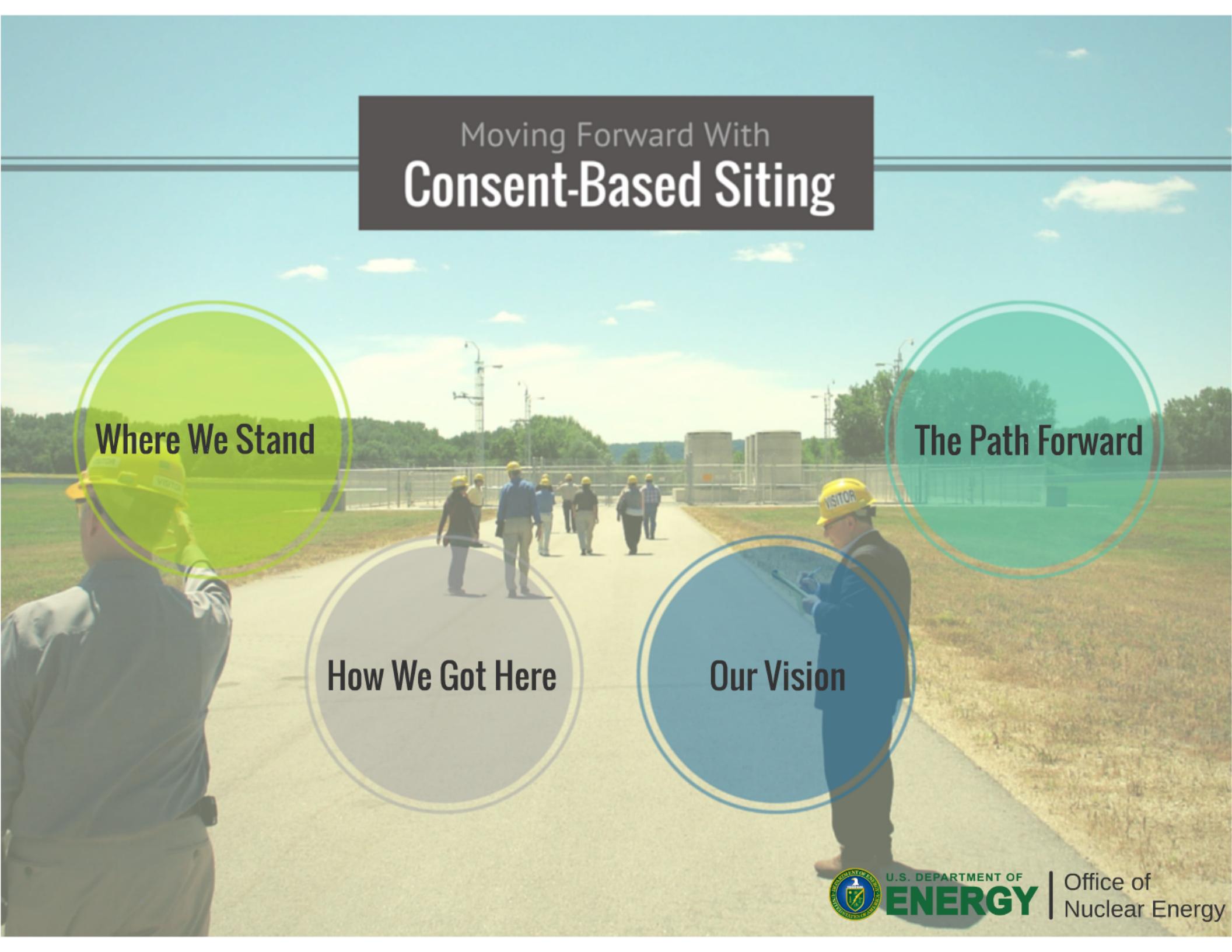
Our Vision

The Path Forward



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Nuclear Energy



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# Where We Stand

# 60

years of electricity from  
nuclear power

## 1942

The world's first nuclear reactor operates in Chicago

## 1955

Arco, Idaho becomes first city in the world to be powered by nuclear energy



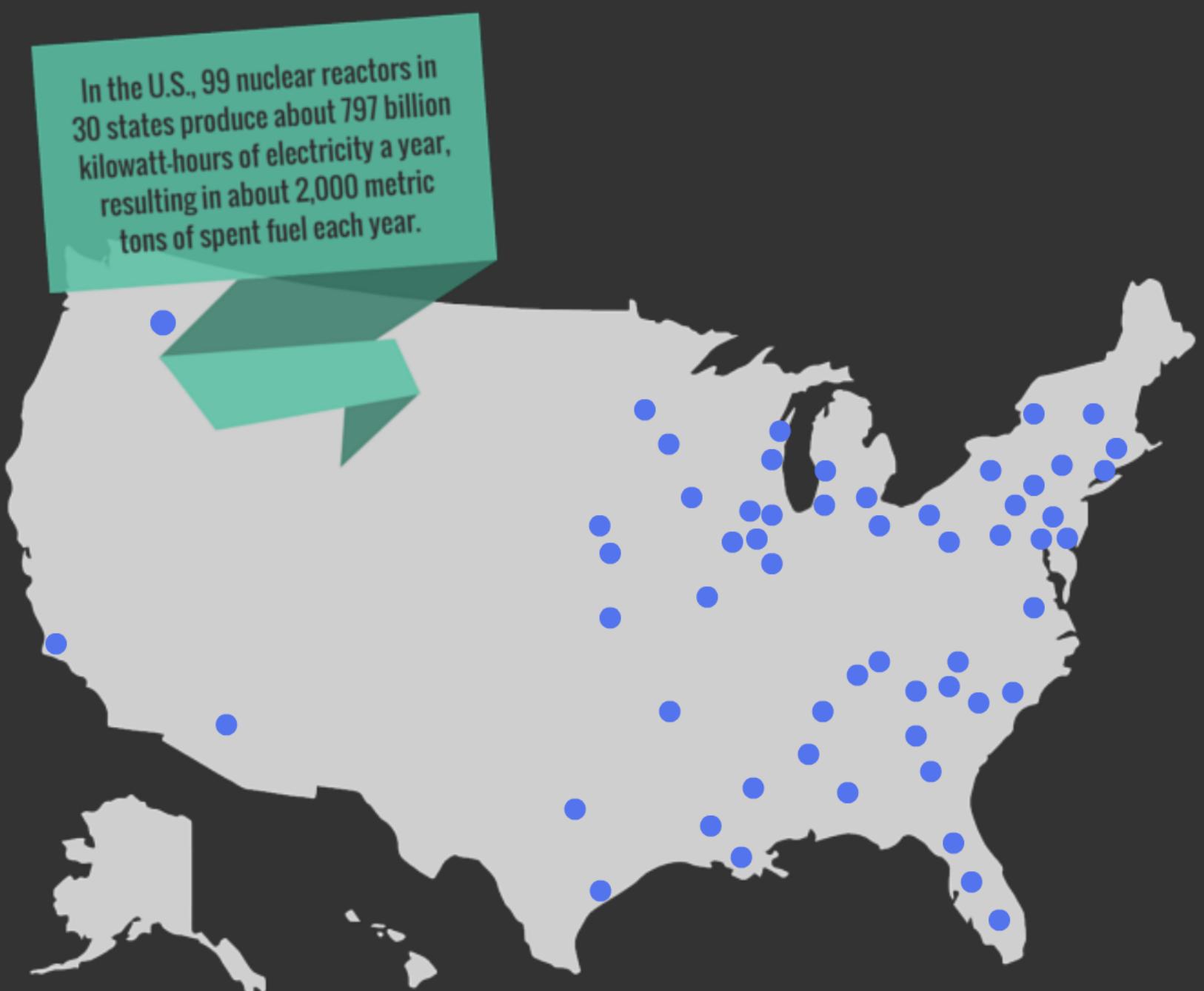
**19.5%**

U.S. electricity  
generated from  
**nuclear power**



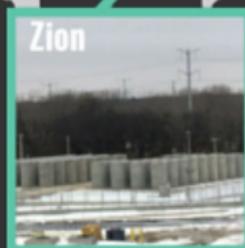
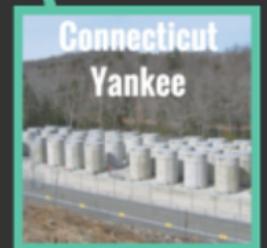
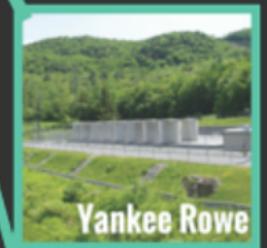
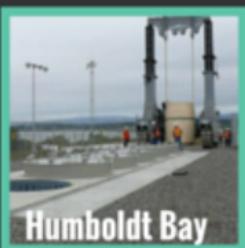
**~70,000**

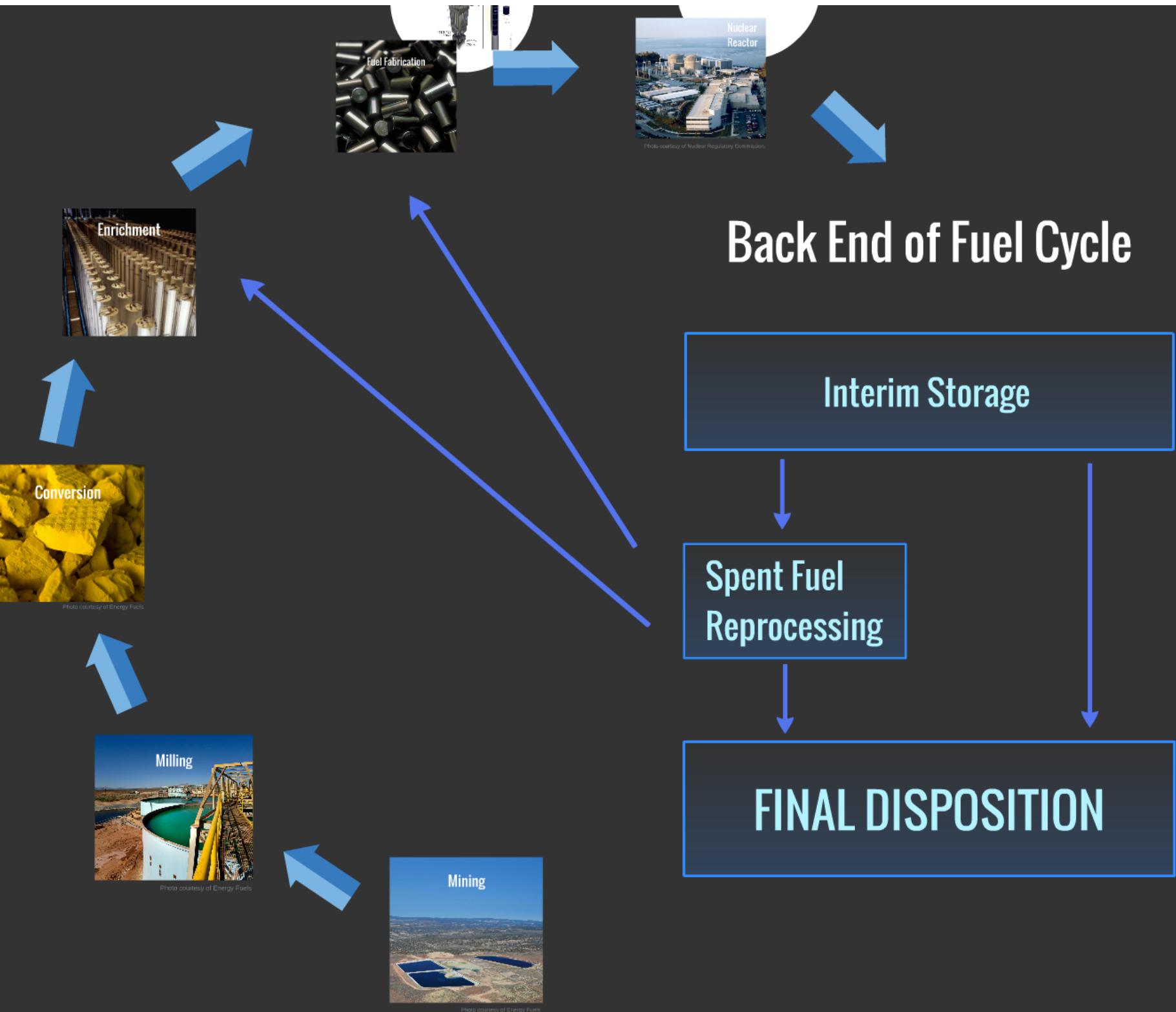
metric tons of spent  
nuclear fuel



In the U.S., 99 nuclear reactors in 30 states produce about 797 billion kilowatt-hours of electricity a year, resulting in about 2,000 metric tons of spent fuel each year.

# Commercial Shutdown Sites





# Mining



Photo courtesy of Energy Fuels

# Milling



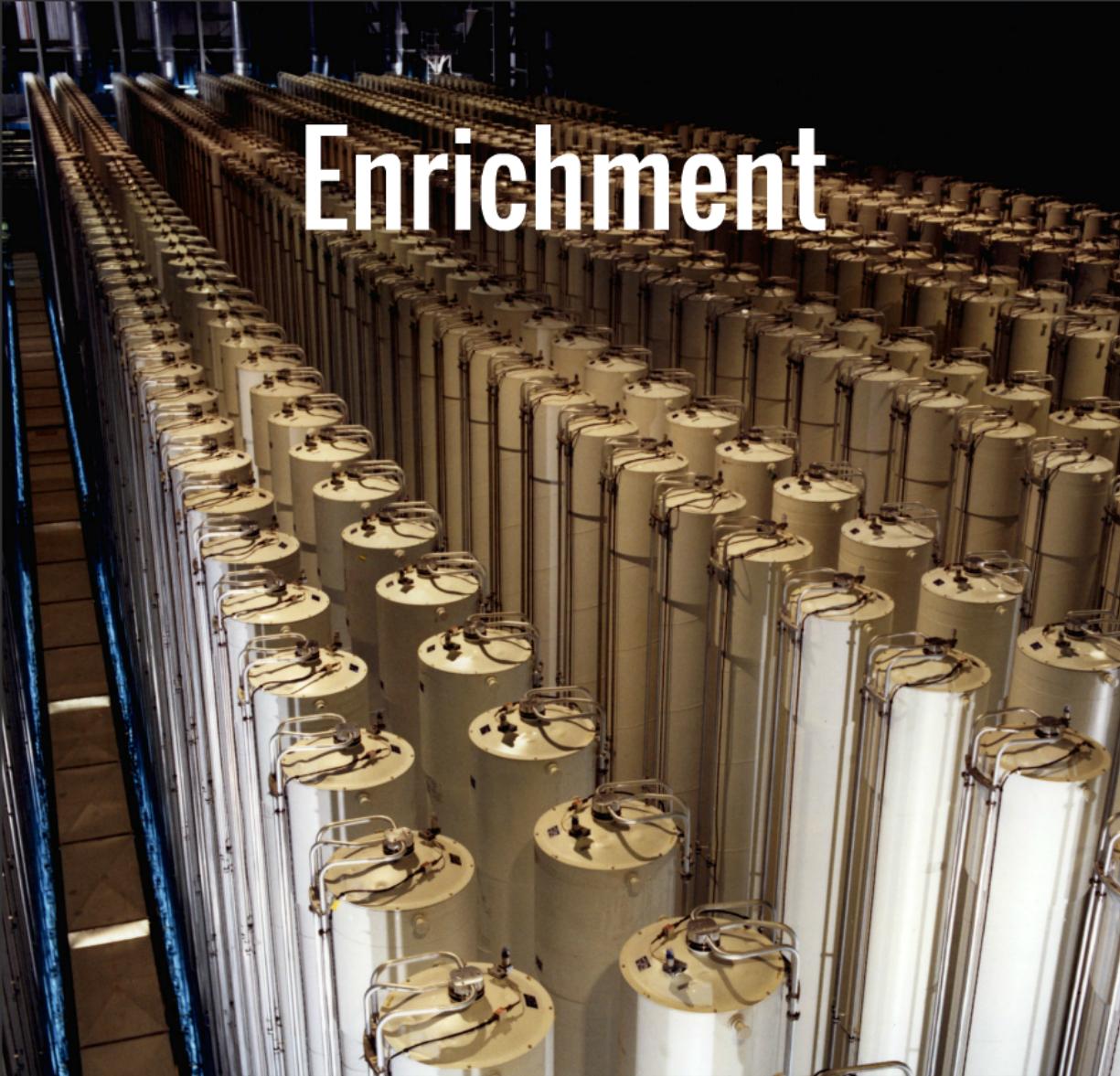
Photo courtesy of Energy Fuels

# Conversion



Photo courtesy of Energy Fuels

# Enrichment

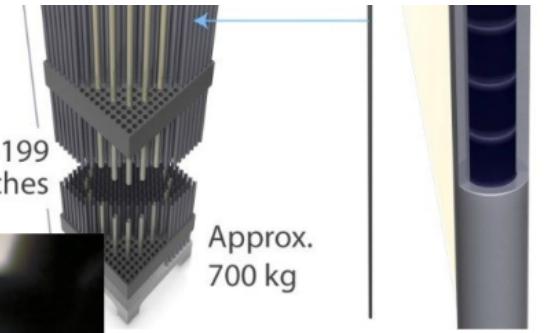




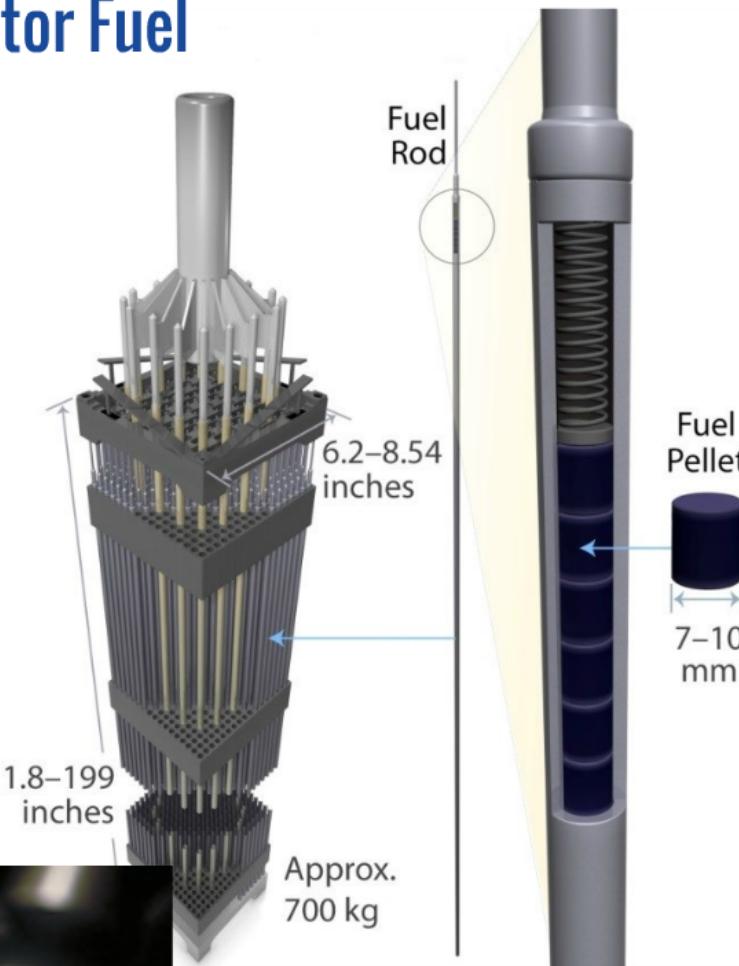
# Fuel Fabrication

111.8–199  
inches

Approx.  
700 kg



# Typical Pressurized Water Reactor Fuel Assembly



ORNL 2015-G00443/aas

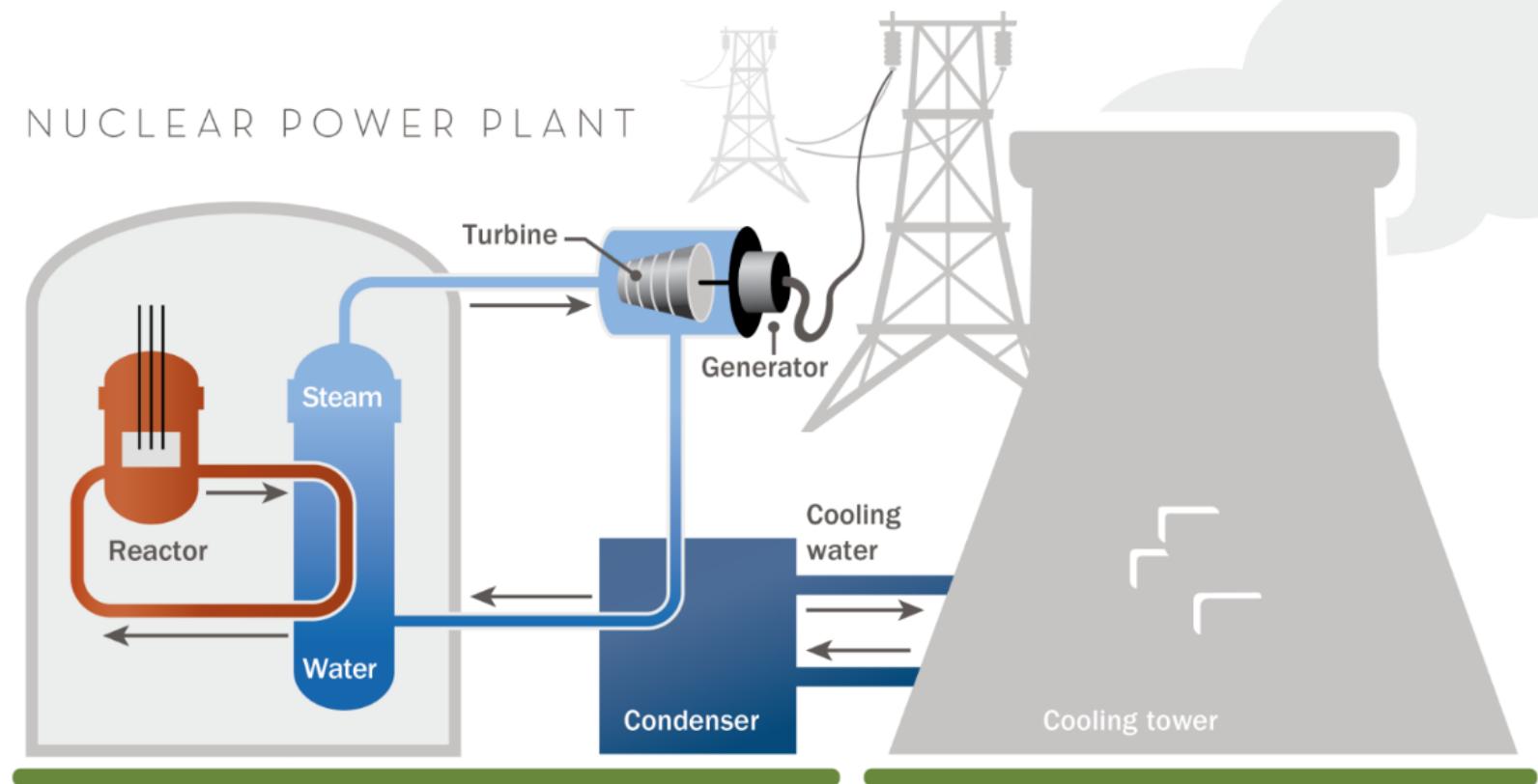
## Fuel Fabrication

# Nuclear Reactor



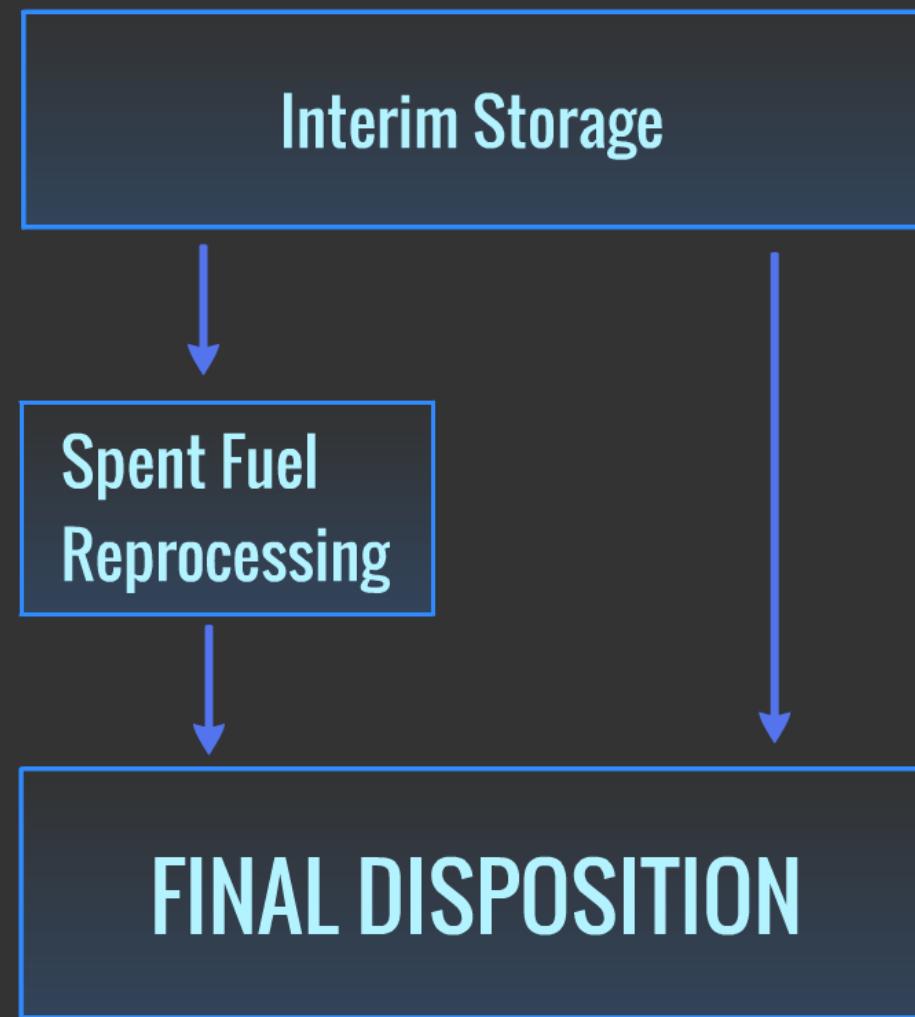
Photo courtesy of Nuclear Regulatory Commission.

## NUCLEAR POWER PLANT



Nuclor

# Back End of Fuel Cycle





**WET STORAGE**

Spent fuel pool at the San Onofre Nuclear Generating Station. Photo courtesy of the Nuclear Regulatory Commission.

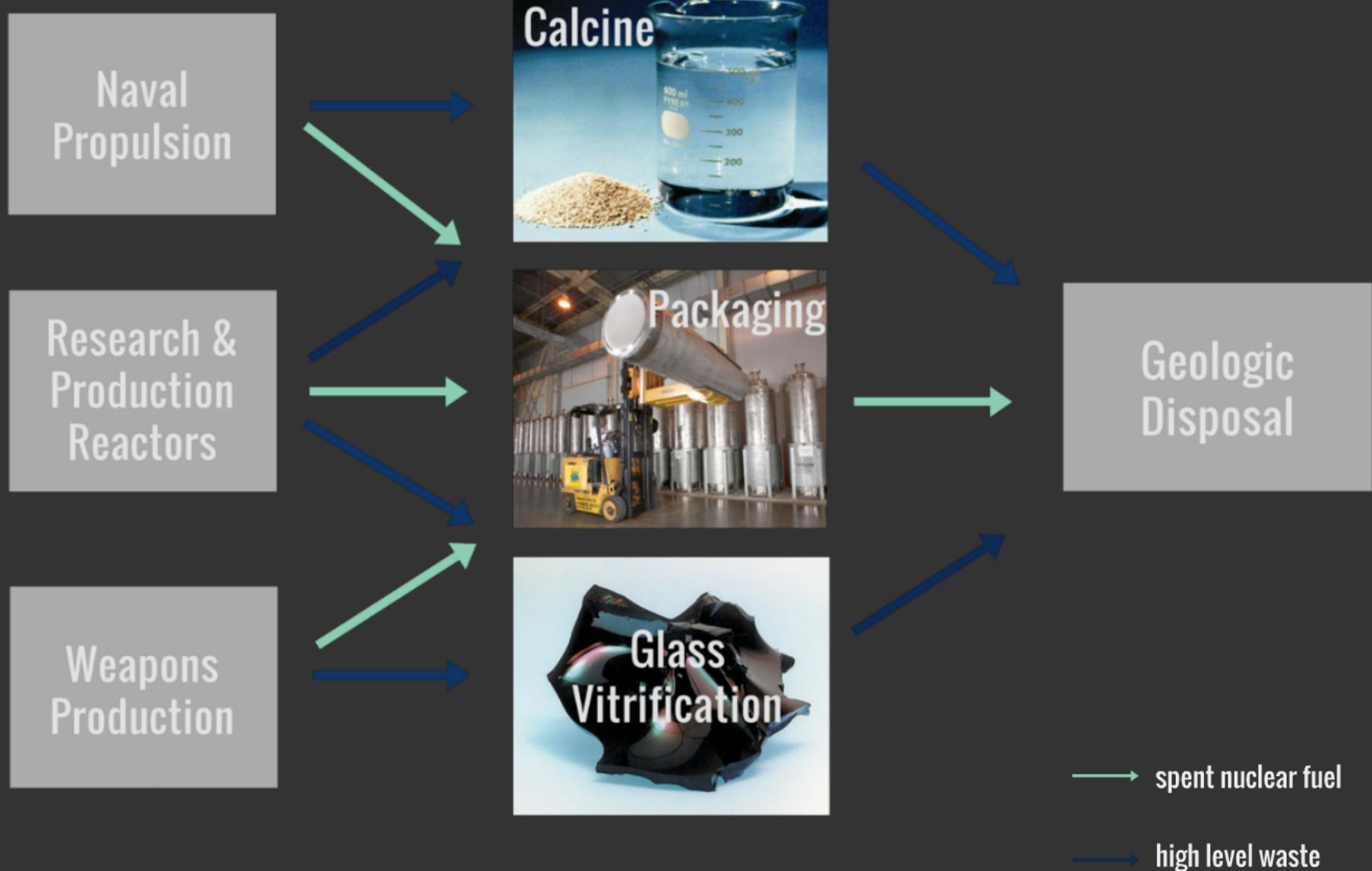


**DRY STORAGE**

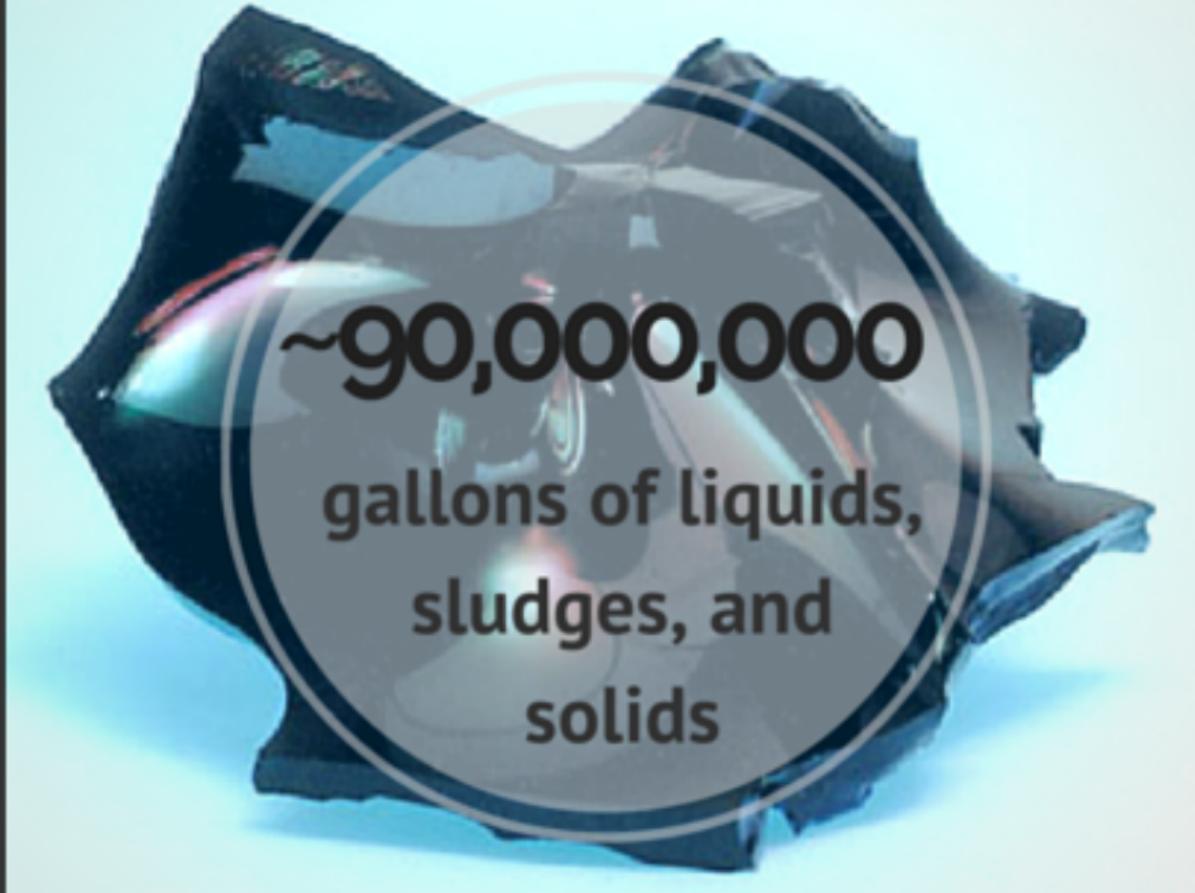
A dry cask loaded with spent fuel being lifted from a horizontal transporter to be placed vertically on a storage pad. Photo courtesy of Sandia National Laboratories.

# Department of Energy

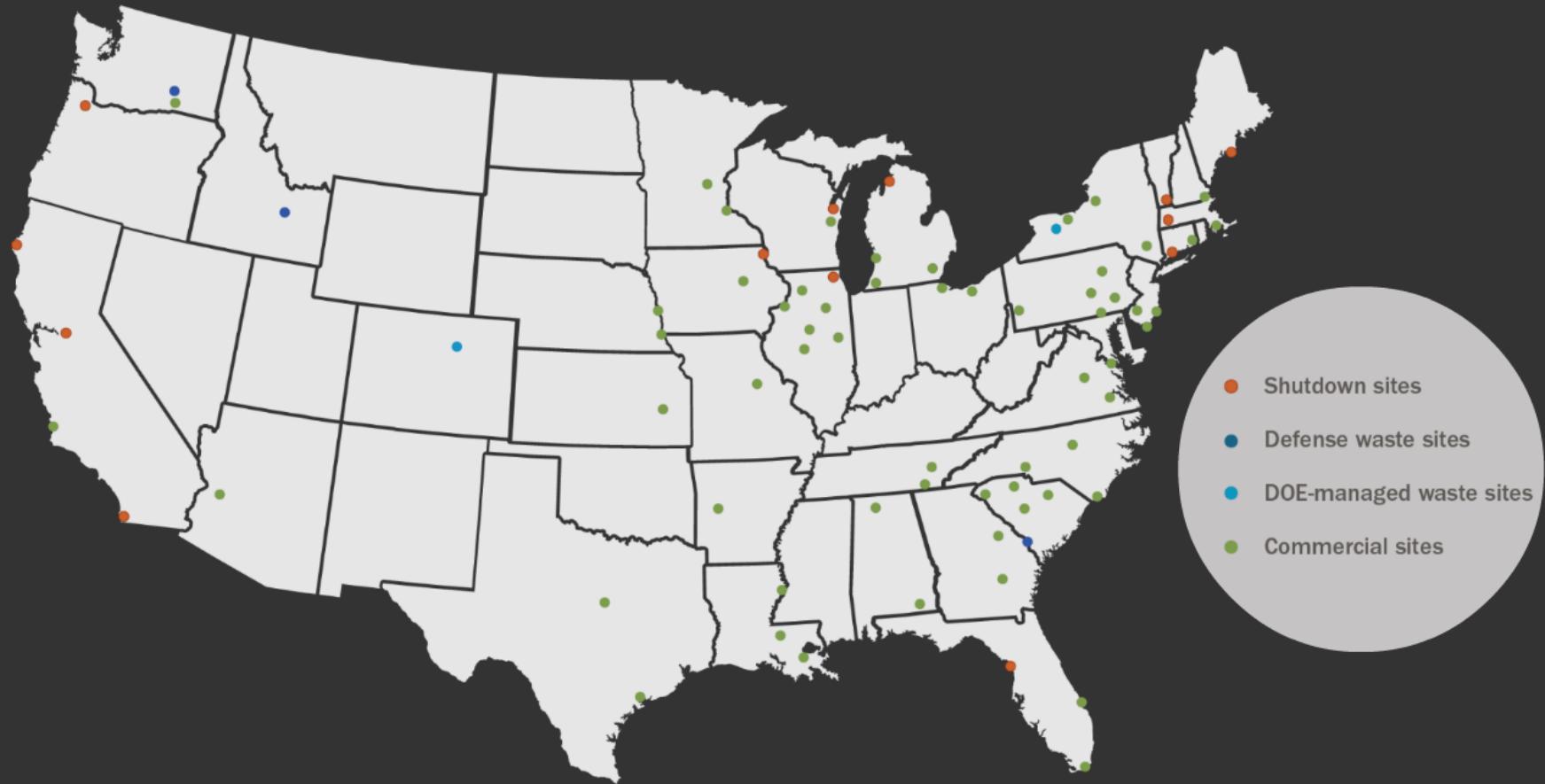
## Managed Waste



## HIGH-LEVEL RADIOACTIVE WASTE



**~90,000,000**  
gallons of liquids,  
sludges, and  
solids





# How We Got Here

## TIMELINE DEVELOPMENT OF NUCLEAR POWER

- 1934 Enrico Fermi splits the atom and achieves the world's first nuclear fission
- 1942 Manhattan Project forms to build the atomic bomb for use in World War II
- 1945 U.S. produces first nuclear weapons
- 1953 U.S. launches the first nuclear-powered submarine, the U.S.S. *Narwhal*
- 1954 Congress passes the Atomic Energy Act of 1954, providing direction for the peaceful use of atomic energy
- 1955 U.S. begins using nuclear power to generate electricity

## DEVELOPMENT OF GEOLOGIC DISPOSAL

- 1957 National Academy of Sciences recommends geologic disposal for disposing of nuclear waste
- 1970 U.S. begins a search for potential repository sites
- 1970 Lyons, Kansas site selected as the first national repository
- 1972 Government withdraws from operations at Lyons site due to technical uncertainties and public opposition

## NUCLEAR WASTE POLICY ACT AND YUCCA MOUNTAIN

- 1982 Congress passes NWPA, establishing process for selecting a disposal site
- 1986 DOE recommends three sites for further study, including Yucca Mountain
- 1987 Congress amends NWPA, directing DOE to study only Yucca Mountain
- 1988-2002 DOE studies Yucca Mountain extensively
- 1998 DOE misses deadline to begin accepting spent nuclear fuel
- FEB 2002 DOE recommends Yucca Mountain as the nation's first disposal site and President Bush submits recommendation to Congress
- APR 2002 Nevada Governor Quinn submits official notice of disapproval to Congress
- JUL 2002 President Bush signs joint resolution approving Yucca Mountain as repository site
- 2008 DOE submits license application for construction of repository to NRC
- 2009 Administration determines Yucca Mountain is not a workable solution. DOE suspends activities at the site

## THE BLUE RIBBON COMMISSION AND CONSENT-BASED SITING

- 2010 Secretary of Energy Chu establishes the Blue Ribbon Commission on America's Nuclear Future (BRC)
- 2012 BRC recommends DOE adopt a consent-based approach to siting nuclear waste facilities, including consolidated interim storage and geologic disposal sites
- 2013 DOE releases *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste* based on the recommendations from the BRC
- 2015 Secretary of Energy Moniz announces DOE will pursue a consent-based approach to siting facilities for interim storage, as well as disposal of defense and commercial waste

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1953	U.S. launches the first nuclear-powered submarine, <i>the U.S.S. Nautilus</i>
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## AND CONSENT-BASED SITING

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2012

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2015

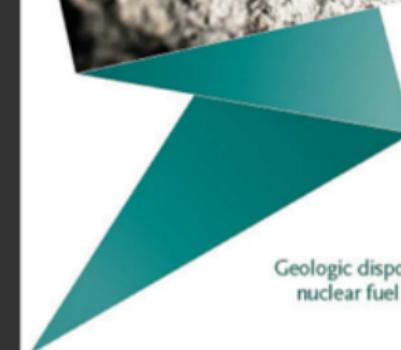
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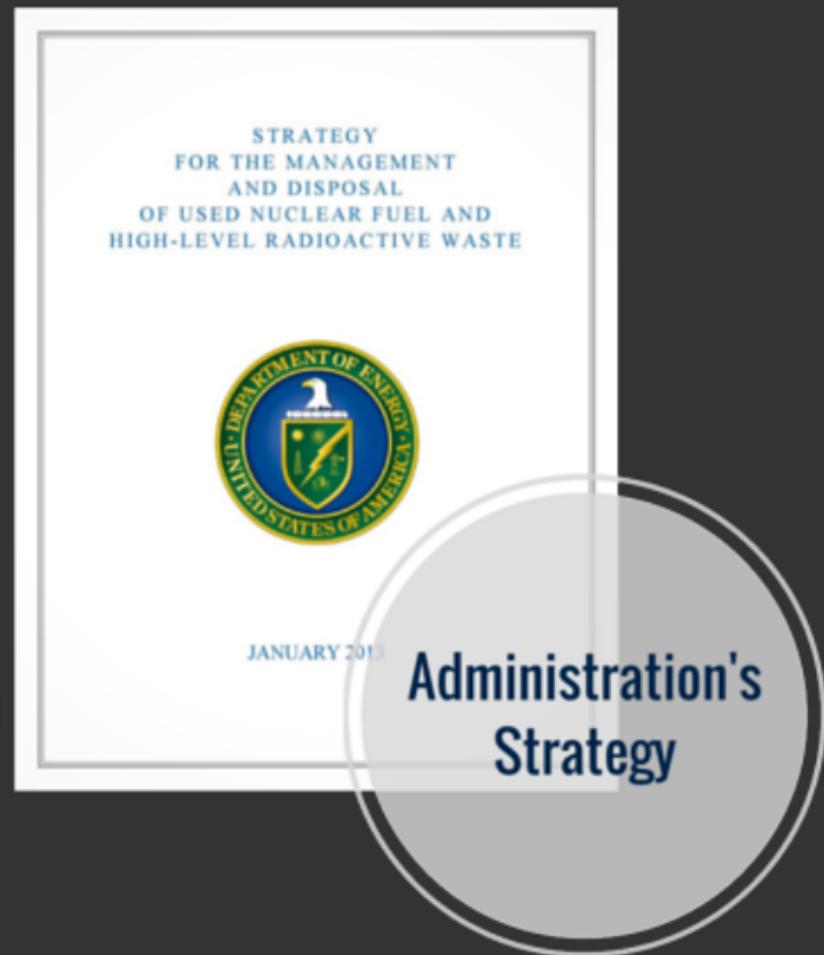
CANADA

Moving Forward Together:  
Process for Selecting a  
Site for Canada's Deep  
Geological Repository  
for Used Nuclear Fuel

MAY 2010



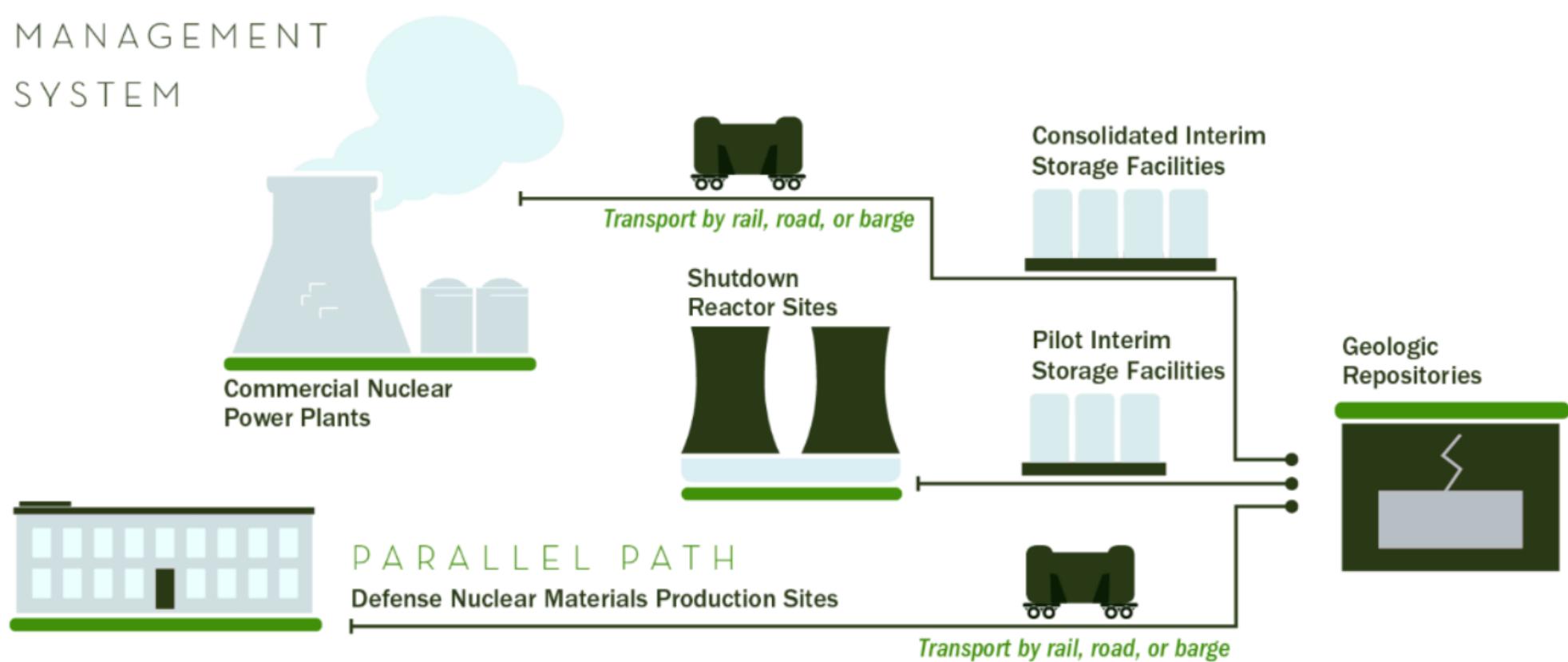
Geologic disposal of spent  
nuclear fuel in Olkiluoto





# Our Vision

# INTEGRATED WASTE MANAGEMENT SYSTEM



# TRANSPORTATION



M-290 shipping container used to ship Navy spent nuclear fuel.

DISPOSAL

The diagram illustrates a waste disposal facility. A large green circle, containing the word "DISPOSAL" in white capital letters, is positioned at the top left. To the right of the circle is a grey industrial building with a row of small windows and a chimney. Below the building is a thick green horizontal bar. In the center of the image is a vertical brown rectangular area with horizontal stripes, representing soil or earth. Two grey pipes enter this area from the top and bottom, forming a zigzag pattern that extends downwards towards the bottom edge of the brown rectangle.



# The Path Forward

# **CONSENT-BASED SITING PROCESS**

**Local  
Governments**

**Tribal  
Nations**

**Communities**

**States**



**ensure safe and secure operations**



**build & maintain trust among stakeholders**



**adapt approach based on lessons learned**

1

Engage with the public and interested parties on the elements of a consent-based siting process

2

Design a consent-based siting process to serve as a flexible framework for engaging with potential host communities

3

Use the resulting consent-based siting process to work with potential host communities

# 1

Engage with the public and interested parties on the elements of a consent-based siting process

- How can the Department ensure that the process for selecting a site is fair?
- What models and experience should the Department use in designing the process?
- Who should be involved in the process for selecting a site, and what is their role?
- What information and resources do you think would facilitate your participation?
- What else should be considered?

--  
role?

you  
ion?



Invitation for Public Comment  
in the Federal Register



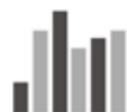
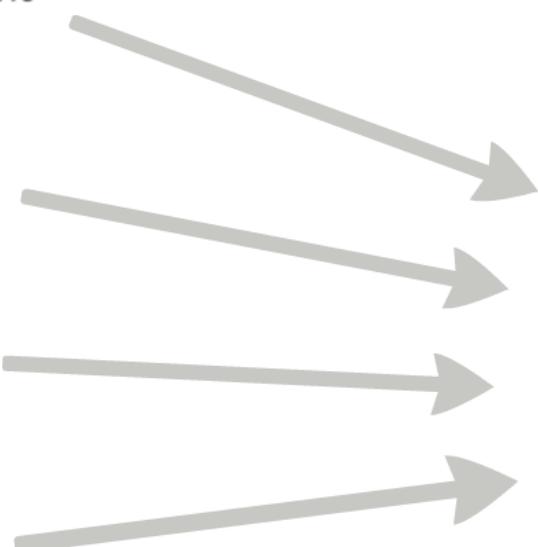
Public meetings hosted  
across the country



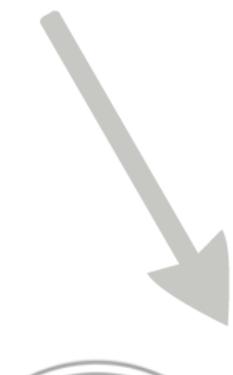
Public webinars or  
conference calls



Meetings with stakeholders  
and groups by request



Summary report for  
public review and  
comment





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

2

Design a consent-based siting process to serve as a flexible framework for engaging with potential host communities



Draft a consent-based siting process based on public input

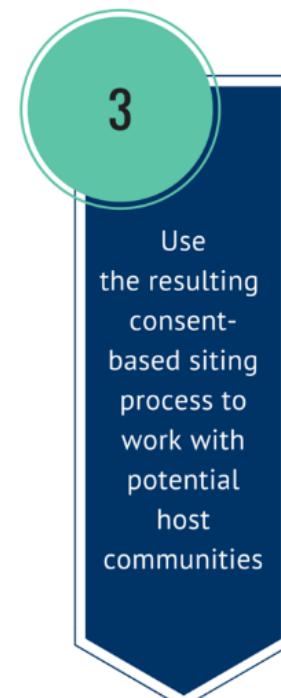
Issue preliminary siting considerations to provide a baseline for siting discussions



Draft a consent-based siting process based on public input



Issue preliminary siting considerations to provide a baseline for siting discussions



# Get involved!

Visit

[energy.gov/consentbasedsiting](http://energy.gov/consentbasedsiting)

Email

[consentbasedsiting@hq.doe.gov](mailto:consentbasedsiting@hq.doe.gov)