

Used Nuclear Fuel in the U.S.- Moving Forward

Rod McCullum
Nuclear Energy Institute

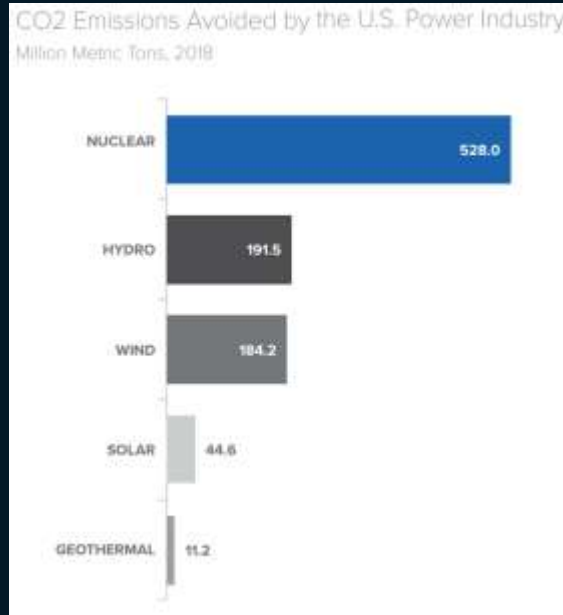
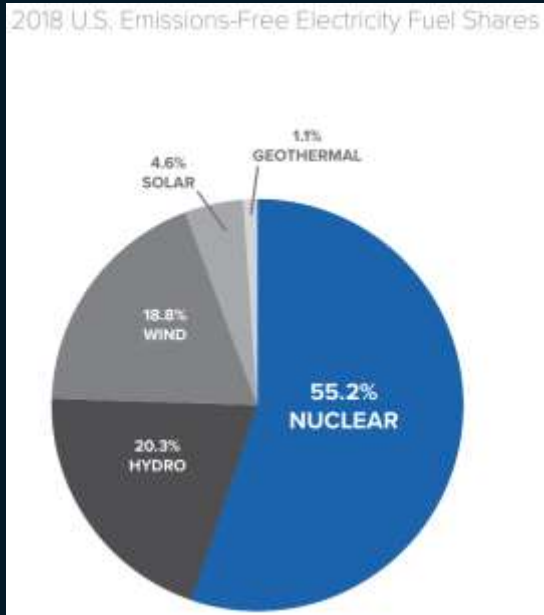
NCSL Nuclear Legislative Working Group
Spring Meeting 2019
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Used Fuel and Clean Energy



Nuclear Clean Air



Social Cost of
CO₂, NO_x, & SO₂
avoided by
Nuclear
=
\$28.1B/yr

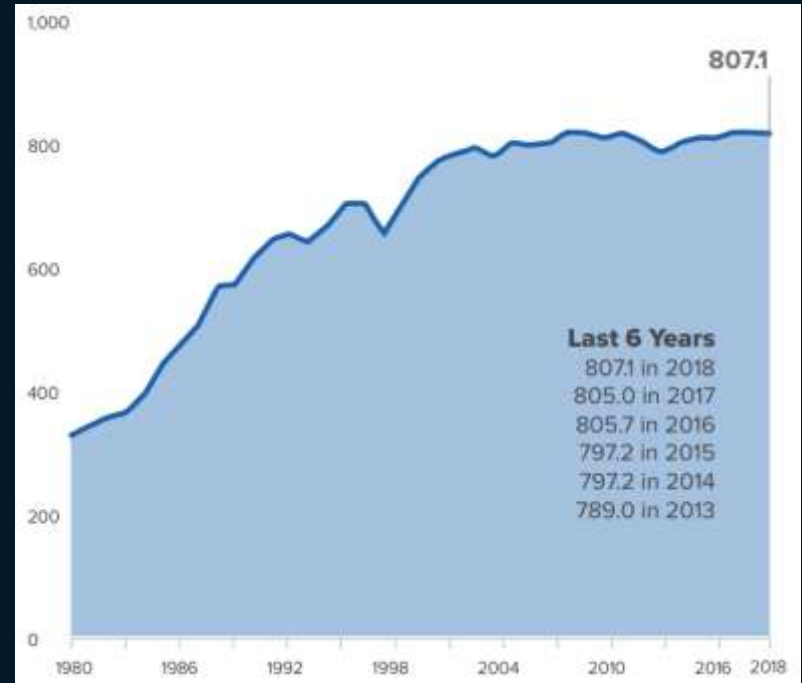
One of the things that makes nuclear electricity so clean is that all of the hazardous byproducts of nuclear reactions remain contained in the original fuel in which these reactions took place - hence the term used nuclear fuel

Nuclear Electricity – more than ever

U.S. Nuclear Power Plants

- 98 reactors across 59 sites
- 99,355 megawatts-electric of baseload capacity
- 807.1 billion kilowatt-hours in 2018
- 92.3 percent capacity factor in 2018

In producing a record amount of clean energy in 2018, U.S. nuclear reactors discharged ~2,000 metric tons of used fuel

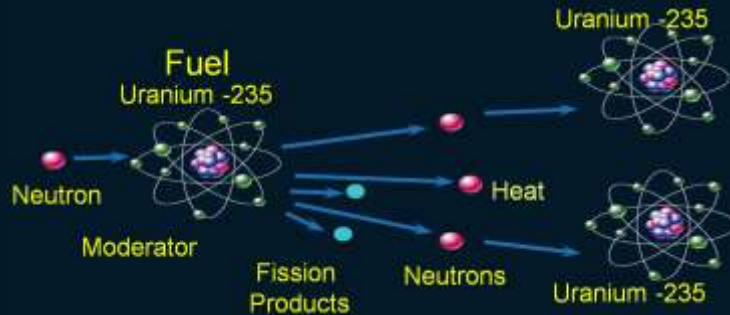


Before and After

New Nuclear Fuel



There is little to no outward difference between the condition of the fuel before it goes into the reactor and when it is discharged. However, inside the fuel rods, the radioactive byproducts of nuclear fission remain. The condition of cladding is carefully monitored at every stage.



Used Nuclear Fuel



Used Nuclear Fuel Storage in the U.S.



Used fuel inventory*

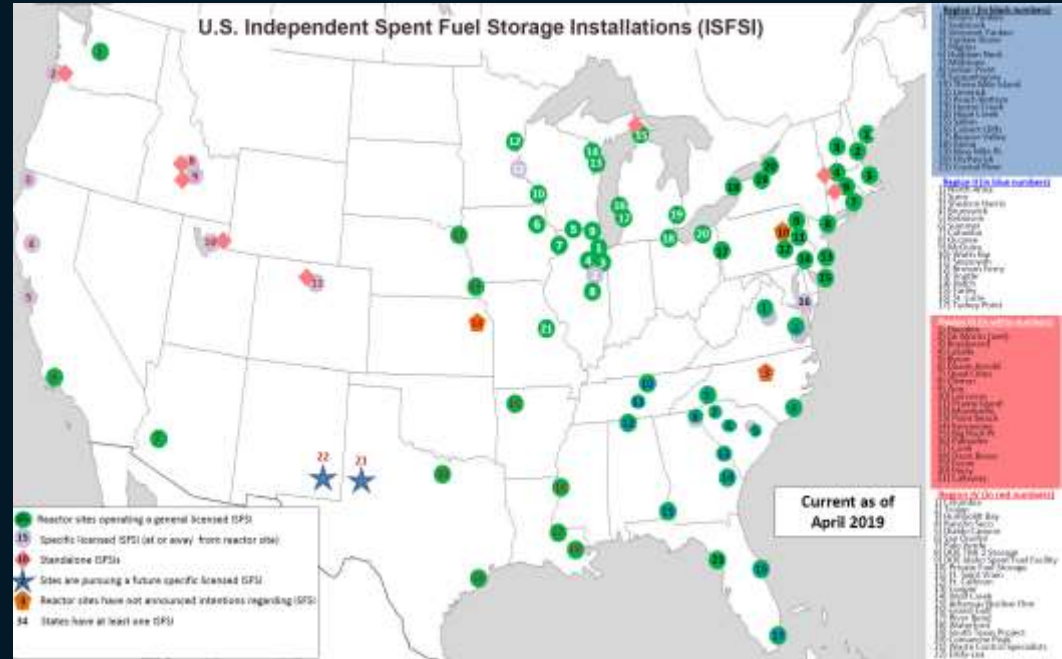
Approximately 81,518 MTU
Increases 2 - 2.4k MTU annually

ISFSI** storage

130,252 assemblies
36,696 MTU (45%)
2,966 casks/modules loaded
72 Operating ISFSIs
70 dry storage, 1 pool, 1 modular vault
Eventually to be deployed at 76 sites
Fuel from 119 reactors

Long term commitment to ISFSIs

Licenses being extended to 60 years
Licenses extensions approved at 30 sites
NRC has found 100 year storage to be safe



*As of December 31, 2018

** ISFSI = Independent Spent Fuel Storage Installation

NEI's Used Fuel Principles

- Protect and the Nuclear Waste Fund and use it as intended
- Develop Consolidated Interim Storage
- Complete Yucca Mountain licensing and abide the result
- Reform management of the Federal Program
- Do not unnecessarily restart the Nuclear Waste Fee
- Protect utilities' contract rights
- Provide benefits to host communities
- Develop advanced technologies as it becomes feasible to do so*

*But not with the Nuclear Waste Fund

The US Decommissioning Marketplace

Status	Plant	Current Owner	Current NRC Licensee	Ownership Transfer
Plants that have completed decommissioning but still have used fuel stored on site	Rancho Seco	SMUD	SMUD	
	Yankee Rowe	Yankee Atomic	Yankee Atomic	
	Maine Yankee			
	Connecticut Yankee			
	Trojan	Portland GE	PGE	
	Rancho Seco	SMUD	SMUD	
	Big Rock Point	Entergy	Entergy	Pending to Holtec
Plants* that have permanently shut down and entered decommissioning	Humbolt Bay	Pacific GE	PGE	
	Lacrosse	Dairyland	Energy Solutions	
	Zion 1&2	Exelon	Energy Solutions	
	San Onofre 1,2,&3	SCE	SCE	
	Crystal River	Duke	Duke	
	Kewaunee	Dominion	Dominion	
	Vermont Yankee	Northstar	Northstar	Northstar purchase from Entergy closed 1/19
	Fort Calhoun	OPPD	OPPD	
	Oyster Creek	Exelon	Exelon	Pending to Holtec
	Three Mile Island 1	Exelon	Exelon	
Plants that have announced intent to enter decommissioning	Pilgrim	Entergy	Entergy	Pending to Holtec
	Davis Bessie	FENOC	FENOC	
	Duane Arnold	NextEra	NextEra	
	Indian Point 2&3	Entergy	Entergy	
	Beaver Valley 1&2	FENOC	FENOC	
	Perry	FENOC	FENOC	
	Palisades	Entergy	Entergy	Pending to Holtec
	Diablo Canyon	Pacific GE	PGE	

*Does not include shutdown plants that are co-located with an operating reactor (Indian Point 1, Peach Bottom 1, Fermi 1, Dresden 1, Three Mile Island 2, & Millstone 1)

Marketplace Transformation

- Decommissioning and Used Fuel Suppliers are Building More Efficient Business Models
 - Decommissioning Experience/Expertise
 - ◆ Nuclear
 - ◆ Non-Nuclear
 - ◆ Domestic and International
 - Decommissioning Plant Ownership
 - Used Fuel Ownership
 - Transportation
 - LLW Disposal
 - Used Fuel Consolidated Interim Storage



Getting from here to there



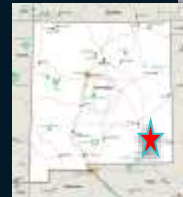
NEI Used Fuel Transportation Tabletop Exercise, May 21 2019

Transformation Enables Solutions

Utility ISFSIs



Transport



Waste Control Specialists



Eddy-Lea Energy Alliance

License application under review
Expected to be available 2023

Yucca Mountain



Fate
Uncertain

License application under review
Expected to be available 2023

Solutions Enable Clean Energy

