



Public Acceptance and Preferences for Used Nuclear Fuel Management in the U.S.

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The UNIVERSITY of OKLAHOMA



Research Goals and Methods

- ◆ CES&S: Partnership between University of Oklahoma and Sandia National Labs
- ◆ Goal: track and analyze the evolution of public perceptions about UNF management in the U.S.
- ◆ Methods: complementary streams of data, such as:
 - Public opinion surveys
 - » Annual surveys since 2006, totaling > 19,000 participants
 - » Latest survey fielded on 27-28 June 2014, n=1,610
 - Social media and big data platforms
 - » Analyzing the co-evolving public and elite narratives using data collected via Twitter, Google News, and Google Trends
 - Qualitative focus groups
 - » Studying group deliberation to assess the kinds of information that stakeholders would like to see when evaluating a prospective UNF management policy



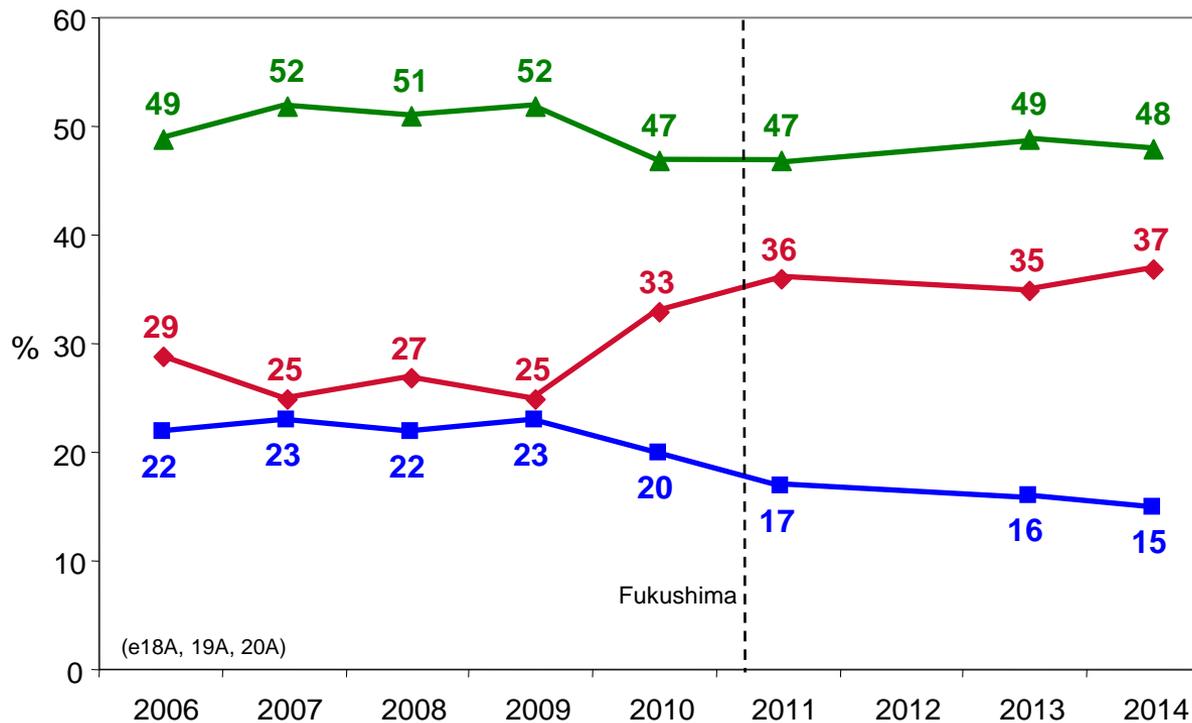
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Preferred Energy Sources

What percent of our energy should come from nuclear energy, which currently provides about 8% of total U.S. energy?



2006–2014

Renewables: 0.0%

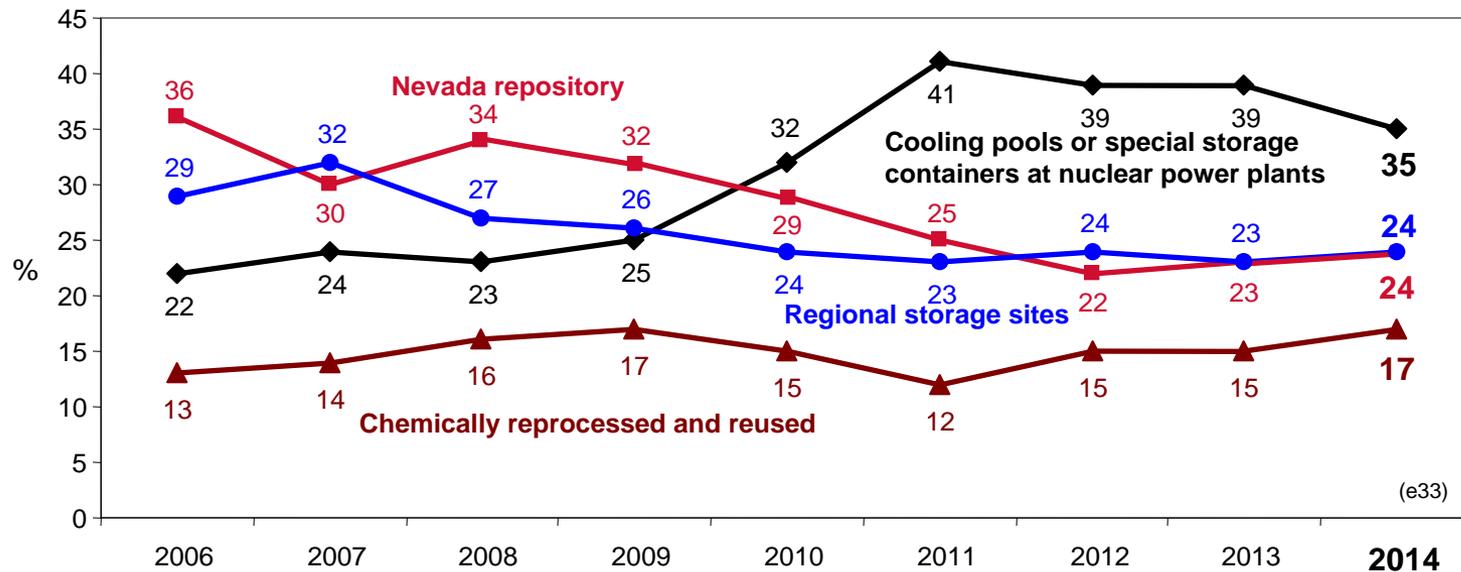
Fossil: + 27.6%

Nuclear: - 31.8%



Knowledge about UNF Policy

As nuclear fuel is used to generate electricity, it becomes contaminated with radioactive byproducts. When it can no longer efficiently produce electricity, it is called “used” or “spent” nuclear fuel. To the best of your knowledge, what currently is being done with most of the used nuclear fuel produced in the U.S.? (response options randomized)



(e33)



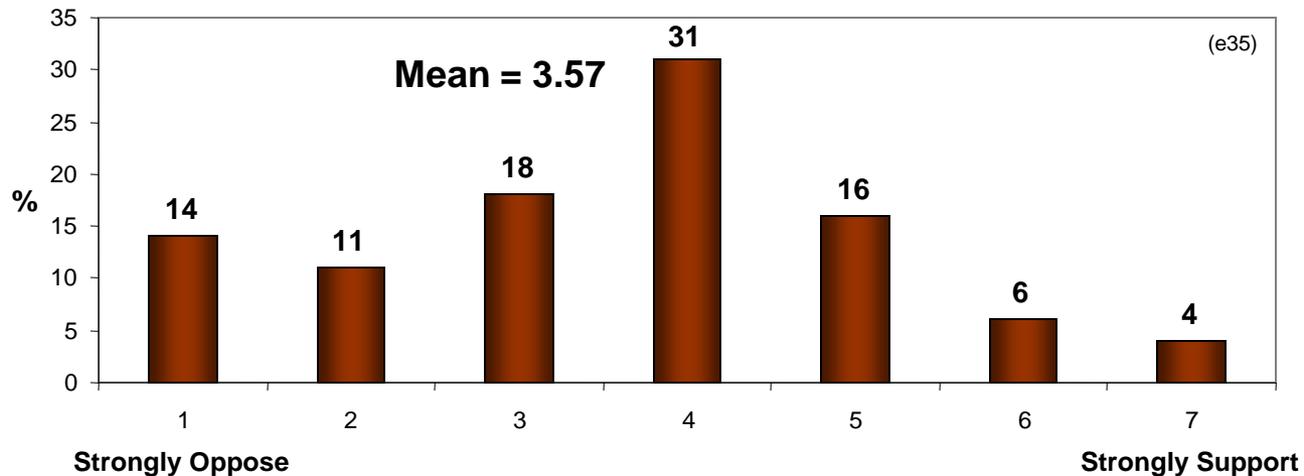
Current On-Site Storage

Arguments FOR

- ◆ Move radioactive materials only once to permanent repository
- ◆ Packing & transporting materials to ISF is risky
- ◆ Less expensive in short-term; buys time for permanent solution
- ◆ No harm yet; risks of terrorism and flooding can be reduced

Arguments AGAINST

- ◆ Improving protections from terrorism and flooding expensive
- ◆ Near large populations; UNF has leaked into pools
- ◆ Quantities of UNF increasing with no permanent solution
- ◆ UNF at “stranded” sites expensive to secure and protect





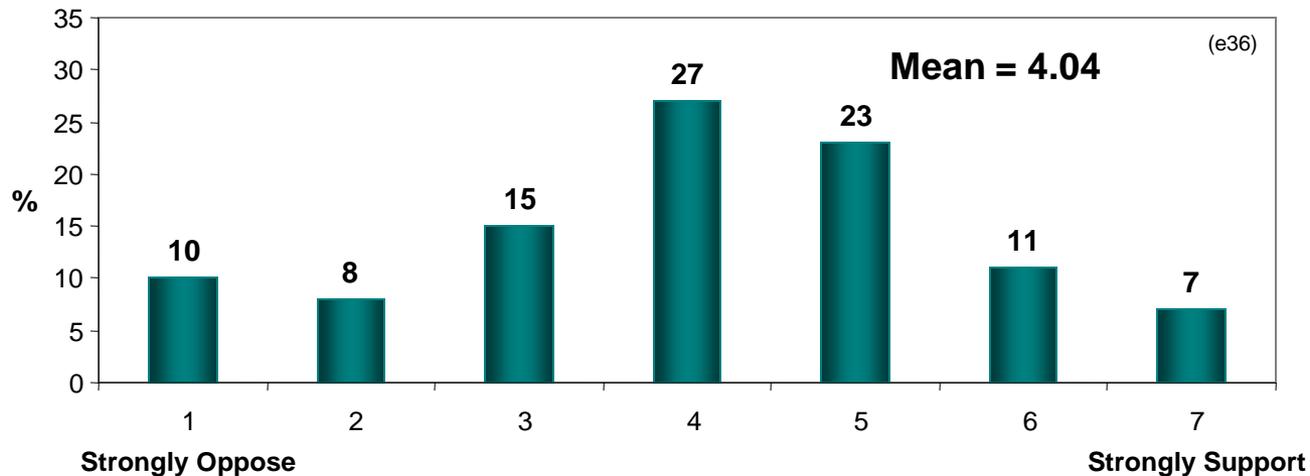
Interim Storage

Arguments FOR

- ◆ Construct sooner than repository; store UNF up to 100 yrs.
- ◆ Better protection from terrorists; allows packaging for repository
- ◆ Reduce UNF storage near pop. centers; reduce risks of flooding
- ◆ Eliminate stranded fuel; savings help offset costs of ISF

Arguments AGAINST

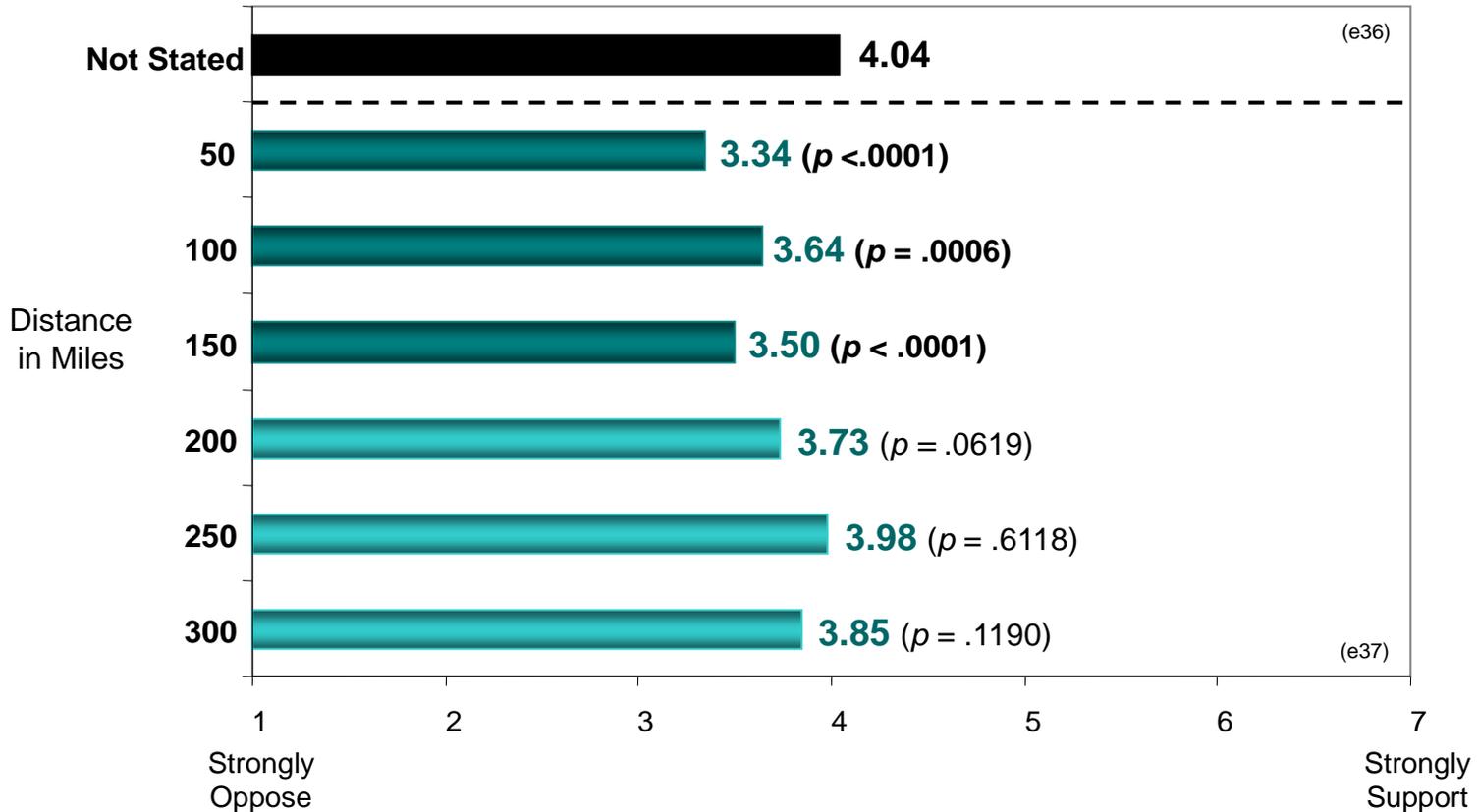
- ◆ Could delay decision on permanent disposition
- ◆ Risks of transportation > risks of on-site storage
- ◆ Cheaper & politically more acceptable than new facilities
- ◆ No public harm yet; risks of terrorism, flooding can be addressed





Proximity to ISF

Now assume that this interim storage facility is to be located [50, 100, 150, 200, 250, or 300] miles from your primary residence.
(distances randomized)

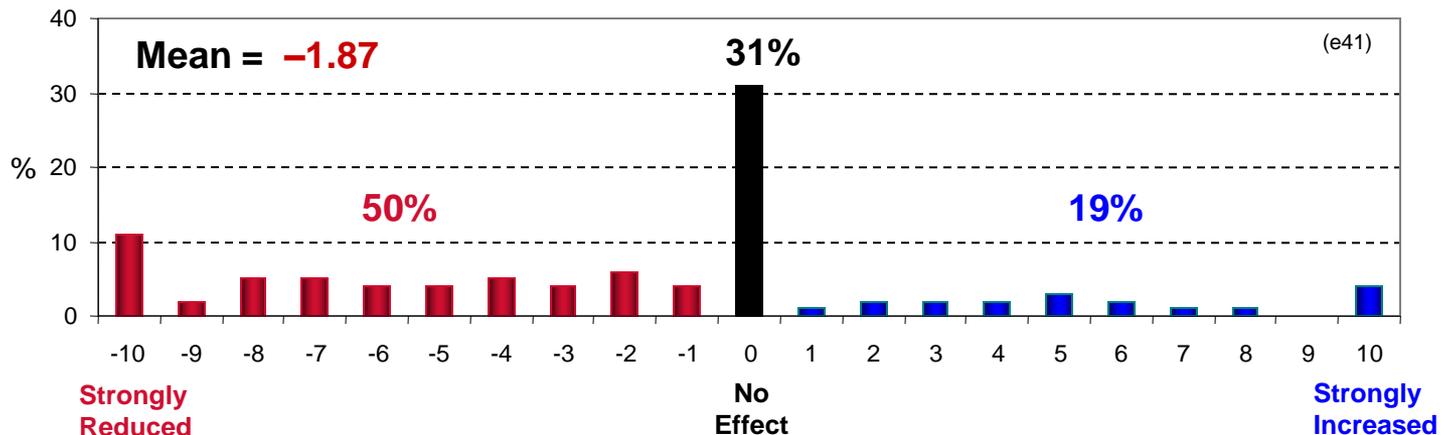




WIPP Incident

On the evening of February 14, 2014, trace amounts of airborne radioactive materials were discovered above ground near the facility. It was determined that 21 workers were exposed to trace levels of radiation. No deaths or serious injuries have been reported, and no one is known to have been exposed to harmful levels of radiation. Pictures from the underground facility show the lid of a drum of waste burst open in a room that is partially filled with containers of radioactive waste. An open drum could release radioactive material into the air flowing through the repository. The cause of the burst lid in an unsealed room is under investigation.

Implications of WIPP Incident for Support of ISF



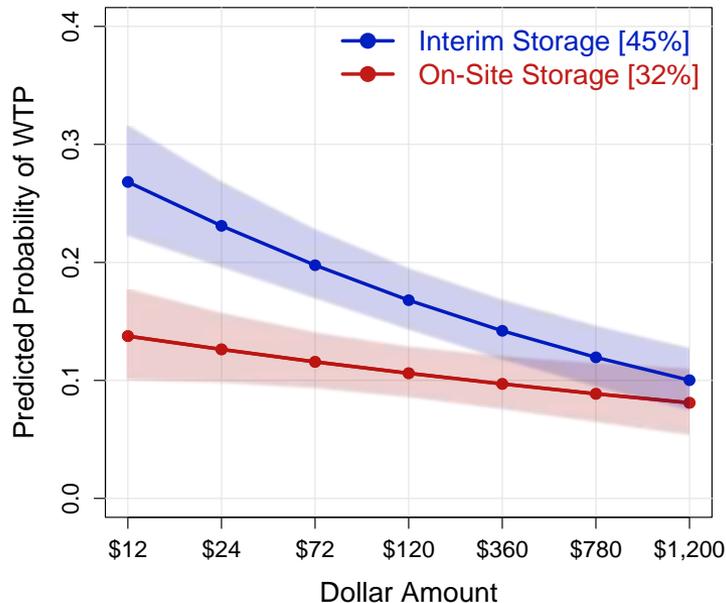


Valuing UNF Storage Options

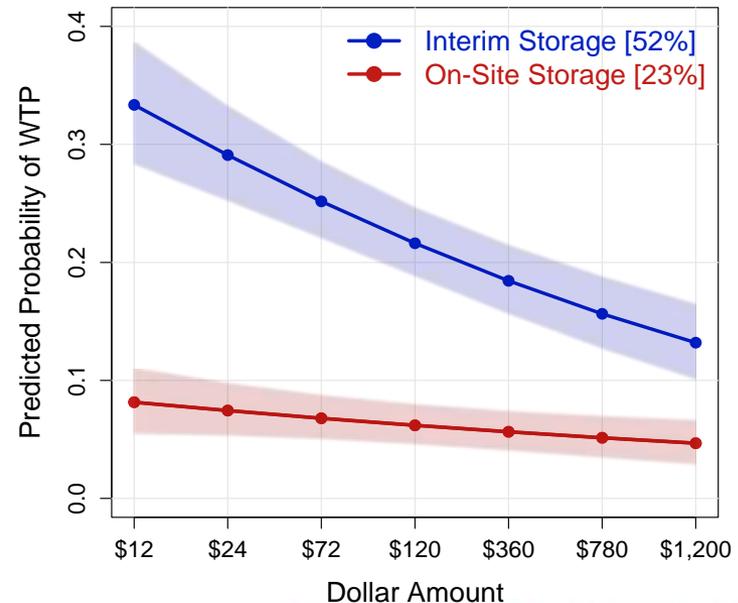
Government officials are deciding how to proceed on storing used nuclear fuel in the U.S. Their decision on how these materials should be stored could cost you money. For example:

- Continuing to store used nuclear fuel at nuclear power plants would require heightened security measures and expanding current practices, which is expensive and could mean higher taxes.
- Construction of interim storage facilities and transportation of used nuclear fuel to the facilities is expensive and could mean higher taxes.

(a) Base ISF Track



(b) Enhanced ISF Track





ISF Siting Process: Who Should Have Veto Power?

Select all of the following that you think should be allowed to block or veto construction of a proposed interim storage facility for used nuclear fuel.

	%
A majority of citizens, including those in Native American communities, residing within 50 miles of the proposed facilities	66
A majority of voters in the host state, including affected Native American communities	64
The host state's environmental protection agency or its equivalent	55
The Governor of the host state	52
The US Environmental Protection Agency	50
The US Department of Energy	44
The US Nuclear Regulatory Commission	43
Either of the two US senators representing the host state	39
The US congressperson representing the host district	39
The leaders of the host state's legislature	39
Tribal authorities of affected Native American communities	38
Nongovernmental environmental interest groups in the host state	26



ISF Siting Process: Likely Modes of Participation

Assuming construction of an ISF is proposed within 50 miles of your residence, how likely is it that you would . . .

(1 = Not At All Likely—7 = Extremely Likely)

Unlikely
(1–3)

Unsure
(4)

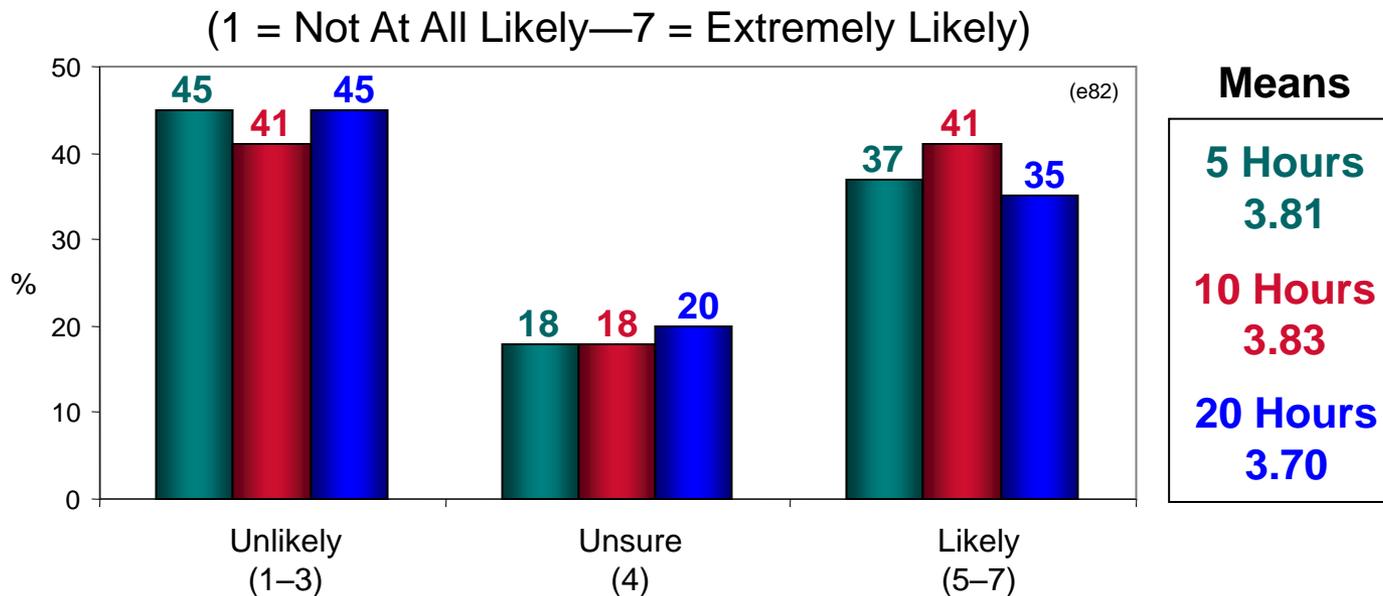
Likely
(5–7)

Attend informational meetings on the proposed ISF held by authorities <small>(e76)</small>	33	18	50
Contact your elected representatives expressing your opinion regarding the proposed ISF <small>(e79)</small>	38	19	43
Express your opinion on the proposed ISF using social media <small>(e78)</small>	40	16	44
Speak at a public hearing about the ISF <small>(e77)</small>	58	17	25
Help organize public opposition to the proposed ISF	56	20	24



Willingness to Engage: ISF Citizens' Advisory Committee

If invited, how likely is it that you would participate as a member of a citizens' committee asked to provide advice and oversight to authorities developing the proposed ISF if it required about [5, 10, 20] hours of your time monthly for a year? (times randomized)





Conclusions

- ◆ Preferences for nuclear in future energy mix have been declining since Fukushima
 - But current percentage (8%) is lower than preferred (15%)
- ◆ Mixed understanding of current UNF management policy
- ◆ Support for interim storage is higher than support for current on-site storage
 - Support for ISF decreases with proximity
 - WIPP incident *has potential to* decrease support for ISF
- ◆ Non-market value of an ISF is higher than non-market value of continued on-site storage
 - Inclusion of a research lab and repackaging facility increases non-market value of an ISF
- ◆ Local residents most likely to have initial NIMBY response
 - Substantial fractions of population willing to engage
 - Absent state level opposition, engagement can reverse NIMBY