

PUBLIC VIEWS ABOUT STORAGE AND DISPOSAL OPTIONS FOR SPENT NUCLEAR FUEL

Energy and Environment Survey: 2017

Highlights

- Public support varies for different policy options for the storage and disposal of SNF in the US. **Support for a permanent disposal facility is higher than that for continued on-site storage or building one or more interim storage facilities.**
- **Support for specific facilities, such as the private initiatives for an ISF in New Mexico and Texas, is higher than support for broad storage and disposal options.**
- Local and state support/opposition matters; **members of the public are more likely to re-evaluate and increase their support for a facility when a majority of people in the local area and a majority of people in the state support the proposal.**
- Local support/opposition has more weight than state support/opposition; **if a majority of the local residents support an interim storage facility (ISF), even in the face of state-level opposition, net support nationwide is likely to increase modestly.** On the other hand, even if the state were to support the program, when the locals oppose it the level of nationwide support is likely to drop substantially.

The US currently has about 80,000 metric tons of uranium in 279,000 used fuel assemblies from commercial spent nuclear fuel (SNF), most of which is stored “on-site” at or near power plants where it was produced. On-site storage facilities were not designed to provide a permanent solution for the disposal of spent nuclear fuel, and building a permanent disposal facility will likely take decades. Therefore, it is important to consider how the US public views options for constructing one or more storage facilities for safely consolidating and storing SNF in the interim. The 2017 iteration of the Energy and Environment survey (EE17) by the Center for Energy, Security, & Society (CES&S) included a battery of questions that measure public views about SNF storage and disposal options. The questions gauge general support for continued on-site storage, interim storage, and permanent disposal. EE17 also measured support for several of the specific sites under consideration, including the two private initiatives for interim storage of SNF in New Mexico and Texas. In addition, EE17 respondents provide insight into the factors likely to affect broader public support for these initiatives as the siting process unfolds, including public views about the importance of support for a prospective facility by host communities and host state residents.

Storage and Disposal of Spent Nuclear Fuel

Storage and disposal options are technically varied (see DOE 2013; 2014; 2015), and past EE surveys have indicated that most members of the public know relatively little about current SNF management policies in the US. Therefore, measuring informed opinion and preferences is challenging. We address this challenge in two ways. First, we provide survey respondents with background information about the issues. Second, we use

the claims and arguments raised by policy advocates on multiple sides of the debate to provide a frame of reference for our respondents as they consider their own views and preferences (For wording, see EE17 Reference Report, Jenkins-Smith et al., 2018). After this, we ask specific questions about the

different options. In EE17, we focus on three options—continued on-site storage, construction of one or more interim storage facilities, or construction of a permanent storage and disposal facility.

On-Site Storage of Spent Nuclear Fuel

All EE17 respondents received basic information about on-site storage, and were presented arguments made for and against it by proponents and opponents. Then, they were asked the following question:

Using a scale from one to seven, where one means *strongly oppose* and seven means *strongly support*, how do you feel about continuing the current practice of storing spent nuclear fuel at or near nuclear power plants?

As shown in Figure 1 (on-site storage responses shown in red), 28% of EE17 respondents support continued on-site storage, with only 5% being strongly supportive. By contrast, 39% of the respondents oppose the option, with 14% being strongly opposed to continued on-site storage. Mean support for on-site storage on the scale from 1 (strongly oppose) to 7 (strongly support) was 3.67, indicating that on average, this policy option garners more opposition than support. Given that public support will be necessary for a sustained and successful spent fuel program, this finding provides an important baseline for comparison as decision makers weigh alternative options for managing SNF.

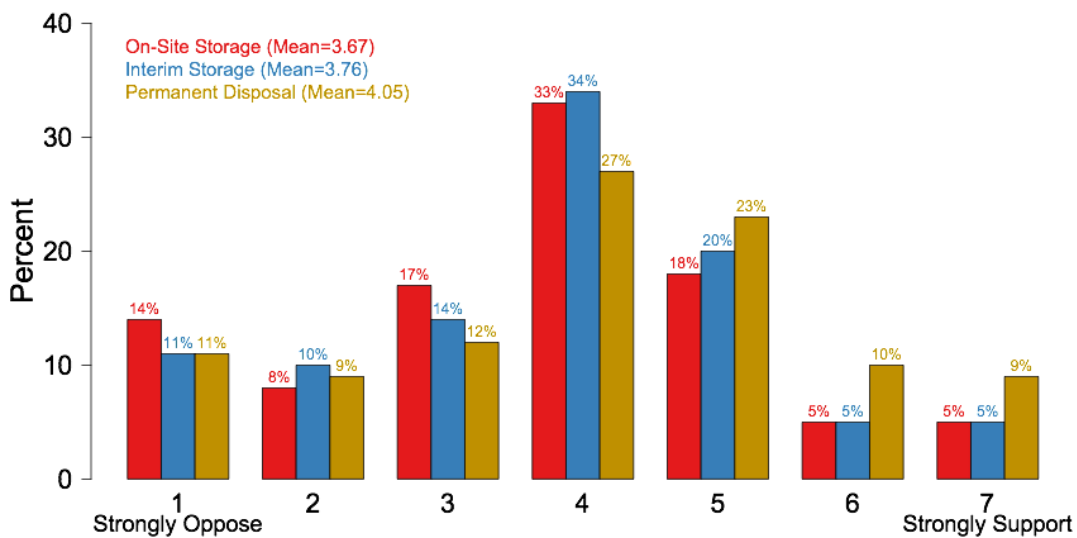


Figure 1: Public Preferences for SNF Storage and Disposal Options

Interim Storage of Spent Nuclear Fuel

One SNF management option is the construction of one or more regional interim storage facilities (ISFs). Similar to the questions about on-site storage, EE17 respondents received background information about the policy and an overview of the key arguments made by proponents and opponents of ISFs. After the information and arguments were presented, respondents were asked the following question:

Using a scale from one to seven, where one means *strongly oppose* and seven means *strongly support*, how do you feel about siting and constructing one or more interim storage facilities for consolidating spent nuclear fuel in the U.S.?

The distribution of support and opposition for ISFs is shown in Figure 1 (in blue). In comparison to public preferences about on-site storage (mean score of 3.67 on a 1-7 scale), the average level of support for ISFs is higher (3.76), but the difference is not statistically significant. There is a nominal dip in the percentage of respondents that are strongly opposed to ISFs (11%) in comparison with on-site storage (14%). Overall, about 30% of respondents support this option, 34% neither support or oppose it, and 35% oppose it. These findings suggest that members of the public are (on average) slightly less likely to oppose ISFs than continued on-site storage, though overall support for this option is still below midscale.

Permanent Disposal of Spent Nuclear Fuel

In 1982, the US Congress passed the *Nuclear Waste Policy Act* (NWPA), which formalized the decision to use geologic repositories to dispose of SNF. Construction of a deep geologic repository (DGR) has long been considered by experts to be the safest way to permanently isolate SNF from people and the environment (National Research Council 2001). Despite broad expert agreement, and the formal designation of DGR as national policy under current law, the US has yet to construct and open such a facility. In part, the challenge is ensuring clear understanding and communication about the attributes of a permanent disposal facility, both to the nation and the state and local communities nearby. Therefore, understanding what members of the public think about permanent disposal (and of the feasible design options) is critical.

In the EE17 survey, respondents were given information about a DGR for permanent disposal, and about the arguments made for and against this option. They were then asked this question:

Using a scale from one to seven, where one means *strongly oppose* and seven means *strongly support*, how do you feel about siting and constructing a permanent storage and disposal facility for consolidating spent nuclear fuel in the U.S.?

As shown in Figure 1 (in yellow), a little less than half of the respondents (42%) support this option, and about a third 32% oppose it. On average, public support for a permanent disposal facility leans positive (with a mean value of 4.05 on the 1-7 scale). More importantly, when compared to on-site and interim storage, support for a DGR is modestly higher.

Preferences for Proposed Storage and Disposal Facilities

The previous section described public views on the primary storage and disposal options. While measuring preferences regarding broad policy options is important, it is instructive to gauge public support for specific sites that are under consideration for a SNF management facility. To achieve this, EE17 included questions about two proposals for consolidated ISFs in Texas and New Mexico. Both facilities have been proposed by private companies, and if successfully licensed and constructed, would store SNF for up to a hundred years. To gauge public support for these facilities, EE17 respondents were randomly assigned to one of two experimental survey tracks. Half of the respondents read a description of the proposed facility in Texas, and the other half read about the proposed facility in New Mexico. After some information about the respective facilities, respondents were asked to indicate their levels of support for the ISF:

Using a scale from one to seven, where one means *strongly oppose* and seven means *strongly support*, how do you feel about this proposal to build this temporary storage facility for spent nuclear fuel in [New Mexico/Texas]?

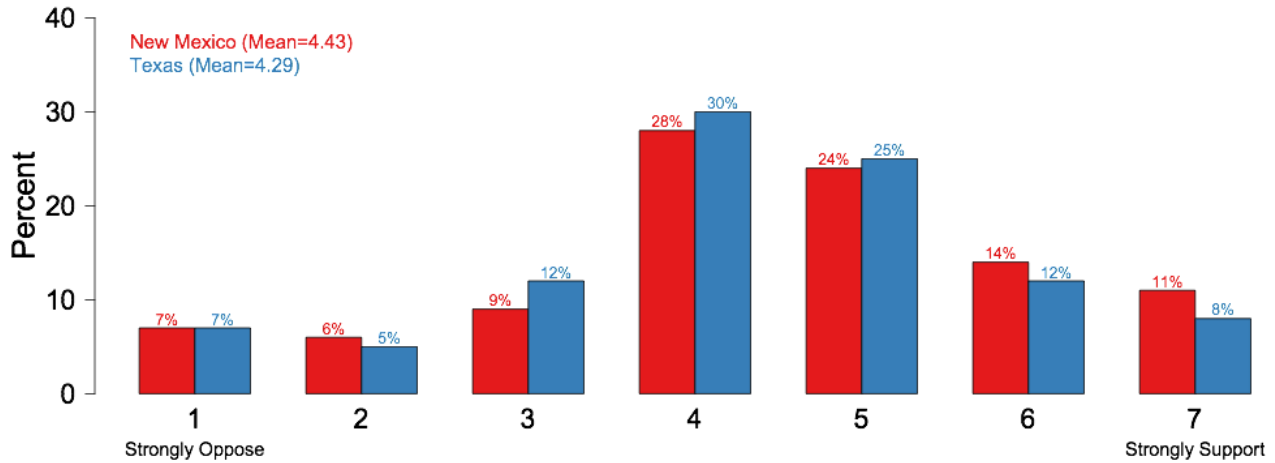


Figure 2: Public Preferences for Consolidated Interim Storage in Texas and New Mexico

Figure 2 shows the distribution of responses to this question. On average, support for the NM private initiative (mean = 4.43) is nominally higher than Texas (mean = 4.29), but the difference is not statistically significant. About 49% of respondents support the New Mexico initiative compared to a similar but slightly lower 45% who support the Texas initiative. Only 22% of respondents indicate opposition to the New Mexico proposal and 24% oppose the Texas proposal.¹ In both cases, mean support is significantly higher than support for ISFs more generally (4.4/4.3 vs. 3.8). As noted above, this finding may indicate that support for a facility will increase as people are given more information about it.

Local and State Support/Opposition and Changes in Public Preferences

The siting process spans many years, directly involving residents of the prospective host state and local communities as well as residents near affected transport routes. In the US, the success of facility siting efforts will depend on support for the proposed facility at both the local and state level (Dunlap, Kraft, and Rosa 1993; Easterling and Kunreuther 1995; Gerrard 1995). Local and state views do not always align, however, resulting in instances where factors like economic effects (positive and negative), risk perceptions, and institutional credibility may lead the local community to be in support of the facility and the state to be opposed, or vice versa.

While researchers have studied local and state dynamics surrounding facility siting efforts, we know relatively little about how these dynamics affect “outsider” views concerning the siting effort. Does

¹ The results presented here do not change when respondents who reside in New Mexico and Texas are excluded from the analysis.

knowledge about local and state preferences influence broader public support across the nation? Do people re-evaluate their support for a facility when they learn about local and state preferences for that facility? To answer this question, after registering their level of support for an ISF in TX or NM, respondents were randomly assigned to one of four follow-up questions [the labels in **bold** were not shown]:

{Local support and state support} What would happen to your level of support for this temporary storage facility if you learned that a majority of people in the local area around the facility and a majority of people in the state support the proposal?

{Local support and state opposition} What would happen to your level of support for this temporary storage facility if you learned that a majority of people in the local area around the facility support the proposal, but a majority of people in the state oppose it?

{Local opposition and state support} What would happen to your level of support for this temporary storage facility if you learned that a majority of people in the local area around the facility oppose the proposal, but a majority of people in the state support it?

{Local opposition and state opposition} What would happen to your level of support for this temporary storage facility if you learned that a majority of people in the local area around the facility and a majority of people in the state oppose the proposal?

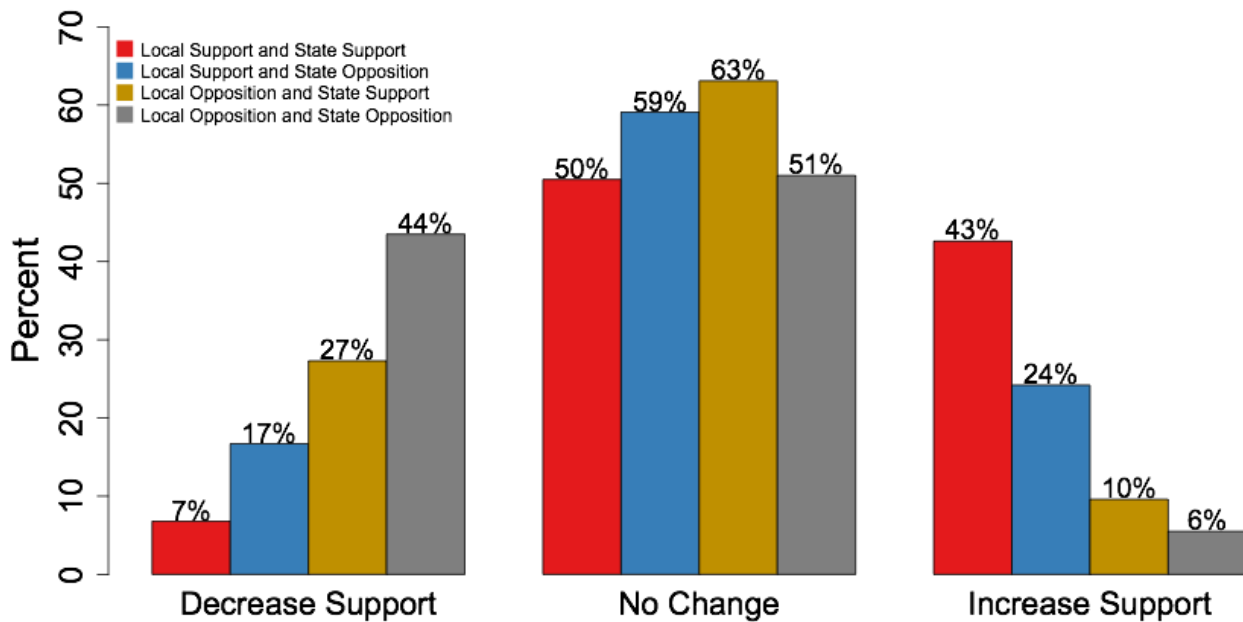


Figure 3: Does Local and State Support/Opposition Matter?

Figure 3 displays the distribution of responses to these follow-up questions among those respondents who neither strongly supported nor strongly opposed the facility (prior to the asking the follow-up questions), and were designated as “undecided.” This large undecided fraction of the public (over 80%) who did not initially take a strong position on the issue is more likely to attend to

new information about the proposed facility. The responses of this group to the different scenarios concerning state and local community support for the facility are shown in four colors.

The red bars in Figure 3 show changes in support among the “undecided” respondents when informed that majorities of both local and state residents support for the facility. Almost half (43%) of these undecided respondents indicated that they would increase their level of support, and another half (50%) said their initial position would remain unchanged. Very few (7%) said that new information would lead them to decrease their level of support. Figure 4 displays the *net change* - that is, the fraction of undecided respondents for whom the new information would increase support minus the fraction for whom it would decrease support is +36% (Figure 4). In short, informing undecided survey respondents that a majority of residents of both the local community and the state support the proposed ISF results in a sizable increase in support nationwide.

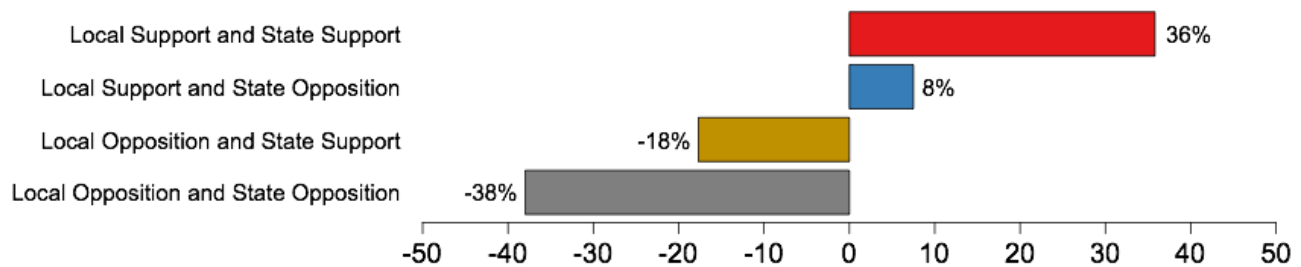


Figure 4: Net Change in Support for Undecided Respondents

The blue bars in Figure 3 show change in support when the “undecided” respondents are told that a majority of the residents in the local community support the ISF, but a majority of the state residents oppose it. The net change in support (shown in Figure 4) is +8% (down from +36% when both the state and local residents support it). When it is the locals who oppose the proposed facility, while residents of the state support it (shown in yellow), the net change in support (shown in Figure 4) is -18%, a significant drop in the level of support among undecided respondents. This pattern demonstrates that local support carries more weight than state support. Indeed, even in the face of state-level opposition, knowledge of local support for the facility leads to a net increase in broader public support for the ISF. Finally, the grey bars in Figure 3 show change in support among “undecided” respondents when told that majorities of residents of both the local community and the state oppose the proposed ISF. In this case, the net change in support (among the undecided; shown in Figure 4) is -38%.

The implications are quite stark: retaining nationwide public support for an ISF siting program (and thereby increasing the likelihood that elected representatives would support that program) is directly affected by how the broader public understands local community and host-state views of that program. If the broader public is informed that majorities of the residents of the potential host

state and local communities support the facility, nationwide support will increase significantly among the large portion of the public that had not previously taken a strong position. Nationwide support will drop if majorities of both the local communities and the state oppose the facility. The most important factor appears to be the presence or absence of *local community* support; if a majority of the local residents support the ISF, even in the face of state-level opposition, net support nationwide is likely to increase modestly. On the other hand, even if the state were to support the program, when the locals oppose it the level of nationwide support is likely to drop substantially.

Summary and Implications

Overall, these results demonstrate two key features of public preferences for the siting process. The first is that, after hearing the kinds of pro and con arguments likely to arise in a public forum, our survey respondents gave preference to siting a DRG to an ISF, and both were preferred to continued reliance on on-site storage. The second is that overall support for the program is directly affected by information about local community and host-state views of that program. Furthermore, support is likely to decline significantly if the local community is believed to oppose the facility.

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