

Workshop Report: Operationalizing Public Participation in Federal Science & Tech Policy

June 26, 2023

EXECUTIVE SUMMARY

Federal agencies can use Participatory Technology Assessment, or pTA, to engage broad and diverse public audiences in decisions about and assessments of complex issues where science and technology meet societal concerns. This report includes major themes and findings from a workshop of federal agency stakeholders and pTA practitioners conducted in December 2021.

What do interested agency leaders need to know about pTA?

pTA is a suite of tools for engaging broad and diverse public audiences to identify and respond to public values, promote equitable outcomes, and connect agencies and the public. It is adaptable to a variety of agency needs and concerns and has been used successfully by several federal agencies. In federal agencies, the success of past pTA projects depended on agency culture and the presence of policy entrepreneurs with expertise related to public engagement, as well as the know-how to navigate regulatory challenges.

What can pTA practitioners learn from agency stakeholders?

The flexibility and adaptability of pTA allows federal agencies to undertake pTA projects to meet a variety of goals and objectives. Learning and exchange among pTA practitioners and federal agencies can further innovation in pTA methods and help to socialize pTA as a usable tool for agency staff. Concise resources about pTA generally and about specific features of pTA (e.g., deliberative public forums) would help agency stakeholders better understand pTA and its utility for decision making and assessment.

What is needed for pTA to continue to be successful?

pTA practitioners and interested federal stakeholders should seek to integrate, socialize, and continue to train federal agency staff to both create awareness of pTA and develop a supportive atmosphere for pTA. Agency stakeholders noted that legislation or policy about public engagement practices would promote the use of pTA. Agency stakeholders also noted that a home for pTA expertise and capacity within government could help agencies better engage the publics they serve.

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INTRODUCTION

What is pTA and how has it been used?

Participatory Technology Assessment, or pTA, describes a suite of approaches for engaging broad and diverse public audiences in decisions about and assessments of complex issues where science and technology meet societal concerns. Most basically, pTA unfolds in three steps (Kaplan et al., 2021). First, pTA practitioners work with subject matter experts, stakeholders, and public audiences to **frame the issue**. This step involves identifying salient considerations about the issue at hand, which informs materials and approaches for later public deliberations. **Public deliberations**, the second step, invite diverse public audiences into in-depth conversations about the issue and potential options or considerations for decision making and assessment. Trusted community institutions, such as science museums or other informal learning spaces, often host these deliberations. The third step is **results integration**, wherein pTA practitioners work with decision makers to interpret the qualitative and quantitative results of deliberative forums and integrate those findings with research, decision making, and policy making.

Federal agencies including NASA, NOAA, and the NIH have sponsored pTA for a variety of topics and for different purposes. NASA used pTA to inform decision making about the agency's asteroid redirect mission and planetary defense efforts.¹ As part of a broader effort to support education for community resilience, NOAA's Office of Education funded pTA exercises in cities across the nation focused on promoting local capacity for climate resilience². pTA has also been used to inform research on climate intervention (supported by the Sloan Foundation), document public perspectives on autonomous vehicle technologies, and capture public values about human genome editing. A list of notable pTA projects conducted in the U.S. by the [Expert and Citizen Assessment of Science and Technology](#) network (ECAST) is available below. Outside of the U.S., organizations including Missions Publiques (France) and the Danish Board of Technology have deployed pTA to inform policy making at both the national and international level on issues related to climate change, biodiversity, and genetically modified organisms.

¹ NASA report [LINK](#)

² NOAA reference [LINK](#)

Notable ECAST pTA projects³

Year	Subject	Scale	Key Sponsor(s)	Locations (Participants)
2012	Biodiversity	National, Global	United Nations Convention on Biological Diversity	4 (277)
2014	Planetary Defense	National	National Aeronautics and Space Administration	2 (186)
2015	Climate and Energy	National, Global	United Nations Framework Convention on Climate Change	4 (275)
2015–2018	Climate Resilience	Local	National Oceanic and Atmospheric Administration	8 (489)
2016–2017	Nuclear Waste Disposal	National	Department of Energy	5 (canceled)
2016–2017	Genetically Modified Algae	National	Environmental Protection Agency	Stakeholder only
2016–2019	Gene Drive Mice	National	Defense Advanced Research Projects Agency	stakeholder only
2017–2018	Driverless Cars Issues	Local, National	Kettering Foundation	2 (23)
2017–2019	Climate Intervention Research	National	Sloan Foundation	4 (202)
2018–2019	Automated Mobility Futures	Local, National	Charles Koch Foundation & Alfred P. Sloan Foundation	4 (317)
2018–2020	Future of Internet Pilot	National	Internet Society	1 (32)
2020–2020	We, The Internet	National, Global	Internet Society, UNESCO, World Economic Forum, European Commission, World Wide Web Foundation, Others	5 (55) (virtual)
2018–2021	Climate Resilience, Citizen Science	Local	National Oceanic and Atmospheric Administration	28 (planned)
2018–2022	Community Co-creation	Local	National Science Foundation	3 (planned)
2019–2020	Public Interest Technologies	Local	New Venture Fund (Public Interest Technology University Network)	4 (201) (virtual)
2019–2020	Human Gene Editing Issues	Local, National	Kettering Foundation	2 (43) (virtual)
2019–2022	Human Genome Editing Futures	National	National Institutes of Health	3 (125) 1 (25) (virtual)

³ Adapted from Kaplan, L. R., Farooque, M., Sarewitz, D., & Tomblin, D. (2021). Designing Participatory Technology Assessments: A Reflexive Method for Advancing the Public Role in Science Policy Decision-making. *Technological Forecasting and Social Change*, 171, 120974. <https://doi.org/10.1016/j.techfore.2021.120974>

Workshop description

This workshop was held on December 15 and 16, 2021 at the Arizona State University Barbara Barrett and Sandra Day O'Connor Washington Center. The first day was open to the public and included a panel presentation by pTA practitioners, a demonstration pTA activity about solar geoengineering research, and a panel discussion including the Alfred P. Sloan Foundation, NASA, and NOAA, all of whom have funded pTA efforts. The second day of the workshop included a mix of short presentations by stakeholders and researchers and discussion-based activities focused on exploring how pTA could be used by federal agencies. Attendees on the second day included pTA practitioners and researchers from universities, think tanks, and informal science learning centers; federal agency staff interested in or with experience working with pTA; and science policy experts and practitioners.

This report is a compilation of workshop attendee responses to an NSF-funded research project, *Collaborative Research: Participatory Technology Assessment and Cultures of Expertise* (NSF award number 1827826). This study examined the working relationships between ECAST and three U.S. Federal Agencies: NASA, DOE, and NOAA. The workshop goals included 1) discussing pTA research with agency practitioners, 2) gathering input about opportunities and barriers for pTA in federal agencies, and 3) building connections among interested agencies and pTA researchers. A complete workshop agenda is available in the appendix. Discussions at the workshop centered on three key themes: Why might agencies use pTA or other public engagement tools? What do agencies need in order to conduct pTA? What challenges do agencies face in deploying or using pTA?

WORKSHOP DISCUSSION THEMES

This section presents a summary of discussions around each of these three themes, as well as open questions about the use of pTA in federal agencies. These summaries are based on notes and presentations from the workshop and include ideas shared by both workshop participants and organizers.

Why might agencies use pTA or other public engagement tools?

- *Identify and respond to public values*
- *Promote equity*
- *Connect agencies and the public*
- *Adapt to different agency needs*

Identify and respond to public values

Participants discussed the benefits of and rationales for using pTA and other public engagement tools within their agencies. These varied from building trust to using pTA to achieve better outcomes through policy to the creation of more robust scientific knowledge. Rationales also addressed how challenges and goals of specific federal agencies influence the design and implementation of pTAs and how pTA might be used.

For example, participants discussed using pTA to address challenges agencies face when soliciting input from the public and integrating that input in policy making. Attendees contrasted input that could be gathered through pTA with input gathered from involved stakeholders through public comment processes or other established mechanisms. Attendees noted that these established mechanisms often limit input reactions or feedback to specific decisions and don't provide a more 'upstream' opportunity to integrate thoughts and concerns from the public. It was noted that agencies with particular goals or missions--for example a goal to integrate usable science into their portfolios or processes--could use pTA or similar engagement strategies to inform and meet those goals.

Discussions referred to the importance of addressing broad public concerns and values in agency work and noted that tools like pTA can help gather those concerns and values. For example, one group of participants noted that agencies ought to use public engagement tools like pTA to "elicit public values that expert communities must consider," in policy or decision making. The group connected efforts like pTA to broader policy for integrating public values into science and policy, such as legislation and

executive action related to the White House’s “Build Back Better” portfolio. Similarly, pTA was discussed as a potential method to complement evidence-based policy making processes. Participants discussed public input as a type of evidence (e.g., evidence about public concerns, hopes, priorities, etc.) that could be integrated alongside other types of evidence such as the effectiveness of specific policy interventions. pTA was also discussed as a method to gather evidence about specific policy challenges or issues.

Public engagement tools can facilitate the co-production of science and policy. Co-production refers to the creation of scientific knowledge and/or policy through collaborative work among scientists, policy makers, stakeholders and communities. Participants noted that practices from pTA--for example, using public deliberations to bring light to community concerns--align well with the goals of co-production. Further, they noted that efforts to co-produce science and policy could in turn inform pTA practices.

Furthermore, tools like pTA can provide broad publics an anticipatory voice in policy making. Rather than responding to programs or policies that have already been designed--as often happens through existing mechanisms like public comment periods--robust public engagement can provide input early on in the process to inform what those programs and policies look like. Participants pointed to this input as a mechanism to make programs more effective and better serve the public interest. Practitioners and scholars of pTA have previously pointed to similar outcomes, noting that pTA can help avoid delays, better align decision making with public priorities, and anticipate potential challenges⁴.

Promote equity

Equity was listed as a priority by all tables at the workshop, suggesting participants saw a deep connection between public engagement and efforts to achieve equitable outcomes from federal programs and policies. Participants pointed to pTA as a mechanism to “ground truth” research and programs with the communities involved in those programs to ensure that important knowledge and values were integrated into decision making. Discussions often centered on how and where specific agencies might adopt pTA to better serve historically marginalized communities. For example, a few participants mentioned that NOAA could use pTA or similar PE strategies to engage communities where their services were already offered and identify ways to better serve

⁴ Emery, S. B., Mulder, H. A. J., & Frewer, L. J. (2015). Maximizing the policy impacts of public engagement: A European study. *Science, Technology, & Human Values*, 40(3), 421–444.

<https://doi.org/10.1177/0162243914550319>

Tomblin, D., Worthington, R., Gano, G., Faroque, M., Sittenfeld, D., & Lloyd, J. (2015). *Informing NASA’s Asteroid Initiative—A Citizens’ Forum*. Expert and Citizen Assessment of Science and Technology (ECAST). <https://cspo.org/library/informing-nasas-asteroid-initiative-a-citizens-forum-full-report/>

those communities by leveraging on-the-ground relationships. Another participant cited the National Disaster Recovery Framework as a model for community-agency collaboration where pTA could be used to ensure disaster planning and recovery reached vulnerable populations and their needs. Tribal liaisons--who are often co-located with federal agency programs, such as the Department of Interior's Climate Adaptation Science Centers--were also mentioned as potential collaborators for public engagement with tribal communities.

Connect agencies and the public

pTA can be used to build connections among federal agencies and broader publics, which may in turn lead to enhanced trust and involvement in agency work. Participants discussed using public engagement as a trust-building tool in two ways. First, participants saw pTA or similar public engagement strategies as an approach for rebuilding relationships with communities where federal actions have led to distrust. Second, participants noted that public engagement could help establish trusting partnerships between agencies, stakeholders, and communities by prioritizing communication, involvement, and integration of community priorities into the design, refinement, and implementation of federal policies and programs. pTA practitioners present at the workshop noted that trust cannot be the sole desired outcome from public engagement strategies lest it become a checkbox activity or a tool to 'smooth over' relationships with communities and stakeholders.

Some participants noted that public engagement strategies could be deployed across the range of decisions agencies face, including for high-level priority setting and for on-the-ground settings where agencies provide services or programs. Regarding the latter, some participants noted that public engagement about on-the-ground services had to be conducted by the people and offices who interface with users of those services. Service offices already have a different connection to local communities and PE tools could make those connections deeper and more responsive to local needs.

Adaptable to different agency needs

The diversity of ways workshop participants spoke of pTA matched with research presented during the workshop about past pTA projects. This research noted that federal agency staff and pTA practitioners reference multiple meanings of pTA, and this multiplicity, generally mirrored the workshop discussion. pTA can variously be defined as

- A collaborative experiment
- Participatory planning
- Understanding public values
- Reframing an issue

- Building public trust and ownership
- Informing decision making
- Reaching and hearing underrepresented communities
- Reflecting on organizational commitments
- Empowering citizens
- Expanding collective literacy or capacity

These multiple meanings underscored the adaptive qualities of pTA to fit a variety of agency needs and goals. This flexibility was also cited by participants as a way to build broader support for pTA projects among agency staff and leadership. Importantly, workshop participants noted that while pTA has broad appeal and utility to agencies, it is not a panacea, and the context of such efforts matters.

What do agencies need to conduct pTA?

- *Expertise related to pTA*
- *Policy and regulatory support*
- *Supportive leadership*
- *Knowledge exchange and learning amongst federal agency practitioners, pTA experts, and broader communities*

Expertise related to pTA

Participants noted pTA expertise is needed across federal agencies in order to implement pTA projects. This discussion followed a presentation of initial findings from an NSF-funded study examining three pTA projects conducted with or for federal agencies. The study examined the cultures of expertise within each agency to identify what attributes led to successful pTA projects.⁵ In particular, it showed the importance of “policy entrepreneurs” (or what might be thought of as boundary spanners) within agencies to help facilitate and enable pTA projects with agencies. Following the presentation, many participants noted that federal agencies would need training and opportunities to engage with public engagement tools like pTA in order to fully realize the benefits of such practices, in addition to expertise in specific practices and fields related to pTA (e.g., qualitative social science methods, science and technology studies, etc.). Participants stated this expertise would also need to cover “on-the-ground” questions about how to deploy pTA and a familiarity with the research and practice

⁵ Torres, C., & Fowler, L. (2023). Creatively interpreting policy to move science forward: Implementing participatory technology assessment at NASA. *Review of Policy Research*, 40(3), 389–405. <https://doi.org/10.1111/ropr.12509>

associated with pTA. For example, participants listed questions about the need for agency staff to understand when pTA is appropriate, what types of questions pTA can help answer, what types of data could be collected through pTA, and when pTA should happen with respect to other decision making processes. Expertise within agencies was also cited as important for communicating with leadership about the benefits and practices of public engagement (see supportive leadership below).

Policy and regulatory support

Participants noted a need for greater clarity on regulations related to how agencies can interact with the public, such as the Paperwork Reduction Act (PRA). This echoed research presented by pTA researchers that found that successful pTA projects depended on agencies having expertise in navigating regulatory structures like the PRA as it relates to public engagement, which in turn required supportive leadership within the agency.

On a larger scale, participants noted that clear direction and policy about the importance of public engagement efforts and appropriate mechanisms for PE would make it easier for federal agencies to implement PE efforts. This direction could come from legislation or executive orders to promote the use of different methods of public engagement, to clarify when regulations like the PRA apply to public engagement efforts, or both. Participants saw such legislation as complimentary of bipartisan efforts like the [American Innovation and Competitiveness Act](#) or the [Foundations for Evidence-Based Policymaking Act](#).

Supportive leadership

Participants pointed to the need for supportive agency leadership to shepherd and implement innovative public engagement approaches. Participants were concerned that few in leadership positions understand the benefits or mechanics of public engagement approaches like pTA, which may hamper efforts to integrate them with decision making, planning, and assessment. Participants noted that time-consuming demonstration activities--like asking agency personnel to participate in an example pTA forum (the typical demonstration method ECAST has used)--limit participation by agency leadership. The group suggested more concise and direct mechanisms for communicating the benefits and processes of public engagement to agency leadership, including one-page summaries of past projects, testimonials from supportive leadership, and products to show how PE helps agencies meet other goals. Participants tied the need for supportive leadership with the need for regulatory and policy clarity, noting that leadership would likely be more responsive to new public engagement efforts if given a clear directive to do so.

Knowledge exchange and learning amongst federal agency practitioners, pTA experts, and broader communities

Participants noted that federal agency practitioners would benefit from knowledge exchanges and learning with the communities they serve and with pTA experts. While the details of what learning and exchange might look like were left open, participants saw it as critical to responding to the changing needs of different communities, to implementing and developing best practices for public engagement, and for sharing successes, setbacks, and knowledge.

pTA practitioners present at the workshop also noted the importance of exchange and learning to the growth of public engagement tools and approaches. They noted that pTA projects conducted with a variety of agencies and stakeholders promoted the emergence of new methodological approaches to suit the needs of different agencies and topics. For example, pTA practitioners noted that working with partners resulted in experimentation with the use of stakeholder cards during public forums and the use of new open framing techniques to inform pTA projects. These innovations were considered critical to better integrating public values with decision making. Research conducted by Christopher Torres, David Tomblin, and Jen Schneider similarly showed that collaboration among pTA practitioners and federal agencies resulted in adaptive learning and new tools to inform pTA. They shared a case study from an ECAST project with NASA in which NASA officials played an active role in the analysis of public forum data. This allowed the ECAST team to learn about NASA concerns and priorities while allowing the NASA team transparent and open access to the analysis process. Researchers cited this co-learning as critical to the success of the project. Taken together, the workshop highlighted the need for a community of practice around pTA and public engagement that includes federal agency practitioners, pTA experts, and broader community partners.

What challenges do agencies face in using pTA?

- *Agency culture and resources*
- *Cross-sector communication*
- *Integrating public engagement with policy making*
- *pTA and long-term issues*

Agency culture and resources

Participants noted that agency culture varies widely among federal agencies, and that agency culture plays an important role supporting and engaging in pTA. Discussions on this theme noted that agencies tend to engage in path-dependent behavior that matches

historical practices. This can make it difficult to enact innovative public engagement approaches. For example, attendees noted that some agencies are simply not used to or comfortable with the idea of meaningfully involving public audiences in assessments and decision making. This was attributed to different agencies' willingness to work with the public in the past, past public backlash to those agencies, limited exposure to the public, or skepticism of what the public offers in specific and technical domains.

Participants also connected characteristics of agency culture with agency structure. For example, the distributed nature of field offices for some agencies (e.g., NOAA) were discussed as a potential opportunity for pTA given the close relationships (or potential for close relationships) between those field offices and the communities they serve. The Department of Energy's National Lab system was mentioned in a similar light, though other workshop attendees noted that systems like that National Labs are often walled off from the public, which may inhibit or complicate efforts to use pTA through such systems. Discussions at the workshop largely supported findings by pTA researchers that agency culture was an important condition for pTA project success.⁶

Researchers also noted the importance of "policy entrepreneurs" within agencies to the success of pTA projects. In past successful pTA projects, policy entrepreneurs within a partnering agency served as the main contact with pTA practitioners and possessed training or experience in science and technology studies, science and technology policy, or related disciplines. Importantly, these entrepreneurs used their knowledge of agency culture and policy to navigate regulatory and leadership challenges, build support, and work across agency programs. Participants at the workshop expressed their agreement for this finding and the role policy entrepreneurs can play in navigating agency culture.

Participants noted that agencies face capacity and resources challenges that may limit if and how they can conduct pTA projects. These capacity challenges echoed concerns discussed elsewhere in this report, including the time and resources required to navigate regulatory hurdles like the Paperwork Reduction Act and secure buy-in from agency leadership. Participants also noted that agency staff already face high demands on their time, and that many have to be entrepreneurial to enact existing programs. These resource and time constraints leave little capacity for staff to advocate for and develop new practices like pTA.

Cross-sector communication

Participants identified several challenges agencies face in working directly with communities. One group noted a "vocabulary mismatch" amongst communities, subject

⁶ Torres, Christopher (2021). *Technology, Public Participation, and the American Bureaucracy: Participatory Technology Assessment in United States Federal Agencies*. Dissertation. Boise State University.

matter experts, and agencies that can prevent progress on public engagement efforts like pTA. Government agencies and experts use specific language and jargon that can limit understanding with broader audiences. Some even noted that pTA is itself a technical, jargoned term and suggested identifying other terminology to describe pTA practices. Participants noted that intermediate organizations--such as libraries or community organizations--can help navigate this vocabulary mismatch while providing a trusted and on-the-ground community presence for pTA work. Other participants expressed concerns that pTA or robust public engagement can burden already burdened communities. Participants noted this burden presents an equity and justice challenge, particularly in communities where past agency work has resulted in few beneficial outcomes for impacted communities.

Additionally, some participants noted that agencies might face difficulties addressing normatively or politically fraught topics through broad public engagement processes. Participants discussed the high emotions, differing worldviews, and potential for raw or difficult conversations that could arise when attempting to conduct pTA with broad public involvement with already contentious issues. Deep public engagement about contested topics could challenge agencies by creating a sense of unease and vulnerability.

Integrating public engagement with policy making

The group noted it could be difficult to directly link efforts like pTA to policy making. Many in government are unfamiliar with pTA and related public engagement strategies, which are complex, involve many steps and stakeholders, and are often laced with unfamiliar jargon or methodologies. Additionally, policy making processes themselves are complex, which complicates decisions about when and where to use tools like pTA. Participants sought more understanding of when pTA or similar tools could be used in the decision making process and what questions or issues were well suited to pTA.

pTA practitioners noted that opportunities to do engagement vary with the developmental stages of policy or research, and that engagement can look different across those stages. Upstream engagement, or engagement conducted alongside the early stages of the policy making or scientific process, allows for closer integration of public input. This presents challenges, including the potential for slower progress, but also brings opportunities to better align policy or research with identified public values. Upstream engagement can also help avoid costly delays or mismatches between policy or research goals and public sentiment. This can be contrasted with downstream engagement in which public engagement happens after policy or scientific/technical work is largely complete. Downstream engagement presents fewer opportunities for course correction in light of public engagement. Midstream engagement involves the

integration of public engagement with core processes in policy formation or technological development, allowing for modulation and changes.

Several participants spoke about the risk of using pTA to inform policy making, specifically pointing to the potential for pTA results to highlight broad public concerns that could jeopardize existing agency work or specific R&D projects or portfolios. One participant discussed the potential for pTA or public sentiment more broadly to halt research or program work that could lead to positive outcomes or breakthroughs.

pTA practitioners, however, pointed out that there are no documented cases of pTA halting policy or R&D work. Instead, pTA practitioners noted that pTA projects on controversial topics like solar radiation management (SRM)--topics where one might expect to see a call for stopping related R&D--have shown that the public instead puts conditions on what would be acceptable research and application of emerging technology. For instance, in the SRM pTA forum, very few participants outright rejected SRM technology, whereas most participants advocated for transparent, incremental research projects that test for unintended environmental and health impacts of SRM technologies first through modeling, then lab experiments, then small-scale outdoor experiments.⁷

pTA practitioners at the meeting also noted that integrating pTA or other forms of PE with agency policy making comes with a risk of finding skepticism or concern from the public. Practitioners stated that such risks present an opportunity to more democratically examine agency programs or R&D, and that pTA functions as just one stream of information to inform decision making. Prior pTA scholarship has articulated that such speed bumps in policy making might lead to better or more effective policy down the road by uncovering and addressing broad public concerns before a program or policy is finalized or implemented.⁸

Participants also noted that many in government might be skeptical of the data and results of pTA: Would results from pTA be considered valid and acceptable as an input to decision making? pTA practitioners present at the meeting spoke about past experiences working with NASA to address these concerns. This discussion highlighted the back-and-forth process of data analysis conducted between ECAST and NASA,

⁷ Kaplan, Leah, John Nelson, David Tomblin, Mahmud Farooque, Jason Lloyd, Mark Neff, Bjørn Bedsted, and Dan Sarewitz (2019). *Cooling a Warming Planet? Public Forums on Climate Intervention Research*. Washington, DC: ASU Consortium for Science, Policy & Outcomes.

<https://cspo.org/publication/srmfinalreport/>

Barben, D. (2010). Analyzing acceptance politics: Towards an epistemological shift in the public understanding of science and technology. *Public Understanding of Science*, 19(3), 274–292.

<https://doi.org/10.1177/0963662509335459>

⁸ Worthington et al., 2012.

which helped guide specific lines of inquiry while giving agency representatives a clear and transparent understanding of the results and analysis. It has been acknowledged by both ECAST and NASA that this process requires providing space for both parties to learn from each other about how to structure public dialogue outputs in a way that is usable in decision-making.

pTA and long-term issues

Participants discussed the utility and challenges of using pTA for decisions and issues where outcomes might not be realized for decades. These issues included high-level nuclear waste storage, climate change mitigation, carbon sequestration and storage and other climate intervention technologies, and advanced gene editing technologies. While participants saw the benefits of conducting pTA for such long-term issues, they nonetheless had questions about the ethical, legal, and justice challenges associated with such long timelines. For example, participants discussed conducting pTA in the present for a long-term issue like high level nuclear waste storage and asked how this process could be continually adapted and modified to meet new concerns and challenges in ten years? What about fifty or one hundred years? Participants and pTA practitioners noted that the long-term nature of such issues isn't a unique challenge to pTA, but an inherent part of governance and politics for these issues.

OPERATIONALIZING PTA

Operationalizing pTA across the federal government requires more than how-to guides and resources; it requires conditions and cultures supportive of public engagement.

Overall, the feedback and discussions at this workshop highlighted a need to create supportive conditions and cultures for pTA across the federal government. While organizers saw the workshop as an opportunity to create a how-to guide on pTA for agency staff, participants and pTA practitioners alike saw that resources themselves are insufficient for operationalizing pTA across the federal government. This section describes five activities that participants discussed as potential mechanisms for fostering cultures and conditions for pTA: Training and socialization for federal agency staff; concise and usable resources; rebranding or renaming pTA; potential need for legislation; and placing pTA capacity in government.

pTA training and socialization for federal agencies

Building capacity for pTA across the federal government requires familiarity, expertise, and experience among federal agency staff, as well as policy entrepreneurs within agencies to champion pTA efforts. Workshop participants suggested creating a training program to help agency staff learn about pTA and how to use it to accomplish agency goals. Such a training program could address the specific conditions and barriers identified by research and this workshop. Participants and pTA practitioners noted that training activities provide a venue to further socialize the need for public engagement across federal agencies. Training programs could be targeted to specific programs within the government, such as Presidential Management Fellows.

Since the workshop in December 2021, members of ECAST have conducted training workshops with AAAS Science & Technology Policy Fellows. These training workshops reached 63 fellows across 7 federal agencies. These training sessions provided an explanation on the benefits of conducting pTA, demonstrated how pTA deliberative forums function, outlined research about the use of pTA, and provided fellows hands-on experience in prototyping a pTA activity.

Participants and researchers noted that an important part of socializing pTA with federal agency staff is sharing pTA work already conducted by agencies. Past pTA projects, like the NASA Asteroid Initiative project, helped build interest for further pTA work elsewhere and provided a concrete example for other policy entrepreneurs to reference. Towards this end, participants highlighted the importance of continuing to

reference past successes and outcomes as part of socializing pTA and training interested federal agency staff.

Create concise and usable resources on pTA techniques and approaches

Participants discussed numerous potential resources that would be beneficial for deploying pTA across federal agencies. These resources roughly fell into three categories: a “Why pTA?” guide; a high-level overview of pTA and summaries of specific methods; and resources that summarize the current state of knowledge about pTA practices.

Create a “Why pTA?” guide

The workshop highlighted the need for a “Why pTA?” guide that federal agency staff could use to communicate the benefits of pTA to agency leadership and collaborators. Participants requested a guide with a concise argument about why an agency may want to use pTA, as well as brief examples of the effectiveness and benefits of conducting pTA based on completed federal pTA projects. Some participants noted that this guide should delineate how pTA was different from but complementary to existing federal decision making processes, such as open comment periods and federal advisory committees, to better fit into how agencies already think about public engagement.

Create a high-level overview of pTA and summaries of specific methods

Participants requested resources that provide a high-level view of the pTA process. While suggestions for what should be included in this overview varied by discussion groups, the whole workshop felt such an overview should address the following questions:

- Who conducts pTA and why?
- What questions do you ask of the public through pTA and how are those questions framed?
- Who participates in pTA and how are they recruited and involved?
- How is pTA evaluated to ensure the data collected is robust and valid?
- What outcomes are produced from pTA?
- Who receives the outputs of pTA and how are those outputs used?

In addition to this high-level view of pTA, participants noted that concise descriptions of various pTA methods would help agency staff better understand how pTA would fit into existing priorities and programs. The group suggested summaries of the following:

- Open framing sessions: Small, focus group-like discussions that seek to gather and document public concerns, hopes, and questions about a topic separate from expert-driven assessments. These sessions start from a broader systems view rather than the issue itself. For example, if the issue is human genome editing (HGE), instead of leading with HGE, the discussions start with people's hopes and concerns for the healthcare system where HGE will likely be implemented. This helps people situate the emerging technology within a broader context and prioritize it within that context.
- Stakeholder design workshops: Workshops with stakeholders and subject matter experts to inform the design of deliberative public forums.
- Deliberative public forums: Large (80-120 people) public forums designed to foster informed dialogue and assessment of particular issues.
- Public forum results analysis: A co-produced process among pTA practitioners and agency staff to identify salient issues in forum results and ensure the analysis process meets agency needs.

Summarize current state of knowledge and practice

Finally, participants requested resources that describe the current state of pTA knowledge and practice. These resources should be targeted to agency staff responsible for coordinating a pTA project with pTA practitioners, such as the “policy entrepreneurs” described in previous sections. This resource could consist of summaries of papers, reports, and other publications about pTA methods and projects. This resource could also include a ‘record of engagement’ of different pTA projects, the methods and approaches used in each project, and the results of each project. Grounding this resource in peer-reviewed publications could help address concerns about the validity of pTA methods.

What to call pTA

Participants noted that the term “participatory technology assessment” was jargony and did not convey a clear picture of what pTA is to the average agency staff member. While no particular alternative was identified at the workshop, participants noted that another term for use in work with federal agencies could help build interest and buy-in for pTA. In response, pTA practitioners noted that their best approach for communicating what pTA was to agency staff was to invite staff to demonstration forums where they could see what forum activities looked like while learning about the data and outputs that come

from forums. Participants agreed that this was an impactful approach but noted that many staff--and most agency leadership--would find it difficult to attend an hours-long demonstration or workshop.

Law and policy for pTA

Throughout the workshop, participants noted that statutes or executive orders calling for the use of pTA to inform agency decision making would make it easier for agencies to adopt pTA. Little discussion took place about the details of such policies or legislation, but participants did note overlap between pTA and existing policies and legislation, including the [American Innovation and Competitiveness Act](#) and various executive orders related to equity and evidence-based policy making.

Since this workshop in December 2021, members of ECAST have argued that the federal government should prioritize evidence about public values, including the types of data that can be collected through pTA, as part of the government's broader push to promote evidence based policy making.⁹ This memo called for 1) a directive from the Office of Management and Budget and the Office of Science and Technology Policy on the importance of public values as a form of evidence and 2) the development of a roadmap for integrating public value evidence into decision making.

Integrating pTA capacity within government

In addition to law or executive orders about pTA, participants discussed how capacity to conduct pTA might be formally integrated into the federal government and where pTA capacity could live within government as a resource for agencies. One idea discussed was the creation of a Federally Funded Research and Development Center (FFRDC) to house expertise and capacity for pTA within government¹⁰. Participants discussed the creation of a new FFRDC as well as the potential for an existing FFRDC to conduct pTA within federal agencies. Participants cited the General Services Administration as a potential home for such an FFRDC given the similarities of GSA supported work (e.g., Challenge.gov, CitizenScience.gov) to the spirit and practice of pTA. It was also noted

⁹ Farooque, M., Govani, M., and Weller, N. (2022). *Public Value Evidence For Public Value Outcomes: Integrating Public Values Into Federal Policymaking*. Memo for the Day One Project.

<https://fas.org/publication/public-value-evidence-for-public-value-outcomes/>

Weller, N., Sullivan Govani, M., & Farooque, M. (2021). Need Public Policy for Human Gene Editing, Heatwaves, or Asteroids? Try Thinking Like a Citizen. *Issues in Science and Technology*, 37(3), 12–15.

<https://issues.org/thinking-like-citizen-participatory-technology-assessment-weller-govani-farooque/>

¹⁰ Separate from this workshop, pTA practitioners noted that an FFRDC like the Science and Technology Policy Institute (STPI) could house expertise and capacity to conduct pTA for federal agencies. See Weller, N., Farooque, M., and Govani, M. (2020). *Supporting Federal Decision Making Through Participatory Technology Assessment*. Memo for the Day One Project.

<https://fas.org/publication/supporting-federal-decision-making-through-participatory-technology-assessment/>

that pTA capacity could be further refined outside of government, for example as part of a National Science Foundation supported Engineering Research Center, before integrating into the federal government.