U.S. GOVERNMENT NATIONAL STANDARDS STRATEGY FOR CRITICAL AND EMERGING TECHNOLOGY:

SUMMARY OF PUBLIC INPUT INFORMING IMPLEMENTATION

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1.0 EXECUTIVE SUMMARY

This document summarizes 12 months of feedback collected across multiple stakeholder communities through multiple means of engagement, including formal consultations with federal advisory committees, listening sessions, a Request for Information (RFI), and stakeholder engagements. These efforts and engagements were conducted to (1) inform stakeholders on USG NSSCET objectives; (2) gather information regarding the status of the U.S. leadership in standards in CET area; and (3) encourage stakeholders to take action that aligns with the USG NSSCET objectives. This report serves to help disseminate the broad feedback with the standards community.

The ability of the U.S. to sustain technological leadership is directly related to its strategic and tactical engagement in standards developing activities for critical and emerging technologies (CET). A U.S. innovation ecosystem that leverages private sector stakeholders and government-sponsored research and development (R&D) initiatives has historically catalyzed and advanced our Nation's competitiveness in global markets. Within this innovation ecosystem, CET standards developing activities will continue to significantly impact U.S. technology progress.

Therefore, in May 2023, the Biden-Harris Administration issued the U.S. Government National Standards Strategy for Critical and Emerging Technology (USG NSSCET)[1]. To effectively implement the USG NSSCET, the NIST on behalf of the USG consulted the private sector, USG, and foreign partners and allies to understand actions the USG can take to effectively bolster support for, but not hinder or cause undue influence on the private sector-led system in the United States. Recognizing the domestic standards systems in the United States is private sector-led and operates in an increasingly complex and dynamic international standards landscape, there are attendant implications for U.S. national and economic security.

Subsequently, the Administration issued the USG NSSCET Implementation Roadmap[2], which is a plan for the USG to strengthen standards developing activities through essential policies, direct participation, and associated resources needed to bring CET products and services to markets. The USG NSSCET Implementation Roadmap provides immediate and long-term actions for the USG to reinforce support for a private sector-led standards system and to work in partnership in addressing recognized challenges in CET standards development activities. The USG's role in bolstering and protecting national economic security necessitates comprehensive actions. The feedback summarized in this document was essential to developing the Implementation Roadmap and underscores the importance of collaboration and coordination among all stakeholders to best support the US standards systems and global leadership.

[1] https://www.whitehouse.gov/wp-content/uploads/2023/05/US-Gov-National-Standards-Strategy-2023.pdf
[2] https://www.whitehouse.gov/wp-content/uploads/2024/07/USG-NSSCET_Implementation_Rdmap_v7_23.pdf

2.0 SUMMARY OF APPROACH

Working on behalf of the USG, National Institute of Standards and Technology (NIST). To support this work NIST worked in the interagency to develop and issue a Request for Information (RFI) and a Request for Comment facilitated a series of stakeholder listening sessions, business roundtables, and stakeholder engagements; and held formal consultations with Federal Advisory Committees, including establishing a NIST Visiting Committee on Advanced Technology (VCAT) Subcommittee on U.S. International Standards Development Activities[3].

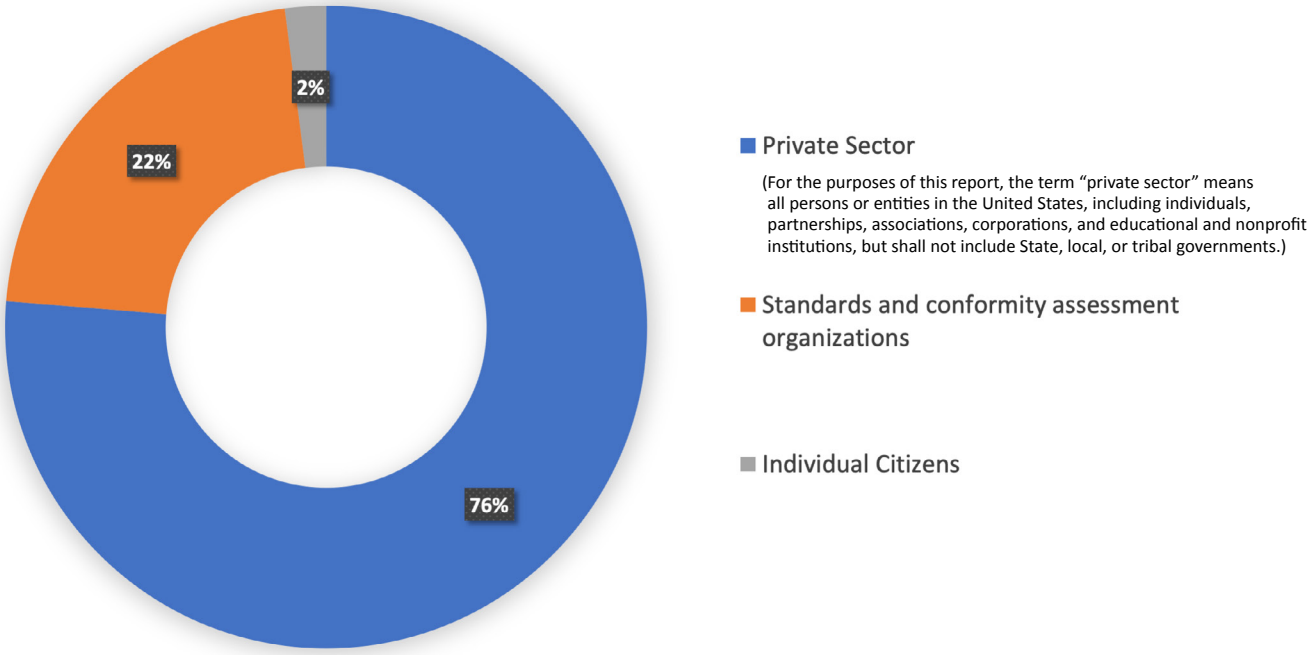
2.1. USG NSSCET Request for Information and Request for Comment

NIST published an RFI in September 2023 and kept it opened through December 2023 seeking public input that would support the development of the most effective implementation of the USG NSSCET[4]. The NIST sought public input on the best ways to partner with relevant stakeholders, remove barriers to participation in international standards development, and enhance the U.S.'s support for an international standards system that is open, consensus-based and led by the private sector. In alignment with the strategy, the RFI posed several questions in each of four broad categories: investment, participation, workforce, and integrity and inclusivity. While specifically seeking input on these topics, NIST welcomed all responses that stakeholders would recommend in order to support a robust and successful implementation of the strategy.

The RFI was complemented by a companion Request for Comment[5] on the intersection of standards and intellectual property undertaken by NIST, International Trade Administration (ITA), and the U.S. Patent and Trademark Office (USPTO). Inputs from all sources were summarized and reviewed by the Department of Commerce, including the NIST, International Trade Administration, U.S. Patent and Trademark Office and Bureau of Industry and Security; and then processes through a formal interagency review. These combined efforts afforded the USG with an informed understanding of the issues and challenges faced, as well as the opportunities to foster greater engagement in international standards development.

[3] https://www.nist.gov/director/vcat
[4] Published RFI comments are available on Regulations.gov https://www.regulations.gov/document/NIST-2023-0005-0001 and https://www.regulations.gov/document/NIST-2023-0005-0034
[5] https://www.federalregister.gov/documents/2023/09/11/2023-19667/joint-ita-nist-uspto-collaboration-initiative-regarding-standards-notice-of-public-listening-session

Responses to the USG NSSCET RFI



2.1.1 Profile of the USG NSSCET RFI Respondents

A total of 105 responses were received from the USG NSSCET RFI issued in September 2023, with 70 relevant submissions comprising 568 recommendations. The combined feedback received represented multiple sectors of the economy domestically and abroad. Responses indicate that the respondents were well-informed on the processes, political climate, and ongoing complexities of domestic and international standards development.

The largest group of respondents were identified as private sector (76%). The second largest group of respondents were standards and conformity assessment organizations (22%). The remaining consisted of individual citizens (2%).

2.1.2 Numerical summary of themes identified in the USG NSSCET RFI submissions

Themes* Identified	Number of RFI Theme Responses
Role of USG in the U.S. standards system	189
Approaches to standards development	47
Intellectual property (IP), standard essential patents (SEPs) and "fair, reasonable, and non-discriminatory" (FRAND) licensing issues	39
Recommendations for incentives	31
Recommendations to overcome communication challenges	29
Recommendations to address leadership in international standards	27
Risks associated with private sector participation in international standards	25
Risks associated with leadership (or lack of) in international standards	23
Recommendations to overcome workforce challenges	23
Education and awareness	22
Value proposition for private sector participation	19
Academic community role in standards development	18
SDO role in private sector participation	14
State, local, and tribal involvement	14
R&D investment and participation in international standards	13
Broadening stakeholder engagement	10
Priority setting	7
Recommendations to support standards that address risk, security, and resilience	7
Recommendations for collaboration	4
Interoperability across the standards system	4
Recommendations for open-source	3
Total RFI theme responses	**379**

• Note themes are not meant to be one for one with each response and some responses received may map to more than one theme.

2.2. Listening sessions and stakeholder engagements

There were additional opportunities for USG and other stakeholders to provide input outside of the RFI process. NIST, along with other USG departments and agencies and American National Standards Institute (ANSI), held a series of over 120 stakeholder engagements, including listening sessions[6] and business roundtables focused on the USG NSSCET implementation and RFI. Summaries of key findings from several listening sessions can be found in the Appendix. Participants included domestic and international CET stakeholder groups from SDOs, industry, small- and medium-sized enterprises, and academia. Stakeholder engagements served as an opportunity to inform CET stakeholders of the goals and purpose of the USG NSSCET, gather information from stakeholders on opportunities for strategic implementation, and generate excitement and increased engagement for the implementation of the strategy.

2.3. Formal consultations with Federal Advisory Committees, and VCAT Subcommittee

NIST held formal consultations with several with Federal Advisory Committees including the Industry Trade Advisory Committees (ITACs)[7] and chartered of a Subcommittee on U.S. International Standards Development Activity established under the NIST Visiting Committee on Advanced Technology (VCAT)[8]. The VCAT Subcommittee was charged with developing specific recommendations for deliberation of the full VCAT to assess the opportunities for NIST to engagement in, support of, and coordination of policy efforts in support of international standards development activity. The VCAT Subcommittee convened numerous independent stakeholder engagements and issued a report with 37 recommendations on how NIST can support the U.S. private sector-led standards system[9].

[6] https://www.nist.gov/standardsgov/past-usg-nsscet-listening-session-summaries
[7] https://www.trade.gov/itac-committees
[8] https://www.nist.gov/director/vcat
[9] https://www.nist.gov/document/2024-vcat-subcommittee-us-international-standards-development-activity-report

3.0 RFI QUESTIONS AND SUMMARY OF STAKEHOLDER RESPONSES

3.1. Broad summaries of respondents' collective feedback on potential efforts to increase U.S. participation in standards are captured here.

The responses capture general actions for enhancing U.S. participation in international standardization; some but not all of the findings are unique to USG mission and mandate and may be more broadly applicable to the overall U.S. standardization community of stakeholders and stakeholder organizations. In general, respondents suggested a variety of ways to include standards in existing funding mechanisms, from ensuring that researchers consider the standardization implications of their research outcomes, to requiring standards development efforts as deliverables as part of CET-related research funding.

General Questions:

3.1.1 Are there potential benefits, opportunities, or risks associated with increased U.S. participation in standards development activities for CET?

Respondents perceived that the benefits of increased US participation in standards include:

- **Innovation and technology transfer.** Properly focused and timely standards development can boost innovation and support the earlier transition of technologies into application.
- **Global competitiveness and economic prosperity and security.** Active participation in international SDOs can help enhance U.S. competitiveness and ensure its industries will be well-positioned to capitalize as CETs are leveraged in various markets.
- **National security, safety and resilience.** Ensuring developed standards align with national security, safety, and resilience requirements, such as protecting critical infrastructure[10] will promote U.S. national security.

Respondents perceived that opportunities for increased engagement in standardization and support of the standards system in the United States may include:

- **Ensure a level playing field.** For national SDOs, make certain that the interests of all key stakeholders are represented and considered, and barriers to underserved, underrepresented communities are removed to enhance engagement and development of standards for CETs. For international SDOs, counter the efforts of nations misaligned with U.S. interests and make certain that developed standards are based on technical merits and are appropriate for all stakeholders.
- **Promote collaboration in standards development efforts.** Participation in SDOs helps industry advance more efficiently and effectively. Model approaches to collaboration that enhance communication across sectors of society including with foreign governments and international SDOs promote and enhance broader international prestandardization research and development.
- **Enhance U.S. participation and effective leadership.** Active participation and leadership within SDO activities both within the U.S. and internationally will provide the U.S. perspective and can shape the direction of future efforts in CET areas.
- **Enhance communication and information sharing.** The USG can bolster engagement in standards development and adoption by creating and encouraging the use of platforms to host prestandardization research and coordination, share standardization related data, and share resources for assessing standards compliance. Stakeholders recommended the USG work with the private sector to provide one central place for consolidated communications on standards meetings and activities that includes the ability to receive feedback from stakeholders across sectors to address gaps in CET standards development, e.g., a website with a posting board. This resource could also promote the potential conferences, workshops, joint forums, and/or collaborative digital platforms to share information about stakeholder participation.

[10] For the purposes of this report, references to "critical infrastructure" were considered to be consistent with the definition found here: https://www.cisa.gov/topics/critical-infrastructure-security-and-resilience

- **Enhance standardization education.** There is an acute skill shortage in the U.S. stemming from both the high cost of education as well as the gap between academic training and real-world skills required for CET. Educational courses and workshops, expanded access to information, interactive discussions, communities of practice, and other educational materials can help to bridge knowledge gaps and develop a broader workforce knowledgeable about the technical and regulatory environment for CET and standards development activities.
- **Support public-private partnerships.** Public-private partnerships as a tool to mobilize USG departments and agencies, academia, research institutions, civil society groups, professional societies, and industry to work together to proactively address challenges presented by CET. Public-private partnerships can lead to more comprehensive and industry-relevant standards, benefiting from the expertise of both public and private sectors.
- Welcome international standards meetings. The USG should work with the private sector to make the U.S. the best, most welcoming place to develop standards and coordinate international standards development projects. This has direct benefits to the ability of the U.S. companies to participate in and lead standards by: decreasing travel, lodging, and incidental costs associated with attending international standards development meetings abroad; lowering perceived barriers to entry for U.S. small and medium enterprises; and giving the U.S. participants a "home-field advantage".

Respondents perceived that the challenges of increased US participation in standards include:

- **Resource allocation issues.** Effectively participating in international SDO activities requires both sustained and significant investment in both human capital and funding for travel and other costs. Allocating these resources to support engagement in standardization can be challenging, especially for organizations with constrained budgets.
- **Intellectual property and licensing issues.** Sharing information about technologies and practices as part of SDO endeavors was perceived as having the potential to expose companies to theft or misuse of their IP. Foreign intellectual property laws and regulations can have a significant and potentially adverse impact on the effectiveness of international standards development.

3.1.2. What are the potential risks or implications of decreased U.S. participation in standards development activities for CET?

RFI respondents expressed the following:

- **Loss of global competitiveness.** With reduced U.S. participation in standards development for CET, there is an increased likelihood that other countries will take the lead, potentially resulting in standards that do not favor U.S. interests or technologies.
- **Slower innovation and adoption.** A lack of active U.S. participation in standards development could slow the pace of innovation and technology adoption, as U.S. companies may face challenges in integrating their products and services with global standards.
- **Barriers to market access.** U.S. companies may face increased barriers to entry in global markets if they are not actively involved in shaping the standards that govern these markets, potentially putting them at a competitive disadvantage.

- **Reduced influence on international policy.** Decreased U.S. participation in standards development activities could limit the nation's insight into emerging CET standards needs. These gaps in knowledge will impact the ability of the USG to guide or influence international policy and regulations related to CET, potentially leading to unfavorable outcomes for U.S. businesses and national security. Decreased participation could also impact U.S. trade negotiations and implementation.
- **Loss of U.S. technology leadership position.** The U.S. risks losing its leadership position in global technology development with decreased participation in CET standards development; decreased participation could also be seen as the U.S. deprioritizing CET. This would give other countries an opportunity to take leadership positions in standards development, which could result in CET standards that are difficult for U.S. companies to adopt, or incongruous with how they utilize CET.
- **Standards fragmentation.** A decline in U.S. participation may result in the development of regional or country-specific standards, leading to fragmentation and increased complexity in the global technology landscape.

3.1.3. What are the most important challenges faced by the private sector (i.e., industry, including start-ups and small- and medium-sized enterprises, academic community, and civil society organizations) when participating in standards development activities for CET, and how can these challenges be addressed?

RFI respondents expressed the following:

- **Limited representation in standards development activities.** The lack of participation in SDOs by small- and medium-sized enterprises, academic community, and civil society organizations can lead to larger organizations dominating standards development efforts. To address this issue, it is essential to improve information dissemination and facilitate better organization within the technology community, enhancing opportunities for small- and medium-sized enterprises to engage without requiring substantial effort or investment to understand where and how best to engage in the complex and dynamic work of standardization.
- **Restricted ability to support activities due to resource constraints.** One major challenge identified by the private sector is mustering of adequate resources to support standards development as those resource commitments must be balanced against other pressing demands for key or limited technical staff expertise, commercial product development timelines, and allocation of capital obtained from private investors. Investment of human capital can be particularly difficult for small and medium sized companies, including start-ups with limited staff and monetary resources.
- **Intellectual property rights (IPR) protections.** Another concern expressed is the protection of IPR. Private sector often worries that participation in SDOs may lead to difficulties in safeguarding their intellectual property. To alleviate this concern responders suggested clear policies and guidelines on IPR, as well as legal support and resources, should be provided to help organizations navigate these challenges while participating in standards development activities.

3.2 USG NSSCET Objective 1: Investment

3.2.1. How can the USG establish policies that promote standards development for CET as a critical component of U.S. innovation culture?

RFI respondents expressed the following:

- **Identify and communicate areas of critical need.** Given the rapid pace of change in CET areas, the USG should work with the private sector to understand needed programs and appropriately review and revise policies to respond to the evolving standards landscapes for enhanced U.S. leadership in CET market creation and technology applications. These efforts should focus on identifying and communicating critical standardization needs and frameworks for standards development and the associated risks to U.S. technologies and markets. Attention needs to be focused on defining the CET

standards landscapes at a granular level. A comprehensive database of existing standards and gaps in standards development that map on to CET standards landscapes should be created and communicated with the private sector. Communication to enhance participation with the required level of urgency and resources to achieve successful outcomes for the U.S. is required.

- **Provide tax incentives.** Respondents expressed that the USG could consider aligning tax policy to support standards participation and development activities. Tax credits could support private investment and incentivize U.S. participation in SDO work including formal leadership positions. The USG could also expand the research and development tax credit to include standards development expenditures. In addition, the USG could encourage increased R&D spending by the private sector by allowing R&D expenses to be deducted in the year they were incurred, instead of requiring that they be amortized over a period of years.

- **Align R&D CET incentives.** The USG could create policies to increase direct and indirect investment incentives in R&D funding in CET areas. It should consider the potential to align grant funding with areas of CET standards development to increase U.S. representation in areas where the private sector has low participation. Stakeholders articulated a lack of participation may be due to a lack of resources including staffing and travel funds when technology areas are early and standardization is immature, or a lack of interest due to the broad mandate of a standards body/activity. The USG should also provide incentives to universities and advanced degree programs that include standard education components in their curricula. Finally, more programs that leverage industry and government support to make standards available at no cost, will help drive standards participation[11].

- **Reaffirm USG commitment to sustaining existing government policies.** The USG should reaffirm the policy statements contained within OMB Circular A-119, which references Public Law PL 104-113, The National Technology Transfer and Advancement Act (NTTAA of 1995) regarding both Federal participation and use of voluntary consensus standards. If needed, these policy statements should be reinforced to ensure government-wide participation in the development and use of industry standards. Regulators participating in the standards development processes ensure that final products are to be acceptable for regulatory use. The appropriate levels of funding should be ensured for agencies to participate in industry standards activities including continuing to work with industry in standards bodies and consortia.

- **Increase government coordination.** The stakeholders expressed that the USG should speak with a consistent standards policy voice through NIST as the "standards expert agency" as appropriate. Multiple and uncoordinated approaches to CET research and development, and standards policy can create confusion both within the USG and in discussions with foreign governments and other stakeholders. The USG should improve its policy on internal coordination to advance standards development. There is also a gap between policy and technical levels in government agencies that, if addressed, would enhance coordination among agencies. Establishing a consistent means to engage with the private sector on CET standards policy would enhance the exchange of information and provide a means to inform and coordinate USG positions on CET areas. Enhanced coordination with the private sector would provide current information on standardization activities and technology advancements, transparency in policy actions, and support related USG positions in CET policy efforts. The USG departments and agencies should work in coordination with each other to revisit existing or develop new CET policy as appropriate to account for emerging and dynamic spaces. Some examples include:

  - **U.S. Department of Energy (DOE) and the EPA** coordinate with SDOs and ANSI regarding their goals to develop standards for electric vehicle (EV) battery design, recycled content, mineral traceability, and producer responsibility.

[11] An example program reported by stakeholders included the IEEE GET Program https://standards.ieee.org/products-programs/ieee-get-program/

- **NIST and National Science Foundation (NSF)** could consider partnering to encourage NSF grant recipients to also see how their research findings could be advanced through the development of voluntary consensus standards.
- **U.S. Trade Representative (USTR) and U.S. Department of Commerce (DOC) with NIST** could continue its coordination to address Technical Barriers to Trade (TBTs), which undermine the competitiveness of U.S. companies innovating, scaling up, and delivering CETs to global markets. This is particularly relevant when international standards do not yet exist.
- **The USG** could learn from the example of the Registry of Recommended Biometric Standards, which lists the standards that federal agencies were required to use in their systems and indicated the USG's focus in this area. The registry's use was later strengthened through National Science and Technology Council (NSTC) policy and presidential directive, driving significant industry participation in SDOs and ensuring that major commercial providers complied with the new standards as soon as possible.

- **Promote Public-Private- Partnerships.** Given the USG NSSCET's large scope, a few specific test programs for cooperation between the private sector and the USG should be selected for immediate planning and action based on their importance to the USG and industry. The USG could promote public-private partnership in CET standards development to facilitate communication and collaboration between the sectors to help identify gaps and needs for CET standards while also underscoring the importance of standards in these fields and the role standards play in innovation, security, and market access. The USG should develop communication mechanisms and programs to inform the U.S. industry about the relevance and importance of standards. The USG can provide enhanced communication about activities where the USG has a unique membership responsibility and/or where the USG has technical program investment to create awareness, motivation, and recognition incentives for increased engagement across the broad CET stakeholder communities.
- **Promote standards in the innovation ecosystem.** The USG should establish policies that maintain standards that promote the innovation ecosystem and outcomes to advance the public good. Policies should support principles such as free and open market principles and the protection of intellectual property (data security). Policies should also ensure the right stakeholders are at table through an inclusive stakeholder engagement process with adherence to "best in class" practices. Policies should provide opportunities for participation by innovators, academia, small businesses, and a wide diversity of innovators as well as by large corporations. Policies should treat standards development as a companion activity to technology development, rather than as a separate endeavor. An example of how policies can integrate standards development into innovation culture is by requiring participation in standards development activities as part of Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR), and other federal grants and contracts.

3.2.2. How can the USG utilize Federal spending on research and development to drive technical contributions for CET standards development activities?

RFI respondents expressed the following:

- **Broaden the scope of funding requirements.** Support the inclusion of standards in existing Federal funding mechanisms and in work performed by USG agencies. This should start with early engagement and partnering with standards organizations as agencies launch research and development projects to support new standards initiatives as well as maintenance of existing standards. Education for funding agencies is also important and NIST should continue engaging and educating funding agencies, such as the National Science Foundation, Department of Energy, Department of Defense, etc. on the role of standards in innovation and how to work with SDOs. Similarly, it was suggested that NIST could develop programs to support awardees' understanding of the value of transferring their research and knowledge to the standards community.

RFI respondents suggested a variety of ways to include standards in existing funding mechanisms, from ensuring that the researchers consider the implications of the research outcomes for standardization to requiring any CET-related funding or research include standards development as deliverables. The scope of funded activities needs to broaden to include efforts such as technology/process validation and verification, standards readiness assessments, evaluation of existing standards, and gap analysis. The scope of the deliverable needs to be broadened to include quantitative and qualitative metrics and data on the breadth of technical standards development activities as well as successfully developed codes and standards.

- **Require a standards perspective in Federal research and procurement.** The USG can lead by example by requiring a specific subset of its internal researchers or project thrusts to actively engage in SDOs, showcasing the USG's dedication to standards development. The USG can also encourage contributions to and adoption of international CET standards by continuing to use international standards as the basis of policy, procurement, and regulatory requirements and where appropriate, indicating at an early stage an intent to use or reference specific standards. By communicating its plans to make use of relevant international CET standards, the USG provides an example for industry to follow, and an indication of where international CET standards are likely to have market relevance.
- **Respondents' suggestions for funding models included:**
  - Reduce the cost of collaboration by directing federal spending to create environments that have access to shared tools, facilities, infrastructure, and IP for R&D programs.
  - Provide funding for innovation within standards bodies to help accelerate standards development timelines while maintaining process integrity.
  - Provide funding for specific open-source efforts and reference implementations in support of standards in key areas of CET. An example is the O-TTPS supply chain security standard, which was initiated in part through funding from the U.S. Department of Defense.
  - Explore the use of existing appropriations, or seek new authorization from the USG, to create targeted grant programs for small- and medium-sized enterprises, academic community, civil society organizations, and startups to participate in international standards activities.
  - Provide NIST with additional funding for CET standards coordination between academia, industry, other organizations.
  - Use Federal research grants to promote the establishment of standards research pilot programs for experimentation of biotechnology as an example and applied in standards for other CET areas.
  - Leverage existing USG programs to assist research and small enterprises, including NIST's Manufacturing Extension Partnership Program[12], U.S. Economic Development Administration's Regional Technology and Innovation (Tech Hubs)[13], NSF Innovation Corps Hubs Program (I-Corps Hubs) and NSF's Regional Innovation Engines[14] and other national and regional research and small business assistance programs to foster engagement in and adoption of standards in CET areas.
  - Fund informational and educational programs for local governments to understand how to support and engage in standardization and serve as a validation and feedback loop for standards development.
  - Establish funded projects consisting of industry teams, using mechanisms like Other Transaction Authority to spur the development of standards specific to CET areas.

[12] https://www.nist.gov/mep
[13] https://www.eda.gov/funding/programs/regional-technology-and-innovation-hubs
[14] https://new.nsf.gov/funding/initiatives/regional-innovation-engines

- Provide grants that pay SDO membership fees for startups and small businesses.
- Provide line-item funding to the national laboratories and qualified universities to participate in CET-related standards R&D.

- **Fund start-ups and small- and medium-sized enterprises.** Without dedicated efforts to include start-ups and small- and medium-sized enterprises, technology pilots are often driven by large private enterprises that have the budget to lobby, network, and coordinate with governments. Funding or subsidies for start-ups and small- and medium-sized enterprises would increase the participation of this segment of the standards development ecosystems. Finding ways to utilize existing mechanisms (e.g., SBIR, STTR) used to target smaller businesses is one approach that could be explored.
- **Fund U.S. based meetings and U.S. participation abroad.** RFI respondents cited the high cost of hosting meetings in the U.S. or traveling to meetings abroad as barriers to engagement that may limit technical contributions for CET standards development.
- **Provide incentives to help offset meeting hosting costs.** Incentives may include grants for hosting and participating in standards meetings as well as tax policy for research and development incentives to be used to support standardization activities. These incentives should be grounded in a private sector-led standards policy designed to support competitive markets and not create dependencies on the USG that may negatively impact or influence the long-term sustainability of U.S. engagement in global standardization.
- **Apply multiple types of incentives.** Use stipends, grants, cost-sharing, or other vehicles of funding support that enables drafting and coordination activities, as well as travel, registration and personnel time, enhance technical contributions to CET standards by lowering costs associated with participation.

3.2.3. How can the USG facilitate the adoption of standards-based CET by industry stakeholders, including start-ups and small- and medium-sized enterprises?

RFI respondents expressed the following:

- **Provide training and education.** A key step in proliferating the adoption of new standards is to demonstrate and share the benefits, including economic prosperity, technical superiority, enhanced interoperability, safety, and security. The USG can facilitate this by providing funding or creating resources to document and disseminate this information. In addition, the USG can host workshops, seminars, and other events in partnership with SDOs to promote key standards and educate stakeholders, especially CET small- and medium-sized enterprises on key standards and the standards development process. CET standards activity updates should continue to be communicated widely to encourage contribution to and investment in the development of CET and CET-based standards. Existing USG programs to assist small enterprises (e.g., NIST Manufacturing Extension Partnership and New Mexico Small Business Assistance Program) can be leveraged to assist with the adoption of standards in CET areas. There are also other opportunities to establish or leverage other federally funded entities, for example, the new biomanufacturing hubs[15] that are already funded or soon will be, including those from the Department of Commerce, NSF, and DoD. In addition to serving as test beds and examples of standards in action, these hubs provide an opportunity to include standards in curricula for biomanufacturing-related training programs.
- **Incorporate standards in regulations.** Industry will voluntarily adopt standards when they expedite certification, streamline commercialization, or enable access to essential industry and supporting technologies. Incorporating standards into existing and emerging regulations was suggested to be the most straightforward mechanism to drive adoption. Regulators and USG agencies can recommend

[15] https://www.commerce.gov/news/fact-sheets/2023/10/fact-sheet-biden-harris-administration-announces-31-regional-tech-hubs

standards for CET areas without mandating them. These recommendations would point enterprises in the right direction without overly regulating CET. The USG can make regulatory pathways clear, simple, and underpinned by standards. The USG can facilitate the adoption of CET by applying standards through regulatory mission, promoting standards-compliant products, and disseminating education and awareness regarding standards.

- **Ensure standards are fit-for-purpose.** The first step to facilitate adoption is to have broad industry participation in the development of the standard to ensure that standards support innovation, are efficiently developed, and are fit for purpose. One way to achieve this is for the USG to support established communities of practice in participating in sector-specific standards development processes at the front end of a standard's lifecycle.
- **Additional suggestions for funding models specific to standards adoption include:**
  - Subsidize the re-tooling, retrofitting, documentation, and consultation efforts that are necessary to comply with new standards.
  - Provide R&D funding for researchers to implement standards and communicate their value to industry.
  - Incentivize industry's adoption of standards with grants and other funding sources. Standards adoption and compliance requirements could be part of Federal contracts and other funding vehicles.
  - Use financial incentives, such as grants or tax credits, to encourage stakeholders' adoption.
- **Target start-ups and small- and medium-sized enterprises.** The USG can develop and deploy programs that provide financial assistance, especially for start-ups and small- and medium-sized enterprises, to purchase appropriate standards documents for little to no cost. This would help promote the use and adoption of the most current versions of standards. Start-up and small- and medium-sized enterprise stakeholders primarily follow market leaders, so identifying and incentivizing market leader participation in a way that does not offer barriers to entry for smaller stakeholders, could result in increased adoption. The USG could create tax incentives and fund the creation of organizations that assist start-ups and small and medium enterprises in participating in and adopting standards. Financial incentives, education campaigns, and participation opportunities designed specifically for start-up and small- and medium-sized enterprise stakeholders will enable participation in standards development, adoption, and adherence.
- **Leverage USG procurement for standards adoption.** The USG is considered by industry stakeholders to be the single largest buyer of technology products and services. Because of this, the USG can significantly influence the design of products to meet government requirements through their acquisition processes. Agencies should consider promoting standards when they are innovative, low-cost, and fully interoperable with existing technologies. Additionally, NIST could increase access to information about SDOs activities including through periodic notices in the Federal Register and by coordinating directly with experts.

3.2.4. How can the USG better support publicly funded and private research in standards development activities for CET?

RFI respondents expressed the following:

- **Provide expertise and resources.** The USG could provide human capital resources to lead, coordinate, and communicate about ongoing CET standards work. Resources could include government employee and affiliate staff hours and resources, and funds for consultants and contractors.
- **Establish a CET resource portal.** Stakeholders recommended that the USG could map CET research and technology development activities against U.S. and international standards and publish them in an open information portal. The focus could be on the most critical technology areas and identifying industry partners to create roadmaps and communicate the return on investment for engaging in standardization. The site could provide an overview

of standards development processes and activities and serve as an accessible means of updates or opportunities for engagement in standards activities. CET-specific sections of the portal could disseminate information, solicit feedback, and improve adoption. The USG could also provide and oversee a third-party resource to secure data and other IP that comes from these research activities.

- **Modernize the national research model.** The traditional research model, described as the "Vannevar Bush" model may be limiting the U.S.'s ability to succeed in today's competitive international CET landscape. The current model suggests that government-funded basic research leads to new knowledge and breakthroughs, which the private sector then independently leverages to create commercial products with practical applications. Increasing the strategic collaboration between government, industry, and academia promotes innovation, accelerates technology adoption and enhances economic growth, ultimately contributing to national competitiveness in the global market. To support standards activities in the context of CET, the USG should focus on fostering this collaborative research model that facilitates partnerships and cooperation among industry sectors to drive more effective and efficient standards development processes. There is a need to broaden the current focus of USG organizations like NSF and Defense Advanced Research Projects Agency (DARPA) to include standards.

3.3 USG NSSCET Objective 2: Participation

3.3.1 How can the USG increase and maintain consistency of private sector (i.e., industry, including start-ups and small- and medium-sized enterprises, academic community, and civil society organizations) engagement in standards development activities for CET?

RFI respondents expressed the following:

- **Increase awareness, education, and information sharing on standardization activities.** Diverse stakeholder engagement can be accomplished through collaborative engagement opportunities that offer informative discussions on the state of science and technology, provide access to data and detailed technical and non-technical publications, and that lead to incremental, impactful, and timely actions to support standards readiness.

- **Define the value proposition.** Stakeholders indicated that in order to increase private sector engagement in CET standards development, there must be a value proposition to garner support from senior leaders in industry, government and academia. A value proposition could include financial incentives for continuous participation, demonstrating/communicating the competitive advantage based on participation (e.g., better understanding of the standards that must be adopted, especially if they are tied into regulatory approvals), or publicity articulating the standardization benefits with the public and private sectors.

- **Provide incentives.** USG could either providing direct funding to pay SDOs membership dues and/or administrative costs, or by funding individual or organizational memberships. In addition, the USG could provide financial support for SDOs to actively recruit private sector engagement in CET standards. Examples of ways the USG can support public and private sector engagement, as suggested by the responders, including hosting seminars, webinars, task groups, and public forums; attending trade shows and conferences hosted by professional societies and technical organizations; developing pilot programs for standards development for novel CETs; and fostering "table-top exercises" to identify opportunities for new standards and support development of draft standards. The USG could provide financial assistance for standards education for small- and medium-sized enterprises, academia, and civil society organizations.

- **Mitigate risk and address challenges to engagement.** There are risks for the private sector, especially for start-ups and small- and medium-sized enterprises associated with participation. Standardization often requires the sustained contributions of individuals with experience and expertise over several years. Consistent participation may come at a cost to the organization. Standards

development is often perceived as a potential risk to the organization's competitive advantage or as a potential risk for exposing intellectual property. Efforts should be made to help manage risks, such as mitigating the cost of engagement, providing information security measures, mentoring to support informed and effective engagement, and educating organizations on the standardization processes for relevant technology areas. Additionally, protection and anonymization of data or other operational details can encourage the sharing of specific, technical expertise without adverse impacts on IP.

3.3.2 How can the USG improve communications among the public and private sector (i.e., industry, including start-ups and small- and medium-sized enterprises, academic community, and civil society organizations) to address potential participation gaps in standards development activities for CET?

RFI respondents expressed the following:

- **Leverage and support existing mechanisms.** The USG should leverage and support existing mechanisms, including regional access and engagement communities to improve communications among public and private sector entities to address education and participation gaps. For example, representatives from many USG departments and agencies serve in formal liaison roles and leadership roles within SDOs, such as the ANSI Standards Board. Liaison and leadership roles provide opportunities for USG employees and their home organizations to share and inform standardization activities with research and technology development insights as well as to support existing and planned standards work products and activities for advanced technologies. For example, the USG could partner with the private sector and work with communities that have been awarded regional tech hub funding[16], as these hubs already bring together academia, industry, and government organizations working on critical technology areas and national priorities. Existing roles, relationships, and convening mechanisms provide additional coordination opportunities, and communication of these efforts provides general awareness of the benefit of public and private partnership for the U.S. standards system.
- **Create an interagency standards team for each CET.** Respondents proposed creating a interagency standards teams for each CET to support greater coordination across government departments and agencies. These teams would be responsible for working across the USG to obtain consensus where appropriate, provide situational awareness on standards engagement goals prior to relevant SDO activities, and/or fulfill the aforementioned tasks for their respective CETs. Utilization of existing mechanisms to support interagency coordination of CET standards should be considered. The National Science and Technology Council or the Interagency Committee on Standards Policy could be tasked with coordinating the development of such standards teams and interagency working groups.
- **Create platforms to host standards information.** The USG could provide one central place for consolidated communications, that includes the ability to receive feedback from stakeholders across sectors to address gaps in CET standards development. For example, this could be done through a website with a posting board. This website could have multiple uses by serving as the place to publish updates, ongoing activities, and other related CET standards information. Generally, the USG could bolster engagement in standards development and adoption by providing platforms to host standards, standards related data, and resources for assessing standards compliance.
- **Partner with academic institutions.** Partnership with academia could be addressed by working collaboratively through organizations such as the National Academies of Sciences, Engineering and Medicine and other professional societies to provide communication, education and standardization mentorship to increase public engagement.

[16] https://new.nsf.gov/funding/initiatives/regional-innovation-engines and https://www.eda.gov/funding/programs/regional-technology-and-innovation-hubs

3.3.3 How can the USG foster early collaboration with private sector (i.e., industry, including start-ups and small- and medium-sized enterprises, academic community, and civil society organizations) stakeholders to identify standards for CET that would encourage market and regulatory acceptance as needed? At what stage is early collaboration most effective?

RFI respondents expressed the following:

- **USG should work with the private sector to make timely information available.** Information on international standards development activities in the new work item proposal stage should be provided to affected national stakeholders in a timely manner and at the earliest appropriate opportunity to allow all relevant national stakeholders to access the information, determine their interest in it and provide input effectively by any deadlines. If a standard is needed to support regulation, then the regulatory body should communicate this need with the private sector and SDOs early in the process for their feedback.
- **Emphasize strategic timing.** Focusing on "early" collaboration may not be the most effective approach. Instead, the emphasis should be on strategic engagement and coordination with the private sector to understand optimal timing and focus for standardization of CETs. By concentrating on strategically timed and focused collaboration, the USG could better engage with private sector stakeholders in identifying and developing standards for CETs. Ultimately this may encourage market and regulatory acceptance as needed.

3.3.4 What roles do the academic community and civil society organizations play in standards development activities for CET, and how can they increase their contributions to a private sector-led system?

Respondents expressed that the role of the academic community may include:

- **Engage and consult.** Academic researchers should be engaged and consulted to create greater awareness of future technologies and novel markets as well as to inform, prepare and develop related standards. Engaging the academic community in standards development means that the novel innovations coming from research laboratories can be developed with industry applications and the associated standards in mind. Students and researchers interested in moving to industry will benefit from education on how standards influence technology deployment and entry into the global market.
- **Conduct workforce training.** Academia also serves the critical role of workforce training, not only for future technology leaders, but technicians, compliance officers, industry workers, and standards developers.

Respondents expressed that the role of civil society may include:

- **Ensure CET standards are informed and non-biased.** Civil society organizations and non-profit organizations have a primary responsibility for ensuring that CET standards are informed by and developed based on a neutral, free-from-conflict, and non-biased approach. These organizations enable voices to be heard across the standardization and technology development ecosystems to assure equity and access in these processes.
- **Advocate for consumer protection and environmental protection.** Civil society also plays an important role by advocating for consumer protection and environmental safety. This input is often highly beneficial to gain social acceptance of the standard by having more public engagement. Civil society contributions are important because they will use, and be directly impacted by, the products and

capabilities that emerge from CETs. As an example, consumer confidence may be improved by open discussions with civil society on how standards are ensuring reliability and safety.

- **Develop a tracker or mapping tool.** Performing a stakeholder mapping for CET areas along with advertising new standards initiatives and active outreach to these groups can increase the participation of these stakeholders and increase their awareness of opportunities. A publicly accessible tracker or other mapping tool for new CET standards development would facilitate this to allow all stakeholders to view opportunities to participate in CET standards development.

3.3.5 How can the USG better support state, local, and tribal governments in participating in standards development activities for CET?

RFI respondents expressed the following:

- **Fund local representative participation.** USG may consider opportunities to fund experts from state, local, and tribal governments to enhance participation in standards development activities. Furthermore, the USG could increase the number of public-private partnership funded programs enabling state, local, and tribal governments to engage in standards research for CET.

3.4 USG NSSCET Objective 3: Workforce

3.4.1 How can the USG leverage existing or develop new digital tools and resources that facilitate access to standards development processes, and increase engagement by private sector (i.e., industry, including start-ups and small- and medium-sized enterprises, academic community, and civil society organizations) CET stakeholders?

RFI respondents expressed the following:

- **Develop an online platform for toolkits and guides.** Digital information sharing tools can be leveraged to ensure U.S. equities are reflected across global standardization efforts and to reinforce engagement from across societal sectors in private sector-led standardization activities. For example, an online platform could serve as a centralized hub where stakeholders from the private sector, academia, and civil society can access tools, training, and expertise to engage in standards-setting activities. Currently, activities are distributed across SDOs and stakeholder organizations and are challenging to track due to the breadth of topics and dynamic nature of standards development for CETs. An online platform could enhance accessibility and engagement in the standards development process, particularly for start-ups, and other organizations that may otherwise lack the resources to participate. Toolkits and guides within the platform can provide information on intellectual property rights protection and can help small- and medium-sized enterprises and start-ups navigate the standards development process and understand the implications of standards on their innovations. This tool could also be an effective way to connect academic researchers with industry practitioners to ensure alignment of needs in pre-standardization research and standards development.
- **Develop an online repository of standards-related training.** An additional initiative could include development of a comprehensive online repository of standards-related training, including courses, webinars, and tutorials focused on standards development in order to deliver easily accessible knowledge and training to a broad audience.
- **Work with academic institutions on standards curricula.** Educational institutions can be incentivized to offer virtual courses and certifications for individuals at various career stages, from students to mid-career professionals. USG could consider working with academia to create digital training modules and simulations that teach practical skills in negotiation and cultural awareness, which are crucial for effective participation in international standards development.

3.4.2 How can the USG incentivize the modification of existing curricula and/or the creation of new curricula, to include faculty professional development, by educational institutions for pedagogy to support standards development activities for CET?

RFI respondents expressed the following:

- **Modify science, engineering, technology, business and law curricula to include standards education.** Accreditation requirements for educational institutions can be modified to mandate the inclusion of standards education in relevant programs. Standards education can be incorporated into existing courses through modules on standards development, standards compliance, and the impact of standards on technology deployment. In addition, federal grants and funding for educational institutions can be tied to the development and implementation of standard-related courses. This can include grants for curriculum development, faculty training, and the creation of curriculum resources focused on standards. Joint grant programs may encourage collaboration between education institutions, the private sector, and government to develop standards education materials and research projects that link academic research with practical standards applications.
- **Develop new standards-related programs.** New standards-related academic programs for undergraduate and graduate degrees as well as certification programs for working professionals could be created. Marketing campaigns that showcase the importance of standardization and career opportunities available in the field may also be valuable. These campaigns should highlight success stories and case studies where standards have significantly impacted technology innovation.

3.4.3 What standards development activities for CET can USG and private sector (i.e., industry, including start-ups and small- and medium-sized enterprises, academic community, and civil society organizations) stakeholders promote or develop to encourage increased participation by students and trainees?

RFI respondents expressed the following:

- **Offer scholarships and tuition programs.** Early exposure to standards in existing academic programs can be achieved through integrating standards into laboratory courses. Sponsoring and building standardization into professional society-hosted student competitions, hackathons, engineering senior design programs, and code competitions can engage students in standards development. Programs providing practical hands-on experiences and mentorship in problem solving, diplomacy, governance, leadership, and consensus building would be beneficial. Scholarship programs and tuition reimbursement may offer financial support for students and adult learners for participation in standards-related education.

3.4.4 How can the USG support both private sector and public sector recognition for standards development expertise and how can this recognition be utilized to increase standards development activities for CET?

RFI respondents expressed the following:

- **Develop standards recognitions and awards.** Certification programs that recognize standards experts can be integrated into academic disciplines and professional development programs. Awards can be given to individuals, academic institutions, and companies that demonstrate leadership and innovation. In addition, rewards programs that publicly recognize outstanding contributions to standards development can elevate the status of standardization work.

- **Outreach campaigns.** Outreach and communications campaigns could be rebranded to showcase the value of standards in society, technology development, national competitiveness, and innovation.

3.5 USG NSSCET Objective 4: Integrity and Inclusivity

3.5.1 How can the USG work with private sector (i.e., industry, including start-ups and small- and medium-sized enterprises, academic community, and civil society organizations) stakeholders to more effectively coordinate with international partners and reinforce private sector-led standards development activities for CET?

RFI respondents expressed the following:

- **Provide policy guidance to industry for USG NSSCET objectives.** Stakeholders stated the need for greater coordination with the private sector in support of USG CET standards policy activities. Working together to address CET standards policy challenges could serve as a force multiplier in strengthening the Nation's engagement in the global standardization system. Recommendations for the USG NSSCET strategy implementation include:
  - Focus on identification of priorities, key events, and specific needs for new standard development activities by working through existing SDOs or even the formation of new standards bodies to address CET-specific standards needs.
  - When possible, the USG could offer diplomatic channels to promote cooperation and collaboration with global stakeholders in support of international standardization for CETs.
- **Emphasize the important international standards.** International standards harmonization should not be pursued to the detriment of the U.S. competitiveness or the ability of U.S.-based efforts to obtain consensus and retain necessary autonomy. The USG must demonstrate to international partners the value of private sector contribution to, and leadership of, standards development.
- **Continue to support work through ANSI and other stakeholder organizations to enhance coordination**. Coordination of engagement in international standards development activities including ISO and IEC is taking place through national standards bodies (NSB). The American National Standards Institute (ANSI) is the U.S. member body to ISO that acts as the primary interface for U.S. stakeholders – between ANSI-accredited U.S. Technical Advisory Groups and their related ISO Committees. The USG should continue to work closely with ANSI to support their efforts to make sure U.S. interests are represented in international standards activities.
- **Provide standards process and governance information in a timely manner.** To ensure a strong and effective U.S. voice in international standardization for CET, information on changes to the international standards processes and governance structures should be provided to national stakeholders in a timely manner, and at the earliest appropriate opportunity. This would allow all relevant national stakeholders to access the information about relevant governance processes, determine their interest in any changes, and provide input effectively by any deadlines established by the standardization organizations. Different SDOs have different approaches to governance and standards development, and standardization needs, and engagement drivers vary by sector.
- **Clarify perceived threats to U.S. leadership in standards.** Given the significant differences in standardization across sectors, clarify and communicate when and where the USG, industry and stakeholder organizations including ANSI perceive specific threats to U.S. leadership in standardization and/or note when inadequate U.S. industry representation is observed and coordinate a response. Consideration should also be given to the many and varied standardization organizations and forums that have industry-shaping influence, such as industry consortia and open-source forums to determine how U.S. interests are represented.

- **Fostering the adoption of standards.** The USG could encourage the adoption of CET standards by fostering a favorable environment for standards adoption, including reducing regulatory barriers and providing access to information on standards activities that are essential to U.S. interests. The USG could also offer incentives for organizations to effectively engage in standards development activities where their unique insights are needed. Stakeholders indicated that standards harmonization should occur at the performance-based regulatory level, with consideration and potential pre-acceptance of internationally generated standards as means of compliance. USG can serve as an early adopter and use its purchasing power to influence CET standards integration.
- **Establish and support public-private partnership to communicate standards processes and promote new standards development, regulatory compliance, and adoption.** These partnerships bring together diverse stakeholders, including government agencies, private sector organizations, and academic institutions, to exchange information, share best practices, pool resources, and help ensure alignment with national interests in the standards development process.
- **Develop international agreements.** The USG should continue incorporating international standards, good regulatory practices (GRPs), and the World Trade Organization (WTO) Technical Barriers to Trade (TBT) principles in international agreements and partnerships, specifically with negotiations concerning CET sector. Incorporating these components in international agreements requires partners to adhere to international standards, GRP, and TBT principles, which promotes market access, harmonized trade, and sustainability through private sector-led standardization. When negotiating agreements, the USG should also have comment periods and consult with relevant CET industry, civil society, and other private sector stakeholders to understand equities, priorities and potential impacts.

3.5.2 How should the USG share information on standards development activities for CET with like-minded partners and allies?

RFI respondents expressed the following:

- **Encourage participation.** The USG can work with stakeholder organizations to host both in-person and virtual events with international partner organizations where standards activities associated with CET areas can be showcased, highlighting current progress as well as opportunities for additional collaboration and engagement. Stakeholder engagement events are essential where timely information exchange will impact and inform policy discussions.
- **Create a national standards database.** A database that provides essential details of standards activities in CET areas (e.g., purpose, scope, SDO, participating companies) would help in the coordination with international partners especially if it includes information on any additional resource needed (e.g., expertise, facilities space).
- **Create shared educational resources.** USG could share and request access to educational resources such as blueprint(s) for enabling standards development, standards-workforce development training/mentoring, and educational materials to help mobilize standards efforts in the U.S. and among international partners more efficiently and effectively.

3.5.3 What standards information and tools can the USG develop and promote to ensure U.S. exporters can compete in global markets for CET?

RFI respondents expressed the following:

- **Communicate and coordinate.** Stakeholders expressed that USG should continue to link standards to trade and competitiveness policy and promote the U.S. standards system in bilateral and multilateral fora. They also suggested the USG increase the standards-related content of intelligence, information, analysis, and advice offered to U.S. firms through the export promotion programs of the International Trade Administration. Stakeholders referenced the White House memo M-12-08[17] , wherein it states that Federal engagement in standardization should:
  - Clearly identify the standards-based challenges that are encountered in addressing a national priority;
  - Define implementation goals as precisely as possible;
  - Provide a reasoned analysis of what has led to the perceived standards gap and what needs to be done to close it (including any relevant and appropriate science-based data); and
  - Commit, to the extent feasible and appropriate, to support the technical work necessary to achieve the defined goals.
- **Develop knowledge sharing platforms for free information sharing.** Consistent with other information sharing related responses, stakeholders articulated the need for information sharing platform(s) to cover a broad range of standards related topics. This would allow private industry to gain visibility on the evolution and trajectory of standards and their impact on products and services globally. The solution should include a searchable database spanning the full range of CETs, and where the technology areas converge, such as artificial intelligence and automation.
- **Address intellectual property, SEPs, and FRAND issues.** Responses suggested promoting FRAND and SEP mechanisms and world-wide licensing of SEPs. This would allow U.S. based companies to take advantage of patent royalties for SEP and non-SEP licensing of their inventions in and related to CET standards. Specifically, it was noted that the Department of Commerce should make it clear that SEPs should be treated like all other patents, without any discrimination. A policy statement from the Department of Commerce would both address the uncertainty surrounding the withdrawal of the 2019 Policy Statement[18], as well as shift the incentive structure in FRAND licensing negotiations back to a neutral position between implementers and innovators. The Department of Commerce should reject domestic proposals that would interject the government into FRAND licensing negotiations between private parties. The USG should counter actions by other countries that undermine international IP rights. The USTR should identify countries that do not abide by international treaties related to IP, or that denigrate SEPs or put roadblocks in the effective enforcement of SEPs. And, when appropriate, the USG should work through international fora like the WTO to hold countries accountable to their treaty commitments. Promoting strong IP rights abroad will ensure that U.S. companies have a level playing field when it comes to competing against foreign competitors. It also will ensure that many of the benefits of the U.S. patent system afforded to U.S. companies will also apply to them in other countries.

[17] https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2012/m-12-08_1.pdf
[18] Department of Justice, United States Patent Office, National Institute of Standards and Technology, Policy Statement on Remedies for Standards-Essential Patents Subject to Voluntary FRAND Commitments (Dec. 19, 2019) https://www.justice.gov/atr/page/file/1228016/dl

3.5.4 How can the USG further advance the design and implementation of technical assistance programs for CET that enable broad and inclusive participation by developing countries in international SDOs?

RFI respondents expressed the following:

- **Support participation by underserved communities, including representation from developing countries, in international SDOs.** The USG should provide programmatic support including funds and other incentives, such as travel award programs, for underrepresented stakeholder organizations and countries to engage more effectively in international standardization. This could be done in coordination with existing international organizations and initiatives that foster technological exchange.
- **Build on current standards-focused public-private partnerships.** Enhance and reinforce existing programs such as the ANSI-USAID Standards Alliance to create new funding opportunities for technological exchange and for SDOs and other entities to promote international participation in CET standards development. USG could also add standardization components to international programs that currently do not have any standardization involved (such as science and technology and research programs), so international partners will know which standards to utilize, receive training on them, and learn how to get involved in standards development.
- **Develop mutually beneficial cooperation.** It is anticipated that developing nations will have their own innovations and technologies that may align with or are outside the scope of the USG NSSCET. Stakeholders articulated a need for mutual collaboration, technological exchange, science, research, and engineering investment alignment and understanding with developing nations in order for global needs and equities to be represented in standardization for critical technology areas.

3.5.5 How can the USG work with international partners to ensure that standards for CET are developed in a way that supports U.S. interests, including a commitment to free and fair market competition in which the best technologies come to market?

RFI respondents expressed the following:

- **Work with international partners to ensure that standards for CETs are developed in a way that supports U.S. and allied nation's interests.** This includes a commitment to free and fair market competition.
- **Advocate for free and fair market competition.** The USG should champion the principles of open, transparent, and market-driven standards development, emphasizing the importance of competition, innovation, and the adoption of the best technologies in the global market. The USG should continue to advocate for the use of the best international standards, whether they be developed by ISO, IEC, ITU, or any other SDO that meets the requirements for an international standard based upon the WTO TBT agreement.
- **Actively support U.S. representatives in international standards organizations.** This can involve helping to nominate experts to serve on technical committees, supporting the representatives' work through public-private partnerships, and promoting U.S. perspectives in relevant forums.
- **Build strategic alliances with like-minded countries.** Forge partnerships with countries that share similar interests in promoting open and transparent standards development for CET. These alliances can help build consensus on common objectives and coordinate efforts to influence the development of global standards. USG should continue to recognize the importance of standards and technical regulations in geopolitical influence and trade and to strategize with allies and trade partners to promote international standards that align with the national security and business interests of the U.S.

- **Develop data-driven insights to foster standards engagement.** Leverage statistics and data analytics and tools to collect relevant data on standards development activities to help assess the objectives and actions of competing nations. Insights based on data can be used to help understand the objectives and likely actions of nations with competing interests. Sharing this information with U.S. representatives and international partners can help them prepare and effectively engage in standards meetings.

3.5.6 How can the USG make the U.S. a more desirable location to hold international standards meetings, events, and activities for CET?

RFI respondents expressed the following:

- **Lower logistical barriers to hosting meetings in the U.S.** The U.S. would also become a more desirable location to hold international standards meetings, events, and activities for CET if the logistics for travel and participation were simplified. The difficulty and lengthy processing times of acquiring a visa is a high barrier to foreign visitors who wish to participate in U.S. meetings. Streamlined and accelerated vetting processes for people invited to CET standards meetings, especially for those who have a known history of U.S. engagement, could alleviate this issue without sacrificing security. Other resources to improve accessibility of international CET standards meetings held in the U.S. include readily available translators, support staff to help with visa applications, comprehensive event logistics for all attendees, and accommodations for physical accessibility needs.

4.0 APPENDIX A: ACRONYMS

American National Standards Institute (ANSI)

Critical and emerging technologies (CET)

Defense Advanced Research Projects Agency (DARPA)

U.S. Department of Energy (DOE)

U.S. Environmental Protection Agency (EPA)

Fair, Reasonable and Non-Discriminatory (FRAND) Licensing

Institute of Electrical and Electronics Engineers (IEEE)

International Electrotechnical Commission (IEC)

International Organization for Standardization (ISO)

International Telecommunication Union (ITU)

International Trade Administration (ITA)

Intellectual Property (IP)

Intellectual Property Rights (IPR)

Internet Engineering Task Force (IETF)

Good Regulatory Practices (GRPs)

Lines of Effort (LOEs)

National Standards Bodies (NSB)

National Institute of Standards and Technology (NIST)

National Science Foundation (NSF)

National Technical Advisory Group (NTAG)

The National Technology Transfer and Advancement Act (NTTAA)

NIST's Interagency Committee on Standards Policy (ICSP)

Office of Management and Budget, The White House (OMB)

Open Trusted Technology Provider Standard (O-TTPS)

Request for Information (RFI)

Research and Development (R&D)

Small Business Innovation Research (SBIR)

Small Business Technology Transfer (STTR)

An essential patent or standard-essential patent (SEP)

Standards Development Organizations (SDO)

Standards Setting Organizations (SSO)

Technical Barriers to Trade (TBT)

U.S. Agency for International Development (USAID)

U.S. Government (USG)

U.S. Government National Standards Strategy for Critical and Emerging Technology (USG NSSCET)

U.S. Trade Representative (USTR)

Visiting Committee on Advanced Technology, NIST (VCAT)

World Trade Organization (WTO)

This publication is freely available from https://doi.org/10.6028/NIST.2024-09-30.001.