

Summary Report for
Topical Group on Public Policy and Government Engagement,
Community Engagement Frontier
Snowmass 2021

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ABSTRACT

This document is the Snowmass topical group report for the Public Policy & Government Engagement group within the Community Engagement Frontier. The charge of this topical group is to review all aspects of how the High Energy Physics community engages with government at all levels, how public policy impacts members of the community and the community at large, and awareness within the community of direct community-driven engagement of the U.S. federal government (*i.e.* advocacy).

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1 Executive Summary

The fields of experimental and theoretical particle and astrophysics plus quantum science have been demonstrated to be topics of interest and excitement outside of the research community to groups ranging from policymakers, the media, and the general public. Community advocacy and outreach efforts have strengthened these impressions. The HEP community has made many efforts to educate and inform these groups about the science that we pursue and its benefits.

1.1 Key Questions

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1.2 Findings

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1.3 Recommendations

Recommendation 1- Policy advocacy and support for HEP are firmly dependent on a unified voice and community support for the P5.

- a) P5 must develop a plan which enables community support.
- b) The community must unite behind the P5 report and present a unified front in all aspects.

Recommendation 2 - Support and grow the annual HEP Congressional advocacy effort.

The annual HEP advocacy effort is essential to increasing knowledge and interest of HEP in Congress. Participation in these efforts should be encouraged. The HEP community should support efforts for continued development and growth.

Recommendation 3 - Continue support for the HEP Communication materials

High quality and well-developed communication and outreach materials are essential for effective government outreach, and their quality reflects directly on how our field is perceived.

Recommendation 4 - Strengthen connections to APS, AIP, AAAS to advocate for D&I, immigration, R&D, basic science reform, and other areas that impact HEP

Recommendation 5 - Enable improved communication between funding agencies and community

Recommendation 6 - Work to improve community engagement with other areas of the government, especially with OMB/OSTP and with local government in areas with HEP facilities.

2 HEP Funding and Community Advocacy

2.1 How HEP is funded in the United States

In order to constructively discuss the role of community advocacy in the funding of HEP in the United States, it is important to briefly cover the federal budget process. Particle Physics in the U.S. is funded by the Department of Energy (DOE) Office of Science (OS) and the National Science Foundation (NSF), and funding for these Executive Branch agencies is provided for in the federal budget on an annual basis. The construction of the federal budget is a lengthy process that can be roughly broken down into three key steps.

1. **The President proposes a budget.** The President's Budget Request (PBR) is based on input from Executive Branch agencies and is coordinated by the Office of Management and Budget (OMB).
2. **Congress legislates a budget.** Both branches of the Legislative Branch (the House

of Representatives and the Senate) propose budgets, taking into account the PBR and their priorities. The House and Senate budgets are then reconciled into a single Congressional budget which forms the basis for authorizations and appropriations¹ to fund Executive Branch agencies.

3. **OMB appropriates funds to the funding agencies.** This process is dictated by Congress's authorizations and appropriations bills, to carry out specific programs, projects, and activities in line with agency and Presidential priorities.

The President's budget request is formulated using policy guidance from OMB informed by the previous year's budget. Based on this guidance and community input, each agency (DOE and NSF for HEP) submits proposals to OMB. OMB revises and synthesizes these proposals, accounting for Presidential priorities, which the President then reviews and transmits to Congress. After OMB has submitted the proposal to the President, agencies have a period during which they may appeal revisions made by OMB. The Congressional budget uses the President's budget request as input, but the appropriated budget often differs from the initial request.

Historically HEP community advocacy efforts have focused on step (2), *i.e.*, advocacy aimed at Congress. The HEP community working with experts formulates a Congressional appropriations request for DOE OSHEP and NSF. During the authorizations and appropriations process in Congress, the budget narratives provided by the HEP community justify the funding levels in their appropriations request.

2.2 P5 and HEP community advocacy

The High Energy Physics advisory council is a federal advisory committee that provides advice and guidance to the DOE OS Office of High Energy Physics (DOE OSHEP) and NSF on experimental and theoretical HEP. Its charge is to facilitate program reviews and long-range planning, and to provide advice on funding levels. The Particle Physics Project Prioritization Panel (P5) is a sub-panel of HEPAP formed as needed to address questions about HEP projects. Recently P5 has been convened following iterations of the HEP community planning process (Snowmass), and has produced a report of its findings. Of particular note are the 2013 [?] and 2008 [?] reports.

In 2013 P5 was charged with producing a strategic plan for HEP in the U.S. with a 10-year timescale in the context of a 20-year global vision for the field. The charge asked for an assessment of the (then) current and future scientific opportunities over the next 20 years, taking into account the field's (then) current state. The charge included three budget scenarios as reference points when forming recommendations. The full 2013 charge to P5 is available in Ref. [?], and the report was approved in May 2014 by HEPAP and is available in Ref. [?]. The 2014 P5 report has provided a focal point for all community advocacy

¹In Congress, the authorization step dictates what each agency may spend its money on, with variable degrees of specificity, while the appropriations bill ultimately allocates the funding.

Year	President's Request	Our Ask (\$M)	Appropriated (\$M)
FY23	TBD	1356	TBD
FY22	1,061	1180	1078
FY21	818	1285	1046
FY20	768	1045	1045
FY19	770	N/A*	980
FY18	673	860	908
FY17	818	833	825

Table 1: The community request and the congressional budget in millions of dollars. *Due to delays in FY19 budget no advocacy aligned with this budget .

since that time, and has factored explicitly into initial budget proposals sent to Congress and into Congress's deliberations.

2.3 Recent HEP Funding Levels

The community's and President's requests often differ, as does the amount appropriated by Congress. See Figure 1 which shows the President's request and Congressional budget and the Scenarios from the last P5 report, and Table 1, which compares the PBR, the community request, and the Congressional budget. Numbers are only shown for DOE OHEP, as particle physics is not the dominant fraction of NSF funding. Note that the impact of the 2014 P5 report on the HEP budget was not seen until 2015 due to the multi-year time frame for the budget process.

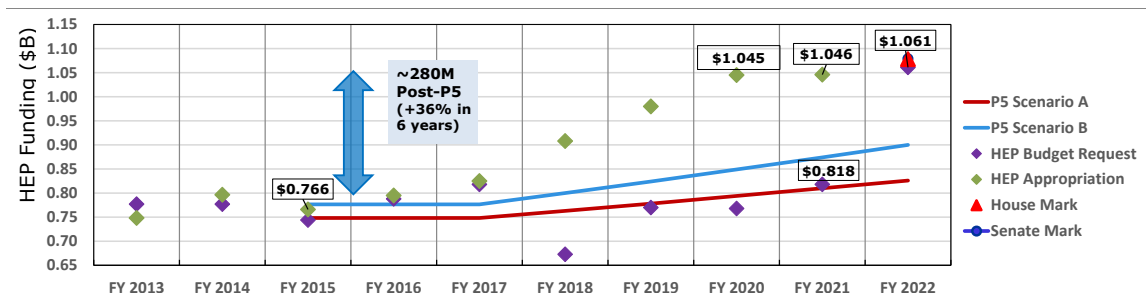


Figure 1: DOE OS HEP funding since the last P5, taken from HEPAP DOE presentation March 2022 [?]. Presidents' budget requests are purple, and Congressionally appropriated budgets in green.

3 Unity of community voice

The stakes are high for the HEP community, which currently has an annual budget in excess of USD 1B and is designing future projects that will require similar or more extensive levels of funding. These budgets, ultimately derived through the U.S. federal budget process as

described in Section 2, are reaffirmed and renewed annually. Translating the excitement and interest in particle physics into public and federal support for funding is critical to the long-term health of the field and the larger scientific enterprise in which particle physics plays an essential role.

One of the fundamental premises of the P5 report and plan is that they outline a community-wide plan for *all* HEP that can garner broad support and community buy-in and result in a singular community-wide message about the status and future of our field. This has been very important to policymakers, as has been the successful implementation of the 2014 P5 plan. The success of this unified message is in notable contrast to the state of community messaging before 2014, which was significantly more fragmented. Of particular relevance for maintaining the unity of our messaging is the science advocacy undertaken by individuals outside of the HEP community or by HEP community members outside of community-organized advocacy. It is critical that the messaging from these individuals be consistent with HEP community messaging. We are responsible for broadly communicating our community message and providing the knowledge and supporting material to convince everyone that the P5 plan is worthy of support.

Recommendation 1- Policy advocacy and support for HEP are firmly dependent on a unified voice and community support for the P5.

- a) **P5 must develop a plan which enables community support.**
- b) **The community must unite behind the P5 report and present a unified front in all aspects.**

4 Congressional Advocacy for HEP funding

Community advocacy plays a key role in sustaining strong support for HEP funding and priorities. Historically (for the past 30+ years) this advocacy has been centered on an annual trip by a delegation of HEP community members to Washington, D.C. The principal goal of this effort is for the delegation to visit with as many Congressional offices as possible and to meet with Members of Congress and their staffs to share their excitement about HEP research and to foster support for HEP with policymakers. This effort also includes meetings with administration (OMB, OSTP) and funding agency (DOE, NSF) representatives.

The annual effort is a joint effort by the Fermilab Users Executive Committee (UEC), SLAC Users Organization (SLUO), and US-LHC Users Association (USLUA), with input from the American Physical Society Division of Particles and Fields Executive Committee (APS DPF EC). Through election, these groups represent a large portion of the US HEP user community, but not the community in its entirety. The trip attendees are 50%, 35%, and 15% UEC, USLUA, and SLUO, respectively. Attempts are made to recruit people from different career stages, demographics, and research areas.

The goal of this effort is to garner support for the funding of physical sciences research in general and for HEP in particular. Members of the delegation discuss the overall benefits of HEP and basic research with policy makers and deliver a specific appropriations “Ask” for

HEP funding. This “Ask” includes a request for specific funding levels for each of the DOE OS HEP and for the NSF. The timing of this trip is usually chosen to align with moment in the annual budgetary cycle when the budget is being discussed by Congress (typically this is in March).

The percentage of offices visited has grown over the years as the trip has grown. In 2010 there were 34 attendees; by 2017 this number grew to 50. In 2017 about 70% of House and Senate offices were visited. Following an increase in funding that enabled greater participation, in 2019 100% of House and Senate offices were visited. This effort, in which approximately 70 community members visit up to 541² Congressional offices, requires considerable organization. Historically the logistics for this effort have been coordinated by the chair of the UEC Government Relations subcommittee with support from the other members of UEC and other User groups, namely SLUO and USLUA. Over the years, a number of sophisticated tools have been developed to support these efforts.

Recommendation 2 - Support and grow the annual HEP Congressional advocacy effort.

The annual HEP advocacy effort is essential to increasing knowledge and interest of HEP in Congress. Participation in these efforts should be encouraged. The HEP community should support efforts for continued development and growth.

4.1 The Washington-HEP Integrated Planning System

The Washington-HEP Integrated Planning System (WHIPS) is a framework developed to handle most of the logistics of planning, executing, and documenting HEP advocacy efforts. Aspects of the trip planning logistics were developed by many individuals over many years, and a considerable effort was undertaken in 2019 to consolidate these aspects into a unified framework. WHIPS has significantly improved the efficiency of organizing, and thereby the success of, our annual advocacy effort. The functions that WHIPS efficiently serve were previously handled manually, involving significant manual, last-minute work for the trip organizers. The development and maintenance of WHIPS has been a voluntary activity by a small group of early carer members of the HEP community, **and it has risks through single-point failures and knowledge transfer.**

WHIPS stores details of trip attendees and their connections to States and Congressional districts, details of Congressional offices and (sub)committee assignments, and all future and past meetings between trip attendees and Congressional staff. An algorithm has been developed that allocates trip attendees to Congressional districts based on where the attendees have lived, worked, voted, or have family. These “connections” to a specific district enable more focused meetings that cater to that district’s or State’s priorities and facilities and allow a foot in the door for setting up meetings. WHIPS has enabled the trip to succeed with its current participant size and hit the target of visiting 100% of offices in 2019. In addition, a wiki is also maintained. **The community must ensure the continued support and development of these essential tools that enable the HEP advocacy efforts.**

²including six non-voting members of the House of Representatives

Synthesize above red text into a recommendation?

4.2 Advocacy Training

The $\mathcal{O}(100)$ volunteers involved in the trip have varying levels of understanding of the US budgeting and appropriations process, how to communicate, how to interact with policy-makers, and the day-to-day and meeting specific logistics of the trip. The training material has been developed to educate each member on these topics quickly. The tools developed here would be beneficial to be made available to a broader audience.

4.3 Community Inreach

Enhancing inreach efforts, increasing knowledge and awareness of the trip, with avenues for community members to participate in organization activities or with the advocacy.

5 HEP communication and outreach materials

A key element of meetings during the annual advocacy trip is a series of informational pamphlets designed to visually relay the community's most important messages. These materials serve a dual purpose, which is to both provide a conversation piece during the meetings and to leave a reference guide for the Congressional staff as they make their recommendations. These materials can be found at the US particle physics website [?], and are jointly maintained by APS DPF, UEC, SLUO, and USLUA.

These community communication materials are an essential part of the Congressional HEP advocacy strategy but are separate from it in many ways. They serve the larger purpose of communicating about HEP and its benefits, and they are used in multiple forums of which the advocacy efforts are just one. ³

A committee of volunteers is formed by representatives from the UEC, USLUA, SLUO, with support from the Fermilab Office of Communication, the DOE, and the former P5 chair, to update this material annually. In the recent past, the community has received support from a member of DOE who has helped the community coordinate the drafting of these materials and has served as a repository of knowledge and as the group leader, making sure that steady progress is made on schedule. We note that the contributions of various individuals have been extremely helpful in crafting the trip materials, but that there is no formal requirement that this support be provided from the Fermilab Office of Communication, DOE, and the former P5 chair. There is a risk that this support may

³We note that due to the Hatch Act of 1939 government employees are expressly barred from engaging in political activities, so these materials have always been explicitly created as communication material and explicitly not to advocate for any area of government support. Their purpose is to inform people in general about HEP and its benefits.

someday end and it would behoove the community to find some other way of maintaining records and maintaining support from these organizations and individuals.

Below is a list of the various documents produced and the aspect of HEP that each seeks to explain.

- **Particle Physics Progress and Priorities.** Regularly updated, this document examines the HEP community's recent accomplishments and the priorities for the upcoming year.
- **Particle Physics is Discovery Science.** This document discusses the broad questions the HEP community is trying to answer and how they tie back to big questions called out in the last P5.
- **Particle Physics Makes a Difference in Your Life.** This document discusses some ways in which particle physics has impacted other fields and industries.
- **Particle Physics Builds STEM Leaders.** This document discusses the outreach and public engagement activities of the HEP community.
- **Particle Physicists Value Diversity and Strive Toward Equity.** This document contains a statement of HEP community values, describes current goals in terms of equity, diversity, and inclusion, and highlights ongoing programs designed to empower and provide opportunities for historically underrepresented groups.
- **Particle Physicists Deliver Discovery Science Through Collaboration.** This document shows that HEP is an international effort and involves some of the best minds from across the country and world. It also summarizes the plans, timelines, and present status of the projects in the 2013 P5 report.
- **Particle Physicists Advance Artificial Intelligence.** This document explains how the HEP community uses machine learning (ML) and successfully interfaces with industrial partners to push the boundaries of ML research and development.
- **Particle Physics and Quantum Information Science.** This document discusses the benefits of QIS, the skill sets that make particle physicists valuable in these endeavors, and how QIS developments can, in turn, help solve fundamental problems in our science.
- **Particle Physics in the US Map.** This map shows the distribution of institutions involved in HEP and that receive funding from either DOE or NSF.

Recommendation 3 - Continue support for the HEP Communication materials
High quality and well-developed communication and outreach materials are essential for effective government outreach, and their quality reflects directly on how our field is perceived.

6 Utilizing the Advocacy Resources available to HEP community

The current HEP advocacy efforts focus on the HEP funding profile and general support and awareness within Congress of basic science and HEP projects and experiments.

Many additional issues highly impact HEP and HEP scientists' day-to-day lives. Throughout the Snowmass process, an extensive discussion took place on how we can strengthen our advocacy in support of these areas. In the advocacy efforts and materials, the benefits of supporting science and basic research are generally discussed. Some areas impact science research, such as Diversity and Inclusion, STEM education programs, and international science. The community effort does not include advocacy for any specific changes or policies in these areas, just general information.

Basic research and grant reform

US basic research funding reform has a much broader scope than is covered in our annual community activity but has far-reaching benefits. An example is the reform to the appropriations process to guarantee multiple years of funding for approved projects could increase international confidence in US-led research.

Social issues reform

D&I, immigration, and policies limit open international science.

6.1 Summary of Resources

Additional resources exist within the larger science community to advocate for these topics. These groups, representing the larger community, have considerably more resources than HEP. Below we summarize some physics-specific groups and point out constraints that need to be considered.

The American Physical Society (APS) is a nonprofit membership organization representing physicists within the United States. The mission of this group is to advance and disseminate physics knowledge and advocate for the needs of physicists and scientists at large. APS advocates for many non-funding legislative issues of importance to the physics community. However, the HEP community is only a subset of the broader APS membership. APS is a trade organization available to all physicists, but the annual fee may limit participation. APS also offers Congressional Science Fellowships, which aid Congress by

providing scientifically literate, skilled personnel. Raising awareness of this program in the HEP community could be beneficial.

The American Institute of Physics (AIP) is another organization that works to promote and advance the physical sciences. AIP is an umbrella organization that pools together the resources of 10 member societies, including the APS. As an umbrella organization, the AIP can help coordinate the individual members' activities and messages. The AIP also provides an identical congressional staff program to the one provided by the APS. The AIP, too, should be promoted as a resource within the HEP community.

The American Association for the advancement of Science (AAAS) is mostly known through its journal *Science* and its active fellowship program. Its goal of advancing science means that it has a very active government engagement group with its training programs and significant resources. It hosts various groups to get scientists involved in policy, such as the Local Science Engagement Network and National Science Policy Network. This group is an underutilized resource, even more so than APS and AIP. Details are available on the AAAS website [?].

Recommendation 4 - Strengthen connections to APS, AIP, AAAS to advocate for D&I, immigration, R&D, basic science reform, and other areas that impact HEP

7 Community engagement with the Funding Agencies

Many discussions during the snowmass process focused on the nature of the communication channels between the funding agencies and community. Although communication channels exist many expressed a desire for improvements. The scientist - funding agency power dynamic creates a strong discouragement for conversation and hinders open and frank discussion.

Simple communications paths could be created and widely advertised (including anomalous options). Communication between scientist at all carer stages and the funding agencies should be encouraged. Users group and DPF should consider working as an in between.

Groups with direct mandates to serve as community communication with the funding agencies such as HEPAP and the Committees of Visitors. Although the membership of the groups is not community-driven (*e.g.* through an election), their compositions are specifically chosen to reflect the demographics of our field and members are generally well-respected within our community. The members of these groups serve as informal conduits between the community and the funding agencies, though this avenue for feedback is clearly biased towards senior, established individuals in our field that are more likely to have personal relationships with members of these groups. Additionally, HEPAP hold regular public meetings at which time is always allocated specifically for public comments. While this provide an opportunity for individuals to speak directly to the funding agencies, the nature of these meetings (in particular the attendance of congressional and executive branch staff members) in practice may limit the nature of feedback that individuals are comfortable

sharing.

Regular meetings between Principal Investigators (PIs) and the program managers at DOE and NSF that oversee their grants are a key feature of the relationship between the funding agencies and the HEP community. At these meetings, the program managers describe current funding opportunities and changes compared to previous years, as well as the overall state of funding for HEP. These meetings also provide an opportunity for PIs to provide feedback on the granting process or any other topic directly to the funding agencies. Participation in these meetings is generally restrictive enough to exclude individuals (*e.g.* early career community members applying for faculty positions) that may be interested in attending and could benefit. Simultaneously these meetings are well-attended enough to potentially disincentivize attendees from providing negative feedback because they may be perceived negatively by other community members, thereby adversely impacting their potential for career advancement. We note that many PIs additionally organize one-on-one meetings with their program managers in advance of submitting grant applications and also that program managers organize community fora at APS DPF meetings.

Funding agency merit and comparative grant review processes also have feedback mechanisms built into them. DOE and NSF review panels provide explicit avenues for soliciting feedback both from grant applicants and grant reviewers as part of their processes. However, we note that both applicants and reviewers may not feel comfortable giving negative feedback to the funding agencies because they may believe that it will negatively impact their current and future grant applications, respectively. Feedback received is submitted to the Office of HEP, in the case of DOE grant reviews, and to the NSF Physics division. Larger-scale aspects of the application and review process are managed at the agency level, which may have the affect of raising the bar for feedback to be propagated to the higher levels of the funding agency. Additionally, the DOE and NSF are distinct agencies with distinct grant processes, structures, and requirements. Feedback leading to change in once agency may not affect change in the other. Additionally, there is presently an asymmetry between the two processes in that NSF explicitly solicits applicants to comment on their outreach activities while the DOE does not. Finally, we note that the feedback mechanisms built into both agencies review processes do not provide a mechanism to supply feedback anonymously.

7.1 Grant reform

7.1.1 Project reform

Recommendation 5 - Enable improved communication between funding agencies and community

8 Expanding government engagement

8.1 Executive Branch engagement

As part of the annual government engagement, efforts meetings are held with two departments within the Executive Office of the President (EOP): the Office of Science and Technology Policy (OSTP) and the Office of Management and Budget (OMB). OSTP's role is to advise the President and others within EOP on science and technology policy matters. During that meeting, the details and justification for our appropriations requests are discussed, along with a summary of our field's state and top priorities. The OSTP and OMB release an annual joint memorandum of their budget priorities which has been a driver of the conversation in these meetings. Staff within the OSTP is often tied to the Administration, so quick turnover usually occurs. This meeting allows us to inform new members of OSTP and OMB of our priorities. The meeting is also an opportunity to learn about the current Administration's priorities and discuss what is covered in the preceding year's joint memo.

Although these meetings have overlaps with the congressional advocacy meetings, there are distinct differences. For example, the priorities of the two groups have distinct differences. The timing for this meeting to be impactful is also different, as it should come as the memo and PBR are being developed.

The materials used in these meetings are currently the standard HEP communications meetings used for the annual advocacy efforts to Congress. Development of a strategy for these meetings is usually done within the small group attending without additional input from government relations experts beyond what has been collected for the congressional advocacy. **Community produced materials and messaging points targeted that this audience, along with specific training on the role of these groups, would benefit these efforts.**

The impact of these meetings can be high. Before the last P5 report, the Community was informed that the lack of unity in our field had negatively affected us and could have a more significant effect if a change was not enacted. The Snowmass process, the 2014 P5 report, and the community unity around that process and message were well received. It is hard to quantify the impact, but OHEP funding in the President's request was seen to increase between 2015 and 2017 (see Fig. 1). The change in the trend between 2018 and 2021 can reflect the Administration's priorities at that time.

8.2 Local/State government advocacy

The state government mirrors the Federal government in structure. States have their constitutions. They have an Executive branch headed by the elected governor and a Legislative branch made up of elected officials that work to get legislation written into law and approve the State's budget. Except for one State, Nebraska, all states have a bicameral legislature of two chambers: the House and Senate. There is also a Judicial branch, generally led by the State supreme court. Local government is usually made up of two tiers, counties and municipalities (cities/towns).

No current community advocacy efforts within Particle physics focus on the state level. However, many facilities have built strong connections with their State and local government, covering all levels from Governors to alderman. As part of the Snowmass process, a discussion was held on the potential advantages of expanding HEP advocacy at the State and local levels. An example of a group with this purpose is the Fermilab Community Advisory Board, that "provides ongoing advice and guidance related to the future of the laboratory. The Board gives feedback on proposed new projects, reviews planned construction activities, advises Fermilab on all forms of public participation, and acts as a liaison with local organizations and communities." [?].

Across the board, increased engagement with governmental officials has been beneficial. We recommend that the community should do more work to understand the potential direct impacts and the resources that would be needed for there to be facility-specific state engagement

Recommendation 6 - Work to improve community engagement with other areas of the government, especially with OMB/OSTP and with local government in areas with HEP facilities.

9 Conclusion

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References