



Inventory of Federal Climate Engagement and Capacity-building Programs

Background

Two years have passed since President Biden's executive orders on climate change, climate-related finance, and Justice40 called for a robust all-of-government response to the multiple societal challenges facing the nation. Through this changing administrative and policy environment, NOAA Climate Program Office's Climate Education Program has been monitoring climate education, workforce development and training, communication, access to information, and public engagement activities in the United States (hereafter referred to as Climate Engagement and Capacity-building, or CEC activities) as they emerge and expand to meet these urgent challenges.

In the summer and fall of 2022, NOAA's Climate Program Office undertook the second inventory of relevant FY22 programs and FY23 plans across federal departments and agencies. The inventory focused specifically on federal programs designed to increase public knowledge and awareness and build the capacity of communities, organizations, and subnational and Tribal governments to mount effective community responses to the climate crisis in just and equitable ways.

The results of the climate engagement and capacity building inventory effort are presented in two parts:

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Including contributions from the Climate Engagement and Capacity-building Interagency Working Group of the U.S. Global Change Research Program.

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NOAA (2023). Inventory of Federal Climate Engagement and Capacity-building Programs. Report of the Climate Education Program, Climate Program Office, NOAA, [January 23, 2023].

1. This report, summarizing key findings in the inventory.
2. An inventory database of federal CEC programs. Contact Frank Niepold, frank.niepold@noaa.gov, for access.

The inventory and analysis builds upon the 2021 *Phase I Inventory of Federal Climate Education, Engagement, Workforce Development and Training Programs* and shows there have been important increases in federal support for public climate action as well as significant opportunities to increase the federal government's collective impact through shared learning, collaboration, and coordination among programs.

Expanding upon this second inventory will be invaluable, especially as significant funding authorized through three recent climate bills (the Bipartisan Infrastructure Law, CHIPS and Science Act, and Inflation Reduction Act) is deployed. Given the ever evolving nature of climate and justice challenges, keeping the inventory up-to-date will provide a much-needed tool for strategic planning and implementation of federal climate programs.

Context

In numerous ways, U.S. federal departments and agencies already work to increase the public's capacity to meet and manage the climate crisis and broader environmental justice challenges and opportunities. Much of this work serves the needs of non-federal partners and communities at regional and local levels across the nation. Federal agencies have developed a great many programs over many years to help segments of our society act skillfully, equitably, and in diverse and regionally appropriate ways to mitigate the causes and risks of climate change. Each department and agency brings its own capabilities, expertise, and context to this work according to the agency's overarching mission.

In 2021, President Biden recast these individual programs in light of a more comprehensive "whole-of-government" climate response strategy. This inventory endeavors to make the climate engagement and capacity-building emerging connections more visible. The results of this inventory show a large number and diversity of federal public awareness, learning, and capacity-building programs that support and enable just climate action. Federal leaders seeking to identify current areas of strength, as well as opportunities to increase collective impact through collaboration and strategic landscape analysis, would benefit from a clear picture of current programs and plans for FY23.

Purpose

Throughout the summer of 2022, NOAA's Climate Program Office conducted the second inventory of climate-related federal public awareness, learning, and capacity building programs and plans. The resulting catalog is an updated look at the landscape of public-facing climate programs across the entire federal government. This initiative focused on federal programs and plans designed to build capacity and increase knowledge across federal and non-federal government agencies and broadly across civil society.¹

These findings were included in the 2022 United States of America National Communication to the United Nations Framework Convention on Climate Change in chapter 9 on

¹ Linkage to the UNFCCC and related international agreements help connect domestic activity to Annex I Party requirements (the United States is an Annex I country) when submitting National Communications to the UNFCCC. Parties included in Annex I to the Convention—including those that are also Parties to the Kyoto Protocol—have committed to submit their National Communications to the secretariat every four years ([decision 2/CP.17](#)). This data also appears in the 8th National Communications, released in December 2022.

Climate Education, Engagement, Workforce Development, and Training.²

Because the federal government cannot solve the climate crisis on its own, this project was undertaken to create a database of existing and proposed federal programs that help support, catalyze, or empower communities, institutions, companies, and individuals to engage in these issues. This inventory is intended to support and expand connections between program managers, facilitate sharing of best practices and learning between programs, promote greater collaboration, and identify critical gaps.

The greatest potential for increasing program effectiveness and resource utilization efficiency, therefore, lies in identifying intersecting activities, objectives, target audiences, resources, and programs that can be improved through increased coordination and collaboration. The value of and potential for intersectional collaboration and strategic alignment of resources and programs are particularly evident in the United States, where many federal departments and agencies, plus highly diverse non-federal communities, organizations, governments, and sectors work on climate change mitigation, adaptation, and climate justice.

The government's many diverse program missions are undertaken to address the needs of specific and varied target audiences and, therefore, are not duplicative. This inventory does not provide any insights into potentially improving fiscal efficiencies. Further work needs to be done to optimize programs through collaboration, resource sharing, and cross-sector learning.

Methodology

The inventory development process involved a desktop review of programs and plans across ten cabinet level departments, seven independent federal agencies, and one interagency program, as well as a review of programs called for in three major climate bills. The desktop review included identifying program leaders in multiple departments and agencies using publicly available information. A more detailed description of the methodology can be found in Appendix A and a detailed list of data collected in Appendix C.

Desktop Review

The desktop review team included a NOAA contractor and NOAA Lapenta intern who worked under the supervision of NOAA employees. Reviewers identified potentially relevant programs using keyword searches of existing federal department and agency websites and the President's FY23 budget proposal. Programs were identified as either base

² <https://unfccc.int/documents/624756>

(existed prior to FY23) or proposed (in the FY23 budget) and flagged according to the relevant terms that applied, noting whether the application appeared to directly, indirectly, or have the potential to support climate engagement and capacity-building. Program names, leaders, and verbatim descriptive language responsive to relevant provisions were captured in a spreadsheet.

- Keyword search terms included: climate, education, jobs, training, workforce, outreach, access to information, engagement, 14008 (referencing “Tackling the Climate Crisis at Home and Abroad,” EO 148008³).

Interagency Review

Members of the Climate Engagement and Capacity-building Interagency Scoping Group of the U.S. Global Change Research Program provided thorough review of their agencies’ inventories. Responses were obtained from the National Science Foundation, Department of Agriculture, Department of the Interior, NASA, NOAA, the Smithsonian Institution, and AmeriCorps. This feedback added dozens of programs that were not identified in the desktop review and removed dozens of programs that were deemed less relevant to CEC or climate goals by agency staff than appeared in the desktop review phase.

Climate Bill Review

NOAA reviewers searched through the three major climate bills that passed during the inventory period: the Inflation Reduction Act, the CHIPS and Science Act, and the Bipartisan Infrastructure Law. These programs were included in the inventory with the amount of money allocated to them, allowing, for the first time, for a limited view of the budget available for CEC programs.

Working Definitions

Program alignment with various selected elements was based on the following working definitions developed during the first year of the Inventory (Table 1). These were derived from relevant UNFCCC and UNESCO reports⁴ and were

further informed by published works by the diverse community of professionals and community-level actors working in the United States. These definitions, therefore, reflect U.S. domestic circumstances and understandings as opposed to verbatim language provided by the international guidance documents.

Definitions for other criteria used in the inventory were recorded at the end of the desktop review process (Table 2).

³ White House. (2021). *Executive Order 14008 of January 27, 2021, Executive Order on Tackling the Climate Crisis at Home and Abroad*.

<https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/>

⁴ UNESCO and UNFCCC. (2016). *Action for Empowerment: Guidelines for Accelerating Solutions Through Education, Training and Public Awareness*. Paris, France: United Nations Educational, Scientific and Cultural Organization (UNESCO).

https://unfccc.int/files/cooperation_and_support/education_and_outreach/application/pdf/action_for_climate_empowerment_guidelines.pdf

Table 1. Climate empowerment elements as defined by NOAA Climate Program Office within the context of the United States.

Element Objective	Definition	Examples
Education <i>Change habits in the long term</i>	Education seeks to enhance and develop individuals' understanding, skills and motivation to build just climate solutions. Education related to climate encompasses both teaching and learning that seeks to achieve profound sustainable changes in individual and community understanding, including cultural knowledge, place-based knowledge, and other non-curricular methods of knowledge transmission. The results of a successful program would be a population and workforce whose deep-seated understanding and appreciation for climate science, climate impacts, and civic action leads to greater climate action and commitment at all levels of society.	Higher education, K-12 education, vocational education, climate learning curricula, socio-emotional and behavioral learning, cultural knowledge sharing, interdisciplinary climate learning, etc.
Training <i>Develop practical skills</i>	Training programs seek to develop specific skills that have a practical application that build capacity or the workforce to address climate impacts. Training can include the ability to gather, interpret, and communicate climate information; conduct inventories of emissions; and identify and deploy climate-friendly solutions. Training is about learning by doing.	Non-formal training through engagement, professional development programs, workforce development, technical assistance, etc.
Public Awareness <i>Reach people of all ages and all walks of life</i>	Public awareness involves outreach programs that improve climate understanding and promote cultural and behavioral changes through targeted, relevant, dynamic, and systematic messaging.	Communication in news outlets, outreach campaigns and programs, etc.
Public Access to Information <i>Make information freely available</i>	Access to information seeks to make climate information freely accessible and usable to individuals, communities and organizations. It encompasses databases and websites that provide climate information, data, and statistics, and programs and tools that make that information more accessible to laypeople.	Full disclosure of information, making climate information accessible and usable, reporting in appropriate languages and formats, etc.
Public Participation <i>Involve all in decision-making and implementation</i>	Public participation provides the opportunity to gather input from non-climate-focused audiences and integrates varied perspectives, including those in underrepresented communities, in climate change decision-making and implementation of projects related to climate mitigation and adaptation. It is a process that directly engages communities affected by the project or solution in decision-making.	Multi-community and sector advisory committees, citizen consultation, co-development of programs with impacted communities, etc.
International Focused <i>Programs and knowledge exchange and capacity building</i>	International focused programs aim to enhance collaboration and educational and training efforts through a range of strategies to build knowledge, institutional capacity, share lessons learned, and develop best practices. It addresses programs in which the US provides or receives access to expertise, financial, and technical resources.	International exchange and capacity-building, technology transfer, funding, international research and technical assistance programs, etc.

Table 2. Additional terms used in the desktop review.

Term	Definition
Climate Action	Concrete steps taken at a variety of scales to reduce GHG emissions, increase resilience to climate change, and adapt to climate impacts.
Direct	Programs that include provisions that directly work to empower members of society to engage in climate action. Individual programs may work towards empowering specific sectors of the public, such as land managers, workers in a specific field, youth, or local government.
Indirect	Programs that increase climate/science literacy or quality or access to climate/scientific knowledge without empowering people to take concrete actions.
Could	Programs that do not currently explicitly focus on climate or empowerment towards climate action but whose program descriptions appear to have the potential to focus on empowering the public towards climate action with a relatively small shift in program focus.
Base	Programs that were funded in the FY2021 budget and were operating at the time of the desktop review.
Proposed	Programs that were proposed in the President's Budget for FY2022.

Strengths and Limitations

The results of this inventory process demonstrate the federal government's substantial and increasing investments in building awareness and public capacity to respond to climate and environmental justice challenges in both direct and indirect ways. This work builds upon the ideas outlined in the FY22 President's Budget and lays the groundwork for further and sustained iteration over time.

- The desktop analysis relied on publicly available program descriptions that might not be comprehensive or up-to-date and might not accurately reflect current program design. Additional programs might also exist that have yet to be discovered and cataloged.
 - Text from federal websites and the President's FY23 budget proposal was used verbatim. Such text does not always capture important characteristics of programs or the nature of interactions between federal and non-federal partners. Interagency review provided evidence of additional relevant programs, more target elements in some programs than were listed in their public documentation, and removed programs that seemed initially relevant in desktop review.
 - Programs described in the President's FY23 budget are likely to be changed before the final budget is passed.
 - The FY23 budget justifications do not include programs resourced through discretionary funding, which makes them much harder to find. Some of these programs are included in the inventory through Interagency Review, but there are undoubtedly more.
 - Program websites varied widely in terms of content availability and specificity of descriptions, which impacted the ability of reviewers to categorize programs.
 - Budgetary information was not always available to the reviewers, so quantitative analysis of all relevant investments was not possible.
 - Program descriptions do not identify the extent, design, or nature of community engagement. Since community engagement is fundamental to the goals of this inventory, additional analysis will be needed.
- The desktop review was conducted by a team of trained analysts who coded programs for the categories listed above. All coding was reviewed by multiple members of the inventory team. Where disagreements occurred,

team members discussed the issues and came to consensus.

- Given the methodological choices made in this work, there are limitations to how inferences and visualizations can be made.
 - For the reasons noted above, a quantitative analysis of existing or proposed relevant programs and plans provides only a partial view of CEC activities.
 - Readers should note that neither the desktop review nor the interviews were designed to evaluate program effectiveness.

None of these caveats and limitations undermine the core value of the inventory or the conclusions drawn elsewhere in this report. They point, instead, to the value of continuing to build upon this process to provide a more comprehensive view of relevant activities across the federal government.

Findings of the Inventory

The Landscape of Climate and Climate-Justice Related Federal Public Awareness, Learning, and Capacity Building Programs.

Perhaps the most important outcome is the creation of an inventory of relevant programs and plans across the federal government (Tables 3, 4, and 5). No such comprehensive inventory of such diverse program categories existed before the 2021 process, which has proved useful to a variety of stakeholders. This inventory provides a snapshot with which to continue building collaborative communities of practice across federal departments and agencies to increase the government's collective impact and increase society's awareness and capacity to respond to the climate challenge.

- During the spring and summer of 2022, the inventory team was able to use the methodology to add programs from the Bipartisan Infrastructure Law, Inflation Reduction Act (IRA), Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Act. These combined programs added 25 climate engagement and capacity building programs with almost \$29 billion in new funding.
- The EPA had the most total programs in FY23, and the Department of Commerce had the most direct

programs, consistent with the previous inventory (Table 3, Figure 1).

- The results show a growing base of existing programs for FY23 that work directly towards all-of-society climate action and shrinking group of indirect programs, suggesting that programs are moving towards implementing CEC. There was a 34% increase in all qualifying programs from the FY22 inventory (Table 4).
- The EPA had the most total direct and indirect programs, followed by the Department of Commerce. The Department of the Interior had vastly more proposed CEC-aligned programs than any other department or agency (Table 5).
- There was a 62% increase in programs that existed in previous budgets or were funded by legislation and a 43% decrease in proposed programs, suggesting a shift towards implementation during the second year of the Biden administration (Table 6).
- The results suggest that departments and federal agencies have different levels of focus on and expertise in the various elements of CEC selected, suggesting potential avenues for inter-agency collaboration (Table 75).
- More of the programs in the FY23 inventory span fewer categories than the FY22 inventory (Table 8). This reduction is concerning because addressing climate change in a just way involves meeting societal needs that are inherently cross-cutting and multi-dimensional.
- The newly passed climate bills direct a large amount of funding to CEC-aligned programs, with the vast majority going to direct and indirect programs (Figure 2).
- Seven of the inventoried agencies receive funding from the climate bills, with the Departments of Energy and Transportation receiving the majority of funds (Figure 3).

Table 3. Number of all programs (base and proposed) that directly, indirectly, or could potentially support selected USG programs/priorities. “Could” programs are not included in other tables because they have not focused on climate yet.

Department* or Independent Agency	Could	Indirect	Direct	Total Programs
Department of Agriculture	22	6	16	44
Department of Commerce	11	6	37	54
Department of Education	17	0	1	18
Department of Energy	17	23	19	59
Department of Health and Human Services	3	3	3	9
Department of Homeland Security	7	7	5	19
Department of Housing and Urban Development	16	0	0	16
Department of Justice	3	0	0	3
Department of the Interior	18	15	23	56
Department of Labor	19	1	3	23
Department of Transportation	25	4	5	34
Department of Veterans Affairs	6	1	0	7
AmeriCorps	1	2	1	4
Environmental Protection Agency	25	21	26	72
Institute of Library and Museum Services	6	1	1	8
National Aeronautics and Space Administration	15	11	12	38
National Endowment for the Humanities	6	2	0	8
National Science Foundation	37	5	1	43
Smithsonian Institution	9	13	26	48
U.S. Global Change Research Program (USGCRP)**	0	0	9	9
Total	263	121	188	572

*The following is a list of agencies within each department that were found to have CEC-related programs.

- **Department of Agriculture:** Agricultural Research Service, Economic Research Service, Farm Service Agency, Forest Service, National Institute for Food and Agriculture, Natural Resources Conservation Service, Office of the Chief Economist, Rural Development.
- **Department of Commerce:** Economic Development Administration, National Institute of Standards and Technology, National Oceanic and Atmospheric Administration, U.S. Census Bureau.
- **Department of Energy:** Brookhaven National Laboratory, Fermilab, National Energy Technology Laboratory, National Renewable Energy Laboratory, Office of Economic Impact and Diversity, Office of Energy Efficiency and Renewable Energy, Office of Environmental Management, Office of Fossil Energy, Office of Indian Energy Policy and Programs, Office of International Affairs, Office of Minority Programs, Office of Nuclear Energy, Office of Public Affairs, Office of Science, Office of State and Community Energy Programs, U.S. Energy Information Administration.
- **Department of Health and Human Services:** Administration for Children & Families, Centers for Disease Control and Prevention, National Institutes of Health.

- **Department of Homeland Security:** Federal Emergency Management Agency, Management Directorate, Science and Technology Directorate.
- **Department of Housing and Urban Development:** Office of Community Planning and Development, Office of Healthy Homes and Lead Hazard Control, Office of Housing, Office of Policy Development and Research, Office of Public and Indian Housing.
- **Department of Justice:** Criminal Division, Environment & Natural Resources Division.
- **Department of the Interior:** Bureau of Indian Affairs, Bureau of Land Management, Bureau of Ocean and Energy Management, Bureau of Reclamation, Fish and Wildlife Service, National Park Service, US Geological Survey.
- **Department of Labor:** Training and Employment Services.
- **Department of Transportation:** Federal Aviation Administration, Federal Highway Administration, Federal Motor Carrier Safety Administration, Federal Railroad Administration, Federal Transit Administration, Maritime Administration.

**USGCRP is a federal program, not a department or agency. The program is mandated by Congress to coordinate federal research and investments in understanding the forces shaping the global environment, both human and natural, and their impacts on society.

Figure 1. Number of all programs (base and proposed) by agency or department, ordered by number of direct programs.

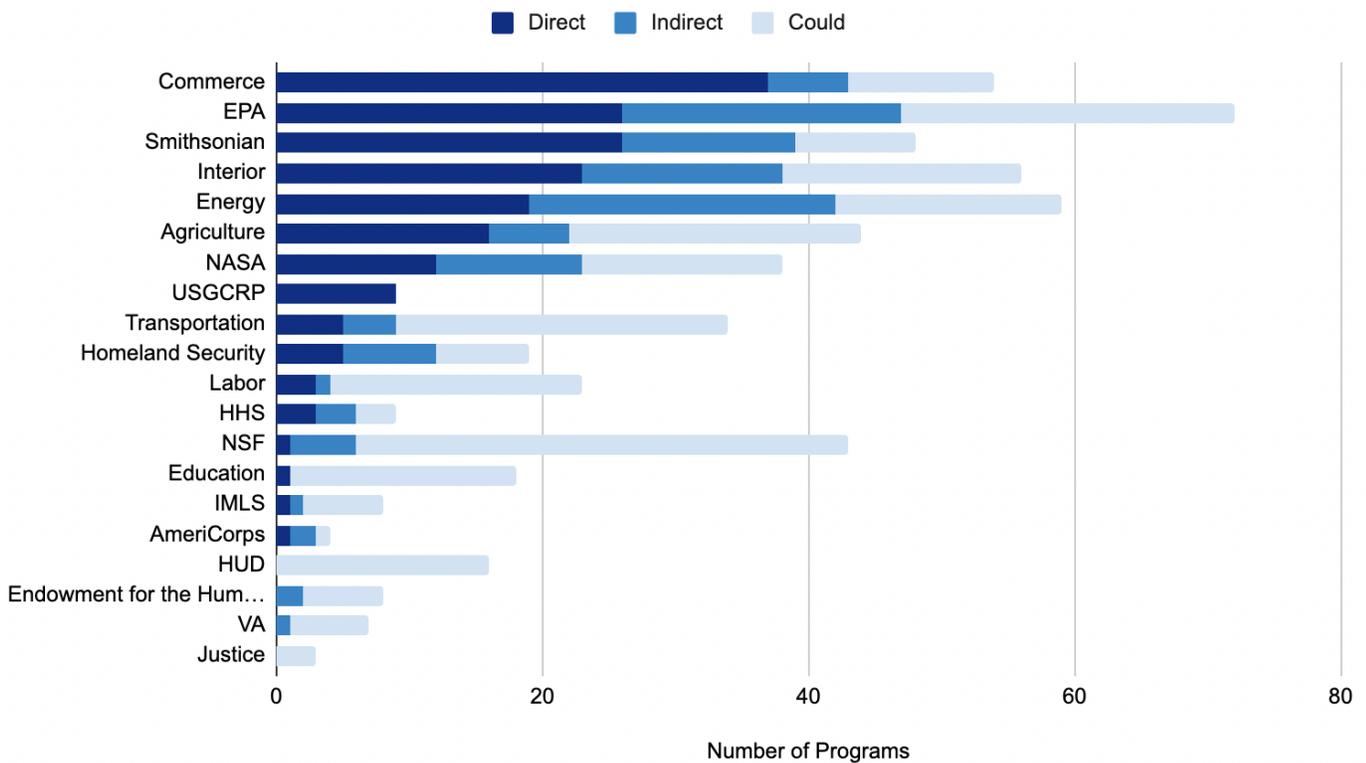


Table 4. Percentage change from the previous inventory year in all programs by alignment category. Percent change is not shown by department due to changes in department reporting and validation.

Program Category	FY22 Number of Programs	FY23 Number of Programs	Percent Change
Could align with CEC	188	263	40%
Indirectly align with CEC	127	121	-5%
Directly Align with CEC	111	188	69%
Total	426	572	34%

Table 5. Number of direct and indirect programs by department or independent agency by status: base programs existed before the President's FY23 budget process or were created by other means and proposed programs were included in the President's FY23 budget.

Department or Independent Agency	Existing	Proposed	Total Programs
Department of Agriculture	21	1	22
Department of Commerce	42	1	43
Department of Education	1	0	1
Department of Energy	37	5	42
Department of Health and Human Services	5	1	6
Department of Homeland Security	9	3	12
Department of the Interior	25	13	38
Department of Labor	2	2	4
Department of Transportation	9	1	10
Department of Veterans Affairs	1	0	1
AmeriCorps	2	1	3
Environmental Protection Agency	43	4	47
Institute of Library and Museum Services	2	0	2
National Aeronautics and Space Administration	22	1	23
National Endowment for the Humanities	2	0	2
National Science Foundation	6	0	6
Smithsonian Institution	31	8	39
U.S. Global Change Research Program (USGCRP)	9	0	9
Total	269	41	310

Table 6. Percent change in the number of existing and proposed programs that directly or indirectly support CEC between FY22 and FY23.

Program Category	FY22 Number of Programs	FY23 Number of Programs	Percent Change
Existing	166	269	62%
Proposed	72	41	-43%
Total	238	310	30%

Table 7. Total elements identified in base and proposed programs that directly or indirectly support selected USG priorities by department or independent agency.

Department or Independent Agency	Total Programs	Education	Training	Communication	Access to Information	Engagement	International
Department of Agriculture	22	19	9	9	17	9	2
Department of Commerce	43	21	23	12	21	24	6
Department of Education	1	1	1	1	1	1	0
Department of Energy	42	15	31	6	9	14	2
Department of Health and Human Services	6	0	3	2	2	2	0
Department of Homeland Security	12	7	7	4	4	5	0
Department of the Interior	38	0	4	0	0	0	0
Department of Labor	4	5	22	6	15	21	0
Department of Transportation	10	0	6	0	0	2	2
Department of Veterans Affairs	1	0	1	0	0	0	0
AmeriCorps	3	2	2	0	0	2	0
Environmental Protection Agency	47	16	16	6	21	24	1
Institute of Library and Museum Services	2	2	1	0	2	1	0
National Aeronautics and Space Administration	23	7	7	2	11	10	5
National Endowment for the Humanities	2	1	1	0	2	1	0
National Science Foundation	6	2	5	0	1	2	1
Smithsonian Institution	39	26	12	9	21	12	4
U.S. Global Change Research Program (USGCRP)	9	27	17	14	26	17	8
Total	310	148	169	71	153	147	31

Table 8. The change in the number of CEC elements per direct or indirect program between inventories.

Number of CEC Elements per Program	FY22 Number of Programs	FY23 Number of Programs	Percent Change
6	3	2	-33%
5	15	16	7%
4	22	26	18%
3	54	48	-11%
2	69	93	35%
1	75	125	67%
Total	238	310	82%

Figure 2: Funding for programs identified in the Bipartisan infrastructure law (BIL), Inflation Reduction Act (IRA), CHIPS and Science Act (CHIPS) by category of CEC program.

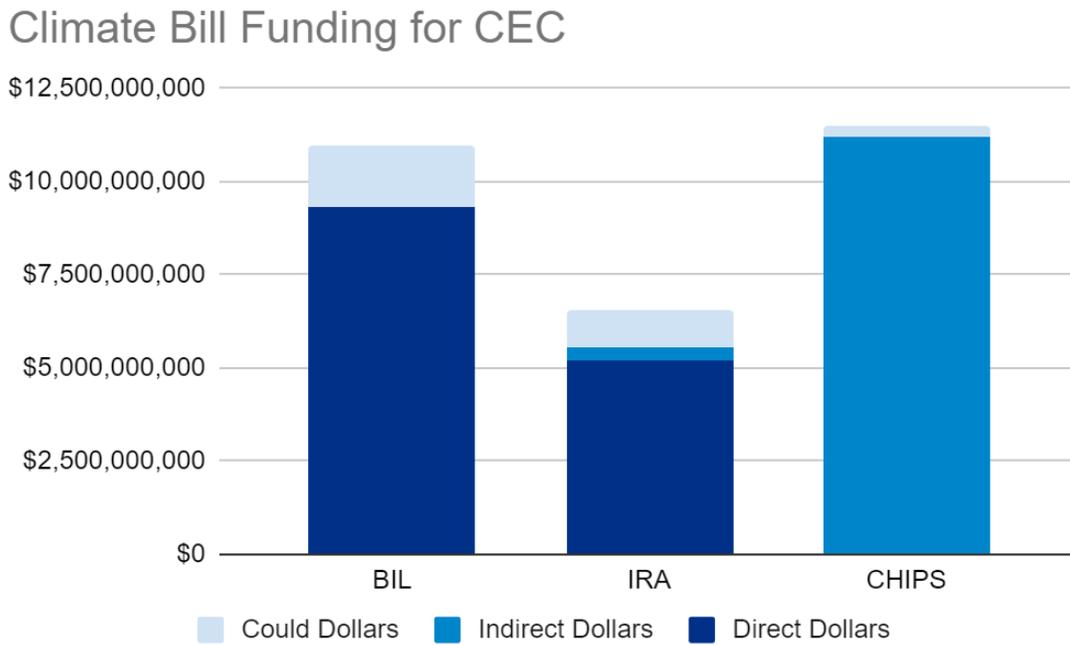
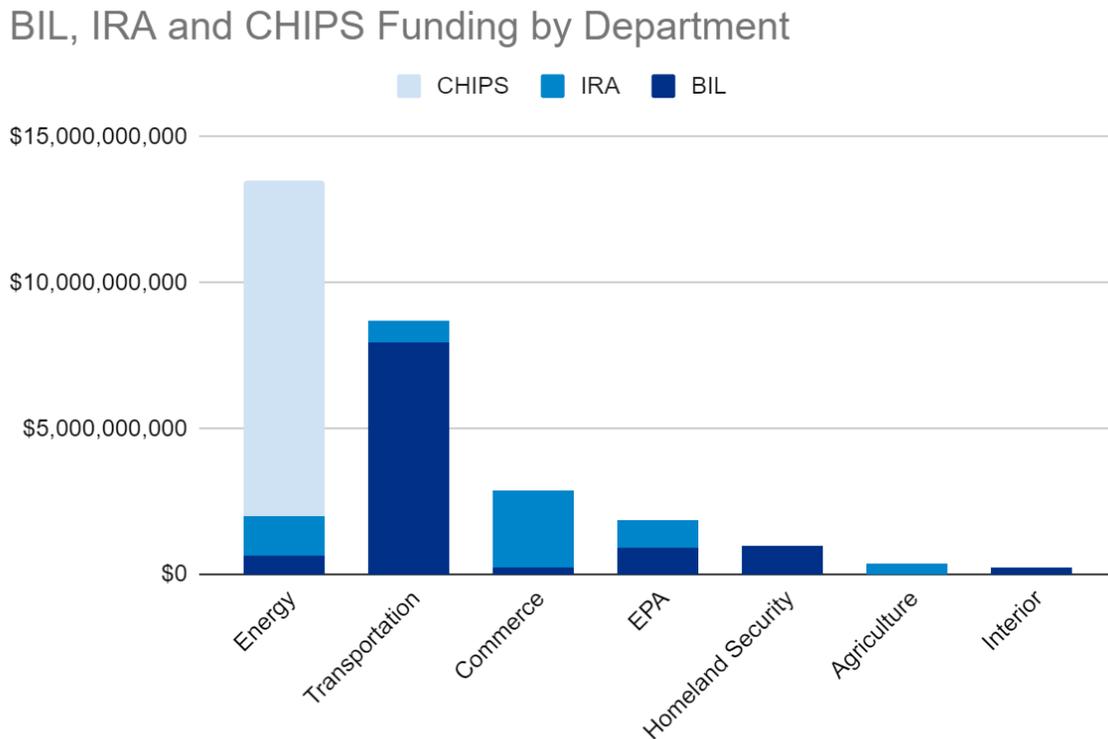


Figure 3: Funding for new CEC programs identified in the bipartisan infrastructure law (BIL), Inflation Reduction Act (IRA), and CHIPS and Science Act (CHIPS) by department.



Discussion

- **Expanding Focus on Justice.** This year's inventory found a large decrease in program language that explicitly mentioned racial, gender, intergenerational, or other types of justice. However, this reflects an Administration movement to enshrine justice at the office, agency, and department level, which makes individual program statements unnecessary, rather than a decreasing focus on climate justice.
- **Collaboration Instead of Transmission.** Some federal programs and plans have a history of transmitting information to communities; however, many programs appear to be transitioning toward community-informed models that collaboratively generate knowledge. The validity and extent of co-development of knowledge needs to be verified, documented, and shared.
 - The inventory identifies programs that are designed to foster collaboration between federal agency personnel, scientists, decision makers, and communities.
 - Programs such as NOAA Climate Adaptation Partnerships Program, formerly known as the Regional Integrated Sciences and Assessments (RISA) Programs and the NASA Applied Science Office may provide useful models for engagement and lessons learned.
- **Potentials for Cross-Department and Agency Collaboration.** Interviews that were part of the FY21 Inventory process revealed some key opportunities for program enhancement through collaboration across agencies.
 - This inventory has already helped program managers and the CEC Interagency Working Group build connections between programs, share learnings, and plan new collaborations.
 - Collaborative sharing across programs will help agencies learn about and adopt funding and engagement models. Agencies could share innovative models for providing lasting support rather than one-off and short term engagement.

- In 2022, the United States Global Change Research Program (USGCRP), is scoping a new interagency group focused on Communication, Engagement, and Capacity-building (CEC-IWG) to coordinate federal programs working on climate education, training and workforce development, communication, public access to information, and engagement. This group is being designed to expand synergies between programs working in this area; share best practices, learnings, and challenges between agencies; and provide a space for collaboration on cross-agency efforts such as climate training for all government employees, inventorying all relevant programs and the writing of the National Communication. Agency participants include the National Oceanic and Atmospheric Administration, Environmental Protection Agency, Smithsonian Institution, National Science Foundation, National Aeronautics and Space Administration, Department of the Interior, Department of Energy, Department of Education, Department of Labor, Department of Health and Human Services, Department of Homeland Security, U.S. Department of Agriculture, U.S. Global Change Research Program, AmeriCorps, and the Institute of Museum and Library Services.
- **Strategic Design for User Experience.** There appears to be substantial opportunities to create more coherent engagement with a variety of communities through strategic collaboration across federal agencies and in collaboration with user communities.
 - There appears to be an ad hoc nature to program development without coordination across multiple agencies or other offices within an agency. A more strategic approach to program funding and design might increase program efficiencies and collective impact. The Interagency Scoping Group is mobilizing the Inventory data to start working on this problem.
 - Much of federal grantmaking appears to lack strategic alignment and planning to maximize collective impact. This is a case where greater strategic collaborations across agencies and in collaborative relationships with community partners might reveal opportunities to better align federal investments.

A Note on Limitations

- **Categorizations.** The identified categories can be problematic.
 - Categorizations, in general, tend to reinforce existing professional silos, inhibiting multi-sectoral communication and collaboration.
 - The terms used in the inventory can lead to a narrowing of program design. The term “education,” for example, tends to be thought of as formal K-16 education rather than lifelong learning, though both fit under the definition.
 - Any such definitions are inherently cultural in nature and the meaning of the terms shifts across different professional, geographic, ethnic, and other communities.
 - Federal programs are largely designed around the perceived needs of sectors and communities. A large number of programs identified in the inventory span multiple categories and definitions. Some categorizations might be shifted with further analysis.

Additional Phases of Work

An expansion of the inventory process is needed.

- The desktop review of website text and the President’s FY23 budget proposal does not reveal the size and scope of programs, how they are designed, how specific communities are engaged in co-creation of knowledge and climate action, or how effective programs might be.
- Programs will shift in scope and focus over the next few years as congressional, executive, and departmental guidance around climate and justice take effect. A continuing inventory will map programs as they shift from “could”, to “indirectly” and “directly” supporting all-of-society climate action, providing evidence for the efficacy of federal climate and coordination strategies in real time.
- As money from the IRA, BIL, and CHIPS and Science Act is mobilized, new programs will need to be inventoried.

Conclusions

This inventory is a first step towards mapping out a whole-of-society climate strategy. Decision-makers and program managers can see how federal efforts might fit together to serve the public in building awareness and capacity to address the climate crisis, where gaps exist (such as programs that promote gender and intergenerational

equity), and where opportunities for greater coordination, coherence, and collective impact might be found. Further work is needed to further refine the results and create a more robust view of such programs across the federal government.

This project also reveals an interest across agencies in more collaboration and strategic alignment. There is significant potential for the federal government to increase its collective impact in building and mobilizing society's capacity to respond equitably and effectively to the climate crisis. Increasing multi-partner collaboration and more strategic design of programs may require new collaborative incentives, professional learning, agency guidelines, and supporting infrastructure. Increasing coherence between related climate empowerment programs tends to amplify synergistic benefits for all involved.⁵

⁵ Penuel, W. R., Bell, P., Pierre, S. D., Hopkins, M., & Farrell, C. C. (2018). Building a networked improvement community to promote equitable, coherent systems of science education: How a state-level team can support district-level change efforts. *Editorial Review Board*, 13(1), 30-38.

Appendices

Appendix A: Detailed Methodology

This inventory includes policies, programs, and plans across the 10 cabinet level departments and 7 independent federal departments and agencies that have climate focused programs. Federal partners, interns, and contractors worked together to develop and implement this methodology. The 10 departments and agencies identified by federal partners as most likely to include climate engagement and capacity building related work were inventoried by a research team consisting of a 2022 William M. Lapenta NOAA Student Internship Program intern from the NOAA Climate Program Office. The remaining departments were inventoried by a contractor. This process was guided by the report by UNESCO and UNFCCC which shares recommendations *for accelerating solutions through education, training and public awareness*.⁶

The federal Climate Education, Engagement, Workforce Development and Training Program Inventory includes federal program details, whether the program includes selected elements: education, training, public awareness, public access to information, public participation, or international cooperation, and whether it includes cross-cutting themes identified as critical to just climate action by the Biden Administration: gender sensitivity, intergenerational equity, and equity and justice for marginalized people.

This methodology is designed to be iterative, as the inventory will need to be updated either annually or on a rolling basis as new relevant programs are added and existing programs pivot to include more elements and themes.

This methodology will not be able to cover the full breadth and diversity of climate education, engagement, and coordination programs across the U.S. government. Data collection relies on publicly available program language; programs may well be engaging on selected elements but use different language than the methodology called for or simply neglect to mention them in how they describe themselves and their work on websites or other accessible information. The main source of information is the 2023 President's Budget, which does not include the many

⁶ UNESCO and UNFCCC. (2016). *Action for Empowerment: Guidelines for Accelerating Solutions Through Education, Training and Public Awareness*. Paris, France: United Nations Educational, Scientific and Cultural Organization (UNESCO). https://unfccc.int/files/cooperation_and_support/education_and_outreach/application/pdf/action_for_climate_empowerment_guidelines.pdf.

programs run by Departments and agencies funded by discretionary or appropriated funds. The budget will also be amended by Congress, potentially cutting, adding, or re-focusing programs, before being passed into law. The main supplementary data source, program websites, may not have been fully updated since the last administration, which discouraged programs and language related to climate and public engagement in certain agencies and departments.

As the inventory is updated, climate empowerment language becomes more standardized, and program leads start working more collaboratively, blind spots will be more comprehensively addressed. The gaps in this methodology make it imperative that the inventory is regularly updated and well maintained.

Inventory Methodology

The creation of this methodology is detailed in the 2021 Inventory Report.⁷

- **Create Inventory Spreadsheet.** The federal leads and contractors set up the inventory spreadsheet using Google Sheets. The spreadsheet was collaboratively created at the beginning of the process and elements were added at the beginning of the research to better fit the data and scope of the project. When a column or designation was added, the research team and contractor ensured that previously inventoried departments and agencies were re-evaluated using the new criteria.
- **Collaboratively set definitions of selected elements.** Definitions were developed by the 2021 team at the beginning of the inventory to guide identification of selected elements and categorization of programs. The definitions were based on definitions from the UNFCCC and adapted to the national context in the United States by including language from definitions used by federal agencies as well as academic work around climate communication, training, and life-long learning. At the end of the inventory process, definitions were updated to better reflect U.S. priorities in practice in the U.S. context. First and final definitions are available in Appendix B.
- **Identify Department and Independent Agency Candidates.** Federal partners identified the departments

⁷ NOAA. (2021). Analysis of a Phase I Inventory of Federal Climate Education, Engagement, Workforce Development and Training Programs. Report of the Climate Education Program, Climate Program Office, NOAA, February 1, 2022.

and independent agencies that were most likely to contain climate capacity building and engagement programs.

- **Identify programs that may contain relevant elements.**

To begin research on a Department or Agency, potentially relevant programs were first identified by searching through each agency's section of the President's Budget for Fiscal Year 2023 using the keyword search function. Additional programs were identified using the same keywords to search through the bipartisan infrastructure law (BIL), Inflation Reduction Act (IRA), CHIPS and department or agency's websites .

- Keyword search terms: Climate, education, jobs, training, workforce, outreach, access to information, international, youth, gender, justice, equity, 14008 (referencing E.O. 14008)

- **Desktop Research.** After programs were identified, they were divided between researchers. The primary researcher for each program started with either the budget description or program website to gain an understanding of the program as a whole. If both a budget description and program website were available, both were used to identify elements and themes of the program. When the presence of an element or theme was confirmed, text supporting the determination was copied and pasted into the spreadsheet with a link to the source of the information. This kept decisions transparent, reproducible, and as objective as possible. Audience, focus, and cross-cutting themes were noted, and program managers were included if available. Particularly relevant or unique programs were marked for follow-up interviews. A more in-depth description of the spreadsheet and types of data collected can be found in Appendix C.

- Occasionally, when a budget noted robust proposed changes to a base program, the program was recorded in two rows: one for the base program and one for the proposed changes to the program. When only the proposed portion of the program was focused on climate or included relevant elements, only the proposed portion was included, and justifying language was exclusively pulled from the budget proposal to ensure justifications were up-to-date.
- At times, program language was unclear or did not exactly match the element or theme definitions. In these cases, the primary researcher would mark the cell with a "maybe" tag and

describe their questions in the "Reviewer(s)" column for discussion.

- **Program Review.** After a researcher finished their primary programs, they reviewed other researchers' programs. After they completed the review, they would record their name, opinions or answers to questions, and justifications for any changes in the "Reviewer(s)" column, marking that the program had been reviewed.
- **Department-level Review.** At the end of research and review on a department or agency, the research team came together in a virtual meeting to review and make determinations on any outstanding questions or "maybe" tagged elements and themes. If the team couldn't come to consensus, they left all notes related to the question for the Quality Control process.
- **Quality Control and Proofreading.** After the research team finished the Department-level review, a contractor who was not involved in the research went through all of the programs, resolving any remaining questions or "maybe" tags alone or with the input of the full team including federal partners if the problem was complex. Once consensus was reached around all questions and tags, the contractor proofread inventory entries, deleted all reviewer comments, and standardized formatting across the entire spreadsheet.
- **Interagency Review Process.** The research team split the inventory spreadsheet by department and agency, creating spreadsheet tabs for each one. The new spreadsheet was then sent as a comment-only document to members of the Climate Engagement and Capacity-Building Interagency Scoping Group to be validated. Group members were given one month to submit any suggested edits and/or additions. The form asked for program name, contact points, and justifications for each element, if present. Research team members took the comments and updated the original inventory spreadsheet, checking websites or clarifying with Group members if needed.

Appendix C: Description of the Inventory Spreadsheet

Column	Description and Notes
Primary Researcher	The name of the person who carried out the first round of research on the program.
Reviewer(s)	The name(s) of the people who reviewed the program after the primary researcher, if applicable.
Department	The federal department, if applicable.
Agency	The independent agency or agency of the department, which can also be called office, directorate, administration, or other names depending on the department.
Office Name	The name of the office that houses the program, if available.
Program Name	The name of the program, including the acronym if applicable.
Program Description	A description of the program, copied and pasted from the budget or program website, with a link to the source of the information.
Proposed (P) or Base (B)	The status of the program. <i>Base:</i> the program is currently running (i.e. existed before the 2022 budget was written). <i>Proposed:</i> a new program in the FY22 budget or a major expansion to an existing program proposed in the 2022 budget. Programs with significant relevant expansions in the 2022 budget may be included on 2 separate lines describing their base and proposed aspects, or only the proposed aspect may be included if the program was not previously related.
Directly supports Goals(D), Indirectly supports Goals(I), or Could support Goals(C)	How the program contributes to selected goals. <i>Direct:</i> Programs that directly serve the overarching goals identified by including provisions that directly work to empower members of society to engage in climate action. Individual programs may work towards empowering specific sectors of the public, such as land managers, workers in a specific field, youth, or local government. <i>Indirect:</i> Programs that indirectly serve the overarching goals identified, e.g. programs that increase climate/science literacy or quality or access to climate/scientific knowledge without empowering people to take concrete actions <i>Could:</i> Programs that do not currently explicitly focus on climate or empowerment towards climate action but or whose program descriptions either lend themselves to empowering the public towards climate action in the future or work towards STEM or climate more broadly.
Program Lead (Name)	The name of the program manager or closest available director, identified via program websites, department staff directories, or department organization charts.
Program Lead (Title)	The title of the program lead.
Program Lead (Email)	The email of the program lead, if available.

Program Website	A link to the program website.
Selected Element: X	Describes if the element is present. Options: Yes/No/Maybe.
Selected Element X Justification	Copy and pasted language from the budget or program website that supports the presence of a selected element (a Yes) or may support the presence of selected element (a Maybe).
Audience	The audience(s) of the program. Options (can be multiple): Youth, K-12, Higher ed, BIPOC, Women and girls, Private sector, Community, Government, Adult, Nonprofit, or Cultural institutions.
Focus	The scope(s) of the program. Options (can be multiple): International, National, Regional, State, Coastal, Rural, Urban, or Federally Recognized Indian Tribal Governments.
Cross-cutting theme: Gender-sensitive	Language that supports the designation that the program is designed to promote gender equality and women's representation in climate issues and solutions.
Cross-cutting theme: Equity and justice	Language that supports the designation that the program has a focus on equity for underrepresented audiences and communities.
Cross-cutting theme: Intergenerational	Language that supports the designation that the program is designed to enhance collaboration between different age groups and/or promote young people's involvement in climate advocacy and solutions.
Potential Interviewee	Designates programs of interest for interviews.

Requests for access to the Inventory of Federal Climate Education, Engagement, Workforce Development and Training Programs contact Frank Niepold, frank.niepold@noaa.gov.