

Return on Investment Study: National Civilian Community Corps Weatherization Projects

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CONTENTS

Executive Summary	ES-1
Program Description	ES-1
Overview of Benefits and Costs	ES-2
ROI Results	ES-3
Introduction	1
Program Description	2
Population Served	2
NCCC Weatherization Projects Evaluation History	3
Selection of NCCC Weatherization for the AmeriCorps ROI Project	5
Comparable ROI Estimates	5
ROI Methodology	8
Monetizing Program Benefits, Forgone Benefits (Opportunity Costs), and Program Costs	10
ROI Study Limitations	18
Program Benefits, Forgone Benefits (Opportunity Costs), Program Costs, and ROI Results	18
Program Benefits	18
Forgone Benefits (Opportunity Costs)	19
Program Costs	20
ROI Results	20
Recommendations for Further Research	23
Conclusion	25
Appendix A: Program Benefits, Forgone Benefits, and Program Costs Included in Return on Investment Calculations	26
Appendix B: Additional Information on the Methodology	31
Methodology Overview	31
Measuring Program Benefits	32
Measuring Forgone Benefits (Opportunity Costs)	51
Measuring Program Costs	54
Calculating ROI	55
Appendix C: Results by Year	57
References	62

LIST OF FIGURES

Figure 1. Benefits Among Stakeholder Groups From NCCC Weatherization Projects	9
Figure 2. Percentage of AmeriCorps Alumni Seeking Work, Providing Caregiving, or Occupied Outside of the Workforce From Friedman et al. (2016).....	36
Figure 3. Compound Interest Formula Used to Calculate Investment Opportunity Cost.....	54

LIST OF TABLES

Table ES-1. ROI Estimates.....	ES-3
Table 1. Demographics of NCCC AmeriCorps Members 2021–2022	3
Table 2. Relevant ROI Studies	7
Table 3. Benefits Realized From NCCC Weatherization by Stakeholder Group	10
Table 4. Program Benefits by Recipient	19
Table 5. Benefits From Weatherized Homes Compared to Other Benefits	19
Table 6. Forgone Benefits From Professional Opportunity Cost	20
Table 7. Investment Opportunity Cost by Scenario	20
Table 8. Program Benefits, Net Benefits, and Program Costs by ROI Scenario.....	21
Table 9. ROI Results for NCCC	22
Table 10. Benefits and Costs Included in the NCCC ROI Calculation.....	26
Table 11. Energy Cost Savings to Households	32
Table 12. Household Health Benefits.....	34
Table 13. Private Insurer Benefit From Household Health Improvements	35
Table 14. Additional Pre-Tax Earnings for NCCC AmeriCorps Members From Reduced Unemployment Based on NCCC AmeriCorps Member Demographics	37
Table 15. Cumulative Additional Post-Tax Earnings Derived From Reduced Unemployment due to Serving With the NCCC Program by Scenario.....	37
Table 16. Average Total Cost of Education and Portion Attributable to Education Award by Degree Type	39
Table 17. Estimates of the Number of Postsecondary Degrees Pursued Using the Education Award by Degree Type	40
Table 18. Additional Earnings From AmeriCorps Members' Use of the Education Award	41
Table 19. NCCC AmeriCorps Member Benefits From the Living Allowance and Education Award.....	42
Table 20. Government Costs by Education Attainment Level per Individual's Lifetime ...	47

Table 21. 2022 Tax Rates and Ratio of Taxable Expenditures for NCCC AmeriCorps Members' Earnings, Living Allowances, and Education Awards.....	48
Table 22. Federal Government Benefits From Household Health Improvements.....	50
Table 23. State/Local and Federal Government Benefits by Stakeholder Group and by Scenario	50
Table 24. Forgone Earnings of NCCC AmeriCorps Members for a Service Term	52
Table 25. Forgone Taxes Associated With the Forgone Earnings of NCCC AmeriCorps Members for a Service Term	53
Table 26. Forgone Benefits From Investment Opportunity Cost Calculation by Scenario and Funding Stream.....	54
Table 27. ROI Calculations for Short-Term Scenario	56
Table 28. ROI Calculations for Medium-Term Scenario	56
Table 29. ROI Calculations for Long-Term Scenario	56
Table 30. NCCC Benefits and Costs per Year	58

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Executive Summary

Program Description

The National Civilian Community Corps (NCCC) is a full-time, team-based program that works to meet various community needs across the country. NCCC teams of 8–12 members and leaders begin their service at one of NCCC's four regional campuses in Vinton, IA; Sacramento, CA; Vicksburg, MS; or Aurora, CO. At the regional campuses, all program members participate in team-based trainings at the start of the 10-month service term. Team leaders complete additional leadership training at that time. Following this initial skill-building, teams move on to work on at least four different projects with sponsor organizations in various locations. During each project, program members live in the communities they serve. During service, NCCC members receive

AmeriCorps, the federal agency for national service and volunteerism, provides opportunities for Americans to serve their country domestically, address the nation's most pressing challenges, improve lives and communities, and strengthen civic engagement. Each year, the agency places more than 200,000 AmeriCorps members and AmeriCorps Seniors volunteers in intensive service roles; and empowers millions more to serve as long-term, short-term, or one-time volunteers. Learn more at [AmeriCorps.gov](https://americorps.gov).

basic expenses, such as communal housing, meals, and a limited health benefit. NCCC members also receive all program-related travel expenses; a modest living allowance; training in leadership, technical skills, teamwork, and more; and forbearance on federally backed student loans, where members are eligible to have the interest incurred during service paid in full.¹ After service, NCCC members also receive over \$7,000 to use on future educational expenses or to pay back qualified student loans.

The work that NCCC teams do varies by project and sponsor site. This analysis focuses on the home weatherization efforts of NCCC AmeriCorps members. Weatherization increases the energy efficiency of homes, producing environmental, economic, and health benefits for households and society. NCCC weatherization activities vary by project but have included installing energy efficiency devices, retrofitting for energy efficient lighting, applying rigid insulation and sheetrock to basement walls, putting flashing around chimneys to block air flow, installing gaskets on exterior doors, measuring and installing interior storm windows, insulating pipes, covering soffits, air sealing with foam, and insulating attics with cellulose insulation. While the mix and scale of these measures vary by project, weatherization efforts generally decrease energy consumption, leading to energy cost savings. Weatherization can also produce health benefits as homes are sealed against outdoor air pollutants.

¹ <https://americorps.gov/serve/americorps/americorps-nccc#benefits>

Overview of Benefits and Costs

To calculate the ROI, the program benefits were identified, quantified, and compared to the program's costs. Benefits of the NCCC weatherization projects that can be monetized based on the available data and research include:

- **Benefits to various stakeholders from NCCC weatherization activities.** NCCC AmeriCorps members participate in weatherization efforts that increase the energy efficiency of homes and produce environmental, economic, and health benefits for households. While the mix and scale of these measures vary by project, weatherization efforts generally result in energy cost savings, health and safety benefits for homes, as well as societal benefits from reduced greenhouse gas emissions and savings on health insurance spending for both private insurers and the federal government.
- **Additional earnings by AmeriCorps members.** Serving in AmeriCorps leads to increased wages and reduced unemployment post-national service through skill acquisition, as well as increased educational attainment post-service.
- **Living allowances, stipends, and education awards.** AmeriCorps members receive living allowances and stipends during their national service and receive a Segal AmeriCorps Education Award after successful completion.
- **Increased tax revenue for government.** Federal, state, and local governments receive more income tax revenue from increased AmeriCorps member earnings post-service, as well as additional sales tax revenue related to those earnings. Federal, state, and local governments also realize tax revenue from the taxable education awards provided to AmeriCorps members. Further, federal and state governments realize tax revenue from increased earnings by AmeriCorps members as a result of increased educational attainment.
- **Reduced lifetime spending on corrections, public assistance, and social insurance.** Because of the increase in postsecondary educational attainment for AmeriCorps members and program participants, federal and state governments spend less on these items.

There are likely additional benefits related to NCCC weatherization activities, including benefits such as a decrease in home fires; a reduction in carbon monoxide poisoning; increased work productivity due to improved sleep; and a potential decrease in housing damage associated with weather-related events such as hurricanes, tornados, and floods. While some studies speak to these benefits of weatherization, the existing research does not yet provide a sufficient basis to rigorously monetize these additional benefits from NCCC's work. Existing studies lack direct observation of improved health or well-being and largely rely on anecdotal information from individuals living in weatherized homes. The exclusion of some potential benefits from the analysis makes this a conservative estimate of NCCC's ROI for weatherization projects.

Program costs for NCCC weatherization projects during the 2021–2022 program year totaled \$124,439, all of which was funded by the federal government.

Limiting the Analysis to NCCC Weatherization Activities

It is important to note that NCCC AmeriCorps members engage in a large number of service activities besides home weatherization. However, this analysis solely focuses on NCCC's weatherization activities and, therefore, does not include the monetized benefits or costs from other NCCC work. The analysis estimates the portion of benefits and costs attributable to weatherization projects based on the proportion of weatherization projects to all NCCC activities in the year studied.

ROI Results

Table ES-1 shows the ROI results, considering total benefits and federal government benefits. The first row shows *total benefits per federal dollar* and the second row shows *federal government benefits per federal dollar*. NCCC receives only federal government funding from AmeriCorps. The ROI estimates are presented as dollars returned for every dollar of investment. The analysis used three different scenarios to estimate benefits under each ROI calculation. Specifically, the study assumed that increased earnings attributable to the program lasted for 1 year (short-term scenario), 15 years (medium-term scenario), or 30 years (long-term scenario).

Table ES-1. ROI Estimates

ROI calculation	ROI scenario		
	Short-term	Medium-term	Long-term
Total benefits per federal dollar	-\$2.96	\$2.25	\$7.60
Federal government benefits per federal dollar	-\$0.21	-\$0.17	-\$0.33

Note: Other ROI studies in this series include estimates of *total benefits per funder dollar*. However, NCCC receives only federal government funding, leading to identical values for the ROI estimates for *total benefits per federal dollar* and *total benefits per funder dollar*. For that reason, this study omits the *total benefits per funder dollar* calculation.

The program produces strong returns for the medium- and long-term scenarios for the *total benefits per federal dollar*. The most significant factors driving the positive ROI estimates are:

- **Educational attainment outcomes of AmeriCorps members.** After serving in the AmeriCorps program, AmeriCorps members receive an education award, which is used by a portion of members to help pay for postsecondary degrees post-service. The additional educational attainment resulting from the use of the education award generates additional earnings for AmeriCorps members.
- **Employment outcomes of AmeriCorps members.** Past studies establish that AmeriCorps members experience increased employment and increased earnings post-service.
- **Benefits to households, society, and government from weatherized homes.** These included benefits to various stakeholders. Households living in weatherized homes benefit from reduced energy costs and reduced medical costs. Society benefits from decreased costs of carbon emissions. The federal government benefits from

reduced spending on public health insurance programs as a result of health benefits to households living in weatherized homes.

In the short-term scenario for the *federal benefits per federal dollar* ROI calculations, the ROI results are negative because the costs of funding NCCC weatherization projects, combined with opportunity costs, exceed benefits 1 year post-program.

ROI estimates that are negative or below \$1 in the first year post-program are characteristic of programs where there is an initial one-time investment and benefits accrue in the following years. This is because it can require several years of benefits to recoup the initial investment and generate positive returns. The break-even point for NCCC weatherization projects is between years 9 and 10. After that point, accrued benefits exceed costs for the *total benefits per federal dollar* ROI calculation. As a result, the medium- and long-term ROI estimates are positive.

NCCC AmeriCorps members for the 2021–2022 program year have a relatively high level of educational attainment prior to service compared to other analyzed AmeriCorps programs. That characteristic results in a comparatively high opportunity cost of what they could have earned had they not participated in AmeriCorps service.

The *federal government benefits per federal dollar* calculations estimate losses for all three scenarios. NCCC weatherization projects are intended primarily to generate benefits to society, households, and AmeriCorps members, rather than benefits to the federal government. The federal government's primary benefit is from tax revenue generated and savings in public assistance from the increased earnings realized by NCCC members and savings in healthcare expenditures associated with improved health outcomes for households. These benefits, however, are not enough to cover the cost of the program. In addition to NCCC member benefits and health benefits, the NCCC weatherization projects also result in benefits to households from reduced energy usage and benefits to society from reduced carbon emissions, which are not included as government benefits. (See Table 3 for a detailed explanation of benefits by stakeholder.)

Introduction

AmeriCorps contracted with ICF Incorporated, LLC (hereafter ICF) to research and quantify the return on investment (ROI) of several programs that rely on national service—specifically AmeriCorps—as a major resource to sustain operations. ROI analyses measure the performance of programs and build the base of evidence for future resource allocation decisions. ROI study results demonstrate the value of AmeriCorps programming to relevant stakeholders.

This project began with a comprehensive literature review and preliminary assessments of whether ROI analyses were feasible for five national service programs. These feasibility studies included thorough reviews of these programs' recent evaluations, detailed logic models, proposed ROI analysis methodologies for each program, and a scorecard mechanism that determined the viability of conducting an ROI analysis for each selected program.

Upon completion of five feasibility studies, AmeriCorps selected four programs to be the subjects of ROI studies for fiscal year 2024: Ancestral Lands Conservation Corps AmeriCorps Program, Minnesota Alliance With Youth Statewide AmeriCorps Promise Fellow program, National Civilian Community Corps (NCCC) weatherization projects, and Homeless & Housing Coalition of Kentucky's Homes for All program. This ROI study measures the benefits of NCCC weatherization projects against costs.

This study is organized into five sections:

- **Program Description** describes the design, activities, and objectives of NCCC weatherization projects, along with the role that national service (specifically AmeriCorps) plays in their operation. This section also provides a brief history of past evaluations, outlines the factors that made NCCC weatherization projects a strong selection for an ROI study, underscores the population this program serves, and identifies a set of ROI estimates of other programs that have similarities to NCCC weatherization projects.
- **ROI Methodology** outlines how this analysis used various data sources to monetize benefits derived from NCCC weatherization projects, describes its associated program costs, and explains how opportunity costs were calculated.
- **Benefits, Forgone Benefits (Opportunity Cost), Program Costs, and ROI Results** provides a detailed description of the program benefits, forgone benefits (opportunity cost), and program costs that are inputs into the ROI analyses and presents the results of the three ROI calculations across different assumptions.
- **Recommendations for Further Research** explores ways AmeriCorps and others could further build the evidence base for this program and similar programs, including how to address limitations of this study.
- **Conclusion** summarizes key points from the ROI study overall.

Program Description

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During service, NCCC members receive basic expenses, such as communal housing, meals, and a limited health benefit. NCCC members also receive all program-related travel expenses, a modest living allowance, training (in leadership, technical skills, teamwork, and more), and forbearance on federally backed student loans through which members are eligible to have the interest incurred during service paid in full.² After service, NCCC members also receive over \$7,000 to use on future educational expenses or to pay back qualified student loans.

The work that NCCC teams do varies by project and sponsor site. This study focuses on the home weatherization efforts of NCCC AmeriCorps members. Weatherization increases the energy efficiency of homes, producing environmental, economic, and health benefits for households and society. NCCC weatherization activities vary by project but have included installing energy efficiency devices, retrofitting for energy efficient lighting, applying rigid insulation and sheetrock to basement walls, putting flashing around chimneys to block air flow, installing gaskets on exterior doors, measuring and installing interior storm windows, insulating pipes, covering soffits, air sealing with foam, and insulating attics with cellulose insulation. While the mix and scale of these measures vary by project, weatherization efforts generally decrease energy consumption, leading to energy cost savings. Weatherization can also produce health and safety benefits as homes are sealed against outdoor air pollutants.

Population Served³

All participating AmeriCorps members are young adults ages 18–26. NCCC members represent a wide variety of socioeconomic, cultural, geographic, and educational backgrounds, and over 1,200 members participate in the NCCC program each year. For the 2021–2022 program year, 93 AmeriCorps members participated in weatherization efforts through NCCC. Demographic information for all AmeriCorps members that participated in NCCC during this time was provided and used as an

² <https://americorps.gov/serve/americancorps/americancorps-nccc#benefits>

³ Sarah Reynolds, NCCC contact, personal communication, March 8, 2024. Hereafter, all instances of NCCC referenced as a data source were retrieved from this communication.

estimate for those who participated in the weatherization activities, as outlined in Table 1 below.

Table 1. Demographics of NCCC AmeriCorps Members 2021–2022

Characteristic	Percentage
Race	
White	67.9%
Other	11.8%
Black/African American	7.8%
Multiracial	6.9%
Asian	4.2%
American Indian/Alaskan Native	0.9%
Hawaiian/Pacific Islander	0.5%
Gender	
Female	53.8%
Male	46.2%
Ethnicity	
Hispanic origin	11.6%
Non-Hispanic origin	79.8%
Unknown	8.6%
Educational attainment	
High school diploma	34.0%
Bachelor's	30.9%
Some college/technical school	24.5%
Less than high school	6.4%
Associate	3.2%
Master's	1.1%

Source: NCCC

NCCC Weatherization Projects Evaluation History

Although there have been evaluation studies of NCCC programs, none have focused on NCCC's weatherization projects.⁴ However, there are sufficient data sources to estimate their impact. In addition to the NCCC-provided data on weatherization

⁴ NCCC evaluation studies can be found here: <https://americorps.gov/evidence-exchange/americorps-nccc-impact-studies>

operations, this analysis uses findings from studies of similar weatherization programs and a study on the social cost of carbon.

*Weatherization Works – Summary of Findings from the Retrospective Evaluation of the U.S. Department of Energy's Weatherization Assistance Program.*⁵

This study by the Oak Ridge National Laboratory provides an evaluation of the U.S. Department of Energy's (DOE) Weatherization Assistance Program (WAP), which provides funding for the weatherization of homes occupied by low-income households. Common weatherization activities provided by this program include air sealing, wall and attic insulation, and furnace repair and replacement. This evaluation estimates the energy savings that result from home weatherization by looking at housing characteristics, fuel type, electricity and natural gas billing histories, survey data, energy use behavior surveys, and other information. To estimate the energy savings per unit, researchers collected utility bills for single-family homes and mobile homes heated by gas or electricity for the 1-year period prior to weatherization through 1 year post-weatherization. Researchers also collected bills for a comparison group of homes over the same period. The evaluation found that the average energy savings per single-family or small multifamily housing unit was 29.3 million British thermal units (MMBtus). Using state-level data provided by the U.S. Energy Information Administration, the study found an overall average cost savings of \$264 per year in 2013 dollars due to this reduction in energy usage.

*Health and Household-Related Benefits Attributable to the Weatherization Assistance Program.*⁶

This Oak Ridge National Laboratory study explored the health and household-related benefits that result from home weatherization. The study monetized 11 different health and household benefits, including reduced home fires, reduced thermal stress on occupants, reduced asthma-related medical care and costs, increased ability to afford prescriptions, and reduced carbon monoxide poisonings. The study estimated the overall total per unit-value of all non-energy benefits to be \$14,148 over a 10-year period.

⁵ Tonn, B., Carroll, D., Pigg, S., Blasnik, M., Dalhoff, G., ... & Cowan, C. (2014-a). *Weatherization works - summary of findings from the retrospective evaluation of the U.S. Department of Energy's Weatherization Assistance Program*. Oak Ridge National Laboratory. https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRetroEvalFinalReports/ORNL_TM-2014_338.pdf

⁶ Tonn, B., Rose, E., Hawkins, B., & Conlon, B. (2014-b). *Health and household-related benefits attributable to the Weatherization Assistance Program*. Oak Ridge National Laboratory. https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRetroEvalFinalReports/ORNL_TM-2014_345.pdf

*Weatherization Assistance Program Technical Memorandum Background Data and Statistics.*⁷

This memorandum by the Oak Ridge National Laboratory looks at outcomes of the WAP and provides greater detail on the program, the population it serves, the energy and cost savings it produces, and its cost effectiveness. The evaluation estimates that each weatherized unit had an annual per-unit energy savings of 29 MMBtus and a reduction in carbon dioxide emissions of 2.65 metric tons. These values can be used to estimate the social and environmental benefit of reduced carbon emissions that result from home weatherization by NCCC.

*Comprehensive Evidence Implies a Higher Social Cost of CO₂.*⁸

This study provides a value for the social cost of carbon dioxide, based on the monetary value of the damages to society caused by an incremental increase in CO₂ emissions. As home weatherization decreases energy usage and corresponding carbon emissions, this value can be used to estimate the benefit to society resulting from NCCC's weatherization efforts.

Selection of NCCC Weatherization Projects for the AmeriCorps ROI Project

ICF recommended AmeriCorps NCCC weatherization projects for an ROI study after reviewing NCCC-wide performance measurement information. The programmatic data on the weatherization portion of NCCC programming, combined with literature that documents outcomes from weatherization, made it a strong candidate for estimating ROI.

This study of NCCC's weatherization efforts contributes to the body of ROI research on weatherization. In addition, it is the first application of ROI analysis to NCCC's unique program model, potentially providing an approach for estimating the return of other facets of NCCC's programming.

Comparable ROI Estimates

ROI studies of other programs that offer similar services provide context for a potential set of ROI estimates for NCCC weatherization projects. Table 2 summarizes information across studies.

⁷ Eisenberg, J.F. (2010). *Weatherization Assistance Program technical memorandum background data and statistics*. Oak Ridge National Laboratory. https://weatherization.ornl.gov/wp-content/uploads/pdf/2006_2010/ORNL_TM-2010-66.pdf

⁸ Rennert, K., Erickson, F., Prest, B. C., Rennels, L., Newell, R. G., Pizer, W., Kingdon, C., Wingenroth, J., Cooke, R., Parthum, B., Smith, D., Cromar, K., Diaz, D., Moore, F. C., Muller, U. K., Plevin, R. J., Raftery, A. E., Sevcikova, H., Sheets, H. Stock, J. H., Tan, T., Watson, M., Wong, T. E., & Anthoff, D. (2022). Comprehensive evidence implies a higher social cost of CO₂. *Nature*, 601, 687–692. <https://www.nature.com/articles/s41586-022-05224-9>

National Weatherization Assistance Program

A number of studies have estimated the cost effectiveness of DOE's WAP activities. The program funds the weatherization of homes for low-income households across the nation. Common weatherization measures include air sealing, wall and attic insulation, duct sealing, and furnace repair and replacement. The first study published by Oak Ridge National Laboratory is an evaluation of WAP program year 2008, prior to the implementation of the American Recovery and Reinvestment Act, which boosted WAP funding from \$230 million per year to \$5 billion per year.⁹ The second study released by Oak Ridge National Laboratory evaluated program year 2010.¹⁰ Both studies reported positive ROI. The benefits evaluated included energy cost savings, health-related benefits, and environmental benefits. The cost estimates encompassed total program funding, including money spent on weatherizing activities and on administration of the program. The cost-effectiveness measures were provided by housing type, fuel type, and climate zone. The weatherization activities for the 2008 program year more closely resemble those of NCCC; Tonn et al. (2014-a) found that every dollar invested in weatherization of single-family homes generated \$1.72 in energy benefits and \$2.78 in non-energy benefits.

State Weatherization Assistance Programs

Weatherization has been evaluated at the state level. The Vermont Department of Health found an ROI of \$2.91 (over a 10-year period).¹¹ The benefits evaluated included thermal and electric energy cost savings; reduced impacts of asthma, cold, and heat; and reduced fine particulate emissions. They considered but did not monetize other benefits of the program such as better mental and social health, fewer accidental injuries, and increased productivity.

A similar evaluation of the Nebraska Energy Office's Dollar and Energy Savings Loan Program and Weatherization Assistance Program also found evidence of cost effectiveness.¹² The analysis of economic impact considered energy cost savings, health benefits, and increased fire safety as benefits associated with the program.

⁹ Tonn, B., Carroll, D., Pigg, S., Blasnik, M., Dalhoff, G., ... & Cowan, C. (2014-a). *Weatherization works - summary of findings from the retrospective evaluation of the U.S. Department of Energy's Weatherization Assistance Program*. Oak Ridge National Laboratory. https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRetroEvalFinalReports/ORNLTM-2014_338.pdf

¹⁰ Tonn, B., Carroll, D., Rose, E., Hawkins, B., Pigg, S., Bausch, D., ... & Conlon, B. (2015). *Weatherization works II—summary of findings from the ARRA period evaluation of the U.S. Department of Energy's Weatherization Assistance Program*. Oak Ridge National Laboratory. https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRecoveryActEvalFinalReports/ORNLTM-2015_139.pdf

¹¹ Vermont Department of Health. (2018). *Weatherization + health: Health and climate change co-benefits of home weatherization in Vermont*. https://www.healthvermont.gov/sites/default/files/documents/pdf/ENV_CH_WxHealthReport.pdf

¹² Rosenbaum, D., Thompson, E., DeKraai, M., Laitner, J., & Pursley, J. (2012). *The energy, economic and environmental impacts of the Nebraska Energy Office's Dollar and Energy Savings Loan Program and Weatherization Assistance Program*. University of Nebraska – Lincoln. <https://neo.ne.gov/info/pubs/pdf/2012-wx-loan-final-report.pdf>

Unlike other comparable ROI estimates, the authors also considered the economic impact of the weatherization program through the sponsoring of construction activity and appliance purchases. Though the evaluation did not report an ROI estimate, they reported an energy cost savings ratio of \$0.58 for every \$1 invested and health and safety benefits of more than \$3.7 million over the life cycle of the investments.

Table 2. Relevant ROI Studies

Study	Study area	Benefits/ cost savings evaluated	ROI estimate* (return in dollars for every \$1 in cost)
Tonn et al. (2014-a)	National weatherization program (program year 2008)	Benefit: Energy cost savings, health benefits, and environmental benefits Cost: Program cost	\$1.72 (energy-related benefits) \$2.78 (all benefits)
Tonn et al. (2015)	National weatherization program (program year 2010)	Benefit: Energy cost savings, health benefits, and environmental benefits Cost: Program cost	\$1.12 (energy-related benefits)
Vermont Department of Health (2018)	State home weatherization program	Benefit: Reduced household energy usage and cost, improved housing conditions (resulting in improved health), reduced greenhouse gas emissions, increased resilience to climate change impacts Cost: Program cost	\$2.91 (10-year benefit)

Study	Study area	Benefits/ cost savings evaluated	ROI estimate* (return in dollars for every \$1 in cost)
Rosenbaum et al. (2012)	State home weatherization program	Benefit: Reduced household energy usage and cost, improved housing conditions (resulting in improved health), reduced greenhouse gas emissions, increased resilience to climate change impacts Cost: Program cost	N/A

*Where studies did not report ROIs, they were calculated based on the net benefits and net costs, where available.

ROI Methodology

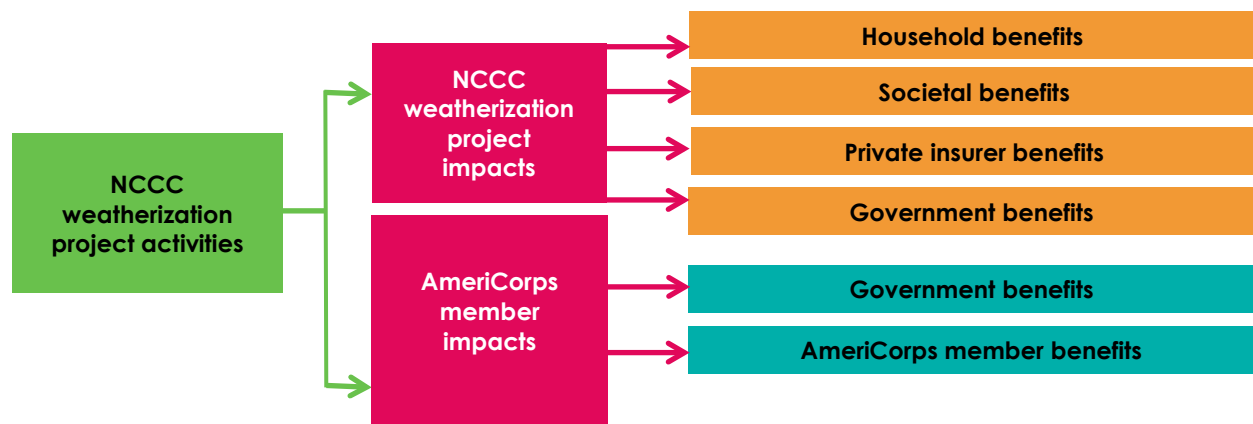
The methodology for estimating the ROI for NCCC weatherization projects conducted during the 2021–2022 program year consisted of the following components:

1. **Measuring and monetizing program benefits.** This included using program data provided by NCCC, publicly available data, and other third-party sources to determine the benefits to households, society, private insurers, AmeriCorps members, and the federal government.
2. **Estimating forgone benefits (opportunity costs).** This ROI analysis estimated two types of forgone benefits. The first was the professional opportunity cost to NCCC AmeriCorps members for the portion of their period of national service spent on weatherization projects, during which they could have earned more pay by doing other work. The second was the investment opportunity cost for NCCC weatherization project funding that could have been used for other purposes.
3. **Assessing program costs.** NCCC provided weatherization project costs for the 2021–2022 program year. NCCC costs included operating costs, AmeriCorps member expenses, and other indirect costs. AmeriCorps NCCC member expenses included the living allowance amounts received during service for housing, meals, and service-related travel and the education awards received post-service.
4. **Calculating the ROI.** The ROI analysis includes two ROI calculations, each assessed under three scenarios representing different assumptions about the persistence of program outcomes:
 - Total benefits per federal dollar
 - Federal government benefits per federal dollar

Other ROI studies in this series include estimates of *total benefits per funder dollar*. However, NCCC receives only federal government funding, leading to identical values for the ROI estimates for *total benefits per federal dollar* and *total benefits per funder dollar*. For that reason, this study omits the *total benefits per funder dollar* calculation.

This analytical framework includes only those benefits that could be reasonably monetized given the available data and that likely would not have occurred without NCCC weatherization projects. Figure 1 shows how NCCC weatherization project activities can result in benefits to program beneficiaries who receive services provided by NCCC weatherization projects; AmeriCorps members; society; private insurers; and federal, state, and local governments.

Figure 1. Benefits Among Stakeholder Groups From NCCC Weatherization Projects



Available data establish that NCCC AmeriCorps members enjoy earnings impacts as a result of serving in the program. However, the data do not establish the duration of those benefits. To address a range of possible durations for those benefits, the analysis includes three scenarios:¹³

- **Short-term.** This scenario assumes short-term earnings impacts. The assumption is that earnings impacts are limited to a single year after program exit. This scenario also assumes no lifetime benefits are realized.
- **Medium-term.** This scenario assumes a longer duration of earnings impacts. The assumption is that earnings impacts last 15 years. A 3 percent discount rate is

¹³ These three scenarios consider varying durations of how long increased employment and earnings benefits last for AmeriCorps members. They also consider varying durations for lifetime benefits that stem from NCCC. For example, lifetime benefits in terms of decreased public assistance, social insurance, and corrections costs result from AmeriCorps members' higher educational attainment post-service. The analysis estimates lifetime benefits differently in the three scenarios. Specifically, the net present value of the entire lifetime benefit is realized for the long-term scenario, half of the net present value of the lifetime benefit is realized for the medium-term scenario, and no lifetime benefit amount is realized for the short-term scenario.

applied each year to represent net present value in 2022 dollars.¹⁴ This scenario also assumes only half of the net present value of lifetime benefits is realized.

- **Long-term.** This scenario assumes sustained earnings impacts throughout NCCC AmeriCorps members' working years. The assumption is that earnings impacts last 30 years. A 3 percent discount rate is applied each year to represent net present value in 2022 dollars. This scenario also assumes the entire net present value of lifetime benefits is realized.

The long-term scenario (i.e., 30 years of sustained employment and earnings benefits) represents roughly a lifetime of working years for a given person while the short-term scenario assumes benefits for only the year after program participation or service is completed. The medium-term scenario (i.e., 15 years of sustained employment and earnings benefits) represents the midpoint between these two scenarios.

Monetizing Program Benefits, Forgone Benefits (Opportunity Costs), and Program Costs

This analysis monetized an array of benefits, costs, and expected opportunity costs—all in 2022 dollars—to assess the ROI of NCCC's weatherization projects. Additional details on the methodology employed and the calculations used for this analysis are in Appendix B. Data on costs and benefits are from the 2021–2022 program year, for which the most recent data were available.

Outcomes of NCCC weatherization projects include monetizable benefits to NCCC AmeriCorps members; households whose homes have been weatherized; society; and federal, state, and local governments. Table 3 summarizes benefits by stakeholder group.

Table 3. Benefits Realized From NCCC Weatherization by Stakeholder Group

Stakeholder group	Benefits
Households living in weatherized homes	<ul style="list-style-type: none"> • Cost savings from reduced energy usage • Health benefits from weatherization projects
Society	<ul style="list-style-type: none"> • Reduced costs to society from carbon emissions
Private insurers	<ul style="list-style-type: none"> • Reduced costs as a result of health benefits to households
NCCC AmeriCorps members	<ul style="list-style-type: none"> • Additional earnings from reduced unemployment • Additional lifetime earnings from increased educational attainment as a result of education awards • Post-tax living allowances and education awards

¹⁴ The Office of Management and Budget (1992) defines a discount rate as, "The interest rate used in calculating the present value of expected yearly benefits and costs" (p. 18). Regarding the 3 percent discount rate, see Office of Management and Budget (2003).

Stakeholder group	Benefits
Federal, state, and local governments	<ul style="list-style-type: none"> • Tax revenue from increased earnings by NCCC members post-program and sales tax revenue from increased economic activity • Tax revenue from living allowances and education awards • Reduced lifetime spending on corrections, public assistance, and social insurance from increased educational attainment by NCCC AmeriCorps members as a result of education awards • Lifetime tax revenue from increased educational attainment by NCCC AmeriCorps members as a result of education awards • Reduced spending on public health insurance programs as a result of health benefits to households

It is important to note that NCCC AmeriCorps members engage in a large number of service activities besides home weatherization. This analysis solely focuses on NCCC's weatherization activities and, therefore, does not include the monetized benefits or costs from other NCCC work. The analysis estimates the portion of benefits and costs attributable to weatherization projects based on the proportion of hours spent on weatherization activities within each project during the 2021–2022 program year when compared to all project activities. The proportion of hours spent on weatherization, which was about 19 percent across all projects, was used as a proxy to estimate the proportion of overall costs that can be attributed to weatherization activities, as well as the proportion of benefits that NCCC AmeriCorps members receive.

Benefits to Households Living in Weatherized Homes

Cost Savings From Reduced Energy Usage

Homes weatherized by NCCC AmeriCorps members generally experience a decrease in energy consumption following weatherization. Activities such as insulation of basements and attics or gasket installation on exterior doors improve the energy efficiency of homes, leading to this decrease. Tonn et al. (2014-a) found an average savings of 29.3 MMBtus per weatherized unit. This decrease in consumption results in an annual cost saving for households living in weatherized homes.

Health Benefits From Weatherization Projects

As described in Tonn et al. (2014-b), weatherization also leads to health benefits for household members. This analysis uses Tonn's results to estimate these health benefits from weatherization projects: reduced thermal stress on occupants from both cold and heat, reduced asthma-related medical care and costs, and fewer missed days at work.

Benefits to Society

Reduced Costs to Society From Carbon Emissions

Weatherization improves the energy efficiency of homes, leading to a decrease in carbon emissions. This analysis multiplied the number of homes weatherized by estimates of the annual carbon dioxide emissions reduction for a single weatherized home unit provided by Eisenberg (2010). The reduction in carbon emissions was then valued using the social cost of carbon (Rennert et al., 2022).

Benefits to Private Insurers

Reduced Costs to Private Insurers From Improved Health Outcomes of Households

As described in Tonn et al. (2014-b), weatherization leads to health benefits for household members, including reduced thermal stress on occupants, reduced asthma-related medical care and costs, and fewer missed days at work. These health benefits also benefit private insurers in the form of reduced spending on healthcare. Using data from the Agency for Healthcare Research and Quality (AHRQ, 2021) on the percentage of people across the United States covered by public or private insurance, this analysis estimates cost savings to private insurers from the improved health outcomes.

Benefits to NCCC AmeriCorps Members

Additional Earnings From Reduced Unemployment

Evaluations have shown that serving in AmeriCorps fosters higher skill acquisition, increased educational attainment, and higher income from increased employment post-national service.¹⁵ Freidman et al. (2016) found that unemployment among AmeriCorps members 6 months after their period of national service was 5 percentage points lower compared to 6 months before service.¹⁶ To monetize this decrease in unemployment, the analysis first determined the demographic distribution of NCCC AmeriCorps members who served during the 2021–2022 program year in terms of race/ethnicity, gender, age, and education level pre-service using data provided by NCCC. The analysis then proceeded to:

1. Estimate NCCC AmeriCorps members' per-person average annual earnings (weighted by the above demographics) using data from the Current Population Survey's Annual Social and Economic (ASEC) Supplement for 2022 (U.S. Census Bureau, 2022-b). Approximately 19 percent of the annual earnings estimate was used in further calculations to represent the weatherization portion of earnings.
2. Multiply the 5-percentage-point reduction in unemployment from Freidman et al. (2016) by the number of full-time equivalent (FTE) NCCC AmeriCorps members

¹⁵ Relevant studies include Markovitz et al., 2008; Spera et al., 2013; Friedman et al., 2016; Zeidenberg et al., 2016.

¹⁶ See page 56 of Friedman et al. (2016).

who served during the most recent program year to estimate the number of *additional* NCCC AmeriCorps members employed post-service.

3. Multiply the demographically weighted per-person average annual earnings by the number of additional NCCC AmeriCorps members employed to estimate the total increased earnings attributable to the weatherization portion of national service.

The earnings metrics for NCCC AmeriCorps members were applied and discounted based on the short-term, medium-term, and long-term scenarios to represent net present 2022 dollars. The post-tax NCCC AmeriCorps members' projected earnings represent the additional income earned by AmeriCorps members attributable to the weatherization portion of their service with NCCC.

Additional Lifetime Earnings From Increased Educational Attainment as a Result of Education Awards

Another benefit derived from national service is the higher educational attainment of AmeriCorps members. AmeriCorps members in general—as documented in Friedman et al. (2016)—can use their education awards to pay for additional postsecondary educational attainment or to repay student loans. Friedman et al. (2016) reported that 46 percent of NCCC members used their education award to pursue additional postsecondary education while 33 percent used it to repay student loans.¹⁷

This analysis estimated the expected increase in lifetime earnings of NCCC AmeriCorps members attributable to their education awards. The analysis estimated the portion of members' education awards corresponding to the share of NCCC's work focused on weatherization work (roughly 19 percent). Based on the findings from Friedman et al. (2016), this ROI analysis further estimated the amount in post-tax education awards used to pay for additional educational attainment. The analysis then estimated the value of the additional educational attainment using data from Trostel (2015). The estimated weatherization portion of additional post-tax lifetime earnings was included as a benefit to NCCC AmeriCorps members.

Post-Tax Living Allowances and Education Awards

Member-specific benefits to AmeriCorps members serving with NCCC include post-tax living allowances members receive during their national service and post-tax education awards they receive after service completion. Both are considered taxable income and thus result in increased government revenue.¹⁸

The post-tax living allowance and the education award amount that was used to repay student loans were included in the ROI analysis as direct one-time benefits to NCCC AmeriCorps members. The analysis estimated the portion of post-tax living allowances

¹⁷ Friedman et al. (2016). op. cit. Exhibit VIII-6.

¹⁸ The tax implications of the AmeriCorps member education award are stated here: AmeriCorps. (n.d.). Segal AmeriCorps Education Award. <https://americorps.gov/members-volunteers/segal-american-corps-education-award>

and post-tax education awards corresponding to the share of NCCC's work focused on weatherization (roughly 19 percent).

Benefits to Government

Tax Revenue From Increased Earnings by NCCC Members Post-Program and Sales Tax Revenue From Increased Economic Activity

Federal, state, and local governments benefit from increased earnings by NCCC AmeriCorps members due to lower unemployment as a result of service. Those benefits include:

- **Income tax revenue from increased earnings by NCCC AmeriCorps members post-service.** Federal income taxes, state income taxes, Medicare taxes, and Social Security taxes were estimated for the weatherization portion of the additional pre-tax earnings of NCCC AmeriCorps members based on 2022 rates. For both federal and state income taxes, the analysis estimated proportional tax rates representing the share of earnings paid in taxes.

To estimate proportional tax rates that reflect federal- and state-level progressive tax brackets and standard deductions, the amount of total taxes paid was divided by the pre-tax earnings per NCCC AmeriCorps member. For the state income tax rate, the analysis weighted individual state-level rates by their respective state populations to estimate a weighted national tax rate to apply program-wide. A weighted national tax rate was used because NCCC AmeriCorps members may disperse to various locations nationwide following their service terms and continue to migrate over the course of their working years.

- **Sales tax revenue from the increased economic activity that results from increased earnings by NCCC AmeriCorps members post-service.** To estimate the additional sales tax revenue generated due to the additional post-tax earnings of NCCC AmeriCorps members, the combined state and average local sales tax rate for the United States—weighted by states' populations—was calculated. This analysis applied that rate to the estimated taxable expenditures of NCCC AmeriCorps members based on their post-service pre-tax earnings using Consumer Expenditure Survey data (U.S. Bureau of Labor Statistics, 2022-c).¹⁹ The resulting product was then applied to the share of post-tax earnings attributable to serving with NCCC to estimate state and local government sales tax revenue.

Tax Revenue From Living Allowances and Education Awards

The living allowance provided to NCCC AmeriCorps members during their service term is considered taxable income. This analysis applied a proportional federal income tax

¹⁹ To calculate the estimated taxable expenditures, Consumer Expenditure Survey (CE) Table 1203 was used from the U.S. Bureau of Labor Statistics (2022-c). This table lists the annual expenditure means by pre-tax income tax brackets. Thus, the pre-tax earnings of NCCC AmeriCorps members were used instead of their post-tax earnings to calculate this metric. Please visit this site for more details: <https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income>.

rate as well as Medicare and Social Security tax rates to the weatherization portion of the pre-tax living allowance amount received by NCCC AmeriCorps members for the most recent program year. The analysis also applied a sales tax rate to the estimated taxable expenditures of NCCC AmeriCorps members based on their post-tax living allowance amount to estimate additional state and local government revenue.

Education awards provided to NCCC AmeriCorps members upon service completion are subject to taxes, resulting in additional government revenue.²⁰ This ROI analysis applied federal income, state income, Social Security, and Medicare tax rates to the expected weatherization portion of the total amount of education awards to be given to NCCC AmeriCorps members (roughly 19 percent) to estimate these additional taxes. Both estimated proportional federal and state income tax rates were used. Sales taxes were not estimated for education awards because they cannot be used for consumer purchases.

Reduced Lifetime Spending on Corrections, Public Assistance, and Social Insurance From Increased Educational Attainment by NCCC AmeriCorps Members as a Result of Education Awards

Higher educational attainment is associated with less dependence on government assistance programs and lower incarceration rates (Blagg and Blom, 2018; Harlow, 2003). Because of NCCC AmeriCorps members' increased postsecondary educational attainment due to the use of the education award, federal and state governments spend less. For the monetization of these benefits, the analysis paired the expected increase in postsecondary educational attainment of NCCC AmeriCorps members with the expected difference in per-person lifetime government cost savings from Medicaid, SNAP, unemployment insurance, workers' compensation, and corrections for individuals with different levels of educational attainment. The latter values were provided by Trostel (2015).

Lifetime Tax Revenue From Increased Educational Attainment by NCCC AmeriCorps Members as a Result of Education Awards

Another benefit related to NCCC AmeriCorps members captured in this ROI study is the lifetime tax revenue generated from members' higher postsecondary educational attainment due to the use of the weatherization portion of the education award (roughly 19 percent of the full award amount). Here, the estimated increase in NCCC AmeriCorps members' postsecondary educational attainment was paired with the expected difference in per-person lifetime taxes for individuals with different levels of education as provided by Trostel (2015). This lifetime tax revenue includes federal income, state income, property, Social Security, Medicare, and sales taxes derived from use of the education award.

²⁰ The tax implications of the AmeriCorps member education award are stated here: AmeriCorps. (n.d.). Segal AmeriCorps Education Award. <https://americorps.gov/members-volunteers/segal-american-corps-education-award>

Reduced Spending on Public Health Insurance Programs as a Result of Health Benefits to Households

As described in Tonn et al. (2014-b), weatherization leads to health benefits for household members, including reduced thermal stress on occupants, reduced asthma-related medical care and costs, and fewer missed days at work. These health benefits also benefit the federal government in the form of reduced spending on health insurance. This analysis uses data from the Agency for Healthcare Research and Quality (AHRQ, 2021) on the percentage of people across the United States covered by public or private insurance to estimate cost savings to public insurance from the improved health outcomes.

Forgone Benefits (Opportunity Costs)

The analysis estimated forgone benefits of both members and funders because of their participation and investment in NCCC. These forgone benefits were subtracted from the program benefits (shown above) to calculate the net benefits of the program. Those net benefits were then compared to program cost to calculate the ROI. These forgone benefits are referred to as the *professional and investment opportunity costs*, described below.

Professional Opportunity Cost to NCCC AmeriCorps Members

The forgone benefit was the professional opportunity cost to NCCC AmeriCorps members for the portion of their period of national service spent on weatherization projects, during which they could otherwise be working and earning higher pay. To calculate the opportunity cost, this analysis estimated what NCCC AmeriCorps members would have earned if they did *not* serve with NCCC. Specifically, this analysis estimated the weighted average annual earnings of this group as well as their weighted unemployment rate using ASEC data and the demographic distribution of NCCC AmeriCorps members for the 2021–2022 program year. The demographics included were gender, age, race/ethnicity, and the highest level of education pre-service. The weighted average annual earnings represent the expected earnings of the NCCC AmeriCorps members if they were employed but *not* serving with NCCC. The weighted unemployment rate represents how many of the NCCC AmeriCorps members would have been unemployed if they did *not* serve with NCCC. These weighted metrics were first used to estimate the portion of NCCC AmeriCorps members who would have been employed and then to calculate the aggregate earnings those employed individuals would have made without serving with NCCC. Namely, they are used to calculate the aggregate post-tax earnings this population would forgo due to serving with NCCC for 1 year. A specific portion of the post-tax earnings estimate for this population was then calculated using the estimated amount of time NCCC AmeriCorps members spent specifically on weatherization. The analysis estimated the amount of this forgone benefit to correspond to the share of NCCC's work focused on weatherization work (roughly 19 percent). This value represents the forgone earnings as a result of weatherization projects.

Some of the forgone earnings would have been paid in the form of taxes. To appropriately allocate opportunity costs between NCCC AmeriCorps members and

federal and state governments, the analysis estimated the reduced tax revenue for federal income, state income, Social Security, and Medicare taxes. The analysis also estimated the reduction in sales tax from reduced consumption. Combined, these taxes represent what the various levels of government are forgoing in tax revenue when these individuals decide to serve with NCCC instead of working for higher pay. The summation of all forgone taxes and the forgone post-tax earnings of NCCC AmeriCorps members is called the *total professional opportunity cost*.

It is important to note that in the *federal government benefits per federal dollar* ROI calculation, only federal government (not total) benefits are included. Given this, only federal components of the professional opportunity cost were subtracted from all federal government benefits (e.g., tax revenue and cost savings) realized as a result of NCCC in this ROI calculation. The parts of the professional opportunity cost removed from these total federal government benefits included the federal income, Social Security, and Medicare taxes forgone due to NCCC AmeriCorps members forgoing earnings during their service year. The summation of these forgone federal taxes is called the *federal professional opportunity cost*.

Investment Opportunity Cost to Funders

The second forgone benefit used in this ROI analysis is an investment opportunity cost. It estimates the expected forgone return if all funds used to support NCCC weatherization projects during the 2021–2022 program year were invested in U.S. Treasury bonds instead. To calculate this, the analysis matched 2021 real interest rates provided by the Office of Management and Budget (2023) to each of the scenarios leveraged in this ROI analysis: short-term, medium-term, and long-term.²¹ The rates of return for U.S. Treasury bonds provide a market-based estimate of return for low-risk investments.

The real interest rate for the 3-year maturity was used for the short-term scenario, the average between the 10-year and 20-year maturity rates was used as the rate for the medium-term scenario, and the 30-year maturity rate was used for the long-term scenario. These real interest rates were -1.2 percent, 0.2 percent, and 0.5 percent, respectively (Office of Management and Budget, 2023). Also, the number of time periods elapsed on these bonds was equal to the number of years the short-term, medium-term, and long-term scenarios assume NCCC AmeriCorps members' employment and earnings gains are sustained, 1 year, 15 years, and 30 years, respectively. These bonds compound biannually, according to the U.S. Department of the Treasury (2022). The forgone accrued interest was calculated for each of the three scenarios if the funding amount used to support NCCC was instead invested.

²¹ The analysis used 2021 real interest rates for U.S. Treasury bonds because the program year analyzed began in 2021.

Program Costs

The costs for NCCC, used for this ROI analysis, include federal funding used to support program operations. The program costs are specific to funding weatherization activities as a segment of NCCC programming.

ROI Study Limitations

The study had limitations that prevented the analysis from capturing the full benefits that likely derive from NCCC weatherization projects. The limitations include the following:

- Two of the primary sources used to estimate the monetary benefits of home weatherization were published in 2014, making them somewhat dated. It is likely that there have been technological advancements related to weatherization over the last decade that may improve the energy savings and overall monetary benefit of home weatherization.
- Specific information on the types of homes that were weatherized by NCCC AmeriCorps members was not available. This analysis assumes that all homes were single-family homes when determining energy savings. However, the true energy savings for each home may vary based on the home type.
- The ROI estimate assumes the benefits of weatherization improvements remain constant over time due to a lack of available data and research on the length of home weatherization benefits. Multiple factors may affect the benefits from weatherization over time. For example, degradation of the materials used to weatherize units may decrease weatherization benefits. However, the benefits may also increase if weather events such as heat waves become more extreme. Additional research on the benefits of home weatherization improvements over time is needed to generate a more precise ROI.

Program Benefits, Forgone Benefits (Opportunity Costs), Program Costs, and ROI Results

This section provides estimates of program benefits, forgone benefits (opportunity costs), and program costs, along with the ROI results.

Program Benefits

Table 4 shows the estimates of monetized benefits of NCCC by stakeholder group for each of the three scenarios. In parentheses, the table shows the stakeholder benefit estimates as a percentage of benefits overall for each scenario. Benefits to NCCC AmeriCorps members were the largest benefit across all three scenarios.

Table 4. Program Benefits by Recipient

Recipient	Benefits by scenario in 2022\$ (percentage of benefits)		
	Short-term	Medium-term	Long-term
Households	\$17,905 (16.6%)	\$268,568 (20.4%)	\$537,136 (20.6%)
Society	\$16,854 (15.6%)	\$252,810 (19.2%)	\$505,620 (19.4%)
Private insurers	\$4,681 (4.3%)	\$70,214 (5.3%)	\$140,429 (5.4%)
NCCC AmeriCorps members	\$52,060 (48.2%)	\$615,570 (46.7%)	\$1,216,656 (46.6%)
Federal government	\$13,542 (12.5%)	\$86,790 (6.6%)	\$165,138 (6.3%)
State and local governments	\$2,885 (2.7%)	\$24,089 (1.8%)	\$46,775 (1.8%)
Total	\$107,926	\$1,318,041	\$2,611,754

Note: Numbers may not sum due to rounding.

Benefits to households, society, private insurers, and government from weatherized homes included benefits to various stakeholders.

- Households living in weatherized homes benefited from reduced energy costs and reduced medical costs.
- Society benefited from decreased costs of carbon emissions.
- Private insurers and the federal government benefited from reduced spending on public insurance programs as a result of health benefits to individuals living in weatherized homes.

Altogether, the benefits from weatherized homes accounted for 48 percent of program benefits over the long-term scenario, as shown in Table 5.

Table 5. Benefits From Weatherized Homes Compared to Other Benefits

Recipient	Benefits by scenario (2022\$) (% of total)		
	Short-term	Medium-term	Long-term
Benefits from weatherized homes	\$41,408 (38%)	\$621,123 (47%)	\$1,242,245 (48%)
Other benefits	\$66,518 (62%)	\$696,918 (53%)	\$1,369,508 (52%)
Total	\$107,926	\$1,318,041	\$2,611,754

Note: Numbers may not sum due to rounding.

Forgone Benefits (Opportunity Costs)

Table 6 shows the breakdown of the forgone benefits from the professional opportunity cost to NCCC AmeriCorps members and government in net present 2022 dollars. It provides the amount of post-tax earnings that members forgo—and the associated taxes forgone—to serve with NCCC. This is called the *total professional opportunity cost*. For the *federal government benefits per federal dollar ROI* calculation, only the forgone federal income, Social Security, and Medicare taxes were subtracted from the total

federal benefits that are realized due to NCCC. The summation of these forgone federal taxes is called the *federal professional opportunity cost*.

Table 6. Forgone Benefits From Professional Opportunity Cost

Forgone category	Professional opportunity cost amount across all scenarios (2022\$)
Post-tax earnings	\$666,588
Federal income, Social Security, and Medicare taxes	\$57,944
State income and sales taxes	\$32,901
Total	\$757,432

Table 7 lists the forgone benefits from the investment opportunity cost incurred by scenario when NCCC weatherization project funding is invested in U.S. Treasury bonds. Table 7 also lists the 2021 real interest rates and the number of years elapsed (with two payments a year) that were used as inputs to calculate the forgone accrued interest value for each scenario.

Table 7. Investment Opportunity Cost by Scenario

Funding stream	Forgone accrued interest by scenario (2022\$)		
	Short-term (-1.20% interest rate and 1 year elapsed)	Medium-term (0.2% interest rate and 15 years elapsed)	Long-term (0.5% interest rate and 30 years elapsed)
NCCC weatherization project funding	\$2,652	\$65,804	\$179,924

Program Costs

Total program costs for NCCC weatherization projects during the 2021–2022 program year amounted to \$124,439, all of which comes from federal funding. The federal government funds education award amounts granted to NCCC AmeriCorps members once they have completed their service term.

ROI Results

This analysis developed three ROI estimates using the three scenarios (short-term, medium-term, and long-term). The ROI calculations compare the net benefits of NCCC weatherization projects with costs to calculate the ROI. As noted above, this analysis did not include the impact of many other NCCC activities.

Table 8 shows the program gross benefits, forgone benefits, net benefits, and cost of NCCC and each of the components that are used to calculate the three ROIs.

Table 8. Program Benefits, Net Benefits, and Program Costs by ROI Scenario

Benefits and costs	ROI scenario (2022\$)		
	Short-term	Medium-term	Long-term
Total program gross benefits	\$107,926	\$1,318,041	\$2,611,754
Household benefits	\$17,905	\$268,568	\$537,136
Societal benefits	\$16,854	\$252,810	\$505,620
Private insurer benefits	\$4,681	\$70,214	\$140,429
AmeriCorps member benefits	\$52,060	\$615,570	\$1,216,656
Federal government benefits	\$13,542	\$86,790	\$165,138
State and local government benefits	\$2,885	\$24,089	\$46,775
Total forgone benefits (opportunity cost)	\$816,874	\$852,545	\$917,005
Forgone benefits to members (forgone earnings post-taxes)	\$757,432	\$757,432	\$757,432
Forgone tax revenue from members' earnings	\$57,944	\$57,944	\$57,944
Forgone tax revenue federal government	\$47,623	\$47,623	\$47,623
Forgone tax revenue state/local governments	\$10,321	\$10,321	\$10,321
Forgone benefits from total investment (NCCC only receives federal funding)	\$1,498	\$37,169	\$101,629
Total program net benefits (total program gross benefits – total forgone benefits)	-\$708,947	\$465,496	\$1,694,749
Net benefits households (household benefits)	\$17,905	\$268,568	\$537,136
Net benefits society (societal benefits)	\$16,854	\$252,810	\$505,620
Net benefits private insurers (private insurer benefits)	\$4,681	\$70,214	\$140,429
Net benefits members (member benefits – forgone benefits members)	-\$705,372	-\$141,862	\$459,224
Net benefits federal government (federal government benefits – forgone tax revenue to federal government – forgone benefits from federal government investment)	-\$35,579	\$1,998	\$15,886
Net benefits state/local government (state/local government benefits – forgone tax revenue state/local governments)	-\$7,436	\$13,768	\$36,454
Program cost	\$124,439	\$124,439	\$124,439

Benefits and costs	ROI scenario (2022\$)		
	Short-term	Medium-term	Long-term
Federal government cost	\$124,439	\$124,439	\$124,439
ROI for total benefits per federal dollar (Total program net benefits / federal government cost)	-\$2.96	\$2.25	\$7.60
Federal government benefits per federal dollar (Net benefits federal government / federal government cost)	-\$0.21	-\$0.17	-\$0.33

Table 9 shows the ROI results. The first row shows *total benefits per federal dollar* and the second row shows *federal government benefits per federal dollar*. The ROI estimates are presented as dollars returned for every dollar of investment. Specifically, these ratios take the form of the sum of monetized benefits over the sum of applicable program costs. The ROIs expressed as cost–benefit ratios in this study can be interpreted as the amount of dollars returned for every \$1 of investment (or program cost).²² See Appendix B for the formulas used to calculate each ROI calculation.

Table 9. ROI Results for NCCC

ROI calculation	ROI scenario		
	Short-term	Medium-term	Long-term
Total benefits per federal dollar	-\$2.96	\$2.25	\$7.60
Federal government benefits per federal dollar	-\$0.21	-\$0.17	-\$0.33

Note: Other ROI studies in this series include estimates of *total benefits per funder dollar*. However, NCCC receives only federal government funding, leading to identical values for the ROI estimates for *total benefits per federal dollar* and *total benefits per funder dollar*. For that reason, this study omits the *total benefits per funder dollar* calculation.

The program produces strong returns in the medium- and long-term scenarios for the *total benefits per federal dollar*. The most significant factors driving the positive ROI estimates are:

- **Educational attainment outcomes of AmeriCorps members.** After serving in the AmeriCorps program, AmeriCorps members receive an education award, which is used by a portion of members to help pay for postsecondary degrees post-service. The additional educational attainment resulting from the use of the education award generates additional earnings for AmeriCorps members.
- **Employment outcomes of AmeriCorps members.** Past studies establish that AmeriCorps members experience increased employment and increased earnings post-service.

²² ROIs can be expressed in percentages or as ratios, such as in this study. Although not shown as a ratio in the results, the ROIs in this study show the amount of return for every \$1 invested.

- **Benefits to households, society, and government from weatherized homes.** These included benefits to various stakeholders. Households living in weatherized homes benefited from reduced energy costs and reduced medical costs. Society benefited from decreased costs of carbon emissions. The federal government benefited from reduced spending on public insurance programs as a result of health benefits to households.

In the short-term scenario for the *federal benefits per federal dollar* ROI calculation, the ROI results are negative because the costs of funding NCCC weatherization projects, combined with opportunity costs, exceed benefits 1 year post-program.

ROI estimates that are negative or below \$1 in the first year post-program are characteristic of programs where there is an initial one-time investment and benefits accrue in the following years. This is because it can require several years of benefits to recoup the initial investment and generate positive returns. The break-even point for NCCC weatherization projects is between years 9 and 10. After that point, accrued benefits exceed costs for the *total benefits per federal dollar* ROI calculation. As a result, the medium- and long-term ROI estimates are positive.

NCCC AmeriCorps members for the 2021–2022 program year have a relatively high level of educational attainment prior to service compared to other analyzed AmeriCorps programs. That characteristic results in a comparatively high opportunity cost of what they could have earned had they not participated in AmeriCorps service.

The *federal government benefits per federal dollar* calculations estimate losses for all three scenarios. NCCC weatherization projects are intended primarily to generate benefits to society, households, and AmeriCorps members, rather than benefits to the federal government, so these results are consistent with the design of the projects.

Recommendations for Further Research

Future ROI studies for national and community service programs, such as NCCC, can be strengthened in several ways.

Recommendation 1: Monetize additional benefits of weatherization through improved data collection. Future evaluations should attempt to collect data on specific outcomes for households living in homes weatherized by NCCC AmeriCorps members to understand the full range of energy- and health-related benefits. Similarly, additional research is needed to understand the direct relationship between weatherization efforts and health-related expenses and costs to households. Additional information on how weatherization improves home air quality and reduces health risks will allow for a more precise and comprehensive ROI estimate.

Relatedly, additional research on the duration of benefits from weatherization would allow for a more precise ROI estimate.

Recommendation 2: Gather additional data on weatherization activities. Additional information on the types of units weatherized (e.g., single-family homes, townhomes, etc.) and the specific weatherization improvements made may enable a more precise estimation of energy cost savings and other outcomes.

Recommendation 3: Determine the persistence of short- and long-term impacts for AmeriCorps members. The persistence of impacts, such as earnings or employment, is often not measured in evaluations because it requires long-term tracking. Although a scenario-based approach that accounts for variations in the persistence of impacts can be used, as was completed in this ROI analysis, rigorous research on the long-term impact of programming will enable AmeriCorps to determine a single value for ROI calculations and avoid relying on the scenario-based approach. For example, Friedman et al. (2016) reported the unemployment status of AmeriCorps member alumni 6 months before service, 6 months after service, and during the summer of 2016. The authors indicate that data for the latter timepoint was collected anywhere from 3 to 11 years after service completion, depending on the AmeriCorps member alumni cohort (i.e., 2005, 2010, or 2013). The varying data collection periods for the cohorts makes it difficult to measure the duration of benefits. Thus, instead of collecting outcome measures at a time that varies by AmeriCorps member or program participant, studies should track outcomes of interest at the same intervals, multiple times after program or service completion, to provide greater insight into the duration and consistency of benefits.

Recommendation 4: Document outcomes using third-party data sources. Using third-party data, along with or in place of self-reported data, can also improve the accuracy of program outcome measurements. While self-reported data are easier to obtain—especially via the use of survey instruments—they have several disadvantages. Some answers may be exaggerated, respondents may not answer honestly, and response biases could affect results. AmeriCorps programs should—where possible—leverage data from third-party sources either to provide data for their program evaluation or to corroborate findings from self-reported data. For example, if employment and earnings outcomes are of interest, unemployment insurance data—which are submitted by employers—could be used to verify members' wages or employment status post-service. Additionally, if degree completion data are of interest, such as in the case of this ROI analysis, data from the National Student Clearinghouse (NSC) could be used to verify what portion of NCCC AmeriCorps members pursued higher education and which degrees were completed post-program with the help of the education award. Were degree or employment outcomes data available from third-party data sources (like NSC), those data may make more precise ROI estimates possible.

Recommendation 5: Quantify ripple effects. Earnings impacts for AmeriCorps members likely have positive benefits for those individuals' families and surrounding communities. Rigorous research on those potential ripple effects would enable AmeriCorps to capture a broader array of benefits of this and other programs, which would be expected to result in an increased ROI. Specifically, the longitudinal impacts on AmeriCorps members could be collected alongside the ripple effects their outcomes have on their families and communities to determine how long these indirect impacts are sustained after program participation or completion.

Conclusion

In the short-term scenario for the *federal benefits per federal dollar* ROI calculation, the ROI results for NCCC weatherization projects are negative because the costs of funding NCCC weatherization projects, combined with opportunity costs, exceed benefits 1 year post-program.

ROI estimates that are negative or below \$1 in the first year post-program are characteristic of programs where there is an initial one-time investment and benefits accrue in the following years. This is because it can require several years of benefits to recoup the initial investment and generate positive returns.

The break-even point for NCCC weatherization projects is between years 9 and 10. After that point, accrued benefits exceed costs for the *total benefits per federal dollar* ROI calculation. As a result, the medium- and long-term ROI estimates are positive.

Appendix A: Program Benefits, Forgone Benefits, and Program Costs Included in Return on Investment Calculations

In Table 10, the three columns on the right indicate by an “X” if the program benefits, forgone benefits (opportunity cost), or program cost is included in the numerator or denominator of an ROI calculation.

Table 10. Benefits and Costs Included in the NCCC ROI Calculation

Benefit or cost			Total net benefits per federal dollar	Federal government net benefits per federal dollar
Benefit	Stakeholder group	Data sources	X indicates inclusion in the ROI numerator	
Cost savings from reduced energy usage	Households	<ul style="list-style-type: none"> NCCC Tonn et al. (2014-a) 	X	
Health benefits	Households	<ul style="list-style-type: none"> NCCC Tonn et al. (2014-b) 	X	
Reduced greenhouse gas emissions	Society	<ul style="list-style-type: none"> NCCC Eisenberg (2010) Rennert et al. (2022) 	X	
Reduced spending on private health insurance	Private insurers	<ul style="list-style-type: none"> Tonn et al. (2014-b) AHRQ (2021) 	X	
Reducing spending on public health insurance	Federal government	<ul style="list-style-type: none"> Tonn et al. (2014-b) AHRQ (2021) 	X	X

Benefit or cost			Total net benefits per federal dollar	Federal government net benefits per federal dollar
Increased earnings of national service members due to increased employment and education of AmeriCorps members	AmeriCorps members	<ul style="list-style-type: none"> • NCCC • Friedman et al. (2016) • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2022-a) • U.S. Bureau of Labor Statistics (2022-b) 	X	
Increased federal and state income tax revenue due to increased earnings of AmeriCorps members	Federal and state governments	<ul style="list-style-type: none"> • NCCC • Friedman et al. (2016) • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2022-a) • Tax rate data on Bankrate.com and Durante (Tax Foundation, 2022) 	X	X
Increased Social Security and Medicare tax revenue due to increased earnings of AmeriCorps members	Federal government	<ul style="list-style-type: none"> • NCCC • Friedman et al. (2016) • U.S. Census Bureau (2022-a) • U.S. Bureau of Labor Statistics (2022-a) • Social Security Administration (2022) 	X	X

Benefit or cost			Total net benefits per federal dollar	Federal government net benefits per federal dollar
Increased sales tax revenue due to increased earnings of AmeriCorps members	State and local governments	<ul style="list-style-type: none"> NCCC Friedman et al. (2016) U.S. Census Bureau (2022-a) U.S. Bureau of Labor Statistics (2022-a) U.S. Bureau of Labor Statistics (2022-c) Tax rate data on Bankrate.com and Durante (Tax Foundation, 2022) 	X	
AmeriCorps member post-tax living allowances and education awards	AmeriCorps members	<ul style="list-style-type: none"> NCCC 	X	
Reduced spending on lifetime public assistance, corrections, and social insurance due to increased educational attainment of AmeriCorps members	Federal, state, and local governments	<ul style="list-style-type: none"> Trostel (2015) Zeidenberg et al. (2016) U.S. Census Bureau (2022-a) 	X	X
Forgone Benefit (Opportunity Cost)	Payer	Data sources	X indicates inclusion in the ROI denominator	
Opportunity costs of forgone market wages for AmeriCorps members	AmeriCorps members	<ul style="list-style-type: none"> NCCC U.S. Census Bureau (2022-a) U.S. Bureau of Labor Statistics (2022-b) 	X	X

Benefit or cost			Total net benefits per federal dollar	Federal government net benefits per federal dollar
Opportunity costs of federal taxes on forgone market wages for AmeriCorps members (e.g., federal income and social security taxes)	Federal government	<ul style="list-style-type: none"> NCCC U.S. Census Bureau (2022-a) U.S. Bureau of Labor Statistics (2022-a) U.S. Bureau of Labor Statistics (2022-b) Tax rate data on Bankrate.com and Durante (Tax Foundation, 2022) Social Security Administration (2022) 	X	X
Opportunity costs of state and local taxes on forgone market wages for AmeriCorps members (e.g., state income and state/local sales taxes)	State and local governments	<ul style="list-style-type: none"> NCCC U.S. Census Bureau (2022-a) U.S. Bureau of Labor Statistics (2022-a) U.S. Bureau of Labor Statistics (2022-b) U.S. Bureau of Labor Statistics (2022-c) Tax rate data on Bankrate.com and Durante (Tax Foundation, 2022) 	X	X
Opportunity costs of federal funders	Federal government	<ul style="list-style-type: none"> AmeriCorps U.S. Treasury Department 	X	X

Benefit or cost			Total net benefits per federal dollar	Federal government net benefits per federal dollar
Program Cost	Payer	Data Sources	X indicates inclusion in the ROI denominator	
AmeriCorps member living allowances and education awards	Federal government (AmeriCorps)	<ul style="list-style-type: none"> AmeriCorps 	X	X
National Civilian Community Corps (NCCC) weatherization project costs	Federal government (AmeriCorps)	<ul style="list-style-type: none"> NCCC 	X	X

Appendix B: Additional Information on the Methodology

This appendix provides additional details on the methodology used for this study, as a supplement to the methodology section in the main report. It describes the steps used to calculate the ROI, the results of interim calculations that contribute to the ROI calculations, and assumptions that underlie the analysis.

Methodology Overview

Estimating the ROI for the NCCC program included the following steps:

- Measuring and monetizing program benefits to households living in weatherized homes, society, private insurers, NCCC AmeriCorps members, and the different levels of government
- Estimating forgone benefits (opportunity costs)
- Assessing program costs
- Calculating the ROI

This ROI analysis included only those benefits that could be reasonably monetized given the available data and that likely would not have occurred without NCCC weatherization projects.

Available data establish that NCCC AmeriCorps members enjoy earnings impacts as a result of serving in the program. However, the data do not establish the duration of those benefits. To address a range of possible durations for those benefits, three scenarios were developed for this ROI study:

- **Short-term.** This scenario assumes short-term earnings impacts. The assumption is that earnings impacts are limited to a single year after program exit. This scenario also assumes no lifetime benefits are realized.
- **Medium-term.** This scenario assumes a longer duration of earnings impacts. The assumption is that earnings impacts last 15 years. A 3 percent discount rate is applied each year to represent net present value in 2022 dollars.²³ This scenario also assumes only half of the net present value of lifetime benefits is realized.
- **Long-term.** This scenario assumes sustained earnings impacts throughout NCCC AmeriCorps members' working years. The assumption is that earnings impacts last 30 years. A 3 percent discount rate is applied each year to represent net present value in 2022 dollars. This scenario also assumes the entire net present value of lifetime benefits is realized.

There are some differences between the three scenarios. One is the length of time that increased employment—and earnings associated with that employment—are

²³ The Office of Management and Budget (1992) defines a discount rate as, "The interest rate used in calculating the present value of expected yearly benefits and costs" (p. 18). Regarding the 3 percent discount rate, see Office of Management and Budget (2003).

sustained. The other is what portion of lifetime benefits, when applicable, are realized.²⁴ For each ROI calculation, three estimates using the three scenarios were developed, which is shown in greater detail in the Calculating ROI section.

Measuring Program Benefits

The first step in calculating the ROI for NCCC weatherization projects is to measure and monetize the program benefits. Households living in weatherized units, society, private insurers, NCCC AmeriCorps members, and various levels of government benefit from NCCC weatherization projects. These benefits were identified through an extensive literature review and data collection process. The methods used to measure benefits for each of these stakeholder groups are described below.

Benefits to Households Living in Weatherized Homes

Cost Savings From Reduced Energy Usage

Households living in weatherized homes experience a decrease in overall energy consumption following weatherization. Activities such as insulation of basements and attics or gasket installation on exterior doors improve the energy efficiency of homes, leading to this decrease. A 2014 study by Oak Ridge National Laboratory looked at the impact of the U.S. Department of Energy's Weatherization Assistance Program on household energy usage (Tonn et al. 2014-a). The study found an average savings of 29.3 MMBtus per weatherized unit per year. The analysis next used data from the U.S. Energy Information Administration's State Profiles and Energy Estimates to understand the cost savings per MMBtu to each household weatherized by NCCC AmeriCorps members, based on the state in which the household was located. Table 11 details the location of homes weatherized by NCCC and the calculation of annual cost savings by state.

Table 11. Energy Cost Savings to Households

Project location (a)	Number of homes weatherized (b)	MMBtus saved due to weatherization (c = b x 29.3 MMBtus)	Price per MMBtu (2022\$) (d)	Annual cost savings to households (e = c x d)
California	1	29.3	\$28.43	\$833.00
Arkansas	6	175.8	\$18.43	\$3,239.99
Colorado (Avon)	6	175.8	\$20.61	\$3,623.24

²⁴ These three scenarios consider varying durations of how long increased employment and earnings benefits last for NCCC AmeriCorps members. They also consider varying durations for lifetime benefits that stem from the NCCC program. For example, lifetime benefits in terms of decreased public assistance, social insurance, and corrections costs result from NCCC AmeriCorps members' higher educational attainment post-service. The analysis estimates lifetime benefits differently in the three scenarios. Specifically, the net present value of the entire lifetime benefit is realized for the long-term scenario, half of the net present value of the lifetime benefit is realized for the medium-term scenario, and no lifetime benefit amount is realized for the short-term scenario.

Project location (a)	Number of homes weatherized (b)	MMBtus saved due to weatherization (c = b x 29.3 MMBtus)	Price per MMBtu (2022\$) (d)	Annual cost savings to households (e = c x d)
Colorado (Durango)	2	58.6	\$20.61	\$1,207.75
Texas	1	29.3	\$16.53	\$484.33
Puerto Rico	1	29.3	\$19.99*	\$585.71
Minnesota	3	87.9	\$18.75	\$1,648.13
South Dakota	1	29.3	\$18.85	\$552.31
Nebraska	2	58.6	\$17.53	\$1,027.26
Iowa	3	87.9	\$16.41	\$1,442.44
Illinois	4	117.2	\$18.38	\$2,154.14
Total	30	-	-	\$16,798

*National average data was used for Puerto Rico.
Sources: NCCC and Tonn et al. (2014-a)

Health Benefits From Weatherization Projects

Oak Ridge National Laboratory also completed an analysis of the health benefits household members experienced as a part of the U.S. Department of Energy's Weatherization Assistance Program. As described in Tonn et al. (2014-b), weatherization leads to numerous health benefits for household members, including reduced asthma-related medical costs due to improved indoor air quality, reduced thermal stress on occupants, and fewer missed days at work.

Tonn et al. (2014-b) details numerous health outcomes in addition to those included in this analysis. The four included in this analysis were chosen because they have direct monetizable outcomes attributable to weatherization and reliable cost data. Table 12 details the annual monetary benefit per unit associated with reduced asthma-related medical costs, reduced thermal stress on occupants, and fewer missed days at work in 2022 dollars.²⁵ The analysis then multiplies each of these annual monetary benefits per unit by the number of homes weatherized by NCCC AmeriCorps Members to calculate a total annual household health benefit. In this case, only 23 of the 30 overall units weatherized by NCCC were used in the calculation, as the remaining seven units were considered public facilities and therefore would not result in household health benefits.

²⁵ Tonn et al. (2014-b) originally presented these estimates in 2008 dollars.

Table 12. Household Health Benefits

Reduced factors providing benefits (a)	Monetary benefit per unit (2022\$) (b)	Total annual benefit to household (c = b x 23 units)
Asthma	\$21.41	\$492.46
Thermal stress – cold	\$2.60	\$59.72
Thermal stress – heat	\$2.07	\$47.53
Missed days at work	\$22.02	\$506.53
Total	-	\$1,106.24

Sources: NCCC, Tonn et al. (2014-a)

Benefits to Society

Reduced Costs to Society From Carbon Emissions

Weatherization improves the energy efficiency of homes, leading to a decrease in carbon emissions. Eisenberg (2010) estimates the annual carbon dioxide emissions reduction for a single weatherized home to be 2.65 metric tons. This analysis used NCCC-provided data indicating that 30 homes were weatherized by NCCC AmeriCorps members during the 2021–2022 program year to calculate an overall annual reduction in carbon dioxide emissions of 79.5 metric tons.

Rennert et al. (2022) estimates the social cost of carbon dioxide, a monetized value of the damages to society caused by increases in carbon emissions. The social cost of carbon emissions is used in regulatory analysis to evaluate climate policies. It accounts for a variety of impacts on public health, property values, and agricultural production that will result when new carbon dioxide is emitted (Rennert et al., 2022). In this recent evaluation, the social cost of carbon is estimated to be \$212 per metric ton in 2022 dollars. Applying the social cost of carbon to the reduction in emissions resulting from NCCC weatherization activities, the analysis estimates an annual societal benefit of \$16,854 as a result of decreased carbon dioxide emissions due to home weatherization.

Benefits to Private Insurers

Reduced Costs to Private Insurers From Improved Health Outcomes of Households

Health benefits to household members reduce costs to private insurers. Tonn et al. (2014-b) provides an annual monetary societal benefit related to reduced asthma-related medical costs, reduced thermal stress on occupants, and fewer missed days at work. The analysis then uses data from the Agency for Healthcare Research and Quality (AHRQ, 2021) on the percentage of people across the United States covered by public or private insurance to determine the proportion of the overall benefit to households in homes weatherized by NCCC AmeriCorps members that is passed on to private

insurers. Table 13 details the annual benefit attributed to private insurers due to improved household health from weatherization.

Table 13. Private Insurer Benefit From Household Health Improvements

Reduced factors providing benefits (a)	Monetary benefit per unit (2022\$) (b)	Total annual benefit (c = b x 23 units)	Total benefit attributed to private insurers (d = c x 70.39%)
Asthma	\$253.20	\$5,823.57	\$4,099.45
Thermal stress – cold	\$20.89	\$480.58	\$338.30
Thermal stress – heat	\$9.52	\$218.87	\$154.07
Missed days at work	\$5.51	\$126.63	\$89.14
Total	-	-	\$4,681

Sources: NCCC, Tonn et al. (2014-a), and AHRQ (2021)

Benefits to NCCC AmeriCorps Members

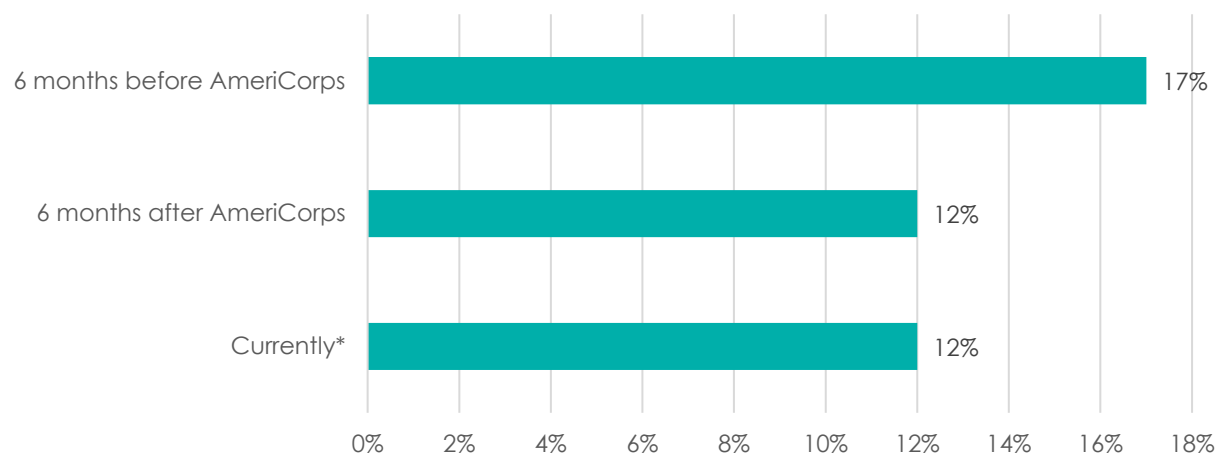
The NCCC AmeriCorps members who provide services as part of the NCCC program experience benefits due to their national service. This analysis estimated the weatherization portion of the following benefits:

- Living allowance and education award
- Increased earnings due to reduced unemployment
- Increased lifetime earnings due to increased postsecondary education derived from the use of education awards

Additional Earnings From Reduced Unemployment

According to Friedman et al. (2016), the percentage of AmeriCorps members unemployed was 5 percentage points lower 6 months after serving in AmeriCorps compared to 6 months before serving. The study did not provide actual employment rates for AmeriCorps members pre- and post-service, but instead provided the unemployment rates shown in Figure 2 (17 percent vs. 12 percent) in which the change between them represents a 5-percentage-point decrease.

Figure 2. Percentage of AmeriCorps Alumni Seeking Work, Providing Caregiving, or Occupied Outside of the Workforce From Friedman et al. (2016)



*"Currently" refers to the summer 2016 survey. Respondents were from the 2005, 2010, and 2013 AmeriCorps cohorts, so respondents varied in how much time had elapsed since their AmeriCorps service.

A direct member benefit from being employed post-service is additional income earned. To monetize this 5-percentage-point decrease in unemployment, ICF requested that NCCC provide the gender, age, pre-service educational attainment, and race/ethnicity distribution of AmeriCorps members who served with NCCC for the most recent program year. Based on those demographics, the analysis used annual average earnings data from the Current Population Survey's Annual Social and Economic (ASEC) Supplement for March 2022 to estimate the weatherization portion of NCCC AmeriCorps members' additional earnings due to the reduced unemployment (U.S. Census Bureau, 2022-b).

Specifically, the analysis used ASEC data to calculate the per-person pre-tax average annual earnings for 18- to 34-year-olds weighted by the demographic distribution of NCCC AmeriCorps members who served during the 2021–2022 program year. Approximately 19 percent of this value was then used to represent the weatherization portion of annual earnings, as roughly 19 percent of the participating NCCC AmeriCorps members' time was spent on weatherization efforts. The resulting value expressed in 2022 dollars was \$8,802 as shown in Table 14. The analysis then multiplied the 5-percentage-point decrease in unemployment from Friedman et al. (2016) by the number of NCCC AmeriCorps member FTEs who served on weatherization projects during the most recent program year (i.e., 93). This estimated the number of *additional* NCCC AmeriCorps member FTEs employed due to national service (i.e., 4.7). To estimate the additional pre-tax earnings that stemmed from the reduced unemployment, the \$8,802 annual earnings amount was multiplied by the additional number of NCCC AmeriCorps members employed post-service. This represents the additional income earned by NCCC AmeriCorps members due to serving with NCCC.

Table 14. Additional Pre-Tax Earnings for NCCC AmeriCorps Members From Reduced Unemployment Based on NCCC AmeriCorps Member Demographics

Metric	Value (2022\$)*
Average per-person pre-tax annual earnings of employed 18- to 34-year-olds weighted by NCCC AmeriCorps member demographics (e.g., gender, race/ethnicity, and pre-service education level)	\$8,802
Reduction in AmeriCorps members' unemployment	5%
Total expected increase in earnings, per member	\$440
NCCC AmeriCorps member FTEs	93
Cumulative additional pre-tax earnings	\$40,928*
Cumulative additional post-tax earnings	\$37,577

*This value is undiscounted; thus, the values do not sum in the table.

Sources: NCCC, Friedman et al. (2016), and U.S. Census Bureau (2022-b)

To avoid double counting, the additional *post-tax* earnings is used to calculate the direct benefit to NCCC AmeriCorps members, rather than the additional *pre-tax* earnings. The post-tax annual earnings for the additional NCCC AmeriCorps member FTEs employed in Table 14 excludes payroll taxes (e.g., federal and state income, Social Security, and Medicare). The payroll tax rates used are described in more detail in the Benefits to Government section.

Based on these calculations, the cumulative additional post-tax earnings for NCCC AmeriCorps members for the three different scenarios—discounted in 2022 dollars using data from the Office of Management and Budget (2003)—are shown in Table 15. These monetary amounts represent the additional post-tax earnings realized due to the employment gain that is solely attributed to the NCCC program.

Table 15. Cumulative Additional Post-Tax Earnings Derived From Reduced Unemployment due to Serving With the NCCC Program by Scenario

Scenario	Cumulative additional post-tax earnings due to serving with the NCCC program (2022\$)
Short-term	\$37,577
Medium-term	\$563,656
Long-term	\$1,127,313

Sources: NCCC, Friedman et al. (2016), U.S. Census Bureau (2022-b), and Office of Management and Budget (2003)

Additional Lifetime Earnings From Increased Educational Attainment as a Result of Education Awards

The AmeriCorps education award pays for some portion of members' increased postsecondary educational attainment, and the future earnings derived from that educational attainment are treated as a direct benefit to NCCC AmeriCorps members. To calculate the portion of members' increased educational attainment that is attributable to the weatherization portion of the NCCC program, this analysis used cost data from the National Center for Education Statistics (NCES). Table 16 details the average total cost for each degree type and the portion of the cost that the weatherization portion of the post-tax education award amount (i.e., \$1,006) represents (\$1,242 before taxes²⁶). The analysis used these percentages to estimate the lifetime benefits of postsecondary educational attainment that can be attributed to the education award. For instance, according to NCES (2023-a), the average annual cost of a public, in-state, 4-year academic institution during the 2021–2022 academic year was \$25,245. This amounts to more than \$100,000 for 4 years if expressed in 2022 dollars. The \$1,006 weatherization portion of the post-tax education award only represents 4 percent of the cost of that degree, so the NCCC program could only be credited with 4 percent of the completion of NCCC AmeriCorps members' bachelor's degrees post-service.

Additional earnings derived from NCCC AmeriCorps members' *reduced unemployment* were calculated annually and then discounted based on the short-term, medium-term, and long-term scenarios in net present 2022 dollars.

For additional earnings derived from NCCC AmeriCorps members' *increased postsecondary educational attainment*—due to using education awards—Trostel (2015) did not provide data on how earnings accrue over time. Therefore, this analysis treated the increases in earnings as lifetime values expressed in 2022 dollars. The analysis assumed 100 percent of those lifetime earnings accrued by year 30 (i.e., in the long-term scenario), 50 percent accrued by year 15 (i.e., in the medium-term scenario), and nothing accrued 1 year post-program (i.e., in the short-term scenario).

²⁶ This analysis used the 2021 to 2022 AmeriCorps education award amount (\$6,495) but adjusted it to net present 2022 dollars using the Consumer Price Index (U.S. Bureau of Labor Statistics, 2022-a). For more information about this education award, please see <https://americorps.gov/members-volunteers/segal-ameri-corps-education-award/find-out-more>.

Table 16. Average Total Cost of Education and Portion Attributable to Education Award by Degree Type

Degree type ²⁷	Average cost (2022\$)*	Percentage of degree total cost covered by post-tax education award
Associate degree	\$35,540	2.8%
Bachelor's degree	\$100,980	1.0%
Graduate degree	\$23,332	4.3%

*Costs were provided for the 2021 to 2022 academic year by NCES (2023-a) for associate degree, bachelor's degree, and graduate degree types.

Sources: AmeriCorps (n.d.) and NCES (2023-a)

To determine the future lifetime earnings realized due to the use of the education award post-service (and, later, the associated lifetime taxes, which are described in the Benefits to Government section), the analysis first determined the number of additional postsecondary degrees estimated to be completed by degree type. The 93 NCCC AmeriCorps member FTEs who served on weatherization projects (along with other projects) during the 2021–2022 program year were distributed by the education award use findings listed in Friedman et al. (2016) across the degree types. Specifically, Friedman et al. (2016) reported 46 percent of NCCC National member alumni used their education award to pursue postsecondary degrees after program completion. This makes the number of NCCC AmeriCorps member FTEs expected to use the education award to pursue additional postsecondary education roughly equal to 48. Specifically, Friedman et al. (2016) indicated that the 46 percent comprises 2 percent using the education award to attend a technical or vocational training program, 21 percent using it to obtain a bachelor's degree, and 23 percent using it for graduate school.²⁸ This results in the number of NCCC AmeriCorps members estimated to *pursue*—due to using the education award—an associate degree, a bachelor's degree, or a graduate degree post-service to be roughly 5.6, 30.7, and 12.1, respectively, for a total of 48. These values are shown in Table 17.

²⁷ Costs for an associate degree include tuition, required fees, books, and supplies for a public, in-state, 2-year program; costs for a bachelor's degree include tuition, required fees, books, supplies, and on-campus housing for a public, in-state, 4-year program; costs for a graduate degree include tuition and required fees for a public, in-state, 2-year graduate program.

²⁸ This analysis considers the use of the education award to attend a technical or vocational training program from Friedman et al. (2016) to be synonymous with using it to pursue an associate degree.

Table 17. Estimates of the Number of Postsecondary Degrees Pursued Using the Education Award by Degree Type

Degree type	Total NCCC AmeriCorps member FTE count	Percentage estimated to pursue postsecondary education according to Friedman et al. (2016)	Number of degrees pursued using the education award
Associate degree	93	2%	5.6
Bachelor's degree	93	21%	30.7
Graduate degree	93	23%	12.1
All degrees	—	46%	48.4

Note: Numbers may not sum due to rounding.

Sources: AmeriCorps (n.d.), NCCC, Friedman et al. (2016), and NCES (2023-b)

Next, the difference in the additional lifetime pre-tax earnings from one degree type to the subsequent degree type was estimated using data provided by Trostel (2015), which is shown in the fifth column of Table 18 and expressed in 2022 dollars.²⁹ For instance, using Trostel (2015) data, the lifetime earnings in 2022 dollars of someone with an associate degree is about \$1 million, while that of someone with a bachelor's degree is almost \$1.5 million. The difference between these two metrics represents the additional lifetime earnings realized as a result of gaining a bachelor's degree if an associate degree was already completed. Approximately 19 percent of the resulting value was then estimated to represent the additional earnings to NCCC AmeriCorps members as a result of weatherization projects. This process was completed for all postsecondary degree types to conservatively estimate the weatherization portion of additional lifetime earnings realized by NCCC AmeriCorps members due to an increase in postsecondary educational attainment. Trostel (2015) also included data on lifetime taxes paid, which was converted to 2022 dollars and then used to estimate the post-tax lifetime earnings that would be realized per additional postsecondary degree received. Specifically, the lifetime taxes paid amounts were subtracted from the pre-tax additional lifetime earnings amounts to estimate the additional post-tax lifetime earnings, a direct benefit to NCCC AmeriCorps members.

²⁹ For an associate degree, comparisons were made between metrics for a high school diploma and those for an associate degree. For a bachelor's degree, comparisons made were between metrics for some college and those of a bachelor's degree. For a graduate degree, comparisons made were between metrics for a bachelor's degree and those of a master's degree.

Table 18. Additional Earnings From AmeriCorps Members' Use of the Education Award

Degree type	Degrees pursued using the education award	Percentage of degree total cost covered by post-tax education award	Number of degrees obtained using the education award	Additional lifetime earnings of the degree (pre-tax)	Additional lifetime earnings from education award (pre-tax)	Additional lifetime earnings from education award (post-tax)
Associate degree	5.6	14.6%	2.8	\$38,809	\$6,131	\$5,819
Bachelor's degree	30.7	4%	1.0	\$119,924	\$36,672	\$34,926
Graduate degree	12.1	22.2%	4.3	\$106,450	\$55,500	\$53,330
Total	48.4	—	8.1		\$98,303	\$94,075

Note: Numbers may not sum due to rounding.

Sources: AmeriCorps (n.d.), NCCC, Friedman et al. (2016), NCES (2023-b), and Trostel (2015)

To isolate the increase in additional lifetime earnings specific to members using the weatherization portion of the education award, the number of NCCC AmeriCorps members who used the education award for this purpose by degree type was reduced by the percentage of the degree cost that can be covered by the \$1,006 post-tax education award received post-service, displayed in the third column of Table 18. As a result, the analysis estimated that the use of the education award among NCCC AmeriCorps members produced roughly 2.8 additional associate degree, 1 additional bachelor's degree, and 4 additional graduate degrees post-service. Then, the number of additional degrees *obtained* was applied to the 2022 additional post-tax lifetime earnings by degree type. This calculates the additional lifetime post-tax earnings realized by NCCC AmeriCorps members from their increase in postsecondary educational attainment that is credited to the use of the education award post-service. The total additional lifetime post-tax earnings amount was roughly \$94,000 across NCCC AmeriCorps members. Of note, these lifetime earnings are *in addition to* the earnings derived from NCCC AmeriCorps members' gains in employment as delineated in the previous section. To reiterate, the earnings from NCCC AmeriCorps members' reduced unemployment differs depending on the scenario (i.e., short-term, medium-term, and long-term) since it is uncertain how long these earnings will persist. For the post-tax lifetime earnings—and all lifetime benefits in this ROI analysis—the entire amount is realized in the long-term, half of it is realized in the medium-term, and no amount is realized in the short-term.

Post-Tax Living Allowances and Education Awards

Living allowances are given to AmeriCorps members during their service term to pay for various living expenses—such as housing and groceries—and they sometimes include members' workers' compensation and health insurance when applicable. Regarding education awards, according to Friedman et al. (2016), a significant portion

(i.e., 46 percent) of NCCC member alumni use them to pay for additional postsecondary education at colleges, graduate schools, and technical/vocational schools, while others (i.e., 33 percent) use them to pay off outstanding student loans. The remaining 21 percent do not use their education awards.

Both the living allowances and education awards (considered one-time benefits that are not discounted or spread over time) are taxable and represent member benefits. However, only the portion of education awards used by members to pay off existing student loans is considered a direct member benefit. The portion that is utilized to pursue further postsecondary education is only used in calculating members' additional lifetime earnings due to the increased educational attainment they experience post-service from using the education award. This is done to avoid double counting. This analysis included the post-tax values of the weatherization portion of the living allowance (roughly 19 percent) and the portion of the education award used to repay student loans as NCCC AmeriCorps member benefits, which are listed in Table 19. The portion of the education award used to fund additional postsecondary education is discussed in the following section.

Table 19. NCCC AmeriCorps Member Benefits From the Living Allowance and Education Award

Benefit	Post-tax value (2022\$)	Notes
Living allowance	\$12,164	Post-tax living allowances members receive during weatherization-specific service
Education award used to pay off student loans	\$32,875	Weatherization portion of post-tax education award amount used to pay off outstanding student loans
Total	\$45,039	

Sources: NCCC and Friedman et al. (2016)

Benefits to Government

State and Local Governments

State and local governments benefit from:

- Additional state income tax revenue from NCCC AmeriCorps members' increased earnings due to reduced unemployment
- Additional lifetime state and local taxes due to NCCC AmeriCorps members' increased postsecondary educational attainment³⁰
- Additional state and local taxes from the living allowance and education award received by these members

³⁰ This benefit was calculated using lifetime tax revenue data from Trostel (2015). These values summed lifetime state income taxes, lifetime property taxes, and lifetime sales taxes by education level.

- Additional state and local sales tax revenue from NCCC AmeriCorps members' increased consumption due to reduced unemployment
- Reduced lifetime spending on public assistance, social insurance, and corrections³¹ due to NCCC AmeriCorps members' increased postsecondary educational attainment

State income tax revenue: To measure income tax revenue generation that stems from reduced unemployment for state governments (any local income taxes are not included), the weatherization portion of the additional pre-tax earnings of NCCC AmeriCorps members that are solely attributed to NCCC are taxed by a weighted estimated proportional state income tax rate. This tax rate considers state-specific progressive tax brackets and standard deduction amounts. Based on the taxable income, the analysis estimated the proportional state income tax for each state as the amount of state income taxes paid per NCCC AmeriCorps member divided by their pre-tax earnings. This analysis then calculated the weighted average of these state-specific tax rates—using these states' populations from the 5-year estimates of the 2021 American Community Survey (U.S. Census Bureau, 2022-a)—to estimate a weighted national tax rate. A weighted national tax rate was used because NCCC AmeriCorps members may disperse to various locations nationwide following their service terms and continue to migrate over the course of their working years.

Lifetime state income tax revenue values are also provided by Trostel (2015) by education level. Based on the number of postsecondary degrees estimated to be obtained due to the use of the weatherization portion of the education award received after serving with NCCC, additional lifetime state income taxes are realized. Thus, the additional lifetime state income taxes' paid values—informed by data from Trostel (2015)—were first converted to 2022 dollars. The analysis then multiplied them by the inferred number of degrees obtained using the education award (which are listed in the fourth column of Table 18).

Additional tax revenue derived from NCCC AmeriCorps members' *reduced unemployment, living allowances, and education awards* was calculated using tax rates specific to each per-person monetary amount.

For additional tax revenue derived from NCCC AmeriCorps members' *increased postsecondary educational attainment*—due to using education awards—Trostel (2015) did not provide specific tax rates. Therefore, this analysis treated the increases in tax revenue as lifetime values expressed in 2022 dollars. The analysis assumed 100 percent of those lifetime tax revenues accrued by year 30 (i.e., in the long-term scenario), 50 percent accrued by year 15 (i.e., in the medium-term scenario), and nothing accrued 1 year post-program (i.e., in the short-term scenario).

³¹ Reduced spending on public assistance due to NCCC AmeriCorps members' increased postsecondary educational attainment is included as a federal government benefit, not a state and local government benefit. This is because public assistance includes programs funded at the federal level (e.g., TANF, etc.).

State governments also receive state income taxes from the education awards that NCCC AmeriCorps members receive post-service. The analysis estimated the weatherization portion of the pre-tax education award amount in 2022 dollars (i.e., \$1,242).³² Then the analysis multiplied it by the number of NCCC AmeriCorps member FTEs expected to redeem the award and use it to pursue postsecondary education or to repay outstanding student loans, based on findings from Friedman et al. (2016). The result represents the pre-tax cumulative education award amount expected to be received by NCCC AmeriCorps members. The portion of this value taxed by state income taxes was estimated using a weighted state income tax rate specific to the per-person education award amount. Additionally, state income taxes were estimated for the living allowance amount received by NCCC AmeriCorps members during their service term using tax rates specific to the per-person value. The different rates used for these member benefits are enumerated in Table 21.

State and local sales tax revenue: To measure sales tax revenue generation for state and local governments that stems from reduced unemployment, a weighted state and local sales tax rate was applied to the amount of NCCC AmeriCorps members' cumulative additional *post-tax* earnings that are available to be spent on taxable goods. To establish a weighted state and local sales tax, this analysis first summed the state sales tax rate and the average local sales tax rate for each state using data from Fritts (2022). Then using 2022 data from the American Community Survey (U.S. Census Bureau, 2022-a), these state-level combined state and local sales tax rates were weighted based on the population of each state. The resulting weighted average sales tax rate used in this analysis was 7.44 percent.

To estimate the additional post-tax earnings as a result of reduced unemployment and program participation that was spent on taxable goods, data from the Consumer Expenditure Survey (U.S. Bureau of Labor Statistics, 2022-c) were used. These data show the amount of spending on a number of different goods and services by national consumers across several different pre-tax income brackets.³³ The proportion of earnings that is spent on taxable goods (such as alcoholic beverages, housekeeping supplies, apparel, etc.) was then calculated for consumers with incomes that matched the weatherization portion of the per-person average pre-tax earnings of NCCC AmeriCorps members. This value was 41.4 percent. This proportion was then applied to NCCC AmeriCorps members' cumulative additional *post-tax* earnings to calculate the post-tax monetary amount they spend on taxable goods. Then the sales tax rate (i.e., 7.44 percent) was applied to estimate the resulting sales tax revenues that go to state

³² This analysis used the 2021 to 2022 AmeriCorps education award amount (\$6,495) but adjusted it to net present 2022 dollars using the Consumer Price Index (U.S. Bureau of Labor Statistics, 2022-a). For more information about this education award, please see <https://americorps.gov/members-volunteers/segal-ameri-corps-education-award/find-out-more>.

³³ To calculate the estimated taxable expenditures, Consumer Expenditure Survey (CE) Table 1203 was used from the U.S. Bureau of Labor Statistics (2022-c). This table lists the annual expenditure means by pre-tax income tax brackets. Thus, the pre-tax earnings of NCCC AmeriCorps members were used instead of their post-tax earnings to calculate this metric. Please visit this site for more details: <https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income>.

and local governments due to NCCC AmeriCorps members' reduced unemployment post-service.

Trostel (2015) also provides additional lifetime state and local sales tax values by education level. Using these values, the analysis calculated the additional sales tax revenue realized by state and local governments as a result of youth members' increased college enrollment and NCCC AmeriCorps members using their education award to achieve higher postsecondary educational attainment post-service. These values represent a direct benefit to state and local governments in the form of increased tax revenue.

State and local government public assistance, social insurance, and corrections cost savings: State and local governments also benefit from NCCC through lifetime savings in public assistance, social insurance, and corrections—as reported in Trostel (2015)—due to the increase in NCCC AmeriCorps members' postsecondary educational attainment after program exit. Of note, social insurance includes unemployment insurance and workers' compensation. To calculate these lifetime non-federal government savings, the analysis first calculated the decrease in public assistance, social insurance, and corrections costs (and thus, savings) from one education level to the subsequent education level using data from Trostel (2015) and then multiplied these monetary amounts by the number of additional postsecondary degrees estimated to be obtained due to the use of the education awards.

To determine what portion of this differential represents lifetime cost savings to state or local governments versus the federal government, a different method was employed for each of these cost savings areas. For social insurance, 50 percent of lifetime unemployment insurance cost savings and all the lifetime cost savings for workers' compensation are apportioned to state and local governments (Oswald, 2018). Regarding reductions in lifetime corrections spending, the portion between the federal and state or local governments was determined based on data from Hyland (2015). Specifically, this report found that 8.4 percent of U.S. corrections costs are paid by the federal government and the remaining 91.6 percent is paid by state and local governments. Therefore, almost 92 percent of the lifetime cost savings in corrections due to NCCC AmeriCorps members experiencing an increase in postsecondary educational attainment post-service are allocated to state and local governments.

Federal Government

The federal government benefits from:

- Additional federal income, Social Security, and Medicare tax revenue from NCCC AmeriCorps members' increased earnings due to reduced unemployment
- Additional federal income, Social Security, and Medicare taxes from the living allowance and education award received by these members
- Additional lifetime federal taxes due to NCCC AmeriCorps members' increased postsecondary educational attainment

- Reduced lifetime spending on public assistance, social insurance, and corrections due to NCCC AmeriCorps members' increased postsecondary educational attainment
- Reduced spending on public health insurance due to improved health outcomes of households in weatherized homes

Federal income tax revenue: To measure federal income tax revenue that stems from reduced unemployment, the weatherization portion of the additional pre-tax earnings of NCCC AmeriCorps members that are solely attributed to the NCCC program—as well as the weatherization portion of the pre-tax living allowance and education award amounts received by NCCC AmeriCorps members—are taxed by a federal income tax rate. The rates used are estimated proportional tax rates that consider the standard deductions and progressive tax brackets specific to federal income taxes as provided by El-Sibaie (2020). To reiterate, an estimated proportional tax rate equals the total amount of taxes estimated to be paid divided by the pre-tax amount of the value to be taxed (e.g., per-person average pre-tax earnings). The specific federal income tax rates used for these different benefits are enumerated in Table 21. Of note, different tax rates were used because they were specific to the per-person pre-tax earnings, living allowance, and education award amounts.

For the additional lifetime earnings of NCCC AmeriCorps members that is based on their increase in postsecondary educational attainment—made possible by the use of the education award—Trostel (2015) provides additional lifetime federal income tax values. These values were used to calculate the additional income tax revenue realized by the federal government due to members' postsecondary education gains.

Social Security and Medicare tax revenue: Social Security and Medicare tax revenue are measured as fiscal gains as a result of the additional pre-tax earnings of NCCC AmeriCorps members from their reduced unemployment and as a result of the pre-tax living allowances and education awards amounts received by members. However, tax rates specific to each revenue source are used. Social Security and Medicare use flat tax rates, 6.2 percent and 1.45 percent, respectively; thus, these rates are applied to the weatherization portion of the additional pre-tax earnings of NCCC AmeriCorps members to calculate the additional amount of revenue the federal government receives. These same rates are also applied to the weatherization portion of the living allowance and education award amounts received by NCCC AmeriCorps members to calculate additional tax revenue. Moreover, lifetime Social Security tax values are provided by Trostel (2015) by education level. The analysis used these values to estimate the additional lifetime Social Security tax revenue realized by the federal government as a result of NCCC AmeriCorps members using their education award to complete different postsecondary education degree types post-service.

Federal government public assistance, social insurance, and corrections cost savings: The federal government realizes cost savings in public assistance, social insurance, and corrections due to the increased postsecondary educational attainment of NCCC AmeriCorps members after program exit. Specifically, the number of additional postsecondary degrees estimated to be earned by NCCC AmeriCorps members

post-service as well as data from Trostel (2015) were used to estimate the federal government portion of lifetime cost savings on social insurance (which is composed of workers' compensation and unemployment insurance, as noted earlier), public assistance (e.g., SNAP, Medicaid, TANF, etc.), and corrections.

Table 20 shows the lifetime costs to the federal versus the state and local governments for each of these areas—where applicable—by education level in 2012 dollars as presented in Trostel (2015). The differences in these lifetime costs from one education level to the next represent cost savings per degree obtained.

Table 20. Government Costs by Education Attainment Level per Individual's Lifetime

Source of government cost	Associate degree (2012\$)	Bachelor's degree (2012\$)	Graduate degree (2012\$)
Public assistance	\$31,803	\$14,480	\$9,394
Social insurance	\$8,209	\$5,863	\$4,732
Federal	\$3,570	\$2,660	\$2,090
State/local	\$4,639	\$3,204	\$2,643
Corrections	\$4,055	\$1,190	\$725
Federal	\$341	\$100	\$61
State/local	\$3,714	\$1,090	\$664

Note: Numbers may not sum due to rounding.

Source: Trostel (2015)

As mentioned earlier in this appendix, as a result of NCCC, the analysis estimated an additional 48 long-term NCCC AmeriCorps members would redeem the education award to pursue additional postsecondary education. Based on the portion of degree costs covered by the post-tax education award, this analysis calculated that an additional associate degree, bachelor's degree, and graduate degree would be obtained due to NCCC. To conservatively calculate the federal government's lifetime savings associated with these education gains, the differences between the public assistance, federal social insurance, and federal corrections lifetime costs for these education levels and those that precede them are calculated and then expressed in 2022 dollars. These values are then multiplied by the number of additional postsecondary degrees estimated to be obtained—where appropriate—to represent the total cost savings realized by the federal government due to NCCC. As previously mentioned when discussing the state and local governments' allocation of the reduction in lifetime social insurance and corrections expenditures, the federal government receives 50 percent of the lifetime cost savings in unemployment insurance (part of social insurance; Oswald, 2018), and more than 8 percent of the lifetime cost savings in corrections (Hyland, 2015). These federal government savings are shown in Table 23.

Table 21 shows the tax rates applied to the weatherization portion of NCCC AmeriCorps members' additional pre-tax and post-tax earnings (derived from reduced unemployment), depending on the type of revenue being calculated. It also enumerates the tax rates used for the pre-tax living allowance and education award amounts received by NCCC AmeriCorps members during their service term or upon service completion, respectively.

Table 21. 2022 Tax Rates and Ratio of Taxable Expenditures for NCCC AmeriCorps Members' Earnings, Living Allowances, and Education Awards

Metric	Rate for additional earnings & education award*	Rate for living allowance & education award**	Notes
Estimated proportional federal income tax	8.10%	3.08%	<ul style="list-style-type: none"> Tax rates are used that consider the progressive tax brackets and standard deductions specific to federal income taxes. These rates are dependent on and applied to the pre-tax value of each metric being taxed.
Estimated proportional state income tax	4.30%	0.00%	<ul style="list-style-type: none"> Tax rates are used that consider the progressive tax brackets and standard deductions specific to each state's income taxes. Each state's tax rate is weighted based on the state's population and summed to estimate a weighted national average. These rates are dependent on and applied to the pre-tax value of each metric being taxed.
Social Security tax	6.20%	6.20%	<ul style="list-style-type: none"> Social Security tax rate for employees and employers. These rates are applied to the pre-tax value of each metric being taxed.
Medicare tax	1.45%	1.45%	<ul style="list-style-type: none"> Medicare tax rate for employees and employers. These rates are applied to the pre-tax value of each metric being taxed.

Metric	Rate for additional earnings & education award*	Rate for living allowance & education award**	Notes
Sales tax	7.44%; N/A to the education award	7.44%; N/A to the education award	<ul style="list-style-type: none"> The combined state and average local tax rate for each state was summed and weighted based on states' populations to calculate a national weighted average sales tax rate. The rate is applied to the additional post-tax earnings of members as well as their post-tax living allowance amount.
Ratio of taxable expenditures per national consumer	57%; N/A to the education award	57%; N/A to the education award	<ul style="list-style-type: none"> Percentage of post-tax earnings spent on taxable goods and services that is used to calculate sales tax from post-tax earnings. Ratio is dependent on the pre-tax value of members' additional earnings or the pre-tax living allowance amount.

*These rates are only used for the portion of the education award used to repay outstanding student loans.

**These rates are only used for the portion of the education award used for additional schooling.

Sources: Fritts (2022), Social Security Administration (2022), U.S. Bureau of Labor Statistics (2022-c), and El-Sibaie (2020)

In addition to a societal benefit from reduced carbon emissions, the health benefits that household members in weatherized homes experience result in a benefit to the federal government due to reduced spending on public health insurance. Tonn et al. (2014-b) estimates annual monetary societal benefits that include reduced asthma-related medical costs due to improved indoor air quality, reduced costs from thermal stress on occupants, and fewer missed days at work. This analysis then uses data from the Agency for Healthcare Research and Quality (AHRQ, 2021) on the percentage of people across the United States covered by public or private insurance to determine the proportion of the overall benefit to households in homes weatherized by NCCC AmeriCorps members that is passed on to public insurance. Table 22 details the annual benefit to the federal government from improved household health from weatherization.

Table 22. Federal Government Benefits From Household Health Improvements

Reduced factors providing benefits (a)	Monetary benefit per unit (2022\$) (b)	Total annual benefit (c = b x 23 units)	Total benefit to government (d = c x 29.60%)
Asthma	\$253.20	\$5,823.57	\$1,724.12
Thermal stress – cold	\$20.89	\$480.58	\$142.28
Thermal stress – heat	\$9.52	\$218.87	\$64.80
Missed days at work	\$5.51	\$126.63	\$37.49
Total	-	-	\$1,969

Sources: NCCC, Tonn et al. (2014-a), AHRQ (2021)

Summary of Benefits to Government

Table 23 shows the amount of tax revenue generated and savings in expenditures for state and local versus federal government that are solely credited to NCCC and calculated using the methods described above. These government revenue and savings amounts are benefits that are included in the three ROI calculations, and they are derived from NCCC impacts.

Table 23. State/Local and Federal Government Benefits by Stakeholder Group and by Scenario

Benefit type	Benefit (2022\$)		
	Short-term	Medium-term	Long-term
State/local government benefits	\$1,674	\$22,878	\$45,564
State income tax revenue from education awards	\$192	\$192	\$192
State income tax revenue from employment	\$220	\$3,300	\$6,599
State and local sales tax revenue from employment	\$1,261	\$18,921	\$37,843
State income, sales, and property taxes from member postsecondary educational attainment (lifetime)	\$0	\$430	\$860
Savings in reduced public assistance, social insurance, and corrections spending from member postsecondary educational attainment (lifetime)	\$0	\$34	\$69
Federal government benefits	\$13,542	\$90,157	\$168,505
Federal income, Social Security, and Medicare tax revenue from living stipend and education award*	\$8,442	\$8,442	\$8,442
Federal income, Social Security, and Medicare tax revenue from employment	\$3,131	\$46,965	\$93,930

Benefit type	Benefit (2022\$)		
	Short-term	Medium-term	Long-term
Federal income, Social Security, and Medicare tax revenue from postsecondary educational attainment (lifetime)	\$0	\$3,367	\$3,367
Federal savings in reduced social insurance, corrections, and public assistance spending from postsecondary educational attainment (lifetime)	\$0	\$1,853	\$3,705
Federal savings in reduced health insurance spending for household members living in weatherized homes	\$1,969	\$29,530	\$59,061
Total	\$15,215	\$113,035	\$214,069

*Living allowances and education awards are one-time taxable payments. The resulting tax revenue does not vary by scenario.

Note: Numbers may not sum due to rounding.

Measuring Forgone Benefits (Opportunity Costs)

The analysis included two types of forgone benefits, referred to as *opportunity costs*, in each of the three ROI calculations to conservatively estimate the return of the NCCC program: forgone benefits from a professional opportunity cost to NCCC AmeriCorps members and forgone benefits from an investment opportunity cost to the funder (NCCC weatherization activities only include federal funding). Each of these forgone benefit (opportunity cost) types is subtracted from the total program benefits—that stem from NCCC—to calculate net benefits. Net benefits are then compared to the program cost to calculate each ROI. The methodologies used to calculate these two forgone benefits (opportunity costs) are described below.

Forgone Benefits From Professional Opportunity Cost to NCCC AmeriCorps Members

There is a professional opportunity cost to NCCC AmeriCorps members for their period of national service, during which they could have otherwise been working. This includes both the forgone earnings of NCCC AmeriCorps members for the portion of their service term spent on weatherization and the forgone taxes associated with those lost earnings. To calculate this, the analysis first used the demographic distribution of NCCC AmeriCorps members for the 2021–2022 program year—in terms of gender, age, race/ethnicity, and pre-service education level—and ASEC data to estimate the weighted unemployment rate for this population (i.e., 5.7 percent). This represents how many of these NCCC AmeriCorps members would have been unemployed if they did not serve with NCCC. Using the weighted unemployment rate and the number of NCCC AmeriCorps member FTEs who served on weatherization projects (along with other projects) during the 2021–2022 program year (i.e., 93), the analysis estimated the number of members who would have been employed without serving with NCCC based on their demographic characteristics. Then the analysis multiplied this value by

the weighted post-tax annual earnings per-person, shown in Table 24. The methodology used to calculate this latter monetary amount is described in the previous Increased Earnings due to Reduced Unemployment section. The post-tax amount subtracts all applicable payroll taxes (e.g., federal income, state income, Medicare, and Social Security). Combined, these values represent what NCCC AmeriCorps members would have earned in total if they did *not* serve with NCCC.

Separately, the analysis then multiplied the number of NCCC AmeriCorps member FTEs who served by the amount they earned during the weatherization portion of their national service in the form of a post-tax living allowance (i.e., \$156 per person). The post-tax living allowance was calculated using the daily allowance provided to AmeriCorps members and team leaders for projects during the 2021–2022 program year. NCCC also provided data on the percentage of hours that were spent on weatherization during each project (roughly 19 percent), allowing an average weatherization-specific living allowance to be calculated. As this analysis is only assessing the benefits of weatherization efforts, a subset of the total living allowance that aligns with weatherization-specific costs is used in the ROI calculation. The difference between what AmeriCorps members would have earned if they did not serve and what they did earn because they served equals the total post-tax earnings forgone due to serving with NCCC. These values and the formula used to calculate the forgone post-tax earnings are shown in Table 24.

Table 24. Forgone Earnings of NCCC AmeriCorps Members for a Service Term

Row	Component	Value	Source
A	NCCC AmeriCorps member FTEs	93	NCCC
B	Weighted unemployment rate	5.7%	U.S. Census Bureau (2022-b) & NCCC
C	Weighted weatherization portion of post-tax annual earnings per person (roughly 19 percent of total earnings)(2022\$)	\$8,802	U.S. Census Bureau (2022-b), U.S. Bureau of Labor Statistics (2022-c), & NCCC
D	Weatherization portion of the post-tax living allowance per person	\$156	NCCC
E	Total post-tax earnings forgone (2022\$)	\$757,432	$[A \times (1 - B) \times C] - (A \times D)$

Note: Numbers may not sum due to rounding.

The second portion of this professional opportunity cost was the forgone taxes associated with the earnings of NCCC AmeriCorps members lost for this year of service. Federal income, state income, Social Security, and Medicare taxes specific to the per-person weighted pre-tax earnings amount were calculated. Specifically, the estimated proportional federal and state income tax rates used were 8.1 percent and 4.3 percent, respectively. The analysis also estimated the sales taxes lost based on the per-person post-tax earnings forgone by the NCCC AmeriCorps members. Using data from the Consumer Expenditure Survey (U.S. Bureau of Labor Statistics, 2022-c), the analysis estimated that based on the per-person weighted pre-tax earnings of NCCC

AmeriCorps members associated with weatherization (i.e., \$8,802), 57 percent of their income would have been spent on taxable goods, the same amount when compared to the living allowance. Then the weighted combined state and local sales tax rate (i.e., 7.44 percent)—used earlier in this analysis to calculate government benefits—was applied to the difference in expected spending on taxable goods to represent the resulting sales tax revenue lost due to individuals serving with NCCC instead of working for higher pay. The totals for these taxes are listed in Table 25.

Table 25. Forgone Taxes Associated With the Forgone Earnings of NCCC AmeriCorps Members for a Service Term

Forgone taxes	Taxes without service term (2022\$)	Taxes realized from living allowance (2022\$)	Net taxes forgone (2022\$)
Federal income taxes	\$0	\$0	\$0
Social Security and Medicare taxes	\$10,321	\$0	\$10,321
State income taxes	\$59,052	\$1,108	\$57,944
Sales taxes	\$23,791	\$1,211	\$22,580
Total taxes	\$93,163	\$2,319	\$90,844

Note: Numbers may not sum due to rounding.

For the *federal government benefits per federal dollar ROI* calculation, only federal government (not total) benefits are included. Because of this, only federal components of the professional opportunity cost are subtracted from all federal government benefits—realized due to NCCC—in this ROI calculation. The parts of the professional opportunity cost subtracted from these total federal government benefits include the forgone net federal income taxes (i.e., \$0) and the net forgone Social Security and Medicare taxes (i.e., \$10,321). The sum of these two values is called the *federal professional opportunity cost*. The sum of all the values listed in Table 25 and the forgone post-tax earnings of NCCC AmeriCorps members is called the *total professional opportunity cost*. These naming conventions are referenced in the Calculating ROI section.

Forgone Benefits From the Investment Opportunity Cost to Funders

The investment opportunity cost estimates the expected forgone return if funds used to support the weatherization activities and positions of NCCC AmeriCorps members during the most recent program year were invested in U.S. Treasury bonds instead.

To calculate these forgone accrued interest values, the analysis first matched 2021 real interest rates provided by the Office of Management and Budget (2023) to each of the scenarios included in this ROI analysis. The real interest rate for the 3-year maturity was used for the short-term scenario, the average between the 10-year and 20-year maturity rates was used as the rate for the medium-term scenario, and the 30-year maturity rate was used for the long-term scenario. These real interest rates were

-1.2 percent, 0.2 percent, and 0.5 percent, respectively (Office of Management and Budget, 2023). Also, the number of years elapsed on these U.S. Treasury bonds was equal to the number of years the different scenarios assumed NCCC AmeriCorps members' employment and earnings gains were sustained. These values are 1 year, 15 years, and 30 years for the short-, medium-, and long-term scenarios, respectively. Given that U.S. Treasury bonds compound biannually, according to the U.S. Department of the Treasury (2022), the formula used to calculate the forgone accrued interest for each of the three scenarios is listed in Figure 3, where A equals the forgone accrued interest (e.g., the investment opportunity cost), P equals the amount of one of the funding streams, r equals the 2021 real interest rate, and t equals the number of years elapsed.

Figure 3. Compound Interest Formula Used to Calculate Investment Opportunity Cost

$$A = P \left(1 + \frac{r}{2} \right)^{t*2} - P$$

Based on this formula, the forgone benefits from the investment opportunity cost calculated by scenario are listed in Table 26, along with their associated inputs.

Table 26. Forgone Benefits From Investment Opportunity Cost Calculation by Scenario and Funding Stream

	Short-term	Medium-term	Long-term
Metric	Funding (all NCCC weatherization funding is federal)	Funding (all NCCC weatherization funding is federal)	Funding (all NCCC weatherization funding is federal)
Real interest rate	-1.2%	0.2%	0.5%
Years elapsed	1	15	30
Funding amount	\$220,307	\$220,307	\$220,307
Forgone return (accrued interest)	-\$2,636	\$6,706	\$35,605

Measuring Program Costs

The costs for NCCC, used for this ROI analysis, include federal funding used to support program operations. The program costs are specific to funding the weatherization activities and positions of NCCC AmeriCorps members whose outcomes are measured in this analysis. Total program costs for NCCC weatherization activities during the 2021–2022 program year amounted to \$124,439.

Calculating ROI

To complete the two ROI calculations for NCCC, the sum of applicable program benefits is reduced by the forgone benefits, or the professional and investment opportunity costs (where appropriate), and then compared to the cost of the program. As described previously, these two ROI calculations are calculated for each of the three scenarios: short-term, medium-term, and long-term.

Since one of the calculations includes benefits to society (e.g., NCCC AmeriCorps members, federal government, etc.), the results are expressed as cost–benefit ratios, while maintaining the ROI terminology. Specifically, these ratios take the form of the sum of monetized benefits over the sum of applicable program costs. The ROIs expressed as cost–benefit ratios in this study can be interpreted as the amount of dollars returned for every \$1 of investment (or program cost).³⁴

The formulas used to calculate each of the ROIs are shown below:³⁵

$$\begin{array}{lcl} \text{Total} & & \text{(Benefits to Non-Government Stakeholders + Benefits to Government) –} \\ \text{Benefits per} & & \text{(Forgone Benefits From Total Professional Opportunity Cost + Forgone} \\ \text{Federal} & = & \text{Benefits From Federal Investment Opportunity Cost)} \\ \text{Dollar} & & \hline & & \text{(AmeriCorps Federal Funding)} \end{array}$$

$$\begin{array}{lcl} \text{Federal} & & \text{(Benefits to the Federal Government) – (Forgone Benefits From Federal} \\ \text{Government} & & \text{Professional Opportunity Cost + Forgone Benefits From Federal Investment} \\ \text{Benefits per} & = & \text{Opportunity Cost)} \\ \text{Federal Dollar} & & \hline & & \text{(AmeriCorps Federal Funding)} \end{array}$$

Other ROI studies in this series include estimates of *total benefits per funder dollar*. However, NCCC receives only federal government funding, leading to identical values for the ROI estimates for *total benefits per federal dollar* and *total benefits per funder dollar*. For that reason, this study omits the *total benefits per funder dollar* calculation.

Table 27, Table 28, and Table 29 show the total benefits, opportunity costs, program costs, and ROI results for each scenario.

³⁴ ROIs can be expressed in percentages or as ratios, such as in this study. Although not shown as a ratio in the results, the ROIs in this study show the amount of return for every \$1 invested.

³⁵ Non-government stakeholders in this ROI analysis include society, NCCC AmeriCorps members, and program beneficiaries.

Table 27. ROI Calculations for Short-Term Scenario

Components	Total benefits per federal dollar (2022\$)	Federal government benefits per federal dollar (2022\$)
Total program benefits	\$107,926	\$13,542
Total forgone benefits (opportunity costs)	\$760,084	\$60,595
Total program costs	\$220,307	\$220,307
Result	-\$2.96	-\$0.21

Table 28. ROI Calculations for Medium-Term Scenario

Components	Total benefits per federal dollar (2022\$)	Federal government benefits per federal dollar (2022\$)
Total program benefits	\$1,318,041	\$86,790
Total forgone benefits (opportunity costs)	\$823,236	\$123,748
Total program costs	\$220,307	\$220,307
Result	\$2.25	-\$0.17

Table 29. ROI Calculations for Long-Term Scenario

Components	Total benefits per federal dollar (2022\$)	Federal government benefits per federal dollar (2022\$)
Total program benefits	\$2,611,754	\$165,138
Total forgone benefits (opportunity costs)	\$937,356	\$237,868
Total program costs	\$220,307	\$220,307
Result	\$7.60	-\$0.33

Appendix C: Results by Year

Table 30 shows the breakdown of costs and benefits over a 30-year period. Program activities create a stream of benefits over time to households living in weatherized homes, AmeriCorps members, private insurers, the federal government, state and local governments, and society. AmeriCorps members' forgone benefits from professional opportunity cost apply to the first year. Funders' forgone benefits from investment opportunity cost accrue over time. Program costs are expended in the first year only. Program benefits are shown in nominal dollars.

Table 30. NCCC Benefits and Costs per Year

Benefits and costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Benefits	\$107,734	\$102,468	\$104,004	\$105,784	\$107,618	\$109,507	\$111,452	\$113,456
Households	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905
Society	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854
Private insurers	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681
AmeriCorps members	\$52,060	\$53,622	\$55,231	\$56,888	\$58,594	\$60,352	\$62,163	\$64,028
Federal government	\$13,542	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223
State/local governments	\$2,693	\$4,183	\$4,111	\$4,234	\$4,361	\$4,492	\$4,627	\$4,765
Forgone benefits (opportunity costs)	\$849,774	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655
Forgone benefits to members	\$757,432	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Forgone tax revenue federal government	\$57,944	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Forgone tax revenue state/local governments	\$32,901	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Federal forgone benefits from investment	\$1,498	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655
Program costs	\$124,439	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Federal government	\$124,439	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Benefits and costs	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
Benefits	\$115,520	\$117,645	\$119,835	\$122,090	\$124,413	\$126,805	\$129,270	\$131,808
Households	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905
Society	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854
Private insurers	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681
AmeriCorps members	\$65,949	\$67,927	\$69,965	\$72,064	\$74,226	\$76,452	\$78,746	\$81,108
Federal government	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223
State/local governments	\$4,908	\$5,056	\$5,207	\$5,363	\$5,524	\$5,690	\$5,861	\$6,037
Forgone benefits (opportunity costs)	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655
Forgone benefits to members	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Forgone tax revenue federal government	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Forgone tax revenue state/local governments	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Federal forgone benefits from investment	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655
Program costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Federal government	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Benefits and costs	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24
Benefits	\$134,422	\$137,115	\$139,888	\$142,745	\$145,688	\$148,718	\$151,840	\$155,055
Households	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905
Society	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854
Private insurers	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681
AmeriCorps members	\$83,542	\$86,048	\$88,629	\$91,288	\$94,027	\$96,848	\$99,753	\$102,746
Federal government	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223
State/local governments	\$6,218	\$6,404	\$6,596	\$6,794	\$6,998	\$7,208	\$7,424	\$7,647
Forgone benefits (opportunity costs)	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655
Forgone benefits to members	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Forgone tax revenue federal government	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Forgone tax revenue state/local governments	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Federal forgone benefits from investment	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655
Program costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Federal government	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Benefits and costs	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Benefits	\$158,367	\$161,778	\$165,292	\$168,911	\$172,638	\$176,477
Households	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905	\$17,905
Society	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854	\$16,854
Private insurers	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681	\$4,681
AmeriCorps members	\$105,828	\$109,003	\$112,273	\$115,641	\$119,110	\$122,684
Federal government	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223	\$5,223
State/local governments	\$7,876	\$8,113	\$8,356	\$8,607	\$8,865	\$9,131
Forgone benefits (opportunity costs)	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655
Forgone benefits to members	\$0	\$0	\$0	\$0	\$0	\$0
Forgone tax revenue federal government	\$0	\$0	\$0	\$0	\$0	\$0
Forgone tax revenue state/local governments	\$0	\$0	\$0	\$0	\$0	\$0
Federal forgone benefits from investment	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655	-\$2,655
Program costs	\$0	\$0	\$0	\$0	\$0	\$0
Federal government	\$0	\$0	\$0	\$0	\$0	\$0

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