

DE-FOA-0001824 Control # 1824-1571  
National Association of State Energy Officials  
Implementation of Codes through Baseline Field Studies

## **A. Project Objectives**

The overall goal of this project is to examine how residential energy codes are implemented in the home rule states of Colorado and Nevada and how implementation can be strengthened through enhanced education, training, and outreach. This project also has a goal of strengthening energy code technical assistance capabilities in the two states. The ultimate goal is improved code implementation that assures better housing with greater energy and monetary savings in the two states while providing data, experience, and lessons that can be applied in other states.

To accomplish this, we have identified the following objectives:

- **Objective 1:** Develop pre- and post-program building industry standard practice studies (Phase I and Phase III) that are statistically significant for the states of Colorado and Nevada per the Department of Energy methodology.
- **Objective 2:** Implement a robust energy code education, training, and outreach program (“Phase II”) that prioritizes stakeholder engagement and relationship-building and that measurably increases residential compliance rates.
- **Objective 3:** Increase the number of energy code experts in Colorado and Nevada to support building code practices that align with energy code requirements in the two states.

## **B. Technical Scope Summary**

This project will be accomplished through (1) performance of baseline energy code field studies in each state to determine current building code practices; (2) enhancing energy code education, training, and outreach to builders, building officials, and home energy raters in both states; and (3) post-training energy code field studies in each state to determine impacts on code implementation of such training, education, and outreach. Results will be disseminated through presentations at conferences with energy code topics, NASEO hosted meetings and conferences, website, and emails, and through program partners as appropriate.

## **C. Tasks To Be Performed**

### **Budget Period 1 Baseline building practices study (Phase I)**

**Task 1.0:** Conduct a baseline study of building practices. (M1-M8).

**Task 1 Summary:** NASEO will complete contracts with code study contractors (CSC) to conduct the initial studies. The CSC will be responsible for identifying homes under construction or at final construction (but without occupants) and obtaining permission to enter the site and gather data for the study. The CSC will contact selected jurisdictions to obtain access and building permit information. The CSC will visit the specified number of homes in the selected jurisdictions and collect requisite data following a sampling plan developed by the Pacific Northwest National Laboratory (PNNL). The CSC will provide this information to NASEO and PNNL for analysis. This task will address Objective 2 by developing a pre-compliance study baseline for Colorado and Nevada.

**Subtask 1.1** Conduct a baseline study of building practices in Colorado.

**Subtask 1.1.b:** Complete field study data collection in Colorado. (M2-M7)

**Subtask 1.1.b Summary:** Collect representative data from homes in Colorado in accordance with the state sampling plan.

**Milestone 1.1.b:** Data collection completed for the pre-compliance field study in Colorado in Q3 of project.

**Subtask 1.1.c:** Submit Colorado data to PNNL for analysis. (M6-M9)

**Subtask 1.1.c Summary:** The NASEO project team will submit project data to PNNL for analysis and be available to respond to questions and review draft documents before the final document is published.

**Milestone 1.1.c:** Data submitted to PNNL by end of Q3 of the project.

**Subtask 1.1.d:** Publicize the results of the first phase of the Colorado field study. (M9-M30)

**Subtask 1.1.d Summary:** The NASEO project team will publicize the results of the field study to stakeholders from industry, code officials, and other interested parties.

**Milestone 1.1.d:** Final Colorado Field Study Report is published. NASEO Project Team will participate in the cohort meeting at the National Energy Codes Conference (or appropriate venue as directed by DOE).

**Subtask 1.2** Conduct a baseline study of building practices in Nevada. (M1-M8).

**Subtask 1.2.b:** Complete field study data collection in Nevada. (M2-M7)

**Subtask 1.2.b Summary:** Collect representative data from homes in Nevada in accordance with the state sampling plan.

**Milestone 1.2.b:** Data collection for the pre-compliance field study in Nevada in Q3.

**Subtask 1.2.c:** Submit Nevada data to PNNL for analysis. (M6-M9)

**Subtask 1.2.c Summary:** The NASEO project team will submit project data to PNNL for analysis and be available to respond to questions and review draft documents before the final document is published.

**Milestone 1.2.c:** Data submitted to PNNL by end of Q3.

**Subtask 1.2.d:** Publicize the results of the first phase of the Nevada field study. (M9-M30)

**Subtask 1.2.d Summary:** The NASEO and project team will publicize the results of the field study to stakeholders from industry, code officials, and other interested parties.

**Milestone 1.2.d:** Final Nevada Field Study Report is published. NASEO Project Team will participate in the cohort meeting at the National Energy Codes Conference (or appropriate venue as directed by DOE).

**Budget Period 1 Go/No-Go Decision Point:** The go/no-go decision point will be made at the conclusion of the field studies. If the field sample data collected is sufficient to produce a representative sample of building industry practices, and if code compliance in the states is less than 90%, the project will continue.

**Task 2.0: Education, Training and outreach to building inspectors, builders and code officials in Colorado and Nevada (M7-M28)**

**Task Summary:** NASEO will work with partners to significantly increase the amount of energy code training available and to develop a group of experts on energy code topics in Colorado and Nevada who can serve as resources in their respective states. These experts will serve as ambassadors and subject matter experts to support increased energy code compliance in the state.

**Subtask 2.1: Education, Training and Outreach to building inspectors, builders and code officials in Colorado**

**Subtask 2.1.b:** NASEO and the project team will develop the resources to address key energy efficiency measures based on opportunities identified in the field study in Colorado. (M7-M30).

**Subtask 2.1.b Summary:** NASEO and its project team will leverage the PNNL report and data collected in Phase I, the energy code field study to develop materials to support energy code training for building inspectors, builders, and energy code officials in Colorado.

**Milestone 2.1.b.1:** Hold kick off meeting in Colorado.

**Milestone 2.1.b.2:** Complete development of initial educational materials by end of Q3.

**Subtask 2.1.c:** Recruit and train 4-5 energy code experts to serve as energy code ambassadors in specific regions of Colorado. (M8-M36)

**Subtask 2.1.c Summary:** Recruit 4-5 energy code ambassadors, with state/partner support, from geographically diverse regions of Colorado and provide them with sufficient training to enable them to deliver regional trainings and serve as an energy code resource.

**Milestone 2.1.c:** Train 4-5 energy code ambassadors by end of Q6.

**Subtask 2.1.d:** Deliver 40 targeted energy code training to building officials, builders, and energy raters across Colorado. (M9-M28)

**Subtask 2.1.d Summary:** Deliver webinars, in-person trainings, and presentations to building officials, builders, and energy raters across Colorado.

**Milestone 2.1.d:** Deliver six trainings per quarter.

**Subtask 2.2: Education and outreach to building inspectors, builders and code officials in Nevada. (M7-M28)**

**Subtask 2.2.b:** NASEO and the project team will develop resources to address key energy efficiency measures based on opportunities identified in the field study in Nevada. (M6-M30).

**Subtask 2.2.b Summary:** NASEO and its project team will leverage the PNNL report and data collected in Phase I, the energy code field study to develop materials to support energy code training for building inspectors, builders, and energy code officials in Nevada.

**Milestone 2.2.b:** Complete development of educational materials by end of Q3.

**Subtask 2.2.c:** Recruit and train 4-5 energy code experts to serve as energy code ambassadors in specific regions of the state. (M8-M36)

**Subtask 2.2.c Summary:** Recruit 4-5 energy code ambassadors, with state/partner support, from geographically diverse regions of Nevada and provide them with sufficient training to enable them to deliver regional trainings and serve as an energy code resource.

**Milestone 2.2.c:** Train 4-5 energy code ambassadors.

**Subtask 2.2.d:** Deliver 24 targeted energy code training to building officials, builders, and energy raters across Nevada. (M9-M28)

**Subtask 2.2.d Summary:** Deliver webinars, in-person trainings, and presentations to building officials, builders, and energy raters across Nevada.

**Milestone 2.2.d:** Deliver four trainings per quarter.

## **Budget Period 2 Education, training and outreach (Phase II)**

**The Education, Training and Outreach Program (Tasks 2.1.c, 2.1.d, 2.2.c and 2.2.d) will begin in Budget Period 1 and continue in Budget Periods 2 and 3.**

**Subtask 2.1.c:** Recruit and train 4-5 energy code experts to serve as energy code ambassadors in specific regions of Colorado. (M8-M36)

**Subtask 2.1.d Summary:** Recruit 4-5 energy code ambassadors from geographically diverse regions of Colorado and provide them with sufficient training to enable them to deliver regional trainings and serve as an energy code resource.

**Milestone 2.1.c:** Train 4-5 energy code ambassadors by end of Q6.

**Subtask 2.1.d:** Deliver 40 targeted energy code training to building officials, builders, and energy raters across Colorado. (M9-M28)

**Subtask 2.1.d Summary:** Deliver webinars, in-person trainings, and presentations to building officials, builders, and energy raters across Colorado.

**Milestone 2.1.d:** Deliver six trainings per quarter.

**Subtask 2.2.c:** Recruit and train 4-5 energy code experts to serve as energy code ambassadors in specific regions of Nevada. (M8-M36)

**Subtask 2.2.c Summary:** Recruit 4-5 energy code ambassadors from geographically diverse regions of Nevada and provide them with sufficient training to enable them to deliver regional trainings and serve as an energy code resource.

**Milestone 2.2.c:** Train 4-5 energy code ambassadors.

**Subtask 2.2.d:** Deliver 24 targeted energy code training to building officials, builders, and energy raters across Nevada. (M9-M28)

**Subtask 2.2.d Summary:** Deliver webinars, in-person trainings, and presentations to building officials, builders, and energy raters across Nevada.

**Milestone 2.2.d:** Deliver four trainings per quarter.

**Budget Period 2 Go/No-Go Decision Point:** If fewer than two-thirds of the proposed trainings have been delivered in a state, the project will not continue in that state.

## **Budget Period 3 Post-Training Building Practices Field Study (Phase III)**

**Task 3: Post-Training field studies in Colorado and Nevada (M28-34)**

**Task 3 Summary:** NASEO and the project team will complete a second field study to determine the impact of the education and outreach training completed in Phase II of the project. This field study will collect a representative sample of homes in the state of Colorado and Nevada to determine the degree of compliance with building energy codes. This study will help the participants understand the impact of the education and training efforts and will inform future education and training efforts in the field study states and in other communities.

**Task 3.1: Post-training field study in Colorado (M28-34)**

**Subtask 3.1.b:** Complete post-training field study data collection in Colorado. (M28-M32)

**Subtask 3.1.b Summary:** Collect representative data from homes in Colorado in accordance with the state sampling plan.

**Milestone 3.1.b:** Complete data collection for the post-training field study in Colorado by the end of Q11.

**Subtask 3.1.c:** Submit Colorado data to PNNL for analysis. (M30-M33)

**Subtask 3.1.c Summary:** The NASEO project team will submit project data to PNNL for analysis and be available to respond to questions and review draft documents before the final document is published.

**Milestone 3.1.c:** Data submitted to PNNL by end of Q11.

**Subtask 3.1.d:** Publicize the results of the of the Colorado field study. (M33-M36)

**Subtask 3.1.d Summary:** The NASEO project team will publicize the results of the field study to stakeholders from industry, code officials, and other interested parties.

**Milestone 3.1.d:** Results will be presented in a NASEO forum such as webinar, presentation, or at the NASEO Annual Meeting. NASEO Project Team will participate in the cohort meeting at the National Energy Codes Conference (or appropriate venue as directed by DOE).

**Task 3.2: Post-training field study in Nevada (M28-34)**

**Subtask 3.2.b:** Complete post-training field study data collection in Nevada. (M28-M34)

**Subtask 3.2.b Summary:** Collect representative data from homes in Nevada in accordance with the state sampling plan.

**Milestone 3.2.b:** Complete data collection for the post-training field study in Nevada end of Q11 of project.

**Subtask 3.2.c:** Submit Nevada data to PNNL for analysis. (M30-M35)

**Subtask 3.2.c Summary:** The NASEO project team will submit project data to PNNL for analysis and be available to respond to questions and review draft documents before the final document is published.

**Milestone 3.2.c:** Data submitted to PNNL by end of Q11 of the project.

**Subtask 3.2.d:** Publicize the results of the of the Nevada field study. (M36)

**Subtask 3.2.d Summary:** The NASEO project team will publicize the results of the field study to stakeholders from industry, code officials, and other interested parties.

**Milestone 3.2.d:** Results will be presented in a NASEO forum such as webinar, presentation, or at the NASEO Annual Meeting. NASEO Project Team will participate in the cohort meeting at the National Energy Codes Conference (or appropriate venue as directed by DOE).

#### **Task 4.0: Project Management (M1-M36)**

**Task 4 Summary:** This is a standard task for project management and reporting to DOE. NASEO's location in the Washington, D.C. area will help facilitate strong communication with DOE staff throughout the project. NASEO does not anticipate any barriers with this task. We have significant experience working with DOE on multi-year cooperative agreements and have strong accounting, project management, and reporting capabilities.

**Milestone 4:** Continuation applications for budget periods 2 and 3.

**End Goals of Project:** Complete field studies of building industry standard practices in the states of Colorado and Nevada, which both behave like home rule states with regard to code adoption. The results of the field studies will inform state energy plans that will likely be developed in the coming years in Colorado and Nevada by providing data showing the impact of energy codes on energy consumption for each state. Conduct a rigorous Education, Training and Outreach Program to increase the awareness of energy efficiency measures in each state. Recruit and train 4-5 energy code experts to serve as energy code ambassadors in each state by the end of the education, training and outreach portion of the project. The Education, Training and Outreach Program will create an expert pool for trainers for the Colorado and Nevada energy offices to engage and leverage beyond the life of this project, which will ensure increased compliance with energy codes. The State Energy Offices and **PARTNER** will be able to use the results of the field study to guide future energy code efforts. The larger pool of energy code trainers will create improved awareness of building energy codes and improved building practices.

## **D. Project Management and Reporting**

Reports and other deliverables will be provided in accordance with the Federal Assistance Reporting Checklist following the instructions included therein.

Additional deliverables as indicated in the task/subtask descriptions include the following:

1. Subtask 1.1.c- Field Study Data for the sample homes in Colorado will be delivered to DOE.
2. Subtask 1.1.d- The NASEO Project team will publicize the final baseline Colorado report on the NASEO website, at conferences and meetings, and through appropriate communications channels.
3. Subtask 1.2.c- Field Study Data for the sample homes in Nevada will be delivered to DOE.
4. Subtask 1.2.d- The NASEO Project team will publicize the final baseline Nevada report on the NASEO website, at conferences and meetings, and through appropriate communications channels.
5. Subtask 2.1.b.2- The NASEO project team will finalize the initial training materials for Colorado and provide them to DOE for comment.
6. Subtask 2.2.b.2- The NASEO project team will finalize the initial training materials for Nevada and provide them to DOE for comment.

7. Task 2.1.d- NASEO will provide quarterly reports to DOE indicating the number of completed trainings for Colorado audiences each quarter, along with the number of attendees and topics.
8. Task 2.2.d- NASEO will provide quarterly reports to DOE indicating the number of completed trainings for Nevada audiences each quarter, along with the number of attendees and topics.
9. Task 3.1.c- Field Study Data for the sample homes in Colorado will be delivered to DOE.
10. Subtask 3.1.d- The NASEO Project team will publicize the final Colorado report on the NASEO website, at conferences and meetings, and through appropriate communications channels.
11. Task 3.2.c- Field Study Data for the sample homes in Nevada will be delivered to DOE.
12. Task 3.2.d- The NASEO Project team will publicize the final Nevada report on the NASEO website, at conferences and meetings, and through appropriate communications channels.

<b>Milestone Summary Table</b>							
<b>Recipient Name:</b>		National Association of State Energy Officials					
<b>Project Title:</b>		Implementation of codes through baseline field studies					
<b>Task Number</b>	<b>Task or Subtask (if applicable) Title</b>	<b>Milestone Type (Milestone, Go/No-Go Decision Point, End of Project Goal)</b>	<b>Milestone Number* (Go/No-Go Decision Point Number)</b>	<b>Milestone Description (Go/No-Go Decision Criteria)</b>	<b>Milestone Verification Process (What, How, Who, Where)</b>	<b>Anticipated Date (Months from Start of the Project)</b>	<b>Anticipated Quarter (Quarters from Start of the Project)</b>
<b>Budget Period 1</b>							
<b>1</b>	<b>Conduct a Baseline building practices studies in Colorado and Nevada (Phase I)</b>						
1.1.b	Complete field study data collection in CO	Milestone	M1.1.b	Complete data collection	All required samples obtained	M7	Q3
1.1.c	Submit Colorado data to PNNL	Milestone	M1.1.c	Submit data	Submit all data	M9	Q3
1.1.d	Publicize the results of the CO field study	Milestone	M1.1.d	Distribute the baseline field study report	Field study report distributed via NASEO newsletter	M12	Q4
1.2.b	Complete field study data collection in NV	Milestone	M1.2.b	Complete data collection	All required samples obtained	M7	Q3
1.2.c	Submit NV data to PNNL	Milestone	M1.2.c	Submit data	Submit all data	M9	Q3
1.2.d	Publicize the results of the NV field study	Milestone	1.2.d	Distribute the baseline field study report	Field study report distributed via NASEO newsletter	M12	Q4
<b>2</b>	<b>Education, training and outreach in Colorado and Nevada (Phase II)</b>						



2.1.b.1	Hold a kick off meeting in CO	Milestone	M2.1.b.1	Kick off meeting with project partners in CO	Project partners will meet to discuss results of field study, plan Task 2. Agenda provided to DOE	M8	Q3
2.1.b.2	Develop initial training materials	Deliverable	D2.1.b.2	Develop training materials based on results of field study	Initial training materials submitted to DOE for review	M6-M30	Q4
2.1.c	Recruit and train 4-5 energy code ambassadors	Deliverable	D2.1.d	Recruit energy code ambassadors	DOE will be provided with a list of code ambassadors	M8-M18	Q6
2.1.d	Conduct 6 trainings this budget period	End project goal	M2.1.d.1	Conduct 6 trainings	Quarterly reporting will provide training summary	M12	Q4
2.2.b.1	Hold a kick off meeting in NV	Milestone	M2.2.b.1	Kick off meeting with project partners in Nevada	Project partners will meet to discuss results of field study, plan Task 2. Agenda provided to DOE	M8	Q3
2.2.b.2	Develop initial training materials	Deliverable	D2.2.b.2	Develop training materials based on results of field study	Initial training materials submitted to DOE for review	M6-M30	Q4
2.2.c	Recruit and train 4-5 energy code ambassadors	Deliverable	D2.2.c	Recruit energy code ambassadors	DOE will be provided with a	M8-M18	Q6

					list of code ambassadors		
2.2.d	Conduct 4 trainings this budget period	Deliverable	D2.2.d.1	Conduct 4 trainings	Quarterly reporting will provide training summary	M12	Q4
		Go/No Go decision point	Go/No-go 2	Go/No-go 2: Go if: A. Pre-program compliance study in individual states show <90% compliance. B. Field data fulfills sampling plan.		M12	Q4
<b>Budget Period 2</b>							
2.1.d	Conduct 6 trainings in CO this budget period	Deliverable	D2.1.d.2	Conduct 6 trainings	Quarterly reporting will provide summary	M15	Q5
2.2.d	Conduct 4 trainings in NV this budget period	Deliverable	D2.2.d.2	Conduct 4 trainings	Quarterly reporting will provide summary	M15	Q5
2.1.d	Conduct 6 trainings in CO this budget period	Deliverable	D2.1.d.3	Conduct 6 trainings	Quarterly reporting will provide summary	M18	Q6
2.2.d	Conduct 4 trainings in NV this budget period	Deliverable	D2.2.d.3	Conduct 4 trainings	Quarterly reporting will provide summary	M18	Q6
2.1.d	Conduct 6 trainings in CO this budget period	Deliverable	D2.1.d.4	Conduct 6 trainings	Quarterly reporting will provide summary	M21	Q7
2.2.d	Conduct 4 trainings in NV this budget period	Deliverable	D2.2.d.4	Conduct 4 trainings	Quarterly reporting will provide summary	M21	Q7
2.1.d	Conduct 6 trainings in CO this budget period	Deliverable	D2.1.d.5	Conduct 6 trainings	Quarterly reporting will provide summary	M24	Q8

2.2.d	Conduct 4 trainings in NV this budget period	Deliverable	D2.2.d.5	Conduct 4 trainings	Quarterly reporting will provide summary	M24	Q8
		Go/No-Go decision point	Go/No-Go 2	If fewer than two-thirds of the proposed trainings have been delivered in a state, the project in that state will not continue.		M24	Q8
<b>Budget Period 3</b>							
2.1.d	Conduct 6 trainings this budget period	Deliverable	D2.1.d.6	Conduct 6 trainings	Quarterly reporting will provide summary	M27	Q9
2.2.d	Conduct 4 trainings this budget period	Deliverable	D2.2.d.6	Conduct 4 trainings	Quarterly reporting will provide summary	M27	Q9
2.1.d.	Conduct 6 trainings this budget period	Deliverable	D2.1.7	Conduct 6 trainings	Quarterly reporting will provide summary	M30	Q10
2.2.d	Conduct 4 trainings this budget period	Deliverable	D2.2.d.7	Conduct 4 trainings	Quarterly reporting will provide summary	M30	Q10
3	<b>Post-training field study in Colorado and Nevada (Phase III)</b>						
3.1.b	Complete field study data collection in CO	Milestone	M3.1.b	Complete data collection	All required samples obtained	M32	Q10
3.1.c	Submit Colorado data to PNNL	Deliverable	D3.1.c	Submit data	Submit all data	M33	Q11
3.1.d	Publicize the results of the CO field study	Deliverable	D3.1.d	Distribute the baseline field study report	Field study report distributed via NASEO newsletter	M36	Q4
3.2.b	Complete field study data collection in NV	Milestone	M3.2.b	Complete data collection	All required samples obtained	M32	Q10

3.2.c	Submit NV data to PNNL	Deliverable	D3.2.c	Submit data	Submit all data	M33	Q11
3.2.d	Publicize the results of the NV field study	Deliverable	D3.2.d	Distribute the baseline field study report	Field study report distributed via NASEO newsletter	M36	Q12