

Final Abstract

Final Report Approved on November 27, 2024

M.L. 2020 Project Abstract

For the Period Ending June 30, 2024

Project Title: Teach Science: Schools as STEM Living Laboratories

Project Manager: Lindsey Kirkland

Affiliation: Climate Generation

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Website: <https://www.climategen.org/>

Funding Source:

Fiscal Year:

Legal Citation: M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 05c

Appropriation Amount: \$250,000

Amount Spent: \$146,439

Amount Remaining: \$103,561

Sound bite of Project Outcomes and Results

In schools, the environment and infrastructure surrounding students can bring science practices to life. TeachScience teachers increased their confidence in environmental education topics and practiced effective teaching strategies proven to build stronger conservation and sustainability ethic in students. Students experienced hands-on learning opportunities; connecting environmental learning opportunities to their curriculum.

Overall Project Outcome and Results

As more cities add renewable energy infrastructure and the need for green jobs grows, teachers must integrate renewable energy and green jobs learning into classrooms to better prepare their students to enter a new economy. There is a critical need to provide professional learning opportunities for teachers so they can meet their students' needs and teach to the new science standards which were adopted in 2019.

The TeachScience program connected 154 teachers to the new standards, renewable energy, and STEM learning opportunities through 3 in-person, two-day workshops and a year-long support program, called a community of practice (COP). Climate Generation (CG) served 266 students directly through classroom presentations on related topics and

5,500 students indirectly by training their teachers.

Teacher confidence rose in climate change science, energy policy, and green career skills, particularly at the intersection of equity. 73% of teachers reported the workshops contributed to their confidence using the new standards; 80% said the COP held them accountable to practicing climate change education in their local context; 80% said the COP increased the time or depth to which they practiced climate change education; and 90% reported the COP was a valuable experience for them as a teacher and had a valuable impact on their students. Students engaged in place-based education; authoring a climate story, identifying energy sources in their schools, and learning about green careers in their regions. Our project suggests that relevant, place-based teacher training can have positive impacts on teacher confidence and students' sustainability ethic as related to climate change and green careers.

Project Results Use and Dissemination

TeachScience events, web pages, and blogs were shared with CG's network. Events and results were showcased at several local and national education conferences. CG hosted several public presentations featuring TeachScience. CG published two blogs about the project and engaged in an interview for The North 103.3FM. Teach Climate Network Workshops recordings which were a part of the year of support are on CG's YouTube channel. The Teach Science workshop model will be used to inform future events and the youth-facing presentations will be reused for future events. TCN Workshop Recordings will be reshared through the network annually.



Environment and Natural Resources Trust Fund

M.L. 2020 Approved Final Report

General Information

Date: December 11, 2024

ID Number: 2020-061

Staff Lead: Mike Campana

Project Title: Teach Science: Schools as STEM Living Laboratories

Project Budget: \$250,000

Project Manager Information

Name: Lindsey Kirkland

Organization: Climate Generation

Office Telephone: (518) 603-1102

Email: lindsey@climategen.org

Web Address: <https://www.climategen.org/>

Project Reporting

Final Report Approved: November 27, 2024

Reporting Status: Project Completed

Date of Last Action: November 27, 2024

Project Completion: June 30, 2024

Legal Information

Legal Citation: M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 05c

Appropriation Language: \$250,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with Climate Generation: A Will Steger Legacy to prepare students for the challenges and careers of the future by connecting new science standards, renewable energy, and STEM opportunities in teacher trainings, classroom demonstrations, and program support across the state.

Appropriation End Date: June 30, 2024

Narrative

Project Summary: TeachScience will connect new science standards, renewable energy, and STEM opportunities through teacher training and support across the state to prepare students for the challenges and careers of the future.

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Schools are living laboratories of learning: a place where the environment and infrastructure surrounding students can bring science and engineering practices to life. Through the TeachScience project, 200 middle school science teachers from across Minnesota (Mankato,, Ely, TC Metro), representing over 2,000 students, will receive hands-on training and ongoing support to make their schools living laboratories of learning about energy and the environment. As more schools and cities add renewable energy as an electricity source, and the need for jobs in this sector grows, there is an opportunity and need to integrate renewable energy and green jobs skills into our classrooms. Additionally, Minnesota science teachers are on the edge of a new era of science education as the first change in science standards in 10 years are adopted in summer 2019. There is a critical need to support teachers, schools, and districts throughout Minnesota as they begin the process of implementing these standards.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

Through participation in TeachScience, teachers will receive resources and support to make their schools living laboratories, highlighting the renewable energy infrastructure on their school or in their community and the opportunity of green STEM careers. The new science standards offer the ideal platform to emphasize these concepts, with their focus on the practice of doing science and engineering, and the inclusion of more environmental and earth science content than in the past. During the school year, teachers will receive support through monthly virtual network meetings and 5 virtual classroom presentations on energy and environmental topics. Climate Generation has over 15 years of experience building the comfort, confidence, and competence of teachers to deliver STEM and environmental-based education in their classrooms, and a suite of curriculum resources already developed and ready to share. Our teacher network includes over 4,000 Minnesota teachers, and this project will leverage this network, our partners in the private energy and public education sector, and our expertise, to develop a new generation of Minnesota students with the STEM-based knowledge and skills for environmental leadership.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

This project is founded on the recognition that schools and communities are rich in environmental learning opportunities with a diversity of examples of natural resource protection, conservation, preservation, and enhancement. Through TeachScience teachers will be connected with natural resource career professionals and will learn ways to connect local, relevant examples to their science curriculum. Students will see how science learning connects with their local community, and build a stronger conservation ethic.

Project Location

What is the best scale for describing where your work will take place?

Statewide

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project and In the Future

Activities and Milestones

Activity 1: Develop and plan trainings and teacher support network

Activity Budget: \$101,700

Activity Description:

We will review the new Minnesota Science Standards, work with statewide partners to identify renewable energy and environmental community themes, and build relationships with 3 schools and districts in and near Mankato, Ely, and the Twin Cities to develop and plan trainings around the state to support the 2023-2024 school year. In addition, we will plan follow up support for teachers in the form of 9 monthly virtual meetings including topics on effective teaching and equity, with the opportunity for discussion. We will also develop 3 virtual classroom presentations featuring energy and environmental topics and speakers.

Activity Milestones:

Description	Approximate Completion Date
Identify specific locations, build partnerships, promote 3 teacher trainings, recruit teachers through our CG network and partner networks	August 31, 2023
Develop content, purchase supplies, identify speakers, and revise resources for each of 3 training locations	October 31, 2023
Develop plan, identify topics, coordinate speakers, for 9 teacher support network virtual meetings during the school-year.	June 30, 2024
Develop plan, identify topics, coordinate speakers for 3 virtual classroom presentations reaching 3000 students during	June 30, 2024

Activity 2: Implement trainings

Activity Budget: \$60,000

Activity Description:

We will implement 3 trainings for 200 middle school science teachers in Mankato Ely, and, the Twin Cities. Trainings will be held Spring-Fall of 2023.

Activity Milestones:

Description	Approximate Completion Date
Implement two-day training in Mankato for up to 100 teachers.	October 31, 2023
Implement two-day training in Ely for up to 50 teachers.	October 31, 2023
Implement two-day training in Twin Cities Metro for up to 150 teachers.	October 31, 2023

Activity 3: School Year Virtual and In-person Support of Teachers and Students

Activity Budget: \$77,600

Activity Description:

We will coordinate 9 monthly virtual meetings for 200 teachers and provide 3 virtual classroom presentations for 2,000 students. Meetings and presentations will be recorded for future use. A deeper and more sustained connection component is important for our School Year Support of Teachers. We will do this by offering 10 Minnesota educators an opportunity to participate in a Climate Change Community of Practice that includes 1 in person workshop and 4 monthly meetings throughout the spring of 2024. The 4 monthly meetings will follow our already offered 9 monthly workshops that feature climate change education experts in order to allow educator to synthesize the presentation and apply the

content to their classrooms. A minimum of 50 educators typically register for these monthly workshops. We anticipate these educators will reach 100 students each, totaling an additional 1000 students served in Minnesota. The 10 teachers will be responsible for sharing their learnings to the broader MN educator community through blogs, conference presentations, and educator trainings.

Activity Milestones:

Description	Approximate Completion Date
Provide 9 monthly virtual meetings for 200 teachers featuring content/opportunity for collaboration.	May 31, 2024
Provide and record for future use 5 virtual classroom presentations on energy and environmental topics. Reach: 5000 students	May 31, 2024
Facilitate a working group of 10 MN educators to build relationships and learn.	May 31, 2024

Activity 4: Project Evaluation

Activity Budget: \$10,700

Activity Description:

Project evaluation will provide important feedback on the trainings to inform future trainings, demonstrate change in capacity to implement the new science standards throughout the year, and demonstrate change in student interest and knowledge on energy, environmental science and engineering concepts.

Activity Milestones:

Description	Approximate Completion Date
Develop comprehensive evaluation plan including formative and summative evaluation.	October 31, 2023
Develop and implement pre and post evaluation for teachers attending trainings and for full year of network support.	June 30, 2024
Develop and implement pre/post evaluation for students attending virtual presentations.	June 30, 2024
Develop final project report.	June 30, 2024

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Community experts receiving honorariums to present at trainings	TBD	We will invite community experts in renewables, engineering, career opportunities, relevant scientific topics, and science education, to present at trainings.	Yes
Contract Web Support/Systems Administrator	Oz Technology	Sole web contractor with Climate Generation since 2013, hired through competitive bidding process, located in Minnesota. Will maintain website and resources	Yes
Minnesota Science Teachers Association	Minnesota Science Teachers Association	Supporting outreach, reviewing materials, suggesting speakers and topics relevant to Minnesota Science teachers.	No
Minnesota Earth Science Teachers Association	Minnesota Earth Science Teachers Association	Supporting outreach, reviewing materials, suggesting speakers and topics relevant to Earth Science standards.	No
Minnesota Association for Environmental Education	Minnesota Association for Environmental Education	Supporting outreach, reviewing materials, suggesting speakers and topics relevant to environmental educators.	No
Department of Education: Science	Department of Education: Science	Providing outreach, suggesting and/or providing speakers	No
Department of Commerce: Energy Division	Department of Commerce: Energy Division	Suggesting and/or providing speakers	No
IPS Solar	IPS Solar	Speaker suggestion, outreach to teachers	No
All Energy Solar	All Energy Solar	Speaker suggestion, outreach to teachers	No
Clean Grid Alliance	Clean Grid Alliance	Speaker suggestion, outreach to teachers	No
RREAL	RREAL	Speaker suggestion, outreach to teachers, connection with tribes doing solar	No
Great Plains Institute	Great Plains Institute	Speaker suggestions, topic suggestions	No

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.

Media will be alerted to each of our community visits for additional coverage and outreach. Additionally, teachers will be encouraged to share their experiences and resources with colleagues for dissemination. Outreach for training will occur at relevant education conferences. Additionally we will be determining through research and evaluation a set of best practices in using communities as a context for science education. We will disseminate our resources and findings via our website (www.climategen.org), the Climate Generation listserv, the Education Minnesota Statewide Educator Conference, the Minnesota Science Teachers Association Conference, MNCERTS (Minnesota Clean Resource Energy Teams) Conference, social media outlets including Facebook, Twitter, and Instagram as well as through the many partners associated with the trainings.

The Minnesota Environment and Natural Resources Trust Fund (ENRTF) will be acknowledged through use of the trust

fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENRTF Acknowledgement Guidelines.

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

Climate Generation has pioneered the development of STEM-based resources and training for over 15 years and is committed to including this as a key component of our K-12 programming. Our diverse funding base ensures the continuity of our programming.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Educating Minnesotans about Potential Impacts of Changing Climate	M.L. 2014, Chp. 226, Sec. 2, Subd. 09e	\$325,000

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount	\$ Amount Spent	\$ Amount Remaining
Personnel										
Senior Director of Programs/Project Manager		Manage, oversee budget, and evaluate			22%	0.25		\$21,000	-	-
Education Manager		Coordinate, develop, implement program			22%	1.25		\$78,500	-	-
Education Coordinator		Support program development and implementation			22%	1.25		\$63,500	-	-
Finance Manager		Administrative and budget reporting support			22%	0.25		\$15,500	-	-
Communications Coordinator		support communication and graphic design of materials and video support			22%	0.13		\$6,100	-	-
Program Intern		outreach and dissemination support, program delivery			0%	0.13		\$14,500	-	-
							Sub Total	\$199,100	\$115,345	\$83,755
Contracts and Services										
Systems Administrator: Laura Borgendale	Professional or Technical Service Contract	technology support, webpage integration- web contractor with Climate Generation since 2019, hired through competitive bidding process, located in Minnesota				0		\$12,500	\$2,987	\$9,513
KidWind	Subaward	KindWind, a renewable energy education non-profit organization in MN, will facilitate a 2.5 hour workshop on solar, wind, and power grid systems at each of the three summer workshops. Educators will learn about renewable energy systems, create models, and will receive classroom kits. \$12,000 = labor + kit cost				0		\$12,000	\$12,000	-
Studio501	Professional or Technical Service Contract	Accounting support, management of expense reporting, and liaison with funder.				-		\$2,500	\$2,500	-

							Sub Total	\$27,000	\$17,487	\$9,513
Equipment, Tools, and Supplies										
	Tools and Supplies	Workshop materials (markers, flipchart paper, snacks \$150/workshop)	For activities and support of workshops					\$450	\$450	-
							Sub Total	\$450	\$450	-
Capital Expenditures										
							Sub Total	-	-	-
Acquisitions and Stewardship										
							Sub Total	-	-	-
Travel In Minnesota										
	Miles/ Meals/ Lodging	Staff travel to Ely and Mankato for trainings (\$952 hotel/meals (2 nights each location, 2 days of per diem each location), \$448 mileage - 800 x.56) plus travel for planning meetings (\$100) per Commissioner's plan.	For travel to trainings and planning meetings					\$3,500	\$2,457	\$1,043
	Conference Registration Miles/ Meals/ Lodging	Minnesota Science Teachers Conference Exhibit and Registration (\$250)	for program dissemination and presentation					\$250	\$250	-
	Conference Registration Miles/ Meals/ Lodging	Education Minnesota Exhibit and Registration (\$500)	For program dissemination and presentation					\$500	\$450	\$50
							Sub Total	\$4,250	\$3,157	\$1,093
Travel Outside Minnesota										
							Sub Total	-	-	-

Printing and Publication										
	Printing	Workshop materials (25*200=5000)	Handouts, activity outlines for trainings					\$5,000	\$3,157	\$1,843
							Sub Total	\$5,000	\$3,157	\$1,843
Other Expenses										
		Facility Rental for 3 workshop locations (\$1000/location)	Locations to hold workshops for teachers					\$3,000	\$1,594	\$1,406
		Workshop meals for participants (Breakfast/lunch for 2 days, 200 teachers: \$25/teacher/day, \$50*200=10000 Participants will be spending full days over meal hours in possibly remote locations. Modest meals will be provided to sustain them and ensure work flow can continues uninterrupted	Workshops will be held over a full day and depending on location may not be close to food. Providing lunch will be critical to maximize time and make the day usefu.					\$10,000	\$4,649	\$5,351
		Speaker Honorariums (\$200/speaker, 2 speakers/training*3 trainings=400*3=1200)	Speakers will travel to training and be sharing their expertise and will need compensation					\$1,200	\$600	\$600
							Sub Total	\$14,200	\$6,843	\$7,357
							Grand Total	\$250,000	\$146,439	\$103,561

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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Non ENRTF Funds

Category	Specific Source	Use	Status	\$ Amount	\$ Amount Spent	\$ Amount Remaining
State						
			State Sub Total	-	-	-
Non-State						
Cash	Xcel Energy Foundation	Teacher network support	Secured	\$10,000	\$10,000	-
Cash	Olseth Family Foundation	K-12 Program Support	Secured	\$20,000	\$20,000	-
In-Kind	Executive Director time	Time spent supporting project	Secured	\$10,000	\$421	\$9,579
In-Kind	Climate Generation curricula resources	Already developed materials used to support the project	Secured	\$15,000	\$15,000	-
			Non State Sub Total	\$55,000	\$45,421	\$9,579
			Funds Total	\$55,000	\$45,421	\$9,579

Attachments

Required Attachments

Visual Component

File: [8c44a748-855.pdf](#)

Alternate Text for Visual Component

The graphic is a flow chart of the project demonstrating the work and the outcomes. It shows a map with 3 stars in different locations of MN and reads: 3 science teacher workshops. This flows to a list of workshop topics including: new science standards, equity, renewable energy, green careers. This flows to an image of a computer and the words: teacher and student support through virtual meetings and presentations. This flows to an image of renewable energy resources and the words Minnesota ...

Financial Capacity

File: [2e9ca5e5-20b.pdf](#)

Board Resolution or Letter

Title	File
Climate Generation Board Resolution	983de273-ce7.pdf

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
Climate Generation Background Check Certification	0e39724b-4f8.pdf
TeachScience Final Project Report	9d9568b4-399.pdf

Media Links

Title	Link
Blog Announcing TeachScience	https://www.climategen.org/blog/teachscience-in-minnesota-schools/
TeachScience Virtual Poster Blog	https://climategen.org/blog/training-educators-supports-climate-change-resilient-communities/
TeachScience Poster	https://drive.google.com/file/d/1JVXHxFHUpuLqdm2Fltt4zi9PtRLxLx/view?usp=sharing
Green Visions: Climate Generation's Teach Science Project	https://lccmrprojectmgmt.leg.mn/#/final/workplan/886
Earth Fest Iron Range 2023 focuses on children in new venue	https://www.kaxe.org/show/91-7-kaxe-90-5-kbxe-morning-show/2023-04-17/earth-fest-iron-range-2023-focuses-on-children-in-new-venue
TeachScience Final Project Report	https://docs.google.com/document/d/1LFEuTuMfIGwmLzWRL4szMw8bxITsv24ai-xFyrWfbLE/edit
Teach Climate Network Virtual Workshops	https://www.youtube.com/watch?v=e7yhtF8Uodg&list=PLcNOW40d5rx1sbTMPGfhlqsUdep007B81&index=2

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

Due to the decrease in funding to \$250,000 we scaled back our deliverables from 5 trainings to 3 trainings. Additionally we adjusted our milestones to reflect the new timeline which extends until June 30, 2024.

Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?

N/A

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I understand the Commissioner's Plan applies.

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

No

Does the organization have a fiscal agent for this project?

No

Work Plan Amendments

Amendment ID	Request Type	Changes made on the following pages	Explanation & justification for Amendment Request (word limit 75)	Date Submitted	Approved	Date of LCCMR Action
1	Amendment Request	<ul style="list-style-type: none"> • Budget • Budget - Capital, Equipment, Tools, and Supplies • Budget - Professional / Technical Contracts • Budget - Travel and Conferences • Budget - Non-ENRTF Funds Contributed 	We would like to reallocate the \$12,000 dedicated to purchasing teacher supplies for renewable energy to support a community partner who will offer a 2.5 hour workshop at each summer workshop, and purchase renewable energy kits for up to 100 educators. This change in funding will still meet the outcome of providing educators with renewable energy professional development and hands-on materials for energy education that they can use in their classrooms.	April 10, 2023	Yes	April 10, 2023
2	Amendment Request	<ul style="list-style-type: none"> • Activities and Milestones • Budget - Professional / Technical Contracts • Budget - Travel and Conferences 	We successfully completed Activity 2 with funds remaining and would like to use those funds to support an in-person support component to Activity 3. This would involve the use of our remaining honorariums for speakers, and shifting some of our contractor funds to meals/mileage/lodging for our staff to meet with educators in greater Minnesota.	November 30, 2023	Yes	December 11, 2023
3	Project Manager	<p>Previous Manager: Kristen Poppleton (kristen@climategen.org) New Manager: Lindsey Kirkland (lindsey@climategen.org)</p>	Kristen Poppleton is leaving Climate Generation on December 14	December 8, 2023	Yes	December 11, 2023
4	Amendment Request	<ul style="list-style-type: none"> • Budget • Project Collaborators - Project Manager Info • Budget - Personnel • Budget - Professional / Technical Contracts • Budget - Travel and Conferences • Budget - Printing and Publication • Budget - Other 	Climate Generation's Finance Manager left Climate Generation. We are contracting with an accounting firm, Studio501, to support the financial aspects of this grant. We would like to move \$2,500 from personnel (Finance Manager) to Professional/Tech/Service Contracts to cover their costs.	March 28, 2024	Yes	August 8, 2024

		• Attachments				
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Status Update Reporting

Final Status Update August 14, 2024

Date Submitted: August 29, 2024

Date Approved: October 16, 2024

Overall Update

Climate Generation has completed Activities 1 - 4. This project engaged a diverse community to re-envision what climate change education can look and feel like within communities. Attendance in our teacher professional development and student-facing workshops were lower than anticipated. We served 108 teachers in online workshops, 35 at in-person workshops, and 11 in the year of support. We served 266 students directly. Indirectly, we reached 5,500 students by trained their teachers. However teachers reported an increase in their confidence and competence in talking about and teaching climate change. Teachers were happy to connect to local experts in climate and energy science, as well as local green professionals working in their communities. Educators were connected to instructional materials that they plan to adapt and use in their classrooms in the coming years. Also participating educators were given the opportunity to connect with local school facilities teams to better understand how they may work with their schools administration and facilities team to steward place-based climate change education.

Recordings of virtual workshops are publicly available on Climate Generation's YouTube:

<https://www.youtube.com/watch?v=e7yhtF8Uodg&list=PLcNOW40d5rx1sbTMPGfhlqsUdep007B81&index=2>.

Activity 1

Planning for the summer workshops was completed in June 2023 and was reported on in the Oct 2023 update.

Planning for the year-long support for teachers and students was completed in Nov 2023. Leveraging the research from early 2023 and the self-identified needs of educators at the summer workshop, we defined a clear scope of themes, topics, and a learning arc for the year. Climate Generation planned a multifaceted year-long support program in response to teachers' request for more long-term, community-based professional development, 1:1 coaching, and increased access to high quality teaching materials. We combined our Teach Climate Network offerings and associated initiatives with the TeachScience year-long support program to build a robust network of opportunities for MN educators including both virtual and in-person opportunities.

(This activity marked as complete as of this status update)

Activity 2

Climate Generation hosted three, 2 day educators workshops in June and August 2023.

-Grand Rapids, June 27-28 at Minnesota North College, Itasca Campus.

-Mankato, August 1-2 at Dakota Meadows Middle School.

-Woodbury, August 15-16 at E-STEM Middle School.

Each workshop was two days and included a mix of hands-on activities, keynote presentations, a tour of energy infrastructure for educators and reflection on the best practices of climate, justice, and energy education.

Attendance at the workshops was lower than anticipated but engagement and energy was high! Educators came from diverse backgrounds, work in varied teaching environments and serve diverse student populations. Many of our pre-established learning and practice outcomes for educators were met. Overall, educators left the workshops feeling inspired, connected, and hopeful about pursuing teaching about climate change and energy in their schools. The workshops also increased educator awareness of the connection between equity and green career skill building. Educators also left feeling connected to school facility teams and community members/organizations working in the

green economy which can serve them as they continue to pursue this work beyond the workshops
(This activity marked as complete as of this status update)

Activity 3

We completed our year-long teacher support program (see list below):

- Monthly Teach Climate Tips e-newsletter sent to 1,500 MN Teachers Sept 2023 - May 2024.
- Monthly Teach Climate Network Workshops engaged 108 Teachers MN in 1 hour of professional learning, Sept 2023 - May 2024.
- Experience Energy Curriculum Evaluation Working Group, a focus group to pilot and discuss the implementation of the Experience Energy -Curriculum; engaged 5 teachers in 15 hours of professional learning, curriculum testing, and collaborative review and writing.
- TeachScience Community of Practice, a group focused on supporting one another to continue practicing the living laboratories model; engaged 11 Teachers in 15 hours of professional learning.

Recordings of virtual workshops are publicly available on Climate Generation's YouTube:

<https://www.youtube.com/watch?v=e7yhtF8Uodg&list=PLcNOW40d5rx1sbTMPGfhlqsUdep007B81&index=2>.

We also hosted several virtual student-facing presentations (see list below). Engagement in virtual programming was significantly lower than anticipated, possibly due to preference for in-person programming after COVID-19 pandemic and restrictions on teachers & student schedules.

- Gustavus, Climate Science (18 students)
- Seward Montessori, Climate and Weather (24 students)
- Aurora Charter School, Climate Change Introduction (155 students)
- Cross Lake Community School, Climate Science (60 students)
- University of Minnesota Duluth, Introduction to

(This activity marked as complete as of this status update)

Activity 4

We evaluated the TeachScience program using formative and summative forms of measurement. We gathered demographic information of the educators, as well as the students they teach, in the workshop registration form to ensure we served a diverse audience. In addition, we asked questions about their prior experience teaching climate change and where they have had challenges and successes. Answers from registration forms were analyzed and integrated into the planning and development of the program. Attendees were given pre and post surveys asking questions that measure change in climate literacy, self-efficacy and intent to implement what they learned. Additionally, we assessed teacher learning in the events themselves, using hands-on activities that demonstrate level of understanding and regular opportunities for discussion and feedback.

A report of the TeachScience Program is attached.

(This activity marked as complete as of this status update)

Dissemination

In addition to all that has been reported, we are hosting the recordings of the Teach Climate Network Workshops on Climate Generation's YouTube page:

<https://www.youtube.com/watch?v=e7yhtF8Uodg&list=PLcNOW40d5rx1sbTMPGfhlqsUdep007B81&index=2>

Status Update Reporting

Status Update April 1, 2024

Date Submitted: March 27, 2024

Date Approved: August 8, 2024

Overall Update

Climate Generation has completed Activities 1 and 2. We are actively working on Activities 3 and 4. Climate Generation staff completed planning the year-long support for MN educators in November 2023 and have since been offering the program, including 9 monthly meetings through the Teach Climate Network, a TeachScience Community of Practice and 1:1 coaching and the Experience Energy Curriculum Evaluation Working Group. We have engaged a total of 105 MN-based educators in our virtual and in-person programming. We have further engaged 51 students in class-based presentations on climate change science, justice, and energy education. We are still developing opportunities to connect with students.

Activity 1

This activity was previously marked complete.

Planning for the summer workshops was completed in June 2023 and was reported on in the Oct 2023 update. Planning for the year-long support for teachers and students was completed in Nov 2023. Leveraging the research from early 2023 and the self-identified needs of educators at the summer workshop, we defined a clear scope of themes, topics, and a learning arc for the year. Climate Generation planned a multifaceted year-long support program in response to teachers' request for more long-term, community-based professional development, 1:1 coaching, and increased access to high quality teaching materials. We combined our Teach Climate Network offerings and associated initiatives with the TeachScience year-long support program to build a robust network of opportunities for MN educators including both virtual and in-person opportunities.

(This activity marked as complete as of this status update)

Activity 2

This activity was previously marked complete.

Climate Generation hosted three, 2 day educators workshops in June and August 2023.

Grand Rapids, June 27-28 at Minnesota North College, Itasca Campus.

Mankato, August 1-2 at Dakota Meadows Middle School.

Woodbury, August 15-16 at E-STEM Middle School.

Each workshop was two days and included a mix of hands-on activities, keynote presentations, a tour of energy infrastructure for educators and reflection on the best practices of climate, justice, and energy education. View the preparatory activities educators engaged in and the agenda for the workshops.

Attendance at the workshops was lower than anticipated but engagement and energy was high! Educators came from diverse backgrounds, work in varied teaching environments and serve diverse student populations. Many of our pre-established learning and practice outcomes for educators were met. Overall, educators left the workshops feeling inspired, connected, and hopeful about pursuing teaching about climate change and energy in their schools. The workshops also increased educator awareness of the connection between equity and green career skill building. Educators also left feeling connected to school facility teams and community members/organizations working in the green economy which can serve them as they continue to pursue this work beyond the workshops

(This activity marked as complete as of this status update)

Activity 3

We are in the middle of our year-long teacher support program. A list of the offerings for the 2023 - 2024 school year:

- Monthly Teach Climate Tips, featuring tips and tricks for practicing climate change educators. Sent to 1,500 MN Teachers Sept 2023 - March 2024.
- Monthly Teach Climate Network Workshops to connect with professionals and resources in climate change education. Engaged 92 MN Teachers Sept 2023 - March 2024.
- Experience Energy Curriculum Evaluation Working Group, a focus group for educators to pilot and discuss the implementation of the Experience Energy Curriculum. Engaging 5 teachers in 20 hours of professional learning, curriculum testing in their classroom, and collaborative review and writing.
- TeachScience Community of Practice and 1:1 coaching for educators who want to continue practicing the living laboratories model in their schools and deepen their implementation of climate change education in their curriculum. Engaging 11 Teachers in 15 hours of professional learning.

We are developing opportunities for student-facing presentations. We have completed 3 of the 5 presentations.

- Gustavus, Climate Science (18 students live)
- Seward Montessori, Climate and Weather (24 students live)
- UM Duluth, Introduction to Environmental Justice (9 students live)
- Cross Lake Community School, Climate Science (60 students)

Activity 4

We continue to evaluate the TeachScience program using formative and summative forms of measurement. We gather demographic information of the educators, as well as the students they teach, in the workshop registration form to ensure we are serving a diverse audience. In addition, we asked questions about their prior experience teaching climate change and where they have had challenges and successes. Answers from registration forms are analyzed and integrated into the planning and development of the program. Attendees are given pre and post surveys asking questions that measure change in climate literacy, self-efficacy and intent to implement what they learned. Additionally, we assess teacher learning in the events themselves, using hands-on activities that demonstrate level of understanding and regular opportunities for discussion and feedback.

Dissemination

In addition to what we reported in Oct 2023...

- Conference Poster Session at the Midwest Climate Resilience Conference Oct 25 - 27th, 2023 in Duluth, MN. (250 people engaged)
- Minnesota Education Association Conference Exhibit Booth, Oct 18th (45 people engaged)
- Authored and disseminated monthly outreach emails & marketing e-blasts to advertise the events to MN audiences, approximately 1,500 people and organizations.
- The TeachScience program webpage and accompanying content (blogs, events, etc.) on our website earned ~1,000 pageviews.
- Published a blog Training Educators Supports Climate Change Resilient Communities.

Status Update Reporting

Status Update October 1, 2023

Date Submitted: November 30, 2023

Date Approved: December 11, 2023

Overall Update

Climate Generation has completed Activity 1 and Activity 2, which is to develop, plan, and execute teacher workshops in the summer of 2023. Climate Generation hosted listening calls with community partners and key stakeholders in each region and within the education community of Minnesota to determine needs of educators and the scope and content of the workshops. The three in-person educator-facing workshops were hosted in June and August summer of 2023. The workshops were developed around the recently revamped Experience Energy curriculum authored by Climate Generation. Each workshop was two days and included a mix of networking opportunities, hands-on activities, keynote presentations, a tour of energy infrastructure for educators and reflection on the best practices of climate, justice, and energy education. Educators were also invited to reflect and discuss how their work at these workshops support their implementation of the new Minnesota State Science Standards and the Next Generation Science Standards and practices related to climate science education. We are in the process of completing activity 3 and 4 and are track to complete all proposed work by June 30, 2024.

Activity 1

Planning for the summer workshops was completed in June 2023.

Using research and listening calls with key stakeholders working in climate, justice, and energy education and action, we created a framework that details the breadth and scope of content for the workshops. We engaged in multiple collaborative conversations with key stakeholders from the Minnesota Education System who have worked deeply to develop the new Minnesota Science Standards and institute the Next Generation Science Standards, to inform the suite of practices and reflection activities that educators engaged with at the workshops.

To support partnership development, marketing and outreach, we built a database that identifies key school districts, educators, and partner organizations in our target regions. We successfully established partnerships with 3 venues for the workshops, Minnesota North College at the Itasca Campus, Dakota Meadows Middle School in Mankato Public School District, E-STEM Middle School in Saint Paul Public School District. The facilities team from each location participated in the development of the workshops and helped facilitate a facilities tour to connect educators to the energy system infrastructure. KidWind and MN State Energy Center of Excellence, two renewable energy education providers, and four green professionals presented their work at the workshops.

(This activity marked as complete as of this status update)

Activity 2

Climate Generation hosted three, 2 day educators workshops in June and August 2023.

Grand Rapids, June 27-28 at Minnesota North College, Itasca Campus, 9 teachers

Mankato, August 1-2 at Dakota Meadows Middle School, 10 teachers

Woodbury, August 15-16 at E-STEM Middle School, 16 teachers

Each workshop was two days and included a mix of hands-on activities, keynote presentations, a tour of energy infrastructure for educators and reflection on the best practices of climate, justice, and energy education. Attendance at the workshops was lower than anticipated but engagement and energy was high! Educators came from diverse backgrounds, work in varied teaching environments and serve diverse student populations. Many of our pre-established learning and practice outcomes for educators were met. Overall, educators left the workshops feeling inspired, connected, and hopeful about pursuing teaching about climate change and energy in their schools. The workshops also

increased educator awareness of the connection between equity and green career skill building. Educators also left feeling connected to school facility teams and community members/organizations working in the green economy which can serve them as they continue to pursue this work beyond the workshops and into the coming school year.¹⁹ educators also attended the Summer Institute.

(This activity marked as complete as of this status update)

Activity 3

We are finalizing the breadth of opportunities for educators to engage in the year-long support program. Leveraging the research from early 2023 and the self-identified needs of educators, we have a clear learning arc for the year. We will combine our Teach Climate Network offerings and associated initiatives with the TeachScience year-long support program to build a robust network of opportunities for MN educators.

A list of the expected offerings educators may opt into throughout the 2023 - 2024 school year:

Monthly Teach Climate Tips and Workshops, featuring tips and tricks for practicing climate change educators and connections with professionals and resources

Curriculum Evaluation Working Group where educators can sign up to be a part of a focus group to pilot and discuss the implementation of the Experience Energy Curriculum.

Inspiring Stories, where educators can receive one-on-one climate storytelling coaching to support the development of storytelling in their curriculum.

TeachScience Community of Practice and coaching for educators who want to continue practicing in their schools and deepen their implementation of climate change education in their curriculum.

We are currently reaching out to teachers that attended the summer workshops to see who wants a Spring 2024 virtual classroom presentation.

Activity 4

We continue to evaluate the TeachScience program using formative and summative forms of measurement. We gathered demographic information of the educators, as well as the students they teach, in the workshop registration form to ensure we are serving a diverse audience. In addition, we asked questions about their prior experience teaching climate change and where they have had challenges and successes. Answers from registration forms were analyzed and integrated into the planning and development of the program. All workshop participants completed pre and post surveys asking questions that measure change in climate literacy, self-efficacy and intent to implement what they learned.

Additionally, we assessed teacher learning in the events themselves, using hands-on activities that demonstrate level of understanding and regular opportunities for discussion and feedback. Finally, Climate Generation's Education Intern observed teacher interactions and experiences at the workshops to create an anthropogenic-style narrative that captured the educator learning and relationship development.

Dissemination

In addition to what we reported in April 2023...

North American Association for Environmental Education's CEE-Change Fellowship: Building Leadership in Civics and Environmental Education (CEE) presentation

Authored and disseminated monthly outreach emails & marketing e-blasts to advertise the events to MN audiences, approximately 1,500 people and organizations.

Hosted a workshop at Climate Generation's Annual Summer Institute for Climate Change Education in July 2023 for 45 people.

Green Visions: Climate Generation's Teach Science Project Interview.

Keynote for the Iron Range Earth Fest event to 15 people and was featured in the media.

The TeachScience program webpage and accompanying content (blogs, events, etc.) on our website earned ~1,000 page views.

Anticipated October conferences to feature the TeachScience Program and Experience Energy Curriculum include Minnesota Educators Association, Minnesota Science Teachers Association, and the Midwest Climate Resilience Conference.

Status Update Reporting

Status Update April 1, 2023

Date Submitted: March 22, 2023

Date Approved: April 10, 2023

Overall Update

Climate Generation is well into the work on Activity 1, which is to develop and plan teacher workshops this summer and connect educators to our teacher support network. Climate Generation has hosted listening calls with community partners and key stakeholders in each region and within the education community of Minnesota to determine needs of educators and the scope and content of the workshops. The three in-person educator-facing workshops have been scheduled. We are currently marketing those events and accepting registration. Climate Generation is actively confirming potential partners and speakers for the events. At the summer workshops educators, partners, and Climate Generation will plan the specific aspects of the support educators will receive through the 9 virtual meetings during the school-year, however Climate Generation has met to discuss what these events could look like broadly and have identified our goals for the year-long support.

Activity 1

Climate Generation continues to attend workshops and working groups to identify emerging issues in climate change, energy, and education standards that are central to this project. Based on our research, we have created a document detailing how the educator workshops support the new Minnesota Science Standards and the Next Generation Science Standards, which is distributed with marketing materials for the events.

We built a database that identifies key school districts, educators, and partner organizations in our target regions which is regularly used for marketing and partnership development. We have successfully established partnerships with 3 venues for the workshops, Minnesota North College at the Itasca Campus, Dakota Meadows Middle School in Mankato Public School District, E-STEM Middle School in Saint Paul Public School District. The facilities teams from each location will participate in development of aspects of the workshops so that educators can learn how school facilities provide a pathway for students to evaluate energy use in an applied context. We have established partnerships with KidWind and MN State Energy Center of Excellence, two renewable energy education providers, that will host aspects of the summer workshops. We are currently confirming presentations by green professionals and other community leaders for each region.

Activity 2

Implementation of the workshops will not begin until June 2023. Climate Generation will be actively planning and marketing the events from now until the week prior to each event. The workshops schedule is below:

Northern MN - Grand Rapids, June 27-28, 2023 at Minnesota North College, Itasca Campus

Southern MN - Mankato, August 1-2, 2023 at Dakota Meadows Middle School

Metro Area - Woodbury, August 15-16, 2023 at E-STEM Middle School

Activity 3

Climate Generation is continuing to plan the scope of content for the 9 monthly virtual meetings to support educators throughout the year. We've identified the arc of learning and key themes connecting climate change, renewable energy, and environmental and social systems, including identifying types of energies and exploring how their use impacts the earth, learning about the energy economy and imagining a future green-er, democratic energy economy, identifying and combating misinformation and disinformation about energy sources, and supporting a just transition to a green economy through green careers education and training. We have also brainstormed how the 9 monthly meetings will align with the opportunities offered by Climate Generation's Teach Climate Network. We plan to combine these two programs to build a more robust network of support for MN educators. A draft of our vision for this work will be shared

with MN educators and partners at the summer workshop, where we will collectively create the final vision for the year-long support. We believe allowing educators and partners to provide feedback on our plan will better align the program to educator needs, and will result in higher attendance.

Activity 4

We will evaluate the TeachScience program using formative and summative forms of measurement. We are gathering demographic information of the educators, as well as the students they teach, in the workshop registration form to ensure we are serving a diverse audience. In addition, we ask questions about their prior experience teaching climate change and where they have had challenges and successes. Answers from registration forms are being regularly analyzed and integrated into the planning and development of the program. All workshop participants and educators who attend events in the year-long support program will receive pre and post surveys asking questions that measure change in climate literacy, self-efficacy and intent to implement what they learned. Additionally, we will assess teacher learning in the events themselves, using hands-on activities that demonstrate level of understanding and regular opportunities for discussion and feedback. We plan to make adjustments to the progression of the workshops and year-long support based on this.

Dissemination

Climate Generation authored a blog announcing the TeachScience project in spring 2022, we have since updated it and have shared it marketing materials: <https://www.climategen.org/blog/teachscience-in-minnesota-schools/> This blog was featured in a print newsletter that reached 750 people and on our social media pages, including Facebook, LinkedIn, and Twitter (<https://twitter.com/ClimateGenOrg/status/1502359706291081216>), and three virtual e-newsletters reaching a total of 10,000+ people in Climate Generation's audience. Climate Generation attended conferences for the MN Science Teachers Association and the Minnesota Education Association in Fall 2022, where we shared informational materials about TeachScience with approximately 150 MN educators. Climate Generation has developed a partnership with Minnesota Clean Resource Energy Teams who have shared TeachScience marketing materials with their networks.

Status Update Reporting

Status Update October 1, 2022

Date Submitted: November 3, 2022

Date Approved: November 7, 2022

Overall Update

We have mostly been working on preparing for the 3 educators workshops that will happen in the Summer/Fall of 2023. We have made progress toward planning the three 2-day educators workshops by building a work plan, hiring supporting staff, aligning the team, creating marketing plans and associated materials, and creating instructional resources that will be used during the educator trainings.

Activity 1

Climate Generation staff have scheduled their attendance at two MN Science teacher conferences (MEA and MNSTA) this fall to advertise the 3 teacher workshops scheduled to occur in the Summer/Fall of 2023. We have created a flyer and registration form so educators can indicate their interest and need.

Climate Generation has also scheduled a marketing plan with our Communications Team to distribute this registration form to our network of MN educators and MN located partner organizations.

For these workshops educators will be trained how to use Climate Generation's updated instructional resource, called Experience Energy. Climate Generation's Instructional Resources Coordinator has developed a work plan to update this resources and has begun the work of updating it. In the coming weeks the Instructional Resources Coordinator will also identify key activities that will be modeled at the workshops and purchase supplies needed to training the educators to do those activities in their classrooms.

Activity 2

No additional work has been done under this activity since the last reporting period. We expect to implement the educator trainings outlined in Activity 2 in the June - Aug 2023.

Activity 3

No additional work has been done under this activity since the last reporting period. We expect to implement the virtual workshops for educators outlined in Activity 3 beginning in Sept 2023 and continuing monthly through May 2024. We expect the the student-facing programs to be planned by educators at the virtual workshops or the in-person 2 day workshops and to be completed by May 2024.

Activity 4

No additional work has been done under this activity since the last reporting period. We expect to begin development and implementation of the evaluation plan outlined by Activity 4 before the beginning of the in-person 2-day educator workshops. We expect to have a fully developed evaluation plan by May 2023, which will be implemented for all programming between June 2023 and May 2024.

Dissemination

Climate Generation staff have scheduled their attendance at two MN Science teacher conferences (MEA and MNSTA) this fall to advertise. Climate Generation has also scheduled a marketing plan with our Communications Team to distribute the workshop information to our network of MN educators and MN located partner organizations, and to generally announce the work to our local partners.

Status Update Reporting

Status Update April 1, 2022

Date Submitted: April 29, 2022

Date Approved: May 2, 2022

Overall Update

Climate Generation has established a core working group. This core working group has met to align the work plan for our LCCMR project with our existing work expectations, including the coordination of our Teach Climate Network, to ensure we will meet the deadlines for project benchmarks. The working group has established key responsibilities for each team member and/or sub-team. We have begun work on Activity 1, which is to develop and plan trainings and connect educators to our teacher support network.

Activity 1

Climate Generation has reviewed the new Minnesota Science Standards to identify the key standards and benchmarks related to climate change, renewable energy, and environmental and social systems to establish a framework of content that closely supports the MN education standards. We have attended multiple workshops, conferences, and working groups hosted by statewide partners to identify renewable energy education and emerging issues in environmental science and climate that are central to this project (see list below; please note these events are not listed under the LCCMR budget/expenses because they are covered by our regular operating costs). Climate Generation has begun to build a database that identifies key school districts in our target regions, with information about renewable energy infrastructure, student demographics, and existing relationships to better target schools that align with the goals of this project.

Coalition Work and Green Energy Working Groups:

- Clean Energy Education Summit hosted by Clean Energy Education and Workforce Alliance
- Mainstream Environmental Organization Collaborative Pathways Program Development Coalition Work
- Community of Practice Community Meetings hosted by SERC
- CLEAN Network Coalition Work
- Midwest Renewable Energy Association Coalition Work
- Clean Energy Economy MN Coalition Work

Activity 2

We plan to begin work on workshop implementation in fall 2022.

Activity 3

Climate Generation has begun planning the scope of content for the 9 monthly virtual meetings to support educators throughout the year in 2024. Using our intimate knowledge of climate change education and our learnings from our ongoing coalition work and leadership with green energy partners we have developed an arc of learning and key themes connecting climate change, renewable energy, and the intersections with environmental and social systems. Key themes include: Identifying types of energies and exploring how their use impacts the earth, learning about the energy economy and imagining a future green-er, democratic energy economy, identifying and combating misinformation and disinformation about energy sources, and supporting a just transition to a green economy through green careers education and training. Next we will identify key presenters, and resources, and establish a framework for the structure of the workshops.

Activity 4

We plan to begin work on developing the evaluation framework for this project in fall 2022.

Dissemination

Climate Generation authored a blog announcing the TeachScience project:

<https://www.climategen.org/blog/teachscience-in-minnesota-schools/>

This blog was featured in a print newsletter that reached 750 people and on our social media pages, including Facebook, LinkedIn, and Twitter (<https://twitter.com/ClimateGenOrg/status/1502359706291081216>) and two virtual e-newsletters reaching a total of 10,000+ people in Climate Generation's audience. The blog will remain live on Climate Generation's website and will be shared with future partners and educators as we begin reaching out to establish relationships.