

### Climate Change-Related Projects & Resources for Museums, Science Centers, Planetariums, Aquaria, & Zoos

Prepared for the Climate Change Showcase at the 2019 ASTC Conference in Toronto, Ontario

<u>Snow: Museum Exhibit, Educational Outreach, and Learning Research</u> - Building on the familiarity and mystique of snow, the University of Alaska Fairbanks, the Oregon Museum of Science and Industry, and COSI's Center for Research and Evaluation are partnering on Winter Worlds (Snow: Museum Exhibit, Educational Outreach and Learning Research), a collaborative project to engage audiences in snow as a platform to explore Earth's climate system and explore how culture affects STEM learning in informal settings. Resources: <u>2019 AISL PI Summit Poster</u>

Science Center Public Forums: Community Engagement for Environmental Literacy, Improved Resilience, and Decision-Making, led by Arizona State University's Consortium for Science, Policy, & Outcomes and the Museum of Science, Boston, engaged citizens in discussions and explorations of NOAA data about climate-related hazards, resilience strategies, and related policies. The team created forum modules about four climate-related hazards, which were used as a part of forum programs at eight museums. Resources: Summative Evaluation

<u>6 Degrees of Influence: Understanding the Interconnectedness of Earth Systems</u> combines a Science On a Sphere presentation with a follow-up creative art activity – designed for middle school students to think of interconnections between natural and human-created phenomena on the planet. The program was developed by the Nurture Nature Center in, Easton PA in collaboration with the Maryland Science Center. Resources: <u>Summative Evaluation</u>

<u>The Hidden World of Permafrost</u> is a collaborative research project led by the University of Alaska Fairbanks and the Oregon Museum of Science and Industry. The project explores the interrelationship between thawing permafrost and climate change and builds on 50 years of informal education and outreach at the Alaskan Permafrost Tunnel, the Nation's only underground research facility related to permafrost and climate. Resources: <u>2016 CAISE PI Meeting Poster</u>, <u>2018 Science for All Video</u>, <u>2019 AISL PI Meeting Poster</u>, <u>Project Website</u>

<u>CCEP-I: Climate Literacy Zoo Education Network (CliZEN)</u> developed and evaluated a new approach to climate change education that connects zoo visitors to polar animals currently endangered by climate change. The partnership brought together a multidisciplinary team led by the Chicago Zoological Society of Brookfield, IL, and a consortium of nine zoos across the country and Polar Bears International. Resources: <u>Project Website</u>, <u>Climate Change Education: A Primer for Zoos and Aquariums</u>, <u>Global Climate Change as Seen by Zoo and Aquarium Visitors: Final Report</u>, <u>Youth Volunteer Interpreters as Facilitators of Learning about Climate Change: Final Report</u>, and <u>Global Climate Change as Seen by Latin American Visitors: Final Report</u>

<u>Our Earth's Future</u>, developed by the American Museum of Natural History (AMNH), included a series of online and face-to-face adult learning courses that focused on the topic of climate change. Resources: <u>Our Earth's Future Final Evaluation Report</u>, <u>AMNH Climate Change Resources / Our Earth online course</u>

<u>Cultural Cognition at Yale Law School</u> is an interdisciplinary team of scholars who use empirical methods to examine the impact of group values on perceptions of risk and related facts. Researcher Dan Kahan has analyzed risk perception, science communication, and the application of decision science to law and policy making. His research has investigated public disagreement over climate change, public reactions to emerging technologies, and conflicting public impressions of scientific consensus.

Gateway Illusion or Cultural Cognition Confusion? In this paper, the authors responded to the critiques presented by (Kahan, 2017). Contrary to claims that the scientific consensus message did not significantly influence the key mediator and outcome variables in our model, we show that the experiment in (van der Linden et al., 2015) did in fact directly influence key beliefs about climate change. We also clarify that the Gateway Belief Model (GBM) is theoretically well-specified, empirically sound, and as hypothesized, the consensus message exerts a significant indirect influence on support for public action through the mediating variables. We support our conclusions with a large-scale replication.

Global Climate Change Explorer, a website created by the Exploratorium, provides a platform to discover how researchers study climate change and examine the latest scientific data. Users can explore a sampling of data sets from different realms affected by climate change: the Atmosphere, Oceans and Water, Ice, and Land and Living Systems. There is also a Looking Ahead section where visitors can explore what computer models tell us about our climate's future, the impact on society, and what can be done to slow down and adapt to climate change.

Species Loss: Exploring Opportunities with Art–Science (article) This article explores the goals, impacts, cascading impacts, and lessons learned from art–science collaborations, as well as ideas for collaborative projects. Using three case studies based on Harrower's scientific research into species interactions, the authors illustrate the importance of artists as a primary audience and the potential for a combination of art and science presentations to influence public understanding and concern related to species loss.

### **Searching InformalScience.org**

Informal Science.org contains a wealth of resources related to climate change and informal STEM learning. To search for more climate resources, go to the home page and click on the Advanced Search button at the bottom of the search box. Under the "Discipline," you can select the term "Climate." You can select other filters such as Resource Type, Funding, Date, or Learning Environment to further narrow your search.





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# The Wild Center's Youth Climate Program





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- Starting a Youth Climate Summit
- Climate Action Planning with youth
- Youth climate leadership programming
- Climate change teacher professional development

Access our free resources at:

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# Climate Change and the Oceans

The New England Aquarium would like to thank EnerNOC and its founder, Timothy G. Healy, a member of the Aquarium's Board of Overseers, whose generous support helped make this program possible.

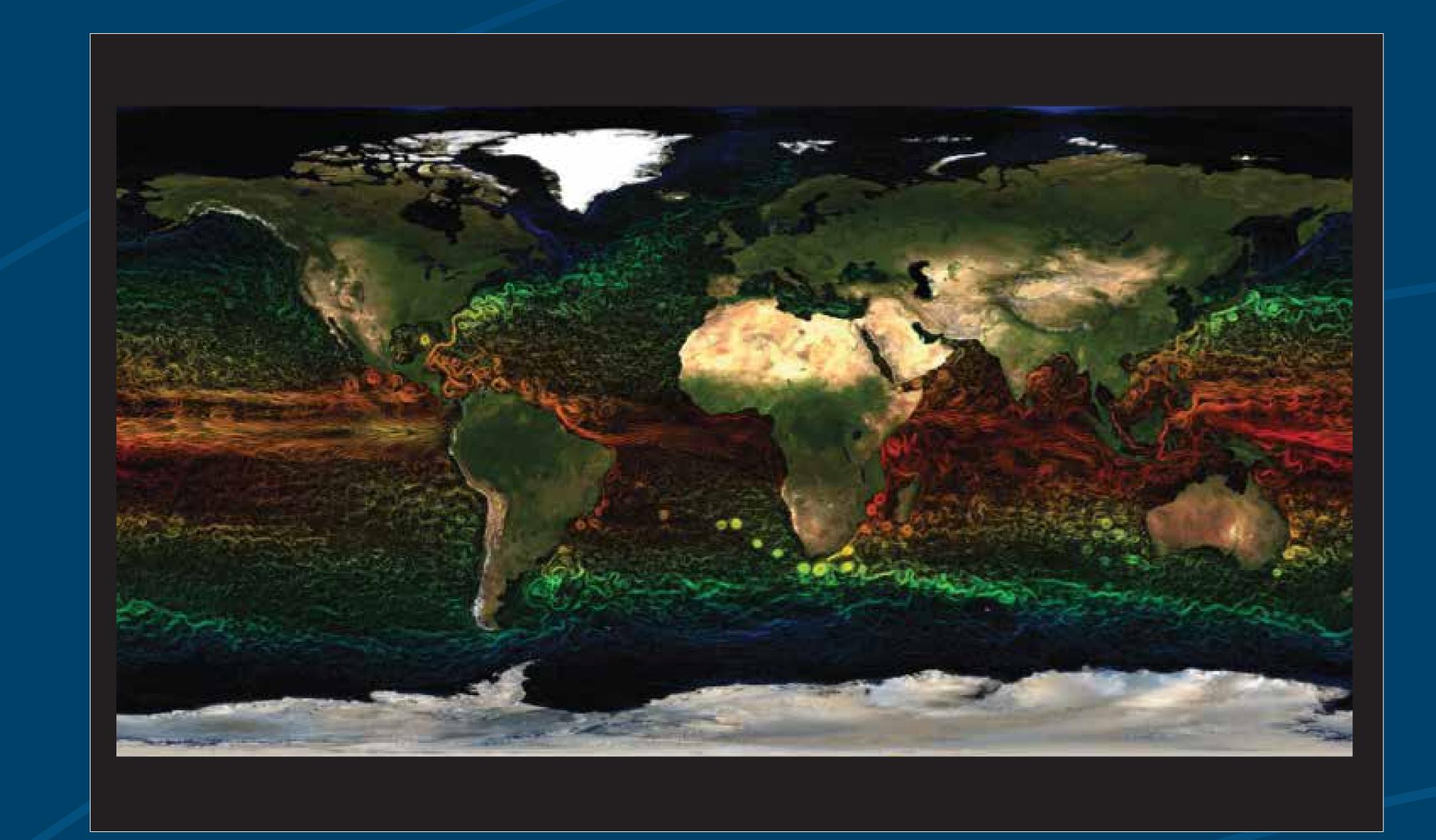
## We talk about climate change ...

You'll hear our staff talking about climate change because protecting the blue planet means protecting the climate system. Knowing this will take everyone, we've researched the most effective ways to talk to and teach others about climate change.



The New England Aquarium spearheaded the creation of the National Network for Ocean and Climate Change Interpretation to train educators and scientists to better communicate climate and ocean science.

## and here's how you can too!



Video of ocean currents and circulation Source: NASA/GSFC/SVS

## Why healthy oceans matter to you

The oceans control the circulation of heat and moisture throughout the climate system, just as a heart circulates blood and regulates the body's temperature. When we burn fossil fuels, such as coal, oil, and natural gas, we release excess carbon dioxide into the atmosphere, where it acts like a heat-trapping blanket. This warms our oceans and disrupts circulation patterns.

Reducing excess carbon dioxide is the key to getting our climate system back under control. For example, in our area, people are coming together to support citywide renewable electricity initiatives.

### Share why this maters

We all have a responsibility to protect people and places from being harmed by issues facing our environment. Taking practical, commonsense steps to address problems facing our environment today is in the best interest of future generations.

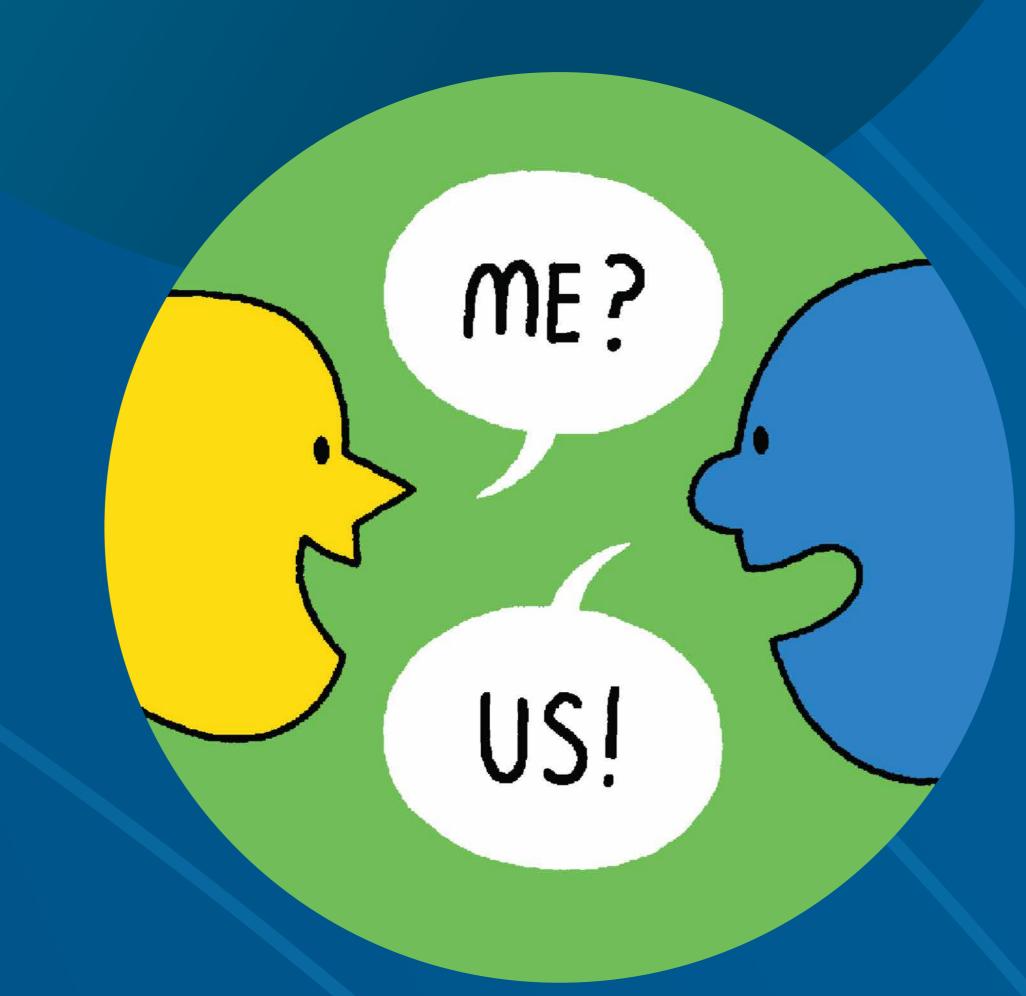


## Share what is happening

When we burn fossil fuels for energy, we add more and more carbon dioxide into the atmosphere. This buildup acts like a blanket around the world that traps heat, disrupting the climate. Rampant carbon dioxide is altering ecosystems and weakening food webs, changing the oceans on a global scale.

## 

Look for solutions already in place in your community—actions your neighborhood, town, or city is taking to move away from fossil fuels and encourage energy efficiency. Working together, people can design new systems to transition away from fossil fuels and slow climate change.





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Real solutions come from active conversations with family, friends, and community leaders.

A majority of Americans share our concerns about climate change, but rarely talk about it.

Let's change that!

Protecting our oceans is key to protecting our blue planet.

### The green museums community and U.N. Climate Week

JOYCE LEE Sep 23, 2019

3 minute read



Museums around the world are working together toward climate goals.

Feature image: Museum of Tomorrow, Brazil.

The September 2019 meeting of the International Council of Museums in Kyoto, Japan, included several days of critical discussion on sustainability. We now know that museums can be more energy-intensive than hospitals. Are there any opportunities to bring the world's museum community together to work in the same direction toward climate goals? The answer is yes.

### Leaders are emerging

Some countries have initiated dialogues with their institutions. For example, Julie's Bicycle, with the support of Arts Council England, has been tracking the carbon footprint and use of clean energy in United Kingdom museums. As seen in the LEED project database, about 150 museums have earned LEED green building certification. Approximately 300 more are working toward certification. This is quite a feat for a complex building type.

"By securing the third-party endorsement of LEED certification, we are showing the community our true commitment to the environment," says JoAnn Newman, President and CEO of Orlando Science Center, which originally earned LEED Gold certification in 2010. "Operating a large building has a big impact on the environment, so it was a priority for us to reduce our energy and water usage. We want to be a conservation leader in our community, which is why we pursued LEED certification, not just once, but twice," she says.



The LEED Gold Orlando Science Center

In honor of Climate Week, take a look at a list of LEED-certified museums around the world. This list includes projects in the United States, Canada, Greece, China, Korea, Brazil, Turkey, Palestine and the Philippines. To learn more about each project, click on the name to view their achievements in the scorecard and read their stories.

LEED certification and recertification are powered by the Arc platform, which uses realworld performance data to power the next generation of green building rating system. The Orlando Science Center, for example, recertified to LEED using Arc.

On Twitter, @MuseumsforParis highlights museums' accomplishments in sustainability, from enhancing their own building environment to upgrading their in-house education programs and exhibits.

In North America, almost 150 museums have voluntarily put their energy consumption into Energy Star Portfolio Manager (ESPM), a platform that can generate a carbon footprint calculation. Energy benchmarking fulfills the pledge of those museums committed to We Are Still In while demonstrating they are "talking the talk and walking the walk."

More than 300 other museums in the U.S. have reported annually on the ESPM platform, as a result of the growing number of cities with benchmarking laws. More recently, the state of California and the province of Ontario have similarly enacted benchmarking legislation.

### Unique to the museum environment

While ESPM is based in North America, where the majority of the 55,000 museums worldwide reside, Arc is becoming a global platform to track buildings interested in common metrics, whether it is measuring energy in KBtu/sqft or GJ/m2. A universal carbon footprint is described in MTCo2e. In addition to energy and water data that is easily exchanged between platforms, the carbon footprint associated with transportation and waste elimination is emerging as a pressing topic for public institutions such as museums.

Recognizing the critical balance between collection care and energy efficiency, the latest ASHRAE Chapter 24 on museums and associated facilities has issued new guidance this summer on humidity control, with updated tables. This includes a larger temperature and humidity range tolerance that will help museums reduce their carbon footprints, while protecting valuable objects and archives.

Another important topic is indoor environmental quality. The ongoing schedules of changing exhibits in museums and their resulting paints, chemical compounds and incoming exhibit materials constantly pose potential compromises on air quality. These significant museum functions would be best served by higher levels of air monitoring than are commonly in use. Not only would it enhance human health for the staff and visitors

every day, but air quality data also gives the conservation department more opportunities to communicate with the facilities staff to ensure building envelope, lighting and HVAC maintenance will benefit the public, office and collection areas.

### Opportunities for museums today and tomorrow

Centuries-old cultural institutions can also last well into the future. Longevity in museums can translate to a higher cumulative carbon footprint, so, considering that museums are designed for a long service life, "Design, Build, Operate Green" seems to be more important now than ever before.

Benchmarking in existing museums and tracking performance is an imperative. In new construction, the greenest design strategies could be embraced: minimizing environmental impact while inspiring the community to think of the future as waste, energy- and water-positive.

View the list of LEED-certified museums



### **Related Articles**



### LEED

Follow up on the LEED in Motion: Venues report with our Green Going Out Guide International Aussum Bay

### Community

International Museum Day showcases 10 U.S. LEED museums

Amanda Sawit Feb 16, 2017 Julia Pergolini May 18, 2016

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