

*Greening America's Capitals: Before and After, Helena, Montana
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Lesson: Survive the Century: Climate Change Decisions for Your Grandchild

By Heidi Scott, SESYNC | June 13, 2022

Overview:

This is the second lesson in a two-part series. It will be helpful to have completed [Lesson 1: Survive the Century: Climate Change Journalists of Tomorrow](#) so that students come with a working knowledge of the Survive the Century game.

[Survive the Century](#) is a climate fiction, choose-your-own-adventure game designed by a SESYNC research team. It allows the player to select among important policy choices that affect climate change in each decade of the 21st century. The provisional objective is to “win” the game by surviving to 2100, but much of the game’s edification comes from comparing various midline scenarios triggered by choices at particular points in history, starting with funding global access to COVID vaccines in 2020. Scenarios result from how the user chooses to fund public- or private-sector infrastructure plans, achieve land-use regulations, and invest in military and speculative geoengineering technologies.

This scenario-based creative lesson challenges students to design their grandchild’s hometown in the year 2100, while limiting global warming to the 1.5–2° Celsius (C) range (the ambitious lower end of what we can achieve). By playing the game in parallel with the [En-ROADS Simulator](#), students will test out various scenarios of environmental adaptation, technology, fossil fuel taxation, population, and green infrastructure to envision their grandchild’s hometown in 2100—a place that is not only survivable, but more equitable, beautiful, and sustainable.

Assumed Prior Knowledge:

This lesson is suitable for high school, undergraduate, and graduate students with some knowledge of climate change and the socio-environmental and technological tools we have to ameliorate it, as well as basic technical skills and a creative imagination.

Learning Objectives:

- Use the tools of Survive the Century and the En-ROADS Simulator to create specific scenarios for climate change adaptation that limits warming to 1.5–2° C.
- Discern among the impacts of various remediation strategies, from carbon taxation to geoengineering to population control to reforestation.
- Translate a technical scenario into a world-building creative exercise in which students describe the features of a future world that has taken impactful action to address climate change; still, this new world may be far from utopian.

Key Terms and Concepts:

climate change scenarios; climate fiction; geoengineering; carbon taxation; reforestation; bioenergy; climate justice; energy sourcing; green infrastructure; efficiency; utopia; dystopia

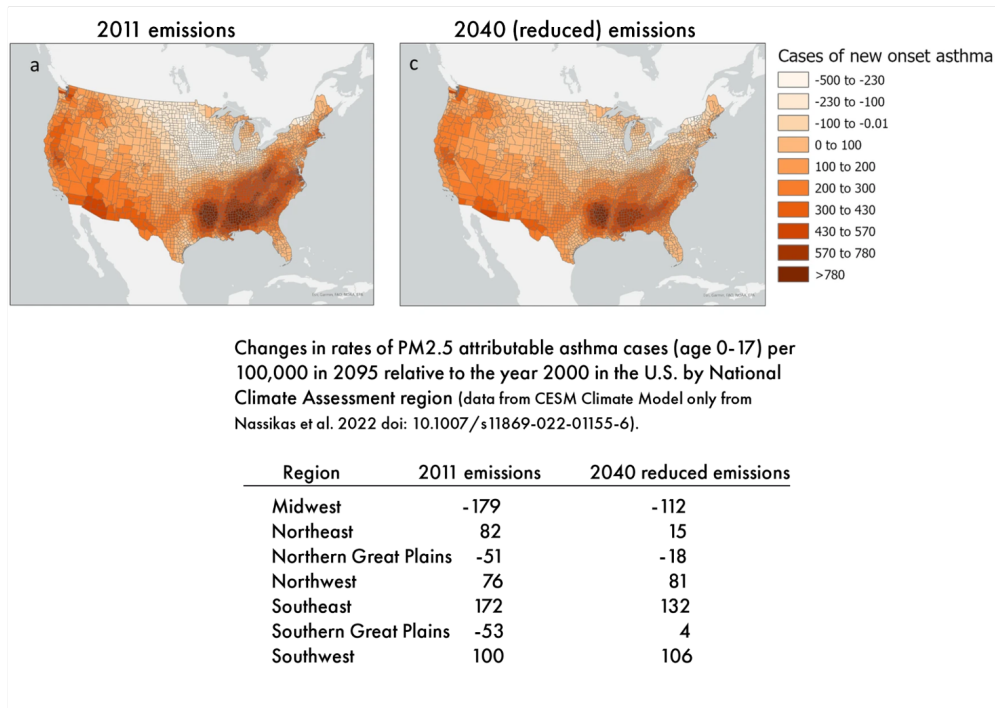
The Hook (suggestions for quickly engaging students):

1. Please spend a few minutes looking at the below artwork by Finbarr Fallon (also available in the associated PowerPoint: [SurvivetheCenturyLesson2.pptx](#)) and ask the students to write down the first two or three thoughts that come to their minds.



“Subterranean Singapore 2065” with permission from [Finbarr Fallon](#)

2. Using ~5 minutes, ask the students to compare the results from the two below scenarios and write responses considering: Why do you think the reduction in asthma rates under the lower emission scenarios is so different between regions of the United States? List both biophysical and social reasons.



Climate change influences air quality and one mechanism is by influencing the concentration of fine particulate matter (PM_{2.5}) in the air. PM is known to both cause asthma and exacerbate existing cases. Using climate change scenario modelings, Nassikas and colleagues (2022) projected future incidence of childhood asthma in the United States if emissions stayed at early 21st-century levels (scenario 2011) and if emissions were significantly reduced through regulations (scenario 2040).

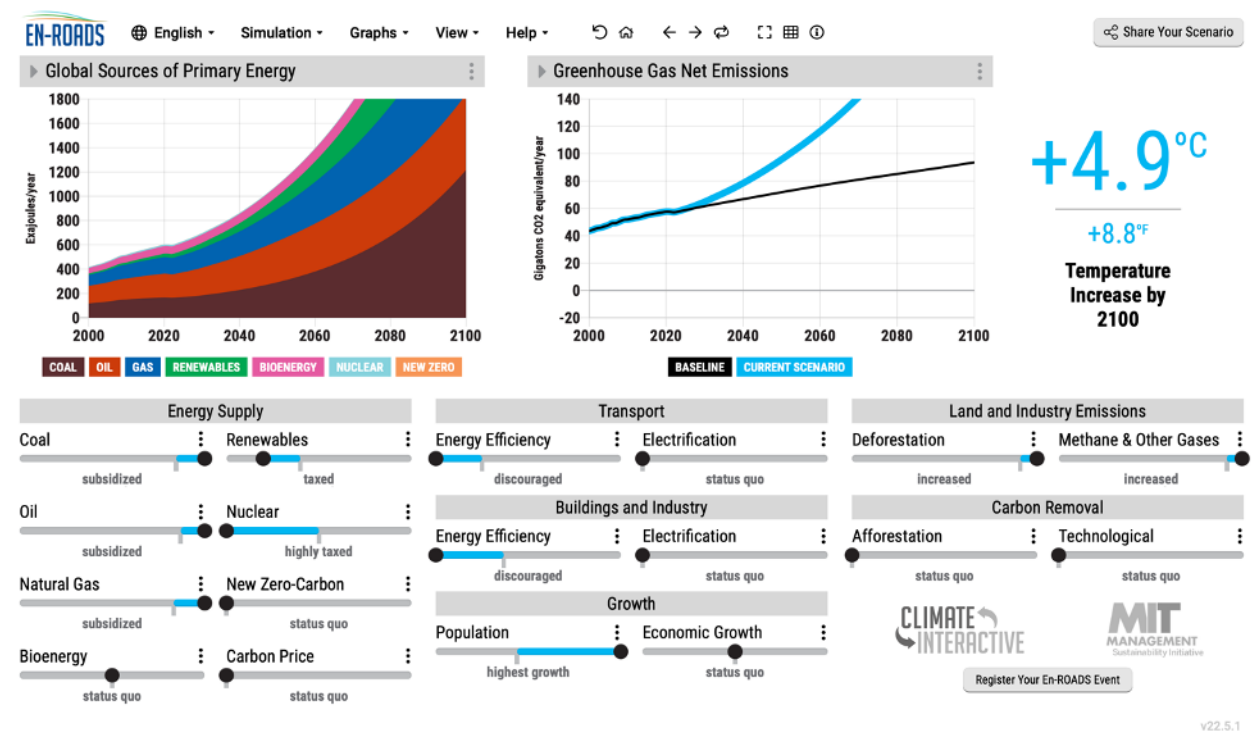
Teaching Assignments

This [Background in En-ROADS Dynamics](#) is a good starting tutorial. Video clips on [climate modeling](#), [carbon capture technologies](#), and [geoengineering](#) may provide additional useful knowledge foundations.

1. The Ugly Outcomes of a Petro-Future with Population Growth (~30 min class time):

- View the image below, on page 4, which is a dystopian climate change scenario provided by En-ROADS. It represents some of the worst possible outcomes based on pro-fossil-fuel energy policies and a lack of family-planning resources that vastly increase the human population by 2100. A +5° C scenario is ecocidal; it would result in global ecosystem collapse, famine, mass extinction, sea level rise, and mythic levels of suffering on a hothouse planet Earth.
- This scenario is extreme. It assumes even more retrograde energy policy than exists in 2022; yet, it is not inconceivable as:
 - The melting Arctic opens for new petroleum and gas exploration.
 - Rogue states like Russia control vast geographies of fossil fuel production.
 - Developed countries like the United States experience chronic underinvestment in family planning and new threats to access to birth control.

- Have students spend 5 minutes assessing the variables they can manipulate using the En-ROADS scenario planner. Considering the current status quo, do they believe the narrative could become as terrible as this by 2100? Ask them to immerse themselves in truly diabolical possibilities for just a few minutes; doing so will serve as a warning and catharsis once they move to happier scenarios. They might consider: climate tipping points, widespread resource conflict, mass climate migration, technological warfare, shifting baselines, climate denialism, suicidal individualism, societal collapse, rogue geoengineering, patriarchal regression, and any other element of today’s socio-environmental cocktail exacerbated by future poor leadership.
- In a 15-minute share session, have the entire group share feasibilities in two categories: “This awful scenario is conceivable because…” and “I just don’t believe we’re this dumb because…”



Screen image from an “En-ROADS simulation in which the user has selected options for factors that influence climate change.” Options range, for example, from the type of energy and transportation used to levels of deforestation and greenhouse gas emissions. (En-ROADS is a climate simulator developed by systems modelers in association with the non-profit organization climateinteractive.org).

2. Imagine Your Grandchild’s Hometown (~50 min. in class)

A blend of imagination and engineering, this lesson empowers students to build a better future using actionable narratives built on factual scenarios.

- Divide your students into groups of 3–4 and assign each group one set of driving values:
 - Economic Growth + Technology: This group values economic growth and bets on future technology.
 - Renewables + Reduction: Renewable energy is a top priority, as is reducing the human footprint on the planet through population limits and lower individual impacts.
 - Restoration + Recapture: Reforestation and carbon/methane recapture are the ethos of this group.

- Each group starts their En-ROADS simulation by toggling the variables according to the group's values. For example, the “restoration + recapture” groups would minimize deforestation, maximize reforestation, and minimize methane emissions while maximizing bioenergy development (as with methane recapture). They will find their efforts result in a +3° C scenario by 2100—they missed the mark. Have the students take a screenshot of this initial effort.
- Now, as each group finds that their interventions are not adequate to redress the status quo that remains in other areas, have them debate and experiment with other policies on energy, population, efficiency, transportation, and economic growth. They must agree on a set of changes that results in at least only +2° C by 2100. Have each group take a screenshot of the final scenario that shows their values + additional measures.
- Have each group present on their initial values and those reduction impacts, then provide a narrative of how they chose additional measures to take. Note that an “easy” solution for all groups will be to take credit for yet-to-exist breakthroughs in zero-carbon energy and carbon-recapture technologies. What are some harder choices and how may they be justified?
- Display all groups' +1.5–2° C scenarios side by side. Allow students 5 minutes to consider these scenarios and have each student choose one as their ideal.

3. Making Choices (~50 min or less in class)

Group together students who have chosen the same En-ROADS scenario from the previous class.

- Have them start with a friendly 5-minute conversation on why they chose this scenario as their ideal. They are together because they have a similar vision of the proper policy, energy, and population choices to make. This similarity should cause some camaraderie and hope, with like-minded individuals offered a creative space to turn this technical scenario into a world they can build—their grandchild's hometown in 2100.
- Once they articulate their choices, values, and anticipated results from these positive developments, have them create a list of what this world would look like on the ground. Think of basic features of a neighborhood: How do people get around? What do houses look like? Where does food come from? Is the place more equal than 2022 across race, gender, and socioeconomics, or not? What makes them happy about this future? What causes doubt?
- Finally, have them write a 1–2 page letter from the future, written by their grateful grandchild. Students can each write a letter individually or the group can write one letter together; students can draft these letters in class, or the instructor can assign the letters as homework.
- The letter profiles the town of 2100 that exists in a world where we have adequately addressed climate change. It is written in the first person by the grandchild, addressed back to the student. The letter should indicate basics of the built infrastructure, natural ecosystems, their occupation, cultural values, technology, and food, but it can also contain new hopes and dreams from 2100. It might also spend some time in retrospect on how an adult in 2100 would view our culture in 2022—probably with some elements of astonishment, shame, and confusion; maybe with some envy or schadenfreude.
- Post the letters to a group discussion board, have students read each letter and respond in brief to the grandchild of their choice. Students may vote on a favorite overall scenario and letter. Excellent letters might be posted as creative contributions to the better 2100 scenarios in Survive the Century.

Background Information for the Instructor:

1. [SESYNC Researchers Develop Game That Challenges Users to “Survive the Century”](#)
 - If you had the global platform to sway human opinion and behavior in the face of climate change—what would you do? What choices would you make when confronted with various political, environmental, and social scenarios? Would you invest in green technology and cut taxes? Would you be tempted to unleash your inner supervillain and spark WWII? What if you blocked out the sun (just a little bit)? If you’ve never considered such questions before, an online game, developed by researchers from the National Socio-Environmental Synthesis Center (SESYNC), now gives you the opportunity to do so.
2. [En-ROADS Climate Solutions Simulator](#)
 - En-ROADS is a global climate simulator that allows users to explore the impact of roughly 30 policies—such as electrifying transport, pricing carbon, and improving agricultural practices—on hundreds of factors like energy prices, temperature, air quality, and sea level rise.

Related SESYNC Content:

- Scott, Heidi. (2022, June 13) *Survive the Century: Climate Change Journalists of Tomorrow*. SESYNC. <https://www.sesync.org/resources/survive-century-climate-change-journalists-tomorrow>
- Jantz, Samuel M., et al. (2015). Future habitat loss and extinctions driven by land-use change in biodiversity hotspots under four scenarios of climate-change mitigation. *Conservation Biology*, 29(4), 1122-1131. <https://doi.org/10.1111/cobi.12549>
- Pereira, L. M., et. al. (2021). From fAIrplay to climate wars: making climate change scenarios more dynamic, creative, and integrative. *Ecology and Society*, 26(4), 30. <https://doi.org/10.5751/ES-12856-260430>
- SESYNC. *Geoengineering Scenarios*. (2018). <https://www.sesync.org/research/geoengineering-scenarios>
- Kosow, H. & Schweizer, V. SESYNC. (2021, November 23). *Creating Socio-Environmental Scenarios*. YouTube. https://youtu.be/imVfvYpG_fs