

Leading Innovation To Address Climate Change
New York University, Stern School of Business
MGMT-GB 3358 30
Spring 2026

Instructor: Raphael Carty: rcarty@stern.nyu.edu
Office: KMC 7-100A
Office Hours: By appointment
Class Timing: Mondays 6:00 pm to 9:00 pm
Classroom: KMC 5-75

Despite headwinds in the U.S. in 2025, the clean energy transition and the shift to making products more sustainable have become a global transformation that is advancing rapidly. The driving forces for progress are no longer dependent on government incentives. U.S. businesses have mostly remained committed to sustainability goals, recognizing the business growth opportunities and increased customer demand. The need to respond to a dramatic escalation in wildfires, flooding, and extreme heat globally has also created greater urgency and significant business formation and growth opportunities.

The class provides a toolkit for participation in this business revolution by teaching how to identify, assess, and accelerate the adoption of innovations that drive sustainability or enable climate adaptation. The class also explores how innovation, business opportunity, and social impact intersect, making the class relevant to a broad range of students who are not planning to work in this domain.

The spring 2026 curriculum incorporates recent changes in the geopolitical landscape and demonstrates how the ecosystem is adapting and how the business opportunities continue to grow.

Course Description

Climate change is the greatest existential threat of our time. This class is designed to educate students on leading action to combat climate change and achieve climate adaptation through innovation and accelerating the diffusion of innovations. We will cover a broad range of science-based sustainability or climate innovations in domains including power generation and storage, buildings, transportation, industry, agriculture, and land use. In addition, we will explore innovations in climate adaptation, carbon removal, enabling technologies (such as AI) that accelerate climate innovation, and geoengineering, a speculative frontier tech sector. We will explore the enormous business formation and growth opportunities created by decarbonization and adaptation throughout the global economy.

We will develop a playbook on how to: a) assess an early-stage sustainability or climate innovation, b) assess the market potential, and c) create a plan to accelerate innovation diffusion. The class will enrich students' understanding of the overall climate change problem, the interrelated systems view (systems theory) needed to address climate change effectively, the diverse stakeholders, the role of government/public policy, and the opportunity for social impact through climate action.

The course combines concepts from innovation theory, innovation diffusion, sustainability, business strategy, technology assessment, technology development, leadership, marketing, and social impact.

Target Audience

This class was developed for practitioners who will take action to achieve an impact on climate:

- product managers, product management leaders, and product development leaders
- general managers
- startup founders/CEOs, presidents, and functional leaders
- sustainability leaders
- public policy leaders in climate (government, non-profits, industry organizations, etc.)
- investors
- consultants

In prior classes, there was another segment of students seeking to understand the climate problem and the range of innovations that can address it, as well as the role of different participants -- in essence, a “survey course on how to fix climate”.

Finally, the skill set developed for assessing early-stage tech innovations and driving broad market adoption is relevant for any industry producing innovative tech products, not just sustainable products.

Course Themes

- Establishing a decision process for assessing the impact of sustainability or climate innovations and the market opportunity created -- what to consider?
- Managing innovation. Assessing early-stage technology (efficacy, maturity, scalability) and the need to collaborate with scientists and engineers to understand the innovation’s capabilities and limitations, progress on an improvement curve, and technology risk.
- Managing uncertainty in assessing early-stage tech innovations and over the arc of bringing these innovations to market.
- Gathering information to assess the market opportunity, especially when there may be little to no secondary source information available for first-of-a-kind (FOAK) disruptive innovations.
- Constructing a point of view on the overall potential market opportunity (size, growth, and evolution).
- Accelerating the diffusion of sustainability or climate innovations: commercialization, public policy, and coordination of action throughout the ecosystem.
- The imperative to consider societal implications: externalities (especially for health), promoting better outcomes for all stakeholders (not just the shareholders), business action for positive social impact, and triple bottom line business philosophy.

Course Methods

The curriculum includes a mix of:

- Lectures on the climate domains, key conceptual material such as innovation theory, climate tech innovations, relevant research, and exploration of emerging climate technology markets
- Guest speakers with deep domain knowledge, such as investors, entrepreneurs, industry experts, business leaders, academics, scientists, etc.
- Case studies on specific climate innovators and markets
- Experiential learning: students complete a project in which they analyze a specific climate innovation as a potential solution to combat climate change and recommend how to optimize innovation diffusion and effectiveness:
 - Assess its current state and likely impact

- Discuss factors involved in the diffusion of the innovation and how to accelerate adoption

Course Materials

For each class, there will be a specific reading assignment for class preparation given in advance. The reading assignments will include conceptual material such as diffusion of innovations and analytical tools, as well as reading on the overall climate/sustainability problem, climate sectors (such as power generation, transportation, buildings, industry, land use, and agriculture), and innovations across all of the sectors.

A week's reading assignment could include a course note or case from the course pack, a chapter from the book list, or an article (with access via links). **Selected book chapters will be assigned, and the majority of the 4 books will not be required reading. All books are available at no charge via ebooks from Bobst Library, and access instructions will be included in the weekly reading assignment.**

Booklist:

- *Speed & Scale: An Action Plan for Solving Our Climate Crisis Now* by John Doerr (2021)
- *How To Avoid A Climate Disaster: The Solutions We Have And The Breakthroughs We Need* by Bill Gates (2021)
- *Net Positive* by Paul Polman and Andrew Winston (2021).
- *Reimagining Capitalism In A World On Fire* (2020) by Rebecca Henderson.

Course notes and cases will be made available through the HBS course pack that will be published by January 19 and updated in the syllabus posted.

Grading

- 35% Class participation
- 25% Midpoint take-home analysis
- 40% Final project: assessment of and diffusion recommendations for a climate innovation

Class Project

Completing a final project instead of a final exam allows students to investigate a specific sustainability or climate innovation of their own choice. The assignment can be completed as an individual project or as part of a small team, with the final project report due 1 week after our last class.

Disclaimer:

This is a preliminary syllabus and is subject to change, especially as class guest speakers are scheduled. A revised syllabus will be reviewed in the first class.

Syllabus Details

Class 1 The Climate Problem and Climate Innovations

The first class has four objectives. First, review the course teaching plan and syllabus and answer all questions about the class. Second, take stock of the upheaval in climate action and policy in 2025 – what changed and what is the path forward? Third, give a robust overview of the climate change problem and define what we mean by science-based innovations for sustainability and climate action. Fourth, impart key conceptual material for analyzing sustainability/climate innovations, including how to assess the diffusion of innovations and how to assess early-stage technologies.

Class 2 Pathways to Decarbonization and Business Leadership for Climate

The class will overview the major categories of climate actions (such as carbon emissions reductions, carbon removal, climate adaptation, and geoengineering) and the climate domains (power generation, transportation, buildings, industry, agriculture, and land use) as key areas of focus for climate action. The categories of climate actions and climate domains outlined in this class will frame most of the future class topics. Our second topic is to explore varied strategies to achieve decarbonization, with a recognition that addressing the monumental climate change problem will require a number of parallel efforts. Next, we will introduce business leadership for effective action on climate, with insights from Paul Polman and Rebecca Henderson.

Class 3 Implementation Success: Managing Risks, Financing, and Building Ecosystems

This class will focus on two important topics: managing different types of uncertainty that arise in diffusing a technology innovation and considerations for implementation success with climate tech innovations. Technology Readiness Levels (TRL) will be introduced as a tool to assess the maturity of new tech innovations. We will also include climate innovation financing, which can be a key risk in achieving successful implementations. In the section on managing uncertainty, scenario planning will be introduced as a tool for de-risking strategies. After a brief lecture on scenario planning, we will conduct an in-class exercise in small teams, applying scenario planning to a specific climate innovation area.

Class 4 Power Decarbonization – The Clean Energy Transition

This class will focus on innovations that are decarbonizing power generation, transmission, and storage, ranging from the rapid rise of renewable power generation, advances in storage technology, geothermal, hydrogen, improved nuclear fission, nuclear fusion, smart grids, etc. This sector is an enormous source of carbon emissions and one in which recent innovations are unlocking huge opportunities for decarbonization. Decarbonizing power generation is often referred to as the clean energy transition.

Class 5 Buildings Decarbonization + Sustainable Cities

This class will explore innovations to decarbonize commercial and residential buildings, an area of great opportunity, especially given the significant energy waste causing excess carbon emissions in facilities of all types. Some of the decarbonization approaches covered include energy efficiency, smart buildings, electrification, heat pumps, low-carbon construction materials, retrofitting existing buildings, etc. In addition, the class will cover the sustainable cities approach in which the unit of analysis shifts from individual buildings to consider how to take coordinated action city-wide to improve sustainability: reduce carbon, reduce energy use, reduce water use, reduce waste, increase reuse, and increase resiliency.

Class 6 Transportation Decarbonization + Market Analysis

This class will focus primarily on innovations to decarbonize all forms of transportation (ground, air, and water) – one of the top contributors to climate change. Some of the transportation climate innovations covered include electric vehicles (cars, trucks), low-carbon fuels such as sustainable aviation fuel (SAF), electric planes, hydrogen fuel cell aviation, etc. Next, we will spend time on customer discovery methods to gather market information to understand the demand for disruptive innovations. These techniques are essential to assessing the market opportunity.

Class 7 Industry Decarbonization

This class will focus on innovations to decarbonize industrial processes with approaches ranging from carbon emissions reduction in existing operations to radical decarbonization of the industrial process. The class will address hard-to-abate sectors, such as chemicals, cement, steel, oil and gas refining, etc. We will discuss horizontal approaches such as energy efficiency and electrification, as well as industry-specific decarbonization innovations that are showing great promise. We will include examples of innovations that reinvent the product and production process to decarbonize on a more fundamental basis than reducing emissions from current technologies in place, with case studies from chemicals, cement, clothing, etc.

Class 8 Agriculture Decarbonization, Land Use Decarbonization, and Ocean Rejuvenation

This class will cover 3 topics. First, decarbonization of agriculture/food production, including such innovations as lab-grown food (meat, dairy, etc), plant-based meat alternatives, carbon-negative fertilizers, etc., will be a primary focus. Second, innovations in land use for decarbonization, such as innovations to bolster natural carbon sequestration from forests. Third, we will touch on innovations in ocean rejuvenation as a way of mitigating the climate change impacts (warming and acidification) that could turn the oceans, the planet's greatest carbon sink, into a source of carbon emissions over time.

Class 9 Carbon Removal + Geoengineering + Unintended Consequences

This class will be in two parts to explore innovations in carbon removal and geoengineering. The carbon removal or negative emissions technologies section will include technologies such as direct air capture (DAC), carbon mineralization, geologic sequestration, methane removal, etc. Geoengineering is a field of advanced science exploring highly speculative ways to change the biosphere to remediate climate change, but with the potential to create significant risks. There is a broad range of geoengineering approaches, ranging from very limited practices such as cloud seeding and cloud brightening to techniques such as stratospheric aerosol injection (SAI) with potentially greater impact and greater risks. This will provide an opportunity to explore the unintended consequences of climate action and how to manage them.

Class 10 Climate Adaptation And Resilience + Enabling Technologies

The primary focus of the class will be climate adaptation and resilience. There has been a dramatic escalation in severe weather events, heightening the need for rapid innovation in this sector. We will include innovations to address the increased frequency and severity of key threats such as extreme heat, wildfires, extreme storms, flooding, water scarcity/drought, etc. The effects of climate change already happening require immediate climate adaptation at the same time as the ongoing effort to decarbonize all sectors of human activity. In the last 5 years, there has been a major uptick in new climate tech innovations for climate adaptation. The secondary topic for this class will be enabling technologies, such as AI/machine learning and biological technologies, that are accelerating the pace of climate innovation.

Class 11 Leading Action on Climate + Business Formation and Growth Opportunities

This class has two topics. We will return to the topic of leading action on climate. We will engage with leadership lessons from Paul Polman and Rebecca Henderson on how to transform organizations for effective climate action. The second topic will be bringing together the vast array of business formation opportunities for entrepreneurs and business growth opportunities for existing businesses that are generated by the need to decarbonize every sector of human activity, adapt to climate change already occurring, and both remove and sequester carbon emissions to prevent the most devastating climate outcomes. This topic will highlight business opportunities identified throughout the semester in examples of startups, corporations, and investors commercializing climate innovations.

Class 12 Class Summary and Reflections

The final class session will include a class summary lecture and reflections from all class participants.

January 2026