BUSINESS AND CLIMATE CHANGE
Tuck School of Business at Dartmouth College
Fall 2022
Class Meets: Wednesdays/Thursdays, 10.20AM - 11.50AM, Stoneman Classroom

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"The bizarre thing is that obviously we're going to run out of oil…. There's only so much oil we can mine and burn…We must have a sustainable energy transport infrastructure in the long term, so why run this crazy experiment where we take trillions of tons of carbon from underground and put it in the atmosphere and the oceans? This is... the dumbest experiment in human history." Elon Musk, CEO Tesla/SpaceX, in a Radio interview.

"When we work on making our devices accessible by the blind, I don't consider the bloody ROI. If you want me to do things only for ROI reasons, you should get out of this stock." Tim Cook, CEO of Apple, responding to a climate skeptic at Apple's shareholder meeting saying that if he did not believe in the company's climate-related spending, he should sell his shares.

"Climate risk is investment risk." Larry Fink, CEO, BlackRock.

Premise of the Course

Climate change, consequent to the warming of the earth – in turn, the result of the build-up of human-caused greenhouse gas (GHG) emissions in the atmosphere – is a vital issue of our time. The transition required to move the world economy towards 'net zero emissions' so as to keep global temperatures within reasonable bounds, within a reasonable time frame, is easily amongst a handful of the greatest challenges facing us – especially your generation – today.

Businesses are centrally implicated. On the one hand, they are the largest emitters of greenhouse gas (GHG) emissions, posing potentially serious risks to their business models. Such risks include not only cash flow and strategic risks arising from rapidly-shifting changes in customer, employee, and investor attitudes or a possible (even likely) carbon price, but also risks arising from increased legal liability and reputation loss associated with inaction.

On the other hand, by deploying the talent, the technologies, and the capital needed, businesses will be the primary source of solutions to climate change. The process of finding solutions will present new business opportunities stemming from the need to forestall, mitigate and adapt to the consequences of climate change. We are seeing the emergence of a "climate economy" in areas such as energy/carbon efficiency technologies, in non-fossil fuel-based sources of energy, in capturing/storing/re-using carbon, and in (still-faraway) solutions such as geo-engineering. Corporations already find it important to view their operations through a low-carbon lens, looking for both efficiencies and new business opportunities.

There is now a coherent body of knowledge and evidence on methods of carbon footprint measurement, a crucial step in managing emissions. Beyond measurement, many CEOs are aggressively implementing corporate imperatives around the issue of climate, serving to motivate and incentivize their entire organization. In responding to climate concerns, firms are rethinking supply chains, their energy mix across the value chain, capital budgeting practices, R&D and packaging, product development and marketing, managerial incentives, corporate disclosure practices, and communication practices.

In short, climate change poses a multifaceted set of challenges and opportunities for businesses, ranging from their social "license to operate," to management and leadership of enterprises informed via a climate lens, to innovation and growth of entirely new climate-oriented businesses and markets. The climate economy will become huge in your career lifetime.

Course Goals

'Business and Climate Change' (BCC) will explore why CEOs of shareholder value-maximizing companies should care about climate change, how they might develop frameworks do so, and what they can learn from numerous companies that are getting in front of this mega-issue. The course has three specific goals:

> (1) To develop your awareness of climate change, and the challenges and opportunities it presents for shareholder value-maximizing businesses;
>
> (2) To understand the climate economy and its implications;
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> (3) To develop frameworks to assess the market value consequences of firms' exposure to climate change, their fossil fuel use, carbon footprints and GHG emissions; economic analysis tools to assess impacts of likely regulatory responses to climate change; and frameworks to address the challenge of energy transition to a net-zero world.

Simply put, the goal of BCC is to provide a forum to put our heads together and collectively learn about how businesses impact, and will be impacted by climate change.

Course Requirements

There are no cookie-cutter answers to complex questions that climate change poses, so the most important requirement of BCC is that you commit to a co-learning process. This process of co-learning, in turn, requires thoughtful preparation of the assigned reading material or assignment for the day for discussion in class. If you're in this class, I'll assume you're prepared and ready to go for every session.

We will not spend time in class debating whether climate change is happening or not, but it is a discussion that I welcome outside of class. I am perfectly fine with someone who's an *agnostic* wanting to take this class since, after all, wise leaders must be able to deal substantively with and effectively address important "what-if" questions during their careers.

We have a lot of issues to cover in nine sessions. Therefore, you must attend every class. Missing classes will impact your class participation, which is an important component of the course grade (see below). That said, if, for extenuating reasons, you are not able to attend class on a particular day, I assume that it is for an important reason and that you have thought it through. *But you should try and notify me in*

advance since this avoids cold calls of those not in class. You should get caught up with the material you missed.

Course Material

We will deal with the topic of climate change in a self-contained way. No prior knowledge of the science or public policy aspects of climate change is presumed.

There has been an explosion of material – articles, reports, books, websites, blogs, rants – on climate change. We will focus on a small subset of those that, in my view, are sufficient to deal with the topic in a confident manner. (For those you how who want deeper, denser (or even academic) material on any of the topics in the syllabus, I shall be happy to provide you with a detailed set of supplementary readings.)

To make your lives easier, I will give you as focused a set of reading guidelines as possible. In some instances, the syllabus only contains broad thought questions for each session, the types of questions you want to keep in the back of your mind as you do the readings for the session.

Grading & Assignments

The course will be graded on the basis of class participation (individual, 25% weight), an energy efficiency problem set (group, 20%), DCF analysis of an Apple's solar project (group, 20%), and a final project report (group, 35%).

Class participation is mostly an *earned* grade in this course. The judgment I make is simple: At the end of each class, I ask, "resulting from the person's presence in and contribution to class that day, did they, to the best of my judgment, move the needle on the overall level of learning in the classroom? If so, by a lot, by a little, not all, or negatively?" In evaluating class participation, there is a new attribute to which I have started to pay close attention in all my classes: **classroom presence**. It is a necessarily subjective attribute, but something we all know when we see it. It is much more than just a verbal contribution in the classroom. It is one's sense of *engagement* with the class and with the group, as well as how one projects oneself: are you observing, are you a glue to enhancing the classroom experience, are you helping to solve problems, are you bringing others along, are you lifting up those who might need it, are you projecting a sense of who you/we are as Tuck through your sense of ease, poise, self-assurance, and I dare say, your quality of bearing? (*Talk to me about it, if this bewilders you! I am still refining this idea for myself, as I go along...*)

Energy Efficiency Calculations: You will analyze the energy and emissions consequences of switching from incandescents to LED light bulbs, and that of switching personal transportation mode from that of a typical ICE passenger vehicle in the US to an electric vehicle.

DCF Analysis of Solar Project: This is an analysis of Apple's 40MW solar power generation project, and examining how subsidies and a 'price on carbon' can affect the project's NPV.

Project Report: You will work on a group final assignment and produce a report that explores a specific aspect of the links between climate change and the corporation. As we get deeper into the issues, you will come up with your own topics. In the meantime, an Appendix to this syllabus contains examples from past few years of BCC classes that could help trigger your thinking with respect to project choices. Topics are grouped into four broad areas: (i) Firm/industry-level climate strategy (carbon footprint, targets, internal initiatives, efforts to mitigate risks/capture opportunities); (ii) Climate policy issues; (iii) Broader solutions to climate change, including the net-zero transition; (iv) Climate finance.

I'll hand out more details on the group project during Weeks 2/3, after we've had a chance to cover a smorgasbord of topics and you can make a more informed choice. **The group write-up is due before 5.00 PM Tuesday, November 15.**

Groups

The ideal group size for this class is 4 (certainly no more than 5). I strongly urge that you prepare – essentially, have a conversation with the members of your study group – for every class as a group, whether or not there is a group assignment.

Honor Code

I expect you will bring integrity and dedication to your learning, accept responsibility to uphold high ethical standards in your work, and promote a learning environment in which honest, participative, and imaginative work flourishes. This entails adequate preparation, sharing/challenging each other's ideas in the classroom, and contributing to our joint learning.

Some of the material in this course has been used before. The use of any previous material is a violation of the Honor Code. It also goes without saying that you should not share any content with anyone who might have the opportunity to take this course in the future.

And, to repeat: If, for extenuating reasons, you are not able to attend class on a particular day, I will assume that it is for an important reason and that you have thought it through. *But you should try and notify me in advance*. You should make sure to get caught up with the material you missed. (I am happy to try and help).

Course Visitors

- ***Mekala Krishnan, Partner, McKinsey Global Institute***
  - ***Topic:*** "***The Net Zero Transition: What It Would Cost, What It Could Bring***"

- ***Til Schuermann, Partner, Oliver Wyman***
  - ***Topic: "Banks and Climate Change Risk"***

Business and Climate Change (BCC)
Syllabus Summary

1) Thurs, October 13, 2022	Climate Change: Basic Issues and Corporate Implications
2) Wed, October 19, 2022	The Climate Economy I: Background and Framework
*3) Thurs, October 20, 2022**	The Climate Economy II: Energy & Carbon Efficiency; The Energy Transition Challenge *(Energy/Carbon Efficiency Assignment Group Write-up)**
4) Wed October 26, 2022	Visitor: **Mekala Krishnan, Partner, McKinsey Global Institute** Topic: "***The Net Zero Transition: What It Would Cost, What It Could Bring****"*
5) Thurs, October 27, 2022	Corporate Climate Strategy *Case: Green Apple – Climate Strategy at Apple*
*6) Wed, November 2, 2022**	DCF Analysis of a Solar Investment and Implied Carbon Price *Case: Apple's Renewable Power Investments in Maiden, North Carolina* *(DCF Analysis Group Write-up)**
7) Thurs, November 3, 2022	Visitor: **Til Schuermann, Partner, Oliver Wyman** Topic: "***Banks and Climate Change Risk***"
8) Wed, November 9, 2022	Climate/ESG Investments and Equity Portfolios
9) Thurs, November 10, 2022	Putting a Price on Carbon and Regulating Global Emissions
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*Tue, November 15, 2022**	**PROJECT WRITE-UP DUE**

** Date on which there is a deliverable*

Detailed Syllabus

Session 1: Climate Change: Basic Issues and Corporate Implications
Thu Oct 13

Prepare:
- What is climate change? What are its causes, what are its likely effects? What aspects of the evidence are strong? Where is the evidence less strong? What are the key findings and uncertainties?
- How are businesses the cause of, and the solution to, the problem of climate change?
- Why should businesses care about climate change? Think about the specific paths through which climate change impacts businesses: more precisely, can you think of the mappings from the phenomenon of climate change to a firm's cash flows, risks, and growth i.e., its enterprise value?

Required Reading:
1) Sundaram, 2022: "Business and Climate Change," forthcoming in the *Handbook of Business and Climate Change*, A. K. Sundaram & R. G. Hansen (eds.), Edward Elgar Publishing, 2023. READ CAREFULLY: SECTIONS 1, 2 & 3; SKIM CAREFULLY: SECTION 6 (INCL. BOX 4)
2) *The Economist*, 2019: "Climate Briefing: 'What Goes Up." (CASUAL SKIM)
3) *The Economist,* 2020 Special Report on 'Business and Climate Change': "The Great Disrupter." (CASUAL SKIM)

Session 2: The Climate Economy: Background and Framework
Wed Oct 19

Prepare:
- What are the key elements of the emerging 'climate economy?'
- How big will it be? Who are (or will be) the main players?
- What are the value-creation (or loss-avoidance) opportunities for companies from the climate economy? What are the risks for companies that lag behind or fail to get in front of it?
- How could climate change affect a company's growth strategies?
- How do companies measure their carbon footprint?

Required Reading:
1) Sundaram, 2022: "Business and Climate Change," forthcoming in the *Handbook of Business and Climate Change*, A. K. Sundaram & R. G. Hansen (eds.), Edward Elgar Publishing, 2023. READ CAREFULLY: SECTIONS 4.1, 5.1 & 5.2
2) FTSE Russell, 2022: "Investing in the Green Economy." READ CAREFULLY: EXECUTIVE SUMMARY; SKIM CAREFULLY: pp. 6-17.

Session 3: The Climate Economy (cont): The Energy Transition Challenge
Thu Oct 20 ***GROUP WRITE-UP DUE! SEE CANVAS FOR DETAILS.***

Prepare:
Burning fossil fuels to meet the energy consumption needs – and the resulting CO_2 emissions – accounts for the vast majority of global GHG emissions. (For instance, over four-fifths of US GHG emissions comes from burning fossil fuels for energy.) Forecasts of emissions – and hence forecasts of global warming and its impacts, and thus scenarios for transitioning to a net zero world – are therefore crucially

determined by forecasts of future energy mix, as well as energy supply and demand. In this session, we will examine issues such as:

- Historical evidence on energy and carbon efficiency; Where we are today; Forecasts for the future, and implications for GHG concentrations and climate change
- The global CO_2 efficiency challenge
- Mapping business opportunities
- Forecasts for world energy mix and the net zero emissions transition challenge
  - Nuclear, wind, solar: analysis of required capacity and collateral resources
- Group write-up due based on energy/carbon efficiency problem set

Required Reading:
1) Sundaram, 2022: "Business and Climate Change," forthcoming in the *Handbook of Business and Climate Change*, A. K. Sundaram & R. G. Hansen (eds.), Edward Elgar Publishing, 2023. READ CAREFULLY: SECTION 4.2
2) Energy Information Administration (EIA), 2021: "International Energy Outlook" (SKIM)
3) Energy/carbon efficiency problem set (DUE BEFORE START OF CLASS)

Session 4: The Net Zero Transition
Wed Oct 26
Visitor: Mekala Krishnan, Partner, McKinsey Global Institute
Topic: "***The Net Zero Transition: What It Would Cost, What It Could Bring***"

Mekala's Bio:

Dr. Mekala Krishnan is a partner at the McKinsey Global Institute (MGI), McKinsey's business and economics research arm. Her research focuses on various topics related to inclusive growth and economic development, including climate risk, globalization, productivity growth in advanced economies, and women's role in labor markets. Her most recent research focuses on the near-term impact of physical climate risk across sectors and geographies, including its implications for companies and countries. Her past research has focused on the future of globalization including the evolution of global value chains, prospects for emerging markets, and the impact of services trade, intangible assets, and digital globalization on value chains. Mekala is a frequent speaker on these topics at global conferences as well as with executives at Fortune 500 companies. She has authored numerous articles and her work has been cited in leading business publications.

Mekala is a member of a task force at the Hutchins Center on Fiscal and Monetary Policy at Brookings focused on improving productivity measurement. She also serves on an advisory board for the Sibley School of Mechanical Engineering at Cornell University and is a board member of the Global Fund for Women, a leading public foundation dedicated to improving global gender equality. Previously, Mekala worked as a consultant for McKinsey's advanced-industries group, where she focused on innovation, strategy, and operations projects for engineering clients.

Mekala received her Ph.D. and M.S. degrees in Mechanical Engineering from Cornell University in 2011. Prior to Cornell, she received a Bachelor of Technology degree in Mechanical Engineering in 2006 from the Indian Institute of Technology Delhi.

Required Reading:

McKinsey Global Institute, 2022: 'Executive Summary: The Net Zero Transition – What It Would Cost, What It Could Bring.' (*When you get to the main page, click on "**Download the Executive Summary**"; It will ask you create a sign-in with a name and password. DO NOT ACCIDENTALLY DOWNLOAD AND READ THE 'FULL REPORT'…. THAT'LL TAKE TOO LONG!*)

Session 5: **Corporate Climate Strategy**
Thu Oct 27 ***Case: 'Green Apple: Environmental Sustainability Reporting & Climate Strategy at Apple,' Tuck School of Business (2020)***

Prepare:
- Read the *Green Apple* case and prepare answers for the following questions:
  - In the 2020 Report, Apple claims that the company is "…now carbon neutral for [its] own operations". Based on the data in the Report (which is for FY2019), do you agree?
  - How would you assess the trends in Apple's Scope 1, Scope 2, and Scope 3 emissions since 2015? What grade would you give Apple?
  - What is your assessment of Apple's efforts to reduce its operational carbon footprint? (Scope 1, Scope 2, Employee Commuting and Employee Business Travel).
  - Assess Apple's efforts to reduce its total lifecycle, especially manufacturing, emissions. In the 2020 Report, Apple said "In the past year, we avoided over 10 million metric tons from our emissions reduction initiatives." Does Apple's claim hold up based on the data provided?
  - How do Apple's efforts to source renewable energy compare to that of other large technology companies? Is Apple a leader or a laggard? Also, do you observe how different business models contribute to different patterns in Scopes 1 v. 2 v. 3 emissions?
  - Apple has received commitments from suppliers to source electricity from 7.8GW of renewable capacity. What would be the impact on its Scope 3 and total life cycle emissions if those commitments are realized? How does that amount compare to its efforts to reduce operational emissions? If there were a carbon price of $50 per tCO_2e, what would the "carbon bill" for Apple and its suppliers be?
  - If Lisa Jackson invited you as a "climate consultant" to give her advice on what she could do to take Apple's climate-related efforts to the next level, what would your advice to her be?

Required Reading:
1) Abridged version of Apple's *2020 Environmental Progress Report* (SKIM CAREFULLY)
2) Link to ghgprotocol.org website (SKIM THE SITE TO GET A SENSE OF WHO THEY ARE)

Session 6 **DCF Analysis of Corporate Solar Investments and Implied Carbon Price**
Wed Nov 2 ***Case: 'Apple's Renewable Power Investments in Maiden North Carolina,' Tuck School of Business (2020).***
GROUP WRITE-UP DUE! SEE CANVAS FOR DETAILS.

Prepare:
- Read the *Apple's Renewable Power Investment* case and prepare answers for the following questions:
  - What are the approaches and strategies that companies like Apple use to reduce or offset their dependence on fossil fuel-based sources for the electricity powering their operations?
  - Using estimated electricity costs in North Carolina, estimates for solar project investment and operating costs, Apple's reported electricity usage, and other data, conduct an NPV analysis of Apple's 40MW solar array. Treat the project as being all-equity financed (i.e., the cost of capital is just the cost of equity), and assume it has the same risk as Apple as a firm. Initial

investment is assumed to occur in January 2012, the solar array becomes operational in 2013, and free cash flows are modelled over the useful life of the project (25 years).

- Forecast the emissions *avoided* during each year of the proforma period based on two scenarios: (1) Flat, based on the 2012 emissions intensity factor; (2) Reducing tCO_2e/MWh by 1.5% per year starting in 2013.
- Using a hypothetical carbon price of $20 per tCO_2e, what is the NPV of the 40MW solar project under these two scenarios? (The US EPA's "social cost of carbon" was estimated to be approximately $20 per tCO_2e at that time).
- Treating that carbon price as a variable, what price per tCO_2e will yield a break even NPV for Apple's efforts? What would the breakeven carbon price need to be if there were *no subsidy* in the form of the investment tax credit (ITC)? What is the implied carbon price without the ITC?
- With the taxpayer subsidy from the ITC included, did Apple get a good return on its spending? What is your view of the taxpayer subsidy implied by the ITC's breakeven price per tCO_2e?

Required Reading:
1) Abridged version of Apple's *2020 Environmental Progress Report,* SKIM CAREFULLY Appendix B.

Session 7: Financial Institutions and Climate Change
Thu Nov 3
Visitor: Til Schuermann, Partner, Oliver Wyman
Topic: "***Banks and Climate Change Risk***"

Til's Bio:
Til Schuermann is a Partner and the Co-Head of the Americas Finance, Risk and Public Policy practice. Til advises private and public sector clients on stress testing, enterprise-wide risk management, governance including board effectiveness, crisis management and climate risk. He has led stress testing and capital planning engagements for about 30 large global (US & non-US) financial institutions, regional banks, and large non-bank financials. He also participated in the stress testing of the Spanish (2012) and Slovenian (2013) banking systems, the European Central Bank's Comprehensive Assessment in 2014, and several confidential programs in Europe and Asia. In 2016, Til conducted an assessment of the Bank of England's stress testing program for the IMF, and recently supported the UN in a global project of estimating the impact of climate risk on banks.

Previously, Til was SVP at the Federal Reserve Bank of New York where he held numerous positions, including head of Financial Intermediation in Research and head of Credit Risk in Bank Supervision. In Spring 2009, he played a leadership role in the design and execution of the Supervisory Capital Assessment Program (SCAP – bank stress test), and the subsequent Comprehensive Capital Analysis and Review (CCAR) programs. Til serves on the board of the Social Science Research Council, is on the Financial Risk Manager (FRM) exam committee for the Global Association of Risk Professionals (GARP), and has taught at Columbia University and at the Wharton School. He has numerous publications in both academic and practitioner journals, including as a contributing editor to the *Handbook of Financial Stress Testing* (Cambridge Univ. Press, 2022).

Til received a PhD in Economics from the University of Pennsylvania.

Required Reading:
Anderson, Khaykin, Pyanet & Schuermann, 2021: "Banks and Climate Change Risk," forthcoming in the *Handbook of Business and Climate Change*, A. Sundaram & R. Hansen (eds.), Edward Elgar Publishing, 2023. (*This is a dense, but very valuable reading! Til will base his talk on this reading*).

Session 8: **Climate/ESG Investments and Equity Portfolios**
Wed Nov 9

Prepare: (*WARNING: JARGON ALERT! If a term or phrase sounds opaque in the readings, just browse the web -- for now -- to get a sense of what seems like a reasonable definition or explanation).*

- What do "E", "S" and "G" refer to in ESG investing? What are the typical components under each?
- How much has ESG investing in stocks and bonds grown during the past decade? How much is it projected to grow in the future?
- Think about what these terms and phrases mean: active/passive investing; exclusion/inclusion in ESG investing; ESG-screened/ESG-integrated/ESG-thematic/ESG impact; Sharpe Ratio; Information Ratio; maximum drawdown; 'factor' investing.
- How does ESG investing affect risk-adjusted portfolio returns when measured against benchmarks? Are there some areas of ESG investing in which the evidence on returns seem stronger? How would you summarize the evidence in this area?
- People claim "good" ESG stocks trade at a premium. Do you agree? What are the arguments for and against the persistence of ESG premiums (or discounts) in financial markets?

Required Reading:
1) Sundaram, 2022: "ESG Investing," forthcoming in the *Handbook of Business and Climate Change*, A. Sundaram & R. Hansen (eds.), Edward Elgar Publishing, 2023.
2) McKinsey, 2022: "Does ESG Investing Really Matter – And Why?", *McKinsey Quarterly*, August *CAREFUL SKIM*
3) Damodaran, 2020: "Sounding Good or Doing Good? A Skeptical Look at ESG Investing" (*THIS IS A SUPPLEMENTARY READING, BUT HIGHLY RECOMMENDED! CAREFUL SKIM*)

Session 9: **Putting a Price on Carbon and Regulating Global Emissions**
Thu Nov 10

Prepare:
- There are two ways to get a 'price on carbon': either a carbon tax or a cap-and-trade system. In what ways are the two approaches similar, and in what ways do they differ?
- Can companies make a difference by setting internal carbon prices? What is required to make such a move effective?
- Deconstruct McKinsey's 'abatement' curve: (i) Where are the biggest opportunities for emissions reduction? (ii) What do the negative prices in the vertical axis mean? (iii) Where prices are positive, what are the least expensive emissions reduction technologies?
- What is 'unburnable carbon'? Are markets mispricing fossil fuel assets because of the 'carbon bubble'? What is the impact of such stranded assets on the oil industry?
- Where does the global policy process stand, what are the key roadblocks?

Required Reading:
1) Union of Concerned Scientists, 2017: 'Carbon pricing 101' (READ CAREFULLY)
2) McKinsey, 2013: Global GHG Abatement Cost Curve (LOOK OVER CAREFULLY)
3) Matikainen & Subeyran, London School of Econ., 2022: "What Are Stranded Assets?"

PROJECT WRITE-UP DUE TUESDAY, NOVEMBER 15, BY 5.00 PM

APPENDIX: EXAMPLES OF PAST BCC PROJECT TOPICS

Firm/industry-level climate strategy (carbon footprint, targets, internal initiatives, efforts to mitigate risks/capture opportunities):

- Cargill; Toyota; Tuck School; Tesla; Solar City; Upper Valley; Apple; BMW; NHL; FIFA World Cup; Formula 1; AB Inbev; TPP; Dominica (the country)
- US food & beverage; US wine industry; Same day delivery; Airlines; Meat production; Fashion; Transportation
- Carbon impact of veganism; Carbon impact of burial vs. cremation; Carbon impact of fracking
- Corporate clean energy targets
- Industry 'climate leadership briefings' across a range of industries (automobiles, beverages, IT, utilities, shipping, transportation, etc.)
- Emerging changes in the disclosure landscape: SEC, IFRS, Int'l Sustainability Standards Board (ISSB), CDP, GRI, SASB (Value Reporting Foundation), TCFD, SFDR, Double Materiality, EU Taxonomy
- Cryptocurrencies

Climate policy issues:

- Net-zero transition
- Assessment of renewable energy potential in the US
- Cap & trade policy in the US (Waxman-Markey; Boxer-Kerry; Cantwell); California; Australia; China; Analysis EU's Emissions Trading System
- Carbon tax versus cap-and-trade
- The Conference of Parties 'COPs' (the UN climate summit); international policy coordination issues
- Genetically Modified (GMO) agriculture in a climate-stressed world
- Health costs of climate change: business and public policy implications
- Energy poverty
- Biodiversity and climate change

Solutions to climate change:

- Corporate investments in renewable energy
- Regional climate initiatives in the US (RGGI, WCI, California)
- China's emissions trading system
- Geo-engineering
- Carbon capture & storage & re-use; Nature-based solutions ('NBS')
- Economics and impact of enhanced oil recovery (EOR)
- Life cycle emissions of solar power
- Waste-to-energy (WTE) technologies
- Small modular reactors (SMRs); NPV analysis of SMRs
- Potential impact of switching to electric vehicles in the US, India
- Prospects for tidal energy
- Corporate 'nature-based solutions': tree-planting initiatives; forest management; soil carbon restoration; tall grass-planting; shiny crops and albedo
- Next-generation air transport; next generation marine transport

- Energy storage technologies
- NPV analysis of fuel cells
- Building efficiency

Climate finance:

- PE/VC trends in climate change-related investments
- Green bonds/sustainability bonds/social bonds
- The private equity 'valley of death' in climate investments and how to mitigate its impact
- Creating the market for carbon/carbon trading: implications and prospects
- Investing in the climate economy