

# Environmental Sustainability and Value Creation

## LGST/OIDD 762

### Fall 2021

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**Classes:** Mondays, 3:30pm to 6:30pm EST

**Professor's Office Hours:** Mondays by appointment, phone, or video (Zoom, FaceTime)

**Teaching Assistant's Office Hours:** Wednesdays (Zoom) starting 9/15 from 9-10pm EST and by appointment, phone, or video (Zoom, FaceTime)

## Course Objectives

1. Understand the **role of environmental sustainability in business today** as it relates to corporate strategy, business operations, financial objectives, and social responsibility.
2. Learn how corporations that have made sustainability a core tenet of their strategy are **making a significant impact on the environment**, independent of government regulation, while **driving strong performance**.
3. Gain an appreciation for the **trade-offs** that are being made daily in business around sustainability issues and understand that there is not always a "right answer."
4. Explore meaningful **opportunities** for businesses and entrepreneurs to drive value creation through sustainable strategies and tactics.
5. Focus on **real world topics** through case studies and current news discussions, enabling exposure to how business and sustainability issues are creating opportunity, while still rapidly evolving.

## Course Overview

It was not long ago when business looked at environmental issues and their impact as a compliance exercise. Slowly, at first, leading businesses began to change their concept of environmental management to look beyond simply meeting governmental dictates. These organizations began to evolve and utilize "sustainability strategies" to create new ways to drive value creation by bringing sustainability to the core of their business strategy. This seismic shift was accompanied by a bottom-line emphasis that, in some cases, turned sustainability efforts into profit centers. Today, there has been a shift, yet again, to confront what a post COVID-19 pandemic means for business resiliency. Businesses must be prepared for climate change's impacts on their operations and must be fully positioned to drive value creation and innovation in these challenging times. *Business cannot simply react to environmental mandates; they must lead and drive change!*

Sustainable initiatives are increasingly not hidden within the silos of sustainability, EHS (environmental, health, and safety), or CSR (Corporate Social Responsibility) departments, but have become much more seamlessly integrated into the operations of enterprise functional disciplines. Today, to effectively work in senior management, an executive needs to be knowledgeable not only about their specific business function, but also on how their business will be impacted by environmental supply chain disruptions, requirements around sustainability reporting, ESG (environmental, social, and governance) demands on a business, ability to market sustainable product attributes, managing energy, water, and food needs globally, and sustainable technology to drive new initiatives.

Within the broader topic of sustainability, the role of business in driving strategies should not only allow an enterprise to survive, but also thrive amid an impending climate crisis. While there is a clear responsibility for the international community at large to address climate change, it is also apparent to all that no real solution will be possible without business changing its current approaches. This reality is a central opportunity for business to create value in the future.

This course will focus on sustainability and value creation strategies within this new paradigm. It is meant to be introductory, yet provide a comprehensive overview of emerging approaches to business and its relationship with the environment. While it will cover academic research and overarching management theories, the class will be integrative and practical in its application of sustainability strategies, management, tactics, and tools.

The time spent in class will be integral to the learning experience. Each class will begin with a discussion of current environmental news and events. Emphasis will be given to topics that deal with sustainable innovations, environmental controversies, and break-through business strategies within the sustainability space. This interactive learning environment will leverage multiple tools including simulations, asynchronous learning, in class exercises, case analysis, real-world artifacts, and guest participants.

## Course Plan

**N.B., CLASS WILL NOT MEET ON 8/30. THE COURSE'S FIRST CLASS IS 9/13.**

Meeting Date	Focus Area
9/13/21	Class Introduction/Sustainability Strategy and Value Creation
9/20/21	Sustainability Reporting and Environmental Footprint
9/24/21*	Sustainability Marketing and Communications
9/27/21	Climate Change: Managing Risk and Opportunity
10/4/21	Climate Change: Scenarios for Reaching 1.5° Celsius
10/11/21	Financing the Cleantech Revolution/Class Wrap-Up

\*N.B., The classroom for the third class may differ than our typical meeting venue and will be announced at a later date.

## Course Requirements

**Class Attendance:** We will be leveraging both synchronous and asynchronous learning techniques. An asynchronous **Base Concepts Lecture (BCL)** video recording will be posted on Canvas as part of the preparation prior to the live class. The **Integrated Learning Session (ILS)** will be our live class where time will be dedicated to utilizing your preparation to fuel interactive learning, discussion, and debate through a combination of lecture, interactive tools, case analyses, breakout groups, and reviews of current issues.

**Given that the ILS is central to our class, your attendance is required.** We are only meeting for 6 sessions, so each class is critical to your learning. These sessions should fuel students' passions around sustainability and make our time together valuable, fun, and productive. N.B., The course will adhere to the MBA program's policy of student use of devices in class. Any violations of [this policy](#) will be reflected in your participation grade.

**If you anticipate missing a class, you must inform the professor and teaching assistant via email prior to the respective class.** Absences will be excused **only** for advanced notice of family or personal medical emergencies, illness, and religious holidays. Your attendance is otherwise imperative for our dynamic learning environment. After completing the BCL for the week, reviewing the lecture slides, listening to the live class recording, an excused student may earn their participation grade by doing the following no later than **12pm EST on the Friday** before the start of the next class:

- **Required:** Complete the areas of inquiry questions in the respective Canvas discussion for the week
- **Required:** Listen to the BCL and complete the learning consolidation questions
- **Optional:** Offline contribution and discussion through articles posted and thoughtful responses on Canvas

**Class Participation:** Class participation is what powers the enjoyment of teaching and presents diverse points-of-view from classmates. Class time will be enriched by the thoughtful participation of you and your peers. As well, participation begins with being present, both physically and mentally. The success of our class time is dependent on a vibrant, participatory group. The weighting on a student's course grade reflects this importance. Emphasis in participation grading will be on consistent, meaningful contribution to the class, not on the amount of talk time—it is quality over quantity.

We believe you should have multiple ways to participate in the class. In addition to attending class, you must **choose at least one of the optional choices to receive full participation credit** for that class.

- **Required:** Class attendance (or asynchronous recording if you are absent from the class)
- **Required:** Complete the BCL and answer the learning consolidation questions prior to class
- **Optional:** Participate in the class discussions

- *Optional:* Contribution and discussion through articles posted and thoughtful responses on Canvas
- *Optional:* Add comments to the weekly areas of inquiry discussion on Canvas

**Learning Resources and Class Preparation:** A highly curated listing of essential readings on a topic can be an accelerator of deeper knowledge on a topic. However, every student has their own point-of-view of what is “essential” and when it crosses the line for being “too much.” **Mindful of this, there are no readings required for any of our classes.**

Chronologically, the recommended preparation for each class is as follows:

- **Base Concepts Lecture (BCL):** Each week, a pre-recorded lecture of the key areas to know and understand for the upcoming class will be posted on Canvas. This lecture will be no more than 1 hour and 30 minutes. The BCL includes several multiple-choice questions to be answered that ensure you are understanding the topics covered. It will refer to readings and concepts that, if you choose, you may elect to explore in the Deeper Knowledge Readings (see below).
- **Sustainability Case Study:** Some classes will have a case study associated with the respective week’s topic. This case will be integrated into our class discussion and work. You will need to read this case prior to class.
- **Original Artifacts:** Real world videos, policies, or letters can form a rich basis for our class discussion. For some classes, there will be an artifact for you to review in preparation for the class. All are housed on Canvas.
- **Deeper Knowledge Readings:** **None of these readings are required** to be prepared for the live class. However, for those students who wish to explore and develop a deeper understanding of a particular topic or point-of-view, these outstanding, curated resources will feed your curiosity.

**Value Creation Response Papers:** During the quarter, each student will be responsible for submitting **two (2) value creation response papers** related to an organization’s creation of value through environmental sustainability. *It must be based on a specific article you have read.*

Each student will choose which two weeks to submit these papers and each paper will account for 10%, totaling 20%, of your final grade. The teaching assistant will notify students how to sign-up for their preferred date(s) immediately following the first class. Each response will answer the following questions and fulfill the following requirements:

- **What business imperative has compelled the organization to address this environmental issue?**
- **How can its response drive value creation in the short and long-term?**
- **Do you believe this is the correct response, or the wrong response? Why?**

- The response will be a maximum of 500 words (a single page) and uploaded as a PDF to Canvas.
- The article URL must be easily accessible and either included after the conclusion or attached as a PDF to the response.
- The responses will also adhere to the course policy on citations and the University's policy and definition of plagiarism, as outlined later in the syllabus.

The teaching assistant will recommend helpful resources on Canvas for students to consult when identifying an article for the response. The response is due for submission on Canvas **by 7pm EST on Thursdays**. The system will provide a **30-minute grace period** and then locks out submissions.

**En-ROADS Simulation Write-Up:** [En-ROADS](#) is a sophisticated policy simulation that enables you to create a scenario of how you might mitigate the impact of climate change. In advance of our 10/11 class, you will develop a scenario and justify the reasoning behind your recommendations. Complete details on how to use En-ROADS and the requirements of this submission are available on Canvas.

**Final Case Analysis:** The final project of the course will be a case analysis of how a single business has driven value creation through its sustainable business strategy. The analysis should be comprehensive the topics we covered during the course. The goal is to integrate the knowledge learned in class, readings, and cases and present a comprehensive picture of a major corporation's sustainability strategies and outcomes. The paper will be no longer than 15 pages. Full details of the paper requirements will be provided on Canvas.

## Assessment

### Weighting

Class Participation/Attendance	25%
Value Creation Responses (2)	20%
En-ROADS Simulation Write-Up	15%
Final Case Analysis	40%

### Grading

A+	97-100
A	93-96
A-	90-92
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
Below these scores...let's talk!	

## Additional Information

**Materials for the Class:** Most materials are posted in the files section of Canvas. As well, some book readings are reserved through the Penn Library Reserves. Finally, there are additional Harvard articles and cases available in Study.net on Canvas.

**Citations and Plagiarism:** Students must give adequate citations for all sources quoted or used in writing papers. No specific form of citations in footnotes is required, as long as the source is identified sufficiently for it to be found and checked. Every written submission, including the final paper, must be the student's own work. Any incident of plagiarism will be fully prosecuted through the usual channels. The University's policy and definition of plagiarism may be found [here](#).

**Writing Center:** Staffed by friendly, well-qualified peer and faculty writing specialists, The Writing Center is open to Penn students and provides feedback on papers, proposals, manuscripts, and other texts. They focus on many facets of the writing process from tips on how to make your papers more engaging to strengthening sentences, paragraphs, diction, grammar, and mechanics. We strongly advocate for students to utilize this resource. Starting the first week of classes, graduate students can schedule 60-minute virtual appointments (once per week) using the [Writing Center Scheduler](#). For more information on how to schedule and attend an online writing consultation, please visit The Writing Center's [guide](#).

**Mental Health and Wellness:** If you are feeling overwhelmed or facing unprecedented challenges, we encourage you to reach out to us. As well, there are professional resources for support at Penn. These include all of the offices under [Wellness at Penn](#).

Counseling and Psychological Services (CAPS) offers a wide range of services including individual and group counseling and therapy, crisis intervention, outreach programming, medication management, and consultation. Services are now being provided virtually with some in-person presence. Students may access a counselor confidentially by calling 215-898-7021 (24/7) and pressing 1. More information on CAPS can be found [here](#).

Student Health Services (SHS) offers primary care, gynecologic care, sports medicine, and more. If you are feeling sick or would like a wellness visit, please call 215-746-3535 to schedule an appointment. All students must have a scheduled appointment before arriving at SHS.

## Curriculum and Assignments

N.B., **SN** denotes part of Study.net case pack, **LR** denotes library reserves, both on Canvas

### **9/13 - Focus Concept: Sustainability Strategy and Value Creation**

Modern business has been challenged to do things differently. The issues of environmental sustainability and the threats of climate change are creating new opportunities for business to drive value. Yet, many organizations have failed to develop a coherent strategy around these issues and ultimately have delivered less value.

#### **AREAS OF INQUIRY**

- What is the role of goals in driving meaningful sustainability initiative results?
- How are organizations driving value from their sustainability initiatives?
- How do different models for competitive sustainability strategies compare?
- Can competitive businesses collaborate on sustainable initiatives?
- Does it pay to be good?

**PREPARE CASE FOR CLASS DISCUSSION:** *Unilever's New Global Strategy: Competing through Sustainability*, by Christopher A. Bartlett. Source: Harvard Business School. **SN**

#### **OPTIONAL DEEPER KNOWLEDGE READINGS**

##### *Business and Sustainability*

The 2021 State of Green Business Report, *GreenBiz*, 1/2021

##### *Strategic Frameworks for Capturing Value*

Creating Shared Value, Porter and Kramer, *Harvard Business Review*, Jan. 2011 **SN**

The Business of Sustainability, Bonini and Gorner, McKinsey, 2011

Saving the Planet: A Tale of Two Strategies, Martin and Kemper, *Harvard Business Review*, April 2012 **SN**

Green Innovation Games: Value-Creation Strategies for Corporate Sustainability, Lampikoski, Westerlund, et al., *California Management Review*, Fall 2014 **SN**

##### *The Power of Collaboration*

The Collaboration Imperative, Nidumolu, Ellison, Whalen, & Billman, *Harvard Business Review*, April 2014 **SN**

The UN Global Compact – Accenture Strategy CEO Study on Sustainability 2019

##### *Goal Setting*

Winston, Chapter Six: Set Big Science Based Goals **LR**

*Creating Value through Sustainability*

How Companies Capture the Value of Sustainability, McKinsey, 4/21



## **9/20 - Focus Concept: Environmental Footprint and Sustainability Reporting**

Every organization has an environmental footprint. The ability for a business to perform a base line analysis of its impact both “upstream” and “downstream” is critical in developing an environmental strategy. The sometimes elusive goal of a circular economy is more recently being integrated into some strategies. The ability to measure and deliver on reduction of a businesses’ environmental footprint is core to driving value.

As well, business lives by numbers. So do organizations that take a strategic view of sustainability. From basic tracking metrics to sophisticated systems to measure value creation and performance, no successful sustainability program can succeed without measurement and goals. The more recent demands of investors have pushed ESG reporting and the value of quantifiable results to the forefront. Yet, reporting standards are a relatively new space and there are few agreed upon guidelines or benchmarks.

### **AREAS OF INQUIRY**

- What is the circular economy, and the actions business is taking to close the loop?
- What are the key components of a Life Cycle Assessment (LCA)?
- What is the impact of materiality on metrics and reporting?
- What standards exist for measuring and reporting environmental business?
- How are calls for integrated reporting shaping the direction of sustainability reporting?
- What is natural capital and how do you value it?
- What is ESG and how does data drive ESG investing?
- How does purpose translate into value creation?

### **ORIGINAL ARTIFACTS**

- Larry Fink’s 2021 [Letter](#) to CEOs
- Letter from the Board of Directors, PMI (Philip Morris International), 2019
- Ford Motor Company Integrated Reporting

**PREPARE CASE FOR CLASS DISCUSSION:** *BlackRock: Linking Purpose to Profit*, by Deshpande, Dey, and Serafeim. Source: Harvard Business School. **SN**

### **OPTIONAL DEEPER KNOWLEDGE READINGS**

#### *Environmental Footprint*

Towards the Circular Economy: Business Rationale for an Accelerated Transition, Ellen MacArthur Foundation, 2015

The Circular Economy: From Concept to Business Reality, Knowledge@Wharton, 2017

### *Sustainability Reporting*

Statement of Intent to Work Together Towards Comprehensive Corporate Reporting,  
World Economic Forum and Deloitte, 9/20

[What is Material in your Sustainability Strategy](#), Sustainability Roundtable, 11/19

Final Report: Recommendations of the Task Force for Climate-Related Financial  
Disclosures, Financial Stabilities Board, June 2017, **Executive Summary, pp. 1-30.**

[Why Companies Should Report the Financial Risks from Climate Change](#), Robert G.  
Eccles and Michael Krzus, *MIT Sloan Mgmt. Review Blog*, 10/27/17

The Performance Frontier: Innovating for a Sustainable Strategy, Eccles and Serafeim,  
*Harvard Business Review*, May 2013 **SN**

Rate the Raters, Sustainability, 3/20

### *Natural Capital and ESG*

Winston, Chapter Ten: Put a Number on the Value of Natural Capital **LR**

### *Purpose*

Purpose: Shifting from Why to How, *McKinsey Quarterly*, Q2 2020, pp. 116-127

## **9/24 - Focus Concept: Sustainability Marketing and Communications**

N.B., Class is meeting on Friday 9/24 due to no first class on 8/30.

Business is being challenged to determine how best to communicate the ways that sustainability is creating value for the enterprise, yet still meet the evolving standards expected by its stakeholders. As well, sustainable marketing has become more mainstream and a critical element in driving value creation. While it is important to incorporate green marketing into the whole marketing mix, there is also a need to understand the unique considerations and issues inherent in green marketing.

Consumers today actively weigh the sustainability attributes of a product in their buying decisions. But, different people put different levels of import on this element of a product. As well, meaningless environmental claims made by businesses, and a reputation for poor performance by “green” products have made some consumers wary of sustainability claims. Recent FTC actions have made it clear that a thorough understanding of how to promote a product’s green attributes is critical.

### **AREAS OF INQUIRY**

- How should green messaging be communicated to different stakeholders?
- What works today in marketing sustainability?
- What is greenwashing? purpose washing? ESG washing?
- What are “allowable” sustainable claims?
- What are some of the different ways to segment the market for sustainable products?
- How do different generations make sustainable purchase decisions?
- Why is it necessary today for companies to be purpose driven to attract customers and employees?

### **ORIGINAL ARTIFACTS**

- Environmental Claims: Summary of the Green Guides, Federal Trade Commission, 10/12.
- Sustainable Market Share Index, NYU Stern Center for Sustainable Business, 7/20

### **OPTIONAL DEEPER KNOWLEDGE READINGS**

#### *Green Consumers*

[Earth Day and the Polling of America 2020](#), *GreenBiz*, 4/20

The State of Consumer Spending: Gen Z Shoppers Demand Sustainable Retail, First Insight, 2020

Engaging Tomorrow’s Consumer, World Economic Forum, 2013

#### *Greenwashing*

Understanding the Effective Use of Green Product Labels, UL Labs, 2013

[Is ‘greenwash’ the new ‘fake news?’](#), *GreenBiz*, 4/21

### *Green Products*

Growing Green: Three Smart Paths to Developing Sustainable Products, Unruh and Etterson, *Harvard Business Review*, Jun. 2010. **SN**

### *Purpose Marketing*

“Woke-Washing”: Your Company Won’t Cut It, *HBR*, 7/20

Recognizing your Customer’s Purpose is Key to Growth, *HBR*, 5/21

### *ESG Washing*

BlackRock’s Former Head of Sustainable Investing Says ESG and Sustainability Investing Are Distractions, Peter McKillop, *GreenBiz*, 4/21

Where ESG Fails, Porter, Serafeim, and Kramer, *Institutional Investor*, 10/16/19

Larry Fink Isn’t Going to Read Your Sustainability Report, Mark R. Kramer, *Harvard Business Review*, January 2020

## **9/27 - Focus Concept: Climate Change: Managing Risk and Opportunity**

We have reached the tipping point of impact from the global change to our climate. Business is acutely aware of the risk to its operations and the need for adaptation. It has a unique role to create resilient companies in the face of dramatic climate changes, but also mitigate further climate damage. It has never been clearer that business must take a leadership role in collaborating with industry and world bodies to manage this change. Ultimately, climate change will present many opportunities for business to drive value creation.

Against this backdrop, the global middle class will grow by 3 billion people in the next 20 years. Business must manage resources around food, water, and energy to ensure that it will continue to drive value creation against the climate change backdrop. The nexus of these three critical resources will create incredible challenges because of their interconnectivity; as well as, opportunities for businesses that innovate.

### **AREAS OF INQUIRY**

- What has COVID-19 taught us about climate change?
- How has and will climate change impact business?
- What are the risks to business of not mitigating and adapting to climate change?
- What is a resilient business?
- What are the special challenges that climate change poses to supply chains?
- How will business's approaches to food, water, and energy alter the path of climate change?
- How do the challenges of the nexus of food, water, and energy impact climate change?

### **ORIGINAL ARTIFACTS**

- BP Strategy Presentation
- Re-Energize Exxon Presentation

**PREPARE CASE FOR CLASS DISCUSSION:** *ExxonMobil: Business as Usual (A) and (B)*, by Serafeim, Rajgopal, and Freiberg. Source: Harvard Business School. **SN**

### **OPTIONAL DEEPER KNOWLEDGE READINGS**

*COVID-19 and Climate Change*

[4 Ideas from COVID-19 to Fight Climate Change](#), Kara Baskin, *MIT Sloan Review*, June 2020

*Energy*

Energy Strategy for the C-Suite, Andrew Winston; George Favaloro; Tim Healy, *HBR*, 1/17 **SN**

GREEN ENERGY CHOICES: The Benefits, Risks and Trade-Offs of Low-Carbon Technologies for Electricity Production, UN Environmental Programs

*Water*

Water: A Human and Business Priority, Hundertmark, Lueck, and Packer, *McKinsey Quarterly*, Q2 2020, pp. 46-53

*Food*

Agriculture Takes Center Stage in the Drive to Reduce Emissions, Daniel Aminetzah, Joshua Katz, and Peter Mannion, *McKinsey Quarterly*, Q2 2020, pp. 76-79

The Path to 2060: Decarbonizing the Agriculture Industry, Rebecca Duff and Michael J. Lenox, UVA Darden School of Business, Batten Report Darden School, 2019

*Nexus Thinking*

The Nexus of Food, Water, and Energy, Knowledge@Wharton and IGEL, 2013  
Winston, Chapter 2: Scarcer (and Richer) **LR**

*Climate Change Adaptation and Resilience*

[Supply Chain Resilience in the Era of Climate Change](#), Kara Baskin, *MIT Sloan Review*, Feb, 2020

[Making the Case for Climate Change Adaptation](#), Janine White, *Wharton Magazine*, Spring/Summer 2020

Winston, Chapter 14: Build a Resilient, Antifragile Company **LR**

Climate Change and Corporate Value, KPMG and Eversheds Sutherland, 2020

*Climate Change Risk*

Understanding Climate Risk, Jonathan Woetzel et al., *McKinsey Quarterly*, Q2 2020, pp. 6-17

## 10/4 - Focus Concept: Climate Change: Scenarios for Reaching 1.5° Celsius

The Intergovernmental Panel on Climate Change (IPCC) determined in 2018 that the world needs to slow its warming to 1.5° Celsius above pre-industrial levels to avoid catastrophic consequences to our planet from climate change. The challenges facing the world, and business, are immense to achieve this level of greenhouse gas emissions. It is critical for every leader to understand how the different levers that impact climate change interact and appreciate the tradeoffs that are required to drive true impact.

### AREAS OF INQUIRY

- How does scenario planning help business manage risk?
- How is business valuing carbon and should a carbon tax be part of the solution?
- Why is climate change considered a “wicked problem?”
- Why is 1.5° Celsius the goal?
- What role does innovation have in addressing climate change?
- What opportunities to drive value creation does climate change present to business?

### ORIGINAL ARTIFACTS

- [En-ROADS Guided Assignment](#) for Interactive Learning Session
- En-ROADS control panel summary

**PREPARE AND SUBMIT ASSIGNMENT FOR CLASS DISCUSSION:** En-ROADS Climate Simulation Scenario

### OPTIONAL DEEPER KNOWLEDGE READINGS

#### *Scenario Planning*

*Climate Path: What a 1.5 degree path would take*, McKinsey Quarterly, Q2 2020, 28-47  
Summary for Policymakers in Global Warming of 1.5° – An Intergovernmental Panel on Climate Change (IPCC) Special Report, IPCC, 2018

#### *Climate Change and Business*

Climate Change in 2020: Implications for Business, Henderson, Reinert, Oseguera, HBS, 2020 **SN**  
[10 Reasons Why Climate Change is a “Wicked” Problem](#), Murtgudde, *The Wire*, 12/19  
Leading a New Era of Climate Action, Andrew Winston, *HBR*, Jan, 2020 **SN**

#### *Carbon Pricing*

The Baker Shultz Carbon Dividend Plan: Bipartisan Climate Roadmap, Climate Leadership Council, 4/20  
The Social Cost of Carbon, Methane, and Nitrous Oxide, Interagency Working Group on the Social Cost of Greenhouse Gases, United States Government, 2/21

*Net Zero Strategies*

Time is running out for business leaders who don't have a 'net zero' strategy, McKinsey Blog, 5/21/21

*Climate Innovation*

These 9 technological innovations will shape the sustainability agenda in 2019, McKinsey Blog, 1/17/19



## 10/11 - Focus Concept: *Financing the Cleantech Revolution*

There are many that believe that our most pressing sustainability challenges will not be solved by existing approaches, but by major, discontinuous advances that leverage technology. Data, AI, ML, blockchain are just some of the tools that will help us deliver a more sustainable future. No doubt that advances in technology will transform our lives in the future, but also, maybe, help preserve them as well.

The challenges to the agriculture, water, and energy segments in the coming years are significant. Climate change will impact all of these areas and demand new innovations to begin driving toward our required net-zero world.

Today, there is an incredible amount of excitement around and money that is poised to be invested in cleantech from both the government and private sector. Yet, we have seen this story before, and it did not end well! So, have we learned from the lessons of the past? What is different this time?

### AREAS OF INQUIRY

- Can technology help battle climate change?
- What challenges will investments in smart cities and urban mobility solve?
- What environmental issues have cleantech businesses addressed?
- How has the definition of cleantech evolved?
- What is the current venture environment for cleantech businesses?
- What are the different options for funding cleantech business?
- How has impact investing changed cleantech investing?

### ORIGINAL ARTIFACTS

The Cautionary Cleantech Tale of KiOR

- \*The Truth about 60 Minutes and the Cleantech Crash
- \*Vinod Khosla's Open Letter to 60 Minutes
- \*RIP KiOR
- \*The Cleantech Crash, 60 Minutes, VIDEO

**PREPARE CASE FOR CLASS DISCUSSION:** *Khosla Ventures: Biofuels Strategy*, by Joseph B. Lassiter; William A. Sahlman; Alison Berkley Wagonfeld. Source: Harvard Business School. **SN**

### OPTIONAL DEEPER KNOWLEDGE READINGS

*Impact Investing*

[A Closer Look at Impact Investing](#), Pandit and Tamhane, *McKinsey Quarterly*, 2/18

*Technology and Sustainability*

Unlocking Technology for the Global Goals, World Economic Forum, 1/20

Beyond the Supercycle: How Technology is Reshaping Resources, McKinsey Global Institute, 2/17

*Cleantech and Climate Tech Investing*

The State of Climate Tech 2020, The Next Frontier for Venture Capital, PWC, 2020

*Urban Mobility*

Driving Forward: The Future of Urban Mobility, Knowledge@Wharton and IGEL, 2017

[The Irresistible Momentum Behind Clean, Electric, Connected Mobility: Four Key Trends](#), McKinsey, 4/21

[Global EV Outlook 2021](#), International Energy Agency, 4/21