

SYLLABUS

Duke University

ENERGY 590: Cleantech Startups and Investors

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Class Logistics:

- 3:30-4:45 on Tuesday
- Full credit = 1.5 for graduate students; 0.5 for undergraduates

Course Overview

The cleantech sector includes resource efficiency fields such as solar power, batteries, electric vehicles, wind power, smart agriculture, green real estate, advanced materials, food tech, and related industries. These sectors also represent considerable growth opportunities in the near term and the coming decades, which means job opportunities and meaningful career paths for students. As an example, Bloomberg projects that \$10 trillion will be invested in solar, wind, and batteries by 2050. For startups and investors in the cleantech sector, the goal of their work is two fold: (1) reduce negative impacts on the environment and human health, and (2) generate attractive market rate financial returns. However, in the early 2000s during the first cleantech wave, many investors and founders made grave mistakes in their cleantech companies, leading to a high failure rate. Today, lessons learned from that period are leading to smarter founder and investor approaches in the cleantech sector. As examples of growth in this sector, Angellist tracks almost 4,000 clean energy startups. And investors such as Breakthrough Energy Ventures, ArcTern Ventures, Renewal Funds, Clean Energy Venture Group, and others have raised billions of dollars in recent years to invest in cleantech sectors. Through “in the trenches” input from eight guest speakers (founders and investors across the US) and various practical assignments, students will become more fluent with certain skills and tools, such as the following: (1) sizing a market, (2) using investor databases, (3) conducting competitor analysis, (4) measuring startup traction in the market, and (5) funding a startup.

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Course Schedule, Readings, Guest Speakers:

[This Google Sheet](#) contains links to all course materials.

Class Meetings and Attendance:

You should attend all classes regularly and on time, having prepared beforehand all assignments and readings. If you are unable to attend class on a given day (and this should not be a regular occurrence), you will not be permitted to make-up that participation in some other way.

Assignments and grading:

Your assignments include the following:

Guest speaker engagement (8 of these) - Individual assignment

- You will add 2 questions for speakers by Friday at noon the week before class, and add 4 comments about the guest speaker's content by Friday at noon after they speak.
- You will be graded on timeliness of completion as well as the quality of your questions and comments.

Reading summaries (4 of these) - Individual assignment

- Via an inline text submission on Sakai, share 2-3 pages of notes on what you learned from the readings, videos, and in-module exercises for these days of class => 1/26, 2/9, 3/16, and 3/30.

Participation - Individual assignment

- Attend all classes, show up on time, be prepared, and speak up.

You're the CEO - Team assignment

- Pick an existing cleantech startup -- e.g., [Global Cleantech 100](#), [50 to Watch](#), etc.
- Estimate the market size for 1-2 of their products and services.
- Conduct a competitive analysis.
- Conduct a premortem analysis on the top 5-7 reasons the company could fail and suggest ways to mitigate those risks. See [CB Insights article](#) and [SkillPacks article](#) for more guidance. We'll also discuss this in class.
- Create a list of all their existing investors by stage (e.g., Series A, B, C), and suggest 5-7 future investor prospects and your rationale.

Your course grade will be based on a final exam, individual and team assignments, and class

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participation. The following weights will be used in calculating your final grade:

Guest speaker engagement	40%
Reading summaries	20%
Participation	10%
You're the CEO	30%

For the group assignment, students will provide assessments of peers' quality and quantity of work via confidential scores, where 1 = below expectations, 2 = met expectations, and 3 = above expectations. Students should submit these to me by April 23 via email with the subject line: ENERGY 590 - CLEANTECH - PEER ASSESSMENT.

I want you to strive for excellence in my class, where the goal is to learn as much as you can. This should be based on your desire to maximize the investment in your education, to show self respect for this opportunity to learn something new and important, and to best prepare yourself for a meaningful and impactful career. In contrast, I am not especially focused on your grades. I do not expect you to worry unnecessarily about grades, and I do not plan on debating grades with students.

Timely Feedback:

My goal is to be one of the best professors you have ever had. My goal is to constantly improve and create a fantastic learning experience for you all. If you have concerns, questions, or suggestions on how to improve student learning, please tell me immediately. I will also reach out to you as a group or individually to better understand what teaching methods are working and which should be changed. This feedback will NOT affect your grade. I may be able to adjust class structure along the way. In contrast, if you wait to provide feedback when the class is over, then I am unable to help you or fellow students who may share similar thoughts on ways I can help you learn better.

Duke University Honor Code:

The Duke University Honor Code applies to all aspects of this course. We will not tolerate any infraction of the Honor Code. The nature of each assignment indicates the type of communication and consultation that is permitted. Work that is described as an individual effort is to be your work alone, without consultation or assistance from any other person. Work that is described as a team effort is to be your team's effort alone, again without consultation or assistance from anyone else. If you are uncertain about the nature of collaboration for any assignment, please ask us.

Disclaimer:

Content, schedules, and assignments in the syllabus may change slightly during the semester.