

SYLLABUS

ENERGY 790-1.01

Clean Energy in Emerging Economies: Policy, Technology, and Business Models

Instructors: Jonathan Phillips, Chris Wedding

Logistics

Class time:

- Wed 12:00-1:15
- Virtual via Zoom (See Sakai > Zoom for link)

Professor Jonathan Phillips

- Email: jonathan.phillips@duke.edu
- Office Hours: by appointment, please email me some available times. Afternoons are typically better for me.

Professor Chris Wedding

- Email: chris.wedding@duke.edu
- Office Hours: Schedule a 15-minute call [at this link](#)

This course is a deep dive into the challenges and opportunities facing low- and middle-income countries emerging from energy poverty. It is a practical course that takes a comprehensive examination of the issues to build fluency with relevant aspects of technology, international development policy and development finance, social entrepreneurialism, and business plan development. Students will gain an understanding of the rapidly evolving off-grid and renewables space, how business models and government programming co-exist, and how the modern energy development sector can achieve its goals.

We are focused on providing students with an understanding of the complex nature of energy poverty in low- and middle-income countries and how clean technology can be harnessed to improve access, and livelihoods. Students will hone practical skills in finance, energy policy and regulatory analysis, negotiation, blog writing, and developing a business plan. A key part of the class includes firsthand discussions with practitioners (i.e., guest speakers) to make this topic real and applied.

Through readings, classroom discussion, guest lectures, case studies, team assignments, and focused skill building, we aim to make this a useful course for anyone looking to develop their vision for what a low-carbon, equitable, and resilient energy system of the near future looks like. By gaining a practical foundation in the key institutions, policies, and dynamics at play in these markets, our goal is to give you the necessary context and confidence to begin implementing that vision.

Assignments and Grading

Sakai will be used for housing course materials and communicating. Course grades will be determined using three criteria, weighted as follows:

50%	Business plan and presentation (April 14 and 21)
25%	Collaborative blog synthesizing readings and guest lecture (one blog between Feb 10 and April 7)
25%	Attendance, participation in class discussion and the simulation, submitting 1-2 questions ahead of guest lectures, and posting 1-2 insights after those lectures (weekly)

Business plan — Early in the semester, you will be assigned a team of 4-5 students that you will work with over the course of the semester developing a business plan and associated materials. We will spend the Feb 3rd class going over the key elements of the business plan and expectations for this assignment. For-profit and nonprofit models are fair game. Below are more details.

2/24 - Elevator pitches due

- Watch this video and do the exercises for additional guidance => [Give your Elevator Pitch](#) (TechStars).
- Clearly identify the customer, their problem, and the solution.
- No longer than 30-40 seconds.
- Submit 1 per team as a video submission via Sakai. Only one person should speak on the video.

3/24 - Business Model Canvas due

- Reflect on the readings (videos and exercises) on this topic from 2/3.
- Submit a completed Canvas. [Use this template.](#)
- Submit as a PDF, one per team, with all team members' last names included in the file name.

4/14 - All final PPTs due

- On 4/14 or 4/21, you will deliver a team pitch on your business plan for 12 minutes followed by 10 minutes of Q&A.
- Aim for 10-15 slides.
- Include 5-10 slides as Appendices to show your additional analysis. Some of these may be useful in your Q&A session.
- Submit as a PDF, one per team, with all team members' last names included in the file name.

Collaborative blog — For each week we have a guest speaker, we will have a small group responsible for developing a blog that builds an argument that incorporates, among other things, themes from the guest speaker's talk and that week's readings. Blogs should be 700-1000 words. These are not book reports or static summaries. They should have a strong problem statement, be fact-driven rather than opinion-based, and include links to other research and publications that support the argument. [NextBillion](#) and [Brookings Future Development](#) are good examples to look to for a sense of format and style. Blogs will be due one week after the relevant guest speaker has given their talk and will be published on the Energy Access Project @Duke website.

Participation — You are expected to do the weekly readings, participate in class discussions, and actively engage in the simulation during the Jan 27th class. 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. NOTE: Sakai may show the incorrect due date or type of submission for this assignment. Please ignore what Sakai says. Use my directions above.

Structure of the course and timeline

Date	Course Content	Speaker name	Org	Role	LinkedIn profile
1/20	Intro and overview				
1/27	Simulation				
2/3	Building the business plan				
2/10	Data analytics, start-ups, off-grid financing	Kate Steel	Nithio	Co-founder and COO	https://www.linkedin.com/in/kate-steel-582953/

2/17	Regulatory reform and enabling environment requirements for investment	Sam Kwon	Millenium Challenge Corporation	Senior Dir for Energy	https://www.linkedin.com/in/samuel-kwon-0446b36/
2/24	Mini-grids: challenges, ops, financing	Nicole Poindexter	Energicity	CEO and Founder	https://www.linkedin.com/in/nicolepoindexter/
3/3	Case study				
3/10	NO CLASS				
3/17	Non-profits, advocacy, working with local orgs	Kristina Skierka	Power for All	CEO	https://www.linkedin.com/in/kristinaskierka/
3/24	Cook stove market ops/challenges, innovative financing mechanisms	Ken Newcombe	C-Quest Capital	CEO	https://www.linkedin.com/in/ken-newcombe-75534a11/
3/31	climate/development finance, working with gov	John Morton	Pollination	Partner	https://www.linkedin.com/in/john-morton-942837/
4/7	International/UN energy diplomacy, energy plans, results-based financing	Jim Walker	Sustainable Energy for All	Senior Director	https://www.linkedin.com/in/jimwalker99/
4/14	Presentations				
4/21	Presentations and wrap-up				

NOTE on guest speakers: These slots are being filled by a diverse group of practitioners that represent the following general perspectives. As speakers are confirmed to specific dates, we will update the syllabus and add accompanying readings.

1. Foundations, donors, the role of grant capital, equity and justice considerations, energy for productivity
2. Mini-grids and off grid financing
3. Venture and impact investing in tough markets
4. NGOs, advocacy, and working with local organizations
5. Data analytics and innovative financing models
6. Development finance, US policy and institutions, working with government agencies, blended capital models,
7. Clean cooking and start-up challenges in LMICs
8. Role of the UN and multilaterals, building diverse coalitions

Jan 20. INAUGURATION DAY. NEW TIME. 12:45-1:45.

Themes:

- Introductions, course overview and expectations, intro to energy access and discussion of readings, preview simulation
- The relationship between energy and people. Tiers of access. SDG 7. Productive use. Reliability and firms. The U.S. electrification template, adopted by China and others. Alternative models for reaching the un-electrified. Major trends.

Readings:

- Prisoners of Geography, Chapter 5: Africa, Tim Marshal.
- Tracking SDG7: the Energy Access Progress Report 2020, executive summary, pages 1-12.

Jan 27. PowerPlay simulation.

In small groups, you will take on the role of a key player in a negotiation to develop a master electrification plan for the fictional country of Wodala. You will need to coordinate with your teammates to meet once for one hour during the week leading up to this class.

Themes:

- The politics and conflicting agendas of electricity development. Negotiations strategy.

Readings:

1. General PowerPlay Instructions
2. Confidential instructions for your role
3. Negotiation Systems and Strategies, Jonathan Hughes et al.

Feb 3. Building the Business Plan.

Themes:

- Business Model Canvas. Competitor analysis. Market sizing. Customer segmentation. Revenue model. Cost structure. Key metrics (KPIs).

Readings:

1. [Build Your Lean Canvas](#) – TechStars (watch all videos, exercises are optional)
2. [Understand Your Customers](#) – TechStars (watch all videos, exercises are optional)
3. [Startup = Growth](#) – Paul Graham (VC investor)

Feb 10. Guest Speaker, TBD

Themes:

- ?

Readings:

1. ?
2. ?

Feb 17. Guest Speaker, TBD

Themes:

- ?

Readings:

1. ?
2. ?

Feb 24. Guest Speaker, TBD

Themes:

- ?

Readings:

1. ?
2. ?

March 3. D.Light Case Study

Themes:

- Off-grid solar. Solar lanterns vs. small solar home systems. Venture capital. Capital raising. Revenue models such as PayGo.

Readings:

1. d.light - Harvard Business Publishing case study. [Order here.](#)

March 17. Guest Speaker, TBD

Themes:

- ?

Readings:

1. ?
2. ?

March 24. Guest Speaker, TBD

Themes:

- ?

Readings:

1. ?
2. ?

March 31. Guest Speaker, TBD

Themes:

- ?

Readings:

1. ?
2. ?

April 7. Guest Speaker, TBD

Themes:

- ?

Readings:

1. ?
2. ?

April 14. Business case presentations

April 21. Business case presentations and wrap-up

Late/missing assignments. Late assignments will not be accepted after the deadline, and a grade of 0 will be assigned. If you feel that you are not able to make a deadline, please raise this question well before that deadline and ask if an extension is possible.

Behavior, Health, and other Matters

As in all Duke classes, students are expected to abide by Duke's academic integrity policy. To assist you in abiding by this policy, we will try to be very clear about when it is permissible to work with other students, and under what conditions, on assignments for this course (nearly all work in this course will allow collaboration). Please ask for clarification if instructions are not clear. Also note the following:

1. The Duke Compact

The Duke Compact recognizes our shared responsibility for our collective health and well-being. Please be reminded that by signing your name to this pledge, you have acknowledged that you understand the conditions for being on campus. These include complying with university, state, and local requirements and acting to protect yourself and those around you. For complete language and updated policies, please visit this [link](#).

2. Duke Community Standard

All students, whether residing on campus or learning remotely, must adhere to the Duke Community Standard (DCS): Duke University is a community dedicated to scholarship, leadership, and service and to the principles of honesty, fairness, and accountability. Citizens of this community commit to reflect upon these principles in all academic and non-academic endeavors, and to protect and promote a culture of integrity. To uphold the Duke Community Standard: Students affirm their commitment to uphold the values of the Duke University community by signing a pledge that states: a) I will not lie, cheat, or steal in my academic

endeavors; b) I will conduct myself honorably in all my endeavors; c) I will act if the Standard is compromised.

Regardless of course delivery format, it is the responsibility of all students to understand and follow Duke policies regarding academic integrity, including doing one's own work, following proper citation of sources, and adhering to guidance around group work projects. Ignoring these requirements is a violation of the Duke Community Standard. If you have any questions about how to follow these requirements, please contact Jeanna McCullers, Director of the Office of Student Conduct.

3. Rules for Video Recording

Student recording of lectures is permitted and shall be for private study only. Such recordings shall not be distributed to anyone else without authorization by the instructor(s). Unauthorized distribution is a cause for disciplinary action by the Judicial Board. The full policy on recording of lectures falls under the Duke University Policy on Intellectual Property Rights, available [here](#). The weekly class sessions will be recorded on Zoom and be available for view upon request.

Mental Health and Wellness

If your mental health concerns and/or stressful events negatively affect your daily emotional state, academic performance, or ability to participate in your daily activities, many resources are available to you, including ones listed below. Duke encourages all students to access these resources, particularly as we navigate the transition and emotions associated with this time. Duke Student Government has worked with Duke Reach and student advocates to create the Fall 2020 "Two-Click Support" Form, and Duke Reach has expanded its drop-in hours as well.

DukeReach. Provides comprehensive outreach services to identify and support students in managing all aspects of wellbeing. If you have concerns about a student's behavior or health visit the [website](#) for resources and assistance.

Counseling and Psychological Services (CAPS). CAPS services include individual, group, and couples counseling services, health coaching, psychiatric services, and workshops and discussions. (919) 660-1000

Blue Devils Care. A convenient and cost-effective way for Duke students to receive 24/7 mental health support.

Managing daily stress and self-care are also important to well-being. Duke offers several resources for students to both seek assistance on coursework and improve overall wellness, some of which are listed below. Please visit <https://studentaffairs.duke.edu/duwell/holistic-wellness> to learn more about:

[The Academic Resource Center](#): (919) 684-5917, theARC@duke.edu

[DuWell](#): (919) 681-8421, duwell@studentaffairs.duke.edu

[WellTrack](#)

5. COVID and online learning: We are planning on running this course entirely online. This sucks, obviously. There is a strong experiential component to the course that faces challenges in transferring to an online format. We will do our best to mitigate these challenges and are open to your thoughts and feedback on how we can do that most effectively so that this course meets your needs. Also, everyone now knows and has experienced “Zoom fatigue”. We empathize. And we understand that this spring will be a continuation of an already very disrupted higher educational experience for all of you. Let us know if we can help in any way. Rule #1 for the semester: be kind.

6. Accessibility: If you need special accommodations due to physical or learning disabilities, medical needs, religious practices, or other reasons, please inform us as soon as possible so we can work to accommodate those needs.

7. Technology issues: In addition to accessibility issues experienced during the typical academic year, we recognize that remote learning may present additional challenges. Students may be experiencing unreliable wi-fi, lack of access to quiet study spaces, varied time zones, or additional responsibilities while studying at home. If you are experiencing these or other difficulties, please contact us to discuss possible solutions. Moreover, students who may have limited access to computers and stable internet may request assistance in the form of loaner laptops and WIFI hotspots from Duke. For updates, please visit this [link](#).