This course presents the complex technical, financial, regulatory, and social challenges of providing universal energy access in developing countries, focusing on electricity supply, but also covering cooking and heating. Students will learn the adequate supply and demand technologies to meet the diverse energy needs, the specific features of the power sector in developing countries, the role of large infrastructures of generation and transmission of electricity, the estimation of the energy demand, on-grid and off-grid modes of electrification, existing and innovative business models and regulatory instruments, tariff design, consumer preferences and willingness to pay, the development impact and electrification planning techniques. Students will make use of optimization models to plan on-grid and microgrid electricity supply. The course will prepare students to contribute to research, technology deployment, and policymaking for energy access worldwide as well as for future careers in industry, government, consulting, or multilateral development organizations.

The course is open to graduate and advanced undergraduate students. No prerequisites. The course will provide the necessary background in engineering, microeconomics and energy policy. No admissions cap.

This course twins with IDS.505, 6.695J, 15.032J “Engineering, economics and regulation of the electric power sector”, which has been taught in the Spring term for the last 10 years, but now focusing on electrification in the developing world, which is a completely different story. Both courses can be taken independently.

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Stellar site: https://stellar.mit.edu/S/course/15/fa18/15.017/