Energy in the 21st Century

‘The Climate Problem is Mainly an Energy Problem’

David MacKay, Sustainable Energy Without the Hot Air

Course Goals:

Empower students to make informed energy use choices
Inspire energy innovation and activism
Build energy literacy and awareness, identify issues, and design solutions

Description

Students discuss energy efficiency as it applies to renewable and non-renewable energy resources. What are the basic chemical and physical principles that limit energy efficiency and sustainability? Students examine potential energy resources and their basic physics, energy potential, sustainability limitations, and global distribution. Are these options viable? Is our current energy dependence sustainable?

Students explore where our current energy resources originate and investigate the resource cycle of oil, natural gas, coal, and nuclear fuel. What are the efficiency differences and climatological costs of non-renewable energy source?

Students learn fundamental terminology and concepts of energy. How are the economics and efficiency of renewable energy calculated? The textbook is online, open access, and SUSTAINABLE!

Action

Every week, students are required to respond to one or two discussion prompts that address the Course Module theme. Some examples:

Why should we care about energy use and conservation? Knowing what we do about fossil fuel energy and the links to anthropogenic climate change, what are the reasons why we don’t take action? What is sustainability, and how should it inform our energy choices? How is natural gas marketed as a sustainable fuel, and is this portrayal accurate?

In addition to containing lectures, reading, and assignments, course modules contain links to conservation and sustainability resources to encourage and inspire students to take action.

Challenges

The online nature of the course and the variety of student backgrounds and ability levels are general challenges. More direct challenges are teaching students to recognize the interrelatedness of their energy choices and the health of the planet. Instead of students feeling paralyzed by the magnitude and complexity of the problem, I want them to feel empowered to apply what they learn.

Impact

Examples of student responses:

‘In the past, I never gave a second thought when I used any form of energy. Never. But even after just a small amount of reading and understanding where the world is at with energy use, it made me realize just how complex everything is. Fossil fuels aren’t a forever thing, saving and supplying energy for ourselves is more of a concern, even the climate is changing because of our energy use! So why SHOULD we care? Nothing is promised or infinite; planning for the future and being prepared is the best hope that we have.’

‘Sustainability is a balance in life that is necessary for all systems to operate and to continue operating... The key component of sustainability is to be able to utilize natural resources in an efficient manner while maintaining a balance with those resources.’

‘Energy can be considered sustainable if the provision of energy meets the needs of now without compromising the ability for future generations to also meet their needs. I found that sustainable energy consists of renewable energy and energy efficiency.’

‘At the rate we are consuming our resources, the question is can we live sustainably? The resources that we have are being used by us at such a fast rate that they won’t be around for future generations to use for their needs. Limiting our use of our current resources while also finding other resources to use for the needs we have will help to start reducing our energy use and conserve it. But the question still remains, if we can’t find alternate energy sources can we live sustainably on the ones that we do have? ‘

‘Sustainability means that we can maintain our present standard of living without compromising the ability of later generations to maintain that same standard. Using hydrocarbons as an energy source comes with concerns over sustainability. First, they are non-renewable and vulnerable to depletion and, second, they release pollutants and are the primary cause of climate change.’

‘While we can discover and create new ways to use more efficient, sustainable, and environmentally friendly energy sources, we must remember that none of them are going to be perfect. However, there is much room for improvement and that is what our goal should be.’

Outcomes

Students will define sustainability in the context of our present and projected energy use, and develop the knowledge to make sustainable environmental, social, and economic energy choices.

Why does this topic matter?

How To Solve the Fossil Fuel Crisis

Harvest Oil From Dinosaur Fossils

Kill and Buy Dinosaurs

Close Dinosaurs in Laboratory

Planetary Thinking

Closing Session

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