Climate Judiciary Project
Energy Transition Curriculum Outline
May 2025

Introduction

I. **<u>Introduction to the Energy System:</u> This module covers the foundational science, regulatory structure, and key terminology of the energy system.**
   A. What is energy, why do we need it, and how do we use it
      i. Introduce the concept of energy services, who is using energy, and energy efficiency
      ii. Define renewable energy, clean energy, and fossil energy (legal definitions can vary by state)
      iii. Discuss lifecycle emissions and full accounting for energy production and emissions
   B. History of the energy system in the United States
      i. Explanation of production, transportation, and usage
      ii. Explain the unique nature of electricity in the energy system
   C. Current U.S. energy profile
      i. Describe the scale, size, and distribution of the U.S. energy system
      ii. Describe the economic, social, and environmental impacts of the energy system (e.g. labor and fiscal impacts, air pollution)
      iii. Emerging trends and the future of the energy sector
   D. How energy is regulated
      i. Regulatory goals and requirements (e.g., reliable, reasonable price, accessible, state and federal budgetary impacts) and associated tradeoffs (e.g., human health, environmental impacts, emissions)
      ii. State and regional jurisdiction: utility regulation, wholesale markets, transmission
      iii. Federal jurisdiction: Department of Energy (R&D and direction), Department of Interior (siting on federal lands), NRC (nuclear), EPA (pollution, see core curriculum)
   E. Glossary of key terms for energy, electricity, and legal terminology

Part One: Using Energy

II. **<u>Using Energy:</u> This technical module covers the end-uses for energy in the United States and the effects that the energy transition has on energy use. This**

module also introduces the important social and justice impacts surrounding energy use in the United States.

A. Explain DOE's four categories of energy consumers (Commercial, Residential, Industrial, Transportation)
B. Discuss electricity's unique role as a carrier of a primary energy source, like coal, gas, wind, or solar
C. Trends in U.S. energy use in the modern era
    i. Decline of coal consumption, rise of gas, wind, and solar-driven electricity
    ii. Special topic: A.I. and data centers are causing an increase in overall energy use
D. Impact of energy costs on vulnerable communities
    i. Lower income groups spend a higher percentage of income on energy
    ii. Disadvantaged communities are frequently closest to pollution and other impacts

III. **<u>Legal Issues in Using Energy:</u> This legal module covers how energy use arises in the law, including select legal cases and statutes at the state and federal levels which govern energy use.**

A. Laws and policies governing energy use and related legal cases
    i. Laws and policies to incentivize energy efficiency and/or reduce energy demand (e.g., building codes, demand response)
    ii. Regulations affecting energy use (e.g., vehicle emission standards, appliance efficiency standards)
B. Tax credits and other laws that impact projects and related legal cases
    i. Special topic: CHIPS and Science Act, Infrastructure Investment and Jobs Act, and Inflation Reduction Act

<u>Part Two: Making Energy</u>

IV. **<u>Legal Processes and Frameworks:</u> Provides a life cycle approach to infrastructure project development, highlighting the relevant levels of governance and potential for litigation at each step in the process (case examples referenced but largely covered in legal modules below).**

A. Planning and Siting
B. Financing (contracting, tax equity)
C. Permitting and Environmental Reviews (federal and state)
D. Public Participation (community benefit agreements)

E. Project Operation and Maintenance (taxes)
F. Decommissioning

V. **<u>Fossil Fuels:</u> This module covers the types of fossil fuels used for energy, what they are used for, and the foundational science behind greenhouse gas (GHG) emissions as a byproduct. It also covers the ways to capture and store the GHG emissions from their use.**
   A. Science, technology, economics, and impacts of coal, oil, and gas (e.g., energy density, availability, existing infrastructure, production cost, and energy independence)
      i. Impacts of fossil fuels on vulnerable communities
      ii. Economics of global imports/exports, and how fossil fuels are traded commodities
   B. Emissions from fossil fuels (coal vs. gas vs. oil) (e.g., GHGs and other pollutants)
      i. CCS: discussion of carbon capture and the practical and technological limits of reducing emissions from coal, oil, and gas
   C. Global efforts to transition away from GHG-emitting fuels to cleaner energy sources (e.g., UNFCCC's, COPs, Paris Agreement)

VI. **<u>Legal Issues in Fossil Fuels:</u> This module will cover key legal cases related to the three most common fossil fuel sources and their impacts.**
   A. Leasing
   B. Environmental reviews/impacts (e.g., NEPA and state equivalents, species, CWA, local air pollution, etc.)
   C. GHG emissions (Clean Air Act, emission reduction targets, carbon pricing)
   D. Other regulation of fossil fuels (export controls, fracking impacts, spills, remediation)

VII. **<u>Wind and Solar:</u> Examines the most common renewable energy sources, their strengths and limitations, and discusses how these technologies are currently driving the energy transition.**
   A. Science, technology, economics, and impacts of wind energy (e.g., clean energy source, market/supply chain issues, readiness, local environmental and social impacts)
   B. Science, technology, economics, and impacts of solar energy (e.g., clean energy source, market/supply chain issues, readiness, local environmental and social impacts)

C. Special topic: critical minerals mining (e.g., use, supply chain requirements, and import/export issues)

VIII. **<u>Legal Issues in Wind and Solar:</u> This module will cover key legal cases related to solar and wind technology, including overlapping legal issues arising for these clean energy sources.**

A. State preemption laws and local ordinances
B. Solar: Commercial, community, and residential net metering
    i. Contract and fraud
    ii. Local environmental and economic impacts
    iii. Health and safety
C. Wind
    i. Onshore wind (e.g., local environmental and economic impacts, nuisance, property issues)
    ii. Offshore wind (e.g., local environmental and economic impacts, nuisance, leasing and sales, CZMA and federal consistency review)

IX. **<u>Nuclear Power:</u> This combined technical and legal module discusses nuclear power, including its unique history and regulation, along with the possible role for nuclear power in the energy transition.**

A. Science, technology, economics, and impacts of nuclear power (e.g., clean energy, stable supply of electricity, cost, public perception)
    i. Approaches and technologies for nuclear power (e.g., refitting of old plants, small modular reactors, other potential technologies like fusion)
B. Special legal and regulatory elements in nuclear power (e.g., U.S. Nuclear Regulatory Commission, etc.)
C. Nuclear power and the law (e.g., liability, permitting, safety and fuel storage)

X. **<u>Other Energy Sources:</u> This combined technical and legal module discusses other existing energy sources, including emerging technologies and what role they may play in the energy transition and related legal issues.**

A. Science, technology, economics, and impacts of hydropower (e.g., hydropower's historical importance as a clean energy source and its future)
B. Science, technology, economics, and impacts of biofuels (e.g., crop type, farming methods, replenishment rate, and GHG impacts)
C. Science, technology, economics, and impacts of hydrogen (e.g., colors, storage potential, emissions, and readiness)

D. Other clean energy sources and their readiness (e.g., geothermal, direct solar thermal, tidal or wave energy)
E. Legal issues in other energy sources:
    i. Hydropower (e.g., dam decommissioning, species, water rights)
    ii. Biofuels (e.g., Renewable Fuel Standards, state fuels standards)
    iii. Hydrogen, geothermal, direct solar thermal, and other alternative energy sources

Part Three: Moving Energy

XI. **Moving Energy: This module focuses on moving energy from where it is produced to where it is consumed. This will highlight the numerous pathways energy takes across the country and explore the trends moving forward.**
    A. The need to move energy for residential, commercial, industrial, and transportation usage, depending on the source
    B. The methods, economics, and impacts of moving energy
        i. Transporting fossil fuels (pipelines, ships, trains)
        ii. Transmitting electricity generated from all sources (including the basics of "The Grid" and reliability)
        iii. Trends in moving energy, including growing demand to move and store more electricity and transition to more distributed energy sources
    C. The methods, economics, and impacts of storing energy (e.g., batteries, hydrogen, others)
    D. Special Topic: CO_2 Pipelines (e.g. moving captured CO_2 for storage)

XII. **Legal Issues in Moving Energy: The legal implications of moving energy, including takings, eminent domain, and liability, and how a shift towards more renewable energy sources will increase the frequency of these cases.**
    A. Transporting fossil fuels (pipelines, ships, trains)
    B. Governing the Grid: regional transmission organizations
        i. Building transmission lines: eminent domain and interstate/state-level siting
    C. Centralized v. distributed energy sources (e.g., microgrids, energy resilience initiatives)
    D. Energy storage (e.g., next generation batteries and hydrogen)