

The Northeast: Reading a Regional Energy System

How It Works or Fails · The Northeast · Grades 11–12 / First-Year College

Name _____ Date _____ Class _____

How to use this sheet. A ride-alongside worksheet: keep the interactive Northeast map open beside you (the East Coast / PADD 1, Maine to Virginia).

The map	Open the Northeast Fuel Flow Map full-screen — the PADD 1 energy flows down the East Coast (NY, PA, NJ, New England, MD, VA, and the rest).
Lens row	Check the power source buttons — natural gas (and the constrained pipelines), nuclear, offshore wind, imported hydro, heating oil / products, and the little coal that is left.
State filter	Switch between New York, New England, Pennsylvania, Virginia, and Maine to isolate one piece of the system.
Emissions	The button opens the emissions app — AIR QUALITY / GHG / SINKS, on EPA/EIA data. Note heating fuels and imported power, not just in-region plants.
Vulnerability	Press VULNERABILITY and open a card. Assets are scored for their weaknesses or strengths.
Scenarios	The story-row buttons run a real Northeast event on today's infrastructure. Three of them — Colonial Ransomware, Winter Storm Elliott, Superstorm Sandy — carry their own supply×demand curves.

Part 1 · The mix — the consumer that imports everything

This is the country's biggest energy consumer, and it makes little of its own — it imports gas, hydro, and products, and is building offshore wind fast.

1.1 Press each power source button and watch the bubbles from the year 2000 to today. Which source generates the most power in this region, and which is barely there at all? Which is growing fastest, and which is disappearing?

1.2 Marcellus gas — some of the cheapest in the country — sits right next door in Pennsylvania, yet New England imports LNG and burns oil in deep winter. What does this map show is in the way?

1.3 Open a plant on the NUCLEAR, COAL and GAS buttons and find how long each could keep running if nothing were delivered to it. Rank the three. Which one can switch fuels instead, and why does this region need that?

Part 2 · The tradeoff — what it costs and what it buys

Open the emissions app (AIR QUALITY / GHG / SINKS). This region has cleaned up its power fleet — little coal, lots of gas, nuclear, hydro imports, and now offshore wind.

2.1 In GHG, compare the sectors from the year 2000 to today. Which sector is biggest here, and is that what you expected from a region's energy map? What has happened to Electric Power over those years?

2.2 In AIR QUALITY, find Heating (res/comm) and compare it across two or three pollutants. Where does heating rank, and what does that say about how this region keeps warm?

2.3 Open the SINKS view. The Northeast is one of the most forested regions in the country — what do its forests do to the region's net carbon, and roughly how much do they offset?

Part 3 · The weak point — a vulnerability judgment that can change

Press VULNERABILITY and open a card.

Pick ONE asset to read (different groups take different assets):

- Transco
- The Québec hydro imports (CHPE / Highgate)
- Coastal Virginia Wind
- Indian Point
- Colonial Pipeline

3.1 Open your asset's card and read its evidence. In your own words, what is this asset's real vulnerability?

3.2 A rating is a snapshot of today's conditions. Think about changes that would make your asset less vulnerable and more secure. Name one, and say why it would work.

Part 4 · The shock — run a scenario

Each scenario runs a real event on today's infrastructure. Three of the five move a supply&demand window of their own; the others are read from the map.

Pick ONE scenario to run (different groups take different shocks):

- Winter Storm Elliott — an Arctic blast spikes heating demand as gas plants freeze and can't get fuel (Dec 2022)
- Colonial Ransomware — the Gulf-to-East-Coast products pipeline goes dark (May 2021)
- Data Center Shed — a record heat peak forces a choice over who keeps the power
- Superstorm Sandy — a 14-ft harbor surge floods the refineries, terminals and grid; nuclear units scram (Oct 2012)
- East Coast Tsunami — a continental-slope landslide sends a wave onto the coast, hitting nuclear, terminals and the pipeline

4.1 Run your scenario. What does it hit FIRST, and does it have an easy backup? Describe the cascade (downstream or secondary effects).

4.2 Run Colonial Ransomware, Winter Storm Elliott, Superstorm Sandy or the East-Coast Tsunami. Each opens its own supply×demand reading when the scene arms. Colonial and Sandy read in barrels a day against a Brent price; Elliott reads in Bcf/d, with no price axis; the Tsunami opens two — one for crude and one for fuel. Which curve moves, and what happens? Then say what actually cleared the shortage in the one you picked.

Part 5 · Judgment — defend a claim

Use evidence from at least two earlier parts. There is no single right answer.

5.1 The Northeast consumes more energy than almost any region and makes little of its own — it imports gas it cannot always pipe in fast enough, Canadian hydro on one grid, and products up one pipeline, while betting its future on offshore wind. How can the Northeast lessen its energy vulnerabilities? What investments could ameliorate (help) the Northeast lessen its dependence? Defend your answer with specific evidence from at least two parts (a state's role, an emissions or benefit reading, a vulnerability judgment, or a scenario signature).

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