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Alaska: Reading an Energy System

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

Name _____ Date _____ Class _____

How to use this sheet. A ride-alongside worksheet: keep the interactive Alaska map open beside you. This guide is about reading a region's whole energy system — its lenses, emissions app, risk scores, and scenarios — not tracing one fuel. The thesis underneath every part: a region's energy mix is a set of bets — each source earns its place with a real strength, and in Alaska every bet is shaped by isolation.

The map	Open the Alaska Fuel Flow Map full-screen. Unlike the Lower 48, Alaska is not one grid — it is a set of isolated systems with no tie to the outside.
Lens row	Crude/oil, natural gas (with a Gasline fork), coal, hydro, wind. (Notice what is *not* there.)
Region filter	Switch between the Railbelt, Interior, Southeast, the North Slope, and rural Alaska — each is a different energy world.
Emissions	The button opens the emissions app — EPA/EIA/state data on who emits what, plus Fires and carbon SINKS.
Vulnerability	Press VULNERABILITY and open a card. It carries the evidence behind the risk — what the asset depends on and what could take it down. Read it as a judgment that can move, not a fixed grade.
Scenarios	The story-row buttons run a real Alaska event on today's infrastructure and move the supply×demand (CURVES) window.

Part 1 · The mix — what runs each Alaska

There is no single Alaskan grid. Sweep the lenses, then use the region filter. The thesis starts here: a region's energy mix is a set of bets — and in Alaska the bet is shaped by isolation.

Pick ONE region to characterize (different groups take different regions):

- ■ Railbelt (Anchorage–Fairbanks grid)
- ■ Southeast (Juneau)
- ■ Interior (Fairbanks)
- ■ North Slope
- ■ Rural / off-road villages

1.1 For your region, sweep the lenses and name what runs it. Give one number or fact from the map. How is your chosen region powered differently from the others?

1.2 The lens row has crude, gas, coal, hydro and wind — but no **nuclear**, **geothermal** or **solar**, which other maps carry. What do those absences, plus Alaska's isolation, tell you about how energy choices get made here?

1.3 Every energy source here earns its place with a real strength. Pick TWO and name what each is genuinely good *at* for Alaska specifically.

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

Open the emissions button — the EPA/EIA/state app: source → pollutant → harm, plus Fires and carbon SINKS.

2.1 Open the electric-power breakout (Coal, Gas, Oil, Biomass). Where do most of Alaska's power emissions come from — and how does that differ from a Lower-48 grid?

2.2 Switch to a fine-particulate / air-toxics or the SINKS view. What non-power force dominates Alaska's air and carbon picture?

2.3 A Southeast town runs on hydro that emits nothing; a road-less village runs on diesel that emits and must be barged in. Yet the village burns diesel anyway. What does diesel *buy* that hydro or wind can't — and why is it worth the cost and the carbon?

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

Press VULNERABILITY and open a card. A score here is not a fixed grade — it is a judgment about how this asset can fail, built from the evidence on the card, and it moves: a changed condition, or new research, can legitimately raise or lower it.

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

- TAPS — one 800-mile line across the Denali Fault
- Cook Inlet gas — aging platforms, falling deliverability, ringed by volcanoes
- Valdez Marine Terminal — the single marine outlet for all TAPS crude
- Railbelt gas-fired power — one basin keeps Southcentral warm
- Prudhoe Bay — the declining supergiant that fills the line
- North Pole refinery — the Interior's thin fuel supply

3.1 Open your asset's card and read its evidence — what it depends on, what has already happened to it, what its failure would take down. In your own words, what is this asset's real vulnerability: where and how does it fail? Cite the card.

3.2 A rating is a snapshot of today's conditions. Name one specific change that would make your asset MORE vulnerable and one that would make it LESS — and say why. Think about what the risk actually rides on: a declining or refilled field, generation diversity, a second fuel source, a seismic event, a cold-weather demand spike.

3.3 (Optional — needs outside research.) Now judge the map's rating for your asset: is it well-supported, understated, or overstated? Take a position and back it with evidence beyond the card — current TAPS throughput, a Cook Inlet deliverability report, a state or federal energy assessment. A vulnerability rating is only as current as the evidence behind it.

Part 4 · The shock — run a scenario

Each scenario runs a real Alaska event on today's infrastructure and moves the supply×demand (CURVES) window. Alaska's theme: with no outside grid, a shock here cannot be imported around.

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

- ■ Denali '02 — M7.9 quake ruptures under TAPS
- ■ Great Alaska Quake '64 — M9.2 + tsunami at Valdez
- ■ Redoubt '09 — volcano over Cook Inlet / Drift River
- ■ Cold Snap — gas shortfall, heating emergency
- ■ Nome '12 — village iced in, the Renda fuel run
- ■ COVID '20 — demand collapse

4.1 Run your scenario. Which asset or region does it hit FIRST, and — because Alaska can't import power from a neighbor — what has no backup? Name the cascade.

4.2 Watch the supply×demand CURVES window. Which curve moves, and what happens to price/quantity? What is the one-line signature of your shock?

4.3 Tie it back: what do these Alaska shocks share that a Lower-48 blackout scenario would not?

Part 5 · Judgment — defend a claim

Use evidence from at least two earlier parts. There is no single right answer — the argument is graded, not the side.

5.1 Alaska's energy system rides on single lines with no backup and no outside grid — one pipeline (TAPS), one gas basin (Cook Inlet), one terminal (Valdez) — yet it also supplies nationally important North Slope oil and keeps isolated communities alive through brutal winters. **Is Alaska's islanded, concentrated energy system a manageable reality or a national vulnerability?** Take a position and defend it with specific evidence from at least two parts (a regional mix, an emissions/benefit reading, a vulnerability score, or a scenario signature).