

The Gulf Coast: Reading a Regional Energy System

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

Name _____ Date _____ Class _____

How to use this sheet. A ride-alongside worksheet: keep the interactive Gulf Coast map open beside you. This guide is about reading a region's whole energy system — its lenses, emissions app, vulnerability cards, and scenarios — not tracing one fuel. The thesis underneath every part: a region's energy system is a set of bets — and the Gulf's bet is scale, running the country's petroleum supply chain end to end, from crude landed to fuel shipped out.

The map	Open the Gulf Coast Fuel Flow Map full-screen — the crude supply, refining, and distribution system across TX, LA, OK and the Permian, plus offshore federal waters.
Lens row	Sweep the views — crude, refining, petrochemicals, products/distribution, LNG and exports, gas, and the emerging offshore wind. It is a petroleum system first.
State filter	Switch between Texas, Louisiana, Oklahoma, and the Permian (NM / West TX) to isolate one piece of the chain.
Emissions	The button opens the emissions app — AIR QUALITY / GHG / SINKS, on EPA/EIA data. Note the refining-corridor air toxics and the natural-gas system, not just power.
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 re-run a real Gulf event — Katrina + Rita, Harvey, Uri, the Colonial ransomware — on today's infrastructure and move the supply×demand (CURVES) window.

Part 1 · The mix — the petroleum heartland

Sweep the views, then use the state filter. The Gulf runs the country's petroleum chain end to end — crude landed, refined, and shipped out. The thesis starts here: a region's energy system is a set of bets, and the Gulf's bet is scale.

Pick ONE state or zone to characterize (different groups take different ones):

- Texas — the refining coast, ERCOT power, Permian crude next door
- Louisiana — refining + petrochemicals, LOOP, Henry Hub gas
- Oklahoma — Cushing, the crude crossroads
- The Permian (NM / West TX) — the crude that feeds the coast
- Offshore federal waters — Gulf production and LOOP

1.1 For your state or zone, sweep the views and name what it contributes to the petroleum chain — crude, refining, storage, gas, or offshore production — with one number or fact from the map.

1.2 The Gulf carries the nation's largest refining and petrochemical concentration and its main crude and products distribution. Why HERE? Point to what the region physically has that stacks the deck.

1.3 Sweep the region's electricity sources on the map and sort them into **firm** (runs day and night) versus **intermittent** — what runs the grid now, and what is growing?

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

Open the emissions app (AIR QUALITY / GHG / SINKS). The Gulf's emissions are not mainly the power grid — they are industry: refining, petrochemicals, and the natural-gas system that produce the fuel, plastics, and exports the country runs on.

2.1 Open the electric-power breakout (Coal, Gas, Biomass). Where do most of the Gulf's power emissions come from?

2.2 Switch to a fine-particulate / air-toxics view (benzene / PM). Where do these concentrate?

2.3 The Gulf's benefit is scale — it fuels national transport, exports, and the petrochemicals in everyday products. What would moderate or cut emissions without shutting the system down?

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):

- LOOP — the only US deepwater port that can take supertankers
- Colonial Pipeline — the single artery carrying fuel to the East Coast
- Port Arthur / Lake Charles — the biggest refining concentration, in the storm corridor
- Cushing (OK) — the world's largest crude tank farm and the WTI price point
- Henry Hub (LA) — the national gas benchmark
- W A Parish / the ERCOT gas fleet — the power that froze in Uri

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 hurricane season, a second route or port, a cyber hardening, a winterization program, a new pipeline, an injection-seismic rule.

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 — a recent hurricane-season outlook, a FERC/NERC winterization report, a pipeline or refinery filing, an Oklahoma seismicity update. A vulnerability rating is only as current as the evidence behind it.

Part 4 · The shock — run a scenario

Each scenario re-runs a real Gulf event on today's infrastructure and moves the supply×demand (CURVES) window. The Gulf theme: a scale system concentrated in a hurricane fairway, with a gas grid on an electrical island.

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

- Katrina + Rita '05 — the twin storms that hit crude and refining at once
- Hurricane Harvey '17 — the flood that drowned the refining coast
- Winter Storm Uri '21 — the freeze that broke the gas fleet
- Colonial Ransomware '21 — the cyberattack that darkened the East Coast artery

4.1 Run your scenario. What does it hit FIRST, and — because the Gulf concentrates so much in one corridor — what has no easy backup? Name the cascade.

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

4.3 Tie it back: what do these Gulf shocks share that, say, a Pacific Northwest drought 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 The Gulf Coast runs the country's petroleum supply chain — the largest refining, petrochemical, and export machine on the continent — yet it concentrates that role in a hurricane fairway and, through ERCOT, on an electrical island proven to freeze. **The Gulf's concentration is a clear national strength that delivers fuel to other regions: how can that concentration also be a vulnerability? Explain** Take a position and defend it with specific evidence from at least two parts (a state/zone role, an emissions or benefit reading, a vulnerability judgment, or a scenario signature).

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