

Power, Water & the Colorado

The Southwest Energy System · Grades 11–12 / First-Year College

Name _____ Date _____ Class _____

How to use this sheet. A ride-alongside worksheet: keep the interactive Southwest map open beside you. It moves from the region's whole power mix, to the Colorado River dams, to a real and current case — Lake Powell and Lake Mead approaching the levels where the turbines stop. The thesis underneath hydro power in the Southwest: energy and water are the same system.

The map	Open the Southwest Fuel Flow Map full-screen — AZ, NV, NM and the California ties. It carries the widest energy mix in the country.
Lens row	Solar, wind, nuclear, natural gas, coal, hydro, geothermal — the SW has them all. Start on solar .
Year slider	Play or drag it to watch solar and batteries grow, coal retire, and the Colorado reservoirs fall.
Hover cards	Hover Palo Verde, a solar field, or the Glen Canyon and Hoover dams to read the detail.
Scenario	The Powell-Mead button (hydro view) runs the live Lake Powell / Lake Mead case — used in Part 3.

Part 1 · The mix — what powers the Southwest

The SW carries every major source at once. Sweep the lenses. The thesis: a region's energy mix is a set of bets — each source earns its place with a real strength.

Pick ONE source to characterize (different groups take different sources):

- Solar (the desert's midday flood)
- Palo Verde nuclear (largest US plant)
- Natural gas (the evening backfill)
- Colorado River hydro (Glen Canyon + Hoover)
- Coal (the retiring workhorse)
- Wind

1.1 For your source, hover its assets and name its strength — what is it genuinely good *at* here — with one number or fact from the map.

1.2 Watch a summer day in the solar lens, top right graph window: generation floods at midday but demand peaks in the evening. What must the grid do at sundown, and which sources on this map

do it?

1.3 Palo Verde nuclear plant sits in the desert with no lake, river, or ocean to cool it — it runs on treated city wastewater. What does that one detail reveal about the master constraint on much of Southwestern energy?

1.4 Which energy systems escape this constraint (water availability)? Does this drive their recent build-out?

Part 2 · Hydro — power that is also water

Switch to the hydro lens. The Colorado River dams are not ordinary power plants — they are the region's plumbing. Hover Glen Canyon and Hoover.

2.1 Read the two big dams. Glen Canyon (Lake Powell) and Hoover (Lake Mead) — how much power does each make, and who receives it?

2.2 The map says Glen Canyon and Hoover are reservoir-managed for water delivery, not melt-following run-of-river (a run-of-river dam has little or no storage behind it, so its power rises and falls with the river's flow as it arrives, instead of being held back and released on a schedule). What does the turbines' output actually depend on — and how is that different from a river dam that follows the snowmelt?

- 2.3** The same water spins the turbines, fills taps in Phoenix and Los Angeles, and irrigates farms. Why does that coupling make Colorado hydro riskier than its megawatts alone suggest?
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Part 3 · The live case — Glen Canyon & Lake Mead

*This is not hypothetical. The map cites Reclamation projecting Lake Powell could reach minimum power pool — 3,490 ft — possibly by August 2026 without intervention. Run the **Powell-Mead** scenario (hydro view) and watch carefully.*

- 3.1** Run the scenario. When Lake Powell drops below 3,490 ft (minimum power pool), what happens to Glen Canyon's turbines — how many, how much power, and to whom?
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- 3.2** Lake Powell sits *upstream* of Lake Mead. The map says 'Powell's crisis is Mead's forecast.' Trace the cascade downstream: what happens to Hoover, and then to the water that reaches Southern California?
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- 3.3** The map distinguishes **minimum power pool** (turbines stop) from **dead pool** (Powell 3,370 ft / Mead 895 ft), where water can no longer pass the dam at all. Why does that distinction matter for the cities, farms, and Mexico downstream?
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Part 4 · 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.

- 4.1** The Colorado River dams make power AND deliver water to tens of millions of people, farms, and ~50 tribes. As the reservoirs fall toward levels the map ties to 2026, **should we think of the Colorado as a power system that also moves water, or a water system that also makes**

power — and what does the coupling mean for how the Southwest should prepare? Take a position and defend it with specific evidence from at least two parts.

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