Strategic Environmental and Operational Impact Assessment: Benchmarking the Proposed El Paso Meta Data Center Against Arid-Region Case Studies

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Executive Summary

The proposed construction of a hyperscale Meta data center in El Paso, Texas, represents a pivotal moment in the region's economic and industrial development. While the project promises significant investment and technological integration, it simultaneously introduces profound challenges to the local resource metabolism, specifically regarding water security, grid stability, air quality, and community noise standards. This report provides an exhaustive evaluation of the proposed facility, benchmarking its potential impacts against a decade of operational data from comparable data centers in arid environments—specifically Meta's facility

in Los Lunas, New Mexico; Google's operations in Storey County, Nevada; and the saturated data center market of the Phoenix, Arizona metropolitan area.

Our analysis reveals a critical dichotomy between corporate sustainability narratives and local operational realities. While parent companies espouse global "Net Zero" and "Water Positive" goals, the physical exigencies of operating gigawatt-scale infrastructure in high-heat, water-stressed deserts frequently necessitate trade-offs that disadvantage host communities. The investigation highlights that the transition from water-intensive evaporative cooling to energy-intensive air cooling—often presented as a panacea for water conservation—invariably precipitates a spike in local power demand. In the specific context of El Paso, this trade-off is manifesting in the proposed construction of the 366 MW McCloud natural gas plant, a development that stands in direct contradiction to the region's decarbonization ambitions and threatens to exacerbate ozone levels in a federally designated non-attainment zone.

Furthermore, a comparative analysis of socio-economic outcomes in New Mexico and Louisiana suggests that job creation figures are systematically overstated during the permitting phase, with permanent operational roles often totaling less than 20% of peak construction employment. The report identifies a systemic lack of binding regulatory oversight in standard incentive agreements, leaving municipalities with limited recourse when environmental or economic promises fail to materialize. To inoculate the El Paso project against the pitfalls observed in Chandler, Arizona (intrusive noise pollution) and Valencia County, New Mexico (aquifer depletion disputes), this report delineates a proactive mitigation framework. This includes binding mandates for the use of reclaimed ("purple pipe") water, the implementation of strict, objective decibel limits measured at the facility's property boundary, and the inclusion of "clawback" provisions in tax abatement agreements tied to verifiable environmental and labor benchmarks.

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1. Introduction: The El Paso Context and the Hyperscale Challenge

The integration of hyperscale data centers into municipal infrastructure is not merely a real estate transaction; it constitutes a profound alteration of a region's resource consumption profile. For El Paso, a city defined by its Chihuahuan Desert climate, finite aquifers, and a uniquely isolated energy grid, the proposed Meta facility acts as a massive new physiological burden on a delicate system.

1.1 The Convergence of Climate and Computation

Data centers function as engines that convert electricity into computational output and waste heat. In temperate climates, managing this waste heat is trivial. In arid environments, where ambient temperatures frequently exceed 100°F (38°C), the thermodynamics of cooling become the central operational challenge. The "desert penalty"—the efficiency loss suffered by cooling systems in high heat—forces operators to choose between consuming vast quantities of water (evaporative cooling) or vast quantities of electricity (air cooling).

El Paso's geographic situation is further complicated by the "Project Jupiter" development in Santa Teresa, New Mexico, just miles from the city limits.[1] The cumulative impact of these clustered facilities creates a regional "resource sink" that individual environmental impact statements frequently fail to capture. The combined load of Meta's El Paso facility and the 1-gigawatt Project Jupiter threatens to consume the region's entire electrical reserve margin and accelerate the depletion of the shared Mesilla and Hueco Bolson aquifers.

1.2 The "Shell Game" of Resource Accounting

A recurring theme across the reviewed case studies is the disconnect between corporate sustainability accounting and local physical reality. "Water Positivity" is often achieved through restoration projects in distant parts of a watershed, which, while ecologically beneficial in the aggregate, do not physically replenish the local aquifer from which a facility draws.[2] Similarly, "100% Renewable Energy" claims frequently rely on Renewable Energy Certificates (RECs) or virtual power purchase agreements (VPPAs). These instruments add green energy to the global grid but do not alter the physics of the local grid, which may require new fossil fuel generation to maintain baseload stability during the intermittent generation windows of solar and wind assets.[4]

This report aims to pierce the veil of these aggregate metrics, focusing instead on the tangible, localized impacts of hyperscale operations. By examining the operational history of similar facilities, we can forecast the likely trajectory of the El Paso project and identify the specific regulatory and engineering interventions required to protect the community's long-term interests.

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2. Water Resource Management in Arid Environments: The Zero-Sum Game

Water remains the most contentious variable in desert data center operations. The industry standard has historically favored evaporative cooling due to its superior energy efficiency, but in water-scarce regions, this model is increasingly untenable. The El Paso project's viability hinges on how it navigates the tension between cooling efficiency and aquifer preservation.

2.1 The "Closed-Loop" Myth vs. Thermodynamic Reality

Meta has publicly described the El Paso facility as utilizing a "closed-loop" cooling system, a term that implies zero water consumption to the layperson. However, a rigorous engineering analysis reveals a critical linguistic deception that obscures the facility's true hydrological impact.

2.1.1 Internal vs. External Loops: The Engineering Sleight of Hand

Modern hyperscale cooling architectures consist of two distinct circuits:

- **The Internal Loop (Technology Cooling System - TCS):** This loop circulates fluid directly over the server chips or through rear-door heat exchangers. This loop is indeed "closed," hermetically sealed, and consumes no water.
- **The External Loop (Facilities Cooling System - FCS):** This loop rejects the heat collected by the internal loop into the outside atmosphere. This is where the consumption occurs.[47]

The discrepancy lies in the fact that while the *internal* loop is closed, the *external* loop typically relies on **Indirect Evaporative Cooling** (likely the StatePoint Liquid Cooling system co-developed by Meta). This system uses a membrane to evaporate water into the air stream to reject heat.[47]

The Evidence: Meta has secured a permit for **1.5 million gallons per day (MGD)** of water withdrawal for the El Paso site.[2] If the facility were truly a "closed-loop" system in the thermodynamic sense (i.e., using dry coolers or chillers), water consumption would be negligible—limited only to initial pipe filling and bathroom use. The necessity of a 1.5 MGD permit confirms that the facility is designed to evaporate massive volumes of water to the atmosphere during peak thermal loads. The "closed-loop" terminology refers only to the fact that the process water does not *touch* the air directly (preventing contamination), not that it isn't consumed.

2.2 The "Water Positive" Metric vs. Local Hydrology

Meta's corporate sustainability goal to be "Water Positive by 2030" involves restoring more water than is consumed by its operations. However, the mechanism of this restoration warrants critical scrutiny. In the Rio Grande basin, Meta funds projects such as the Comanche Creek Restoration, which removes invasive species and restores wetlands to increase watershed yield.[2]

While these projects improve general watershed health, they often occur hundreds of miles upstream or in hydrologically distinct sub-basins. Residents in Los Lunas have correctly identified a fundamental disconnect: "Water returned to the watershed is not the same as water available to Los Lunas for drinking".[3] The physical water withdrawn from the local aquifer for data center cooling is lost to evaporation and atmospheric transport; the "restored" water is a credit accounting mechanism that does not physically recharge the specific aquifer being depleted by the facility.

Strategic Recommendation for El Paso:

- **Localized Restoration Mandate:** Any "water positive" claims must be substantiated by restoration projects that recharge the *specific* Hueco Bolson or Mesilla Bolson aquifers utilized by the city, rather than general Rio Grande basin credits that may benefit downstream or upstream users but leave El Paso in a deficit.
- **Prohibition of Potable Water for Cooling:** Following the precedent set by municipalities like Santa Clara, California, and Chandler, Arizona, El Paso should mandate the use of reclaimed wastewater ("purple pipe") for all industrial cooling needs.[8] This effectively decouples data center growth from the potable water supply.

2.3 The Impact of AI Chip Design on Water Intensity

The industry-wide shift toward Artificial Intelligence (AI) introduces a new variable: higher thermal density. AI chips (GPUs and TPUs) run significantly hotter than traditional CPUs, often requiring liquid cooling directly to the chip.[10] While liquid cooling loops are closed systems that recycle the heat-transfer fluid, the heat removed from the chips must still be rejected to the atmosphere. This is typically achieved via a secondary loop that may use evaporative cooling towers to lower the temperature of the coolant.

Research indicates that AI-focused data centers can have power densities of 50kW to 100kW per rack, compared to 5-10kW for traditional servers.[12] This intensification suggests that as the El Paso facility upgrades to host future AI hardware, its water profile could shift dramatically. Consequently, regulatory agreements must include flexible caps on water intensity (Liters per kWh) rather than static annual withdrawal limits, ensuring that the city retains leverage as technology evolves.

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3. Energy Grid Reliability and Carbon Footprint: The Hidden Fossil Fuel Cost

The relationship between water and energy in data center operations is reciprocal: saving water via air cooling inevitably requires more energy to run chillers and fans. In El Paso, this trade-off has manifested in a controversial proposal for new fossil fuel generation, revealing the limitations of the current grid infrastructure.

3.1 The McCloud Natural Gas Plant Controversy

Perhaps the most significant finding relevant to the El Paso project is the revelation that El Paso Electric (EPE) proposes building a 366 MW natural gas plant (the McCloud facility) specifically to power the Meta data center.[4] This proposal fundamentally undermines the project's sustainability narrative.

- **The Mechanism:** The plant would not rely on a single large turbine but would instead consist of an array of 813 modular natural gas generators, likely supplied by Enchanted Rock.[5] These units are designed for quick deployment and rapid start-up capabilities.
- **The "Bridge" Strategy:** EPE argues this is a "bridge" solution. Under the proposal, Meta

would pay for the construction and operation of the plant for an initial five-year period, during which the facility would be electrically disconnected from the broader grid. After this five-year "bridge," the plant would be integrated into the general ratepayer base.[5]

- **The Contradiction:** This proposal explicitly contradicts El Paso's climate goals and Meta's public renewable energy commitments. It reveals the physical limitations of the current grid: solar and wind are intermittent resources. Without massive, utility-scale battery storage (which EPE admits is land-constrained and expensive), 24/7 hyperscale operations require firm baseload power.[13]

Comparative Insight: In Northern Virginia, the global epicenter of data centers, grid constraints have forced operators to rely on diesel backup generators for extended durations, essentially turning data centers into stationary fossil fuel power plants during peak demand.[15] El Paso's gas plant proposal appears to be a formalized version of this "shadow grid," institutionalizing fossil fuel dependence to support "green" technology.

3.2 24/7 Renewable Matching: The Feasibility Gap

Corporate promises of "100% Renewable Energy" usually rely on annual matching—producing enough solar energy during the day to mathematically cover night-time usage. However, the grid must balance supply and demand every second. "24/7 Hourly Matching" is the emerging gold standard (championed by Google and Microsoft in pilots in Sweden) [16], ensuring green power is available *at the specific time of use*.

Currently, El Paso Electric's renewable capacity is insufficient for true 24/7 matching for a load of this magnitude.

- **Solar Availability:** El Paso has excellent solar potential (ranking 3rd in Texas cities) [18], but solar generation vanishes at night when data centers continue to run at peak AI training loads.
- **Storage Deficit:** While EPE plans to add solar plus storage (e.g., 50 MW battery storage at Buena Vista) [19], the Meta load alone (potentially 150-200 MW initially, scaling to 1GW) dwarfs current storage projects.

Operational Risk: Without a binding requirement for 24/7 matching utilizing *local* storage assets, the El Paso facility will effectively run on natural gas every night, regardless of how many solar credits Meta purchases from West Texas wind farms.

3.3 Regional Grid Strain: The "Project Jupiter" Multiplier

The challenge is compounded by the "Project Jupiter" facility (likely involving Oracle and OpenAI) in Santa Teresa, New Mexico.[20] Situated just across the state line, this massive project draws from the same regional energy ecosystem. The cumulative load of Meta (El Paso) and Project Jupiter (NM) threatens to consume the region's entire reserve margin.

- **Load Forecasting Failure:** Utilities consistently underestimate the speed of data center growth. Research into grid strategies shows that 5-year load growth forecasts have jumped six-fold in just three years due to data center demand.[22]
- **Ratepayer Impact:** If new transmission lines or generation assets like the McCloud plant are rolled into the rate base after the "bridge period," El Paso residents could effectively subsidize the infrastructure costs of these private entities through higher monthly bills.[23]

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4. Air Quality and Environmental Health: The Point-Source Pollution Problem

The operation of a hyperscale data center introduces significant point-source pollution, primarily from the backup power generation required to ensure 99.999% uptime.

4.1 The Hidden Diesel/Gas Giant

To guarantee continuous operation during grid outages, data centers install massive arrays of backup generators.

- **The Virginia Warning:** In Northern Virginia, the concentration of data centers has led to a situation where the industry now emits more Nitrogen Oxides (NOx) and particulate matter than some utility-scale power plants.[15]
- **El Paso Context:** El Paso is already designated as a non-attainment area for ozone standards by the EPA.[25] Ozone is formed when NOx and Volatile Organic Compounds (VOCs) react in the presence of sunlight and heat—conditions that are abundant in El Paso. Adding the McCloud plant (natural gas) and on-site backup generators will inevitably

exacerbate ground-level ozone formation, potentially triggering federal penalties or health crises.

4.2 Technology Comparison: Diesel vs. Modular Gas

The proposal to use Enchanted Rock modular gas generators [13] offers a technological trade-off that requires careful evaluation:

- **Emissions Profile:** Modular natural gas generators generally emit up to 99% less particulate matter and significantly lower NOx compared to traditional Tier 4 diesel generators.[26] From a strict air quality perspective, this is a preferable technology to diesel.
- **Carbon Lock-in:** However, installing natural gas infrastructure locks the facility into fossil fuel usage for decades. Diesel tanks are distinct units that can be removed and replaced with batteries as technology matures; piped natural gas infrastructure is a permanent capital investment that incentivizes continued fossil fuel use.

Regulatory Gap: Current EPA and state permits often treat these generators as "emergency use only" assets, allowing them to bypass strict emissions controls applicable to power plants. However, "demand response" programs increasingly call on these generators to run during peak grid stress (not just outages) for economic profit, effectively turning them into peaker plants operating far more frequently than true emergencies would dictate.[28]

Mitigation Recommendation: The El Paso facility should be contractually prohibited from participating in fossil-fuel-based demand response programs that run backup generators for profit. Instead, demand response should be achieved through "load shedding"—throttling non-essential compute tasks during peak grid stress.

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5. Noise Pollution and Community Coexistence

Noise is often the most immediate, tangible nuisance for residents living in proximity to data centers. The constant low-frequency hum of cooling fans and the roar of generator testing can degrade quality of life miles from the source.

5.1 The "Data Center Hum": Lessons from Arizona

Case studies from Chandler and Mesa, Arizona, highlight the severity of this issue.

- **The Source:** Rooftop air handling units (AHUs) and evaporative cooling towers generate noise levels of 85-100 dBA.[29]
- **Propagation:** Low-frequency noise (the "hum") travels further and penetrates walls better than high-frequency sound. Residents describe it as a "constant drone" or "buzz" that is inescapable, even indoors.[30]
- **Community Reaction:** In Chandler, resident outcry over noise contributed to the rejection of new data center proposals and the imposition of strict zoning updates.[30]

5.2 Regulatory Failures and Successes

Phoenix recently updated its zoning ordinance to strictly limit data center noise to **55 dB (day) / 45 dB (night)** measured at the property boundary of residential zones.[33]

- **El Paso's Current Code:** Existing El Paso noise ordinances typically set limits around 50-55 dB for residential zones.[34] However, enforcement is often reactive and relies on "reasonable sensibility" standards, which are subjective and difficult to enforce in court.[35]
- **The Loophole:** Many ordinances measure noise at the *receiving* property line. Data centers often purchase buffer land to dissipate sound. However, atmospheric conditions (such as thermal inversions common in desert winters) can refract sound downward, allowing it to bypass buffer zones and affect distant neighborhoods.

Proactive Engineering Solution: To avoid the conflicts seen in Arizona, the El Paso facility must incorporate specific design features:

1. **Acoustic Louvers & Baffles:** Mandatory installation on all intake/exhaust ports.[36]
2. **Encapsulated Generators:** Sound-attenuating enclosures for all backup units are non-negotiable near residential areas.
3. **Strict Decibel Caps:** A strict, objectively measurable limit (e.g., 45 dBA) measured at the *data center's* property line, rather than the residential boundary. This accounts for future residential development that may encroach on the industrial zone.

Table 2 compares noise ordinance thresholds, illustrating the need for stricter standards.

Jurisdiction	Residential Day Limit	Residential Night Limit	Measurement Point	Source
Phoenix, AZ	55 dBA	45 dBA	Property Line	[33]
El Paso, TX (Current)	55 dBA	50 dBA	Receiving Property	[34]
El Paso (Proposed/Ideal)	**50 dBA**	**45 dBA**	**Source Property**	*Rec.*

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6. Socio-Economic Impact: Jobs, Incentives, and Governance

The economic argument for data centers typically rests on two pillars: tax revenue and job creation. However, comparative analysis suggests both are frequently overpromised and underdelivered.

6.1 The "Jobless" Recovery

Data centers are capital-intensive, not labor-intensive.

- **Construction vs. Operations:** Meta's Louisiana project promised 300-500 jobs but later revised this figure down to roughly 100 permanent roles.[37] Similarly, the El Paso project expects approximately 100 permanent jobs despite a $1.5 billion capital investment.[4]
- **Cost per Job:** In New York, data center subsidies amounted to **$6.4 million per job** created.[38] This represents an inefficient use of public funds compared to investments in

manufacturing, healthcare, or retail sectors, which generate significantly more employment per dollar of subsidy.

- **Skill Mismatch:** Operational jobs (technicians) require specialized skills. Without a robust local workforce pipeline (like the Western Technical College partnership with El Paso Electric [39]), these high-paying jobs often go to imported labor or transient contractors, leaving locals with only low-wage security or janitorial roles.[40]

6.2 Tax Abatement Risks and the Need for Clawbacks

El Paso has offered up to $110 million in incentives for the project.[4]

- **The Revenue Trap:** States like Texas lose over $1 billion annually in foregone revenue due to data center exemptions and abatements.[41]
- **Clawback Necessity:** "Clawbacks" are legal mechanisms that allow a municipality to recover incentives if specific targets are not met. The advocacy group Good Jobs First recommends a **5% annual clawback** for failure to maintain promised job levels.[43]
- **Success Story:** Virginia is currently conducting detailed cost-benefit analyses to determine if the tax breaks are worth the strain on the grid, a level of scrutiny that El Paso should emulate before finalizing agreements.[44]

Strategic Recommendation: El Paso should implement a "tiered" incentive structure. Full tax abatement should only be granted if the facility meets *both* job targets AND environmental benchmarks (e.g., specific water reuse utilization rates, participation in demand response). If targets are missed, the abatement percentage should be automatically reduced.

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7. Detailed Comparative Case Studies

To fully understand the potential trajectory of the El Paso project, we must examine the operational history of similar facilities in detail.

7.1 Meta Los Lunas, NM: The Direct Analog

Located in the Rio Grande Valley, this facility shares El Paso’s geography, hydrology, and socio-economic context.

- **History:** Announced with promises of economic revitalization, the project quickly faced backlash over its water consumption.
- **The Conflict:** Farmers in Valencia County organized protests, arguing that the data center's water use would exacerbate shortages during drought years.
- **The Outcome:** The pressure worked. Meta was forced to re-engineer its cooling systems, adopting aggressive water reuse technology that dropped usage from 1.5 million gallons/day to roughly 155,000 gallons/day.[3]
- **Lesson for El Paso:** Community vigilance and early intervention can force technological changes that significantly reduce environmental impact. The initial engineering proposal is rarely the final capability; operators will default to the cheapest solution (water) unless forced to adopt the most efficient one (reuse/air).

7.2 Google Storey County, NV: The High Desert Benchmark

- **Context:** Located in the Nevada desert, this facility faces extreme temperature swings and water scarcity.
- **Operational Reality:** Google utilizes air cooling here to minimize water use. However, the facility still consumes 1.5 million gallons annually for humidity control and maintenance.[6] More importantly, the reliance on air cooling results in a higher Power Usage Effectiveness (PUE) ratio, meaning more electricity is required per unit of computing power compared to water-cooled facilities.
- **Lesson for El Paso:** There is no "free lunch." Saving water costs energy. El Paso must decide which resource—water or electricity—is the more critical constraint. Given the proposed gas plant, it appears the region is sacrificing air quality (energy) to save water.

7.3 Phoenix Metro, AZ: The Saturation Point

- **Context:** Phoenix is the second-largest data center market in the US.
- **The Crisis:** The unchecked proliferation of data centers led to a "moratorium" tipping point. Residents in Chandler and Mesa rebelled against the noise and the visual blight of massive, windowless concrete boxes.
- **The Response:** Cities were forced to retroactively tighten zoning laws, impose strict noise ordinances, and demand architectural treatments to make facilities less obtrusive.[45]

- **Lesson for El Paso:** El Paso has the opportunity to enact these "guardrails" *before* saturation occurs. Implementing strict zoning overlays and design standards now will prevent the political and community backlash seen in Arizona.

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8. Strategic Recommendations: A Playbook for El Paso

Based on the synthesis of data from Nevada, Arizona, and New Mexico, the following strategies are proposed to mitigate negative impacts and ensure the Meta facility is a net positive for the region.

8.1 Water: Mandate "Purple Pipe" or Closed-Loop Systems

Explicit Ban on Evaporative Cooling: El Paso must codify a city-wide prohibition on evaporative cooling towers for data centers, requiring air cooling or closed-loop systems only. Meta's corporate "water positive" claims often mask operational reality; Los Lunas secured rights for 1.5M gallons/day initially while touting sustainability (Cloud Sustainability Watch, 2026). Only binding technology mandates, not accounting tricks, protect local aquifers.

- **Action:** Explicitly prohibit the use of potable aquifer water for primary cooling functions. Mandate connection to El Paso Water's reclaimed water system ("purple pipe") for all cooling needs.
- **Benchmark:** Require a Water Usage Effectiveness (WUE) of < 0.3 L/kWh, enforced via real-time metering accessible to city auditors.
- **Technological Mandate:** Require the facility to be "Liquid Ready," designed to accommodate future direct-to-chip liquid cooling technologies that drastically reduce water consumption.

8.2 Energy: Reject the Gas Plant, Demand Solar+Storage

- **Action:** The City of El Paso should maintain its legal intervention in the PUC case regarding the McCloud gas plant.[4] The city should argue that the plant imposes long-term health and financial costs on residents for the benefit of a single private entity.
- **Alternative:** Require Meta to fund a "Virtual Power Plant" (VPP) composed of distributed

residential solar and batteries across El Paso. This would provide grid resilience to the community while offsetting the data center's load, offering a tangible community benefit unlike a dedicated gas plant.

8.3 Noise: Source-Based Enforcement

- **Action:** Adopt a specific Data Center Noise Ordinance.
- **Standard:** Set a limit of **50 dBA daytime / 45 dBA nighttime** measured at the *data center property line*. This prevents the facility from relying on buffer zones that may be developed in the future.
- **Verification:** Require independent acoustic modeling prior to permitting, with mandatory post-construction monitoring paid for by the operator but conducted by a city-appointed auditor.

8.4 Transparency: Binding Citizen Oversight

- **Action:** Establish a **Data Center Oversight Board** comprising city engineers, environmental advocates, and community representatives.[43]
- **Authority:** This board should have the power to review annual compliance reports regarding water use, employment figures, and air emissions.
- **Mechanism:** Link tax abatements directly to the findings of this board. If the facility exceeds water caps or misses local hiring targets, the abatement percentage for that year should be automatically reduced.[43]

9. Conclusion

The Meta data center in El Paso is not merely a construction project; it is a long-term commitment of the region's scarce water and energy resources. While the digital economy offers potential benefits, the research from Nevada, Arizona, and New Mexico demonstrates that without strict, binding, and proactive regulation, the costs—depleted aquifers, smog-choked air, and industrial noise—are socialized locally while the profits are privatized globally.

The "bridge" proposal for the McCloud natural gas plant is a critical inflection point. Accepting it would signal that El Paso is willing to sacrifice its air quality and climate goals for industrial expansion. Rejecting it, and demanding a truly renewable energy solution, would position El

Paso as a leader in sustainable infrastructure. By learning from the "growing pains" of other desert hubs, El Paso can set a new standard for sustainable digital infrastructure, but only if it refuses to compromise on the physical realities of its desert environment.

Detailed Analysis of Research Findings

Table 3: Economic Impact & Job Creation Reality

Project	Investment	Promised Jobs	Actual/Revised Jobs	Subsidy Cost/Job	Source
Meta (Louisiana)	$10 Billion	300-500	~100	N/A	[37]
Stream Data (NY)	$11.2 Billion	N/A	125	$6.4 Million	[38]
Meta (El Paso)	$1.5 Billion	50 (min)	~100 (est)	$1.1 Million*	[4]

**Calculated based on $110M incentive package and 100 estimated jobs.*

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10. Technical Deep Dive: Cooling Technologies in High Ambient Heat

10.1 The Psychrometrics of Desert Cooling

- **Direct Evaporative Cooling:** Efficient in dry heat because the "wet bulb" temperature is significantly lower than the "dry bulb" temperature. However, it consumes massive water.

- **Adiabatic Cooling:** A hybrid approach where air is pre-cooled by misting water *before* it hits the heat exchanger. It uses less water than direct evaporation but still requires a steady supply.
- **Liquid Immersion Cooling:** The future standard for AI. Servers are submerged in dielectric fluid. This is the most energy-efficient but requires entirely new facility designs.
  - *Recommendation:* The El Paso facility should be "Liquid Ready" to future-proof against rising temperatures and water costs.

10.2 The "Heat Island" Effect

Data centers exhaust massive amounts of hot air. In a dense cluster (like the proposed alignment of Project Jupiter and Meta), this can create a localized heat island, raising the ambient temperature for nearby residents and reducing the efficiency of neighboring cooling systems.

- **Mitigation:** White roofing (high albedo), shade structures over parking/generators, and spacing requirements between facilities to allow heat dissipation.

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11. Governance Framework: The "Clawback" Mechanism

To ensure proactive solutions are not just promised but *delivered*, the legal framework of the agreement is paramount.

11.1 Designing a Robust Clawback

Standard incentives often lack teeth. A robust clawback provision should look like this:

- **Trigger:** Annual audit of 1) Full-time local employment (W-2, not 1099), 2) Water usage per MW, 3) Renewable energy matching %.
- **Penalty:** If targets are missed by >10%, the tax abatement for that year is reduced by 25%. If missed by >20%, the abatement is voided for that year.
- **Transparency:** The audit results must be published on a public-facing municipal dashboard.[42]

11.2 Preventing the "LLC Shell" Game

Companies often negotiate under obscure LLC names (e.g., "Greater Kudu LLC" for Meta in NM, "Wurldwide LLC" in El Paso) to avoid public scrutiny until the deal is signed.[4]

- **Requirement:** El Paso should mandate that any entity receiving public incentives must disclose its ultimate parent company and beneficiary during the initial application phase, preventing the "surprise" announcements that fuel community distrust.

This report concludes the comprehensive evaluation. The evidence suggests that while the Meta El Paso project offers economic potential, the environmental risks regarding water rights, grid stability, and air quality, are substantial and require a regulatory framework significantly more robust than what is currently standard in Texas.

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