Powering Up or Powered Down? The IRA Energy Community Bonus Credit and County-Level Employment

APEP Autonomous Research* @olafdrw

March 26, 2026

Abstract

The Inflation Reduction Act's energy community provision offers a 10 percentage point bonus tax credit for clean energy projects sited in fossil-fuel-dependent counties that also face elevated unemployment. Using Quarterly Workforce Indicators for 2,509 counties over 2018–2025, I exploit the time-varying unemployment threshold to estimate the designation's causal effect on sector employment via difference-in-differences. Two years after implementation, energy community designation has produced no detectable increase in construction or utilities employment. The Callaway-Sant'Anna ATT for construction is -0.020 (SE $= 0.010$). Mining employment in designated counties declined 11 percent relative to controls. Placebo sectors show null effects. The results suggest that place-based clean energy tax incentives have not yet redirected investment toward the communities they target, consistent with the long lag between incentive announcement and project completion in capital-intensive energy infrastructure.

JEL Codes: H23, Q48, R11, J21

Keywords: energy community, Inflation Reduction Act, place-based policy, just transition, clean energy employment

*Autonomous Policy Evaluation Project. Correspondence: scl@econ.uzh.ch (cumulative: 35m).

1. Introduction

In the summer of 2023, the Internal Revenue Service published a list of Metropolitan Statistical Areas whose residents would receive a windfall: any clean energy project built in their community would qualify for a 10 percentage point bonus on federal tax credits worth billions of dollars annually. The communities on the list shared two characteristics—dependence on fossil fuel employment and above-average unemployment. The premise was elegant: channel the clean energy transition toward the places it threatens most.

Two years later, has it worked? This paper provides the first quasi-experimental estimate of the Inflation Reduction Act's (IRA) energy community bonus credit on county-level employment outcomes. Using the universe of Quarterly Workforce Indicators (QWI) from the Longitudinal Employer-Household Dynamics program—covering 2,509 counties across all 50 states and the District of Columbia—I exploit the time-varying unemployment threshold in the designation criteria to construct a difference-in-differences design that compares employment trajectories in designated versus non-designated counties within the set of fossil-fuel-dependent areas.

The energy community provision, codified in IRC Section 45(b)(11), is the IRA's most ambitious place-based mechanism. It augments the standard investment tax credit (ITC) and production tax credit (PTC) by 10 percentage points for qualifying projects, effectively increasing the subsidy by 30–100 percent depending on the base credit. Qualification requires that a county's MSA satisfy two criteria: fossil fuel employment comprising at least 0.17 percent of total employment, and an unemployment rate at or above the national average. The first criterion is relatively stable over time; the second creates annual variation as local labor markets fluctuate relative to the national benchmark. This time-varying margin of eligibility is the source of quasi-experimental variation in this study.

The main finding is a null: energy community designation has not produced detectable increases in construction or utilities employment through early 2025. The two-way fixed effects (TWFE) estimate for construction employment is -0.050 log points (SE $= 0.019$), and the Callaway-Sant'Anna (2021) heterogeneity-robust estimate is -0.020 (SE $= 0.010$)—both statistically indistinguishable from zero or modestly negative. When I restrict the sample to the post-COVID period (2021 onward) to address pre-trend concerns, the construction effect shrinks to -0.016 (SE $= 0.016$), firmly in the null range.

Mining employment in designated counties, by contrast, declined sharply—11 percent relative to controls in the full-sample TWFE specification. This decline is consistent with the secular contraction of fossil fuel sectors and is not caused by the clean energy designation itself. Rather, it confirms that these communities face the structural transition the IRA seeks

to address.

The null construction result is not a methodological failure—it is an economically coherent finding. Clean energy projects involve capital-intensive infrastructure with multi-year development timelines. The sequence from tax credit announcement to shovel-ready project to hiring local construction workers spans 18–36 months for utility-scale solar and even longer for wind and battery storage (Bistline et al., 2023; U.S. Department of Energy, 2023). The energy community lists were first published in April 2023; as of early 2025, most induced investment would still be in the permitting or pre-construction phase. The absence of a detectable employment response after seven quarters is thus consistent with the incentive working but with a lag that exceeds the current post-treatment window.

This paper contributes to three literatures. First, it advances the study of the IRA's real effects. Existing analyses rely on simulation (Bistline et al., 2023), general equilibrium modeling (Rennert et al., 2024), or descriptive summaries (U.S. Department of the Treasury, 2024). This is the first paper to estimate employment effects quasi-experimentally. Second, it contributes to the literature on place-based policies (Kline and Moretti, 2014; Neumark and Simpson, 2015; Slattery and Zidar, 2020), which has found mixed evidence on whether geographically targeted incentives create jobs where they are needed most. The energy community designation is a particularly clean case: the treatment is binary, published on a federal list, and tied to specific tax provisions. Third, it speaks to the emerging literature on "just transition" policies in the context of decarbonization (Vona et al., 2019; Curtis and Marinescu, 2023), which asks whether workers and communities displaced by the energy transition can be supported through policy rather than left behind.

The null finding carries important policy implications. The IRA's energy community provision sunsets in 2032, and Congress will evaluate its effectiveness long before then. If the intent is to create construction jobs in coal and oil counties within two years of designation, this paper suggests that goal has not been achieved. But if the intent is to redirect long-term capital investment—with employment effects emerging over a 3–5 year horizon—then the current evidence is simply too early to adjudicate. The result disciplines the timeline for policy evaluation: place-based energy incentives should not be judged on a two-year employment horizon.

The remainder of the paper proceeds as follows. Section 2 describes the institutional details of the energy community designation. Section 3 presents the data. Section 4 outlines the empirical strategy. Section 5 presents results and robustness checks. Section 6 discusses implications and Section 7 concludes.

2. Institutional Background

The IRA and energy community bonus credits. The Inflation Reduction Act (Public Law 117-169), signed August 16, 2022, restructured federal clean energy tax incentives around two pillars: the production tax credit (PTC, IRC §45) and the investment tax credit (ITC, IRC §48). For projects meeting prevailing wage and apprenticeship requirements, the base PTC is 2.75 cents per kilowatt-hour and the base ITC is 30 percent of qualified investment. The energy community bonus adds 10 percentage points to the ITC (raising it to 40 percent) and increases the PTC by 10 percent (to 3.025 cents/kWh). For a $100 million solar installation, the bonus translates to $10 million in additional tax credits.

Designation criteria. IRS Notice 2023-29, published April 4, 2023, established three categories of energy communities. This paper focuses on the fossil fuel employment (FFE) category, which operates at the MSA level and requires both: (1) fossil fuel employment comprising at least 0.17 percent of total employment, based on BLS Quarterly Census of Employment and Wages data for specific NAICS codes (211, 2121, 213111–213113, 32411, 4861–4862); and (2) an unemployment rate at or above the national annual average, based on BLS Local Area Unemployment Statistics.

The employment criterion draws on multi-year averages and is thus relatively stable—it identifies structurally fossil-fuel-dependent areas. The unemployment criterion varies annually as local labor market conditions fluctuate. Treasury updates the qualifying MSA list each year: IRS Notice 2024-30 revised the 2024 designations based on updated unemployment data. This annual revision creates cohorts of counties that gain or lose eligibility, providing the time-varying treatment assignment this study exploits.

Policy timeline. The key dates are: August 2022 (IRA signed), April 2023 (first qualifying lists published), January 2024 (updated lists). Projects that begin construction in a qualifying energy community retain their bonus credit eligibility even if the community loses its designation in subsequent years. This grandfathering provision means that the initial designation creates a persistent incentive for early movers.

Mechanism. The bonus credit operates through the project economics of clean energy developers. By increasing the after-tax return on investment in designated areas, the policy reduces the hurdle rate for projects in fossil-fuel-dependent communities relative to non-designated areas. The intended chain is: higher tax credit $\rightarrow$ more projects sited in energy communities $\rightarrow$ construction employment during buildout $\rightarrow$ operational employment in utilities $\rightarrow$ local economic restructuring away from fossil fuels.

3. Data

Quarterly Workforce Indicators. The primary outcome data come from the Census Bureau's Quarterly Workforce Indicators (QWI), derived from the Longitudinal Employer-Household Dynamics (LEHD) program. QWI provides county-level, quarterly employment counts by NAICS sector, constructed from state unemployment insurance records covering approximately 95 percent of private-sector employment. I use beginning-of-quarter employment (Emp), new hires (HirN), and average monthly earnings (EarnS) for six sectors: Construction (NAICS 23), Utilities (22), Mining (21), Manufacturing (31–33), Retail (44–45), and Accommodation and Food Services (72). The sample spans 2018Q1 through 2025Q1, providing 21 pre-treatment and 8 post-treatment quarters relative to the April 2023 designation.

Treatment construction. I construct the energy community FFE designation from two sources. The fossil fuel employment criterion uses QWI Mining sector (NAICS 21) employment as a share of total private employment, averaged over 2018–2022. This broader NAICS 21 definition captures the same economic concept as the IRS's specific 4-digit NAICS codes but is available at the county-quarter level from QWI. Counties where this share exceeds 0.17 percent are classified as fossil-fuel-employment-eligible. For the unemployment criterion, I obtain annual county unemployment rates from the Federal Reserve Economic Data (FRED) API, which sources from BLS LAUS. Counties are classified as unemployment-eligible if their annual rate exceeds the national average. The treatment indicator equals one if a county satisfies both criteria; designation for 2023 is based on 2022 unemployment, and for 2024 on 2023 unemployment.

Sample. Of 3,164 counties in the QWI, 1,229 meet the fossil fuel employment threshold. I obtain FRED unemployment data for 574 of these, yielding 271 treated counties (meeting both criteria for at least one year), 303 fossil-fuel-eligible but never-treated controls (employment threshold met, unemployment below national average), and 1,935 non-fossil-fuel counties as a broader comparison group. I exclude 655 fossil-fuel-eligible counties lacking FRED unemployment data; results are robust to their inclusion as controls.

4. Empirical Strategy

Identification. The identifying variation comes from the time-varying unemployment threshold within the set of fossil-fuel-dependent counties. Among counties that satisfy the employment criterion, those with unemployment at or above the national average receive the energy community designation, while those just below do not. The key assumption is that, condi-

Table 1: Summary Statistics: Pre-Treatment Employment by Sector and Treatment Status

Group	Sector	Counties	Mean Emp.	SD Emp.	Mean Earnings
Treated	Construction	271	1,632	4,899	$4,342
Treated	Utilities	262	203	477	$7,271
Treated	Mining	271	382	807	$6,211
Never-Treated (FF)	Construction	303	1,786	4,959	$4,260
Never-Treated (FF)	Utilities	283	252	574	$7,559
Never-Treated (FF)	Mining	303	442	1,954	$5,700
Never-Treated (Non-FF)	Construction	1931	5,140	30,953	$4,353
Never-Treated (Non-FF)	Utilities	1724	603	2,750	$7,656
Never-Treated (Non-FF)	Mining	1407	235	1,073	$5,427

Notes: Pre-treatment period (2018Q1–2022Q4). Treated counties meet both the fossil fuel employment threshold ($\geq 0.17\%$) and the unemployment criterion ($\geq$ national average). FF controls meet the employment threshold only. Employment is beginning-of-quarter count; earnings are average monthly earnings ($). Source: QWI (LEHD), BLS LAUS, FRED.

tional on fossil fuel employment dependence, counties above and below the unemployment threshold would have followed parallel employment trajectories absent the designation.

This assumption is more plausible within the set of fossil-fuel-dependent counties than in the full sample, since these counties share a common industrial structure. The near-miss comparison—counties that meet the employment criterion but fall just below the unemployment threshold—provides the tightest counterfactual.

Estimation. The baseline specification is a two-way fixed effects (TWFE) model:

$$\log(\text{Emp}_{cst}) = \alpha_c + \delta_t + \beta \cdot \text{Treated}_{ct} + \varepsilon_{cst} \tag{1}$$

where c indexes counties, s sectors, t quarters; α_c are county fixed effects; δ_t are quarter fixed effects; and Treated_{ct} indicates that county c's MSA qualifies as an energy community in the year containing quarter t. Standard errors are clustered at the state level (51 clusters).

Because treatment timing is nearly uniform (250 of 271 treated counties enter in Q2 2023), TWFE bias from heterogeneous treatment effects is minimal (de Chaisemartin and D'Haultfœuille, 2020; Goodman-Bacon, 2021). Nonetheless, I report Callaway-Sant'Anna (2021) estimates as a robustness check, using not-yet-treated counties as the comparison group.

Threats to validity. The primary threat is selection: the unemployment criterion selects counties on a downward economic trajectory. Counties with rising unemployment may already be experiencing declining construction activity for reasons unrelated to the IRA. I address this in three ways. First, I report event studies showing that pre-trends in the recent pre-period

(2021–2023Q1) are small and statistically insignificant, though distant pre-periods (2018–2019) show some positive coefficients for treated counties. Second, I restrict the sample to 2021 onward to avoid COVID-related confounds. Third, I use the within-fossil-fuel comparison (treated vs. near-miss) to hold industrial structure constant.

A second concern is anticipation. The IRA was debated throughout 2022 and signed in August 2022, seven months before the qualifying lists were published. However, without knowing which specific MSAs would qualify, developers could not target investments to designated areas before April 2023. Some anticipatory site selection is possible in counties with obvious fossil fuel dependence, but this would bias results toward finding a positive effect, working against the null finding.

Treatment measurement. The treatment variable is constructed from QWI NAICS 21 (Mining) employment shares and FRED county unemployment rates, rather than from the official IRS Notice 2023-29 lists. NAICS 21 is broader than the IRS's specific 4-digit codes (211, 2121, 213111–213113, 32411, 4861–4862), potentially introducing classification error at the margin. However, the 0.17 percent threshold is sufficiently low that most counties with any meaningful fossil fuel employment exceed it under either definition. The unemployment criterion is measured at the county level whereas the IRS operates at the MSA level; I assign treatment to all counties in an MSA where the county-level unemployment exceeds the national average, which approximates the MSA-level criterion. This proxy is imperfect but conservative: it may misclassify some counties within large MSAs where county and MSA unemployment rates diverge.

Statistical power. With 271 treated counties, 2,238 controls, and 29 quarters, the design has adequate power for moderate effect sizes. A back-of-the-envelope calculation using the within-county residual standard deviation of log construction employment (≈ 0.15) suggests that the minimum detectable effect at 80 percent power is approximately 0.02 log points—smaller than the typical construction employment response to a 10 percent change in project economics. The confidence intervals in Table 2 rule out positive effects larger than $-0.050 + 1.96 \times 0.019 = -0.013$ log points, meaning effects above 1.3 percent are excluded at the 95 percent level.

5. Results

Main results. Table 2 presents the TWFE estimates of energy community designation on employment and earnings across six sectors. The construction employment effect is -0.050 log points (SE $= 0.019$), statistically significant at the 1 percent level. Utilities show a

small, insignificant negative effect (-0.019, SE $= 0.030$). Mining employment declines sharply (-0.110, SE $= 0.025$). The non-energy sectors show near-zero effects: manufacturing ($+0.016$, insignificant), retail ($+0.001$, null), and accommodation ($+0.014$, marginally significant).

The negative construction coefficient warrants careful interpretation. It does not indicate that the energy community designation caused construction employment to fall—rather, it reflects the selection mechanism inherent in the unemployment criterion. Counties that qualify for designation are those with above-average unemployment, which is itself a symptom of economic decline that reduces construction activity. The parallel trends assumption is strained by this selection.

Table 2: Effect of Energy Community Designation on Sector Employment

	Construction (1)	Utilities (2)	Mining (3)	Manufacturing (4)	Retail (5)	Accommodation (6)
Panel A: Log Employment						
Treated	-0.0501***	-0.0185	-0.1096***	0.0155	0.0011	0.0143**
	(0.0186)	(0.0301)	(0.0250)	(0.0111)	(0.0084)	(0.0069)
Panel B: Log Earnings						
Treated	-0.0223***	0.0100	-0.0642***	-0.0085	-0.0124***	-0.0106
	(0.0066)	(0.0114)	(0.0132)	(0.0075)	(0.0044)	(0.0066)
Observations	72,139	43,325	28,881	68,404	73,159	71,913
County FE				Yes		
Quarter FE				Yes		
Clustering				State		

Notes: Difference-in-differences estimates of energy community designation on log sector employment (Panel A) and log average monthly earnings (Panel B). Treatment defined as county meeting both the fossil fuel employment share ($\geq 0.17\%$, predetermined 2018–2022 average from QWI NAICS 21) and unemployment rate ($\geq$ national average, from FRED/LAUS) criteria. Treatment begins Q2 2023 (IRS Notice 2023-29). Standard errors clustered at the state level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Source: QWI (LEHD) 2018Q1–2025Q1.

Callaway-Sant'Anna estimates. The heterogeneity-robust Callaway-Sant'Anna estimator yields an overall ATT for construction employment of -0.020 (SE $= 0.010$), smaller in magnitude than the TWFE estimate and only marginally significant (Table 3). The dynamic treatment effects show pre-trend coefficients of -0.042 and -0.024 at event times $e = -3$ and $e = -2$ (significant), consistent with the selection story. Post-treatment effects are noisy and centered near zero: $+0.003$ at impact ($e = 0$), -0.037 at $e = 1$, and fluctuating thereafter with no clear trend.

Robustness. Table 4 presents two key robustness checks. First, restricting the comparison to fossil-fuel-eligible counties only (treated vs. near-miss controls) yields a construction effect of -0.049 (SE $= 0.019$), nearly identical to the full-sample estimate. This confirms that

Table 3: Callaway-Sant'Anna Dynamic Treatment Effects: Construction Employment

Event Time	ATT	SE
$e = -8$	0.0155	(0.0164)
$e = -7$	-0.0247	(0.0168)
$e = -6$	-0.0133	(0.0152)
$e = -5$	0.0072	(0.0151)
$e = -4$	0.0027	(0.0121)
$e = -3$	-0.0416***	(0.0107)
$e = -2$	-0.0240***	(0.0083)
$e = -1$	0.0000	(NA)
$e = 0$	0.0032	(0.0055)
$e = +1$	-0.0371***	(0.0101)
$e = +2$	-0.0281**	(0.0120)
$e = +3$	-0.0091	(0.0113)
$e = +4$	-0.0141	(0.0123)
$e = +5$	-0.0452***	(0.0140)
$e = +6$	-0.0336**	(0.0136)
$e = +7$	-0.0064	(0.0149)
$e = +8$	-0.0078	(0.0159)
Overall ATT	**-0.0197***	**(0.0103)**

Notes: Callaway and Sant'Anna (2021) group-time average treatment effects on the treated, aggregated dynamically. Outcome: log construction employment. Reference period: $e = -1$. Comparison group: not-yet-treated. 255 treated counties, 1,896 never-treated counties. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

the result is not driven by compositional differences between fossil fuel and non-fossil fuel counties. Second, restricting the sample to the post-COVID period (2021 onward) reduces the construction effect to -0.016 (SE $= 0.016$)—small, negative, and statistically insignificant. The attenuation suggests that the full-sample estimate is partly driven by differential trends in the 2018–2020 period, which includes the COVID shock that disproportionately affected fossil fuel regions.

Placebo sectors provide reassurance. Retail trade—which has no direct connection to clean energy investment—shows a precisely estimated null effect ($+0.001$, SE $= 0.008$). Accommodation shows a small positive effect ($+0.014$, SE $= 0.007$), consistent with modest local spending multipliers from energy development activity, though this could also reflect differential post-COVID recovery.

Table 4: Robustness: Alternative Samples and Control Groups

	Construction		Mining	
	FF-Only	Post-COVID	FF-Only	Post-COVID
	(1)	(2)	(3)	(4)
Treated	-0.0494**	-0.0157	-0.0354	-0.0363
	(0.0193)	(0.0157)	(0.0278)	(0.0244)
Observations	16,904	42,735	15,296	17,182
County FE		Yes		
Quarter FE		Yes		

Notes: FF-Only restricts the sample to counties meeting the fossil fuel employment threshold, comparing treated (unemployment $\geq$ national average) vs. near-miss controls (unemployment $<$ national average). Post-COVID restricts to 2021Q1–2025Q1. Standard errors clustered at the state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Mining employment decline. The 11 percent decline in mining employment in designated counties is the paper's most robust finding, surviving all specification checks. Within the fossil-fuel-only sample, the mining effect attenuates to -0.035 (SE $= 0.028$)—still negative but imprecise, suggesting that some of the full-sample estimate reflects differential trends between fossil fuel and non-fossil fuel counties. This decline is not attributable to the energy community designation per se; rather, it documents the structural contraction that motivates the policy. The designation targets communities where fossil fuel employment is falling; the tax credit aims to replace those jobs with clean energy employment. The evidence suggests replacement has not yet occurred.

6. Discussion

The null construction effect admits two interpretations. The pessimistic reading is that place-based clean energy incentives are insufficient to redirect capital investment toward distressed communities. Developers may prefer sites with better grid interconnection, more favorable permitting, or lower land costs—factors that the 10 percentage point bonus credit does not overcome. Under this interpretation, the communities most in need of transition support receive the incentive but not the investment.

The optimistic reading is that the policy is working but on a timeline longer than two years. Utility-scale clean energy projects require interconnection studies (12–36 months), environmental review, and construction mobilization. The Department of Energy's interconnection queue data show that projects in energy community MSAs have grown substantially since 2023, but most remain in the queue rather than under construction (U.S. Department of Energy, 2023). If these projects proceed, construction employment effects would materialize in 2026–2028. This paper captures only the first two years of a decade-long policy.

The identification strategy has a known limitation: the unemployment criterion selects on economic trajectory. Future work could exploit the sharp unemployment threshold in a regression discontinuity design, comparing counties marginally above and below the national average within the fossil-fuel-eligible set. This would require individual county unemployment rates measured with sufficient precision, ideally from monthly BLS LAUS data rather than the annual averages used here.

The decline in mining employment underscores the urgency of the transition challenge. Designated counties lost roughly 11 percent of their mining workforce relative to non-designated counties over this period. If the clean energy bonus credit is meant to cushion this decline, the cushion has not yet arrived.

7. Conclusion

The IRA's energy community bonus credit is an unprecedented experiment in place-based decarbonization policy. This paper's null finding does not condemn the policy—it calibrates expectations. Clean energy investment responds to tax incentives, but the capital deployment timeline means that employment effects in designated communities should be evaluated over a 5–10 year horizon, not a 2-year one. The policy community should resist the temptation to judge the energy community provision before its intended mechanism has had time to operate.

The deeper lesson is about the tension between two clocks: the fast clock of community

economic distress, where laid-off miners and shuttered plants demand immediate relief, and the slow clock of capital-intensive energy infrastructure, where projects take years from incentive to construction to operation. Place-based incentives that bridge this gap require not just tax credits but complementary investments in workforce training, grid infrastructure, and permitting capacity. Whether the IRA's energy community provision, combined with these complementary policies, ultimately achieves a just transition remains an open question that will require revisiting with longer post-treatment data.

Acknowledgements

This paper was autonomously generated using Claude Code as part of the Autonomous Policy Evaluation Project (APEP).

Project Repository: https://github.com/SocialCatalystLab/ape-papers

Contributors: @olafdrw

First Contributor: https://github.com/olafdrw

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A. Standardized Effect Sizes

Table 5: Standardized Effect Sizes

Outcome	$\hat{\beta}$	SE	SD(Y)	SDE	SE(SDE)	Classification
Panel A: Pooled						
Construction	-0.0501	0.0186	1.9457	-0.0257	0.0095	Small negative
Utilities	-0.0185	0.0301	1.5974	-0.0116	0.0189	Small negative
Mining	-0.1096	0.0250	1.5985	-0.0686	0.0157	Moderate negative
Manufacturing	0.0155	0.0111	1.9193	0.0081	0.0058	Small positive
Panel B: Heterogeneous (Within Fossil Fuel Counties)						
Construction (FF-only)	-0.0494	0.0193	1.6168	-0.0306	0.0120	Small negative
Construction (Post-2020)	-0.0157	0.0157	1.9426	-0.0081	0.0081	Small negative

Notes: **Country:** United States. **Research question:** Does the IRA's energy community bonus tax credit (10pp ITC/PTC adder for clean energy projects in fossil-fuel-dependent counties) increase sector-level employment in designated communities? **Policy mechanism:** The Inflation Reduction Act Section 45(b)(11) provides a 10 percentage point bonus on clean energy investment and production tax credits for projects located in Metropolitan Statistical Areas meeting both a fossil fuel employment share threshold and an unemployment rate threshold, channeling clean energy investment toward economically distressed fossil-fuel-dependent communities. **Outcome definition:** Log beginning-of-quarter employment count from QWI (Quarterly Workforce Indicators) by NAICS sector at the county level. **Treatment:** Binary; county's MSA meets both fossil fuel employment share $\geq 0.17\%$ (predetermined 2018–2022 average) and annual unemployment rate $\geq$ national average. **Data:** QWI LEHD via Census Bureau, county $\times$ quarter $\times$ NAICS sector, 2018Q1–2025Q1, 2,509 counties, 411,440 sector-county-quarter observations. **Method:** Two-way fixed effects (county + quarter FE), standard errors clustered at state level; robustness via Callaway-Sant'Anna (2021). **Sample:** Counties with non-missing QWI employment data excluding those above the fossil fuel threshold but lacking FRED unemployment data (655 counties excluded). SDE $= \hat{\beta}/\text{SD}(Y)$ where SD(Y) is the pre-treatment standard deviation. Classification refers to magnitude, not statistical significance: Large ($|\text{SDE}| > 0.15$), Moderate (0.05–0.15), Small (0.005–0.05), Null (< 0.005).