



MIT CEEPR

Center for Energy and
Environmental Policy Research

The distribution of energy transition vulnerability in employment

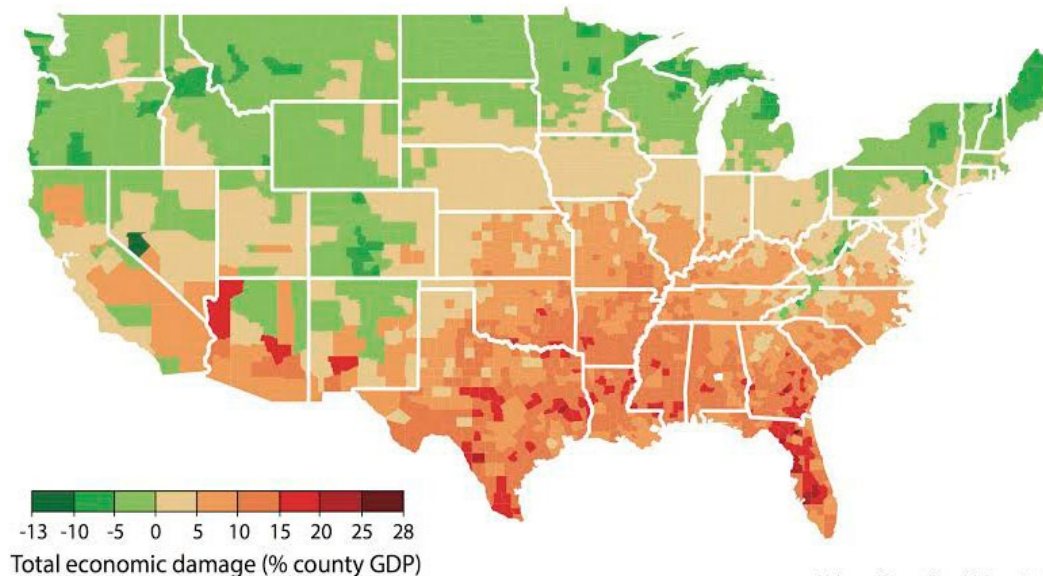
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NBER



MOTIVATION A “just” energy transition must account for economic disruption of communities

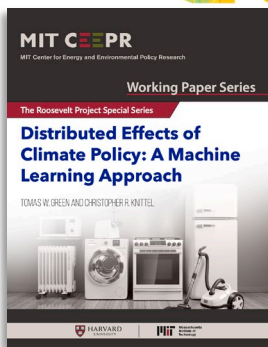
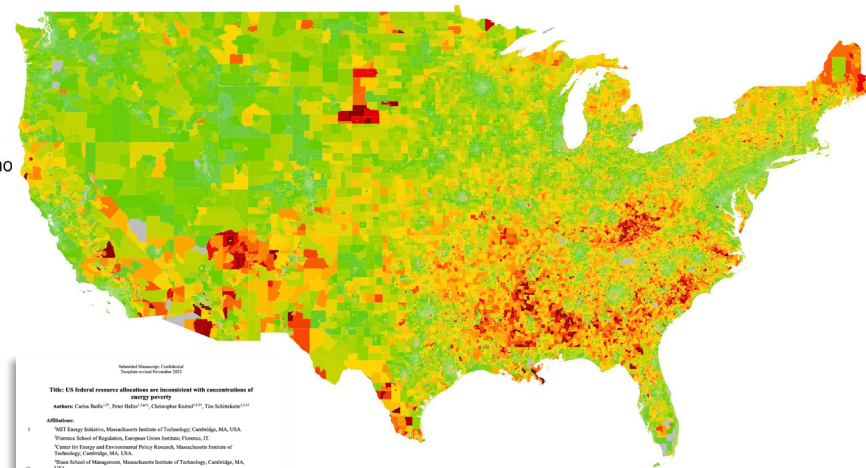
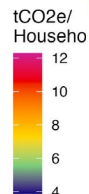
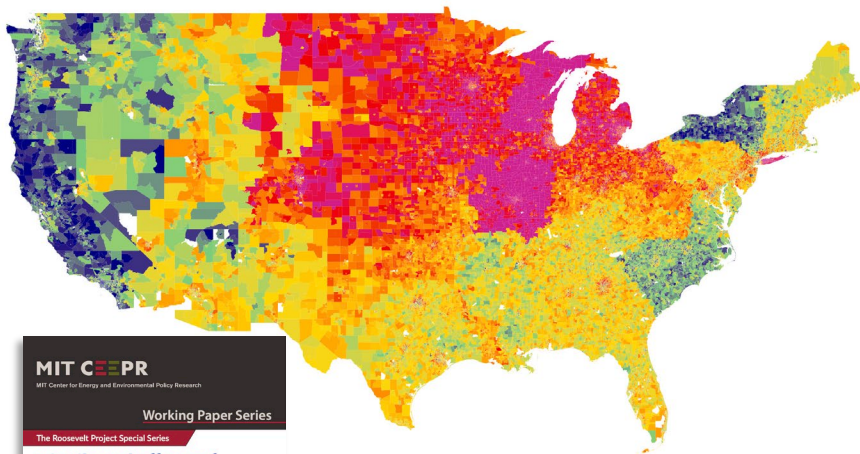
Just transition: Focus is often on the impact of climate change/pollution on outcomes



Hsiang, Kopp, Jina, Rising, et al. (2017)

MOTIVATION

But, policy choice can also matter



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† These authors contributed to research design.

‡ Miller is responsible for data cleaning, analysis, and evaluation. Miller wrote the paper.

Abstract: Recent data from the United States (US) Energy Information Administration reveals that nearly one in three households in the US could substantially reduce energy intensity, and 40% more households could reduce energy intensity by 20% or more. To date, however, energy intensity has been nearly static since 1980, with the distribution of energy intensity in dynamic markets and rates. We analyze a novel machine learning approach based on sociodemographic and geographic characteristics to estimate energy intensity across US counties from 2005 and 2010. Our analysis confirms that average household energy burden increased, and the range of household energy intensity widened. We provide an empirical alternative to current energy policy makers to review the distribution of funds to better reach assistance needs.

One-Sentence Summary: Through machine learning, we show that federal energy poverty assistance program budgets are misallocated and require revision.

MOTIVATION

Jobs in energy transition politics

POLICY

Granolm, Manchin take stage in debate over energy jobs

Granolm says the administration wants to bring jobs to areas hard-hit by the transition to cleaner energy

The New York Times

FACT CHECK

Trump Misleads on Energy and Jobs at Houston Rally

A Biden electric Army tank mandate? A decimation of auto jobs? The G.O.P. front-runner used misleading and recycled claims to talk about energy and jobs.

ENERGYWIRE

SOTU: Biden links clean energy policy to 'tens of thousands' of jobs

By Brian Dabbs, Heather Richards, Jason Plautz | 03/08/2024 06:54 AM EST

The president made big promises about what his climate and energy agenda could deliver in a speech crafted to boost his reelection bid.

GREENWIRE

Biden launches American Climate Corps

By Robin Bravender | 09/20/2023 08:11 AM EDT

A government program aimed at putting young people to work on climate has been on President Joe Biden's wish list for years.

The New York Times

NEWS ANALYSIS

Battle Over Electric Vehicles Is Central to Auto Strike

Carmakers are anxious to keep costs down as they ramp up electric vehicle manufacturing, while striking workers want to preserve jobs as the industry shifts to batteries.



MOTIVATION Just transition in federal policy: Inflation Reduction Act *energy communities*

- Inflation Reduction Act (IRA) “energy communities” (ECs) eligible for extra 10% tax credit



Brownfield
sites



Census tracts with
recent coal closures



+



MSAs with >0.17% fossil
fuel employment and
>avg unemployment

- One of the first policies to specifically target vulnerable communities
- Limitations:
 - Focuses on only some fossil fuel communities.
 - Backwards-looking criteria

Policymakers need better ways to understand where communities are vulnerable and where policy is needed.



MOTIVATION In the “just transition,” **which communities need policy support most?**



PNAS

RESEARCH ARTICLE | ECONOMIC SCIENCES



Assessing the distribution of employment vulnerability to the energy transition using employment carbon footprints

Kailin Graham  and Christopher R. Knittel  [Authors Info & Affiliations](#)

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Research Questions

1. How can we better identify which communities are **most reliant on fossil fuels** and therefore vulnerable to employment impacts during the energy transition?
2. How do our identified communities compare to the energy communities in the IRA?
3. How is employment vulnerability explained by observable socioeconomic and demographic characteristics?

METHODOLOGY Calculate the “Employment Carbon Footprint” (ECF) of (almost) all U.S. jobs

Direct, on-site
emissions (Scope 1)

Emissions from electricity
consumption (Scope 2)

Emissions embedded in
fossil fuel products (Scope 3)



+



+



$ECF =$

weighted by incidence of carbon emissions pass-through based on price elasticities

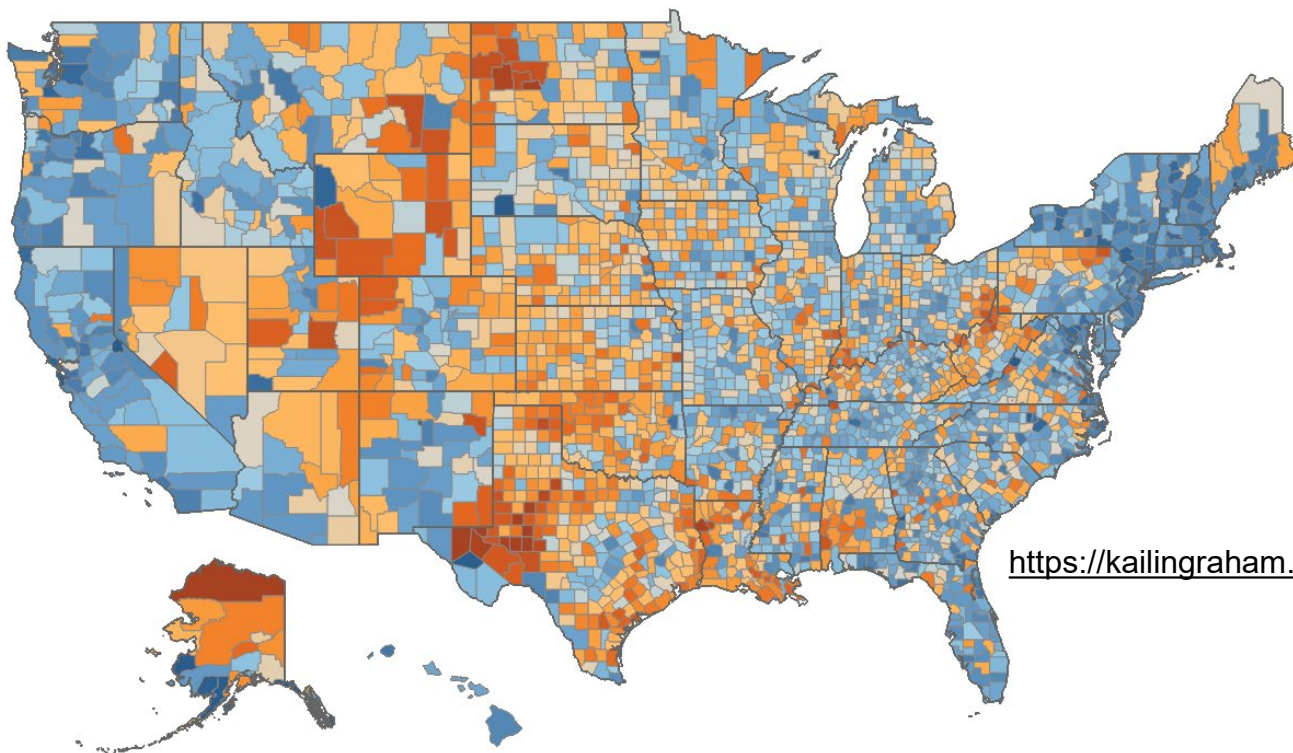


Total
employment

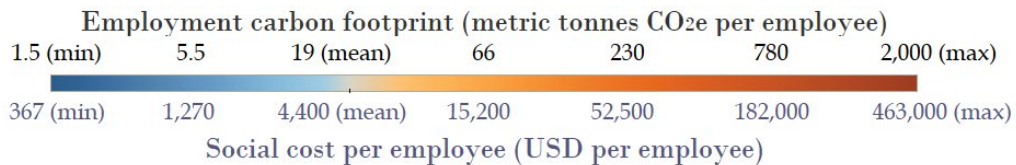
- Agriculture
- Construction
- Coal mining
- Commercial
- Manufacturing
- Non-fossil mining
- Oil & gas
- Fossil power gen.

86% of employment in the U.S.
94% of emissions outside of transportation

RESULTS Employment is most vulnerable in the inland states

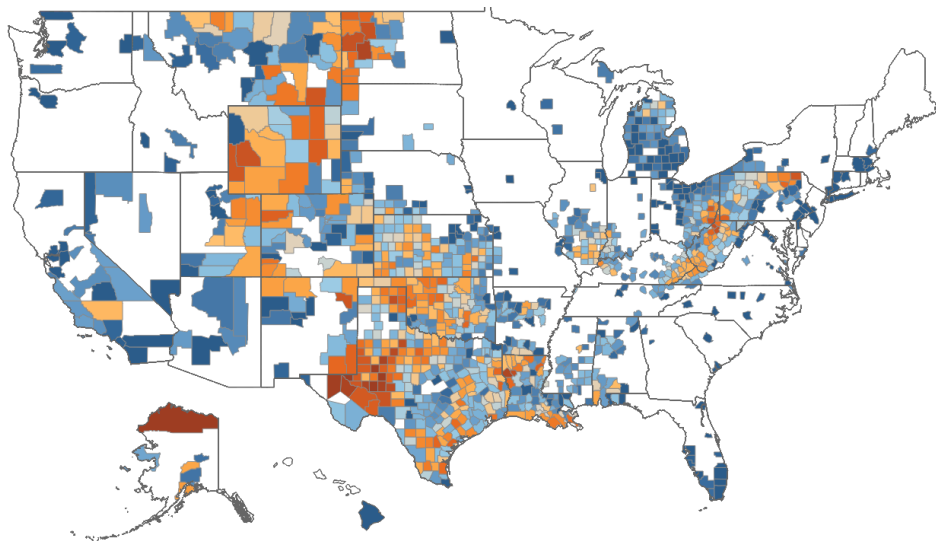


<https://kailingraham.github.io/ecf-vis-tool/>

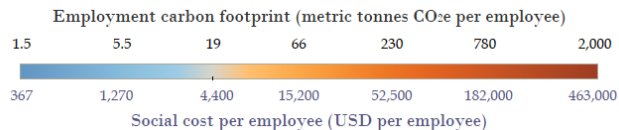
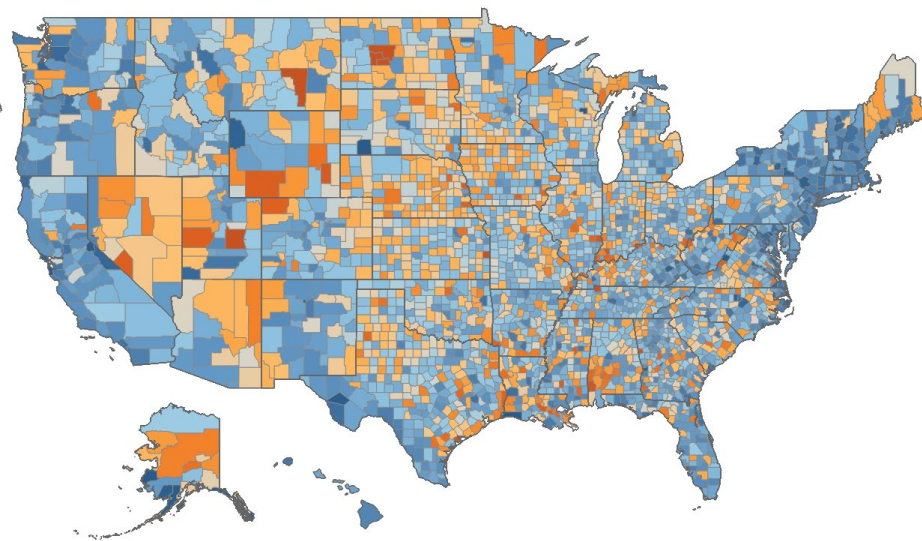


RESULTS Both fossil fuel-extracting and non-extracting counties are vulnerable

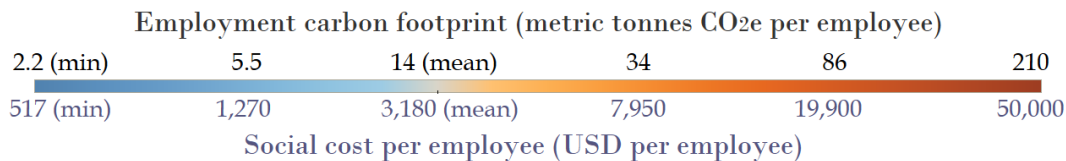
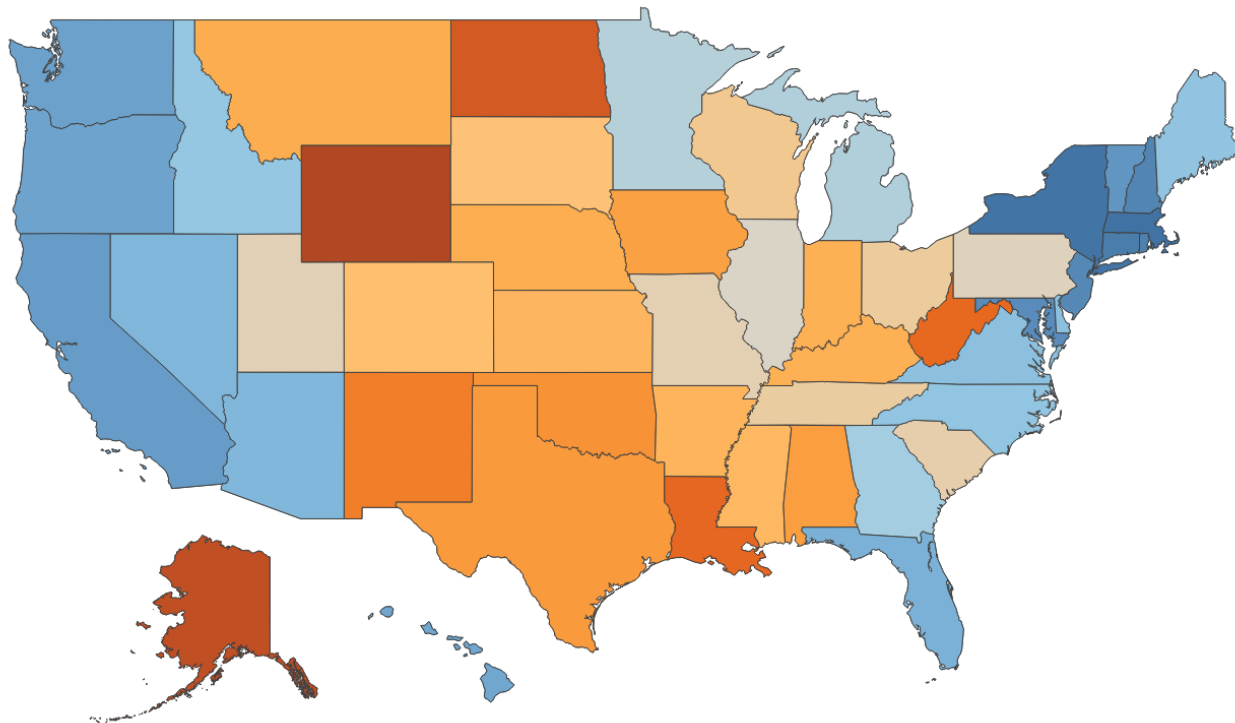
fossil fuel extraction sectors



all other sectors

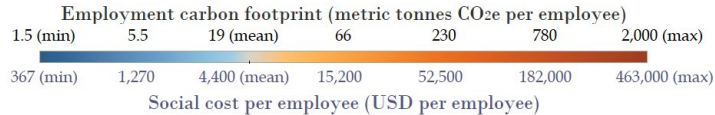
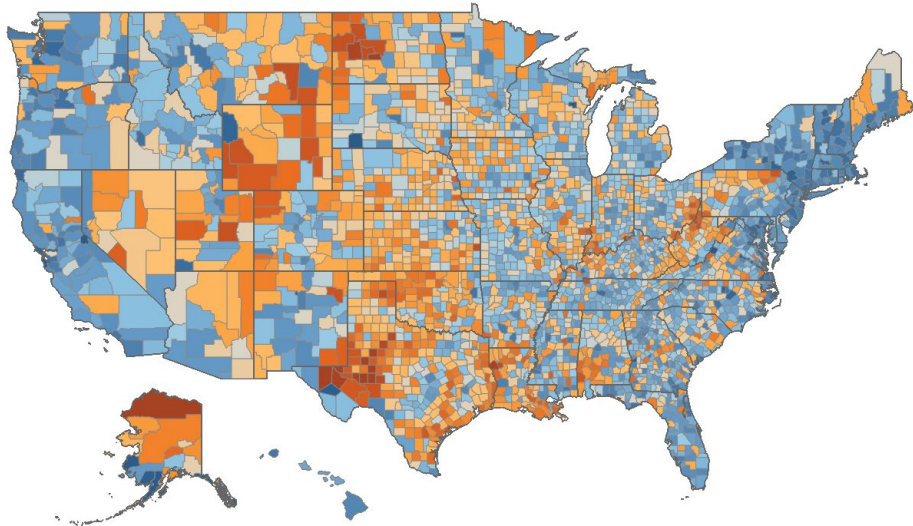


RESULTS Employment is most vulnerable in the inland states

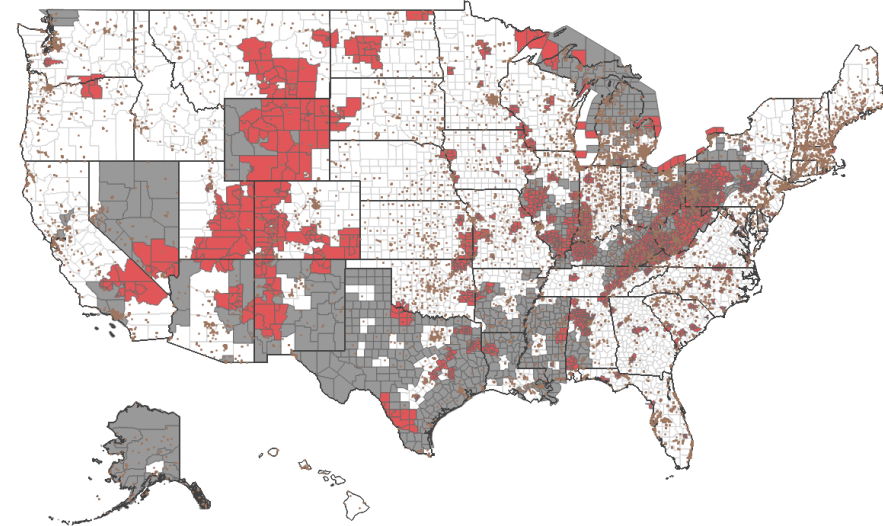


RESULTS Overall ECF vs IRA energy communities

Overall employment carbon footprints, by county



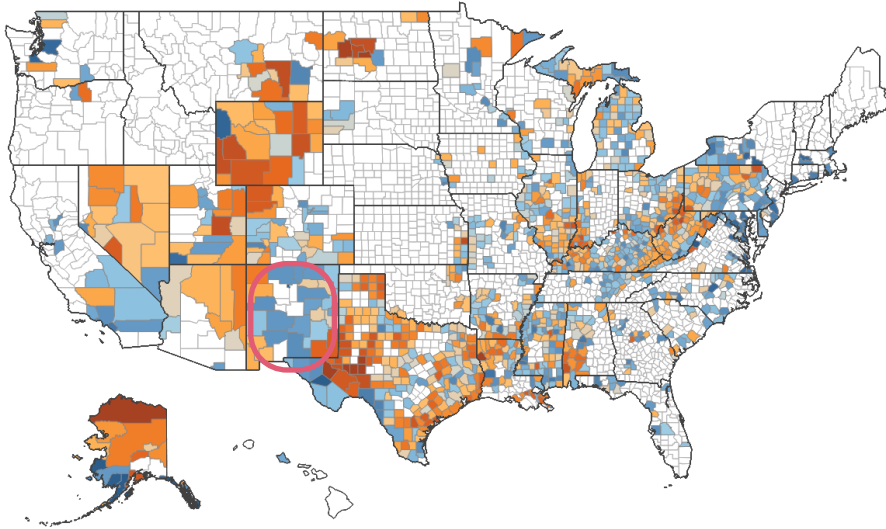
Qualifying IRA energy communities



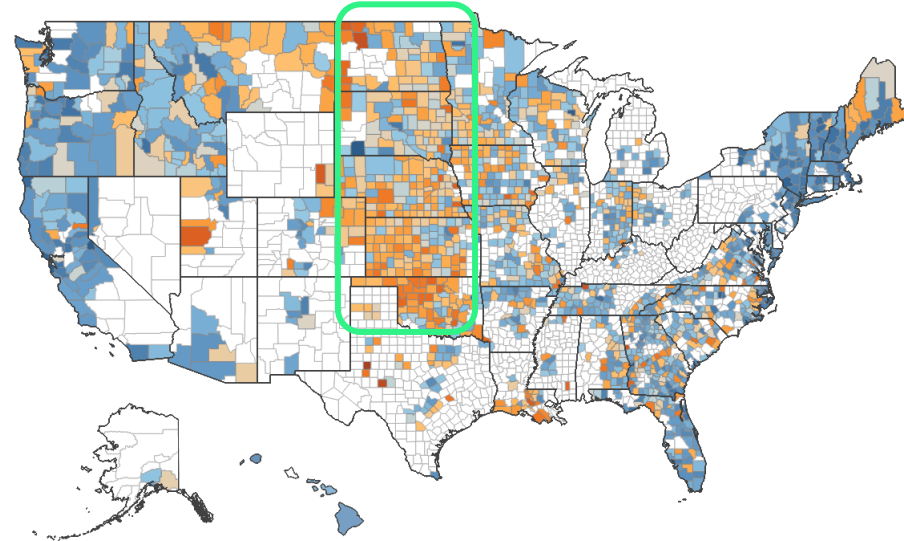
- Brownfield sites
- Fossil fuel employment areas
- Coal mine/power plant closure tract (and adjacent tracts)

RESULTS IRA misses at-risk communities

Qualifying counties

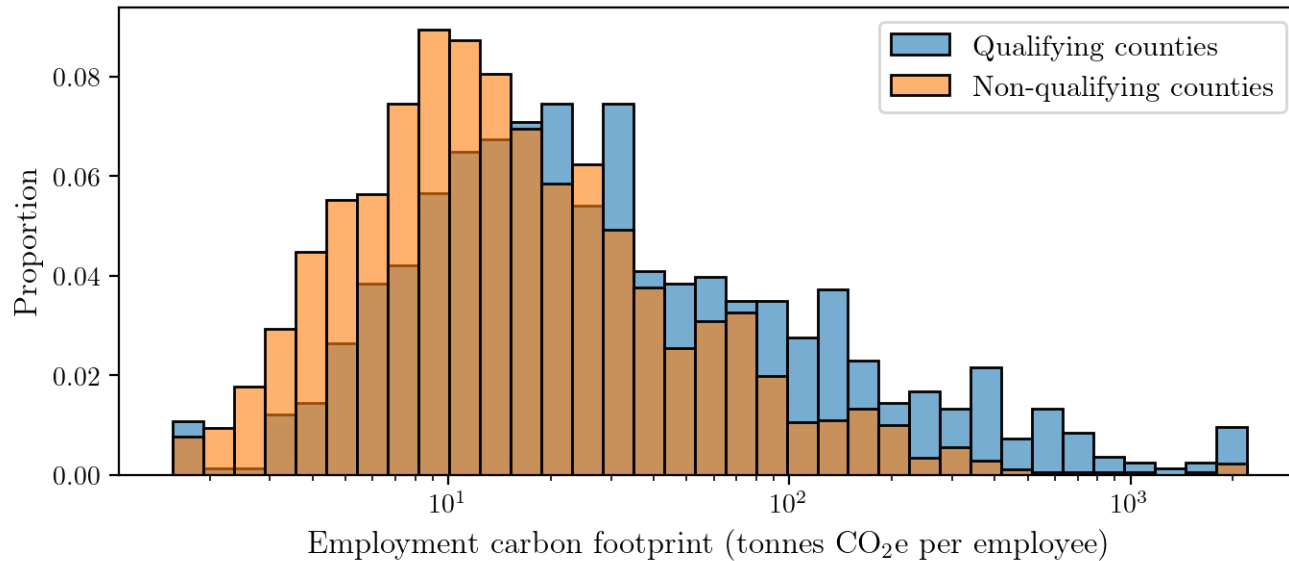


Non-qualifying counties



RESULTS False positives and false negatives

ECF distributions for counties with and without qualifying IRA energy communities (fossil-fuel employment communities only)



RESULTS Why are communities missed?

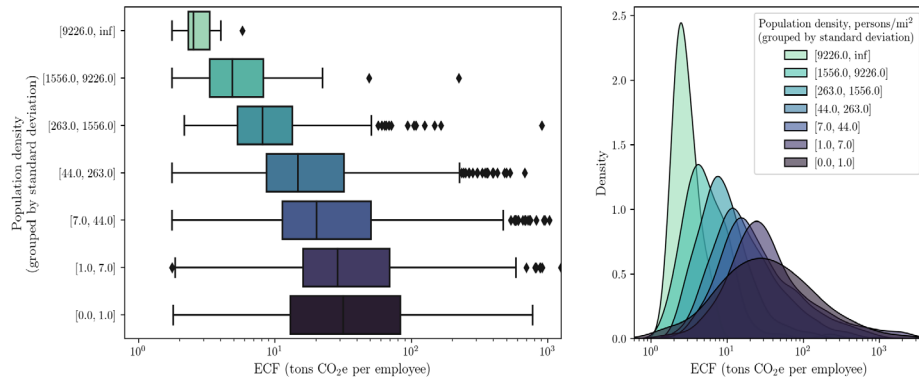


- Focuses only on fossil fuel production, not consumption
 - **Power plants do not qualify** until after they have closed
 - A third of top 100 most vulnerable overlooked counties rely on carbon-intensive manufacturing
- Unemployment rate: backwards-looking criterion
 - Withholds support **until after damage is done**

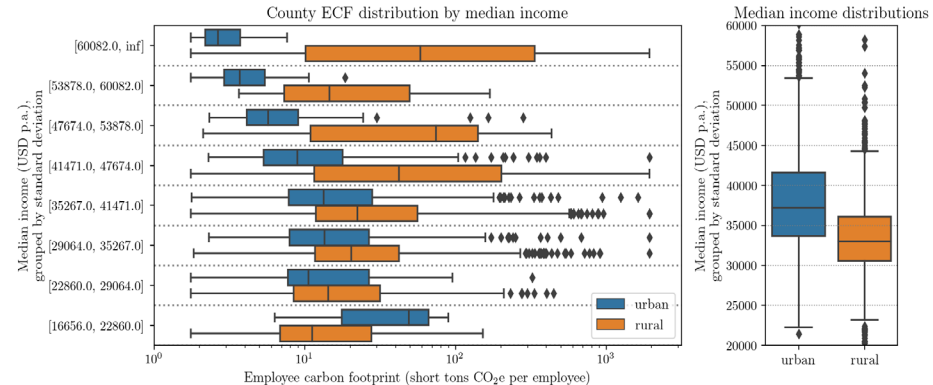
RESULTS Distributive Analysis

- Analyzed overall ECFs across county urbanity, median income, racioethnic diversity, educational attainment & political affiliation
- Key findings:
 - Urban-rural divide**, with high ECF counties tending to be more rural
 - Rural counties see **ECF increase with income**, opposite for urban counties

ECF distributions by county population density



Median county income and ECF distributions by urbanity



How can this inform policy?

E-VET Tool

tinyurl.com/ceepr-ecf

Play around!

POLICY TAKEAWAYS Economy-wide impacts require proactive policy approaches



- Both fossil fuel **extraction and non-fossil** fuel communities are vulnerable
- **IRA energy communities are insufficient** in identifying the counties with the most carbon-intensive employment
- Support for vulnerable communities needs to be **proactive**
- **Significant distributional** issues exist – just transition policy should cater to specific **context of each community**
- **ECF data can help policymakers target** future just transition policy

Thank you

Questions?

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