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# Risks of Reductionism:

## Comparing Climate & Equity Methodologies for Interdisciplinary Energy Justice Research

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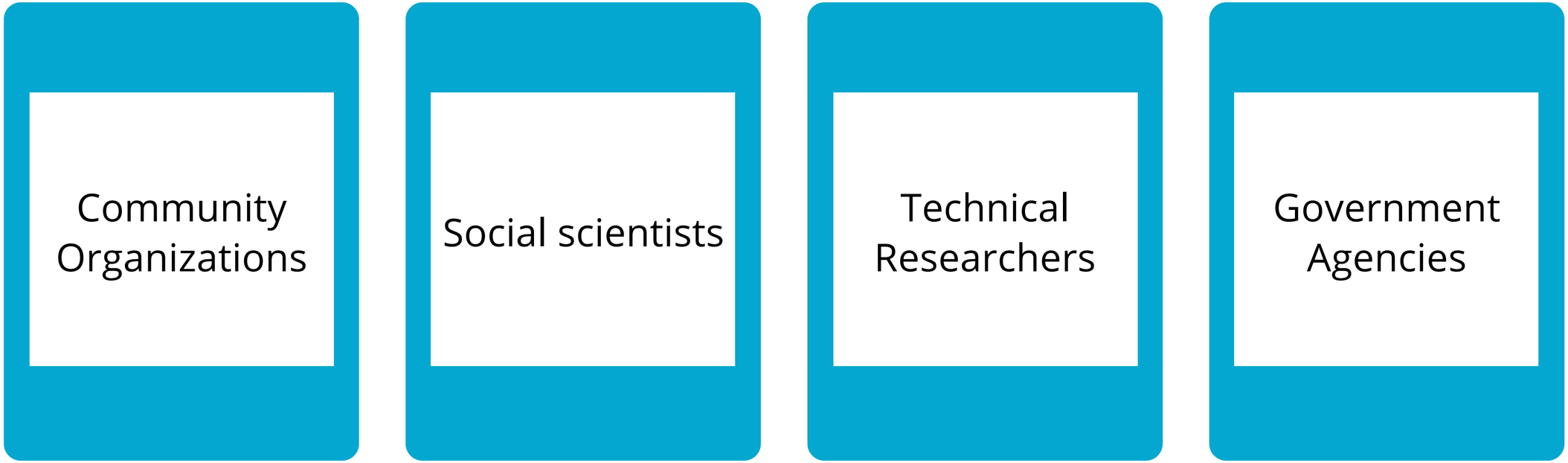
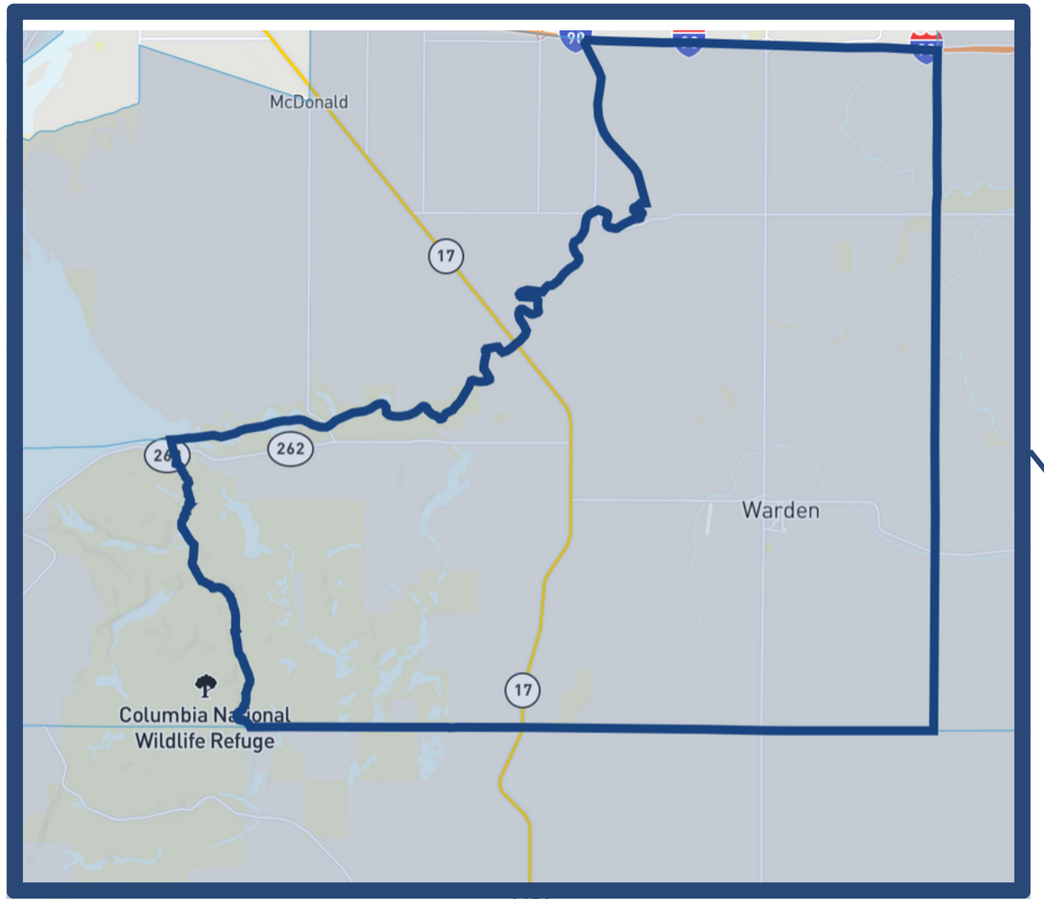
# The Many Disciplines of Energy Justice



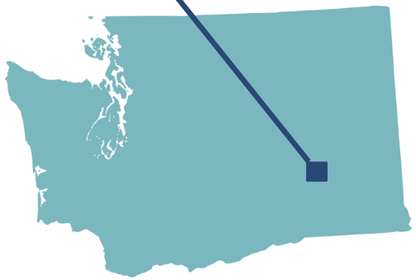
# Executive Order 14008: Landmark Federal Legislation for Climate and Energy Justice

> The Chair of the Council on Environmental Quality shall, within 6 months of the date of this order, create a geospatial Climate and Economic Justice Screening Tool and shall annually publish interactive maps highlighting disadvantaged communities

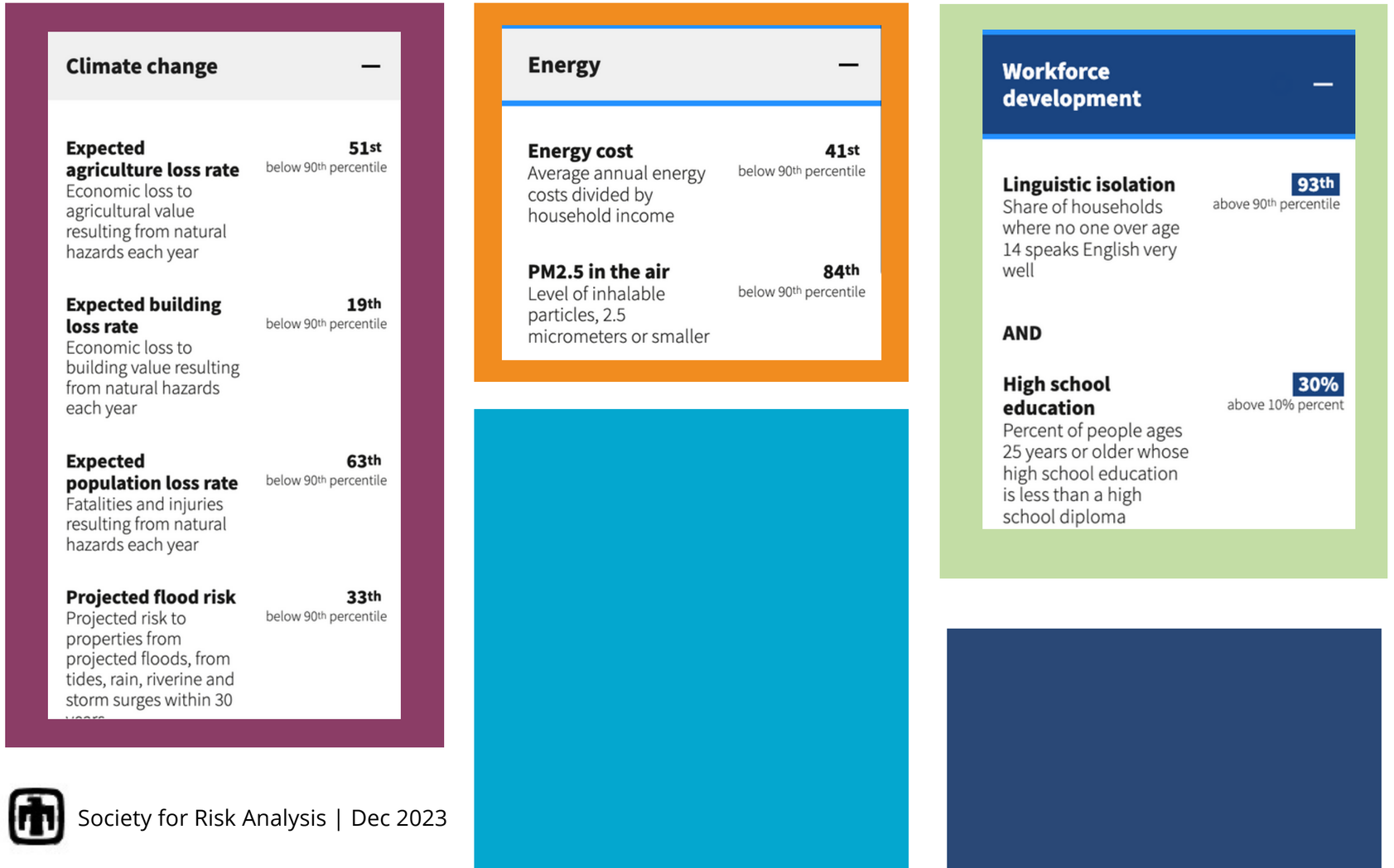
Sec. 222, EO 14008




Example of CEJST Tool in Warden, WA (CEJST, 2022)



# CEJST Tool Reduces Lived Experience to Adjacent Metrics




- Binary measure for "disadvantaged"
- No measures for future climate change
  - Adjacent metrics such as population loss, agricultural loss which are not experienced equally.
- Energy measures do not consider systems-level impacts
- Socioeconomic measures must be above 90th percentile to be flagged

# Measuring Energy and Climate using Lived Experience

## HOMES

**Cooling/heating and energy efficiency**

- Tong et al., 2021
- Reames, 2016
- Goldstein et al., 2022

## FINANCES

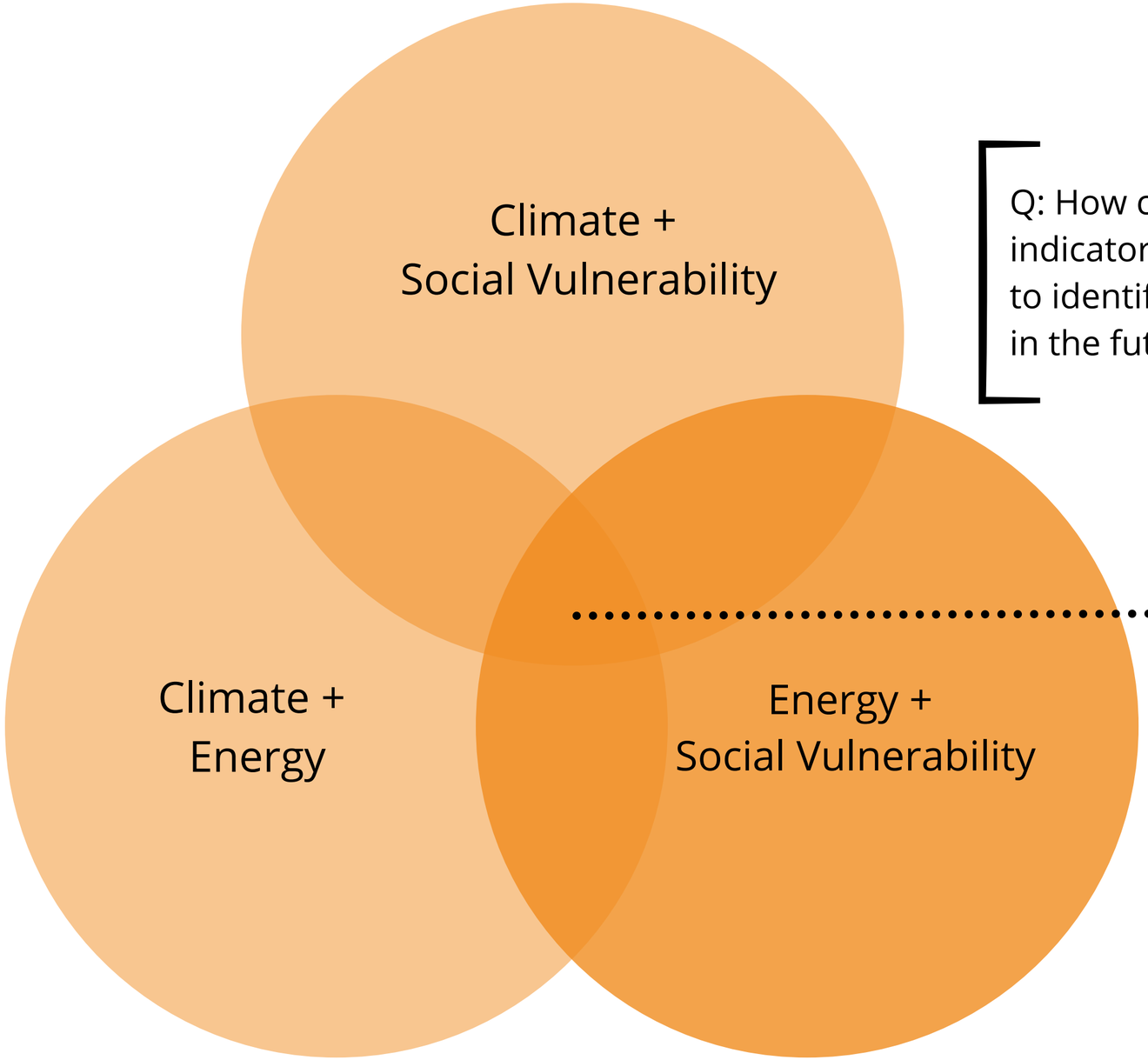
**Affordability and Energy Burden**

- Obringer et al., 2022
- MacDonald et al., 2021
- Goldstein et al., 2020

## WELLBEING

**Health and Ability**

- Bai et al., 2018
- Brown et al., 2020
- Fleischer et al., 2013

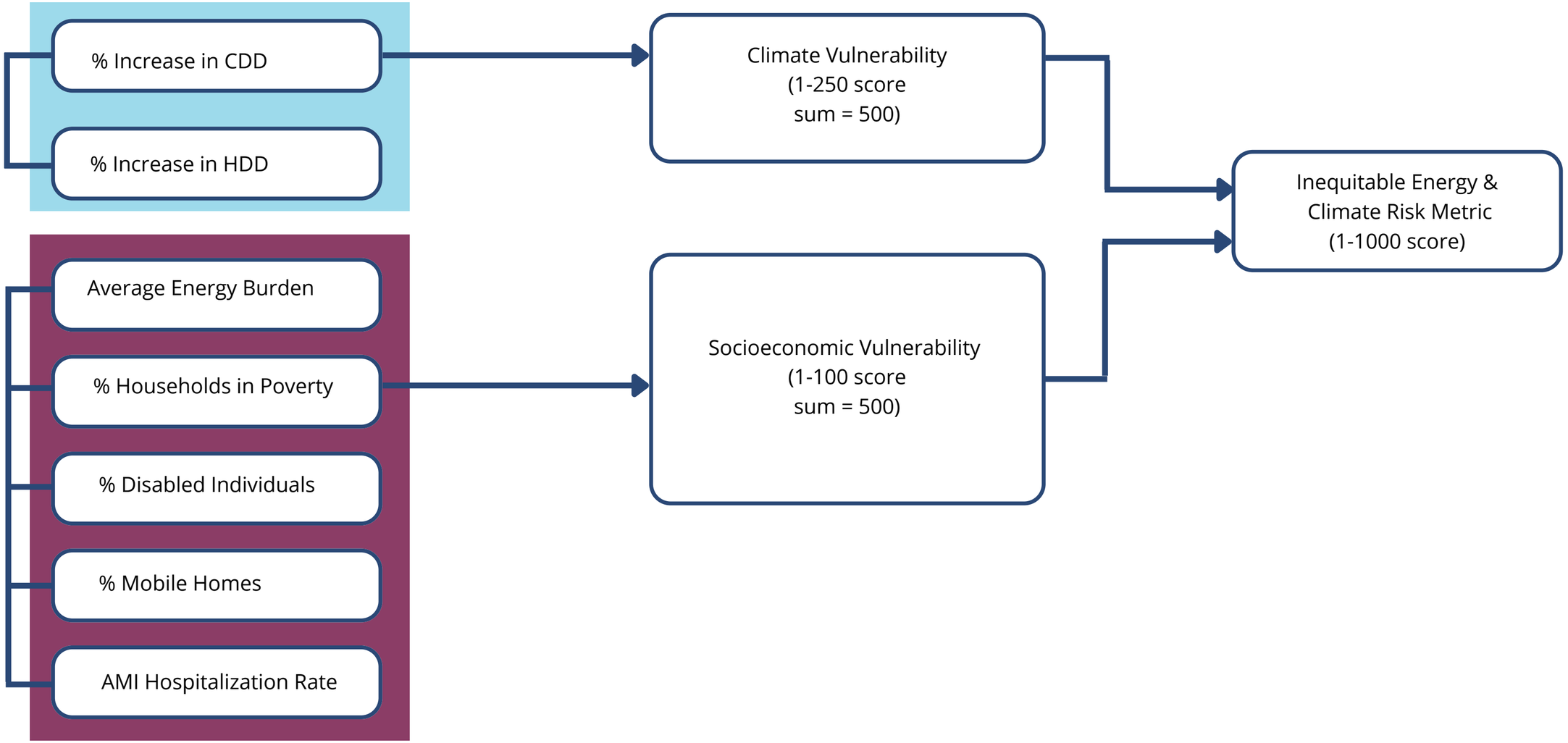



Q: How can we use climate modeling and local indicators of socioeconomic/environmental vulnerability to identify disproportionate energy risk to communities in the future?

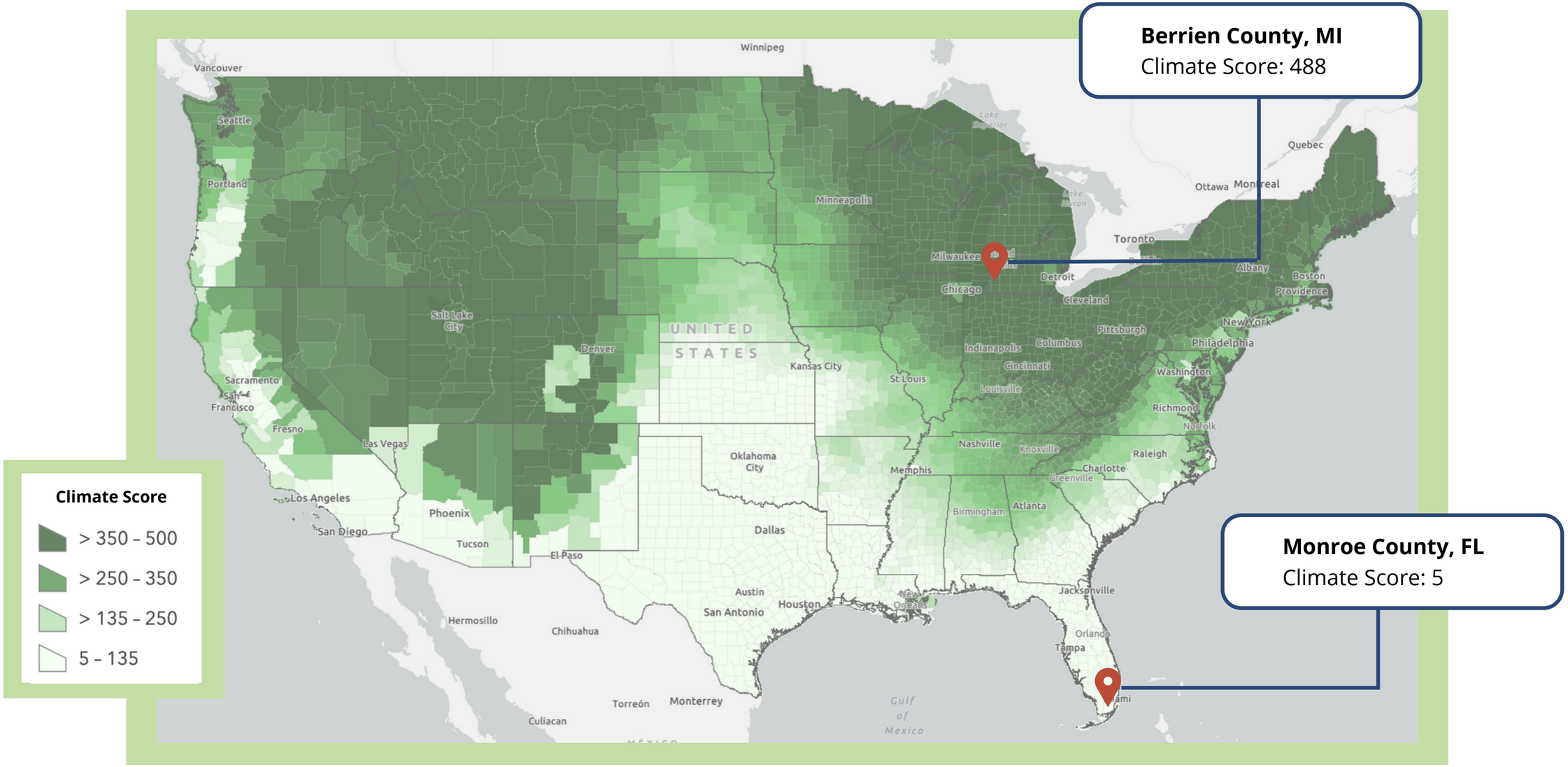
# Our Variables

| Theme | Metric | Source | Spatial Representation | Temporal Representation |
|---|---|---|---|---|
| Climate | % Increase in Cooling Degree Days | NARCCAP | County | Baseline, 2030, 2050 |
| Climate | % Increase in Heating Degree Days | NARCCAP | County | Baseline, 2030, 2050 |
| Socioeconomic | Energy Burden | DOE LEAD Tool | County | 2014-2018 |
| Socioeconomic | Poverty | ACS | County | 2014-2018 |
| Socioeconomic | Non-institutionalized Disability | ACS | County | 2014-2018 |
| Socioeconomic | Mobile Homes | ACS | County | 2014-2018 |
| Socioeconomic | Myocardial Infarction Hospitalization | CDC | County | 2014-2018 |

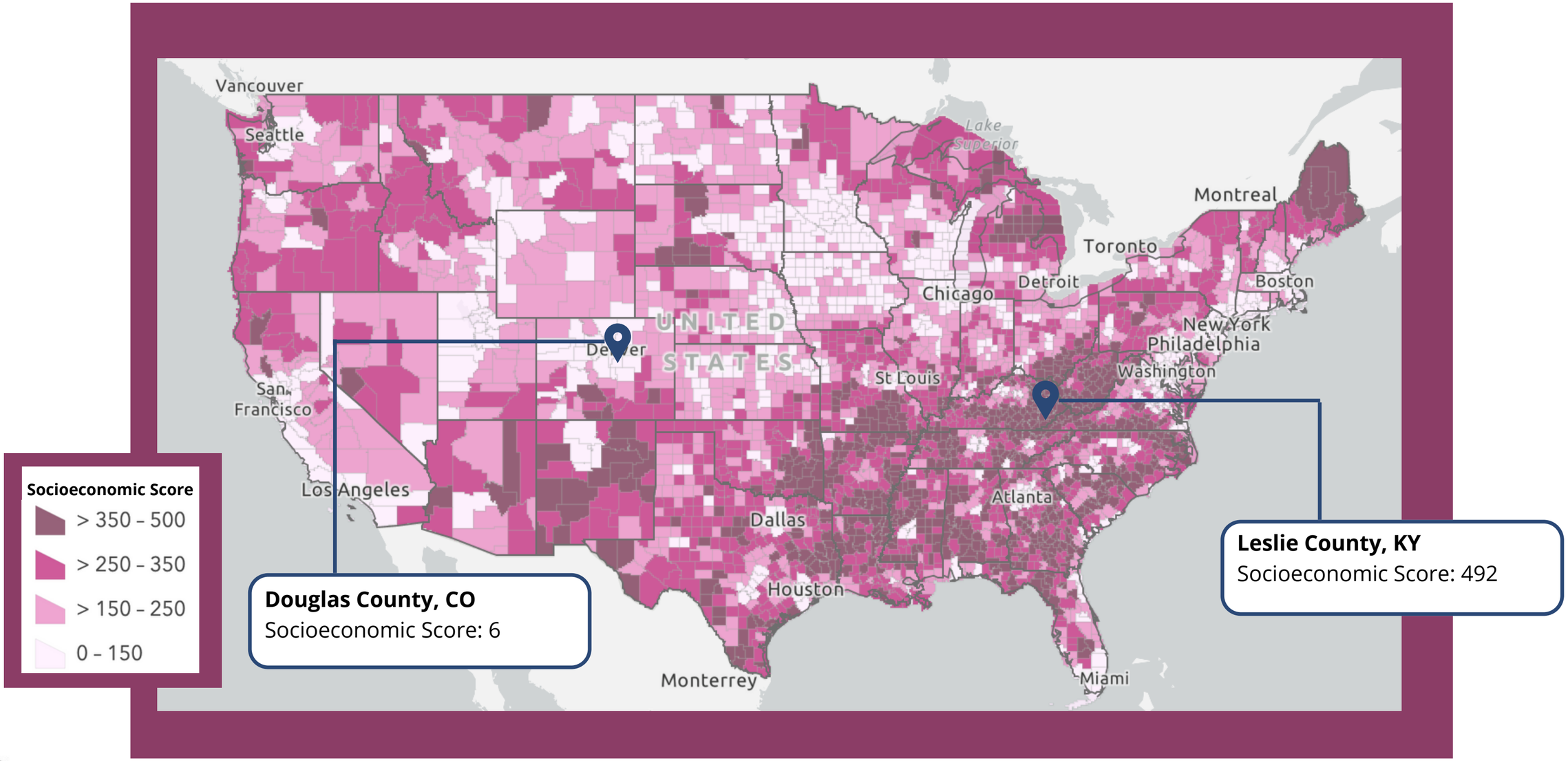
# Understanding Disproportionate Energy and Climate Requires Multiple Datasets



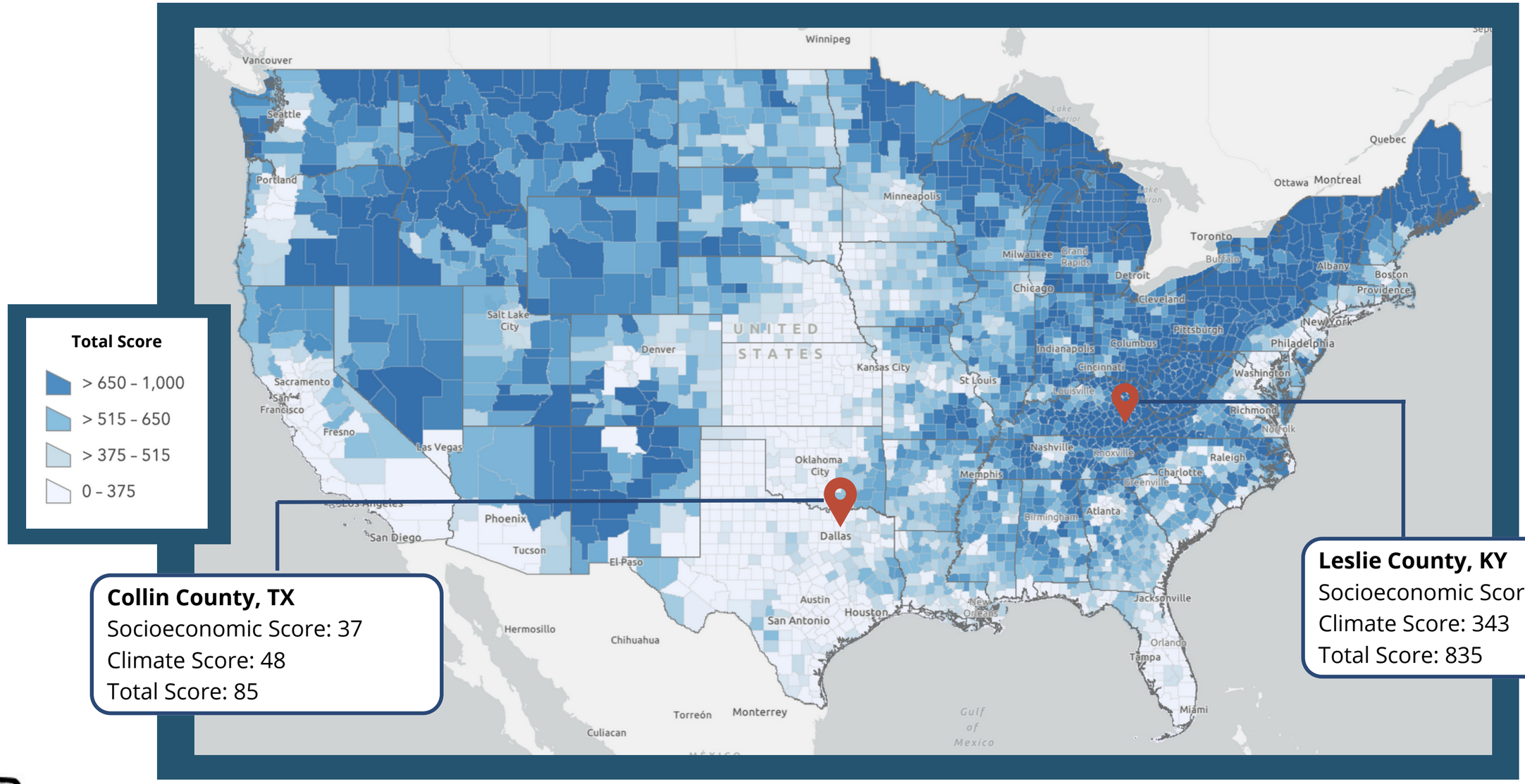
# Mapping Climate Vulnerability using Percent Change in Cooling Degree Days and Heating Degree Days, Baseline to 2050



# Mapping Socioeconomic Vulnerability using Publicly Available Socioeconomic Data, 2014- 2018



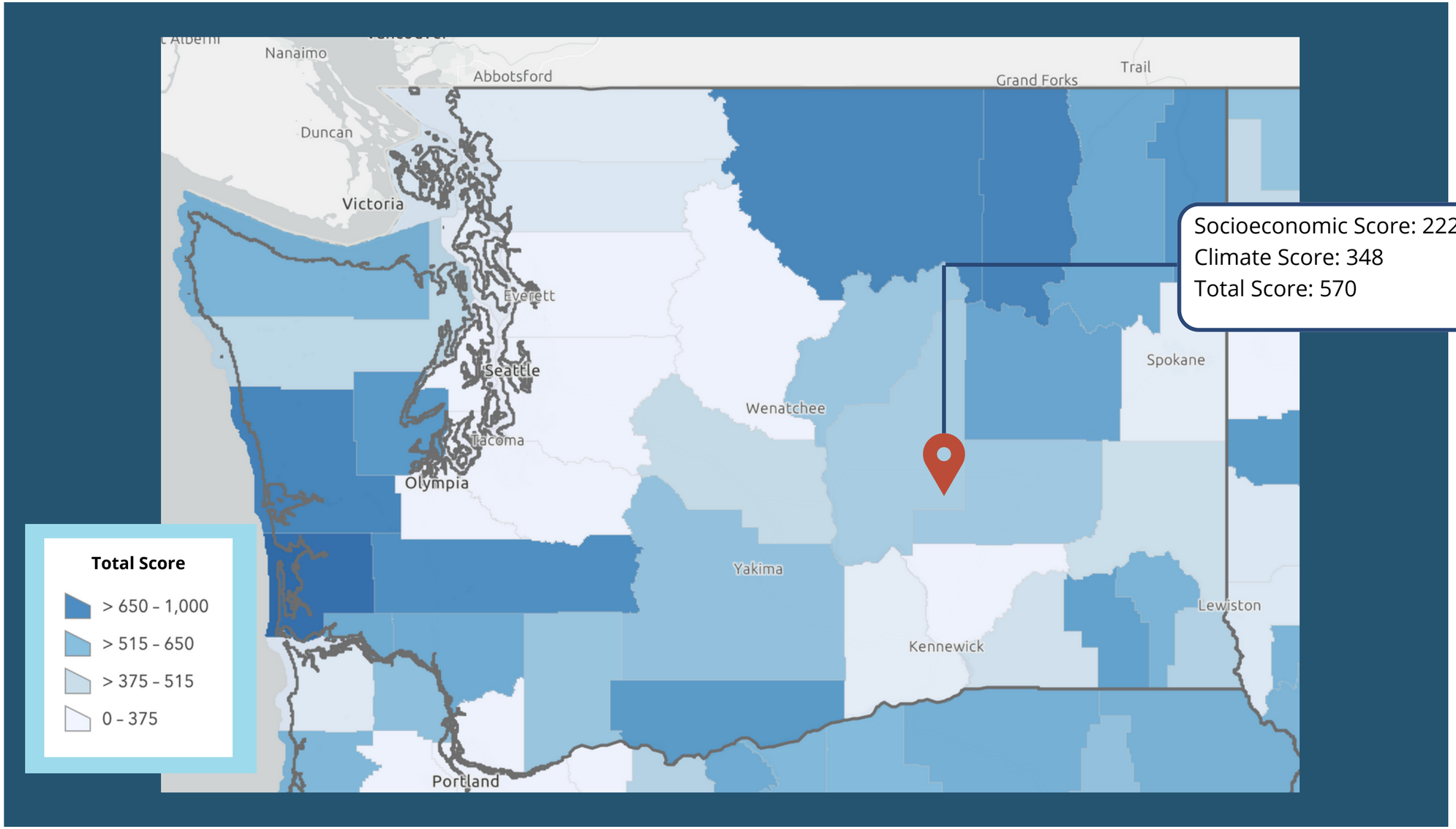
# Our Combined Metric Suggests Disproportionate Experience for Climate and Energy Risk Nationally




**Collin County, TX**
Socioeconomic Score: 37
Climate Score: 48
Total Score: 85

**Leslie County, KY**
Socioeconomic Score: 492
Climate Score: 343
Total Score: 835

# …. and at the Local-Level



# Designing Metrics using Lived Experience Aligns well with EJ Research

## CEJST Tool

- Binary measure for "disadvantaged"
- No measures for future climate change
  - Adjacent metrics such as population loss, agricultural loss which are not experienced equally.
- Energy measures do not consider systems-level impacts
- Socioeconomic measures must be above 90th percentile

## Our Metric

- Continuous measure for climate and energy injustice
- Includes metrics from future climate models to understand future risk
- Energy measures consider several systems- level impacts
- Socioeconomic measures are continuous

# Lived Experience *Matters* for Meaningful Climate & Equity Risk Metrics

- Paired current social vulnerabilities with future climate models
- Created metric more reflective of lived experience

- Could benefit from finer spatial resolution
- Working to integrate additional climate variables, such as changes in heat index and precipitation

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