

U.S. DEPARTMENT OF
ENERGY

Office of
**ENERGY EFFICIENCY &
RENEWABLE ENERGY**

Mapping Tools to Identify Underserved Communities

Margaret Smith, U.S. Department of Energy's Vehicle Technologies Office

Dr. Yan (Joann) Zhou, Argonne National Laboratory

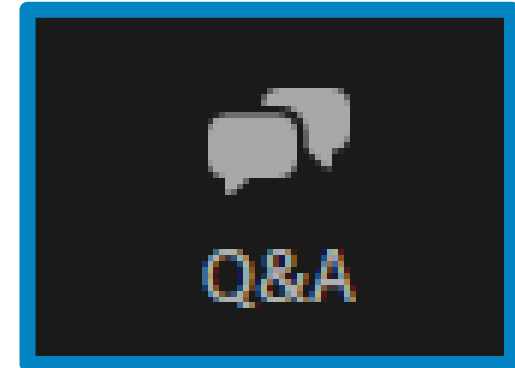
Jim Kuiper, Argonne National Laboratory

DOE Justice Week: September 15, 2022



Zoom Tips & Housekeeping

- **Controls are located at the bottom of your screen. If they aren't appearing, move your cursor to the bottom edge.**
- **Submit questions using the “Q&A” window**



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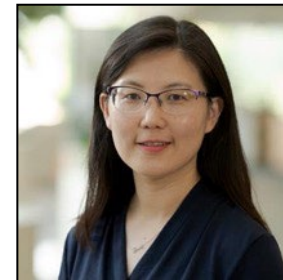
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Webinar Agenda

- Justice40 Overview
- Mapping Definition Tools
 - DOE's Energy Justice Mapping Tool - Disadvantaged Communities Reporter
 - DOT's Transportation Disadvantaged Census Tracts
 - DOE/DOT Electric Vehicle (EV) Charging Justice40 Map Tool
 - White House Climate and Economic Justice Screening Tool (CEJST) – BETA
- Additional Relevant Mapping Tools
- Case Studies
- Q&A



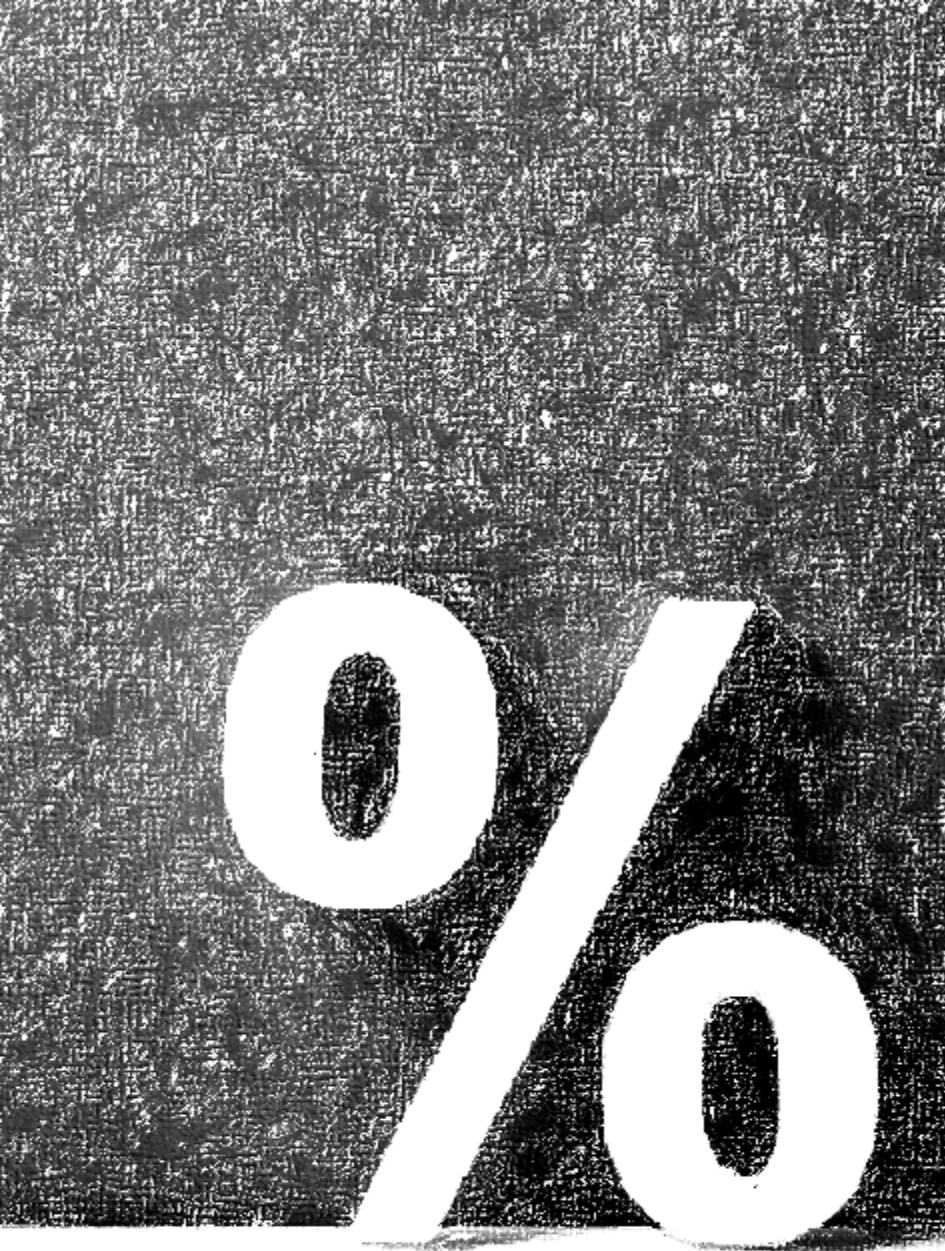
Margaret Smith, DOE



Dr. Yan (Joann) Zhou, ANL



Jim Kuiper, ANL



What is Justice40?

40% of the overall benefits of certain Federal investments—including investments in clean energy and energy efficiency; clean transit; affordable and sustainable housing; training and workforce development; the remediation and reduction of legacy pollution; and the development of clean water infrastructure—must flow to disadvantaged communities.

Office of Energy Efficiency & Renewable Energy (EERE)

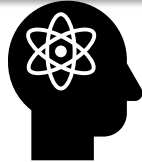
EERE Mission

Accelerate the research, development, **demonstration, and deployment** of technologies and solutions to equitably transition America to **net-zero greenhouse gas emissions economywide by no later than 2050**, creating good paying jobs, and ensuring the clean energy economy benefits all Americans, especially workers and communities impacted by the energy transition and those **historically underserved by the energy system and overburdened by pollution**.

Crosscutting Principles



Energy and
Environmental
Justice



Diversity in STEM



Workforce
Development



State and Local
Partnerships

EERE Program Priorities

Decarbonizing transportation
across all modes: air, sea, rail,
and road

Decarbonizing
energy-intensive
industries

Reduce the carbon
footprint of
buildings

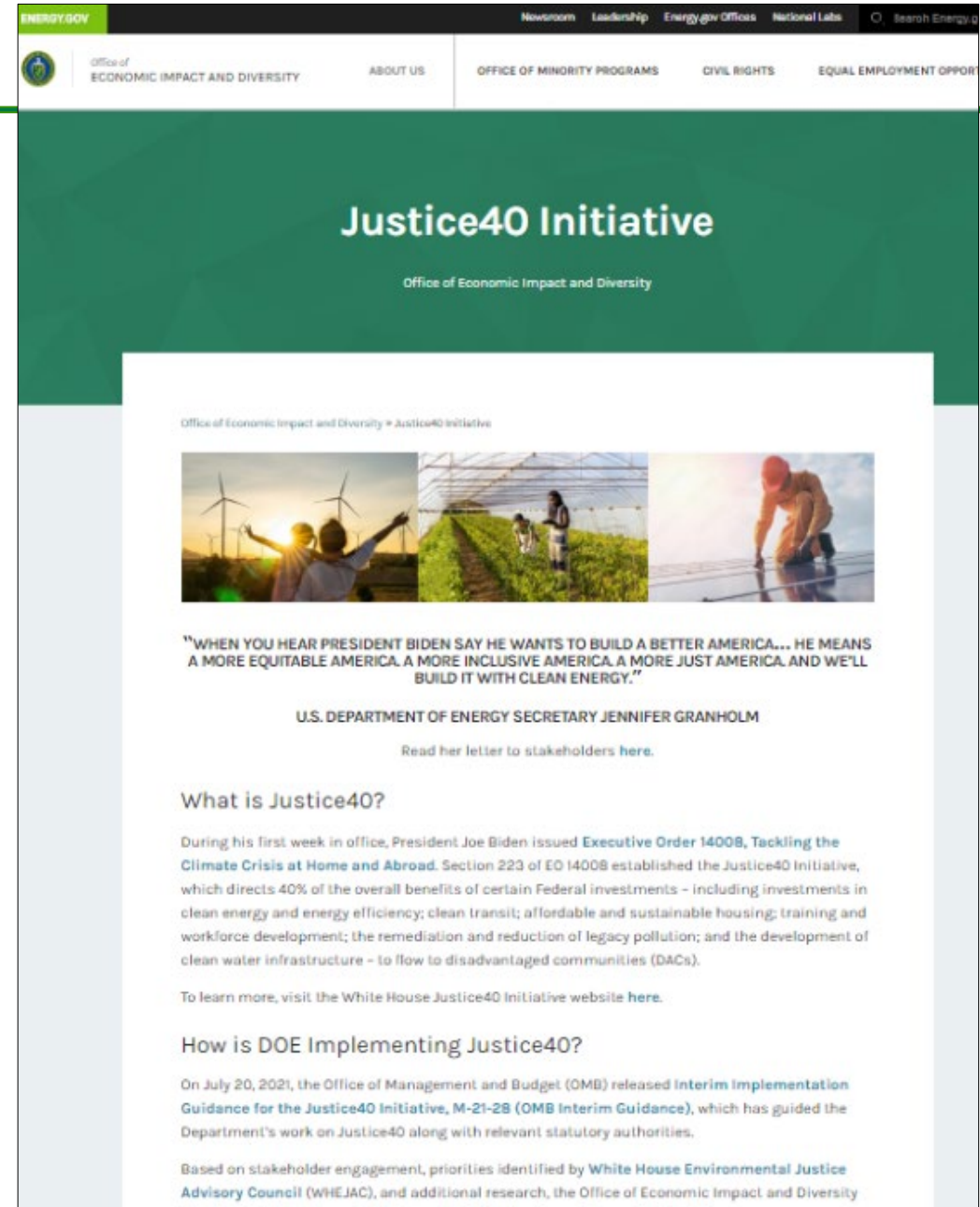
Decarbonizing the
agriculture sector,
specifically focused
on the nexus
between energy and
water

Decarbonizing the
electricity sector

DOE Justice40 Policy Priorities

1. Decrease energy burden in disadvantaged communities (DACs)
2. Decrease environmental exposure and burdens for DACs
3. Increase parity in clean energy technology (e.g., solar, storage) access and adoption in DACs.
4. Increase access to low-cost capital in DACs.
5. Increase clean energy enterprise creation in DACs.
6. Increase the clean energy job pipeline and job training for individuals from DACs.
7. Increase energy resiliency in DACs.
8. Increase energy democracy in DACs.

<https://www.energy.gov/diversity/justice40-initiative>



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Justice40 Initiative

Office of Economic Impact and Diversity

Office of Economic Impact and Diversity » Justice40 Initiative



"WHEN YOU HEAR PRESIDENT BIDEN SAY HE WANTS TO BUILD A BETTER AMERICA... HE MEANS A MORE EQUITABLE AMERICA. A MORE INCLUSIVE AMERICA. A MORE JUST AMERICA. AND WE'LL BUILD IT WITH CLEAN ENERGY."

U.S. DEPARTMENT OF ENERGY SECRETARY JENNIFER GRANHOLM

[Read her letter to stakeholders here.](#)

What is Justice40?

During his first week in office, President Joe Biden issued [Executive Order 14008, Tackling the Climate Crisis at Home and Abroad](#). Section 223 of EO 14008 established the Justice40 Initiative, which directs 40% of the overall benefits of certain Federal investments – including investments in clean energy and energy efficiency; clean transit; affordable and sustainable housing; training and workforce development; the remediation and reduction of legacy pollution; and the development of clean water infrastructure – to flow to disadvantaged communities (DACs).

To learn more, visit the White House Justice40 Initiative website [here](#).

How is DOE Implementing Justice40?

On July 20, 2021, the Office of Management and Budget (OMB) released [Interim Implementation Guidance for the Justice40 Initiative, M-21-28 \(OMB Interim Guidance\)](#), which has guided the Department's work on Justice40 along with relevant statutory authorities.

Based on stakeholder engagement, priorities identified by White House Environmental Justice Advisory Council (WHEJAC), and additional research, the Office of Economic Impact and Diversity

Federal Justice40 Initiative – Year 1

1/21
EO14008
Establishes
J40 Initiative

Agencies create
interim working
DAC definitions
for J40

2/22
CEQ Releases
BETA Climate
and Economic
Justice
Screening Tool

7/21
OMB Interim
Implementation
Guidance

- Provides Interim Definition of Disadvantaged Communities (DACs)
- Requires agencies submit J40 metrics by 12/21

12/21
Agencies
deadline to
submit J40
metrics to OMB

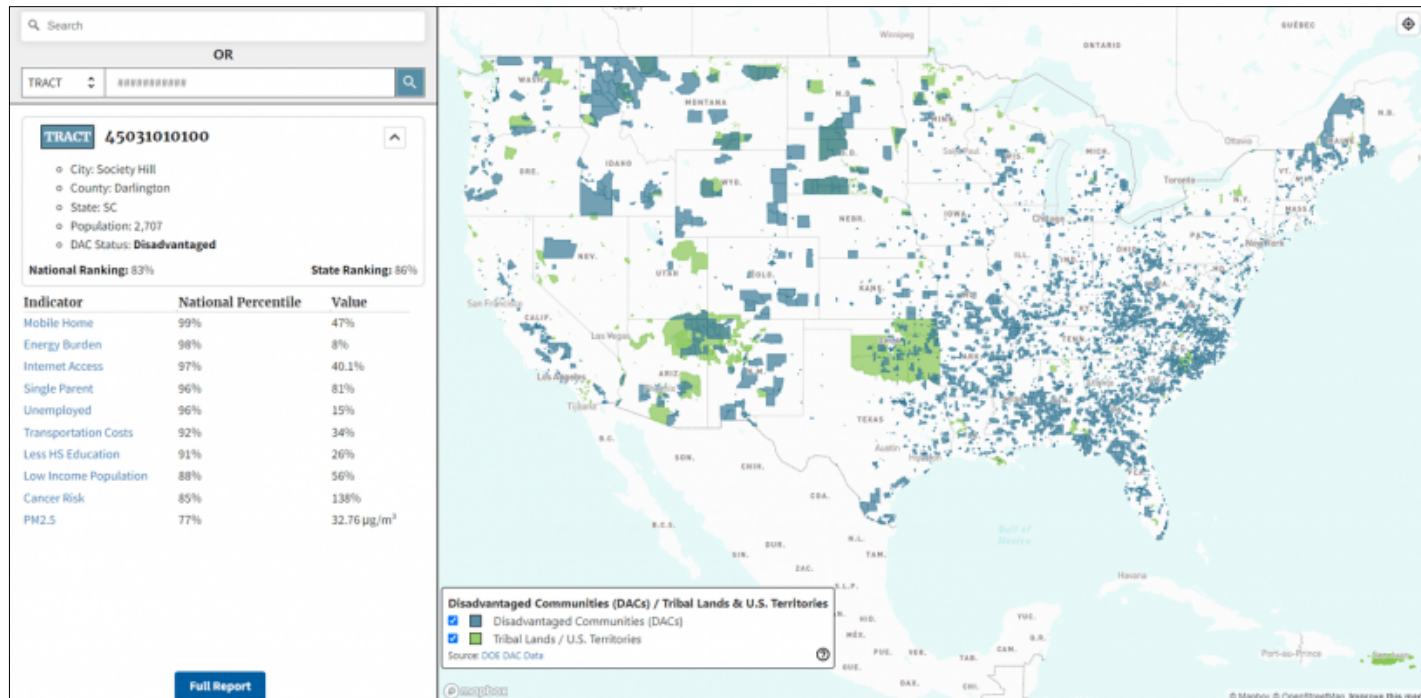
DOE's Working Disadvantaged Communities (DAC) Definition

Tool #1: Energy Justice Mapping Tool - Disadvantaged Communities Reporter

<https://energyjustice.egs.anl.gov/>

DOE's working definition of *disadvantaged* is based on cumulative burden and includes data for thirty-six (36) burden indicators collected at the census tract level.

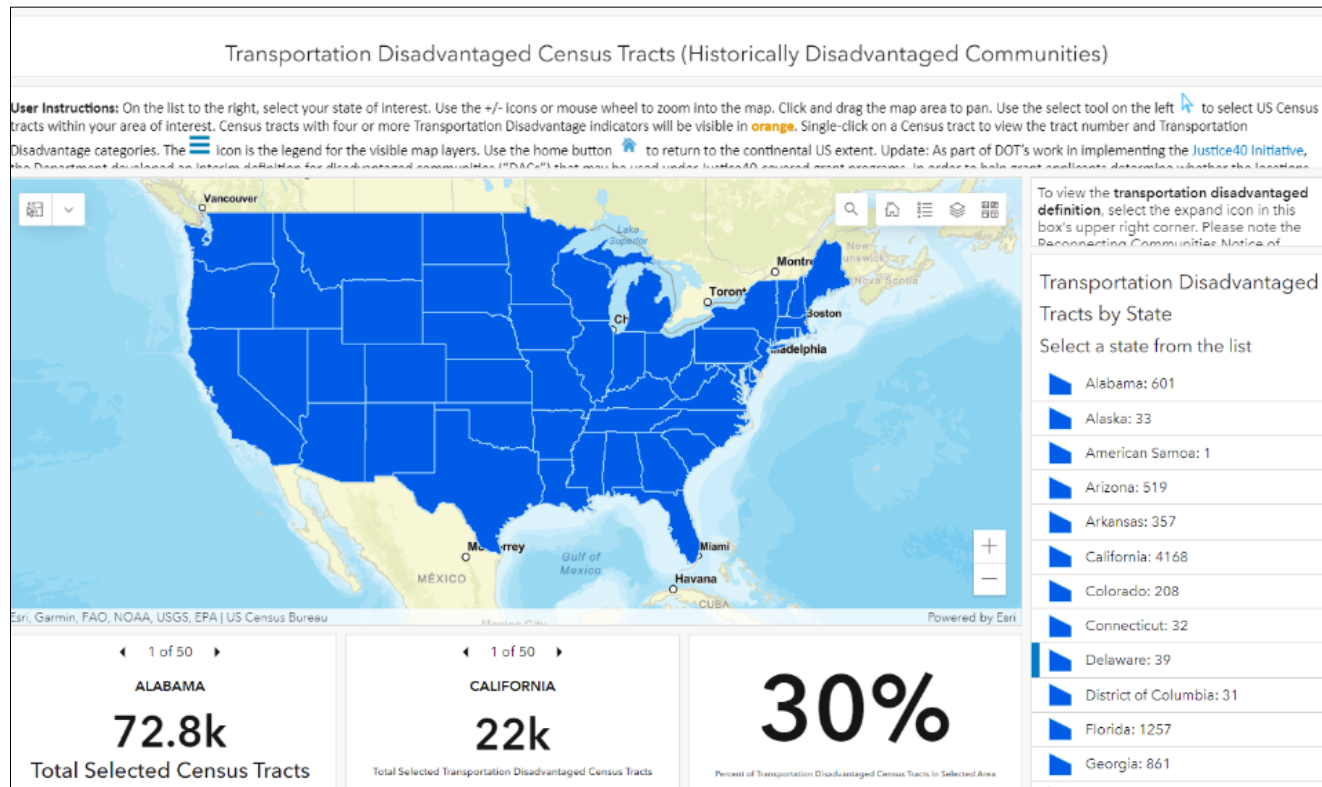
- Fossil Dependence (2)
- Energy Burden (5)
- Environmental and Climate Hazards (10)
- Socio-economic Vulnerabilities (19)



DOT's Working Disadvantaged Communities (DAC) Definition

Tool #2: Transportation Disadvantaged Census Tracts

<https://www.transportation.gov/equity-Justice40>



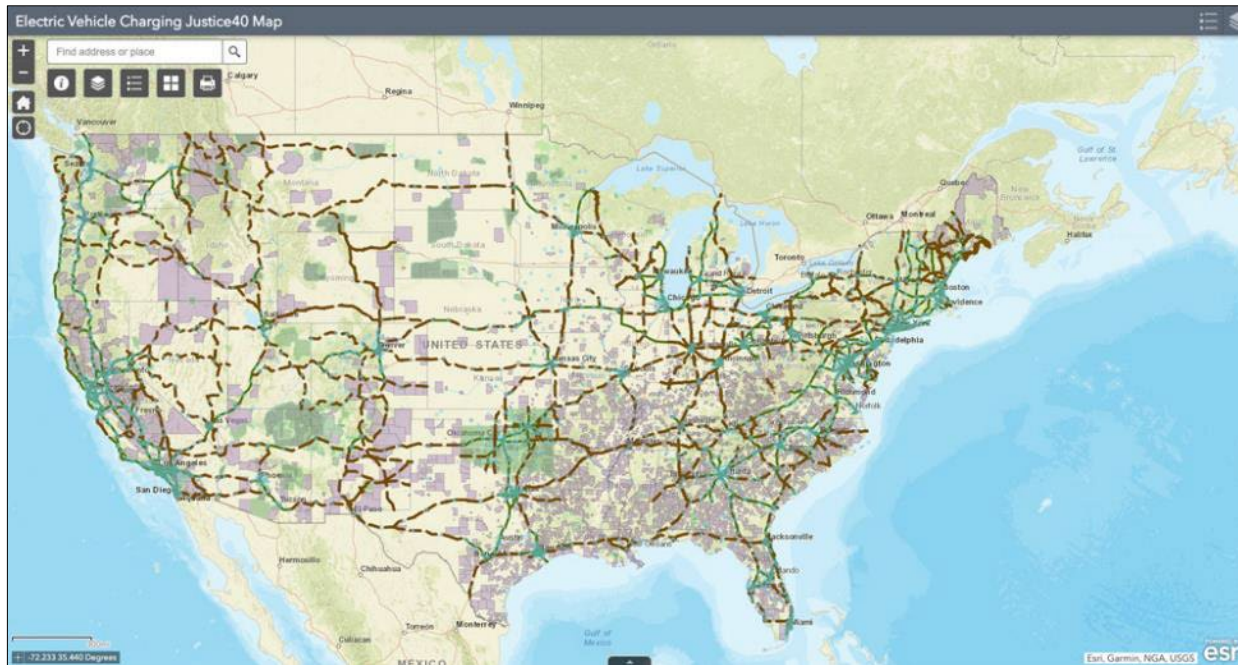
The U.S. Department of Transportation's (DOT) working definition of DACs includes data for 22 indicators collected at the census tract level and grouped into 6 categories of transportation disadvantage.

- Transportation access disadvantage (4)
- Health disadvantage (3)
- Environmental disadvantage (6)
- Economic disadvantage (7)
- Resilience disadvantage (1)
- Equity disadvantage (1)

National Electric Vehicle Infrastructure Program DAC Definition

Tool #3: Electric Vehicle (EV) Charging Justice40 Map Tool

<https://www.anl.gov/esia/electric-vehicle-charging-equity-considerations>



DOT and DOE developed a joint interim definition of disadvantaged communities (DACs) for the National Electric Vehicle Infrastructure (NEVI) Program including:

- Census tracts from DOT's working DAC definition;
- Census tracts from DOE's working DAC definition;
- Tribal Lands; and
- U.S. Territories.

White House Council on Environmental Quality (CEQ) BETA Tool

Tool #4: Climate and Economic Justice Screening Tool (CEJST) - BETA

<https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5>

Specific formulas for identifying DACs by category:

- Climate change
- Clean energy and energy efficiency
- Clean transit
- Affordable and sustainable housing
- Reduction and remediation of legacy pollution
- Critical clean water and wastewater infrastructure
- Health burdens
- Training and workforce development

Climate and Economic Justice Screening Tool **BETA**

Explore the map

Use the map to see communities that are identified as disadvantaged. The map uses publicly-available, nationally-consistent datasets. Learn more about the methodology and datasets that were used to identify disadvantaged communities in the current version of the map on the [Methodology & data](#) page.

Federal Defining Disadvantaged Communities (DACs) Tools

Tool #1: Energy Justice Mapping Tool	U.S. Department of Energy (DOE)	<ul style="list-style-type: none">• <i>Energy</i>
Tool #2: Transportation Disadvantaged Census Tracts	U.S. Department of Transportation (DOT)	<ul style="list-style-type: none">• <i>Transportation</i>
Tool #3: Electric Vehicle (EV) Charging Justice40 Map Tool	National Electric Vehicle Infrastructure (NEVI) Program	<ul style="list-style-type: none">• <i>Electric Vehicle Charging Infrastructure (Transportation + Energy)</i>
Tool #4: Climate and Economic Justice Screening Tool (CEJST) - BETA	White House Council on Environmental Quality (CEQ)	<ul style="list-style-type: none">• <i>Climate change</i>• <i>Clean energy and energy efficiency</i>• <i>Clean transit</i>• <i>Affordable and sustainable housing</i>• <i>Reduction and remediation of legacy pollution</i>• <i>Critical clean water and wastewater infrastructure</i>• <i>Health burdens</i>• <i>Training and workforce development</i>

Additional Relevant Mapping Tools (not DAC definitions)

EPA's EJScreen: Environmental Justice Screening and Mapping Tool



United States Environmental Protection Agency

Search EPA.gov

Environmental Topics ▾ Laws & Regulations ▾ Report a Violation ▾ About EPA ▾

EJScreen: Environmental Justice Screening and Mapping Tool

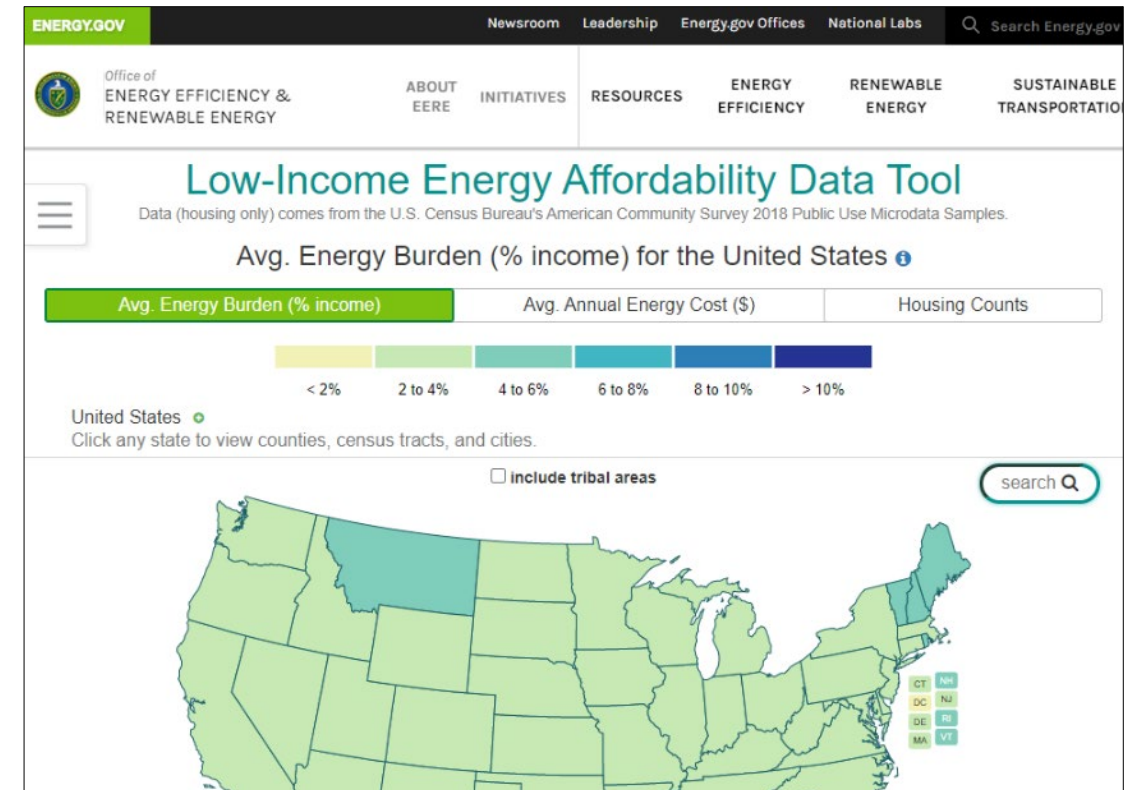
CONTACT US

Launch the EJScreen Tool

[Explore EPA's environmental justice screening and mapping tool](#)

<https://www.epa.gov/ejscreen>

DOE's Low-Income Energy Affordability Data (LEAD) Tool



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Low-Income Energy Affordability Data Tool

Data (housing only) comes from the U.S. Census Bureau's American Community Survey 2018 Public Use Microdata Samples.

Avg. Energy Burden (% income) for the United States

Avg. Energy Burden (% income) Avg. Annual Energy Cost (\$) Housing Counts

< 2% 2 to 4% 4 to 6% 6 to 8% 8 to 10% > 10%

United States Click any state to view counties, census tracts, and cities.

Include tribal areas

search

<https://www.energy.gov/eere/slsc/maps/lead-tool>

EJScreen: Environmental Justice Screening and Mapping Tool

EJScreen includes:


- 12 environmental indicators
- 7 demographic indicators
- 12 EJ indexes
 - combines demographic factors with a single environmental factor
 - does not combine various environmental factors into a cumulative score

The screenshot displays the EPA EJScreen interface. At the top, it reads "EPA EJScreen EPA's Environmental Justice Screening and Mapping Tool (Version 2.0)". The main map area shows California with a search bar and navigation icons. On the left, a sidebar contains several menu items: "Compare to US" (selected), "Compare to State", "Environmental Justice Indexes", "Pollution and Sources", "Socioeconomic Indicators", "Health Disparities", "Climate Change Data", "Critical Service Gaps", and "More Demographics". On the right, a "Map Contents" panel lists "EJ Indexes" with a legend for "Particulate Matter 2.5 (State Percentiles)" showing color-coded ranges: 95-100 percentile (red), 90-95 percentile (orange), 80-90 percentile (yellow), and 70-80 percentile (light yellow). Below the map, two expanded panels are visible: "Environmental Justice Indexes" listing 12 indicators (Particulate Matter 2.5, Ozone, 2017 Diesel Particulate Matter, 2017 Air Toxics Cancer Risk, 2017 Air Toxics Respiratory HI, Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Proximity, Hazardous Waste Proximity, Underground Storage Tanks, Wastewater Discharge) and "Socioeconomic Indicators" listing 7 indicators (Demographic Index, People of Color, Low Income, Unemployment Rate, Linguistically Isolated, Less Than High School Education, Under Age 5, Over Age 64).

EV Charging Equity Mapping Tools and Approaches

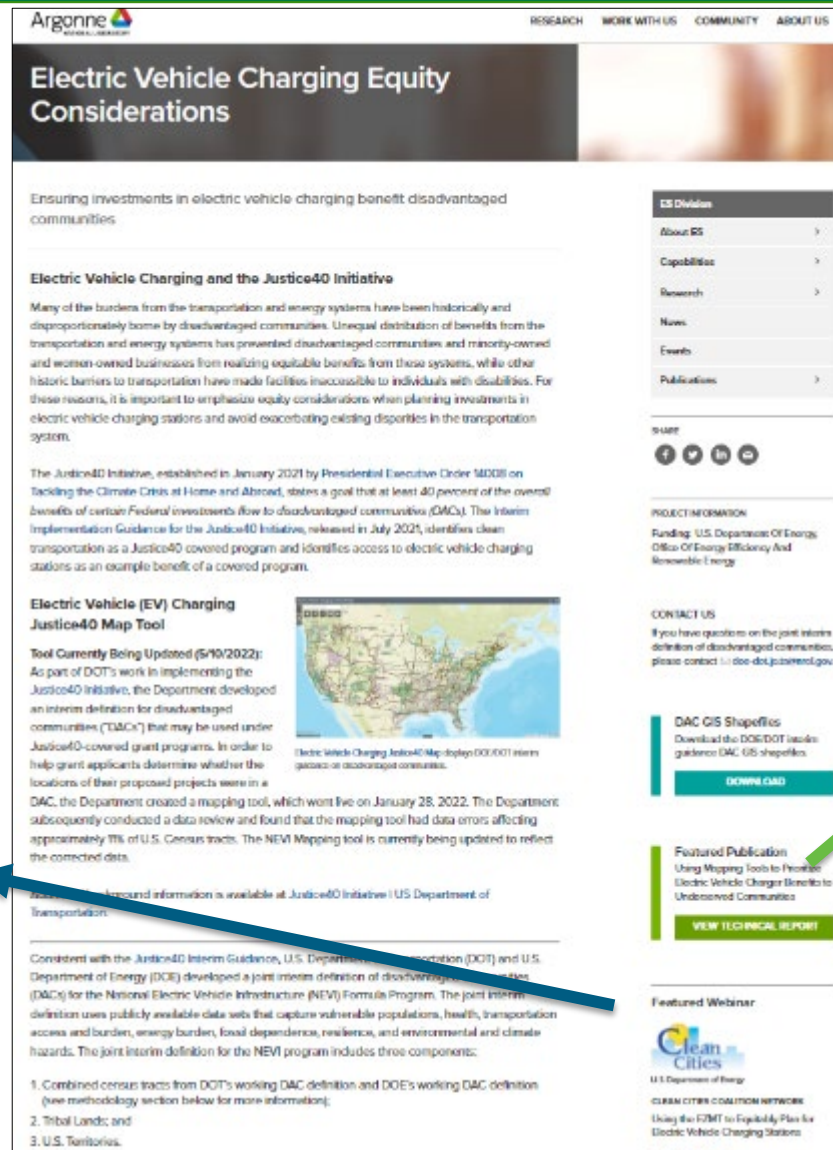
EQUITY MAPPING LAYERS IN THE EZMT

- EPA EJScreen 2020 (includes 28 equity metrics)
- EPA Class I Areas
- Household transportation energy burden
- Households without vehicles
- Housing – Units in multi-unit structures
- Housing – Mobile home units
- HUD opportunity zones
- Low-income percentage
- Minority percentage
- National air quality standard areas (7 types)
- Population density
- Rural areas
- Transit desert index
- Tribal reservation



Household transportation energy burden with EV charging stations and designated EV corridors in the EZMT

Mapping layers can be viewed and queried on the map, and downloaded



Electric Vehicle Charging Equity Considerations

Ensuring investments in electric vehicle charging benefit disadvantaged communities

Electric Vehicle Charging and the Justice40 Initiative

Many of the burdens from the transportation and energy systems have been historically and disproportionately borne by disadvantaged communities. Unequal distribution of benefits from the transportation and energy systems has prevented disadvantaged communities and minority-owned and women-owned businesses from realizing equitable benefits from these systems, while other historic barriers to transportation have made facilities inaccessible to individuals with disabilities. For these reasons, it is important to emphasize equity considerations when planning investments in electric vehicle charging stations and avoid exacerbating existing disparities in the transportation system.

The Justice40 Initiative, established in January 2021 by Presidential Executive Order 14035 on Tackling the Climate Crisis at Home and Abroad, states a goal that at least 40 percent of the overall benefits of certain Federal investments flow to disadvantaged communities (DACs). The Interim Implementation Guidance for the Justice40 Initiative, released in July 2023, identifies clean transportation as a Justice40 covered program and identifies access to electric vehicle charging stations as an example benefit of a covered program.

Electric Vehicle (EV) Charging Justice40 Map Tool

Tool Currently Being Updated (5/10/2022): As part of DOT's work in implementing the Justice40 Initiative, the Department developed an interim definition for disadvantaged communities ("DACs") that may be used under Justice40-covered grant programs. In order to help grant applicants determine whether the locations of their proposed projects were in a DAC, the Department created a mapping tool, which went live on January 28, 2022. The Department subsequently conducted a data review and found that the mapping tool had data errors affecting approximately 1% of U.S. Census tracts. The NEVI Mapping tool is currently being updated to reflect the corrected data.

Additional background information is available at Justice40 Initiative | U.S. Department of Transportation

Consistent with the Justice40 Interim Guidance, U.S. Department of Transportation (DOT) and U.S. Department of Energy (DOE) developed a joint interim definition of disadvantaged communities (DACs) for the National Electric Vehicle Infrastructure (NEVI) Formula Program. The joint interim definition uses publicly available data sets that capture vulnerable populations, health, transportation access and burden, energy burden, food dependence, resilience, and environmental and climate hazards. The joint interim definition for the NEVI program includes three components:

1. Combined census tracts from DOT's working DAC definition and DOE's working DAC definition (see methodology section below for more information);
2. Tribal Lands; and
3. U.S. Territories.

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PROJECT INFORMATION

Funding: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy

CONTACT US

If you have questions on the joint interim definition of disadvantaged communities, please contact doe-dot.justice40.gov.

DAC GIS Shapefiles

Download the DOE/DOT Interim Guidance DAC GIS shapefiles

DOWNLOAD

Featured Publication

Using Mapping Tools to Prioritize Electric Vehicle Charger Benefits to Underserved Communities

VIEW TECHNICAL REPORT

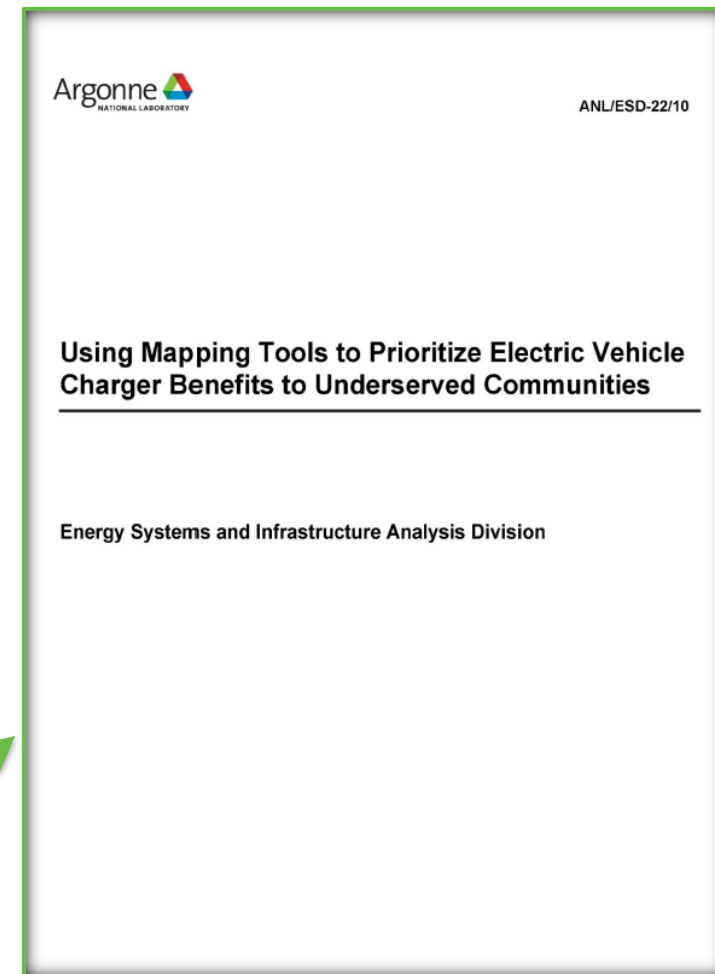
Featured Webinar

Clean Cities

U.S. Department of Energy

CLEAN CITIES COALITION NETWORK

Using the EZMT to Equitably Plan for Electric Vehicle Charging Stations



Argonne NATIONAL LABORATORY

ANL/ESD-22/10

Using Mapping Tools to Prioritize Electric Vehicle Charger Benefits to Underserved Communities

Energy Systems and Infrastructure Analysis Division

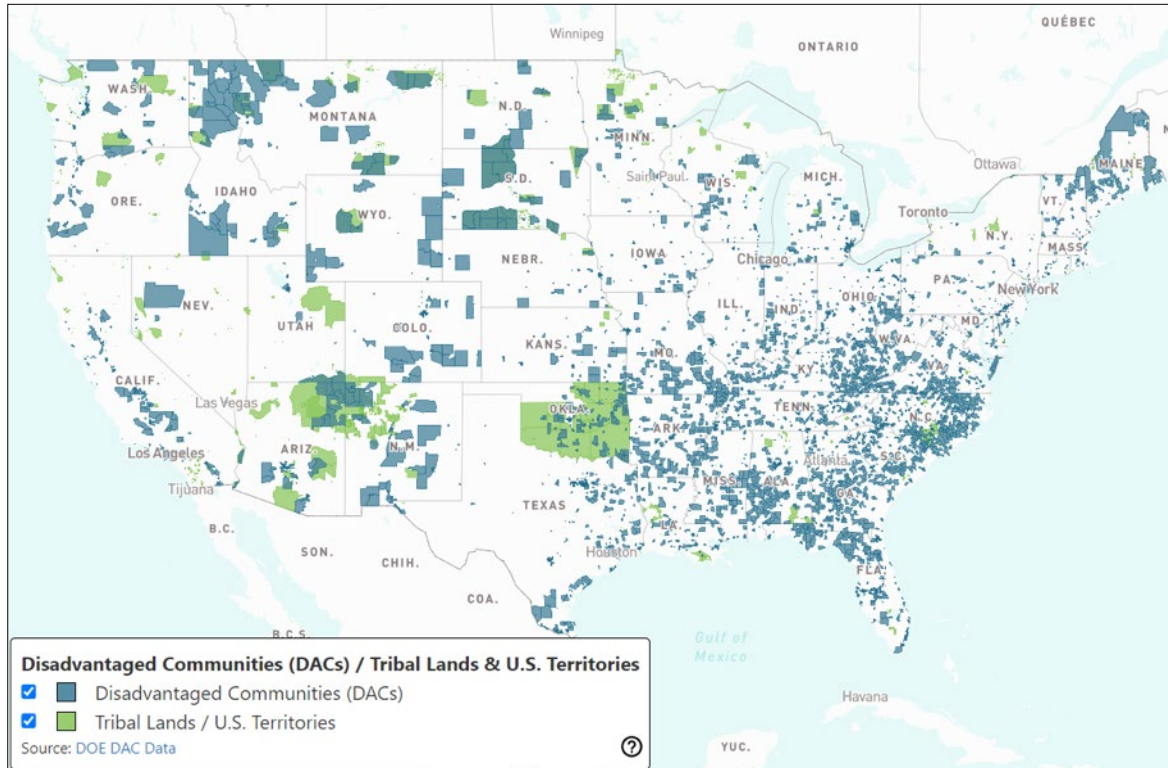
Report Released May 2022

Using the Energy Zones Mapping Tool to Equitably Plan for Electric Vehicle Charging Stations (webinar)

<https://www.anl.gov/esia/electric-vehicle-charging-equity-considerations>

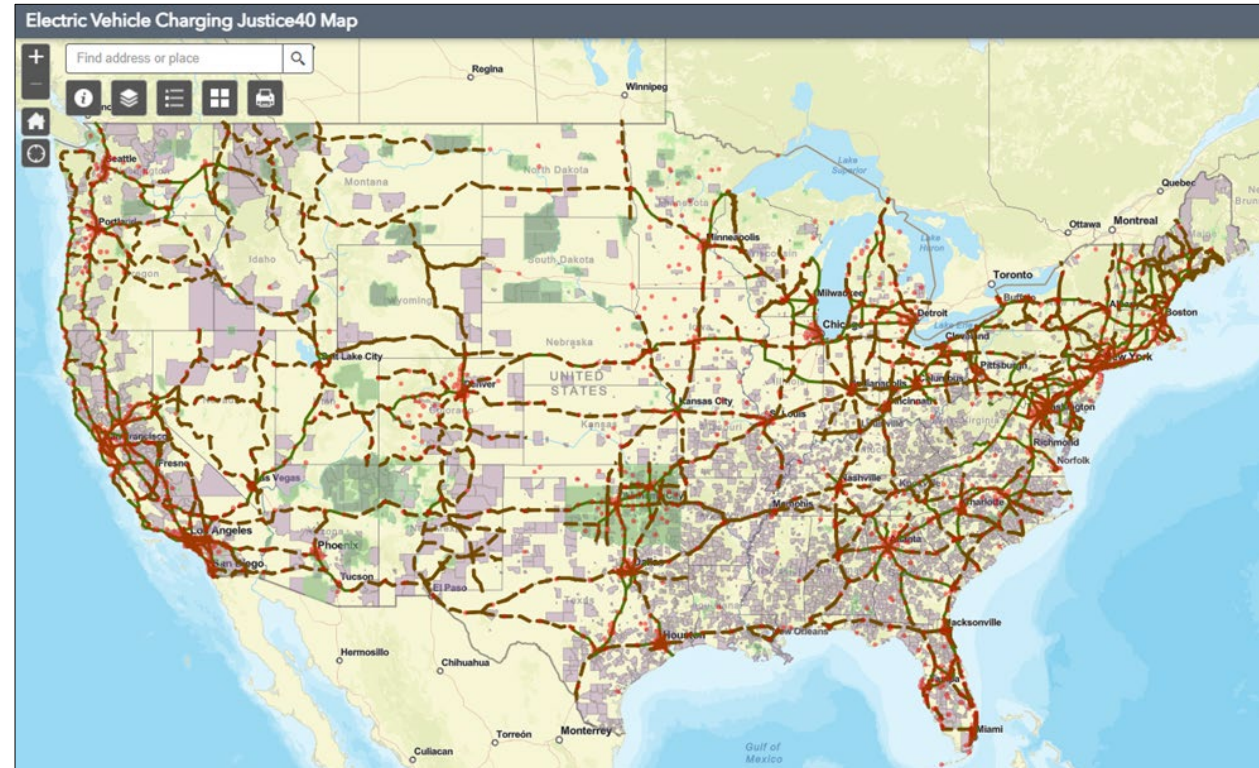
Tool Demo: DOE and the DOT/DOE Joint Office Mapping Tools

DOE Energy Justice Mapping Tool



<https://www.energy.gov/diversity/justice40-initiative>

EV Charging Justice40 Map



<https://www.anl.gov/es/electric-vehicle-charging-equity-c>

The Energy Zones Mapping Tool (EZMT)

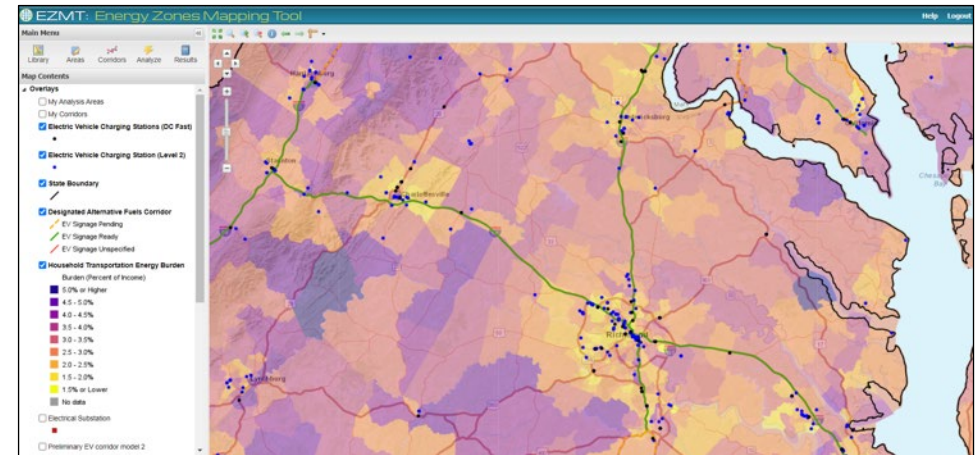
- Public web-based mapping tool
- Mapping library includes over 360 layers gathered from publicly available data
 - Energy resources
 - Energy infrastructure
 - Siting factors
 - Reference data
- Suitability models highlight locations meeting specific siting criteria (including equity)
- An updated system will be released soon (Geospatial Energy Mapper – GEM)



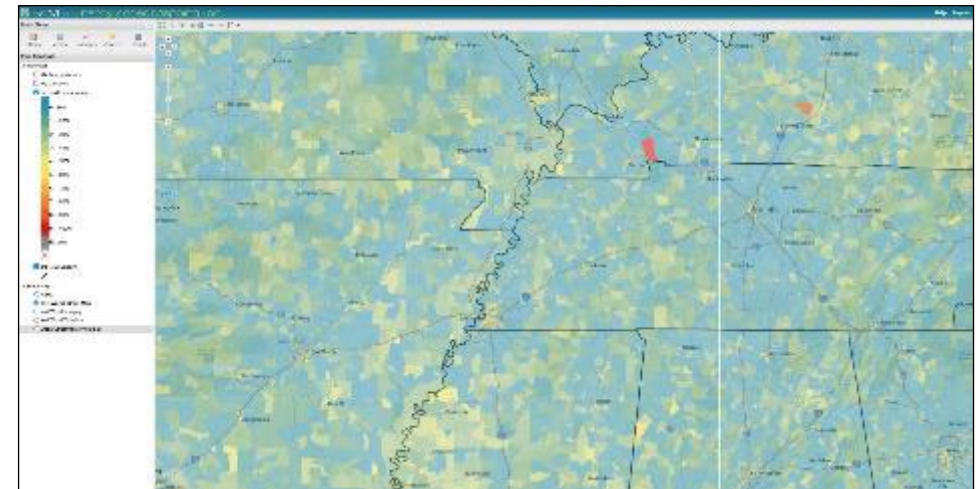
<https://ezmt.anl.gov>

Equity-focused Modeling Layers Facilitate Factoring Equity into Planning Decisions

- DOE/DOT Interim Guidance DACs and Tribal Lands
- Household Transportation Energy Burden
- Housing Density – Large Multi-family
- Housing Density – Manufactured
- Low-income Percentage
- Minority Percentage
- Percentage of Households Lacking a Vehicle
- Population Density (e.g., Rural Areas)
- Public Transit Stop Density
- Transit Desert Index
- More will be added – Let us know what would be useful to you at ezmt@anl.gov.

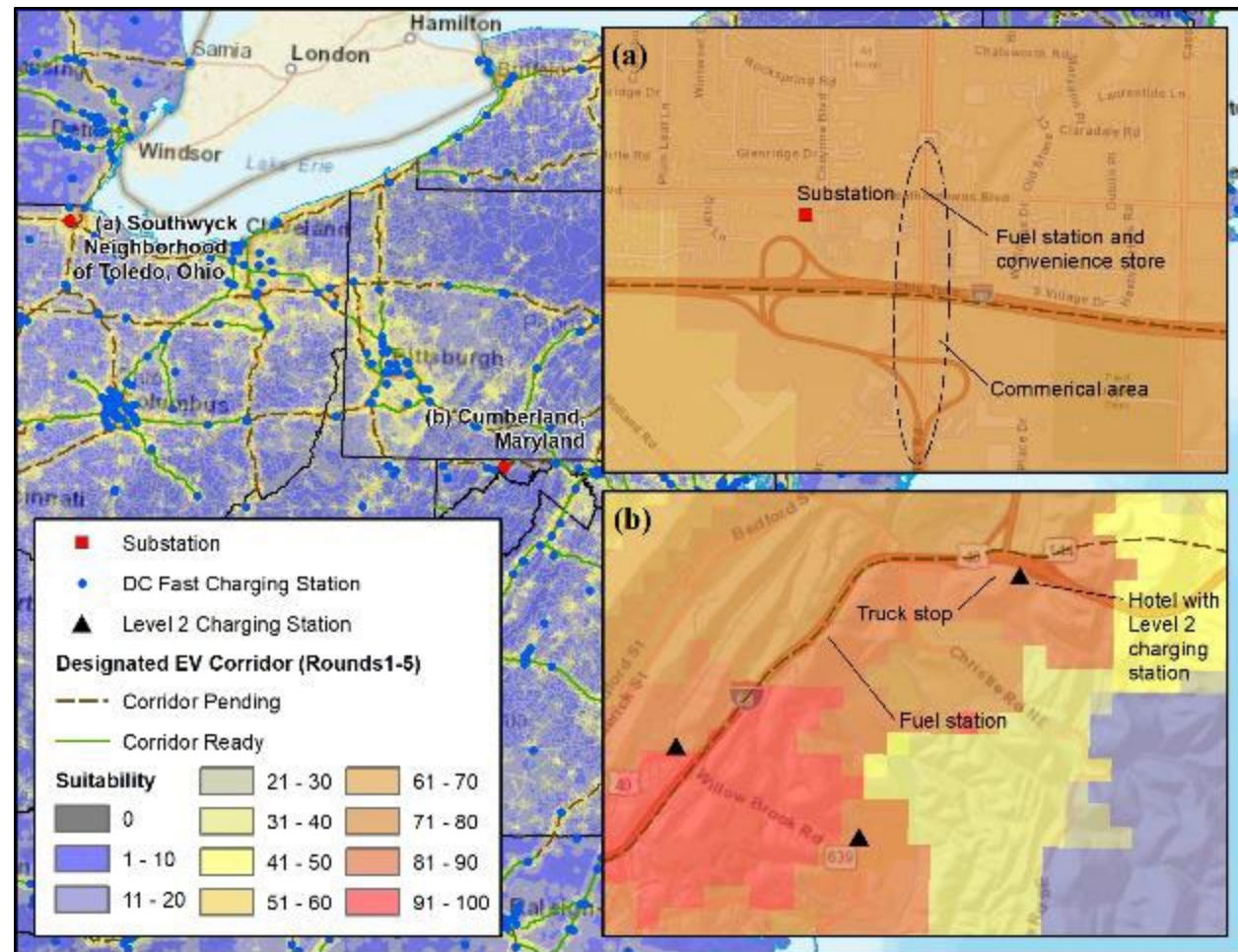
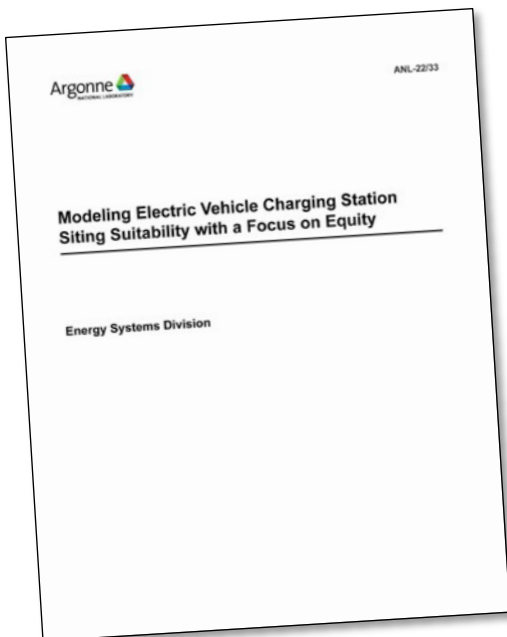


Household transportation energy burden with EV charging stations and designated EV corridors in the EZMT



Low-Income Percentage

Suitability Models Highlight Locations Meeting Specific Siting Criteria



Report: “Modeling Electric Vehicle Charging Station Siting Suitability with a Focus on Equity”

- Examples and discussion of modeling process
- Step by step EZMT guide in the appendix

Corridor model results for Ohio, western Pennsylvania, and surrounding areas with enlarged examples

Case Study 1: DACs with a High Environmental Burden (PM2.5)

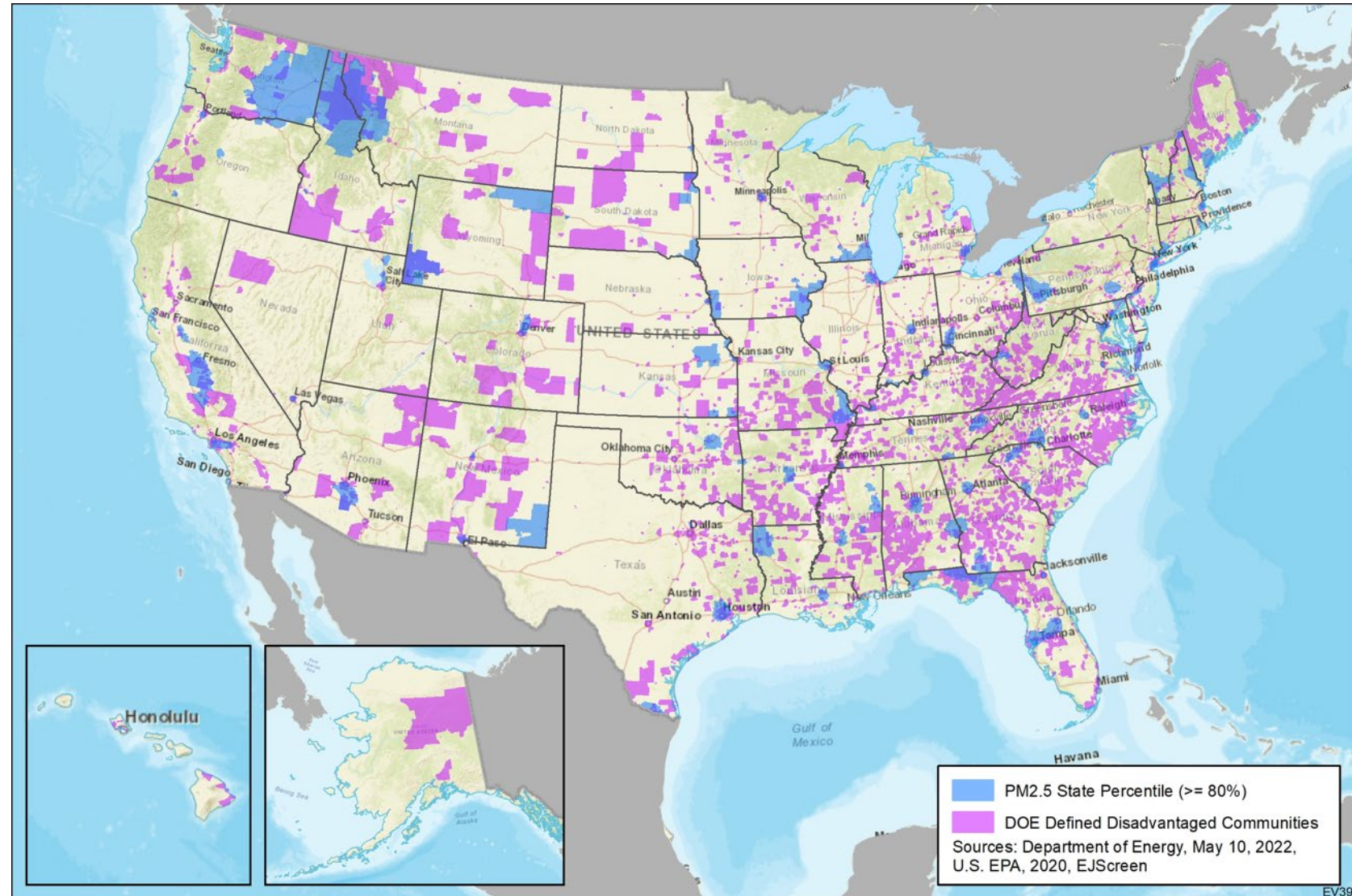
Objective: Identify DOE DACs that have a high environmental burden (air pollution)

Map Layers:

- DOE-defined DACs
- PM2.5 (above 80th percentile by state)

J40 Priority: Decrease environmental exposure and burdens for DACs

EERE Principle: Address environmental injustices



EV39

Case Study 1: DACs with a High Environmental Burden (PM2.5)

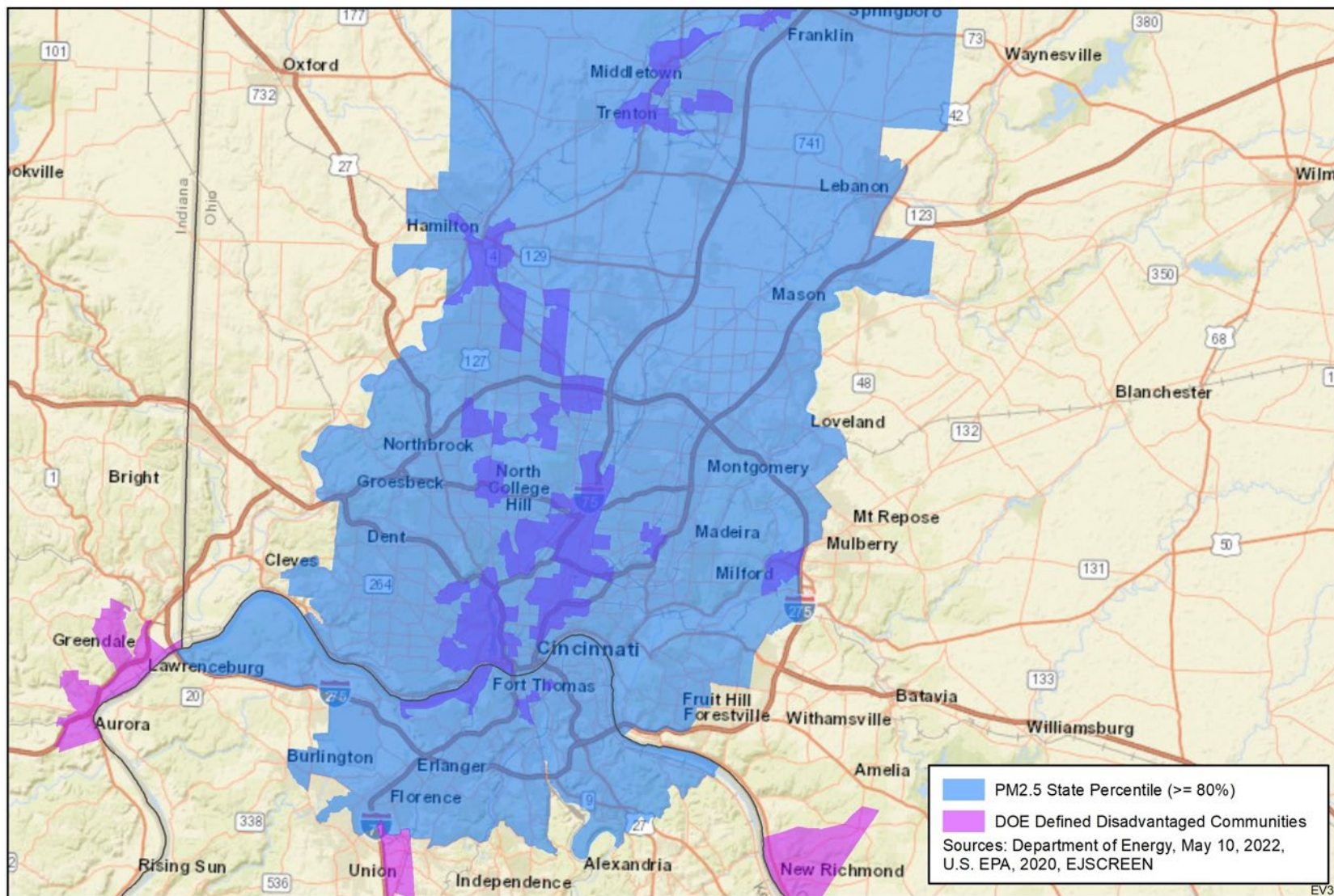
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Case Study 2: DACs and Communities of Color

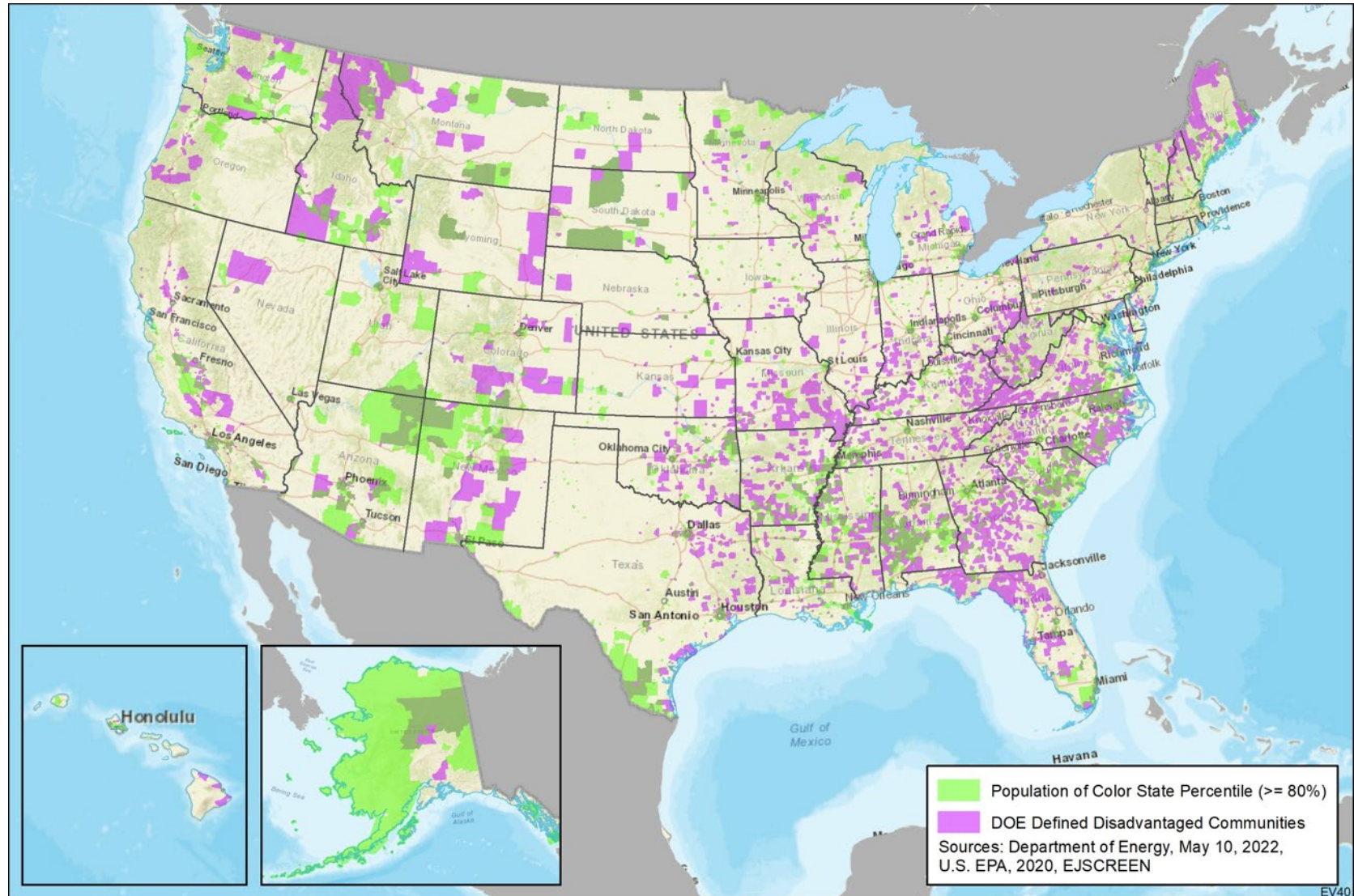
Objective: Identify overlaps between DOE DACs and communities of color

May Layers:

- DOE-defined DACs
- % population of color (above 80th percentile by state)

J40 Priority: Increase clean energy job pipeline and job training for individuals from DACs

EERE Principle: Foster a diverse STEM workforce



Case Study 2: DACs and Communities of Color

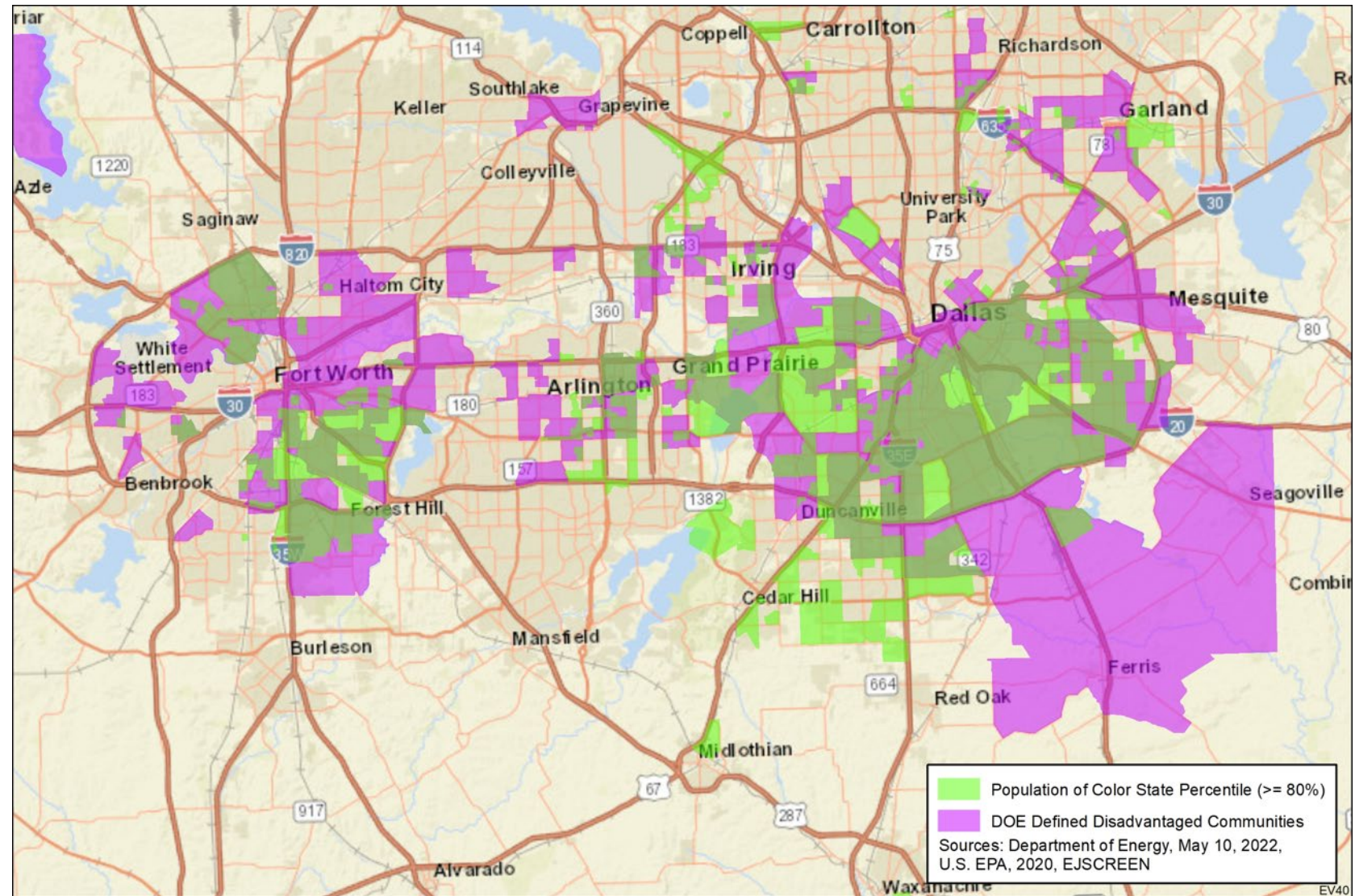
Objective: Identify overlaps between DOE DACs and communities of color

Map Layers:

- DOE-defined DACs
- % population of color (above 80th percentile by state)

J40 Priority: Increase clean energy job pipeline and job training for individuals from DACs

EERE Principle: Foster a diverse STEM workforce



Case Study 3: DACs with a High Transportation Energy Burden

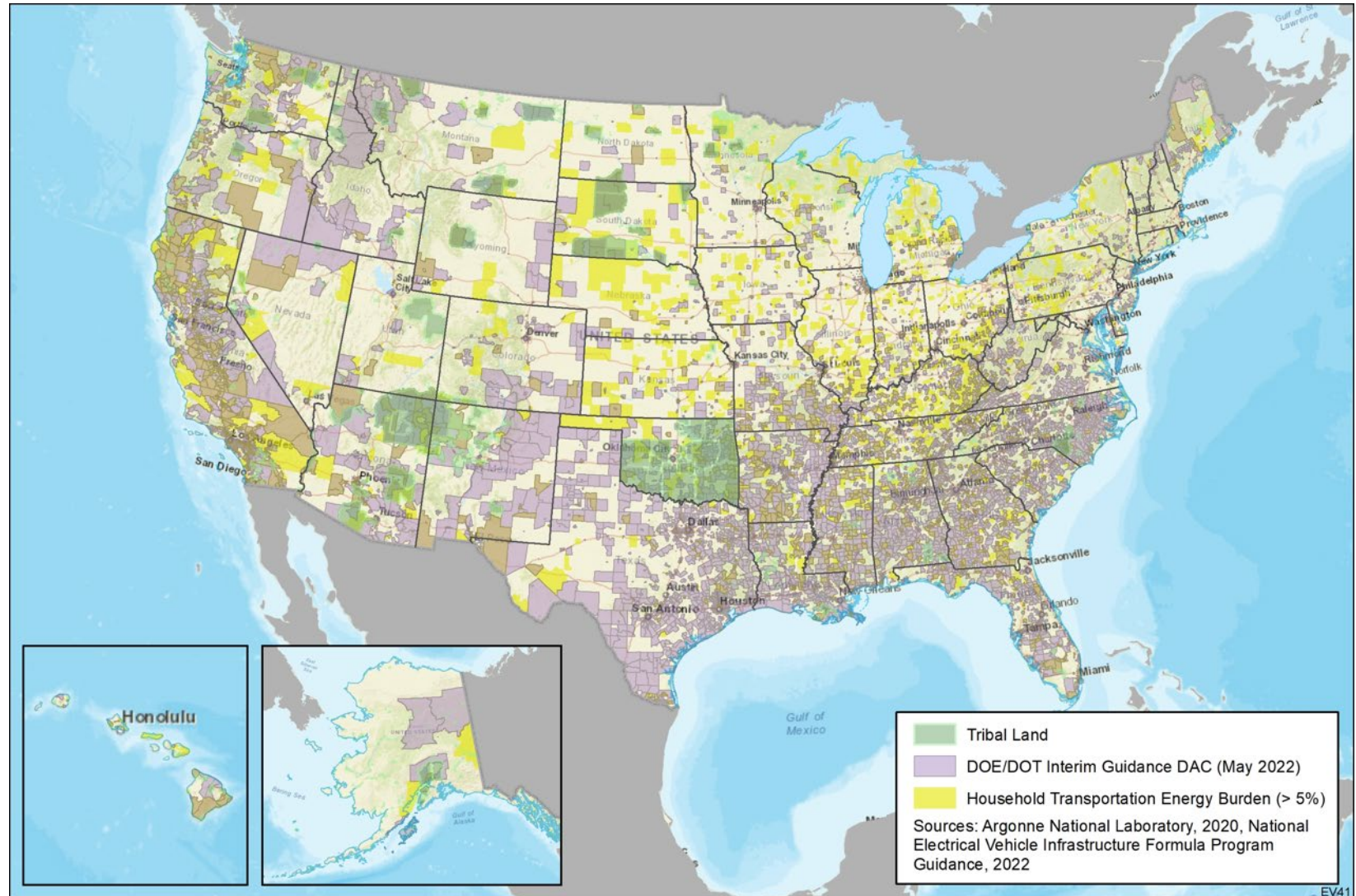
Objective: Identify DACs (joint DOE/DOT definition) that have a high transportation energy burden

Map Layers:

- Joint DOE/DOT DAC definition
- Transportation Energy Burden (over 5% of household budget)

J40 Priority: Decrease energy burden in DACs

EERE Principle: Build the clean energy economy



Case Study 3: DACs with a High Transportation Energy Burden

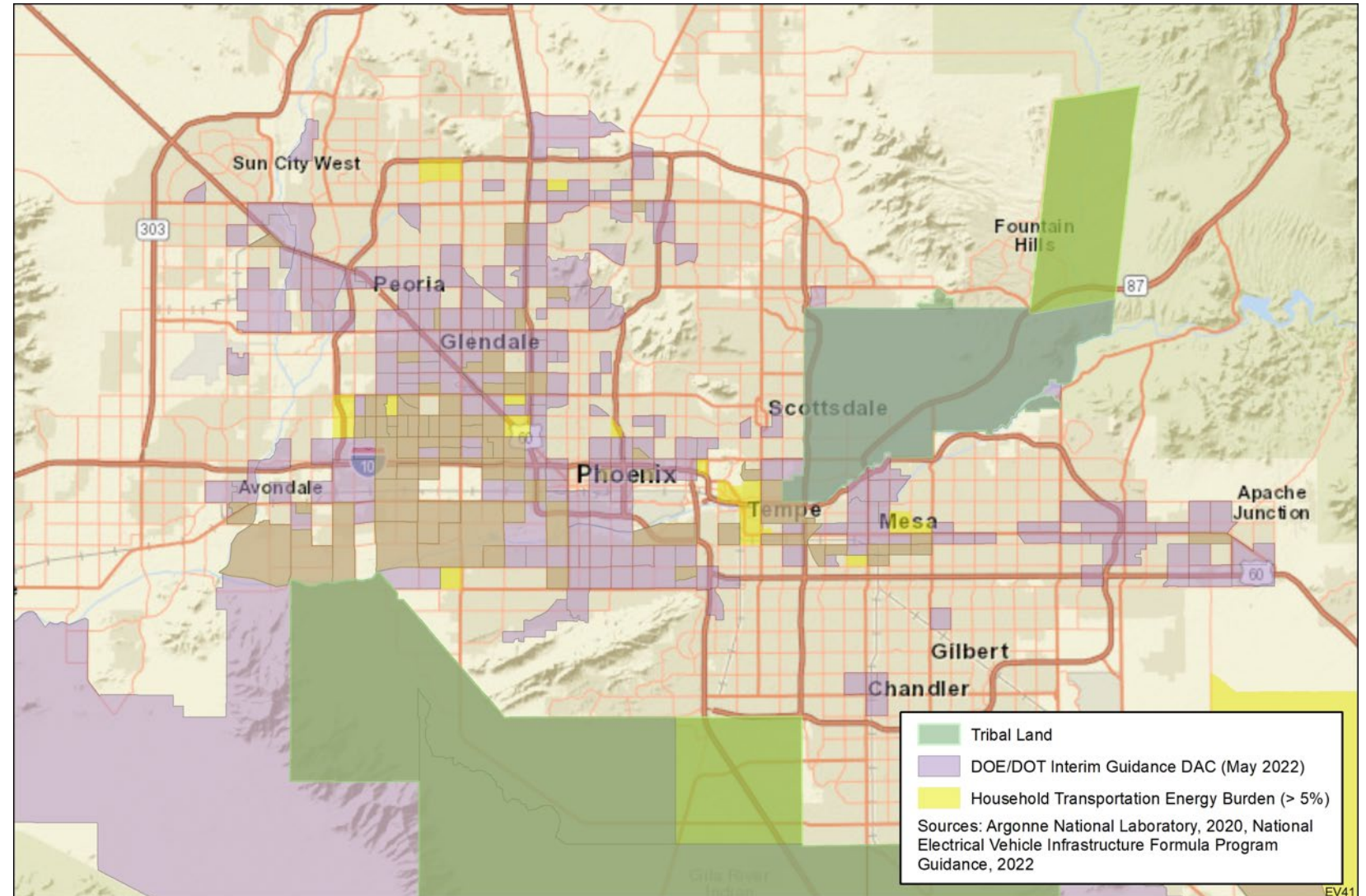
Objective: Identify DACs (joint DOE/DOT definition) that have a high transportation energy burden

Map Layers:

- Joint DOE/DOT DAC definition
- Transportation Energy Burden (over 5% of household budget)

J40 Priority: Decrease energy burden in DACs

EERE Principle: Build the clean energy economy



Equity Guiding Principles For Underserved Community Benefits

Determine the targeted underserved communities

Incorporate community education, outreach, and engagement

Empower communities to co-create the process

Identify equity goals and metrics

Actively avoid causing disbenefits

Identify synergistic funding sources for comprehensive solutions

Measure equity metrics and track progress towards equity goals

From report: Using Mapping Tools to Prioritize Electric Vehicle Charger Benefits to Underserved Communities



THANK YOU

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