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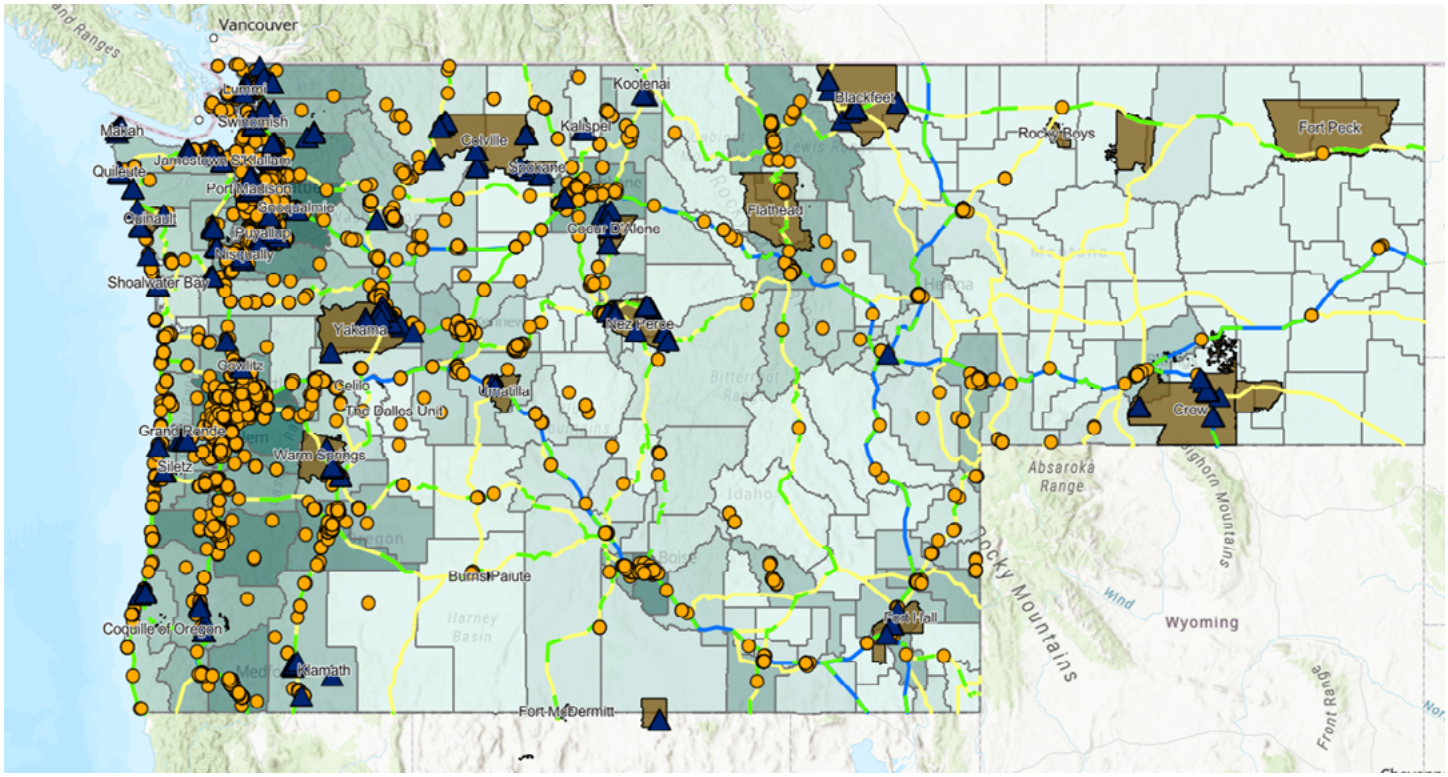
Moving forward with Washington's public fleets

EV Mapping Tool for Tribal Nations User Guide



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WSU Energy Program

Our mission is to advance environmental and economic well-being by providing unmatched energy services, products, education and information based on world-class research. Our staff of energy engineers, energy specialists, technical experts and software developers work out of Olympia, Washington. The WSU Energy Program is a self-supported department within the WSU College of Agricultural, Human and Natural Resource Sciences.

Green Transportation Program

In 2019, the WSU Energy Program established the Green Transportation Program to provide unbiased education and technical assistance to support the transition of public fleets to cleaner fuels, including electricity and renewable hydrogen. The public entities served in this effort include cities, counties, transit agencies, school districts, colleges and universities, utilities and PUDs, tribes, ports, and other state political subdivisions.

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The NW Tribal EV Mapping Tool

The Northwest Tribal Electic Vehicle (EV) Mapping Tool is a tribal-focused tool to help Tribes plan, fund, and manage EV infrastructure, identify opportunities and gaps, and build partnerships. It is designed to support Tribal nations in making informed, data-driven decisions about EV infrastructure. By integrating Tribal, state, and federal datasets into a single interactive map, the tool supports both near-term project planning and long-term transportation and energy strategies. The tool is available on ArcGIS Online and is built for Tribal leaders, planners, and members.

Access the tool: NW Tribal EV Mapping Tool

Ways to Use the Map

- **Identify Strategic EV Charging Locations:** Explore Points of Interest such as community centers, casinos, markets, and Tribal offices to pinpoint potential charging station sites with higher public visibility and vehicle traffic.
- **Assess EV Adoption and Demand:** Use the “EV Registration by County” layer to understand where electric vehicle ownership is growing and how it aligns with Tribal lands and nearby communities.
- **Understand Connectivity and Access:** Review the “Roads” layers (U.S. Highways, Interstates, and Alternative Fuel Corridors) to evaluate how existing routes and pending corridors intersect with Tribal lands. This helps identify corridor gaps or high-priority travel routes for future charging installations.
- **Consider Energy and Utility Partnerships:** Examine utility service territories to determine which providers operate in and around your Tribal areas. This information supports relationship building and coordination with utilities for project development and funding opportunities.
- **Overlay Environmental and Geographic Data:** Use the “Geographies” group to view Tribal boundaries, states, and environmental context (such as Justice40 data) to ensure planning efforts reflect both sovereignty and environmental justice priorities.

This Map Empowers Tribes to:

- Strengthen their role in EV infrastructure planning and clean energy transitions.
- Prepare for grant opportunities, funding applications, and technical assistance opportunities.
- Build strategic partnerships with state, federal, and private sector organizations.
- Ensure Tribal lands and communities are represented in regional and statewide EV planning.

StoryMap: Electric Vehicle Infrastructure & Tribal Lands in the Pacific Northwest

This user guide accompanies the WSU Tribal Green Transportation Project StoryMap, "**Electric Vehicle Infrastructure & Tribal Lands in the Pacific Northwest**," which provides narrative context, Tribal perspectives, and regional background on zero-emission vehicle readiness and infrastructure needs. The StoryMap highlights why EV infrastructure and clean transportation matter for Tribal Nations, including transportation cost burden, health and environmental impacts, and economic opportunities.

Authors: Michael Stewart & Bryan Strom Jr.

Feedback and Information

We welcome feedback, questions, and updates from Tribal leaders, planners, and community members. Your input helps improve the NW Tribal EV Mapping Tool and ensures it reflects the most accurate and useful data for Tribal communities.

For questions, feedback, or data updates, please contact:

- Bryan Strom Jr. – WSU Green Transportation Program – bryan.strom@wsu.edu
- Brad James – WSU Green Transportation Program Coordinator – bradley.james1@wsu.edu

Getting Started with the Tool

When you open the map link, ArcGIS Online will launch an interactive web map displaying the Northwest Tribal EV Planning region, which includes Washington, Oregon, Idaho, and Montana. By default, the map opens with key base layers and essential data layers activated to give a clear regional overview of EV infrastructure and Tribal lands. Visible layers on startup include Points of Interest, Existing EV Charging Stations, Major Roads and Highways, Tribal Lands, and EV Registrations by County.

The default basemap combines World Hillshade and OpenStreetMap, but users may switch to alternative basemaps at any time using the left-hand panel.

The table below shows the map layers and a description of their purpose.

Map Layer	Description
Points of Interest	Potential EV charging sites identified on or near tribal lands.
Existing EV Charging Stations	Displays all currently available public EV charging infrastructure.
Major Roads and Highways	Includes interstates, U.S. routes, and designated alternative fuel corridors.
Tribal Lands - Bureau of Indian Affairs (BIA)	Depicts the extent of federally recognized Tribal lands based on BIA boundary data, supporting planning and analysis involving Tribal jurisdictions.
EV Registrations by County	Shows the distribution and density of registered EVs at the county level.
Household Transportation Burden	Indicates transportation related cost burdens faced by households across the region.
Justice40 Air Quality and Health	Highlights environmental justice and health related indicators used in Justice40 screening.
Utility Service Areas	Displays electric utility service boundaries to help evaluate charging infrastructure feasibility and grid connectivity.

Map Interface Overview

The main components of the interface are organized along the left and right sides of the screen, with additional quick access tools located in the bottom right corner.

Left-Side Panel - Map Authoring & Data Controls
(Outlined panel on left side of Figure 1)

The left side panel, highlighted with a red, rectangular outline in Figure 1, contains the primary tools for managing map content and overall map settings. These tools support adding data, organizing layers, and sharing the map.
Key functions include:

- Add Layer – Add new datasets from your files, ArcGIS Online, or organization content.
- Layers – View, reorder, toggle visibility, and adjust settings for all layers in the map.
- Tables – Access standalone tables associated with the project.
- Basemap – Choose from a variety of basemaps (e.g., imagery, topographic, light gray).
- Legend – Display the map's symbology for all visible layers.
- More Options
- Bookmarks – Jump to predefined geographic locations.
- Charts – Create attribute based charts for analysis.
- Save & Open – Save edits to the map or open existing projects.
- Map Properties – Adjust map metadata, extent, and settings.
- Share Map – Generate a sharing link, update privacy settings, or create a group item.
- Embed Map – Produce HTML code for embedding the map in a website.
- More (Create App / Print) – Build instant apps or export the map layout for printing.
- Information – View map item details.
- Expand/Collapse Panel – Hide or show the left-side workspace.

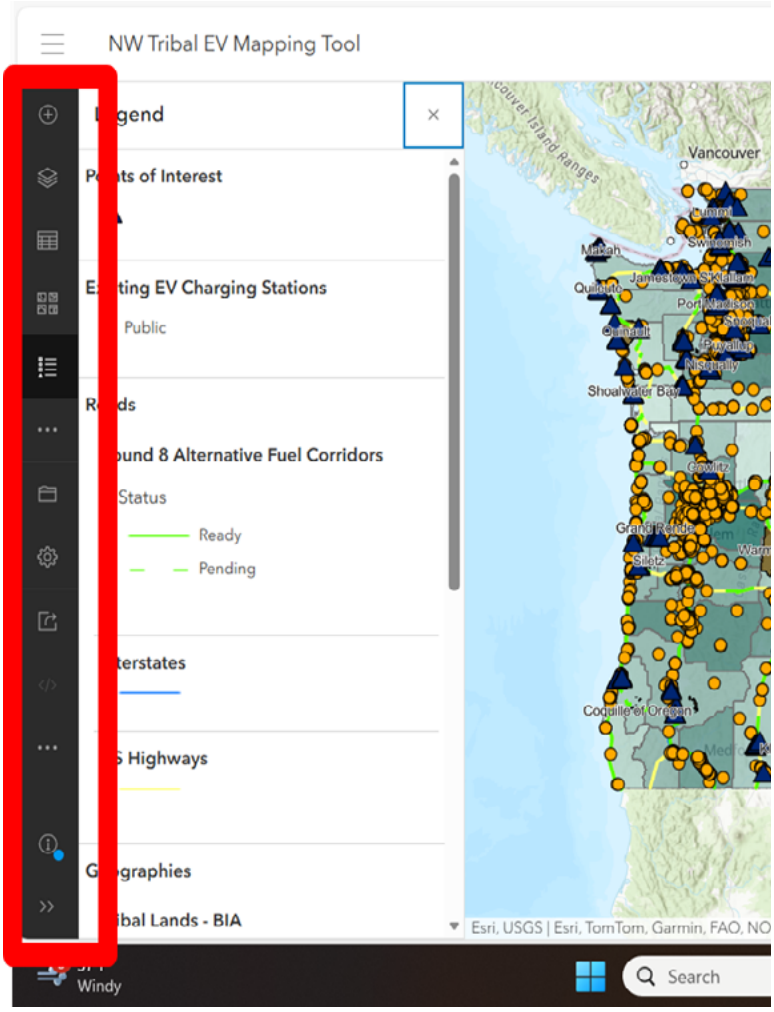

Figure 1. Screenshot of the left side of the EV Mapping Tool interface. The left side panel (outlined in a red rectangle) shows authoring and data controls.

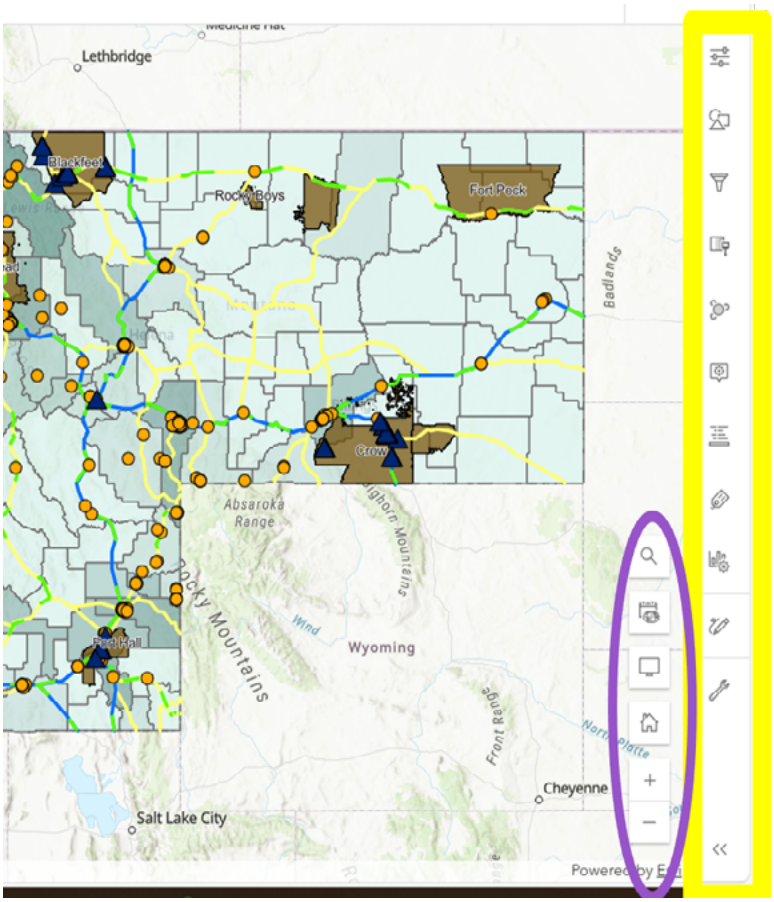

Figure 2. Screenshot of the right side of the EV Mapping Tool interface. The right side panel (outlined in a yellow rectangle) shows layer styling and analysis tools.

Right-Side Panel - Layer Styling & Analysis Tools
(Outlined panel on right side of Figure 2)

The right-side panel, highlighted with a yellow, rectangular outline in Figure 2, provides tools for styling, filtering, and configuring how individual layers appear and behave within the map. This panel becomes active when a layer is selected. Available tools include:

- Properties – View details about the selected layer.
- Styles – Change symbology, color schemes, and drawing styles.
- Filter – Display only features that meet specific attribute conditions.
- Effects – Apply visual effects such as blur, drop shadow, transparency, etc.
- Aggregation – Configure clustering or binning for dense datasets.
- Pop-Ups – Customize the information displayed when clicking on features.
- Fields – View, edit, and calculate fields in the layer's attribute table.
- Labels – Turn labels on/off and define label expressions.
- Configure Charts – Create histograms, bar charts, or line charts for selected data.
- Add Sketch – Draw shapes, text, or markup directly on the map.
- Map Tools – Access measure tools, select tools, and other interactive functions.
- Expand/Collapse Panel – Hide or reveal the right-side toolset.

Bottom-Right Quick Tools
(Small panel on the right side of Figure 2 with a purple, oval outline)

A set of compact utility tools, highlighted with a purple oval in Figure 2, appears in the lower right corner of the map. These tools provide quick access to common navigation and viewing functions:

- Search Bar – Look up addresses, places, or features by name.
- Time Zone Label – Displays the current time zone reference for map timestamps.
- Hide Interface – Temporarily hide tool panels for a full-screen map view.
- Default Map View – Return the map to its original, saved extent.
- Zoom In (+) / Zoom Out (–) – Manually adjust the map scale.

To view data, click on any feature, such as a charging station, Point of Interest, or Tribal land, to open a pop-up window containing detailed attribute information.

Navigating the Map

Some tools that can be used to navigate the map include:

- Zoom In/Out: Use +/– buttons or scroll wheel.
- Pan: Click and drag to move around the map.
- Full Extent: Click home icon to reset the view.

Turning Layers On and Off

Users can customize the map view by turning layers on or off to see the information you need. The map includes several main layer groups, each showing data relevant to EV planning across Tribal lands in Washington, Oregon, Idaho, and Montana.

Layer Priority:
Layers at the top of the list appear above layers below them. This means that if a layer on top (such as EV charging stations) covers another layer (such as EV registrations), it may block clicks or visibility. To interact with or see layers underneath, you may need to temporarily turn off the layers above.

How to Turn Layers On or Off:

1. Click the Layers button on the right side of the map viewer to open the layer list.
2. Each layer has an eye icon next to it. Click the eye to show or hide that layer.
3. Click the arrow next to a layer group to expand and see sublayers. You can toggle individual sublayers on or off by clicking their eye icons.
4. Click the arrow again to collapse the group when finished.
5. To adjust a layer's transparency, click the More Options (three dots) next to the layer, select Transparency, and move the slider to make the layer more or less visible.

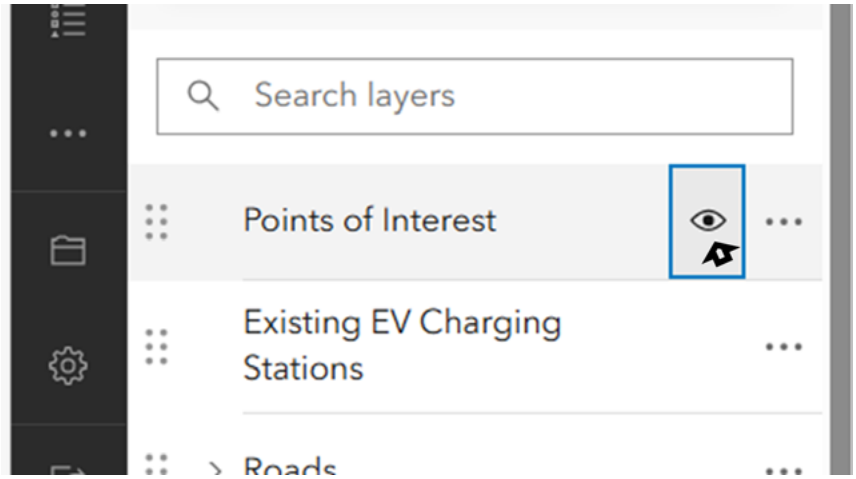

Figure 3. Zoomed-in view of the Layers panel showing the eye icon that can be clicked to turn map layers on or off.

Tip: If a layer seems blocked by another layer on top, simply click the eye icon for the top layer to hide it temporarily, then interact with the layer underneath.

Viewing Layer Information

The EV Mapping Tool allows you to explore detailed information about map features, such as EV charging stations, points of interest, and geographic areas, through pop-ups. Pop-ups display attribute data linked to the feature you select, including station name, network, location details, or EV registration counts.

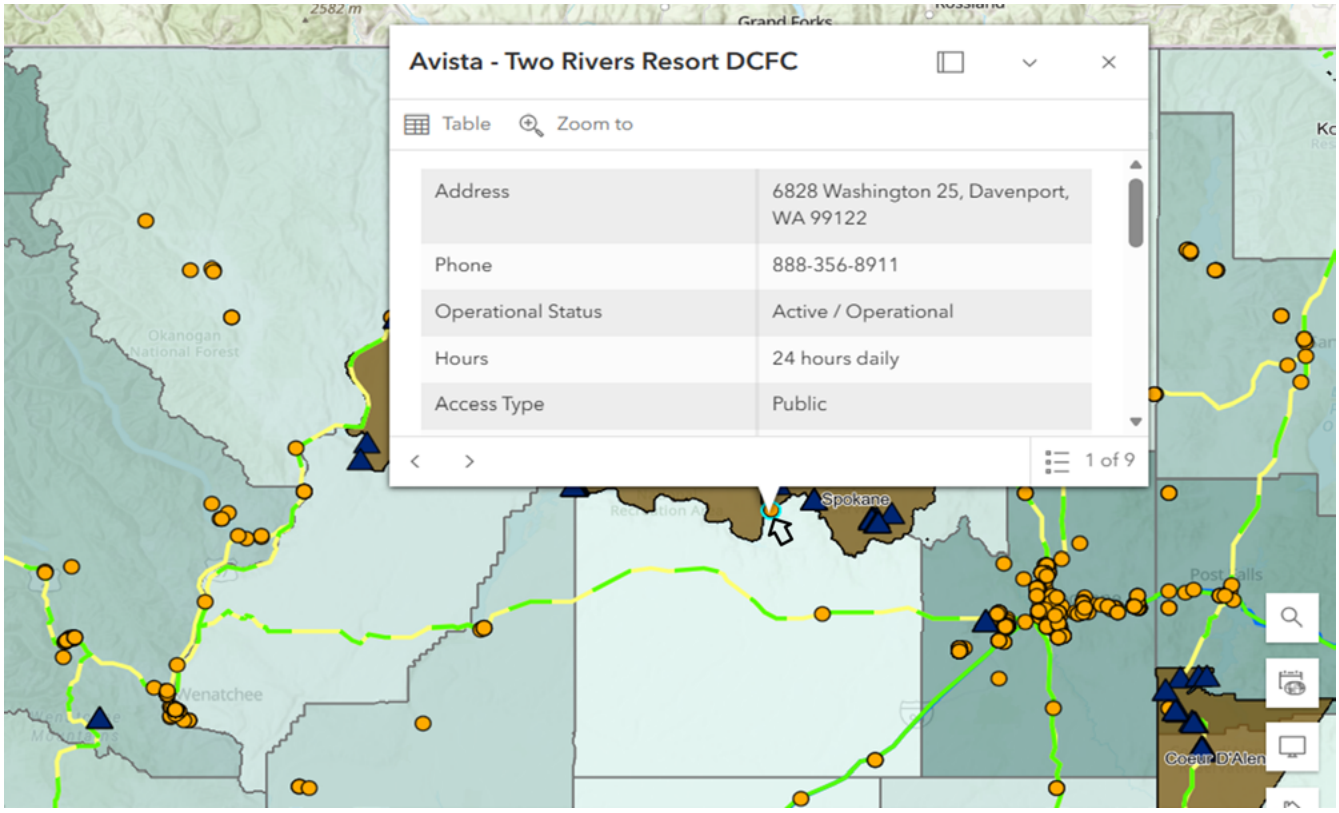

Figure 4. Example pop-up displayed after clicking an EV charging station near the Colville and Spokane Reservations. The pop-up shows address, phone, operation status, hours, and access type details for “Avista - Two Rivers Resort DCFC.”

How to View Feature Information:

1. Click directly on a feature (point, line, or polygon) on the map.
2. A pop-up window will appear, showing the data available for all layers at that location.
3. Scroll through the pop-up to view information from different layers if multiple layers overlap at that spot.

Tips for Best Results:

- Turn off unnecessary layers to reduce clutter in pop-ups. For example, large polygon layers like EV Registration by County can obscure smaller features.
- Zoom in closely to your area of interest before clicking to ensure you select the correct feature.

Data Sources

Each data layer in the NW Tribal EV Mapping Tool is based on publicly available datasets. Users can view additional metadata, such as source agency, dataset description, publication date, and update frequency, by opening each layer's details in ArcGIS Online.

Note: Since each dataset comes from a different agency, source information is also included within individual layers. While the map itself cannot be edited, all datasets are publicly accessible. Users may download layers for their own analysis or visualization. Below is a summary of key layers, their units, description, and primary sources, including links.

Layer	Units	Description	Source/How Layer Was Created
EV Stations	Spatial points	Locations of public electric vehicle charging stations	Alternative Fuel Data Center: • Data Downloads • Electric Vehicle Charging Station Locations • AFDC Feature Layers - Overview • NREL: Electric Vehicle Charging Stations
Roads & Alt Fuel Corridors	Spatial lines	Interstates, state highways, and designated alternative fuel corridors	Alt Fuel Corridors: Station Data for Alternative Fuel Corridors State Highways: TIGER/Line Shapefiles
Air Quality & Health (Justice40)	Unitless composite index	Combines multiple environmental, health, and social indicators into a relative score per census tract. Higher scores indicate greater cumulative impact.	Justice40: • Disadvantaged Communities (DACs) - Overview • Analysis • Number of Categories Map November 2022
Household Transportation Burden	Fraction of household income	Represents the proportion of household income spent on transportation costs. Also includes miles traveled, cost per mile, and fuel efficiency.	Geospatial Energy Mapper (GEM) Note: search for "Household Transportation Energy Affordability"
EV Registrations by County	Number of EVs	Total EV registrations by county.	Department of Energy State EV Registration Data MT & OR State EV Registration Data WA EV Population Data Electric Vehicle Registrations and Consumption by state

User Permissions and Data Access

Users are free to interact with and use the map and its data as they wish. While the published map itself cannot be edited, all layers are publicly accessible.
Users can:

- Download datasets and use them in their own maps or analysis
- Make edits or modifications when they open the data independently

Any changes made by users to downloaded data will not affect the published map or other users' views. The original map remains unchanged for everyone.

Notes and Disclaimers

- This mapping tool was developed using publicly accessible data sources.
- The map is intended for planning, educational, and visualization purposes only and should not be used for legal or engineering decisions.
- Tribal boundaries are approximate and may not represent official trust, reservation, or treaty land designations.
- Data sources vary in date, scale, and accuracy, and may be updated periodically as new information becomes available.
- This project recognizes Tribal data sovereignty and the right of Tribes to govern, access, and protect their own data and mapping resources.

Users are encouraged to verify data and share updates or corrections to help improve the tool.

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