Disadvantage in Different Types of U.S. Communities

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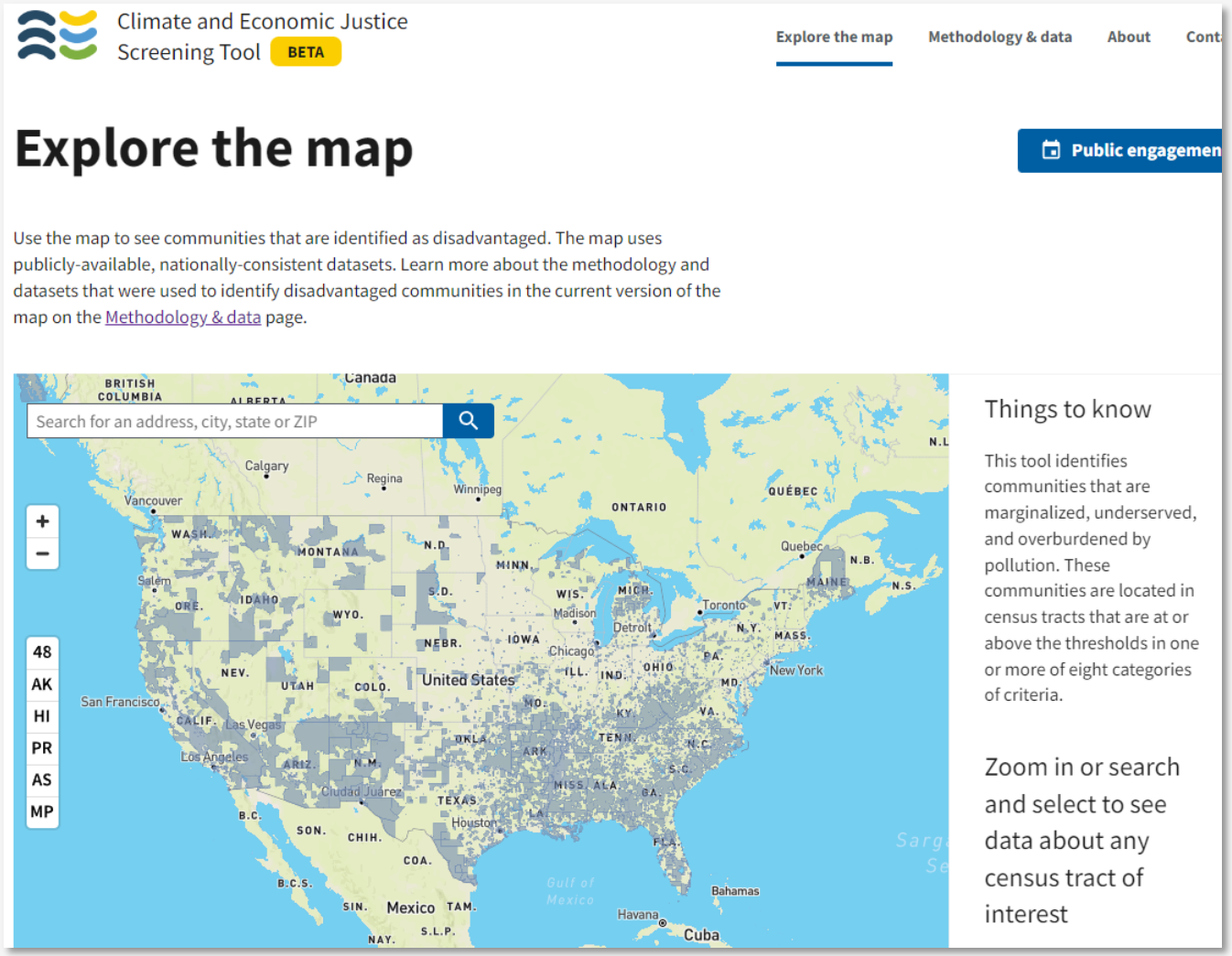
Intro & Background

STARTING POINT:
Climate & Economic Justice Screening Tool

The main dataset in this project is a government dataset underlying the Climate and Economic Justice Screening Tool, which was created by the U.S. Council of Environmental Quality to fulfill a Biden administration executive order . The tool "identifies communities that are marginalized, underserved, and overburdened by pollution. These communities are located in census tracts* that are at or above the thresholds in one or more of eight categories of criteria." ("Methodology", 2022).

The purpose of this project is to look at these categories of disadvantage factors through the lens of community type (urban, rural, etc.). Are different types of communities impacted by different types of factors?

* Census tracts are small sections of the country that are used in censuses, containing between 1200 and 8000 people. They are contiguous and smaller than counties or zip codes. ("Glossary", 2022).



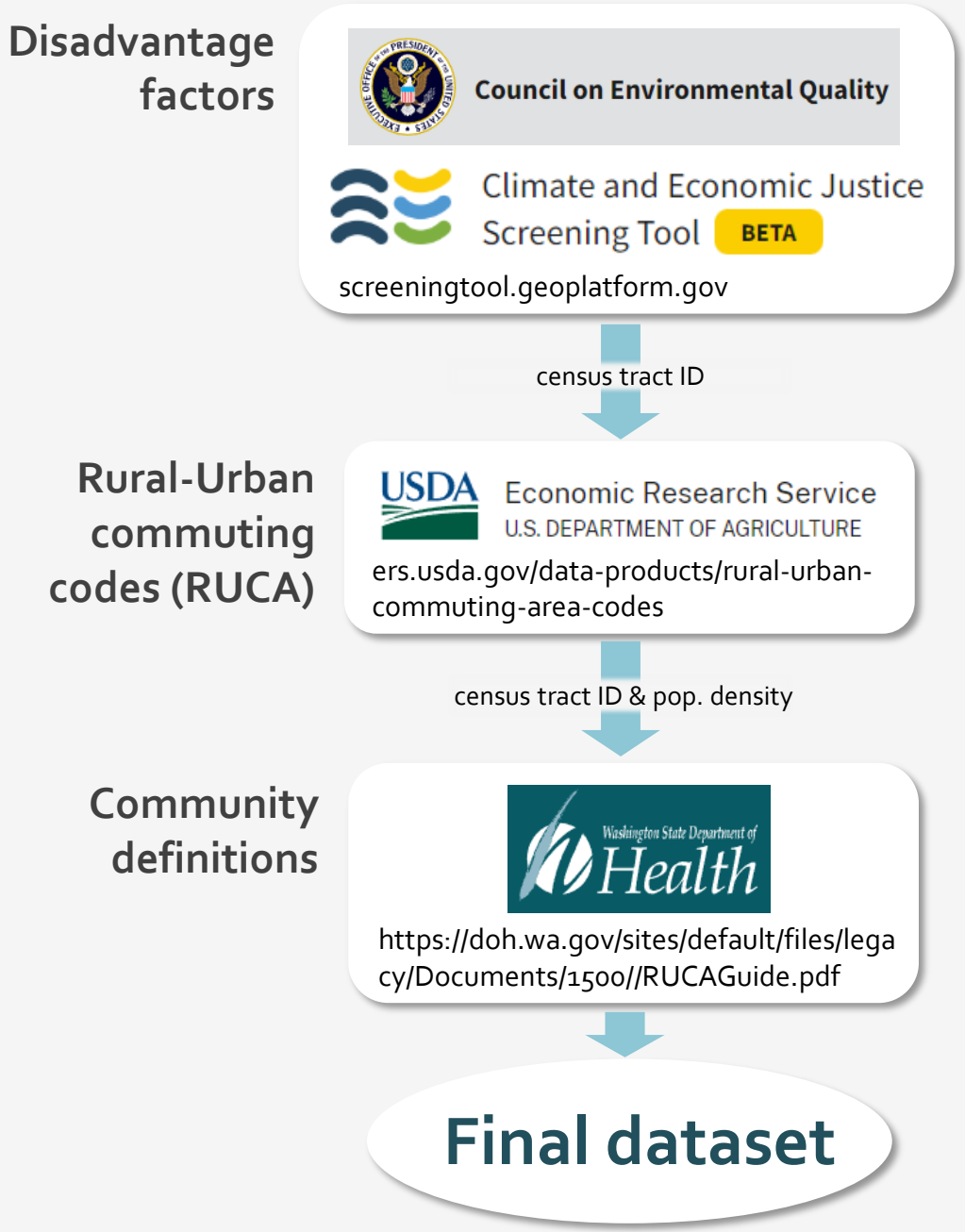
Data Collection

Public Government Sources

The main dataset (from the Climate and Economic Justice Screening Tool) did not include community type information.

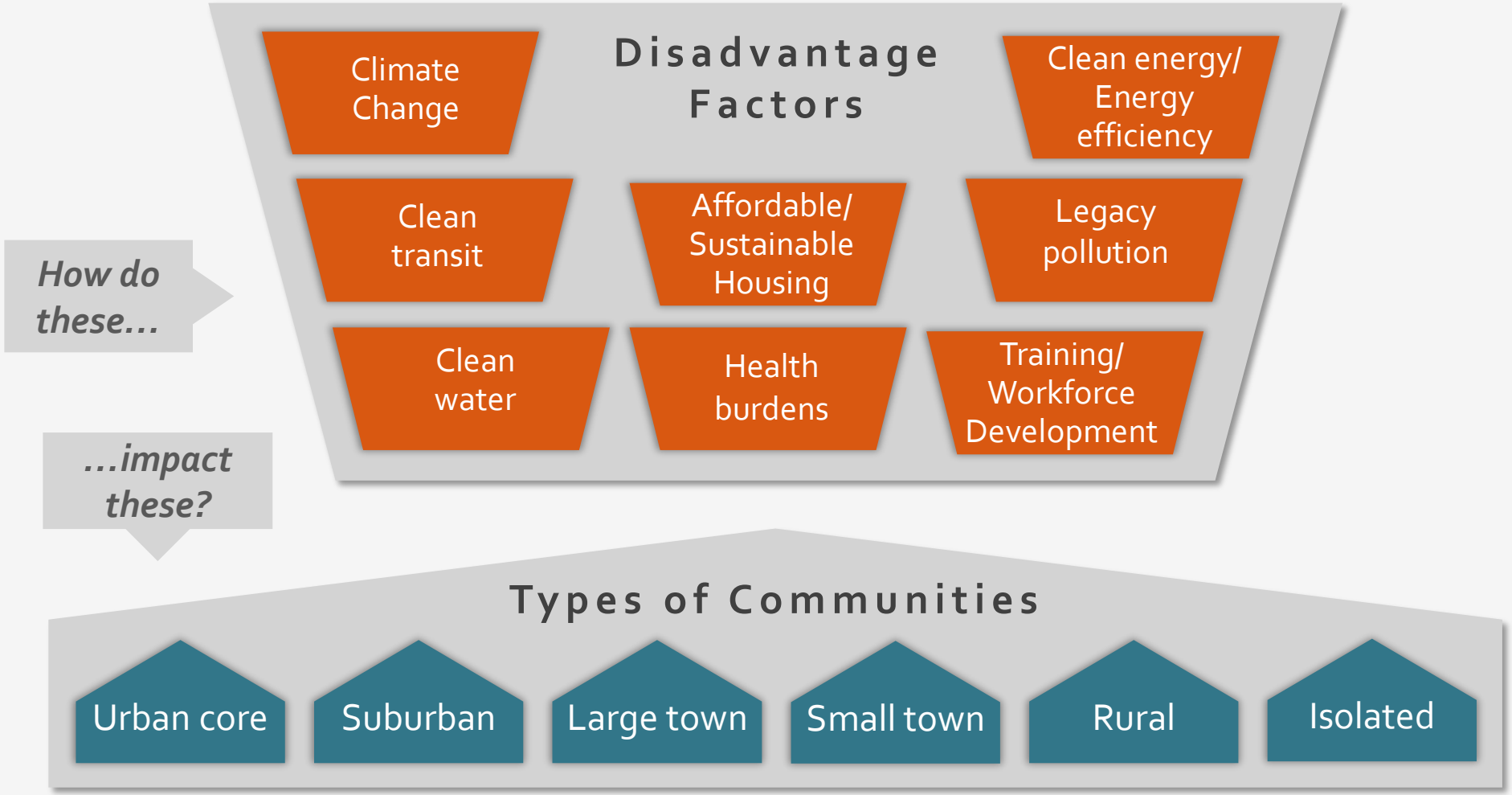
The community types are determined from the USDA Economic Research Service's Rural-urban Commuting Codes (RUCA). These codes "classify U.S. census tracts using measures of population density, urbanization, and daily commuting" (2010 Rural-Urban, 2019).

The RUCA codes, however, are very granular, so for a more general categorization, a framework from a Washington State Department of Health paper was used to define the six types of communities shown on the next slide (Guidelines for Using, 2016).



Major Components

The eight categories of disadvantage factors identified in the Climate & Economic Justice Screening Tool dataset are shown in orange. The six types of communities identified are shown in blue.



Data Prep / Cleansing

Most of the data prep and cleansing was completed in Python:

- Renaming columns
- Dropping columns
- Dropping territory rows
- Joining w/ community definitions
- Creating new dataframes
- Export for Power BI visualizations

Dropping columns that only apply to territories

```
In [7]: communities = communities.drop(['Unemploy % island (2009), states/PR (2010)',
                ' Below 100% poverty, island (2009), states/PR (2010)',
               'Unemployment, low HS grad, island (2009)',
               'Poverty, low HS grad, island (2009)',
               'Low inc., low HS grad, island (2009)'], axis=1)
communities.head()
```

```
In [14]: col_names = pd.read_csv('factor broad categories_2.csv')
col_names.head()
```

Out[14]:

	Factor Category	UPDATED CODE	UPDATED COL NAMES	New Name	
0	General	0	Percent below 200% Poverty Ln (perc.)_0	Percent below 200% Poverty Ln (perc.)	Per
1	General	0	Percent below 200% Poverty Ln_0	Percent below 200% Poverty Ln	Per
2	General	0	Not enrolled in higher ed %_0	Not enrolled in higher ed %	P
3	Climate change	1	Ag loss, low inc., not high ed_1	Ag loss, low inc., not high ed	G

oss rate (perc.)

L NAMES']))

Creating new dataframe that deletes everything except bool columns, to be used in aggrega the factors so they can be counted.

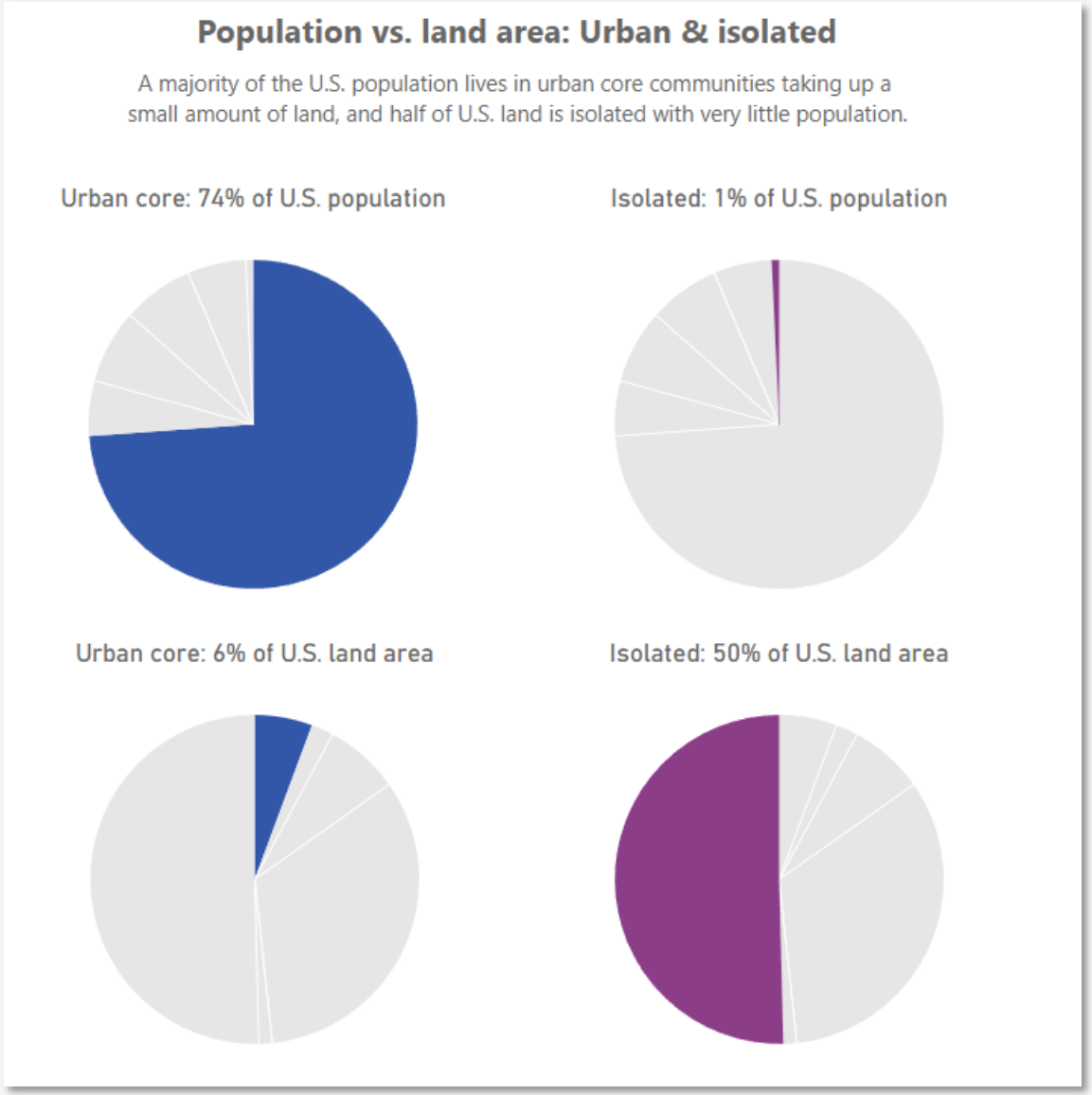
```
In [13]: communities_bool = communities.drop(columns = ['Expected ag loss rate (perc.)_1'
               'Expected ag loss rate_1',
               'Expected building loss rate (perc.)_1',
               'Expected building loss rate_1',
               'Expected pop loss rate (perc.)_1', 'Expected pop loss rate_1', 'Energy b
               'Energy burden_2',
               'PM2.5 in the air (perc.)_2', 'PM2.5 in the air_2',
               'Diesel part exposure (perc.)_3', 'Diesel part exposure_3','Traffic proxi
               'Traffic proximity_3',
               'Housing burden (percent) (perc.)_4', 'Housing burden (percent)_4',
               'Percent pre-1960s housing (perc.)_4', 'Percent pre-1960s housing_4',
               'Median housing value (perc.)_4', 'Median housing value_4',
               'Hazardous waste proximity (perc.)_5', 'Hazardous waste proximity_5', 'Su
               'Superfund Proximity_5',
               'RMP Proximity (perc.)_5', 'RMP Proximity_5', 'Wastewater discharge (perc
               'Wastewater discharge 6',
```

Key Findings:

U.S. Distribution within types of communities

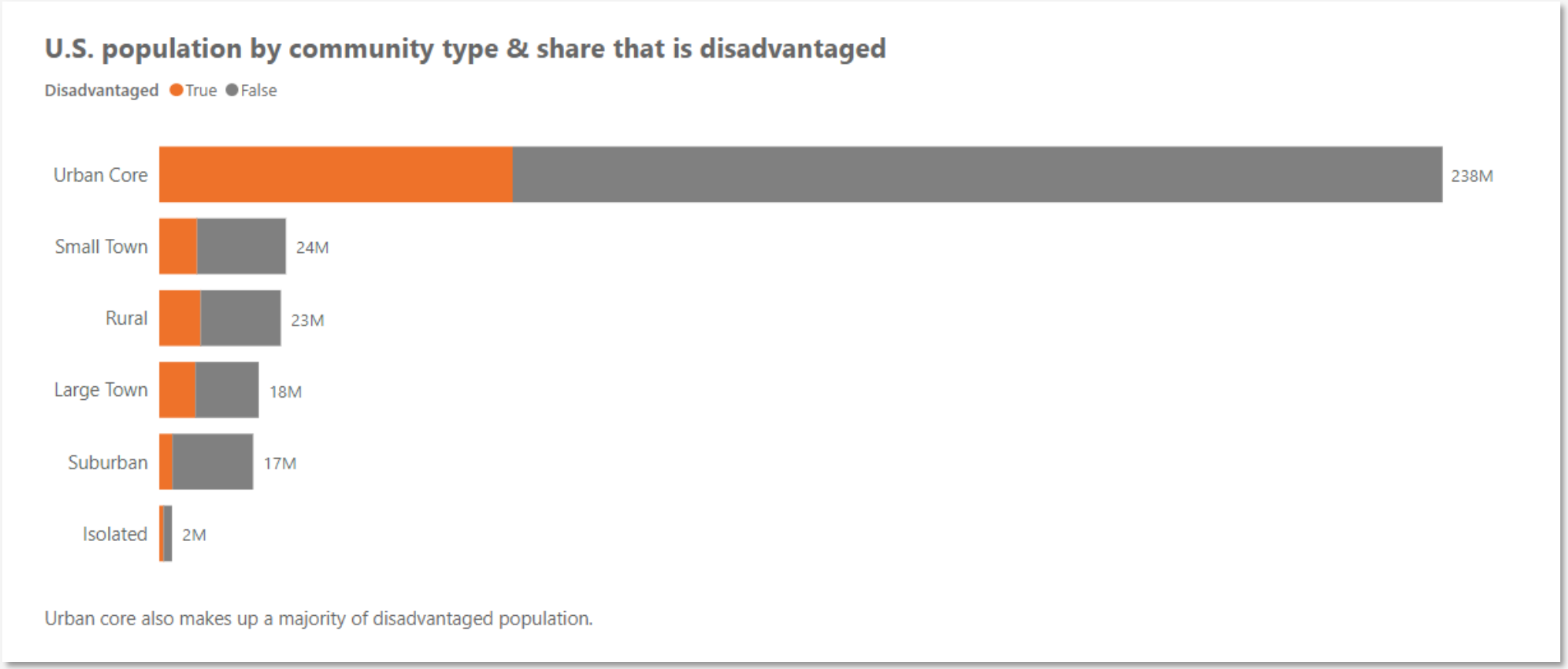
A major disparity between the concentration of people vs. land within the various types of communities is immediately apparent:

- The urban core (blue) encompasses 74% of the U.S. population, but only 6% of the land area.
- Isolated areas (purple) make up only 1% of the population, but 50% of the land.



Key Findings: Distribution of population & disadvantaged share

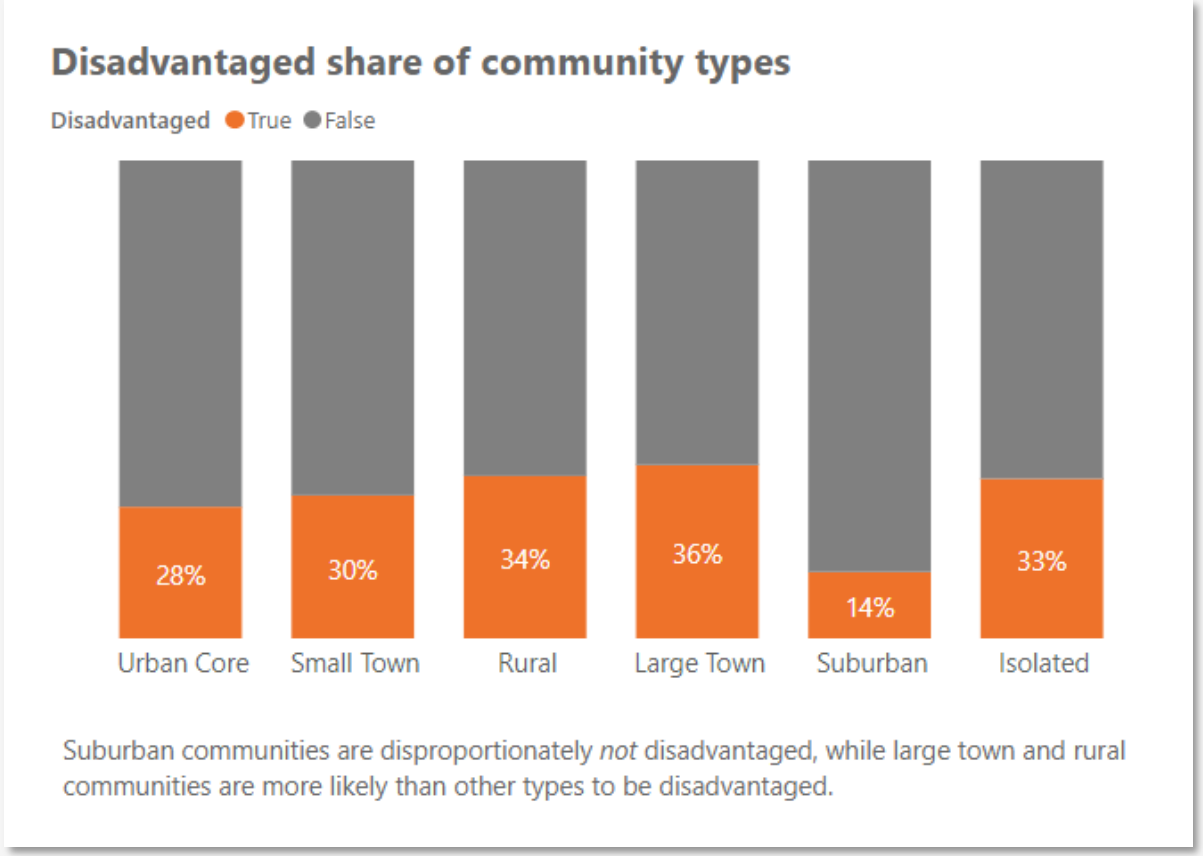
Another view of population breakdown, now including the proportion that is disadvantaged (orange). The urban core again emerges as a large majority in both overall population and disadvantaged population.



Key Findings:

Percentage of each community that is disadvantaged

Strikingly fewer suburban communities are disadvantaged than other types, while large town communities are most likely to be disadvantaged.



Key Findings:

Average count of criteria exceeded

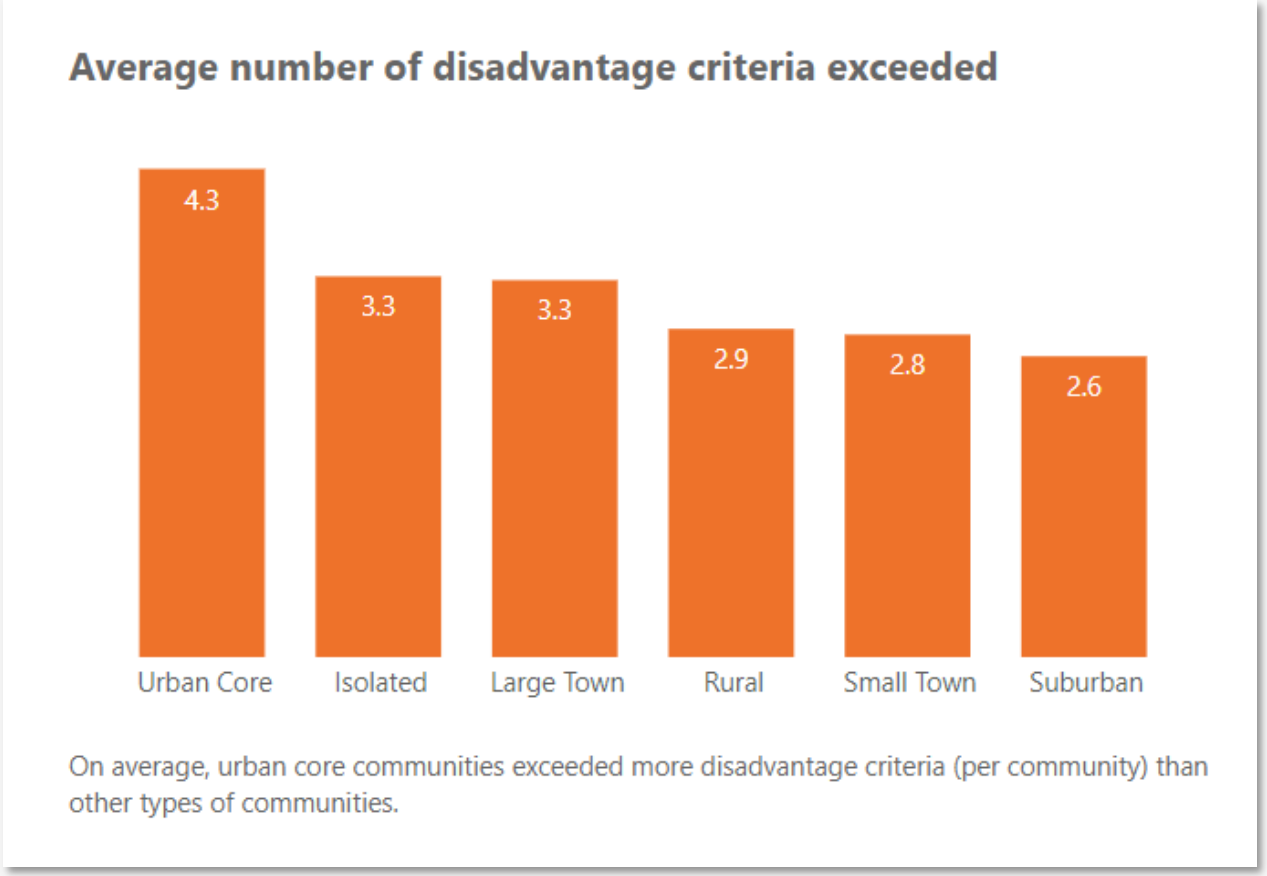
In the original dataset, a community needed only exceed one set of criteria in one category to be classified as disadvantaged.

Many communities, however, exceed more.

This view reveals the average number of criteria that were exceeded by disadvantaged communities of each type.

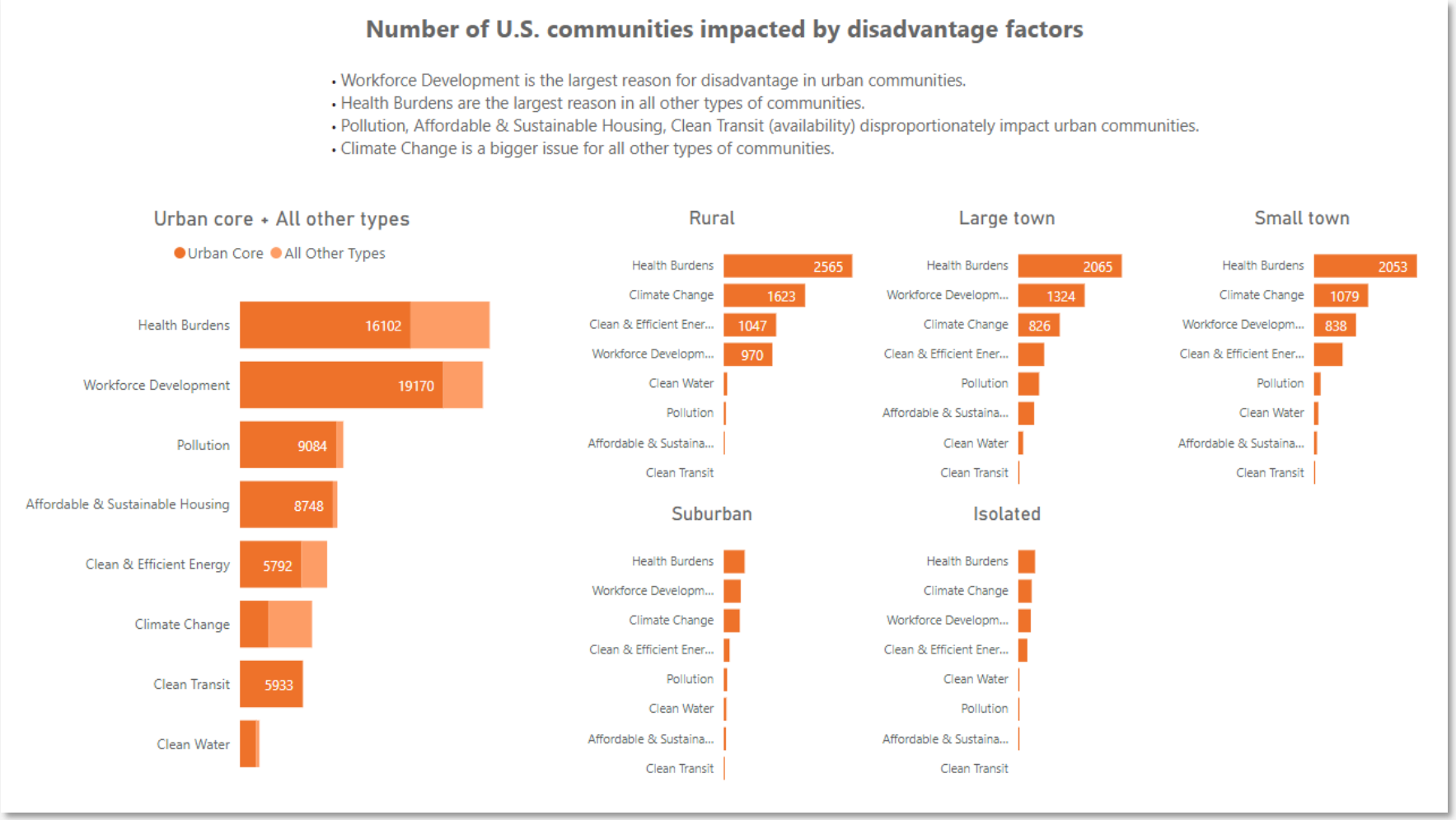
Notable takeaways:

- Disadvantaged urban core communities exceed the most criteria on average
- Suburban communities exceed the least
  - **not only are fewer suburban communities disadvantaged, but those that *are* are less so than other types of communities.**



Key Findings: Count of communities impacted by categories of disadvantage

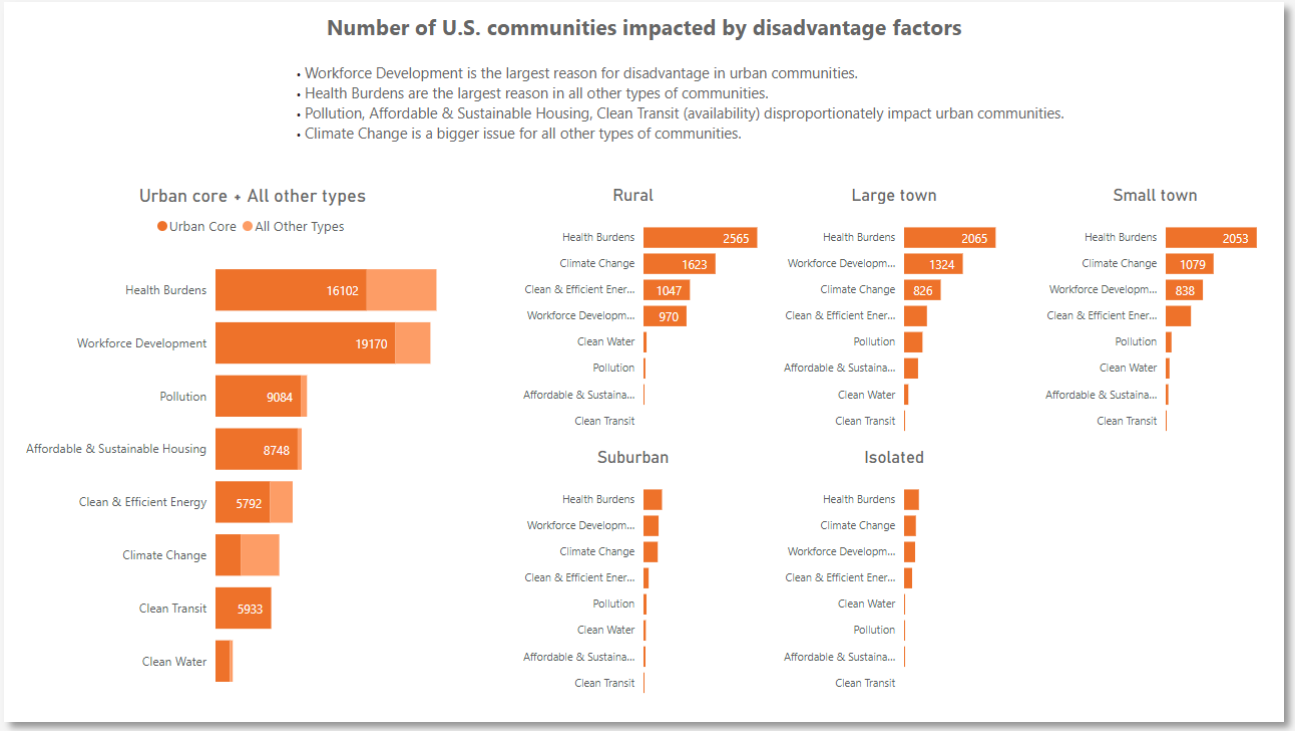
This view allows us to see the scale at which issues are impacting different types of communities.
The larger chart on the left shows counts for urban core in darker orange, with lighter orange representing all other types of communities.
Therefore, the collection of smaller charts on the right combine to make the lighter orange "all other types" on the left.



Key Findings: Count of communities impacted by categories of disadvantage

Key takeaways from previous slide:

- Workforce development in the urban core is the largest "bucket" of disadvantage in the U.S.
- Health burdens are second in urban core but are the top reason in every other community type, adding up to be the largest overall factor.
- Pollution, Affordable & sustainable housing, and clean transit availability disproportionately impact the urban core.
- Climate change is a larger issue for non-urban core communities.

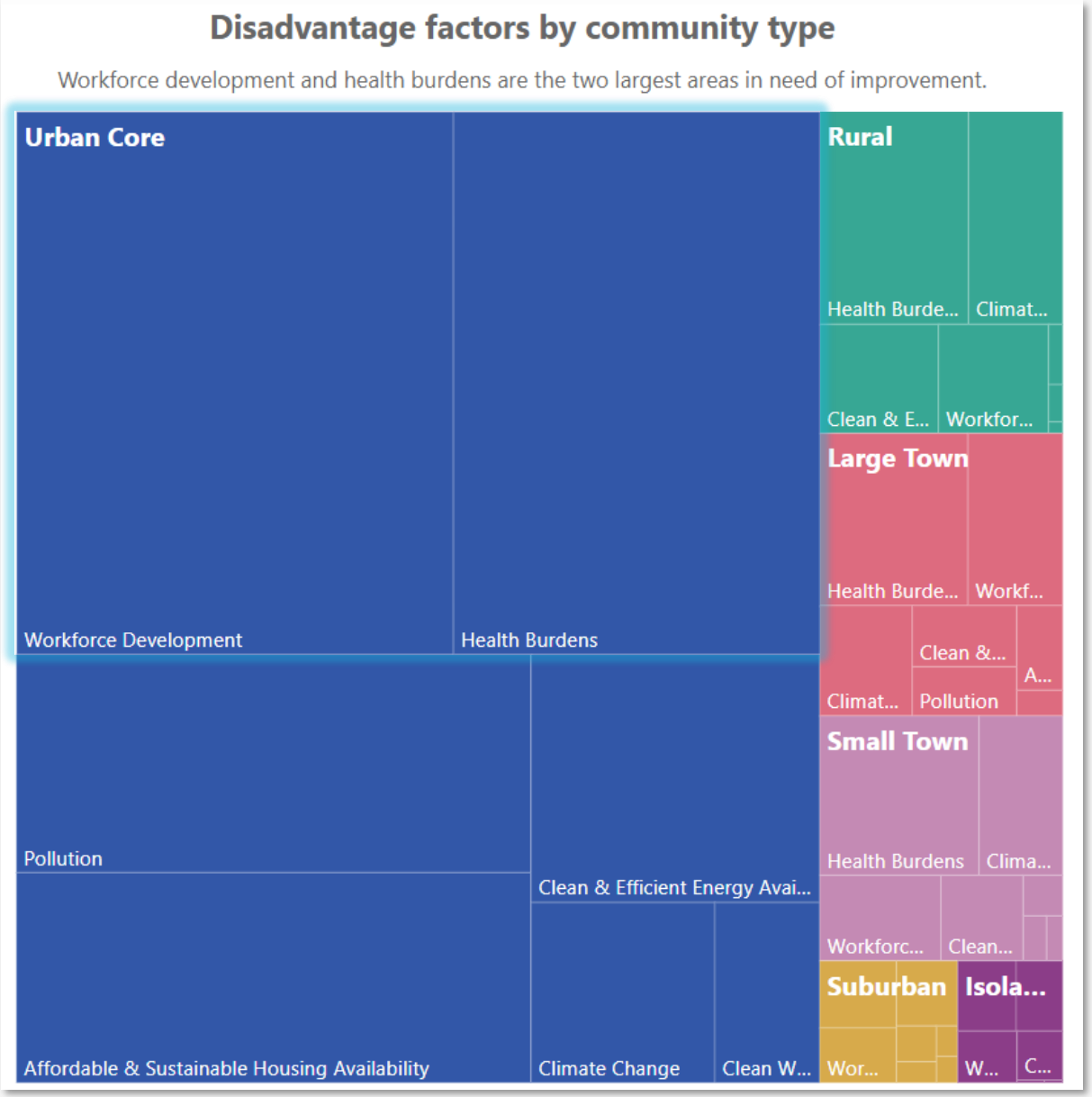


Key Findings:

Count of factors by community type

Essentially the same information as previous slide, but a simple treemap more clearly the largest issues .

The largest "levers to pull" to help the most amount of disadvantaged people are Workforce Development and Health Burdens



References

- Climate and Economic Justice Screening Tool. (2022). *Communities list data*. [Data set]. Council on Environmental Quality. https://screeningtool.geoplatform.gov/en/downloads
- Climate and Economic Justice Screening Tool. (2022). *About*. Council on Environmental Quality. https://screeningtool.geoplatform.gov/en/about
- Climate and Economic Justice Screening Tool. (2022). *Methodology*. Council on Environmental Quality. https://screeningtool.geoplatform.gov/en/methodology
- Economic Research Service. (2019). *2010 Rural-Urban Commuting Area Codes (revised 7/3/2019)*. [Data set]. U.S.Department of Agriculture. https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes.aspx
- Hailu, A., & Wasserman, C. (2016). *Guidelines for Using Rural-Urban Classification Systems for Community Health Assessment*. Washington State Department of Health. https://doh.wa.gov/sites/default/files/legacy/Documents/1500//RUCAGuide.pdf
- United States Census Bureau. (2022). *Glossary*. U.S. Census Bureau. https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_13