Leveraging Data to Equitably Prioritize Program Impact

slipstream

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Slipstream is a nonprofit that discovers, tests, and scales climate solutions in buildings and communities.
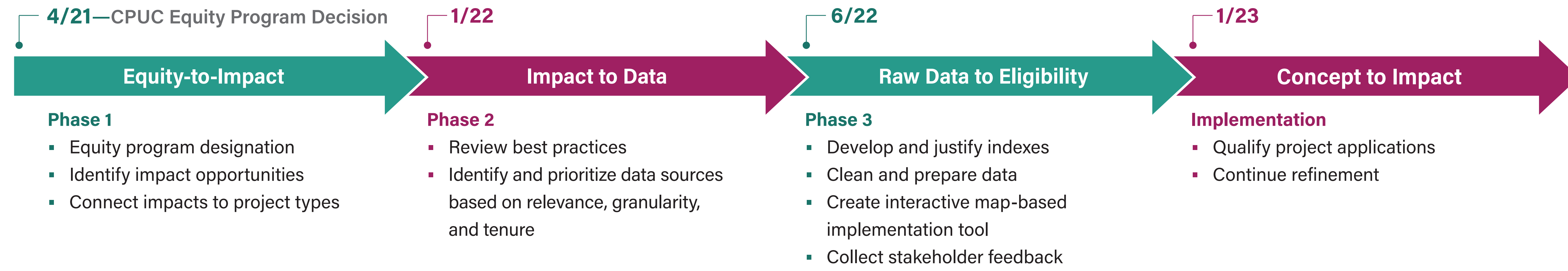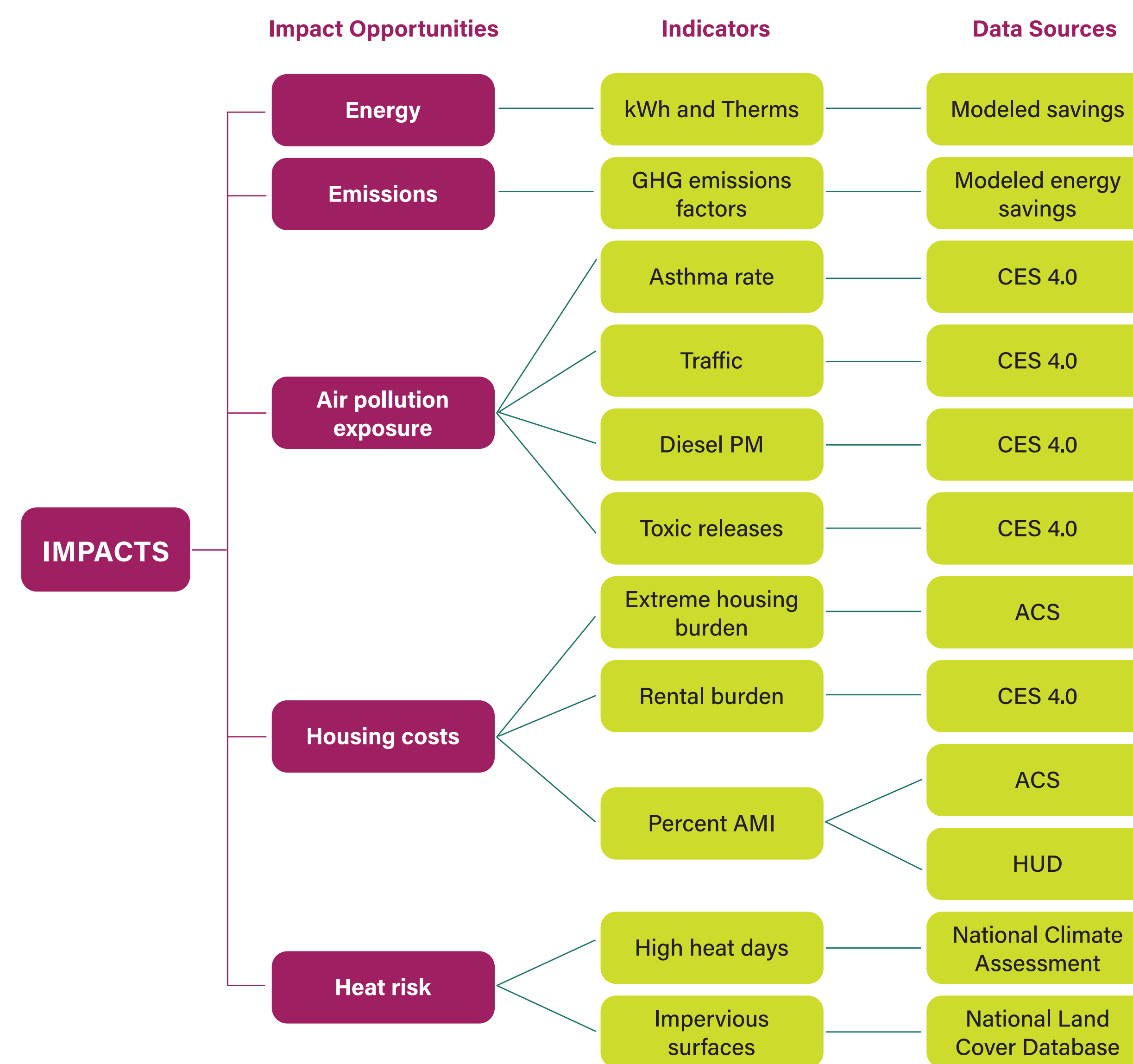
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Data-guided development of a Multifamily Equity Program

4/21—CPUC Equity Program Decision
1/22
6/22
1/23

Equity-to-Impact → Impact to Data → Raw Data to Eligibility → Concept to Impact

Phase 1
- Equity program designation
- Identify impact opportunities
- Connect impacts to project types

Phase 2
- Review best practices
- Identify and prioritize data sources based on relevance, granularity, and tenure

Phase 3
- Develop and justify indexes
- Clean and prepare data
- Create interactive map-based implementation tool
- Collect stakeholder feedback

Implementation
- Qualify project applications
- Continue refinement

Aligning available data with impact potential.

Impact Opportunities	Indicators	Data Sources
Energy	kWh and Therms	Modeled savings
Emissions	GHG emissions factors	Modeled energy savings
Air pollution exposure	Asthma rate	CES 4.0
	Traffic	CES 4.0
	Diesel PM	CES 4.0
	Toxic releases	CES 4.0
Housing costs	Extreme housing burden	ACS
	Rental burden	CES 4.0
	Percent AMI	ACS
		HUD
Heat risk	High heat days	National Climate Assessment
	Impervious surfaces	National Land Cover Database

IMPACTS

Role of local lived experience in a data-based framework

COMMUNITY MEMBER FEEDBACK

GRANULAR DATA
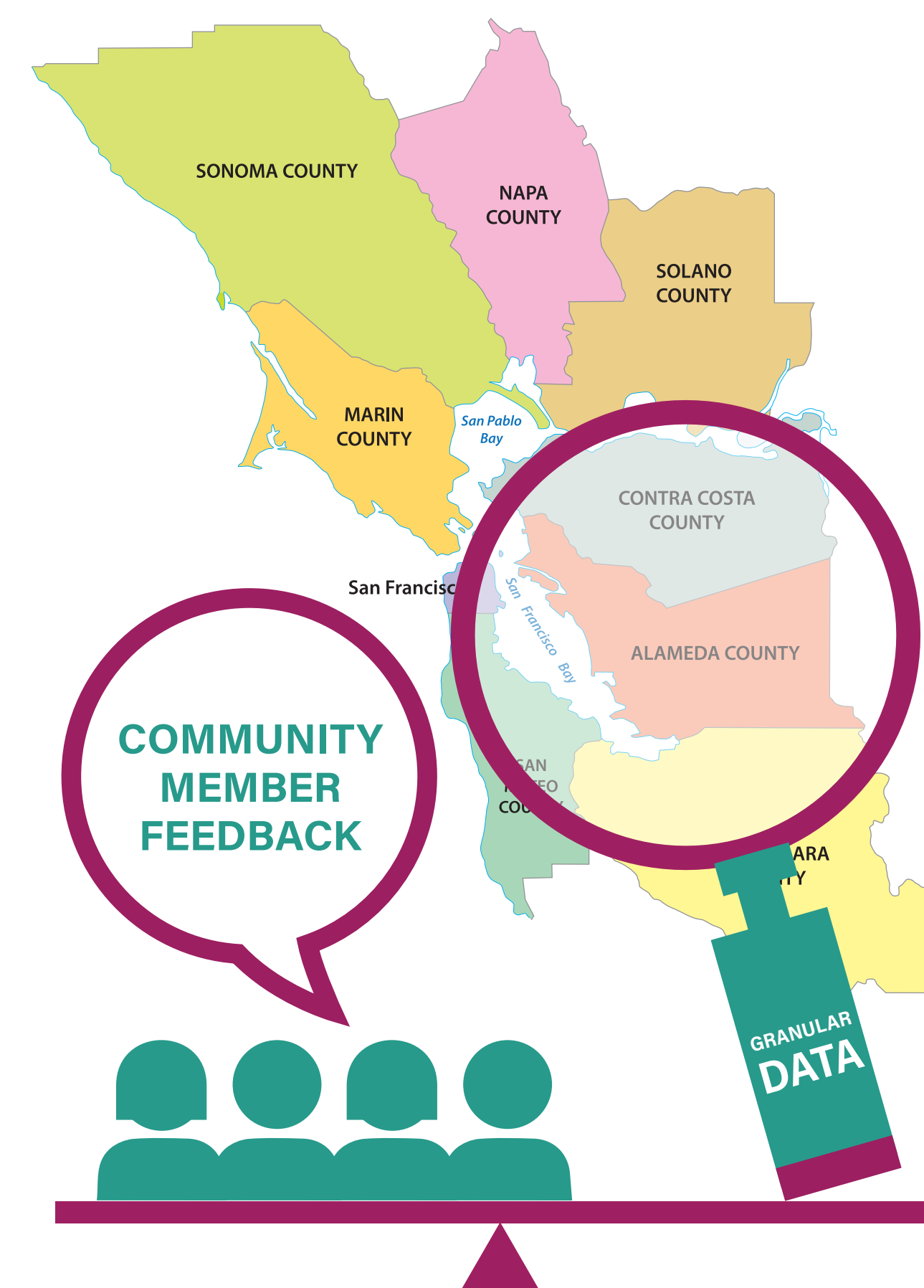
We worked to balance feedback from community members on their experiences with housing burden, local air pollution, and heat risk with what the map tells us about the levels of those burdens in that area.

Selecting data sources

GRANULARITY: Level of similarity within geographic boundary

TENURE: Time between data collection and use

RELEVANCE: Alignment between data and objective
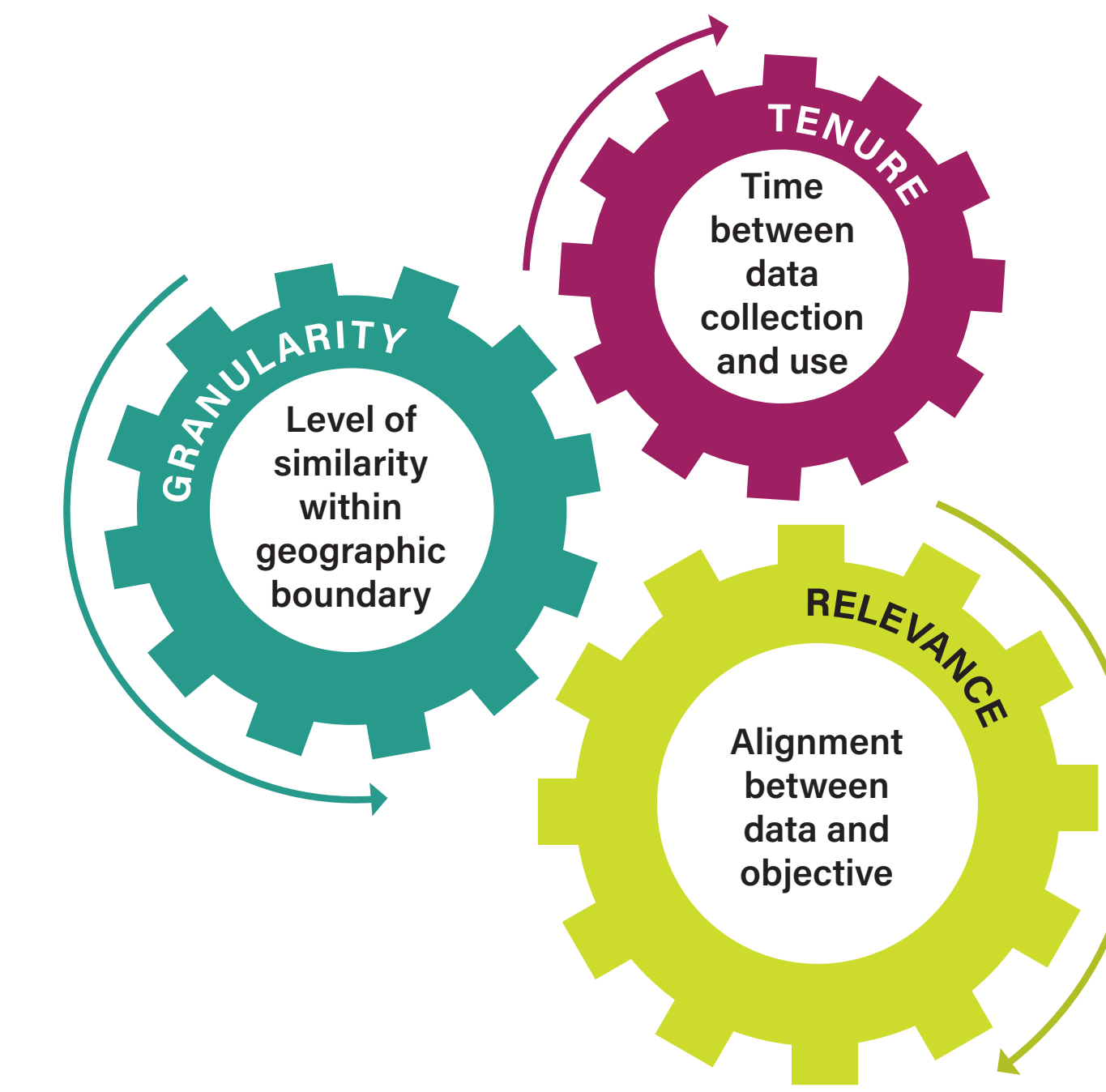
Multiple data sets may be related to a program's intended impact.

Relevance: Selecting data sources based on clear alignment between the metric being reported and the factor that a program seeks to address increases opportunity for impact.

Granularity: Heterogeneity among residents and buildings within a geographic area may increase as the size of the area increases. Greater geographic granularity allows location-based data to better represent the people and buildings in that area.

Tenure: Residents, buildings, and land change over time. More recently collected data may more accurately depict current conditions in an area.

Results: Incentive Indexes

$$\frac{2 * HHD\ \% + Impervious\ Surface\ \%}{3}$$

High Heat Days (HHD): The projected average annual number of days (2016–2045) with high temperatures greater than 90 degrees.

Impervious Surfaces: The percentage of land in the tract covered by parking lots, buildings and other impervious surfaces.

- Impervious surfaces amplify the heat risks created by high temperatures.[1]
- Weighting the calculation toward HHD reflects dependence of Impervious Surface variable on HHD variable.

$$\frac{Renter\ Burden + Low\text{-}Income\ Extreme\ Housing\ Burden\ \%}{2}$$

Renter Burden: Number of renter households of all income levels whose housing costs exceed 30% of their income.

Low-Income Extreme Housing Burden %: The percent of all households in the tract whose income is less than 80% of AMI and whose housing costs exceed 50% of their income.

- Indicators measure separate metrics both partially correlated with intended BAMBE impact.
- Together, indicators create metric that matches BAMBE impact objective.

$$\frac{Asthma\ Rate\% + Diesel\ PM\ \% + Toxic\ Releases\ from\ Facilities\ \% + Traffic\ Impacts\ \%}{4}$$

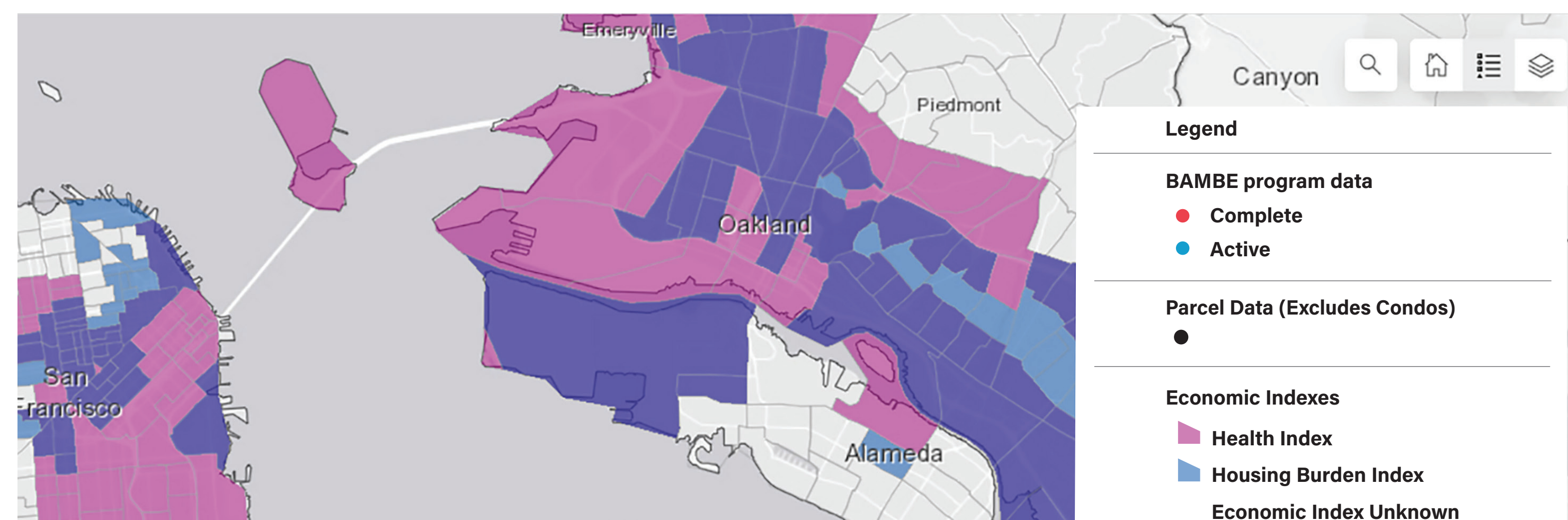**Asthma Rate %:** Per capita rate of asthma-related ER visits by tract residents.

Diesel PM%: Diesel particulate matter from on-road and off-road sources.

Toxic Releases from Facilities %: Toxicity-weighted concentrations of modeled releases from incineration facilities.

Traffic Impacts %: Traffic volumes on roads within 150m of the tract.

Connects aggravating environmental conditions (Diesel, Toxic Releases, and Traffic) with concentrations of targeted health burden.

BAMBE Bonus Eligibility Map

Legend

BAMBE program data
- Complete
- Active

Parcel Data (Excludes Condos)

Economic Indexes
- Health Index
- Housing Burden Index
- Economic Index Unknown

Bureau of Land Management, Esri, HERE, Garmin, GeoTechnologies, Inc, USGS, EPA / U.S. Census Bureau, Esri | Esri, HERE

Program staff may add data layers showing all multifamily buildings and all completed BAMBE projects in the selected area.

BAMBE 2023 Incentive Framework.

Need more, do more, Get more!

Base rebate—$500 per unit for qualifying projects that include 2 or more measures and reduce energy consumption by 10% or more.

Electrification adder—Varying per-unit rebates for high-efficiency electric space heating, water heating, and cooking equipment.

Health Burden adder—Additional $500 per unit for properties located in communities with high levels of air pollution and asthma that install building upgrades to improve indoor air quality.

Heat Resilience adder—Additional $500 per unit for properties located in communities with high vulnerability to extreme heat that install building upgrades to reduce indoor summer temperatures.

Housing Burden adder—Up to a doubling of all other program rebates for properties located in communities with high housing burdens that install building upgrades to lower in-unit utility bills.

CalEnviroScreen 4.0 identifies disadvantaged communities (DACs) based on composite indexes representing environmental and demographic factors. BAMBE indexes extract certain indicator values from the CES 4.0 dataset that represent vulnerabilities specifically aligned with BAMBE's program impact strategy.

Notes

High Heat Burden Index:
HHD values are derived from the National Climate Assessment's LOCA dataset forecasts for annual average number of days with temperatures over 90 degrees from 2016–2045. The forward-looking timeframe recognizes that climate change will unevenly affect sub-regions within the Bay Area and approximately aligns with the average expected useful life of building improvements that may be included in a BAMBE project.

Housing Burden Index:
"Renter Housing Burden" data does not distinguish between the impacts of modest housing burden (ex. 31% of income paid for housing costs) and extreme housing burden (ex. 60% of income paid for housing costs).

"Low-Income Extreme Housing Burden" data excludes households with unaffordable housing costs below 50 percent of their incomes and also excludes moderate income households, for whom market rate housing costs are unaffordable.

Because the "Renter Housing Burden" indicator measures burden across all income levels, in the absence of a value for the "Low-Income Extreme Housing Burden" indicator, the index uses tract median income (ACS) in comparison to county median income (HUD) to exclude tracts with moderate and high median incomes.

Health Burden Index:
CalEnviroScreen 4.0 (CES) includes Diesel PM, Toxic Releases from Facilities, and Traffic Impacts as "Exposure Indicators" in its Pollution Burden index and includes asthma rate in the Population Characteristics Score. While CES considers asthma rate in a different category from the other three inputs, the composite CES 4.0 score weights all four of these indicators equally. CES is a well-researched framework and the use of these four indicators in CES is similar to their use in defining the BAMBE "health burdened" geographic zone. Moreover, we did not identify any considerations that would suggest that one of these indicators is considerably more relevant than the others to BAMBE's impacts and objectives. Therefore, the BAMBE health index evenly weights the value of the four input indicators.

[1] Vujovic, S. et. Al. 2021. Urban Heat Island: Causes, Consequences, and Mitigation Measures with Emphasis on Reflective and Permeable Pavements. Advances in Civil Engineering. 2 (2) 459-484. https://doi.org/10.3390/civileng2020026