Center for Sustainable Energy® CALIFORNIA

Regional Energy Mapping Project

Retrofit Potential Modeling and Local Government Data Tool

June 25, 2013

Overview

- Project Scope
- Data Sources
- Analysis/Modeling
- Targeted Outreach
- LG Data Tool

Project Scope

- Support comprehensive energy efficiency upgrades
- Residential Building Stock
- San Diego County
- Project Activities
  - Retrofit Potential Modeling and Outreach
  - Local Government Data Visualization Tool

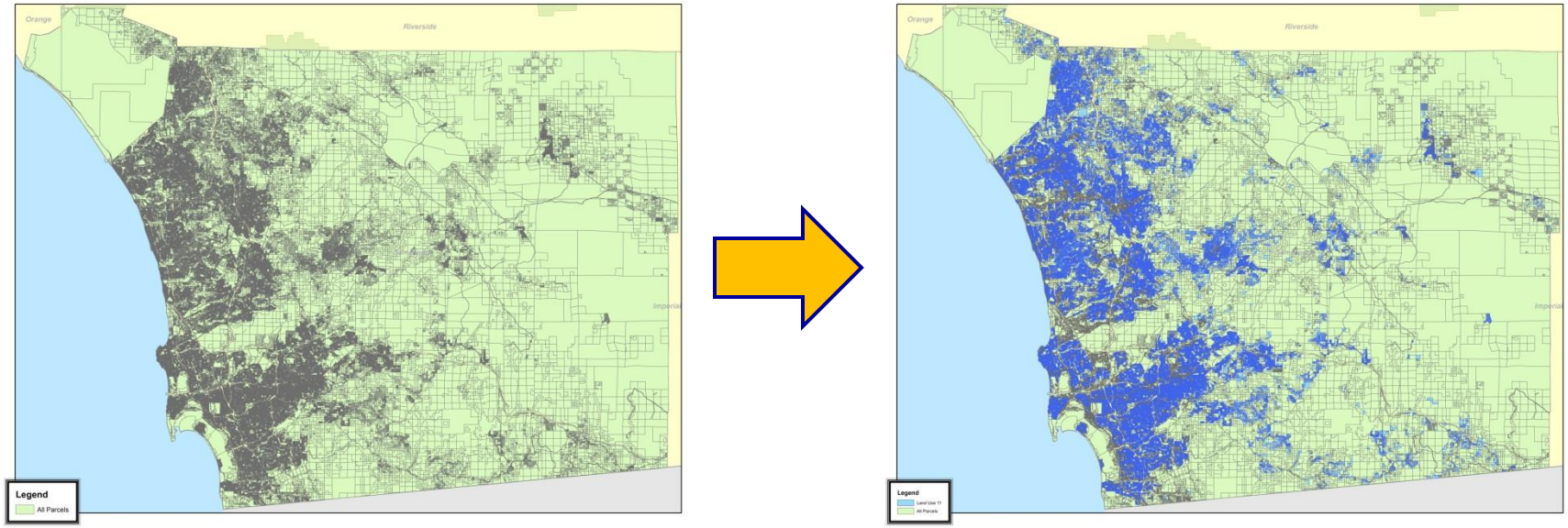
Data Sources

- County Assessor Parcel Database
- Loan to Value and Property Characteristic Data
- SDG&E Zip Code+4 Monthly Avg. Usage Data
- NOAA National Climate Data Center Files
- SANDAG 2010 Tract Level Income Estimates
- CSI/ERP and CVRP Program Participation Data

Retrofit Potential Modeling and Outreach

Retrofit Potential Modeling

- Parcel Data Selection
  - 997,139 Parcels county-wide
  - 586,117 Single-Family Residential Parcels (LU-10 & 11)



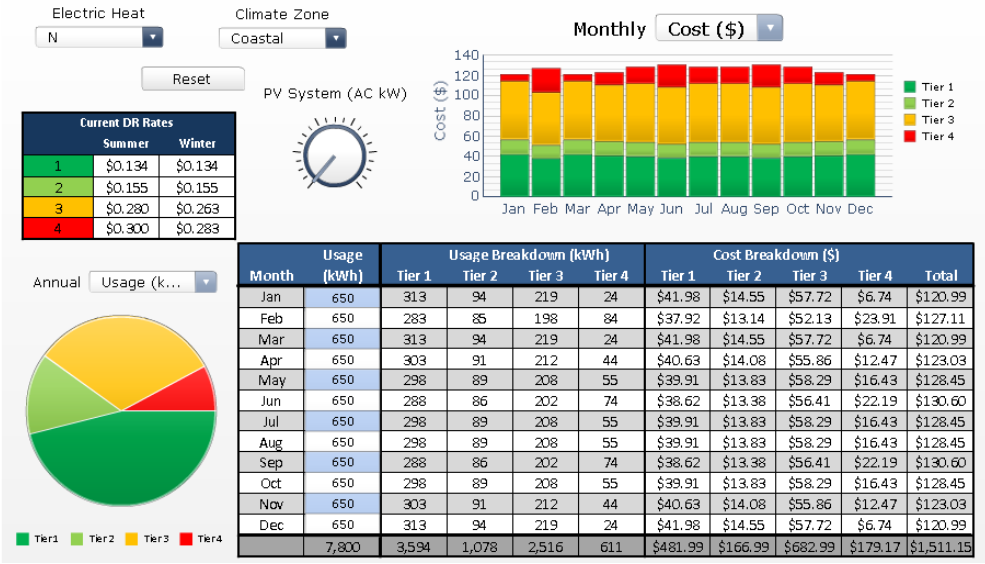
Retrofit Potential Modeling

- Avoided Utility Cost Savings
  - Annual kWh Usage
  - Summer Usage and CDD Correlation
  - Building Year
  - Therm Baseline Usage

- Ability/Willingness to Pay
  - Owner Occupancy
  - Loan to Value
  - Participation Rates in CSI/ERP and CVRP
  - Tract Level Income Distribution

Retrofit Potential Modeling

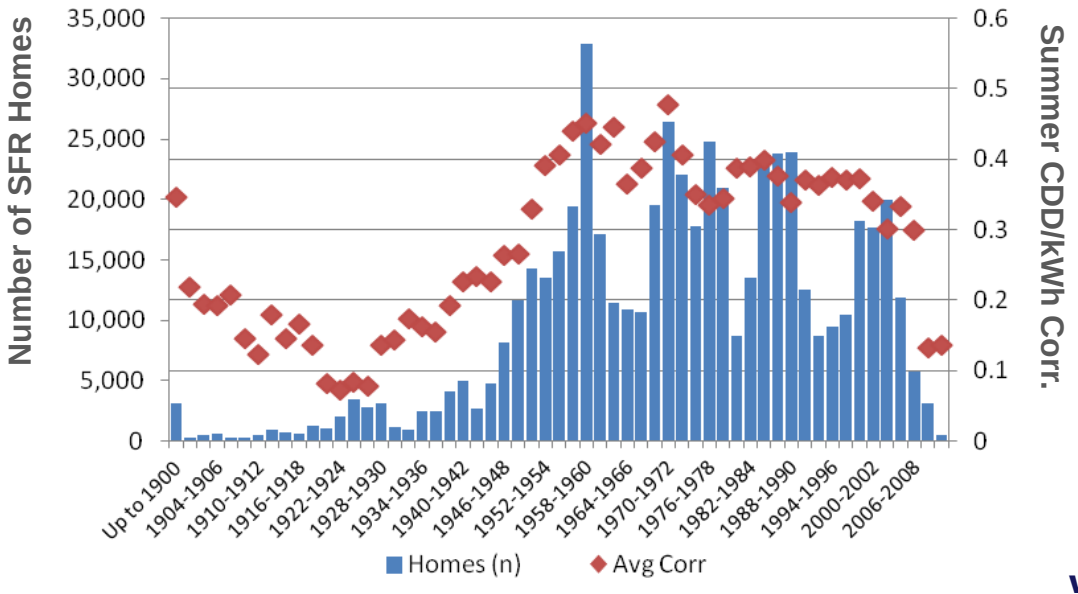
- Avoided Utility Cost Savings
  - Target high marginal cost electricity consumption
    - Customers consuming Tier 3 & 4 (650 kWh/mo. average)



Month	Usage (kWh)	Usage Breakdown (kWh) Tier 1	Tier 2	Tier 3	Tier 4	Cost Breakdown ($) Tier 1	Tier 2	Tier 3	Tier 4	Total
Jan	650	313	94	219	24	$41.98	$14.55	$57.72	$6.74	$120.99
Feb	650	283	85	198	84	$37.92	$13.14	$52.13	$23.91	$127.11
Mar	650	313	94	219	24	$41.98	$14.55	$57.72	$6.74	$120.99
Apr	650	303	91	212	44	$40.63	$14.08	$55.86	$12.47	$123.03
May	650	298	89	208	55	$39.91	$13.83	$58.29	$16.43	$128.45
Jun	650	288	86	202	74	$38.62	$13.38	$56.41	$22.19	$130.60
Jul	650	298	89	208	55	$39.91	$13.83	$58.29	$16.43	$128.45
Aug	650	298	89	208	55	$39.91	$13.83	$58.29	$16.43	$128.45
Sep	650	288	86	202	74	$38.62	$13.38	$56.41	$22.19	$130.60
Oct	650	298	89	208	55	$39.91	$13.83	$58.29	$16.43	$128.45
Nov	650	303	91	212	44	$40.63	$14.08	$55.86	$12.47	$123.03
Dec	650	313	94	219	24	$41.98	$14.55	$57.72	$6.74	$120.99
	7,800	3,594	1,078	2,516	611	$481.99	$166.99	$682.99	$179.17	$1,511.15

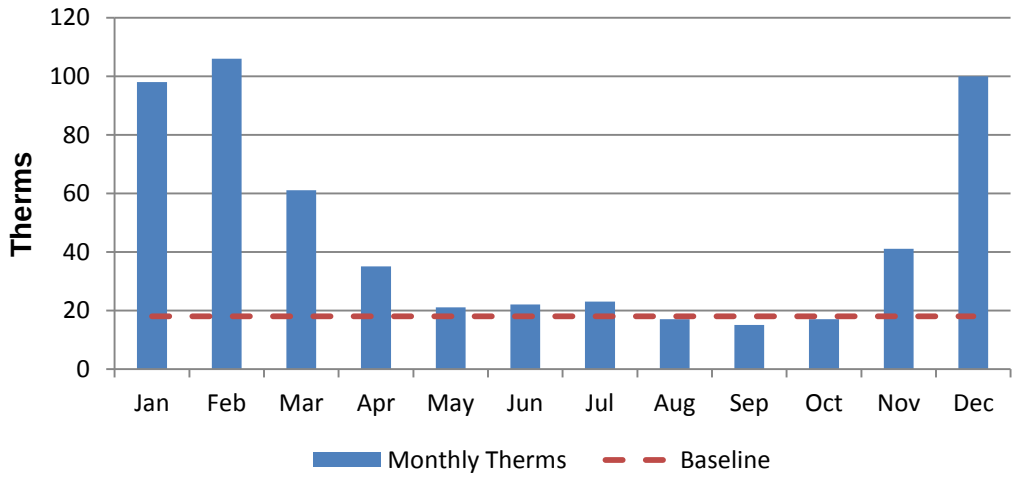
Retrofit Potential Modeling

- Avoided Utility Cost Savings
  - Target electricity use that tracks ambient air temperature
    - Summer CDD/kWh correlation of 40% and 650 kWh/mo. Avg.



Retrofit Potential Modeling

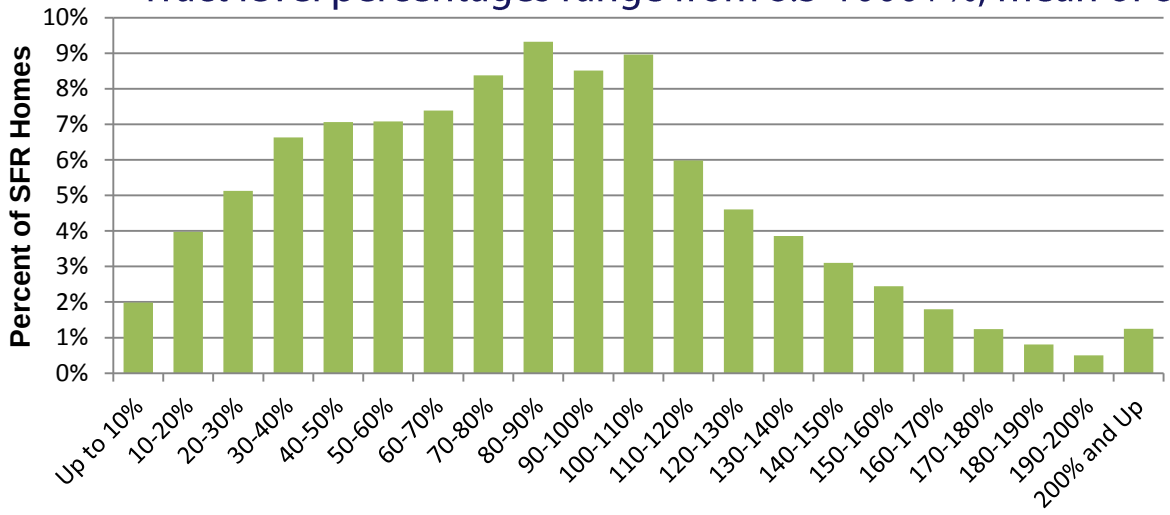
- Avoided Utility Cost Savings
  - Build Year
    - Target areas with homes built before Title 24 standards
  - Target high baseline Therm usage for domestic hot water
    - Homes where usage exceeds BPI baseline for DWH



People	Baseline
2	230
3	320
4	410
5 and Up	750

Retrofit Potential Modeling

- Ability/Willingness to Pay
  - Owner Occupancy
    - Tract level percentages range from 0-100%, mean of 70.5%
  - Loan to Value – 110% Threshold
    - Tract level percentages range from 8.5-1000+%, mean of 89.5%



Retrofit Potential Modeling

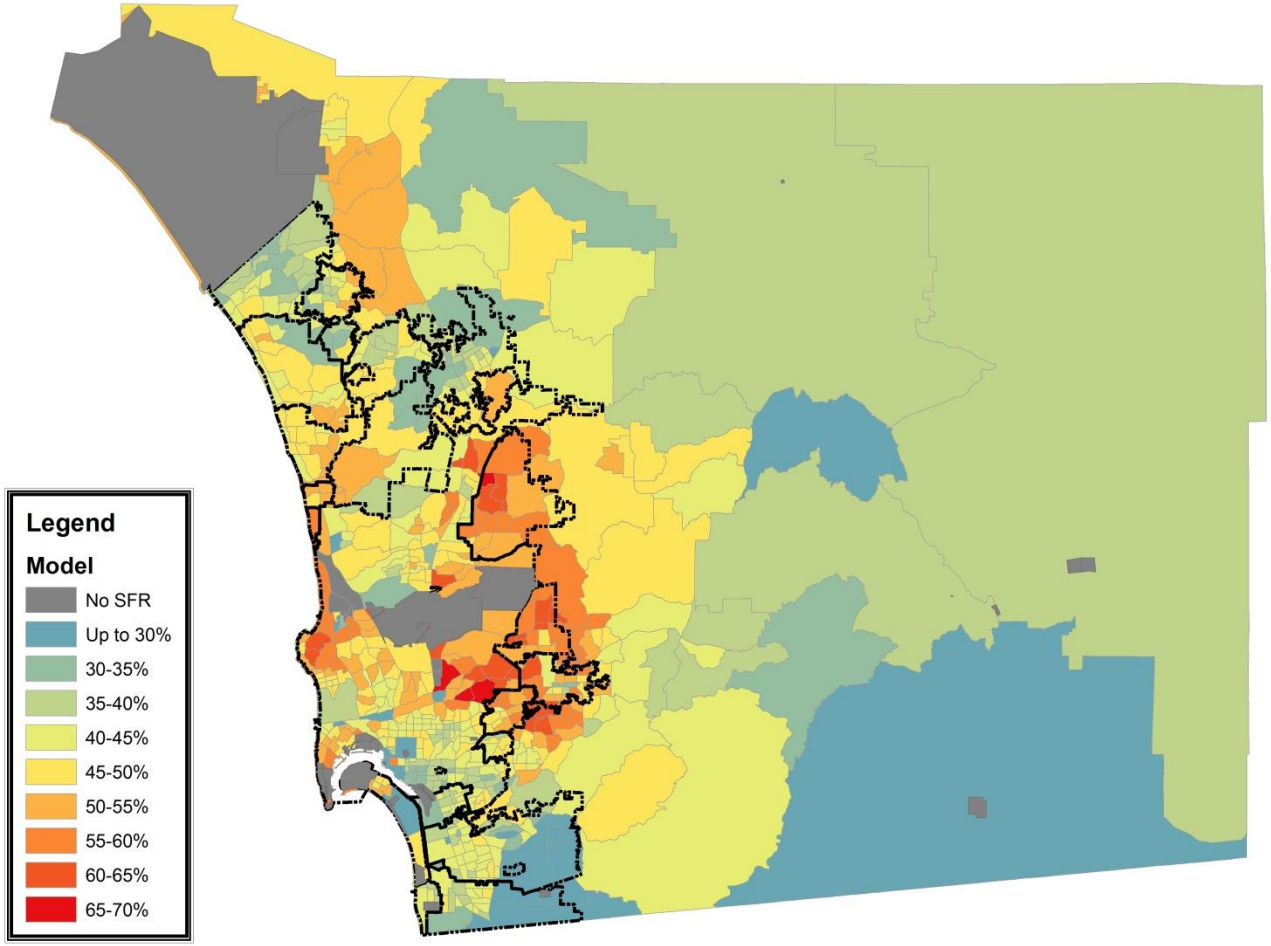
- Ability/Willingness to Pay
  - Participation Rates in PV and CVRP
    - Concentration of PV Program participants (CSI & ERP)
      - ~11,000 residential installations equal to ~90 MW of capacity
    - Concentration of CVRP participants (applied multiplier)
      - ~1,000 rebated vehicles
  - Tract Level Income Distribution
    - Density of households with income less than or equal to $45k
    - Tract level percentages range from 0-98%, mean of 50%

Retrofit Potential Modeling

- Input variables weighted based on target goals
  - **EUC** – focus on high willingness/ability to pay and value of avoided cost

Variable	Weighting
LTV	4
Summer kWh/Correlation	4
BL Therm	2
Year Built	4
Low Income	0
Program Participation	3
Annual Avg. kWh	1
Owner Occupancy	5

Tract	Score	Total (n)
100.15	24.4%	561
162.01	64.8%	1876
93.05	49.3%	794


Legend
Model
No SFR
Up to 30%
30-35%
35-40%
40-45%
45-50%
50-55%
55-60%
60-65%
65-70%

Targeted Outreach

- Conduct monthly community events based on retrofit potential modeling
- Use direct mail, canvasing, and community groups/associations to drive attendance
- Provided attendees with;
  - A primer on home performance basics,
  - The requirements of the EUC Program, and
  - An introduction to approved contractors
- Track attendance (housing data) and contractor referrals

Local Government Data Visualization Tool

Data Visualization Tool

- Leverages data aggregation and cleaning process
- Provides protected access to underlying data elements
- Allows custom queries and exports from spatial database
- Sets on a secure server with password protected access for LGs

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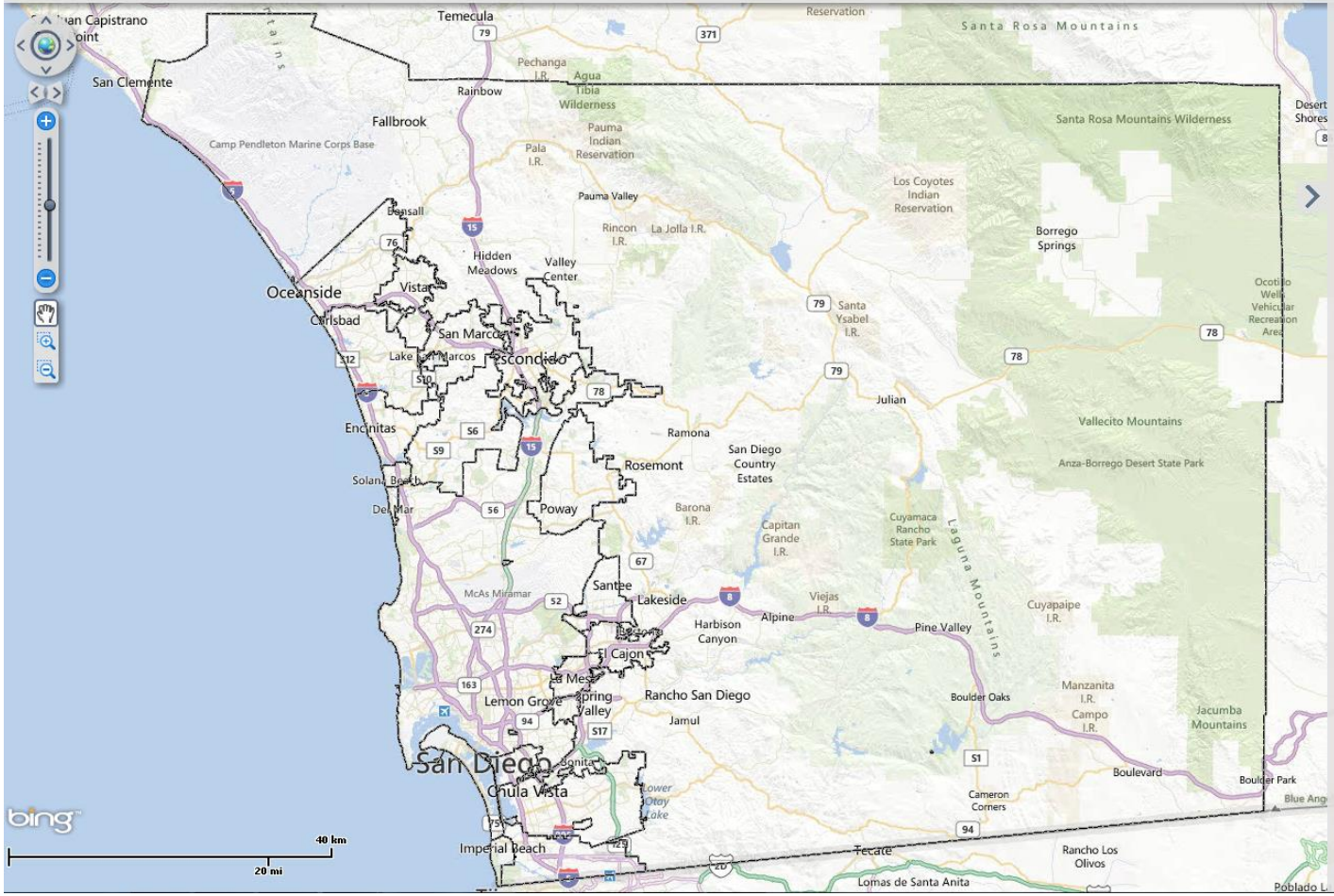
San Diego Climate Collaborative Energy Map

Climate Collaborative SAN DIEGO REGION



Display Map Legend

Display Map Layerlist

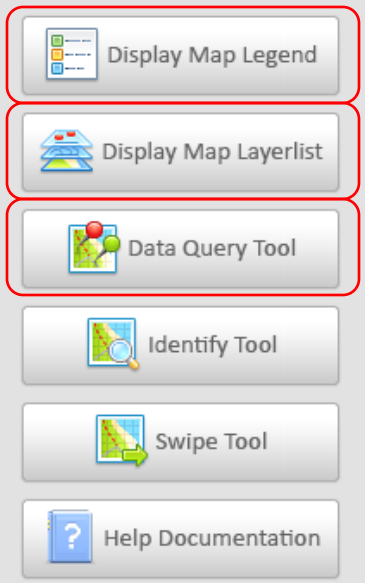
Data Query Tool

Identify Tool

Swipe Tool

Help Documentation

Data Visualization Tool



Dynamic Data and Query Tools

Data Visualization Tool

Waterfall Data Structure

- Climate Zone
  - Municipal Boundaries
    - Zip Code (Income, Race and Ethnicity, CVRP)
      - Zip Code +4 (Solar PV, Build Year)
        - Parcels (Square Footage, Residence Type)

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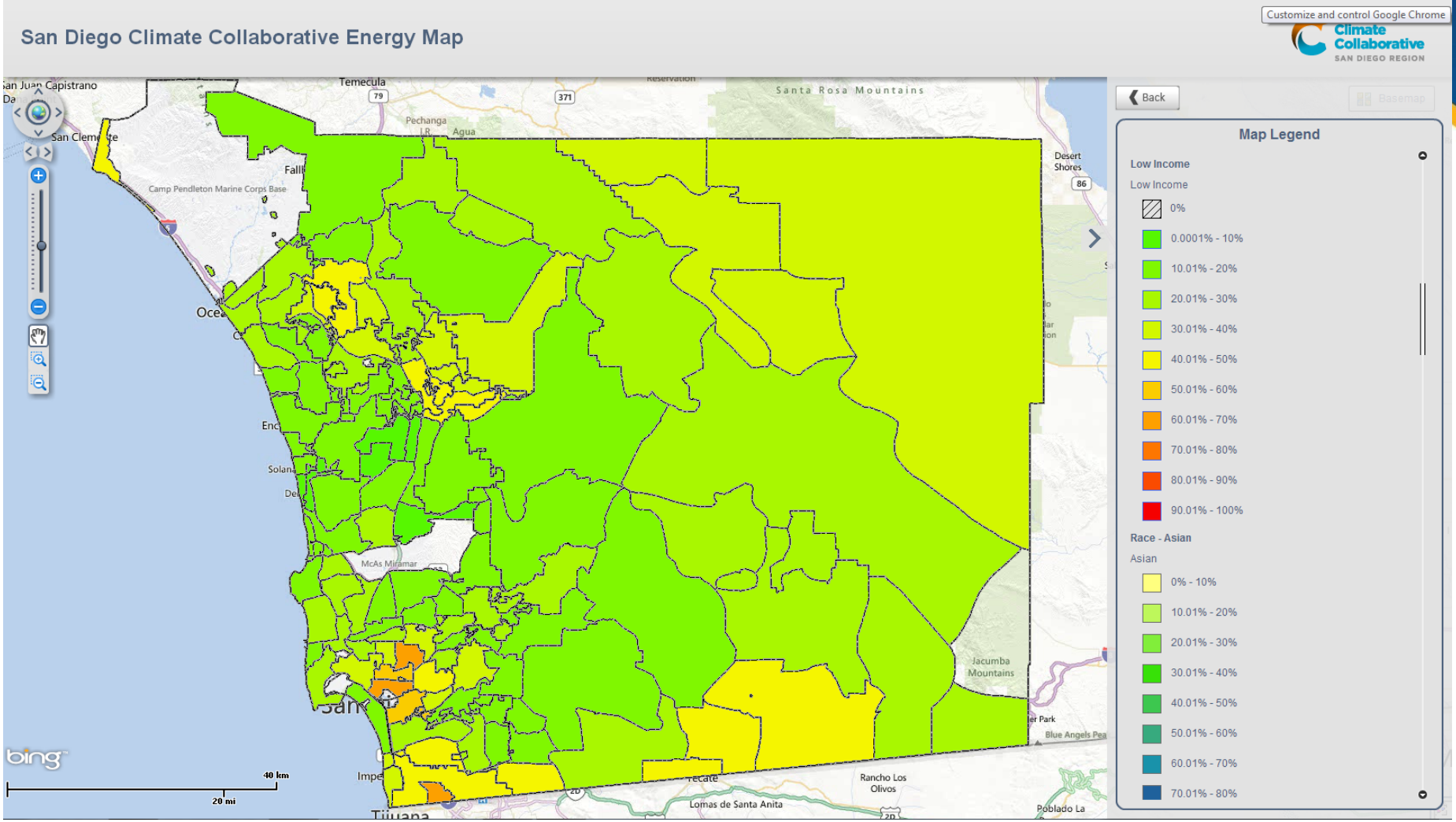

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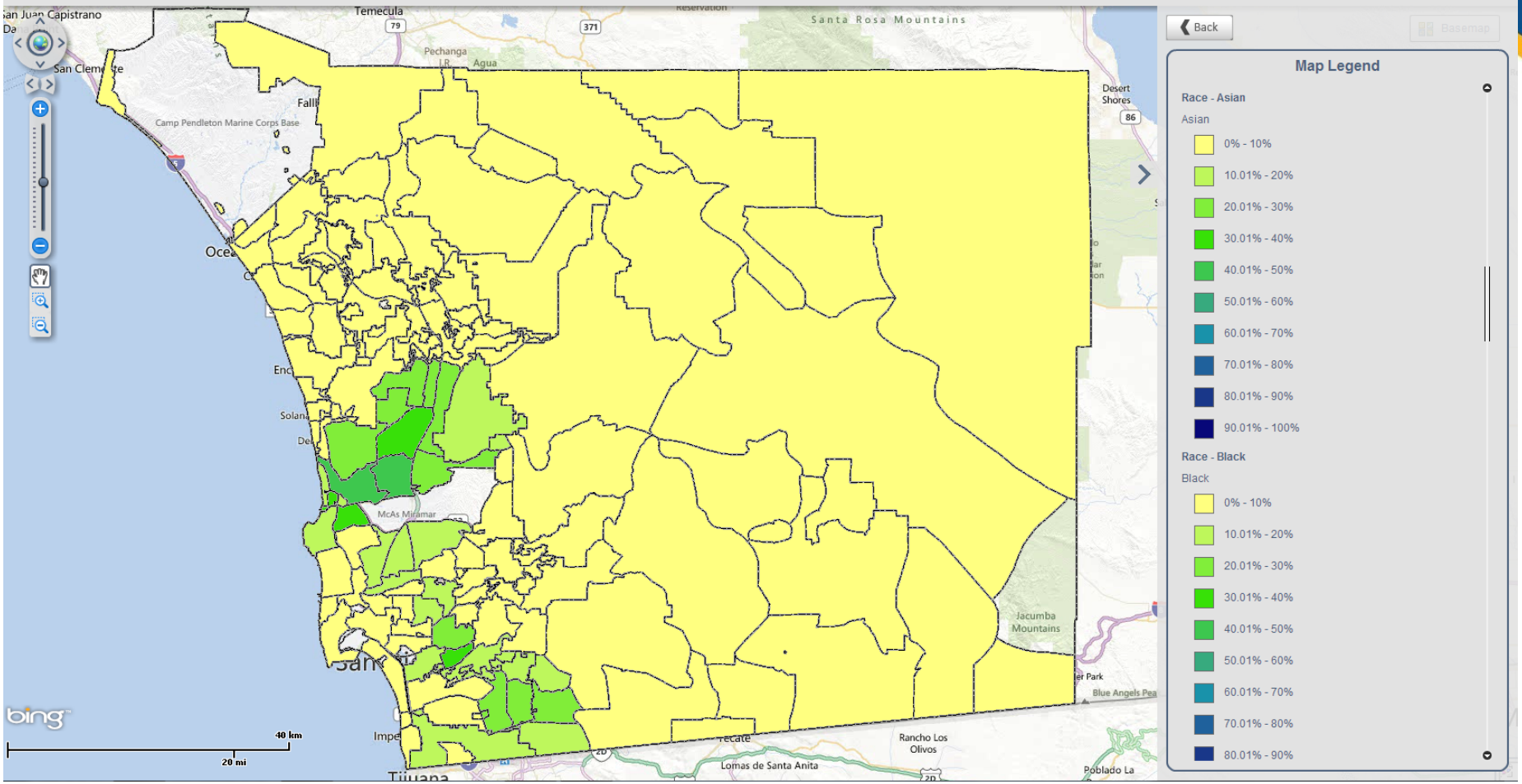

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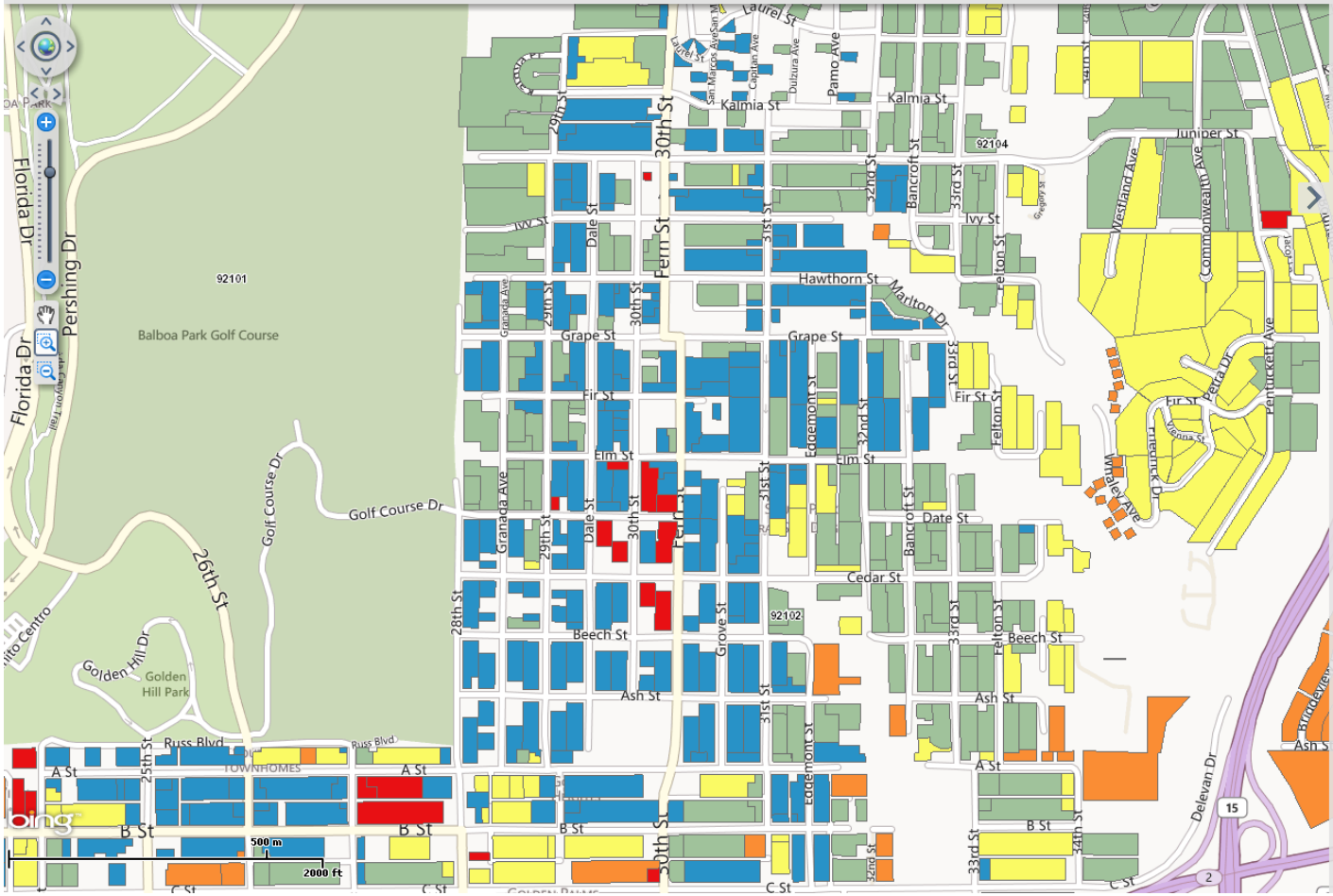

Back

Basemap

Map Legend

Build Year

Build Year

- 1912 - 1932
- 1933 - 1952
- 1953 - 1971
- 1972 - 1991
- 1992 - 2011

Residence Type

Residence Type

- Multi Family
- Single Family

Total Living Area

Total Living Area

- 0 - 500
- 501 - 1,000
- 1,001 - 1,500
- 1,501 - 2,000
- 2,001 - 2,500
- 2,501 - 3,000
- 3,001 - 3,500
- 3,501 - 4,000
- 4,001 - 4,500
- 4,501 - 15,000

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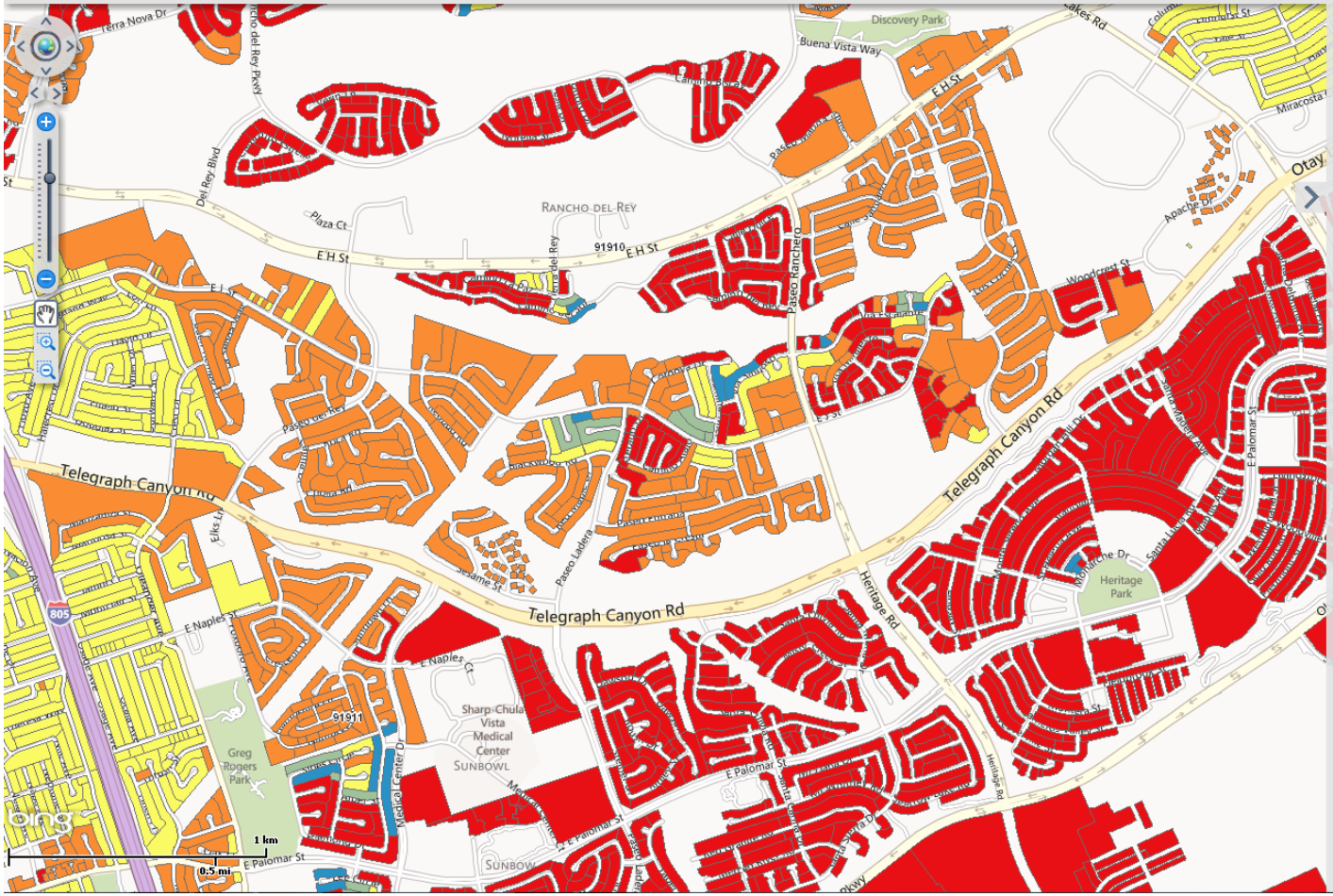

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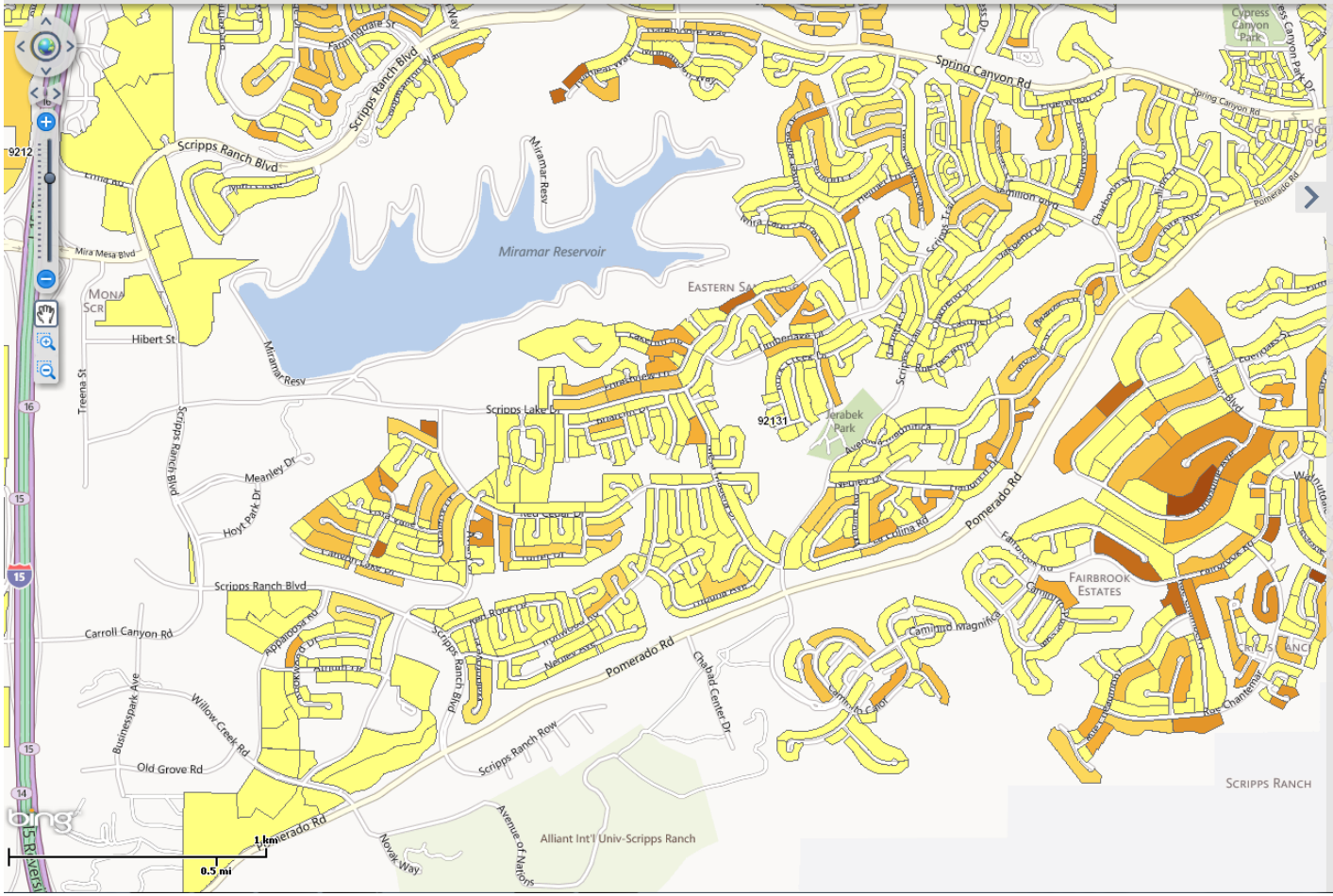

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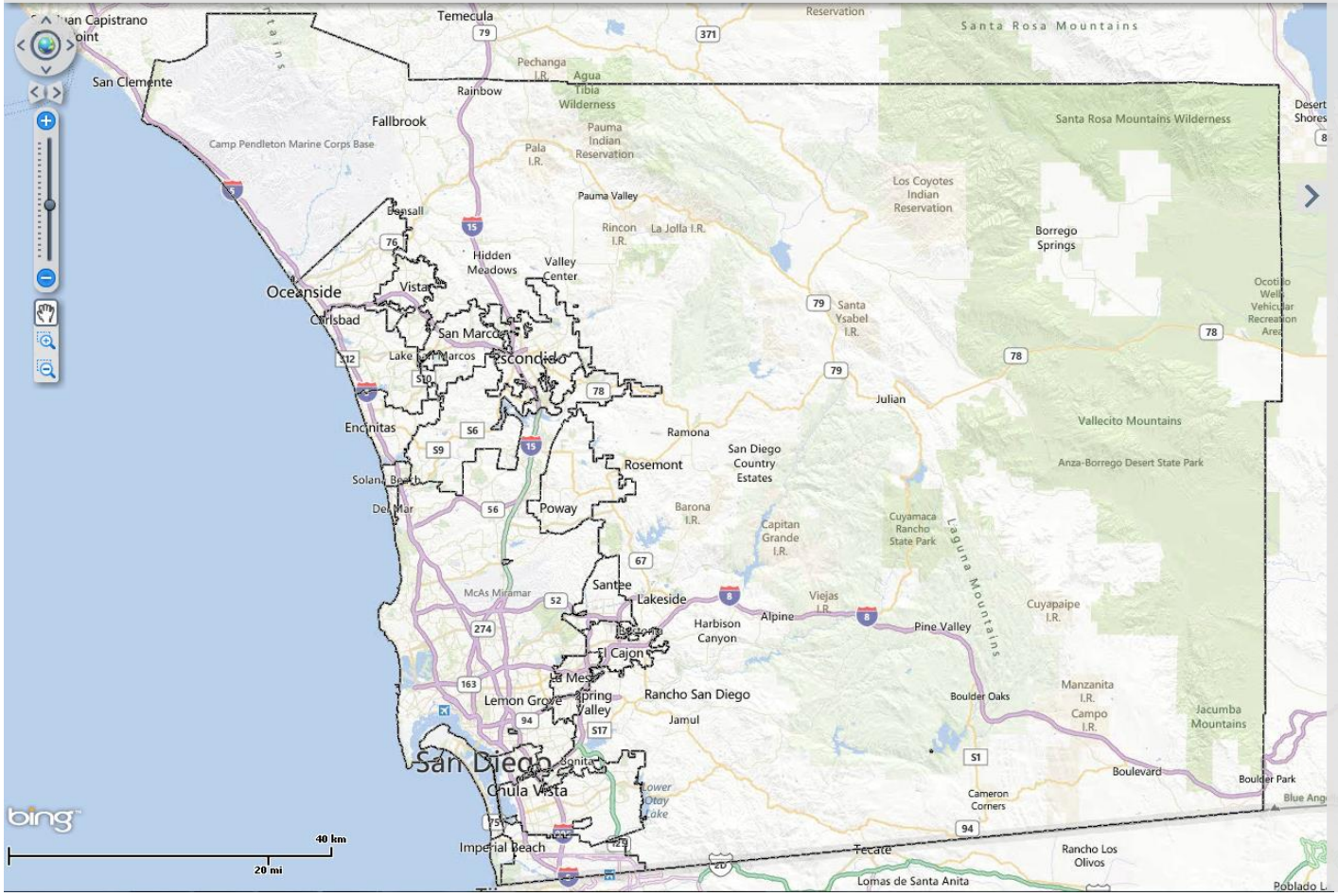

- Municipal Boundaries
- Income
- Race and Ethnicity
- CVRP
- Energy

Query Average # of SDG&E Accounts (ZIP+4):
0 — 68

Query Winter SDG&E kWh Tier (ZIP+4):
Tier 0 Tier 1 Tier 2 Tier 3 Tier 4

Query Summer SDG&E kWh Tier (ZIP+4):
Tier 0 Tier 1 Tier 2 Tier 3 Tier 4

Query Winter SDG&E Therm Tier (ZIP+4):
Tier 0 Tier 1 Tier 2 Tier 3 Tier 4

Query Summer SDG&E Therm Tier (ZIP+4):
Tier 0 Tier 1 Tier 2 Tier 3 Tier 4

Enter

- Misc
- Housing
- Results

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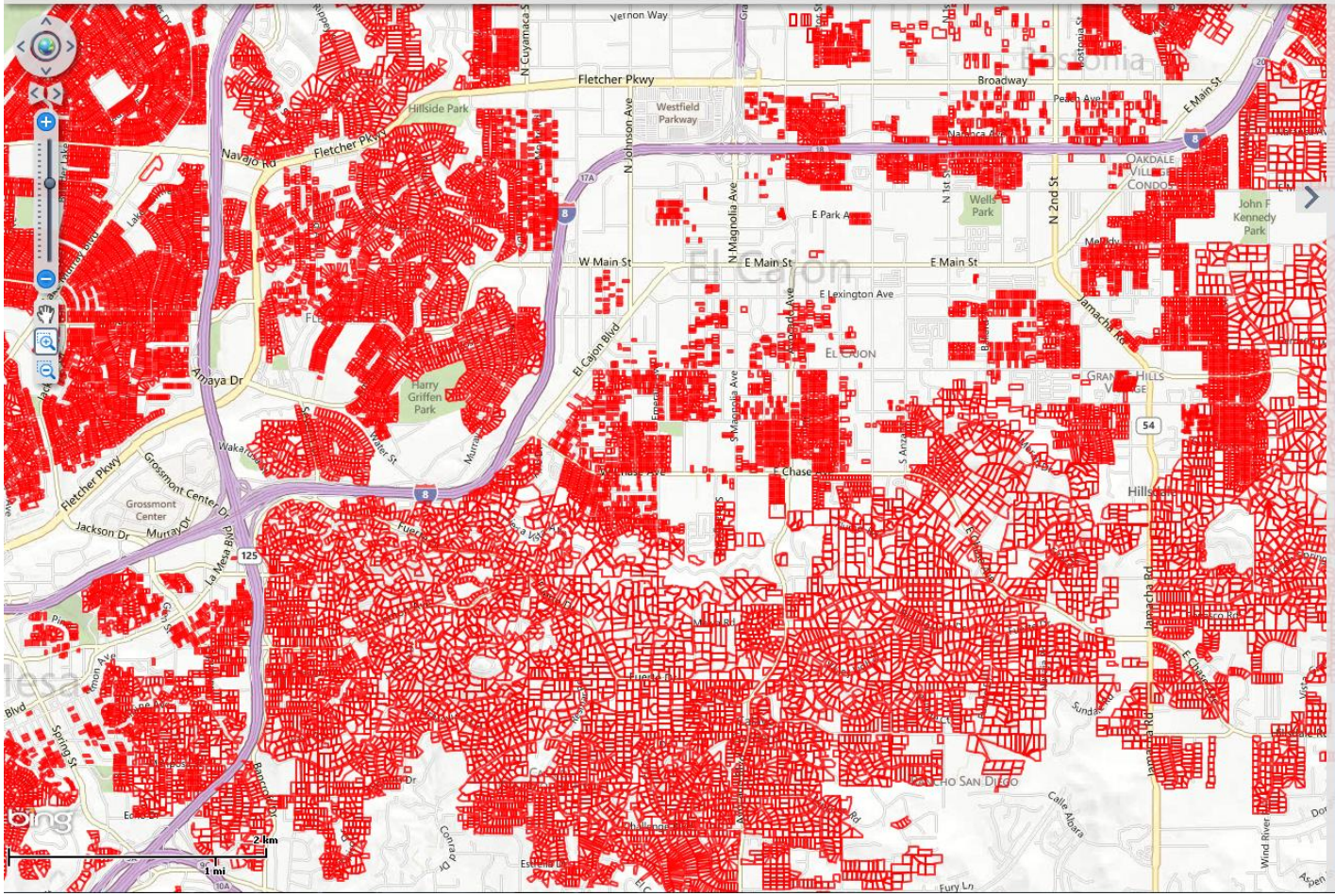


Back

- Municipal Boundaries
- Income
- Race and Ethnicity
- CVRP
- Energy
- Misc
- Housing
- Results

Query Results Found: 42576

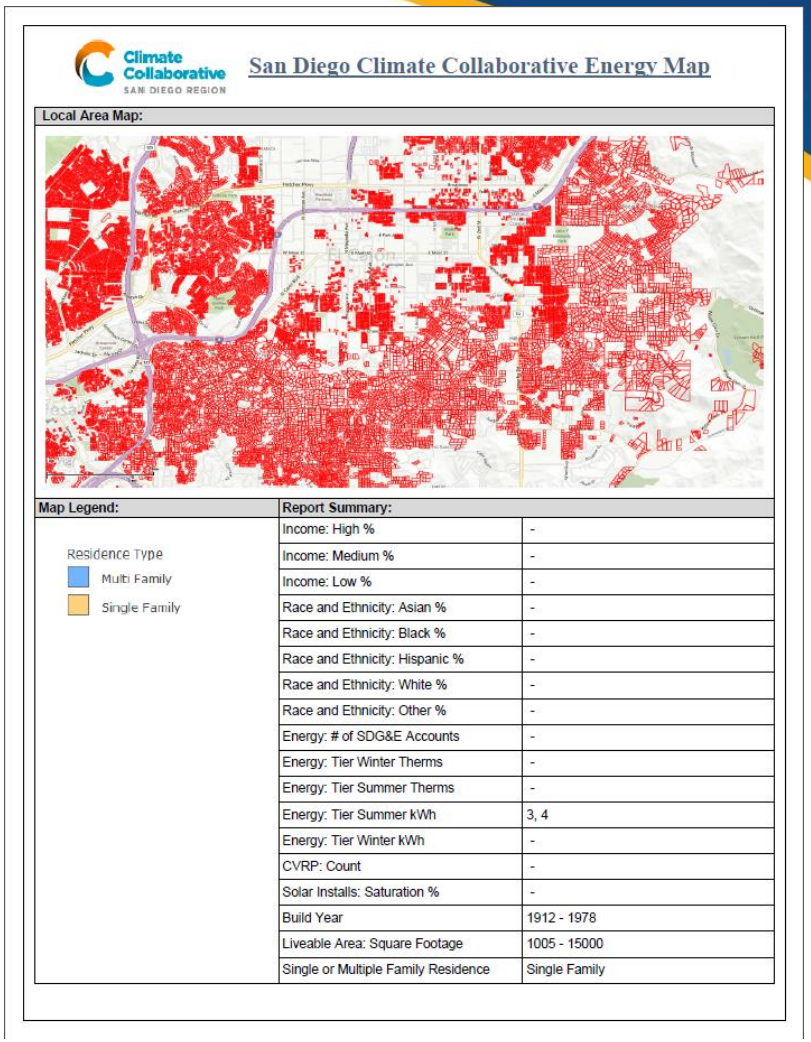
OBJECTID	APN	APN_8
58615	3712110500	37121105
58619	3712111300	37121113
58697	3711000600	37110006
58724	3781141200	37811412
58727	3806620200	38066202
58728	3813421800	38134218
58801	3710612200	37106122
58804	3711000700	37110007
58816	3781210200	37812102
58817	3781230300	37812303
58827	3711101300	37111013
58831	3711202800	37112028
58832	3711601000	37116010
58881	3782500400	37825004
58898	3781141800	3781141
58903	3806620500	3806620
58904	3806630300	3806630
58908	3806610700	3806610
58914	3711000800	3711000

Clear | Zoom | Export | Report

Export Table Definitions

Query Report

- Exports Query Specifications
- Screenshot of Current View
- Map Legend of active feature



Climate Collaborative SAN DIEGO REGION

San Diego Climate Collaborative Energy Map

Local Area Map:

Map Legend:

Residence Type
Multi Family
Single Family

Report Summary:	
Income: High %	-
Income: Medium %	-
Income: Low %	-
Race and Ethnicity: Asian %	-
Race and Ethnicity: Black %	-
Race and Ethnicity: Hispanic %	-
Race and Ethnicity: White %	-
Race and Ethnicity: Other %	-
Energy: # of SDG&E Accounts	-
Energy: Tier Winter Therms	-
Energy: Tier Summer Therms	-
Energy: Tier Summer kWh	3, 4
Energy: Tier Winter kWh	-
CVRP: Count	-
Solar Installs: Saturation %	-
Build Year	1912 - 1978
Liveable Area: Square Footage	1005 - 15000
Single or Multiple Family Residence	Single Family

Questions?

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