Spatial Electric Load Forecast for Kansas City Power & Light

Spatial Electric Load Forecast for Kansas City Power & Light

Printed: August 2011 in Cincinnati, OH

Special thanks to:

All KCP&L staff, Jay Patel and Scott Grafelman for continued LoadSEER data support and management.

Table of Contents

1 Executive Summary

Long-range spatial load forecasting improves the long-range value of short-range planning. A long-term forecast helps utilities evaluate how well short term planning commitments fit into long-term needs. No commitment needs to be made to the elements in a long-term forecast. Capacity and location are more important than timing in a long-term forecast. In other words, it is more important to know what will eventually be needed than to know exactly when it will be needed.

Long-range spatial load forecasting is done so you can answer questions such as:

- "Is this a good decision in the long run, or will we regret it only a few years after we build it?"
- "Do we need to allow for a second transformer in the new substation we will build in four years?"
- "How long will this be an effective solution to the problem?"
- "How much load will the feeder eventually need to serve?"
- "Will we need an additional substation near here in the future? Or will the new substation we're building now be sufficient forever?"

Integral Analytics, Inc. (IA) is pleased to complete this initial electric vehicle (EV) impact study and long-range spatial load forecast for the Kansas City Power & Light (KCPL) territory using the LoadSEER 2010 model. The process of spatial load forecasting is iterative and requires periodic updates in data as more information becomes available. This study details long-range substation load growth due to increases in employment and population, and also the future adoption of electric vehicles at different penetration level.

Generally speaking, EVs may not represent much risk to transmission, sub-transmission, or large distribution assets However, local service transformer risk, or local risk on bank and circuit sections, may persist, given the magnitude of the existing end use loads, the desire for fast charging, or the extent to which similar types of customer neighborhoods adopt EVs somewhat simultaneously. At the extreme, a street of wealthy car enthusiasts may all adopt high performing Tesla, Fiskar or other similar type EV, coupled with requests for 460V fast charging. In this case, significant distribution risk may exist for that particular section of circuit. To mitigate this risk, utilities must employ a process of integrating the customer adoption forecasts with the distribution system overlays.

Importantly, EV load in and of itself is not necessarily good or bad, profitable or risky, load. Rather, the value or risk derived from EVs significantly depends on how the utility manages the load. Generally, analysts are likely to find that Excel-based valuation tools are not adequate to valuing EVs, given the importance of hourly peak time charging risk. The valuation tool used almost certainly requires the simulation of charging possibilities over various time-of-use conditions, ideally overlaid with the existing weather or market risk faced by the supply side, both operationally and in terms of long term integrated resource planning.

© 2011 Integral Analytics Inc

2 Methodology

1) Review, validate and complete the set-up of the LoadSEER database for long term spatial load forecasting.
   a. Static Calibration - Calculate load density for each land use type from substation or secondary transformer peaks
      i. Current and or historic peak data
      ii. Service areas / substation polygon sampling (tabulate area for load density optimization)
   b. Dynamic Calibration - Build and adjust preference matrix
      i. Set default proximity, surround, regional factors list
      ii. Iterate by adding attractor and detractors
      iii. Run growth total scenarios
2) Market research for electric vehicle adoption and charging behavior
   a. Recruit 110 customers via phone to participate in the adaptive conjoint and discrete choice survey online. Followup mailing or phone call, for those that have not responded.
   b. Process survey results and develop unique electric vehicle adoption and charging behavior segments. Create an Excel based market simulator, using the derived preference parameters for the various vehicle attributes, for use by KCPL staff.
   c. Apply segmentation forecast to KCPL customer base with demographic information pulled from the Experian (or equivalent) database and integrate into LoadSEER model. Prepare data for LoadSEER map documents for passenger and fleet EV location analysis.
3) Use LoadSEER to incorporate the KCPL electric vehicle market results into mid and long term analysis
   a. Calculate land-use based horizon loads.
   b. Increase substation horizons with electric vehicle additions.
   c. Calculate substation capacity impacts.

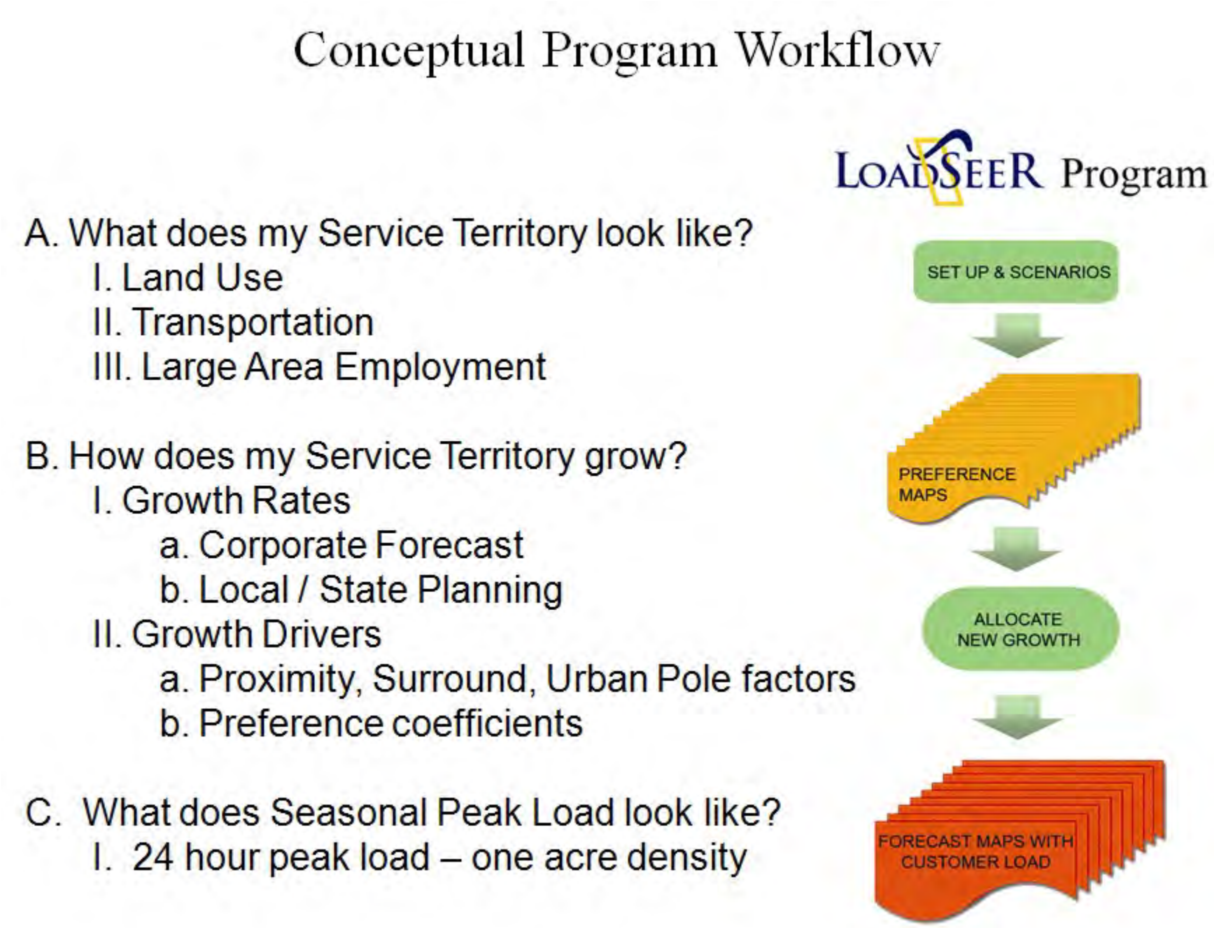
© 2011 Integral Analytics Inc

2.1 Land Use Forecast

LoadSEER's land-use algorithm can be thought of as a transformation of a set of current land-use and customer maps. Several of the maps represent how various land use classes like residential, commercial, industrial, and others are distributed throughout the study region. From this set of maps representing, say, customer patterns in Kansas City in 2010, to a representation of what they are expected to look like in 2030, LoadSEER converts this land-use based customer projection to an electric load forecast on a small-area basis by using customer class peak load values.

2.1.1 How the Core Forecast Algorithm Works

Every customer class has a preference map, where each small area is assigned a preference score. LoadSEER first assembles the user defined regional, proximity, and surround factor maps, and then multiplies each factor map by a preference value for each customer class. The preference value indicates how much that customer class is attracted to that factor. If there are a total of 33 regional, proximity, and surround factors, then each land use class will require 33 preference values to be entered. LoadSEER also requires users to prioritize customer classes into a rank ordered list by economic bidding power. In other words, users are required to determine which customer classes can outbid each other during land and property sales. Consequentially, LoadSEER will model development scenarios where growth is allocated by class in order from high to low.



2.1.1.1 Regional Influence Rules

Cities and towns are, in effect, large geographic "machines" built by mankind to support its economic and societal needs. There are numerous simple but effective rules that can be inferred from studying the various parts of these "machines", how they interrelate, and how they are sized relative to one another. These regional and urban influence rules can then be used to determine what, for example, a "bigger Kansas City than today's Kansas City" would look like, or how big will downtown be if the population increases by 15% but suburban office parks on the city's edges compete for the office market. How will the mix of high-rise to mid-rise buildings in the core of downtown change as the city expands outward at the edges and higher in the center? What is the impact of an arterial and ring (loop) highway system on the distribution of industrial activity in the region (Houston) versus an omnipresent arterial grid street system (Phoenix) on how a city expands and grows?

What distinguishes ***Regional Influence*** rules from local preference rules is that regional rules relate to the structure of the whole city, and many of the effects of the regional factor have an influence over dozens of miles across the region (like the "pull" of the downtown region influences growth in the outlying suburbs). Regional growth factors can vary in terms of their source, as well. For example, the user might model a major bridge (say, the San Francisco bridge) as a regional pull factor for Marin County to the north, due to the draw that downtown San Francisco has on the growth of Marin County. All of this "pull" is centered on exactly the corridor represented by the bridge and the user would want to set the regional pull factor exactly at the bridge location. Growth within Marin County, in this example, would prefer, all other factors being equal, to locate closer to the bridge entrance. Other regional pull factors include large office complexes with significant employment, large entertainment districts, stadiums, universities, or any other source that pulls people toward it for whatever reason, be it employment, entertainment or necessity, among others.

2.1.1.2 Local Preference Rules

Local preference rules depend only on data in a small area, or within a specified distance of it. Just about any parcel of land has attributes or locational factors that make it more useful for some purposes than other purposes. Most often this pattern is totally dependent on other nearby factors. Anyone who has ever paid attention to how cities and towns are laid out has recognized that retail commercial development is always located near major street intersections or along major roads. Other land-use classes also establish themselves in areas fitting certain patterns which can be discerned by spatial analysis. More examples of local preference rules are: 1) Medium and heavy industrial growth within a ten year period located within ¼ mile of an existing railroad track, and within ½ mile of existing industrial land. 2) residential growth at least 1/8 to ¼ mile away from railroad tracks, locate adjacent to other residential, and close (within two miles) but not too close (not next door) to major retail development (shopping centers).

2.1.1.3 Growth Percentages

LoadSEER's forecast of the future spatial distribution of land use is "driven" by a set of exogenous ***Growth Percentages*** – or numbers in its Forecast Controls input page, which tell it in effect, "the total increase in residential growth during this three year period 2011 – 2030 will be 13,200 new customers," etc. It is recommended that these Growth Percentages match the Corporate economic forecasting departments new customer forecast or the regional metropolitan planning organizations (MARC in this study) population and employment forecast.

2.1.1.4 Growth Allocation

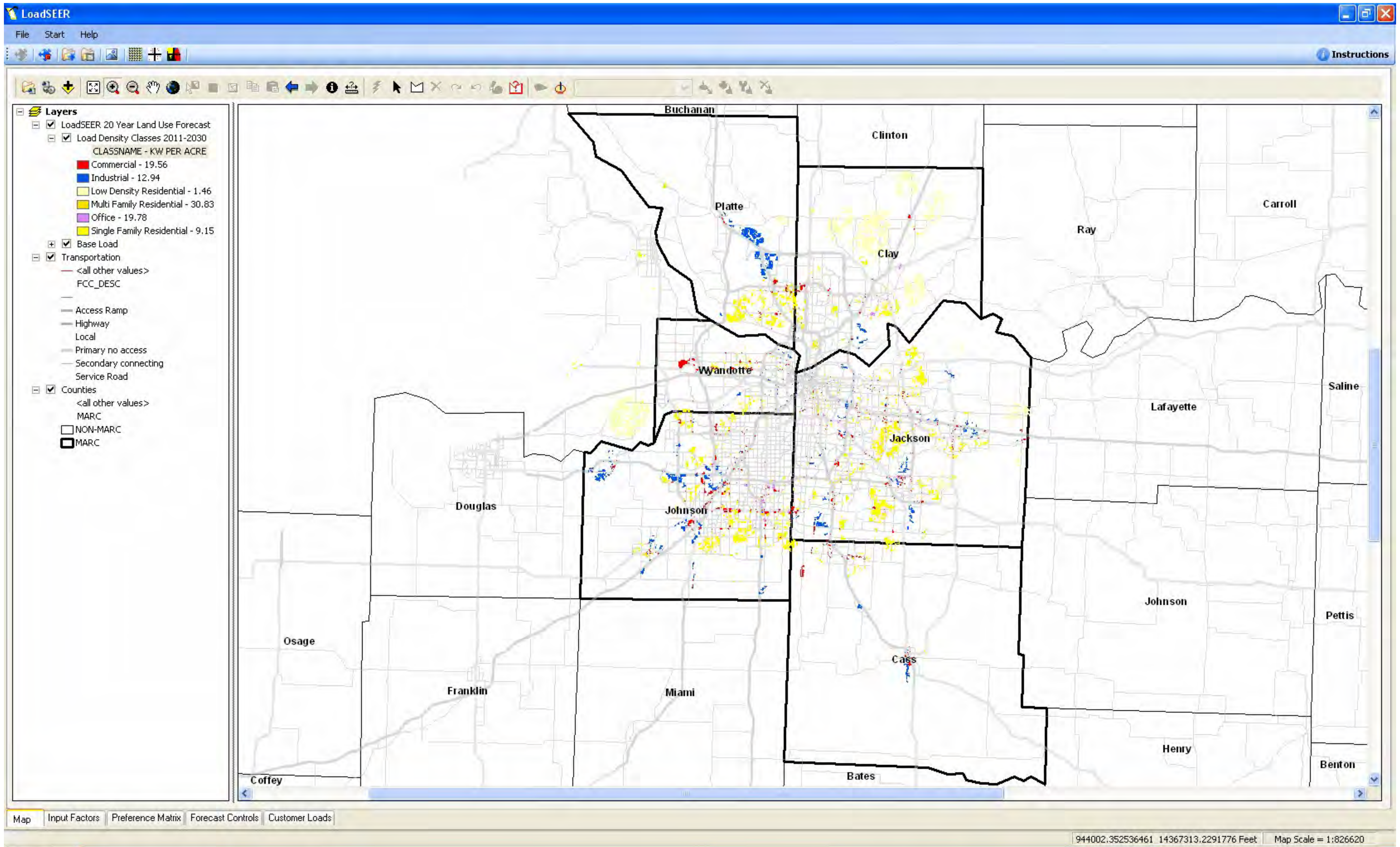
The LoadSEER algorithm uses a demand and supply matching approach to allocate the growth percentages of land use growth, for any given year, within the framework of regional influences, local preference rules and availability limits. First, using the regional influence rules, the core algorithm builds a number of maps that represent "regional demand" for residential, commercial, and industrial development space within the urban or rural area it is forecasting. These are maps of how much demand there is for new development in various areas. It could be that there is no demand for new office space downtown, or that the demand is all in the "edge city" areas of the metroplex, or other places. Using urban and rural regional influence rules, as appropriate, it builds such maps for all land use classes, along with various maps that model certain aspects of the interactions between these classes (e.g., retail stores locate where there are customers, which means that this location occurs in proportion to residential growth in various sub-regions of a study region). Second, the core algorithm builds a set of supply or "preference maps" that show how every small area measures against the pattern of needs of each of the various land use classes. For example, where are there developable areas, available for new growth, that best match the needs of a new industrial plant, and which has that combination of nearby railroads, other industry nearby, process water availability, etc. to make it attractive ? Third, the core algorithm builds a map of what land is available for development, regardless of whether it is vacant or unrestricted, or currently for an existing developed land use. Finally, the core algorithm applies various rules about land use growth to allocate the control total growth (e.g., "I need 13,200 new homes to be located somewhere) while balancing demand and supply, keeping within the limits all of the specified growth rules, and keeping all interacting factors in balance.

© 2011 Integral Analytics Inc

2.1.2 KCPL Land Use Model

The KCPL LoadSEER Model covers Platte, Johnson, Cass, Clay, Jackson, and Wyandotte counties. The input land use map was created by the Mid-America Regional Council (MARC). The map below represents the new load growth results of KCPL's 20 year LoadSEER land use model. The regional influence and local preference factors used in this model were: **Downtown Kansas City, sewer availability, flood zones, land use zoning, census block income, principle arterial roads, ramps, collector roads, minor arterial roads, railroads, existing commercial, industrial, residential, office, and vacant parcels.**

This model's 20 year load growth allocation is equivalent to an estimated 798 MW increase in system peak, assuming .9 diversity for every substation.



2.1.2.1 Forecast Controls

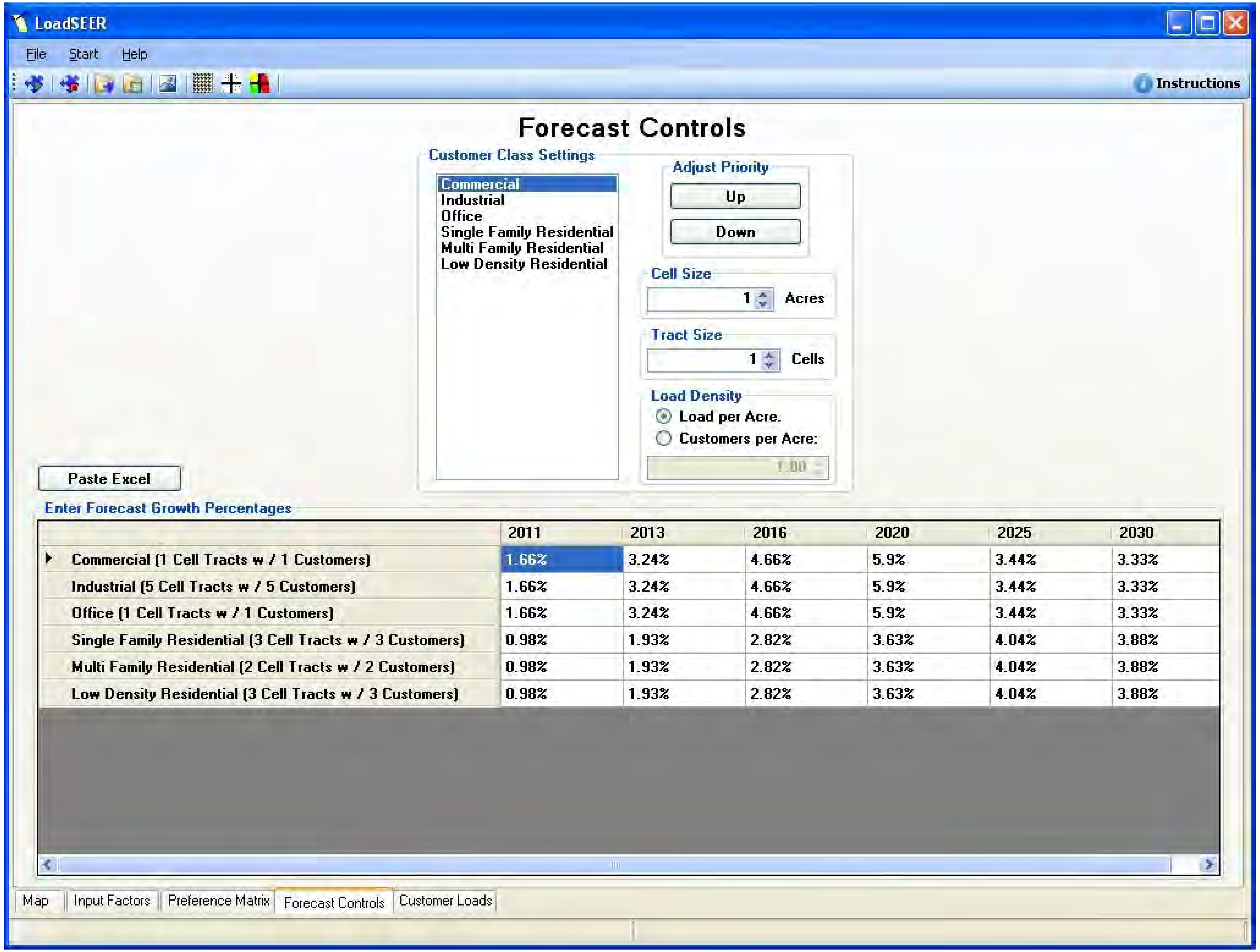
The average population and employment growth rates for Kansas and Missouri counties served by KCPL, produced by the MARC, were use to estimate the number of new residential and commercial/industrial customers respectively. The growth rates in yellow were applied to the residential classes and the growth rates in orange we applied to commercial and industrial class.

MARC Population and Employment Growth Rates:

Date	KS pop	MO pop	Avg KCPL pop	KS emp	MO emp	Avg KCPL emp
2009	1.59%	0.79%	1.19%	2.28%	1.58%	1.93%
2010	1.57%	0.79%	1.18%	2.23%	1.56%	1.89%
2011	1.26%	0.70%	0.98%	1.86%	1.46%	1.66%
2012	1.25%	0.69%	0.97%	1.82%	1.44%	1.63%
2013	1.23%	0.69%	0.96%	1.79%	1.42%	1.61%
2014	1.22%	0.68%	0.95%	1.76%	1.40%	1.58%
2015	1.20%	0.68%	0.94%	1.73%	1.38%	1.55%
2016	1.19%	0.67%	0.93%	1.70%	1.36%	1.53%
2017	1.17%	0.67%	0.92%	1.67%	1.34%	1.51%
2018	1.16%	0.67%	0.91%	1.64%	1.33%	1.48%
2019	1.15%	0.66%	0.90%	1.62%	1.31%	1.46%
2020	1.13%	0.66%	0.90%	1.59%	1.29%	1.44%
2021	1.05%	0.60%	0.82%	0.78%	0.62%	0.70%
2022	1.04%	0.59%	0.82%	0.77%	0.61%	0.69%
2023	1.03%	0.59%	0.81%	0.77%	0.61%	0.69%
2024	1.02%	0.59%	0.80%	0.76%	0.61%	0.68%
2025	1.01%	0.58%	0.79%	0.75%	0.60%	0.68%
2026	1.00%	0.58%	0.79%	0.75%	0.60%	0.67%
2027	0.99%	0.58%	0.78%	0.74%	0.60%	0.67%
2028	0.98%	0.57%	0.78%	0.74%	0.59%	0.67%
2029	0.97%	0.57%	0.77%	0.73%	0.59%	0.66%
2030	0.96%	0.57%	0.76%	0.73%	0.59%	0.66%

 © 2011 Integral Analytics Inc

2.1.2.1.1 Screenshot



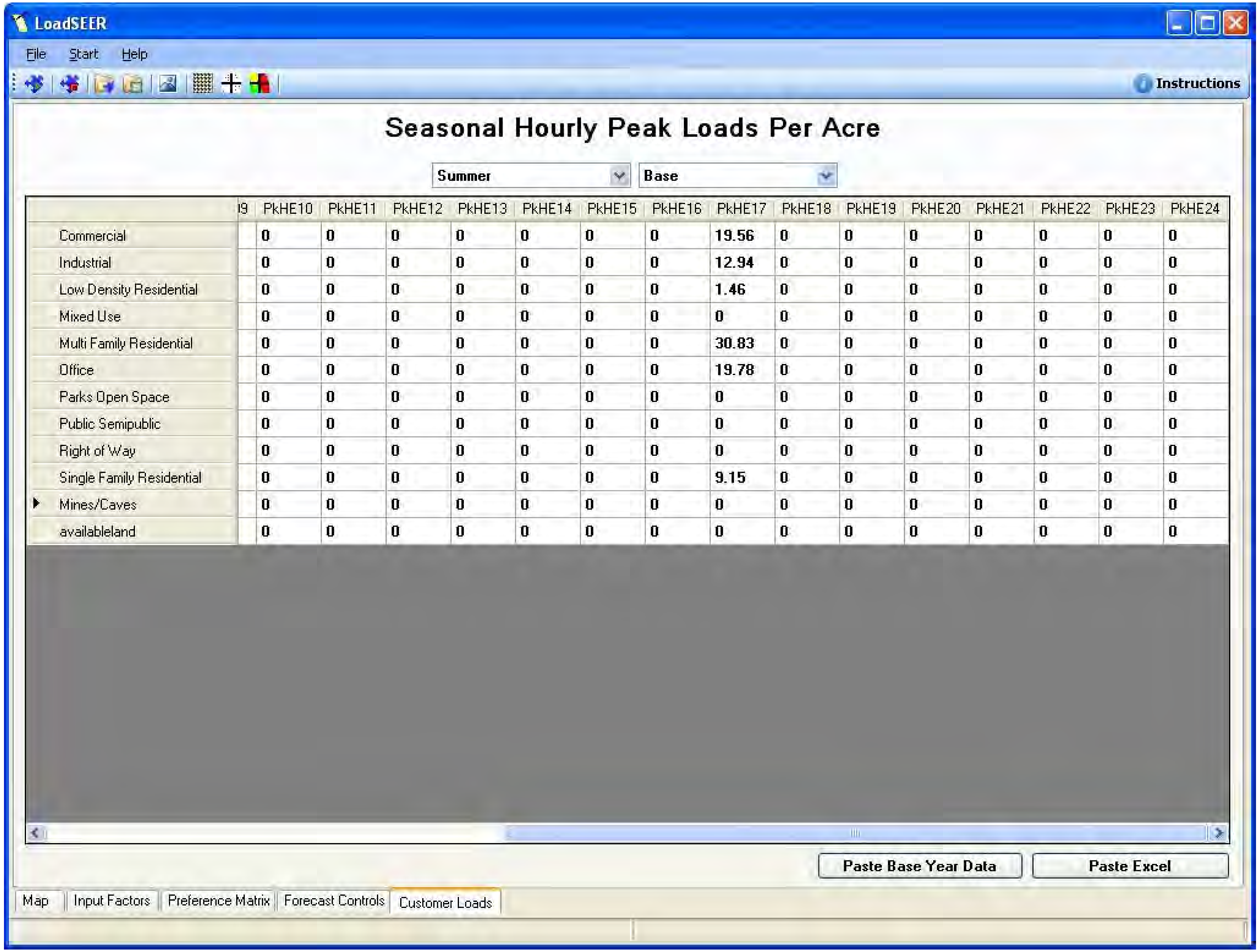
2.1.2.2 Customer Loads

In order to estimate the annual peak load per acre for each land use class, the numbers of customers per acre were multiplied by the average annual kilowatt peaks by each customer class, respectively.

Land Use Class	Customers Per Acre	Avg Customer Peak KW	Avg Peak KW Per Acre
Commercial	5.97	3.28	19.56
Industrial	3.95	3.28	12.94
Low-Density Residential	0.81	1.80	1.46
Multi-Family Residential	17.13	1.80	30.83
Office	6.03	3.28	19.78
Single-Family Residential	5.08	1.80	9.15

© 2011 Integral Analytics Inc

2.1.2.2.1 Screenshot



	9	PkHE10	PkHE11	PkHE12	PkHE13	PkHE14	PkHE15	PkHE16	PkHE17	PkHE18	PkHE19	PkHE20	PkHE21	PkHE22	PkHE23	PkHE24
Commercial		0	0	0	0	0	0	0	19.56	0	0	0	0	0	0	0
Industrial		0	0	0	0	0	0	0	12.94	0	0	0	0	0	0	0
Low Density Residential		0	0	0	0	0	0	0	1.46	0	0	0	0	0	0	0
Mixed Use		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Multi Family Residential		0	0	0	0	0	0	0	30.83	0	0	0	0	0	0	0
Office		0	0	0	0	0	0	0	19.78	0	0	0	0	0	0	0
Parks Open Space		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public Semipublic		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Right of Way		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single Family Residential		0	0	0	0	0	0	0	9.15	0	0	0	0	0	0	0
Mines/Caves		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
availableland		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2 Electric Vehicle Forecast

Electric vehicles present a significantly large end use addition to system loads, and as such, utilities may require a more rigorous, and more broadly defined, planning framework against which to plan for EV adoption. Unlike other smaller end uses, electric vehicles tend to effect many utility departments including distribution planning, marketing, finance, regulatory, operations, rates and supply.

This study focused on customer segmentation and the use of adaptive conjoint and discrete choice analysis. The study identifies which customer segments are likely to adopt which types of vehicles, and which customers are likely to prefer rapid and/or unrestricted charging. IA recruited approximately 110 KCPL customers via telephone to participate in an online survey. IA then purchased Experian data for these 110 customers, and for all other KCPL customers (approx. 850,000).

The survey was not designed for commercial fleets customers. In this study, we used secondary vehicle information, regarding which types of firms already have fleet vehicles, and assume that electric penetration will be a similar roll out, as current.

© 2011 Integral Analytics Inc

2.2.1 Residential

Market Research

1) Random sample of KCPL and GMO customers.

IA chose to use 100 sample points for the following reasons: KCPL desired to keep recruiting and survey costs low, for this first electric vehicle forecast. After 30 sample points, where customer responses are similar (i.e., the variance in the sampled responses is low), statistically, the central limit theorem holds that the results and 95% confidence limits are asymptotically the same as a Z test, which theoretically demonstrates that even a sample as low as 30 is often representative of the population at large. Long term, as customers gain a deeper understanding of the use and need for electric vehicles, these preferences and responses will begin to segment more, leading to the need for much larger samples. But at this point, new in the product development cycle, IA does not believe that this level of segmentation yet exists. Future studies should call for larger sample sizes as customer preferences, purchasing behaviors and adoption become more complex.

2) The design and execution of discrete choice survey. 113 valid responses were collected.

3) Customer behavior analysis and data analysis.

A fundamental aspect of customer behaviors analysis is the development of customer scores, or probabilities of adoption, for different types of electric vehicles, and for various attributes of electric vehicles.

Two key aspects are emphasized in the customer research and analytics, namely predicting which customers are likely to adopt which types of vehicles, and which customers are likely to prefer rapid and/or unrestricted charging. These factors appear to be the most consequential among the possible set of EV key drivers, given their significant consequence on long term integrative utility plans.

Customer Scoring

1) A customer's likelihood to purchase an EV is based on these questions in survey:
 -Is the vehicle you primarily drive a Hybrid vehicle ?
 -Are you extremely or very likely to purchase PHEV in future 1 – 10 years?
2) A customer's preferred EV type is based on the utility scores measuring how they prefer different vehicle attributes, such as speed, range, size, efficiency, etc.
- A customer's EV charging preference is based on the utility scores of how much they prefer rapid and uncontrolled charging. These score are combined as a proxy for a customer's tolerance to be controlled and therefore charge off-peak, at night.

The higher the utility score, the more a customer prefers a given option. For example, by plotting the utility scores for a given option by different customer segments, a graph can show how differently a college student prefers EVs than retirees. The utility scores in this study (see Appendix) are normalized to be 0 centered, so overall the utility score has a mean of 0. Anything above 0 are the top half choices for a customer.

Controlled and Uncontrolled Circuit Load Implications

- Customers are ranks by their likelihood to purchase an EV.
- Every customer is assigned an uncontrolled (on-peak) kW based on an estimated battery size of their preferred EV, and only customers with a predicted high tolerance for controlled charging are assigned a controlled (off-peak/ night) kW.
- Historical vehicle registration counts for Kansas and Missouri were used to produce a linear forecast of yearly vehicle registrations for the next 20 years.
- Customers are divided into penetration scenario groups based on their rank and various EV penetration scenarios.
- Circuit load additions are calculated for both controlled and uncontrolled loads at each penetration scenario.

An EV penetration scenario is defined as a percentage of newly registered vehicles per year for the next 20 years. A penetration scenario group ID of "1", for example, represents all customers that are likely to purchase their preferred EV if 1% of all newly registered vehicles are EVs for the next 20 years. Similarly, a penetration scenario group ID of "100" represents the customers that are likely to purchase their preferred EV if 100% of all newly registered vehicles are EVs for the next 20 years.

 © 2011 Integral Analytics Inc

2.2.1.1 Survey Respondents Profile

Survey respondents profile

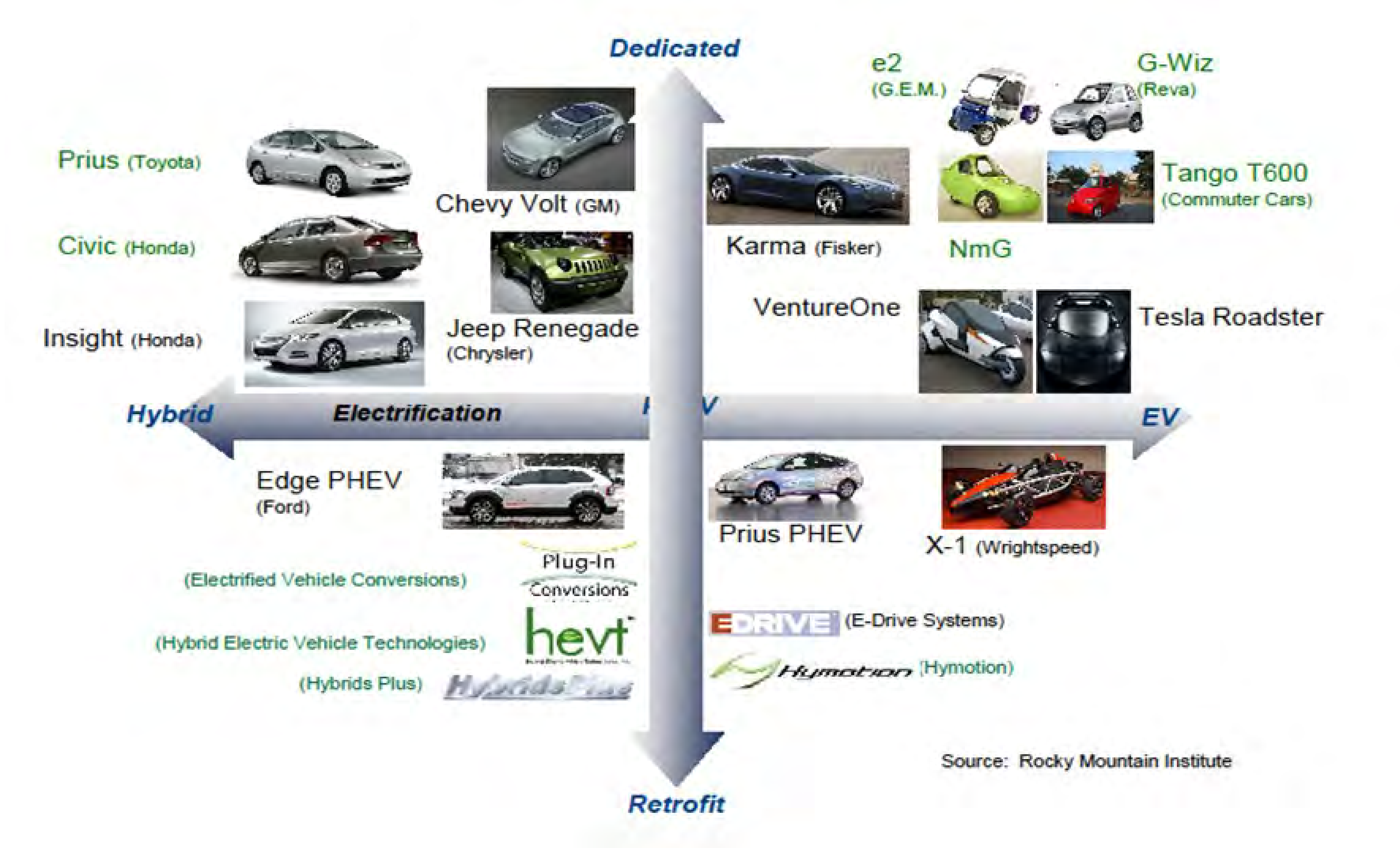
Age Range	18 - 25	26 - 35	36 - 45	46 - 55	56 - 65	GT 65	Refused
Count	2	12	18	26	26	16	1
Percent of Total	2%	12%	18%	26%	26%	16%	1%

Income Range	Under $15,000	$15,000 - $29,000	$30,000 - $49,000	$50,000 - $74,000	$75,000 - $99,999	$100,000 - $129,000	$130,000 - $150,000	Greater than $150,000	Refused
Count	5	8	14	13	23	13	5	10	9
Percent of Total	5%	8%	14%	13%	23%	13%	5%	10%	9%

Type of Car	Sedan	Hybrid Vehicle	Luxury Sedan	SUV	Minivan	Fun / Sport	Pickup / Truck	Other
Count	32	3	7	21	17	3	16	5
Percent of Total	31%	3%	7%	20%	16%	3%	15%	5%

Next Purchase	6 months	1 year	2 years	3 years	4 years	5 years	>5 years	No Plans
Count	6	9	25	13	10	11	11	19
Percent of Total	6%	9%	24%	13%	10%	11%	11%	18%

2.2.1.2 RMI's EV Market Structure



2.2.1.3 Customer Survey Examples

KCP&L

The current vehicle market mainly consists of **standard gasoline engine vehicles** which consume gasoline as the only fuel. Besides the standard gasoline powered vehicles, there are four types of electric powered vehicles: Hybrid Electric Vehicles, Plug-in Hybrid Electric Vehicles, All-Electric Vehicles, and All-Electric Two-Wheel Transporter, each is defined as follows:

Hybrid Electric Vehicles (HEVs): Hybrid Electric Vehicle (HEV) has an electric motor and battery, but the battery is charged by the gasoline engine and cannot be charged from an electrical outlet.

Plug-in Hybrid Electric Vehicles (PHEVs): A PHEV is like a hybrid vehicle, except that the battery can also be charged from an electrical outlet.

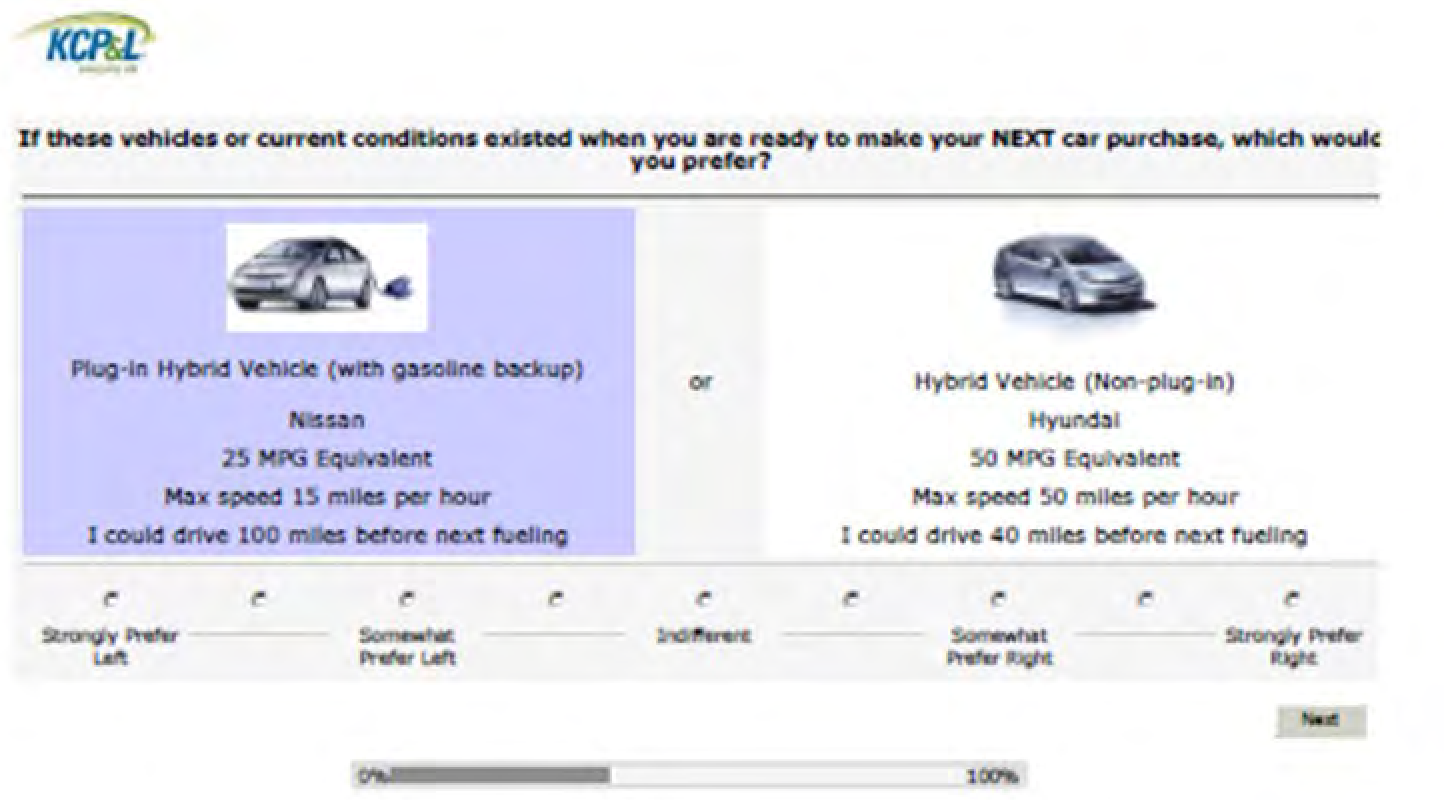
All-Electric Vehicles Four-Wheel (EVs): Electric Vehicles (EVs) are vehicles that run on electricity only. They are powered by batteries that need to be plugged in to recharge once the battery is depleted.

Scooter or Segway (All Electric Two-Wheel Transporter): Similar to an EV but smaller, a Segway or a scooter is a self-balancing personal transportation device with two wheels which operates in any pedestrian environment with a maximum speed of 15 miles per hour.

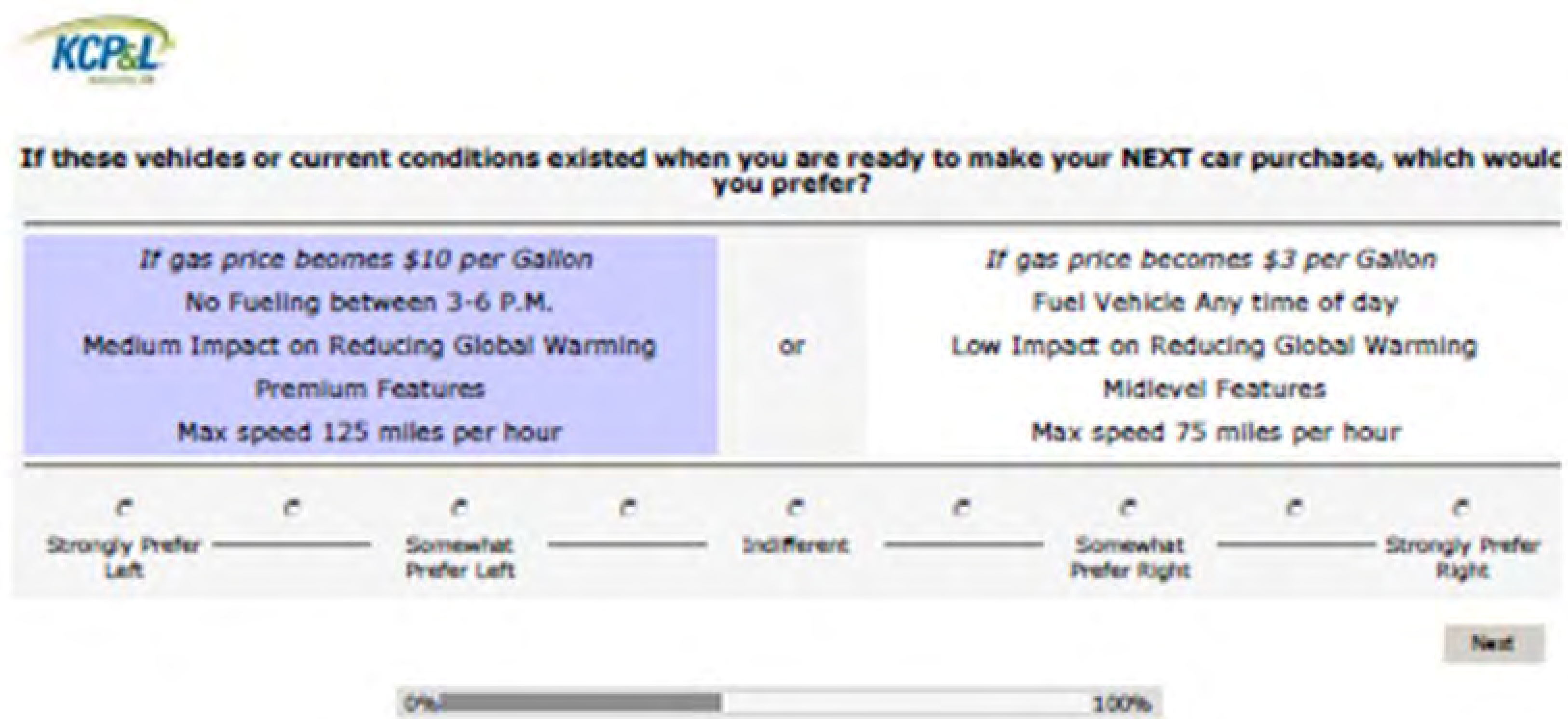
All-Electric Motorcycle or Three-Wheeled Transporter: Motorcycles or three-wheelers that run on electricity only.

All-Electric Commuter: Like golf carts, these commuters run on electricity only. Their maximum speed is 15 miles per hour.

© 2011 Integral Analytics Inc



 © 2011 Integral Analytics Inc



© 2011 Integral Analytics Inc

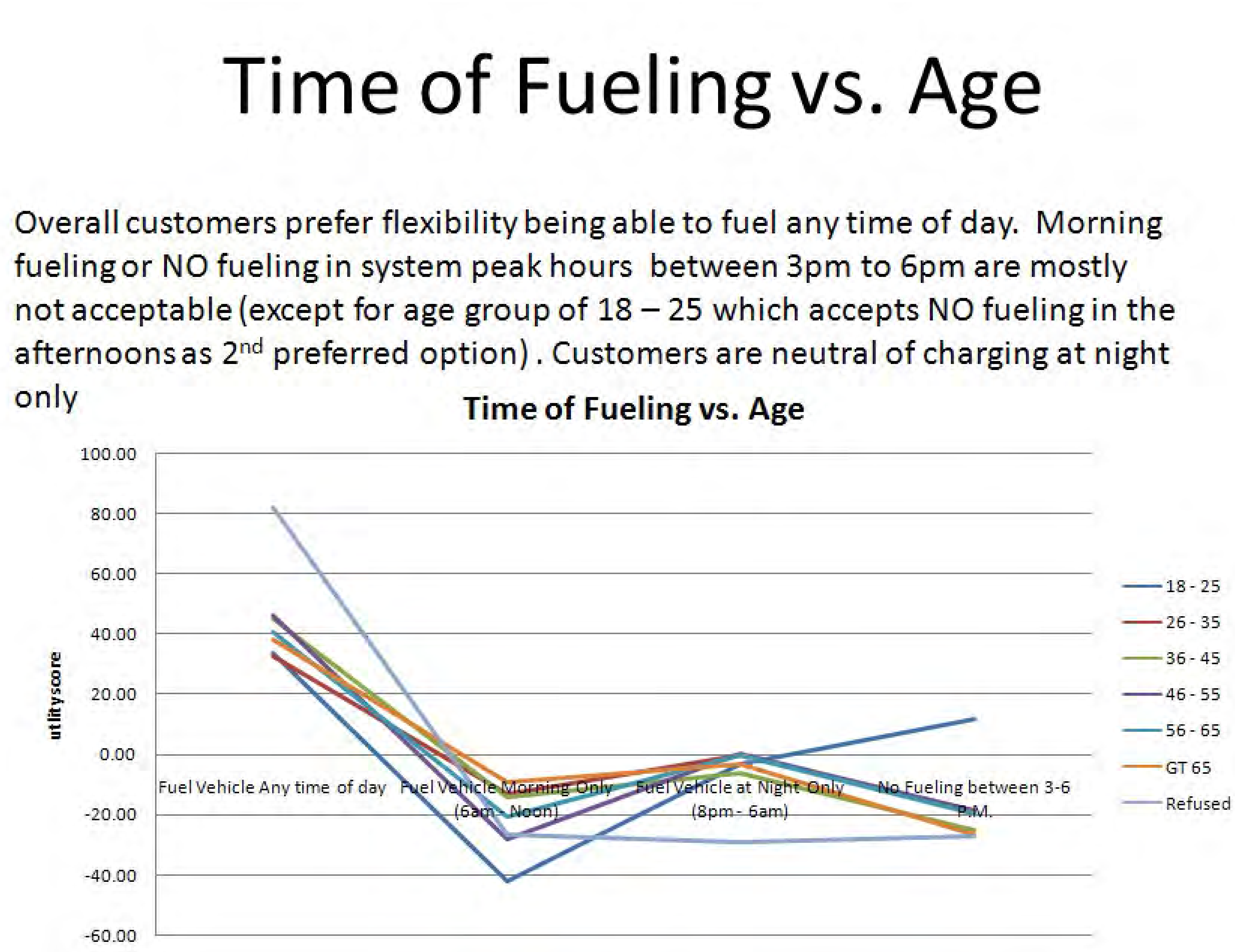
Considering the NEXT NEW car you plan on purchasing, please rate the following Incentive **<u>for Purchasing a PHEV or an EV</u>**s
in terms of how desirable they are.

	Not Desirable		Somewhat Desirable		Very Desirable		Extremely Desirable
Free battery recharging in public lots (PHEV or EV only)							
Ability to use back up power for your house during outages (PHEV or EV only)							
Ability to sell back electricity to Kansas City Power & Light (PHEV or EV only)							
Free parking (PHEV or EV only)							
Free access to carpool lanes (HOV lanes) (PHEV or EV only)							
Free battery charging at night (PHEV or EV only)							
Reduced Insurance rates (PHEV or EV only)							

2.2.1.4 Market Research Results

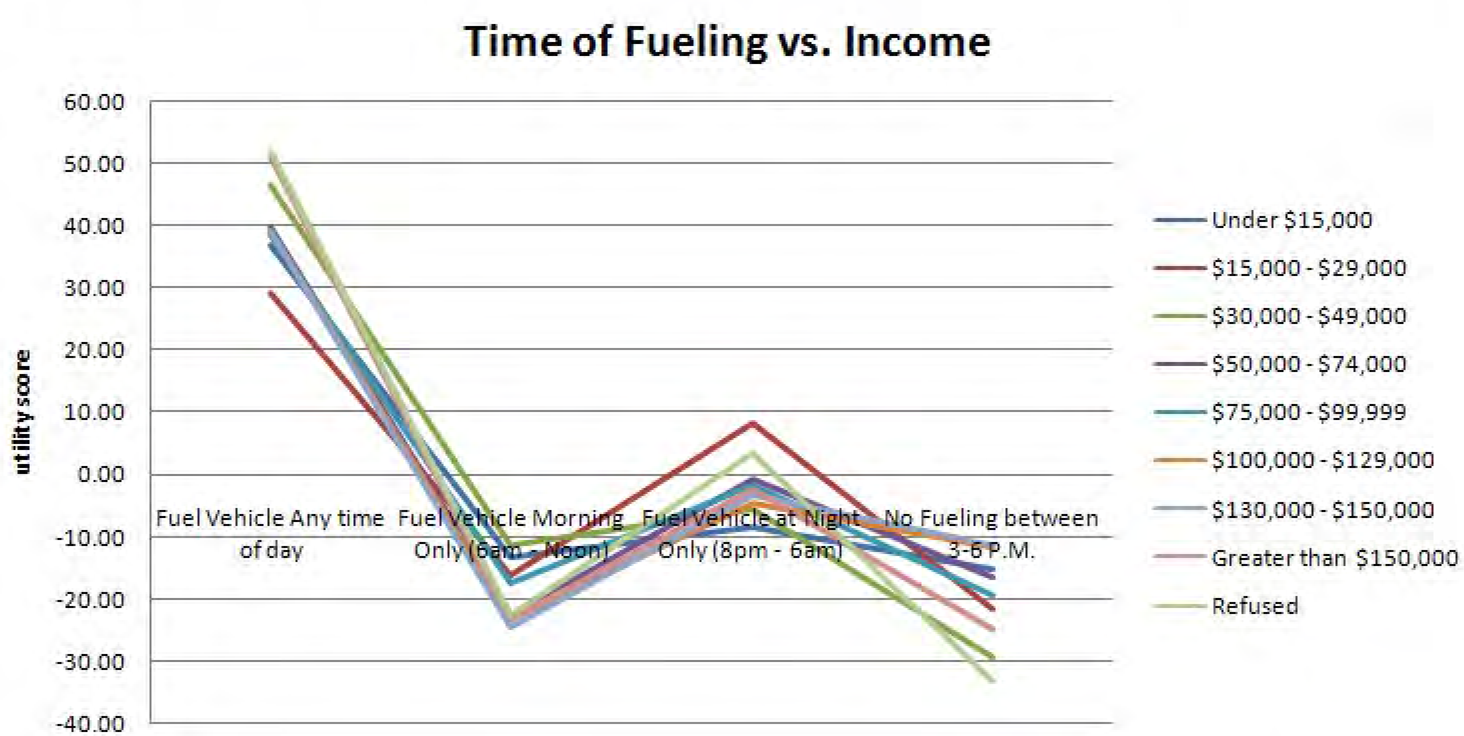
The higher the utility score, the more a customer prefers a given option. For example, by plotting the utility scores for a given option by different customer segments, a graph can show how differently a college student prefers EVs than retirees.

The utility scores in this study are plotted against 4 customer attributes: age, income, current vehicle type, and estimated time till next purchase. The utility scores are normalized to be 0 centered, so overall the utility score has a mean of 0. Anything above 0 are the top half choices for a customer.

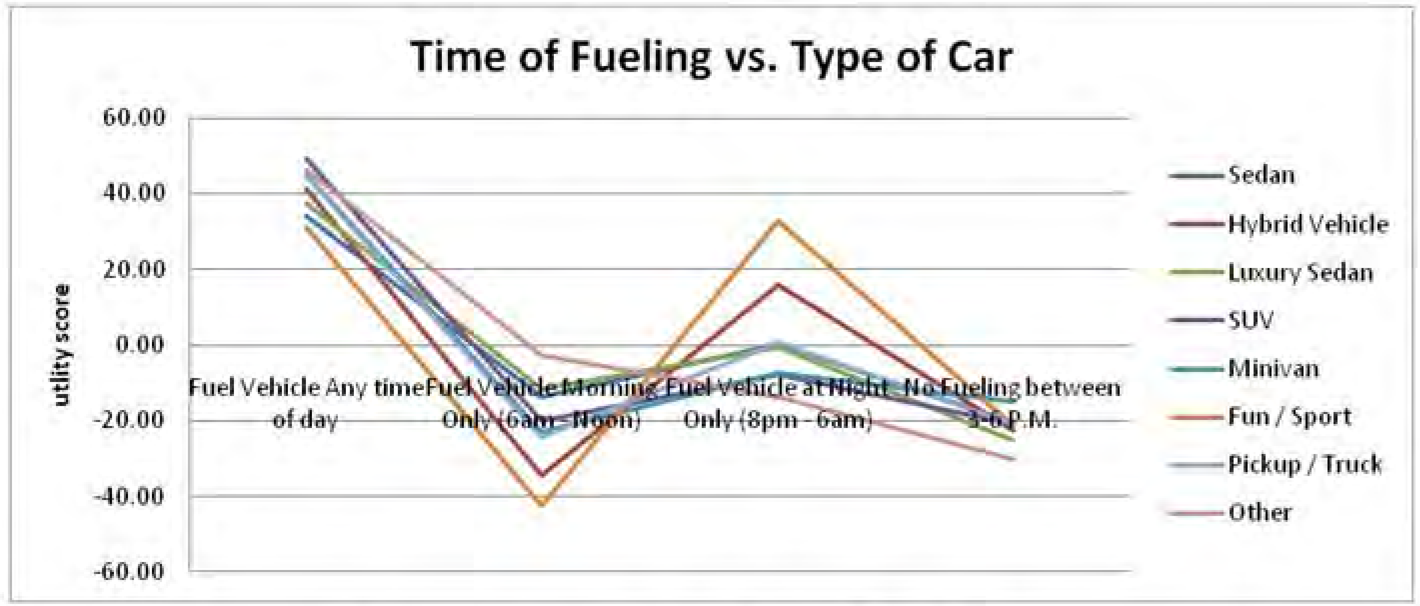


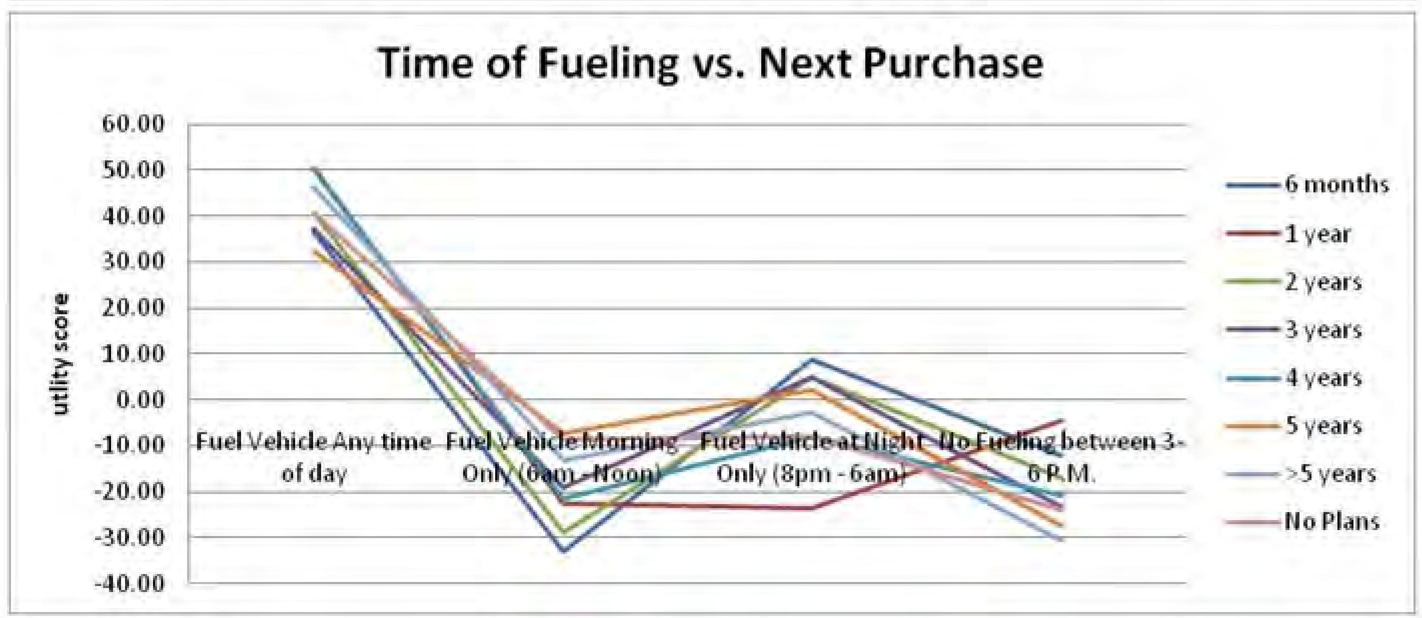
Time of Fueling vs. Income

Similar pattern as previous slide. Except income group $15,000 – $29,000 accepts night charging as 2nd top preferred option. And night charging is more acceptable than morning charging or NO afternoon peak hour charging



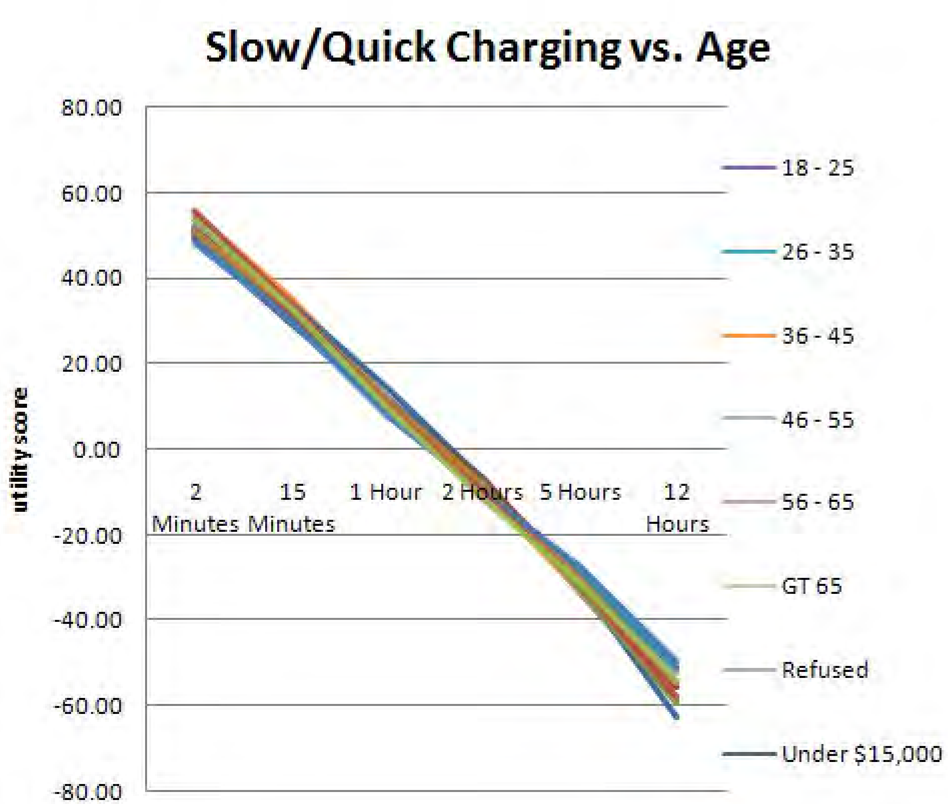
Time of Fueling vs. Type and Next Purchase

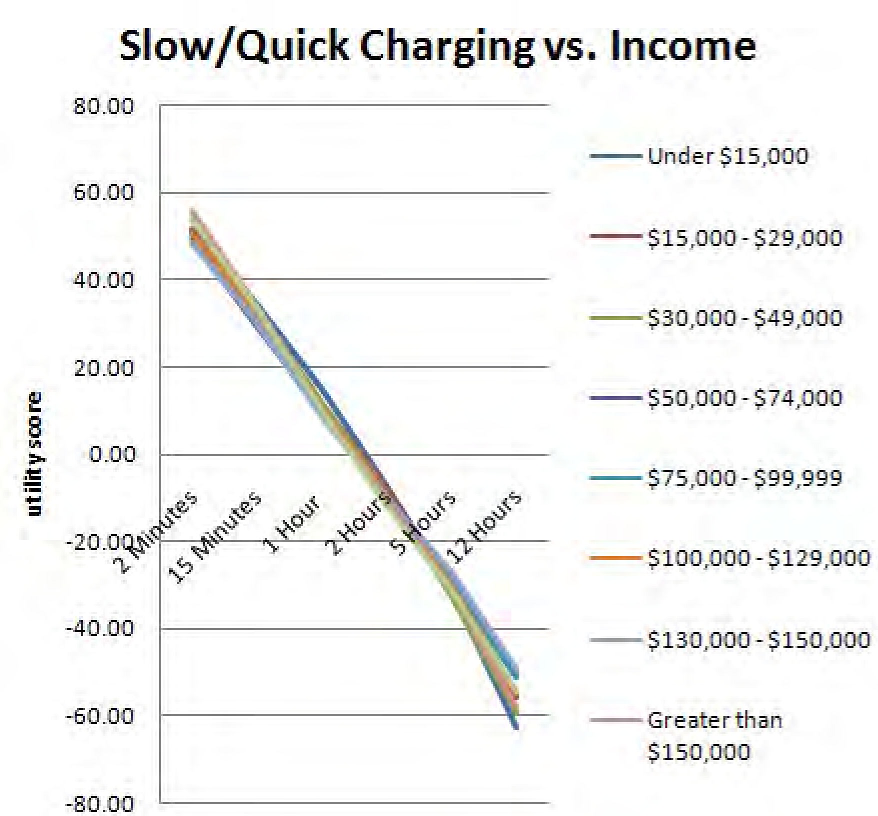




Charging Hours vs. Income and Age

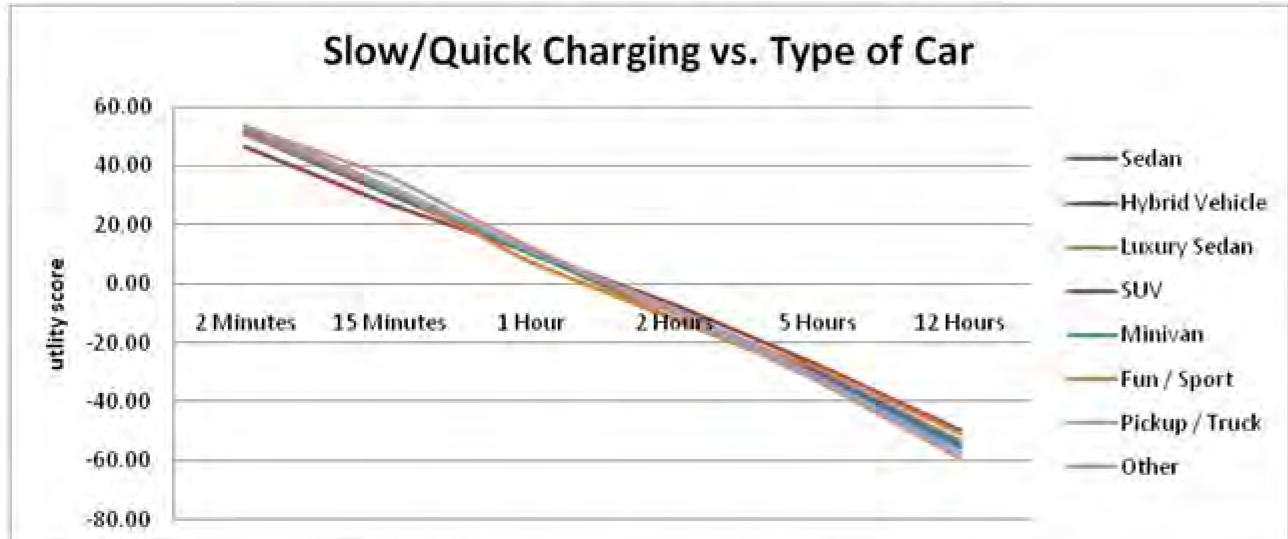
Preference decline linearly with longer hour of charging. It seems the market envisions charging takes up to 2 hours (negative utility score if it takes longer than 2 hours)

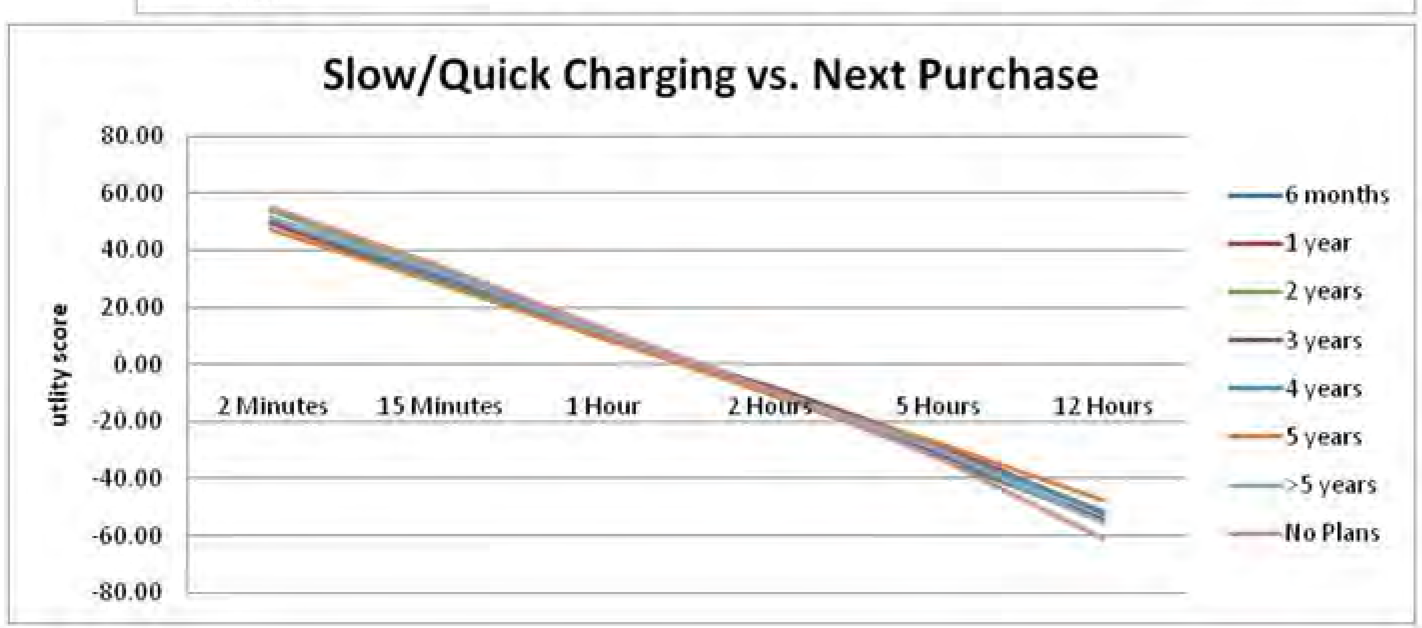




 © 2011 Integral Analytics Inc

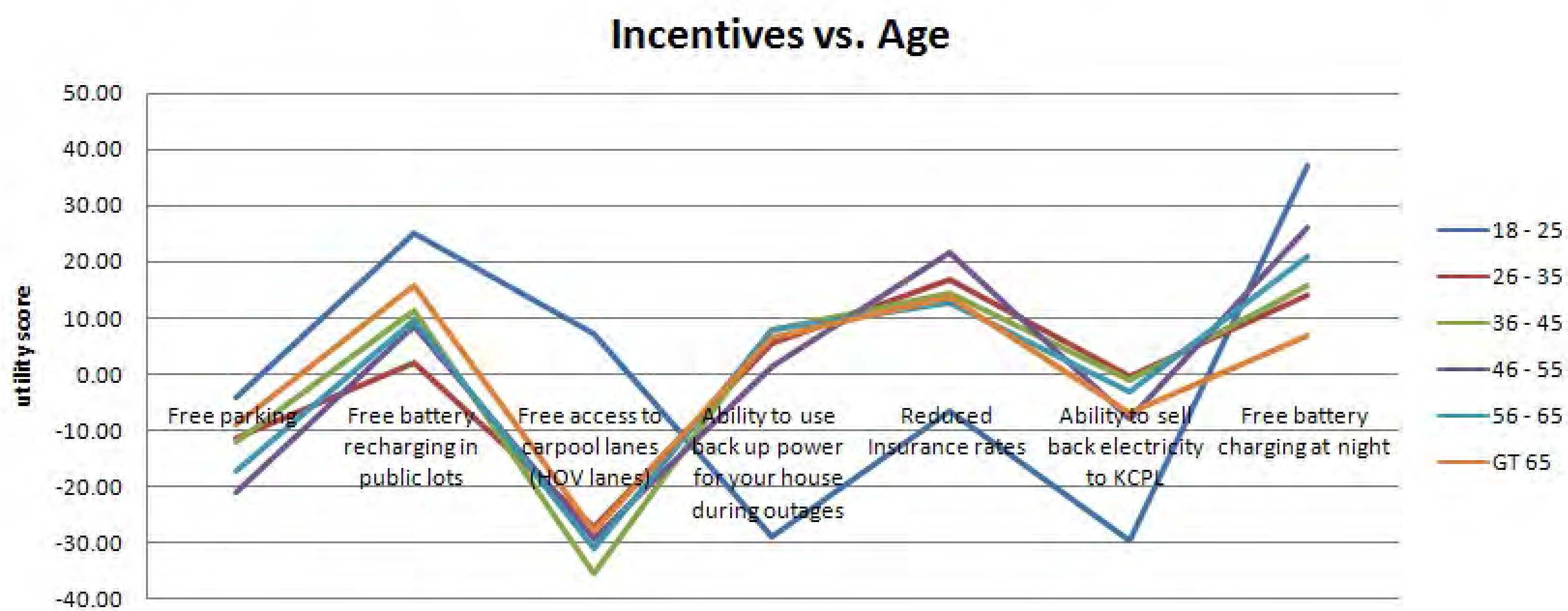
Charging Hours vs. Type and Next Purchase





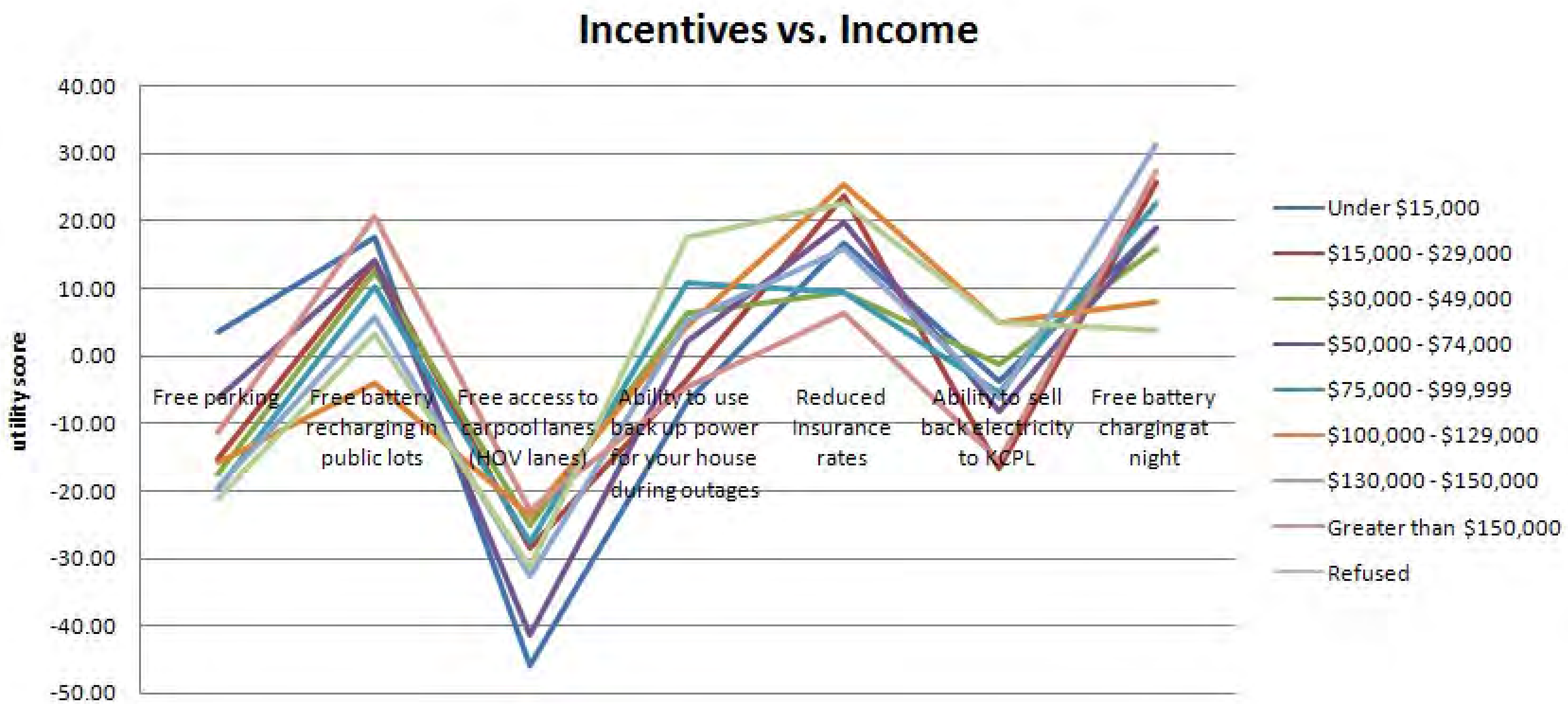
Incentives vs. Age

The youngest group 18 - 25 shows distinct pattern different from the other age groups. Young population (age<25) prefers free charge in public lots and free charge at night the most, they also like free access to HOV lane. The other age groups older than 25 years old prefer reduced insurance and free charge, they also value ability to use backup power during outages. Free access to HOV lane does not appeal to them.



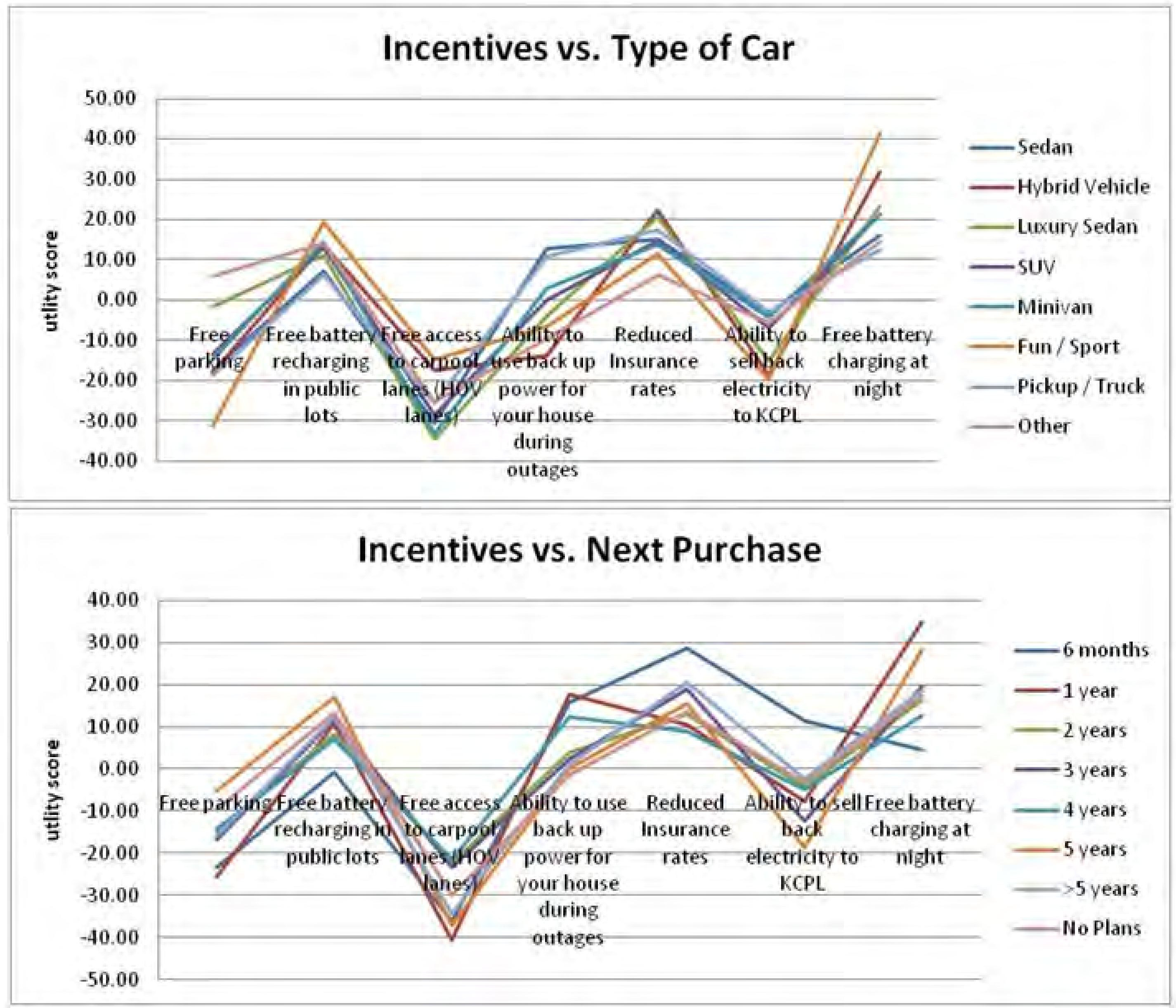
Incentives vs. Income

The top 3 incentives most customers prefer are free charging in public lots, reduced insurance rate and free charge at night. Income group $15,000 - $29,000 prefers reduced insurance rate and free night charge, free charge in public lots does not appeal to this group. Free access to HOV lane and selling back to grid do not appeal to customers overall.



© 2011 Integral Analytics Inc

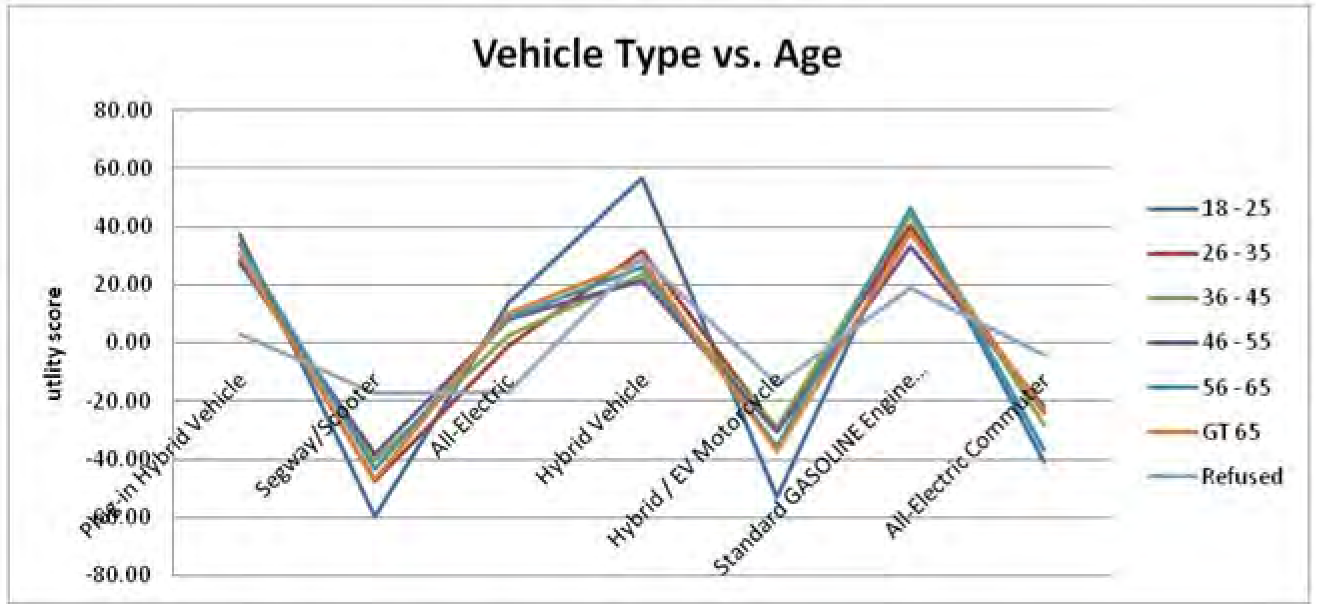
Incentives vs. Type and Next Purchase



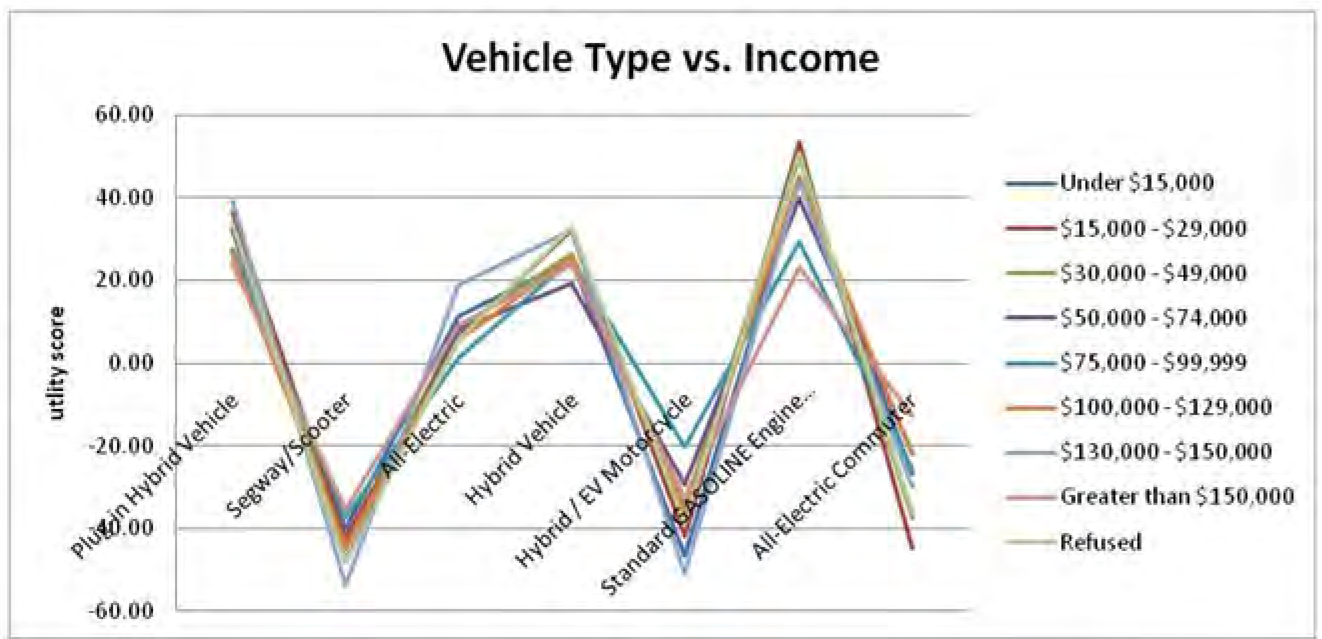
 © 2011 Integral Analytics Inc

Vehicle Type

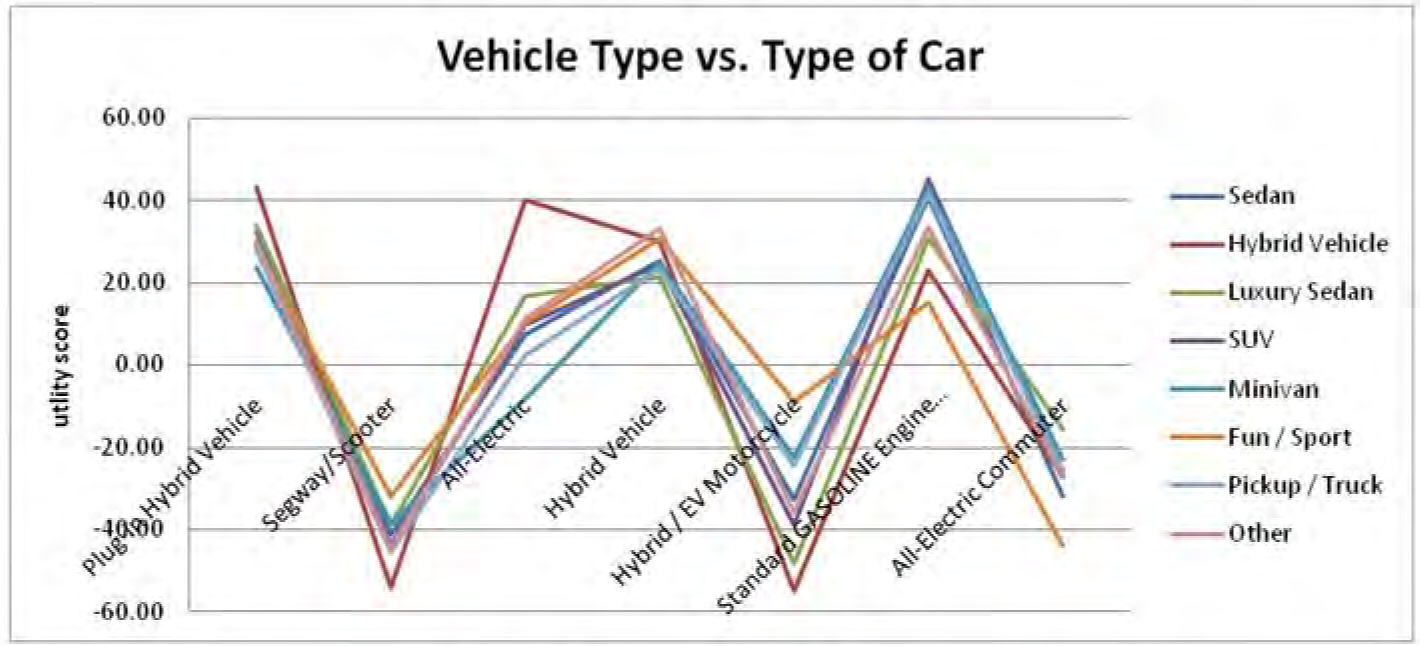
All age groups show a similar response to vehicle types. All ages have lower preference for Segway/Scooter and Hybrid/Electric Motorcycles, , or small All-Electric Commuter (golf cart size).

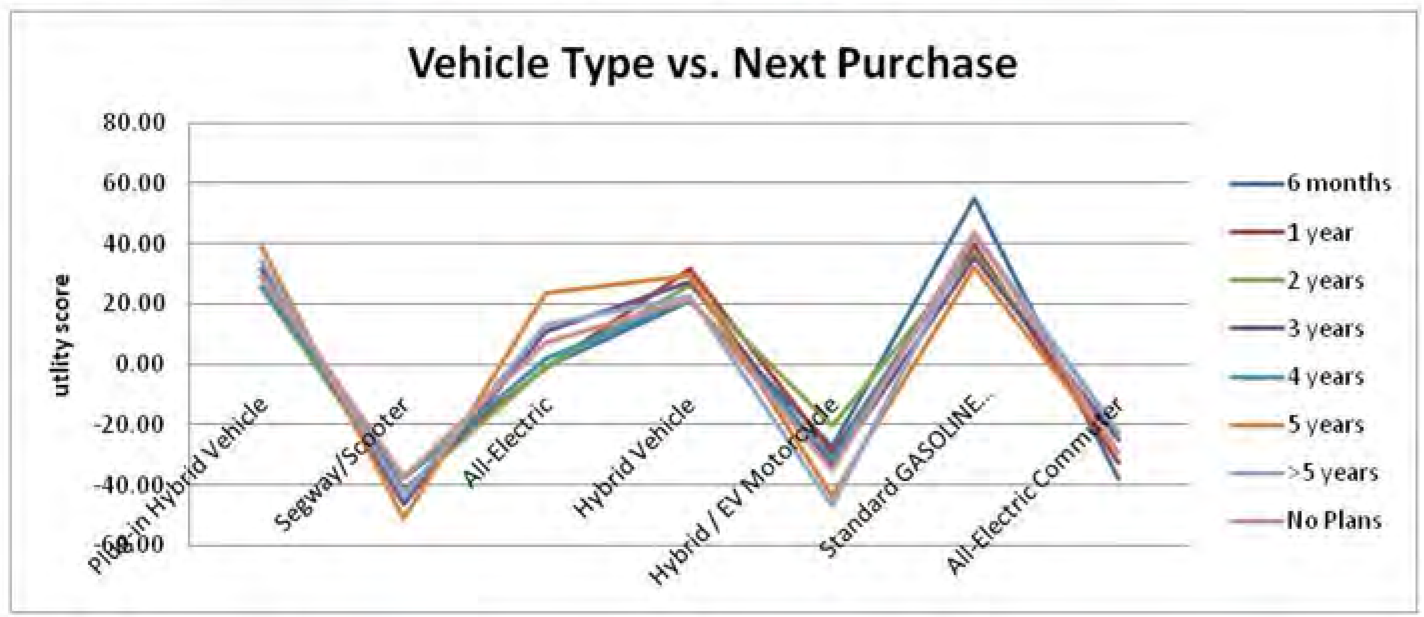


All income groups show a similar response to vehicle types. All income levels have lower preference for Segway/Scooter, Hybrid/Electric Motorcycle, or small All-Electric Commuter (golf cart size).



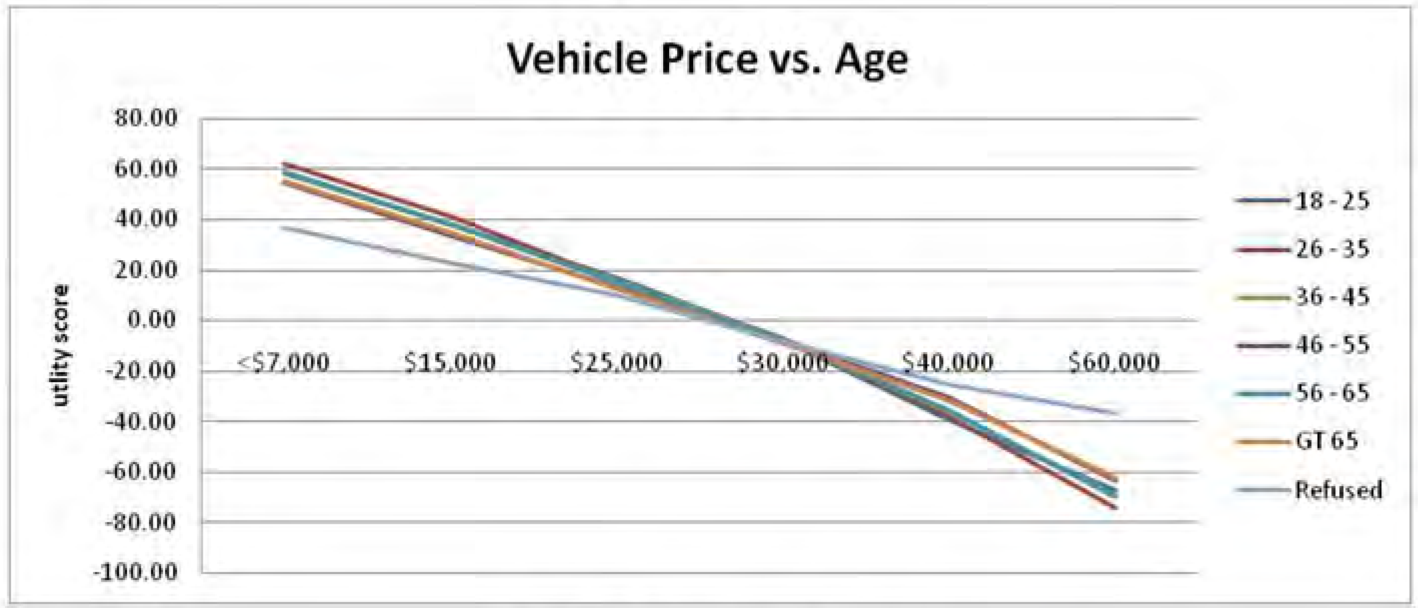
Vehicle Type



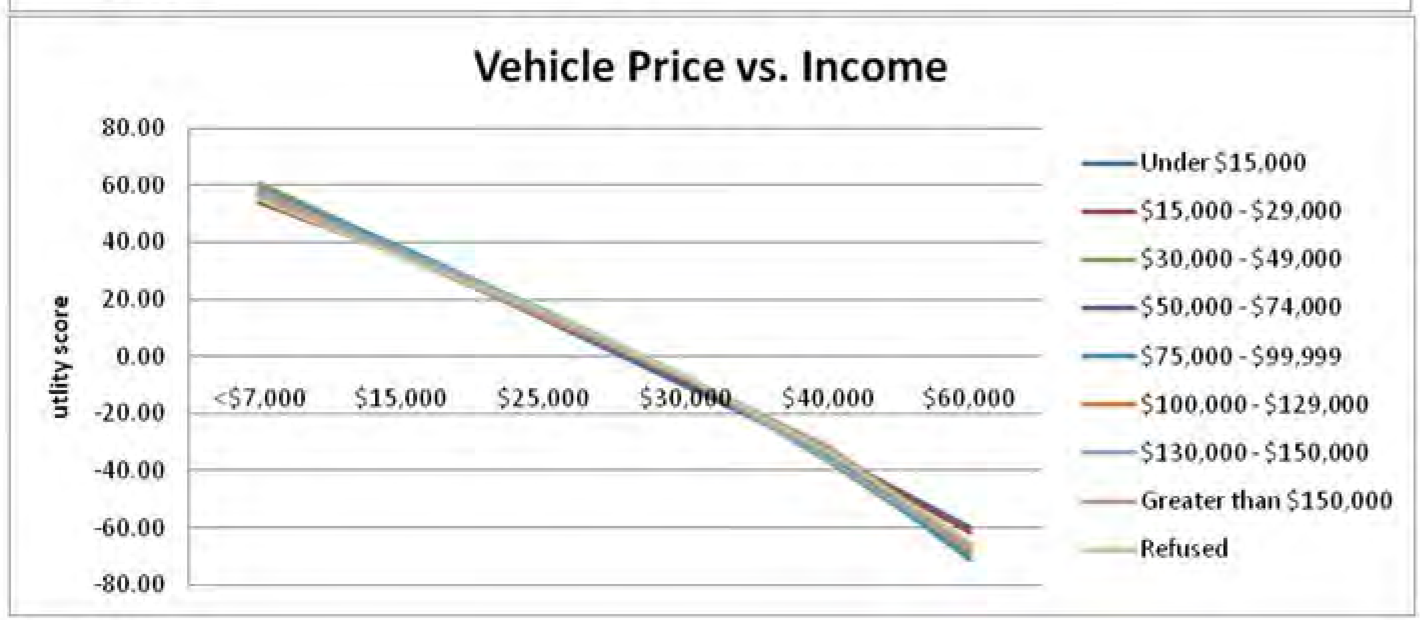


Vehicle Price

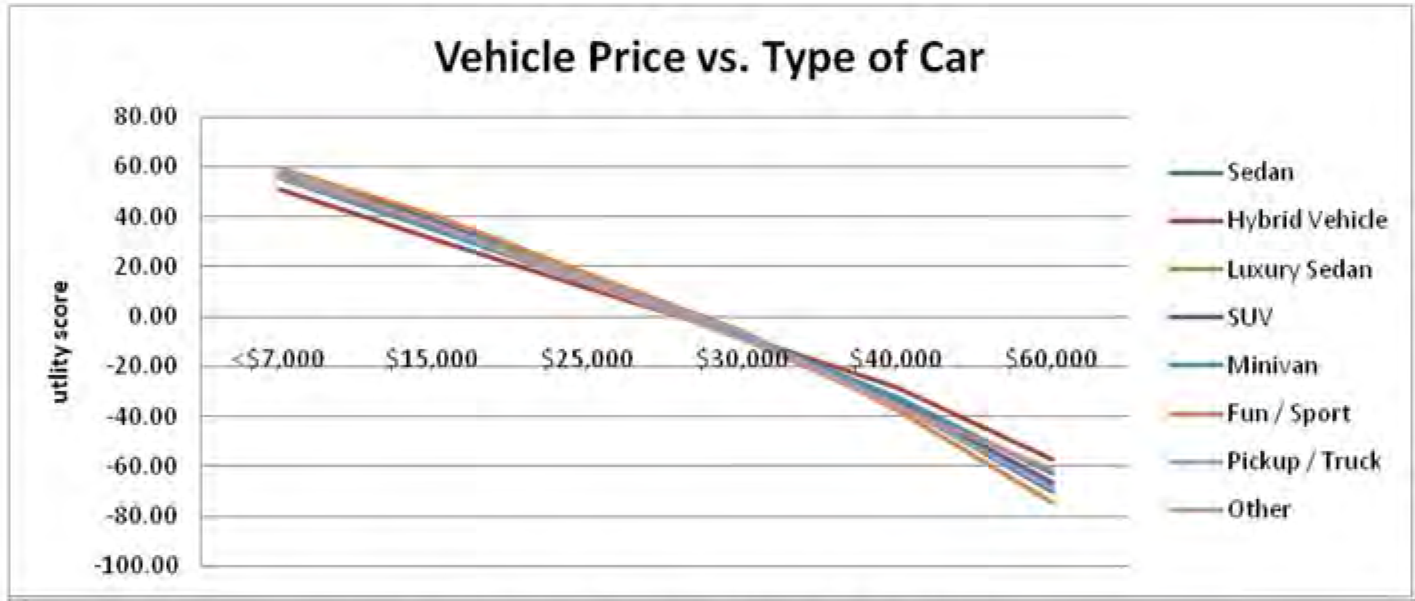
All ages show similar response to vehicle price. Preference decreases linearly as price increases.

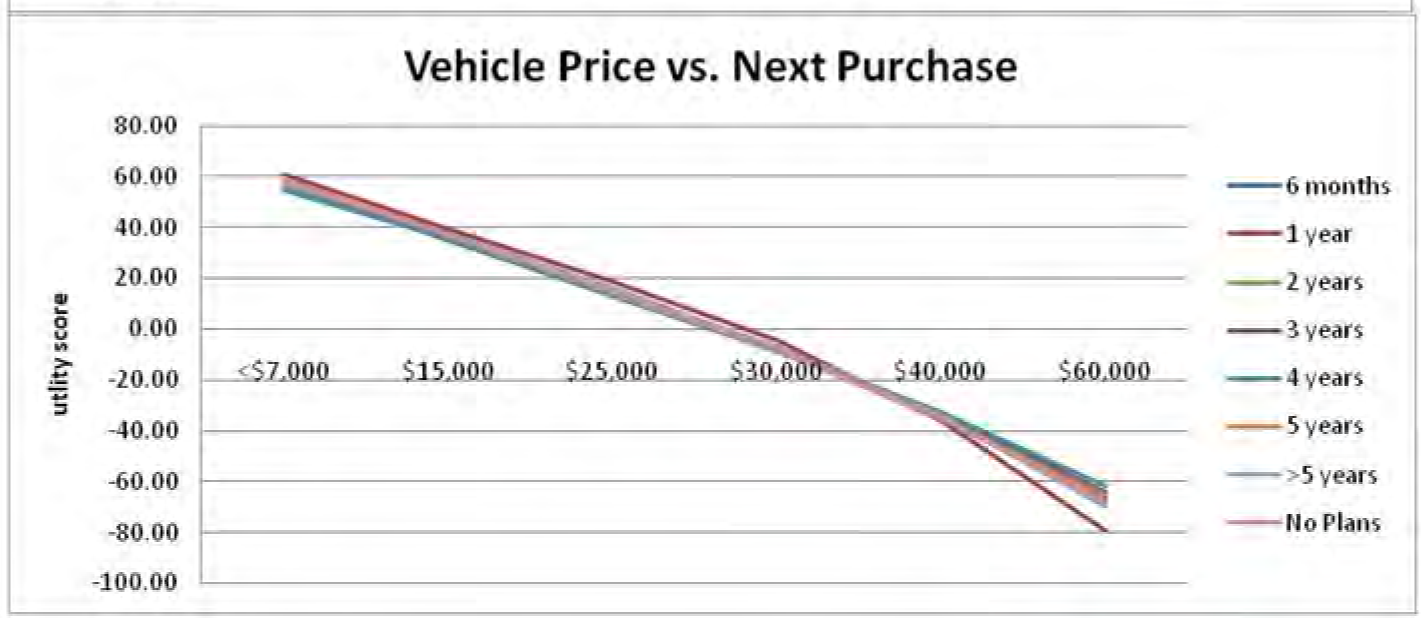


All income group show similar response to vehicle price. Preference decreases linearly as price increases.



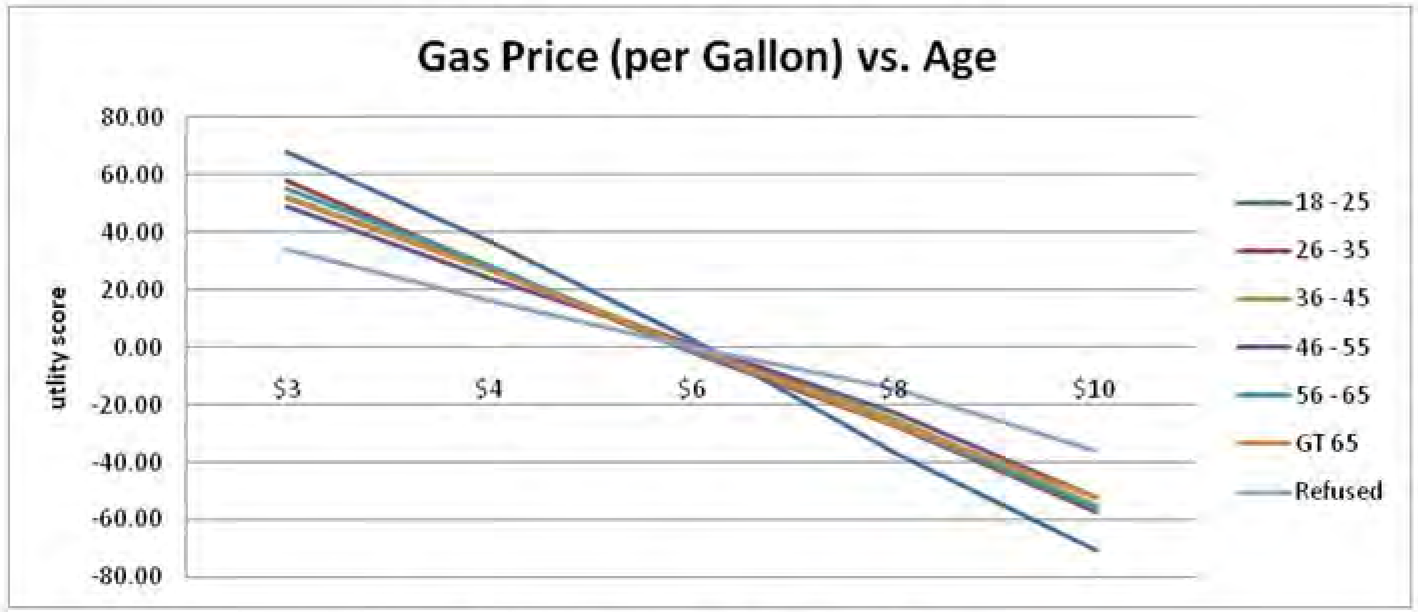
Vehicle Price

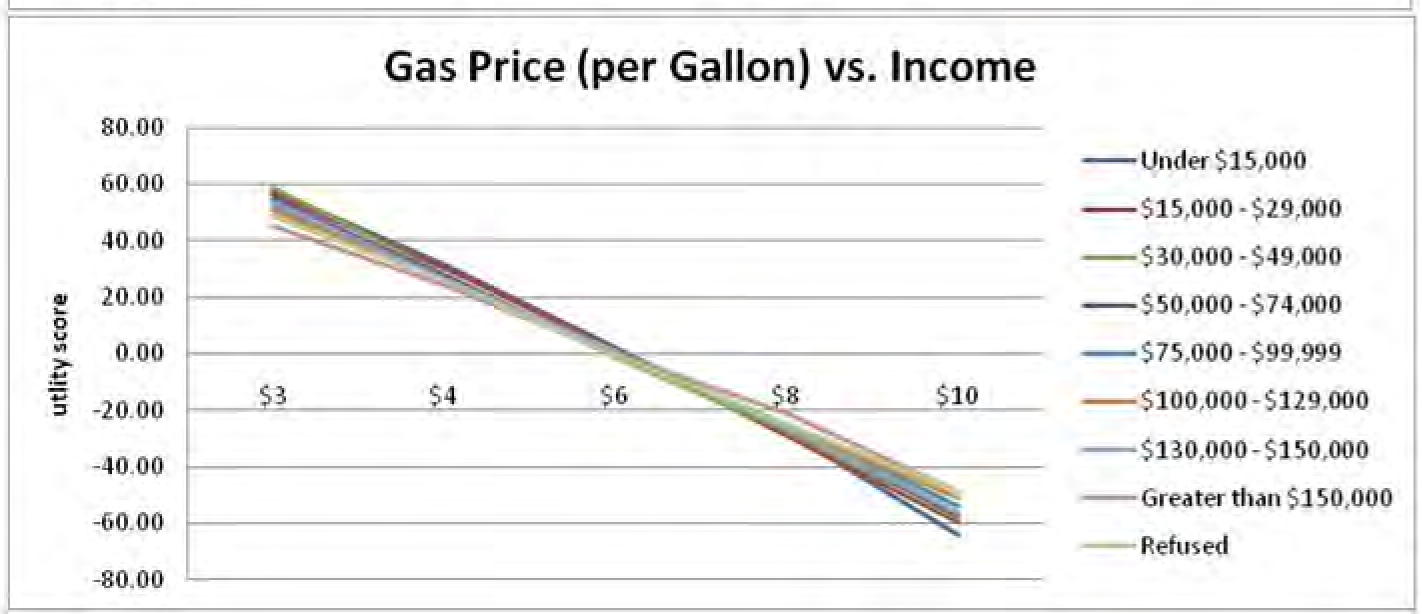




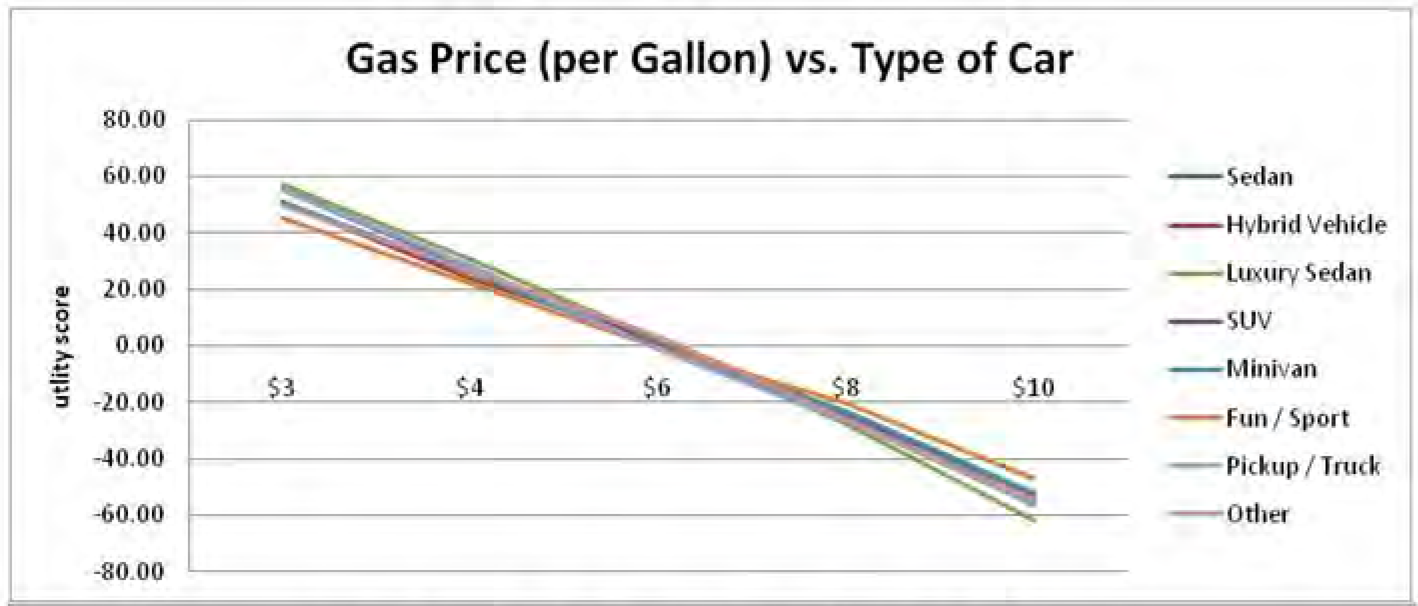
Standard Vehicle Gas Price Aversion

All groups are adverse to gas over $6 per gallon.



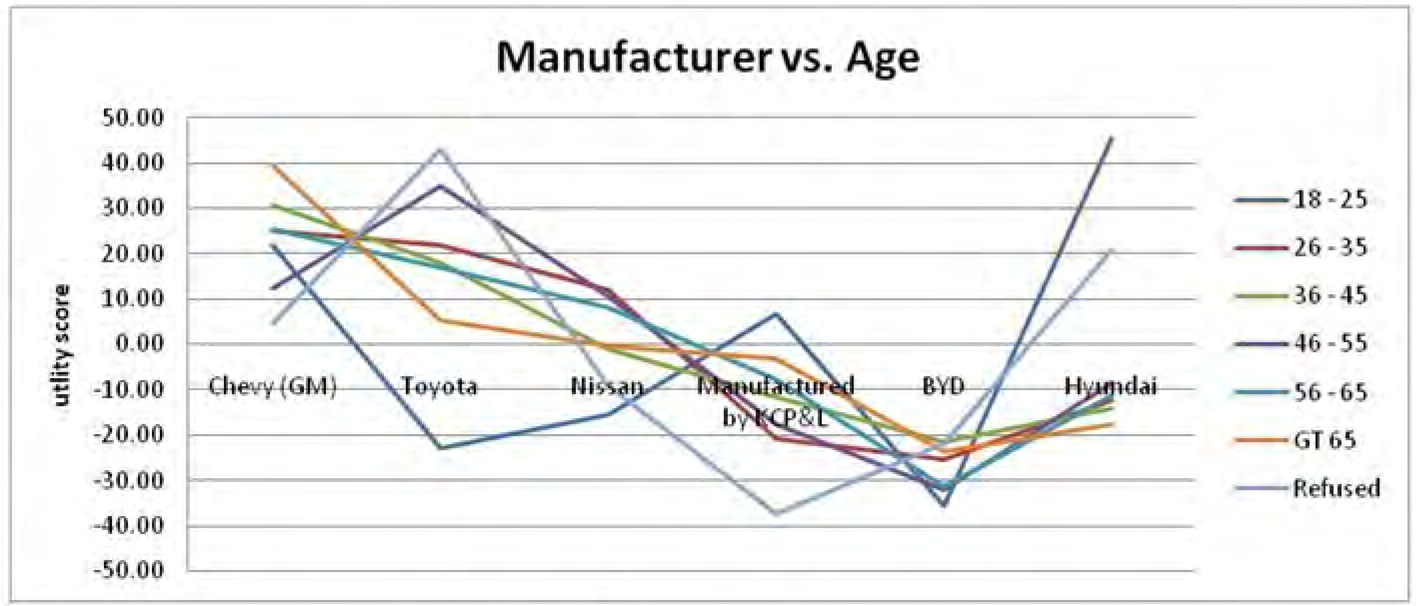


Standard Vehicle Gas Price Aversion

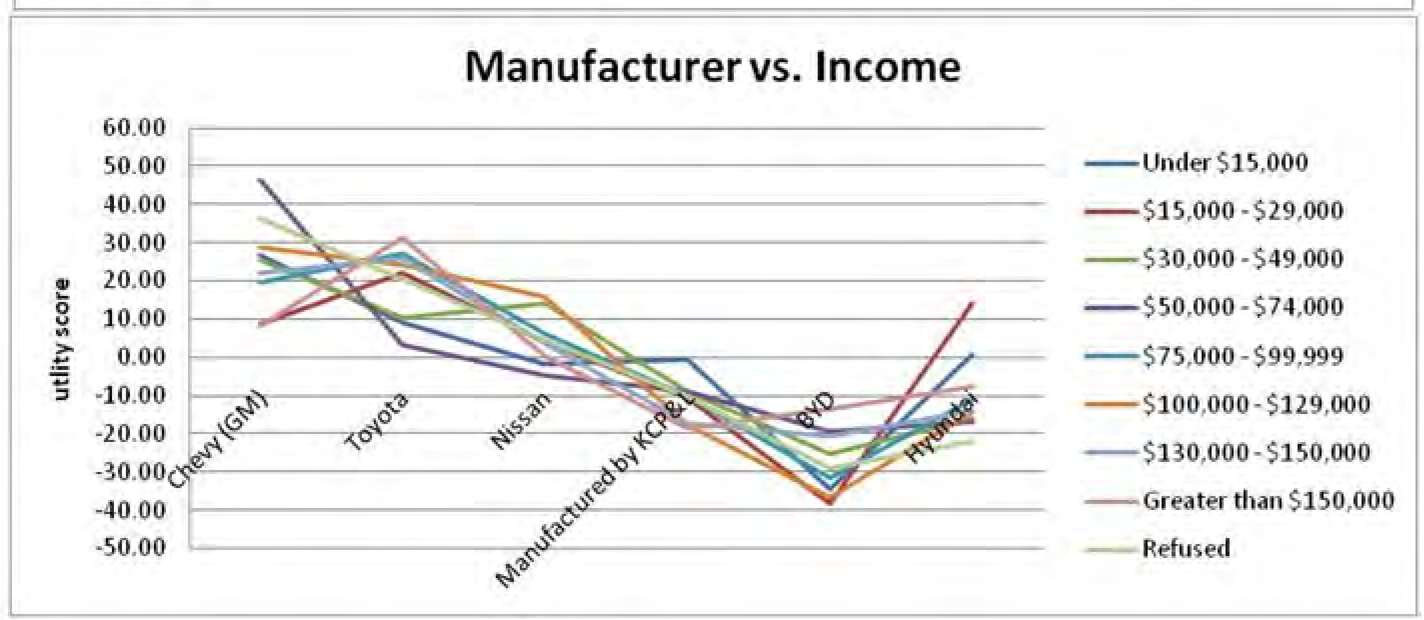


Vehicle Manufacturer

Ages 18-25 prefer Hyundai, then Chevy, and are the only age group that would consider a car manufactured by KCP&L. All ages above 25 prefer Chevy and or Toyota.

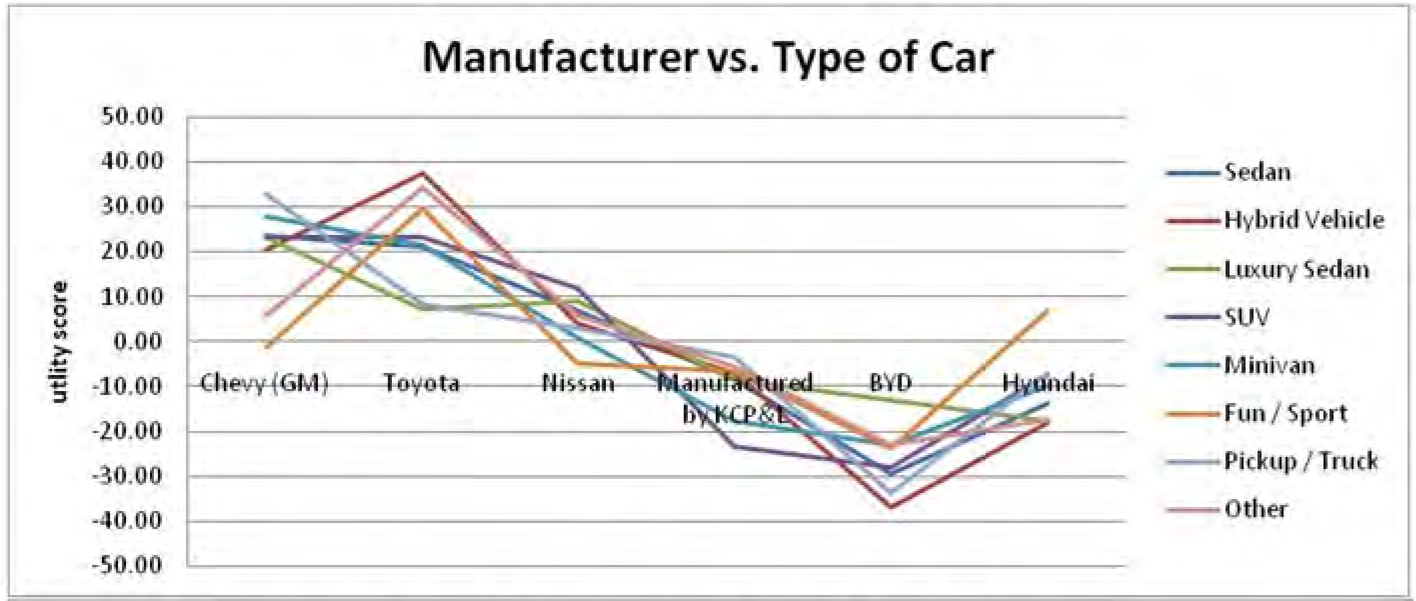


All income groups prefer Chevy and or Toyota the most, then Nissan. The lowest income group, $15-29,000, also prefers Hyundai. No income group showed a preference for Evs manufactured by KCP&L.

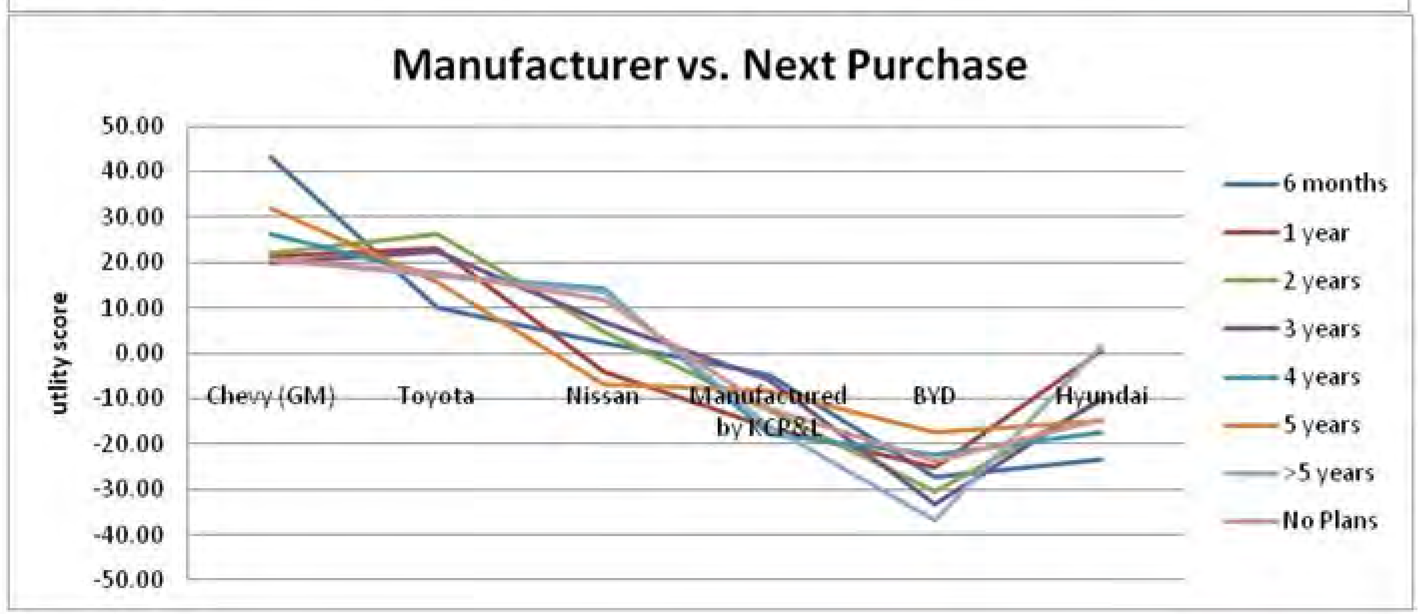


Vehicle Manufacturer

People who currently drive a hybrid car prefer Toyota, then GM. Pick-up truck owners prefer GM, then Toyota.

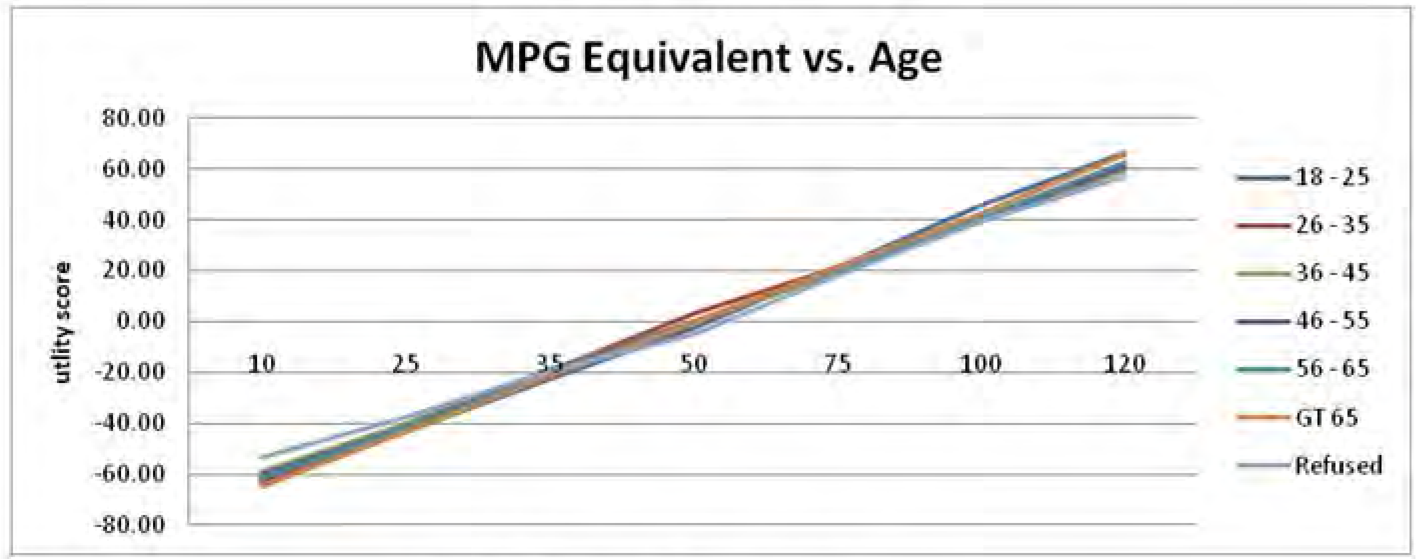


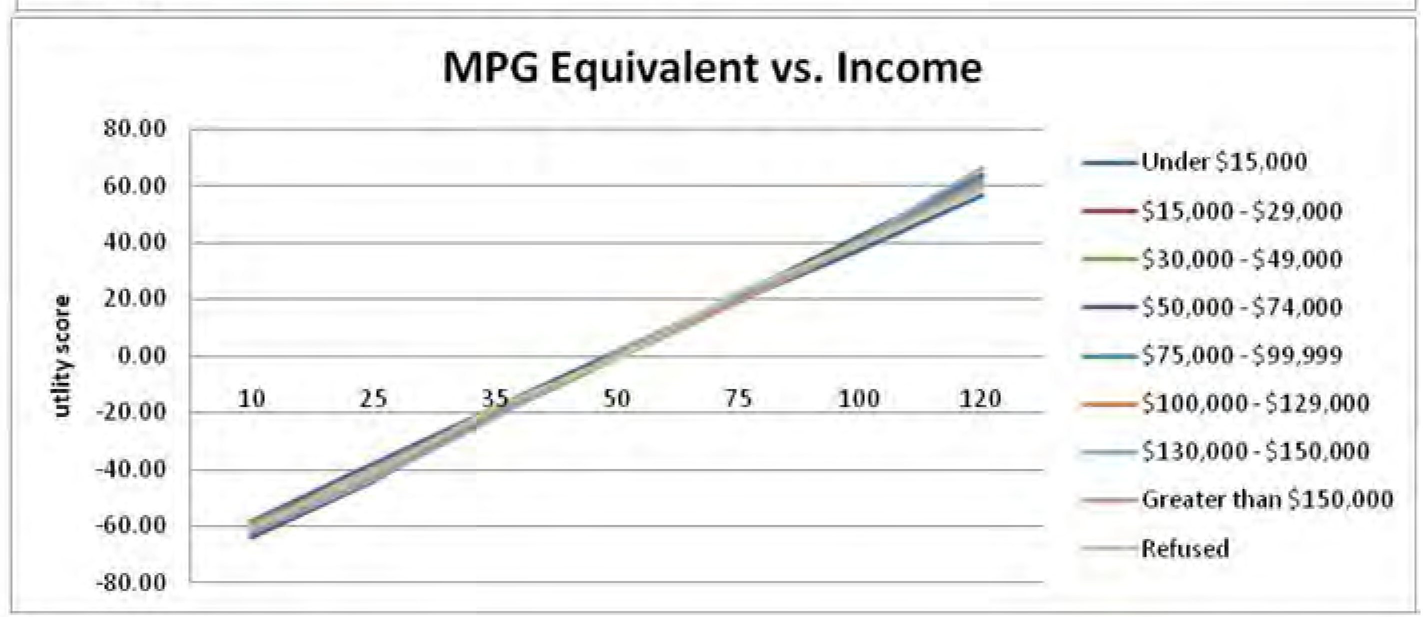
In the short term, people tend to prefer GM and Toyota, with a significant preference towards GM in the next 6 months.



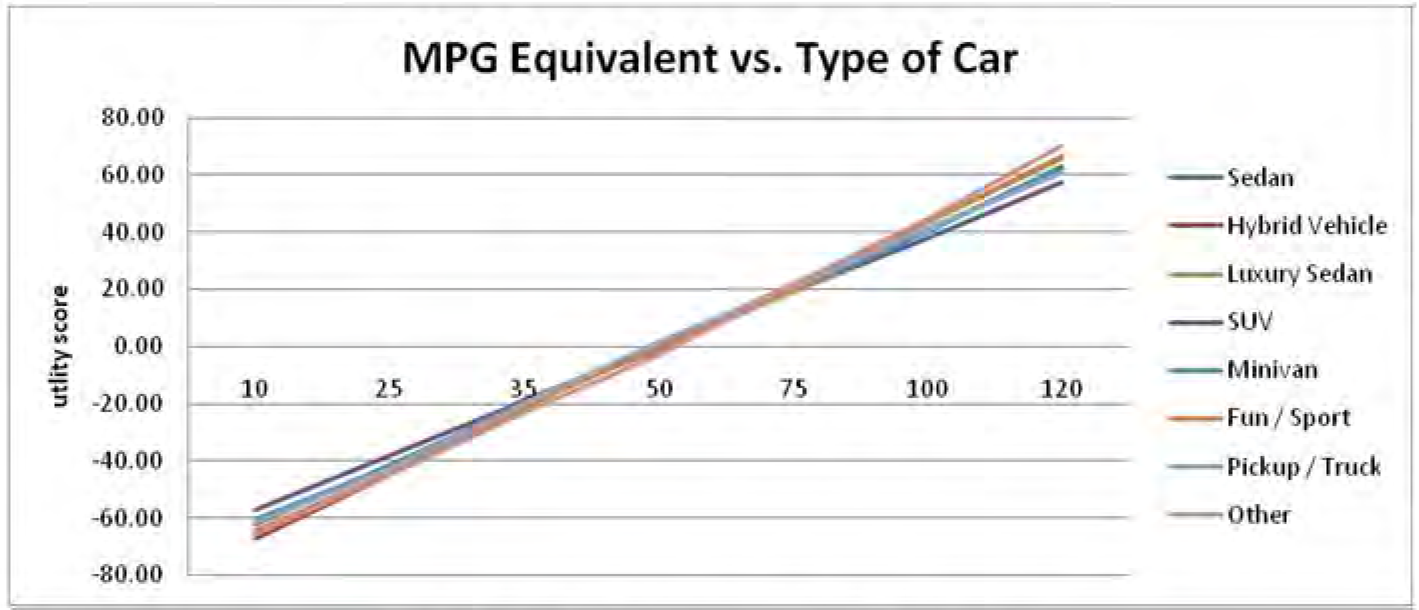
MGE Equivalent

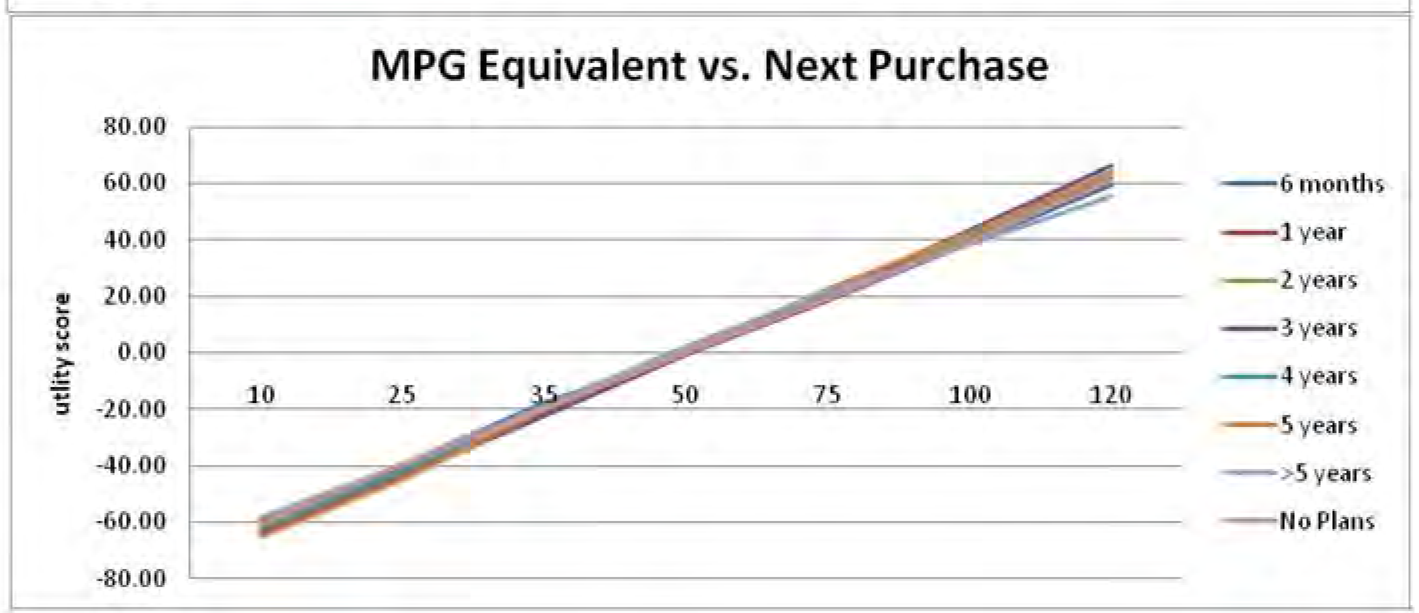
Preference increases linearly as driving range increases.





MGE Equivalent

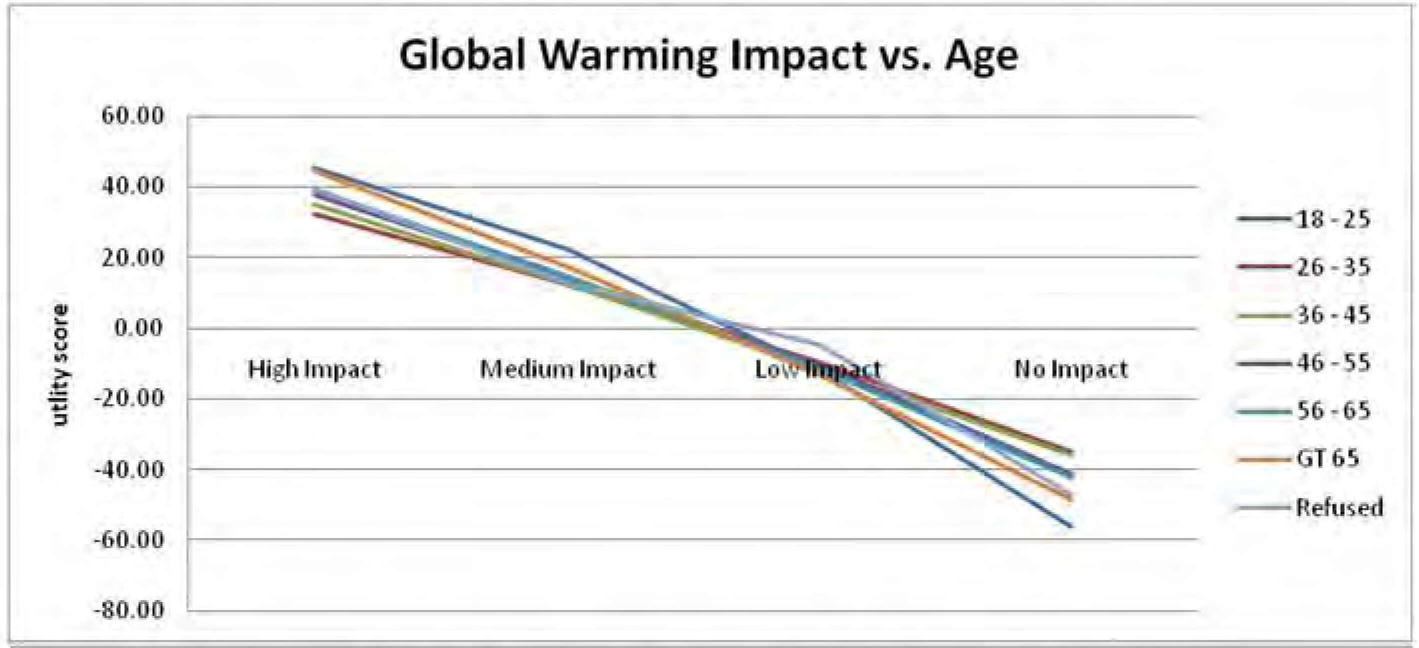


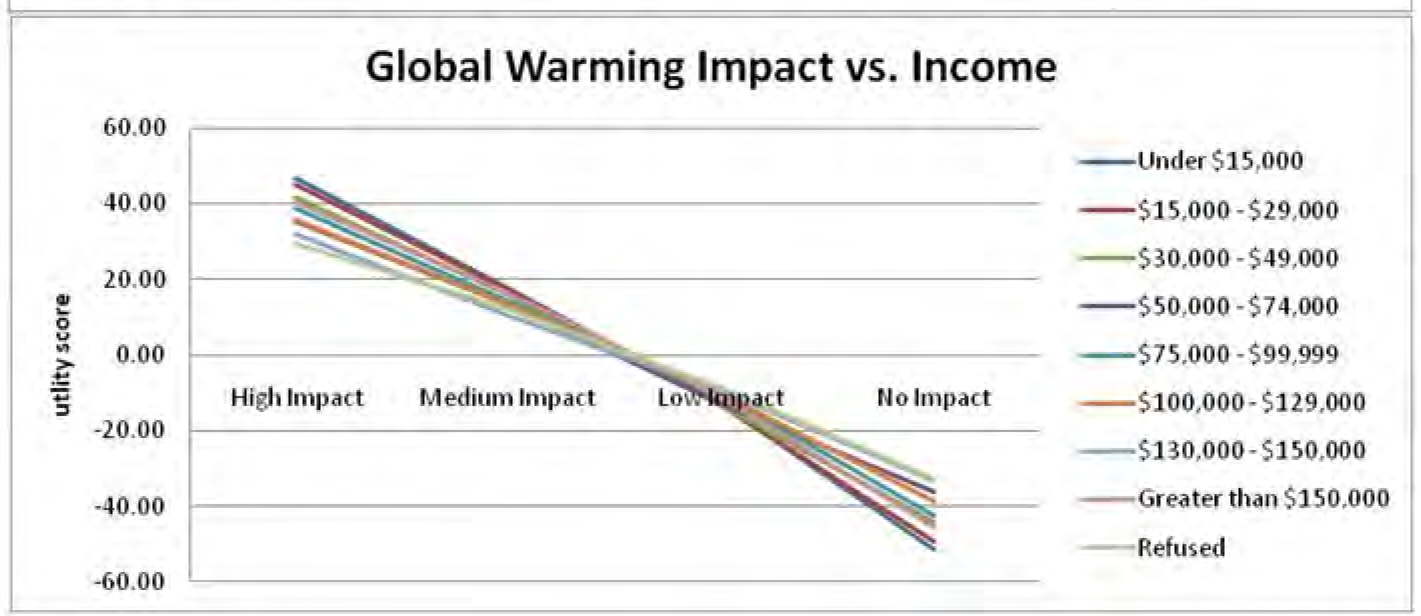


 © 2011 Integral Analytics Inc

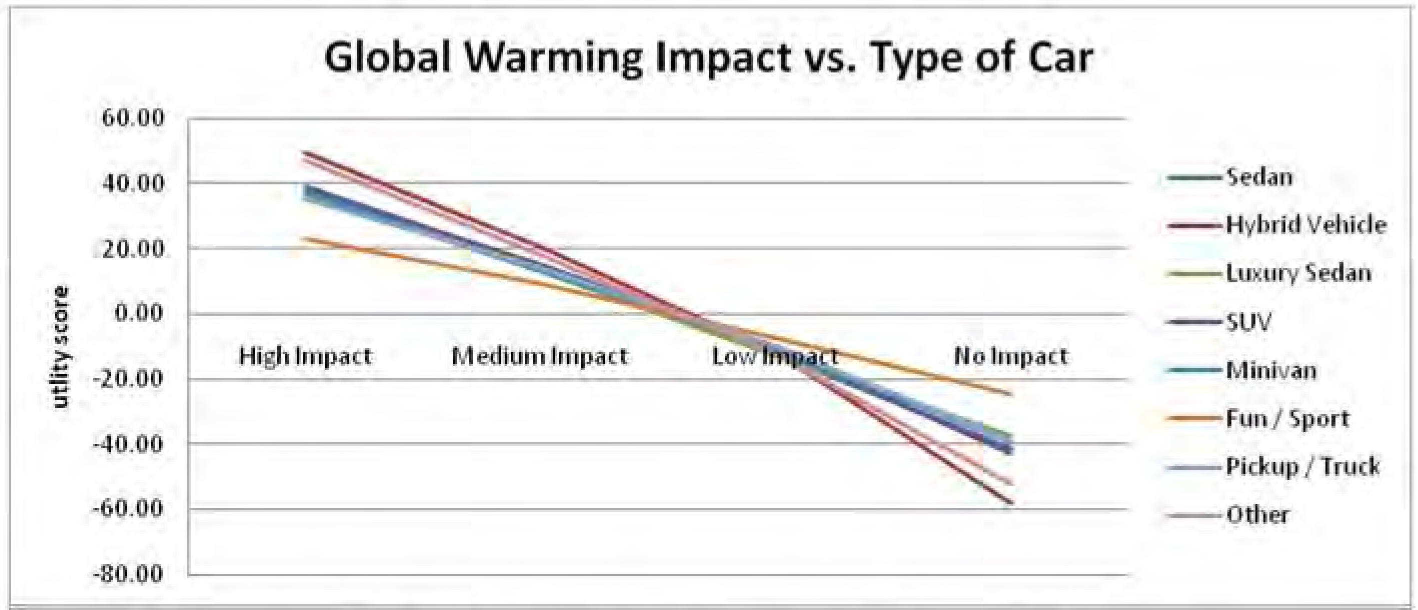
Global Warming Impact

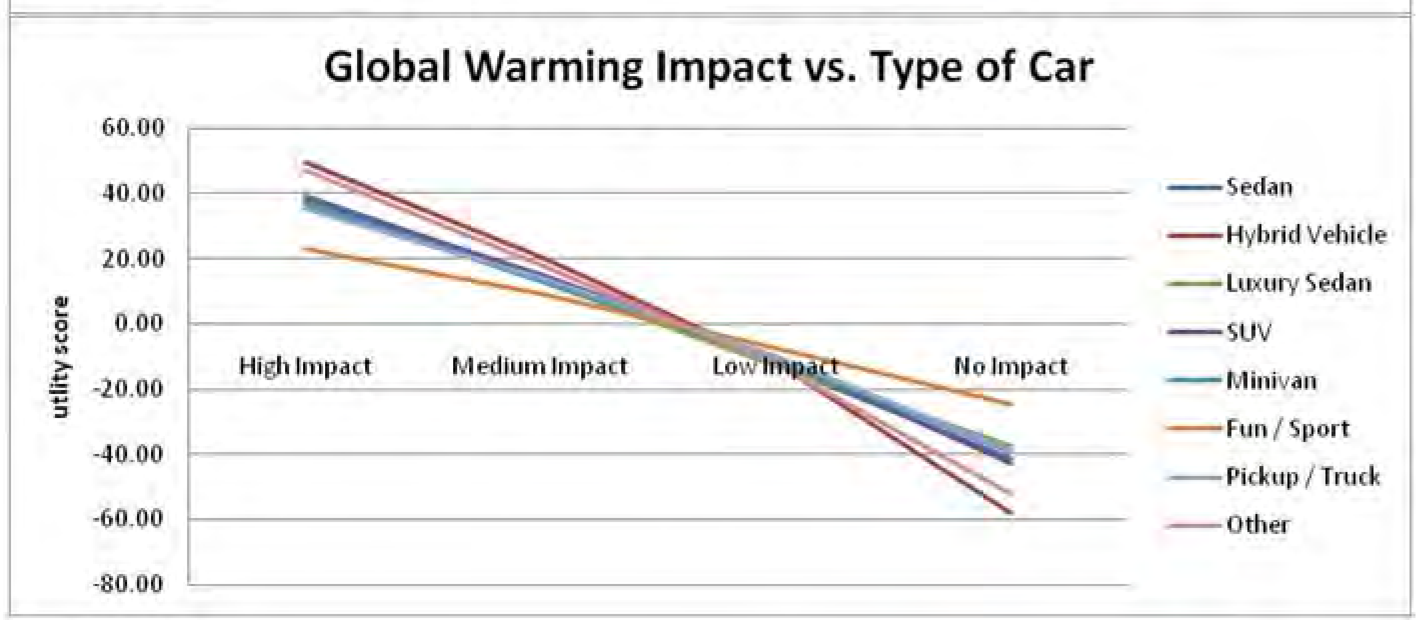
Preference decreases linearly as global warming impact decreases. All groups would like to have a high impact on global warming.





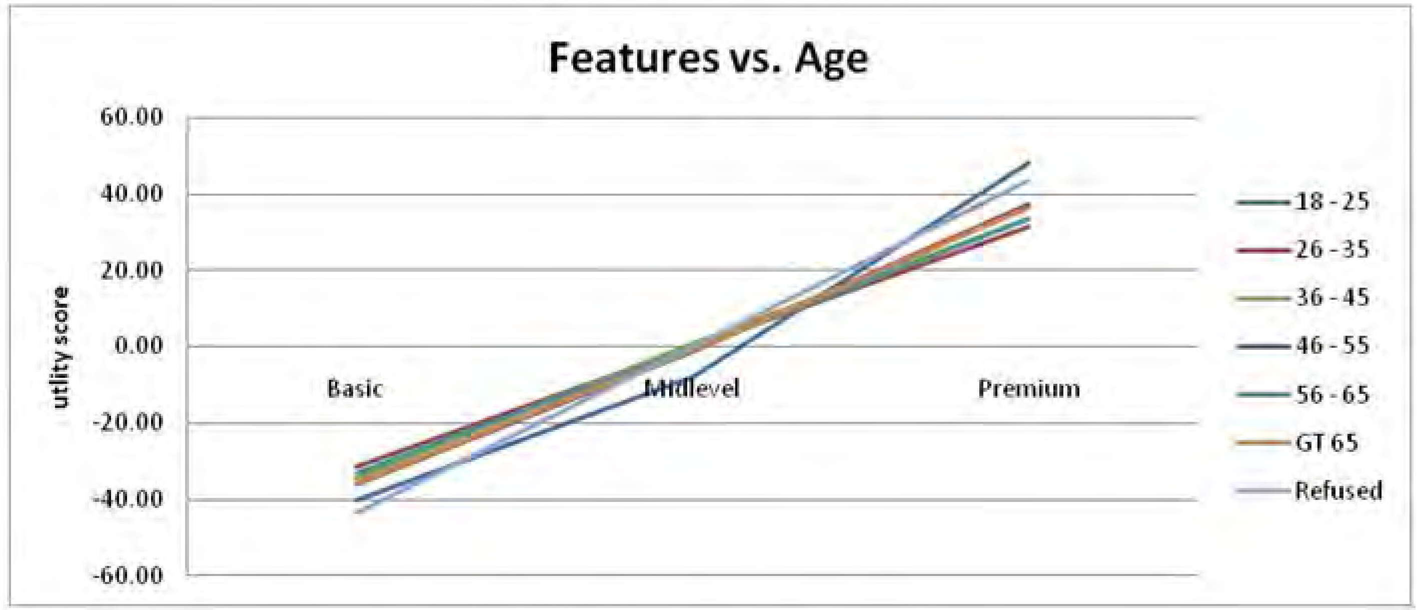
Global Warming Impact

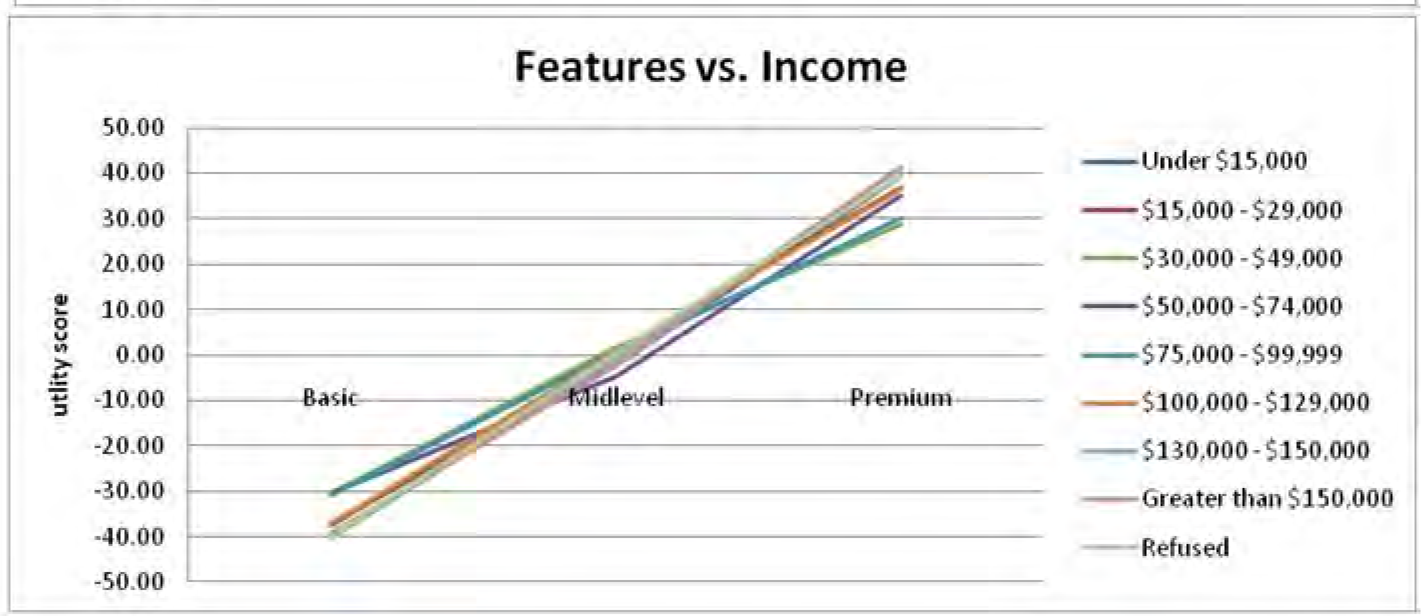




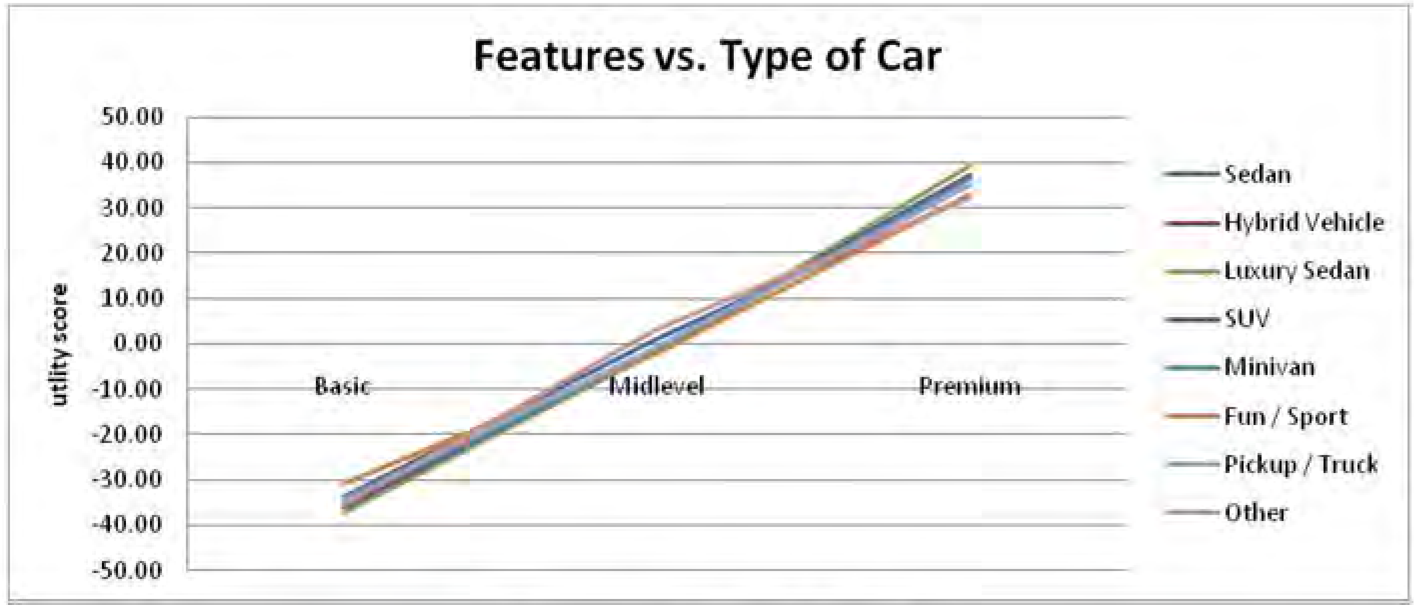
Vehicle Features

Preference increases linearly as more features are added to an EV.



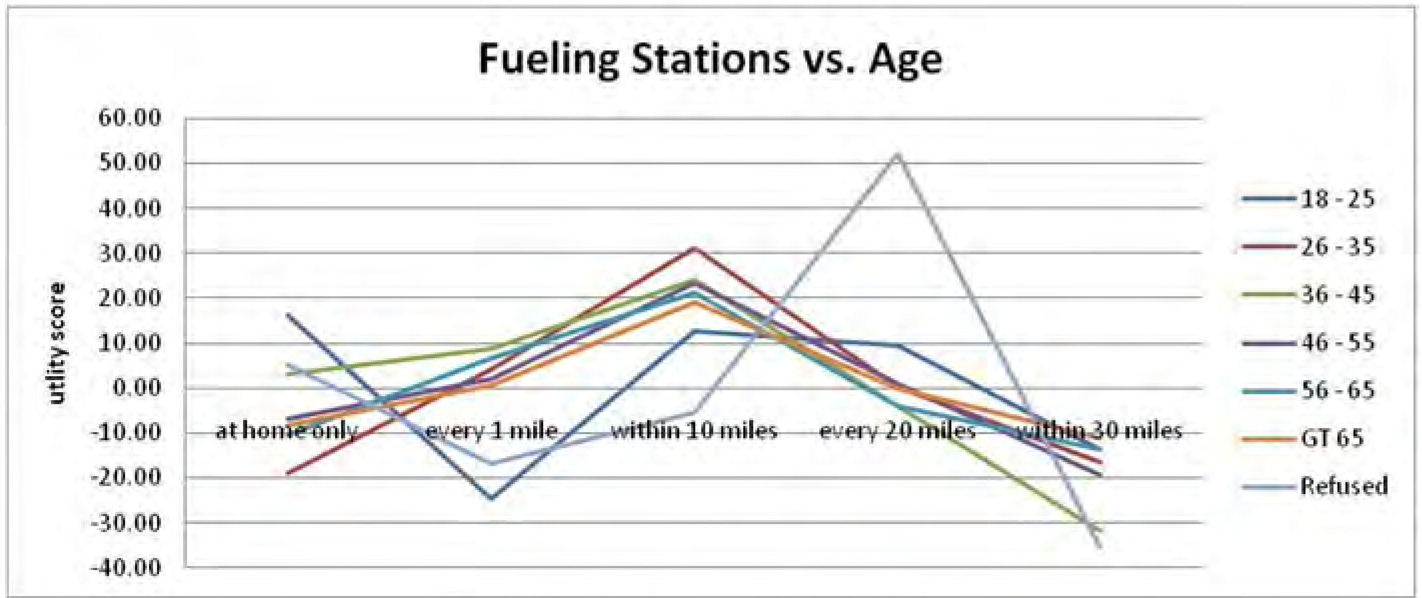


Vehicle Features

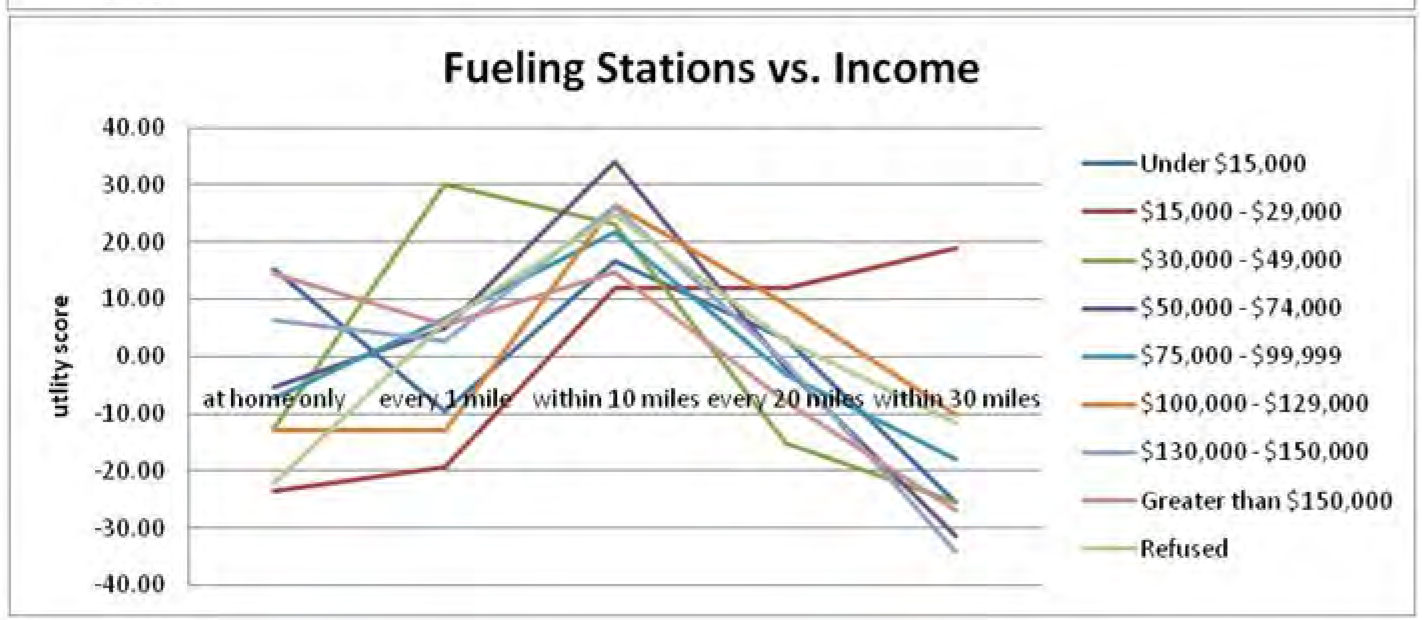


Fueling Station

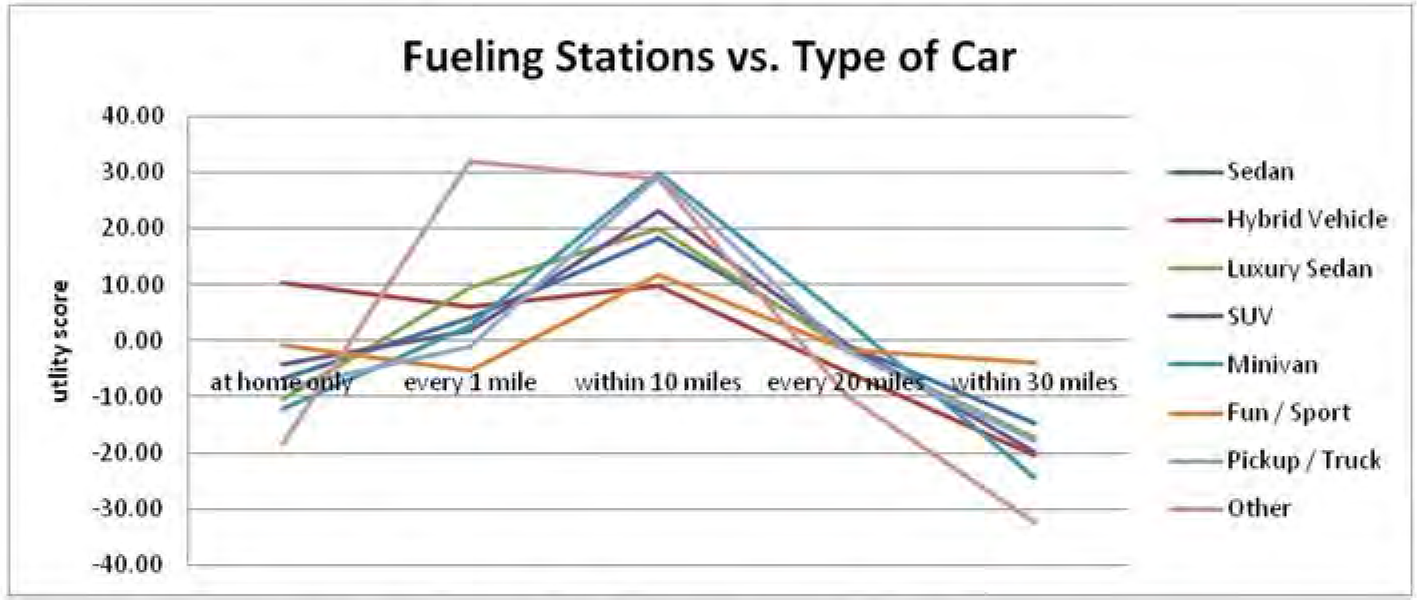
All ages would prefer to have access to charging stations within 10 miles of home.

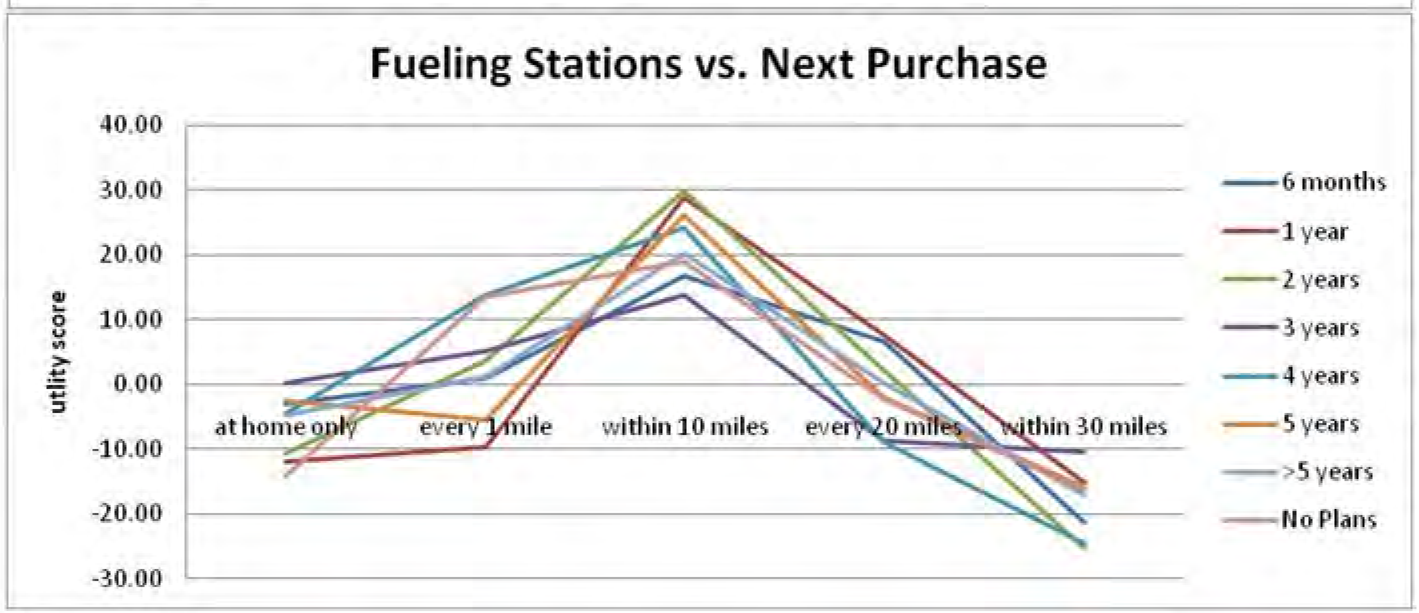


All incomes would prefer to have access to charging stations within 10 miles of home, and the $30-49,000 income group would prefer on every mile.



Fueling Station

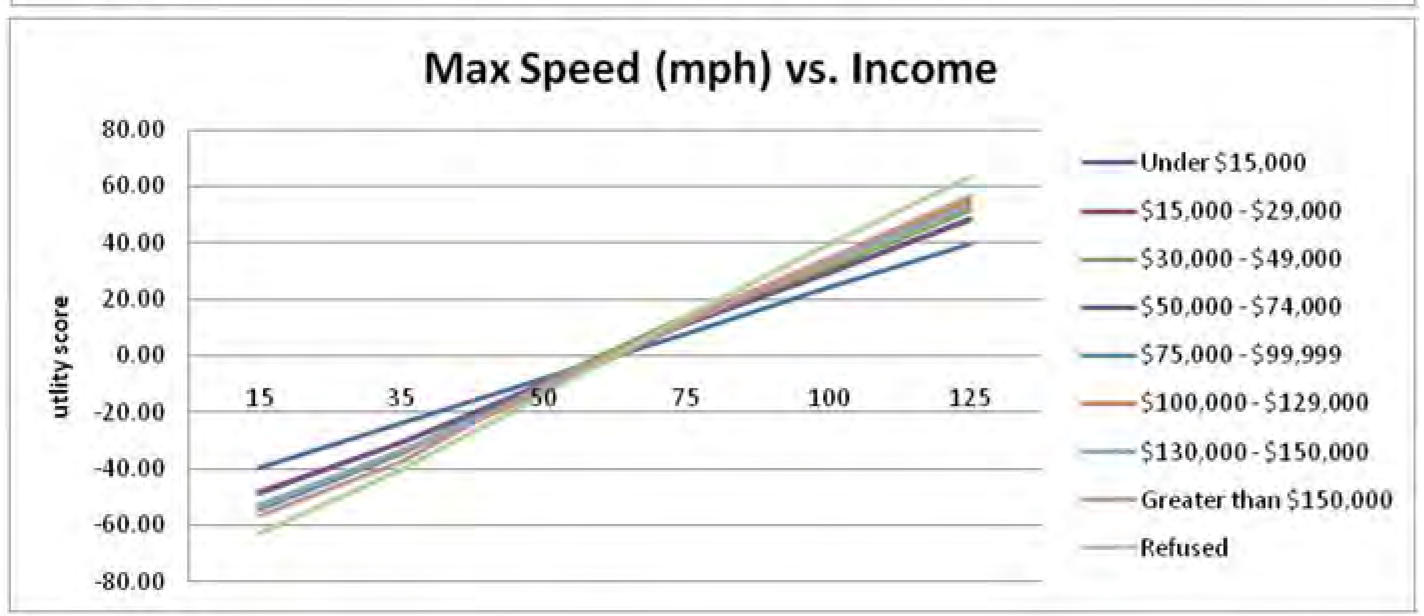




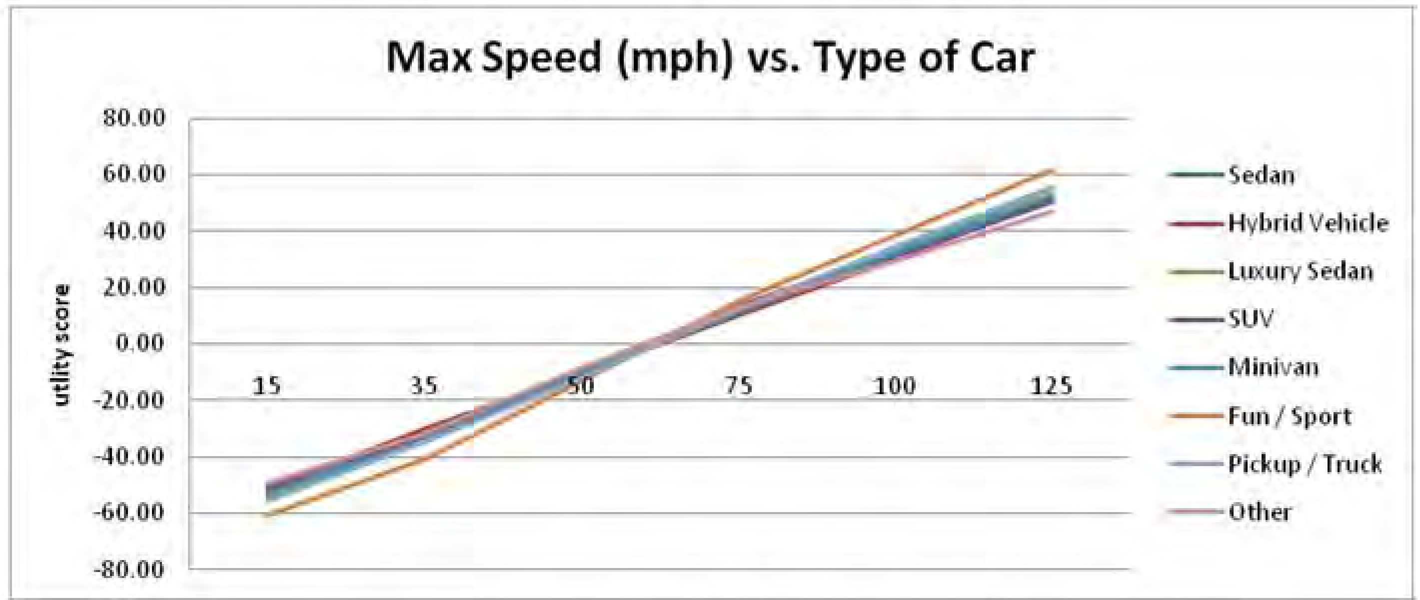
 © 2011 Integral Analytics Inc

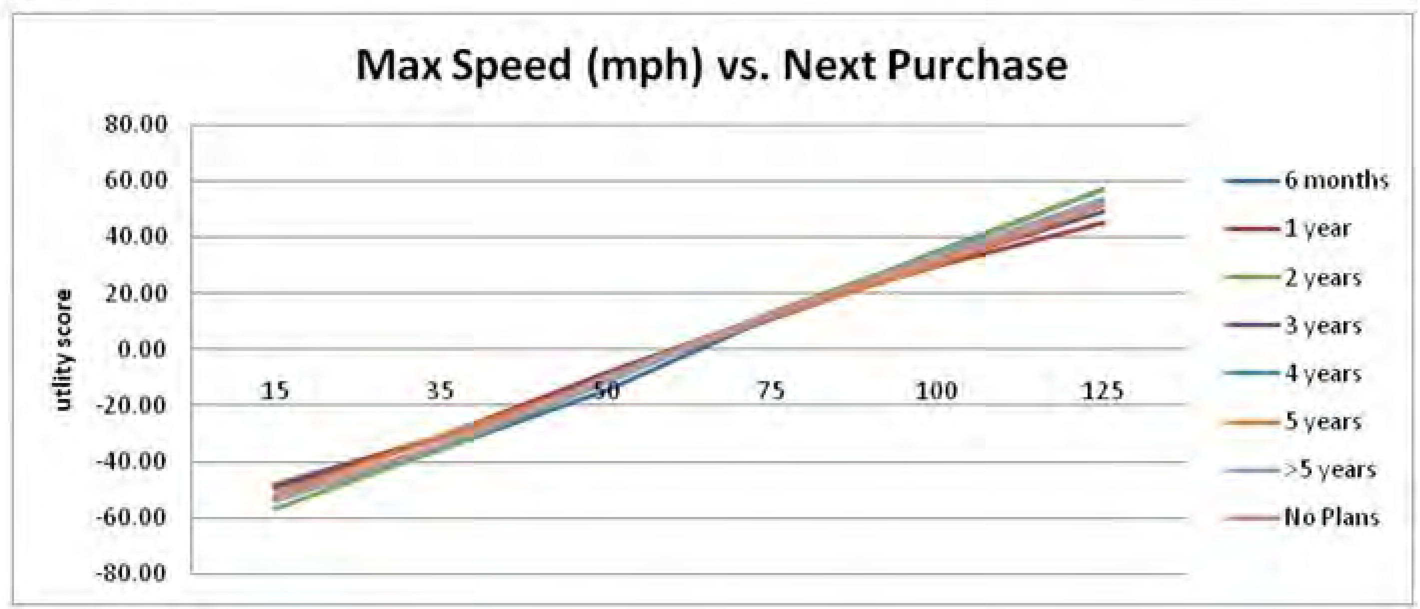
Vehicle Max Speed

Preference increases linearly as max speed increases.



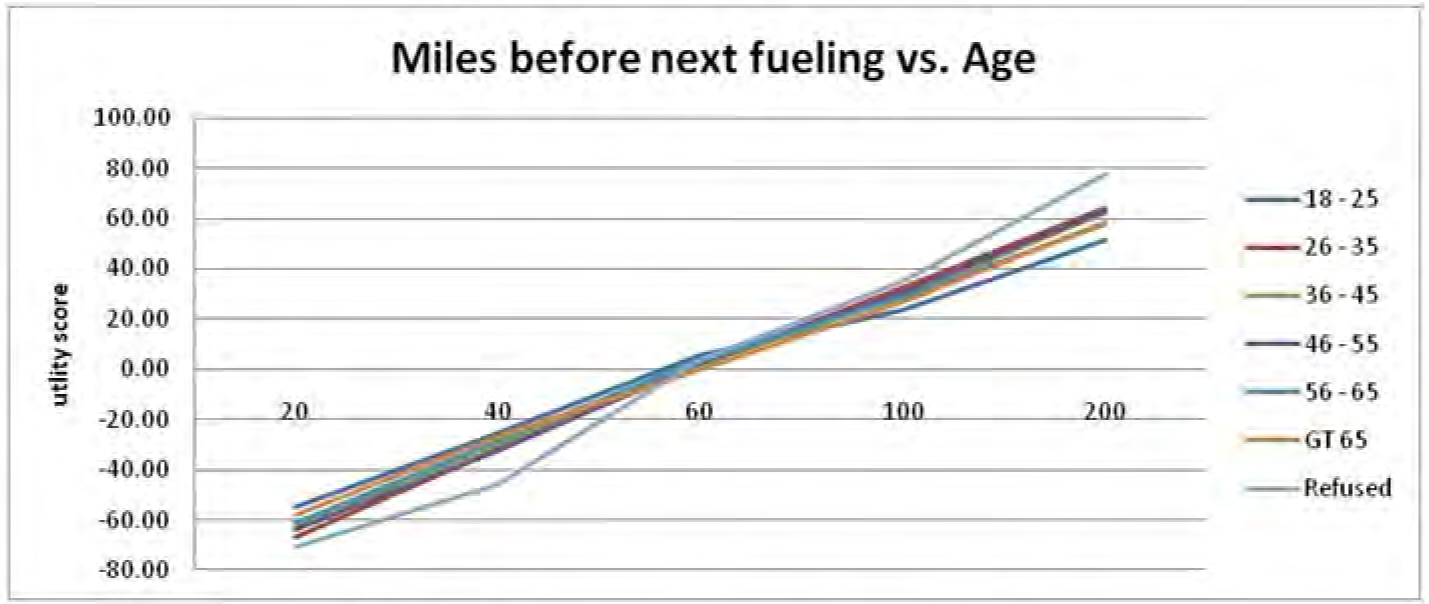
Vehicle Max Speed

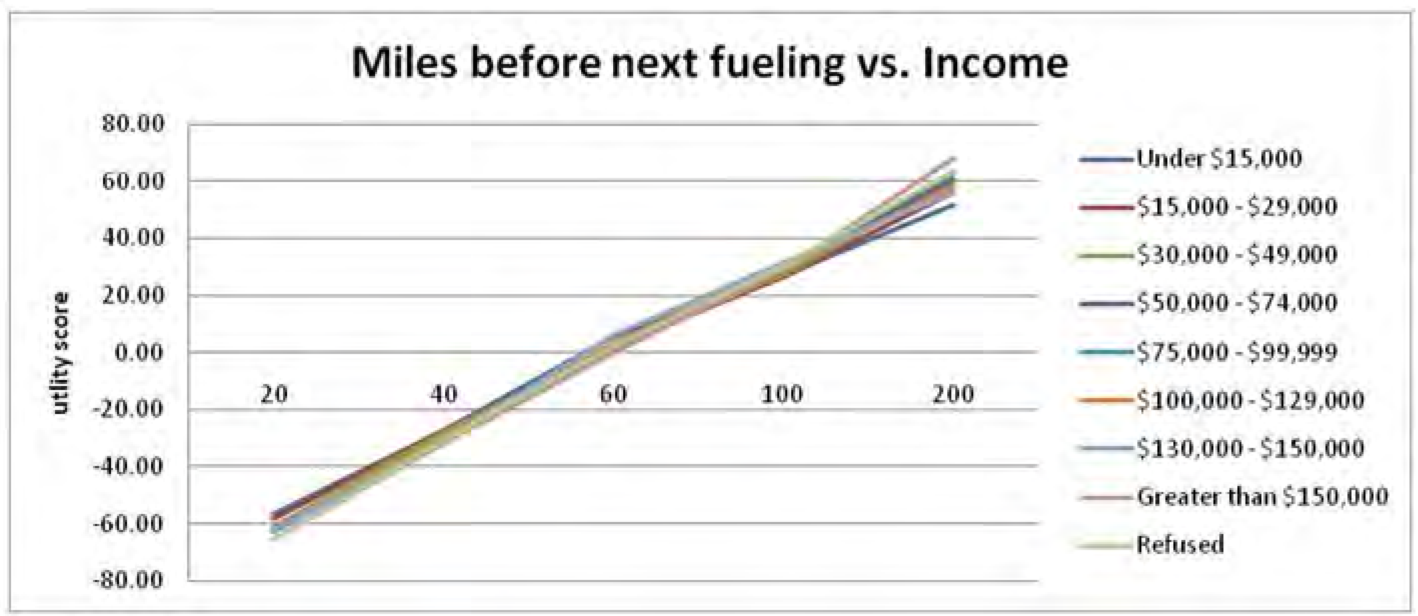




Vehicle Range

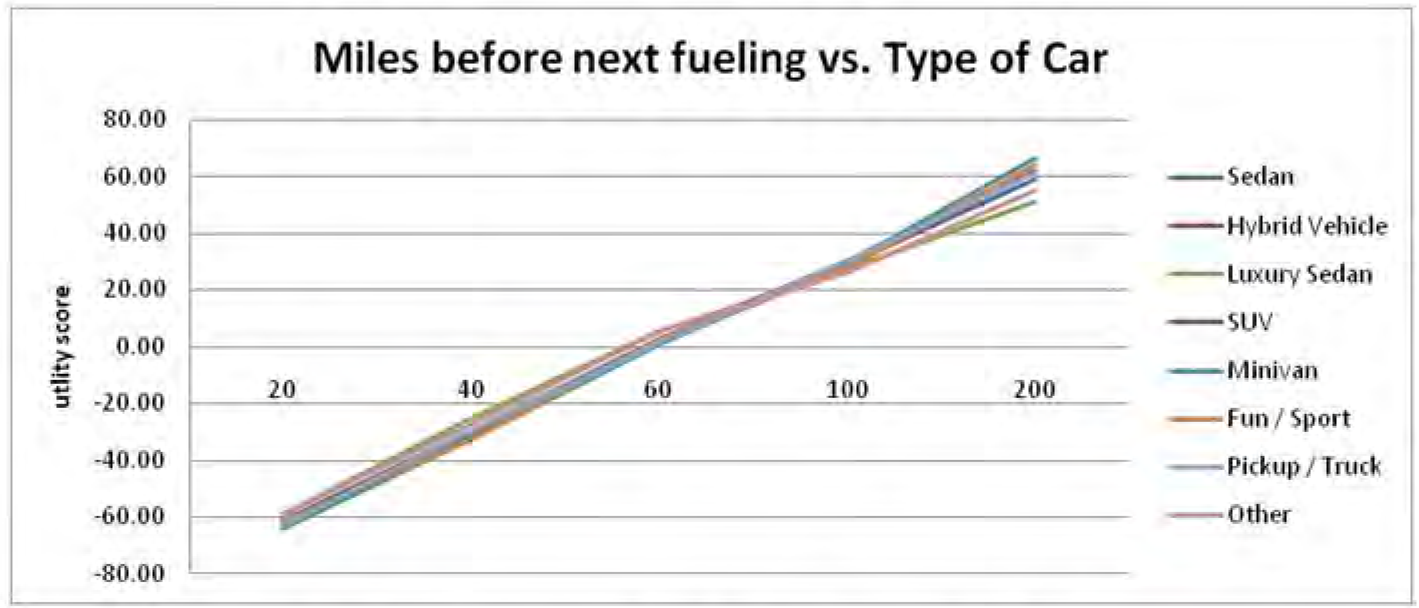
Preference increases linearly as the number of miles between charging increases (range).

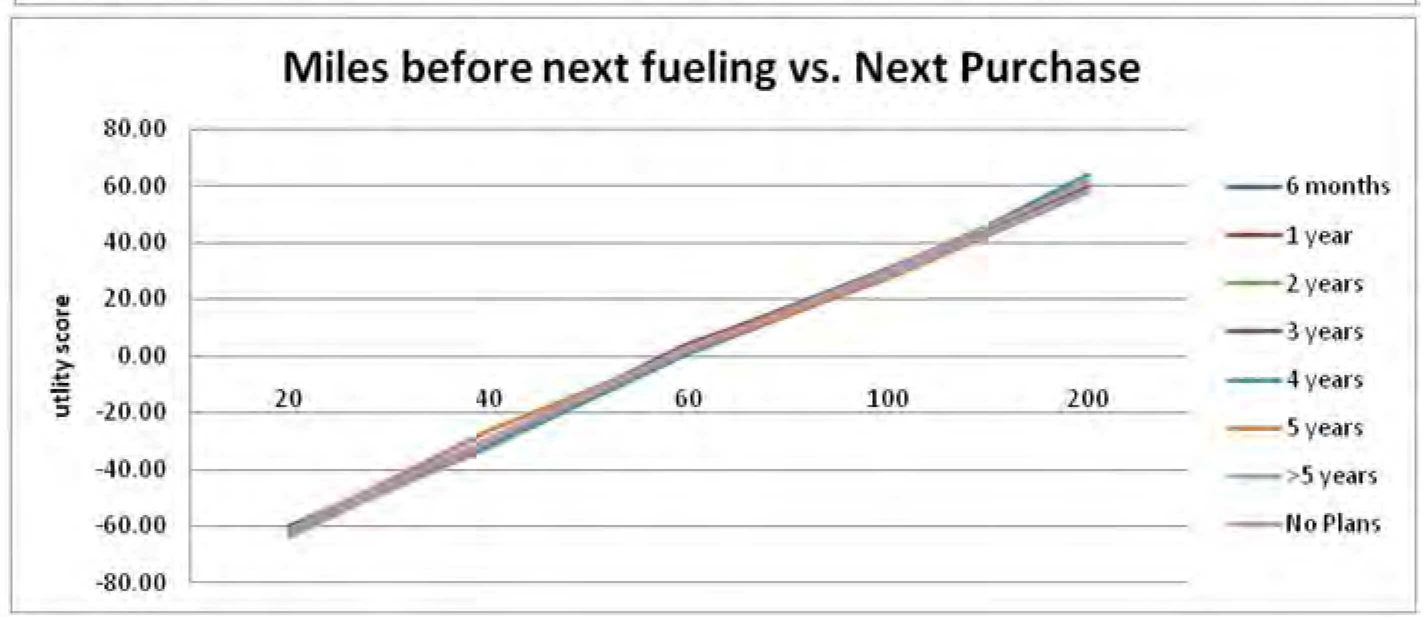




 © 2011 Integral Analytics Inc

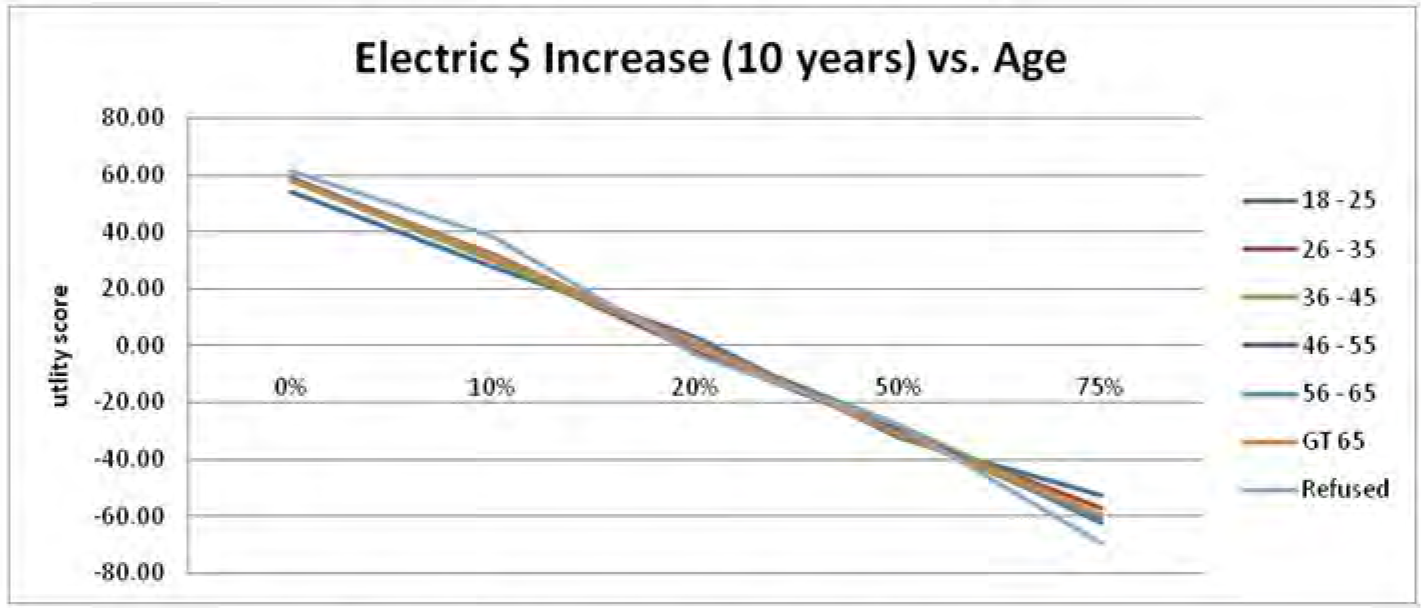
Vehicle Range

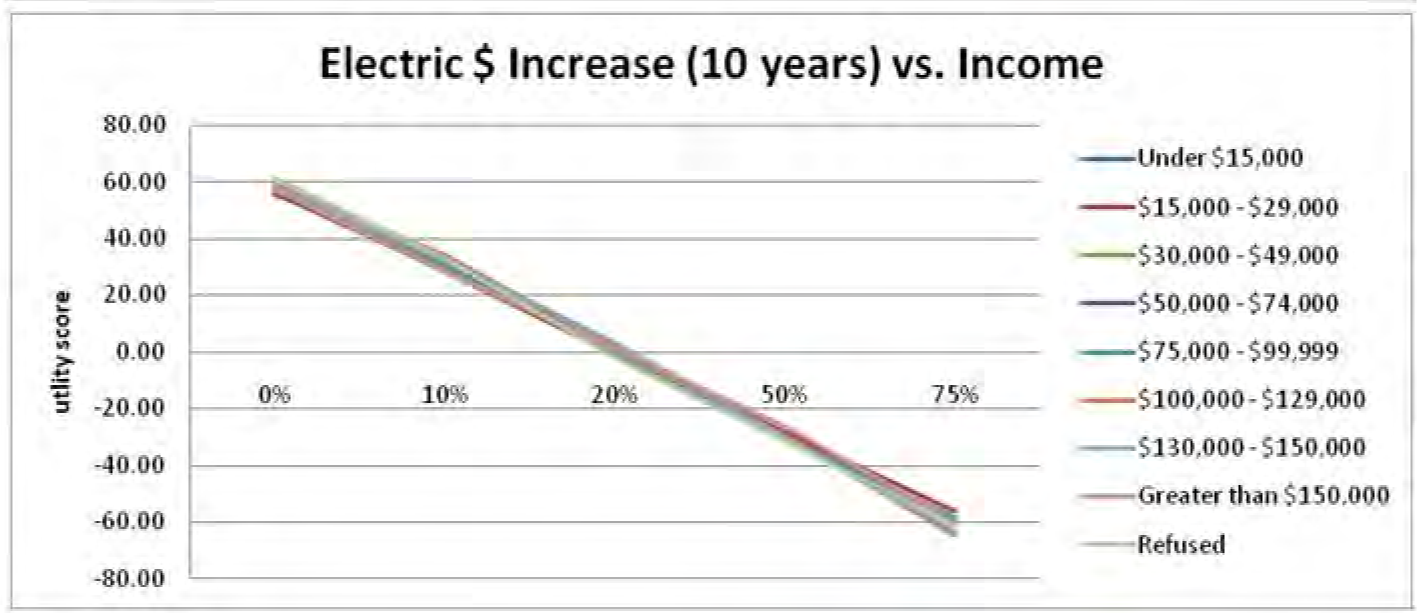




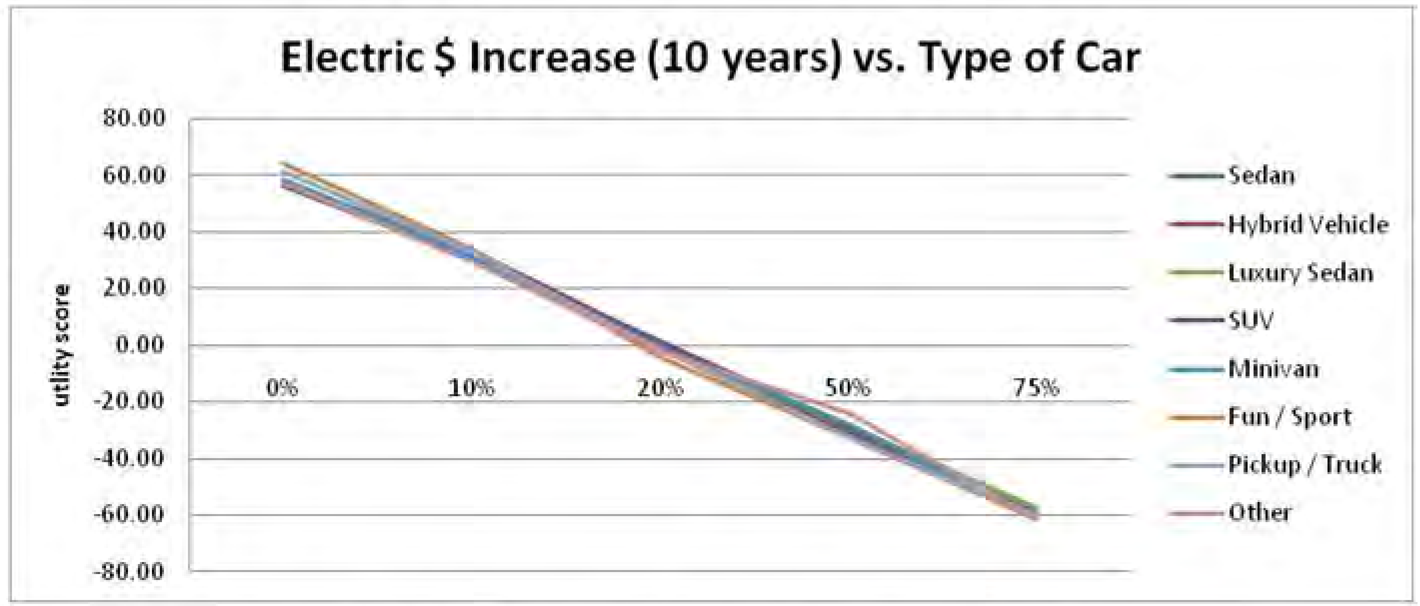
Electricity Price

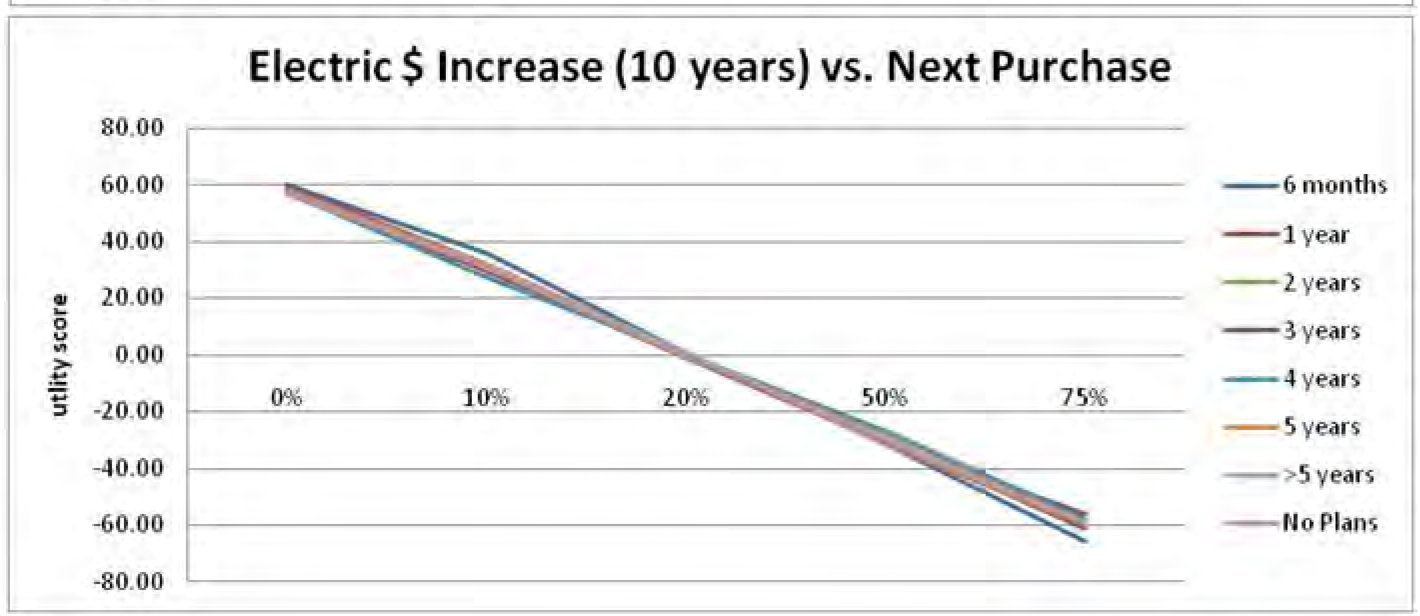
Preference decreases linearly as the price of electricity increases.





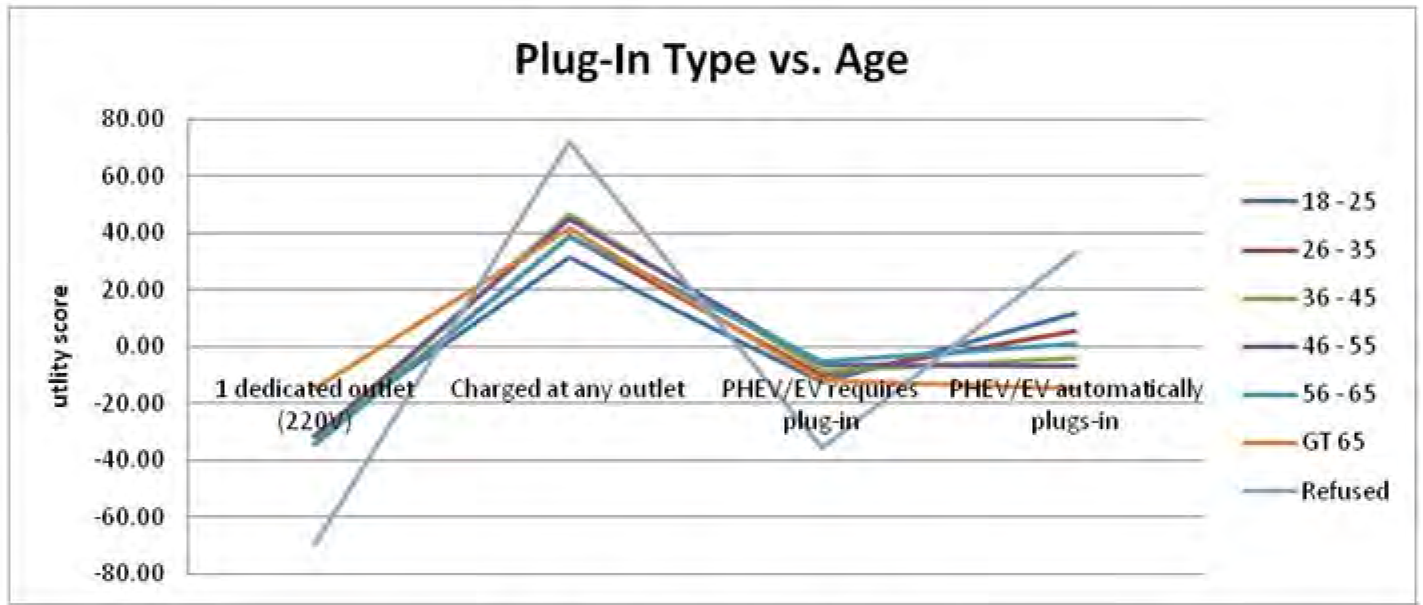
Electricity Price



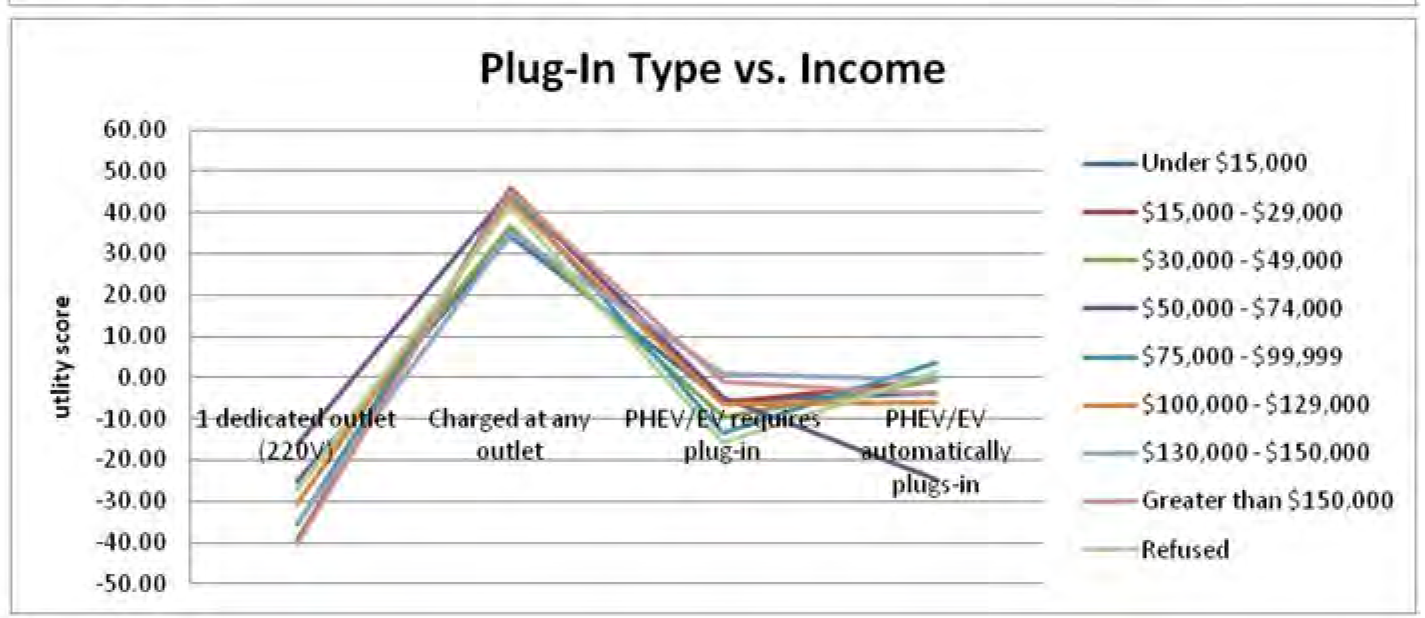


Plug-In Type

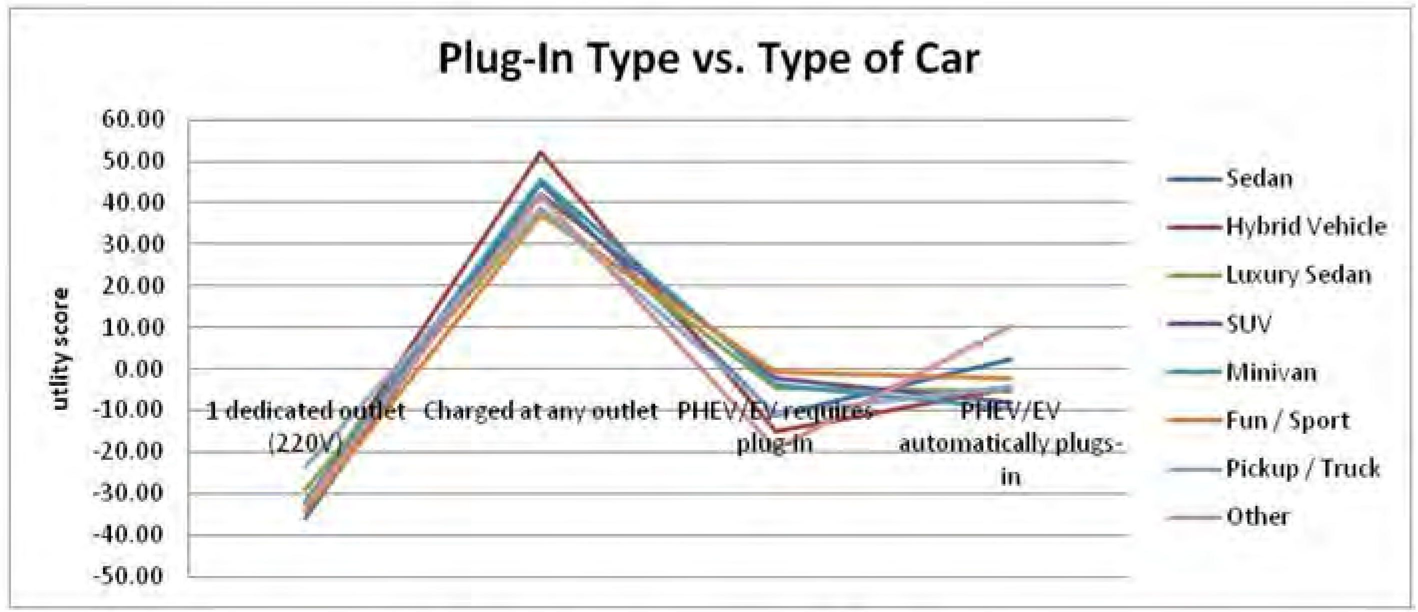
All ages do NOT want to be restricted to one outlet and would prefer to charge at any outlet in their garage or outside. As age increases, there is a decrease in a preference for "automatic" plug-in.

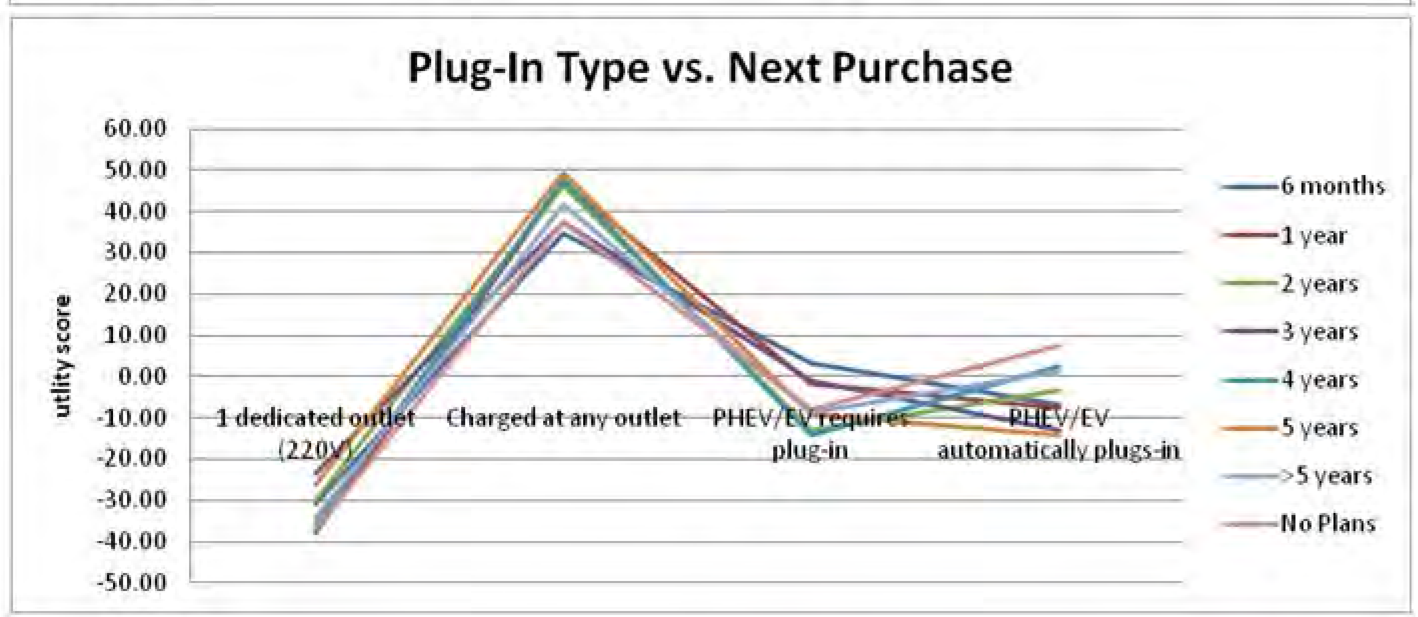


All income groups do NOT want to be restricted to one outlet and would prefer to charge at any outlet in their garage or outside.



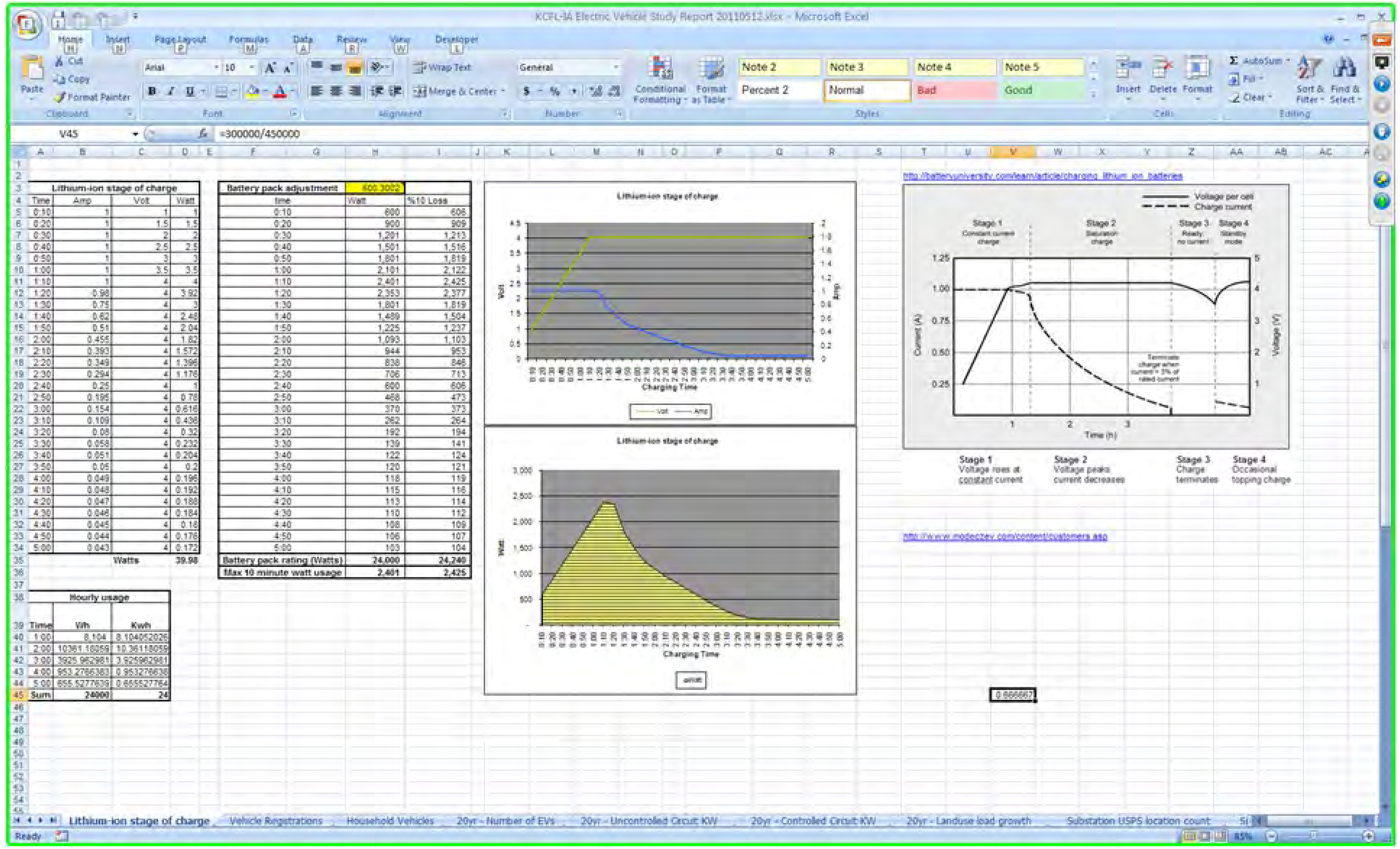
Plug-In Type


Plug-In Type vs. Type of Car
utlity score
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
1 dedicated outlet (220V)
Charged at any outlet
PHEV/EV requires plug-in
PHEV/EV automatically plugs-in
Sedan
Hybrid Vehicle
Luxury Sedan
SUV
Minivan
Fun / Sport
Pickup / Truck
Other


Plug-In Type vs. Next Purchase
utlity score
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
1 dedicated outlet (220V)
Charged at any outlet
PHEV/EV requires plug-in
PHEV/EV automatically plugs-in
6 months
1 year
2 years
3 years
4 years
5 years
>5 years
No Plans

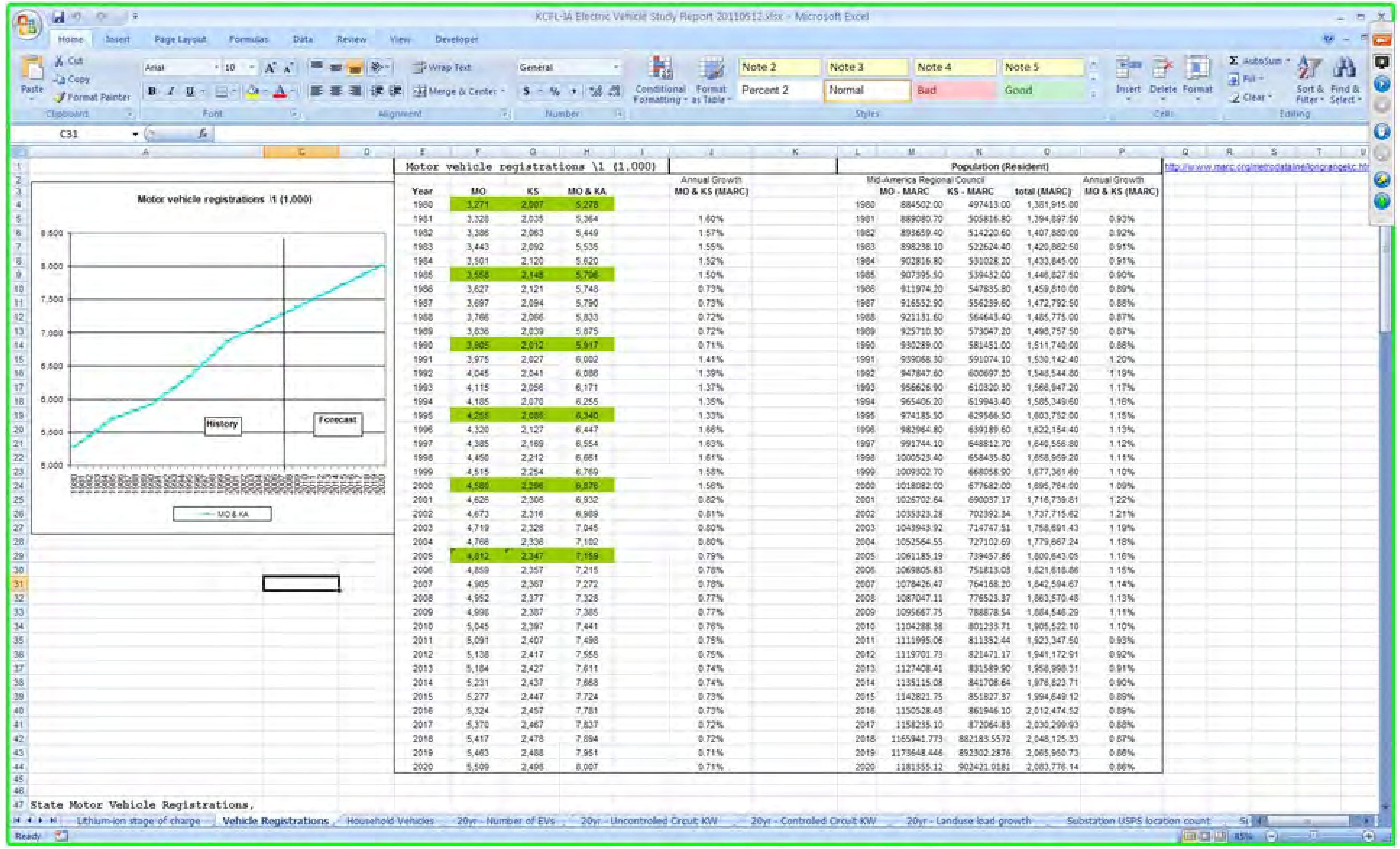
2.2.1.5 Battery Size and Peak KW

Every customer is assigned an uncontrolled (on-peak) kW based on an estimated battery size of their preferred EV, and only customers with a predicted high tolerance for controlled charging are assigned a controlled (off-peak/night) kW. Source: http://batteryuniversity.com/learn/article/charging_lithium_ion_batteries



2.2.1.6 New Vehicle Registration Forecast

Historical vehicle registration counts for Kansas and Missouri were used to produce a linear forecast of yearly vehicle registrations for the next 20 years.
Source: http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.cfm

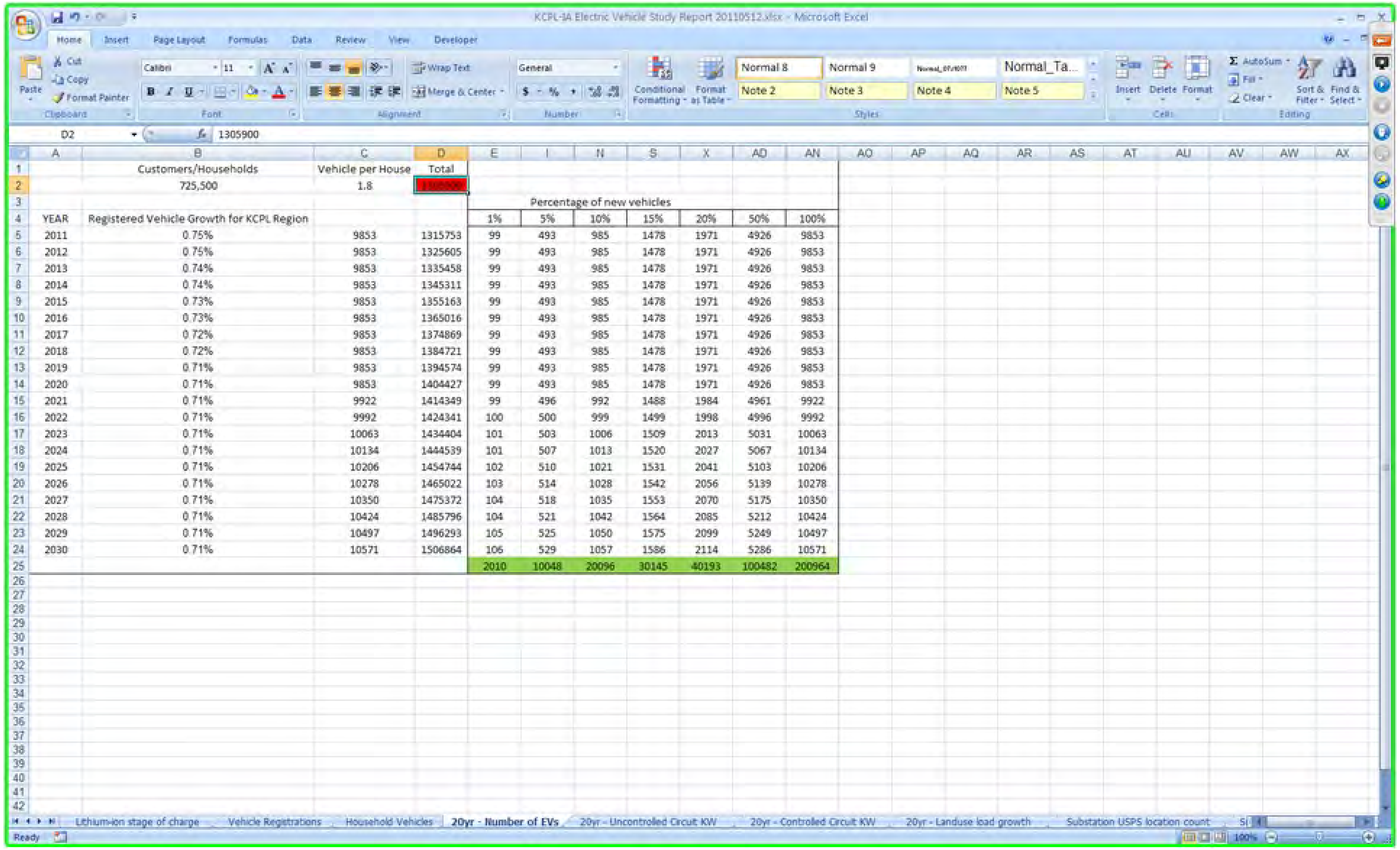


Motor vehicle registrations \1 (1,000) / Population (Resident)

Year	MO	KS	MO & KA	Annual Growth MO & KS (MARC)	Year	Mid-America Regional Council MO - MARC	KS - MARC	total (MARC)	Annual Growth MO & KS (MARC)
1980	3,271	2,007	5,278		1980	884502.00	497413.00	1,381,915.00	
1981	3,328	2,036	5,364	1.60%	1981	889080.70	505816.80	1,394,897.50	0.93%
1982	3,386	2,063	5,449	1.57%	1982	893659.40	514220.60	1,407,880.00	0.92%
1983	3,443	2,092	5,535	1.55%	1983	898238.10	522624.40	1,420,862.50	0.91%
1984	3,501	2,120	5,620	1.52%	1984	902816.80	531028.20	1,433,845.00	0.91%
1985	3,558	2,148	5,706	1.50%	1985	907395.50	539432.00	1,446,827.50	0.90%
1986	3,627	2,121	5,748	0.73%	1986	911974.20	547835.80	1,459,810.00	0.89%
1987	3,697	2,094	5,790	0.73%	1987	916552.90	556239.60	1,472,792.50	0.88%
1988	3,766	2,066	5,833	0.72%	1988	921131.60	564643.40	1,485,775.00	0.87%
1989	3,836	2,039	5,875	0.72%	1989	925710.30	573047.20	1,498,757.50	0.87%
1990	3,905	2,012	5,917	0.71%	1990	930289.00	581451.00	1,511,740.00	0.86%
1991	3,975	2,027	6,002	1.41%	1991	939068.30	591074.10	1,530,142.40	1.20%
1992	4,045	2,041	6,086	1.39%	1992	947847.60	600697.20	1,548,544.80	1.19%
1993	4,115	2,056	6,171	1.37%	1993	956626.90	610320.30	1,566,947.20	1.17%
1994	4,185	2,070	6,255	1.35%	1994	965406.20	619943.40	1,585,349.60	1.16%
1995	4,255	2,085	6,340	1.33%	1995	974185.50	629566.50	1,603,752.00	1.15%
1996	4,320	2,127	6,447	1.66%	1996	982964.80	639189.60	1,622,154.40	1.13%
1997	4,385	2,169	6,554	1.63%	1997	991744.10	648812.70	1,640,556.80	1.12%
1998	4,450	2,212	6,661	1.61%	1998	1000523.40	658435.80	1,658,959.20	1.11%
1999	4,515	2,254	6,769	1.58%	1999	1009302.70	668058.90	1,677,361.60	1.10%
2000	4,580	2,296	6,876	1.56%	2000	1018082.00	677682.00	1,695,764.00	1.09%
2001	4,626	2,306	6,932	0.82%	2001	1026702.64	690037.17	1,716,739.81	1.22%
2002	4,673	2,316	6,989	0.81%	2002	1035323.28	702392.34	1,737,715.62	1.21%
2003	4,719	2,326	7,045	0.80%	2003	1043943.92	714747.51	1,758,691.43	1.19%
2004	4,766	2,336	7,102	0.80%	2004	1052564.55	727102.69	1,779,667.24	1.18%
2005	4,812	2,347	7,159	0.79%	2005	1061185.19	739457.86	1,800,643.05	1.16%
2006	4,859	2,357	7,215	0.78%	2006	1069805.83	751813.03	1,821,618.86	1.15%
2007	4,905	2,367	7,272	0.78%	2007	1078426.47	764168.20	1,842,594.67	1.14%
2008	4,952	2,377	7,328	0.77%	2008	1087047.11	776523.37	1,863,570.48	1.13%
2009	4,998	2,387	7,385	0.77%	2009	1095667.75	788878.54	1,884,546.29	1.11%
2010	5,045	2,397	7,441	0.76%	2010	1104288.38	801233.71	1,905,522.10	1.10%
2011	5,091	2,407	7,498	0.75%	2011	1111995.06	811352.44	1,923,347.50	0.93%
2012	5,138	2,417	7,555	0.75%	2012	1119701.73	821471.17	1,941,172.91	0.92%
2013	5,184	2,427	7,611	0.74%	2013	1127408.41	831589.90	1,958,998.31	0.91%
2014	5,231	2,437	7,668	0.74%	2014	1135115.08	841708.64	1,976,823.71	0.90%
2015	5,277	2,447	7,724	0.73%	2015	1142821.75	851827.37	1,994,649.12	0.89%
2016	5,324	2,457	7,781	0.73%	2016	1150528.43	861946.10	2,012,474.52	0.89%
2017	5,370	2,467	7,837	0.72%	2017	1158235.10	872064.83	2,030,299.93	0.88%
2018	5,417	2,478	7,894	0.72%	2018	1165941.773	882183.5572	2,048,125.33	0.87%
2019	5,463	2,488	7,951	0.71%	2019	1173648.446	892302.2876	2,065,950.73	0.86%
2020	5,509	2,498	8,007	0.71%	2020	1181355.12	902421.0181	2,083,776.14	0.86%

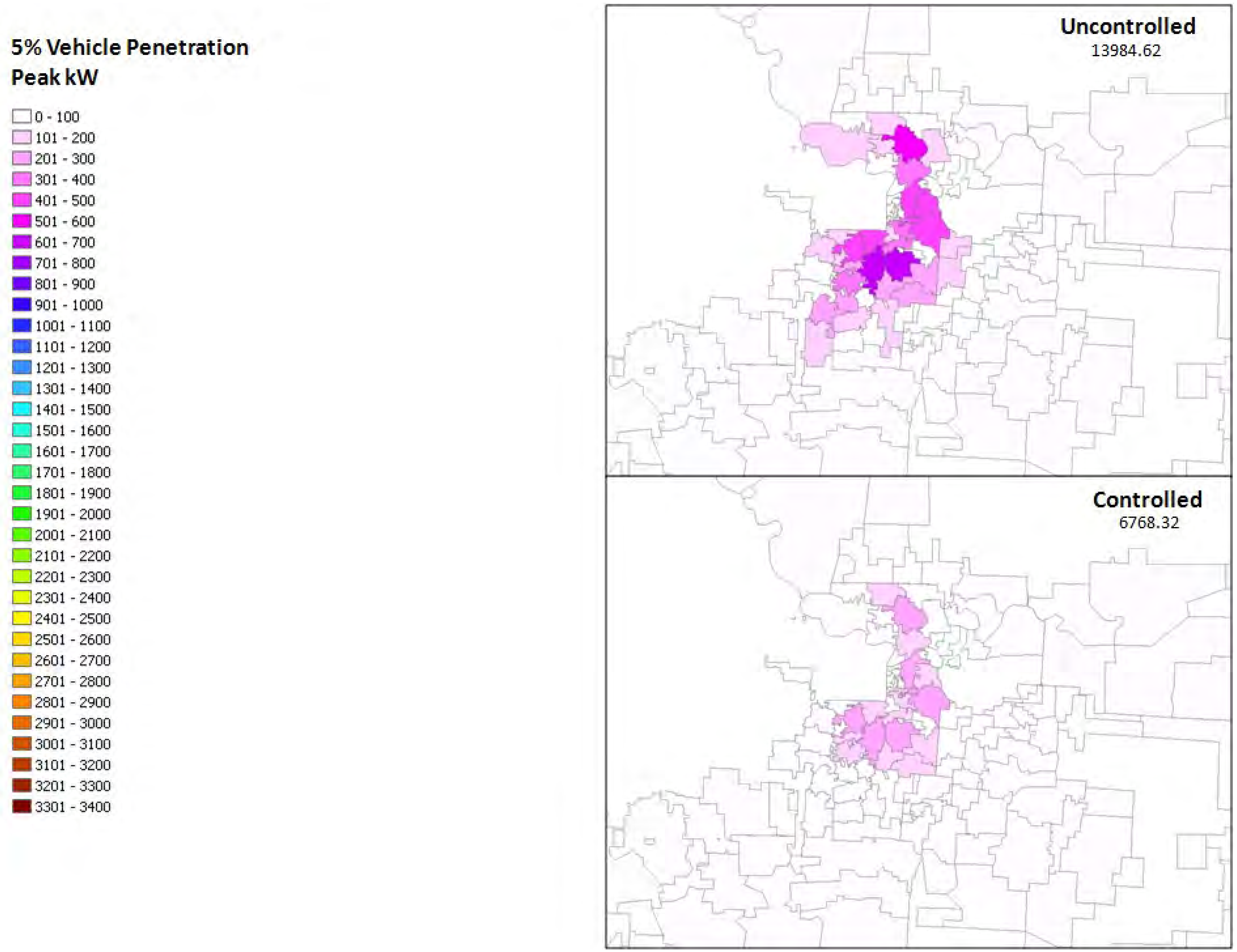
2.2.1.7 Number of Electric Vehicles

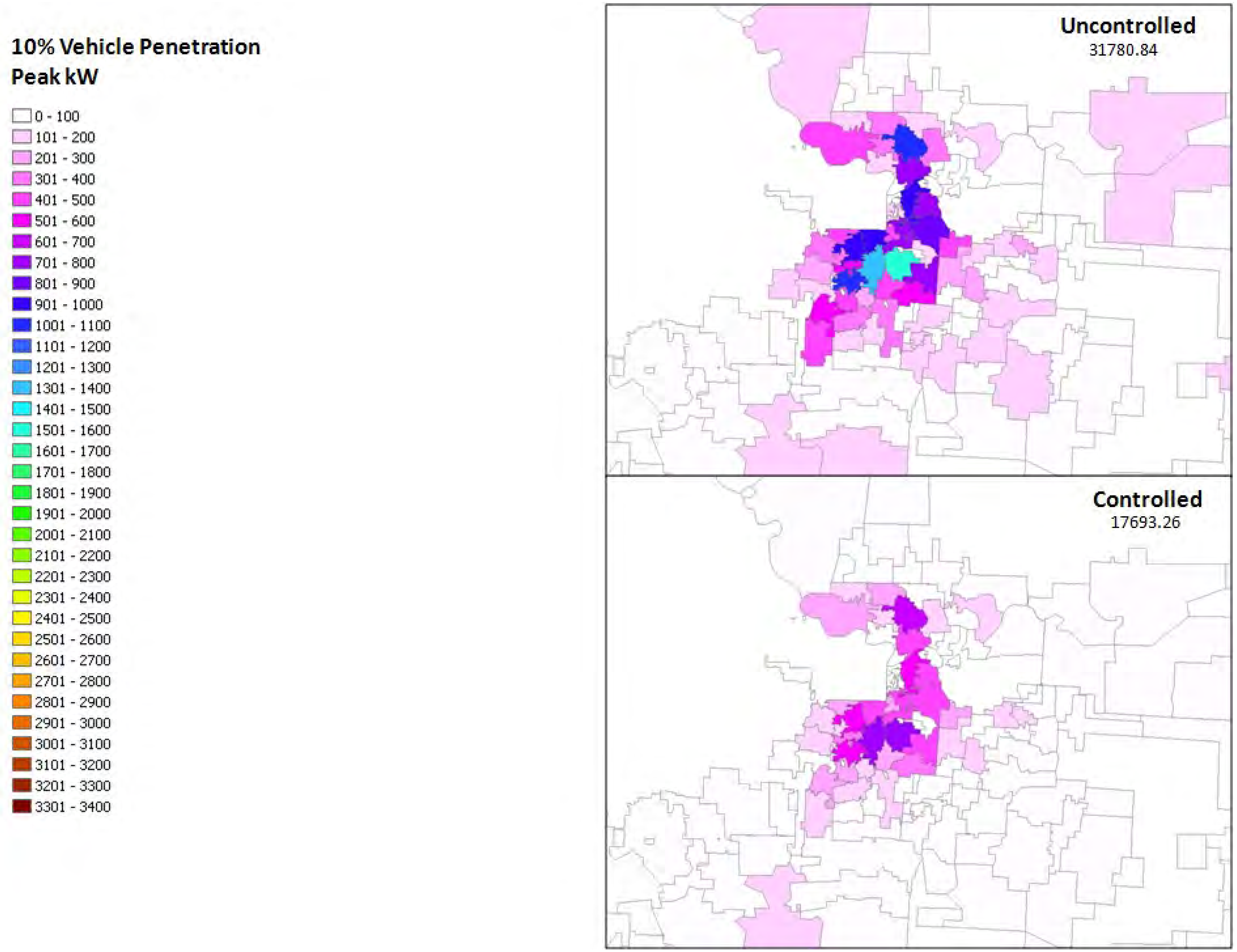
An EV penetration scenario is defined as a percentage of newly registered vehicles per year for the next 20 years. A penetration scenario group ID of "1", for example, represents all customers that are likely to purchase their preferred EV if 1% of all newly registered vehicles are EVs for the next 20 years. Similarly, a penetration scenario group ID of "100" represents the customers that are likely to purchase their preferred EV if 100% of all newly registered vehicles are EVs for the next 20 years.

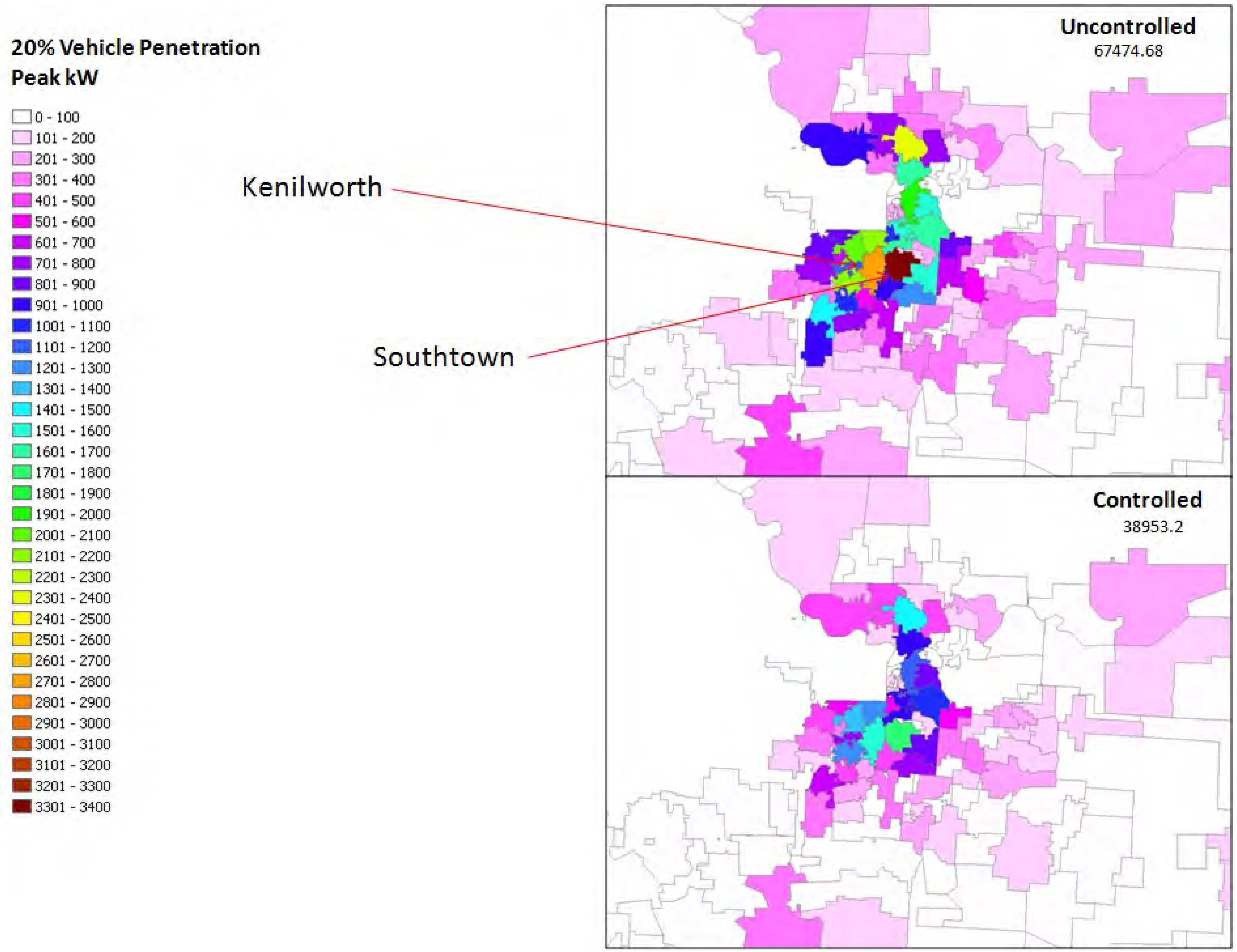


	Customers/Households	Vehicle per House	Total							
	725,500	1.8	1305900							
				Percentage of new vehicles						
YEAR	Registered Vehicle Growth for KCPL Region			1%	5%	10%	15%	20%	50%	100%
2011	0.75%	9853	1315753	99	493	985	1478	1971	4926	9853
2012	0.75%	9853	1325605	99	493	985	1478	1971	4926	9853
2013	0.74%	9853	1335458	99	493	985	1478	1971	4926	9853
2014	0.74%	9853	1345311	99	493	985	1478	1971	4926	9853
2015	0.73%	9853	1355163	99	493	985	1478	1971	4926	9853
2016	0.73%	9853	1365016	99	493	985	1478	1971	4926	9853
2017	0.72%	9853	1374869	99	493	985	1478	1971	4926	9853
2018	0.72%	9853	1384721	99	493	985	1478	1971	4926	9853
2019	0.71%	9853	1394574	99	493	985	1478	1971	4926	9853
2020	0.71%	9853	1404427	99	493	985	1478	1971	4926	9853
2021	0.71%	9922	1414349	99	496	992	1488	1984	4961	9922
2022	0.71%	9992	1424341	100	500	999	1499	1998	4996	9992
2023	0.71%	10063	1434404	101	503	1006	1509	2013	5031	10063
2024	0.71%	10134	1444539	101	507	1013	1520	2027	5067	10134
2025	0.71%	10206	1454744	102	510	1021	1531	2041	5103	10206
2026	0.71%	10278	1465022	103	514	1028	1542	2056	5139	10278
2027	0.71%	10350	1475372	104	518	1035	1553	2070	5175	10350
2028	0.71%	10424	1485796	104	521	1042	1564	2085	5212	10424
2029	0.71%	10497	1496293	105	525	1050	1575	2099	5249	10497
2030	0.71%	10571	1506864	106	529	1057	1586	2114	5286	10571
				2010	10048	20096	30145	40193	100482	200964

2.2.1.8 Load Estimates by Substation




10% Vehicle Penetration
Peak kW
0 - 100
101 - 200
201 - 300
301 - 400
401 - 500
501 - 600
601 - 700
701 - 800
801 - 900
901 - 1000
1001 - 1100
1101 - 1200
1201 - 1300
1301 - 1400
1401 - 1500
1501 - 1600
1601 - 1700
1701 - 1800
1801 - 1900
1901 - 2000
2001 - 2100
2101 - 2200
2201 - 2300
2301 - 2400
2401 - 2500
2501 - 2600
2601 - 2700
2701 - 2800
2801 - 2900
2901 - 3000
3001 - 3100
3101 - 3200
3201 - 3300
3301 - 3400
Uncontrolled
31780.84
Controlled
17693.26


20% Vehicle Penetration
Peak kW
0 - 100
101 - 200
201 - 300
301 - 400
401 - 500
501 - 600
601 - 700
701 - 800
801 - 900
901 - 1000
1001 - 1100
1101 - 1200
1201 - 1300
1301 - 1400
1401 - 1500
1501 - 1600
1601 - 1700
1701 - 1800
1801 - 1900
1901 - 2000
2001 - 2100
2101 - 2200
2201 - 2300
2301 - 2400
2401 - 2500
2501 - 2600
2601 - 2700
2701 - 2800
2801 - 2900
2901 - 3000
3001 - 3100
3101 - 3200
3201 - 3300
3301 - 3400
Kenilworth
Southtown
Uncontrolled
67474.68
Controlled
38953.2

2.2.2 Fleet

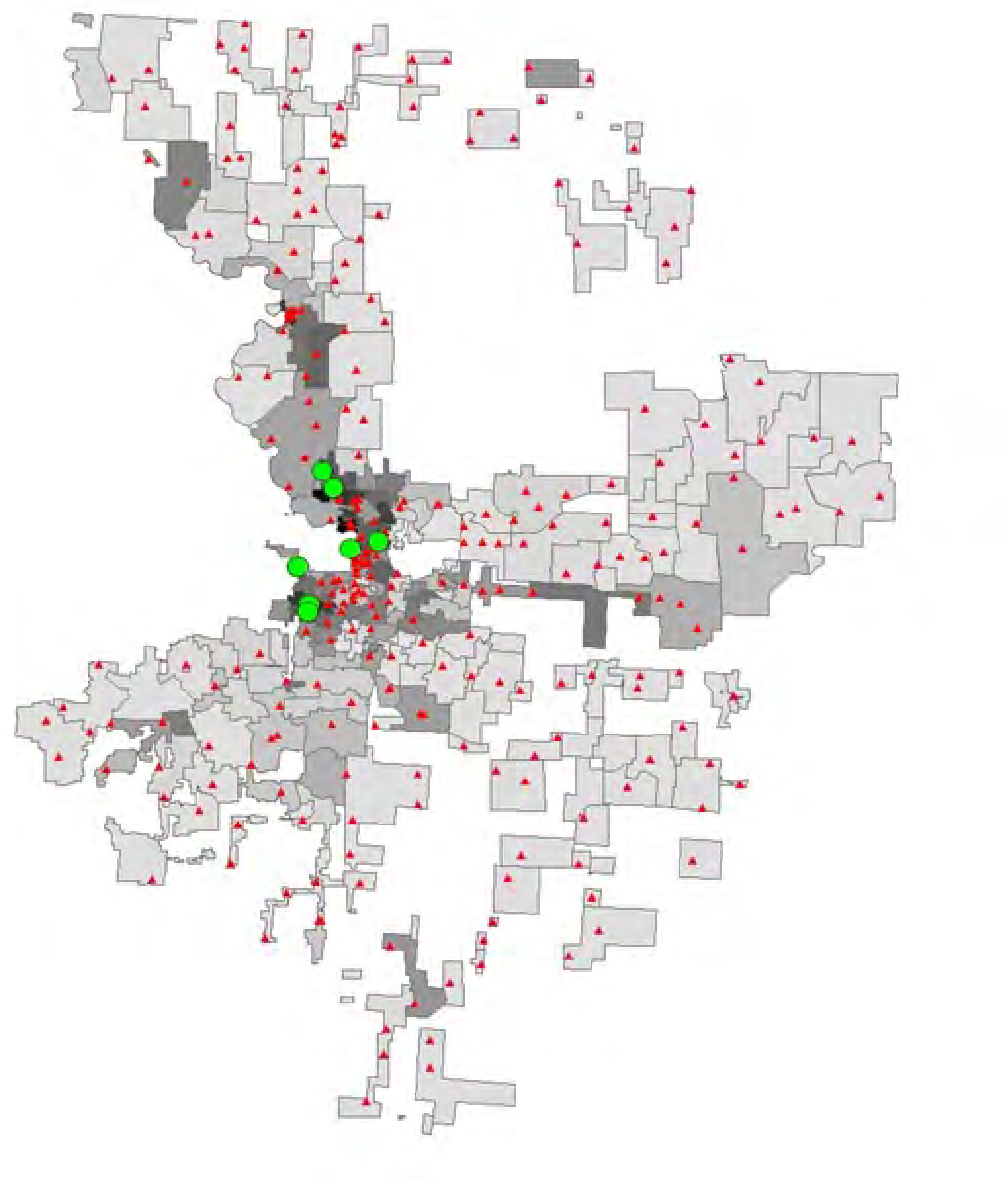
Electric Fleet Vehicles:

- Existing FedEx, UPS, and USPS fleet locations were used as a proxy for potential EV fleet zones.
- Using spatial analysis, the following proximity and surround factors were found to be common to existing fleet locations: jobs, population, access roads, highways, industrial and business parks.
- LoadSEER's spatial preference map calculation technique was used to score every General Service customer based on the proximity and surround factors identified in step 2. This is a weighted summation of the proximity and surround maps for every customer location.
- Substation polygon boundaries were used to aggregate General Service customer scores and score each substation. This score represents a **location based fleet preference score**.
- Public and private fleet statistics at the National level were used to estimated the total number of fleet vehicle in KCPL. A ratio of U.S. population to U.S. fleets (public and private) was used to estimate the number of KCPL fleets from KCPL population.
- Load impacts were then calculated based on an estimated percentages of fleets, by weight and cargo class, in the KCPL territory converting to electric vehicles.

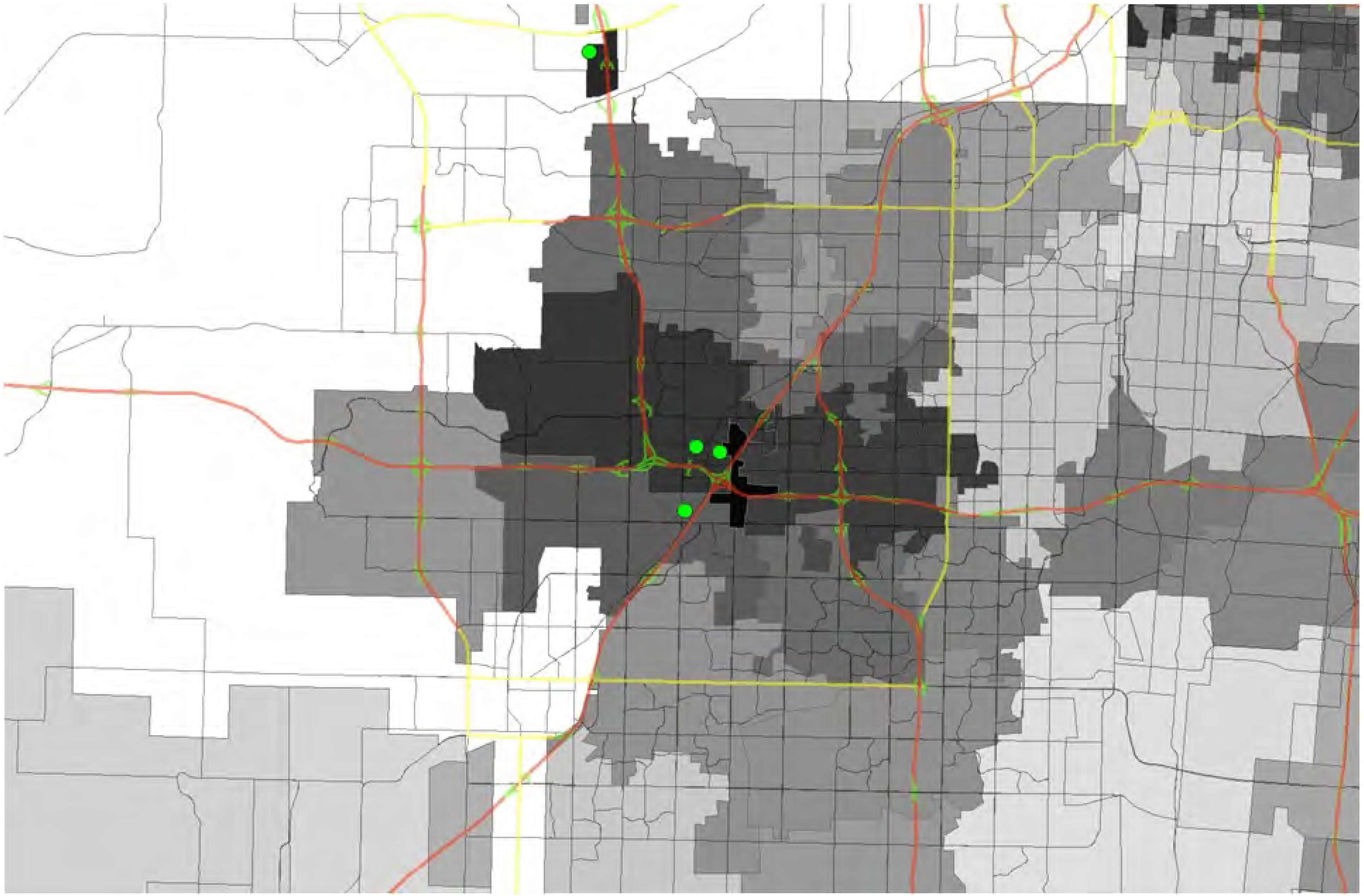
© 2011 Integral Analytics Inc

2.2.2.1 Locational Proxy

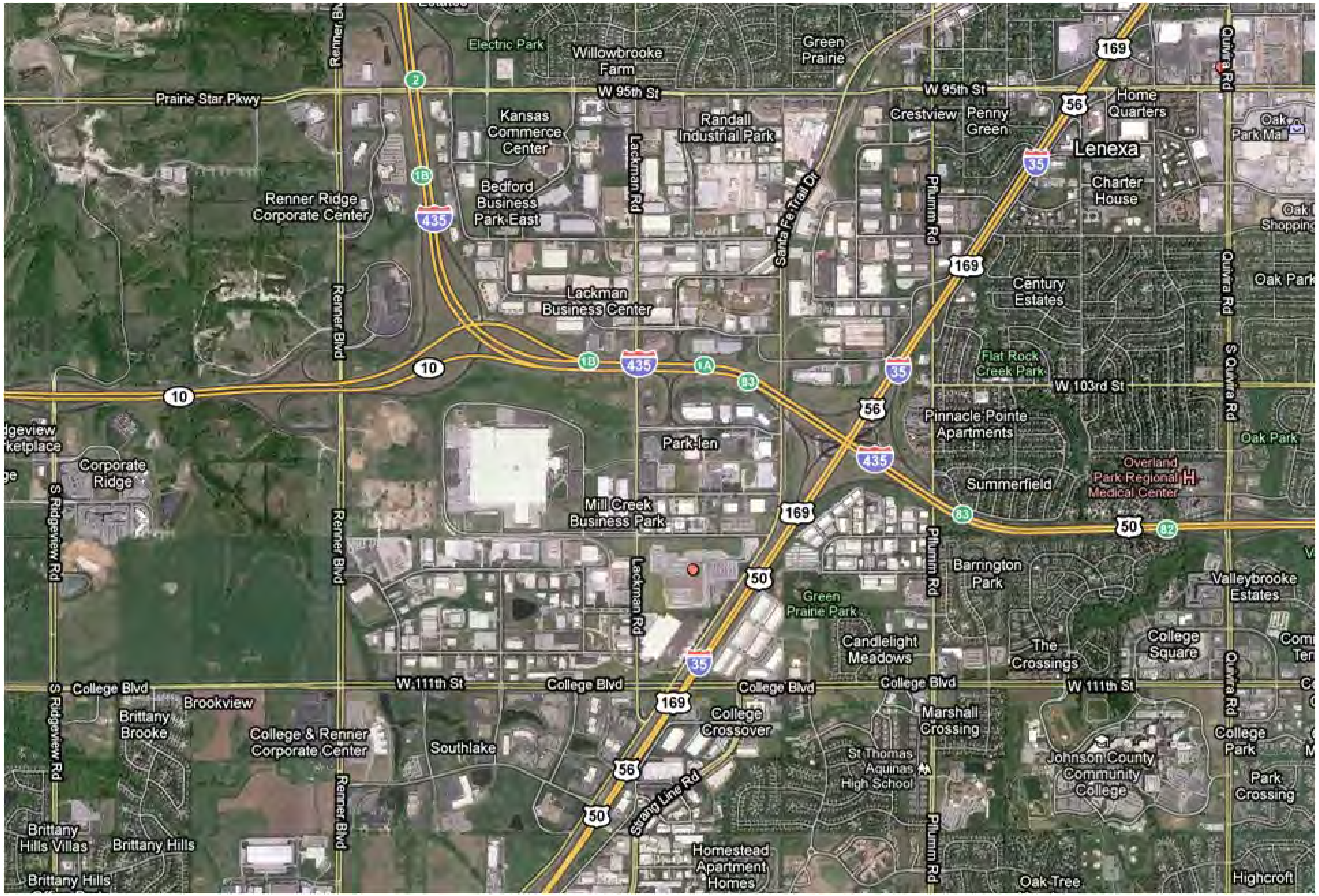
PROXY for locational fleet preference: Grayscale polygons are substation boundaries, Green dots are UPS and FedEx locations, Red triangles are USPS locations



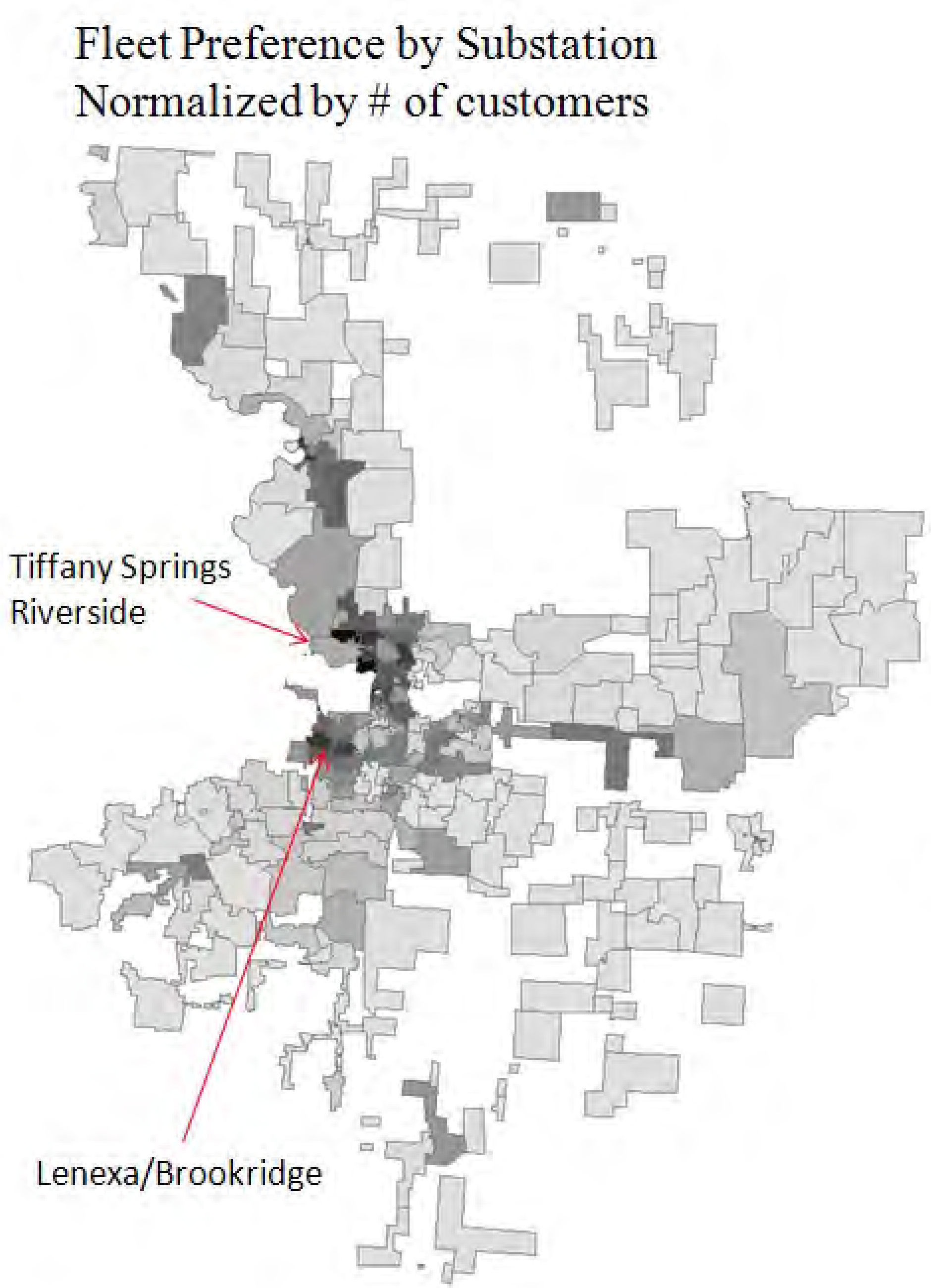
PROXY ZOOM: Green dots are current FedEx and UPS ground service locations. Yellow lines are primary roads or highways with limited accessibility, red lines are primary roads or highways with high accessibility, and green lines are access ramps. The underlying substation polygons are symbolized by their location fleet preference score.

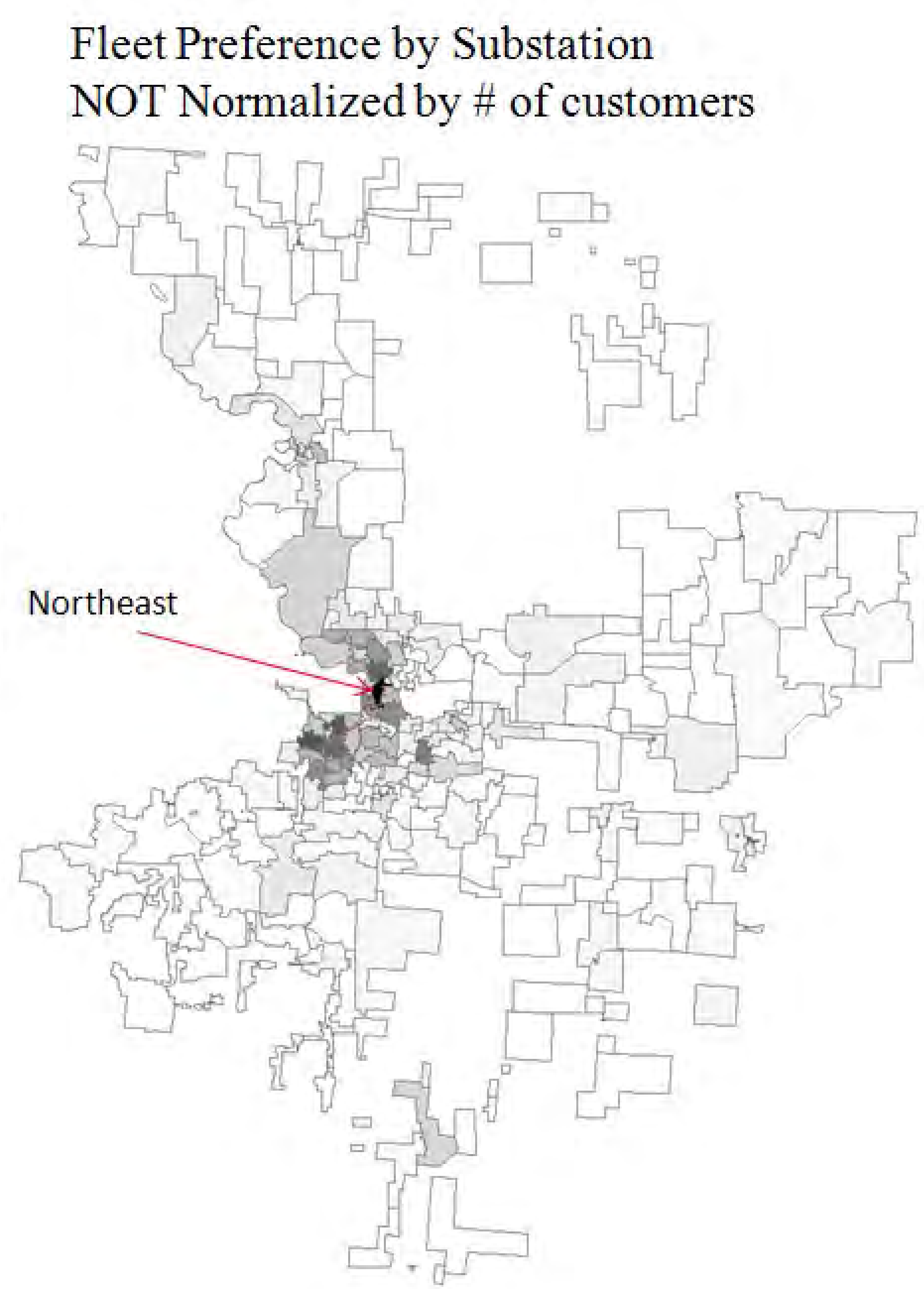


PROXY ZOOM 2: Locational context of existing fleet location: An industrial / business park with close proximity to population, fast access to HWY loop / interstate, and close but not too close to airport.



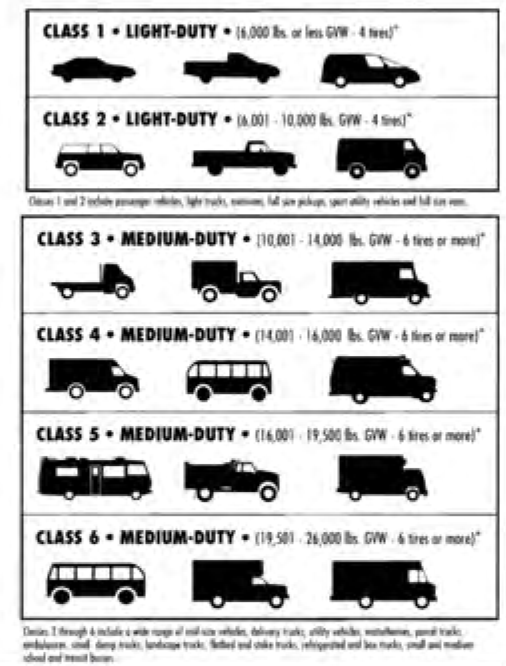
2.2.2.2 Locational Preference by Substation





2.2.2.3 Number of Fleet Vehicles

	US Pop 2009	305,500,000	KCPL Pop	2,000,000
	Total US Fleet Vehicles	16,300,000	Est KCPL Fleet Vehicles	106,710
Public Sector	27%	4,401,000	27%	28811.784
Federal	4%	652000	4%	4268.41244
State & Local	23%	3749000	23%	24543.3715
Private Sector	73%	11,899,000	73%	77898.527
Short-Haul Delivery	28%	4564000	28%	29878.8871
Long-Haul Delivery	13%	2119000	13%	13872.3404
Sales & Services	11%	1793000	11%	11738.1342
Rental	10%	1630000	10%	10671.0311
Fleets 5-14	6%	978000	6%	6402.61866
Utility & Telecom	3%	489000	3%	3201.30933
Other	3%	489000	3%	3201.30933
Taxi	1%	163000	1%	1067.10311



	Auto	Class 1-2	Class 3-6
Public Sector			
Federal (USPS = 33%)	30%	65%	2.50%
State & Local	35%	35%	10%
Private Sector			
Short-Haul Delivery	0%	50%	20%
Long-Haul Delivery	0%	0%	10%
Sales & Services	40%	18%	30%
Rental	76%	12%	12%
Fleets 5-14	0%	100%	0%
Utility & Telecom	18%	16%	28%
Other	0%	0%	10%
Taxi	70%	30%	0%

© 2011 Integral Analytics Inc

2.2.2.4 Electric Vehicle Fleet Loads

	US Pop 2009	305,500,000	KCPL Pop	2,000,000
	Total US Fleet Vehicles	16,300,000	Est KCPL Fleet Vehicles	106,710
Public Sector	27%	4,401,000	27%	28811.784
Federal	4%	652000	4%	4268.41244
State & Local	23%	3749000	23%	24543.3715
Private Sector	73%	11,899,000	73%	77898.527
Short-Haul Delivery	28%	4564000	28%	29878.8871
Long-Haul Delivery	13%	2119000	13%	13872.3404
Sales & Services	11%	1793000	11%	11738.1342
Rental	10%	1630000	10%	10671.0311
Fleets 5-14	6%	978000	6%	6402.61866
Utility & Telecom	3%	489000	3%	3201.30933
Other	3%	489000	3%	3201.30933
Taxi	1%	163000	1%	1067.10311

	KCPL Fleet Vehicle Penetration Scenarios							
	1%	2%	3%	4%	5%	10%	15%	20%
Public Sector	288.12	576.24	864.35	1152.47	1440.59	2881.18	4321.77	5762.36
Federal	42.68	85.37	128.05	170.74	213.42	426.84	640.26	853.68
State & Local	245.43	490.87	736.30	981.73	1227.17	2454.34	3681.51	4908.67
Private Sector	778.99	1557.97	2336.96	3115.94	3894.93	7789.85	11684.78	15579.71
Short-Haul Delivery	298.79	597.58	896.37	1195.16	1493.94	2987.89	4481.83	5975.78
Long-Haul Delivery	138.72	277.45	416.17	554.89	693.62	1387.23	2080.85	2774.47
Sales & Services	117.38	234.76	352.14	469.53	586.91	1173.81	1760.72	2347.63
Rental	106.71	213.42	320.13	426.84	533.55	1067.10	1600.65	2134.21
Fleets 5-14	64.03	128.05	192.08	256.10	320.13	640.26	960.39	1280.52
Utility & Telecom	32.01	64.03	96.04	128.05	160.07	320.13	480.20	640.26
Other	32.01	64.03	96.04	128.05	160.07	320.13	480.20	640.26
Taxi	10.67	21.34	32.01	42.68	53.36	106.71	160.07	213.42

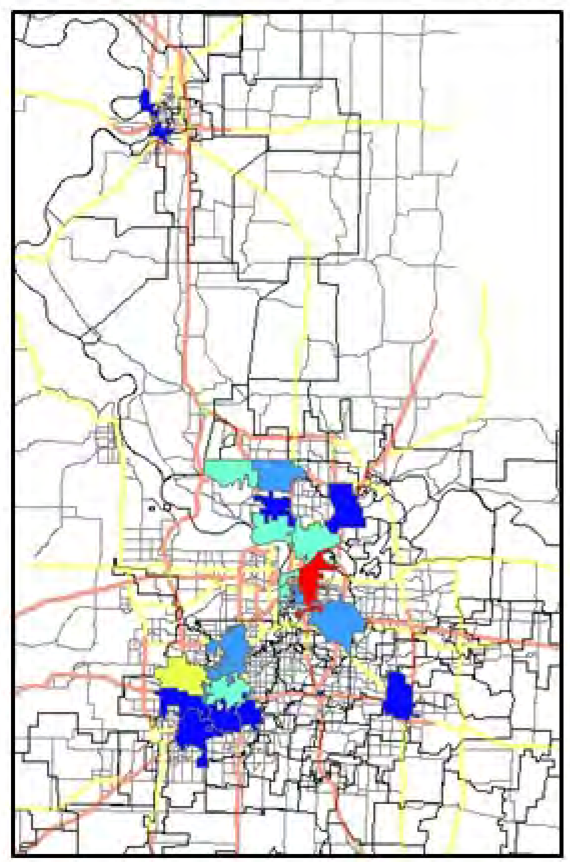
					Battery peak kw (5hr charge)				
	100% Scenario	Auto	Class 1-2	Class 3-6	Auto	Class 1-2	Class 3-6		
Public Sector					2.425	3.84	5.255	Peak load addition	
Federal (USPS = 33%)	4268.412439	30%	65%	2.50%	3105	10654	561	14320	KW
State & Local	24543.37152	35%	35%	10%	20831	32986	12898	66715	KW
Private Sector									
Short-Haul Delivery	29878.88707	0%	50%	20%	0	57367	31403	88770	KW
Long-Haul Delivery	13872.34043	0%	0%	10%	0	0	7290	7290	KW
Sales & Services	11738.13421	40%	18%	30%	11386	8113	18505	38005	KW
Rental	10671.0311	76%	12%	12%	19667	4917	6729	31313	KW
Fleets 5-14	6402.618658	0%	100%	0%	0	24586	0	24586	KW
Utility & Telecom	3201.309329	18%	16%	28%	1397	1967	4710	8075	KW
Other	3201.309329	0%	0%	10%	0	0	1682	1682	KW
Taxi	1067.10311	70%	30%	0%	1811	1229	0	3041	KW
								283796	KW
								283.7964	MW

					Battery peak kw (5hr charge)				
	20% Scenario	Auto	Class 1-2	Class 3-6	Auto	Class 1-2	Class 3-6		
Public Sector					2.425	3.84	5.255	Peak load addition	
Federal (USPS = 33%)	853.68	30%	65%	2.50%	621	2131	112	2864	KW
State & Local	4908.674304	35%	35%	10%	4166	6597	2580	13343	KW
Private Sector									
Short-Haul Delivery	5975.777414	0%	50%	20%	0	11473	6281	17754	KW
Long-Haul Delivery	2774.468085	0%	0%	10%	0	0	1458	1458	KW
Sales & Services	2347.626841	40%	18%	30%	2277	1623	3701	7601	KW
Rental	2134.206219	76%	12%	12%	3933	983	1346	6263	KW
Fleets 5-14	1280.523732	0%	100%	0%	0	4917	0	4917	KW
Utility & Telecom	640.2618658	18%	16%	28%	279	393	942	1615	KW
Other	640.2618658	0%	0%	10%	0	0	336	336	KW
Taxi	213.4206219	70%	30%	0%	362	246	0	608	KW
								56759	KW
								56.75929	MW

© 2011 Integral Analytics Inc

2.2.2.5 Load Estimates by Substation

			KCPL Fleet Vehicle Penetration Scenarios (MW)							
			1%	2%	3%	4%	5%	10%	15%	20%
Substation	**KCPL_ID**	**Fleet Score**	**2.84**	**5.68**	**8.51**	**11.35**	**14.19**	**28.38**	**42.57**	**56.76**
Northeast	74	1.00	0.95	0.95	1.22	1.26	1.29	1.89	2.03	2.03
Lenexa	29	0.85	0.95	0.95	1.22	1.26	1.29	1.89	2.03	2.03
Brookridge	12	0.79	0.95	0.95	1.22	1.26	1.29	1.89	2.03	2.03
Grand Avenue	15	0.76		0.95	1.22	1.26	1.29	1.89	2.03	2.03
Riverside	98	0.76		0.95	1.22	1.26	1.29	1.89	2.03	2.03
Tiffany Springs	39	0.74		0.95	1.22	1.26	1.29	1.89	2.03	2.03
Avondale	27	0.72			1.22	1.26	1.29	1.89	2.03	2.03
Terrace	37	0.71				1.26	1.29	1.89	2.03	2.03
Pflumm	125	0.68				1.26	1.29	1.89	2.03	2.03
Merriam	91	0.66					1.29	1.89	2.03	2.03
Barry	11	0.64					1.29	1.89	2.03	2.03
Crosstown	24	0.63						1.89	2.03	2.03
Overland Park	47	0.63						1.89	2.03	2.03
Northeast	74	0.62						1.89	2.03	2.03
Grand Avenue	15	0.62						1.89	2.03	2.03
Leeds	61	0.61						1.89	2.03	2.03
Western Electric	376	0.59							2.03	2.03
Bunker Ridge	84	0.58							2.03	2.03
Crosstown	24	0.58							2.03	2.03
Claycomo	52	0.55							2.03	2.03
College	90	0.55							2.03	2.03
Oak Street	416	0.55							2.03	2.03
Edmond Street	391	0.54								2.03
Grand Avenue	15	0.53								2.03
Riley	19	0.52								2.03
Switzer	22	0.52								2.03
Line Creek	63	0.51								2.03
Olathe	41	0.51								2.03
Crosstown	24	0.51								2.03



 © 2011 Integral Analytics Inc

3 Substation Map Series

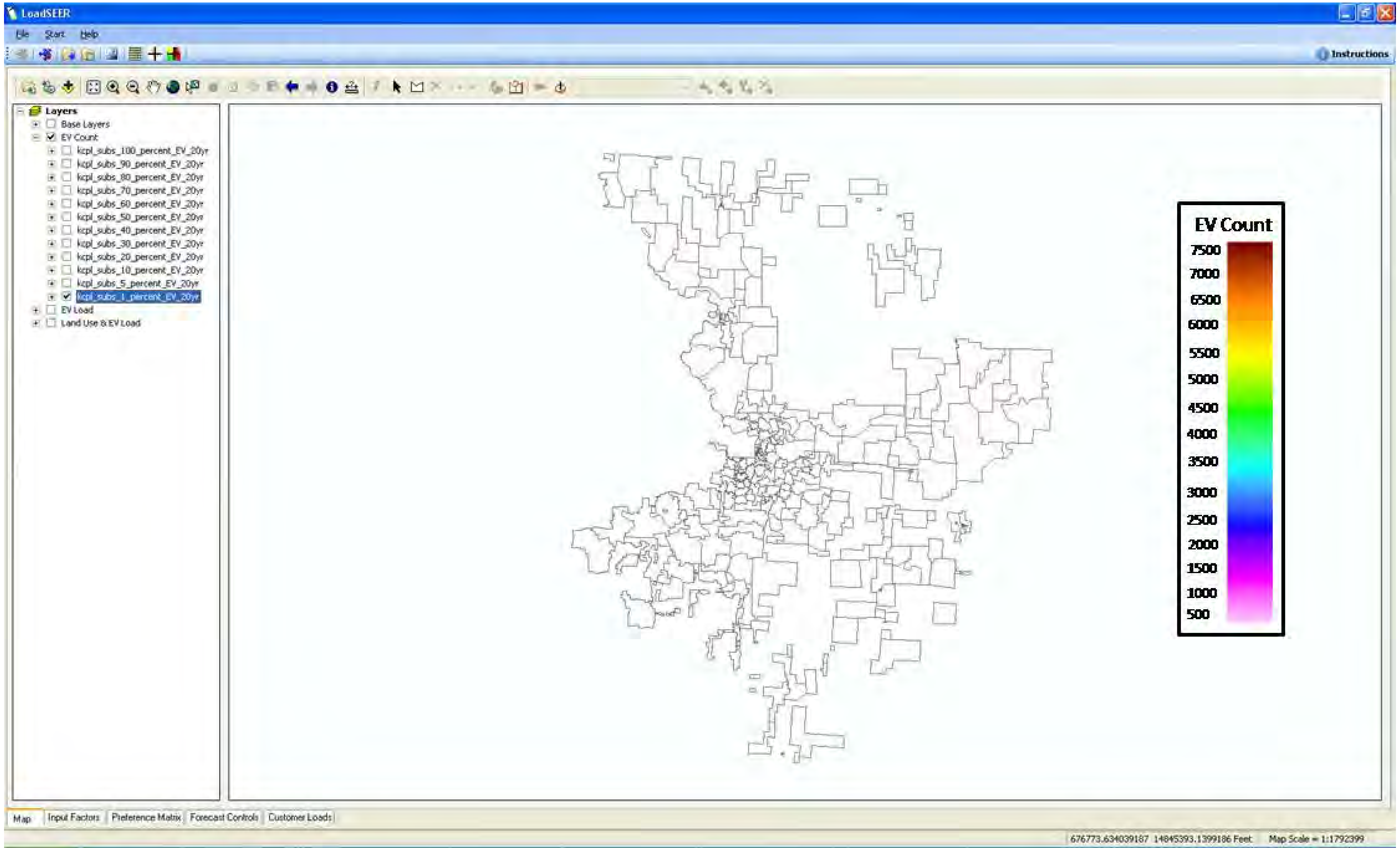
The following map series contains three separate 20 year perspectives at the substation level. Refer to the map's table of contents to identify which perspective is being displayed and at what penetration level. Note: The percent levels correspond to the annual percent of newly registered vehicles for a 20 year period.

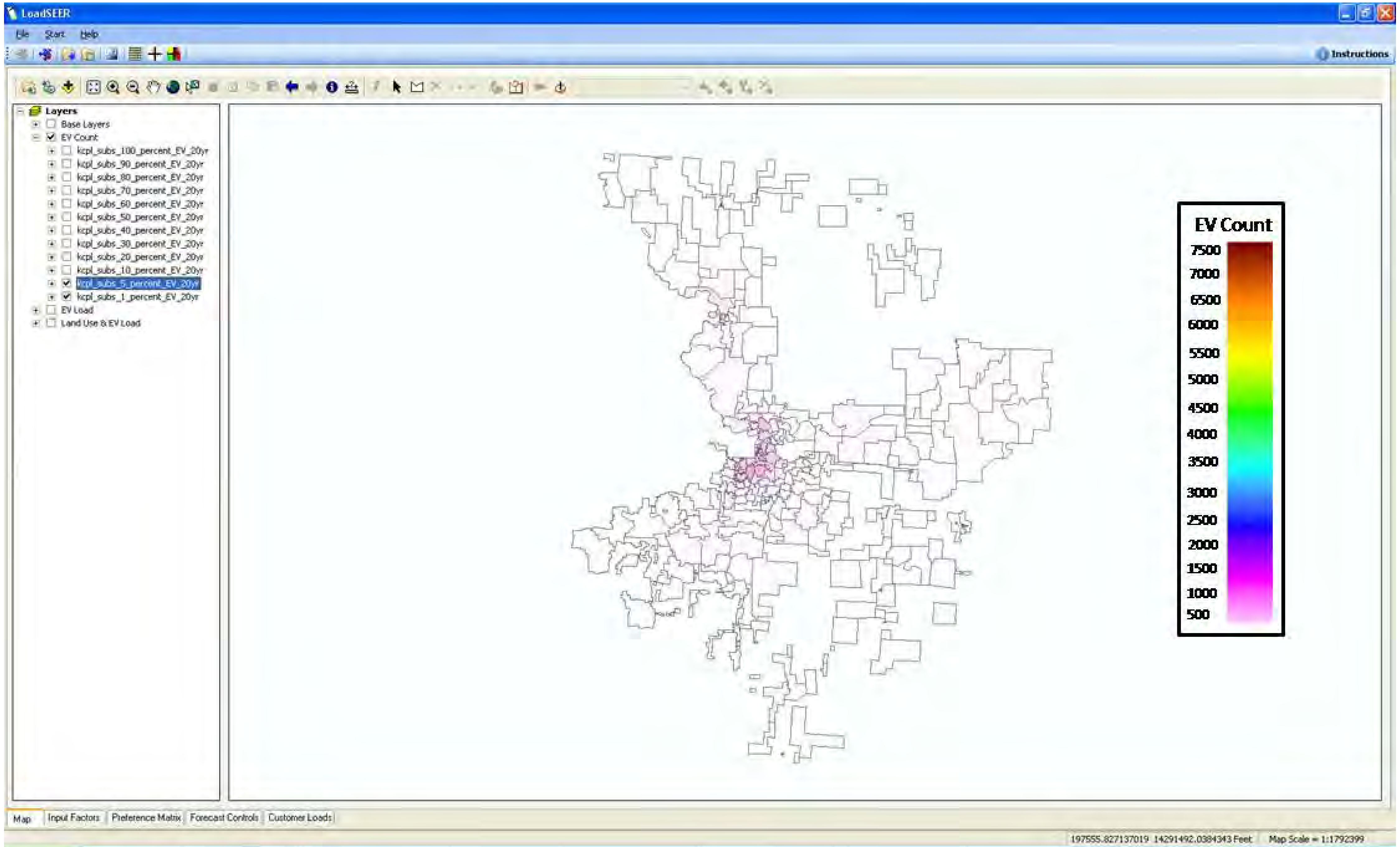
"EV Count" is a 20 year perspective of the forecasted number of electric vehicles by substation.

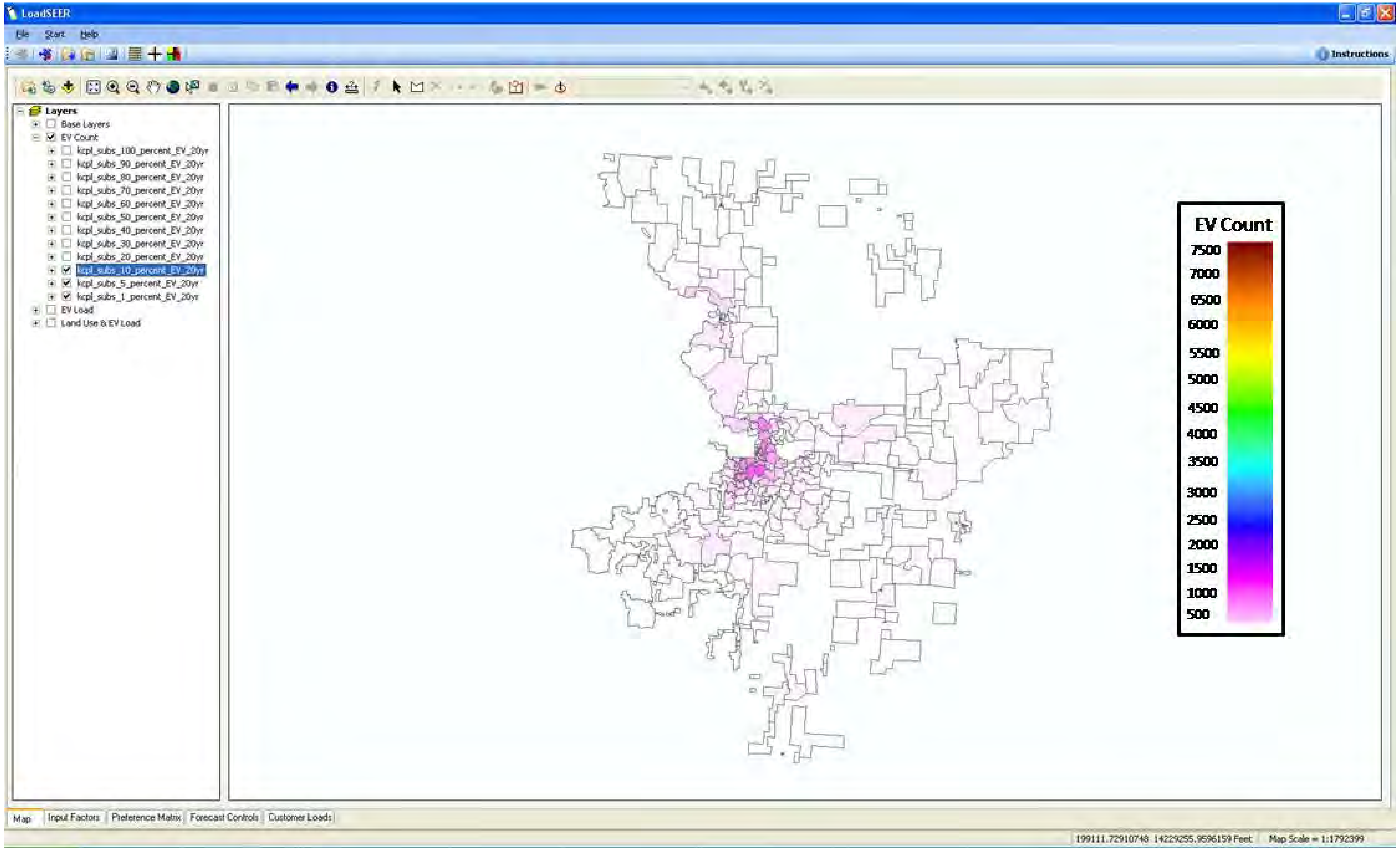
"EV Load" is a 20 year perspective on the percent of normal capacity reached at each substation by EV load growth only. In this case, there is no increase to base load.

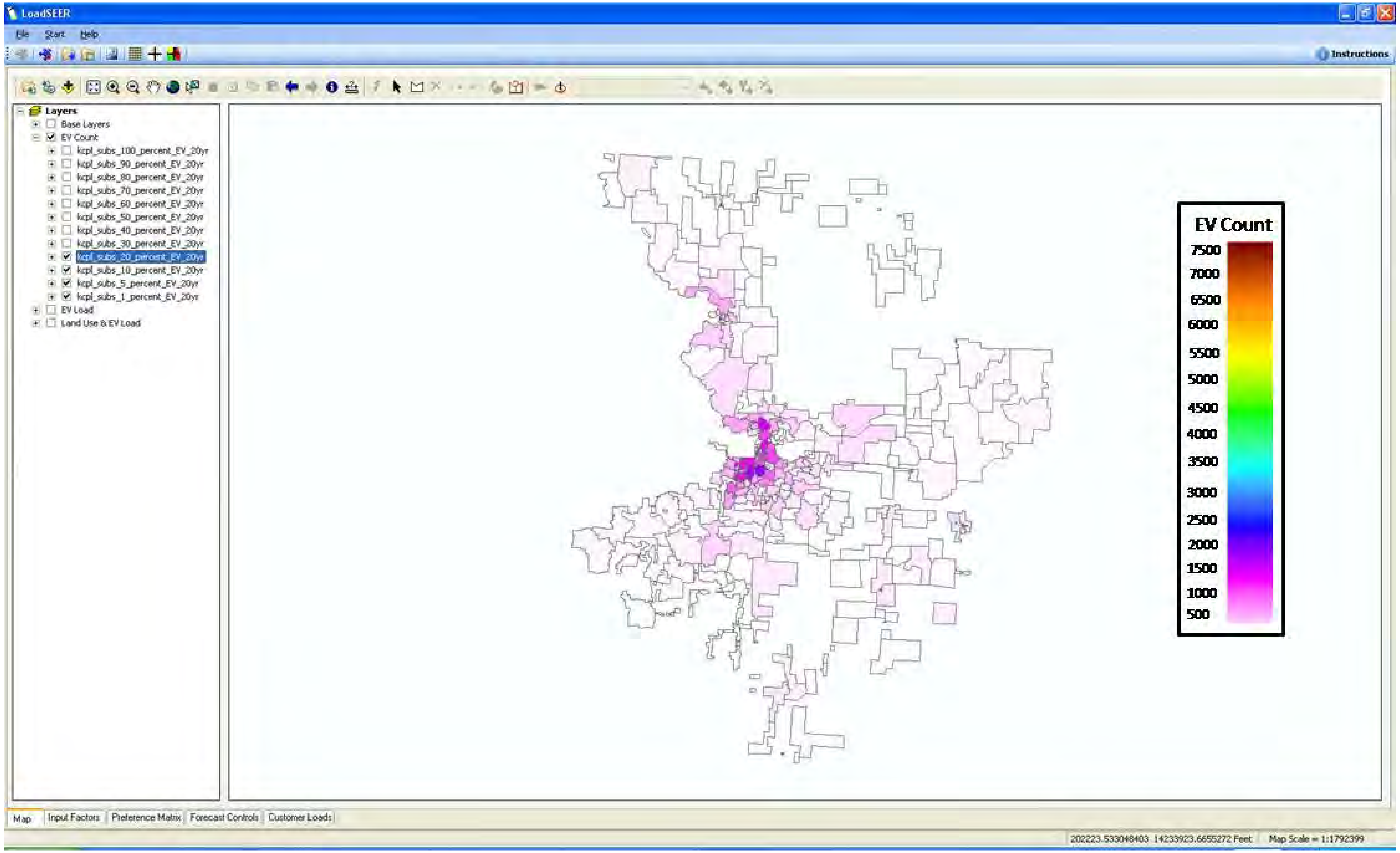
"Land Use & EV Loads" is a 20 year perspective on the percent of normal capacity reached at each substation by the combination of EV and land use (new customer) load growth.

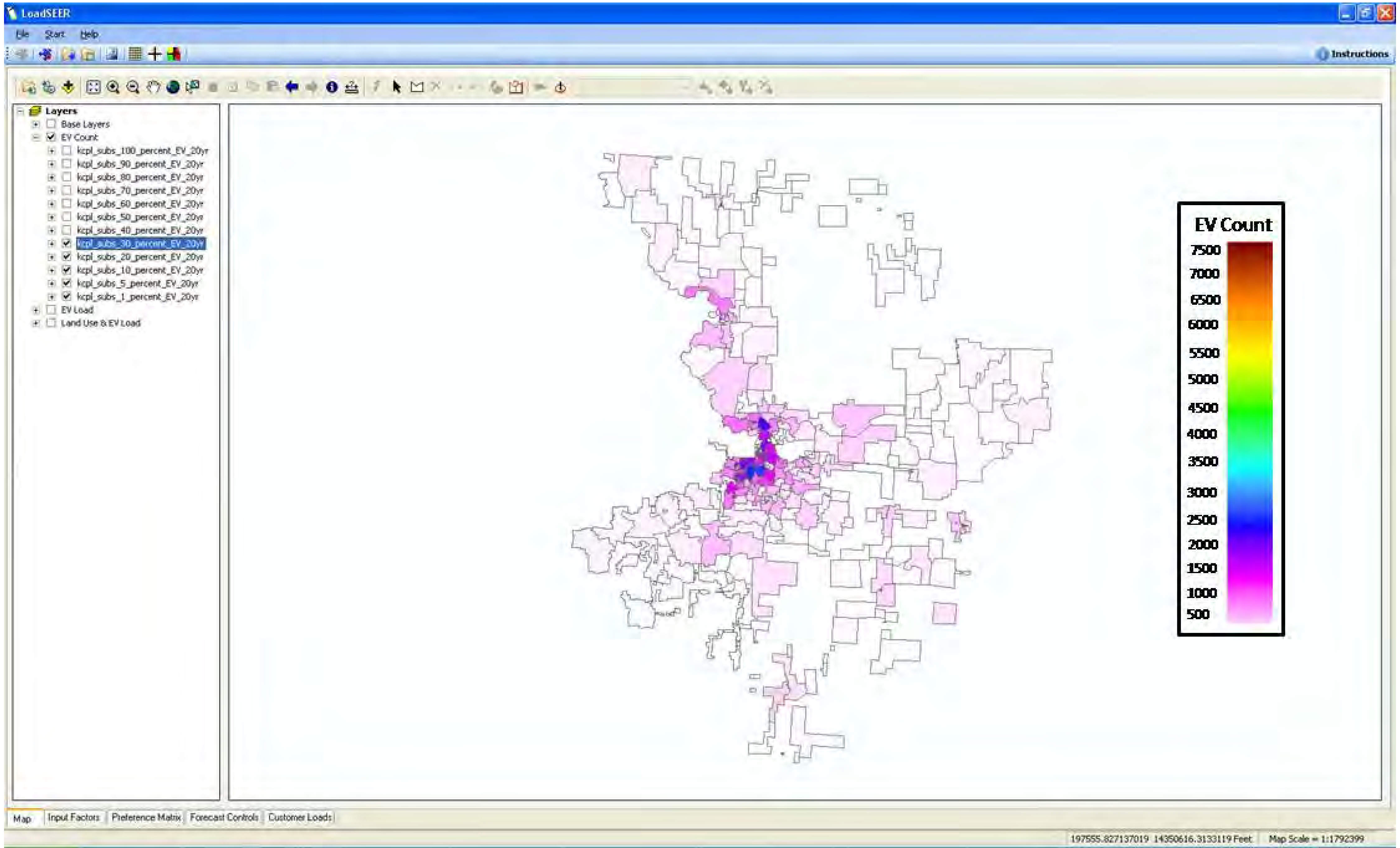
© 2011 Integral Analytics Inc

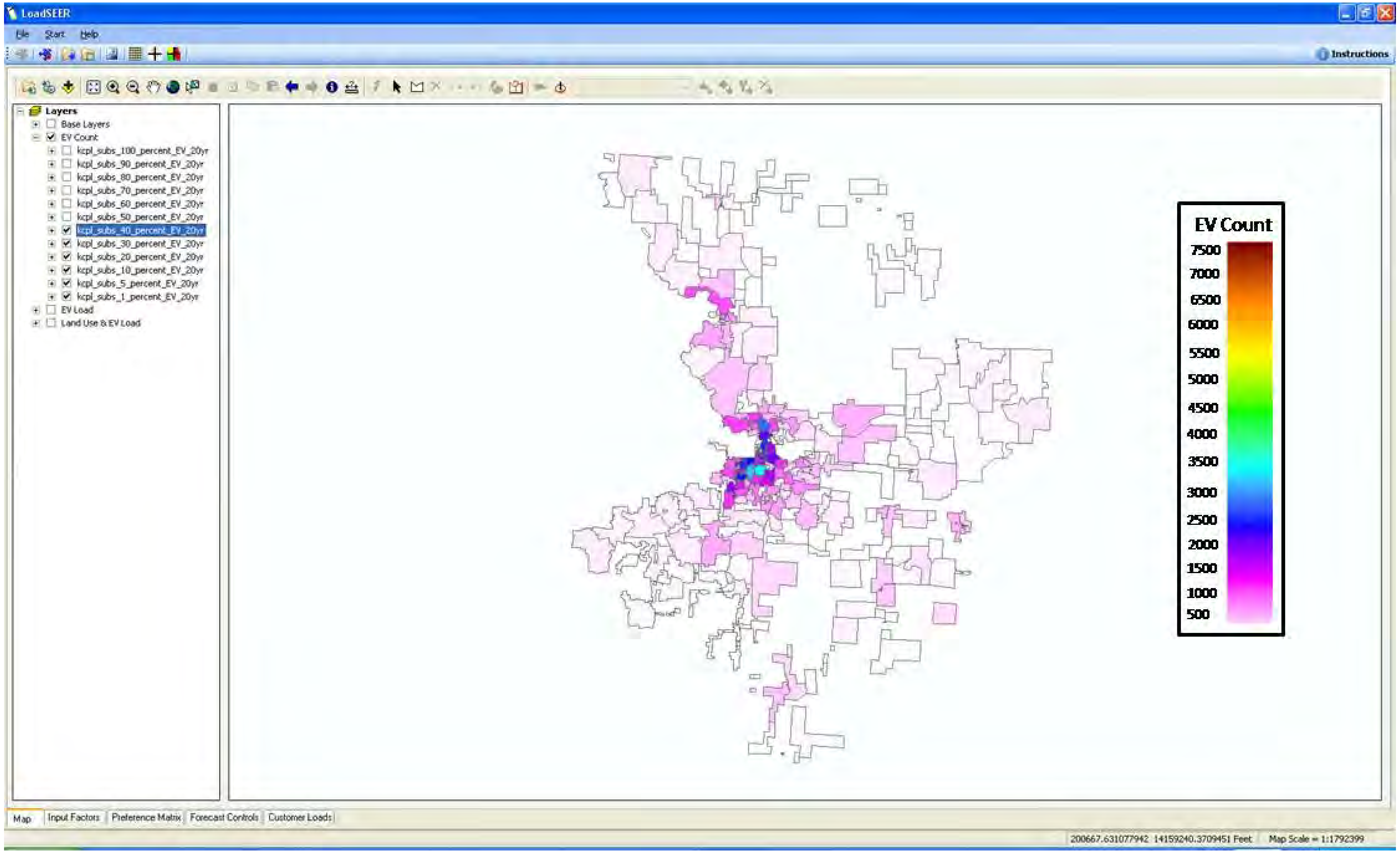

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
676773.634039187 14845393.1399186 Feet
Map Scale = 1:1792399

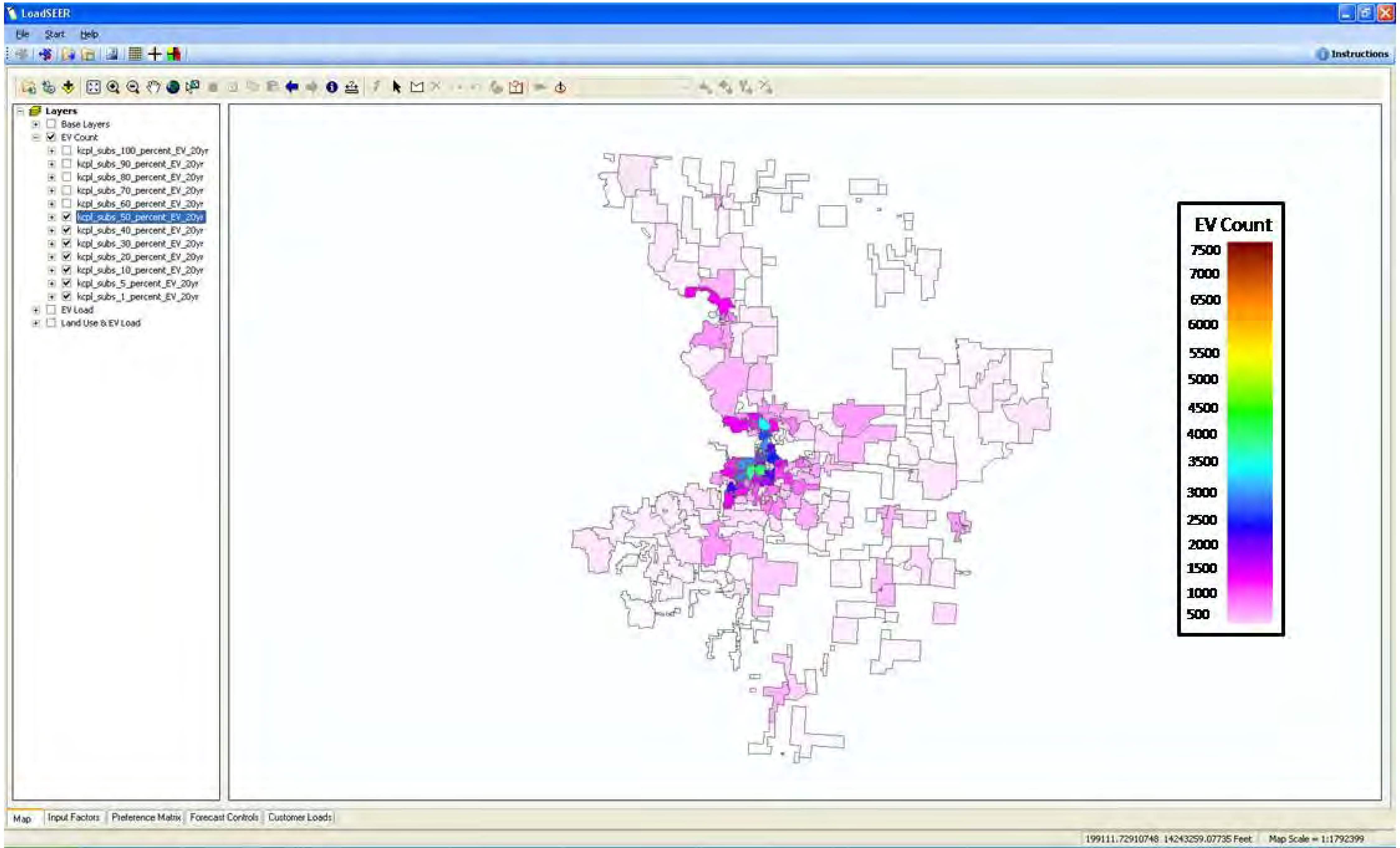

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
197555.827137019 14291492.0384343 Feet
Map Scale = 1:1792399

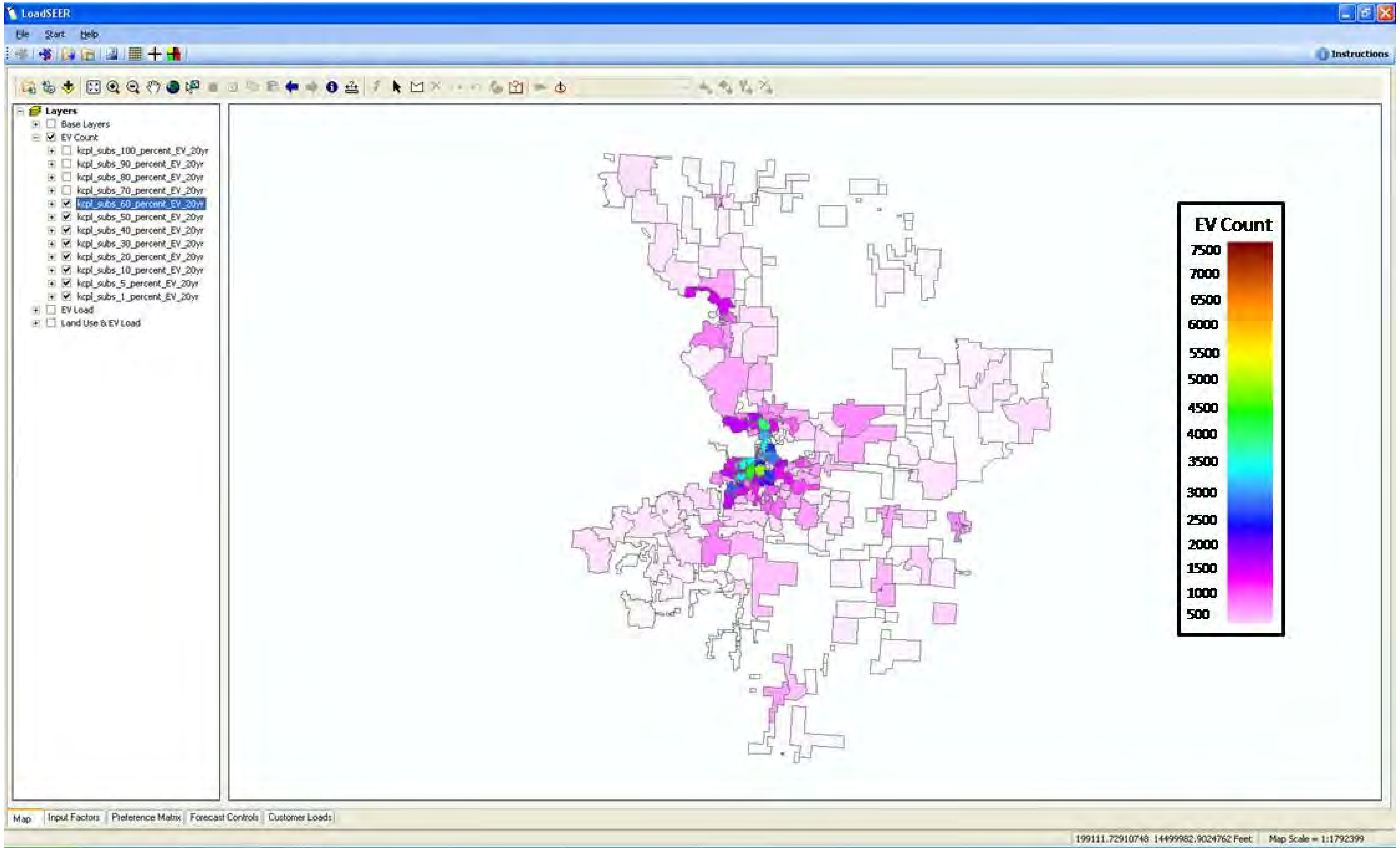

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
Map Scale = 1:1792399

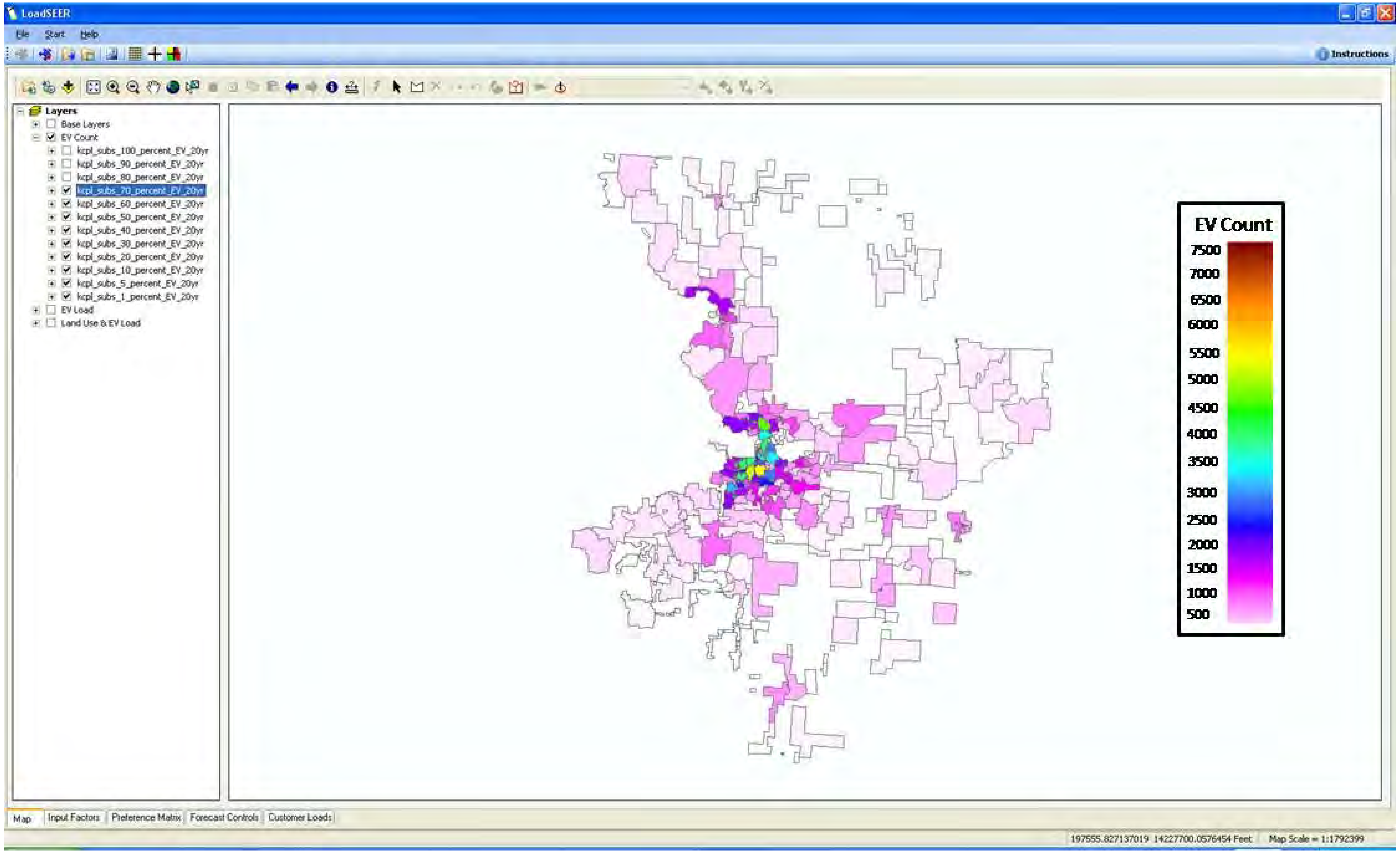

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
202223.533048403 14233923.6655272 Feet
Map Scale = 1:1792399

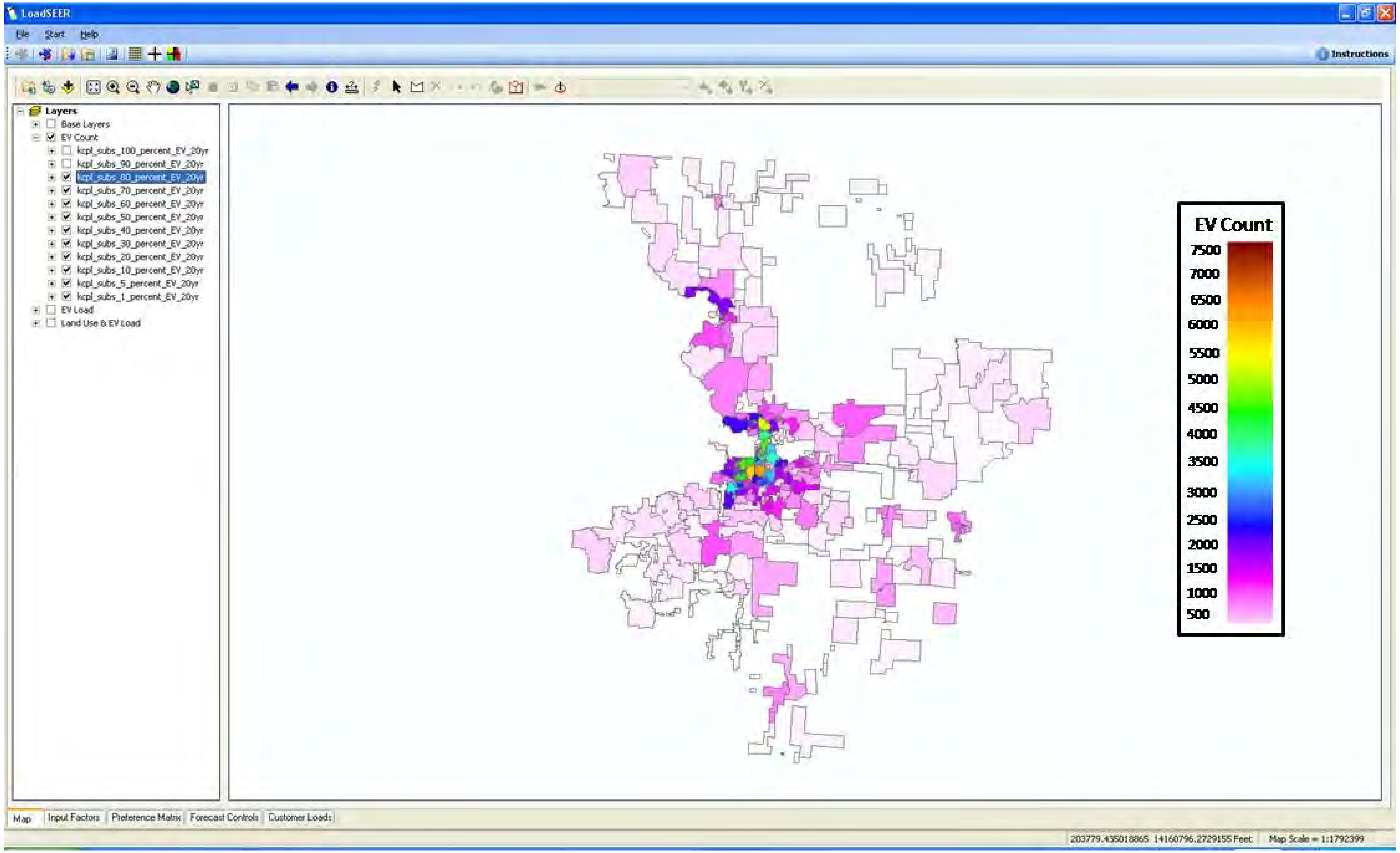

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
197555.827137019 14350616.3133119 Feet
Map Scale = 1:1792399


LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
Map Scale = 1:1792399

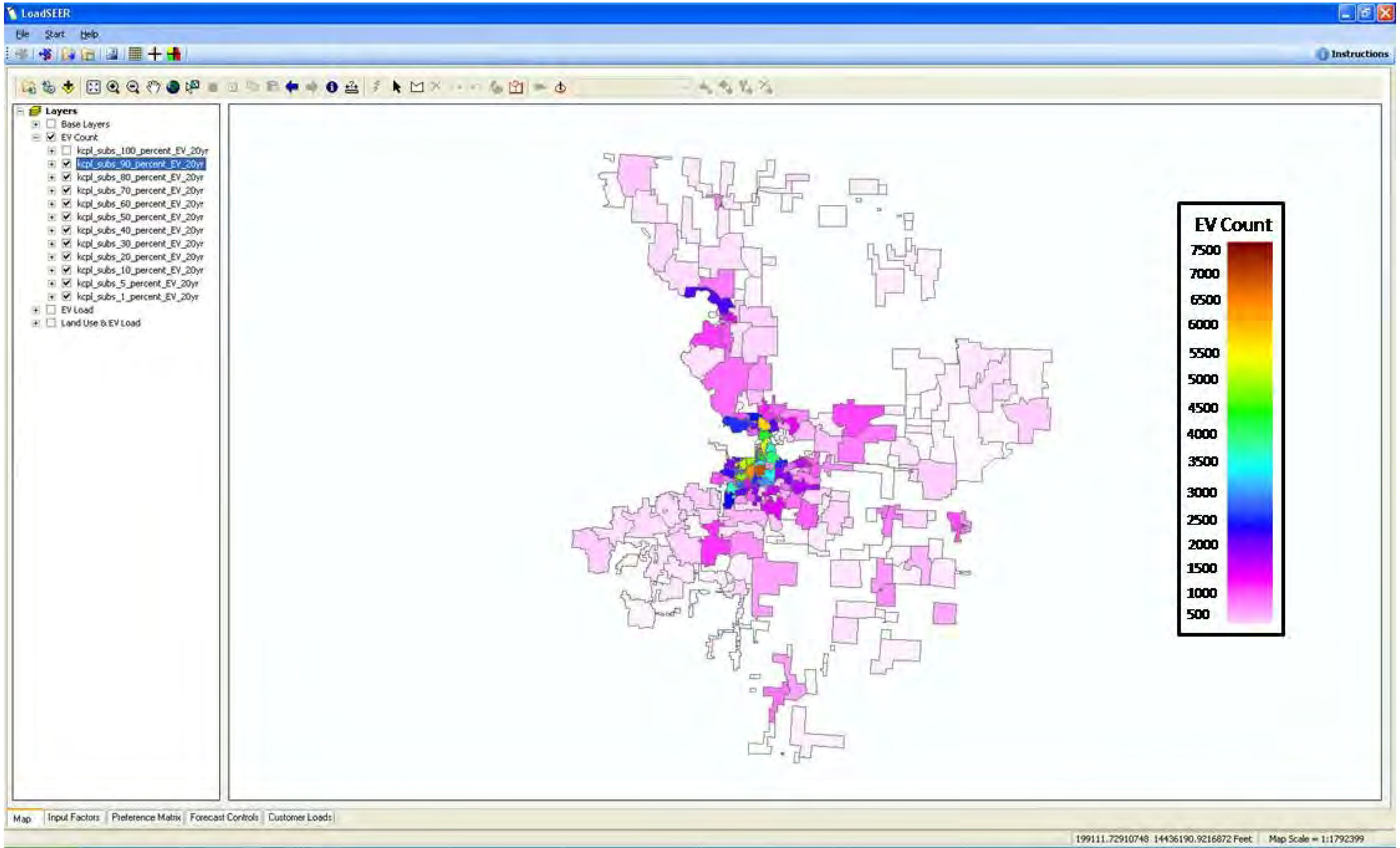

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
199111.72910748 14243259.07735 Feet
Map Scale = 1:1792399

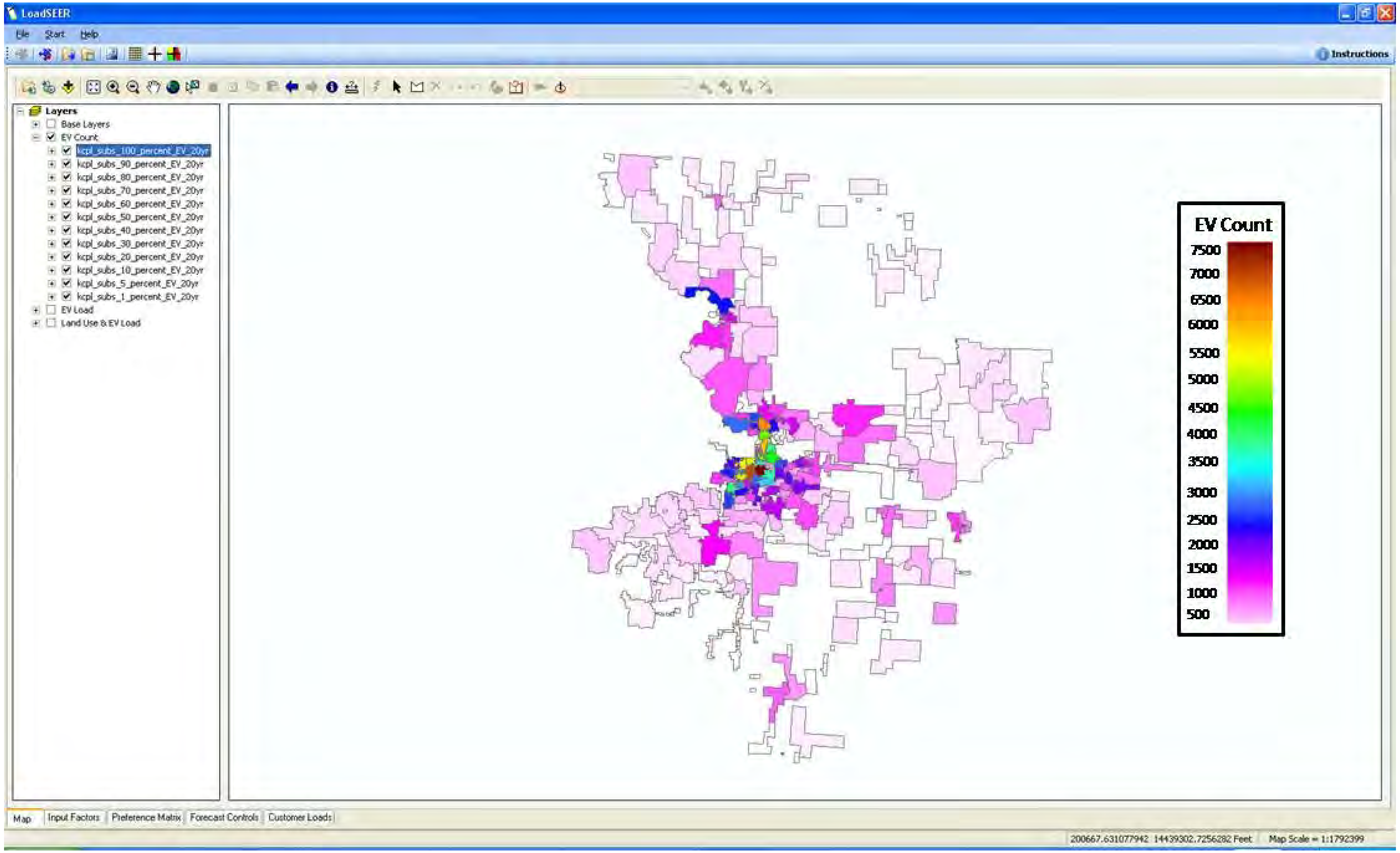

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
199111.72910748 14499982.9024762 Feet
Map Scale = 1:1792399

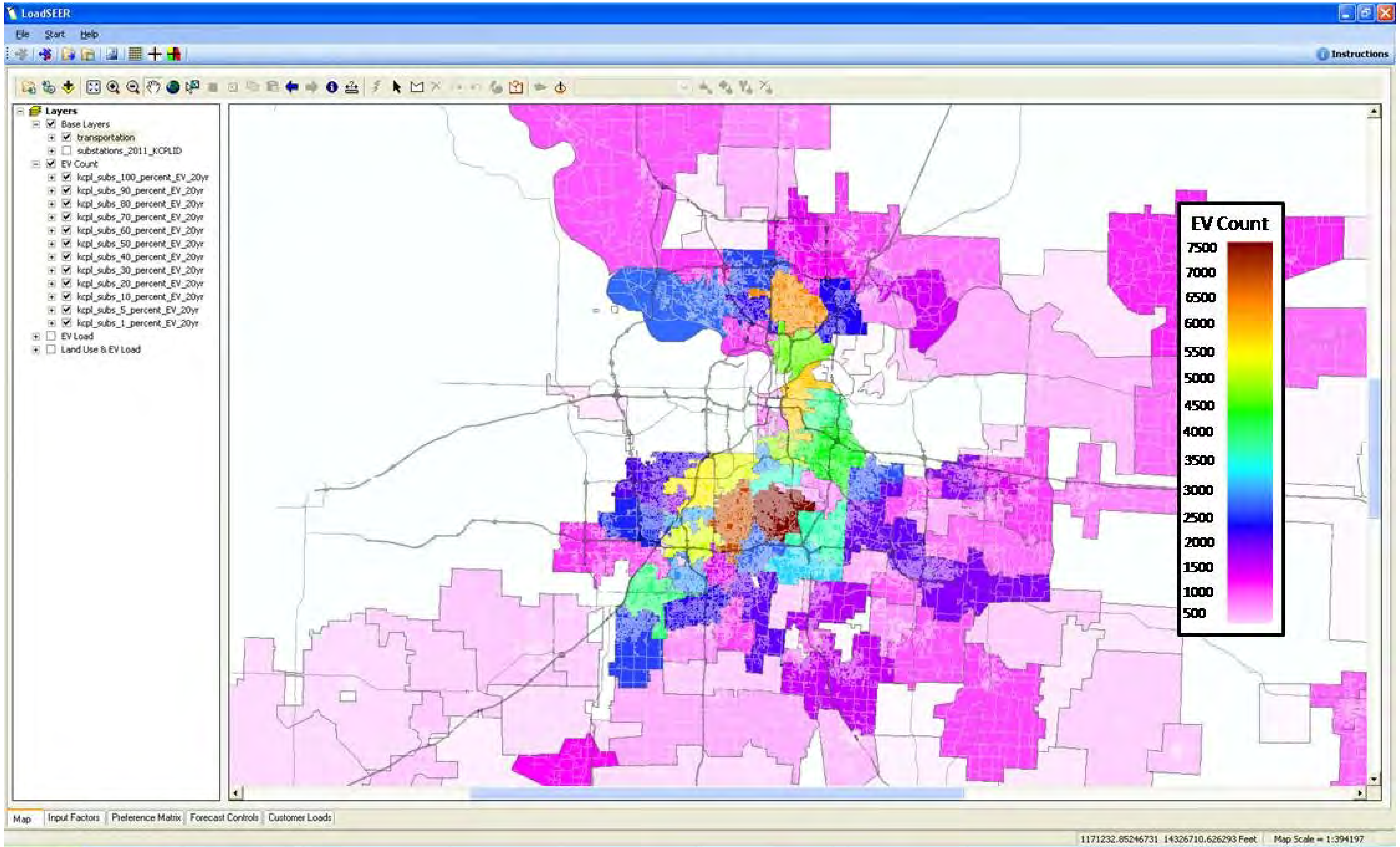

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
197555.827137019 14227700.0576454 Feet
Map Scale = 1:1792399

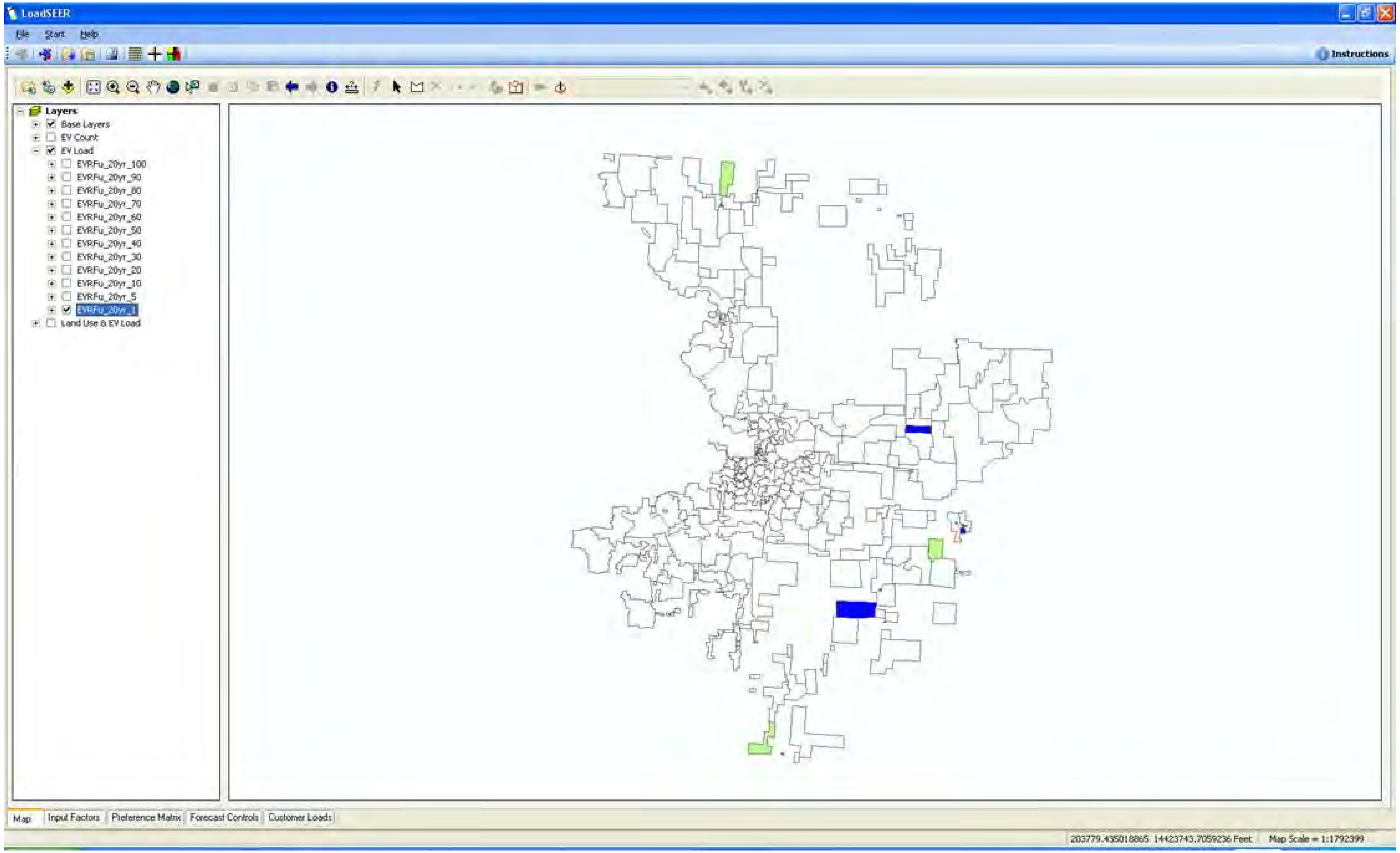


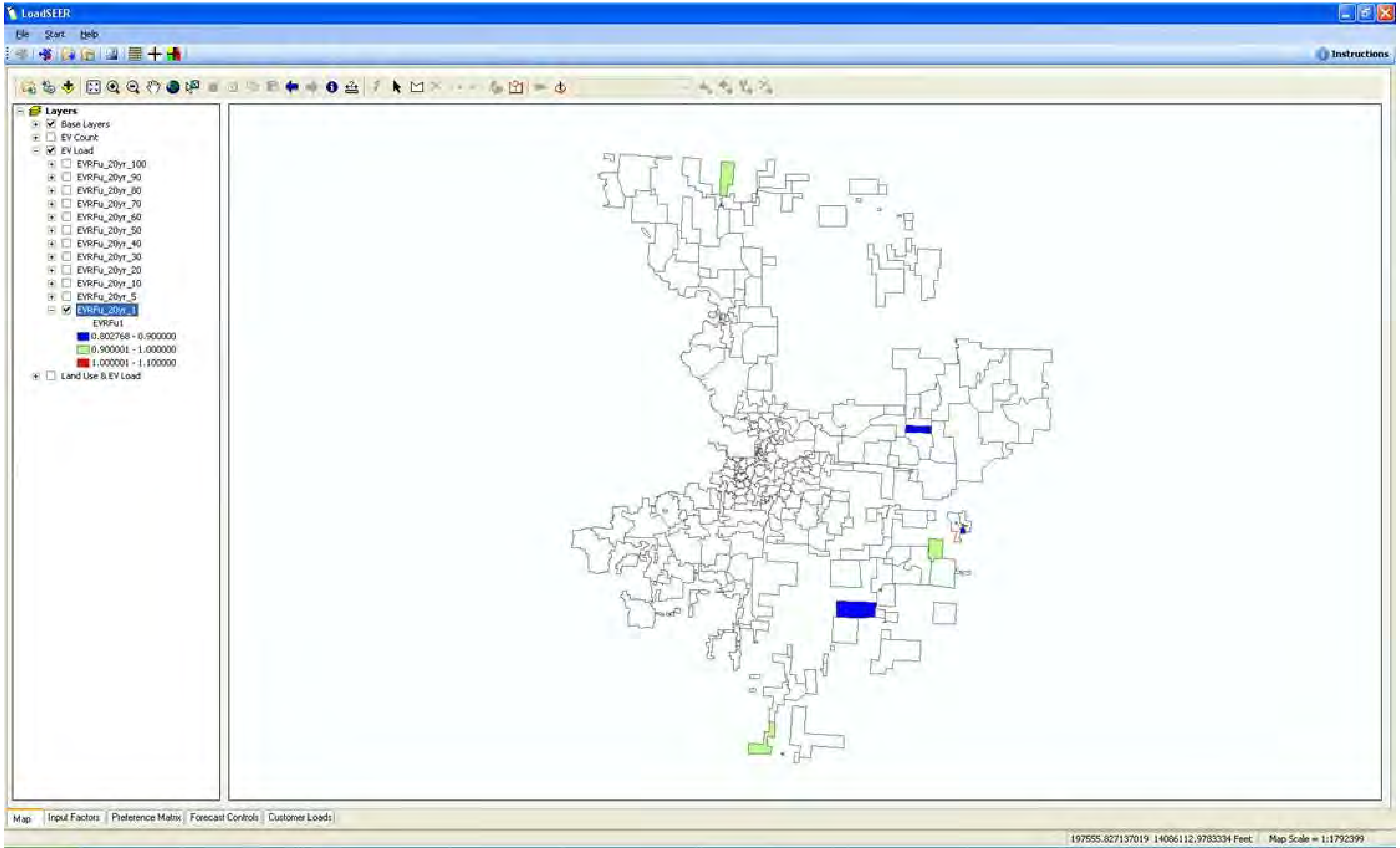
© 2011 Integral Analytics Inc

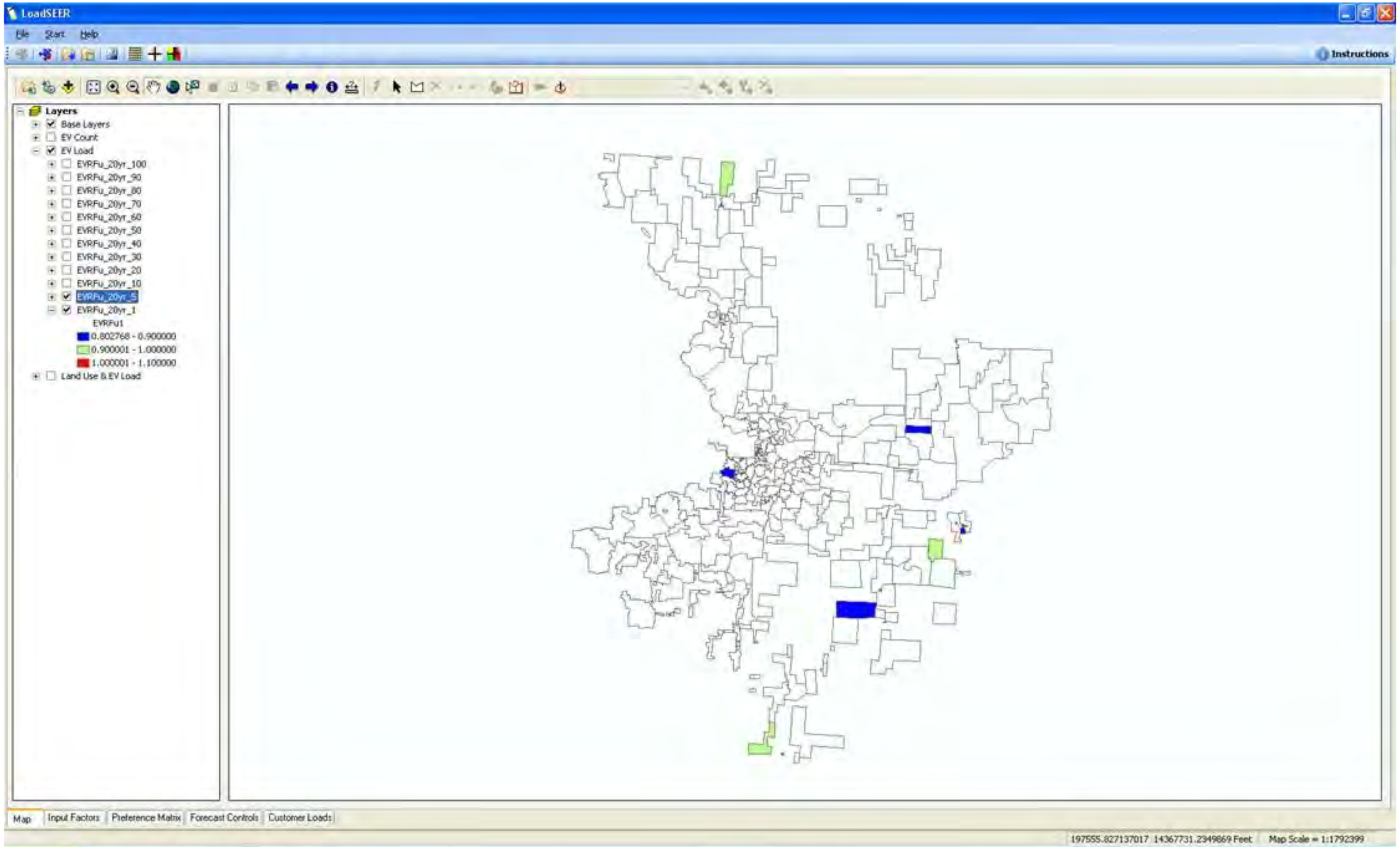

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
199111.72910748 14436190.9216872 Feet
Map Scale = 1:1792399

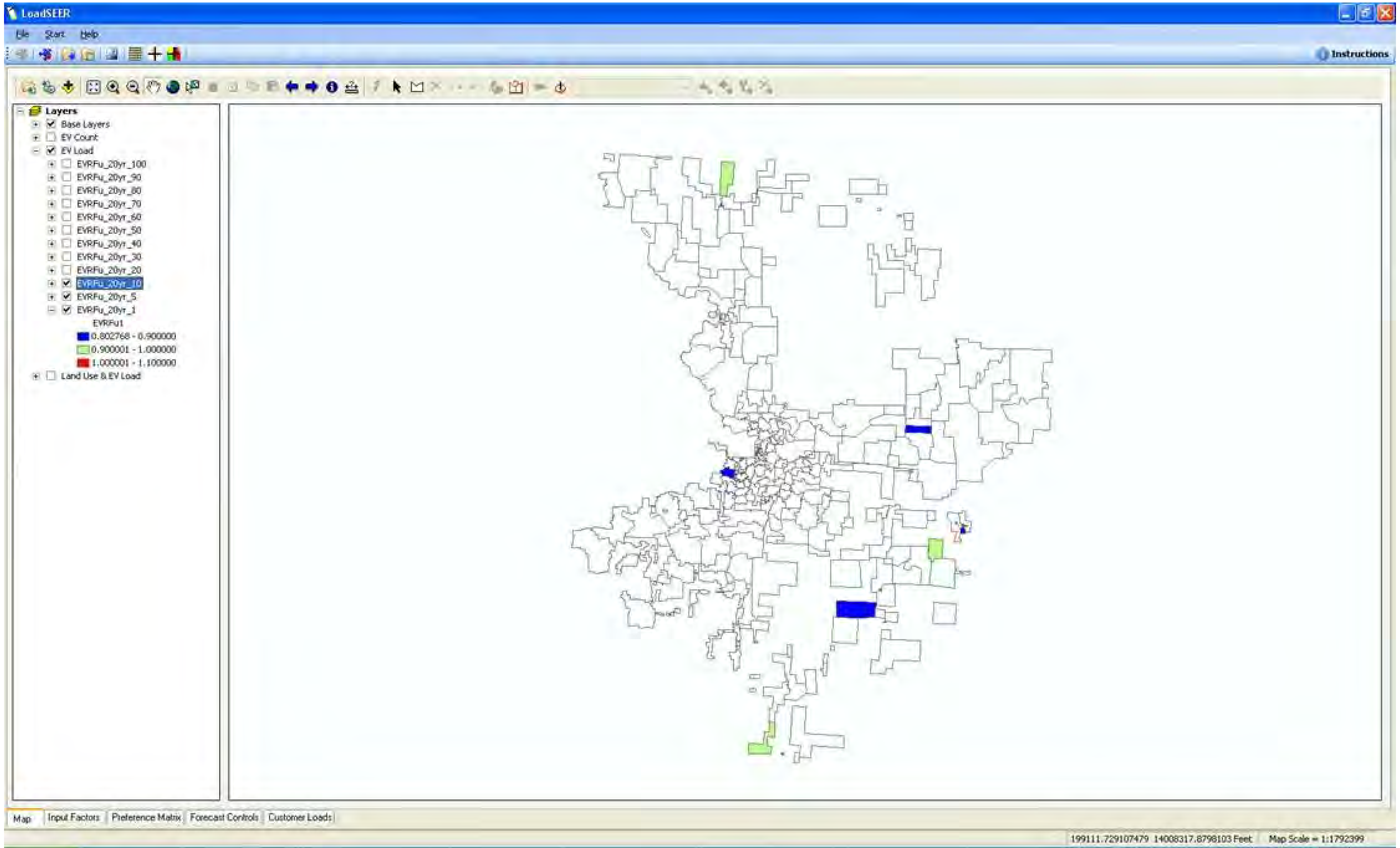

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
200667.631077942 14439302.7256282 Feet
Map Scale = 1:1792399

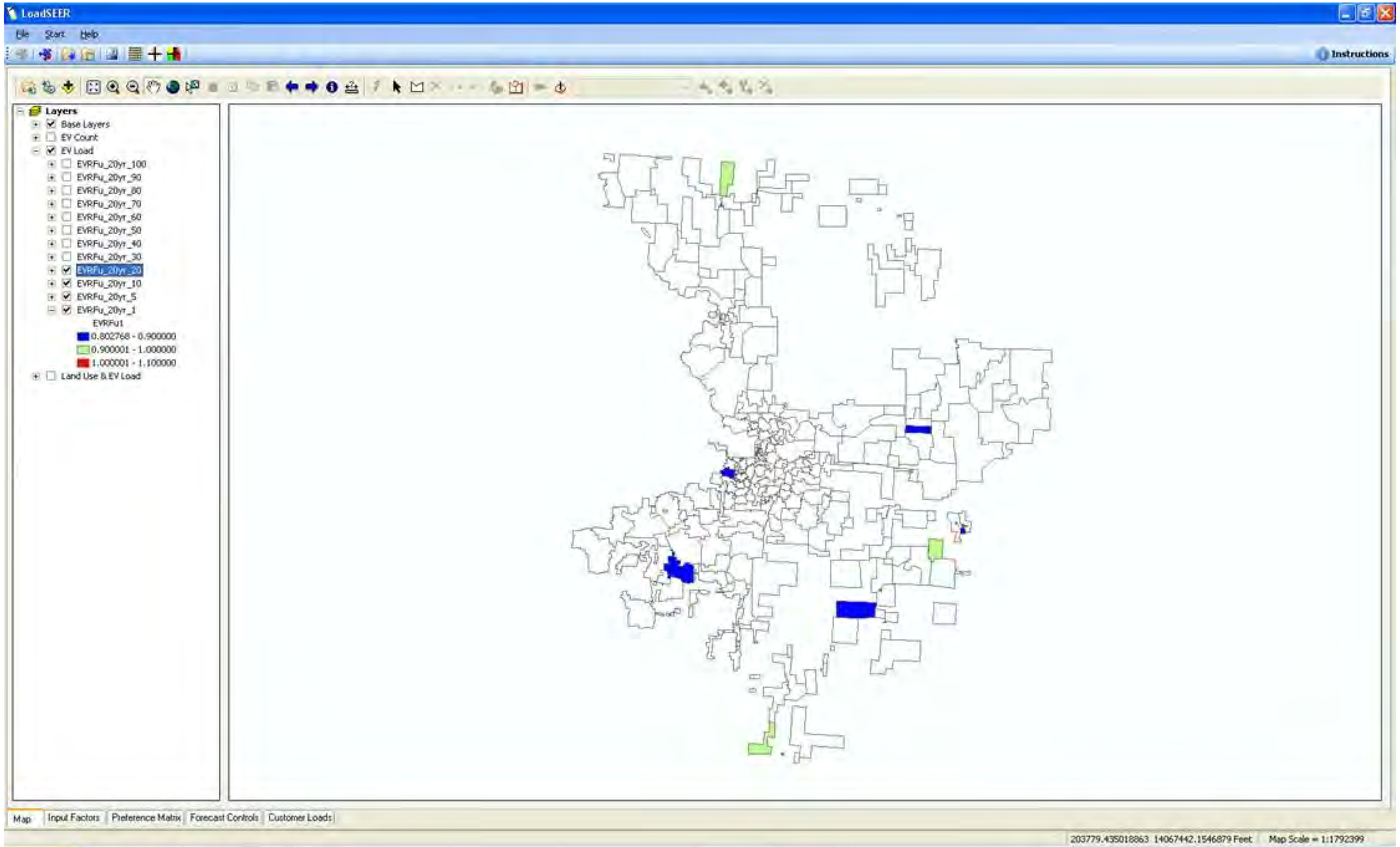

LoadSEER
File Start Help
Instructions
Layers
Base Layers
transportation
substations_2011_KCPLID
EV Count
kcpl_subs_100_percent_EV_20yr
kcpl_subs_90_percent_EV_20yr
kcpl_subs_80_percent_EV_20yr
kcpl_subs_70_percent_EV_20yr
kcpl_subs_60_percent_EV_20yr
kcpl_subs_50_percent_EV_20yr
kcpl_subs_40_percent_EV_20yr
kcpl_subs_30_percent_EV_20yr
kcpl_subs_20_percent_EV_20yr
kcpl_subs_10_percent_EV_20yr
kcpl_subs_5_percent_EV_20yr
kcpl_subs_1_percent_EV_20yr
EV Load
Land Use & EV Load
EV Count
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
1171232.85246731 14326710.626293 Feet
Map Scale = 1:394197

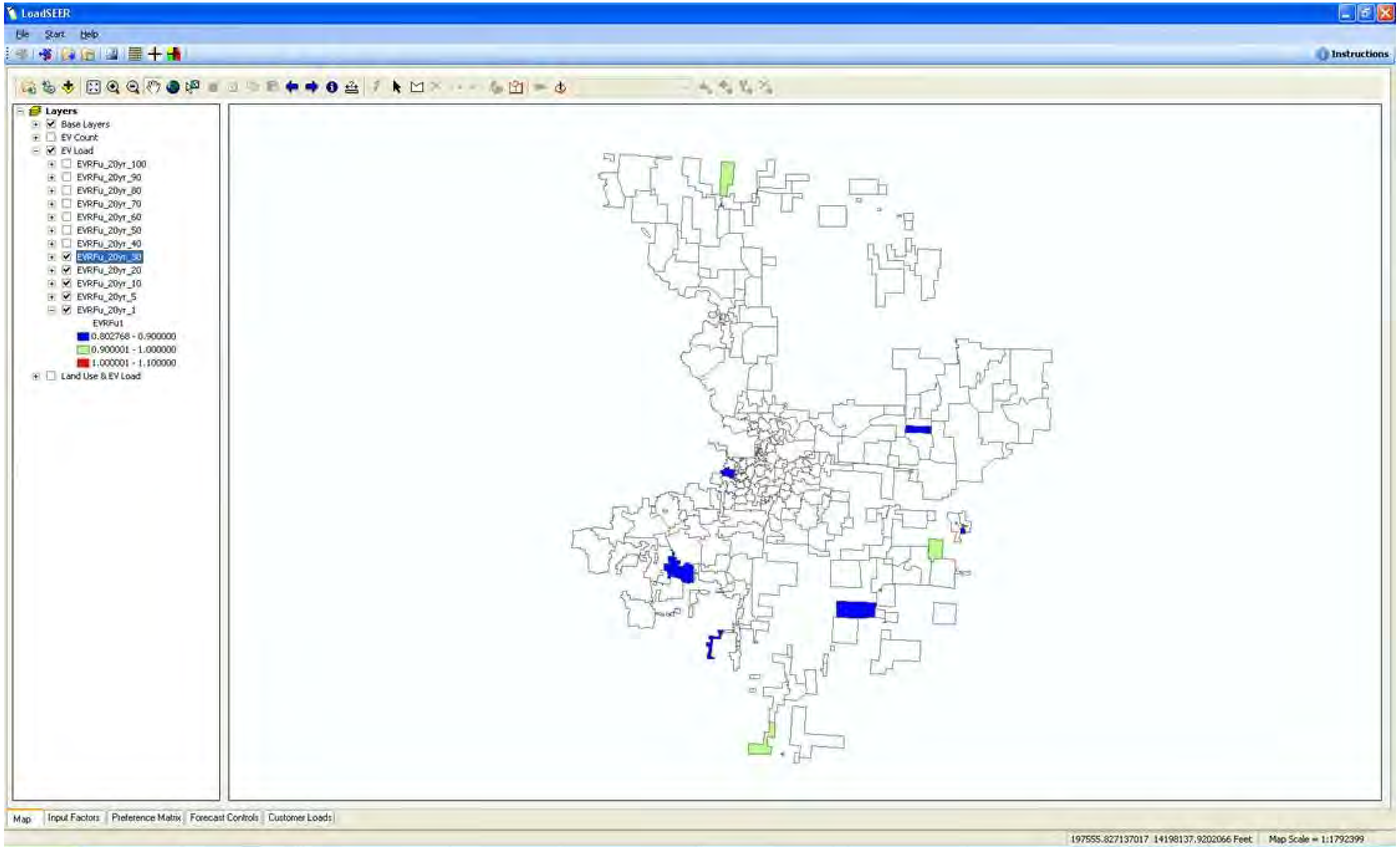

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
203779.435018865 14423743.7059236 Feet
Map Scale = 1:1792399

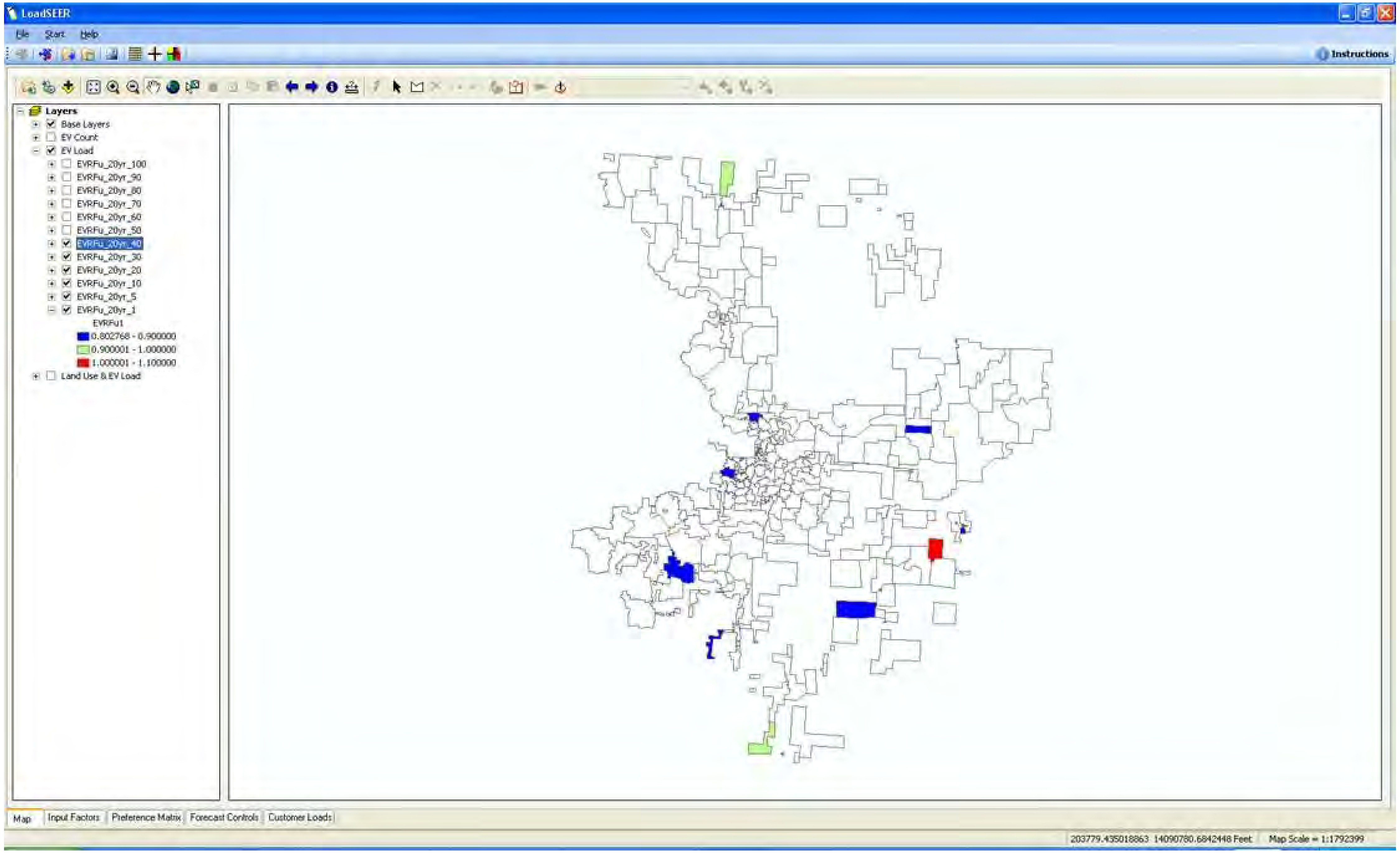

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
197555.827137019 14086112.9783334 Feet
Map Scale = 1:1792399

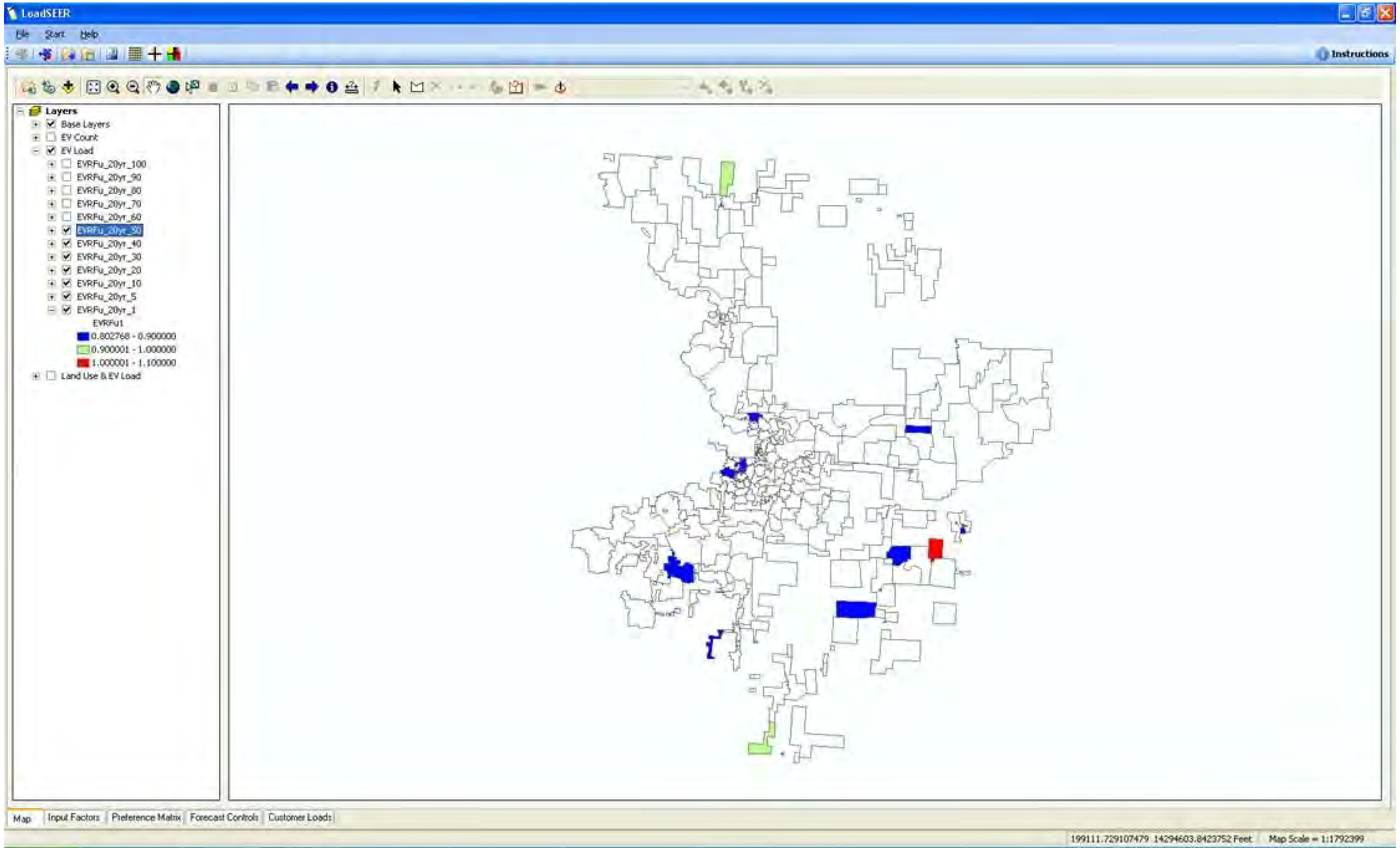

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
197555.827137017 14367731.2349869 Feet
Map Scale = 1:1792399

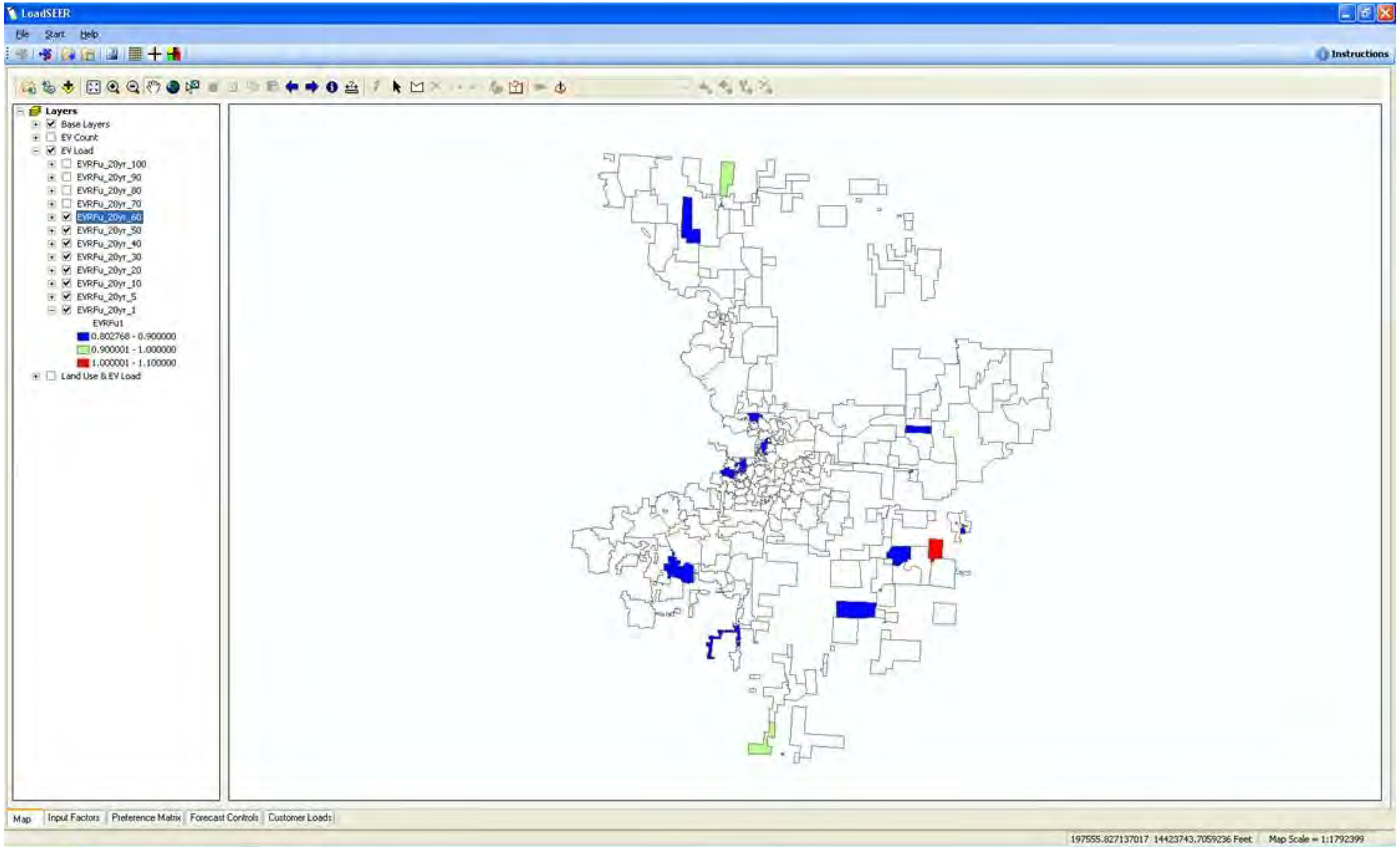

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map Input Factors Preference Matrix Forecast Controls Customer Loads
199111.729107479 14008317.8798103 Feet
Map Scale = 1:1792399

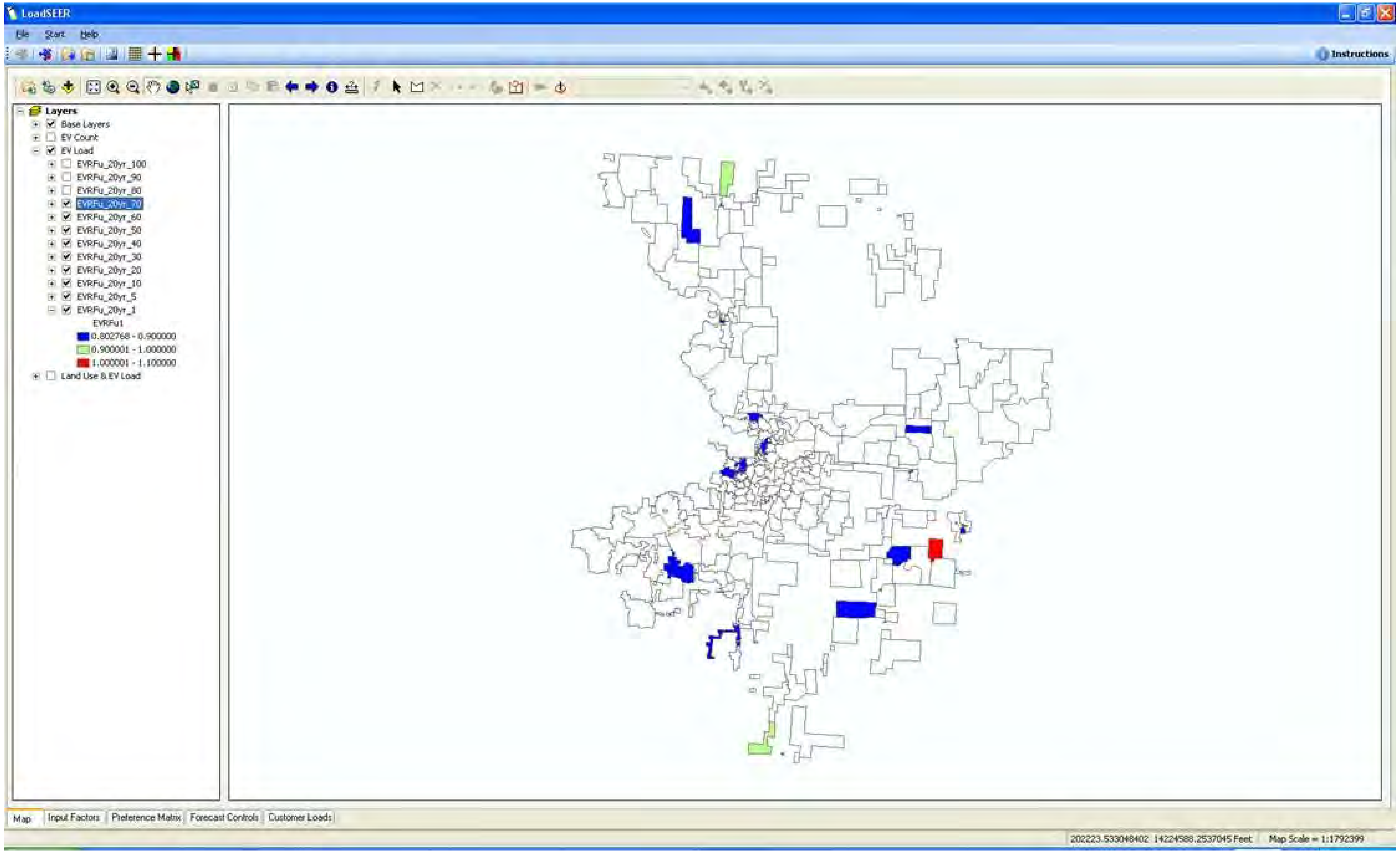

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
203779.435018863 14067442.1546879 Feet
Map Scale = 1:1792399

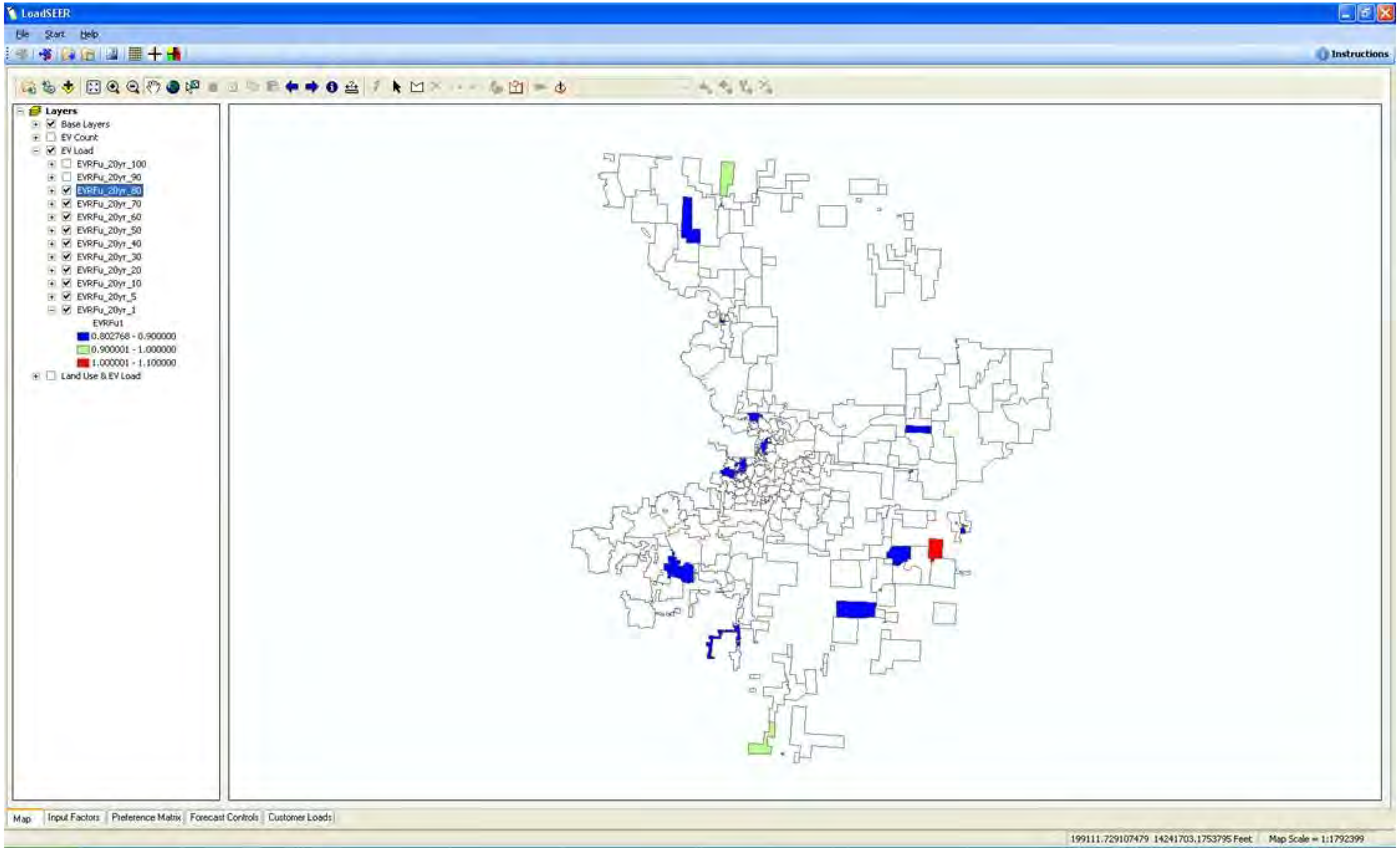

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
197555.827137017 14198137.9202066 Feet
Map Scale = 1:1792399

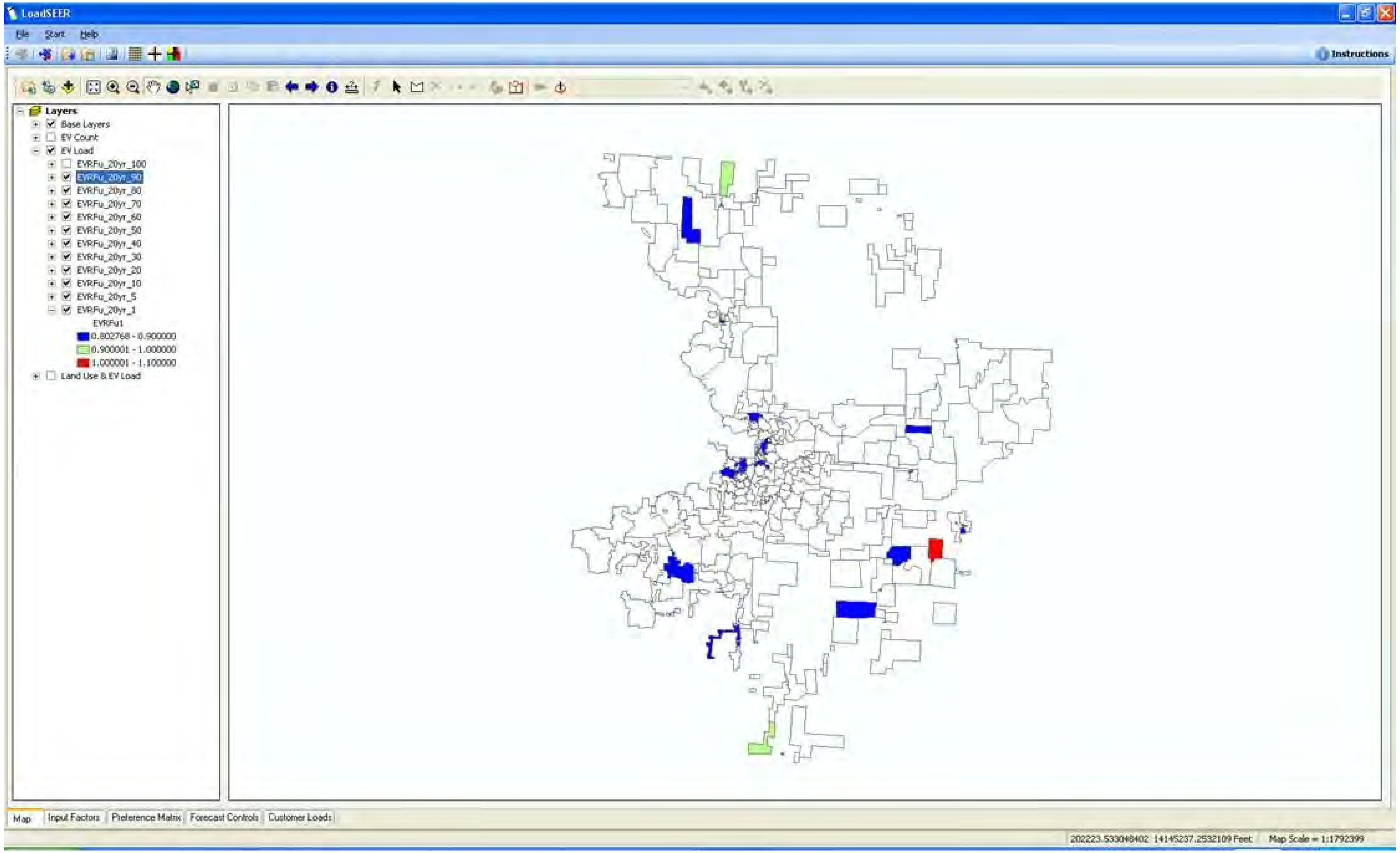

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
203779.435018863 14090780.6842448 Feet
Map Scale = 1:1792399

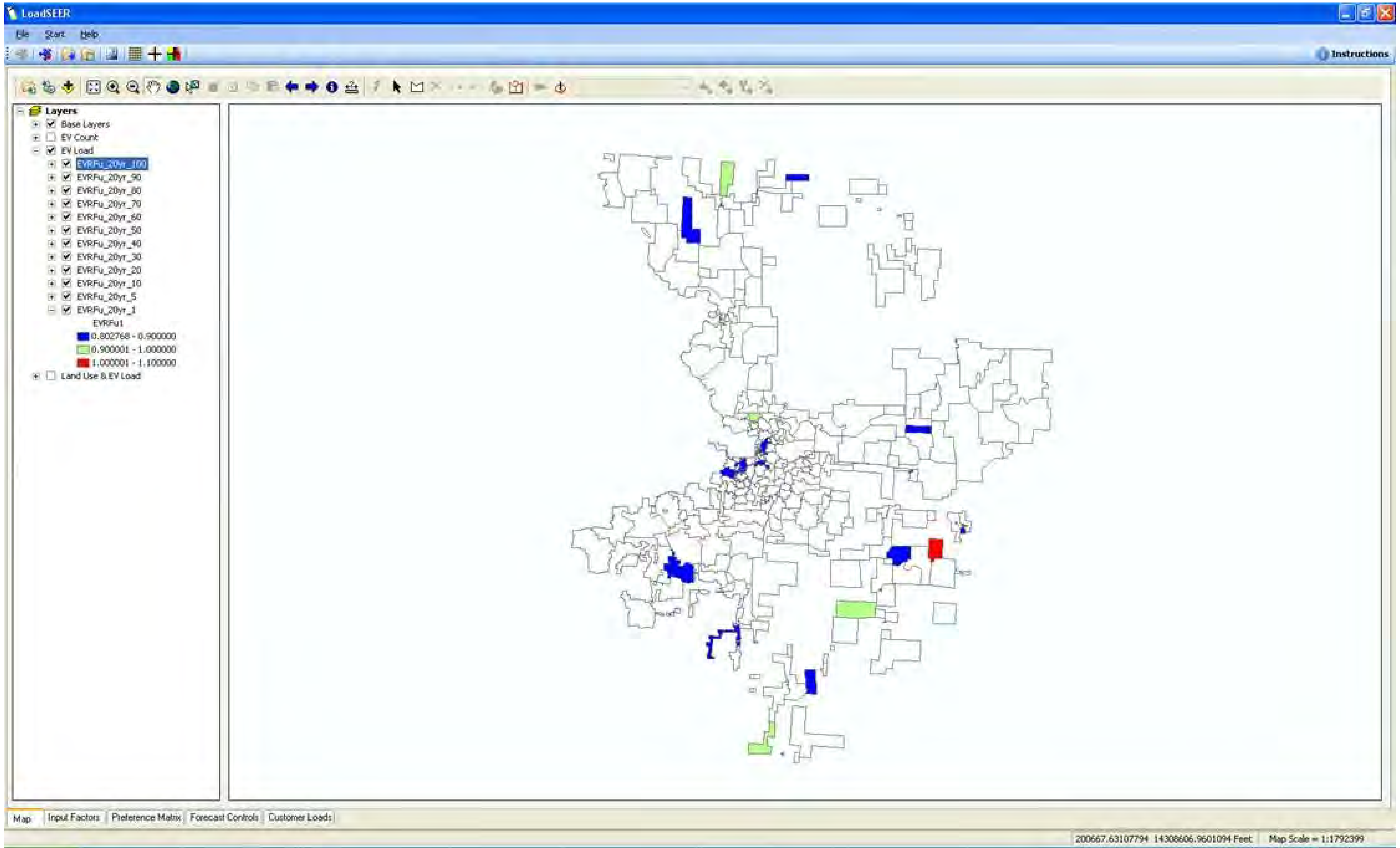

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
199111.729107479 14294603.8423752 Feet
Map Scale = 1:1792399

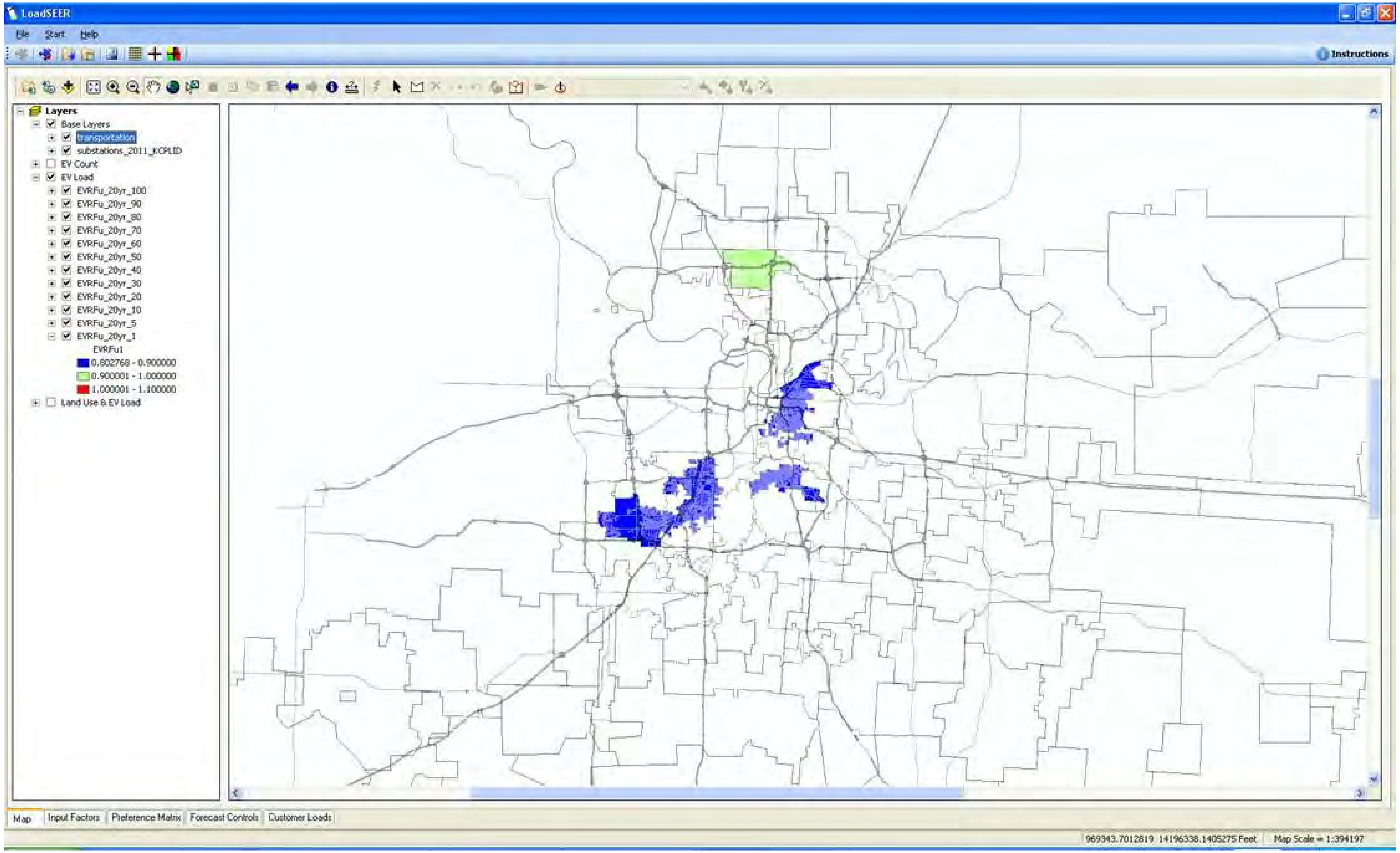

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
197555.827137017 14423743.7059236 Feet
Map Scale = 1:1792399

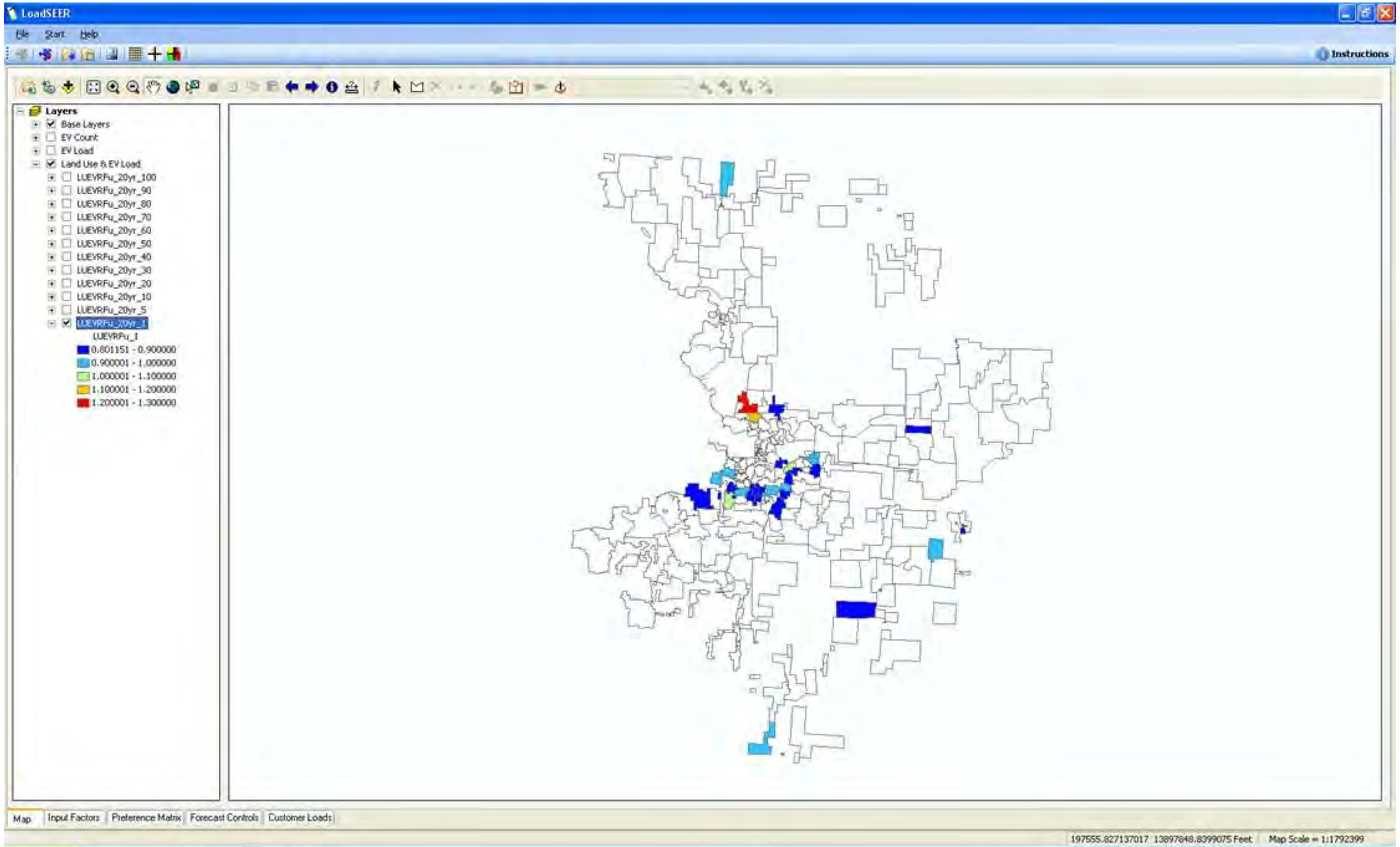

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
202223.533048402 14224588.2537045 Feet
Map Scale = 1:1792399

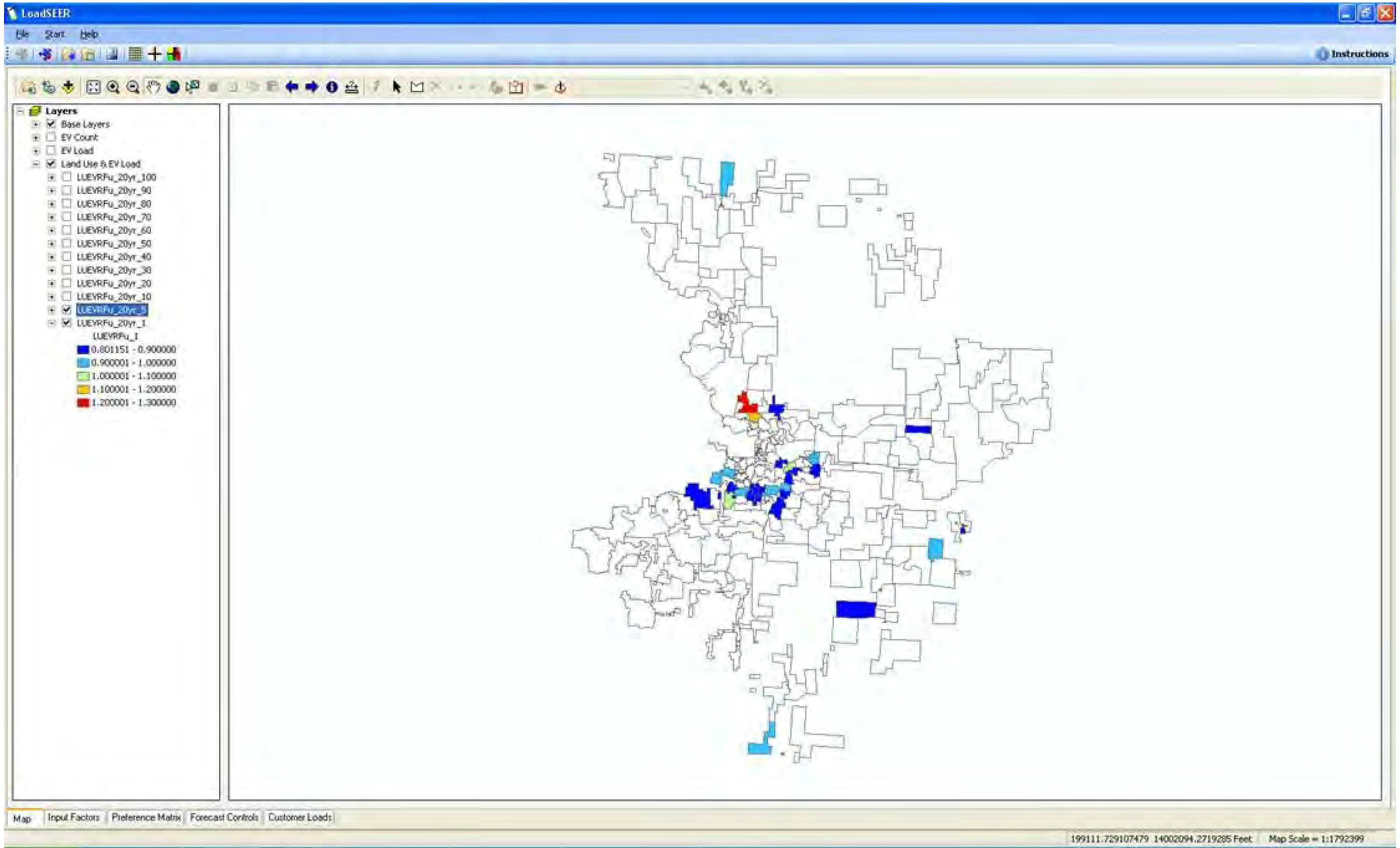

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
199111.729107479 14241703.1753795 Feet
Map Scale = 1:1792399

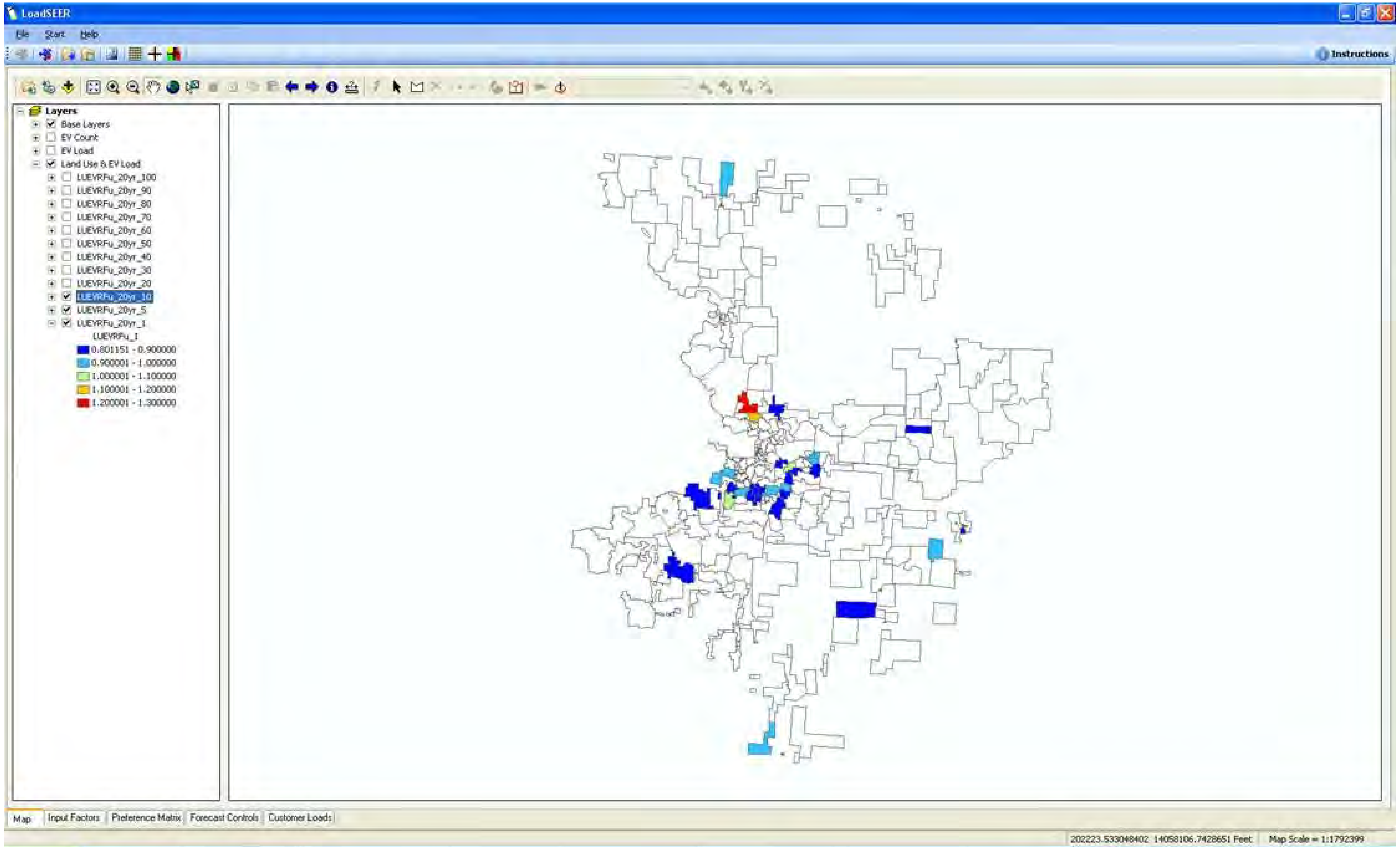

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
202223.533048402 14145237.2532109 Feet
Map Scale = 1:1792399

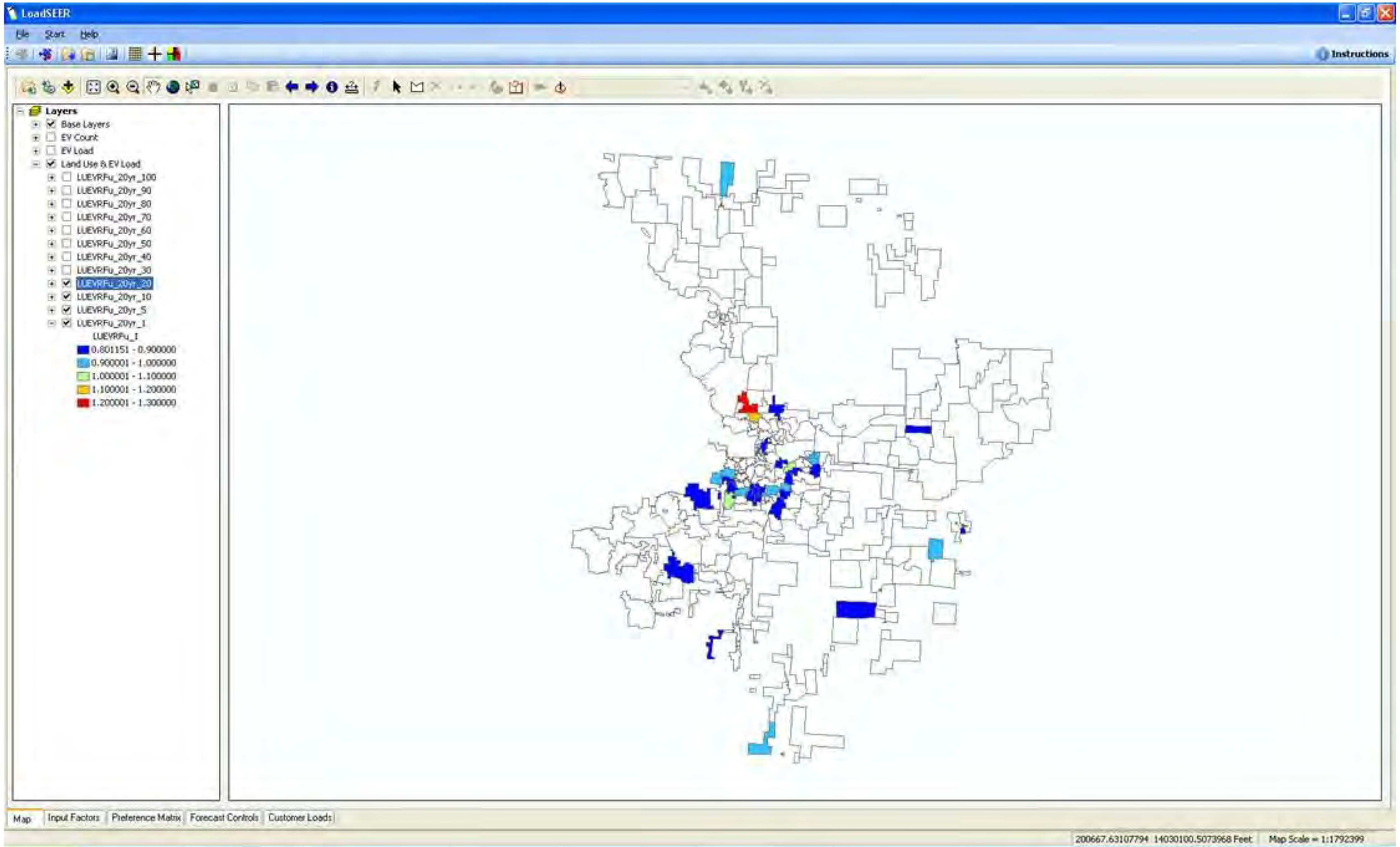

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map
Input Factors
Forecast Controls
Customer Loads
200667.63107794 14308606.9601094 Feet
Map Scale = 1:1792399

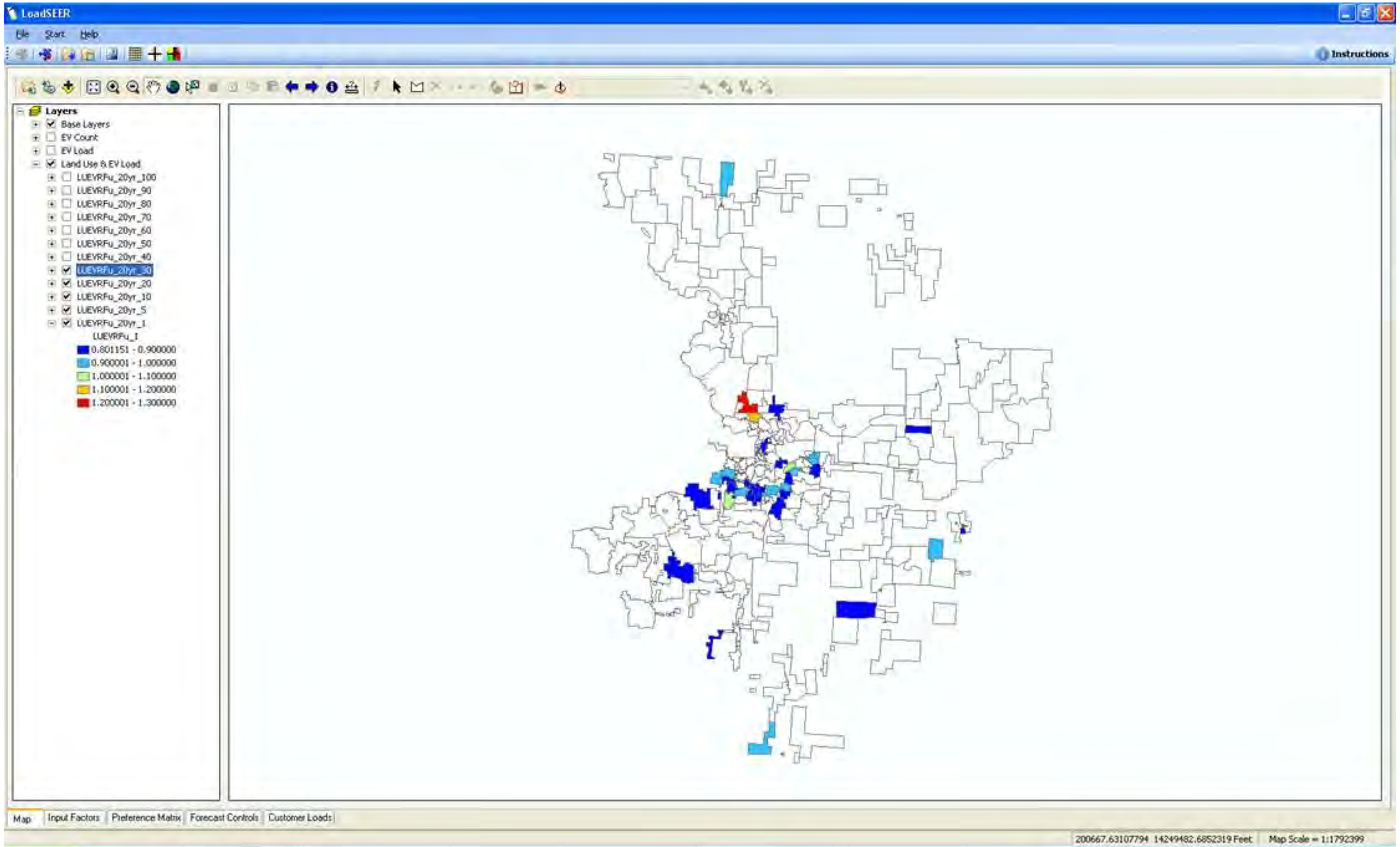

LoadSEER
File Start Help
Instructions
Layers
Base Layers
transportation
substations_2011_KCPLID
EV Count
EV Load
EVRFu_20yr_100
EVRFu_20yr_90
EVRFu_20yr_80
EVRFu_20yr_70
EVRFu_20yr_60
EVRFu_20yr_50
EVRFu_20yr_40
EVRFu_20yr_30
EVRFu_20yr_20
EVRFu_20yr_10
EVRFu_20yr_5
EVRFu_20yr_1
EVRFu1
0.802768 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
Land Use & EV Load
Map Input Factors Preference Matrix Forecast Controls Customer Loads
969343.7012819 14196338.1405275 Feet Map Scale = 1:394197

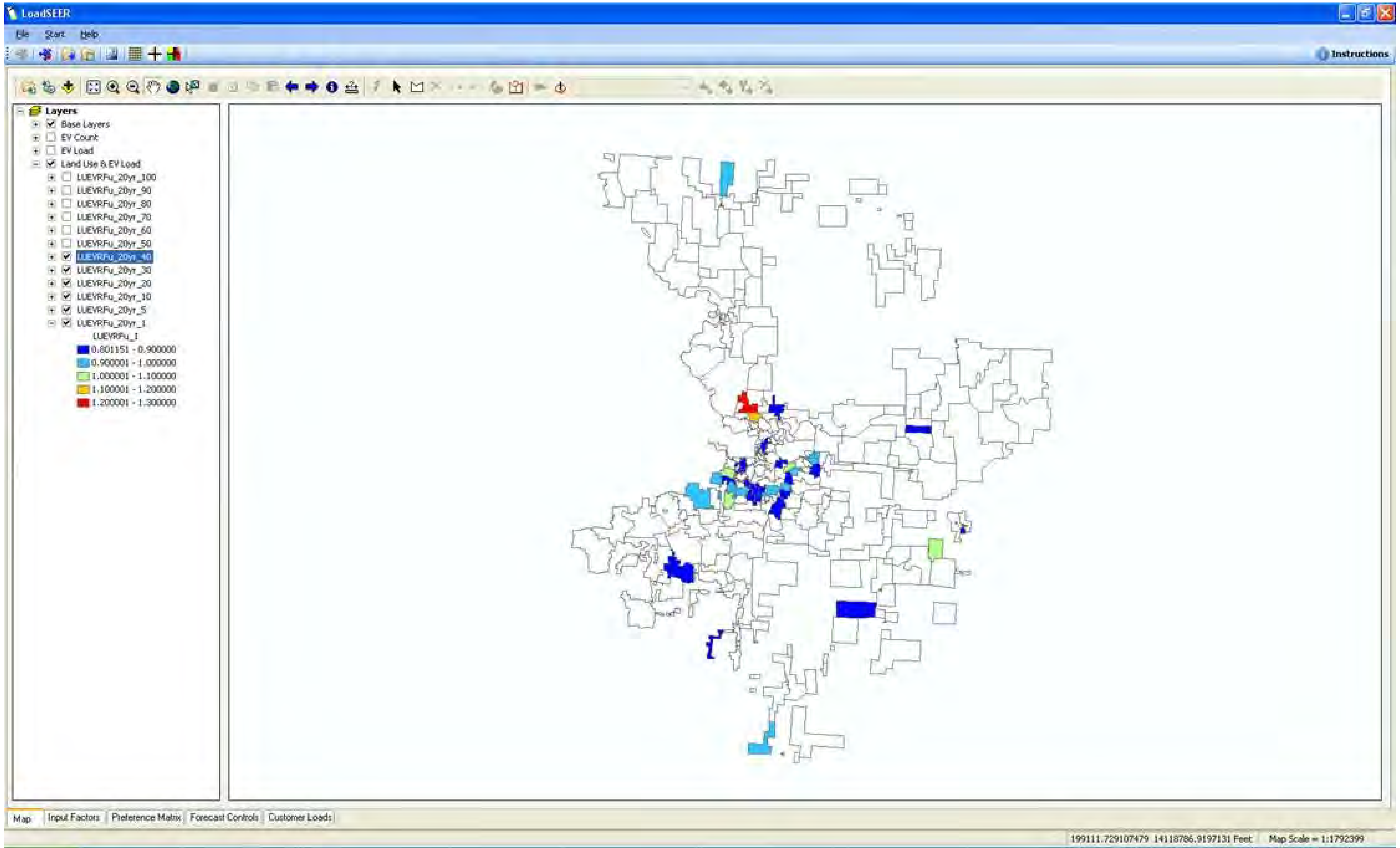

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map Input Factors Preference Matrix Forecast Controls Customer Loads
197555.827137017 13897848.8399075 Feet Map Scale = 1:1792399

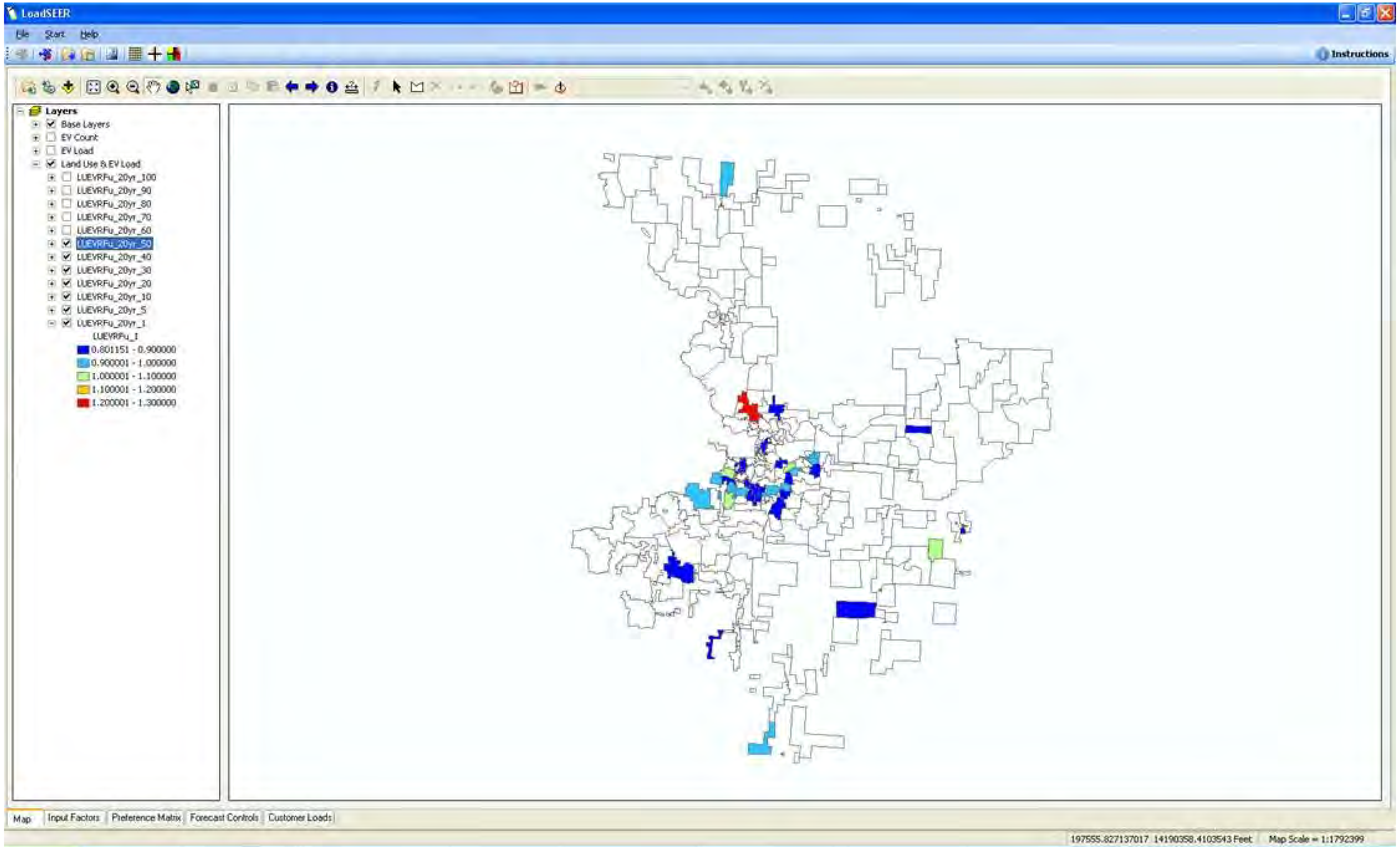

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
199111.729107479 14002094.2719285 Feet
Map Scale = 1:1792399

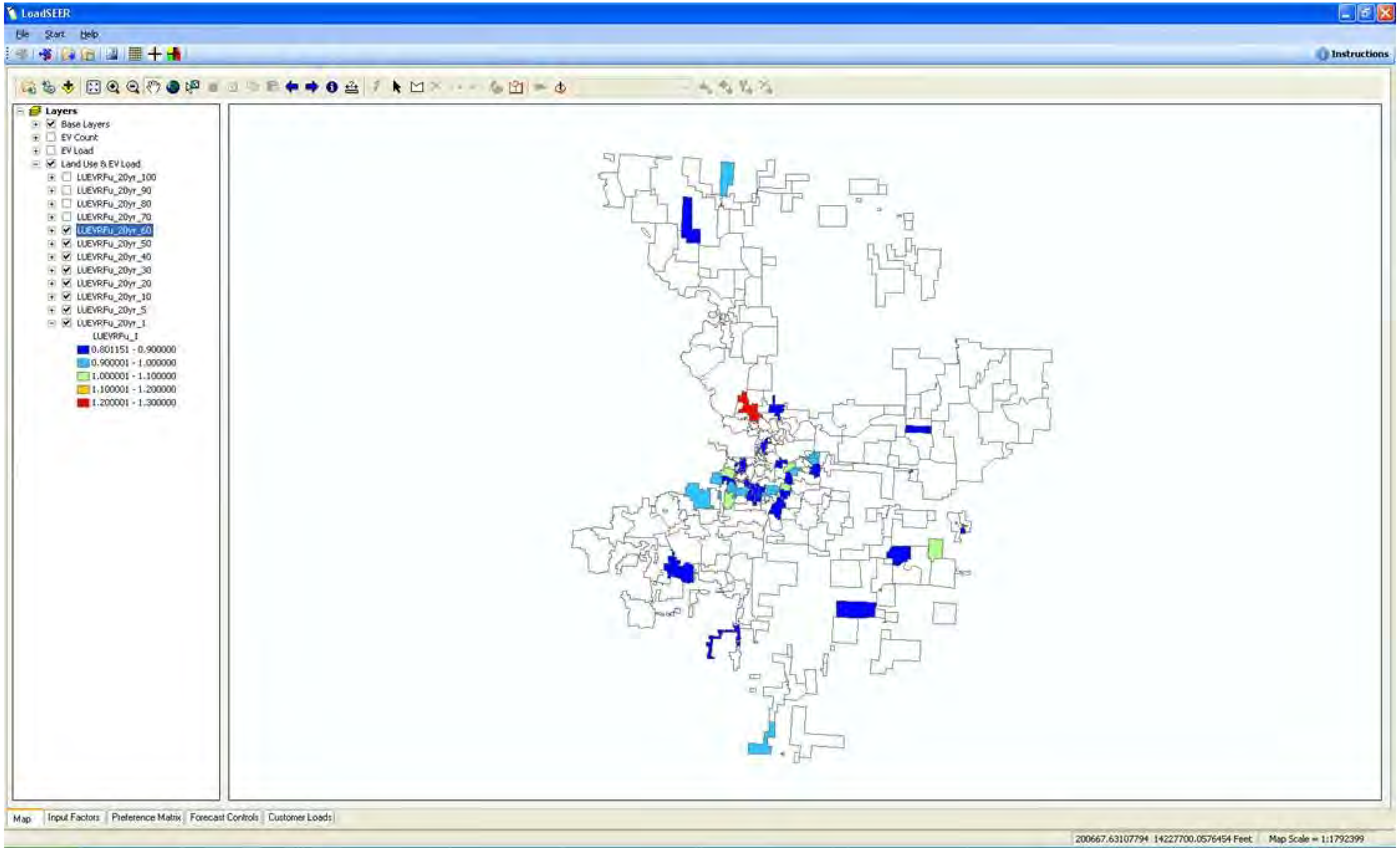

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
202223.533048402 14058106.7428651 Feet
Map Scale = 1:1792399

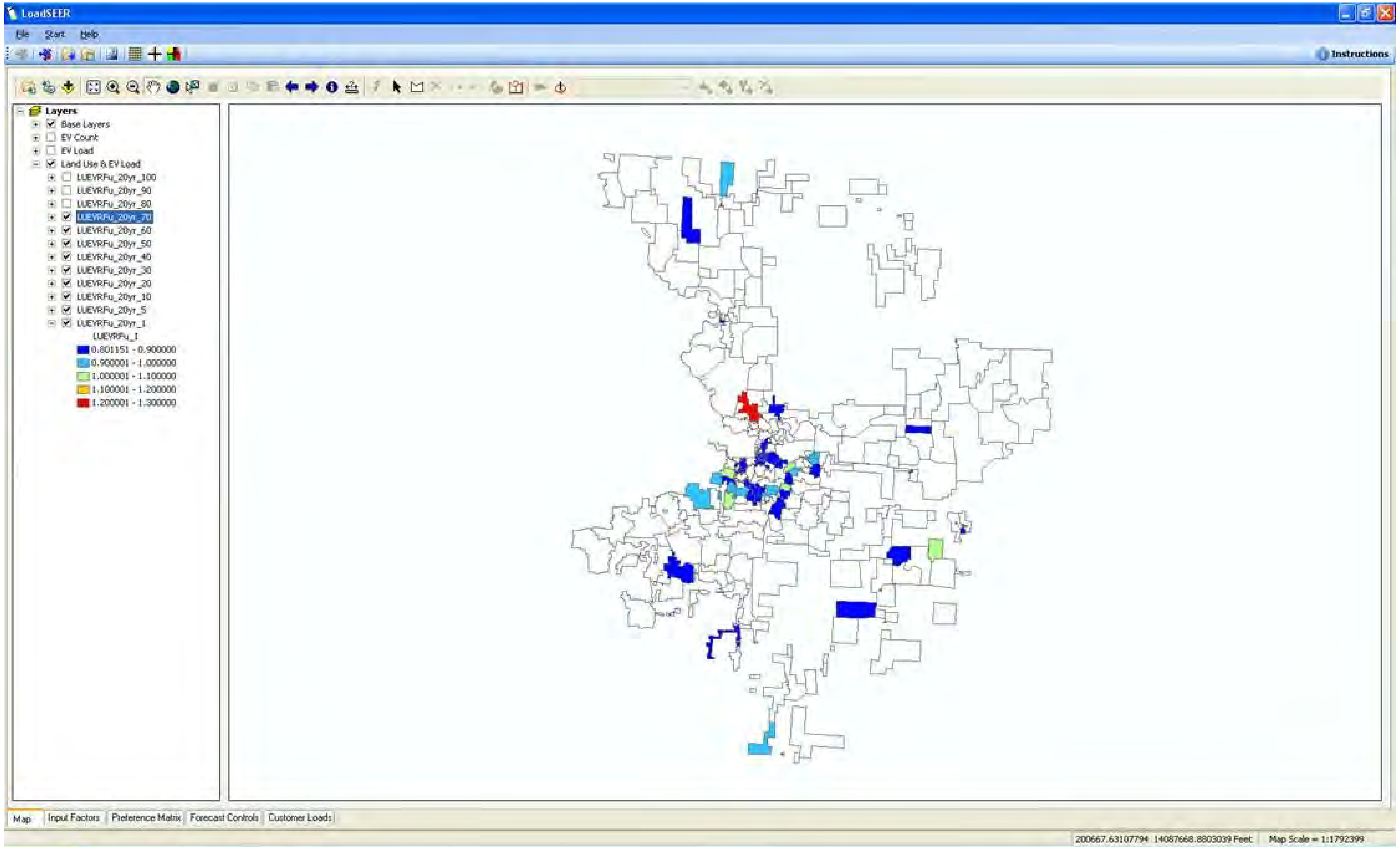

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
200667.63107794 14030100.5073968 Feet
Map Scale = 1:1792399

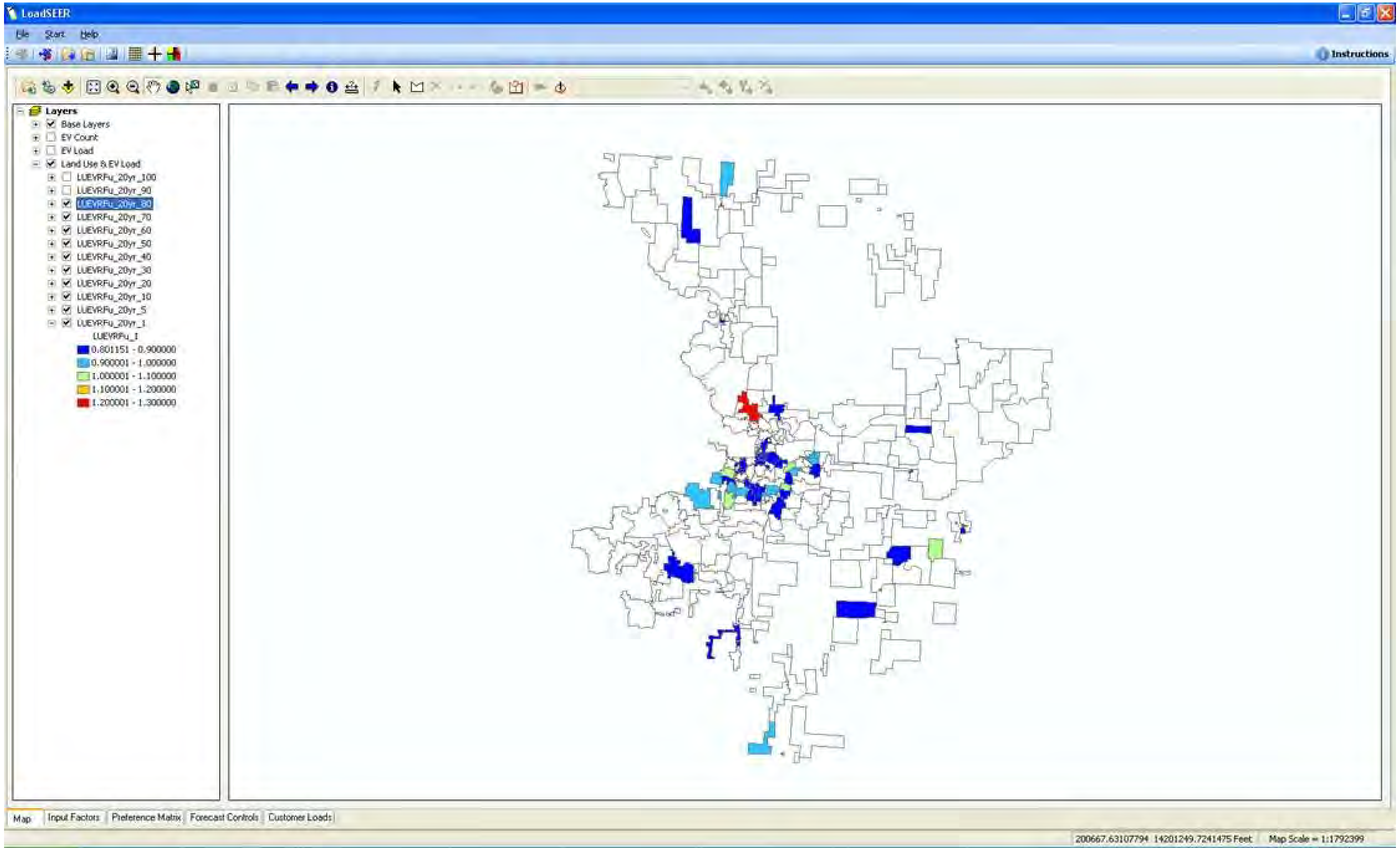

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
200667.63107794 14249482.6852319 Feet
Map Scale = 1:1792399

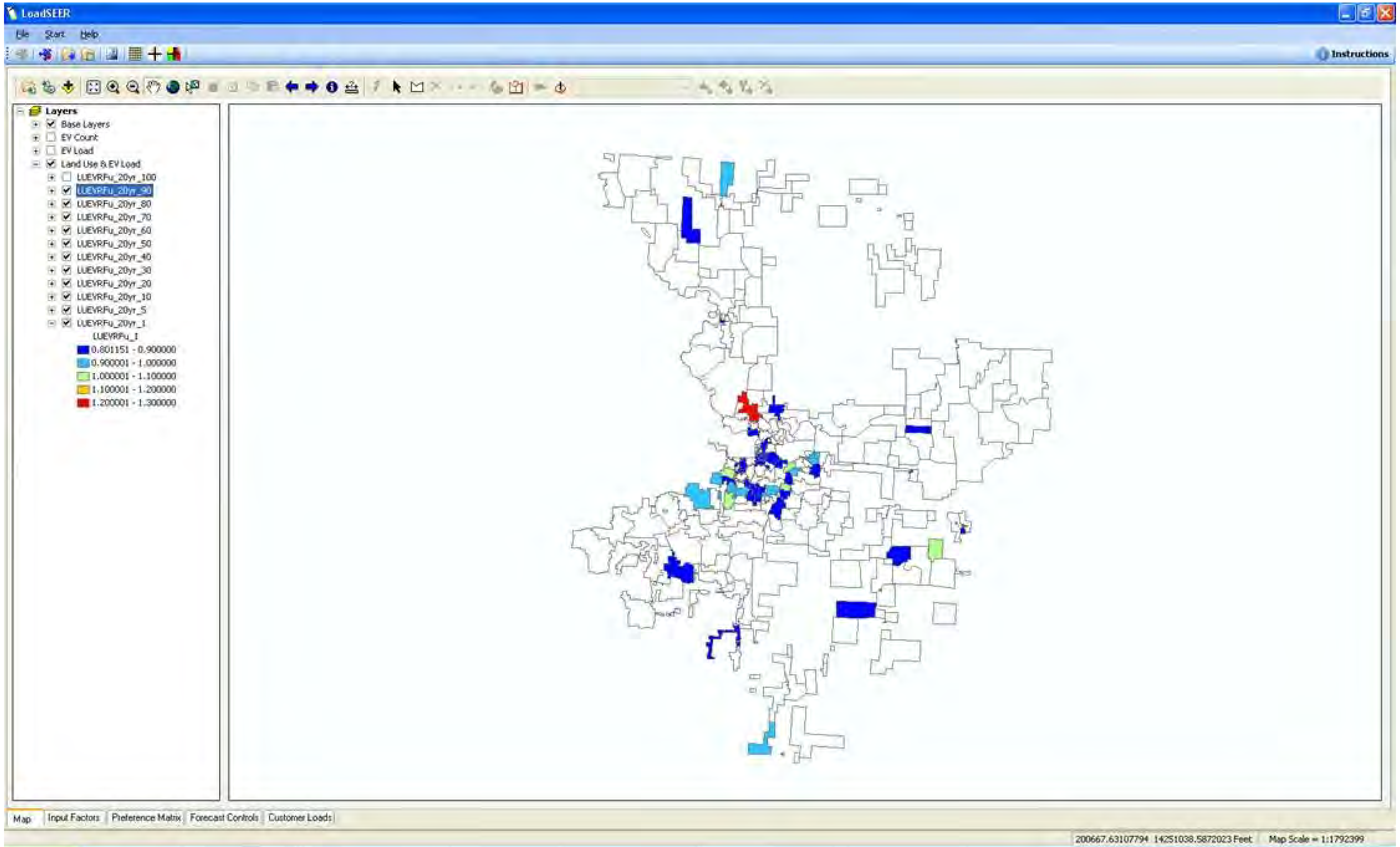

LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
199111.729107479 14118786.9197131 Feet
Map Scale = 1:1792399

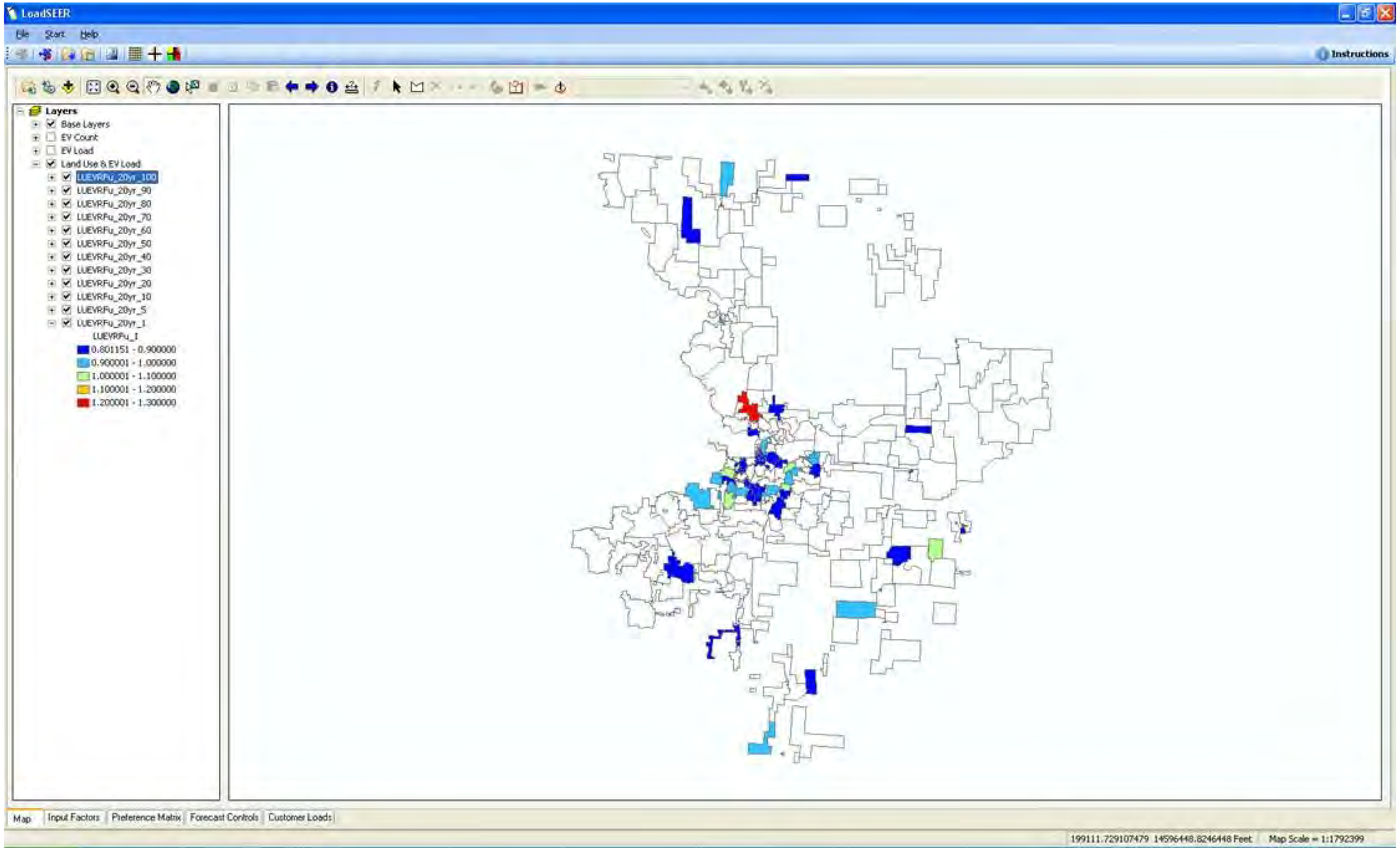

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
197555.827137017 14190358.4103543 Feet
Map Scale = 1:1792399


LoadSEER
File Start Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map Input Factors Preference Matrix Forecast Controls Customer Loads
200667.63107794 14227700.0576454 Feet Map Scale = 1:1792399

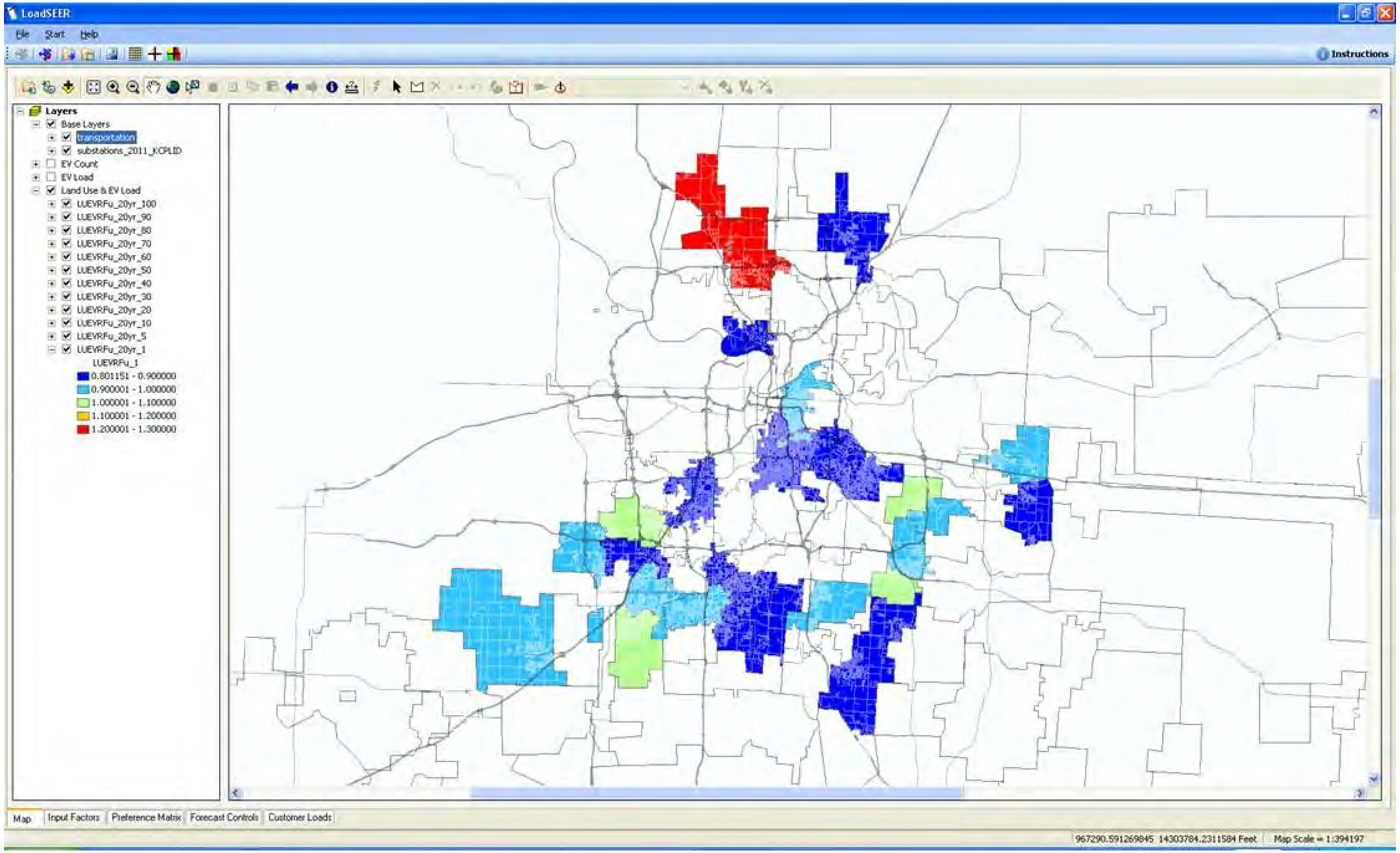

LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
200667.63107794 14087668.8803039 Feet
Map Scale = 1:1792399


LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
200667.63107794 14201249.7241475 Feet
Map Scale = 1:1792399


LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
200667.63107794 14251038.5872023 Feet
Map Scale = 1:1792399



LoadSEER
File
Start
Help
Instructions
Layers
Base Layers
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
199111.729107479 14596448.8246448 Feet
Map Scale = 1:1792399


LoadSEER
File Start Help
Instructions
Layers
Base Layers
transportation
substations_2011_KCPLID
EV Count
EV Load
Land Use & EV Load
LUEVRFu_20yr_100
LUEVRFu_20yr_90
LUEVRFu_20yr_80
LUEVRFu_20yr_70
LUEVRFu_20yr_60
LUEVRFu_20yr_50
LUEVRFu_20yr_40
LUEVRFu_20yr_30
LUEVRFu_20yr_20
LUEVRFu_20yr_10
LUEVRFu_20yr_5
LUEVRFu_20yr_1
LUEVRFu_1
0.801151 - 0.900000
0.900001 - 1.000000
1.000001 - 1.100000
1.100001 - 1.200000
1.200001 - 1.300000
Map
Input Factors
Preference Matrix
Forecast Controls
Customer Loads
967290.591269845 14303784.2311584 Feet
Map Scale = 1:394197