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Daniel S. Little, Executive Director

DATE: June 24, 2014
TO: Daniel Little, Executive Director
FROM: Sean Tiedgen, Associate Transportation Planner
SUBJECT: Recent Travel Model History at SRTA

Background

Federal and state laws require that metropolitan planning organizations (MPOs) have the ability to forecast travel on the region's transportation network. Travel demand models must routinely be updated to reflect the latest available estimates and assumptions for population, land use, travel, employment, congestion and economic activity (23 CFR §450.322(e)).

A travel demand model utilizes the relationships between land use, travel behavior, road system capacity and other key factors to model each person's decision-making process of: why, when, where and how to make a trip, and what route to take. Two key functions of the model are to:

- 1) **Conduct traffic studies that forecast the impacts that projects may have on the transportation network** – Travel demand models are statistical and algorithmic computerized processes that forecast the impact of growth and development on the region's transportation network. Vehicle miles traveled (VMT) and person-trips are the primary outputs used to understand the impact projects or policy decisions may have on the transportation network.
- 2) **Measure performance** – Geographic Information Systems (GIS) analysis and post processing tools are used to measure the performance of transportation projects and resultant impacts on air quality, economic development, public health and other key policy areas. Level-of-service (LOS) – a measure of roadway congestion – is used to identify impending bottlenecks and problem areas. Other commonly evaluated outputs include but are not limited to, average travel speeds, travel delay, mobility, and greenhouse gas emissions.

Data is collected from many federal, state and local sources, including but not limited to: US Census or American Community Survey (ACS) data, local or state traffic counts, and household travel surveys. This data was reviewed by consultants and the interagency modeling technical

advisory committee – also known as the Shasta Model Users Group (SMUG). It was then adjusted to reflect known conditions of the region.

Travel Modeling History at SRTA

The first model for the agency was adopted in 1995. Travel models are generally updated every five years to reflect changing regional conditions (e.g. housing, jobs, and transportation projects) as part of the update of the regional transportation plan. A minor update was done in November 2011 to reflect the latest population, housing and employment forecasts. The last major update to the model was in 2007. While the agency's current four-step model is valid, new and emerging reporting requirements from federal and state funding and/or regulatory agencies, coupled with a unique funding opportunity (Prop 84 Modeling Improvement grants) made available by the Strategic Growth Council, motivated SRTA to upgrade to the latest model.

SRTA hired DKS Associates, Inc. to assist the agency in developing the model. An internal "beta" model was completed in 2012 for SRTA staff to review and become familiar with the new model. Additional data was collected and model components were added in order to address expanding federal and state transportation performance metrics.

Several presentations were made to the SRTA Board of Directors during model development, including:

- June 28, 2011 – BOD approves contract with DKS Associates to develop model
- October 25, 2011 – BOD approves update to forecast assumptions to reflect recession
- June 22, 2012 – BOD approves on-call services contract with DKS Associates and model update
- December 12, 2012 – Model update and BOD amends contract to include Prop 84 "Round 2" funds
- June 25, 2013 – Progress report on 2015 RTP and update on modeling efforts
- February 24, 2014 – 2015 RTP update and BOD approves draft vision, goals, policies, and strategies
- May 7, 2014 – BOD approves 2015 RTP draft projects list

Development of 2015 RTP and Travel Model Forecasts

Analysis is only as good as the data on which it is based. The model development process spanned three years (2011-2014) in order to incorporate the best and most current data available. Because national, state and local data is not synchronized, a "cutoff point" is established in order to finalize the model. December 31, 2013 was the "cutoff point" for incorporating data into the model – except for 2015 RTP projects which were approved by the board of directors on May 7, 2014. There are four key model inputs and forecasts that affect vehicle trips, travel behavior and trip length:

1. Land use, Population and Housing – The home is the origin of most of our trip purposes in our daily lives, whether it be for work, school, shopping, socializing or recreation. Land use, as dictated by local General Plans and zoning ordinances, has a major impact on where we live, the time it takes to reach the destinations we need to travel to and density at which

development can take place. Significant effort was made to reflect the most current land uses, housing densities and types, and numbers of people by city and county throughout the region. This information helps the region by:

- Ensuring federal and state regulations regarding adequate housing are met;
- Allowing the model to know:
 - Where trip origins (households) are likely to start from;
 - Where trip destinations are likely to be located;
 - Approximately how many jobs are available on commercial, industrial, retail and other employment-related land uses;
- Gaining an understanding of the travel that takes place on our highways and streets;
- Understanding how long an average trip make take; and
- Understanding how future growth may impact development of our precious natural resources – open space and agricultural lands.

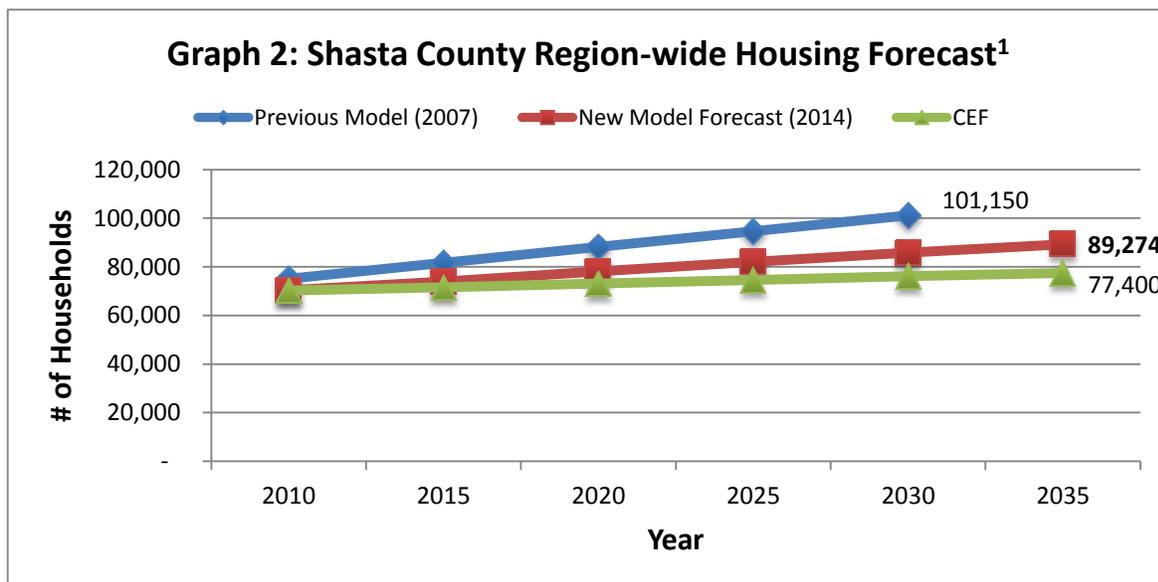
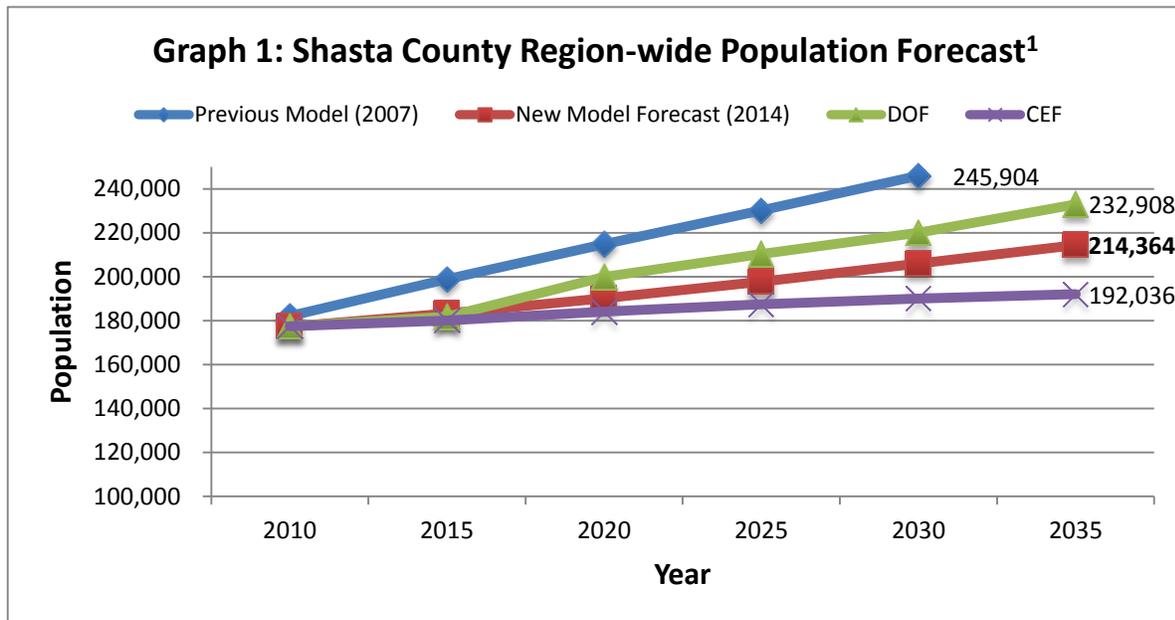
A model update completed in November 2011, provides the primary basis for the land use, population and housing assumptions and forecasts. Details of that effort are described in the November 8, 2011, memo available on SRTA’s website at http://www.srta.ca.gov/pastel/RT_TDM.htm.

The Sustainable Communities and Climate Protection Act of 2008, or more commonly known as Senate Bill 375 (SB 375), requires the agency’s 2015 Regional Transportation Plan, and subsequent plans, to be consistent with the Regional Housing Need Allocation (RHNA). On June 30, 2012, the California Department of Housing and Community Development issued the 2014-2019 RHNA for the Shasta County Region. Table 1 is a summary of the RHNA for each jurisdiction in Shasta County, by income category.

Table 1: January 1, 2014 – June 30, 2019 Shasta County RHNA Distribution

Jurisdiction	Number of housing units needed by income category				
	Very-low	Low	Moderate	Above-Moderate	Total
Anderson	32	21	24	59	136
Redding	287	181	205	502	1,175
Shasta Lake	32	21	23	58	134
Unincorporated	189	117	128	321	755
Total:	540	340	380	940	2,200

SRTA staff worked with SMUG to review the RHNA determination and found that housing units needed to be added to the forecast for the city of Anderson in order to be consistent. A detailed account of the process is available on SRTA’s website at: http://www.srta.ca.gov/pastel/RT_TDM.htm. The updated population and housing information was reviewed and approved by SMUG and the California Air Resources Board staff. Graph 1 and Graph 2 below provide updated population and housing forecasts, respectively.

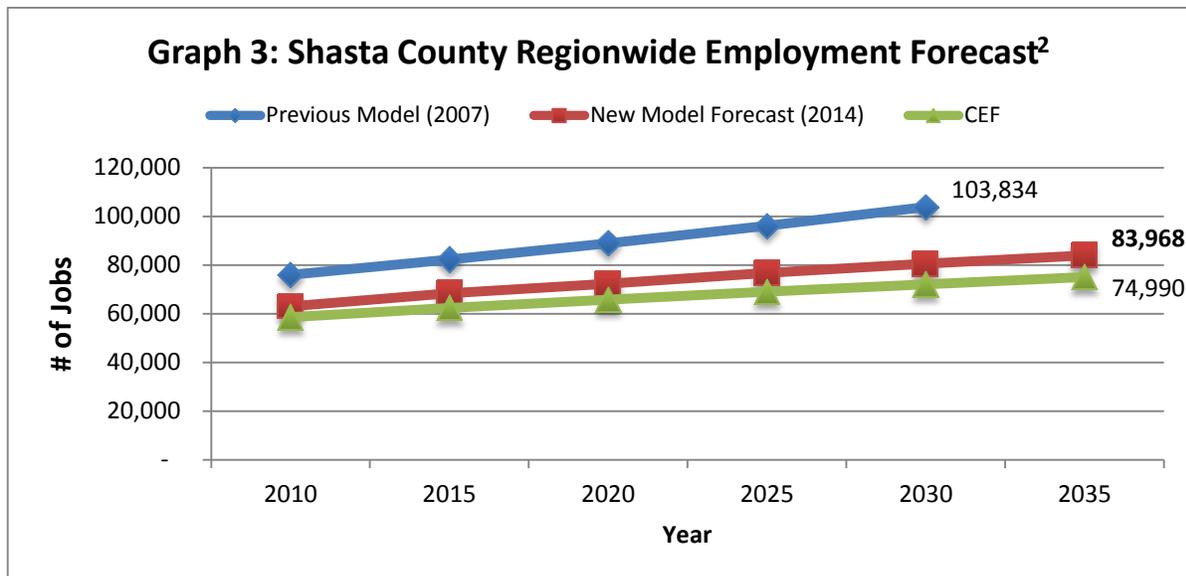


¹Department of Finance (DOF) data from *State and County Population Projections by Race/Ethnicity, Age, and Gender, 2010-2060 (Jan. 2013)*; California Economic Forecast (CEF) data from *California County-level Economic Forecast, 2013-2040 for Caltrans (Oct. 2013)*

- Employment and Economic Recession – Employment locations are the primary destination point for many of our trips and where they are located ultimately, in conjunction with the available routes and transportation modes we can take, affect our travel behavior. The model uses this information to estimate such things as (but not limited to):

 - The number of trips a person typically takes;
 - The type of mode and route likely used to make a trip; and
 - The average time it takes to make a trip.

The November 2011 model update provides the primary basis for the employment assumptions for the region. Employment data was first compiled from 2010 data produced by the California Economic Development Department (EDD). An 8% increase in jobs was done, from the base data, to account for estimated part-time and self-employment jobs for the Shasta County region – which are not reported as part of the EDD reports. This adjustment is similar to those done in previous model updates.



²California Economic Forecast (CEF) data from California County-level Economic Forecast, 2013-2040 for Caltrans (Oct. 2013)

Additionally, adjustments were made in the modeling assumptions to account for the recent economic recession and for when the region would potentially see a recovery to “normal” activities. The modeling forecasts have two assumptions:

- A. Existing buildings were operating at lower occupancies in 2010 than in 2004; and
- B. Employment space would return to “normal” occupancy levels (which are typically 85-95% of existing square footage) 20 years into the future or by the year 2030.

Details regarding the Employment Occupancy rate assumptions can be found in Table 4 of the November 8, 2011 memo, by Dowling Associates, available on SRTA’s website at: http://www.srta.ca.gov/pastel/RT_TDM.htm.

Table 2 below summarizes population, housing, and employment forecast totals, annual percentage growth, and total percentage growth over the planning period (2010-2035).

Table 2: 2010-2035 Forecasted Growth

Year	Population	% Annual Growth	Total % Pop. Growth	Housing (HH)	% Annual Growth	Total % HH Growth	Jobs	% Annual Growth	Total % Job Growth
2010	177,223	0.81%	20.3%	70,346	1.02%	25.6%	63,054	1.22%	30.6%
2035	214,364			89,274			83,968		

- 3. Transportation Network** – The transportation network (roads, bridges, bike lanes/trails, and sidewalks) is the fabric that connects the region. Within the model the regional transportation network is a computerized representation of the major streets and highway system and includes freeways, highways, expressways, arterials, collectors and some local roads. Most local roads are not included because the effort to update and maintain the data is cost and time prohibitive. The transportation network in the model was updated to be current as of December 31, 2013, reflects recent improvements over the last few years, and includes forecasted improvements through 2035.
- 4. Transit** – An updated transit network allows us to more accurately forecast transit ridership and evaluate the impact various policies may have on transit ridership. Fixed-route transit service and stops by the Redding Area Bus Authority (RABA) were updated to match the existing transit system as of December 31, 2013. The transit system is assumed to be the same for every year in the model, because it is difficult to anticipate when new transit routes/stops will be needed or changes to existing routes/stops are necessary. The model does not automatically create new transit routes as the region grows. Instead transit updates to the model are typically done manually after transit service changes have been implemented by transit providers.

Future Activity-based Model Uses

The new model will provide a more realistic assessment of travel behavior because it:

- Provides analyses down to the parcel level (versus generalized outputs based on groupings of parcels known as ‘traffic analysis zones’);
- Recognizes people typically plan multiple trip purposes together (known as ‘trip chaining’); and
- Is sensitive to specific development projects, demographic variables, other modes of travel, and the cost of travel.

Specific examples of near-term applications of the new activity-based travel demand model include:

- Estimation of vehicle miles traveled (VMT), level of service (LOS) and related vehicle emissions for the 2015 RTP project and alternatives;
- Development and evaluation of expanded performance measures for the 2015 RTP;
- Local agency general plan circulation element updates;
- Local traffic impact fee programs;
- Local development project review;
- Improved transit planning; and
- Estimation of benefits from active transportation projects.