

California High-Speed Train Project

Senate Transportation Committee Hearing

November 4, 2010

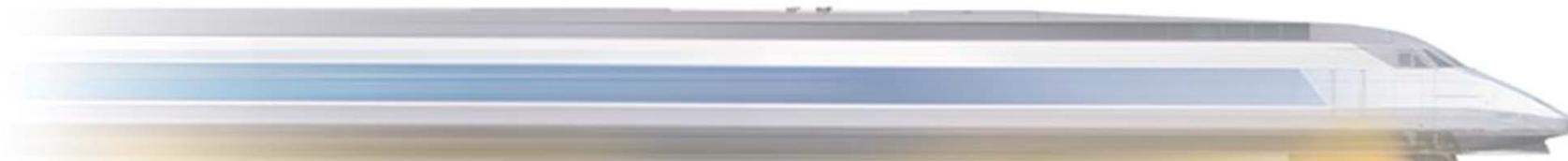
Roelof van Ark
Chief Executive Officer



California High-Speed Rail Authority

Presentations during this Hearing

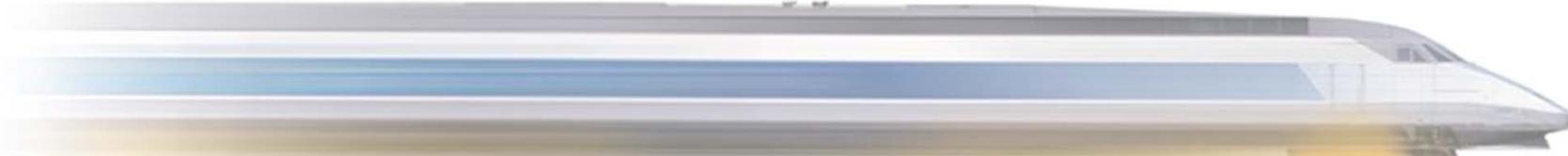
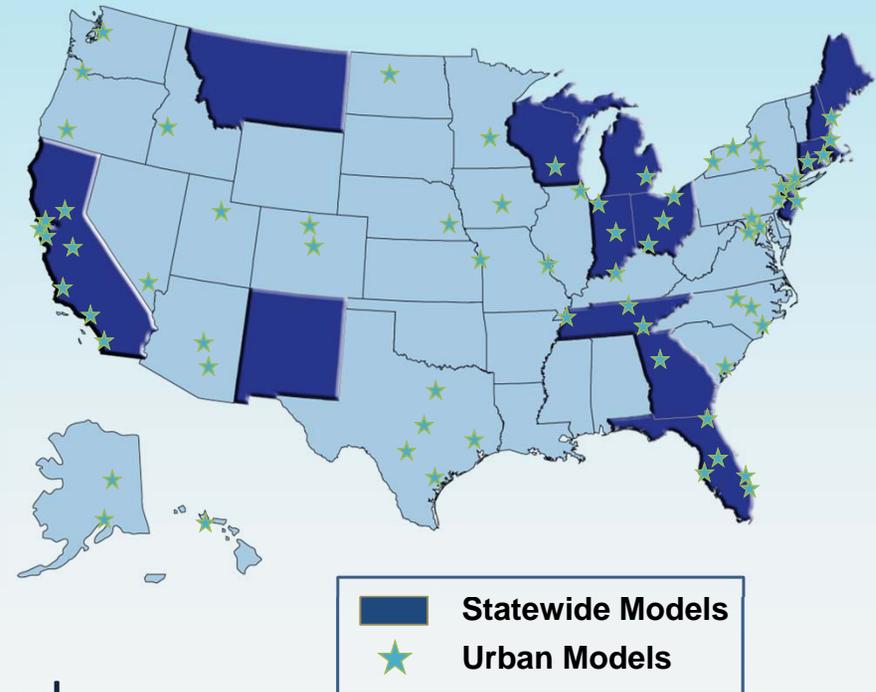
- 1) Response to the ITS Report by:
 - Lance Neumann, Ph.D., President Cambridge Systematics
 - Kimon Proussaloglou, Ph.D., Principal, Cambridge Systematics
- 2) Comments on Next Steps as included in the letter to the Legislature dated Aug 2, 2010, including the establishment of a Peer Review Group
- 3) Discussion on a few International HSR ridership comparisons
- 4) Other HSR related issues.



Cambridge Systematics

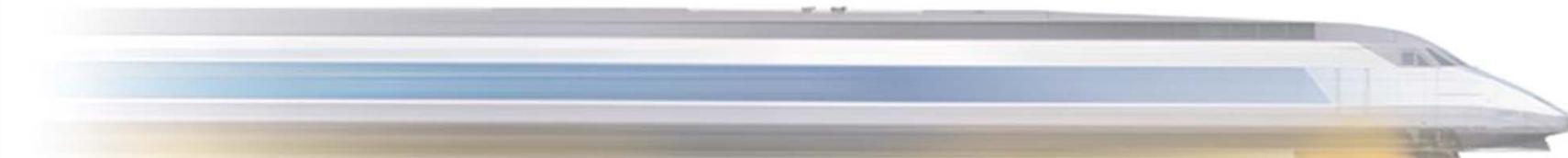
Travel Demand Forecasting Leadership

- Over 35 years of national and international experience
- Largest travel demand forecasting firm in the U.S.
- Pioneered many of the most significant advances in the travel demand forecasting profession
- Practical worldwide experience
 - 16 statewide and 30+ urban models
 - High-speed rail models in both the U.S. and abroad



Model Research, Training, and Technical Guidance

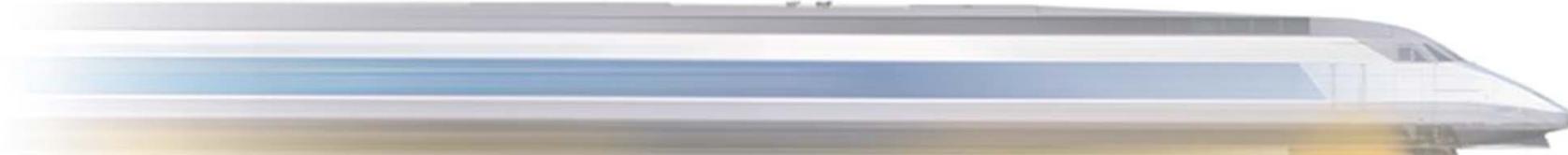
- CS staff play leadership roles in key Transportation Research Board (National Academy of Sciences) modeling committees
- CS has developed and delivered modeling training courses for U.S. DOT
- CS has written numerous modeling technical guidance documents for U.S. DOT



Cambridge Systematics

Model Development and Application Leadership

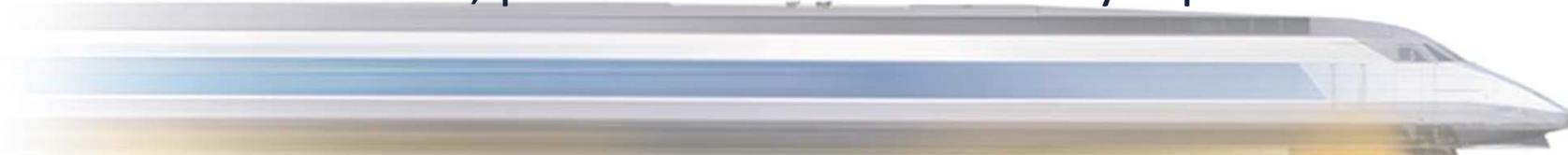
- We **do**
 - Consider the specific policy and decision-making context
 - Balance model theory, practicality, complexity, and cost to our clients
 - Develop a modeling approach consistent with an agency's schedule and resource constraints while meeting appropriate professionals standards
- We **do not**
 - Assume a “one size fits all” theoretical approach is right for each ridership forecasting problem
 - Include unneeded features that would adversely affect model performance and cost



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California High-Speed Rail Ridership and Revenue Forecasting

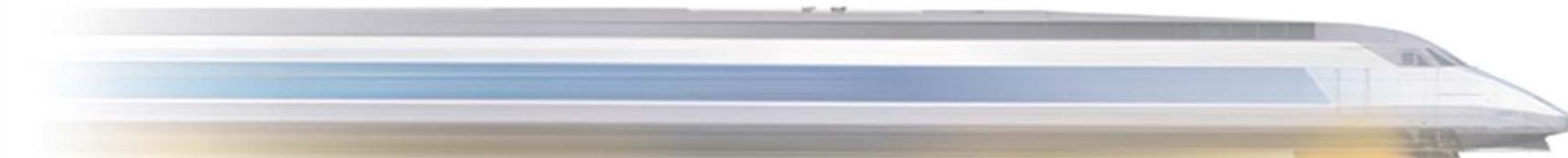
- Expert Model Development Team
 - Assembled internationally recognized team that has developed high-speed rail forecasts in Europe, Australia, and the U.S.
 - Convened an independent peer review panel of academic and practitioner experts
 - Client project manager also is a recognized national leader
- Ridership and Revenue Model
 - State-of-the-art
 - Appropriate blend of theory and judgment
 - Realistic, proven sensitivities to key inputs



Cambridge Systematics

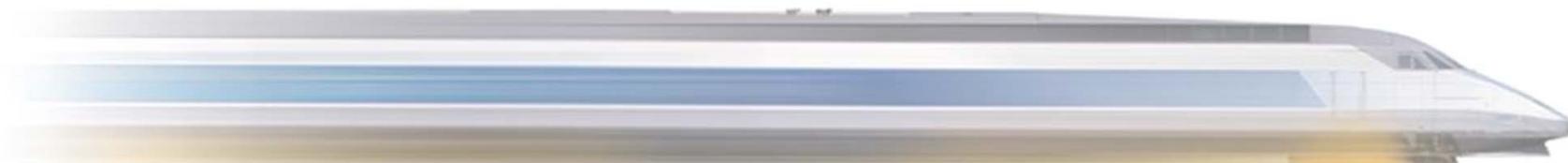
California High-Speed Rail Ridership and Revenue Forecasting (continued)

- Model has been an appropriate tool to support environmental and planning-level analysis to date.
- New model enhancements will support investment and operating/design decisions



Response to ITS Review Overview

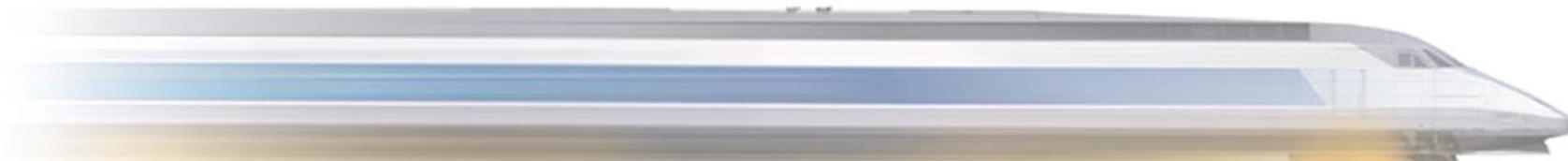
- Initial review generated 30 questions
- Issues discussed in the final report
 - Division into short and long trips
 - Assigning all business travel to peak period
 - Treatment of panel dataset
 - Constraining the headway coefficient
 - Absence of an airport/station choice model
 - Calibration of constants in mode choice models
 - Constraining of coefficients
- A complex system of models
- Data, models, calibration, and sensitivity



Response to ITS Review

Key Points

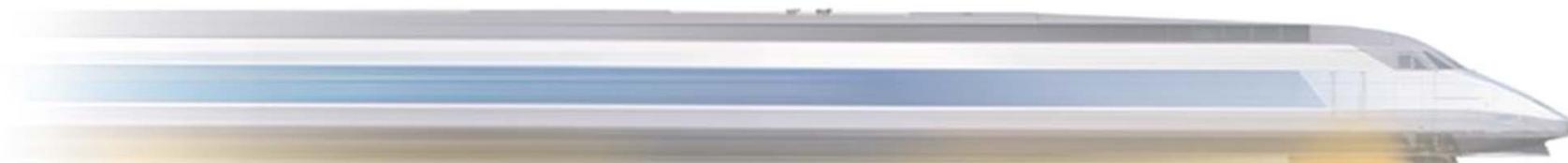
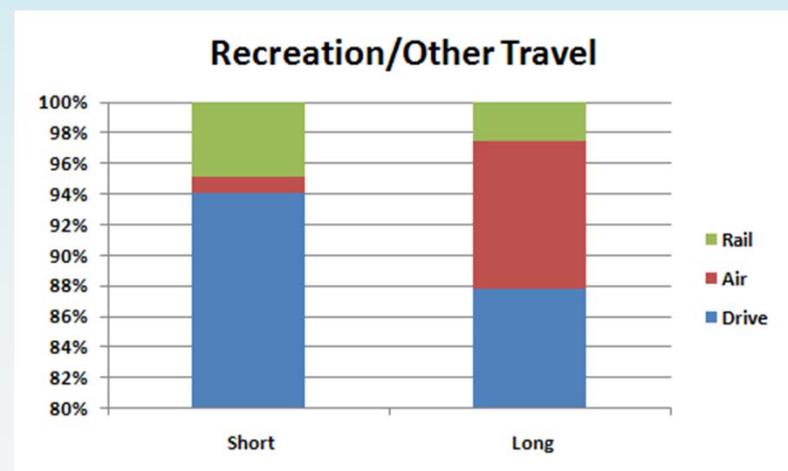
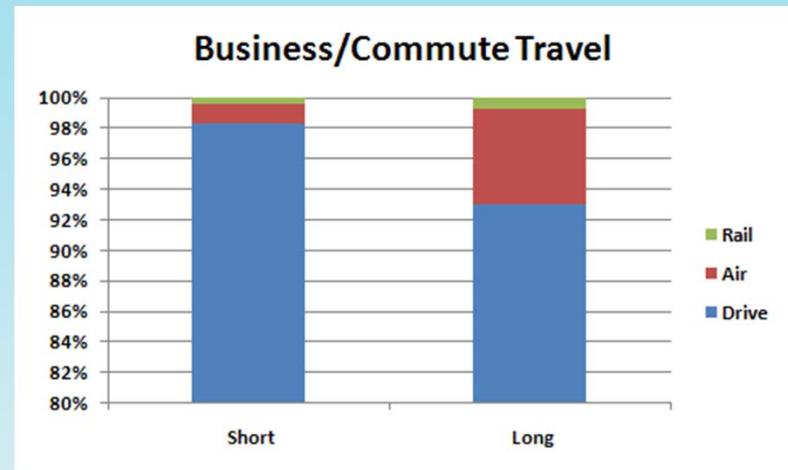
- Creative tension
 - Academic approach versus real-world application
 - We “followed generally accepted professional standards in carrying out the demand modeling and analysis”
- We disagree with other broad conclusions
 - Data reflect travel among California residents
 - Model validity is not compromised by econometric issues
 - A policy-sensitive model addresses planning-level questions
 - Model sensitivity has been proven in 3+ years of application
- The CAHSRA demand model supports decisions taken to date



Issue 1:

Division into Short and Long Trips

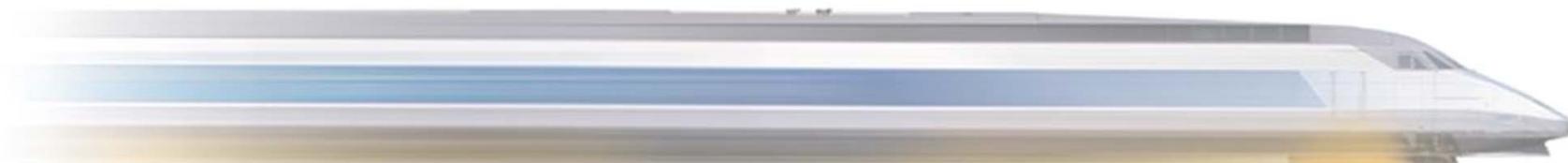
- Market segmentation
- Travel behavior by distance
- 100 miles as a cutoff point
- Consistent with nationwide FHWA surveys
- Reflection of market segments and traveler tradeoffs



Issue 2:

Assigning All Business Travel to Peak Period

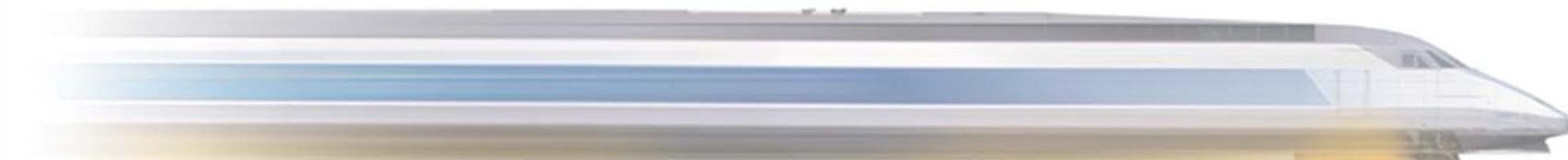
- Majority of business travel occurs during the peak
- Similar patterns in urban and interregional travel
- Model properly reflects
 - Total market size
 - Size of work and non-work market segments
 - Service and costs during peak and off-peak periods
- Model enhancement option to address pricing by time of day to be considered in model refinements



Issue 3:

Treatment of Panel Dataset

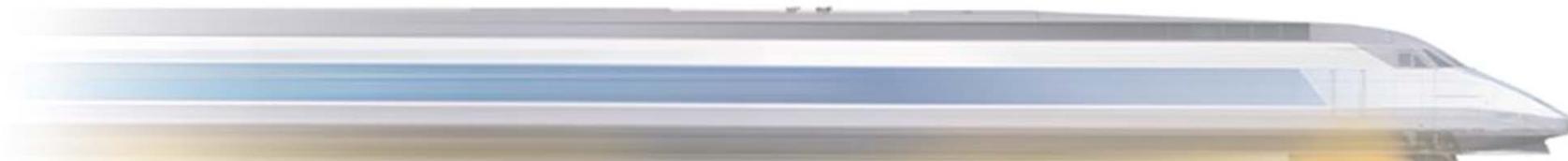
- Two questions in the ITS review
 - The relative values of the policy sensitive parameters
 - The statistical significance of the estimated parameters
- Relative importance is key to policy-sensitive models
 - Parameters are consistent and free of bias
 - Relative importance of parameters is correct



Issue 4:

Constraining the Headway Coefficient

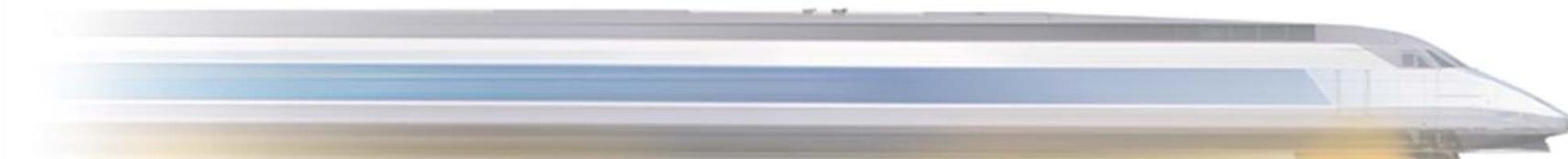
- Components of out-of-vehicle time
 - Access time, wait time, terminal time, and egress time
 - Schedule convenience: Headway component
- High-speed rail: a different paradigm of service frequency
 - Headways are short like commuter rail operations
 - Headway coefficient within range discussed with peer panel
- Reasonable value leading to a policy-sensitive model
- Review and testing of the impact of a range of coefficients planned in model refinement



Issue 5:

Absence of an Airport/Station Model

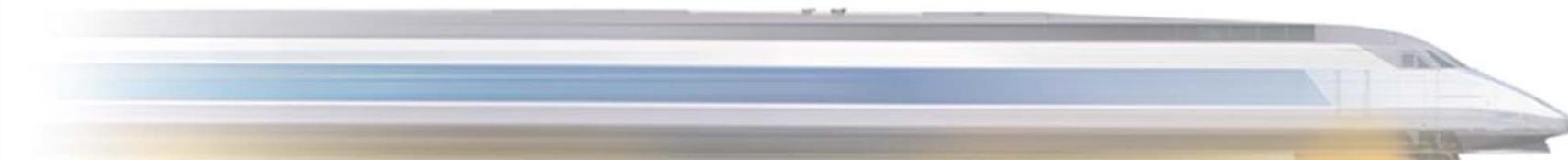
- CS method considers station and airport choice
- A model would assign travelers to 2 or more airports / stations
- Magnitude of impact is estimated to be small
- Model option to address parking pricing and airport / station capacity to be considered in model refinement



Issue 6:

Calibration of Constants - Data

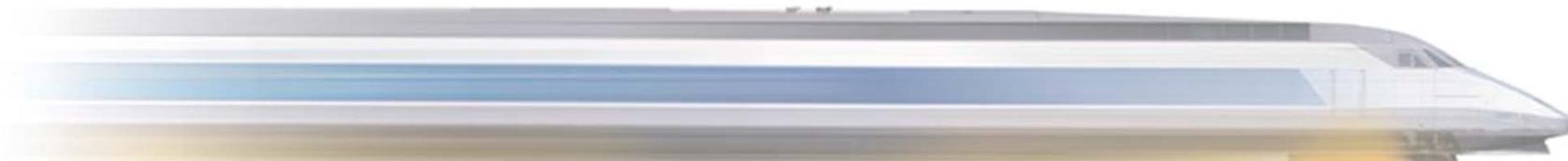
- Representative data for modeling choice behavior
- A random sample for the study
 - Caltrans household survey (N=17,000 households)
 - A minimal sample size for air and rail riders (N=25)
- Enriched sampling
 - New revealed and stated preference surveys
 - 3,000 surveys with 1,500 auto users
 - On-board and airport terminal surveys
 - Data used to develop reliable choice models



Issue 7:

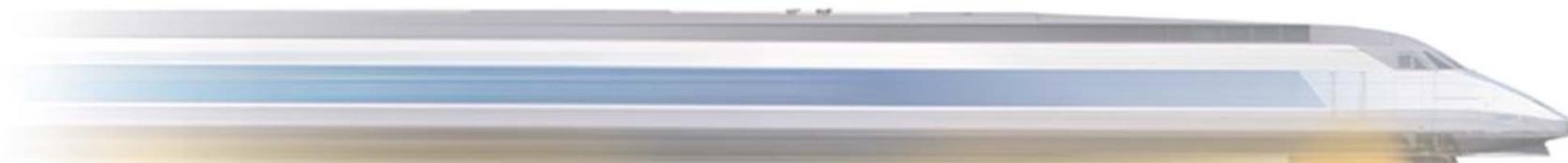
Constraining of Coefficients

- Model calibration to match observed travel
 - Adjustments to mode and airport constants
 - Constraints only on few explanatory variables
- Empirical evidence was used extensively
 - Decisions made to reflect base-year results
 - Reconciling of different sets of data sources
 - Published literature and accepted practice
- Limited constraining of explanatory variables
- No impact on model validity



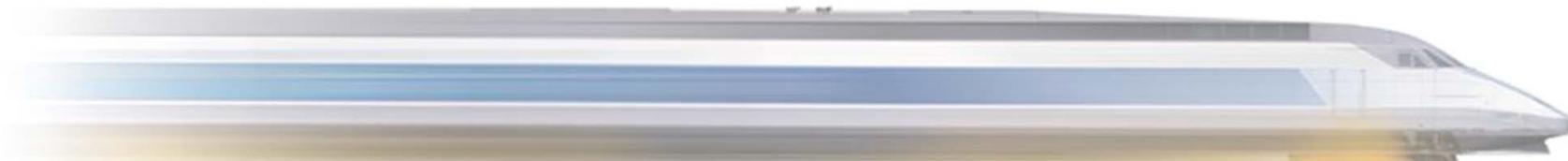
Commitment to Improve Ridership Forecasting

- Letter to Sen. Lowenthal in August promised to:
 - produce forecasting ranges for the HST system,
 - refine forecast models to improve sensitivity,
 - develop independent forecasts of critical inputs,
 - conduct a rigorous risk analysis,
 - integrate peer review into the forecasting work
- Next we will explain how we are planning to perform this work:
 - in the short term for the update to the business plan
 - fully and rigorously in the next two years



Existing model a good base for improvements

- Based on extensive data on travel and demographic characteristics of California
- Developed by Cambridge Systematics, one of the leading practitioner firms in the field
- Professionally accepted standards used in carrying out the modeling and analysis
- Detailed enough to allow realistic testing of alternative alignments, station locations, & service levels
- Open and transparent to allow outside review



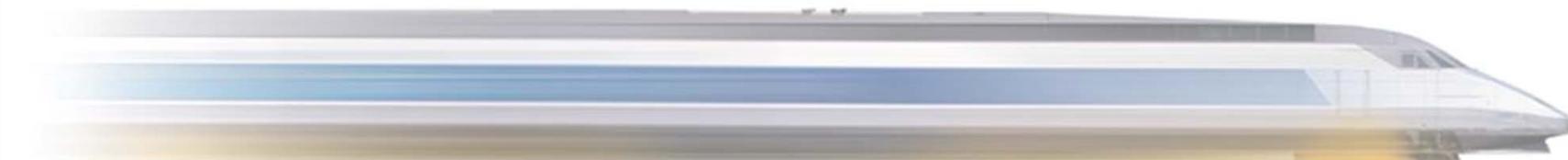
Ridership & Revenue Peer Review Panel

- Will guide & advise the Authority and the forecasting team on updates and improvements to models.
- To be a mix of experienced professional practitioners and academically respected modelers/experts. Will report to the Authority CEO.
- Prof. Frank Koppelman, Professor Emeritus Northwestern University, has agreed to chair the panel.
- Others include
 - Mr. Billy Charlton, SF County;
 - Prof. Eric Miller, University of Toronto;
 - Prof. Kay Axhauser, Inst. Fuer Verkehrsplanung/Transportsysteme Switzerland
- We request a member of the ITS team to become a valuable member of the panel.



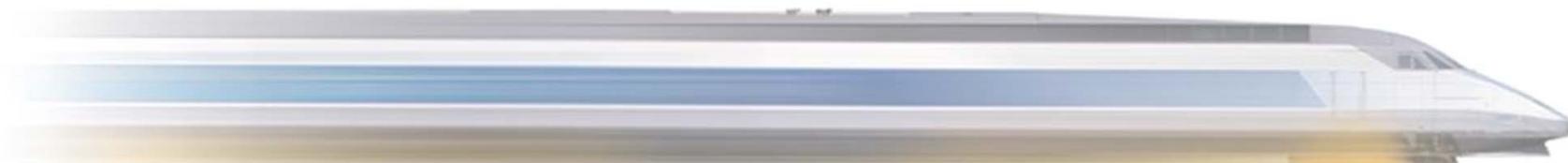
Next Steps

- Use existing model for:
 - Environmental and outreach process
 - The High-Speed Rail Authority business plan
- Engage independent Peer Review group to:
 - Guide model updates
 - Evaluate need for enhancements
- Implement model enhancements
- Evaluate results within an uncertainty framework



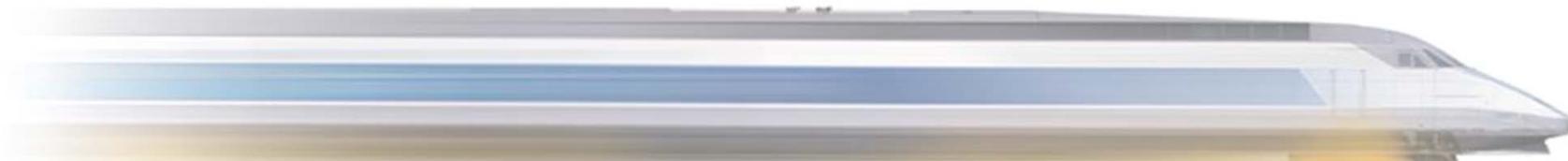
Improvements to business plan forecasts

- Update HST stations and service levels to reflect environmental and operational work of last 12 months
- Review and update key inputs to reflect changes evident from 2005 to present – for example:
 - Population / economic growth
 - Airline competitive response, fuel costs
 - Potential added markets (airport access, tourism)
- Initial analysis of forecast sensitivity using reasonable ranges of possible variation from the central values



Model Enhancements

- Update model to 2008 conditions
 - Revised socioeconomic and network data
 - Changes in long distance travel patterns
 - Revalidation of model to current travel conditions
- Refine model to address more complex questions
 - Parking pricing and constraints
 - Differential peak/off-peak pricing
 - Integrated rail services/Express and local service mix



Risk Analysis Framework

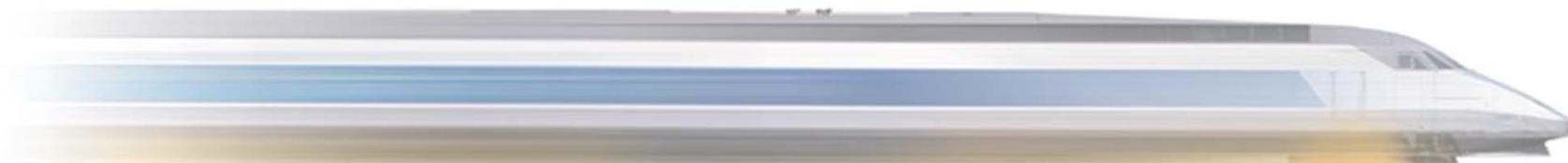
- Model sensitive to a range of inputs
 - Population and employment forecasts
 - Levels of service and cost of travel
 - Properties of the model - coefficients and constants
- Uncertainty analysis to ridership and revenue
 - Sensitivity runs to evaluate “what if” scenarios
 - Evaluation of internally consistent growth scenarios
 - Range of forecasts to assess downside risk and upside potential



Model Enhancements

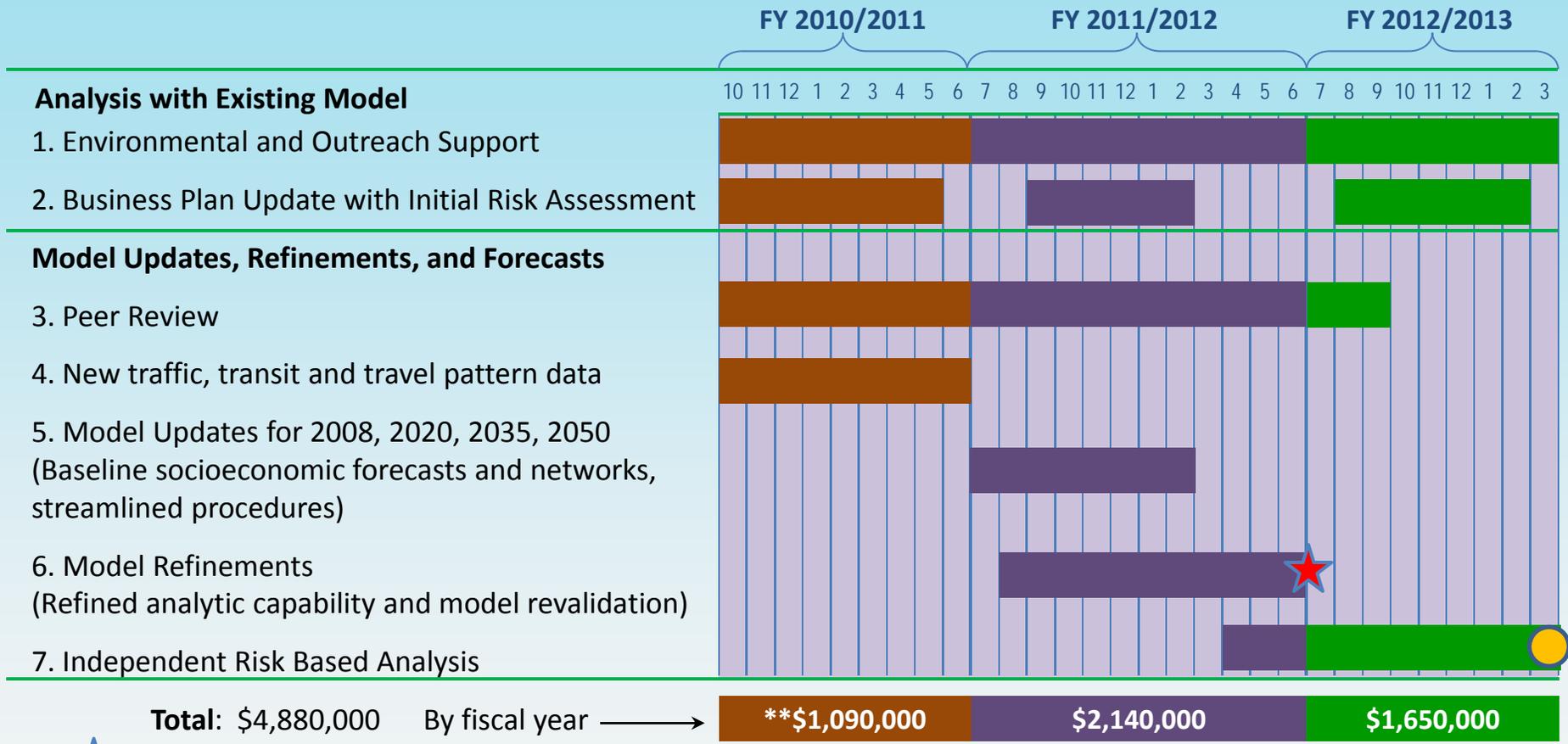
Reflecting the ITS Review

- Peer review group
 - Literature review and model properties
 - ITS question about the value of the headway coefficient
- Station choice model
 - Develop a model to allocate trips by airport/station
 - ITS recommendation for a refined model-based approach
- Time of day model
 - Split trips by purpose and time of day to address pricing
 - ITS recommendation for a more refined procedure to travel markets



Ridership and Revenue Forecasting

FY 2010/2011 Budget Constrained Schedule



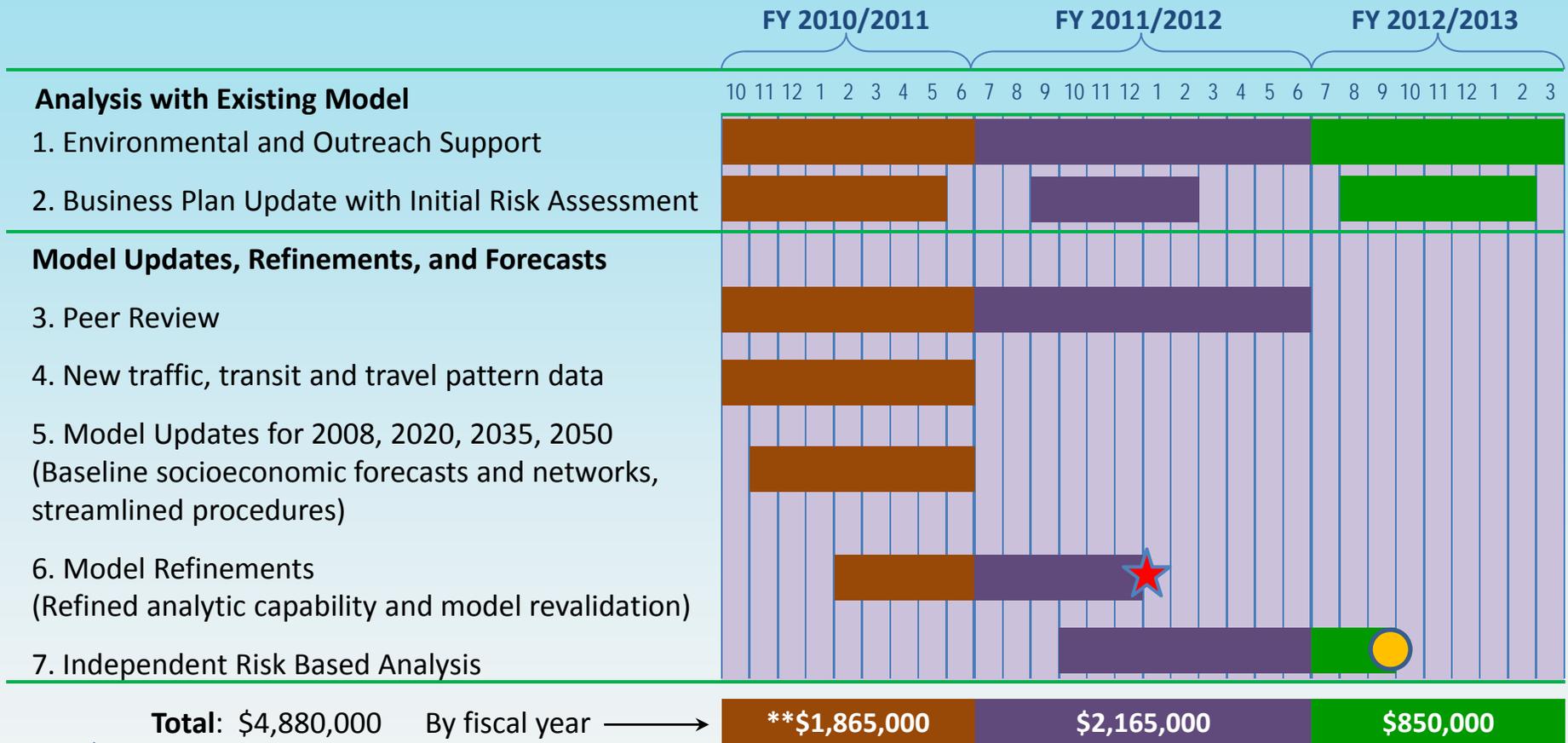
★ Updated and refined model ready to use

● Independent analysis complete

** \$690,000 already authorized

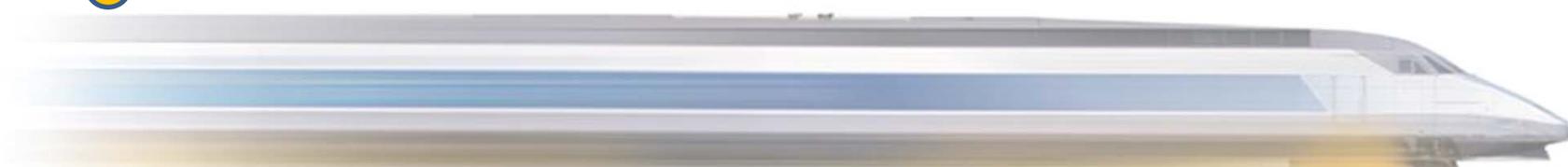


Ridership and Revenue Forecasting Accelerated Schedule

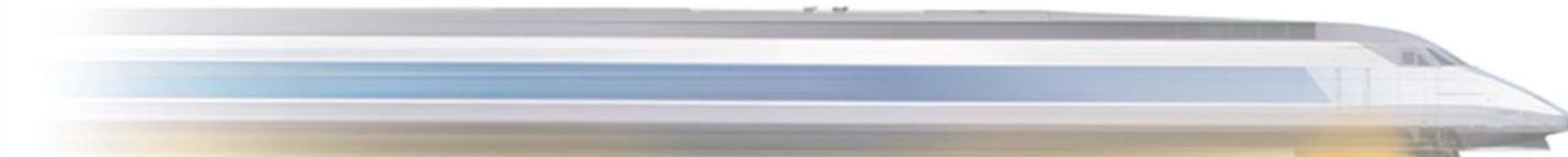


-  Updated and refined model ready to use
-  Independent analysis complete

** \$690,000 already authorized

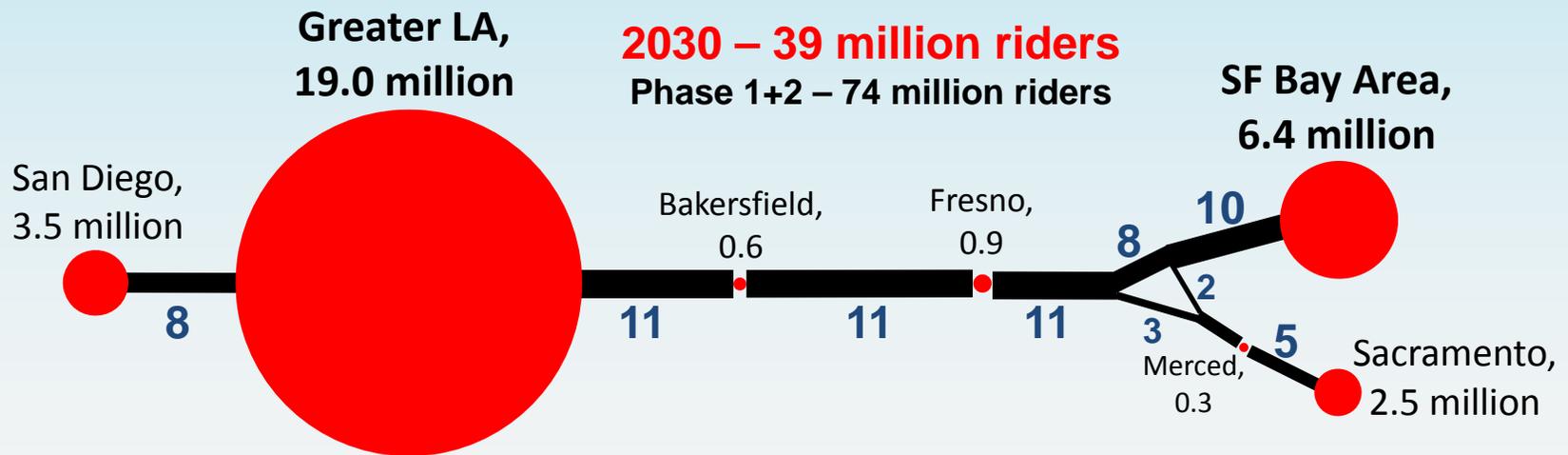
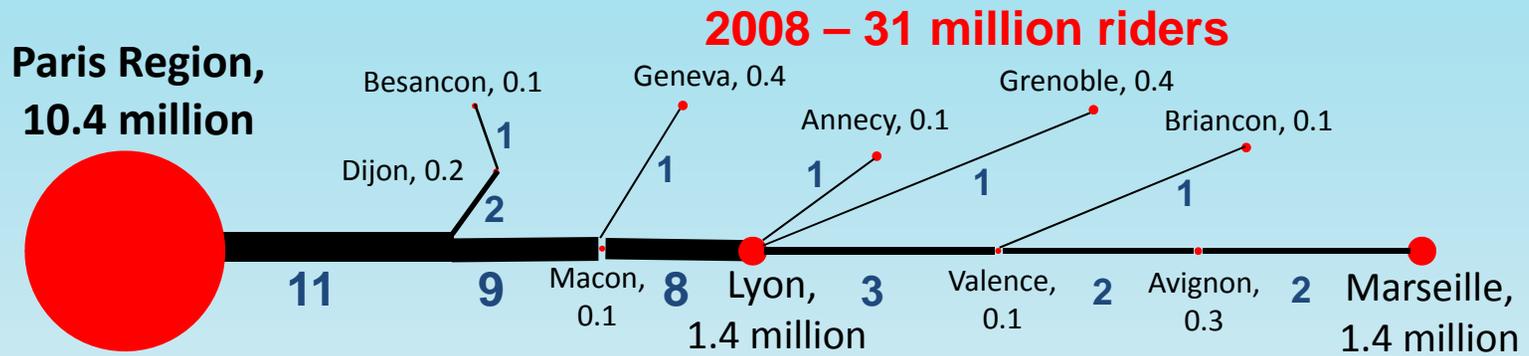


Ridership in HST Corridors



Population & trains/hour peak direction Paris – SE France 2009 & forecast California 2030

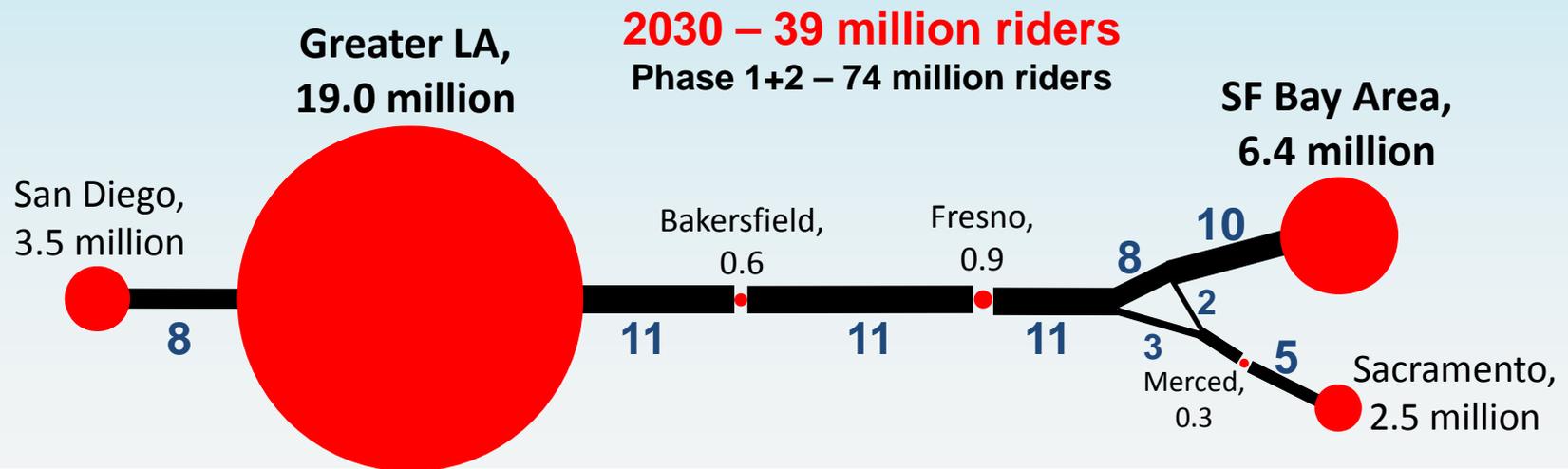
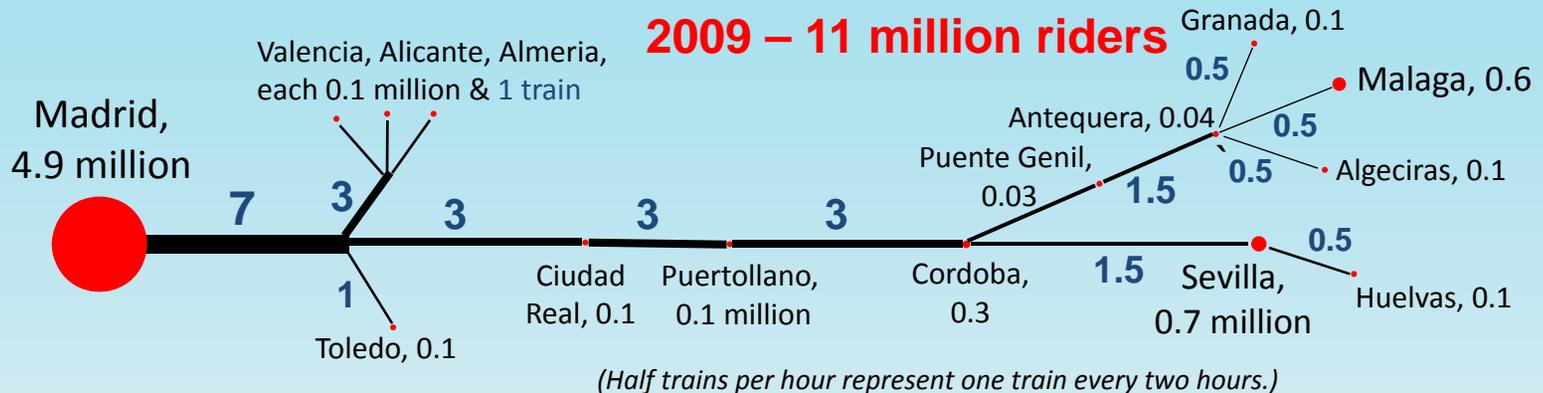
(Population in millions, trains/peak hour/direction in blue)



Urban area population from Demographia World Urban Areas Population & Projections, April 2009; trains per hour from CA Full System and bonjourlafrance.net/france-trains; 1700 hour; March 2009

Population & HS trains/hour peak direction Madrid – Sevilla & SE, Fall 2010 & forecast California 2030

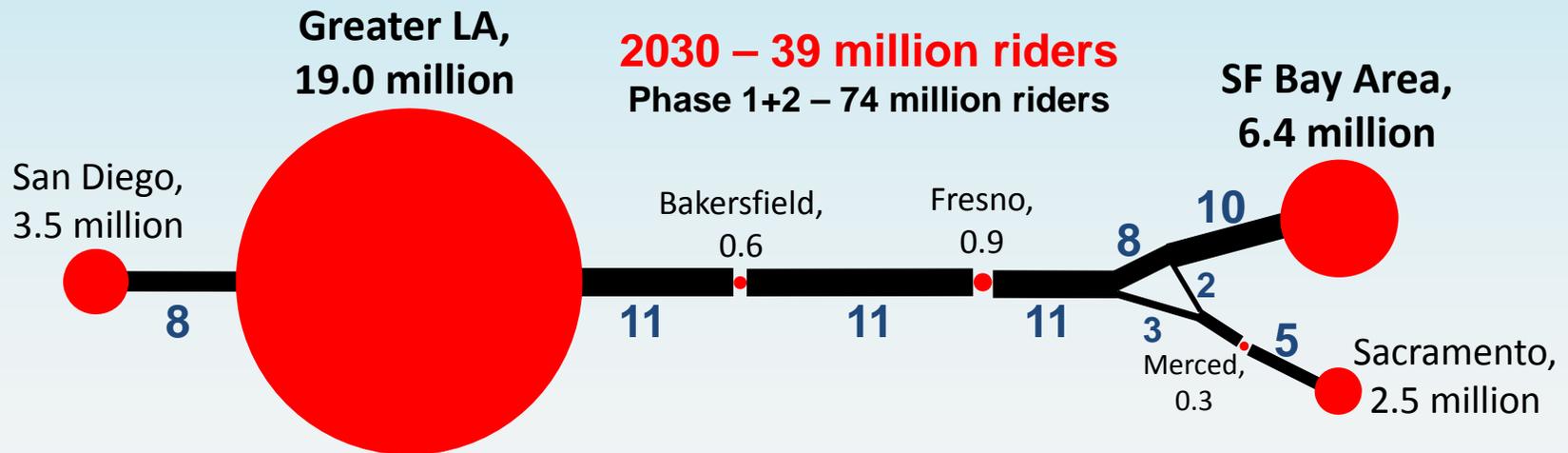
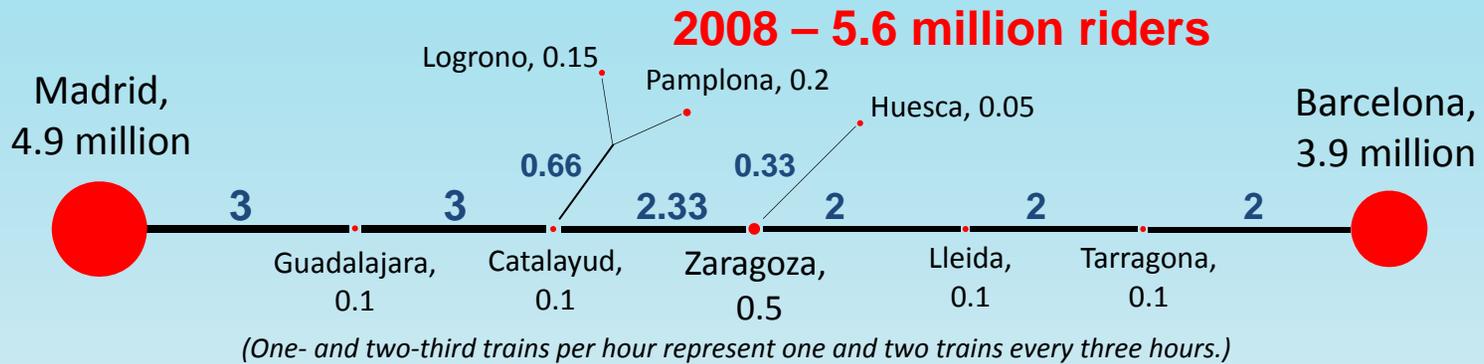
(Population in millions, trains/peak hour/direction in blue)



Urban area population from Demographia World Urban Areas Population & Projections, April 2009; trains per hour from CA Full System and Renfe on-line reservations system, October 2010

Population & HS trains/hour peak direction Madrid – Barcelona, Fall 2010 & forecast California 2030

(Population in millions, trains/peak hour/direction in blue)



Urban area population from Demographia World Urban Areas Population & Projections, April 2009;
trains per hour from CA Full System and Renfe on-line reservations system, October 2010

Comparisons of CA with other HST (cont.)

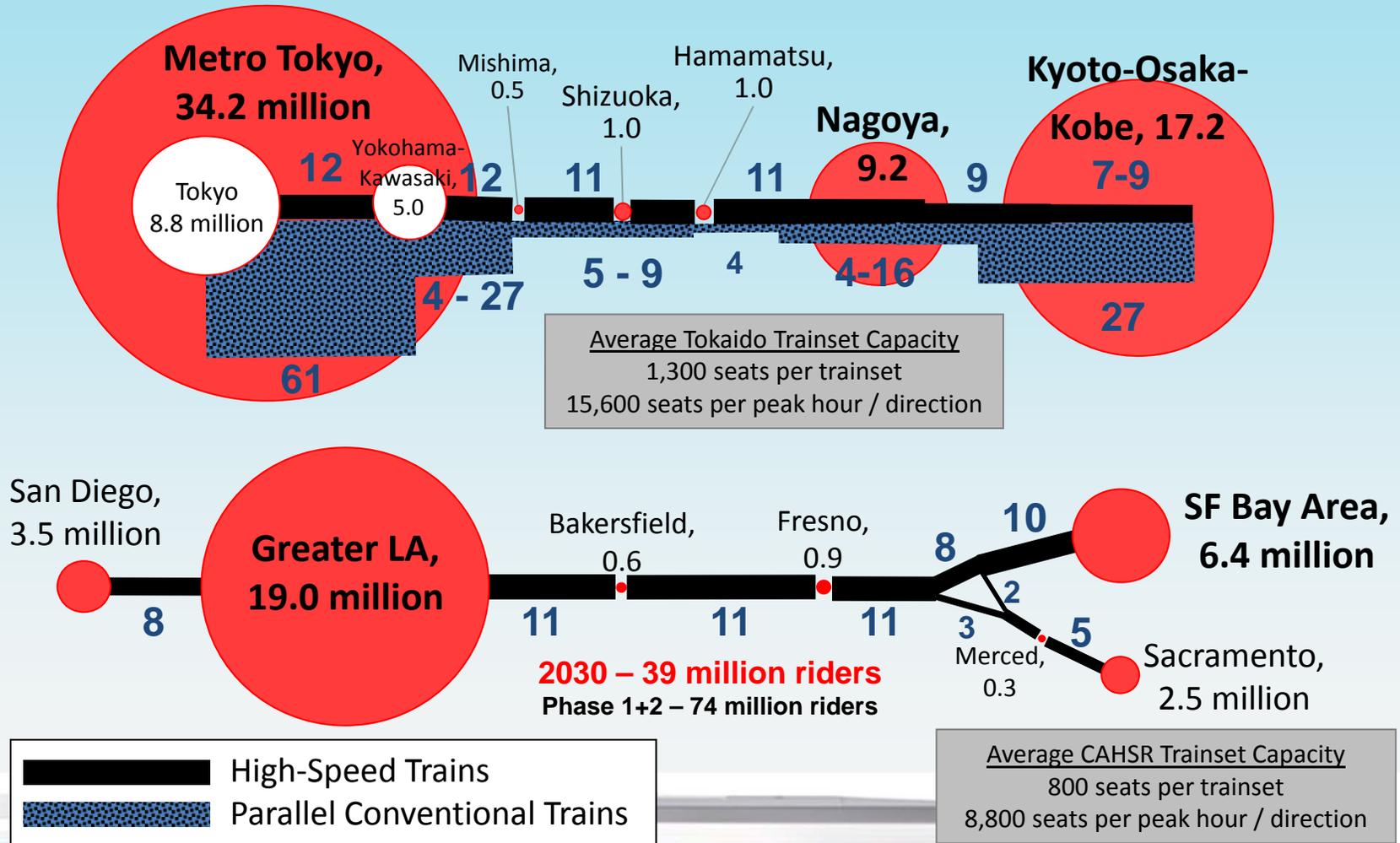
- Tokyo-Osaka Corridor
 - ~70 million people, roughly 2X California
 - Shinkansen provides 11 trains/hour premier service with 77% more seats than planned for CA in 2030
 - Line at capacity; JR Central maglev 40-mile test track first step in planned second HS line
 - 73 trains in peak on 6-10 tracks Yokohama–Tokyo vs. planned 20 trains in peak on 4 tracks SJ-SF
- Tokyo – Northern Japan (JR-East)
 - 25% more people than CA, $\frac{3}{4}$ in Tokyo
 - Normal peak 10 Shinkansen departures per hour
 - Holiday peak 18 Shinkansen departures per hour



Population & HS trains/hour in peak direction Tokyo - Osaka today & California 2030

(Population in millions, trains/peak hour/direction in blue)

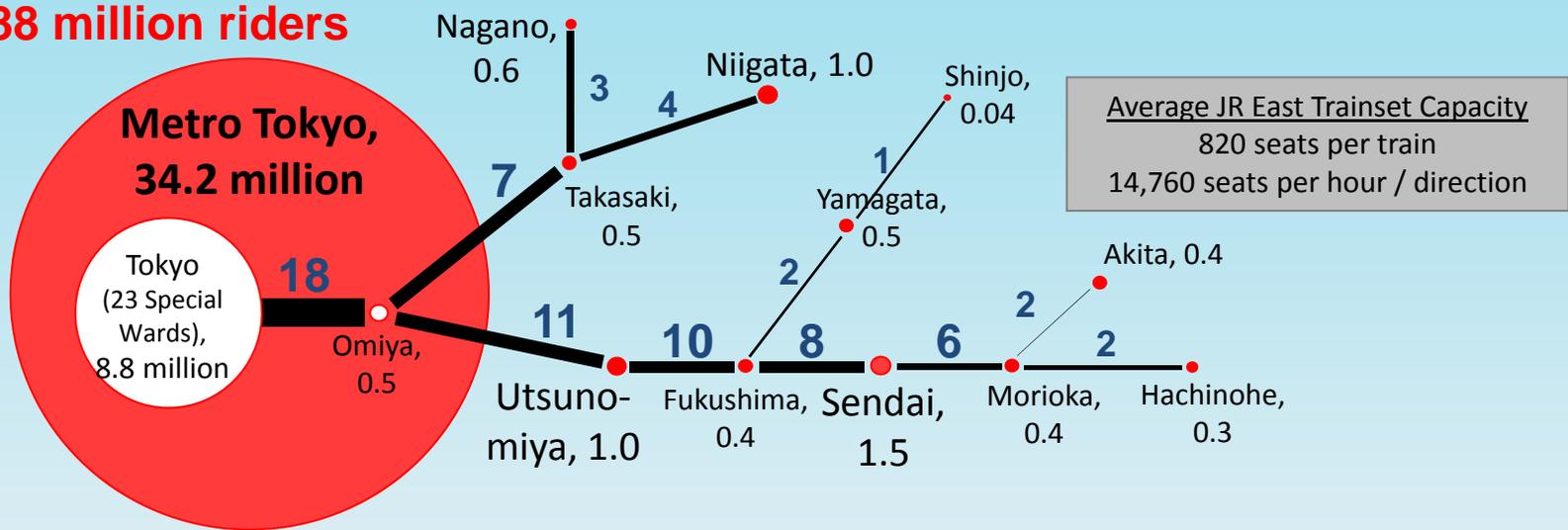
2008 – 151 million Shinkansen riders, 1.7 billion conventional train riders



Population & HS trains/hour peak direction (Holidays) Japan-East, Fall 2010

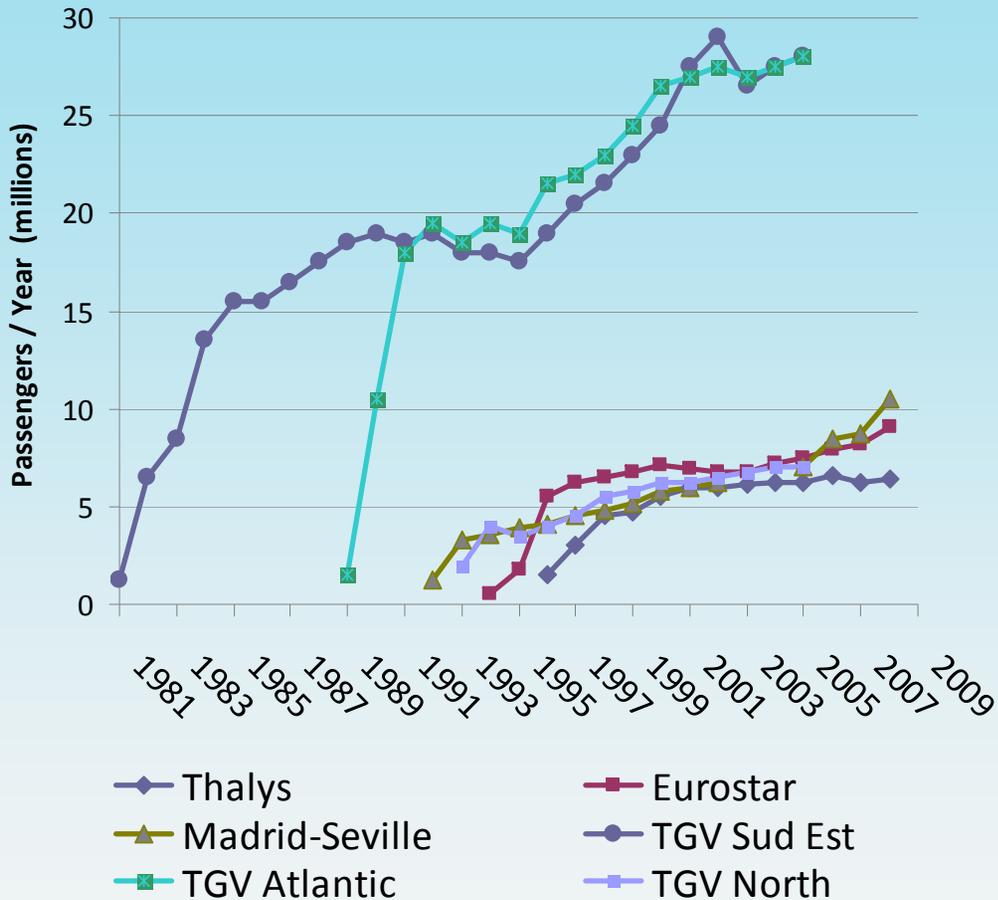
(Population in millions, trains/peak hour/direction in blue)

2009 – 88 million riders



Major metropolitan area population from Demographia World Urban Areas Population & Projections, April 2009; Population of other cities from 2005 Population Census; trains per hour from CA Full System and Japan Rail Group Nationwide Timetable, October 2010

Ridership Ramp-up - Europe

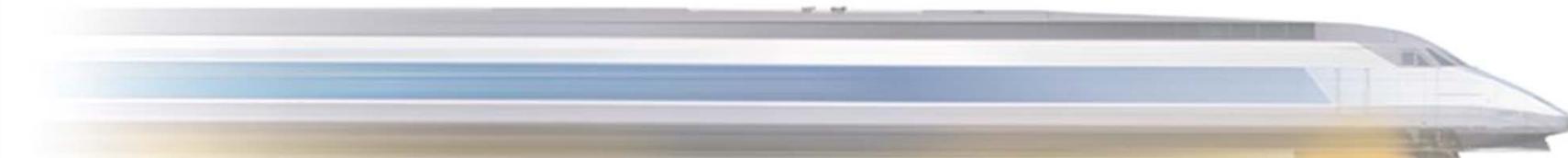


- First HS line (TGV-SE) open in stages '82 & '84
- HS line extended in stages south to Marseille by '01
- TGV Atlantic opened in '89 & '91, steadily adding service after
- Services have taken several years to achieve a steady level of riders



Various other HST issues

- Organizational Changes at CHSRA:
 - Maj-Gen. Hans van Winkle Program Director
 - Mr. Cliff Eby : EVP Parsons Brinkerhoff
 - Other PMT changes
 - Shortage of the Exempt positions
- Commitment to prepare an updated Business Plan.
- Hiring of Price Waterhouse Coopers as financial consultants
- The Inspector General's report
- Federal support focus required.
- The Central Valley.



Q & A

