

MPO Survey of Current Practices of Developing a Baseline Forecast

- Questions
- Responses
 - ❖ Houston-Galveston Area Council (H-GAC)
 - ❖ Maricopa Association of Governments (MAG)
 - ❖ Pima Association of Governments (PAG)
 - ❖ Puget Sound Regional Council (PSRC)
 - ❖ San Diego Association of Governments (SANDAG)
 - ❖ Wasatch Front Regional Council (Salt Lake City MPO) (WFRC)

MPO Survey of Current Practices of Developing a Baseline Forecast

MPOs develop growth forecasts for diverse planning purposes. The final (*plan or policy*) growth forecast is eventually adopted along with the plan (e.g., long-range transportation plan, air quality plan, housing needs allocation plan, economic growth strategy, etc) by the regional council. The transportation plans or air quality plans are generally evaluated against “no plan” or “no build” alternative using transportation or environmental performance measures (e.g., mobility, speed, delay, accessibility, gasoline use, nitrogen (NO_x), particulate matter (PM), and carbon dioxide (CO₂), etc). This MPO survey is designed to understand the current MPO practices of developing a “baseline” or “no project” growth forecast to be used for assessing “no plan” or “no build” alternative. Please email the completed survey to Lingqian Hu at hul@scag.ca.gov or Simon Choi at choi@scag.ca.gov by June 8th, 2007.

I would appreciate your kind and quick response:

Simon Choi
Southern California Association of Governments
818 West 7th Street 12th Floor
Los Angeles, CA 90017
213-236-1849
choi@scag.ca.gov

Please fill out the respondent's name, position, department, organization, phone number, email address:

Q1. Does your agency develop a “baseline” or “no project” forecast?
(Sample Answer: Yes, but we call it a “pure” forecast)

Q2. If you have a baseline forecast, what would be an operational definition of the baseline forecast?

(Sample Answer: A *regional baseline forecast* is defined as the most likely forecast in the absence of regional policy intervention. A *small area baseline forecast (allocation)* is based on historical trend and local general plan)

Q3. What is the difference between a baseline forecast and a plan forecast?

(Sample Answer: A baseline forecast does not include *regional policy* elements and might be *lower* than that of plan forecast)

Q4. How many socioeconomic variables do you develop for a baseline forecast?
(Sample Answer: We develop 25 socioeconomic variables for a baseline forecast. They include population, households, employment, etc.)

Q5. At what geographic levels do you develop a baseline forecast?
(Sample Answer: 1 region, 6 counties, 187 cities, 4108 census tracts, partial tract, census block group, census block, 4100 TAZs, 2 million grid cells (100m*100m), etc)

Q6. What is the planning horizon? What is the data point? What is frequency of the update?
(Sample Answer: We update a baseline forecast in 5 year interval for 30 year planning periods. A baseline forecast is updated every three or four years)

Q7. What is the forecasting process?
(Sample Answer: See attached)

Q8. What are the uses of a baseline forecast?
(Sample Answer: regional transportation plan, regional housing needs allocation, air quality plan, economic growth strategy, etc.)

Q9. What kinds of forecasts do you use for “no-build” scenario of the transportation plan? (Sample Answer: a baseline forecast. We sometimes experience untenable growth assumptions, such as growth of traffic beyond capacity in some areas. It raised serious issues about the relation of land use and transportation at the regional level)

Q10. What kinds of forecasts do you use to develop the baseline emission budget for the air quality plan? Any timing issue between transportation plan and air quality plan?
(Sample Answer: a baseline forecast. Yes, there is sometimes an issue because of a different plan schedule.)

Q11. Do you develop a plan forecast, which adds more jobs to a baseline forecast, to promote regional economic growth?
(Sample Answer: Yes)

Q12. Do you use "one" baseline forecast for any planning purposes?
(Sample Answer: Yes)

Please provide any other comments or issues to be discussed:

Houston-Galveston Area Council (H-GAC)

Please fill out your name, position, department, organization, phone number, email address:

Dmitry Messen, PhD
Forecast Program Manager
Community and Environmental Planning Department
Houston-Galveston Area Council
713-993-4535
dmessen@h-gac.com

Q1. Does your agency develop a "baseline" or "no project" forecast? Please identify all types of forecasts. (Yes, we develop three types of growth forecasts. They are a baseline forecast (no policy intervention), an alternative forecast (based on different scenarios), and a plan forecast (a desired future).)

H-GAC: With respect to the county (and regional) control totals, we develop only one forecast. It's called "base". We also have a "base" sub-county forecast; essentially, it's predicated on all projects from the old RTP coming on-line. The only variations we have are in the "scenarios", which lead to different spatial patterns of growth (the "total" growth is always unchanged). These scenarios are exploratory (not official) in nature we only allude to them in the RTP. The whole idea of "alternative future" is new to our policymakers. Generally, I would argue that the "desired future" is not a forecast, unless by the "desired future" you mean an outcome of the certain policy options.

Q2. If you have a baseline forecast, what would be an operational definition of the baseline forecast?

(Sample Answer: A *regional baseline forecast* is defined as the most likely forecast in the absence of regional policy intervention. A *small area baseline forecast (allocation)* is based on historical trend and local general plan)

H-GAC: A regional baseline forecast is defined as the most likely forecast (policy intervention is not really considered explicitly). A small area forecast is based on the disaggregate land use model (UrbanSim) which is informed by the historical trends.

Q3. What is the difference between a baseline forecast and a plan forecast?

(Sample Answer: A baseline forecast does not include *regional policy* elements and might be *lower* than that of plan forecast)

H-GAC: we don't have a "plan" forecast

Q4. How many socioeconomic variables do you develop for planning/modeling purposes? What kind of local review is done by member agencies?

(Sample Answer: We develop 53 socioeconomic variables for planning/modeling purposes. Four major variables including population, households, housing, and employment go through extensive technical/political review, and local input process.)

H-GAC: we develop population by age/race, households by age/race/size, employment by 7 sectors; local review (for control totals) is mostly done by county representatives. We also do an open (not formal public) review of small area forecast and invite all interesting parties.

Q5. At what geographic levels do you develop a socioeconomic forecast?

(Sample Answer: 1 region, 6 counties, 187 cities, 4108 census tracts, 5000 partial tract, 7,000 census block group, 25,000 census block, 4100 TAZs, 2 million grid cells (100m*100m), etc)

H-GAC: 8 counties, 0.25 million 1,000 by 1,000 ft grid cells. The forecast for TAZ's, census tracts, zipcodes, and all other standard and custom units are derived from the grid cells.

Q6. What is the forecast horizon? What is the data point? What is the frequency of the update?

(Sample Answer: We update a baseline forecast in 5 year interval for 30 year forecast periods. A baseline forecast is updated every three or four years)

H-GAC: The last forecast was for 30 years (2005-2035), with annual data available. The frequency of updates varies, this is being discussed.

Q7. What is the forecasting process?

H-GAC: The forecast is developed in two distinct yet connected phases. Phase I involves forecasting population and employment for each of the 8 counties in the Houston area for 2005-20035. These are called "county control totals." Phase II involves distributing each county's control totals into smaller geographic areas. County control totals are developed using a multi-step trends-based model, while sub-county allocations are derived from UrbanSim forecasting model, which approximates and simulates the complexities of the land use trends, patterns, and dynamics.

Q8. What are the uses of a baseline forecast?

(Sample Answer: regional transportation plan, regional housing needs allocation, air quality plan, economic growth strategy, etc.)

H-GAC: Primarily, transportation planning and air quality.

Q9. What kinds of forecasts do you use for "no-build" scenario of the transportation plan? (Sample Answer: a baseline forecast. We sometimes experience untenable growth assumptions, such as growth of traffic beyond capacity in some areas. It raised serious issues about the relation of land use and transportation at the regional level)

H-GAC: We have not yet achieved a good integration with TDM, their no-build scenario does not impact the demographic forecast ("people will be here no matter what" assumption).

Q10. What kinds of forecasts do you use to develop the baseline emission budget for the air quality plan? Is there any timing issue between transportation plan and air quality plan?

(Sample Answer: a baseline forecast. Yes, there is sometimes an issue because of a different plan schedule.)

H-GAC: Baseline forecast. There's always a timing issue.

Q11. Do you develop a plan forecast, which adds more jobs to a baseline forecast, to promote regional economic growth?

(Sample Answer: Yes. A plan forecast contains an explicit economic growth strategy associated with the “extra” private sector investment, which is beyond and above the historical pattern.)

H-GAC: No

Q12. Do you use “one” baseline forecast for any planning purposes?

(Sample Answer: Yes. We intend to use the a baseline forecast as reference for a wide range of planning purposes)

H-GAC: Yes

Q13. Socioeconomic forecasters need “reliable” historical and the base year socio-economic data to develop a better forecast. How do you validate such historical and the base year socioeconomic data? (Sample Answer: We have used county/jurisdictional level “official” socioeconomic estimates released by the state agency. Below the jurisdictional level, we work with the most recent land use image data, public and private sources, and local planners to allocate the county/jurisdictional level socioeconomic estimates)

H-GAC: Validation is difficult and often times not possible. In simulation modeling framework, validation, I think, should apply mostly to parameter estimation. We use most recent imagery, appraisal, and real estate data.

Q14. The goal of socioeconomic forecasters is to develop a consistent and accurate socioeconomic forecast, given the time and budget constraints. The forecast also should be politically acceptable. How do you test the “reasonableness” of the forecast? (Sample Answer: We use the forecast error measures (e.g., mean absolute percent error, mean algebraic percent error) to measure the forecast error using the historical and projected socioeconomic data. We communicate with the stakeholders by indicating that the smaller area, longer forecast horizon, smaller population size, and the lower growth rates would result in more forecast errors than the larger area, shorter forecast horizon, larger population size, and the higher growth rates)

H-GAC: If anybody questions our small area forecast (too high or too low), we ask to provide either evidence for why development cannot occur in this particular place or evidence that we don’t have the existing development in our forecast.

Q15. Please tell us about your current efforts of socioeconomic forecast model enhancements for different levels of geography. (Sample Answer: At the county level, we upgraded the gross migration module of the cohort-component model to better reflect the demographic processes. We are in the process of developing a timeline of implementing PECAS and UrbanSim for the small area forecast.)

H-GAC: we are developing a disaggregated simulation cohort-component model with explicit migration module; we are adding more details and specifics to our UrbanSim model; we are trying to integrate UrbanSim with TDM.

Q16. Please tell us about the basic characteristics of the "official" forecast (it could be a baseline forecast, a plan forecast, or a policy forecast.) of your agency for planning/modeling purposes. (Sample Answer: The regional council (decision making body) of our region adopts the official forecast of three major variables (population, households, and employment) in a five year increment at the county level for thirty year forecast horizon. The small area forecast below the county level is not officially adopted by the regional council, but is developed and maintained by the forecast group)

H-GAC: H-GAC Board adopts the control totals, sub-county forecast is not "official".

Please provide any other comments or issues to be discussed:

Maricopa Association of Governments (MAG)

Please fill out your name, position, department, organization, phone number, email address:

Rita Walton, Manager, Information Services, Maricopa Association of Governments, 602-452-5014
rwalton@mag.maricopa.gov

Q1. Does your agency develop a "baseline" or "no project" forecast? Please identify all types of forecasts

We currently develop a baseline projection which assumes the implementation of the programmed MAG Regional Transportation Plan and that local jurisdictions follow the vision in their general (or long range) plans. This plan and program is funded, in part, by a voter-approved sales tax to support the implementation of the regional transportation system. Within Arizona, a local community's general plan is approved by the voters within the community.

Please note: MAG produces long-range regional projections, for various levels of geographies; as opposed to forecasts. The regional projections are developed, in part, based on the State of Arizona's adopted long-range county population projections.

Q2. If you have a baseline forecast, what would be an operational definition of the baseline forecast?

(Sample Answer: A *regional baseline forecast* is defined as the most likely forecast in the absence of regional policy intervention. A *small area baseline forecast (allocation)* is based on historical trend and local general plan)

Our baseline projection reflects the recently approved state and county population projections, along with compatible most likely economic scenario. The economic scenario is based on well-accepted national, state , and regional economic forecasts.

The projection also reflects the voter-approved plans and program implementation as identified in the Regional Transportation Plan (RTP), the Transportation Improvement Program (TIP), other associated transportation plans/programs, and the local member agencies' general plans.

Q3. What is the difference between a baseline forecast and a plan forecast?

(Sample Answer: A baseline forecast does not include *regional policy* elements and might be *lower* than that of plan forecast)

At this time, the MAG regional projections assumes all adopted policy and planning initiatives. Any additional alternatives or policy initiatives, whether regional or local, could be incorporated in additional projections scenarios, which could be model for policy discussions.

Q4. How many socioeconomic variables do you develop for planning/modeling purposes? What kind of local review is done by member agencies?

The current projections series includes 37 detailed socioeconomic variables.

The variables that are subjected to the local/policy review process are: total resident population, population in households, housing units, population in group quarters, and employment by five land use types (retail, office, industrial, public and other). They are reviewed by members of our Population Technical Advisory Committee made up of representatives of our member agencies. They are recommended for approval by the MAG Management, consisting of City/Town/County Managers. Ultimately they are approved by the MAG Regional Council which is comprised of elected officials of member agencies.

Q5. At what geographic levels do you develop a socioeconomic forecast?

Socioeconomic projections are developed for 1 region, 1 county, 29 Municipal Planning Areas, 148 Regional Analysis Zones and 1955 Socioeconomic Analysis Zones. They are also developed at the one-acre grid level from which they can be aggregated to any level of geography.

Q6. What is the forecast horizon? What is the data point? What is the frequency of the update?

We project the 2005 baseline population and employment variables for 2010, 2020 and 2030. The official projections are updated every five years.

Q7. What is the forecasting process?

Please see flow charts attached as PDF Files.

Q8. What are the uses of a baseline forecast?

The MAG socioeconomic projections are widely used in transportation planning and program development, air quality conformity analysis, and infrastructure planning. The projections are used by the public, private and non-profit sectors. Specific users include: Valley Metro, banks, school districts, retail establishments, water providers, and firms considering expansion or location in the region.

Q9. What kinds of forecasts do you use for "no-build" scenario of the transportation plan?

As discussed earlier, the regional projections series includes all voter –adopted plans and programs. As an example, as the sales tax to fund regional transportation system is in place, it is assumed that the resources will become available to implement the RTP.

Q10. What kinds of forecasts do you use to develop the baseline emission budget for the air quality plan? Is there any timing issue between transportation plan and air quality plan?

N.A.

Q11. Do you develop a plan forecast, which adds more jobs to a baseline forecast, to promote regional economic growth?

No. We can and do, from time to time, produce scenario projection series reflecting based upon changing conditions or special situations.

Q12. Do you use "one" baseline forecast for any planning purposes?

The regional socioeconomic projections are used as a basis for analyzing and estimating outcomes of the Regional Transportation Plan, regional development/growth outcomes analysis, and by member agencies in their community development and planning efforts.

Q13. Socioeconomic forecasters need “reliable” historical and the base year socio-economic data to develop a better forecast. How do you validate such historical and the base year socioeconomic data? (Sample Answer: We have used county/jurisdictional level “official” socioeconomic estimates released by the state agency. Below the jurisdictional level, we work with the most recent land use image data, public and private sources, and local planners to allocate the county/jurisdictional level socioeconomic estimates)

Below the county level we work with the most recent land use image data, our residential completion database, and local planners to verify the accuracy of the data. In addition, a number of reliable sources (both governmental and private) are used to ensure the reliability and validity of the demographic and economic data used in modeling.

Q14. The goal of socioeconomic forecasters is to develop a consistent and accurate socioeconomic forecast, given the time and budget constraints. The forecast also should be politically acceptable. How do you test the “reasonableness” of the forecast?

The regional projections are reviewed and analyzed by knowledgeable public and private sector users of this data. Throughout the modeling process, a careful and thorough review of the current and base data – along with the development conditions.

We look at past growth and known development plans at a regional level, analyze the model results, and focus review both changing characteristics and conditions as well as final outcomes. We meet several times with member agencies staff to have them review the inputs and implementation of community general plans to assure that they make sense. We look at growth rates, map the changes over time, use extensive knowledge of the area, etc.

In short, the modeled outcomes face two tests, one of appropriateness and one of reliability.

Q15. Please tell us about your current efforts of socioeconomic forecast model enhancements for different levels of geography.

We have a continuing improvements program to ensure the validity and reliability of data, assumptions, and models used in the projections. The employment projections model was recently reviewed and enhanced. We are in the process of working on updates to demographic modeling.

At the Regional Analysis Zone (RAZ) level, a spatial allocation model is used. A GIS based model is used to develop projections by Socioeconomic Analysis Zone. The model produces the projections by one acre grid which can be summed to any level of geography.

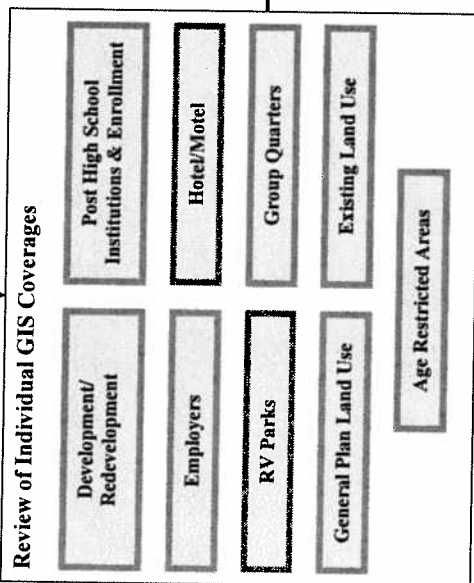
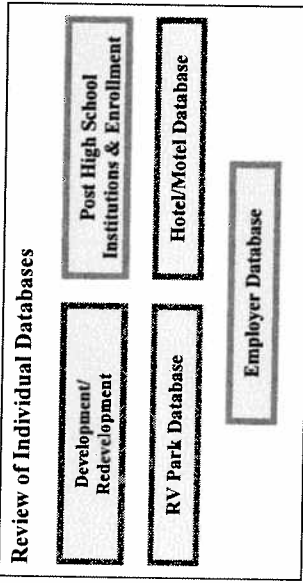
Our modeling effort is expanding to consider and produce outcomes reflecting the interrelationships of growth between Maricopa County and surrounding counties. The current model already extends beyond the Maricopa County (and the MPO) borders in recognition that the urbanized area has joint and connected effects on growth and development.

Finally, and perhaps most importantly, MAG is underway with a major modeling initiative. MAG has retained the Paul Waddell and his colleagues at the University of Washington's CUSPA to update and migrate the MAG Socioeconomic Model to up-to-date software and newer modeling methodologies and tools.

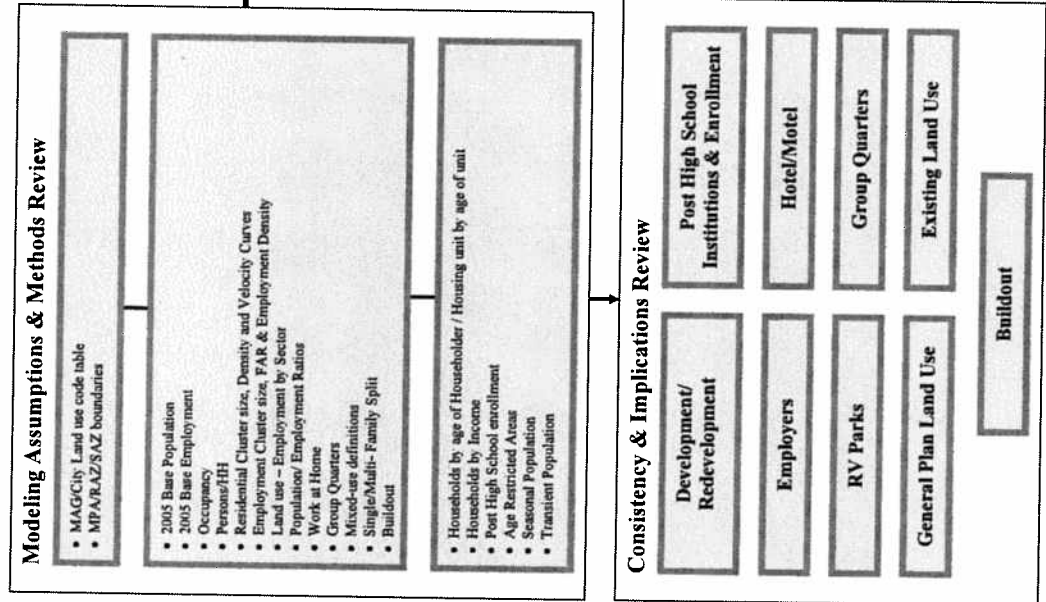
Q16. Please tell us about the basic characteristics of the "official" forecast (it could be a baseline forecast, a plan forecast, or a policy forecast.) of your agency for planning/modeling purposes.

The Regional Council, comprised of elected officials of our member agencies approves the official projections of total resident population, population in households, population in group quarters, housing units and employment by five land use types: (retail, office, industrial, public and other) in 10 years increments for a 25 year forecast horizon at the Municipal Planning Area (MPA) and Regional Analysis Zone (RAZ) level of geography. The small area forecast at the Socioeconomic Analysis Zone level is not approved by the Regional Council but is developed by MAG in collaboration with member agencies.

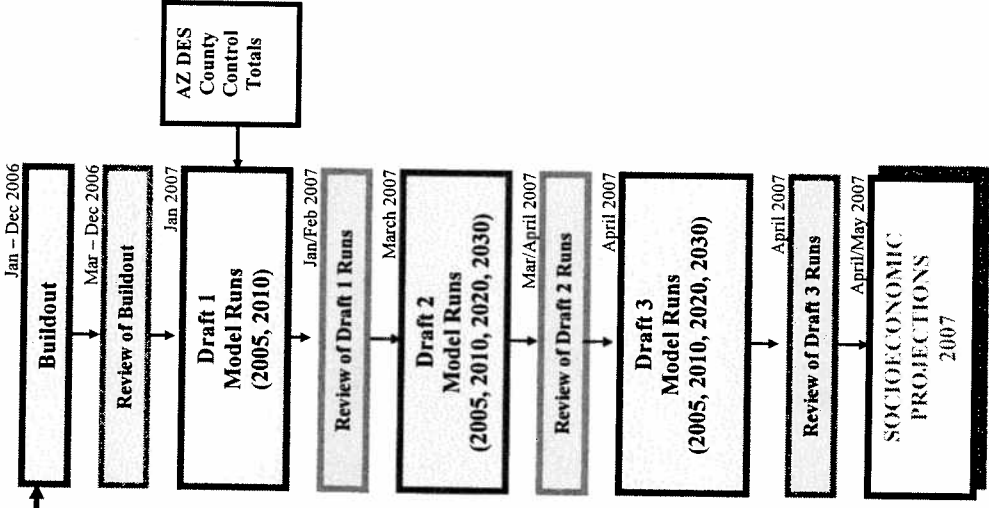
Preparation for Socioeconomic Modeling (December 2005 – March 2007)



CENSUS 2000 & CENSUS SURVEY 2005



Socioeconomic Modeling (January 2006 – May 2007)



KEY

MAG TASK

TO BE REVIEWED THIS MONTH

TO BE REVIEWED

REVIEW COMPLETE

SOCIOECONOMIC DATA & MODELING REVIEW PROCESS
FOR PREPARATION OF 2007 SCOCIOECONOMIC PROJECTIONS BY THE MARICOPA ASSOCIATION OF GOVERNMENTS



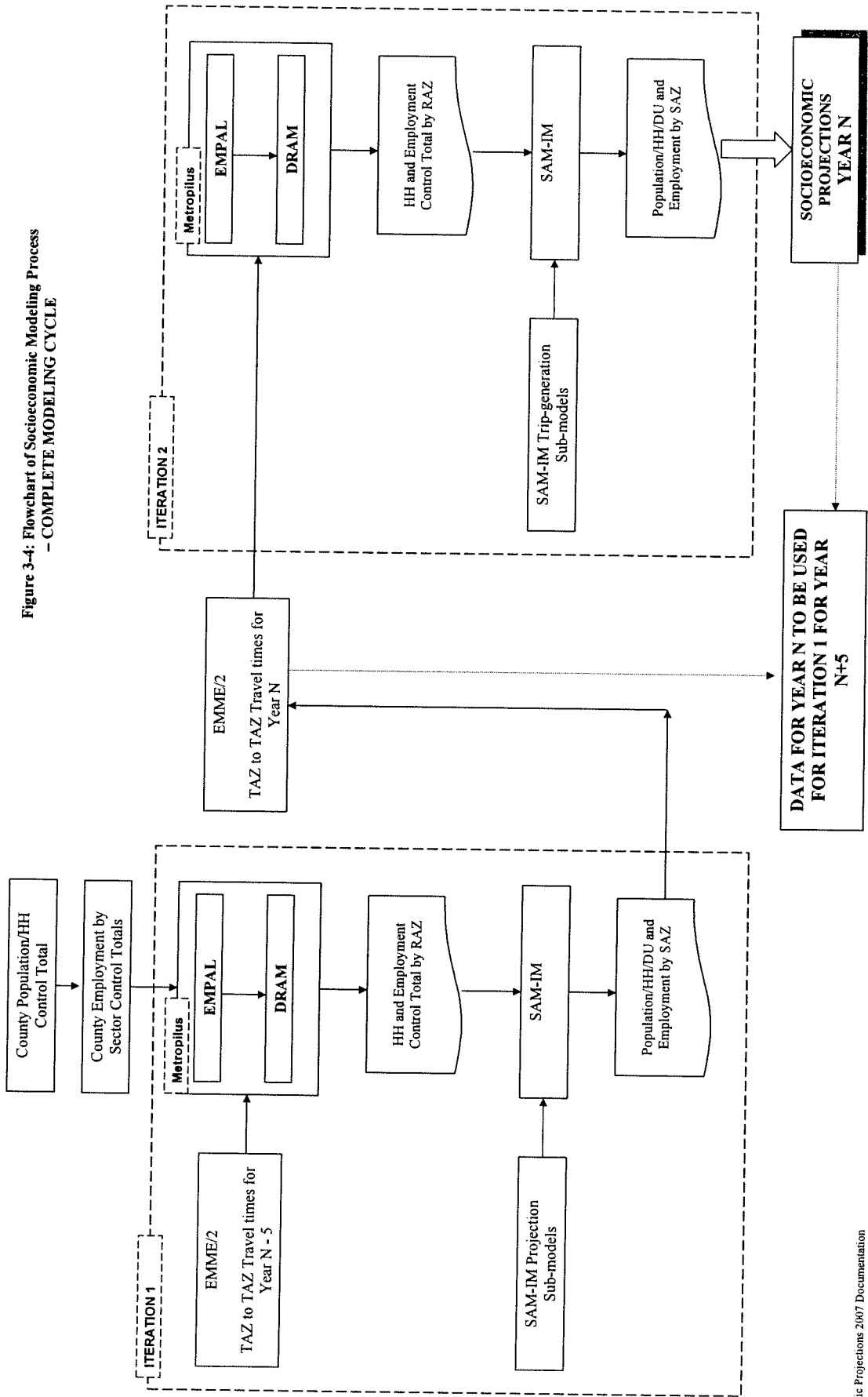


Figure 3-4: Flowchart of Socioeconomic Modeling Process - COMPLETE MODELING CYCLE

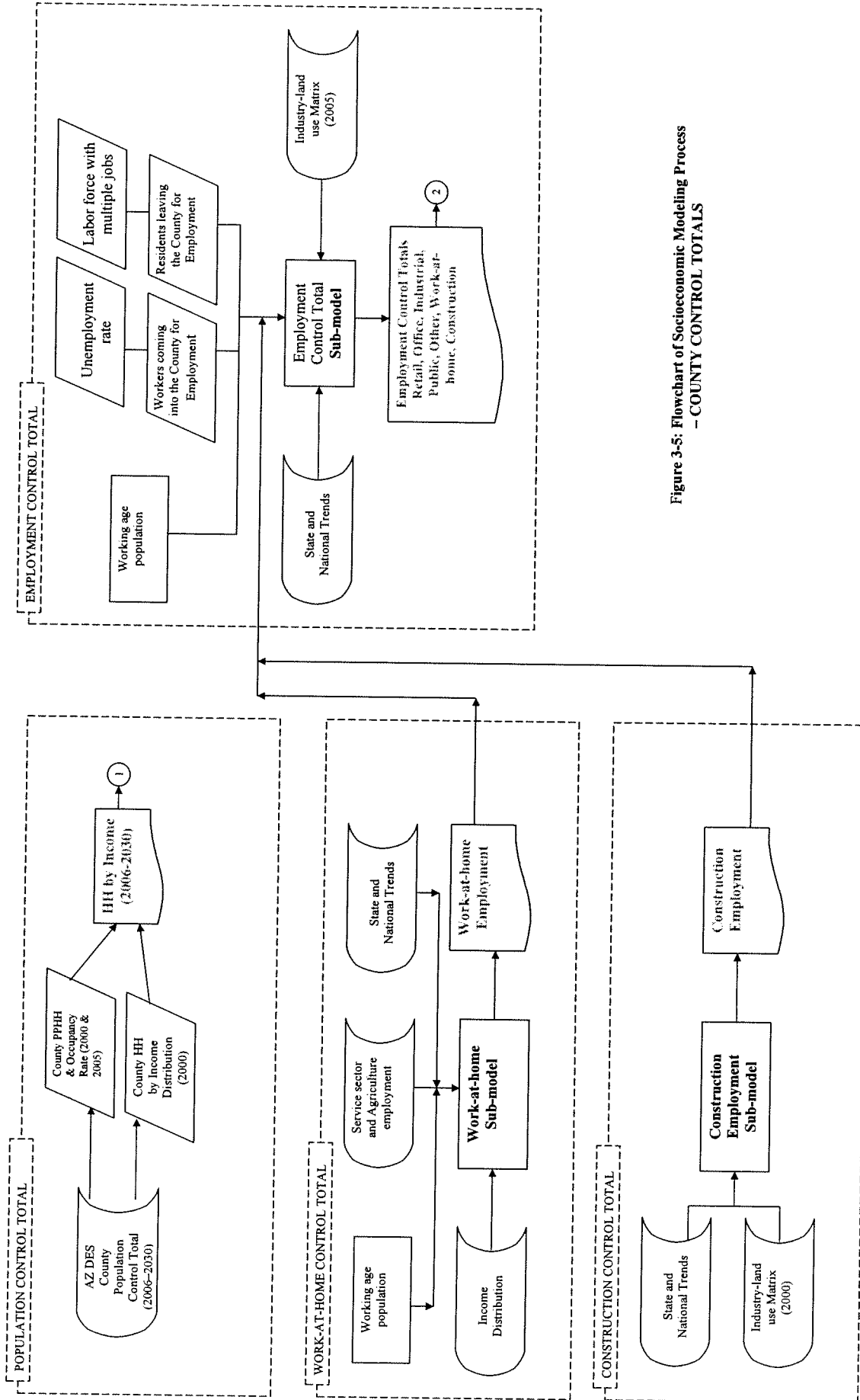


Figure 3-5: Flowchart of Socioeconomic Modeling Process
- COUNTY CONTROL TOTALS

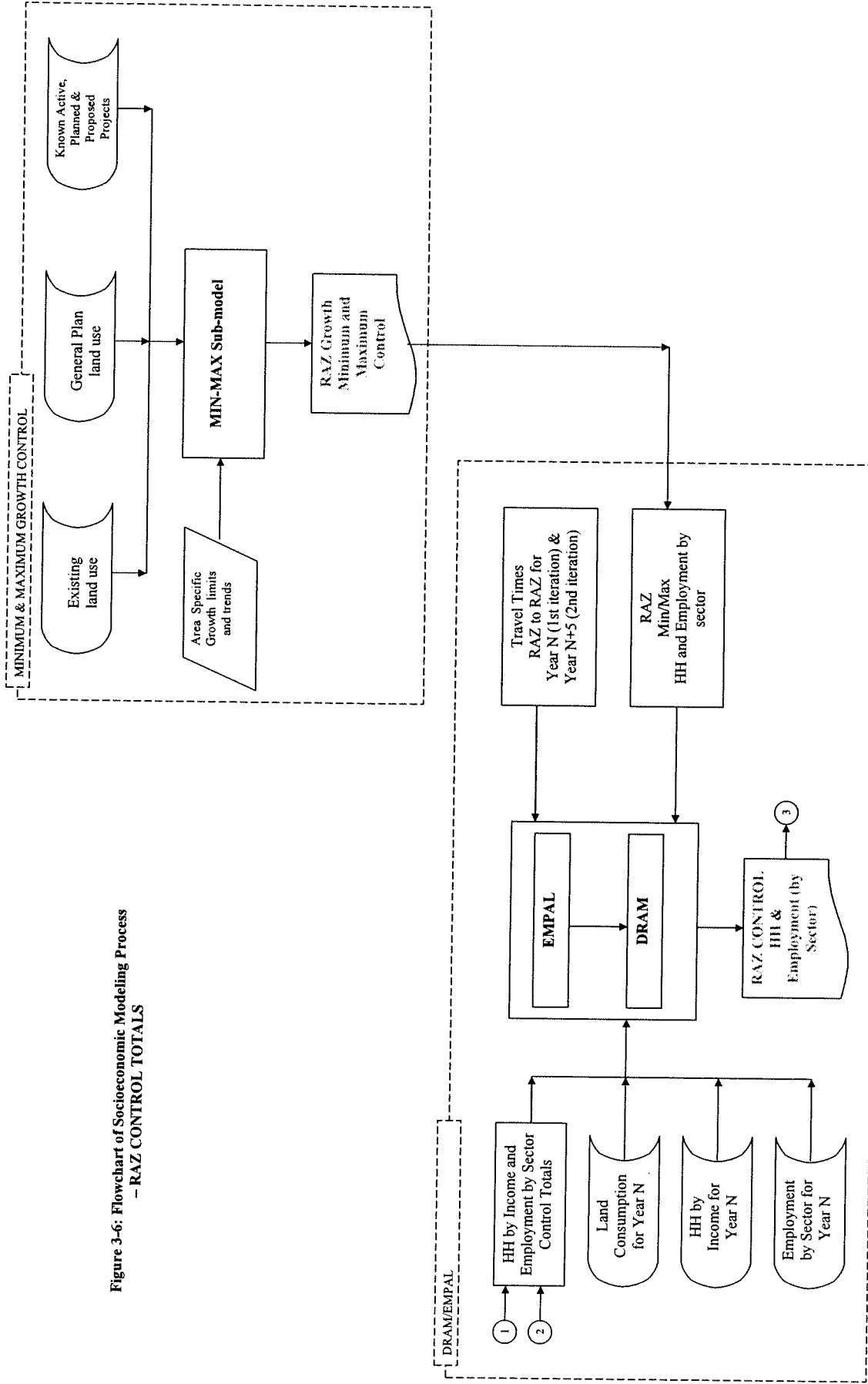


Figure 3-6: Flowchart of Socioeconomic Modeling Process
- RAZ CONTROL TOTALS

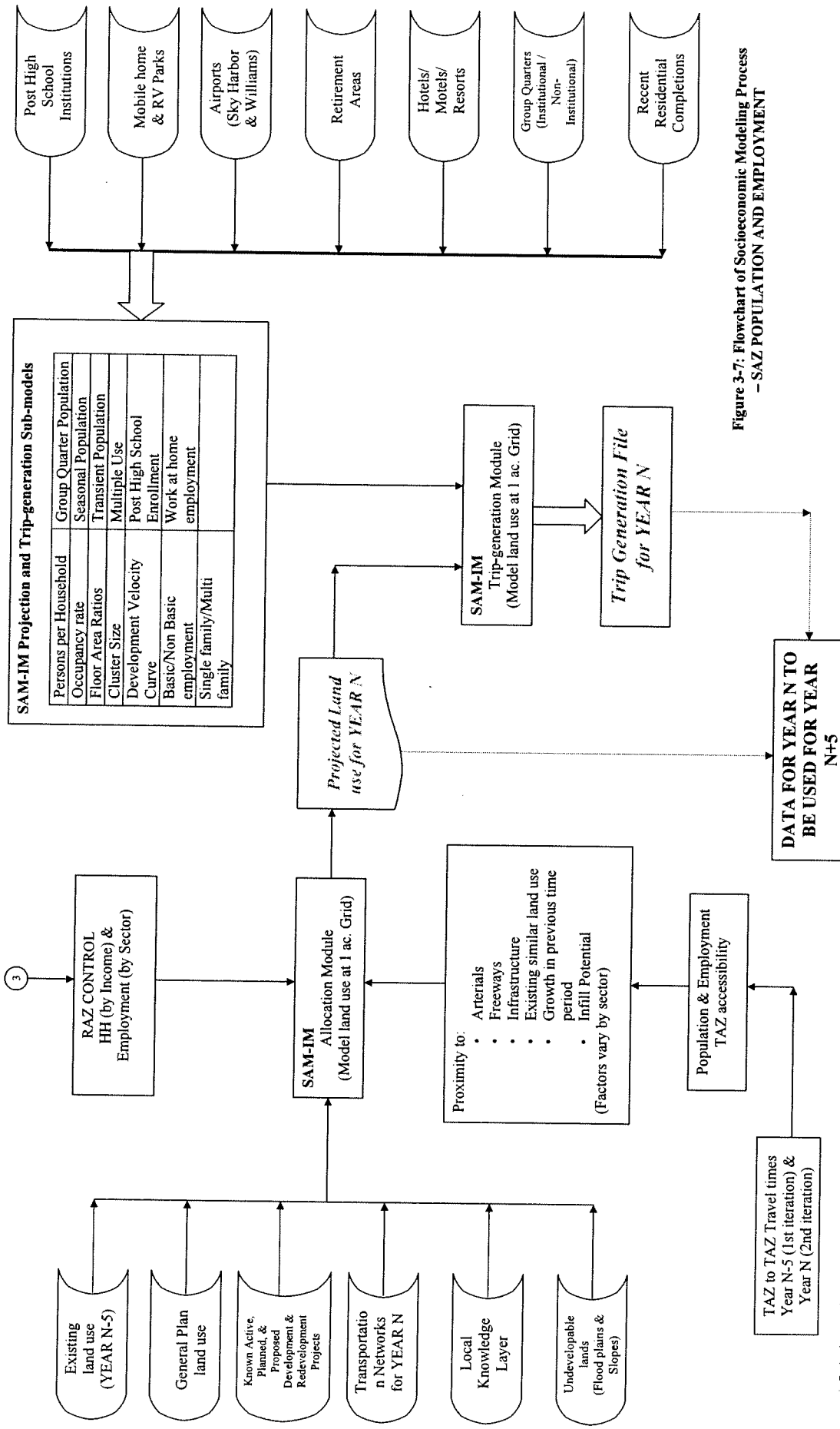


Figure 3-7: Flowchart of Socioeconomic Modeling Process - SAZ POPULATION AND EMPLOYMENT

Preparation for Socioeconomic Modeling (December 2005 - March 2007) Socioeconomic
Modeling (January 2006 - May 2007)
Jan - Dec 2006

Development/
Redevelopment
Employer Database
Hotel/Motel Database RV Park Database
Post High School
Institutions & Enrollment
Review of Individual Databases
Employers Hotel/Motel
RV Parks Group Quarters
Post High School
Institutions & Enrollment
General Plan Land Use Existing Land Use

Development/
Redevelopment

Age Restricted Areas

SOCIOECONOMIC DATA & MODELING REVIEW PROCESS

FOR PREPARATION OF 2007 SCOCIOECONOMIC PROJECTIONS BY THE MARICOPA ASSOCIATION OF
GOVERNMENTS

Modeling Assumptions & Methods Review

- 2005 Base Population
- 2005 Base Employment
- Occupancy
- Persons/HH
- Residential Cluster size, Density and Velocity Curves
- Employment Cluster size, FAR & Employment Density
- Land use - Employment by Sector
- Population/ Employment Ratios
- Work at Home
- Group Quarters
- Mixed-use definitions
- Single/Multi- Family Split
- Buildout

Employers Hotel/Motel

RV Parks Group Quarters

Post High School

Institutions & Enrollment

Consistency & Implications Review

General Plan Land Use Existing Land Use

Development/

Redevelopment

TO BE REVIEWED

KEY

TO BE REVIEWED

THIS MONTH

MAG TASK

AZ DES

County

Control

Totals

Buildout

Review of Buildout

Mar - Dec 2006

Draft 1

Model Runs

(2005, 2010)

Jan 2007

Review of Draft 1 Runs

Jan/Feb 2007

Draft 2

mag3_Review Process.txt

Model Runs
(2005, 2010, 2020, 2030)

March 2007

Review of Draft 2 Runs

Mar/April 2007

SOCIOECONOMIC

PROJECTIONS

2007

April/May 2007

Buildout

Review of Draft 3 Runs

April 2007

Draft 3

Model Runs

(2005, 2010, 2020, 2030)

April 2007

•Households by age of Householder / Housing unit by age of unit

•Households by Income

•Post High School enrollment

•Age Restricted Areas

•Seasonal Population

•Transient Population

•MAG/City Land use code table

•MPA/RAZ/SAZ boundaries

Review of Individual GIS Coverages

CENSUS 2000

&

CENSUS SURVEY

2005

REVIEW COMPLETE

45

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Pima Association of Governments (PAG)

Please fill out your name, position, department, organization, phone number, email address:

Q1. Does your agency develop a "baseline" or "no project" forecast? Please identify all types of forecasts. (Yes, we develop three types of growth forecasts. They are a baseline forecast (no policy intervention), an alternative forecast (based on different scenarios), and a plan forecast (a desired future).)

Historically, one baseyear TAZ dataset and one forecast year TAZ dataset was manually developed for each RTP (every 3-5 years or so), however, we are in the process of implementing a county wide population and households projection model and a sub county land use allocation model. Eventually we anticipate doing a number of scenario-based forecasts, but for the moment this is hypothetical. We hope to use both models for the next RTP, which will be finalized in the next two years.

Q2. If you have a baseline forecast, what would be an operational definition of the baseline forecast?

(Sample Answer: A *regional baseline forecast* is defined as the most likely forecast in the absence of regional policy intervention. A *small area baseline forecast (allocation)* is based on historical trend and local general plan)

N/A

Q3. What is the difference between a baseline forecast and a plan forecast?

(Sample Answer: A baseline forecast does not include *regional policy* elements and might be *lower* than that of plan forecast)

N/A

Q4. How many socioeconomic variables do you develop for planning/modeling purposes? What kind of local review is done by member agencies?

(Sample Answer: We develop 53 socioeconomic variables for planning/modeling purposes. Four major variables including population, households, housing, and employment go through extensive technical/political review, and local input process.)

The county level model (POPGROUP) requires births, deaths, and net migration. The sub-county level allocation model (SAM-IM) requires existing land use attributed with residential and employment densities, known developments (e.g., projects under review by the jurisdictional planning departments), and planned land use. The travel model requires an additional 17 variables covering group quarters population, special generators, K-12 school enrollment, and income.

In the past, local review has primarily been through the Local PopTAC, we also anticipate given local jurisdictions multiple opportunities to review data on an individual and on-going basis and make specific requests for different scenarios.

Q5. At what geographic levels do you develop a socioeconomic forecast?
(Sample Answer: 1 region, 6 counties, 187 cities, 4108 census tracts, 5000 partial tract, 7,000 census block group, 25,000 census block, 4100 TAZs, 2 million grid cells (100m*100m), etc)

Anticipate (in the near term) county, subcounty (jurisdictional and possibly smaller), and TAZ forecasts. We also hope to be able to respond to requests by specific agencies (e.g. school districts, water agencies) for requested planning areas. In the longer term it is likely we will try and develop more regional forecasts since the metropolitan growth is increasingly beyond the county boundaries.

Q6. What is the forecast horizon? What is the data point? What is the frequency of the update?

(Sample Answer: We update a baseline forecast in 5 year interval for 30 year forecast periods. A baseline forecast is updated every three or four years)
(Approximately) a baseline forecast for 5 year intervals for a 30 year period. We also anticipate running a build-out scenario and updating the County population (but perhaps not other variables) on at least an annual basis. We are increasingly being asked to provide 50 year forecasts by various agencies and may begin to produce these.

Q7. What is the forecasting process?

(Sample Answer: See attached)

Again, since we are in transition this is difficult to answer. We can provide an outline of what has been done in the past (see attached), although none of the current staff were involved in generating this data series. We are moving towards using the program POPGROUP (University of Manchester, England) to inform the SAM-IM (and eventually OPUS as implemented by joint MAG/PAG land use modeling software project) land use model.

Q8. What are the uses of a baseline forecast?

(Sample Answer: regional transportation plan, regional housing needs allocation, air quality plan, economic growth strategy, etc.)

Transportation modeling, transportation planning, air quality modeling, drinking water service planning, wastewater service planning, electric service planning

Q9. What kinds of forecasts do you use for “no-build” scenario of the transportation plan? (Sample Answer: a baseline forecast. We sometimes experience untenable growth assumptions, such as growth of traffic beyond capacity in some areas. It raised serious issues about the relation of land use and transportation at the regional level)

N/A

Q10. What kinds of forecasts do you use to develop the baseline emission budget for the air quality plan? Is there any timing issue between transportation plan and air quality plan?

(Sample Answer: a baseline forecast. Yes, there is sometimes an issue because of a different plan schedule.)

Historically, the same forecast has been used for running the travel model and the subsequent air quality model.

Q11. Do you develop a plan forecast, which adds more jobs to a baseline forecast, to promote regional economic growth?

(Sample Answer: Yes. A plan forecast contains an explicit economic growth strategy associated with the “extra” private sector investment, which is beyond and above the historical pattern.)

Not at present

Q12. Do you use “one” baseline forecast for any planning purposes?

(Sample Answer: Yes. We intend to use the a baseline forecast as reference for a wide range of planning purposes)

This is the intention, but is subject to change with the current transition underway

Q13. Socioeconomic forecasters need “reliable” historical and the base year socio-economic data to develop a better forecast. How do you validate such historical and the base year socioeconomic data? (Sample Answer: We have used county/jurisdictional level “official” socioeconomic estimates released by the state agency. Below the jurisdictional level, we work with the most recent land use image data, public and private sources, and local planners to allocate the county/jurisdictional level socioeconomic estimates)

Reference to Census, local agencies building permits, subscribe to the local university land use inventory and economic forecasting projects, input from local planners and jurisdictional representatives

Q14. The goal of socioeconomic forecasters is to develop a consistent and accurate socioeconomic forecast, given the time and budget constraints. The forecast also should be politically acceptable. How do you test the

“reasonableness” of the forecast? (Sample Answer: We use the forecast error measures (e.g., mean absolute percent error, mean algebraic percent error) to measure the forecast error using the historical and projected socioeconomic data. We communicate with the stakeholders by indicating that the smaller area, longer forecast horizon, smaller population size, and the lower growth rates would result in more forecast errors than the larger area, shorter forecast horizon, larger population size, and the higher growth rates)

Your sample answer is representative. It is difficult to give specific answers to any of these questions while we are developing new methodologies.

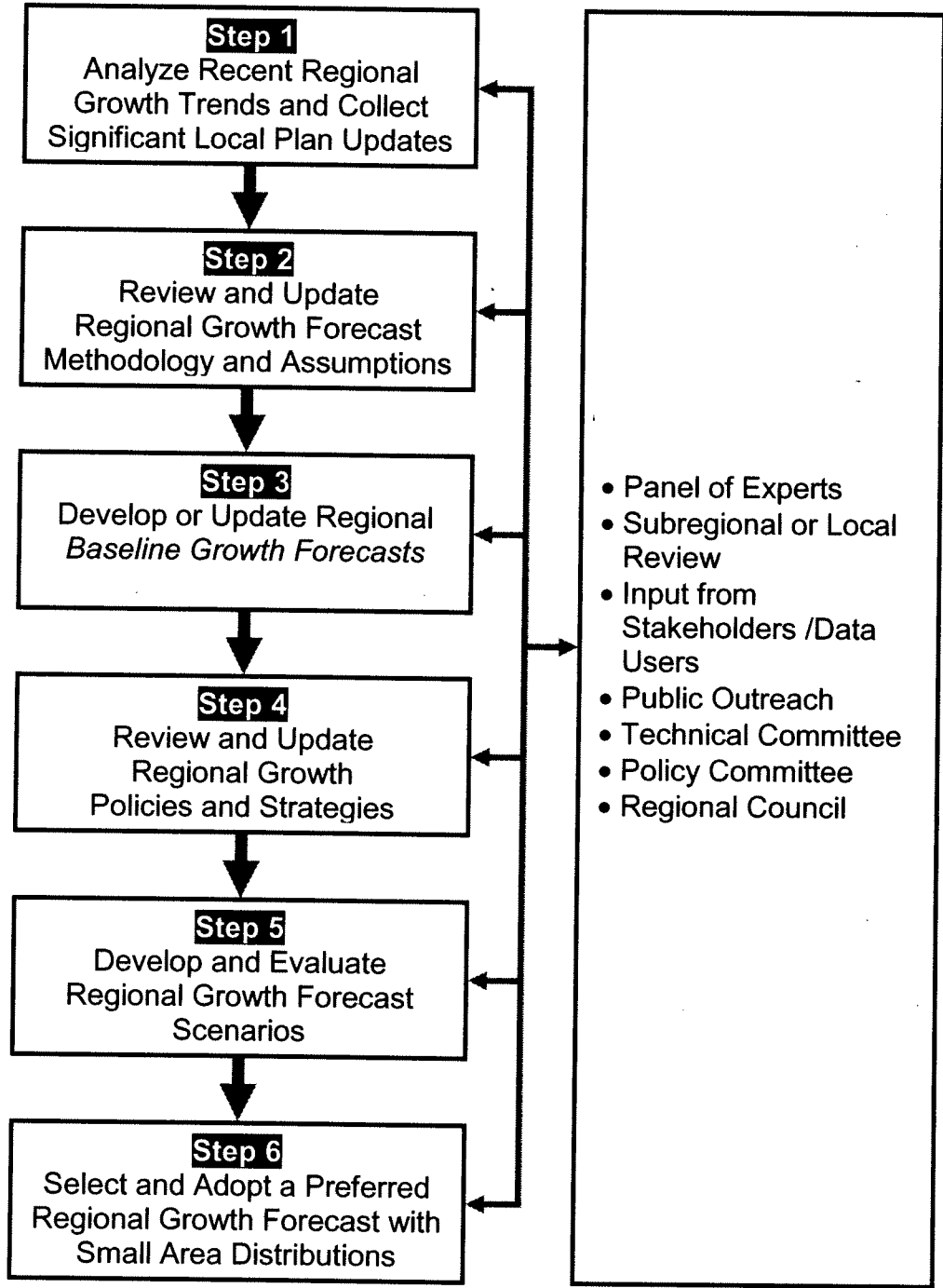
Q15. Please tell us about your current efforts of socioeconomic forecast model enhancements for different levels of geography. (Sample Answer: At the county level, we upgraded the gross migration module of the cohort-component model to better reflect the demographic processes. We are in the process of developing a timeline of implementing PECAS and UrbanSim for the small area forecast.) Recently purchased POPGROUP and HOUSEGROUP and hope to develop county-wide forecasts over the summer. Similarly with SAM-IM. Currently partering with MAG in the development of AZ-SMART.

Q16. Please tell us about the basic characteristics of the “official” forecast (it could be a baseline forecast, a plan forecast, or a policy forecast.) of your agency for planning/modeling purposes. (Sample Answer: The regional council (decision making body) of our region adopts the official forecast of three major variables (population, households, and employment) in a five year increment at the county level for thirty year forecast horizon. The small area forecast below the county level is not officially adopted by the regional council, but is developed and maintained by the forecast group)

As mentioned above, we historically developed one forecast. We hope to provide a handful of different land use scenario forecasts for the next RTP process.

Please provide any other comments or issues to be discussed:

Regional Growth Forecast Process



Puget Sound Regional Council (PSRC)

Please fill out your name, position, department, organization, phone number, email address:

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Q1. Does your agency develop a "baseline" or "no project" forecast? Please identify all types of forecasts. (Yes, we develop three types of growth forecasts. They are a baseline forecast (no policy intervention), an alternative forecast (based on different scenarios), and a plan forecast (a desired future).)

We develop one land use / growth forecast, which represents our best estimate of what the future year population, households, and employment figures will be for the region, and where (what zones) will they be found in.

Recently, the agency used a sketch planning tool, a variation of the INDEX program developed by Criterion, Inc., to develop future year scenario allocations of growth for the update of our regional growth plan, "Vision 2040."

Q2. If you have a baseline forecast, what would be an operational definition of the baseline forecast?

(Sample Answer: A *regional baseline forecast* is defined as the most likely forecast in the absence of regional policy intervention. A *small area baseline forecast (allocation)* is based on historical trend and local general plan)

The regional forecasts provide a most likely estimate of annual job and population change for the region as a whole, given an independent, exogenous US forecast, and established relationships between regional growth and national growth in key demographic and economic variables.

The small area forecast can be described as a reasonable estimate of the population, households, and employment for individual forecast zones, given existing levels of activity in each zone, and recent growth trends. It assumes the current comprehensive land use designations stay in place, and the regional transportation plan is implemented by the horizon year.

Q3. What is the difference between a baseline forecast and a plan forecast?
(Sample Answer: A baseline forecast does not include *regional policy* elements and might be *lower* than that of plan forecast)

PSRC does not currently have a plan forecast, so our baseline forecast is essentially our only forecast. We do, however, as per Q1 above, now have a future year hand-allocation of the regional job, population, and household

forecast prepared for the update of the regional growth plan, Vision 2040. It is a depiction of goals, or what the region would like to see happen in terms of growth, rather than a forecast, or what we think will happen given current plans and trends. By design, the hand-allocation is loosely done among groupings of similarly-sized cities, rather than a specific allocation to each city or zone, reflecting that the final allocations of such a preferred growth scenario would need to be done by the jurisdictions with the land use planning authority.

Q4. How many socioeconomic variables do you develop for planning/modeling purposes? What kind of local review is done by member agencies?
(Sample Answer: We develop 53 socioeconomic variables for planning/modeling purposes. Four major variables including population, households, housing, and employment go through extensive technical/political review, and local input process.)

PSRC employs a two-stage, top-down process to developing the growth forecasts. First a regional model is used to forecast 103 endogenous economic and demographic variables for the four-county (King, Kitsap, Pierce, and Snohomish) region as a whole. Then, a tailored version of the early DRAM / EMPAL models (originally applied back in the early 1980s) is used to allocate 14 of the regional variables to a Forecast Analysis Zone (FAZ) system:

- Households (2 types): Multi-family, single-family
- Households (4 income quartiles): Lower, Lower Middle, Upper Middle, and Upper
- Population (3 groups): Group Quarters Institutional, GQ Non-Institutional, and Household
- Jobs(5 sectors): Manufacturing, WTCU, Retail, FIRES, and Government/Education

Local member jurisdiction planning staff have multiple opportunities to review the draft results produced by the DRAM and EMPAL models. Comments usually center on consistency of the model results with known development projects, comprehensive plans, or growth planning targets developed for an area. PSRC staff make negotiated changes to certain DRAM and EMPAL inputs to address comments, re-run and re-release draft forecasts, until a consensus emerges among all involved that the final product represents a reasonable forecast.

Q5. At what geographic levels do you develop a socioeconomic forecast?
(Sample Answer: 1 region, 6 counties, 187 cities, 4108 census tracts, 5000 partial tract, 7,000 census block group, 25,000 census block, 4100 TAZs, 2 million grid cells (100m*100m), etc)

1 region, to 219 Forecast Analysis Zones (FAZs), back up to 4 counties. For the travel model, we split the 219 FAZs to 938 nested Traffic Analysis Zones (TAZs)

using mostly existing proportions, ie if a TAZ contains 80 percent of the parent FAZs retail jobs in 2000, it will contain 80 percent of the total in 2040 as well.

Note that during the last update in 2006, PSRC used a regional forecast model that was able to produce county-level forecasts. It was decided, given the absence of any inputs regarding land use plans or travel model feedback loops in the regional model, to rely on the sub-regional DRAM EMPAL models to develop the "official" county-level forecasts, and use the regional model county-level output as for quality-control checks.

Q6. What is the forecast horizon? What is the data point? What is the frequency of the update?

(Sample Answer: We update a baseline forecast in 5 year interval for 30 year forecast periods. A baseline forecast is updated every three or four years)

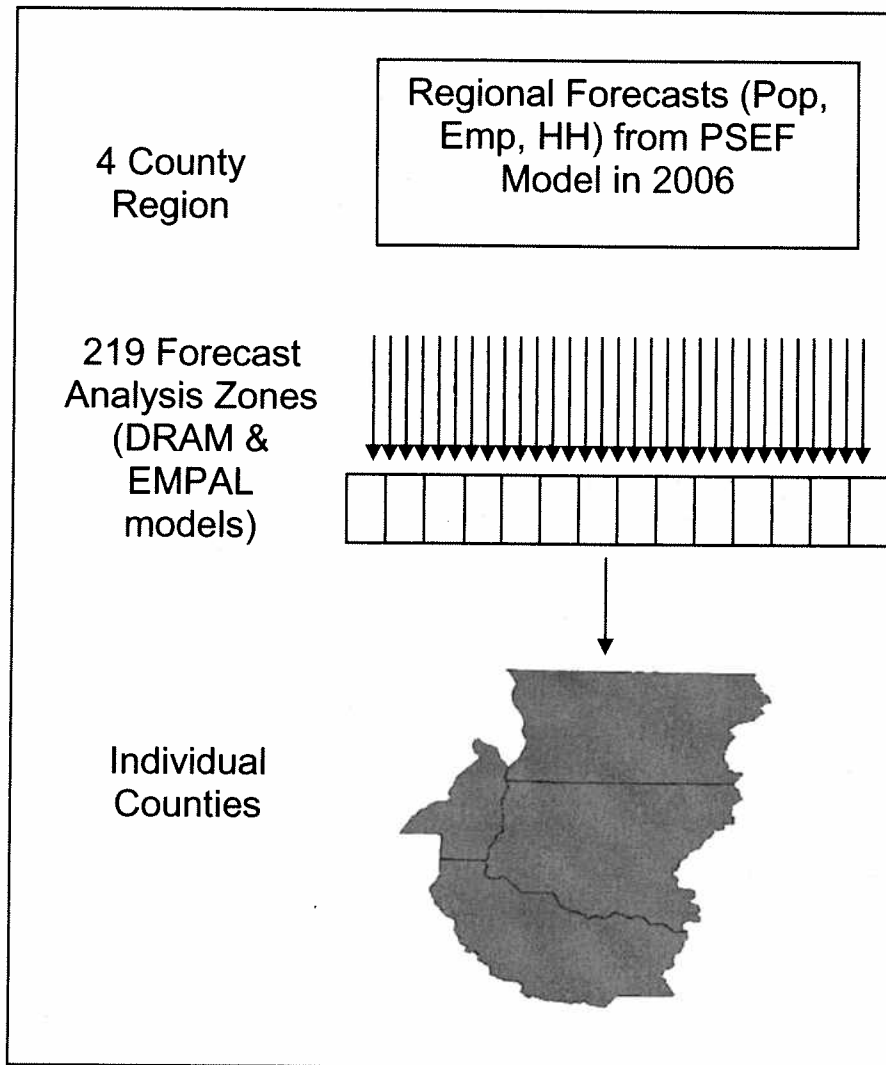
Regional forecasts are updated every 3-4 years. The goal is to have at least a 30 year horizon. The last forecast was completed in 2006, using data through 2005, and extends to 2040 for essentially a 35 year forecast. Regional forecasts contain annual projects for each variable.

New sub-regional (or Small Area Forecasts as they are commonly referred to) are done using the DRAM EMPAL model following the regional forecasts, every 3-4 years. Small Area Forecasts contain estimates and forecasts only in 10 year intervals (trend data for 1980, 1990, and 2000, forecasts for 2010, 2020, 2030, and 2040). And while new forecasts are only produced every 3-4 years, the agency does review annually the FAZ forecasts for possible edits / changes if needed.

Q7. What is the forecasting process?

(Sample Answer: See attached)

Here is a standard, high-level summary flow chart. Note that at the end of the DRAM / EMPAL FAZ allocation step, there is opportunity for local planning staff to review and comment on the modeling results. Certain inputs are modified to reflect valid comments, and the DRAM/EMPAL models are rerun, and revised draft forecasts released, until a consensus is reached in terms of developing a reasonable forecast. There is also a feedback loop with the travel demand models, where initial DRAM/EMPAL results are fed back into the travel model to produced revised travel time matrices for the subsequent DRAM / EMPAL run.



Q8. What are the uses of a baseline forecast?

(Sample Answer: regional transportation plan, regional housing needs allocation, air quality plan, economic growth strategy, etc.)

Internally, uses of the forecasts would include the regional transportation plan, air quality analysis, financial forecasts, and numerous other smaller-scale study efforts. Externally, agency forecasts get used as inputs to such efforts as establishing growth planning targets, more disaggregate county and city land use forecasts and travel demand model inputs, support utility and school district planning, private sector applications, etc.

Q9. What kinds of forecasts do you use for “no-build” scenario of the transportation plan? (Sample Answer: a baseline forecast. We sometimes experience untenable growth assumptions, such as growth of traffic beyond

capacity in some areas. It raised serious issues about the relation of land use and transportation at the regional level)

PSRC does not do an established “no build” forecast – our only forecast product assumes implementation of the regional transportation plan as developed.

Q10. What kinds of forecasts do you use to develop the baseline emission budget for the air quality plan? Is there any timing issue between transportation plan and air quality plan?

(Sample Answer: a baseline forecast. Yes, there is sometimes an issue because of a different plan schedule.)

We use our only forecast product, as described in the previous answers.

Q11. Do you develop a plan forecast, which adds more jobs to a baseline forecast, to promote regional economic growth?

(Sample Answer: Yes. A plan forecast contains an explicit economic growth strategy associated with the “extra” private sector investment, which is beyond and above the historical pattern.)

No, although the regional forecasts are “tested” with an optimistic scenario and pessimistic scenario, where the US forecast is modified, and certain key relationships examined (ie how many Boeing plants will be needed, what will Microsoft’s growth plans be, etc). These scenarios are used to evaluate the most likely scenario.

Q12. Do you use “one” baseline forecast for any planning purposes?

(Sample Answer: Yes. We intend to use the a baseline forecast as reference for a wide range of planning purposes)

Yes, our growth forecast has historically provided all the starting forecast data for agency planning work.

Q13. Socioeconomic forecasters need “reliable” historical and the base year socio-economic data to develop a better forecast. How do you validate such historical and the base year socioeconomic data? (Sample Answer: We have used county/jurisdictional level “official” socioeconomic estimates released by the state agency. Below the jurisdictional level, we work with the most recent land use image data, public and private sources, and local planners to allocate the county/jurisdictional level socioeconomic estimates)

For our DRAM and EMPAL land use allocation models, we use the most recent decadal year as the base year, and the previous 10 year decadal year for the historical base – that’s what our DRAM and EMPAL models need for calibration. We use Census data and our own in-house database of geocoded covered employment records that we receive from the Washington State Employment

Security Department (ESD) to estimate population, households, and employment by zone. For the general land use estimates, we have relied on gross estimates of acres of land available, from a combination of GIS inputs on future year land use, parcel layers, and a grid cell coverage of the region assembled for the UrbanSim model development project.

Q14. The goal of socioeconomic forecasters is to develop a consistent and accurate socioeconomic forecast, given the time and budget constraints. The forecast also should be politically acceptable. How do you test the "reasonableness" of the forecast? (Sample Answer: We use the forecast error measures (e.g., mean absolute percent error, mean algebraic percent error) to measure the forecast error using the historical and projected socioeconomic data. We communicate with the stakeholders by indicating that the smaller area, longer forecast horizon, smaller population size, and the lower growth rates would result in more forecast errors than the larger area, shorter forecast horizon, larger population size, and the higher growth rates)

We rely heavily on external staff review, primarily drawn from staff that regularly attend our monthly Regional Technical Forum and are consistent users of PSRC data, to review our forecasts for inconsistencies with plans, current trends, previous forecasts, etc. We compare new draft forecasts with trend data and previous forecasts to add context.

Q15. Please tell us about your current efforts of socioeconomic forecast model enhancements for different levels of geography. (Sample Answer: At the county level, we upgraded the gross migration module of the cohort-component model to better reflect the demographic processes. We are in the process of developing a timeline of implementing PECAS and UrbanSim for the small area forecast.)

At the regional level, the forecasts in 2006 used a new model that accounted for the switch in trend data from SIC to NAICS coding. For the next round of regional forecasts in 2009, we are interested in revising certain aspects of our long-range forecasting model, such as the forecasts of average household size.

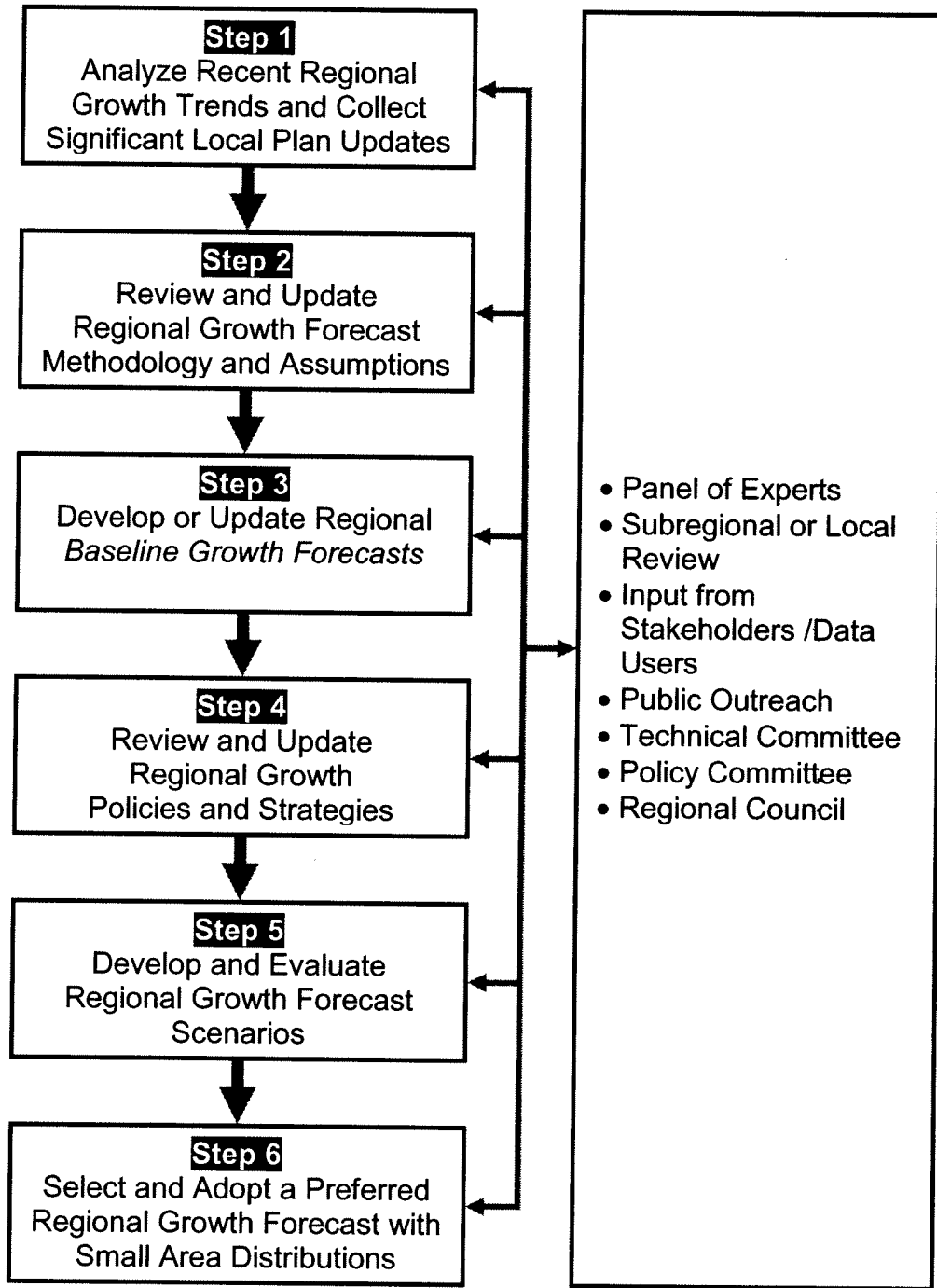
Work has been underway since 2003 replace our current DRAM and EMPAL models with UrbanSim for our small area forecast work. UrbanSim would allow forecasts at a smaller level of geography, since it will work at either a 5.5 acre grid cell or an individual parcel level, although we still anticipate prepared our standard forecast products at the FAZ level for consistency. The current schedule calls for a working version of UrbanSim to be installed at PSRC following the completion of the current contract with the University of Washington's Center for Urban Simulation and Policy Analysis (CUSPA), which officially ends June 30th, 2007. UrbanSim would then be placed on an R&D track through 2008, with plans to use it as the agency's official forecasting tool in 2009.

Q16. Please tell us about the basic characteristics of the “official” forecast (it could be a baseline forecast, a plan forecast, or a policy forecast.) of your agency for planning/modeling purposes. (Sample Answer: The regional council (decision making body) of our region adopts the official forecast of three major variables (population, households, and employment) in a five year increment at the county level for thirty year forecast horizon. The small area forecast below the county level is not officially adopted by the regional council, but is developed and maintained by the forecast group)

PSRC’s forecasts are described in the answers to Q4, Q5 and Q6 above. Currently forecasts are not “adopted” by any of the PSRC’s official governance or policy boards. Rather, they are released following a detailed review, once a general consensus is reached that the most recent round of edits has addressed any concerns – this is usually achieved on a reviewer-by-reviewer basis or at the Regional Technical Forum.

Please provide any other comments or issues to be discussed:

Regional Growth Forecast Process



San Diego Association of Governments
(SANDAG)

Please fill out your name, position, department, organization, phone number, email address:

Ed Schafer
Senior Analyst
Technical Services
SANDAG
619-699-1967
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Q1. Does your agency develop a "baseline" or "no project" forecast? Please identify all types of forecasts. (Yes, we develop three types of growth forecasts. They are a baseline forecast (no policy intervention), an alternative forecast (based on different scenarios), and a plan forecast (a desired future).)

We generally develop 3 types of regional forecasts: 1) Baseline, 2) Existing Plans and Policies and 3) Smart Growth. Only the last two are allocated to sub-regional areas.

The baseline regional forecast is unconstrained by current plans or policies, thus it is completely divorced from land use plans. It generally produces more housing units than can currently be sited within the region's jurisdictions.

The regional current plans and policies forecast is consistent with the adopted plans of the region's jurisdictions. Generally, in the current plans and policies forecast, the forecast of housing units must be constrained to stay within the number of housing units authorized by the current plans and policies. The excess housing units are assigned to areas near, but not in, the region by an interregional commuting model. In addition to the loss of housing units, there is generally a slight loss of employment and population vis-à-vis the Baseline regional forecast. However, there is not a one-to-one loss of population or employment compared to the loss of housing units. Regarding population, the model usually partially compensates by increasing PPH and decreasing vacancy rates as housing is constrained.

The existing plans and policies forecast is allocated to the sub-regional area.

The Smart Growth forecast considers transit oriented development to partially overcome the housing deficiencies found within the current plans and policies. The TODs are agreed upon by each jurisdiction and are modeled using a generic development pattern based upon the type of TOD being modeled. This smart growth land use scenario is then evaluated against the Baseline regional forecast and the interregional commuting model. Generally, not all TODs will be developed by the sub-regional model due to the attractiveness of the area vis-à-vis the attractiveness of housing opportunities near, but outside, the region.

Q2. If you have a baseline forecast, what would be an operational definition of the baseline forecast?

The regional baseline forecast is described above, i.e., it is unconstrained by jurisdictions' plans.

Q3. What is the difference between a baseline forecast and a plan forecast?

The difference between the baseline forecast and the planned forecast is the introduction of the jurisdictions' land use policies as constraints to residential building. In the last forecast this resulted in approximately 100,000 housing units outside the region that were used to house San Diego region workers and their families.

Q4. How many socioeconomic variables do you develop for planning/modeling purposes? What kind of local review is done by member agencies?

At the regional level we produce hundreds of economic and demographic variables. At the subregional level, we produce population by age, sex and ethnicity; employment by 13 super NAICS sectors, and geography by approximately 90 land use categories.

Q5. At what geographic levels do you develop a socioeconomic forecast?

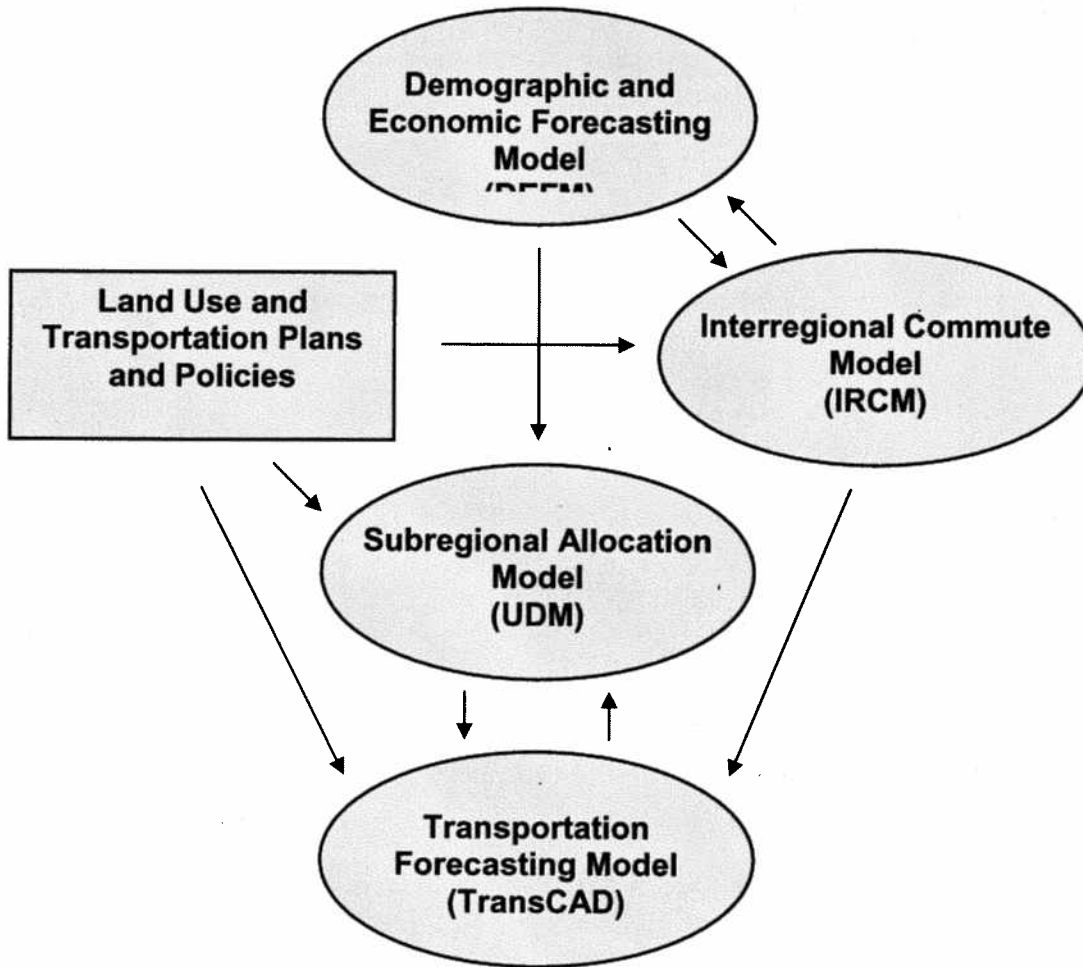
Regional (1 area), SGRA (SANDAG geographic reference area) (1850 areas), and LCKEY (parcel of subparcel areas (900,000 areas). In addition, we can aggregate the LCKEY and SGRA data to nearly any subregional geography.

Q6. What is the forecast horizon? What is the data point? What is the frequency of the update?

Our forecast horizon is 25 to 30 years, with 5 year iterations. We update every 3 to 5 years.

Q7. What is the forecasting process?
(Sample Answer: See attached)

SANDAG'S FORECASTING PROCESS:



Q8. What are the uses of a baseline forecast?

The baseline forecast is used to predict the economic activity within the region and the demographic activity that it will produce within the region and outside, but near, the region.

Q9. What kinds of forecasts do you use for “no-build” scenario of the transportation plan?

Current plans and policies.

Q10. What kinds of forecasts do you use to develop the baseline emission budget for the air quality plan? Is there any timing issue between transportation plan and air quality plan?

Current plans and policies. No.

Q11. Do you develop a plan forecast, which adds more jobs to a baseline forecast, to promote regional economic growth?

No. However, in the past we have included assumptions consistent with our "Prosperity Strategy" (increased productivity) that impacted income and output directly and employment indirectly.

Q12. Do you use "one" baseline forecast for any planning purposes?

Generally, yes, as long as the forecast is tracking well.

Q13. Socioeconomic forecasters need "reliable" historical and the base year socio-economic data to develop a better forecast. How do you validate such historical and the base year socioeconomic data?

Through our GIS program, we are constantly editing and "ground truthing" our subregional forecast input data. In addition, we regularly update the regional data to include any historical adjustments (i.e., intercensal population estimates, revised employment estimates).

Q14. The goal of socioeconomic forecasters is to develop a consistent and accurate socioeconomic forecast, given the time and budget constraints. The forecast also should be politically acceptable. How do you test the "reasonableness" of the forecast?

For our regional forecasts, we assemble a technical advisory committee to review our assumptions and the forecast outputs for reasonableness. For our subregional forecast, the forecast is vetted through our jurisdictions to ensure political acceptance.

Q15. Please tell us about your current efforts of socioeconomic forecast model enhancements for different levels of geography.

Currently, we are developing a PECAS model that will directly link to our regional econometric forecasting model. Thus, the new model relationships will insure that land use constraints are captured by the regional model.

Q16. Please tell us about the basic characteristics of the "official" forecast (it could be a baseline forecast, a plan forecast, or a policy forecast.) of your agency for planning/modeling purposes.

The Board of Directors adopts the current plans and policies forecasts for planning purposes. This forecast then becomes the basis of the Regional Transportation Plan and the Regional Comprehensive Plan. In addition, other agencies (such as the County Water Authority and the Air Quality District) adopt the forecast for their use. To a large extent, the SANDAG forecast is used by most public agencies in the region for planning purposes.

Please provide any other comments or issues to be discussed:

**Wasatch Front Regional Council (Salt Lake City
MPO) (WFRC)**

Please fill out your name, position, department, organization, phone number, email address:

*Scott Festin, AICP
Data Manager
Wasatch Front Regional Council (Salt Lake City MPO)
801-363-4230 x113, sfestin@wfrc.org*

Q1. Does your agency develop a "baseline" or "no project" forecast? Please identify all types of forecasts. (Yes, we develop three types of growth forecasts. They are a baseline forecast (no policy intervention), an alternative forecast (based on different scenarios), and a plan forecast (a desired future).)

Based on your definitions, we only do a "baseline forecast". Occasionally, transportation studies will adjust forecasts, while holding control totals constant.

Q2. If you have a baseline forecast, what would be an operational definition of the baseline forecast?

(Sample Answer: A regional baseline forecast is defined as the most likely forecast in the absence of regional policy intervention. A small area baseline forecast (allocation) is based on historical trend and local general plan)

Our regional baseline forecast is what is likely to develop based on current city land use plans. These land use plans are updated each time a regional baseline forecast is created, about every three years.

Q3. What is the difference between a baseline forecast and a plan forecast?

(Sample Answer: A baseline forecast does not include regional policy elements and might be lower than that of plan forecast)

N/A

Q4. How many socioeconomic variables do you develop for planning/modeling purposes? What kind of local review is done by member agencies?

(Sample Answer: We develop 53 socioeconomic variables for planning/modeling purposes. Four major variables including population, households, housing, and employment go through extensive technical/political review, and local input process.)

We develop three major variables (population, households, employment) and we break down the employment into retail, industrial, and other.

Q5. At what geographic levels do you develop a socioeconomic forecast?
(Sample Answer: 1 region, 6 counties, 187 cities, 4108 census tracts, 5000 partial tract, 7,000 census block group, 25,000 census block, 4100 TAZs, 2 million grid cells (100m*100m), etc)

*We have 1 region, 2 urbanized areas, 3 urbanized counties, 2 rural counties, 58 cities, 999 TAZs, 150,000 150m*150m gridcells*

Q6. What is the forecast horizon? What is the data point? What is the frequency of the update?

(Sample Answer: We update a baseline forecast in 5 year interval for 30 year forecast periods. A baseline forecast is updated every three or four years)

Our baseline forecast is every year to 2030 (currently) and is updated approximately every three years.

Q7. What is the forecasting process?

(Sample Answer: See attached)

See attachment

Q8. What are the uses of a baseline forecast?

(Sample Answer: regional transportation plan, regional housing needs allocation, air quality plan, economic growth strategy, etc.)

The baseline forecast is used in the development of Regional transportation plan, air quality conformity, and individual transportation projects. It has also been used for water planning, by school districts, and by other interested individuals.

Q9. What kinds of forecasts do you use for “no-build” scenario of the transportation plan? (Sample Answer: a baseline forecast. We sometimes experience untenable growth assumptions, such as growth of traffic beyond capacity in some areas. It raised serious issues about the relation of land use and transportation at the regional level)

N/A

Q10. What kinds of forecasts do you use to develop the baseline emission budget for the air quality plan? Is there any timing issue between transportation plan and air quality plan?

(Sample Answer: a baseline forecast. Yes, there is sometimes an issue because of a different plan schedule.)

The baseline forecast. The air quality and RTP are on the same schedule.

Q11. Do you develop a plan forecast, which adds more jobs to a baseline forecast, to promote regional economic growth?

(Sample Answer: Yes. A plan forecast contains an explicit economic growth strategy associated with the “extra” private sector investment, which is beyond and above the historical pattern.)

No

Q12. Do you use “one” baseline forecast for any planning purposes?

(Sample Answer: Yes. We intend to use the a baseline forecast as reference for a wide range of planning purposes)

Yes.

Q13. Socioeconomic forecasters need “reliable” historical and the base year socio-economic data to develop a better forecast. How do you validate such historical and the base year socioeconomic data? (Sample Answer: We have used county/jurisdictional level “official” socioeconomic estimates released by the state agency. Below the jurisdictional level, we work with the most recent land use image data, public and private sources, and local planners to allocate the county/jurisdictional level socioeconomic estimates)

We compare county totals with state agency (Utah Population Estimates Committee) county totals. We don't have any comparison below the county level.

Q14. The goal of socioeconomic forecasters is to develop a consistent and accurate socioeconomic forecast, given the time and budget constraints. The forecast also should be politically acceptable. How do you test the “reasonableness” of the forecast? (Sample Answer: We use the forecast error measures (e.g., mean absolute percent error, mean algebraic percent error) to measure the forecast error using the historical and projected socioeconomic data. We communicate with the stakeholders by indicating that the smaller area, longer forecast horizon, smaller population size, and the lower growth rates would result in more forecast errors than the larger area, shorter forecast horizon, larger population size, and the higher growth rates)

Projections are subject to review by local entities at the city and TAZ level at the land use input stage, the preliminary data stage, and the final draft stage. We rely on staff expertise and elected officials for reasonableness checks.

Q15. Please tell us about your current efforts of socioeconomic forecast model enhancements for different levels of geography. (Sample Answer: At the county level, we upgraded the gross migration module of the cohort-component model to better reflect the demographic processes. We are in the process of developing a timeline of implementing PECAS and UrbanSim for the small area forecast.)

The latest forecast was done using UrbanSim. We are still experimenting and tweaking UrbanSim and considering upgrading to the OPUS platform.

Q16. Please tell us about the basic characteristics of the “official” forecast (it could be a baseline forecast, a plan forecast, or a policy forecast.) of your agency for planning/modeling purposes. (Sample Answer: The regional council (decision making body) of our region adopts the official forecast of three major variables (population, households, and employment) in a five year increment at the county level for thirty year forecast horizon. The small area forecast below the county level is not officially adopted by the regional council, but is developed and maintained by the forecast group)

The Regional Council adopts the projections of population, households, and employment at the city level. County level numbers are from the Governor's Office of Planning and Budget. TAZ level projections are maintained by the staff.

Please provide any other comments or issues to be discussed:

<Attachment>

Chapter 2: Methodology and Assumptions

This projection set is the first to be created locally using the UrbanSim land use projection model as a tool in the process. This model, developed at the University of Washington, uses statistical modeling to calculate the probability of a certain piece of land developing or redeveloping and what that development may look like¹. One of the variables considered is the accessibility of a piece of land to the transportation system. This feedback loop between the socioeconomic projections and the travel model is a new feature that WFRC has been and will continue to be developing. There are still four basic components to the projections methodology, base data, control totals, projections process, and review. These are discussed below.

Base Data

Two major data sets comprise the base data that was developed for the UrbanSim base data set. These are the parcel data from each county and employment data from the Utah Department of Workforce Services (DWS).

Data collection began in mid-2004 with the acquisition of 2003 parcel data from the County Assessors in Davis, Salt Lake, and Weber Counties. Parcel boundaries were collected from the IS departments at each county as well. Data quality varied widely across the counties, making extensive data verification an essential task.

Employment data was collected from DWS for July 1, 2003. The employer points were geocoded to the street address of the worksite. 93% of the total employees were able to be located to a point. The rest were distributed to points based on a share of total methodology. The employment totals were adjusted to account for home-based and proprietor employment that is not included in the DWS data, but is in the GOPB control totals. This adjustment was done by calculating the share of each employment sector in the home-based and proprietor categories. Data from the Bureau of Labor Statistics (BLS) was used in this calculation. Additional employment was added to each sector based on the BLS data and controlled to the non-agricultural, non-construction totals from GOPB. Jobs data reported in Chapter 3 have had construction and agricultural jobs removed from the totals.

The parcel boundaries and assessor data needed cleaning and standardizing before they were usable. The parcel ID numbers needed to be standardized and the boundaries, especially at the county lines, were adjusted. The number and definition of land use categories varied from county to county. These categories were then standardized across the region.

¹ <http://www.urbansim.org/>

Where information on non-residential square feet for commercial properties was lacking, square footage was estimated using the employment points. This was done by using the employment total at each point to calculate the amount of square footage required, based on the employment sector of the point. The calculated square footage was increased by 10% to account for vacancy. Checking of parcels with multi-family units and trailer parks to verify the total number of housing units was done using aerial photography, phone surveys, and field checking.

Once the parcel and employment data were finished, they were converted to a grid matrix for use in UrbanSim. This was done by intersecting the parcels with the grids in ArcInfo. Data were assumed to be uniformly distributed across the parcel, so the share of the area of a parcel was used to calculate the share of the data in each gridcell. The data in each intersected polygon were summed to the gridcell. Each gridcell is 5.56 acres in size, thus, the small size of the gridcells (relative to the size of TAZs) makes for a more refined projections set.

Control Totals

Control totals for the years 2005-2030 for population, households, and employment were generated at the county level by the Governor's Office of Planning and Budget (GOPB) and published in the *Economic Report to the Governor* in early 2005. These numbers were adjusted to be consistent with the output from the UrbanSim model, specifically; population was adjusted to incorporate only population in households. Both GOPB and WFRC staffs collaborate on the review of county level totals before their publication.²

Projections Process

Base data and the control totals, as well as the Long Range Plan transportation network from the 2003 plan were all used by UrbanSim to produce a set of projections at the gridcell level. The gridcells were summed to the TAZ, City, and County level. As UrbanSim works at the regional level, the county level projections were controlled back to the county-level control totals from GOPB. City and TAZ level projections were analyzed internally for reasonableness and adjusted where necessary. Once all internal reviews were finished and adjustments made, the numbers were sent to the cities and counties for their review and comment.

Review Process

The projections were subject to several rounds of review and revision. Initially, visits were made to each City Council to receive direction regarding the land use inputs. As part of the Regional Transportation Plan, WFRC participated in the Wasatch Choices 2040 visioning study conducted by WFRC, MAG, and Envision Utah. City Councils were asked whether to use the city's adopted land use element or the results of the preferred vision as the input to

² For a detailed explanation of the Control Total production, please see the GOPB website at <http://governor.utah.gov/dea/2005Baseline.pdf>.

the projections.³ City staffs were asked to review and comment on the city and TAZ level projections. The scope and extent of comments from the cities varied widely. Comments and suggested changes were incorporated into the projections. The projections set was approved for use in the RTP process by the Wasatch Front Regional Council board on October 26, 2006.

³ More information on the Wasatch Choices 2040 process can be found at <http://www.wfrc.org/cms/publications/wasatchchoices2040report.pdf>.