

# One BayArea

Date: November 5, 2010  
To: Executive Board  
From: ABAG Staff  
Subject: Employment Forecasting Method & Determining 25 Year Regional Housing Need

## Summary

SB 375 requires each Metropolitan Planning Organization (MPO) in California to develop a Sustainable Communities Strategy (SCS), an integrated regional land use and transportation plan, that demonstrates, amongst other things, areas within the region sufficient to house “all the population of the region.” The steps and formulas for estimating the amount of housing needed to house all of the region’s population, as well as the demographic and economic assumptions incorporated into the housing estimate are provided in detail in this memo and its attachments.

In the Bay Area, MTC and ABAG share the task of developing the SCS, and ABAG has the lead role in adopting housing and employment forecasts. In this memo, staff requests that the ABAG Board approve a new methodology to forecast the region’s long term employment growth. Regional job estimates are a fundamental component to forecasting population growth and housing need.

As the result of a comprehensive review of employment growth forecasting techniques and results, staff recommends that ABAG adopt the “shift share” methodology to prepare the long-term forecast, specifically to estimate the regional total number of jobs. This methodology would make ABAG’s employment growth forecasts more consistent with the other large metropolitan planning organizations in California, and better accounts for the most recent twenty year trend in Bay Area employment growth (1990-2010).

In summary, staff is recommends that ABAG’s Executive Board approve at its November 18, 2010, meeting:

- 1) A revised methodology for forecasting the region’s long-term employment growth;
- 2) The formula for calculating the region’s 25 year housing need;
- 3) The household formation assumptions to be used in the formula for calculating the 25 year housing need.

### **Revised Employment Forecasting Methodology**

For this year's update to the forecast, we recommend that staff employ a different methodology for forecasting the region's long-term job growth--a shift share method instead of the current econometric (IMPLAN) model.

The alternative forecast method, utilized by the other large MPOs in California, is known as the "shift share method." The shift share method is essentially a two step process, whereby total U.S. employment is first forecasted for a future year. Next, the Bay Area's share of that employment is estimated for future years, typically by looking at historical regional shares of national employment. The Bay Area's share of employment is then applied to the U.S. total employment estimate, thereby arriving at total future Bay Area employment.

There are several reasons for selecting shift share over econometric models to estimate total future Bay Area employment. The shift share method is more consistent with the methodology of employment forecast that is used by the other large MPOs in the State, namely SACOG and SCAG. It is more transparent in terms of explanation and tracking history. It is more practical to explain the regional economic narrative that underlies planning and the SCS. Additionally, the results of shift share conform better to the recent experience of relatively modest average job growth in the Bay Area. We recognize that there is great uncertainty in forecasting the future economy. To better connect with our SCS partners, we will gain more credibility with forecasts that comport better with their understanding of the future economy.

Using this shift share method, the Bay Area's jobs forecast would be in the 4.4 million range in 2035, which means that the Bay Area would be projected to grow an average of 50,000 jobs per year over the next 25 years, compared to 3.1 million jobs today. Put another way, the average annual rate of job growth in the Bay Area would be less than 1%, compared to 1.1% in Los Angeles, and 1.3% in Sacramento forecasts. Bay Area jobs would grow by roughly 24% compared to the national job gain of 18%. The rationale and optimism for this higher growth rate is that the Bay Area economic base is concentrated in sectors likely to lead the nation in job growth. However, while this forecast takes into account the Bay Area's assets, it is substantially below the econometric forecast of Projections 2009 of 5.1 million jobs (it's important to note that the reduction in forecasted jobs is a combination of both a change in forecast methodology and the lower base job level attributable to the persistent economic recession). In any case, we believe this forecast methodology more accurately builds in recognition of the prior twenty year trend which has constrained job growth in the Bay Area.

### **Calculating the Region's 25 Year Housing need**

The specific calculation of the number of units needed to "house all the population of the region" can be described best as a series of steps. The first three steps are to estimate total population, while the final two

are about applying household formation rates to that total population:

1. Estimate **demographic population growth**, as determined by natural increase;
2. Estimate **employment growth**;
3. Determine **in-migration**, mostly due to employment growth;
4. Add in-migration to demographic population to arrive at **total population**;
5. Determine **“household formation” rates**;
6. Apply household formation or headship rate to total population to determine **total housing need**.

### **Household Formation Assumptions for the 25 Year Need**

To describe the method more fully, draft household estimates are shown in Attachment 1. This estimate was made by starting with the 2000 census headship rates by age and racial/ethnic group for the Bay Area. Since the Projections 2009 forecast did not differentiate racial/ethnic populations, estimates in the forecast years were derived using data from the California Department of Finance’s long range population forecast. After reviewing various state demographic methodologies, and consulting with state agencies and other regions, it was assumed that individual racial/ethnic headship rates would trend 50% toward the 2000 regional mean by the 2040 forecast year.

### **Summary**

The new housing and employment forecast methodologies will change the Projections 2009 regional totals as shown in Attachment 1. The Household projections assume that the Bay Area can accommodate all the region’s forecasted housing demand by income level consistent with the requirements of SB375. If in fact we are able to accomplish this goal remains to be seen, based on ongoing discussions with local agencies on what is realistic to assume. The revised Household forecasts do assume a much lower jobs per household rate based on a re-evaluation of national and local trends and expert advice. The Employment forecast methodology is a vast departure from the methodology used in previous Projections series; while this produces much lower job forecasts, we think it is a more accurate reflection of job growth, especially in comparison to other MPOs in the state.

As such, the new forecasts will likely change our previous Greenhouse Gas Emissions (GHG) calculations and our ability to reach GHG targets recently adopted by the California Air Resources Board (ARB). You may recall that the 2009 RTP using Projections 2009 was able to achieve a 2% GHG per capita reduction in 2035, compared a 2% per capita increase from the 2009 RTP using Projections 2007, which included about 150,000 fewer jobs in 2035. Given the new methodology and the persistent sluggish economy, total jobs in 2035 are now estimated to be about 4.4 million in 2035 compared to 5.1 million in Projections 2009. As such, we can expect a significant further decline in GHG emissions per capita once we complete growth assignments to local agencies and re-run the 2009 RTP travel forecasts. This new information is expected to be available at your next meeting.

Our joint ABAG and MTC analytical efforts over the last several months have clearly demonstrated the extreme sensitivity of our GHG emission estimates to changes in the underlying demographic assumptions. While staff acknowledge that the amount of housing in these assumptions may cause some temporary conclusions and consternation, we believe it is more important to try to “get the numbers right”.

Attachment 1

<b>Households 2035</b>			<b>Employment 2035</b>		
<b>Projections 09</b>	<b>New Projections 011</b>	<b>Difference</b>	<b>Projections 09</b>	<b>New Projections 011</b>	<b>Difference</b>
3,302,780	3,569,750	266,970	5,107,390	4,400,000	(707,390)

**Attachment 2: Detailed Discussion****Revised Employment Forecasting Methodology**

As discussed in the September, 2010 staff report to the ABAG Executive Board, from 1990 to 2010, there was a marked shift in the trend of employment growth in the Bay Area. If we look at the current decade and the 1990's, we see that overall employment growth has only been about 5 percent; or about 0.25 percent annually. In 1990, total jobs amounted to 3.1 million, in 2000 there were 3.6 million jobs in the Bay Area and by 2010, jobs declined to approximately 3.3 million.

ABAG's previous projections (P 2009) estimated a total number of jobs of 5.1 million by 2035, reflecting an average annual growth rate of approximately 1.7 percent. Despite the low percentage increase, this trend is far greater than the Bay Area's job production over the last 20 years. One of the key issues in forecasting future employment growth is explaining why the Bay Area has added so few jobs in the last twenty years despite robust growth in the regional economy, and whether this trend will continue into the future.

The job component of the forecast is crucial for estimating total population and long term housing need, as discussed further below. For this year's update to the forecast, the agency is recommending that staff employ a different methodology for forecasting the region's long-term job growth-- a shift share method instead of the current econometric (IMPLAN) model. Over the last 15 years, ABAG staff has been using IMPLAN software to generate a set of input/output (I/O) tables at the county level to estimate future employment. Data sources that inform the county-level I/O tables, among others, are originally from the U.S. Census Bureau, the State of California Employment Development Department and the State Franchise Tax Board. These tables, primarily utilized to reflect the economic relationship between firms ("impact analysis"), represent the Bay Area's economy by showing the flow of goods and services between sectors. Outputs from one regional industry become the input for another, or an economic sector can use inputs from outside the region. Some outputs are locally sold; others are exported from the region. These sector flows show the inputs from each industry needed to produce goods or services for a single economic activity and the corresponding sales of goods and services to other industry sectors and to consumers. For long term forecasting purposes however, the econometric model does not accurately reflect changes in the region's competitiveness with respect to how growth in the region's economy translates to growth in the region's job production.

While there have been significant job losses during the recent recessions, there has also been a shift in the regional economy over the last two decades. Growth in manufacturing, retail and utilities has been limited, while significant growth has occurred in professional services, education, and healthcare; areas

that tend to have higher output per employee. Further explaining the continued growth in regional GDP is that jobs are also being restructured. Jobs that can be off shored or relocated to other lower cost areas have increased firms' productivity, but result in less employment in the Bay Area. Therefore, while there is still a relationship of economic growth (or GDP) to employment, the relationship appears to be fundamentally altered. Part of this explanation could result from the type of industries that are expanding in the Bay Area, and part can be explained by the Bay Area's cost of living which impacts regional competitiveness. Survey information from Bay Area firms indicates that the cost of housing in the Bay Area is one of the largest impediments to job growth here.

The alternative forecast method, utilized by the other large MPOs in California, is known as the "shift share method." The shift share method is essentially a two step process, whereby first total U.S. employment is assumed for a future year. Next, the Bay Area's share of that employment is assumed for future years, typically by looking at historical regional shares of national employment. The Bay Area's share of employment is then applied to the U.S. total employment estimate, thereby arriving at total future Bay Area employment.

A shift share analysis for the Bay Area was performed by Steve Levy, Director and Senior Economist at the Center for Continuing Study of the California Economy at the request of ABAG. Mr. Levy, who is an authority in the field, provides similar information to both the Southern California Association of Governments and Sacramento Council of Governments.

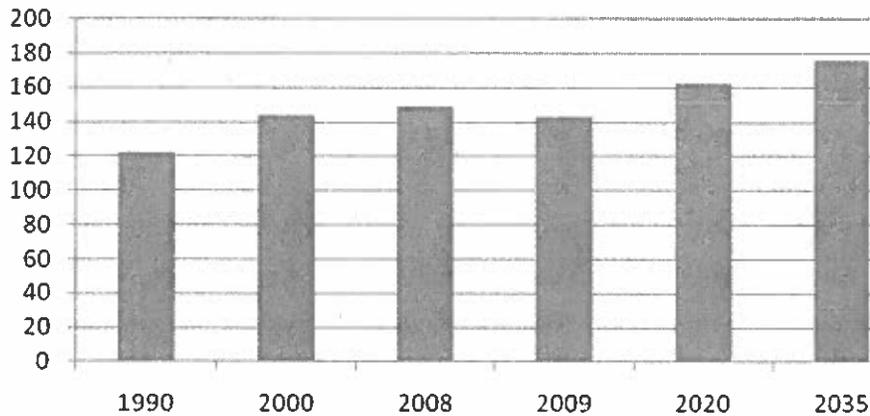
As indicated at the September ABAG Executive Board meeting, staff has been participating in numerous discussions with respect to data associated with the Bay Area economy and job forecasting trends. A peer review group on this subject was set up under the auspices of the Bay Area Council Economic Institute. Additional meetings were held between MTC and ABAG to discuss the rationale of alternative methodologies. Following a sufficient period of due diligence, ABAG staff concludes that the best method for forecasting future employment in the Bay Area is the shift share method and recommends its usage. A fuller discussion of our rationale is provided below.

### **Shift Share Method and Results**

The shift share method for employment forecasting utilizes the following approach: 1) estimate U.S. job growth and 2) review historical data as to the share of jobs that the Bay Area captures of the national total; 3) estimate the future Bay Area employment growth in relation to the national forecast. To estimate long term U.S. job growth, Levy states (in memo to ABAG staff, See attachment 1, August 24 report, and attachment 2, September 19 report) that the "normal methodology is to start with population by age group, project labor force participation rates and unemployment rates and end with a projection of total jobs for the nation." Using this method, Mr. Levy projects U.S. job growth at just fewer than 180 million jobs. While other metropolitan areas utilize other national employment forecast numbers, Mr. Levy's

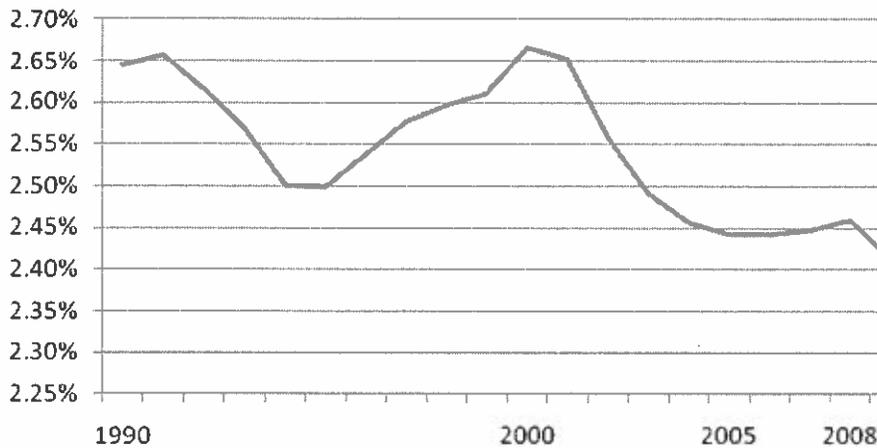
analysis reflects a 0.6 percent annual growth rate for the 2008-2035 period. According to Levy, the forecast assumes less growth in immigration and 6 percent unemployment over the period. The forecast also assumes “large growth in labor force participation by older workers.”

### U.S. Jobs (Millions)



Mr. Levy also examined the Bay Area’s historical share of total U.S. jobs.

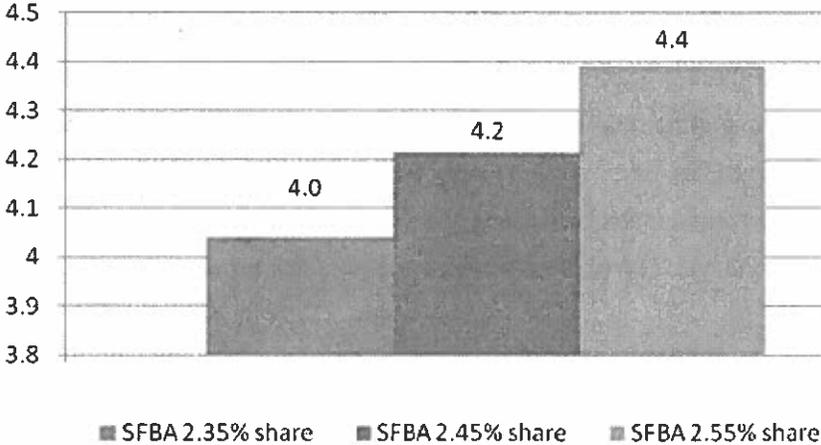
### Bay Area Share of U.S. Jobs



According to Levy’s analysis, the Bay Area had 2.65 percent of the nation’s jobs in 1990, and that share fell to 2.46 percent in 2008. He goes on to say that the Bay Area lost approximately 100,000 jobs in the 1990s related to base closures, defense downsizing and their multiplier effect. He indicates that without these losses, the Bay Area’s job share in 2008 would have been 2.53 percent instead of 2.46 percent. Levy also states the “remaining share losses are largely the result of high productivity gains in the tech manufacturing sector plus some movement of assembly jobs to other locations in the older parts of the region’s high tech base. It is somewhat complicated in the sense that the Bay Area did not lose share in these sectors since 1990 but that these sectors represent a larger part of the region’s economic base and, thus, the national job losses hurt our region more.” Under this analysis, Mr. Levy has concluded that the

Bay Area’s high end share of 2.55% would result in a forecast of 4.4 million jobs in 2035, which means that the Bay Area would be projected to grow an average of 50,000 jobs per year over the next 25 years. Bay Area jobs would grow by roughly 24% compared to the national job gain of 18%, a higher growth rate than that currently projected for SCAG and SANDAG. The rationale and optimism for this higher growth rate is that the Bay Area economic base is concentrated in sectors likely to lead the nation in job growth. However, while this forecast takes into account the Bay Area’s assets, it is substantially below the econometric forecast of Projections 2009. We believe this forecast methodology more accurately builds in recognition of the prior twenty year trend which has constrained job growth in the Bay Area.

**SFBA Jobs in 2035 (Millions)**



While the agency is recommending a change in methodology to forecast total regional employment, the existing model would be used to determine employment distribution by county and industry sector, as well as to calculate related variables. However, total employment results from the traditional model would be adjusted to fit the 4.4 million job estimate for the region.

**Rationale for Using Shift Share**

There are several reasons for selecting shift share over econometric models to estimate total future Bay Area employment. Shift share methodology is consistent with other metropolitan planning organizations (MPOs) in the state, and is more transparent and easier to understand than internal econometric modeling.

*Consistency*

The shift share method is more consistent with the methodology of employment forecast that is used by the other large MPOs in the State, namely SACOG and SCAG. SANDAG uses a blend of methodologies but their results, in terms of job growth forecasts, are similar to the other MPOs. Consistency with other MPOs is valuable in that it makes SCS metrics comparable across the major metropolitan areas and assists in implementing the policy goals of the State.

### *Transparent*

The shift share methodology is more transparent in terms of explanation and tracking history. Assumptions regarding U.S. job growth projections are utilized throughout the nation. Looking at the Bay Area's share (as well as other regions in CA) of national employment is easy to track over time, and transparent as to which midpoint is selected based on the regional narrative. This simplicity contrasts with ABAG's econometric model which uses a variety of inputs/assumptions and then transforms national GDP projections into regional employment through a set of coefficients using IMPLAN data. One of the many issues of using econometric data is that it is difficult to forecast the impacts on regional competitiveness and leakage to the Central Valley.

### *Practical*

Shift share methodology is more practical to use to explain the regional economic narrative that underlies planning and the SCS. Using shift share, we can look at discreet periods (1960-1990) (1990-2010) and track data. Projecting outward, the narrative as to how the SCS and other regional planning processes may impact regional competitiveness is more understandable, as it is tracking the regional share of jobs compared to the national average. Above the national average is one narrative; at or below is another.

### *Conforms to Regional Understanding*

The results of shift share conform better to the regional perception of the long term job forecast. Comments have been made by professors, planners, investment bankers and economists that ABAG's employment projections are too high. We recognize that there is great uncertainty in forecasting the future economy. In order to better connect with our partners with the SCS, we gain more credibility with forecasts that comport better with their understanding of the future economy. Economic growth and job growth are dependent on the region making progress on the many issues associated with proper planning and investment. To the extent that the Bay Area makes progress on reducing constraints to job growth, the Bay Area's share of national employment will increase.

### **SB 375 & Regional Housing Target**

Senate Bill 375 states that the Sustainable Communities strategy must "identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan, taking into account net migration into the region, population growth, household formation and employment growth."

The Bay Area regional agencies, as well as the State Department of Housing and Community Development (HCD), interpret this requirement to mean that the region must plan for housing sufficient to meet total new demand, as generated by natural population increase (net births), household formation and employment growth. The region must demonstrate how all of the region's growth in housing demand can be met within the Bay Area's nine county borders, and not by surrounding counties via "spill-over".

The purpose of this requirement is presumably to reduce vehicle miles traveled (VMT) attributed to people living just outside of the region, and commuting to jobs within the Bay Area.

The net effect of this legislative requirement is that the region must plan for more housing than it has traditionally planned. To assume that the entire region's housing demand will be fully met within the region means to assume that there will be an increase in housing supply. The supply could be increased through modifications to local land use plans and expanded subsidies for below-market rate housing.

### **Calculating the Regional Housing Target**

Estimating housing demand or need is a different process than what is used to traditionally estimate long-term household growth. Demand in housing is generated by natural increase, employment growth, and migration. When estimating demand, limitations on housing development are not taken into account, such as fiscal or local land use constraints, e.g. zoning codes. Need is simply based on estimates of total population and household formation.

How to specifically calculate the number of units needed to "house all the population of the region" can be described best as a series of steps. The first three steps are to estimate total population, while the final two are about applying household formation rates to that total population:

7. Estimate **demographic population growth**, as determined by natural increase;
8. Estimate **employment growth**;
9. Determine **in-migration**, mostly due to employment growth;
10. Add in-migration to demographic population to arrive at **total population**;
11. Determine **"household formation" rates**;
12. Apply household formation or headship rate to total population to determine **total housing need**.

Formulaically, the above steps could be summarized as:

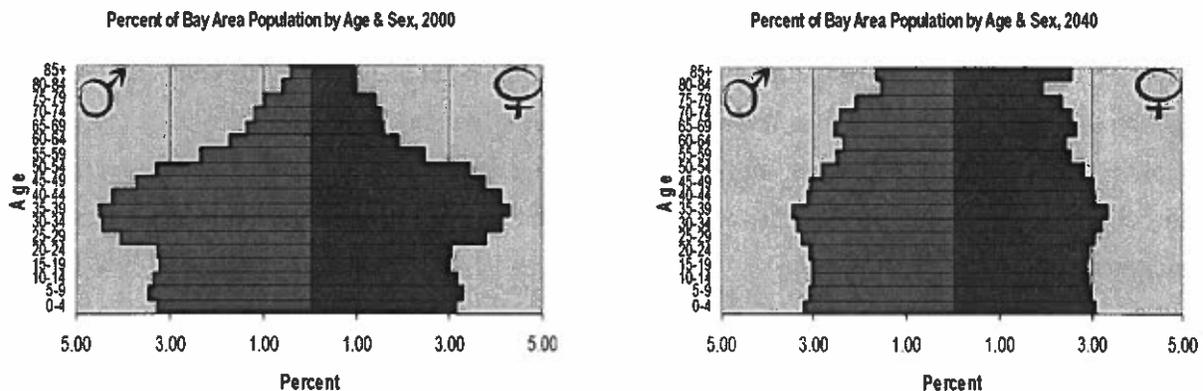
- 1)  $\text{Population}_{\text{Total}} = \text{Population}_{(\text{births-deaths})} + \text{Net Migration}_{(\text{jobs})}$
- 2)  $\text{Housing}_{\text{Total Need}} = \text{Population}_{\text{Total}} \times \text{Household Formation}$

### **Step 1: Demographic Population Growth**

Estimating long-term growth in the demographic population is perhaps the most straightforward aspect of estimating total housing need. Demographic population growth refers to growth attributed exclusively to natural increase, or the number of new births, less deaths. Migration into the region is not taken into account in the demographic population.

In looking at the details of the projected population for the region, specific policy implications emerge, the most significant of which is the projected aging of the population. Over the next several decades, the

number of people over 65 and over 80 years old will nearly triple. By 2035, one quarter of the population, almost 2.3 million people will be 65 years or older. Over three million people will be over 55; this is one-third of the Bay Area's projected population. As we plan our communities, and move forward with the development of the Sustainable Communities Strategy, we will need to consider the needs of a much older, and perhaps significantly greater non-driving population, including the need for non-auto dependent mobility and smaller homes.



### Step 2: Employment Growth

The region's total projected population is directly impacted by economic growth. Population growth is attributed to two fundamental factors: natural increase and net in-migration. Economic opportunities are a key driver to in-migration. Therefore, to understand migration you first need to understand how the regional economy will grow, specifically how many jobs the Bay Area will have in the next 25 years.

Staff assumes that there will be a long-term decline in employment growth, over previous forecast periods. Considering the magnitude of the recession and anticipated slow recovery, in 2009 ABAG reduced its long-term forecast by nearly 140,400 jobs for the year 2035, compared to earlier forecasts. Under the recommendation contained in this staff report, the 2035 forecast would be reduced by 700,000 jobs over Projection 2009 estimates. (See discussion regarding employment forecasting method above)

### Step 3: In-Migration

As stated above, migration is driven by economic opportunities in the Bay Area relative to opportunities outside the region. A primary driver of in-migration occurs when a tight labor market causes people (economic migrants) to relocate to obtain employment. Once employment growth is estimated, labor force participation rates are applied to the demographic population. The difference between the available labor force and the number of new jobs is the unmet demand for labor. The demand for labor is supplied by migrants into the region and in-commuters.

Migration is also composed of (although to a much lesser extent) social migration and retirement migration, which is dependent on employment, income and the cost of living. Data from the Department of Finance on projected migration by age cohort demonstrates that an increasing number of seniors will be migrating out of the region by 2040. Even considering the increase in retirement migration, we project the 65 years and older age group to see the greatest growth rates in the coming decades.

**Step 4: Compute Total Population**

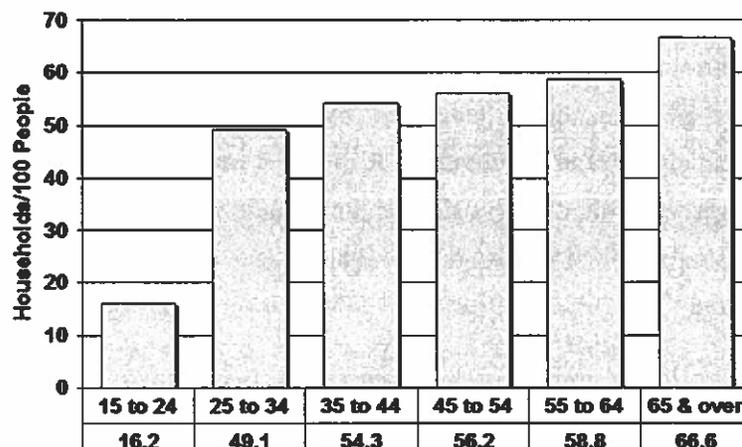
Once employment growth is estimated, net migration can be computed. The net number of new migrants into the region is added to the demographic population to make up the region’s total projected population.

$$\text{Population}_{\text{Total}} = \text{Population}_{(\text{births-deaths})} + \text{Net Migration}_{(\text{jobs})}$$

**Step 5: Headship Rates/Household Formation**

Headship rate is the percentage of people in the population who are heads of household. Every head of household, theoretically, requires a separate housing unit. If there were no restrictions on the number of housing units available, i.e. those that exist due to local land use policies or other financial and/or environmental constraints on development, every head of household would form new “households” or need a home. The rate of new households that are formed is called the household formation rate. It is these rates that are applied to the total population to determine how many housing units are needed to house the entire population.

**Age-specific Headship Rates, 2002**



The chart above, constructed from data compiled by a housing economist at the National Association of Home Builders (NAHB), shows U.S. age-specific headship rates for 2002. Notice that those age 65 and over have a headship rate four times that of 15- to 24-year olds, and about third larger than those in the 25- to 34-year old category. As the senior age group grows, this difference in headship rates really begins to matter. That the Bay Area’s population is dramatically aging over the next 25 years, therefore, has significant implications for the region’s total housing need.

To describe the method more fully, exemplary household estimates have been included. This estimate was

made by starting with the 2000 census headship rates by age and racial/ethnic group for the bay area. Since the Projections 2009 forecast did not differentiate racial/ethnic populations, estimates in the forecast years were derived using data from the California Department of Finance's long run population forecast. After reviewing various state demographic methodologies, and consulting with state from other regions, it was assumed that individual racial/ethnic headship rates would trend 50% toward the 2000 regional mean by the 2040 forecast year. This is to reflect the pattern of migrant groups taking on the characteristics of the broader population over time..

#### **Step 6: Apply Headship Rate to Total Population**

Once total population is determined, the second formula uses household formation rates to determine how many house units are needed to house the total population.

$$\text{Housing}_{\text{Total Need}} = \text{Population}_{\text{Total}} \times \text{Household Formation}$$

#### **Housing Need and the In-Commute**

A related component of the population forecast is inter-regional commuting. People working in the Bay Area, but living outside the region are motivated by factors similar to economic migrants. However, housing costs and opportunities cause them to make different choices, i.e. to live just outside of the region in surrounding counties, rather than within the region. If the region were to supply sufficient housing to meet all demand, as generated by both demographic changes and migration, then inter-regional commuting would be obviated. If the total need is not supplied, then people will continue to choose to live just outside of the region, and commute in to their place of employment. Therefore, the amount of housing supplied by the region has a direct impact on the numbers of people who commute into the region.