

## Chapter 13: WA Electric Service Area Population Estimation Methodology

**Variable:** Basic Consolidated EPS

**Period of Data:** Annual

**Source of Data:** U.S. Census and company data

**Period of Data Update:** Annual

**Recipient of Analysis:** Avista's Power Supply Department

**Purpose of Analysis:** For use in emission reports submitted to the WA UTC

### 1. Introduction

The methodology described below is used to estimate the population in Avista's electric service area in Washington (WA) for the years 1990 and 2005-2014. Section 2 presents the methodology for the 2005-2014 period and Section 3 presents the methodology for 1990. The WA UTC has asked for a 1990 estimate as a baseline year for carbon reporting.

### 2. 2005-2014 Methodology

Service area population for Washington (WA) for the 2005-2014 period is estimated using the following equation that links average occupied household size (AHS) to our residential customer count in WA:

$$[13.1] P_{y,WA} = \overline{AHS}_{ACS(5)} \cdot C_{y,WA,r} \text{ for } y = 2005, \dots, 2014$$

$P_y$  is estimated population,  $\overline{AHS}_{ACS(5)}$  is the average of the occupied household size in Spokane County using the five-year moving average American Community Survey (ACS) for the years  $2009_{ACS(5)}$ ,  $2010_{ACS(5)}$ ,  $2011_{ACS(5)}$ ,  $2012_{ACS(5)}$ , and  $2013_{ACS(5)}$ . By way of interpretation,  $2009_{ACS(5)}$  means the average of the years 2005-2009;  $2010_{ACS(5)}$  the average of 2006-2010;  $2011_{ACS(5)}$  the average of 2007-2011;  $2012_{ACS(5)}$  the average of 2008-2012; and  $2013_{ACS(5)}$  the years 2009-2013. The five-year average is used because a single year estimates can be very volatile.

Note that  $\overline{AHS}_{ACS(5)}$  is to average over the five values of  $AHS_{y,ACS(5)}$ :

$$[13.2] \overline{AHS}_{ACS(5)} = \frac{1}{5} \sum_{i=1}^5 AHS_{y,ACS(5)} \text{ for } y = 2009_{ACS(5)}, \dots, 2013_{ACS(5)}$$

Only AHS for Spokane County is used because more than 74% of our residential WA customers are in this county.<sup>1</sup> Simulations using all counties did not result in large differences in the population estimates. This approach smoothes the average household size to a single value for estimating population over the 2005-2014 period. With the five-year averages for the 2009-2013 period,  $\overline{AHS}_{ACS(5)} = 2.43$ . Multiplying this number by total annual WA residential (r) customers,  $C_{y,WA,r}$ , from 2009 to 2014 generates a base, fixed

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<sup>1</sup> Note that in any given year AHS is the weighted average of AHS for owner occupied and renter occupied housing. That is  $AHS_y = \alpha \cdot AHS_{owner,y} + (1-\alpha)AHS_{renter,y}$ , where  $\alpha$  is the share of owner occupied housing.

historical time-series of estimated population. As new five year averages are released, [2] can be updated and applied to future years. For example, when  $2014_{ACS(5)}$  is released, [2] can be updated so that so that average is calculated for  $y = 2010_{ACS(5)} \dots 2014_{ACS(5)}$ . This would be applied to estimate 2015 population. When  $2015_{ACS(5)}$  is released, [2] can be updated so that so that average is calculated for  $y = 2011_{ACS(5)} \dots 2015_{ACS(5)}$ . This would be applied to estimate 2016 population, and so on.

Note that  $C_{y,WA,r}$  represents a count of all billed residential meters. The population estimated generated by [1] assumes that every residential meter is a household. In some cases, some households may have more than one meter or customers may include multifamily units with only one master meter. However, the largest share is going to be single family households or multifamily units with separate meters.

### 3. 1990 Methodology

The data from 1990 comes from the decennial U.S. Census. The methodology is similar, however because the 1990 household count is not a five-year average, the estimation relies on single year estimate. The 1990 population estimate is:

$$[13.3] P_{1990,WA} = AHS_{1990} \cdot C_{1990,WA,r}$$

$AHS_{1990}$  is the occupied household size in Spokane County in 1990.