Community Scale Greenhouse Gas Emissions Inventory for the City of Reno and Washoe County for 2014

Prepared for:
City of Reno
Washoe County

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Executive Summary

The estimation of greenhouse gas emissions to the atmosphere at the county scale has become a global priority for many local decision makers and scientists. It is part of the effort to track, mitigate, and reduce concentrations at the local level to benefit the world as a whole. This report provides a brief overview of greenhouse gases in the atmosphere and the resulting effects on climate. It also details the approach and methods used to develop a community scale inventory for Washoe County and the City of Reno, and presents the inventory results. The results were computed using the International Council for Local Environmental Initiatives (ICLEI) ClearPath© Program with greenhouse gas (GHG) emissions reported in equivalent carbon dioxide (CO_2e) using a sector-based approach. The inventory is completed for Washoe County and the City of Reno for 2014. Based on data from the US Census the population in 2014 for Washoe County was 440,078, Reno: 236,995, Sparks: 94,708, and the Nevada state population was 2,839,099[1].

For all of Washoe County, the total GHG emissions were 4.516 million metric tons of CO_2e in 2014 (Figure 1). The transportation sector contributed the highest amount of emissions at 32.23% (1,455,397 metric tons CO_2e), with the residential and commercial energy sectors second and third, respectively (28.29% or 1,277,392 metric tons CO_2e and 28.25% or 1,275,550 metric tons CO_2e, respectively). Industrial energy (253,922 metric tons CO_2e), solid waste (195,051 metric tons CO_2e), water & wastewater (30,472 metric tons CO_2e), and agriculture (28,196 metric tons CO_2e) together make up the other 11.23%.

The 2014 City of Reno total GHG emissions were 2.792 million metric tons of CO_2e (Figure 2). The commercial energy sector contributed the highest amount of emissions at 31.77% (887,077 metric tons CO_2e), with transportation at 29.43% (821,705 metric tons CO_2e), and residential energy 27.39% (764,770 metric tons CO_2e). The rest 11.41% includes the industrial energy (176,598 metric tons CO_2e), solid waste (124,749 metric tons CO_2e), water & wastewater (16,337 metric tons CO_2e), and agriculture (888 metric tons CO_2e). The City of Reno emissions make up 61.83% of the total 2014 annual Washoe County emissions. When possible Reno specific activity data was used as inputs to the software to calculate the CO_2 equivalent, however the city data was not always available. When city data was not available the Washoe County activity data was used and scaled to the city level. The details of the scaling method used for the input data are discussed below in Section 4 and the input values are included in the Appendix.

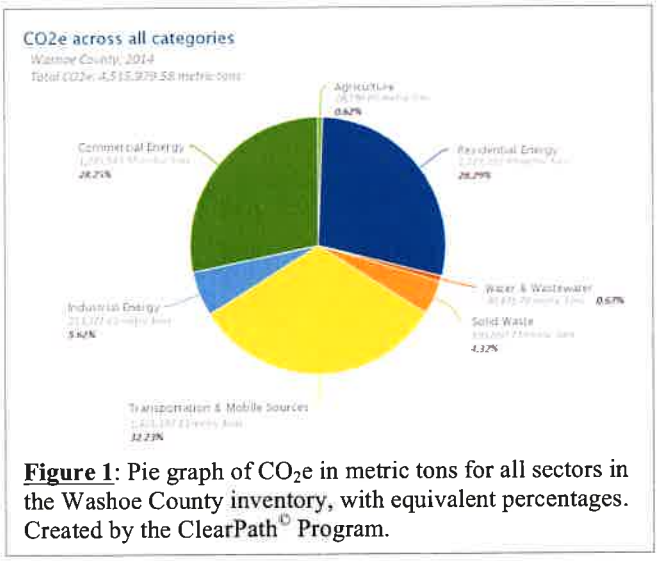

Figure 1: Pie graph of CO_2e in metric tons for all sectors in the Washoe County inventory, with equivalent percentages. Created by the ClearPath© Program.

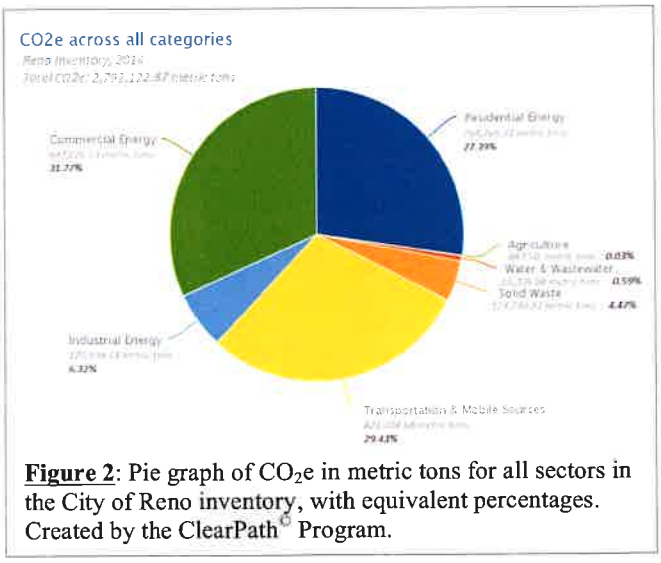

Figure 2: Pie graph of CO_2e in metric tons for all sectors in the City of Reno inventory, with equivalent percentages. Created by the ClearPath© Program.

[1]Population estimates from: http://quickfacts.census.gov/

1. Introduction

The earth's atmosphere is made up of various layers and gases that help regulate, protect, and make life possible at the surface. Its layers have different densities and temperatures, being divided from top to bottom into the exosphere, thermosphere, mesosphere, stratosphere, and troposphere. The density of atmospheric gases is greater in the bottom layers, and equates to higher temperatures near the surface. Nitrogen (N_2) and oxygen (O_2) are the most abundant species throughout the atmosphere, together making up around 99% of dry air. These gases are essential as N_2 is a constituent of DNA and part of the genetic code, while O_2 is what allows our bodies to convert food to energy. Though making up a much smaller percentage of the atmosphere, the other components of the atmosphere are equally important. Water vapor (H_2O), carbon dioxide (CO_2), and other gases play a very important role in the phenomenon known as the Greenhouse Effect.

Atmospheric conditions (i.e. climate) mostly affect animals and humans by regulating the global distribution of biomes, such as forests, grasslands, tundra, and deserts. The aforementioned Greenhouse Gases (GHGs) impact this distribution because of the absorption of incident solar radiation and outgoing terrestrial radiation, which results in effects on temperature, heat, and precipitation. Incoming solar radiation (short wave) is reflected and absorbed by the earth's surface and terrestrial (long wave) radiation is emitted from the earth's surface. The GHGs trap and reflect this radiation back to the surface, due to their tendency to absorb radiation more strongly in the longwave part of the spectrum associated with outgoing terrestrial radiation than the shortwave part associated with incoming solar radiation. This effect is what keeps the planet at a warm enough temperature to sustain life. However, recent human activities have resulted in record high GHG concentrations, and contributed to global climate change.

Anthropogenic activities have always contributed to GHG emissions. Many basic, everyday tasks give off carbon dioxide, methane, and nitrous oxide, i.e., fossil fuel combustion, deforestation, biomass burning, landfills, coal production, cattle ranches, and energy consumption. Since the Industrial Revolution in 1760, humankind has noticeably been causing global climate change through the emission of GHGs. According to the Intergovernmental Panel on Climate Change (IPCC), the concentrations of CO_2 and CH_4 have increased respectively by 40 and 150% compared to pre-industrial times (Sreenivas *et al.,* 2015). This is the result of mass fossil fuel emissions and net land use changes such as biomass burning, vehicle transportation, and the increase of urban areas. Over the past few decades, there have been reports of higher measurements of average air and ocean temperatures, reports of snow and ice melts, and global sea level rise (IPCC, 2014).

United Nations data suggests that cities are responsible for some 70% of global greenhouse-gas emissions and that countries with high urbanization rates emit more CO_2 per capita (Tollefson, 2012). The high rates of emissions are a result of the high concentrations of energy usage, waste disposal, and fuel burning. However, cities also have the greatest ability to make changes that affect a larger group of people and reduce a larger amount of anthropogenic GHGs, e.g., through city planning and public transportation. These two factors alone can greatly reduce GHGs by creating more compact urban areas and taking millions of cars off the road. Sprawling cities tend to have higher per capita emissions that compact ones. For example, New York City, because of high population density and a vast public transportation network, is able to keep its annual CO_2 emissions per capita down to 7.1 tons. Compare that with a less dense Washington D.C. which emits 19.7 tons of CO_2 per capita each year (UN-HABITAT, 2011).

People and their governments around the globe are taking it upon themselves to measure, report, and create action plans to mitigate greenhouse gas emissions. To more effectively go about reducing emissions and educating the populace, counties and cities around the globe are conducting GHG inventories in an effort to pinpoint the sources of their local emissions. Washoe County and specifically the city of Reno, Nevada have joined the Compact of Mayors. This coalition is the largest of its kind and hopes to standardize the measurement and reporting of GHGs internationally in hopes to come up with more sustainable and effective controls and policies in regards to the problem of global climate change.

2. Approach

The base year for the emissions inventory is 2014 because it was the year with the most complete data sets from all the different sources. The determination of a baseline year for an emissions inventory is the first milestone of International Council for Local Environmental Initiatives (ICLEI) Five Milestone Process to fight global warming. The program used for the 2014 inventory was ICLEI's ClearPath software, which has updated methods and emissions factors, as well as the ability to compute emissions from sources and activities unavailable in previous ICELI software packages (e.g. emissions from wastewater treatment). This updated software was created to more easily comply with the Compact of Mayors campaign which began in 2014. This new campaign is similar to Cities for Climate Protection, except that all data are uploaded into one central online repository. The benefits of this campaign are that it provides a public space for the measurement of emissions and climate risk, as well as an internationally consistent reporting platform. It provides a global picture of the anthropogenic effects on GHG emissions while at the same time breaking them down into their individual sources to more efficiently develop plans to reduce emissions. However, it is important to note that the emissions calculated by ClearPath are approximations rather than exact values. The software depends on numerous assumptions, and is limited by the quantity and quality of available data. Despite all this, it is still a useful tool in developing local mitigation plans to reduce GHG emissions.

In ClearPath, emission estimates are derived from community activities which are divided into the following sectors: Stationary Energy, Transportation, Waste, Industrial Processes and Product Use (IPPU), and Agriculture/Forestry/Other Land Use (AFOLU). These sectors are further broken down into scopes: *Scope 1* being all in-boundary sources, *Scope 2* being grid-supplied energy sources (those which cross the boundary), and *Scope 3* being all out-of-boundary sources, shown in Figure 3. All emissions from GHGs are converted into equivalent carbon dioxide units (CO_2e) for an easier comparison. For example, methane is twenty-five times more powerful than carbon dioxide in its capacity to trap heat, so the model converts one ton of methane emissions to 25 tons of CO_2e.

All the data for the inventory were provided by the US Census Bureau, Air Quality Management Division at the Washoe County Health District, NV Energy, Nevada Department of Transportation (NDOT), Department of Motor Vehicles (DMV), Regional Transportation Commission (RTC), Reno-Tahoe Airport Authority, Waste Management (WM), Nevada Division of Environmental Protection (NDEP), U.S. Department of Agriculture (USDA), Truckee Meadows Water Authority (TMWA), and University of Nevada Reno Department of Agriculture, Nutrition and Veterinary Sciences.

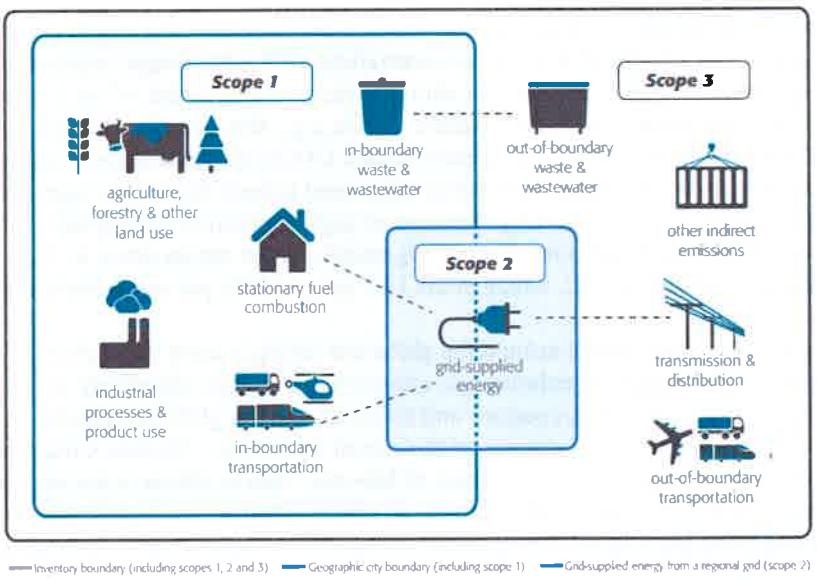

Figure 3: Sources and scope boundaries of GHG emissions, http://ghgprotocol.org/files/ghgp/GHGP_GPC.pdf.

Stationary Energy Sector

The stationary energy sector is broken down into nine subsectors: residential buildings, commercial facilities, industries and construction, energy industries, energy generation supplied to the grid, agriculture/forestry/fishing activities, non-specified sources, fugitive emissions associated with coal, and fugitive emissions from oil and natural gas systems. These are further broken down into scopes:

- *Scope 1*: Emissions from fuel combustion and fugitive emissions in the city
- *Scope 2*: Emissions from the consumption of grid-supplied electricity, steam, heating and cooling in the city
- *Scope 3*: Distribution losses from grid-supplied electricity, steam, heating and cooling in the city

The stationary energy sector is one of the largest contributors to a city's GHG emissions. GHGs result from fuel combustion, as well as fugitive emissions released in the process of generating, delivering, and consuming useful forms of energy (such as electricity or heat). The given Grid Electricity factor set by the EPA eGrid includes northern Nevada (by extension Washoe County) in the North West Power Pool (NWPP) region. However, the energy mix was very different from that of northern Nevada because the region includes Washington and Oregon which includes a significant portion of hydro power. The Electric Reliability Council of Texas (ERCOT) All region (mostly Texas) was instead chosen because that region uses equivalent amounts of natural gas and similar percentages of other power resources. The ClearPath program calculates the GHGs emitted from all of the electricity and fuel used, converting them all to tons of CO_2e using the factor set in Table 3.

Table 3: The Factor Set used for the Stationary Energy Sector. Numbers were taken from the EPA eGrid, Annual Total Output Emission Rates for the ERCOT All region as the energy mix was the closest to Washoe County.

CO_2	1143.04 lbs/MWh	5.72×10^{-4} tons/KWh
CH_4	16.70 lbs/GWh	8.35×10^{-9} tons/KWh
N_2O	12.33 lbs/GWh	6.17×10^{-9} tons/KWh

Transportation and Mobile Sources Sector

Vehicles and mobile machinery produce GHG emissions directly by combusting fuel and indirectly by consuming grid-delivered electricity. This sector is broken down into on-road transportation, railway, water-borne transportation, aviation, and off-road transportation. For Washoe County, it was decided to use a bottom-up methodology by using vehicle miles travelled (VMT) and miles per gallon (MPG) rates within the county limits.

This sector is broken down into the following scopes:

- *Scope 1*: Emissions from transportation occurring inside the city.
- *Scope 2*: Emissions from grid-supplied electricity used in the city for electric vehicles
- *Scope 3*: Emissions from the portion of the transboundary journeys occurring outside the city, and transmission and distribution losses from grid-supplied energy from electric vehicle use.

Calculations were then made for each fuel type using the annual VMT of different vehicle types and the factor set in Table 4. The fuel mix breakdown for the vehicles was determined for Washoe County by using the DMV vehicle registrations, results are shown in Table 5. The aircraft emissions were calculated based on the aviation fuel loaded onto the airplane and ground support vehicles with the corresponding fuel emissions factors in ClearPath. The jet fuel and aviation emissions were then scaled based on the number of community passengers (43% of passengers) to determine the community GHG emissions. The ClearPath program calculates the GHGs emitted from all of the electricity and fuel used, converting them all to tons of CO_2e.

Table 4: Transportation factor set, fuel economy, provided by the ICELI Community US Protocol.

Gas Passenger Vehicle Fuel Economy (MPG)	**23.8**	**Diesel Passenger Vehicle Fuel Economy (MPG)**	**13.81**
Gas Light Truck Fuel Economy (MPG)	**17.4**	**Diesel Light Truck Fuel Economy (MPG)**	**13.81**
Gas Heavy Truck Fuel Economy (MPG)	**5.36**	**Diesel Heavy Truck Fuel Economy (MPG)**	**6.06**
Gas Transit Bus Fuel Economy (MPG)	**5.36**	**Diesel Transit Bus Fuel Economy (MPG)**	**6.06**
Gas Para Transit Fuel Economy (MPG)	**5.36**	**Diesel Para Transit Bus Fuel Economy (MPG)**	**6.06**
Gas Motorcycle Fuel Economy (MPG)	**43.54**	**Diesel Motorcycle Fuel Economy (MPG)**	**115**
Electric Vehicle Fuel Economy (MPGe)	**102**		

Table 5: Percentage breakdown of vehicle types calculated using the fuel mix estimated for Washoe County using the EPA MOBILE6 Vehicle Emission Modeling Software.

Motorcycle	**4.62%**
Passenger Car	**83.13%**
Light Truck	**8.30%**
Heavy Truck	**3.95%**

Waste Sector

Waste disposal and treatment produces GHG emissions through aerobic and anaerobic decomposition, or incineration. The waste sector is broken down by solid waste generated in and outside the city and disposed in landfill or open dumps, solid waste generated in and outside the city that is treated biologically, solid waste generated in and outside the city that is incinerated or burned in the open, and any wastewater generated in and outside the city. These sectors are broken down into only two scopes:

- *Scope 1*: Emissions from waste treated inside the city.
- *Scope 3*: Emissions from waste generated by the city but treated outside of it.

The software converts all the emissions into CO_2e using built in emissions factors and the waste characterization factor set shown in Table 6. The data in this table is based on the recycled materials characterization for Washoe County and the percentages are applied to the total waste being sent to the landfill because the waste mix sent to the landfill was not available.

Table 6: Waste characterization factor set calculated from the percentage of recycled materials in Washoe County that are GHG emitting, percentages are assumed to be equivalent for waste sent to the landfill.

Mixed MSW	**45.13%**	**Newspaper**	**0.25%**
Office Paper	**0.50%**	**Corrugated Cardboard**	**13.13%**
Magazines/Third Class Mail	**5.81%**	**Food Scraps**	**11.22%**
Grass	**0.96%**	**Leaves**	**0.96%**
Branches	**1.28%**	**Dimensional Lumber**	**1.46%**

Agriculture, Forestry, and Other Land Use Sector

The Agriculture, Forestry, and Other Land Use (AFOLU) sector produces emissions through a variety of ways, including land-use changes that alter the composition of the soil, methane produced in the digestive processes of livestock, and nutrient management for agricultural purposes. For Washoe County, the only activity included for this sector was the methane produced by livestock. The scope breakdown is as follows:

- *Scope 1*: In-boundary emissions from agricultural activity, land use, and land use change within the city boundary.
- *Scope 3*: Other out-of-boundary emissions.

For this inventory, the methane emissions from dairy cows, horses, and beef cows were converted to CO_2e using the following equation:

$$= \sum \frac{Animal\ Population \times Emissions\ Factor(EF) \times Global\ Warming\ Potential\ of\ CH_4 (GWP_{CH_4})}{1000}$$

$$GWP_{CH_4} = 25$$

$$Dairy\ cow\ EF\ for\ 2009 = 140\ kg\ CH_4/head/year$$

$$Horse\ EF\ for\ 2009 = 18\ kg\ CH_4/head/year$$

$$Beef\ cow\ EF\ for\ 2009 = 94\ kg\ CH_4/head/year$$

3. Community Greenhouse Gas Inventory for Washoe County

Washoe County is located in the high desert, basin and range area of northwest Nevada. It typically has low humidity, fluctuating temperatures, high intensity sunlight, and dry winds. Covering an area of about 6,540 square miles, it borders California along the eastern slopes of the Sierra Nevada Mountains and Oregon to the north. It contains Reno (the third largest city in Nevada), Sparks, and Incline Village. Washoe County's population is 440,078 and has a visitor count nearly 10x that amount[2] due to Lake Tahoe and year round cultural events. According to the EPA, the region's naturally variable and unpredictable hydrological and climatic systems would become even more variable with changes in climate (EPA, 1998). The main local impact would be on the already unstable water supply. A warmer climate would exacerbate fire risk in the late summer as it would increase evaporation and shorten the snow season in the mountains, resulting in earlier spring runoff and reduced summer stream flow. The following sections detail the GHG emissions from each sector.

3.1 Energy

The energy sector is broken up into three main sub sectors residential (Table 7), commercial (Table 8), and industrial (Table 9). The residential and commercial energy sectors make up the majority of the GHG emissions from stationary energy, where electricity generation is the largest contributor in all three of the subsectors and natural gas usage being the second largest contributor.

Table 7: Results for the Washoe County Stationary Energy Residential Sector

Input Record Name	CO_2e in metric tons (T)
Residential Distillate Oil Use—WC	36,436.998
Residential Natural Gas Usage—WC	481,922.597
Residential LPG Use—WC	29,675.049
Residential Kerosene Use—WC	5,378.653
Residential Wood Combustion—WC	3,714.576
Residential Electricity—NVE	720,264.528
Totals	*1,277,392.402*

[2]2014 visitor counts 4,631,195, from https://www.visitrenotahoe.com/docs/9_-_Visitor_Counts_-_March_2016.pdf

Table 8: Results for the Washoe County Stationary Energy Commercial Sector

Input Record Name	CO_2e in metric tons (T)
Commercial Distillate Oil Use—WC	1245.000
Commercial Natural Gas Usage—WC	223,678.302
Commercial LPG Use—WC	13,339.840
Commercial Kerosene Use—WC	24,225.719
Commercial Electricity—NVE	1,013,061.086
Totals	*1,275,549.923*

Table 9: Results for the Washoe County Stationary Energy Industrial Sector

Input Record Name	CO_2e in metric tons (T)
Industrial Distillate Oil Use—WC	364.429
Industrial Natural Gas Usage—WC	78,399.285
Industrial LPG Use—WC	765.758
Industrial Kerosene Use—WC	2.089
Industrial Electricity—NVE	174,390.086
Totals	*253,921.649*

3.2 Transportation

The total GHG emissions from the transportation sector were 1,455,397 metric tons of CO_2e for Washoe County. This is divided into the following subsectors on-road automobiles, public transit, railroad, and aviation. Table 10 shows all of the mobile and rail emissions and Table 11 shows the aviation emission. The on-road mobile sources have the largest GHG emissions in the transportation sector with over 1 million metric tons of eCO_2, where gasoline vehicles are the majority of those emissions. Air travel is the second largest emitter in the transportation sector with over 100,000 metric tons of CO_2e. However, the air travel is about 2.7% of the total CO_2e emission in Washoe County, which is less than the US average of 3%.

Table 10: Results for the Washoe County Transportation Sector

Input Record Name	CO_2e in metric tons
Amtrak Rail—Passenger	784.09
UPRR Rail—Freight	28,260.56
UPRR Rail—Switchyard	881.17
Public Transit—CNG	81.23
Public Transit—Diesel	6,265.30
Public Transit—Electric	0.21
CNG On Road VMT	10,640.01
Electric On Road VMT	7.45
Methanol On Road VMT	677.76
Diesel On Road VMT	116,747.84
Gasoline On Road VMT	1,171,674.89
Ethanol On Road VMT	4.40
Total	**1,336,024.91**

Table 11: Results for the Washoe County Aviation Sector

Input Record Name	CO_2e in metric tons
International Flight (Guadalajara, Mexico-GDL)	66.45
Reno-Tahoe, Jet Fuel	115,617.52
Reno-Tahoe, Aviation Gasoline	463.26
Support Vehicles, Reno-Tahoe—Gasoline	571.30
Support Vehicles, Reno-Tahoe—Diesel	742.76
Reno-Stead, Jet Fuel	1,235.30
Reno-Stead, Aviation Gasoline	585.85
Support Vehicles, Reno-Stead—Gasoline	33.22
Support Vehicles, Reno-Stead—Diesel	56.66
Total	**119,372.32**

3.3 Waste Disposal

The waste disposal sector includes water and waste water treatment (Table 12) and solid waste disposal (Table 13). It is important to note that recycling is not included in the GHG emissions, therefore any solid waste materials that were sent to recycling are removed from the total inventory estimates. In 2014, the recycling rate in Washoe County was 37.5%. Also the burning or flaring of methane at the Lockwood Landfill was started in 2009, which results in a 75% methane recovery factor in the ClearPath software.

Table 12: Results for the Washoe County Water and Wastewater Sector

Input Record Name	CO_2e in metric tons
Water Usage—WC	10,408.08
Nitrification of Wastewater—Stead	74.31
Wastewater Treatment—WC	16,026.19
Combustion of Digester Gas—WC	2.44×10^{-5}
Methanol in Wastewater Treatment—WC	3,963.11
Total	**30,471.69**

Table 13: Results for the Washoe County Solid Waste Sector

Input Record Name	CO_2e in metric tons (T)
Waste Collection, WC—Diesel	8,102.337
Waste Collection, WC—CNG	1,082.656
Quarter 1 Waste—WC	43,668.243
Quarter 2 Waste—WC	50,854.122
Quarter 3 Waste—WC	49,204.153
Quarter 4 Waste—WC	41,953.300
Combustion of Solid Waste—EPA/WM	185.912
Totals	*195,050.731*

3.4 Agriculture

The final sector of the GHG emissions inventory is agricultural emissions, shown in Table 14. There was not a significant amount of livestock farming in Washoe County but the dairy cow, beef cow, and horse estimates were included in this inventory. These emissions account for less than 1% of the total GHG emissions in Washoe County.

Table 14: Results for the Washoe County Agriculture Sector

Input Record Name	CO_2e in metric tons (T)
Dairy Cow Emissions	13,097.000
Beef Cow Emissions	13,984.850
Horse Emissions	1,114.200
Totals	*28,196.05*

4. Community Greenhouse Gas Inventory for City of Reno

The City of Reno is located in the southern portion of Washoe County and borders the City of Sparks. The 2014 population of Reno was 236,995, which makes up 53.85% of the Washoe County population. Together the City of Reno and City of Sparks accounts for just over 75% of Washoe County residents. The City of Reno is a transportation hub for Lake Tahoe and the Sierra Nevada region, including one airport (Reno-Tahoe International Airport), rail (Amtrak), bus (Greyhound, Silver State Trailways, Megabus), and major roadways (Interstates 80 and 580, U.S. Routes 40 and 395). The Truckee River is the main water source for the City of Reno and flows through downtown.

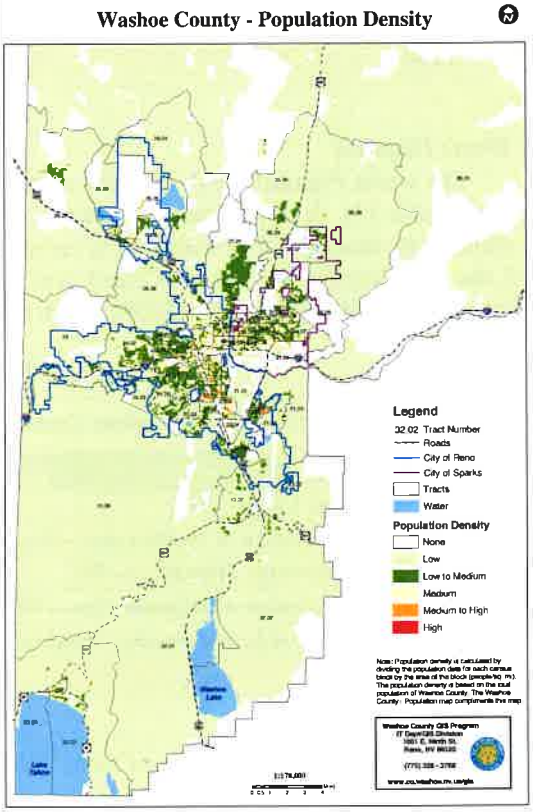

Figure 4: Washoe County population density.

When possible, data specific to the City of Reno was used for this emissions inventory but the data was not available at the city level for each sector. Therefore, when necessary the county level data was used and scaled down to the city level. The scaling method used for each sector is discussed in each subsection, however the majority of the scaled emissions were based on population ratios of Reno versus Washoe County. Most of the Washoe County residents live in the Reno-Sparks metropolitan area therefore the activity data at the county level is likely representative of residents in a low to medium population density region (Figure 4). Because the majority of the Washoe county residents live in a region with low to medium population density the activity data for the county is representative of residents with activity habits similar to residents of Reno.

4.1 Energy

The City of Reno grid electricity usage data was used for this sector, while all other stationary fuel combustion sources were scaled from the Washoe County data. This scaling was done for the residential, commercial, and industrial subsectors using the ratio of grid electricity from Reno versus Washoe County. This ratio was then used to scale down the stationary gas usage from the county level to the city level.

The energy sector is broken up into three main subsectors residential (Table 15), commercial (Table 16), and industrial (Table 17). The residential and commercial energy sectors make up the majority of the GHG emissions from stationary energy, where electricity generation is the largest

contributor in the commercial and industrial subsectors with natural gas usage the second largest contributor. For residential energy the electricity and natural gas usage are both the largest contributors to the subsector.

Table 15: Results for the City of Reno Stationary Energy Residential Sector

Input Record Name	CO_2e in metric tons
Residential Electricity—Reno	354,351.22
Residential Wood Combustion—Reno	1,727.10
Residential Kerosene Use--Reno	27,695.41
Residential Distillate Oil Use—Reno	25,328.65
Residential Natural Gas Usage—Reno	335,039.58
Residential LPG Use--Reno	20,627.94
Total	**764,769.90**

Table 16: Results for the City of Reno Stationary Energy Commercial Sector

Input Record Name	CO_2e in metric tons
Commercial Electricity—Reno	704,593.70
Commercial Kerosene Use--Reno	16,840.11
Commercial Distillate Oil Use—Reno	865.43
Commercial Natural Gas Usage—Reno	155,504.40
Commercial LPG Use--Reno	9,272.89
Total	**887,076.53**

Table 17: Results for the City of Reno Stationary Energy Industrial Sector

Input Record Name	CO_2e in metric tons
Industrial Electricity—Reno	121,289.98
Industrial Kerosene Use--Reno	1.45
Industrial Distillate Oil Use—Reno	253.44
Industrial Natural Gas Usage—Reno	54,520.72
Industrial LPG Use--Reno	532.56
Total	**176,598.15**

4.2 Transportation

The vehicle fuel mix for the City of Reno mobile emissions was assumed to be the same as Washoe County (Table 5). The vehicle miles traveled for Washoe County were scaled down to the City of Reno using population scaling. The rail activity was scaled by the amount of track in Washoe County versus the City of Reno.

The total GHG emissions from the transportation sector are 821,705 metric tons of CO_2e for City of Reno, which is 56.5% of the Washoe County transportation GHG emissions. This is divided into the following subsectors on-road automobiles, public transit, railroad, and aviation. Table 18 shows all of the transportation emissions, including the aviation emissions from the Reno-Tahoe International Airport. The on-road mobile sources have the largest GHG emissions in the transportation sector with over 690,000 metric tons of eCO_2, where gasoline vehicles are the majority of those emissions. Air travel is the second largest emitter in the transportation sector with over 100,000 metric tons of CO_2e, and about 4.2% of the total CO_2e emission in the City of Reno.

Table 18: Results for the City of Reno Transportation Sector

Input Record Name	CO_2e in metric tons
International Flight (Guadalajara, Mexico-GDL)–Reno	57.15
Reno-Tahoe, Jet Fuel—Reno	115,622.90
Reno-Tahoe, Aviation Gasoline—Reno	463.08
Support Vehicles, Reno-Tahoe—Gasoline	571.34
Support Vehicles, Reno-Tahoe—Diesel	742.76
Amtrak Rail—Passenger	239.21
UPRR Rail—Freight	4,321.50
Public Transit—CNG—Reno	41.06
Public Transit—Diesel—Reno	3,358.20
Public Transit—Electric—Reno	0.11
CNG On Road VMT—Reno	5,310.20
Electric On Road VMT—Reno	3.99
Methanol On Road VMT—Reno	376.24
Diesel On Road VMT—Reno	62,576.84
Gasoline On Road VMT—Reno	628,017.74
Ethanol On Road VMT–Reno	2.36
Total	**821,704.68**

4.3 Waste Disposal

The solid waste disposal and transportation data was provided specifically for the City of Reno, however the numbers for Quarter 2 to Quarter 4 were for 2014, and Quarter 1 was from 2015. The combustion of solid waste activity data was scaled down to the city level from the county data using the population ratio. The water and waste water treatment activity data for the City of Reno was also scaled using the population ratio from the county level data.

The waste disposal sector includes water and waste water treatment (Table 19) and solid waste disposal (Table 20). Again, recycling is not included in the GHG emissions, therefore any solid waste materials that were sent to recycling are removed from the total inventory estimates. In 2014, the recycling rate in Washoe County was 37.5%, which is assumed to be similar for the City of Reno.

Table 19: Results for the City of Reno Water and Wastewater Sector

Input Record Name	CO_2e in metric tons
Water Usage—Reno	5,579.13
Nitrification of Wastewater—Reno	41.44
Wastewater Treatment—Reno	8,590.65
Combustion of Digester Gas—Reno	1.28×10^{-5}
Methanol in Wastewater Treatment–Reno	2,125.67
Total	**16,336.89**

Table 20: Results for the City of Reno Solid Waste Sector

Input Record Name	CO_2e in metric tons
Quarter 1 Waste—Reno	29,748.69
Quarter 2 Waste—Reno	29,235.29
Quarter 3 Waste—Reno	29,638.89
Quarter 4 Waste—Reno	29,540.08
Waste Collection, Reno—CNG	757.86
Waste Collection, Reno—Diesel	5,671.64
Combustion of Solid Waste—Reno	156.79
Total	**124,749.24**

4.4 Agriculture

The number of livestock was given for the City of Reno and therefore not scaled down from the county level data. There is not a significant amount of livestock farming in the City of Reno but cow and sheep emission were both accounted for. These emissions account for less than 0.05% of the total GHG emissions in Reno.

Table 21: Results for the City of Reno Agriculture Sector

Input Record Name	CO_2e in metric tons
Cow Emissions—Reno	877.50
Sheep Emissions—Reno	10.00
Total	**887.50**

5. Summary

This baseline emission inventory for the year 2014 will serve as a guide for the City of Reno and Washoe County to set targets for emissions reduction. It is important to note that the calculations made by software programs to determine GHG emissions are continually being updated with new emissions factors as the science advances. Therefore, caution should be used when comparing inventory estimates from different software programs that use different calculations and emissions factors. It can be helpful to compare the raw input data instead of the emissions, which for this inventory are included in the Appendix. For example, in a previous GHG emissions inventory for Washoe County for the year 2008 (Ling-Barnes, 2010) the mobile emissions were 2,605,371 metric tons of eCO_2 or 44% greater than the transportation emissions found in this 2014 inventory. This is despite the fact the total vehicle miles traveled in the 2008 inventory was only 10% greater than the VMT in the 2014 inventory. The 2008 inventory was completed using ICLEI's Clean Air and Climate Protection (CACP) software, which uses different emissions factors than the ClearPath software. The 44% reduction therefore is not physically realistic and is an artifact of methodological updates.

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Appendix

The following pages include all of the data used as inputs to the ClearPath software for Washoe County and the City of Reno. Along with the raw data, the contact information for the data is included with each dataset.

2014_RNO Aviation_RTAAk.xlsx

Community Emissions Inventory
Air Travel: Working Data

Back to Intro

Inventory Log

Part A: Data for allocation of emissions to community

Airport name	Total airport passengers*	Community Passengers**	% of Passengers from community
Reno-Tahoe International Airport	3,298,915	1,418,533	0.43
Reno-Stead Airport (No Commercial Air Service	NA	NA	
International Flight (Guadalajara, Mexico - GDL)	1,135	NA	

* Number of passengers may be boardings, deplanings, or boardings + deplanings, as long as consistency is maintained between measurement for airport total and for community

**"Total Community Passengers = Boardings

*deplanings + boardings

Part B: Data on fuel loaded onto airplanes

Record Name	Jet Fuel Total	Units	Aviation Gasoline Total	Units	% of passengers from community	Jet Fuel allocated to community	Aviation Gasoline allocated to community
Reno-Tahoe International Airport	28,063,411	Gallons	129,255	Gallons	0.43	12,067,267	55,580
Reno-Stead Airport	128,929	Gallons	70,288	Gallons	NA	#VALUE!	#VALUE!
International Flight (Guadalajara, Mexico - GDL)	13,870	Gallons				0	0
						0	0

We need to discuss this number

Part C: Data on airport fleet and ground support vehicles

Record Name	Gasoline Total	Units	Diesel Total	Units	CNG Total	Units	LPG Total	Units
Reno-Tahoe International Airport	64,495	Gallons	72,748	Gallons	0		0	
Reno-Stead Airport	3,750	Gallons	5,549	Gallons	0		0	

Airport fleet and ground support vehicles continued. Enter % of passengers from community; do not type in gray cells, data will be calculated automatically

Record name	% of passengers from community	Gasoline allocated to community	Diesel allocated to community	CNG Allocated to Community	LPG allocated to community
Reno-Tahoe International Airport	0.43	27,733	31,282	0	0
Reno-Stead Airport	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!
		0	0	0	0
		0	0	0	0
		0	0	0	0

RNO Facilities/Stationary Sources (Airport Authority Owned and Operated Facilities Only - Does not include Tenant-Owned Facilities on-airport Property) Examples: Nevada Air National Guard and General Aviation Fixed-Based Oper

Electricity (kWh)	16,879,473	kWh
Natural Gas (Therms)	412,444	Therms
Solar-Renewable Energy Generation (kWh)	262,520	kWh

Reno-Stead Airport (Airport Authority Owned and Operated Facilities Only - Does not include Tenant-Owned Facilities on-airport Property) Examples: Nevada Army National Guard and General Aviation Fixed-Based Operators

Electricity (kWh)	611,827	kWh
Natural Gas (Therms)	24,198	Therms

Factor Set Input Data

Washoe County Outputs: 2014				Reno Outputs: 2014		
	MT	%	% Change		MT	%
Commercial En	1,275,549.92	28.25%	-30.46	Commercial Energy	887,076.53	31.77
Residential Ene	1,277,392.40	28.29%	-40.13	Residential Energy	764,769.91	27.39
Industrial Energ	253,921.65	5.62%	-30.45	Industrial Energy	176,598.14	6.32
Agriculture	28,196.05	0.62%	-96.85	Agriculture	887.50	0.03
Water & Waste	30,471.70	0.67%	-46.39	Water & Wastewate	16,336.88	0.59
Solid Waste	195,050.73	4.32%	-36.04	Solid Waste	124,749.23	4.47
Transportation	1,455,397.13	32.23%	-43.54	Transportation	821,704.68	29.43
Total	*4,515,979.58*	100.00%	-38.17	*Total*	*2,792,122.87*	*100.00*

WC Comparison to Yann's: 2008				*Run on ClearPath without Rail or Aviation		
Sector	2008 CO2e (metric t	2014 CO2e (metric t	% Change	2008 CO2e (metric t	2014 CO2e (me	% Change
Residential	1,155,619	1,277,392	11	---	---	---
Commercial/Ind	1,612,383	1,529,472	-5	---	---	---
Transportation	2,605,371	1,455,397	-44	1,681,422	1,306,099	-22
Solid Waste	720,028	195,051	-73	---	---	---
TOTAL	*6,093,401*	*4,457,312*	*-27*	*1,681,422*	*1,306,099*	*-22*

Washoe County	2008	2014	% Change
	Recycling Rate %	Recycling Rate %	
	22.00	37.5	70
	Waste Disposal	Waste Disposal	
	889,251	571,663	-36
	Emissions in CO2e	Emissions in CO2e	
	720,028	230,873	-68
	Population	Population	% Change
	412,219	442,123	7

"Net" % Difference	
-106	*Flaring methane in 2009 that causes this reduction!

Washoe County Inventory: IPCC 4th Assessment vs 2nd Assessment				
	4th Assessment	*2nd Assessment*	*Units*	*% Change*
Commercial	1,275,549.92	1,275,524.17	*metric tons*	***0.002***
Residential	1,277,392.40	1,276,746.63	*metric tons*	***0.051***
Industrial	253,921.65	253,929.84	*metric tons*	***-0.003***
Agriculture	28,196.05	28,196.05	*metric tons*	***0.000***
Water/Waste	30,471.70	30,476.56	*metric tons*	***-0.016***
Solid Waste	195,050.73	165,341.11	*metric tons*	***17.969***
Transportation	1,455,397.13	1,371,619.54	*metric tons*	***6.108***
Total	*4,515,979.58*	*4,401,833.90*	*metric tons*	
	% Change	*2.59*		

Raw Data_Agriculture_.xlsx

2012 Census of Agriculture for Nevada--Washoe County

Source Contact: Washoe County	
Name	
Title	
Department	
Telephone	
Email	

Emissions Inventory Year: 2014

2012_AG_Nevada_Census.pdf

Number of Farms in Washoe	Land in Farms (acres)	Average Size of Farm (acres)	Median Size of Farm (acres)
479	442,697	924	15

Farms by size	Quantity	Farms by size	Quantity
1 to 9 acres	171	1 to 9 acres	171
10 to 49 acres	**161**	**10 to 49 acres**	**161**
50 to 179 acres	96	50 to 179 acres	96
180 to 499 acres	**17**	**180 to 499 acres**	**17**
500 to 999 acres	16	500 to 999 acres	16
1,000 acres or more	**18**	**1,000 acres or more**	**18**
Totals	479	*Totals*	479

Livestock and Poultry	Farms	Quantity
Cattle and Calves Inventory	147	9,693
_Cattle and Calves Sold	**128**	**6,601**
Hogs and Pigs Inventory	9	(D)Witheld
_Hogs and Pigs Sold	**14**	128
Sheep and Lambs Inventory	67	(D)Witheld
Layers Inventory	**108**	4,231
_Broilers and other Meat-type Chickens Sold	21	2,508

Other Land uses	Farms	Acres
Total Cropland	172	13,737
Harvested Cropland	**144**	**7,910**
Irrigated Land	210	15,397

2016_MainStation **Ranch Head** Count_Chris Pritsos_Reno.pdf

*counts vary over time as a research and teaching facility

		CH4 Emissions in CO2e	EF	GWP
Cattle	300	877.5	117 [1]	25
Sheep	50	10.0	8	25

Equation: CH4 emissions in CO2e = Animal Population x Emissions Factor (EF) x Global Warming Potential of CH4 (GWP_{CH4})

1000

Raw Data_Agriculture_.xlsx

[1] Average of beef and dairy cow EF factors as they don't have a set breakup

Raw Data_Solid Waste

Recycling Rate, Washoe County--DCNR

Source Contact: Waste Management	YEAR: 2014
Name	Patricia Moen
Title	Northern Nevada Recycling Coordinator
Department	DCNR
Telephone	775-687-9466
Email	pmoen@dcnr.nv.gov

2014 DCNR Washoe County Recycling Rate_Patricia Moen.xls

Recycling Rate	Total Rate
33.90%	100.00%
	Landfill Rate
	66.10%

Total Tons of Recycled Material	Total MSW
221,389.68	653,066.90 tons
	Total Landfill MSW
	431,677.22 tons

Paper	Quantity	Units
Corrugated Cardboard	29,079.12	Tons
Newspaper	548.44	Tons
Office Paper	1,117.69	Tons
Magazines	972.25	Tons
Telephone Books	5.06	Tons
Mixed Paper	11,878.61	Tons
Totals	43,601.17	Tons

Metals	Quantity	Units
Aluminum Containers	10,167.43	Tons
Tin/steel Containers	19,625.01	Tons
Ferrous Scrap Metals	47,971.40	Tons
Non-ferrous Scrap Metals	6,413.43	Tons
Appliances (white goods)	6,438.00	Tons
Totals	90,615.27	Tons

Plastic	Quantity	Units
Plastic (PET)	42.42	Tons
Plastic(HDPE)	19.84	Tons
Mixed Plastic	4,222.53	Tons
Plastic Film	3,320.09	Tons
Polystyrene	15.25	Tons
Other (PVC, LDPE, PP)	114.26	Tons
Totals	7,734.39	Tons

Glass	Quantity	Units
Glass whole (wine/beer bottles	-	Tons
Clear crushed	0.00	Tons
Green crushed	0.00	Tons
Amber/Brown crushed	0.00	Tons
Commingled crushed	5	Tons
Totals	5.00	Tons

Organic Material	Quantity	Units
Yard Debris	7,097.38	Tons
Food Waste	12,153.26	Tons
Biosolids (processed sewage sludge fro	39,594.33	Tons
Restaurant Grease	9,466.81	Tons
Rendered Animal Matter	3,220.33	Tons
Totals	71,532.11	Tons

Special Waste	Quantity	Units
Used Tires	2,491.23	Tons
Paint	0.00	Tons
Household Hazardous Waste	28.00	Tons
Commercial Used Oil	4,406.82	Tons
Commercial Used Anti-freeze	376.65	
Totals	7,302.70	Tons

Textiles	Quantity	Units
Textiles	226.85	Tons
Other-Clothing	0.00	Tons
Totals	226.85	Tons

Other Materials	Quantity	Units
Toner Cartridges	0.69	Tons
Other--Computers	371.50	Tons
Totals	372.19	Tons

2014 Recycling Rate Washoe County Construction & Demolition (C&D)

Recycling Rate	Landfill Rate
41.00%	59.00%

Total Tons of Recycled C&D	Total C&D
234,325.47	571,525.54 tons
	Total Landfill C&D
	337,200.07 tons

C&D	Quantity	Units
Asphalt (6" thickness)	110,422.00	Tons
Concrete (6" thickness)	119,464.35	Tons
Carpet	526.00	Tons
Carpet padding	501.00	Tons
Drywall	0	Tons
Wood	3,412.00	Tons
Plastic Buckets	0.12	Tons
Other--Waste Ink	0.00	Tons
Other--Hardware	0.00	Tons
Totals	234,325.47	Tons

Recycled MSW AND C & D Grand Total	455,715.15

Total MSW Disposed of in County: 431337.59 tons

Raw Data_Solid Waste

Total Industrial & Special Waste disposed of in county:	219964.77	tons
*Total MSW generated in county	653975.09	tons
**Total Waste generated in county:	1108265.33	tons

* Total MSW generated is the sum of recycled MSW (tabulated above) plus the quantity of MSW disposed of in landfill which was reported as generated in the county.

** Total Waste generated is the sum of recycled MSW and Construction and Demolition Debris (tabulated above) plus the quantity of MSW which was reported as generated in the county plus the quantity of Industrial/Special wastes (which includes Construction and Demolition Debris) disposed of in the county. Note that Nevada solid waste regulations do not require disposal facilities to report the county of origin for Industrial/Special waste.

Percentage of Recycled Materials that are GHG Emitting		*assume equivalent % in landfill
Corrugated Cardboard	13.13	
Newspapers	0.25	
Office Paper	0.50	
Magazines/3rd Class Mail	5.81	
Yard Debris	3.21	
--grass	*0.96*	30% of yard debris
--leaves	*0.96*	30% of yard debris
--branches	*1.28*	40% of yard debris
Food Waste	5.49	
Biosolids	17.88	
Rest. Grease/Animal Matter	5.73	
Wood	1.46	
Drywall	0.00	

Tons of Materials in Landfill that are GHG Emitting		
Corrugated Cardboard	56700.00	tons
Newspapers	1069.38	tons
Office Paper	2179.33	tons
Magazines/3rd Class Mail	25067.15	tons
Yard Debris	13838.84	tons
--grass	*4151.65*	tons
--leaves	*4151.65*	tons
--branches	*5535.54*	tons
Food Waste	23697.06	tons
Biosolids	77203.10	tons
Rest. Grease/Animal Matter	24738.05	tons
Wood	4909.95	tons
Drywall	0.00	tons
Total	*243241.71*	*tons*

Collection and Transportation Data, WC--W

Source Contact: WM	YEAR: 2014
Name	Greg Martinelli
Title	Area Manager
Department	Waste Management Northern California-Nevada Area
Telephone	775-326-2322
Email	gmartinelli@wm.com

Collection and Transportation Data.pdf

https://drive.google.com/drive/folders/0B_NzLa2wYhsgdFpWWHNWcVlJalk

Vehicle Type	Rear Load	Front Load	Side Load	Roll Off
Fuel Type	Diesel (94 trucks)	CNG (18 trucks)		
AVG MPG	8	6		
Avg. Miles to Disposal Site	17 miles			

WC VMT	5305296.90
--Diesel	4452659.90
--CNG	852637.00

Raw Data_Solid Waste

2014 TRI Lockwood Landfill Report--EPA/WM

Source Contact: Waste Management	YEAR: 2014
Name	Christoper Anderson&Joe Beard
Title	District Manager/Environmental Protecti
Department	Lockwood Regional Landfill
Telephone	775-343-7372/775-342-7906
Email	cander14@wm.com
	jbeard4@wm.com

Current Waste Disposal Quantity Determination Details	
Reporting Year	2014
Total Annual Waste Disposal Quantity	953,317.815 MT
Method Used to Determine Quantity	Use scales to weigh loads before off-loading
Annual Waste Disposal Quantity	953,317 MT

2016 EPA TRI Lockwood Landfill Report_online

https://drive.google.com/drive/folders/0B_NzLa2wYhsgdFpWWHNWcVlJalk

*Has total annual waste disposal quantities for 1969-2014 from pgs. 6-23

Landfill Location: Storey County	
% of Landfill Waste from Reno/WC: 50-66	
2014 Total Landfill Gas Flow Produced	1052.8 MMSCF
--Methane Concentration	51.57 %
2014 Gas Flow Flared	530.6 MMSCF
--Methane Concentration	51.5 %
2014 Gas Flow Recaptured and Sent to the Renewable Engin	522.2 MMSCF
--Methane Concentration	51.6 %
2014 Energy Sold to NV Energy	24568 MWH

Facility Name	
Refuse Inc.-Lockwood Landfill	
Facility Identifier	
Reporting Year	2014
Facility Location	
Address	1491 Canyon Way
City	Lockwood
State	NV
Postal Code	89434

Facility Site Details	
CO2 Equivalent Emissions	
--From Facility Subparts C-II, SS, and TT	89,990.2 MT
--From Supplier Subparts LL-QQ	-- MT
Biogenic CO2 Emissions	
--From Facility Subparts C-II, SS, and TT	14,059.3 MT
Cogeneration Unit Emissions Indicator	N
Reporting Dates	
--Start Date	1/1/2014
--End Date	12/31/2014

Parent Company Details	
Parent Company Name	Waste Management, Inc. (WM)
Address	1001 Fannin, Suite 4000
City	Houston
State	TX
Postal Code	77002
Percent Ownership Interest	100%

Description of Changes to Methodology	
Part 75 Biogenic Emissions Indication:	
--Plant Code Indicator	N
--Primary NAICS Code	562212
--Second Primary NAICS Code	--
--Additional NAICS Codes	--

Subpart C: General Stationary Fuel Combustion	
Gas Information Details	
Gas Name	Gas Quantity (MT)
Carbon Dioxide (CO2)	242.60
Biogenic Carbon Dioxide (CO2)	14,059.30
Methane (CH4)	0.87
Nitrous Oxide (N2O)	0.17

Unit Details	
Unit Name	PROPHTR001
Unit Type	CH (Comfort heater)
Unit Description	--
Individual Unit Detail	--
Use Ivt Indicator	N
Max. Rated Heat Input Capacity	0.2020 (mmBtu/hr)
Emission Details	
Annual CO2 mass Emissions from sorbent	0 MT
Annual Biogenic CO2 Emissions	0 MT
Annual Fossil fuel based CO2 Emissions	-- MT
Tier Fuel Details	
Fuel	Propane Gas

Unit Details	
Unit Name	PROPHTR002
Unit Type	CH (Comfort heater)
Unit Description	--
Individual Unit Detail	--
Use Ivt Indicator	N
Max. Rated Heat Input Capacity	0.2020 (mmBtu/hr)
Emission Details	
Annual CO2 mass Emissions from sorbent	0 MT
Annual Biogenic CO2 Emissions	0 MT
Annual Fossil fuel based CO2 Emissions	-- MT
Tier Fuel Details	
Fuel	Propane Gas

Raw Data_Solid Waste

Tier Name	Tier 1 (Equation C-1)
Tier Methodology Start Date	1/1/2014
Tier Methodology End Date	12/31/2014
Equation C1/C8 Inputs	
Fuel Quantity	703,306.836248 (scf/yr)
Fuel Emission Details	
Total CO2 Emissions	108.8 MT
Total CH4 Emissions	0 MT
Total N2O Emissions	0 MT
Total CH4 Emissions CO2e	0 MT
Total N2O Emissions CO2e	0 MT

Tier Name	Tier 1 (Equation C-1)
Tier Methodology Start Date	1/1/2014
Tier Methodology End Date	12/31/2014
Equation C1/C8 Inputs	
Fuel Quantity	703,306.836248 (scf/yr)
Fuel Emission Details	
Total CO2 Emissions	108.8 MT
Total CH4 Emissions	0 MT
Total N2O Emissions	0 MT
Total CH4 Emissions CO2e	0 MT
Total N2O Emissions CO2e	0 MT

Unit Details	
Unit Name	SCRNENG001
Unit Type	OCS (Other combustion source)
Unit Description	--
Individual Unit Detail	--
Use Ivt Indicator	N
Max. Rated Heat Input Capacity	1.3211680 (mmBtu/hr)
Emission Details	
Annual CO2 mass Emissions from sorbent	0 MT
Annual Biogenic CO2 Emissions	0 MT
Annual Fossil fuel based CO2 Emissions	-- MT
Tier Fuel Details	
Fuel	Distillate Fuel Oil No.2
Tier Name	Tier 1 (Equation C-1)
Tier Methodology Start Date	1/1/2014
Tier Methodology End Date	12/31/2014
Equation C1/C8 Inputs	
Fuel Quantity	0 (gallons/yr)
Fuel Emission Details	
Total CO2 Emissions	0 MT
Total CH4 Emissions	0 MT
Total N2O Emissions	0 MT
Total CH4 Emissions CO2e	0 MT
Total N2O Emissions CO2e	0 MT

Unit Details	
Unit Name	PUMP001
Unit Type	OCS (Other combustion source)
Unit Description	--
Individual Unit Detail	--
Use Ivt Indicator	N
Max. Rated Heat Input Capacity	0.0407510 (mmBtu/hr)
Emission Details	
Annual CO2 mass Emissions from sorbent	0 MT
Annual Biogenic CO2 Emissions	0 MT
Annual Fossil fuel based CO2 Emissions	-- MT
Tier Fuel Details	
Fuel	Motor Gasoline
Tier Name	Tier 1 (Equation C-1)
Tier Methodology Start Date	1/1/2014
Tier Methodology End Date	12/31/2014
Equation C1/C8 Inputs	
Fuel Quantity	2,855.900152 (gallons/yr)
Fuel Emission Details	
Total CO2 Emissions	25.1 MT
Total CH4 Emissions	0 MT
Total N2O Emissions	0 MT
Total CH4 Emissions CO2e	0.03 MT
Total N2O Emissions CO2e	0.064 MT

Unit Details	
Unit Name	CP-1
Unit Type	--
Unit Description	--
Individual Unit Detail	--
Use Ivt Indicator	N
Max. Rated Heat Input Capacity	180 (mmBtu/hr)
Emission Details	
Annual CO2 mass Emissions from sorbent	0 MT
Annual Biogenic CO2 Emissions	14,059.3 MT
Annual Fossil fuel based CO2 Emissions	0 MT

Tier Fuel Details	
Fuel	Landfill Gas
Tier Name	Tier 2 (Equation C-2a)
Tier Methodology Start Date	1/1/2014
Tier Methodology End Date	12/31/2014
Frequency of HHV determinations	Quarterly
Equation C1/C8 Inputs	
Fuel Quantity	522,916,000 (scf/yr)
Use Default High Heat Value	TRUE
High Heat Value	0.00051635 (mmBtu/scf)
Fuel Emission Details	
Total CO2 Emissions	14,059.3 MT
Total CH4 Emissions	0.86 MT

Tier 2 Monthly HHV Details	
Jan.	N
Feb.	N
March	N
April	N
May	N
June	N
July	N
Aug.	N
Sept.	N
Oct.	N
Nov.	N
Dec.	N

Raw Data_Solid Waste

Total N2O Emissions	0.17 MT
Total CH4 Emissions CO2e	21.6 MT
Total N2O Emissions CO2e	50.691 MT

Subpart HH: Municipal Solid Waste Landfills	
Gas Information Details	
Gas Name	Gas Quantity (MT)
Methane (CH4)	3,587.01

Landfill Details	
Is the landfill open?	Yes
Estimated Year Landfill Closure	2149
Starting Year for Accepting Waste	1,969.00
First Year of Emissions Reporting	2010
Leachate Recirculation Used during Reporting Year	No
Typical Frequency of Use for Leachate Recirculation System	Not used for the past 10 yrs
Scales are present at the landfill in the Reporting Year	Yes
Does the landfill have a landfill gas collection system?	Yes
Passive vents and/or flares are present	No
Landfill Capacity	289,861,424.808037 MT
Total Surface Area of the landfill containing waste	1,169,566.976932 m^2
Covertype Details	
Clay Cover	4,046.78 m^2
Sand Cover	1,165,472.87 m^2

Aeration Details	
Aeration Blower Capacity	NA
Landfill Fraction Affected by Aeration	NA
Aeration Blower Operation Hours	NA
Other MCF Factors	NA
Additional Descripton	NA

Current Waste Disposal Quantity Determination Details	
Reporting Year	2014
Total Annual Waste Disposal Quantity	953,317.815 MT
Method Used to Determine Quantity	Use scales to weigh loads before off-loading
Annual Waste Disposal Quantity	953,317 MT

Waste Type Details	
Year Waste Disposed	2014
Missing data procedure used?	No
Number of Times Substituted	--
Waste Type Details	
Option Waste Type	0.057621
Methan Fraction Determination Method	0
Methane Fraction Determination Value	0.50
An MCF value other than the default of 1 was used	0
Annual MCF Value	0.942379
Percent by Weight	0.20
Degradable Organic Carbon Value	0.5
Fraction of DOC Dissimilated Decay Rate	0.02

Raw Data_Solid Waste

SOLID WASTE REPORT/QUARTERLY-WASTE MANAGEMENT

LOCKWOOD REGIONAL LANDFILL, STOREY COUNTY

			Residential & Commercial	Industrial & Special Waste	Landfill Totals
Source Contact Waste Management	YEAR: 2014				
Name	Christoper Anderson	*2014 TOTALS*	742,140.45	226,530.92	968,671.37
Title	District Manager	*--Percentage of the landfill (%)*	76.61	23.39	100.00
Department	Lockwood Regional Landfill	*2014 WASHOE COUNTY TOTALS*	437,151.11	134,511.55	571,662.66
Telephone	775-343-7372	*--Percentage of the landfill (%)*	45.13	13.89	59.02
Email	cander14@wm.com	*WASHOE COUNTY WM VEHICLE TOTAL*	430,993.70		
		Portion by Diesel	362034.71		
2014 WM SolidWasteReport_(Q1,Q2,Q3,Q4)_Christopher Anderson.pdf		Portion by CNG	68958.99		
		Reno WM VEHICLE TOTALS	301695.59		
		Portion by Diesel	253424.30		
		Portion by CNG	48271.29		

2014 TOTALS	Received from Collin Pavelchik
MSW	731781
C & D	258251
INERT	60551

*assuming that similar percentage of Industrial & Special Waste for WC

RESIDENTIAL & COMMERCIAL WASTE	QUARTER 1			% of Total for Quarter
County and State of Origin	Commercial Vehicles	Private Vehicles	Units	
STOREY COUNTY, NEVADA ***	805.34	0.15	TONS	
WASHOE COUNTY, NEVADA	98,424.89	1,051.95	TONS	59.58869317
SACRAMENTO COUNTY, CA	22,899.37		TONS	
EL DORADO COUNTY, CA	7,623.91		TONS	
DOUGLAS COUNTY, NV	7,040.21		TONS	
LYON COUNTY, NV	9,981.53		TONS	
CHURCHILL COUNTY, NV	0.00		TONS	
PLUMAS COUNTY, CA	3,244.90		TONS	
NEVADA COUNTY, CA	15,759.46		TONS	
MODOC COUNTY, CA	1,159.51		TONS	
MINERAL COUNTY, NV	0.00		TONS	
TOULUMNE COUNTY, CA	NA		TONS	
AMADOR COUNTY, CA	NA		TONS	
TOTAL	166,939.12	1,052.10	TONS	

INDUSTRIAL & SPECIAL WASTE	QUARTER 1	
Industrial Waste	Uncompacted Quantity	Units
Sludge	10,449.75	TONS
Tires	137.78	TONS
Hydrocarbon Soil: Includes Soil <600 P.P.M.	0.00	TONS
Hydrocarbon Soil:≥600 P.P.M.	48.00	TONS
		TONS
Ash	3,698.88	TONS
Asbestos Friable & non-Friable	257.88	TONS
Construction & Demonlition Waste	44,088.28	TONS
TOTAL	58,680.57	TONS

WC Industrial Portion	Units
34966.98481	Tons
Reno Quarter 1 Totals [1]	Units
94110.68	Tons
WC Quarter 1 Totals	Units
134,443.82	Tons

RESIDENTIAL & COMMERCIAL WASTE	QUARTER 2			% of Total for Quarter
County and State of Origin	Commercial Vehicles	Private Vehicles	Units	
STOREY COUNTY, NEVADA ***	932.11	0.00	TONS	
WASHOE COUNTY, NEVADA	118,943.60	2,799.29	TONS	61.94375331
SACRAMENTO COUNTY, CA	22,771.12		TONS	
EL DORADO COUNTY, CA	9,275.29		TONS	
DOUGLAS COUNTY, NV	7,790.60		TONS	
LYON COUNTY, NV	11,224.19		TONS	
CHURCHILL COUNTY, NV	0.00		TONS	
PLUMAS COUNTY, CA	4,590.26		TONS	
NEVADA COUNTY, CA	19,376.49		TONS	
MODOC COUNTY, CA	1,386.78		TONS	
MINERAL COUNTY, NV	0.00		TONS	
TOULUMNE COUNTY, CA	NA		TONS	
AMADOR COUNTY, CA	NA		TONS	
LASSEN COUNTY, CA	247.36			
TOTAL	196,537.80	2,799.29	TONS	

INDUSTRIAL & SPECIAL WASTE	QUARTER 2	
Industrial Waste	Uncompacted Quantity	Units
Sludge	11,943.73	TONS
Tires	179.51	TONS
Hydrocarbon Soil: Includes Soil <600 P.P.M.	0.00	TONS
Hydrocarbon Soil:≥600 P.P.M.	822.00	TONS
		TONS
Ash	0.00	TONS
Asbestos Friable & non-Friable	629.50	TONS
Construction & Demonlition Waste	42,644.80	TONS
TOTAL	56,219.54	TONS

WC Industrial Portion	Units
34824.49317	Tons
Reno Quarter 2 Totals [2]	Units
109597.17	Tons
WC Quarter 2 Totals	Units
156,567.38	Tons

RESIDENTIAL & COMMERCIAL WASTE	QUARTER 3			% of Total for Quarter
County and State of Origin	Commercial Vehicles	Private Vehicles	Units	
STOREY COUNTY, NEVADA ***	962.33	0.00	TONS	
WASHOE COUNTY, NEVADA	114,627.52	1,286.98	TONS	58.31819589
SACRAMENTO COUNTY, CA	21,526.68		TONS	
EL DORADO COUNTY, CA	12,738.12		TONS	
DOUGLAS COUNTY, NV	8,595.76		TONS	
LYON COUNTY, NV	11,554.20		TONS	
CHURCHILL COUNTY, NV	0.00		TONS	
PLUMAS COUNTY, CA	4,976.25		TONS	
NEVADA COUNTY, CA	22,310.96		TONS	
MODOC COUNTY, CA	1,470.33		TONS	
MINERAL COUNTY, NV	0.00		TONS	
TOULUMNE COUNTY, CA	0.00		TONS	
AMADOR COUNTY, CA	NA		TONS	
LASSEN COUNTY, CA	0			

INDUSTRIAL & SPECIAL WASTE	QUARTER 3	
Industrial Waste	Uncompacted Quantity	Units
Sludge	12,511.23	TONS
Tires	259.18	TONS
Hydrocarbon Soil: Includes Soil <600 P.P.M.	0.00	TONS
Hydrocarbon Soil:≥600 P.P.M.	127.50	TONS
		TONS
Ash	25.05	TONS
Asbestos Friable & non-Friable	1,135.50	TONS
Construction & Demonlition Waste	46,939.70	TONS

WC Industrial Portion	Units
35573.02644	Tons
Reno Quarter 3 Totals [3]	Units
106041.27	Tons
WC Quarter 3 Totals	Units

Raw Data_Solid Waste

TOTAL		198,762.15	1,286.98	TONS		*TOTAL*	60,998.16	TONS	151,487.53	Tons

RESIDENTIAL & COMMERCIAL WASTE	QUARTER 4			% of Total for Quarter	INDUSTRIAL & SPECIAL WASTE		QUARTER 4		
County and State of Origin	Commercial Vehicles	Private Vehicles	Units		Industrial Waste	Uncompacted Quantity	Units	WC Industrial Portion	Units
STOREY COUNTY, NEVADA ***	885.36	0.00	TONS		Sludge	2,106.75	TONS	29147.04925	Tons
WASHOE COUNTY, NEVADA	98,997.69	1,019.19	TONS	57.56571946	Tires	293.59	TONS		
SACRAMENTO COUNTY, CA	22,391.61		TONS		Hydrocarbon Soil: Includes Soil <600 P.P.M.	216.00	TONS		
EL DORADO COUNTY, CA	9,289.88		TONS		Hydrocarbon Soil:≥600 P.P.M.	136.50	TONS		
DOUGLAS COUNTY, NV	7,518.98		TONS				TONS		
LYON COUNTY, NV	10,558.88		TONS		Ash	22.68	TONS		
CHURCHILL COUNTY, NV	0.00		TONS		Asbestos Friable & non-Friable	1,031.95	TONS		
PLUMAS COUNTY, CA	3,483.83		TONS		Construction & Demonlition Waste	46,825.18	TONS		
NEVADA COUNTY, CA	19,386.66		TONS						
MODOC COUNTY, CA	1,230.93		TONS						
MINERAL COUNTY, NV	0.00		TONS						
TOULUMNE COUNTY, CA	NA		TONS					Reno Quarter 4 Totals (4)	Units
AMADOR COUNTY, CA	NA		TONS					90414.75	Tons
								WC Quarter 4 Totals	Units
TOTAL	173,743.82	1,019.19	TONS		*TOTAL*	50,632.65	TONS	129,163.93	Tons

Raw Data_Solid Waste

[1] Assumed Reno 70% of WC waste...told assumption was safe by Greg Martinelli (Lockwood)
[2] Assumed Reno 70% of WC waste...told assumption was safe by Greg Martinelli (Lockwood)
[3] Assumed Reno 70% of WC waste...told assumption was safe by Greg Martinelli (Lockwood)
[4] Assumed Reno 70% of WC waste...told assumption was safe by Greg Martinelli (Lockwood)

Raw Data_Solid Waste

SOLID WASTE REPORT/QUARTERLY-WASTE MANAGEMENT

LOCKWOOD REGIONAL LANDFILL, STOREY COUNTY

Source Contact: Waste	YEAR: 2014/2015
Name	Christoper Anderson
Title	District Manager
Department	Lockwood Regional Landfill
Telephone	775-343-7372
Email	cander14@wm.com

2014-2015 RENO WM volumes.xlsx

2014 Reno Solid Waste_WM_Greg_Martinelli.xlsx

*1 ton = 1.332 cubic yards

Total Residential and Commercial MSW	
433,089 tons	(for 2014)

	Q1-2014 [1]	Q2-2014	Q3-2014	Q4-2014	Q1-2015	Q2-2015	Q3-2015	Q4-2015
Residential Accounts	63,597	62,275	63,197	62,846	63,597	63,681	63,809	63,838
Commercial Accounts	4,140	4,293	4,290	4,416	4,140	4,381	4,478	4,585
Total	*67,737*	*66,568*	*67,487*	*67,262*	*67,737*	*68,072*	*68,287*	*68,423*
			2014 Total	269,054			2015 Totals	272,519
% of Total Year	*25.18*	*24.74*	*25.08*	*25.00*	*24.86*	*24.98*	*25.06*	*25.11*
Tons	*109034.43*	*107152.72*	*108632.01*	*108269.84*				

Service Level							
35-gallon trash/64-gallon r	13,782	13,863	13,639	13,615	13,314	13,172	13,193
Senice Rate	1,150	1,238	1,299	1,499	1,626	1,651	1,661
35-gallon trash/96-gallon r	1,135	1,114	1,279	1,478	1,621	1,803	1,881
64-gallon trash/96-gallon r	5,262	5,646	5,809	6,136	6,481	6,693	6,826
96-gallon trash/96-gallon r	42,596	42,574	42,119	42,368	42,545	42,141	41,938
Est. Participation Rate	75%	75%	75%	75%	75%	75%	75%

Material Deposited (Tons)							
Commercial Raw Transfer	100,141	98,862	90,819	88,630	96,335	107,860	104,047
Mead Transfer Station	9,757	10,784	10,626	9,934	6,908	5,430	5,616
Ecocenter	3,166	3,290	3,288	3,792	3,899	4,205	5,112

Material (Tons)							
OCC Corrugated Cardboard	607.9	457.3	601.7	513.5	662.8	588.8	671.9
Newspaper	1,133.5	832.4	1029.2	568.8	526.4	761.1	776.7
Mixed Paper	82.3	-	69.0	584.8	514.7	484.7	914.1
Plastic #1	139.3	92.1	134.8	107.7	105.3	172.2	89.1
Plastic #2 (Natural)	50.7	52.6	49.3	103.9	140.4	132.2	85.4
Plastic #2 (Colored)	47.5	39.5	52.6	74.7	93.6	48.1	97.4
Plastics 3-7	44.3	79.0	39.5	92.5	97.5	108.2	158.8
Aluminum	38.0	46.1	3.3	99.0	85.8	60.1	181.9
Steel	66.5	52.6	42.7	106.9	109.2	108.2	163.4
Scrap Metal/White Metal	9.5	-	78.9			198.8	161.2
Glass	763.0	1,293.0	23.0	809.2	658.9	376.5	582.0
Other	183.6	345.5	792.4	731.5	904.6	1165.7	1230.3
Total	*3,166.1*	*3,290.1*	*2916.4*	*3792.5*	*3899.2*	*4204.6*	*5112.2*

Plastic film	9.5	6.0	8.32	8.35	11.34	7.6
E-Waste	39.4	37.5	33.35	40.18	38.18	34.90

Commercial food waste div	474	1,068	1,068	819	520	204

Residential trips						
Commercial Raw Transfer	2,367	2,053	2,418	2,538	3,219	3,164
Mead Transfer Station	309	325	327	365	575	538
Total	*2,676*	*2,378*	*2,745*	*2,903*	*3,794*	*3,702*

Final destinations for recycling streams:

Newspaper-Newburg: Oregon & China_x000D_

Office Paper: Halsey, Oregon, China & Mexico_x000D_

Glass: Sacramento, California_x000D_

Aluminum cans: Muscle Shoals, Alabama_x000D_

Cardboard-Longview: Washington & China

Steel Cans: Manhattan Beach, California

Plastics: China

Other fibers: China

Residential

Customer Counts		
Container Size	MSW	RECY
32 Gallons	4350	
35 Gallons	16505	
64 Gallons	5017	14102
96 Gallons	59612	47597
Grand Total	*85484*	*61699*

Container Counts		
Container Size	MSW	RECY
32 gallons	5041	
35 gallons	16577	
64 gallons	5045	14108
96 gallons	60101	47691
Grand Total	*86764*	*61799*

	MSW	RECY
Weekly Yardage	37424.37	27406.24

Commercial

Customer counts			
Container Size	MSW	ORGANICS	RECY
1	34		
2	432		57
3	543	2	139
4	1309	6	169
6	709	2	76
10	1		
32	101		
35	2		
64	1151		1
96	926		307
Grand Total	*5208*	*10*	*749*

Container Counts			
Container Size	MSW	ORGANICS	RECY
1	35		
2	446		59
3	585	2	143
4	1825	11	227
6	859	2	82
10	1		
32	345		
35	36		
64	2362		1
96	2592		450
Grand Total	*9086*	*15*	*962*

	MSW	ORGANICS	RECY
Weekly Yardage	31724.23	62.00	3465.92

[1] data unavailable, so used Q1-2015 numbers

Commercial/Industrial Energy, Reno--NV Energy

Source Contact: NV Energy	YEAR:2014
Name	Candice Payette
Title	Major Account Executive
Department	Major Accounts
Telephone	775-834-5742
Email	cpayette@nvenergy.com

https://www.nvenergy.com/company/rates/nnv/electric/schedules/
Source: 2014_NVEnergy_KWH_Usage_Towncode Candice Payette

Record Name	Sector	Usage	Units	Notes
NEV_GS1: Small General Service	?	239824764.90	kWh	Reno
NEV_GS2: Medium General Service	?	38462916.29	kWh	Reno
NEV_GS2_TOU: Medium General Service_Time	?	10589674.00	kWh	Reno
NEV_GS2P: Medium General Service_Primary S	?	5117943.53	kWh	Reno
NEV_GS2P_TOU: Medium General Service_Pri	?	3779948.00	kWh	Reno
NEV_GS2S: Medium General Service_Secondar	?	535867889.70	kWh	Reno
NEV_GS2S_TOU: Medium General Service_Seco	?	176985640.00	kWh	Reno
NEV_GS2T: Medium General Service_Transmiss	?	0.00	kWh	Reno
NEV_GS3_TOU: Large General Service_Time of	?	26120426.26	kWh	Reno
NEV_GS3P_TOU: Large General Service_Primar	?	180588991.00	kWh	Reno
NEV_GS3S_TOU: Large General Service_Second	?	247367158.70	kWh	Reno
NEV_GS3T_TOU: Large General Service_Transm	?	360059.00	kWh	Reno
NEV_GS4_TOU: Large Transmission Service_Ti	?	30543840.00	kWh	Reno
NEV_IS1: Irrigation Service	?	261358.00	kWh	Reno
NEV_IS2: Interruptible Irrigation Service	?	0.00	kWh	Reno
NEV_LSR1_GS2: Large Standby Service Rider_M	?	0.00	kWh	Reno
NEV_LSR1_GS2T: Large Standby Service Rider_	?	0.00	kWh	Reno
NEV_LSR2_GS3: Large Standby Service Rider_La	?	0.00	kWh	Reno
NEV_LSR2_GS3T: Large Standby Service Rider_L	?	5841.00	kWh	Reno
NEV_OGS1_TOU: Optional General Service_Tim	?	4397760.00	kWh	Reno
NEV_OGS2_TOU: Optional Medium General Ser	?	3775082.00	kWh	Reno
NEV_OGS2S_TOU: Optional Medium General S	?	74605639.00	kWh	Reno
NEV_OLS_C: Outdoor Ligting Service_Commerci	?	1147382.74	kWh	Reno
NEV_SSR2_GS1: Small Standby Service Rider_ G	?	0.00	kWh	Reno
NEV_SSR3_GS2: Small Standby Service Rider_	?	0.00	kWh	Reno
NEV_SSR3_GS2P	?	0.00	kWh	Reno
NEV_SSR3_GS2T: Small Standby Service Rider_	?	0.00	kWh	Reno
NEV_STLT	?	7313307.00	kWh	Reno
Totals		1,587,115,621.12	kWh	
	WC Totals	2,282,107,872.30	kWh	

Raw Data_Stationary Energy

Reno % of WC	69.55	%

Average Industrial % of Usag [1]	14.69	kWh Equivalent	233085146.28
Average Commercial % of Usage	85.31	kWh Equivalent	1354030474.84

[1] calculated from percentage of gas usage...assumed similar percentage of electricity

Commercial/Industrial Energy, Washoe County--NV Energy

Source Contact: NV Energy	YEAR:2014
Name	Candice Payette
Title	Major Account Executive
Department	Major Accounts
Telephone	775-834-5742
Email	cpayette@nvenergy.com

https://www.nvenergy.com/company/rates/nnv/electric/schedules/
Source: 2014_NVEnergy_KWH_Usage_Towncode Candice Payette

Record Name	Sector	Usage	Units	Notes
NEV_GS1: Small General Service	?	382272263.90	kWh	WC
NEV_GS2: Medium General Service	?	64220391.52	kWh	WC
NEV_GS2_TOU: Medium General Ser	?	17087298.67	kWh	WC
NEV_GS2P: Medium General Service	?	5533275.53	kWh	WC
NEV_GS2P_TOU: Medium General S	?	12791345.00	kWh	WC
NEV_GS2S: Medium General Service	?	792954474.50	kWh	WC
NEV_GS2S_TOU: Medium General S	?	251268613.30	kWh	WC
NEV_GS2T: Medium General Service	?	1278577.00	kWh	WC
NEV_GS3_TOU: Large General Servic	?	35447601.26	kWh	WC
NEV_GS3P_TOU: Large General Servi	?	217890713.00	kWh	WC
NEV_GS3S_TOU: Large General Servi	?	319445928.70	kWh	WC
NEV_GS3T_TOU: Large General Servi	?	360059.00	kWh	WC
NEV_GS4_TOU: Large Transmission S	?	30543840.00	kWh	WC
NEV_IS1: Irrigation Service	?	3189896.00	kWh	WC
NEV_IS2: Interruptible Irrigation Serv	?	55817.45	kWh	WC
NEV_LSR1_GS2: Large Standby Servi	?	17742.00	kWh	WC
NEV_LSR1_GS2T: Large Standby Serv	?	105874.00	kWh	WC
NEV_LSR2_GS3: Large Standby Servi	?	3933.00	kWh	WC
NEV_LSR2_GS3T: Large Standby Serv	?	14735.00	kWh	WC
NEV_OGS1_TOU: Optional General S	?	7689294.00	kWh	WC
NEV_OGS2_TOU: Optional Medium	?	7235852.00	kWh	WC
NEV_OGS2S_TOU: Optional Medium	?	119544098.00	kWh	WC
NEV_OLS_C: Outdoor Ligting Service	?	1842545.07	kWh	WC
NEV_SSR2_GS1: Small Standby Servi	?	2303.00	kWh	WC
NEV_SSR3_GS2: Small Standby Servi	?	0.00	kWh	WC
NEV_SSR3_GS2P	?	0.00	kWh	WC
NEV_SSR3_GS2T: Small Standby Serv	?	91.00	kWh	WC
NEV_STLT	?	11311310.40	kWh	WC
Totals		2,282,107,872.30	kWh	

Average Industrial % of Usag [1]	14.69	kWh Equivalent	335152297.77

Raw Data_Stationary Energy

Average Commercial % of Usage	85.31	kWh Equivalent	1946955574.53

[1] calculated from percentage of gas usage...assumed similar percentage of electricity

Energy Profile, Washoe County--EPA eGrid

Source Contact: EPA eGri	YEAR:2014
Region	ERCOT All
Power Company	Sierra Pacific Power Co.

*chose Texas (ERCOT All) as energy fuel mix as much closer than WECC Northwest, which includes Oregon, Washington

https://oaspub.epa.gov/powpro/ept_pack.charts

ERCOT All		National	
Fuel Mix	Percentage (%)	Fuel Mix	Percentage (%)
Non-Hydro Renewables	8.5	Non-Hydro Renewables	5.4
Hydro	0	Hydro	6.7
Nuclear	10.7	Nuclear	19
Oil	0.9	Oil	0.7
Gas	49	Gas	30.3
Coal	30.5	Coal	37.4

Emission Rate Compariso	ERCOT All	National	
Nitrogen Oxides (NOx)	0.6	0.9	*lbs/MWh*
Sulfur Dioxide (SO2)	1.9	1.9	*lbs/MWh*
Carbon Dioxide (CO2)	1143	1137	*lbs/MWh*

https://www.epa.gov/sites/production/files/2015-10/documents/egrid2012_ghgoutputrates_0.pdf

		Annual Total Output Emission Rates			Annual Non-baseload Output Emission Rates		
eGRID Subregion Acrony	eGRID Subregion Nam	CO2 (lbs/MWh)	CH4 (lbs/GWh)	N2O (lbs/GWh)	CO2 (lbs/MWh)	CH4 (lbs/GWh)	N2O (lbs/GWh)
ERCT	ERCOT All	1143.04	16.7	12.33	1280.59	21.53	10.71

Raw Data_Stationary Energy

Fuel Usage of Washoe County--Washoe County

Source Contact: Washoe County	YEAR: 2014
Name	Yann Ling-Barnes
Title	Environmental Engineer
Department	Health District/Air Quality
Telephone	775-784-7208
Email	ylbarnes@washoecounty.us

2014 WC Energy Data by Providers Yann Ling.xlsx
(Therms * 100,000) / BTU's per Standard Cubic Feet = Standard Cubic Feet
HA 87 = Truckee Meadows

Record Name	Sector	Usage	Type of Gas	Units	Fuel Name	Usage	Units	Notes
Compress NG_Outlying		6,212	Natural Gas	Standard Cubic Feet				
LG Com/Ind NG_Outlying	Comm/Industrial	3,451,851	Natural Gas	Standard Cubic Feet				
LPG-Residential_Outlying	Residential				LPG	1755	Standard Cubic Feet	
Residential NG_Outlying	Residential	24,432,733	Natural Gas	Standard Cubic Feet				
Sm/Med Comm NG_Outlying	Commercial	4,407,763	Natural Gas	Standard Cubic Feet				
Compress NG_Truckee Meadows		362,871	Natural Gas	Standard Cubic Feet				
LG Com/Ind NG_Truckee Meadows	Comm/Industrial	11,670,386	Natural Gas	Standard Cubic Feet				
LPG-Commercial_Truckee Meadows	Commercial				LPG	22,317	Standard Cubic Feet	
LPG-Residential_Truckee Meadows	Residential				LPG	193,425	Standard Cubic Feet	
Residential NG_Truckee Meadows	Residential	59,056,269	Natural Gas					
SCNG_Truckee Meadows	Commercial(?)	35,332,792	Natural Gas					
Washoe County Totals		138,720,877	Natural Gas	Standard Cubic Feet	LPG	217,497	Standard Cubic Feet	

Residential NG Totals	83,489,002
Comm/Industrial NG Totals	55,231,875

Residential LPG Totals	195180
Comm/Industrial LPG Tota	22317

Raw Data_Stationary Energy

Fuel Usage of Washoe County--Washoe County

Source Contact: Washoe County	YEAR: 2014
Name	Yann Ling-Barnes
Title	Environmental Engineer
Department	Health District/Air Quality
Telephone	775-784-7208
Email	ylbarnes@washoecounty.us
2014 WC Stat Fuel Usage_Yann Ling.xlsx	
HA 87 = Truckee Meadows	

		Natural Gas Usage			Other Gas Usage		
Record Name	Sector	Usage	Type of Gas	Units	Fuel Name	Usage	Units
Industrial_Distillate Oil	Industrial				Distillate Oil	35,567	gal
Industrial_Natural Gas	**Industrial**	**1,477,147.072**	**Natural Gas**	**MMBtu**			
Industrial_LPG	Industrial				LPG	131,315	gal
Industrial_Kerosene	**Industrial**				**Kerosene**	**205**	**gal**
Com/Institutional_Distillate Oil	Com/Institutional				Distillate Oil	121,180	gal
Com/Institutional_Natural Gas	**Com/Institutional**	**4,206,471.894**	**Natural Gas**	**MMBtu**			
Com/Institutional_LPG	Com/Institutional				LPG	2,280,720	gal
Com/Institutional_Kerosene	**Com/Institutional**				**Kerosene**	**2,370,585**	**gal**
Residential_Distillate Oil	Residential				Distillate Oil	3,546,601	gal
Residential_Natural Gas	**Residential**	**9,062,988.430**	**Natural Gas**	**MMBtu**			
Residential_LPG	Residential				LPG	5,073,560	gal
Residential_Kerosene	**Residential**				**Kerosene**	**526,323**	**gal**
WC Totals		14,746,607.396		MMBtu		14,086,055	gal

Total Industrial/Com	5,683,618.966 scf	Total Industrial/Com	4,939,571 gal
% Industrial	25.99	% Industrial	3.38
% Commercial	74.01	% Commercial	96.62

Average Industrial % of Usage	14.69
Average Commercial % of Usage	85.31

Reno % of WC [1]	69.55 %

		Natural Gas Usage			Other Gas Usage		
Record Name	Sector	Usage	Type of Gas	Units	Fuel Name	Usage	Units
Industrial_Distillate Oil	Industrial				Distillate Oil	24,735.440	gal
Industrial_Natural Gas	**Industrial**	**1,027,297.272**	**Natural Gas**	**MMBtu**			
Industrial_LPG	Industrial				LPG	91,324.573	gal
Industrial_Kerosene	**Industrial**				**Kerosene**	**142.265**	**gal**
Com/Institutional_Distillate Oil	Com/Institutional				Distillate Oil	84,275.674	gal
Com/Institutional_Natural Gas	**Com/Institutional**	**2,925,434.566**	**Natural Gas**	**MMBtu**			
Com/Institutional_LPG	Com/Institutional				LPG	1,586,150.579	gal
Com/Institutional_Kerosene	**Com/Institutional**				**Kerosene**	**1,648,647.617**	**gal**
Residential_Distillate Oil	Residential				Distillate Oil	2,466,520.378	gal
Residential_Natural Gas	**Residential**	**6,302,949.429**	**Natural Gas**	**MMBtu**			
Residential_LPG	Residential				LPG	3,528,459.909	gal
Residential_Kerosene	**Residential**				**Kerosene**	**366,036.591**	**gal**
Reno Totals [2]		10,255,681.268		MMBtu		9,796,293.025	gal

Raw Data_Stationary Energy

[1] These are estimates based on percentages of Reno electricity use out of WC
[2] These are estimates based on percentages of Reno electricity use out of WC

Residential Energy, Reno--NV Energy

Source Contact: NV Energy	YEAR: 2014
Name	Candice Payette
Title	Major Accounts Executive
Department	Major Acounts
Telephone	775-834-5742
Email	cpayette@nvenergy.com

https://www.nvenergy.com/company/rates/nnv/electric/schedules/
Source: 2014_NVEnergy_KWH_Usage_Towncode Candice Payette

Record Name	Sector	Usage	Units	Notes
D1_CPP: Domestic Service	Residential	3668881	kWh	RENO
D1_TOU_E: Domestic Service_Time of Use	Residential	3087629	kWh	RENO
NEV_D1: Domestic Service	Residential	464271141.1	kWh	RENO
NEV_DM1: Domestic Multi-Family Service	Residential	208212882.2	kWh	RENO
NEV_OD1_TOU: Optional Domestic Service	Residential	1154775	kWh	RENO
NEV_OD1_TOU_HEV: Optional Domestic Service_Time of Use	Residential	163461	kWh	RENO
NEV_ODM1_TOU: Optional Domestic Multi-Family Service	Residential	92825	kWh	RENO
NEV_OLS_R: Outdoor Lighting Service_Residential(?)	Residential	311568.764	kWh	RENO
Totals		680,963,163.06	kWh	

Residential Energy, Washoe County--NV Energy

Source Contact: NV Energy	YEAR:2014
Name	Candice Payette
Title	Major Account Executive
Department	Major Accounts
Telephone	775-834-5742
Email	cpayette@nvenergy.com

https://www.nvenergy.com/company/rates/nnv/electric/schedules/
Source: 2014_NVEnergy_KWH_Usage_Towncode Candice Payette

Record Name	Sector	Usage	Units	Notes
D1_CPP: Domestic Service	Residential	6812792.391	kWh	WC
D1_TOU_E: Domestic Service_Time of Use	Residential	6714291	kWh	WC
NEV_D1: Domestic Service	Residential	1070501585	kWh	WC
NEV_DM1: Domestic Multi-Family Service	Residential	296194092.2	kWh	WC
			kWh	WC
NEV_OD1_TOU: Optional Domestic Service	Residential	2688102	kWh	WC
NEV_OD1_TOU_HEV: Optional Domestic Service_Time of	Residential	331868	kWh	WC
NEV_ODM1_TOU: Optional Domestic Multi-Family Service	Residential	167156	kWh	WC
			kWh	WC
NEV_OLS_R: Outdoor Lighting Service, Residential(?)	Residenitial	833431.432	kWh	WC
			kWh	
			kWh	
			kWh	
Totals		1,384,243,318.02	kWh	

Residential Wood Combustion of Washoe County--Washoe County

Source Contact: Washoe County	YEAR: 2014
Name	Yann Ling-Barnes
Title	Environmental Engineer
Department	Health District/Air Quality
Telephone	775-784-7208
Email	ylbarnes@washoecounty.us

Wood Usage by Device	Total Tons of Wood/Pellets Used	% Households in WC Using Device	Households in WC Using Device	Approx. Population Using Device
Fireplaces	14,216.00	52.00	98847.84	244154.16
Woodstoves/Inserts	8,742.00	29.00	55126.68	136162.90
Pellet Stoves	3,433.00	15.00	28513.80	70429.09
	26,391.00	96.00	182488.32	450746.15

	% of Tons used by Reno		
	14,146.60		
Persons per Household (2010-20	2.47		
Total Population in WC (2014)	442123.00	Total Population in Reno (2014)	236995.00
Total Households in WC (2014)	190092.00	Total Households in Reno (2014)	91133.00
		Reno % of WC	0.54

Raw Data_Transportation

On-Road Vehicle Miles Traveled--Reno (scaled down)

*Reno fraction of WC based on popula [1] 0.536

Source Contact: Washoe County	YEAR: 2014
Name	Yann Ling-Barnes
Title	Environmental Engineer
Department	Health District/Air Quality
Telephone	775-784-7208
Email	ylbarnes@washoecounty.us

2014_RTC_VMT_1-26-16_Yann Ling.xlsx
2014 WC Veh Pop Yann Ling.xlsx

Record Name	Daily VMT	Notes
Truckee Meadows	6080988	road type sum
Washoe County	8978673	road type sum
--Yearly VMT	3277215645	
Outside Truckee Meadows	2897680	road type sum

TOTAL ACTIVE VEHICLE REGISTRATIONS THROUGH DECEMBER 2004 BY FUEL TYPE

	WASHOE COUNTY		
	BLANK	6,002.00	1.47 %
9.43	COMPRESSED NAT	73.00	0.02 %
	DIESEL	19,485.00	4.78 %
	ELECTRIC	182.00	0.04 %
	ETHANOL GAS ONL	2.00	0.00 %
	FLEXIBLE FUEL	16,318.00	4.00 %
84.75	GASOLINE	320,713.00	78.66 %
	GASOLINE/ELECTRI	194.00	0.05 %
	METHANOL GAS O	4,062.00	1.00 %
	NONE	24.00	0.01 %
	PROPANE	38,390.00	9.42 %
	UNKNOWN	166.00	0.04 %
		2089	0.51 %
	TOTAL	407,700.00	100.00 %

Percentage of Vehicle Types	%
Motorcycle	4.62 %
Passenger Car	83.13 %
Light Truck	8.30 %
Heavy Truck	3.95 %
	100.00 %

2014

WC Vehicle Population	Vehicle Type	Reno VMT	Totals	Percent %	Gasoline VMT	Diesel VMT	Ethanol VMT	Methanol VMT	Electric VMT	Natural Gas VMT	Total VMT by Vehicle Typ
Motorcycle	Motorcycle	81071059.59		4.62	68703795.72	3874588.17	397.70	807727.85	36190.66	7648359.49	81071059.59
Passenger Car	Passenger Car	875954263.75		49.87	742328805.13	41864039.32	4297.05	8727314.74	391031.83	82638775.68	875954263.75
Passenger Truck	Passenger Car	584377819.34		33.27	495231893.18	27928873.71	2866.71	5822277.91	260870.16	55131037.69	584377819.34
Light Commercial Truck	Light Truck/SUV/Pickup	145847319.73		8.30	123598538.27	6970407.22	715.46	1453107.22	65107.22	13759444.34	145847319.73
Intercity Bus	WC RTC (3 + 1 spare - al	21490.01	4	0.00	0.00	21490.01	0.00	0.00	0.00	0.00	21490.01
Transit Bus	WC RTC (16 diesel-electr	655445.28	122	0.04	0.00	365330.16	0.00	0.00	21490.01	268625.11	655445.28
School Bus	WCSD - Jason Geddes &	1767553.25	329	0.10	0.00	1606378.19	0.00	0.00	0.00	161175.07	1767553.25
Refuse Truck	Waste Management of Ren	601720.26	112	0.03	0.00	505015.22	0.00	0.00	0.00	96705.04	601720.26
Single Unit Short-Haul Truck	Heavy Truck	32777636.49		1.87	27777459.09	1566525.01	160.79	326570.42	14632.16	3092289.02	32777636.49
Single Unit Long-haul Truck	Heavy Truck	1622495.69		0.09	1374986.50	77549.12	7.96	16165.26	724.29	153068.56	1622495.69
Motor Home	Heavy Truck	12098875.16		0.69	10253210.60	578235.42	59.35	120543.61	5401.02	1141425.15	12098875.16
Combination Short Haul Truck	Heavy Truck	9417996.52		0.54	7981295.82	450109.55	46.20	93833.46	4204.26	888507.24	9417996.52
Combination Long-Haul Truck	Heavy Truck	10374301.93		0.59	8791718.33	495813.77	50.89	103361.33	4631.16	978726.45	10374301.93
	[illegible] Totals	1756587977.00		100	1486041702.63	83806195.28	8602.12	17470901.80	782792.74	165491633.63	
				Public Transit	0.00	1993198.35	0.00	0.00	21490.01	429800.18	
				Waste Managemen	0.00	505015.22	0.00	0.00	0.00	96705.04	

Vehicle Type	Definition	Fuel Type
Heavy Truck	Trucks with a gross vehicle weight over 8500 lbs. (e.g. a public transit bus)	Gasoline
Light Truck/SUV/Pickup	Includes Sports Utility Vehicles, pickup trucks, vans, minivans, and trucks. A gross vehicle weight up to 8500 l	Diesel
Passenger Car	Compact cars, sub-compact cars, sedans, and station wagons.	Ethanol
Passenger Vehicle	Combines passenger cars with light trucks, SUVs, and pickups	Biodiesel
		CNG
		Other

Raw Data_Transportation

[1] WC Pop:442,123
Reno Pop:235,995
Reno % of Washoe Population: 53.6%

Raw Data_Transportation.xlsx

On-Road Vehicle Miles Traveled--Washoe Count

Source Contact: Washoe County	YEAR: 2014
Name	Yann Ling-Barnes
Title	Environmental Engineer
Department	Health District/Air Quality
Telephone	775-784-7208
Email	ylbarnes@washoecounty.us

2014_RTC_VMT_1-26-16_Yann Ling xlsx

2014 WC Veh Pop Yann Ling.xlsx

Record Name	Daily VMT	Notes
Truckee Meadows	6080988	road type sum
Washoe County	8978675	road type sum
--Yearly VMT	3277216375	
Outside Truckee Meadows	2897680	road type sum

TOTAL ACTIVE VEHICLE REGISTRATIONS THROUGH DECEMBER 2004 BY FUEL TYPE

	WASHOE COUNTY		
	BLANK	6,002.00	1.47 %
9.43	COMPRESSED NA	73.00	0.02 %
	DIESEL	19,485.00	4.78 %
	ELECTRIC	182.00	0.04 %
	ETHANOL GAS O	2.00	0.00 %
	FLEXIBLE FUEL	16,318.00	4.00 %
84.75	GASOLINE	320,713.00	78.66 %
	GASOLINE/ELECT	194.00	0.05 %
	METHANOL GAS	4,062.00	1.00 %
	NONE	24.00	0.01 %
	PROPANE	38,390.00	9.42 %
	UNKNOWN	166.00	0.04 %
		2089	0.51 %
	TOTAL	407,700.00	100.00 %

Percentage of Vehicle Types	%
Motorcycle	4.62 %
Passenger Car	83.13 %
Light Truck	8.30 %
Heavy Truck	3.95 %
	100.00 %

2014

WC Vehicle Population	Vehicle Type	WC VMT	Totals	Percent %	Gasoline VMT	Diesel VMT	Ethanol VMT	Methanol VMT	Electric VMT	Natural Gas VMT	Total VMT by Vehicle Type
Motorcycle	Motorcycle	151251976.85	15090	4.62	128178723.36	7228709.27	741.98	1506954.94	67519.89	14269327.41	151251976.85
Passenger Car	Passenger Car	1634243029.39	163,044	49.87	1384941800.62	78104550.96	8016.89	16282303.62	729536.99	154176820.31	1634243029.39
Passenger Truck	Passenger Car	1090257125.64	108,772	33.27	923940099.22	52106107.66	5348.33	10862458.78	466698.05	102856413.60	1090257125.64
Light Commercial Truck	Light Truck/SUV/Pickup	272103208.45	27,147	8.30	230594287.81	13004491.09	1334.82	2711020.93	121468.69	25670605.12	272103208.45
Intercity Bus	WC RTC (3 + 1 spare -	40093.30	4	0.00	0.00	40093.30	0.00	0.00	0.00	0.00	40093.30
Transit Bus	WC RTC (18 diesel-ele	1222845.67	122	0.04	0.00	681586.11	0.00	0.00	40093.30	501166.26	1222845.67
School Bus	WCSD - Jason Gedde	3297673.98	329	0.10	0.00	2996974.23	0.00	0.00	0.00	300699.76	3297673.98
Refuse Truck	Waste Management of R	1122612.42	112	0.03	0.00	942192.57	0.00	0.00	0.00	180419.85	1122612.42
Single Unit Short-Haul Truck	Heavy Truck	61152306.88	6,101	1.87	51823617.71	2922621.29	299.99	609273.17	27298.80	5769195.93	61152306.88
Single Unit Long-haul Truck	Heavy Truck	3027044.20	302	0.09	2565273.32	144669.99	14.85	30159.07	1351.29	285575.67	3027044.20
Motor Home	Heavy Truck	22572528.29	2,252	0.69	19129124.25	1078797.43	110.73	224894.80	10076.53	2129524.54	22572528.29
Combination Short Haul Truck	Heavy Truck	17570889.03	1,753	0.54	14890477.27	839756.62	86.20	175062.43	7843.76	1657662.75	17570889.03
Combination Long-Haul Truck	Heavy Truck	19355040.91	1,931	0.59	16402459.56	925025.69	94.95	192838.30	8640.22	1825982.19	19355040.91
	Totals	3277216375.00	326959	100.00	2772465863.12	156354730.00	16048.73	32594966.04	1460434.22	308641107.52	
				Public Transit	0.00	3718653.64	0.00	0.00	40093.30	801866.01	
				Waste Managem	0.00	942192.57	0.00	0.00	0.00	180419.85	

2008

WC Vehicle Population	Vehicle Type	WC VMT		Percent %	Gasoline VMT	Diesel VMT	Ethanol VMT	Methanol VMT	Electric VMT	Natural Gas VMT	Total VMT by Vehicle Type
Motorcycle	Motorcycle	166257140.57		4.62	140894872.72	7945843.47	815.59	1656454.51	74218.30	15684935.98	166257140.57
Passenger Car	Passenger Car	1796370392.78		49.87	1522336887.24	85853022.08	8812.22	17897612.30	801911.73	169472147.21	1796370392.78
Passenger Truck	Passenger Car	1198417607.29		33.27	1015600867.86	57275366.88	5878.92	11940084.18	534981.62	113060427.84	1198417607.29
Light Commercial Truck	Light Truck/SUV/Pickup	299097587.48		8.30	253470716.36	14294619.80	1467.24	2979971.55	133519.16	28217293.37	299097587.48
Intercity Bus	WC RTC (3 + 1 spare -	44070.81		0.00	0.00	44070.81	0.00	0.00	0.00	0.00	44070.81
Transit Bus	WC RTC (18 diesel-ele	1344159.78	122	0.04	0.00	749203.81	0.00	0.00	44070.81	550885.16	1344159.78
School Bus	WCSD - Jason Gedde	3624824.34	329	0.10	0.00	3294293.24	0.00	0.00	0.00	330531.09	3624824.34
Refuse Truck	Waste Management of R	1233982.75	112	0.03	0.00	1035664.10	0.00	0.00	0.00	198318.66	1233982.75
Single Unit Short-Haul Truck	Heavy Truck	67219006.93		1.87	56964852.12	3212564.02	329.75	669716.96	30007.01	6341537.07	67219006.93
Single Unit Long-haul Truck	Heavy Truck	3327346.35		0.09	2819764.85	159022.18	16.32	33151.04	1485.35	313906.60	3327346.35
Motor Home	Heavy Truck	24811867.50		0.69	21026855.76	1185821.04	121.72	247205.80	11076.18	2340787.00	24811867.50
Combination Short Haul Truck	Heavy Truck	19314033.63		0.54	16367707.88	923065.85	94.75	192429.74	8621.91	1822113.50	19314033.63
Combination Long-Haul Truck	Heavy Truck	21275184.79		0.59	18029688.48	1016794.15	104.37	211969.10	9497.38	2007131.30	21275184.79
	Totals	3602337205.00		100.00	3047512213.26	171866119.48	17640.86	35828595.19	1605318.64	339260279.88	
				Public Transit	0.00	4087567.87	0.00	0.00	44070.81	881416.25	
				Waste Managem	0.00	1035664.10	0.00	0.00	0.00	198318.66	

Washoe County--2008 Daily VMT	*9,869,417*
--Yearly VMT	*3602337205*

Washoe County--2014

Type	source TypeID	WC Daily VMT - Weekd	WC Yearly VMT -	WC Veh Populat	Percentage (%)	
Motorcycle	11	30,614	11,174,110	15090	4.62	4.62
Passenger Car	21	4,195,947	1,531,520,655	163044	49.87	83.14
Passenger Truck	31	3,136,037	1,144,653,505	108772	33.27	
Light Commercial Truck	32	797,919	291,240,435	27147	8.3	8.3
Intercity Bus	41	5,067	1,849,455	4	0	0.14
Transit Bus	42	9,965	3,637,225	122	0.04	
School Bus	43	26,685	9,740,025	329	0.1	
Refuse Truck	51	14,535	5,305,275	112	0.03	0.03
Single Unit Short-haul Truck	52	207,746	75,827,290	6101	1.87	3.78
Single Unit Long-haul Truck	53	14,660	5,350,900	302	0.09	
Motor Home	54	11,300	4,124,500	2253	0.69	
Combination Short-haul Truck	61	119,251	43,526,615	1753	0.54	*3.95*
Combination Long-haul Truck	62	408,947	149,265,655	1931	0.59	
	Total	*8,978,672*	*3,277,215,645*	*326960*	*100*	

	WASHOE COUNTY		
	BLANK	6,002.00	1.47 %
9.43	COMPRESSED NAT	73.00	0.02 %
	DIESEL	19,485.00	4.78 %
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Vehicle Type	Definition	Fuel Type
Heavy Truck	Trucks with a gross vehicle weight over 8500 lbs. (e.g. a public transit bus)	Gasoline
Light Truck/SUV/Pickup	Includes Sports Utility Vehicles, pickup trucks, vans, minivans, and trucks. A gross vehicle weight up to 8500 lbs.	Diesel
Passenger Car	Compact cars, sub-compact cars, sedans, and station wagons.	Ethanol
Passenger Vehicle	Combines passenger cars with light trucks, SUVs, and pickups	Biodiesel
		CNG
		Other

Raw Data_Transportation.xlsx

On-Road Vehicle Miles Traveled--Washoe Count

Source Contact: Washoe County	YEAR: 2014
Name	Yann Ling-Barnes
Title	Environmental Engineer
Department	Health District/Air Quality
Telephone	775-784-7208
Email	ylbarnes@washoecounty.us

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	100.00 %

2014

WC Vehicle Population	Vehicle Type	WC VMT	Totals	Percent %	Gasoline VMT	Diesel VMT	Ethanol VMT	Methanol VMT	Electric VMT	Natural Gas VMT	Total VMT by Vehicle Type
Motorcycle	Motorcycle	151251976.85	15090	4.62	128178723.36	7228709.27	741.98	1506954.94	67519.89	14269327.41	151251976.85
Passenger Car	Passenger Car	1634243029.39	163,044	49.87	1384941800.62	78104550.96	8016.89	16282303.62	729536.99	154176820.31	1634243029.39
Passenger Truck	Passenger Car	1090257125.64	108,772	33.27	923940099.22	52106107.66	5348.33	10862458.78	486698.05	102856413.60	1090257125.64
Light Commercial Truck	Light Truck/SUV/Pickup	272103208.45	27,147	8.30	230594287.81	13004491.09	1334.82	2711020.93	121468.69	25670605.12	272103208.45
Intercity Bus	WC RTC (3 + 1 spare -	40093.30	4	0.00	0.00	40093.30	0.00	0.00	0.00	0.00	40093.30
Transit Bus	WC RTC (18 diesel-ele	1222845.67	122	0.04	0.00	681586.11	0.00	0.00	40093.30	501166.26	1222845.67
School Bus	WCSD - Jason Gedde	3297673.98	329	0.10	0.00	2996974.23	0.00	0.00	0.00	300699.76	3297673.98
Refuse Truck	Waste Management of R	1122612.42	112	0.03	0.00	942192.57	0.00	0.00	0.00	180419.85	1122612.42
Single Unit Short-Haul Truck	Heavy Truck	61152306.88	6,101	1.87	51823617.71	2922621.29	299.99	609273.17	27298.80	5769195.93	61152306.88
Single Unit Long-haul Truck	Heavy Truck	3027044.20	302	0.09	2565273.32	144669.99	14.85	30159.07	1351.29	285575.67	3027044.20
Motor Home	Heavy Truck	22572528.29	2,252	0.69	19129124.25	1078797.43	110.73	224894.80	10076.53	2129524.54	22572528.29
Combination Short Haul Truck	Heavy Truck	17570889.03	1,753	0.54	14890477.27	839756.62	86.20	175062.43	7843.76	1657662.75	17570889.03
Combination Long-Haul Truck	Heavy Truck	19355040.91	1,931	0.59	16402459.56	925025.69	94.95	192838.30	8640.22	1825982.19	19355040.91
	Non-grf. Totals	3277216375.00	326959	100.00	2772465863.12	156354730.00	16048.73	32584966.04	1460484.22	308641107.52	
				Public Transit	0.00	3718653.64	0.00	0.00	40093.30	801866.01	
				Waste Managem	0.00	942192.57	0.00	0.00	0.00	180419.85	

2008

WC Vehicle Population	Vehicle Type	WC VMT		Percent %	Gasoline VMT	Diesel VMT	Ethanol VMT	Methanol VMT	Electric VMT	Natural Gas VMT	Total VMT by Vehicle Type
Motorcycle	Motorcycle	166257140.57		4.62	140894872.72	7945843.47	815.59	1656454.51	74218.30	15664935.98	166257140.57
Passenger Car	Passenger Car	1796370392.78		49.87	1522336887.24	85853022.08	8812.22	17897612.30	801911.73	169472147.21	1796370392.78
Passenger Truck	Passenger Car	1198417607.29		33.27	1015600867.86	57275366.88	5878.92	11940084.18	534981.62	113060427.84	1198417607.29
Light Commercial Truck	Light Truck/SUV/Pickup	299097587.48		8.30	253470716.36	14294619.80	1467.24	2979971.55	133519.16	28217293.37	299097587.48
Intercity Bus	WC RTC (3 + 1 spare -	44070.81		0.00	0.00	44070.81	0.00	0.00	0.00	0.00	44070.81
Transit Bus	WC RTC (18 diesel-ele	1344159.78	122	0.04	0.00	749203.81	0.00	0.00	44070.81	550885.16	1344159.78
School Bus	WCSD - Jason Gedde	3624824.34	329	0.10	0.00	3294293.24	0.00	0.00	0.00	330531.09	3624824.34
Refuse Truck	Waste Management of R	1233982.75	112	0.03	0.00	1035664.10	0.00	0.00	0.00	198318.66	1233982.75
Single Unit Short-Haul Truck	Heavy Truck	67219006.93		1.87	56964852.12	3212564.02	329.75	669716.96	30007.01	6341537.07	67219006.93
Single Unit Long-haul Truck	Heavy Truck	3327346.35		0.09	2819764.85	159022.18	16.32	33151.04	1485.35	313906.60	3327346.35
Motor Home	Heavy Truck	24811867.50		0.69	21026855.76	1185821.04	121.72	247205.80	11076.18	2340787.00	24811867.50
Combination Short Haul Truck	Heavy Truck	19314033.63		0.54	16367707.88	923065.85	94.75	192429.74	8621.91	1822113.50	19314033.63
Combination Long-Haul Truck	Heavy Truck	21275184.79		0.59	18029688.48	1016794.15	104.37	211969.10	9497.38	2007131.30	21275184.79
	Non-grf. Totals	3602337205.00		100.00	3047512213.26	171866119.48	17640.86	35828595.19	1605318.64	339260279.88	
				Public Transit	0.00	4087567.87	0.00	0.00	44070.81	881416.25	
				Waste Managem	0.00	1035664.10	0.00	0.00	0.00	198318.66	

Washoe County--2008 Daily VMT	*9,869,417*
--Yearly VMT	*3602337205*

Washoe County--2014

Type	source TypeID	WC Daily VMT - Weekd	WC Yearly VMT -	WC Veh Populat	Percentage (%)		
Motorcycle	11	30,614	11,174,110	15090	4.62	4.62	
Passenger Car	21	4,195,947	1,531,520,655	163044	49.87	83.14	9.43
Passenger Truck	31	3,136,037	1,144,653,505	108772	33.27		
Light Commercial Truck	32	797,919	291,240,435	27147	8.3	8.3	
Intercity Bus	41	5,067	1,849,455	4	0	0.14	
Transit Bus	42	9,965	3,637,225	122	0.04		
School Bus	43	26,685	9,740,025	329	0.1		84.75
Refuse Truck	51	14,535	5,305,275	112	0.03	0.03	
Single Unit Short-haul Truck	52	207,746	75,827,290	6101	1.87	3.78	
Single Unit Long-haul Truck	53	14,660	5,350,900	302	0.09		
Motor Home	54	11,300	4,124,500	2253	0.69		
Combination Short-haul Truck	61	119,251	43,526,615	1753	0.54	3.95	
Combination Long-haul Truck	62	408,947	149,265,655	1931	0.59		
	Total	*8,978,672*	*3,277,215,645*	*326960*	*100*		

WASHOE COUNTY		
BLANK	6,002.00	1.47 %
COMPRESSED NAT	73.00	0.02 %
DIESEL	19,485.00	4.78 %
ELECTRIC	182.00	0.04 %
ETHANOL GAS ON	2.00	0.00 %
FLEXIBLE FUEL	16,318.00	4.00 %
GASOLINE	320,713.00	78.66 %
GASOLINE/ELECTR	194.00	0.05 %
METHANOL GAS O	4,062.00	1.00 %
NONE	24.00	0.01 %
PROPANE	38,390.00	9.42 %
UNKNOWN	166.00	0.04 %
	2089	0.51 %
TOTAL	407,700.00	100.00 %

Vehicle Type	Definition	Fuel Type
Heavy Truck	Trucks with a gross vehicle weight over 8500 lbs. (e.g. a public transit bus)	Gasoline
Light Truck/SUV/Pickup	Includes Sports Utility Vehicles, pickup trucks, vans, minivans, and trucks. A gross vehicle weight up to 8500 lbs.	Diesel
Passenger Car	Compact cars, sub-compact cars, sedans, and station wagons.	Ethanol
Passenger Vehicle	Combines passenger cars with light trucks, SUVs, and pickups	Biodiesel
		CNG
		Other

Raw Data_Transportation

Railroad Emissions--Washoe County

Source Contact: Washoe County		Emissions Inventory Year: 2014
Name	Yann Ling-Barnes	
Title	Environmental Engineer	
Department	Health District/Air Quality Management	
Telephone	775-784-7208	
Email	ylbarnes@washoecounty.us	

2014 WC Railroad Data Yann Ling xlsx

2014 Railroad Emissions in Washoe County						
Activity	Facility	Track Miles w/in WC or Switches	Diesel Consumed (gal/yr)	% w/in Reno		Diesel Consumed (gal/yr)--Reno
Line Haul- Freight	UPRR	117.71	2,741,753.00	18.00	miles	419,263.90
2285002006				15.29	%	
Line Haul- Passenger	Amtrak	59.00	76,070.00	18.00	miles	23,207.80
2285002008				30.51	%	
Switch Yard [1]	UPRR	2.00 [2]	85,488.00	0.00	miles	0.00
2285002010				0.00	%	
Totals		176.71	2,903,311.00			442,471.70

2014 Railroad Emissions in HA 81 (Truckee Meadows Basin)			
Activity	Facility	Track Miles w/in WC or Switches	Diesel Consumed (gal/yr)
Line Haul- Freight	UPRR	15.66	364,653
2285002006			
Line Haul- Passenger	Amtrak	#REF!	#REF!
2285002008			
Switch Yard [3]	UPRR	2 [4]	85,488
2285002010			
Totals		#REF!	#REF!

[1] ylbarnes:
Reported as Point Source in EIS per EPA preference. SSC=228500201.

[2] ylbarnes:
Switches, located in Sparks.

[3] ylbarnes:
Reported as Point Source in EIS per EPA preference. SSC=228500201.

[4] ylbarnes:
Switches, located in Sparks.

RTC TRANSIT SYSTEM 2014

RIDE fixed route and ACCESS paratransit

Source Contact: RTC	YEAR: 2014
Name	Amy Cummings
Title	Director of Planning
Department	
Telephone	
Email	acummings@rtcwashoe.com

Smart Trips Program RTC Amy Cummings.pdf

	Diesel-Electric Hybrids	Clean Diesel Buses (B5 biodiesel	Electric Buses	CNG ACCESS Vans	*Total*
Vehicle count	18.00	54.00	4.00	50.00	*126.00*
Percent %	14.29	42.86	3.17	39.68	*100.00*
VMT	412,791.86	1,238,375.57	91,731.52	1,146,644.05	*2,889,543.00*
Reno % of VMT	200,740.68	602,222.04	44,609.04	557,613.00	*1,405,184.76*

RTC RIDE transit trips	8,246,921.00	802,962.72
VMT for RTC RIDE	2,889,543.00	

	AVG Number of Vanpools
FY 2013	36
FY 2014	51
FY 2015	65

Vanpool Destinations	Trips
Susanville	4
Herlong	60
Spanish Springs	1
Stead	1
TRIC	8
Carson City	5

VEHICLE REGISTRATIONS BY VEHICLE TYPE & FUEL TYPE-DMV

Source Contact: DMV	YEAR: 2014
Name	Andreas McCool
Title	Management Analyst
Department	Management Services & Programs Division
Telephone	775-684-4550
Email	AMcCool@dmv.nv.gov

2014-12 Active Vehicle Registrations 1-5-15.pdf

TOTAL ACTIVE VEHICLE REGISTRATIONS THROUGH DECEMBER 2014

WASHOE COUNTY				Gasoline	Diesel
CARS & RVS	253,244.00	62.12	%	199332.28	12103.16
TRUCK, VAN, BUS	83,744.00	20.54	%	65916.20	4002.33
TRAILER, UTILITY, TENT	36,500.00	8.95	%	28729.72	1744.43
MOTORCYCLE	14,758.00	3.62	%	11616.25	705.32
OFF-HIGHWAY VEHICLE	9,493.00	2.33	%	7472.09	453.69
TRV-TLR & 5TH WHEEL	9,945.00	2.44	%	7827.86	475.30
TOTAL	407,684.00	100.00	%	320894.41	19484.24

TOTAL ACTIVE VEHICLE REGISTRATIONS THROUGH DECEMBER 2004 BY FUEL TYPE

WASHOE COUNTY			
BLANK	6,002.00	1.47	%
COMPRESSED NATURAL GAS	73.00	0.02	%
DIESEL	19,485.00	4.78	%
ELECTRIC	182.00	0.04	%
ETHANOL GAS ONLY	2.00	0.00	%
FLEXIBLE FUEL	16,318.00	4.00	%
GASOLINE	320,713.00	78.66	%
GASOLINE/ELECTRIC	194.00	0.05	%
METHANOL GAS ONLY	4,062.00	1.00	%
NONE	24.00	0.01	%
PROPANE	38,390.00	9.42	%
UNKNOWN	166.00	0.04	%
	2089	0.51	%
TOTAL	407,700.00	100.00	%

POTW Emissions Data, WC--W

Source Contact: WC	YEAR: 2014
Name	Yann Ling Barnes
Title	
Department	
Telephone	
Email	

POTW Data for Reno's GHG EI_Yann Ling Barnes.xlsx

https://drive.google.com/drive/folders/0B_NzLa2wYhsgQWNYN2R1SXZyNI

Facility	Annual Throughput (million gal/yr)	Percent (%)
Cold Springs WRF	109.64	0.89
Gerlach GID	3.69	0.03
Incline Village GID	333.90	2.72
Lemmon Valley WWTP	64.99	0.53
Stead WRF	312.24	2.55
South Truckee Meadows WR	1260.53	10.28
Truckee Meadows WRD	10173.00	82.99
Washoe County Total	**12257.99**	**100.00**

SCNG/LCNG Wastewater Gas Use, Stead--City of Reno

Source Contact:	YEAR: 2014
Name	
Title	
Department	
Telephone	
Email	

2014_Stead Gas Use_Robert Zoncki.pdf

file:///C:/Users/hjung/Downloads/2014_Stead%20Gas%20Use_Robert%20Zoncki.pdf

Read Date	Nbr. Days	Therms Used	Gas Usage Charge	KWH	KHW$	KW
12/16/2014	32	5,551	$4,045.57	153,600	$8,850.62	312
11/14/2014	29	3,109	$2,265.84	122,400	$6,566.59	360
10/16/2014	30	590	$428.62	127,200	$6,688.81	336
9/17/2014	30	69	$49.71	108,000	$4,819.30	336
8/19/2014	32	20	$14.41	129,600	$6,236.74	360
7/18/2014	32	25	$17.54	115,200	$5,303.59	336
6/19/2014	31	6,563	$4,273.51	120,000	$5,032.30	360
5/19/2014	32	687	$457.45	144,000	$5,016.82	408
4/17/2014	29	2,892	$1,931.35	108,000	$4,604.60	360
3/19/2014	28	3,893	$2,610.61	110,400	$4,703.04	360
2/19/2014	29	4,798	$3,217.49	129,600	$5,520.96	360
1/21/2014	21	3,986	$2,672.97	91,200	$3,885.12	360
Totals	355	32,183	$21,985.07	1,459,200	$67,228.49	4248

Wastewater Info, WC--TMWRF

Source Contact: TMWRF	Year: 2015
Name	
Title	
Department	
Telephone	
Email	

2014_TMWRF_Wastewater_David Kershaw.pdf

Gas and Electricity use for 2014 TMWRF Operations_David Kershaw.pdf

2015 Average Daily Flow to TMWRF_David Kershaw.pdf

file:///C:/Users/hjung/Downloads/2014_TMWRF_Wastewater_David%20Kershaw.pdf

			Reno
General Facility Information			
Population Served	330,000.00		*176,880.00*
Does facility use nitrification/denitrification?	Y		*Y*

			Reno
Power Usage	30,800,000	kWh	*16,508,800.00*
Avg Daily Fl [1]	26.33	million gallons/day	*14.11*

Data for Effluent N2O Emissions			
N load	185.00	kg N/day	*(same)*

If Methanol is used:			
Methanol Use	8.80	MT CH3OH/day	*4.72*
Solids Treatment Type	Panaerobic Digestion—>Landfill		*(same)*

If biosolids are combusted:			
Amount combusted	---	MT/day	---
Energy content	---	MMBtu/MT	---

If facility has anaerobic digester:			
Digester gas combusted	498,240.00	scf/day	*267,056.64*
Energy Content	0.0005	MMBtu/scf	*0.0005*
Percent CH4	50.00	%	*50.00*

[1] This includes Reno, Sparks, County, and Reno/Stead WRF

Water Power Usage, WC--Truckee Meadows Water Authority

Source Contact: TMWA	
Name	John Enloe, P.E.
Title	Director
Department	Natural Resources
Telephone	775-834-8250
Email	jenloe@tmwa.com

2014_Water Energy_TMWA.pdf

https://drive.google.com/drive/folders/0B_NzLa2wYhsgQWNYN2R1SXZyNI

For 2014		For 2015	
Total Power Consumption	48,066,256 KWH	Total Power Consumption	58,349,029 KWH
Total Power Generation	28,063,442 KWH	Total Power Generation	28,063,442 KWH
–for 3 hydroelectric facilities along the Truckee River		–for 3 hydroelectric facilities along the Truckee River	
Net Power Consumption	20,002,814 KWH	Net Power Consumption	30,285,587 KWH
Reno	*10721508.3 KWH*		

Water Usage, WC--Truckee Meadows Water Authority

Source Contact: TMWA	YEAR: 2015
Name	Shawn Stoddard
Title	Senior Resource Economist
Department	Natural Resources
Telephone	775-834-8018
Email	sstoddard@tmwa.com

2015_Email_TMWA.pdf

https://drive.google.com/drive/folders/0B_NzLa2wYhsgQWNYN2R1SXZyNlk

*1 af = 325,851 gallons

*2015 is the base year of recently approved water resource plan (WRP)

	gallons/year	af	million gallons/year	
Total Water Consumption	26,633,000	81,735	26.63	*Reno*
Inflation for all WC	30556953856	93776	30556.95	*16378.53*
Population (WC)	443,729	est.		
Population Served by TMWA	386,752	est.		
Gallons per person	68,864	gallons/person		
Gallons per person per day	189	gpd/person		

WC vs Reno Scale Data

	=	given data
	=	scaled-down data

Agriculture	WC	Reno
Agricultural Process	Y	Y
Biogenic CO2	N	N
CO2 Emissions	N	N
CH4 Emissions	Y [1]	Y [2]
N2O Emissions	N	N
Acres Cultivated	Y	N
Head of Livestock	Y	Y
Value of Production	Y	N

Transportation	WC	Reno
VMT	Y	Y
Travel Type	Y	Y
Fuel Type	Y [3]	Y
Vehicle %	Y	Y
Population	Y	Y
Public Transit	Y	Y
Rail Transit	Y	Y

Solid Waste	WC	Reno
Waste Generation		
–Total Waste Generated	Y	Y
–Disposal Location	Y	Y
–# of Households/Businesses	Y	Y
Collection and Transportation Emissions		
–Mass of Solid Waste	Y	Y
–Fuel Type	Y	Y
–Miles travelled to disposal site	Y	Y
–Population Served	Y	Y
Combustion of Solid Waste Generated by the Community		
–% of Total Combusted MSW Generated In	Y	Y [4]
–"Electricity Generated from Waste?"	Y	Y [5]
–Waste generation and disposal location	Y	Y [6]

Water and Wastewater	WC	Reno
Waste Water Treatment Energy Use		
Electricity Used	Y	Y
Natural Gas Used	Y	Y
Volume of Water Treated	Y	Y
Population	Y	Y
Supply of Potable Water		
Electricity Used	Y	Y
Natural Gas Used	Y	Y
Volume of Water Delivered	Y	Y
Population	Y	Y
Combustion of Digester Gas		
Population	Y	Y
Energy recovered?	Y	Y
Generation and Treatment Location	Y	Y
Septic Systems		
BOD5 Load	N	N
Population	N	N
Combustion of Biosolids and Sludges		
Daily Quantity Incinerated	N	N
Energy Content of Biosolids (if known)	N	N
Population	N	N
Energy recovered?	N	N
Generation and Treatment Location	N	N
Wastewater Treatment Lagoons		
BOD5 Load	N	N
Industrial Discharge Multiplier	N	N
Generation and Treatment Location	N	N
Nitrification/Denitrification Process N2O from Wastewater		
Population	Y	Y
Generation and Treatment Location	Y	Y
Flaring of Digester Gas		
Fraction of CH4 in Digester Gas	Y	Y
Destruction Efficiency	Y	Y
Generation and Treatment Location	Y	Y
Process N2O from Effluent Discharges to Rivers/Estuarie		
Daily N Load for Discharge?	N	N
Population	N	N
Generation and Treatment Location	N	N
CO2 from Use of Fossil Fuel Derived Methanol		
Daily Methanol Load	N	N
Wastewater Plant Treatment Type	N	N
Population	N	N
Generation and Treatment Location	N	N

Stationary Energy	WC	Reno	
Grid Electricity			
Electricity Used	Y	Y	
# of Households	Y	Y	
Population	Y	Y	
Stationary Fuel Combustion			Residential
Fuel Type	Y	Y	
Fuel Use	Y	Y	
# of Households	Y	Y	
Population	Y	Y	
Grid Electricity			
Electricity Used	Y	Y	
Commercial Floor Area	Y	Y	
Workforce Size	Y	Y	
# of Establishments	Y	Y	
Stationary Fuel Combustion			Commercial
Fuel Type	Y	Y	
Fuel Use	Y	Y	
Commercial Floor Area	Y	Y	
Workforce Size	Y	Y	
# of Establishments	Y	Y	
Grid Electricity			
Electricity Used	Y	Y	
Stationary Fuel Combustion			
Fuel Type	N	N	
Fuel Use	N	N	
Stationary Fuel Combustion at Energy Industries			Industrial
Fuel Type	Y	Y	
Fuel Use	Y	Y	
Energy Use Attribution	N	N	
Industrial Point Source from Stationary Fuel Combustion			
Fuel Type	Y (?)	Y (?)	
Fuel Use	Y (?)	Y (?)	

WC vs Reno Scale Data

[1] I calculated these by hand using equation from the protocol
[2] I calculated these by hand using equation from the protocol
[3] I have the fuel type of active vehicle registrations through Dec 2004
[4] Yes if I apply % of Reno to WC numbers
[5] Yes if I apply % of Reno to WC numbers
[6] Yes if I apply % of Reno to WC numbers