



**Riverwalk Marketplace II  
Evaluation of Global Climate Change Impacts**

**Table GHG-1  
Summary of Annual GHG Emissions**

Emissions Scenario	Construction Emissions		Operational Direct Emissions		Operational Indirect Emissions				Fugitive Emissions		Total (MT CO <sub>2</sub> e/yr)
	Total Construction (MT CO <sub>2</sub> e)	Amortized* Construction (MT CO <sub>2</sub> e)	Motor Vehicles (MT CO <sub>2</sub> e/yr)	Area Sources (MT CO <sub>2</sub> e/yr)	Electricity (MT CO <sub>2</sub> e/yr)	Solid Waste (MT CO <sub>2</sub> e/yr)	Water (MT CO <sub>2</sub> e/yr)	Wastewater (MT CO <sub>2</sub> e/yr)	Refrigeration (MT CO <sub>2</sub> e/yr)	Air Conditioning (MT CO <sub>2</sub> e/yr)	
BAU Project	354.26	11.81	11,799.97	390.98	1,590.20	161.54	9.70	1.07	2,543.41	926.49	<b>17,435.19</b>
Proposed Project	354.26	11.81	7,052.23	354.28	976.54	161.54	3.75	0.43	2,543.41	705.31	<b>11,809.29</b>
<b>Proposed Project Reduction from BAU</b>	-	-	4,747.75	36.70	613.67	-	5.95	0.64	-	221.18	<b>5,625.89</b>
<b>Percent Reduction from BAU</b>	0.0%	0.0%	40.2%	9.4%	38.6%	0.0%	61.4%	59.9%	0.0%	23.9%	<b>32.3%</b>

\* Amortized over the "project lifetime" (30 years). Included in the total emissions.

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**Table GHG-2  
Construction GHG Emission Factors**

<b>Equipment Type</b>	<b>CO<sub>2</sub> Emission Factor<sup>1</sup> (kg/gal)</b>	<b>CH<sub>4</sub> Emission Factor<sup>2,3</sup> (kg/gal)</b>	<b>N<sub>2</sub>O Emission Factor<sup>2,3</sup> (kg/gal)</b>	<b>CO<sub>2</sub> to CO<sub>2</sub>e Ratio (GWP CH<sub>4</sub> = 21) (GWP N<sub>2</sub>O = 310)</b>
Off-Road	10.15	0.00058	0.00026	0.991
On-Road	10.15	0.000031	0.000029	0.999
Vendor	10.15	0.000031	0.000029	0.999
Autos <sup>4</sup>	n/a	n/a	n/a	0.950

Sources:

- California Climate Action Registry, *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions Version 3.1*, (2009) 96.
- California Climate Action Registry, *General Reporting Protocol: Reporting Entity-Wide Greenhouse as Emissions Version 3.1*, (2009) 98, 100.
- California Energy Commission, *Diesel Use in California, Remarks by Commissioner James D. Boyd*, (2002). It was assumed that heavy duty on-road trucks have a fuel economy of 6 miles per gallon based on this data source.
- U.S. Environmental Protection Agency, Office of Transportation and Air Quality, *Emission Facts - Greenhouse Gas Emissions from a Typical Passenger Vehicle (EPA420-F-05-004)*, (2005) 4. Passenger vehicle CO<sub>2</sub> emissions are assumed to be 95% of GHG emissions on a CO<sub>2</sub> equivalent basis.

**Table GHG-3  
Construction GHG Emissions**

<b>Construction Year</b>	<b>Equipment Type</b>	<b>Annual CO<sub>2</sub> Emissions<sup>1</sup> (Tons CO<sub>2</sub>/yr)</b>	<b>Annual CO<sub>2</sub> Emissions (MT CO<sub>2</sub>/yr)</b>	<b>CO<sub>2</sub> to CO<sub>2</sub>e Ratio</b>	<b>Annual CO<sub>2</sub>e Emissions (MT CO<sub>2</sub>e/yr)</b>
2010	Off-Road	199.87	181.32	0.991	182.98
2010	On-Road	1.21	1.10	0.999	1.10
2010	Vendor	17.06	15.48	0.999	15.49
2010	Worker/Autos	95.38	86.53	0.950	91.08
<b>Total 2010</b>		<b>313.52</b>	<b>284.42</b>		<b>290.65</b>
2011	Off-Road	33.23	30.15	0.991	30.42
2011	On-Road	-	-	0.999	-
2011	Vendor	5.30	4.81	0.999	4.81
2011	Worker/Autos	29.72	26.96	0.950	28.38
<b>Total 2011</b>		<b>68.25</b>	<b>61.92</b>		<b>63.61</b>
<b>Total</b>					<b>354.26</b>
<b>Total over "Project Lifetime" (30 years)</b>					<b>11.81</b>

Sources:

- Estimated CO<sub>2</sub> emissions from URBEMIS2007.

Where:

CH <sub>4</sub>	Methane	kg	Kilograms
CO <sub>2</sub>	Carbon dioxide	MT	Metric ton
CO <sub>2</sub> e	Carbon dioxide equivalent	N <sub>2</sub> O	Nitrous oxide
gal	Gallons	yr	Year
GWP	Global warming potential		

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**Table GHG-4  
Operational Motor Vehicle GHG Emissions**

<b>Emissions Scenario</b>	<b>Units</b>	<b>Annual CO<sub>2</sub> Emissions<sup>1</sup> (Tons CO<sub>2</sub>/yr)</b>	<b>CO<sub>2</sub> to CO<sub>2</sub>e Ratio<sup>2</sup></b>	<b>Annual CO<sub>2</sub>e Emissions (MT CO<sub>2</sub>e/yr)</b>
BAU Project				
Walmart	161.60 ksf	8,330.61	0.950	7,955.16
Other Commercial	41.25 ksf	4,026.27	0.950	3,844.81
Subtotal	202.85 ksf	12,356.88		11,799.97
Proposed Project				
Walmart	161.60 ksf	4,608.45	0.950	4,400.75
Walmart (Trucks, Non-Refrigerated)		43.43	0.950	41.47
Walmart (Trucks, Refrigerated)		217.48	0.950	207.68
Other Commercial	41.25 ksf	2,515.70	0.950	2,402.32
Subtotal	202.85 ksf	7,385.06		7,052.23
<b>Proposed Project Reduction from BAU</b>				<b>4,747.75</b>
<b>Percent Reduction from BAU</b>				<b>40.24%</b>

Sources:

1. Estimated CO<sub>2</sub> emissions from URBEMIS2007 Environmental Management Software.
2. U.S. Environmental Protection Agency, Office of Transportation and Air Quality, *Emission Facts - Greenhouse Gas Emissions from a Typical Passenger Vehicle* (EPA420-F-05-004), (2005) 4. Passenger vehicle CO<sub>2</sub> emissions are assumed to be 95% of GHG emissions on a CO<sub>2</sub> equivalent basis.

Where:

CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
ksf	Thousand square feet
MT	Metric ton
yr	Year

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**Table GHG-5  
Area Source GHG Emissions**

Emissions Scenario	Efficiency <sup>1,2</sup>			CO <sub>2</sub> Emission Factor GWP = 1 (kg/MMBtu)	CH <sub>4</sub> Emission Factor GWP = 21 (kg/MMBtu)	N <sub>2</sub> O Emission Factor GWP = 310 (kg/MMBtu)	Annual CO <sub>2</sub> Emissions (Tons CO <sub>2</sub> /yr)	Annual CO <sub>2</sub> e Emissions (MT CO <sub>2</sub> e/yr)
	Title 24 2005 (%)	Title 24 2008 (%)	Cumulative Efficiency (%)					
BAU Project								
Natural Gas <sup>3</sup>	0.00%	0.00%	0.00%	56.06	0.005	0.0001	429.43	390.52
Landscape Maintenance <sup>4</sup>	-	-	-	70.88	0.011	0.0006	0.51	0.47
Hearths (Natural Gas) <sup>3</sup>	-	-	-	56.06	0.005	0.0001	-	-
Hearths (Wood) <sup>5</sup>	-	-	-	93.87	0.316	0.0042	-	-
Subtotal							429.94	390.98
Proposed Project								
Natural Gas <sup>3</sup>	0.00%	9.40%	9.40%	56.06	0.005	0.0001	389.07	353.81
Landscape Maintenance <sup>4</sup>	-	-	-	70.88	0.011	0.0006	0.51	0.47
Hearths (Natural Gas) <sup>3</sup>	-	-	-	56.06	0.005	0.0001	-	-
Hearths (Wood) <sup>5</sup>	-	-	-	93.87	0.316	0.0042	-	-
Subtotal							389.58	354.28
<b>Proposed Project Reduction from BAU</b>								<b>36.70</b>
<b>Percent Reduction from BAU</b>								<b>9.39%</b>

Note:

The cumulative efficiency percentage is calculated based on the following formula: (X% + Y%) - (X% × Y%).

Sources:

1. California Energy Commission, *Impact Analysis: 2005 Update to the California Energy Efficiency Standards*, (2003) 6.
2. California Energy Commission, *Impact Analysis: 2008 Update to the California Energy Efficiency Standards*, (2007) 6.
3. URBEMIS2007 uses a CO<sub>2</sub> emission factor of 120,000 pounds per million cubic feet for natural gas. This value was converted to kg/MMBtu based on 1.03 therms per cubic feet.
4. California Climate Action Registry, General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions Version 3.1, (2009) 101, 103. Landscape maintenance equipment were assumed to be fueled with motor gasoline.
5. California Climate Action Registry, General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions Version 3.1, (2009) 102, 103.

Where:

CH <sub>4</sub>	Methane	MMBtu	Million British thermal units
CO <sub>2</sub>	Carbon dioxide	MT	Metric ton
CO <sub>2</sub> e	Carbon dioxide equivalent	N <sub>2</sub> O	Nitrous oxide
GWP	Global warming potential	yr	Year
kg	Kilogram		

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**Table GHG-6  
Electrical Consumption GHG Emissions**

Emissions Scenario	Units	Title 24 Standards <sup>1,2</sup>			Other Energy Features <sup>3,4</sup> (%)	Electrical Consumption Factor <sup>5</sup> (kW-hr/unit/yr)	Annual Consumption Factor (MW-hr/yr)	CO <sub>2</sub> Emission Factor <sup>6</sup> GWP = 1 (lbs/MW-hr)	CH <sub>4</sub> Emission Factor <sup>6</sup> GWP = 21 (lbs/MW-hr)	N <sub>2</sub> O Emission Factor <sup>6</sup> GWP = 310 (lbs/MW-hr)	Annual CO <sub>2</sub> e Emissions (MT CO <sub>2</sub> e/yr)
		Title 24 2005 (%)	Title 24 2008 (%)	Cumulative Efficiency (%)							
BAU Project											
Walmart	161,602 gsf	0.00%	0.00%	0.00%	0.00%	28.45	4,597.99	678.88	0.030	0.011	1,424.11
Other Commercial	41,252 gsf	0.00%	0.00%	0.00%	0.00%	13.00	536.28	678.88	0.030	0.011	166.10
Subtotal	202,854 gsf						5,134.27				1,590.20
Proposed Project											
Walmart	161,602 gsf	0.00%	4.90%	4.90%	33.63%	17.49	2,826.39	641.26	0.029	0.011	827.27
Other Commercial	41,252 gsf	0.00%	4.90%	4.90%	0.00%	12.36	510.00	641.26	0.029	0.011	149.27
Subtotal	202,854 gsf						3,336.38				976.54
<b>Proposed Project Reduction from BAU</b>											<b>613.67</b>
<b>Percent Reduction from BAU</b>											<b>38.59%</b>

Note:

The cumulative efficiency percentage for the Title 24 Standards is calculated based on the following formula: (X% + Y%) - (X% × Y%).

Sources:

- California Energy Commission, *Impact Analysis: 2005 Update to the California Energy Efficiency Standards*, (2003) 4.
- California Energy Commission, *Impact Analysis: 2008 Update to the California Energy Efficiency Standards*, (2007) 4.
- Project Applicant.  
Energy-Saving Features include:  
- Lighting (Walmart only): All lighting in the store will be T-8 fluorescent lamps and electronic ballasts. (15% reduction)  
- Lighting (Walmart only): Total estimated energy savings for LED lighting in the store's grocery section is approximately 59,000 kW-hr/yr. (1.14% reduction)  
- Day Lighting (Walmart only): Daylight harvesting can reduce up to 75 percent of the electric lighting energy used in a Walmart store during daylight hours. Each system can save up to an average of 800,000 kW-hr annually. (15.49% reduction)
- Sacramento Metropolitan Air Quality Management District, *Recommended Guidance for Land Use Emission Reductions*, (2010).  
Energy-Saving Features include:  
- Roof Materials (Walmart only): The store will feature a white membrane roof instead of the typical darker colored roof materials employed in commercial construction. (1% reduction)  
- Non-roof Surfaces (Walmart only): Shaded parking lot and driveway areas at a minimum rate of one tree per eight parking spaces; A minimum of 5 percent of the parking area are to be shaded with other plant materials; A minimum of 50 percent of walkways are to be shaded from trees and architectural features within seven years of project completion; Trees along the Springville Avenue, Indiana Street, Vandalia Avenue, and Route 190 frontages of the property. (1% reduction)
- South Coast Air Quality Management District, *CEQA Air Quality Handbook*, (1993) A9-114.  
It is assumed that because the factors were developed for the 1993 SCAQMD *CEQA Air Quality Handbook*, they do not represent current energy consumption factors. Therefore, efficiencies associated with the 2005 and 2008 version of the Title 24 Building Code Standards were applied to the project using data from the California Energy Commission, as cited above.
- California Air Resources Board, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.0, (2008) 174.  
The CO<sub>2</sub> factor is for Southern California Edison. For BAU Project: The CO<sub>2</sub> factor is based on the 2004 value (data is not available for 2002 and 2003). The CH<sub>4</sub> and N<sub>2</sub>O factors are based on the average of the 2002-2004 values. For Proposed Project: The CO<sub>2</sub> factor is based on the 2006 value. The CH<sub>4</sub> and N<sub>2</sub>O factors are based on the 2004 values.

Where:

CH <sub>4</sub>	Methane	lbs	Pounds
CO <sub>2</sub>	Carbon dioxide	MW-hr	Megawatt-hour
CO <sub>2</sub> e	Carbon dioxide equivalent	MT	Metric ton
gsf	Gross square feet	n/a	Not applicable
GWP	Global warming potential	N <sub>2</sub> O	Nitrous oxide
kW-hr	Kilowatt-hour	yr	Year

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**Table GHG-7  
Solid Waste GHG Emissions**

<b>Emissions Scenario</b>	<b>Units</b>	<b>Solid Waste Generation<sup>1</sup> (MT/yr)</b>	<b>CO<sub>2</sub>e Emission Factor<sup>2</sup> (MT CO<sub>2</sub>e/MT waste)</b>	<b>Annual CO<sub>2</sub>e Emissions (MT CO<sub>2</sub>e/yr)</b>
BAU Project				
Walmart	161,602 gsf	347.82	0.37	128.69
Other Commercial	41,252 gsf	88.79	0.37	32.85
Subtotal	202,854 gsf	436.60		161.54
Proposed Project				
Walmart	161,602 gsf	347.82	0.37	128.69
Other Commercial	41,252 gsf	88.79	0.37	32.85
Subtotal	202,854 gsf	436.60		161.54
<b>Proposed Project Reduction from BAU</b>				-
<b>Percent Reduction from BAU</b>				<b>0.00%</b>

Sources:

1. Draft EIR, Section 5.13, Utilities - Solid Waste Disposal. Values do not include diversion (recycling) and are converted to metric tons per year.
2. U.S. Environmental Protection Agency, *Solid Waste Management and Greenhouse Gases: A Lifecycle Assessment of Emissions and Sinks* (2006) 93. The net CO<sub>2</sub>e emission factors are based on mixed municipal solid waste (MSW) as disposed in landfills without landfill gas recovery.

Where:

CO <sub>2</sub> e	Carbon dioxide equivalent
gsf	Gross square feet
MT	Metric ton
yr	Year

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**Table GHG-8  
Potable Water Supply, Conveyance, Treatment, and Distribution GHG Emissions**

<b>Emissions Scenario</b>	<b>Action</b>	<b>Water Saving Features (%)</b>	<b>Potable Water Estimate<sup>1</sup> (MG/yr)</b>	<b>Electrical Consumption Factor<sup>2,3,4</sup> (kW-hr/MG)</b>	<b>Annual Electrical Consumption (MW-hr/yr)</b>	<b>CO<sub>2</sub> Emission Factor<sup>5</sup> GWP = 1 (lbs/MW-hr)</b>	<b>CH<sub>4</sub> Emission Factor<sup>5</sup> GWP = 21 (lbs/MW-hr)</b>	<b>N<sub>2</sub>O Emission Factor<sup>5</sup> GWP = 310 (lbs/MW-hr)</b>	<b>Annual CO<sub>2</sub>e Emissions (MT CO<sub>2</sub>e/yr)</b>
<b>BAU Project</b>									
Walmart and Other Com.	Supply & Conveyance	0.00%	2.82	9,727	27.43	678.88	0.030	0.011	8.50
Walmart and Other Com.	Treatment	0.00%	2.82	111	0.31	678.88	0.030	0.011	0.10
Walmart and Other Com.	Distribution	0.00%	2.82	1,272	3.59	678.88	0.030	0.011	1.11
Walmart and Other Com.	Recycled Water	0.00%	-	875	-	678.88	0.030	0.011	-
<b>Subtotal</b>									<b>9.70</b>
<b>Proposed Project</b>									
Walmart and Other Com.	Supply & Conveyance	59.11%	1.15	9,727	11.22	641.26	0.029	0.011	3.28
Walmart and Other Com.	Treatment	59.11%	1.15	111	0.13	641.26	0.029	0.011	0.04
Walmart and Other Com.	Distribution	59.11%	1.15	1,272	1.47	641.26	0.029	0.011	0.43
Walmart and Other Com.	Recycled Water	59.11%	-	875	-	641.26	0.029	0.011	-
<b>Subtotal</b>									<b>3.75</b>
<b>Proposed Project Reduction from BAU</b>									<b>5.95</b>
<b>Percent Reduction from BAU</b>									<b>61.36%</b>

Sources:

- Project Applicant.  
Water-Saving Features include:  
- *Water Conservation (Walmart only): It is estimated that Walmart's water conservation measures could save approximately 70% of water used annually at this store. (59.11% reduction project-wide)*
- Draft EIR, Section 5.11, Utilities - Water Supply. Values are converted to million gallons per year.
- California Energy Commission, *California's Water-Energy Relationship, Final Staff Report*, CEC-700-2005-011-SF, (2005) 26.
- California Energy Commission, *Refining Estimates of Water-Related Energy Use in California, PIER Final Project Report*, CEC-500-2006-118, (2006) 22.
- R. C. Wilkinson, et. al, California Department of Water Resources, *Water Sources "Powering" Southern California*, n.d.  
Recycled water is estimated to use 285 kW-hr per acre-foot (West Basin Municipal Water District).
- California Air Resources Board, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.0, (2008) 174.  
The CO<sub>2</sub> factor is for Southern California Edison. For BAU Project: The CO<sub>2</sub> factor is based on the 2004 value (data is not available for 2002 and 2003). The CH<sub>4</sub> and N<sub>2</sub>O factors are based on the average of the 2002-2004 values. For Proposed Project: The CO<sub>2</sub> factor is based on the 2006 value. The CH<sub>4</sub> and N<sub>2</sub>O factors are based on the 2004 values.

Where:

CH <sub>4</sub>	Methane	MG	Million gallons
CO <sub>2</sub>	Carbon dioxide	MW-hr	Megawatt-hour
CO <sub>2</sub> e	Carbon dioxide equivalent	MT	Metric ton
GWP	Global warming potential	n/a	Not applicable
kW-hr	Kilowatt-hour	N <sub>2</sub> O	Nitrous oxide
lbs	Pounds	yr	Year

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**Table GHG-9  
Wastewater Treatment Electrical Demand GHG Emissions**

<b>Emissions Scenario</b>	<b>Net Wastewater Generation Rate<sup>1</sup> (MG/yr)</b>	<b>Electrical Demand Factor<sup>2</sup> (kW-hr/MG)</b>	<b>Annual Demand Factor (MW-hr/yr)</b>	<b>CO<sub>2</sub> Emission Factor<sup>3</sup> GWP = 1 (lbs/MW-hr)</b>	<b>CH<sub>4</sub> Emission Factor<sup>3</sup> GWP = 21 (lbs/MW-hr)</b>	<b>N<sub>2</sub>O Emission Factor<sup>3</sup> GWP = 310 (lbs/MW-hr)</b>	<b>Annual CO<sub>2</sub>e Emissions (MT CO<sub>2</sub>e/yr)</b>
BAU Project							
Walmart	1.49	1,911	2.85	678.88	0.030	0.011	0.88
Other Commercial	0.32	1,911	0.61	678.88	0.030	0.011	0.19
Subtotal	1.81						1.07
Proposed Project							
Walmart	0.45	1,911	0.85	641.26	0.029	0.011	0.25
Other Commercial	0.32	1,911	0.61	641.26	0.029	0.011	0.18
Subtotal	0.77						0.43
<b>Proposed Project Reduction from BAU</b>							<b>0.64</b>
<b>Percent Reduction from BAU</b>							<b>59.92%</b>

Sources:

1. Draft EIR, Section 5.12, Utilities - Sanitary Sewer. Values are converted to million gallons per year. Proposed Project for Walmart includes 70% water reduction.
2. California Energy Commission, *Refining Estimates of Water-Related Energy Use in California, PIER Final Project Report (CEC-500-2006-118)*. Prepared by Navigant Consulting, Inc., (2006) 22.
3. California Air Resources Board, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.0, (2008) 174.

The CO<sub>2</sub> factor is for Southern California Edison. For BAU Project: The CO<sub>2</sub> factor is based on the 2004 value (data is not available for 2002 and 2003). The CH<sub>4</sub> and N<sub>2</sub>O factors are based on the average of the 2002-2004 values. For Proposed Project: The CO<sub>2</sub> factor is based on the 2006 value. The CH<sub>4</sub> and N<sub>2</sub>O factors are based on the 2004 values.

Where:

CH <sub>4</sub>	Methane	MG	Million gallons
CO <sub>2</sub>	Carbon dioxide	MT	Metric ton
CO <sub>2</sub> e	Carbon dioxide equivalent	MW-hr	Megawatt-hour
GWP	Global warming potential	N <sub>2</sub> O	Nitrous oxide
kW-hr	Kilowatt-hour	yr	Year
lbs	Pounds		

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**Table GHG-10  
Refrigeration Fugitive GHG Emissions**

Emissions Scenario	Stationary Refrigeration <sup>1</sup>					Transport Refrigeration <sup>2</sup>				Annual Emissions (MT CO <sub>2</sub> e/yr)	Annual CO <sub>2</sub> e Emissions (MT CO <sub>2</sub> e/yr)
	Equipment Type	Number of Units	Capacity (kg/equip.)	Operating Emissions Factor (% Capacity/yr)	Annual Emissions (MT CO <sub>2</sub> e/yr)	Number of Units (TRUs)	Capacity (kg/TRU)	Operating Emissions Factor (% Capacity/yr)	Fraction Attributed to Project (%)		
BAU Project					R-404a; GWP=3,260					R-404a; GWP=3,260	
Walmart	Large Refrigeration	1	2,000	35%	2,282.00	1,352	5.50	50%	0.27%	33.21	2,315.21
Other Commercial	Medium Refrigeration	4	50	35%	228.20	-	-	0%	0.00%	-	228.20
Subtotal											2,543.41
Proposed Project					R-404a; GWP=3,260					R-404a; GWP=3,260	
Walmart	Large Refrigeration	1	2,000	35%	2,282.00	1,352	5.50	50%	0.27%	33.21	2,315.21
Other Commercial	Medium Refrigeration	4	50	35%	228.20	-	-	0%	0.00%	-	228.20
Subtotal											2,543.41
<b>Proposed Project Reduction from BAU</b>											-
<b>Percent Reduction from BAU</b>											<b>0.00%</b>

Sources:

- U.S. Environmental Protection Agency, *Direct HFC and PFC Emissions from Use of Refrigeration and Air Conditioning Equipment*, (2008).

Assumptions:

- The number of units is assumed to be 1 unit per building pad (Walmart is considered to have a large refrigeration unit, while the other commercial stores are assumed to have medium units).
- Refrigeration compound is assumed to be R-404a, with a global warming potential of 3,260. The Montreal Protocol, ratified by the U.S. in 1987, called for the phase out of R-22.

- U.S. Environmental Protection Agency, *Direct HFC and PFC Emissions from Use of Refrigeration and Air Conditioning Equipment*, (2008).

Assumptions:

- Number of TRUs per year visiting the site is provided by the Project Applicant.
- The U.S. EPA methodology provides a default capacity range of 3 to 8 kg for transport refrigeration. The average value of 5.5 kg was used in the analysis.
- Fraction attributed to the project estimates the amount of operating emissions that is a result of the project. The operating emissions for a single TRU over the course of a year should not be attributed to a single project. It is assumed that a single TRU would be assigned to the project for 1 day and would complete a round trip delivery of perishable goods during that 1 day. Therefore, the fraction is equal to 1/365 or 0.27%.
- Refrigeration compound is assumed to be R-404a, with a global warming potential of 3,260. The Montreal Protocol, ratified by the U.S. in 1987, called for the phase out of R-22.

Where:

CO <sub>2</sub> e	Carbon dioxide equivalent	MT	Metric ton
GWP	Global warming potential	TRU	Transportation refrigeration unit
kg	Kilograms	yr	Year
lbs	Pounds		

**Riverwalk Marketplace II  
Evaluation of Global Climate Change Impacts**

**Table GHG-11  
Air Conditioning Fugitive GHG Emissions**

Emissions Scenario	Stationary Air Conditioning <sup>1</sup>				Mobile Air Conditioning <sup>2</sup>							Annual CO <sub>2</sub> e Emissions (MT CO <sub>2</sub> e/yr)	
	Number of Units	Capacity (kg/equip.)	Operating Emissions Factor (% Capacity/yr)	Annual Emissions (MT CO <sub>2</sub> e/yr)	Project-Related Average Daily Trips (ADT)	Vehicle Miles Traveled (VMT/day/trip)	Regional (EMFAC2007) Number of Vehicles	Vehicle Miles Traveled (VMT/day/veh.)	Capacity (kg)	Operating Emissions Factor (% Capacity/yr)	Fraction Attributed to Project (%)		Annual Emissions (MT CO <sub>2</sub> e/yr)
BAU Project				R-410a; GWP=1,725								R-410a; GWP=1,725	
Walmart	1	100	10%	17.25	7,298	8.60	334,674	34.59	1.00	20%	24.87%	626.27	643.52
Other Commercial	4	6.38	10%	4.40	3,246	6.21	334,674	34.59	1.00	20%	24.87%	278.56	282.97
Subtotal													926.49
Proposed Project				R-410a; GWP=1,725								R-410a; GWP=1,725	
Walmart	1	100	10%	17.25	5,370	6.79	334,674	34.59	1.00	20%	24.87%	460.80	478.05
Other Commercial	4	6.38	10%	4.40	2,597	4.70	334,674	34.59	1.00	20%	24.87%	222.85	227.25
Subtotal													705.31
<b>Proposed Project Reduction from BAU</b>													<b>221.18</b>
<b>Percent Reduction from BAU</b>													<b>23.87%</b>

Sources:

- U.S. Environmental Protection Agency, *Direct HFC and PFC Emissions from Use of Refrigeration and Air Conditioning Equipment*, (2008).

Assumptions:

- The number of units is assumed to be 1 unit per building pad (Walmart is considered to have a large capacity unit, while the other commercial stores' capacities are prorated based on square footage).
- Refrigerant compound is assumed to be R-410a, with a global warming potential of 3,260. The Montreal Protocol, ratified by the U.S. in 1987, called for the phase out of R-22.

- U.S. Environmental Protection Agency, *Direct HFC and PFC Emissions from Use of Refrigeration and Air Conditioning Equipment*, (2008).

Assumptions:

- The U.S. EPA methodology provides a default capacity range of 0.5 to 1.5 kg for mobile air conditioning. The average value of 1.0 kg was used in the analysis.
- Fraction attributed to the project estimates the amount of operating emissions that is a result of the project. The operating emissions for a single vehicle over the course of a year should not be attributed to a single project. The fraction is the ratio of the project-related average daily VMT per trip and the regional average daily VMT per vehicle in Tulare County (based on EMFAC2007).
- Refrigerant compound is assumed to be R-410a, with a global warming potential of 3,260. The Montreal Protocol, ratified by the U.S. in 1987, called for the phase out of R-22.

Where:

CO <sub>2</sub> e	Carbon dioxide equivalent	MT	Metric ton
GWP	Global warming potential	TRU	Transportation refrigeration unit
kg	Kilograms	yr	Year
lbs	Pounds		