

## **Appendix F: Greenhouse Gas Emissions**



**Greenhouse Gas Modeling Data  
Wasco Center Walmart  
Wasco, California**

Prepared for:



**City of Wasco**  
764 E Street  
Wasco, CA 93280  
661.758.7200

Contact: Sara Allinder, Community Development Director

Prepared by:

**Michael Brandman Associates**  
220 Commerce, Suite 200  
Irvine, CA 92602  
714.508.4100

Contact: Michael Houlihan, AICP, Manager of Environmental Services  
Author: Cori Wilson, Air Quality and Greenhouse Gas Specialist



November 22, 2010

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Unmitigated Emissions (Tons/Year)

File Name: C:\MBA\Client\26190011 Wasco Walmart\Air Quality and GHG\Models\WascoWalmartConstruction.urb924

Project Name: Wasco Walmart Construction

Project Location: San Joaquin Valley APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

CO2

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2012	861.70
Fine Grading 01/02/2012-02/29/2012	223.93
Fine Grading Dust	0.00
Fine Grading Off Road Diesel	173.24
Fine Grading On Road Diesel	45.47
Fine Grading Worker Trips	5.22
Trenching 02/01/2012-02/29/2012	22.39
Trenching Off Road Diesel	21.43
Trenching Worker Trips	0.96
Building 03/01/2012-12/31/2012	566.94
Building Off Road Diesel	385.09
Building Vendor Trips	35.95
Building Worker Trips	145.90
Coating 08/01/2012-12/31/2012	2.18
Architectural Coating	0.00
Coating Worker Trips	2.18
Asphalt 12/03/2012-12/31/2012	46.27
Paving Off-Gas	0.00
Paving Off Road Diesel	37.36
Paving On Road Diesel	5.07
Paving Worker Trips	3.84

Phase Assumptions

Phase: Fine Grading 1/2/2012 - 2/29/2012 - Remove trees and grade 1/4 of Wasco Center  
 Total Acres Disturbed: 28  
 Maximum Daily Acreage Disturbed: 7  
 Fugitive Dust Level of Detail: Default  
 20 lbs per acre-day  
 On Road Truck Travel (VMT): 442.88

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Off-Road Equipment:

- 1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
- 2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day
- 1 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day
- 1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
- 2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
- 1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 2/1/2012 - 2/29/2012 - Trenching

Off-Road Equipment:

- 2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day
- 1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

Phase: Paving 12/3/2012 - 12/31/2012 - Paving site

Acres to be Paved: 8.5

Off-Road Equipment:

- 4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day
- 1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
- 1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day
- 2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day
- 2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day
- 1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
- 1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 3/1/2012 - 12/31/2012 - Construct building

Off-Road Equipment:

- 1 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day
- 1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
- 1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day
- 2 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day
- 5 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
- 1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
- 3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 8/1/2012 - 12/31/2012 - Painting

Greenhouse Gas Modeling Data

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Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\MBA\Client\26190011 Wasco Walmart\Air Quality\WascoWalmart 2013Operation.urb924

Project Name: Wasco Walmart Operation 2013

Project Location: San Joaquin Valley APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.02	0.30	0.25	0.00	0.00	0.00	359.89
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.18						
<b>TOTALS (tons/year, unmitigated)</b>	<b>0.21</b>	<b>0.30</b>	<b>0.39</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>360.14</b>

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	ROG	NOX	CO	SO2	PM10	PM25	CO2
Free-standing discount superstore	8.68	10.44	97.26	0.10	8.87	1.91	9,685.38
<b>TOTALS (tons/year, unmitigated)</b>	<b>8.68</b>	<b>10.44</b>	<b>97.26</b>	<b>0.10</b>	<b>8.87</b>	<b>1.91</b>	<b>9,685.38</b>

Operational Settings:

Includes correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2013 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Free-standing discount superstore		49.78	1000 sq ft	170.00	8,462.60	57,159.85
					8,462.60	57,159.85

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	51.1	0.7	99.1	0.2
Light Truck < 3750 lbs	22.5	1.7	92.5	5.8
Light Truck 3751-5750 lbs	16.4	0.9	98.6	0.5
Med Truck 5751-8500 lbs	6.4	0.8	99.2	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.2	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	44.4	55.6

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Med-Heavy Truck 14,001-33,000 lbs	0.7	0.0	15.4	84.6
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	1.3	56.4	43.6	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.8	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commuter	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	9.5	7.3	11.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Free-standing discount superstore				2.0	1.0	97.0

Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: C:\MBA\Client\26190011 Wasco Walmart\Air Quality\WascoWalmart 2014Operation.urb924

Project Name: Wasco Walmart Operation 2014

Project Location: San Joaquin Valley APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

<u>Source</u>	ROG	NOX	CO	SO2	PM10	PM25	CO2
Free-standing discount superstore	8.19	9.59	90.68	0.10	8.86	1.91	9,685.31
<b>TOTALS (tons/year, unmitigated)</b>	<b>8.19</b>	<b>9.59</b>	<b>90.68</b>	<b>0.10</b>	<b>8.86</b>	<b>1.91</b>	<b>9,685.31</b>

Includes correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2014 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Free-standing discount superstore		49.78	1000 sq ft	170.00	8,462.60	57,159.85
					8,462.60	57,159.85

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	51.1	0.7	99.1	0.2

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Truck < 3750 lbs	22.5	1.7	92.5	5.8
Light Truck 3751-5750 lbs	16.4	0.9	98.6	0.5
Med Truck 5751-8500 lbs	6.4	0.8	99.2	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.2	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	44.4	55.6
Med-Heavy Truck 14,001-33,000 lbs	0.7	0.0	15.4	84.6
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	1.3	56.4	43.6	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.8	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	9.5	7.3	11.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

% of Trips - Commercial (by land use)

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Free-standing discount superstore				2.0	1.0	97.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Commercial-based commute rural trip length changed from 14.7 miles to 9.5 miles

Commercial-based non-work rural trip length changed from 6.6 miles to 7.3 miles

Commercial-based customer rural trip length changed from 6.6 miles to 11 miles

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\MBA\Client\26190011 Wasco Walmart\Air Quality\WascoWalmart 2020Operation.urb924

Project Name: Wasco Walmart Operation 2020

Project Location: San Joaquin Valley APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.02	0.30	0.25	0.00	0.00	0.00	359.89
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.18						
<b>TOTALS (tons/year, unmitigated)</b>	<b>0.21</b>	<b>0.30</b>	<b>0.39</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>360.14</b>

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Free-standing discount superstore	4.33	4.96	48.30	0.10	8.81	1.86	9,689.80
TOTALS (tons/year, unmitigated)	4.33	4.96	48.30	0.10	8.81	1.86	9,689.80

Operational Settings:

- Includes correction for passby trips
- Does not include double counting adjustment for internal trips
- Analysis Year: 2020 Season: Annual
- Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Free-standing discount superstore		49.78	1000 sq ft	170.00	8,462.60	57,159.85
					8,462.60	57,159.85

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	51.1	0.0	100.0	0.0
Light Truck < 3750 lbs	22.5	0.0	97.5	2.5
Light Truck 3751-5750 lbs	16.4	0.0	100.0	0.0
Med Truck 5751-8500 lbs	6.4	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.2	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	44.4	55.6

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Med-Heavy Truck 14,001-33,000 lbs	0.7	0.0	15.4	84.6
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	1.3	41.0	59.0	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.8	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commuter	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	9.5	7.3	11.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Free-standing discount superstore				2.0	1.0	97.0

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\MBA\Client\26190011 Wasco Walmart\Air Quality\WascoWalmart 2035Operation.urb924

Project Name: Wasco Walmart Operation 2035

Project Location: San Joaquin Valley APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
Natural Gas	0.02	0.30	0.25	0.00	0.00	0.00	359.89
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.18						
<b>TOTALS (tons/year, unmitigated)</b>	<b>0.21</b>	<b>0.30</b>	<b>0.39</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>360.14</b>

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Free-standing discount superstore	2.50	2.43	28.31	0.10	9.49	1.99	10,556.45
TOTALS (tons/year, unmitigated)	2.50	2.43	28.31	0.10	9.49	1.99	10,556.45

Operational Settings:

- Includes correction for passby trips
- Does not include double counting adjustment for internal trips
- Analysis Year: 2035 Season: Annual
- Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Free-standing discount superstore		49.78	1000 sq ft	170.00	8,462.60	61,739.67
					8,462.60	61,739.67

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	48.1	0.0	100.0	0.0
Light Truck < 3750 lbs	23.8	0.0	100.0	0.0
Light Truck 3751-5750 lbs	17.1	0.0	100.0	0.0
Med Truck 5751-8500 lbs	6.8	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.1	0.0	79.2	20.8
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	55.6	44.4

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Med-Heavy Truck 14,001-33,000 lbs	0.7	0.0	23.1	76.9
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	1.3	33.3	66.7	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	1.5	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commuter	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	9.5	7.3	11.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Free-standing discount superstore				2.0	1.0	97.0



**Mobile Emissions - Methane**

Wasco Walmart

16-Nov-10

Prepared by Michael Brandman Associates

**Vehicle Miles Traveled** 57,160

**Vehicle Trips** 8,463

	Pounds/day	Tons/day	Tons/year
<b>Starting Emissions</b>	0.74	0.0004	0.14
<b>Running Emissions</b>	4.15	0.0021	0.76
<b>Total</b>	4.90	0.0024	0.89

**Vehicle Percentages**

Vehicle Type	Percent	Non-Catalyst	Catalyst	Diesel
Light Auto	51.1	0.6	99.2	0.2
Light Truck < 3,750 lbs	22.5	1.4	95.9	2.7
Light Truck 3,751- 5,750	16.4	0.4	99.6	0.0
Med Truck 5,751- 8,500	6.4	0.9	99.1	0.0
Lite-Heavy 8,501-10,000	0.2	0.0	81.2	18.8
Lite-Heavy 10,001-14,000	0.0	0.0	60.0	40.0
Med-Heavy 14,001-33,000	0.7	0.0	22.2	77.8
Heavy-Heavy 33,001-60,000	0.5	0.0	0.0	100.0
Line Haul > 60,000 lbs	0.0	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	1.3	60.7	39.3	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.8	0.0	88.9	11.1

**Running Emission Factors (g/mile)**

Vehicle Type	Type	Non-Catalyst	Catalyst	Diesel
Light Auto	LDA	0.3250	0.0250	0.0080
Light Truck < 3,750 lbs	LDT1	0.3310	0.0330	0.0040
Light Truck 3,751- 5,750	LDT2	0.3300	0.0300	0.0060
Med Truck 5,751- 8,500	MDV	0.3910	0.0370	0.0030
Lite-Heavy 8,501-10,000	LHDT1	0.2500	0.0280	0.0070
Lite-Heavy 10,001-14,000	LHDT2	0.2500	0.0330	0.0100
Med-Heavy 14,001-33,000	MHDT	0.3210	0.0720	0.0100
Heavy-Heavy 33,001-60,000	HHDT	0.7950	0.2250	0.0480
Line Haul > 60,000 lbs	LHV	0.7950	0.2250	0.0480
Urban Bus	UB	0.3680	0.0920	0.0280
Motorcycle	MCY	0.2230	0.1620	0.0000
School Bus	SBUS	0.3210	0.1260	0.0130
Motor Home	MH	0.3210	0.0560	0.0050

**Running Emissions (pounds per day)**

Vehicle Type	Non-Catalyst	Catalyst	Diesel
Light Auto	0.13	1.59	0.00
Light Truck < 3,750 lbs	0.13	0.90	0.00
Light Truck 3,751- 5,750	0.03	0.62	0.00
Med Truck 5,751- 8,500	0.03	0.30	0.00
Lite-Heavy 8,501-10,000	0.00	0.01	0.00
Lite-Heavy 10,001-14,000	0.00	0.00	0.00
Med-Heavy 14,001-33,000	0.00	0.01	0.01
Heavy-Heavy 33,001-60,000	0.00	0.00	0.03
Line Haul > 60,000 lbs	0.00	0.00	0.00
Urban Bus	0.00	0.00	0.00
Motorcycle	0.22	0.10	0.00
School Bus	0.00	0.00	0.00
Motor Home	0.00	0.05	0.00
<b>Total</b>	<b>0.53</b>	<b>3.57</b>	<b>0.05</b>

**Mobile Emissions - Methane**

Wasco Walmart

Prepared by Michael Brandman Associates

**Total Trips** 8463

**Starting Emission Factors (g/start)**

Vehicle Type	Type	Non-Catalyst	Catalyst	Diesel
Light Auto	LDA	0.384	0.032	0
Light Truck < 3,750 lbs	LDT1	0.381	0.038	0.000
Light Truck 3,751- 5,750	LDT2	0.377	0.034	0.000
Med Truck 5,751- 8,500	MDV	0.463	0.044	0.000
Lite-Heavy 8,501-10,000	LHDT1	0.615	0.106	0.000
Lite-Heavy 10,001-14,000	LHDT2	0.615	0.123	0.000
Med-Heavy 14,001-33,000	MHDT	0.923	0.277	0.000
Heavy-Heavy 33,001-60,000	HHDT	1.756	0.829	0.000
Line Haul > 60,000 lbs	LHV	1.756	0.829	0.000
Urban Bus	UB	1.127	0.314	0.000
Motorcycle	MCY	0.183	0.155	0.000
School Bus	SBUS	0.923	0.313	0.000
Motor Home	MH	0.923	0.200	0.000

**Trip Distribution**

Vehicle Type	Type	Non-Catalyst	Catalyst	Diesel
Light Auto	LDA	25.9	4290.0	8.6
Light Truck < 3,750 lbs	LDT1	26.7	1826.1	51.4
Light Truck 3,751- 5,750	LDT2	5.6	1382.4	0.0
Med Truck 5,751- 8,500	MDV	4.9	536.8	0.0
Lite-Heavy 8,501-10,000	LHDT1	0.0	13.7	3.2
Lite-Heavy 10,001-14,000	LHDT2	0.0	0.0	0.0
Med-Heavy 14,001-33,000	MHDT	0.0	13.2	46.1
Heavy-Heavy 33,001-60,000	HHDT	0.0	0.0	42.3
Line Haul > 60,000 lbs	LHV	0.0	0.0	0.0
Urban Bus	UB	0.0	0.0	8.5
Motorcycle	MCY	66.8	43.2	0.0
School Bus	SBUS	0.0	0.0	0.0
Motor Home	MH	0.0	60.2	7.5
<b>Total</b>		<b>129.8</b>	<b>8165.6</b>	<b>167.6</b>

**Starting Emissions (pounds per day)**

Vehicle Type	Type	Non-Catalyst	Catalyst	Diesel
Light Auto	LDA	0.0219	0.3020	0.0000
Light Truck < 3,750 lbs	LDT1	0.0223	0.1527	0.0000
Light Truck 3,751- 5,750	LDT2	0.0046	0.1034	0.0000
Med Truck 5,751- 8,500	MDV	0.0050	0.0520	0.0000
Lite-Heavy 8,501-10,000	LHDT1	0.0000	0.0032	0.0000
Lite-Heavy 10,001-14,000	LHDT2	0.0000	0.0000	0.0000
Med-Heavy 14,001-33,000	MHDT	0.0000	0.0080	0.0000
Heavy-Heavy 33,001-60,000	HHDT	0.0000	0.0000	0.0000
Line Haul > 60,000 lbs	LHV	0.0000	0.0000	0.0000
Urban Bus	UB	0.0000	0.0000	0.0000
Motorcycle	MCY	0.0269	0.0147	0.0000
School Bus	SBUS	0.0000	0.0000	0.0000
Motor Home	MH	0.0000	0.0265	0.0000
<b>Total</b>		<b>0.0807</b>	<b>0.6625</b>	<b>0.0000</b>

- Source of vehicle percentages: URBEMIS.  
 - Source of emission factors: EMFAC2007, Statewide average, year 2010, temperature 60F, relative humidity 50%

**Mobile Emissions - Nitrous Oxide**

Project: Wasco Walmart **Vehicle Miles Traveled** 57,160  
 Prepared by: Michael Brandman Associates

	Pounds/day	Tons/day	Tons/year
<b>Starting Emissions</b>	0.94	0.0005	0.17
<b>Running Emissions</b>	1.75	0.0009	0.32
<b>Total</b>	2.68	0.0013	0.49

**Vehicle Percentages**

<u>Vehicle Type</u>	<u>Percent</u>	<u>Non-Catalyst</u>	<u>Catalyst</u>	<u>Diesel</u>
Light Auto	51.1	0.6	99.2	0.2
Light Truck < 3,750 lbs	22.5	1.4	95.9	2.7
Light Truck 3,751- 5,750	16.4	0.4	99.6	0.0
Med Truck 5,751- 8,500	6.4	0.9	99.1	0.0
Lite-Heavy 8,501-10,000	0.2	0.0	81.2	18.8
Lite-Heavy 10,001-14,000	0.0	0.0	60.0	40.0
Med-Heavy 14,001-33,000	0.7	0.0	22.2	77.8
Heavy-Heavy 33,001-60,000	0.5	0.0	0.0	100.0
Line Haul > 60,000 lbs	0.0	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	1.3	60.7	39.3	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.8	0.0	88.9	11.1

**Running Emission Factors (mg/km)**

<u>Vehicle Type</u>	<u>Non-Catalyst</u>	<u>Catalyst</u>	<u>Diesel</u>
Automobile	8	20	1
Light duty truck	9	26	1
Heavy duty trucks and buses	20	55	3
Motorcycle	3	3	3

**Running Emission Factors (g/mile)**

<u>Vehicle Type</u>	<u>Type</u>	<u>Non-Catalyst</u>	<u>Catalyst</u>	<u>Diesel</u>
Light Auto	LDA	0.0050	0.0124	0.0006
Light Truck < 3,750 lbs	LDT1	0.0056	0.0162	0.0006
Light Truck 3,751- 5,750	LDT2	0.0056	0.0162	0.0006
Med Truck 5,751- 8,500	MDV	0.0056	0.0162	0.0006
Lite-Heavy 8,501-10,000	LHDT1	0.0124	0.0342	0.0019
Lite-Heavy 10,001-14,000	LHDT2	0.0124	0.0342	0.0019
Med-Heavy 14,001-33,000	MHDT	0.0124	0.0342	0.0019
Heavy-Heavy 33,001-60,000	HHDT	0.0124	0.0342	0.0019
Line Haul > 60,000 lbs	LHV	0.0124	0.0342	0.0019
Urban Bus	UB	0.0124	0.0342	0.0019
Motorcycle	MCY	0.0019	0.0019	0.0019
School Bus	SBUS	0.0124	0.0342	0.0019
Motor Home	MH	0.0124	0.0342	0.0019

**Running Emissions (pounds per day)**

<u>Vehicle Type</u>	<u>Non-Catalyst</u>	<u>Catalyst</u>	<u>Diesel</u>
Light Auto	0.00	0.79	0.00
Light Truck < 3,750 lbs	0.00	0.44	0.00
Light Truck 3,751- 5,750	0.00	0.33	0.00
Med Truck 5,751- 8,500	0.00	0.13	0.00
Lite-Heavy 8,501-10,000	0.00	0.01	0.00
Lite-Heavy 10,001-14,000	0.00	0.00	0.00
Med-Heavy 14,001-33,000	0.00	0.01	0.00
Heavy-Heavy 33,001-60,000	0.00	0.00	0.00
Line Haul > 60,000 lbs	0.00	0.00	0.00
Urban Bus	0.00	0.00	0.00
Motorcycle	0.00	0.00	0.00
School Bus	0.00	0.00	0.00
Motor Home	0.00	0.03	0.00
<b>Total</b>	<b>0.01</b>	<b>1.74</b>	<b>0.00</b>

**Mobile Emissions - Nitrous Oxide**

**Total Trips** 8463

**Starting Emission Factors (mg/start)**

<u>Vehicle Type</u>	<u>Non-Catalyst</u>	<u>Catalyst</u>	<u>Diesel</u>
Automobile	28	72	0
Light duty truck	9	26	-1
Heavy duty trucks and buses	70	194	-2
Motorcycle	12	12	0

**Starting Emission Factors (g/start)**

<u>Vehicle Type</u>	<u>Type</u>	<u>Non-Catalyst</u>	<u>Catalyst</u>	<u>Diesel</u>
Light Auto	LDA	0.028	0.072	0
Light Truck < 3,750 lbs	LDT1	0.009	0.026	-0.001
Light Truck 3,751- 5,750	LDT2	0.009	0.026	-0.001
Med Truck 5,751- 8,500	MDV	0.009	0.026	-0.001
Lite-Heavy 8,501-10,000	LHDT1	0.070	0.194	-0.002
Lite-Heavy 10,001-14,000	LHDT2	0.070	0.194	-0.002
Med-Heavy 14,001-33,000	MHDT	0.070	0.194	-0.002
Heavy-Heavy 33,001-60,000	HHDT	0.070	0.194	-0.002
Line Haul > 60,000 lbs	LHV	0.070	0.194	-0.002
Urban Bus	UB	0.070	0.194	-0.002
Motorcycle	MCY	0.012	0.012	0.000
School Bus	SBUS	0.070	0.194	-0.002
Motor Home	MH	0.070	0.194	-0.002

**Trip Distribution**

<u>Vehicle Type</u>	<u>Type</u>	<u>Non-Catalyst</u>	<u>Catalyst</u>	<u>Diesel</u>
Light Auto	LDA	25.9	4290.0	8.6
Light Truck < 3,750 lbs	LDT1	26.7	1826.1	51.4
Light Truck 3,751- 5,750	LDT2	5.6	1382.4	0.0
Med Truck 5,751- 8,500	MDV	4.9	536.8	0.0
Lite-Heavy 8,501-10,000	LHDT1	0.0	13.7	3.2
Lite-Heavy 10,001-14,000	LHDT2	0.0	0.0	0.0
Med-Heavy 14,001-33,000	MHDT	0.0	13.2	46.1
Heavy-Heavy 33,001-60,000	HHDT	0.0	0.0	42.3
Line Haul > 60,000 lbs	LHV	0.0	0.0	0.0
Urban Bus	UB	0.0	0.0	8.5
Motorcycle	MCY	66.8	43.2	0.0
School Bus	SBUS	0.0	0.0	0.0
Motor Home	MH	0.0	60.2	7.5
Total		129.8	8165.6	167.6

**Starting Emissions (pounds per day)**

<u>Vehicle Type</u>	<u>Type</u>	<u>Non-Catalyst</u>	<u>Catalyst</u>	<u>Diesel</u>
Light Auto	LDA	0.0016	0.6795	0.0000
Light Truck < 3,750 lbs	LDT1	0.0005	0.1045	-0.0001
Light Truck 3,751- 5,750	LDT2	0.0001	0.0791	0.0000
Med Truck 5,751- 8,500	MDV	0.0001	0.0307	0.0000
Lite-Heavy 8,501-10,000	LHDT1	0.0000	0.0059	0.0000
Lite-Heavy 10,001-14,000	LHDT2	0.0000	0.0000	0.0000
Med-Heavy 14,001-33,000	MHDT	0.0000	0.0056	-0.0002
Heavy-Heavy 33,001-60,000	HHDT	0.0000	0.0000	-0.0002
Line Haul > 60,000 lbs	LHV	0.0000	0.0000	0.0000
Urban Bus	UB	0.0000	0.0000	0.0000
Motorcycle	MCY	0.0018	0.0011	0.0000
School Bus	SBUS	0.0000	0.0000	0.0000
Motor Home	MH	0.0000	0.0257	0.0000
Total		0.0041	0.9321	-0.0006

Sources: Vehicle percentages: URBEMIS2007.

Emission Factors (mg/km and mg/start): 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Table 3.2.3, [www.ipcc-nggip.iges.or.jp/EFDB/find\\_ef\\_main.php](http://www.ipcc-nggip.iges.or.jp/EFDB/find_ef_main.php)

## Electricity - Indirect Emissions

Project: Wasco Walmart  
 Prepared by: Michael Brandman Associates  
 Prepared on: 11/16/2010

Land Use	square feet (sf)	Electricity Use (kWh/sf-year)	Electricity Use (kWh/year)
Walmart - Sales area	123000	40.99	5041770
Walmart - office/storage	47000	17.7	831900
			0
			0
<b>Total (kWh/year)</b>			<b>5873670</b>
<b>Total (MWh/year)</b>			<b>5874</b>

Greenhouse Gas	Emission Factor (pounds per MWh)	Emissions (pounds/year)	Emissions (tons/year)	Global Warming Potential	Emissions (MTCO2e)
Carbon dioxide	724.12	4,253,242	2,127	1	1929
Methane	0.0302	177	0.09	21	2
Nitrous oxide	0.0081	48	0.02	310	7
SF6	0.00031	2	0.001	23900	20

Emission factor source: California Climate Action Registry. General Reporting Protocol. Reporting Entity-Wide Greenhouse Gas Emissions. Version 3.1, January 2009. Table C.2  
[www.climateregistry.org/resources/docs/protocols/grp/GRP\\_3.1\\_January2009.pdf](http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf)

SF6 emissions refer to sulfur hexafluoride emissions, which are released over electricity transmission lines. The emission factor was calculated by dividing California SF6 emissions from transmission lines (ARB 2010) by the total electricity generated in California in 2008 (CEC 2010), 0.96 MMTCO2e divided by 287782 millions of kWh \* 2205 pounds/MT \* 23900 \* 1000.

- ARB 2010: California Air Resources Board. May 12, 2010. California Greenhouse Gas Inventory for 2000-2008 by Category as Defined in the Scoping Plan.  
 - CEC 2010: California Energy Commission. Energy Consumption Data Management System. Electricity Consumption by County.  
<http://www.ecdms.energy.ca.gov/elecbycounty.aspx>

## Water Conveyance, Treatment, Distribution

Project: Wasco Walmart  
 Prepared by: Michael Brandman Associates  
 Prepared on: 11/16/2010

<u>Electricity Requirements</u>	kWh per million gallons	
	Northern California	Southern California
Water Supply, Conveyance	2,117	9,727
Water Treatment	111	111
Water Distribution	1,272	1,272
Wastewater Treatment	<u>1,911</u>	<u>1,911</u>
<i>Total</i>	<i>5,411</i>	<i>13,021</i>

### Project

Water Usage 37400 gallons per day  
 Water Usage 13.651 million gallons per year  
 Energy Usage 177,750 kWh  
 Energy Usage 178 MWh

<u>Greenhouse Gas</u>	<u>Electricity Emission</u>		
	<u>Factor</u> (pounds per MWh)	<u>Emissions</u> (pounds/year)	<u>Emissions</u> (tons/year)
Carbon dioxide	724.12	128,712	64
Methane	0.0302	5.37	0.003
Nitrous oxide	0.0081	1.44	0.001

Source for electricity emission factor:  
 California Climate Action Registry. General Reporting Protocol. Reporting Entity-Wide Greenhouse Gas Emissions. Version 3.1, January 2009. Table C.2.  
[www.climateregistry.org/resources/docs/protocols/grp/GRP\\_3.1\\_January2009.pdf](http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf)

Source for electricity requirements:  
 Navigant Consulting, Inc. 2006. Refining Estimates of Water-Related Energy Use in California. California Energy Commission, PIER Industrial/Agricultural/Water End Use Energy Efficiency Program. CEC-500-2006-118. [www.energy.ca.gov/pier/project\\_reports/CEC-500-2006-118.html](http://www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html)

Source of water use: Based on the data from the Water Supply Assessment that was prepared for the Wasco Center, the water demand factor for commercial structures was 220 gallons per day per one thousand square feet.

## Natural Gas Combustion

Project: Wasco Walmart  
 Prepared by: Michael Brandman Associates  
 Prepared on: 11/16/2010

Gas	Type of Land Use	Square Feet	Annual Natural Gas Usage Factor* (kBTU/sf)	Natural Gas Usage for Project (MMBTU/year)	Emission Factor (kg/MMBTU)**	Emissions (kg/year)	Emissions (tons/year)	Emissions (MTCO2e/year)
Methane	Walmart: Food Store	123000	27.60	3395	0.005	17.0	0.019	0.36
	Walmart: Office	47000	21.9	1031	0.005	5.2	0.006	0.11
				0	0.005	0.0	0.000	0.00
<i>Total Methane</i>				4426		22.1	0.024	0.46
Nitrous Oxide	Walmart: Food Store	123000	27.60	3395	0.0001	0.3	0.0004	0.11
	Walmart: Office	47000	21.93	1031	0.0001	0.1	0.0001	0.03
		0	0	0	0.0001	0.0	0.0000	0.00
<i>Total Nitrous Oxide</i>				4426		0.4	0.0005	0.14

Greenhouse Gas	Global Warming Potentials
Methane	21
Nitrous Oxide	310

\* Natural gas usage: Table E-1 from California Energy Commission. California Commercial End-Use Survey. Consultant Report. March 2006. CEC-400-2006-005

\*\* Emission factors: Table C.8 from California Climate Action Registry, General Reporting Protocol. Version 3.1, January 2009. [www.climateregistry.org/tools/protocols/general-reporting-protocol.html](http://www.climateregistry.org/tools/protocols/general-reporting-protocol.html)

Table E-1: Overview of Energy Usage in the Statewide Service Area

Building Type	Floor Stock (kft <sup>2</sup> )	Annual Energy Intensities			Total Annual Usage	
		Electricity (kWh/ft <sup>2</sup> )	Natural Gas (therms/ft <sup>2</sup> )	Natural Gas (kBtu/ft <sup>2</sup> )	Electricity (GWh)	Natural Gas (Mtherms)
All Commercial	4,920,114	13.63	0.26	25.99	67077	1278.60
Small Office (<30k ft <sup>2</sup> )	361,584	13.10	0.11	10.54	4738	38.10
Large Office (>=30k ft <sup>2</sup> )	660,429	17.70	0.22	21.93	11691	144.80
Restaurant	148,892	40.20	2.10	209.98	5986	312.60
Retail	702,053	14.06	0.05	4.62	9871	32.50
Food Store	144,209	40.99	0.28	27.60	5911	39.80
Refrigerated Warehouse	95,540	20.02	0.06	5.60	1913	5.30
Unrefrigerated Warehouse	554,166	4.45	0.03	3.07	2467	17.00
School	445,106	7.46	0.16	15.97	3322	71.10
College	205,942	12.26	0.34	34.24	2524	70.50
Health	232,606	19.61	0.76	75.53	4561	175.70
Lodging	270,044	12.13	0.42	42.40	3275	114.50
Miscellaneous	1,099,544	9.84	0.23	23.34	10817	256.60
All Offices	1,022,012	16.08	0.18	17.90	16430	182.90
All Warehouses	649,706	6.74	0.03	3.44	4380	22.40

## Air Conditioning Emissions

Project: Wasco Walmart  
 Prepared by: Michael Brandman Associates  
 Prepared on: 11/16/2010

Type of Unit	Units	Capacity of Unit (pounds)	Capacity of Unit (kg)	Annual Leak Rate in percent of capacity	Emissions (kg/year)	Emissions (tons/year)	Global Warming Potential (r410a)	MTCO2e per year
<b>Without Regulations</b>								
Packaged chiller air conditioning (medium)	17.0	526	239	7.0%	284	0.31	1725	489
<b>Total</b>						<b>0.31</b>		<b>489</b>
<b>With Regulations</b>								
Packaged chiller air conditioning (medium)	17.0	526	239	3.5%	142	0.16	1725	244
<b>Total</b>						<b>0.16</b>		<b>244</b>
Percent Reduction								50%

**Sources:**

- U.S. Environmental Protection Agency, Climate Leaders. May 2008. Direct HFC and PFC Emissions from Use of Refrigeration and Air Conditioning Equipment. EPA430-K-03-004. <http://www.epa.gov/stateply/documents/resources/mfgrfg.pdf>
- California Air Resources Board. Appendix B, California Facilities and Greenhouse Gas Emissions Inventory - High-Global Warming Potential Stationary Source Refrigerant Management Program. [www.arb.ca.gov/cc/reftrack/APPENDIX\\_B\\_10\\_22\\_.pdf](http://www.arb.ca.gov/cc/reftrack/APPENDIX_B_10_22_.pdf)
- Source of global warming potential: [http://www.engineeringtoolbox.com/Refrigerants-Environment-Properties-d\\_1220.html](http://www.engineeringtoolbox.com/Refrigerants-Environment-Properties-d_1220.html) and [http://www.engineeringtoolbox.com/refrigerants-properties-d\\_145.html](http://www.engineeringtoolbox.com/refrigerants-properties-d_145.html)
- With regulation refers to a change in the annual leak rate pursuant to California Air Resources Board Stationary Equipment Refrigerant Management Program. <http://www.arb.ca.gov/cc/reftrack/reftrack.htm>
- It is assumed that there would be one unit per 10,000 square feet.

## Refrigerators and Freezers: Installation (Construction Related Emissions)

Project: Wasco Walmart  
 Prepared by: Michael Brandman Associates  
 Prepared on: 11/16/2010

Number	Doors	R = Refrigerator			Refrigerant Charge/unit (lbs)	Total Charge (kg)	Installation Emission Factor (% of capacity)	Emissions (kg/year)	Emissions (tons/year)	Global Warming Potential (R404a)	Metric Tons CO2 Equiv./year
		F = Freezer	Manufacturer	Model							
6	3	R	HUSSMANN	RM3	3.2	8.6	3%	1.6	0.002	3785	6
10	4	R	HUSSMANN	RM4	4.1	18.5	3%	5.5	0.006	3785	21
20	5	R	HUSSMANN	RM5	5.1	45.9	3%	27.5	0.030	3785	104
16		F (open top)	HUSSMANN	?	5.1	36.7	3%	17.6	0.019	3785	67
18		R (open door)	HUSSMANN	?	5.1	41.3	3%	22.3	0.025	3785	84
7		F (for meat)	HILL PHOENIX	OHHM12	5.1	16.1	3%	3.4	0.004	3785	13
14		R (lunch meat, etc)	HILL PHOENIX	O5DM12	5.1	32.1	3%	13.5	0.015	3785	51
4		R (behind deli)	?	?	5.1	9.2	3%	1.1	0.001	3785	4
6		R (in deli)	TYLER	?	5.1	13.8	3%	2.5	0.003	3785	9
2		R (cakes)	KYSOR	?	5.1	4.6	3%	0.3	0.000	3785	1
4		R (beer)	KYSOR-WARREN	?	5.1	9.2	3%	1.1	0.001	3785	4
10		R (produce)	TYLER	N6DL12	5.1	23.0	3%	6.9	0.008	3785	26
1	Pipes and Compressors, estimation				2000	900.0	3%	27.0	0.030	3785	102
<b>Total</b>					<b>2058.3</b>	<b>1158.9</b>	<b>0.4</b>	<b>130.3</b>	<b>0.143</b>		<b>492</b>

## Refrigerators and Freezers: Operating Emissions (Business as Usual)

Project: Wasco Walmart  
 Prepared by: Michael Brandman Associates  
 Prepared on: 11/16/2010

Number	Doors	R = Refrigerator F = Freezer			Refrigerant Charge/unit (lbs)	Total Charge (kg)	Annual Leak Rate in percent of capacity	Emissions (kg/year)	Emissions (tons/year)	Global Warming Potential (R404a)	Metric Tons CO2 Equiv./year
		Manufacturer	Model								
6	3	R	HUSSMANN	RM3	3.2	8.6	21%	10.9	0.012	3785	41
10	4	R	HUSSMANN	RM4	4.1	18.5	21%	38.7	0.043	3785	146
20	5	R	HUSSMANN	RM5	5.1	45.9	21%	192.8	0.212	3785	728
16		F (open top)	HUSSMANN	?	5.1	36.7	21%	123.4	0.136	3785	466
18		R (open door)	HUSSMANN	?	5.1	41.3	21%	156.2	0.172	3785	590
7		F (for meat)	HILL PHOENIX	OHMH12	5.1	16.1	21%	23.6	0.026	3785	89
14		R (lunch meat, etc)	HILL PHOENIX	O5DM12	5.1	32.1	21%	94.5	0.104	3785	357
4		R (behind deli)	?	?	5.1	9.2	21%	7.7	0.008	3785	29
6		R (in deli)	TYLER	?	5.1	13.8	21%	17.4	0.019	3785	66
2		R (cakes)	KYSOR	?	5.1	4.6	21%	1.9	0.002	3785	7
4		R (beer)	KYSOR-WARREN	?	5.1	9.2	21%	7.7	0.008	3785	29
10		R (produce)	TYLER	N6DL12	5.1	23.0	21%	48.2	0.053	3785	182
1	Pipes and Compressors, estimation				2000	900.0	21%	189.0	0.208	3785	714
<b>Total</b>					<b>2058.3</b>	<b>1158.9</b>		<b>911.9</b>	<b>1.003</b>		<b>3,444</b>

Estimation methodology:  
 U.S. Environmental Protection Agency, Climate Leaders. May 2008. Direct HFC and PFC Emissions from Use of Refrigeration and Air Conditioning Equipment. EPA430-K-03-004. <http://www.epa.gov/stateply/documents/resources/mfgrfg.pdf>, Accessed in July 2008.

HUSSMANN refrigerant charge for RM models:  
 HUSSMANN RM with INNOVATOR Doors Technical Data Sheet P/N 0425645\_H, July 2007. [www.hussmann.com/docs/data\\_shts/impact/0425645\\_H\\_RMi.pdf](http://www.hussmann.com/docs/data_shts/impact/0425645_H_RMi.pdf)

HUSSMANN refrigerant charge for RL models:  
 HUSSMANN, RL with INNOVATOR II No Heat Doors, Technical Data Sheet P/N 0440999\_G, May 2008.  
[http://www.hussmann.com/docs/data\\_shts/impact/0440999\\_G\\_RLii.pdf](http://www.hussmann.com/docs/data_shts/impact/0440999_G_RLii.pdf)

The highlighted items are assumed to have a refrigerant charge is assumed to be 5.1 per unit, which is the maximum observed in the HUSSMANN units. It is unknown how many produce units there would be; therefore, this number is estimated.

It is assumed that there are emissions associated with the pipes that run from the racks (the refrigeration units) to a separate room that contains the compressors. It is also assumed that there are emissions associated with the compressors. The exact charge in the copper wires and pipes is unknown at this time; however, an industry specialist indicated that the charge can range from 1500 to 3000 pounds per store (personal communication, July 9, 2009).

Inventory from a Wal-Mart store located in Beaumont, California.

Global warming potential for the refrigerant is from: Forane 404a technical data sheet, April 2006, [www.arkema-inc.com/tds/451.pdf](http://www.arkema-inc.com/tds/451.pdf)

## Refrigerators and Freezers: Operating Emissions (with Regulation)

Project: Wasco Walmart  
 Prepared by: Michael Brandman Associates  
 Prepared on: 11/16/2010

Number	Doors	R = Refrigerator F = Freezer			Refrigerant Charge/unit (lbs)	Total Charge (kg)	Annual Leak Rate in percent of capacity	Emissions (kg/year)	Emissions (tons/year)	Global Warming Potential (R404a)	Metric Tons CO2 Equiv./year
		Manufacturer	Model								
6	3	R	HUSSMANN	RM3	3.2	8.6	10%	5.2	0.006	3785	20
10	4	R	HUSSMANN	RM4	4.1	18.5	10%	18.5	0.020	3785	70
20	5	R	HUSSMANN	RM5	5.1	45.9	10%	91.8	0.101	3785	347
16		F (open top)	HUSSMANN	?	5.1	36.7	10%	58.8	0.065	3785	222
18		R (open door)	HUSSMANN	?	5.1	41.3	10%	74.4	0.082	3785	281
7		F (for meat)	HILL PHOENIX	OHMH12	5.1	16.1	10%	11.2	0.012	3785	42
14		R (lunch meat, etc)	HILL PHOENIX	O5DM12	5.1	32.1	10%	45.0	0.049	3785	170
4		R (behind deli)	?	?	5.1	9.2	10%	3.7	0.004	3785	14
6		R (in deli)	TYLER	?	5.1	13.8	10%	8.3	0.009	3785	31
2		R (cakes)	KYSOR	?	5.1	4.6	10%	0.9	0.001	3785	3
4		R (beer)	KYSOR-WARREN	?	5.1	9.2	10%	3.7	0.004	3785	14
10		R (produce)	TYLER	N6DL12	5.1	23.0	10%	23.0	0.025	3785	87
1	Pipes and Compressors, estimation				2000	900.0	10%	90.0	0.099	3785	340
<b>Total</b>					<b>2058.3</b>	<b>1158.9</b>		<b>434.2</b>	<b>0.478</b>		<b>1,640</b>

Note that the annual leak rate is 10 percent, while in the business as usual scenario the leak rate is 21 percent. This is due to regulations as described in Table 8 (for centralized refrigeration systems) of the following source:

California Air Resources Board. 2009. Appendix B - California Facilities and Greenhouse Gas Emissions Inventory – High-Global Warming Potential Stationary Source Refrigerant Management Program. October 23. Available at:  
<http://www.arb.ca.gov/regact/2009/gwprmp09/refappb.pdf>

## Waste Generation Estimates

### Construction/Demolition

Project: Wasco Walmart  
 Prepared by: Michael Brandman Associates  
 Prepared on: 11/16/2010

Waste generation rate 4 pounds per sf  
 Square feet 170000 square feet  
**Total 340 tons**

### EPA Waste Reduction Model (WARM) Inputs

Material	% Generated	Tons Generated
Aluminum Cans		0.0
Steel Cans		0.0
Copper Wire		0.0
Glass	5.0%	17.0
HDPE		0.0
LDPE		0.0
PET		0.0
Corrugated Cardboard	5.0%	17.0
Magazines/Third-class Mail		0.0
Newspaper		0.0
Office Paper		0.0
Phonebooks		0.0
Textbooks		0.0
Dimensional Lumber	8.0%	27.2
Medium-density Fiberboard	8.0%	27.2
Food Scraps		0.0
Yard Trimmings		0.0
Grass	1.0%	3.4
Leaves	0.0%	0.0
Branches	10.0%	34.0
Mixed Paper (general)	3.0%	10.2
Mixed Paper (primarily residential)		0.0
Mixed Paper (primarily from offices)		0.0
Mixed Metals	4.0%	13.6
Mixed Plastics	5.0%	17.0
Mixed Recyclables		0.0
Mixed Organics		0.0
Mixed MSW	36.0%	122.4
Carpet		0.0
Personal Computers		0.0
Clay Bricks		0.0
Concrete	15.0%	51.0
Fly Ash		0.0
Tires		0.0
Asphalt Concrete	10.0%	34.0
Asphalt Shingles		0.0
Drywall	10.0%	34.0
Fiberglass Insulation	5.0%	17.0
Vinyl Flooring	5.0%	17.0
Wood Flooring	0.0%	0.0
<b>Total</b>	<b>100.0%</b>	<b>340.0</b>

**Notes:**

- Source for waste generation rate: U.S. Environmental Protection Agency. Characterization of Building Related Construction and Demolition Debris in the United States. June 1998. [www.epa.gov/osw/hazard/generation/sqg/c&d-rpt.pdf](http://www.epa.gov/osw/hazard/generation/sqg/c&d-rpt.pdf) (Table 4)
- WARM - U.S. Environmental Protection Agency. November 2009. Waste Reduction Model. [www.epa.gov/climatechange/wycd/waste/calculators/Warm\\_home.html](http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html)
- Percent generated from project information and: Cascadia Consulting Group, prepared for California Integrated Waste Management Board. Detailed Characterization of Construction and Demolition Waste. June 2006. [www.ciwmb.ca.gov/Publications/LocalAsst/Extracts/34106007/ExecSummary.pdf](http://www.ciwmb.ca.gov/Publications/LocalAsst/Extracts/34106007/ExecSummary.pdf)



## Waste Generation Estimates - Operation

Project: Wasco Walmart  
 Prepared by: Michael Brandman Associates  
 Prepared on: 11/16/2010

Project Land Use	Land Use for Waste Generation Rate	square feet (sf)	Employees	Waste Generation Rate (pounds per employee)	Waste (tons/year)
Walmart	Retail - Big box stores	170,000	300	2,866	430
<b>Total</b>		<b>170,000</b>	<b>300</b>		<b>430</b>

### EPA Waste Reduction Model (WARM) Inputs

Material	Percent Generated	Tons Generated
Aluminum Cans		0.0
Steel Cans		0.0
Copper Wire		0.0
Glass	1%	4.3
HDPE		0.0
LDPE		0.0
PET		0.0
Corrugated Cardboard	10%	43.0
Magazines/Third-class Mail		0.0
Newspaper	1%	4.3
Office Paper	5%	21.5
Phonebooks		0.0
Textbooks		0.0
Dimensional Lumber	8%	34.4
Medium-density Fiberboard	2%	8.6
Food Scraps	18%	77.4
Yard Trimmings		0.0
Grass	2%	8.6
Leaves	1%	4.3
Branches		0.0
Mixed Paper (general)	9%	38.7
Mixed Paper (primarily residential)		0.0
Mixed Paper (primarily from offices)		0.0
Mixed Metals	5%	21.5
Mixed Plastics	16%	68.8
Mixed Recyclables		0.0
Mixed Organics	2%	8.6
Mixed MSW	20%	86.0
Carpet		0.0
Personal Computers		0.0
Clay Bricks		0.0
Concrete		0.0
Fly Ash		0.0
Tires		0.0
Asphalt Concrete		0.0
Asphalt Shingles		0.0
Drywall		0.0
Fiberglass Insulation		0.0
Vinyl Flooring		0.0
Wood Flooring		0.0
<b>Total</b>	<b>100%</b>	<b>430</b>

- Source of waste generation rate and percent generated: Project description and Targeted Statewide Waste Characterization Study: Waste Disposal and Diversion Findings for Selected Industry Groups. June 2006. Prepared for the California Integrated Waste Management Board by Cascadia Consulting Group. [www.ciwm.ca.gov/Publications/LocalAsst/Extracts/34106006/Tables.pdf](http://www.ciwm.ca.gov/Publications/LocalAsst/Extracts/34106006/Tables.pdf)  
 - WARM - U.S. Environmental Protection Agency. 2009. Waste Reduction Model. [www.epa.gov/climatechange/wycd/waste/calculators/Warm\\_home.html](http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html)



**Transportation**

Baseline is Currently: Off

Unmitigated Transportation	Target Year: 2020		2013	Project-Baseline
	Project	Baseline		
Operational Emissions from URBEMIS (CO2 tons/year)	9,689.80	0.00		
Metric Ton Adjustment (CO2 metric tons/year)	8,792.92	0.00		
Pavley Regulation Adjustment (CO2 metric tons/year):	7,506.60	0.00		
US EPA Adjustment (CO2e metric tons/year):	7,901.69	0.00		
Low Carbon Fuels Rule Adjustment (CO2e metric tons/year)	7,332.76	0.00		
<b>Total (CO2e metric tons/year):</b>				<b>7,332.76</b>

Mitigated Transportation	Target Year: 2020		2013	Project-Baseline
	Project	Baseline		
Operational Vehicles from URBEMIS (CO2 tons/year):	9,689.80	0.00		
Metric Ton Adjustment (CO2 metric tons/year):	8,792.92	0.00		
Pavley Regulation Adjustment (CO2 metric tons/year):	7,506.60	0.00		
US EPA Adjustment (CO2e metric tons/year):	7,901.69	0.00		
Low Carbon Fuels Adjustment (CO2e metric tons/year)	7,332.76	0.00		
<b>Total (CO2e metric tons/year):</b>				<b>7,332.76</b>

**Bay Area Air Quality Management District  
Greenhouse Gas Model**

The BGM User's Manual describes in detail each step used to convert URBEMIS's transportation CO2 emissions to total CO2e. These steps include converting from English to Metric units, adjusting for the Pavley Rule, converting CO2 to CO2e, and adjusting for the Low Carbon Fuels Rule.

Reference

U.S. EPA assumption that GHG emissions from other pollutants - CH4, N2O, and hydrofluorocarbons (HFCs) from leaking air conditioners account for 5 percent of emissions from vehicles, after accounting for global warming potential of each GHG.

Jump to the Following Transportation Related Tabs:  
[Transportation Detail for Operational Mitigation](#)  
[Land Use Detail](#)

	Don't Need to Adjust this amt	Unadjusted Amount Affected by Pavley	Adjusted	Adjusted	Adjusted	Adjusted	Adjusted
Pavley Calculations - Project Unmitigated		1,443.08	7,349.84	2,935.37	921.61	1,497.85	708.69
Pavley Calculations - Baseline Unmitigated		0.00	0.00	0.00	0.00	0.00	0.00
Pavley Calculations - Project Mitigated		1,443.08	7,349.84	2,935.37	921.61	1,497.85	708.69
Pavley Calculations - Baseline Mitigated		0.00	0.00	0.00	0.00	0.00	0.00

**Pavley Adjustment**

Year	% LDA CO2 Emissions	% LDT1 CO2 Emissions	% LDT2 CO2 Emissions	% MDV CO2 Emissions	% LDA/LDT1/LDT2/MDV	% everything else	% CO2 Reduction - LDA	% CO2 Reduction - LDT1	% CO2 Reduction - LDT2	% CO2 Reduction - MDV	12.00	13.00	14.00	15.00	16.00
2009	41.59%	12.33%	19.61%	9.71%	83.26%	16.74%	0.00%	0.00%	0.07%	0.08%	0.0000	0.0000	0.0006	0.0007	0.0013
2010	41.72%	12.39%	19.54%	9.61%	83.26%	16.74%	0.35%	0.25%	0.45%	0.48%	0.0020	0.0022	0.0036	0.0044	0.0122
2011	41.83%	12.45%	19.50%	9.50%	83.27%	16.73%	1.75%	1.34%	1.31%	1.29%	0.0102	0.0117	0.0106	0.0117	0.0442
2012	41.89%	12.50%	19.47%	9.40%	83.27%	16.73%	4.07%	3.27%	2.60%	2.44%	0.0237	0.0286	0.0209	0.0221	0.0953
2013	41.94%	12.56%	19.46%	9.32%	83.28%	16.72%	6.31%	5.26%	3.88%	3.61%	0.0366	0.0460	0.0313	0.0328	0.1466
2014	41.98%	12.62%	19.46%	9.27%	83.33%	16.67%	8.48%	7.26%	5.17%	4.83%	0.0492	0.0634	0.0416	0.0438	0.1980
2015	42.00%	12.67%	19.47%	9.24%	83.38%	16.62%	10.74%	9.38%	6.54%	6.17%	0.0623	0.0819	0.0527	0.0560	0.2529
2016	42.05%	12.70%	19.50%	9.23%	83.54%	16.46%	12.96%	11.56%	7.94%	7.54%	0.0751	0.1008	0.0639	0.0684	0.3082
2017	42.02%	12.81%	19.51%	9.21%	83.55%	16.45%	15.03%	13.58%	9.27%	8.88%	0.0871	0.1184	0.0746	0.0806	0.3608
2018	41.98%	12.84%	19.52%	9.21%	83.55%	16.45%	16.94%	15.43%	10.54%	10.16%	0.0983	0.1345	0.0848	0.0923	0.4099
2019	41.95%	12.87%	19.53%	9.21%	83.57%	16.43%	18.72%	17.13%	11.74%	11.40%	0.1087	0.1492	0.0945	0.1035	0.4559
2020	41.92%	12.89%	19.53%	9.22%	83.59%	16.41%	20.37%	18.69%	12.89%	12.59%	0.1183	0.1628	0.1037	0.1143	0.4990
2025	41.92%	12.96%	19.67%	9.28%	83.62%	16.38%	26.87%	24.86%	17.60%	17.42%	0.1560	0.2164	0.1414	0.1581	0.6719
2030	42.15%	13.03%	19.76%	9.32%	84.26%	15.74%	30.60%	28.71%	20.63%	20.47%	0.1770	0.2497	0.1655	0.1856	0.7779
2035	42.21%	13.11%	19.80%	9.35%	84.47%	15.53%	32.38%	31.17%	22.43%	22.29%	0.1871	0.2708	0.1799	0.2021	0.8400
2040	42.24%	13.14%	19.90%	9.44%	84.72%	15.28%	33.27%	32.61%	23.60%	23.53%	0.1922	0.2832	0.1890	0.2131	0.8775

**Low Carbon Fuels Standards**

Year	% Reduction Gasoline and Diesel Fuel	% Reduction Tank to Wheels
2010	0.00	0.00
2011	0.25	0.18
2012	0.50	0.36
2013	1.00	0.72
2014	1.50	1.08
2015	2.50	1.80
2016	3.50	2.52
2017	5.00	3.60
2018	6.50	4.68
2019	8.00	5.76
2020	10.00	7.20
2021	10.00	7.20
2022	10.00	7.20
2023	10.00	7.20
2024	10.00	7.20
2025	10.00	7.20
2026	10.00	7.20
2027	10.00	7.20
2028	10.00	7.20
2029	10.00	7.20
2030	10.00	7.20
2031	10.00	7.20
2032	10.00	7.20
2033	10.00	7.20
2034	10.00	7.20
2035	10.00	7.20
2036	10.00	7.20
2037	10.00	7.20
2038	10.00	7.20
2039	10.00	7.20
2040	10.00	7.20

Source:  
 Final Regulation Order  
 Subchapter 10, Climate Change  
 Article 4, Regulations to Achieve Greenhouse Gas Reductions  
 Subarticle 7, Low Carbon Fuel Standard  
 Section 95482, Average Carbon Intensity Requirements for Gasoline and Diesel

