

DOCUMENTATION OF CALIFORNIA'S GREENHOUSE GAS INVENTORY

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◆ Category: Energy

IPCC: 1A3biii - Fuel Combustion Activities - Transport - Road Transportation - Heavy-duty Trucks and Buses

Sector: Transportation : On Road : Heavy-duty Vehicles : **Heavy-duty Trucks**, Buses & Motorhomes

◆ Greenhouse gas: Nitrous oxide (N2O)

▶ 2006 N2O from Fuel combustion - Distillate —

(Version 2 - Last updated on 03/13/2009)

● GREENHOUSE GAS EMISSION ESTIMATE —

Amount: 964.97 tonnes of N2O Emitted (299,140 tonnes CO2 Eq.)

Basis: Calculation

Calculation: [Fuel Combustion] * [Fuel N2O emission]

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● ACTIVITY LEVEL USED IN CALCULATIONS —

Activity: Fuel combustion = 2,910,041,641 gal of Distillate

Basis: Calculation

Calculation: [EMFAC category fuel combustion] * ([Fuel sales] / [EMFAC total fuel combustion])

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● PARAMETERS AND CONSTANTS USED IN CALCULATIONS —

Parameter: EMFAC category fuel combustion = 3,284,416,051 gal

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC NOx emission = 340,390,326,602 g (i.e. 340.39 thousand tonnes)

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC total fuel combustion = 3,379,231,038 gal

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: Fuel N2O emission = 0.332 g / gal

Reference: Long, J. (2007). Personal communication between Kevin Eslinger of CA Air Resources Board and Jeff Long, Air Resources Board Mobile Sources Assessment Branch, September 2007.

Parameter: Fuel sales = 2,994,049,134 gal

Reference: Dwarka R. (2008). Personal communication between Larry Hunsaker of the Air Resources Board and Ronil Dwarka of the California State Board of Equalization. Spring 2008.

Parameter: Vehicle miles traveled = 20,296,159,821 mile

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Constant: Global warming potential of N2O = 310

Reference: IPCC (1996). Second Assessment Report. Climate Change 1995: WG I - The Science of Climate Change. Intergovernmental Panel on Climate Change; J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell (eds.); Cambridge University Press. Cambridge, U.K.

- **GREENHOUSE GAS EMITTED PER UNIT ACTIVITY —**

Amount: 0.332 g of N2O per gal of Distillate
103 g of CO2eq. per gal of Distillate

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◆ Category: Energy

IPCC: 1A3bi - Fuel Combustion Activities - Transport - Road Transportation - Cars

Sector: Transportation : On Road : **Light-duty Vehicles** : **Passenger Cars**

◆ Greenhouse gas: Nitrous oxide (N2O)

▶ 2006 N2O from Fuel combustion - Gasoline —

(Version 2 - Last updated on 03/13/2009)

● GREENHOUSE GAS EMISSION ESTIMATE —

Amount: 4,237 tonnes of N2O Emitted (1,313,457 tonnes CO2 Eq.)

Basis: Calculation

Calculation: $([\text{Vehicle miles traveled}] * (0.0318 * ([\text{EMFAC NOx emission}] / [\text{Vehicle miles traveled}] + 0.0167)) * ([\text{Fuel sales}] / [\text{EMFAC total fuel combustion}]) * [\text{Fraction of fuel mix}]$

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● ACTIVITY LEVEL USED IN CALCULATIONS —

Activity: Fuel combustion = 6,346,722,748 gal of Gasoline

Basis: Calculation

Calculation: $[\text{EMFAC category fuel combustion}] * ([\text{Fuel sales}] / [\text{EMFAC total fuel combustion}]) * [\text{Fraction of fuel mix}]$

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● PARAMETERS AND CONSTANTS USED IN CALCULATIONS —

Parameter: EMFAC category fuel combustion = 7,108,718,129 gal

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC NOx emission = 68,854,369,222 g (i.e. 68.85 thousand tonnes)

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC total fuel combustion = 16,389,786,721 gal

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: Fraction of fuel mix = 0.943

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

Parameter: Fuel sales = 15,509,940,000 gal

Reference: FHWA (various). US Department of Transportation, Federal Highway Administration - Highway Statistics Series. Motor Fuel. Data accessed online at: <http://www.fhwa.dot.gov/policy/ohpi/qffuel.cfm>

Parameter: Vehicle miles traveled = 153,058,882,143 mile

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Constant: Global warming potential of N2O = 310

Reference: IPCC (1996). Second Assessment Report. Climate Change 1995: WG I - The Science of Climate

Change. Intergovernmental Panel on Climate Change; J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell (eds.); Cambridge University Press. Cambridge, U.K.

- **GREENHOUSE GAS EMITTED PER UNIT ACTIVITY** —

Amount: 0.668 g of N₂O per gal of Gasoline
207 g of CO₂eq. per gal of Gasoline

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◆ Category: Energy

IPCC: 1A3bi - Fuel Combustion Activities - Transport - Road Transportation - Cars

Sector: Transportation : On Road : **Light-duty Vehicles** : **Passenger Cars**

◆ Greenhouse gas: Nitrous oxide (N2O)

▶ 2006 N2O from Fuel combustion - Distillate —

(Version 2 - Last updated on 03/13/2009)

● GREENHOUSE GAS EMISSION ESTIMATE —

Amount: 5.11 tonnes of N2O Emitted (1,583 tonnes CO2 Eq.)

Basis: Calculation

Calculation: [Fuel Combustion] * [Fuel N2O emission]

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● ACTIVITY LEVEL USED IN CALCULATIONS —

Activity: Fuel combustion = 15,397,810 gal of Distillate

Basis: Calculation

Calculation: [EMFAC category fuel combustion] * ([Fuel sales] / [EMFAC total fuel combustion])

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● PARAMETERS AND CONSTANTS USED IN CALCULATIONS —

Parameter: EMFAC category fuel combustion = 17,378,725 gal

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC NOx emission = 712,992,532 g (i.e. 712.99 tonnes)

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC total fuel combustion = 3,379,231,038 gal

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: Fuel N2O emission = 0.332 g / gal

Reference: Long, J. (2007). Personal communication between Kevin Eslinger of CA Air Resources Board and Jeff Long, Air Resources Board Mobile Sources Assessment Branch, September 2007.

Parameter: Fuel sales = 2,994,049,134 gal

Reference: Dwarka R. (2008). Personal communication between Larry Hunsaker of the Air Resources Board and Ronil Dwarka of the California State Board of Equalization. Spring 2008.

Parameter: Vehicle miles traveled = 483,304,018 mile

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Constant: Global warming potential of N2O = 310

Reference: IPCC (1996). Second Assessment Report. Climate Change 1995: WG I - The Science of Climate Change. Intergovernmental Panel on Climate Change; J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell (eds.); Cambridge University Press. Cambridge, U.K.

- **GREENHOUSE GAS EMITTED PER UNIT ACTIVITY —**

Amount: 0.332 g of N₂O per gal of Distillate
103 g of CO₂eq. per gal of Distillate

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◆ Category: Energy

IPCC: 1A3bii - Fuel Combustion Activities - Transport - Road Transportation - Light-duty Trucks

Sector: Transportation : On Road : Light-duty Vehicles : **Light-duty Trucks & SUVs**

◆ Greenhouse gas: Nitrous oxide (N2O)

▶ 2006 N2O from Fuel combustion - Gasoline —

(Version 2 - Last updated on 03/13/2009)

● GREENHOUSE GAS EMISSION ESTIMATE —

Amount: 4,937 tonnes of N2O Emitted (1,530,560 tonnes CO2 Eq.)

Basis: Calculation

Calculation: $([\text{Vehicle miles traveled}] * (0.0318 * ([\text{EMFAC NOx emission}] / [\text{Vehicle miles traveled}] + 0.0167))) * ([\text{Fuel sales}] / [\text{EMFAC total fuel combustion}]) * [\text{Fraction of fuel mix}]$

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● ACTIVITY LEVEL USED IN CALCULATIONS —

Activity: Fuel combustion = 7,472,562,952 gal of Gasoline

Basis: Calculation

Calculation: $[\text{EMFAC category fuel combustion}] * ([\text{Fuel sales}] / [\text{EMFAC total fuel combustion}]) * [\text{Fraction of fuel mix}]$

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● PARAMETERS AND CONSTANTS USED IN CALCULATIONS —

Parameter: EMFAC category fuel combustion = 8,369,728,100 gal

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC NOx emission = 102,169,167,145 g (i.e. 102.17 thousand tonnes)

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC total fuel combustion = 16,389,786,721 gal

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: Fraction of fuel mix = 0.943

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

Parameter: Fuel sales = 15,509,940,000 gal

Reference: FHWA (various). US Department of Transportation, Federal Highway Administration - Highway Statistics Series. Motor Fuel. Data accessed online at: <http://www.fhwa.dot.gov/policy/ohpi/qffuel.cfm>

Parameter: Vehicle miles traveled = 136,592,020,714 mile

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Constant: Global warming potential of N2O = 310

Reference: IPCC (1996). Second Assessment Report. Climate Change 1995: WG I - The Science of Climate

Change. Intergovernmental Panel on Climate Change; J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell (eds.); Cambridge University Press. Cambridge, U.K.

• **GREENHOUSE GAS EMITTED PER UNIT ACTIVITY** —

Amount: 0.661 g of N₂O per gal of Gasoline
205 g of CO₂eq. per gal of Gasoline

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◆ Category: Energy

IPCC: 1A3bii - Fuel Combustion Activities - Transport - Road Transportation - Light-duty Trucks

Sector: Transportation : On Road : **Light-duty Vehicles : Light-duty Trucks & SUVs**

◆ Greenhouse gas: Nitrous oxide (N2O)

▶ 2006 N2O from Fuel combustion - Distillate —

(Version 2 - Last updated on 03/13/2009)

● GREENHOUSE GAS EMISSION ESTIMATE —

Amount: 22.75 tonnes of N2O Emitted (7,053 tonnes CO2 Eq.)

Basis: Calculation

Calculation: [Fuel Combustion] * [Fuel N2O emission]

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● ACTIVITY LEVEL USED IN CALCULATIONS —

Activity: Fuel combustion = 68,609,683 gal of Distillate

Basis: Calculation

Calculation: [EMFAC category fuel combustion] * ([Fuel sales] / [EMFAC total fuel combustion])

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● PARAMETERS AND CONSTANTS USED IN CALCULATIONS —

Parameter: EMFAC category fuel combustion = 77,436,261 gal

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC NOx emission = 3,322,367,689 g (i.e. 3.32 thousand tonnes)

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC total fuel combustion = 3,379,231,038 gal

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: Fuel N2O emission = 0.332 g / gal

Reference: Long, J. (2007). Personal communication between Kevin Eslinger of CA Air Resources Board and Jeff Long, Air Resources Board Mobile Sources Assessment Branch, September 2007.

Parameter: Fuel sales = 2,994,049,134 gal

Reference: Dwarka R. (2008). Personal communication between Larry Hunsaker of the Air Resources Board and Ronil Dwarka of the California State Board of Equalization. Spring 2008.

Parameter: Vehicle miles traveled = 2,245,635,268 mile

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Constant: Global warming potential of N2O = 310

Reference: IPCC (1996). Second Assessment Report. Climate Change 1995: WG I - The Science of Climate Change. Intergovernmental Panel on Climate Change; J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell (eds.); Cambridge University Press. Cambridge, U.K.

- **GREENHOUSE GAS EMITTED PER UNIT ACTIVITY —**

Amount: 0.332 g of N₂O per gal of Distillate
103 g of CO₂eq. per gal of Distillate

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◆ Category: Energy

IPCC: 1A3biii - Fuel Combustion Activities - Transport - Road Transportation - Heavy-duty Trucks and Buses

Sector: Transportation : On Road : Heavy-duty Vehicles : **Heavy-duty Trucks, Buses & Motorhomes**

◆ Greenhouse gas: Nitrous oxide (N2O)

▶ 2006 N2O from Fuel combustion - Gasoline —

(Version 2 - Last updated on 03/13/2009)

● GREENHOUSE GAS EMISSION ESTIMATE —

Amount: 1,024 tonnes of N2O Emitted (317,500 tonnes CO2 Eq.)

Basis: Calculation

Calculation: $([\text{Vehicle miles traveled}] * (0.0318 * ([\text{EMFAC NOx emission}] / [\text{Vehicle miles traveled}] + 0.0167)) * ([\text{Fuel sales}] / [\text{EMFAC total fuel combustion}]) * [\text{Fraction of fuel mix}]$

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● ACTIVITY LEVEL USED IN CALCULATIONS —

Activity: Fuel combustion = 755,078,926 gal of Gasoline

Basis: Calculation

Calculation: $[\text{EMFAC category fuel combustion}] * ([\text{Fuel sales}] / [\text{EMFAC total fuel combustion}]) * [\text{Fraction of fuel mix}]$

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

● PARAMETERS AND CONSTANTS USED IN CALCULATIONS —

Parameter: EMFAC category fuel combustion = 845,734,636 gal

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC NOx emission = 31,560,224,877 g (i.e. 31.56 thousand tonnes)

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC total fuel combustion = 16,389,786,721 gal

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: Fraction of fuel mix = 0.943

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see: <http://www.arb.ca.gov/cc/inventory/contacts.htm>

Parameter: Fuel sales = 15,509,940,000 gal

Reference: FHWA (various). US Department of Transportation, Federal Highway Administration - Highway Statistics Series. Motor Fuel. Data accessed online at: <http://www.fhwa.dot.gov/policy/ohpi/qffuel.cfm>

Parameter: Vehicle miles traveled = 8,595,550,000 mile

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Constant: Global warming potential of N2O = 310

Reference: IPCC (1996). Second Assessment Report. Climate Change 1995: WG I - The Science of Climate

Change. Intergovernmental Panel on Climate Change; J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell (eds.); Cambridge University Press. Cambridge, U.K.

• **GREENHOUSE GAS EMITTED PER UNIT ACTIVITY** —

Amount: 1.36 g of N₂O per gal of Gasoline
420 g of CO₂eq. per gal of Gasoline

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? Category: Energy

IPCC: 1A3biv - Fuel Combustion Activities - Transport - Road Transportation - Motorcycles

Sector: Transportation : On Road : **Light-duty Vehicles : Motorcycles**

? Greenhouse gas: Nitrous oxide (N2O)

? **2006** N2O from Fuel combustion - Gasoline —

(Version 2 - Last updated on 03/13/2009)

? **GREENHOUSE GAS EMISSION ESTIMATE** —

Amount: 139.28 tonnes of N2O Emitted (43,178 tonnes CO2 Eq.)

Basis: Calculation

Calculation: $[\text{Vehicle miles traveled}] * (0.0318 * ([\text{EMFAC NOx emission}] / [\text{Vehicle miles traveled}]) + 0.0167) * ([\text{Fuel sales}] / [\text{EMFAC total fuel combustion}]) * [\text{Fraction of fuel mix}]$

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see:

<http://www.arb.ca.gov/cc/inventory/contacts.htm>

? **ACTIVITY LEVEL USED IN CALCULATIONS** —

Activity: Fuel combustion = 58,573,456 gal of Gasoline

Basis: Calculation

Calculation: $[\text{EMFAC category fuel combustion}] * ([\text{Fuel sales}] / [\text{EMFAC total fuel combustion}]) * [\text{Fraction of fuel mix}]$

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see:

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? **PARAMETERS AND CONSTANTS USED IN CALCULATIONS** —

Parameter: EMFAC category fuel combustion = 65,605,857 gal

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at:

http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC NOx emission = 3,572,260,230 g (i.e. 3.57 thousand tonnes)

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at:

http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: EMFAC total fuel combustion = 16,389,786,721 gal

Reference: ARB (2007). The California Air Resources Board's Emission Factors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at:

http://www.arb.ca.gov/msei/onroad/latest_version.htm

Parameter: Fraction of fuel mix = 0.943

Reference: ARB (2009). Upcoming technical support document on GHG inventory methodologies. Version 2 (1990-2006 inventory). Specific questions may be directed to ARB staff, see:

<http://www.arb.ca.gov/cc/inventory/contacts.htm>

Parameter: Fuel sales = 15,509,940,000 gal

Reference: FHWA (various). US Department of Transportation, Federal Highway Administration - Highway Statistics Series. Motor Fuel. Data accessed online at: <http://www.fhwa.dot.gov/policy/ohpi/qffuel.cfm>

Parameter: Vehicle miles traveled = 2,539,357,143 mile

Reference: ARB (2007). The California Air Resources Board's Emission FACTors (EMFAC) model was used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California. Model and documentation available online at: http://www.arb.ca.gov/msei/onroad/latest_version.htm

Constant: Global warming potential of N₂O = 310

Reference: IPCC (1996). Second Assessment Report. Climate Change 1995: WG I - The Science of Climate Change. Intergovernmental Panel on Climate Change; J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell (eds.); Cambridge University Press. Cambridge, U.K.

? **GREENHOUSE GAS EMITTED PER UNIT ACTIVITY** —

Amount: 2.38 g of N₂O per gal of Gasoline
737 g of CO₂eq. per gal of Gasoline

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