



SECTOR SPECIFIC GHG EMISSIONS BY INDUSTRY

This fact sheet provides examples of what GHG sources are expected from a typical entity, delineated by industry sector. It also lists the types of GHGs associated with those specific emissions sources.

Note: This list is intended to be used as an aid only. Not all entities will have each source or GHG listed under their industry sector. Also, some entities may have sources or GHGs that must be reported and are not covered by this sheet. Please email the California Registry help@climateregistry.org if you identify additional sources or GHGs to be included on this list.

Industry Sector	Emissions Type	Emissions Source	CO ₂	CH ₄	N ₂ O	HFC	PFC	SF ₆
Service Sector & Office Based Organizations	Indirect Emissions	<ul style="list-style-type: none"> Purchased Electricity 	✓	✓	✓			
	Mobile Emissions	<ul style="list-style-type: none"> Vehicle Fleet 	✓	✓	✓			
	Stationary Combustion	<ul style="list-style-type: none"> Heating 	✓	✓	✓			
		<ul style="list-style-type: none"> Back-Up Generators 	✓	✓	✓			
	Fugitive Emissions	<ul style="list-style-type: none"> A/C Units 				✓		
		<ul style="list-style-type: none"> Fire Suppression Systems 	✓			✓	✓	
Primary Aluminum Manufacture and Casting	Indirect Emissions	<ul style="list-style-type: none"> Purchased Electricity 	✓	✓	✓			
		<ul style="list-style-type: none"> Purchased Steam 	✓	✓	✓			
	Mobile Emissions	<ul style="list-style-type: none"> Vehicle Fleet 	✓	✓	✓			
		<ul style="list-style-type: none"> On-Site Vehicle Use 	✓	✓	✓			
	Stationary Combustion	<ul style="list-style-type: none"> Digester 	✓	✓	✓			
		<ul style="list-style-type: none"> Smelting 	✓	✓	✓			
		<ul style="list-style-type: none"> Merge Cells 	✓	✓	✓			
		<ul style="list-style-type: none"> Casting 	✓	✓	✓			
		<ul style="list-style-type: none"> Generators 	✓	✓	✓			
	Process Emissions	<ul style="list-style-type: none"> Calciners 	✓	✓	✓			
		<ul style="list-style-type: none"> Calcining Process 	✓					
<ul style="list-style-type: none"> Electrolysis Processes 		✓				✓	✓	

Industry Sector	Emissions Type	Emissions Source	CO ₂	CH ₄	N ₂ O	HFC	PFC	SF ₆
	Fugitive Emissions	• Fuel Lines		✓				
		• Cover Gas Transport and Storage						✓
		• A/C Systems				✓		
		• Fire Suppression Systems	✓			✓	✓	
Pulp and Paper Production	Indirect Emission	• Electricity Consumption	✓	✓	✓			
	Mobile Emissions	• On-Site Vehicle Use	✓	✓	✓			
		• Vehicle Fleet	✓	✓	✓			
	Stationary Combustion	• Kraft Digester	✓	✓	✓			
		• Generators	✓	✓	✓			
		• Cogeneration	✓	✓	✓			
		• Boilers	✓	✓	✓			
		• Lime Kilns	✓	✓	✓			
		• Calciners	✓	✓	✓			
		• Incinerators	✓	✓	✓			
		• Dryers	✓	✓	✓			
	Process Emissions	• Recovery Furnaces	✓	✓	✓			
		• On-Site Wastewater Treatment		✓	✓			
		• Wastewater Treatment Lagoons		✓	✓			
	Fugitive Emissions	• Biogenic CO ₂ from Calciners (Optionally Reported)	✓					
		• A/C Systems				✓		
		• Fire Suppression Systems				✓	✓	
Cement and Lime Production	Indirect Emissions	• Purchased Electricity and Steam	✓	✓	✓			

Industry Sector	Emissions Type	Emissions Source	CO ₂	CH ₄	N ₂ O	HFC	PFC	SF ₆
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	Mobile Emissions	• Vehicle Fleet	✓	✓	✓				
		• On-Site Vehicle Use	✓	✓	✓				
	Stationary Combustion	• Heaters/ Pre-Heaters	✓	✓	✓				
		• Calcinators/ Pre-Calcinators	✓	✓	✓				
		• Kilns	✓	✓	✓				
	Process Emissions	• Calcination CO ₂	✓						
		• SO ₂ Scrubbers	✓						
	Fugitive Emissions	• A/C Units				✓			
		• Fire Suppression Systems	✓			✓	✓		
		• Refrigerants				✓	✓		
		• Coal/Fuel Handling and Storage		✓					
	Education-University	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
			• Purchased Steam	✓	✓	✓			
		Mobile Emissions	• Buses	✓	✓	✓			
• Fleet Vehicles			✓	✓	✓				
• Agricultural Vehicles			✓	✓	✓				
• Boats			✓	✓	✓				
• Heating			✓	✓	✓				
Stationary Combustion		• Acetylene for Welding	✓	✓	✓				
		• Electrical Generation	✓	✓	✓				
		• Steam Generation	✓	✓	✓				
		• Laboratory Natural Gas Use	✓	✓	✓				
	• Food Prep								

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		Gas Use	√	√	√			
	Process Emissions	<ul style="list-style-type: none"> Laboratory CO₂ and Dry-Ice Use 	√					
	Fugitive Emissions	<ul style="list-style-type: none"> CO₂ and Dry Ice Transport and Storage 	√					
		<ul style="list-style-type: none"> Electrical Breakers 						√
		<ul style="list-style-type: none"> Fire Suppressants 	√			√	√	
		<ul style="list-style-type: none"> Refrigerants 				√	√	
		<ul style="list-style-type: none"> A/C Systems 				√		
		<ul style="list-style-type: none"> Natural Gas Transmission 	√	√				
		<ul style="list-style-type: none"> N₂O Storage 			√			
Electric Power Production	Indirect Emissions	<ul style="list-style-type: none"> Facility Electricity Usage 	√	√	√			
		<ul style="list-style-type: none"> Purchased Electricity 	√	√	√			
		<ul style="list-style-type: none"> Transmission & Distribution Losses 	√	√	√			
		<ul style="list-style-type: none"> Wheeled Power Losses 	√	√	√			
	Mobile Emissions	<ul style="list-style-type: none"> Vehicle Fleet 	√	√	√			
		<ul style="list-style-type: none"> Mobile Equipment 	√	√	√			
	Stationary Combustion	<ul style="list-style-type: none"> Power Generation (Boilers, Turbines, etc.) 	√	√	√			
		<ul style="list-style-type: none"> Fuel Cells 	√	√	√			
		<ul style="list-style-type: none"> Steam Production 	√	√	√			
		<ul style="list-style-type: none"> Emergency Generators 	√	√	√			
		<ul style="list-style-type: none"> Office Gas Usage 	√	√	√			
		<ul style="list-style-type: none"> SO₂ /Acid Gas 	√					

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		Scrubbers							
		• CO ₂ pass-through cleaning	✓						
	Fugitive Emissions	• A/C Systems				✓			
		• Fire Suppression	✓			✓	✓		
		• Coal Handling and Storage		✓					
		• Natural Gas Transmission	✓	✓					
		• Vented Gases	✓	✓					
• Electrical Switchgear and Breakers						✓			
Electronics	Indirect Emissions	• Vehicle Fleet	✓	✓	✓				
		• On-Site Vehicle Use (forklifts, etc.)	✓	✓	✓				
	Mobile Emissions	• Purchased Electricity	✓	✓	✓				
	Stationary Combustion	• Generators	✓	✓	✓				
		• Facility Heating	✓	✓	✓				
		• Boilers	✓	✓	✓				
		• Incinerators	✓	✓	✓				
		• Burnboxes	✓	✓	✓				
	Process Emissions	• Semiconduct or Production		✓				✓	✓
		• Cleaning	✓			✓			
		• Nitric Acid Etching			✓				
	Fugitive Emissions	• Process Gas Transpiration and Storage				✓	✓	✓	
		• Nitric Acid Fugitives			✓				
		• A/C Systems				✓			
		• Fire Suppression Systems	✓			✓	✓		

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Food Processing	Indirect Emissions	<ul style="list-style-type: none"> Purchased Electricity 	✓	✓	✓			
	Mobile Emissions	<ul style="list-style-type: none"> Fleet Vehicles 	✓	✓	✓			
		<ul style="list-style-type: none"> On-Site Vehicle Use (forklifts, etc.) 	✓	✓	✓			
	Stationary Combustion	<ul style="list-style-type: none"> Boilers/ Roasters 	✓	✓	✓			
		<ul style="list-style-type: none"> Heating 	✓	✓	✓			
		<ul style="list-style-type: none"> Generators 	✓	✓	✓			
		<ul style="list-style-type: none"> Process-Heating 	✓	✓	✓			
	Process Emissions	<ul style="list-style-type: none"> CO₂ Use 	✓					
	Fugitive Emissions	<ul style="list-style-type: none"> A/C Units 				✓		
		<ul style="list-style-type: none"> Refrigeration Systems 				✓	✓	
		<ul style="list-style-type: none"> Fire Suppression Systems 	✓			✓	✓	
		<ul style="list-style-type: none"> CO₂ Storage and Transport 	✓					
	Government- (Municipalities may also need to report municipal utility emissions)	Indirect Emissions	<ul style="list-style-type: none"> Purchased Electricity 	✓	✓	✓		
<ul style="list-style-type: none"> Electricity Use (Utility-Direct Access) 			✓	✓	✓			
<ul style="list-style-type: none"> Purchased Steam 			✓	✓	✓			
Mobile Emissions		<ul style="list-style-type: none"> Vehicle Fleets 	✓	✓	✓			
		<ul style="list-style-type: none"> Mobile Equipment 	✓	✓	✓			
		<ul style="list-style-type: none"> On-Site Vehicle Use 	✓	✓	✓			
		<ul style="list-style-type: none"> Aviation 	✓	✓	✓			
		<ul style="list-style-type: none"> Boats 	✓	✓	✓			
Stationary Combustion		<ul style="list-style-type: none"> Acetylene Torch 	✓	✓	✓			
		<ul style="list-style-type: none"> Boilers 	✓	✓	✓			
		<ul style="list-style-type: none"> Cogeneration 	✓	✓	✓			
		<ul style="list-style-type: none"> Generators 	✓	✓	✓			

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		• Building Natural Gas Use	✓	✓	✓			
		• Heating	✓	✓	✓			
	Fugitive Emissions	• A/C Units				✓		
		• Fire Suppression Systems	✓			✓	✓	
Healthcare	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
	Mobile Emissions	• Fleet Vehicles	✓	✓	✓			
		• Ambulances	✓	✓	✓			
		• On-site Vehicles	✓	✓	✓			
	Stationary Combustion	• Boilers	✓	✓	✓			
		• Back-Up Generators	✓	✓	✓			
		• Heating	✓	✓	✓			
		• Sterilization Boilers	✓	✓	✓			
	Process Emissions	• Medical CO ₂	✓					
	Fugitive Emissions	• CO ₂ Storage and Transport	✓					
		• A/C Systems				✓		
		• Refrigeration				✓	✓	
		• Fire Suppression Systems	✓			✓	✓	
Iron & Steel	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
	Mobile Emissions	• Vehicle Fleet	✓	✓	✓			
		• Mobile Equipment	✓	✓	✓			
	Stationary Combustion	• Acetylene Welding and Cutting	✓	✓	✓			
		• Furnaces	✓	✓	✓			
		• Ladle Heating	✓	✓	✓			
	Process Emissions	• Steel Production	✓					

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	Fugitive Emissions	• Coal Handling and Storage		✓				
		• A/C Units				✓		
		• Fire Suppression	✓			✓	✓	
Livestock Feeding Operations	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
	Mobile Emissions	• Farm Equipment	✓	✓	✓			
		• Other Vehicles	✓	✓	✓			
	Process Emissions	• Enteric Fermentation		✓				
	Fugitive Emissions	• Dry Compost Lots		✓	✓			
		• Compost Piles		✓	✓			
		• Solid Storage Piles		✓	✓			
		• Anaerobic Lagoons and Storage Ponds		✓	✓			
		• Land Application				✓		
	Manufacturing (General)	Indirect Emissions	• Purchased Electricity	✓	✓	✓		
• Purchased Steam			✓	✓	✓			
Mobile Emissions		• Vehicle Fleet	✓	✓	✓			
		• On-Site Vehicle Use	✓	✓	✓			
		• Aircraft	✓	✓	✓			
Stationary Combustion		• Boilers	✓	✓	✓			
		• Generators	✓	✓	✓			
		• Heating	✓	✓	✓			
		• Cogeneration	✓	✓	✓			
		• Dryers	✓	✓	✓			
		• Water Heating	✓	✓	✓			
		• Thermal Oxidizers	✓	✓	✓			
Process Emissions		• Process CO ₂						

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		Use	✓					
		• On-Site Wastewater Treatment	✓	✓	✓			
		• CO ₂ Cleaning Equipment	✓					
		• Electron Beams						✓
		• Wastewater Treatment Lagoons		✓				
	Fugitive Emissions	• Refrigerants				✓		
		• A/C Systems				✓		
		• Fire Suppression System	✓			✓	✓	
Mining	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
		• Purchased Steam	✓	✓	✓			
	Mobile Emissions	• Vehicle Fleets	✓	✓	✓			
		• On-Site Vehicle Use	✓	✓	✓			
		• Mobile Equipment	✓	✓	✓			
		• Railcar Moving Equipment	✓	✓	✓			
		• Boilers	✓	✓	✓			
	Stationary Combustion	• Blasting Diesel	✓	✓	✓			
		• Generators	✓	✓	✓			
		• Hot Plant Burners, Heaters and Vaporization	✓	✓	✓			
		• Refining Equipment	✓	✓	✓			
		• Heating	✓	✓	✓			
		• Methane Flares	✓	✓	✓			
		• Coal						
		Fugitive Emissions						

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		Handling and Storage		✓				
		• A/C Systems				✓		
		• Fire Suppression Systems	✓			✓	✓	
Wastewater Treatment	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
	Mobile Emissions	• Vehicle Fleet	✓	✓	✓			
		• On-Site Vehicles Use	✓	✓	✓			
	Stationary Combustion	• Digester Gas Combustion		✓	✓			
	Process Emissions	• Anaerobic Waste Treatment		✓				
		• Nitrification/Denitrification			✓			
		• Effluent Discharge to receiving waters			✓			
		• Septic Tank		✓	✓			
	Fugitive Emissions	• A/C Systems				✓		
		• Fire Suppression Systems	✓			✓	✓	
Oil & Gas	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
		• Purchased Steam	✓	✓	✓			
	Mobile Combustion	• Vehicle Fleets	✓	✓	✓			
		• Crew Boats	✓	✓	✓			
		• Mobile Equipment	✓	✓	✓			
		• Fuel Delivery Trucks	✓	✓	✓			
		• Mobile Pumps	✓	✓	✓			
		• Work Boats	✓	✓	✓			
		• Tanker						

Industry Sector	Emissions Type	Emissions Source	CO ₂	CH ₄	N ₂ O	HFC	PFC	SF ₆
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	Stationary Combustion	Vessels	✓	✓	✓			
		• Methane Flares	✓	✓	✓			
		• Acid Gas Flares	✓	✓	✓			
		• Boilers/ Re-Boilers	✓	✓	✓			
		• Heaters/Pre-Heaters/Re-Heaters	✓	✓	✓			
		• Generators	✓	✓	✓			
		• Coke Combustion	✓	✓	✓			
		• Fuel Combustion	✓	✓	✓			
		• Compressor Engines	✓	✓	✓			
		• Dehydrators	✓	✓	✓			
		• Vacuum Furnaces	✓	✓	✓			
		• Pumps	✓	✓	✓			
	Process Emissions	• Catalyst Units	✓					
		• SO ₂ Recovery Scrubbers	✓					
		• Waste Treatment	✓	✓	✓			
		• Process Venting	✓	✓	✓			
		• CO ₂ Pass-Through Cleaning	✓					
		• Hydrogen Production	✓	✓	✓			
	Fugitive Emissions	• Tank De-gassing and Cleansing	✓	✓				
		• Storage Tank Emissions	✓	✓	✓			
		• Component Leaks (Valves, Fittings,	✓	✓	✓			

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		Hatches)						
		• Bulk Oil Transport	✓	✓				
		• Natural Gas Transport	✓	✓				
		• LPG Storage Cooling				✓		
		• A/C Units				✓		
		• Fire Suppression	✓			✓	✓	
		• Refrigeration				✓	✓	
		• Oil/Water Separation		✓				
Telecom	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
	Mobile Emissions	• Vehicle Fleets	✓	✓	✓			
		• Mobile Equipment	✓	✓	✓			
		• Aviation	✓	✓	✓			
	Stationary Combustion	• Heating	✓	✓	✓			
		• Boilers	✓	✓	✓			
		• Generators	✓	✓	✓			
	Fugitive Emissions	• A/C Units				✓		
• Fire Suppression Systems		✓			✓	✓		
Transportation	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
	Mobile Emissions	• Vehicle Fleet	✓	✓	✓			
		• On-site Vehicle Usage (Fork-lifts, etc.)	✓	✓	✓			
	Stationary Combustion	• Acetylene Torches	✓	✓	✓			
		• Heaters	✓	✓	✓			
		• Generators	✓	✓	✓			
	Fugitive Emissions	• A/C Units				✓		
		• Vehicle A/C				✓		
• Fire Suppression Systems		✓			✓	✓		
Gas Utility	Indirect Emissions	• Purchased						

Industry Sector	Emissions Type	Emissions Source	CO ₂	CH ₄	N ₂ O	HFC	PFC	SF ₆
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		Electricity	✓	✓	✓			
		• Purchased Steam	✓	✓	✓			
	Mobile Emissions	• Vehicle Fleets	✓	✓	✓			
		• Mobile Equipment	✓	✓	✓			
		• Aviation	✓	✓	✓			
	Stationary Combustion	• Transmission Compressors	✓	✓	✓			
		• Dehydrators	✓	✓	✓			
		• Generators	✓	✓	✓			
		• Flares	✓	✓	✓			
		• Heaters	✓	✓	✓			
	Process Emissions	• Boilers	✓	✓	✓			
		• SO ₂ Scrubbers	✓					
	Fugitive Emissions	• Vents			✓			
		• A/C Units				✓		
		• Component Leaks (Valves, Fittings, Hatches)	✓	✓	✓			
			• Fire Suppression Systems	✓				✓
Waste Management	Indirect Emissions	• Purchased Electricity	✓	✓	✓			
	Mobile Emissions	• Vehicle Fleet	✓	✓	✓			
		• Mobile Equipment	✓	✓	✓			
		• On-Site Vehicle Use	✓	✓	✓			
	Stationary Combustion	• Acetylene Torches	✓	✓	✓			
		• Boilers	✓	✓	✓			
		• Generators	✓	✓	✓			
		• Heating	✓	✓	✓			
	Process Emissions	• Flares	✓	✓	✓			
		• SO ₂ Scrubbers	✓					
			• pH Control systems	✓				

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	Fugitive Emissions	<ul style="list-style-type: none"> • Transfer and Storage of CO₂ for pH control systems 	✓					
		<ul style="list-style-type: none"> • CH₄ From Anaerobic Metabolic Processes 		✓				
		<ul style="list-style-type: none"> • Biogenic CO₂ (Optional Reporting) 	✓					
		<ul style="list-style-type: none"> • A/C Systems 				✓		
		<ul style="list-style-type: none"> • Fire Suppression Systems 	✓			✓	✓	