

Hawaii Greenhouse Gas (GHG) Emission Report for 2015: Summary of Key Results

Statewide carbon dioxide equivalent (CO₂e) emissions and sinks (GHG removals) were compiled for the following four (4) Intergovernmental Panel on Climate Change (IPCC) sectors: (1) Energy - emissions from stationary combustion, transportation, waste incineration, and oil and natural gas systems; (2) Industrial Processes and Product Use (IPPU) - emissions from cement production, electrical transmission and distribution, and substitution of ozone depleting substances; (3) Agriculture, Forestry, and other Land Use (AFOLU) - emissions and sinks from agricultural activities, land use, changes in land use, and land management practices; and (4) Waste - emissions from waste management and treatment activities such as landfills, composting, and wastewater treatment.

Energy sector emissions from aircraft (e.g., domestic aviation) were quantified and subtracted from net emissions for comparison to Hawaii's CO₂e emissions limit¹. Biogenic carbon dioxide (CO₂) and international bunker fuel CO₂e emissions were excluded from the statewide GHG totals in accordance with IPCC guidelines.

As of 2015, the statewide GHG emission limit has not been reached, however, statewide GHG projections of 13.88 million metric tons (MMT) and 11.19 MMT for 2020 and 2025, respectively, indicate Hawaii is on target to meet its 1990 statewide GHG emissions limit of 14.43 MMT.

Hawaii GHG Emissions and Sinks by Sector/Category for 1990, 2007, 2010, 2015, 2020, and 2025 (MMT CO₂e); Reproduced from Tables ES-1 and ES-2 (Projections) * of the Report.						
Sector/Category	1990	2007	2010	2015	<u>2020</u>	<u>2025</u>
Energy	19.61	21.84	20.46	18.57	<u>18</u>	<u>15.51</u>
IPPU	0.17	0.54	0.67	0.83	<u>0.89</u>	<u>0.95</u>
AFOLU (Sources)	1.61	1.56	1.18	1.1	<u>1.18</u>	<u>1.11</u>
AFOLU (Sinks)	-3.06	-3.28	-3.44	-3.54	<u>-3.57</u>	<u>-3.6</u>
Waste	0.75	1.05	0.89	0.78	<u>0.84</u>	<u>0.9</u>
Total Emissions (Excluding Sinks)	22.15	25.00	23.21	21.28	<u>20.9</u>	<u>18.46</u>
Net Emissions (Including Sinks)	19.08	21.71	19.77	17.75	<u>17.34</u>	<u>14.86</u>
Domestic Aviation	4.66	4.42	2.87	3.23	<u>3.46</u>	<u>3.67</u>
Net Emissions (State Goal) **	14.43	17.29	16.9	14.52	<u>13.88</u>	<u>11.19</u>

* Projected emissions are underlined.

** Emissions include sinks and exclude aviation. Updated statewide limit is 1990 GHG emissions level. Emissions beyond 1990 show Hawaii's progress relative to the statewide goal of not exceeding the 1990 GHG level.

Energy: The table above provides results from the 2015 report showing that most of the emissions are from the energy sector for all emission years. For 2015, the 18.57 MMT of CO₂e from the energy sector are about 87% of the total 21.28 MMT of statewide CO₂e emissions.

IPPU: IPPU sector emissions for 2015 represent about 4% of statewide emissions but are seen to grow from 0.17 MMT of CO₂e in 1990 to 0.83 MMT of CO₂e in 2015. The growth rate in this sector is due to the way IPPC guidance considers ozone depleting substances (ODS) versus their substitutes. While IPPC guidance does not count the significant GHG emission reductions from the decline in use of ODS associated with the Montreal Protocol, it does count the increase in GHG emissions from the associated growth in the use of their substitutes².

AFOLU: AFOLU sector emissions for 2015 represent about 5% of statewide emissions. AFOLU sinks offset about 17% of statewide emissions.

Waste: Waste sector emissions for 2015 represent about 4% of statewide emissions.

¹ Statewide GHG emission limit excludes aviation and international bunker fuel emissions and includes carbon sinks. International bunker fuel emissions are defined as marine and aviation travel originating in Hawaii and ending in a foreign country.

² Appendix G: ODS Emissions documents the reduction in ODS emissions and growth in ODS substitutes from 1990 to 2015. The ICF estimates for ODS emissions were 10.74 MMT of CO₂e in 1990, 1.8 MMT of CO₂e in 2007, 1.61 MMT of CO₂e in 2010, and 1.41 MMT of CO₂e in 2015.

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The report also updates emission estimates for 1990 and 2007 from those estimated by ICF in 2008 for DBEDT³ as shown in the table below. The change to the 1990 net statewide GHG emissions (including sinks and excluding aviation) also updates the 1990 statewide GHG emissions limit. Key reasons for the difference in prior and updated GHG inventories are changes in GHG global warming potentials, updates to emission factors, and revised international aviation mileage data⁴. As shown in the table below, the updated statewide 1990 level GHG emission limit increased by about 5.6% from 13.66 MMT of CO₂e reported in the 2008 ICF report to 14.43 MMT of CO₂e in the 2015 report.

Change in Hawaii GHG Emissions and Sinks by Sector/Category for 1990 and 2007 (MMT CO₂e); Reproduced from Table B-1 of the Report.						
Sector	1990			2007		
	2008 Report	This Report	Percent Change	2008 Report	This Report	Percent Change
Energy	21.12	19.61	-7.2%	21.83	21.84	0.03%
IPPU	0.18	0.17	-3.5%	0.54	0.54	1.4%
AFOLU (Sources)	0.98	1.61	63.6%	0.83	1.56	88.1%
AFOLU (Sinks)	-2.67	-3.06	14.7%	-2.75	-3.28	19.4%
Waste	0.85	0.75	-11.1%	1.07	1.05	-1.6%
Total Emissions (Excluding Sinks)	23.13	22.15	-4.3%	24.27	25.00	3.0%
Net Emissions (Including Sinks)	20.46	19.08	-6.7%	21.52	21.71	0.9%
Domestic Aviation	6.8	4.66	-31.5%	4.82	4.42	-8.4%
Net Emissions *	13.66	14.43	5.6%	16.69	17.29	3.6%

* Emissions include sinks and exclude aviation. GHG emissions from international bunker fuel and biogenic CO₂ are excluded from statewide GHG totals in accordance with IPCC guidance.

ICF implemented quality assurance/quality control (QA/QC) measures to help ensure and improve accuracy of the GHG emission estimates. While a quantitative uncertainty analysis was not performed for this first annual progress report, ICF will accomplish this for the two remaining annual reports to address QA/QC measures.

³ Prepared by ICF International for the Hawaii Department of Business, Economic Development & Tourism, "Hawaii Greenhouse Gas Inventory: 1990 and 2007", December 31, 2008; <https://energy.hawaii.gov/wp-content/uploads/2011/10/ghg-inventory-20081.pdf>.

⁴ ICF detailed and explained these changes in Appendix B: Summary of Updates to Emission Estimates since the Previous Inventory of the Report.