

# **Updating Hawaii's Greenhouse Gas Emissions Inventory Under Act 234, SLH 2007**

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# Updating Hawaii's Greenhouse Gas Emissions Inventory - Overview

- Hawaii's Initial Greenhouse Gas (GHG) Inventory
  - Context and Purpose
  - Inventory Methodology and Assumptions
- Act 234 and Updating the Inventory for 1990
- Resources

# Hawaii's Initial GHG Inventory

- Phase I of Program for Developing, Implementing, and Evaluating a Greenhouse Reduction Strategy for the State of Hawaii
- Phase II was Hawaii Climate Change Action Plan
- Joint project of DBEDT Strategic Industries Division and the Department of Health Clean Air Branch (DOH contractor was UH Environmental Center for non-energy sectors)
- U.S. Environmental Protection Agency provided grant for and assistance with:
  - Identifying state's greenhouse gas emissions sources and estimating overall contribution to global warming;
  - Assessing areas of state most vulnerable to climate change; and
  - Developing state-specific greenhouse gas mitigation strategies

# Purpose of Hawaii's Initial GHG Inventory

- Understand sources and amounts of Hawaii's GHG emissions
- Increase awareness of State GHG
- First step to developing GHG reduction measures later included in second-phase Hawaii Climate Change Action Plan
- **NOT intended for regulatory purposes**

# Hawaii Initial 1990 Baseline Inventory

## Methodology and Assumptions

### Methodology

- Collected relevant data for energy use, industrial processes, agriculture, municipal waste management, crop waste burning, fertilizer use, and land use changes.
- Applied formulas provided by EPA to calculate emissions of CO<sub>2</sub>, methane (CH<sub>4</sub>) and nitrous oxides N<sub>2</sub>O, the principal GHG, and the precursor gases: nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and non-methane volatile organic compounds (NMVOC)
- Reported global warming potential of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions in short tons of carbon dioxide-equivalent (CO<sub>2</sub>E).

### Assumptions

- GWP factors provided by EPA at time:
  - CO<sub>2</sub> = 1
  - CH<sub>4</sub> = 22 (now 21)
  - N<sub>2</sub>O = 270 (now 310)
- CO<sub>2</sub> emissions from burning of bagasse, macadamia nut shells, and wood chips for electricity and process heat not included in total as fuels sequester CO<sub>2</sub> in growing stage and were assumed replanted
- Hawaii estimate did not include exported fuels or overseas uses per Kyoto Protocol
- Excluded military aviation uses due to lack of data on location of use

# ACT 234, SLH 2007

## Relating to GHG Emissions

- By December 31, 2008, DBEDT and DOH shall complete an updated inventory of emission sources or categories of sources from the past report entitled *Inventory of Hawaii Greenhouse Gas Emissions Estimates for 1990*, dated July 1997 with
- At least one public hearing shall be held prior to the completion of the updated inventory
- Basis of limits for 2020 to be set by Greenhouse Gas Emissions Reduction Task Force

# Updating the 1990 Inventory

- Revisions made
  - Used revised radiative forcing factors to calculate Global Warming potential
  - Used updated data in several categories
  - Corrected formulas previously used in some calculations
- Needed (Preliminary)
  - Resolve time series consistency issues with marine fuels, stationary diesel use in commercial sector,
  - Improve analysis of land use changes
  - Obtain new data sources for fertilizer use and some categories of animal manure management-related data
  - Improve transparency of data

## Preliminary Estimate of Hawaii Greenhouse Gas Emissions Global Warming Potential in Tons Carbon Dioxide Equivalent

ENERGY SECTOR	1990	2005
Residential Commercial Industrial	1,182,631	2,297,520
Electric Utility	7,884,515	9,037,987
<b>Stationary Subtotal</b>	<b>9,067,146</b>	<b>11,335,507</b>
Domestic Transportation	7,776,389	8,709,843
<b>Mobile Subtotal</b>	<b>7,776,389</b>	<b>8,709,843</b>
<b>Energy TOTAL</b>	<b>16,843,535</b>	<b>20,045,350</b>
NON-ENERGY SECTOR	1990	2005
Oil/Gas Industrial Processes	4,977	5,157
Cement Industry	109,274	-
Industrial Processes Subtotal	114,251	5,157
MSW Management	1,161,291	1,701,100
Wastewater Treatment	21,563	23,923
Domestic Animals	273,879	192,119
Manure Management	129,768	56,774
Sugarcane Burning	31,958	10,797
Fertilizer Use	60,850	62,310
<b>Non-Energy TOTAL</b>	<b>1,793,559</b>	<b>2,052,180</b>
<b>TOTAL</b>	<b>18,637,094</b>	<b>22,097,530</b>

Note: Emissions from International Transportation and Military use excluded

# What is to be done?

- Obtain consultant support to assist with the following:
  - Select GHG calculation methodology that best serves Hawaii's situation
  - Review all data used in developing initial inventory and identify possible discrepancies
  - Obtain better, more accurate data where needed
  - Produce new 1990 Baseline Inventory

# Sources of Additional Information

- EPA Summary Table of Models Used by States to Develop Action Plans
  - Hawaii has used ENERGY 2020/Regional Economic Models, Inc. (REMI) model since early 1990s
- The GHG Library
  - Handout provided to Public providing Internet locations
  - Provided to Task Force on CD-ROM
- EPA WebCast Training

# EPA WebCast Training

## GHG Inventory 101 for State, Regional, and Local Government Staff

- DBEDT Staff will “attend” training in Room 501, State Office Tower (TF Members Invited)
  - First Session: Creating an Inventory  
Wednesday, October 10, 8 – 9:30 AM
  - Second Session: Translating Inventory Results into Action – Tuesday, November 6, 9- 10:30 AM
  - Third Session: State Inventory Tool (SIT) Training Session – Date and Time, TBD
- Training will be placed on an EPA website about a week after session (URL TBD)