Overview and Progress to Date

U.S. Greenhouse Gas Reporting Program

Kong Chiu
Office of Atmospheric Programs
U.S. EPA
International Emissions Inventory Conference (NEI)
14 April, 2015
San Diego

1

Overview

- Overview
- Timeline, GHG Reporting Progress since Tampa
- GHG Reporting Program key data and programmatic attributes
- Spotlight on Oil & Gas Sector (Subpart W) including changes
- State-EPA collaboration on GHG Reporting
- International engagement on GHG Reporting and Data management
- RY 2014 Data Milestones
- Q&A

2

US GHGRP Timeline

U.S. GHGRP and The International Emissions Inventory Conference

April, 2009

18th Emissions Inventory Conference, Baltimore

- proposed mandatory reporting rule

September, 2010

19th Emissions Inventory Conference, San Antonio

- final rule (first 29 sources), technical revisions, data system development underway

August, 2012

20th Emissions Inventory Conference, Tampa

- launched e-GGRT, 12 more sources
- successfully collected & verified 1+ years of data

U.S. GHGRP and The Emissions Inventory Conference (cont'd)

April, 2015

21st Emissions Inventory Conference, San Diego

- Published 4 years of data (RY2010 - 2013)
- Collected RY2014 data
- Major changes/improvements since Tampa include:
  - Collected data across all sources in one reporting period (RY12 and on)
  - Implemented 100s of reg revisions (including W, Oil & Gas)
  - Ingest and validate data directly from "smart" XLS spreadsheets
  - Integrated data verification into GHG data system and
  - Implemented "critical errors" to improve data quality
  - Collected GHG equation inputs data retroactively
  - Shifted to AR4 Global Warming Potentials
  - Launched Inputs Verifier Tool to handle sensitive equation inputs

5

US GHGRP Basics

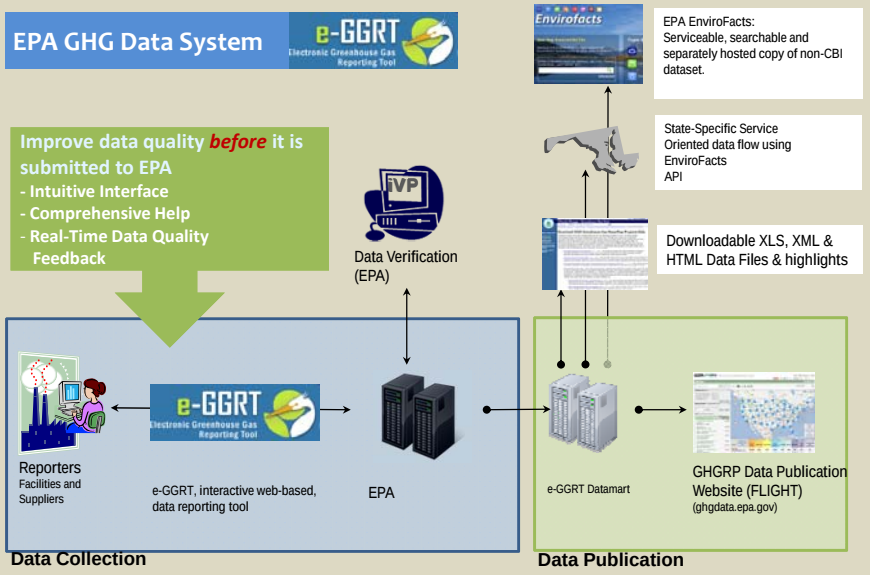
6

US GHG Reporting Program

- Annual mandatory reporting of GHG :
  - Rule covers 41 source categories for reporting, accounting for 85-90% of total U.S. GHG emissions:
  - 33 types of direct emitters
  - 6 types of suppliers of fuel and industrial GHG
  - Facilities that inject CO2 underground for geologic sequestration, enhanced oil recovery, or any other purpose.
- 25,000 MTCO2e threshold for some sources
- Direct reporting to EPA electronically
- EPA verification of emissions data
- Monitoring began in 2010 for most emission sources with first reports submitted to EPA in September, 2011
- 2010 to 2013 data now publicly available

7

Electronic Reporting Workflow



U.S. GHGRP: Source Categories Covered

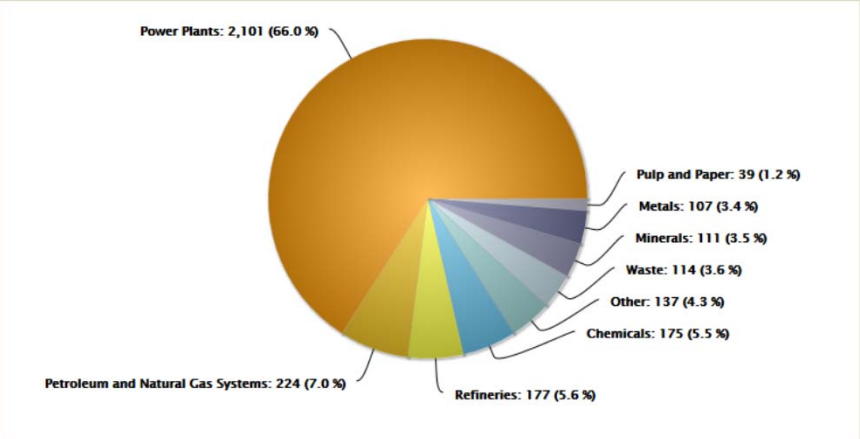
Power	Refining & Petrochem.	Other Chemicals	Combustion	Waste	Metals	Minerals	Pulp & Paper	High GWP Gases
-Electricity Generation - Electrical Equipment Mfg. - Use of Electrical Equip.	- Petroleum Refineries - Petrochem. Production	- Adipic Acid -Ammonia -Hydrogen Production - Nitric Acid - Titanium Dioxide - Phosphoric Acid	- Stationary Combustion	- Municipal Landfills - Industrial Waste Landfills - Waste Water Treatment	- Aluminum - Ferroalloy - Iron & Steel - Lead - Zinc - Magnesium - Silicon Carbide	- Cement - Glass - Lime - Misc. Carbonate Use - Soda Ash Production	- Pulp & Paper	- Fluorinated GHG Prod. - HCFC-22 Prod./HFC-23 Destruction - Electronics Mfg. - Pre-Charged Equip. Imp./Exp. - Suppliers of Industrial Gases

Petroleum & Natural Gas Systems – Direct Emissions	Fuel Suppliers	Carbon Capture &Sequestration	Mining
- Onshore Production - Offshore Production - Natural Gas Processing - Natural Gas Transmission/Compression - Natural Gas Distribution - Underground Natural Gas Storage - Liquefied Natural Gas Storage - Liquefied Natural Gas Import/Export	- Coal based Liquid Suppliers - Petroleum Product Suppliers -Natural Gas Distribution Companies -Natural Gas Liquids Suppliers	- Suppliers of CO2 - Injection of CO2 - Geologic Sequestration of CO2	- Underground Coal Mines

Direct Emitters
Suppliers
CO2 Injection

9

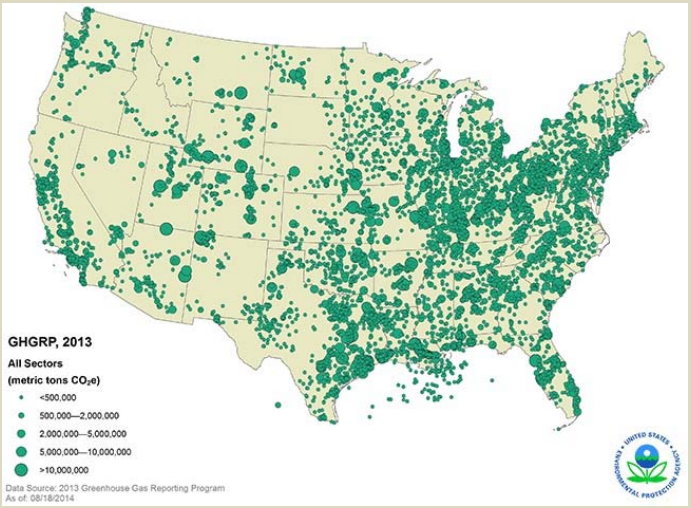
2013 Reporting Year Data (Direct GHG Emissions)



10

GHGRP Coverage – Direct Emissions

- In 2013, Reported Direct Emissions totaled 3.18 billion metric tons CO2e, about half of total U.S. greenhouse gas emissions.



11

GHGRP, GHG Inventory, NEI

Greenhouse Gas Reporting Program GHGRP (40 CFR Part 98)

National Inventory of Greenhouse Gas Emissions and Sinks

National Emissions Inventory (NEI)

12

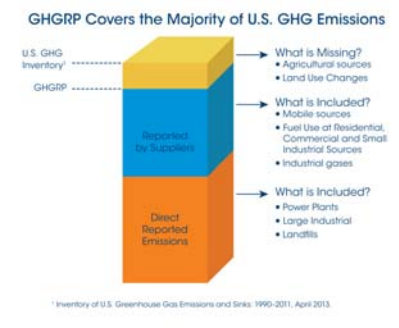
GHG Inventory, GHG Reporting Program

- The U.S. GHG Inventory is a comprehensive top-down assessment of national GHG emissions and removals which presents emissions across multiple years starting in 1990.
  - U.S. GHG emissions calculated using internationally-accepted methods and nationally appropriate statistics
  - Generally, emissions estimates not provided at the geographic or facility level
    - Gridded CH4 available soon
  - Includes small industrial emitters, residential and commercial sectors
  - Includes agriculture and land-use/forestry sectors
- When compared in aggregate, some of the summary emissions totals for specific industries appear different in the Inventory and GHGRP.
  - Different Source Category Definitions
  - Inclusion of combustion emissions
  - Reporting Threshold
  - Lack of Disaggregated Data to Represent Certain Industries
  - Use of Continuous Emissions Monitoring Technologies
  - Differences in use of Default International Factors from Facility-Specific Methods

13

GHG Reporting Program vs. US GHG Inventory

- Inventory of U.S. Greenhouse Gas Emissions and Sinks (Inventory) tracks total annual U.S. emissions across all sectors of the economy using national-level data
- GHGRP collects detailed emissions data from large greenhouse gas emitting facilities in the United States
  - GHGRP covers most, but not all, U.S. GHG emissions
  - GHGRP does not include agriculture, land use, and small sources



Task	Inventory	Greenhouse Gas Reporting Program
Find total U.S. emissions	✓	
Review trend data for the past 20 years	✓	
Browse a map to find largest emitters in your area		✓
Compare facility emissions across an industrial sector		✓
Find reported emissions by state		✓

14

Using GHG Reporting Program Data: US Inventory

Direct Use

- **Replace the entire estimate -** e.g., categories where the Reporting Program has complete coverage
  - Semiconductor Manufacture, Magnesium Production and Processing, Refineries

Indirect Use for Calculations (Non-CBI)

- **Develop more accurate emission factors based on GHGRP data:** Landfills, Wastewater Treatment (Industrial), Natural Gas Systems, Petroleum Systems
- **Develop updated activity data:** Natural Gas Systems
- **Disaggregate national estimates to show more detail:** Industrial sector fossil fuel combustion

Indirect Use for QA/QC

- **General QA/QC on a national estimate**

15

Spotlight on Oil and Gas Data (Subpart W)

16

Oil and Gas GHG Data

- Oil and Gas GHG estimates available in U.S. GHG Inventory (national/regional-level) and GHGRP (facility-level)
- Enhancing the EPA GHG data on oil and gas is a key part of the White House Climate Action Plan Strategy to Reduce Methane Emissions
  - EPA continues to refine GHG Inventory estimates to reflect the most robust information available
  - EPA has proposed updates to GHGRP

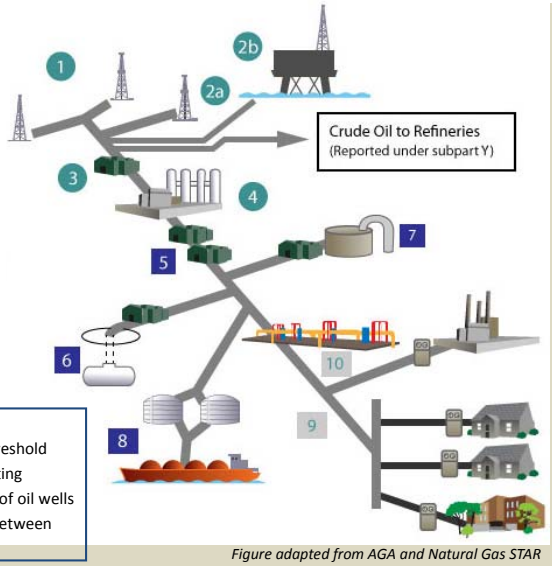
17

Petroleum and Natural Gas Systems in GHGRP (Subpart W)

Production and Processing
1. Onshore Production
2a, 2b. Offshore Production
3. Gathering and Boosting (not covered by Subpart W)
4. Natural Gas Processing

Transmission and Storage
5. Natural Gas Transmission
6. Underground Natural Gas Storage
7. LNG Storage
8. LNG Import-Export

Distribution
9, 10. Natural Gas Distribution



Not Covered
- Emissions below 25,000 metric ton CO_2e threshold
- Process emissions from gathering and boosting
- Vented emissions from hydraulic fracturing of oil wells
- Process emissions from transmission lines between compressor stations

Figure adapted from AGA and Natural Gas STAR

18

Reported GHG Emissions by Industry Segment

- EPA received annual reports from over 2,000 facilities
- Reported emissions totaled 224 Million Metric Tons (MMT) CO_2e
- Largest segments in terms of reported GHG emissions were onshore production, natural gas processing, and natural gas transmission

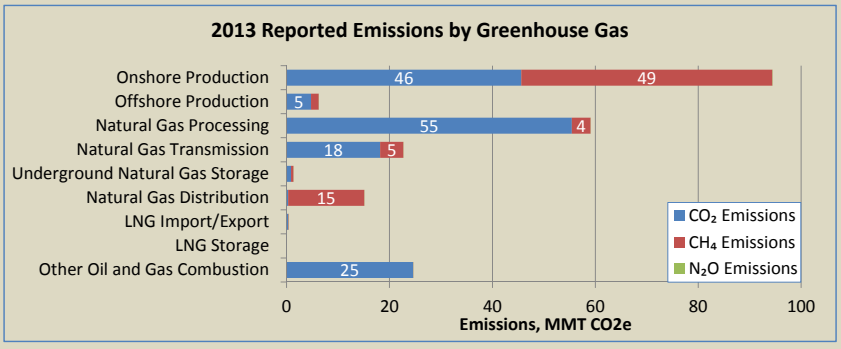
Segment	Number of Facilities	2013 Reported Emissions (Million Metric Tons CO_2e)
Onshore Production	503	95
Offshore Production	107	6
Natural Gas Processing	433	59
Natural Gas Transmission	487	23
Underground Natural Gas Storage	48	1
Natural Gas Distribution	173	15
LNG Import/Export	8	< 1
LNG Storage	5	< 1
Other Oil and Gas Combustion	415	25
Total	**2,164**	**224**

U.S. Greenhouse Gas Reporting Program RY2013 data as of 8/18/14

19

Reported Emissions by Greenhouse Gas

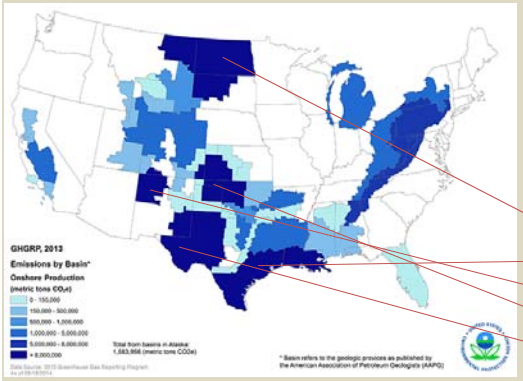
- Carbon dioxide (CO_2) emissions accounted for 150 MMT CO_2e and methane (CH_4) emissions accounted for 74 MMT CO_2e
- Emissions from onshore production were primarily methane while emissions from natural gas transmission, natural gas processing, and other oil and gas combustion were primarily carbon dioxide



U.S. Greenhouse Gas Reporting Program RY2013 data as of 8/18/14

20

Onshore Production Basins



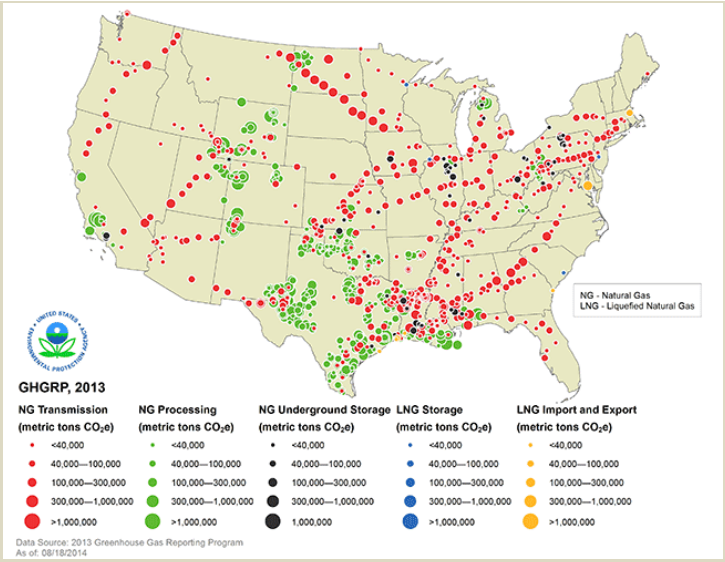
- Emissions in onshore production are reported by basin
- The map to the left shows reported emissions aggregated for all onshore production facilities by basin
- The basins with highest reported emissions were:
  - Williston Basin (12.8 MMT CO_2e)
  - Gulf Coast Basin (12.6 MMT CO_2e)
  - San Juan Basin (10.1 MMT CO_2e)
  - Anadarko Basin (9.2 MMT CO_2e)
  - Permian Basin (9.2 MMT CO_2e)

Note: For the onshore production segment, the "facility" includes all emissions associated with wells owned or operated by a single company in a specific hydrocarbon producing basin. A basin refers to a geologic region where sediment infilling has occurred. The GHG Reporting Program definition of basin refers to the geologic provinces as published by the American Association of Petroleum Geologists (AAPG).

U.S. Greenhouse Gas Reporting Program RY2013 data as of 8/18/14

21

NG Processing, Storage, Transmission, LNG

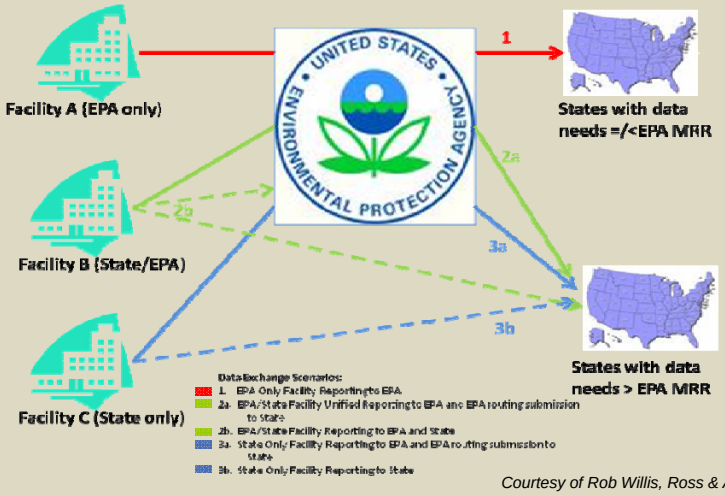


U.S. Greenhouse Gas Reporting Program data as of 8/18/14

22

State Coordination

- State - EPA Workgroup on GHG Data Collection and Exchange
  - AZ , CA , CO (State co-chair), HI , IA , MA , MI, NC , NJ , NV , NM, OR , WA , WI

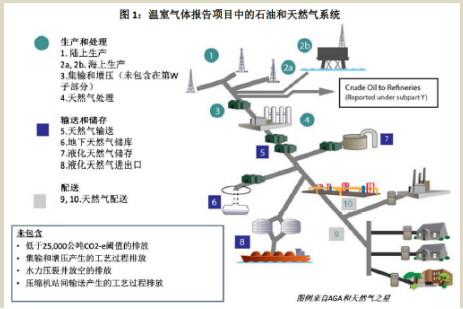


Courtesy of Rob Willis, Ross & Associates

23

International Capacity Building

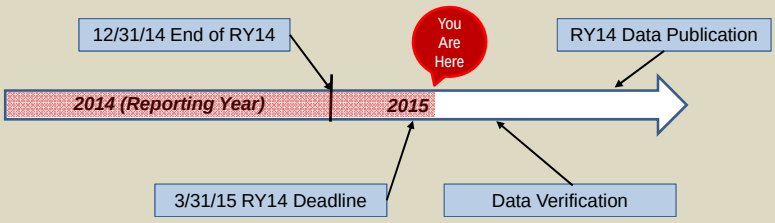
- Improve greenhouse gas data measurement, reporting and verification
- Improve accountability in Non Annex-1 Countries
  - World Bank
  - US-China Climate Change Working Group



24

GHGRP Reporting Year (RY) 2014 Milestones

Milestone	Schedule
Annual reports & deferred data reports due	March 31, 2015
EPA verification of submitted data	April – August 2015
2014 Data Publication (including deferred data)	October 2015



25

Thank you! For More Information…

- Part 98 (U.S. GHG Reporting Rule) Info:
  - www.epa.gov/ghgreporting
- Published Data (FLIGHT):
  - ghgdata.epa.gov
- Published Data (Envirofacts):
  - http://www.epa.gov/enviro/facts/ghg/search.html
- Published Data (Highlights):
  - http://www.epa.gov/ghgreporting/ghgdata/reportingdatasets.html