

What's Ahead in Air Quality for Agriculture

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National Air Emissions Monitoring Study

- 18-month study funded by industry that concluded in Feb 2010
- Preliminary reports available for housing sources
- Still awaiting reports for open sources

Ammonia EPCRA thresholds (100 lb/day)

- 1560 to 7500 sows
- 800 to 9,000 dairy cows
- 40,000 to 75,000 hens
- 84,000 broilers

***Only housing emissions accounted for in these values

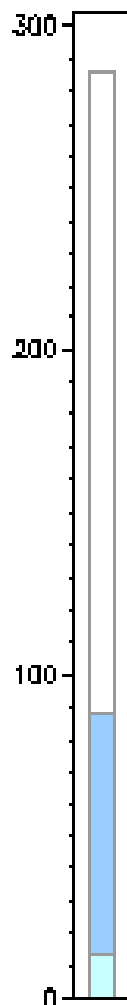
Clean Air Act Ammonia Thresholds (100 tons/year in non-attainment areas)

- 5.47 times the number of animals for EPCRA
 - >8,500 sows
 - >4,375 cows
 - >218,800 hens
 - >459,000 broilers

Clean Air Act Thresholds (250 tons/year in attainment areas)

- 2.5 times the number of animals for non-attainment CAA thresholds
 - >21,250 sows
 - >10,937 cows
 - >547,000 hens
 - >1,147,500 broilers

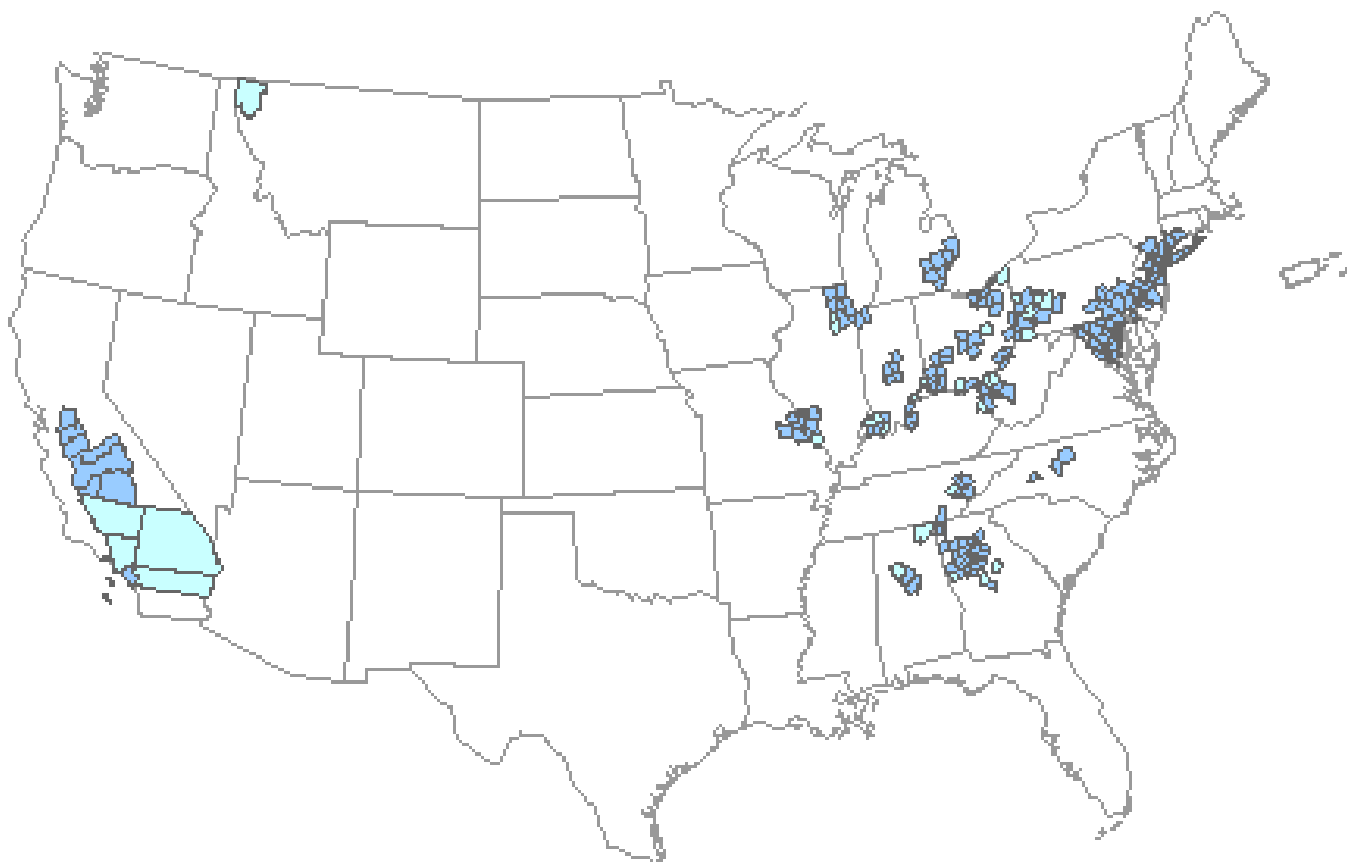
Nonattainment Areas Map – Particulate (size < 2.5 micrometers) United States



Population
(Millions)

Nonattainment Status:

- Part of County
- Whole County
- Attainment

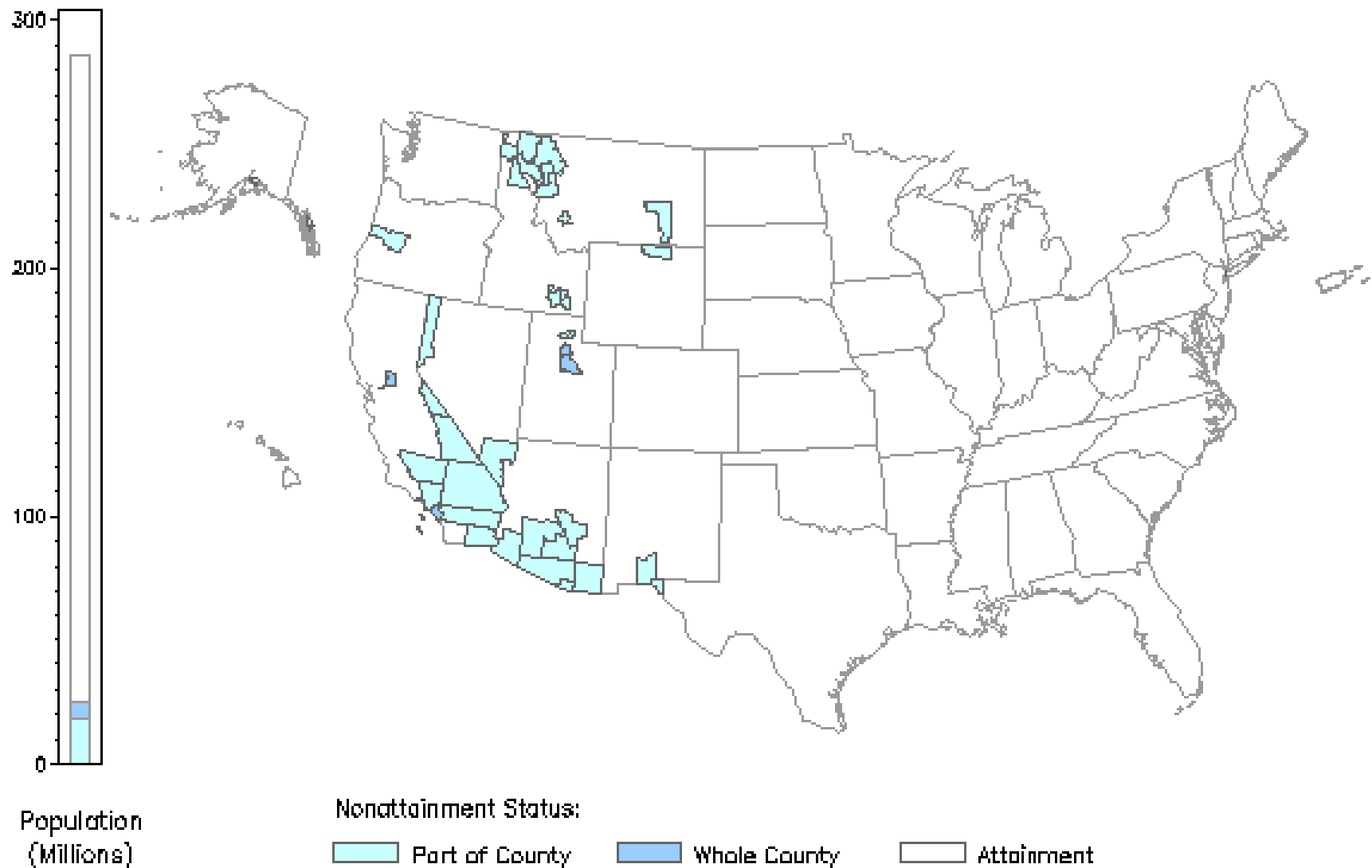


Dust Clean Air Act Thresholds

Attainment areas - PM10

- 368,000 sows
- 16 million layers
- 13 million broilers

Nonattainment Areas Map – Particulate (size < 10 micrometers) United States



Renewable Fuel Standards

- 2011 Proposed Standard
 - Public comment opened in July 2010
 - Final rule expected November 30 2010

Table 1
Proposed Volumes for 2011

	Actual Volume	Ethanol Equivalent Volume
Cellulosic biofuel	5 - 17.1 mill gal	6.5 - 25.5 mill gal
Biomass-based diesel	0.80 bill gal	1.20 bill gal
Advanced biofuel	1.35 bill gal	1.35 bill gal
Renewable fuel	13.95 bill gal	13.95 bill gal

Table 2
Proposed Percentage Standards for 2011

Cellulosic biofuel	0.004-0.015%
Biomass-based diesel	0.68%
Advanced biofuel	0.77%
Renewable fuel	7.95%

Reactive Nitrogen

- Reactive nitrogen (Nr) encompasses biologically and radiatively active and chemically reactive nitrogen compounds
- Integrated Nitrogen Committee
 - Formed in 2006
 - 6 draft reports since 2008
 - Most recent draft May 2010

Committee goals

- Identify and analyze from a scientific perspective the problems reactive nitrogen presents in the environment and the links among them;
- Evaluate the contribution an integrated nitrogen management strategy could make to environmental protection;
- Identify additional risk management options for EPA's consideration; and
- Make recommendations to EPA concerning improvements in nitrogen research to support risk reduction.

Findings

- The Committee explored how a 25% reduction in Nr losses might be achieved with existing technology in the coming 5 to 10 years
- An outlined strategy included:
 - increased controls of oxides of nitrogen
 - improved Nr uptake by agricultural crops
 - decreased loss of Nr from agricultural lands and AFOs
 - decreased discharge of Nr from point sources and developed (urban) lands

- *Target Goal 1. The Committee suggests that the EPA expand its NO_x control efforts from the current decreases of emissions of light duty vehicles (including passenger cars) and power plants to include other important unregulated mobile and stationary sources (e.g., off road vehicles) sufficient to achieve a 2.0 Tg N/yr decrease in the generation of reactive nitrogen.*

- *Target Goal 2. The Committee suggests that crop N-uptake efficiencies be increased by up to 25% over current practices through a combination of knowledge-based practices and advances in fertilizer technology amounting to ~2.4 Tg N/yr below current amounts of Nr additions to the environment. The Committee further suggests that excess flows of Nr into streams, rivers, and coastal systems be decreased by approximately 20% (~1 Tg N/yr) through improved landscape management and without undue disruption to agricultural production.*

- *Target Goal 3. The Committee suggests a goal of decreasing livestock-derived NH₃ emissions by 30% (a decrease of 0.5 Tg N/yr) by a combination of BMPs and engineered solutions. This is expected to decrease PM_{2.5} by ~0.3 µg/m³ (2.5%), and improve health of ecosystems by achieving progress towards critical load recommendations. Additionally we suggest decreasing NH₃ emissions derived from fertilizer applications by 20% (decrease by ~0.2 Tg N/yr), through the use of NH₃ treatment systems and BMPs.*

Goals for livestock production

- Swine and poultry production: a moderate reduction of 50% from 1990 NH₃ emission estimates should be attainable
 - Manure storage covers, digesters
- Dairy and beef production: a more modest and reachable goal of decreasing NH₃ emissions by 10% through improvements in animal diet and manure management is proposed

- *Target Goal 4. The Committee recommends that a high priority be assigned to nutrient management of stormwater, nonpoint sources and wastewater treatment plant effluents. This will decrease Nr emissions from human sewage by between 0.5 and 0.8 Tg N/yr, with additional decreases likely with increased stormwater and nonpoint source BMP application support.*

NAAQS of Clean Air Act

- Review process occurs every 5 years
- Status: SO_x complete, NO_x is next
 - Then PM, including NH₃?
 - Or add Nr?
 - Add additional criteria pollutants
- Proposed to add GHG
 - Unlikely?
 - Endangerment finding in late 2010

HSUS Petition

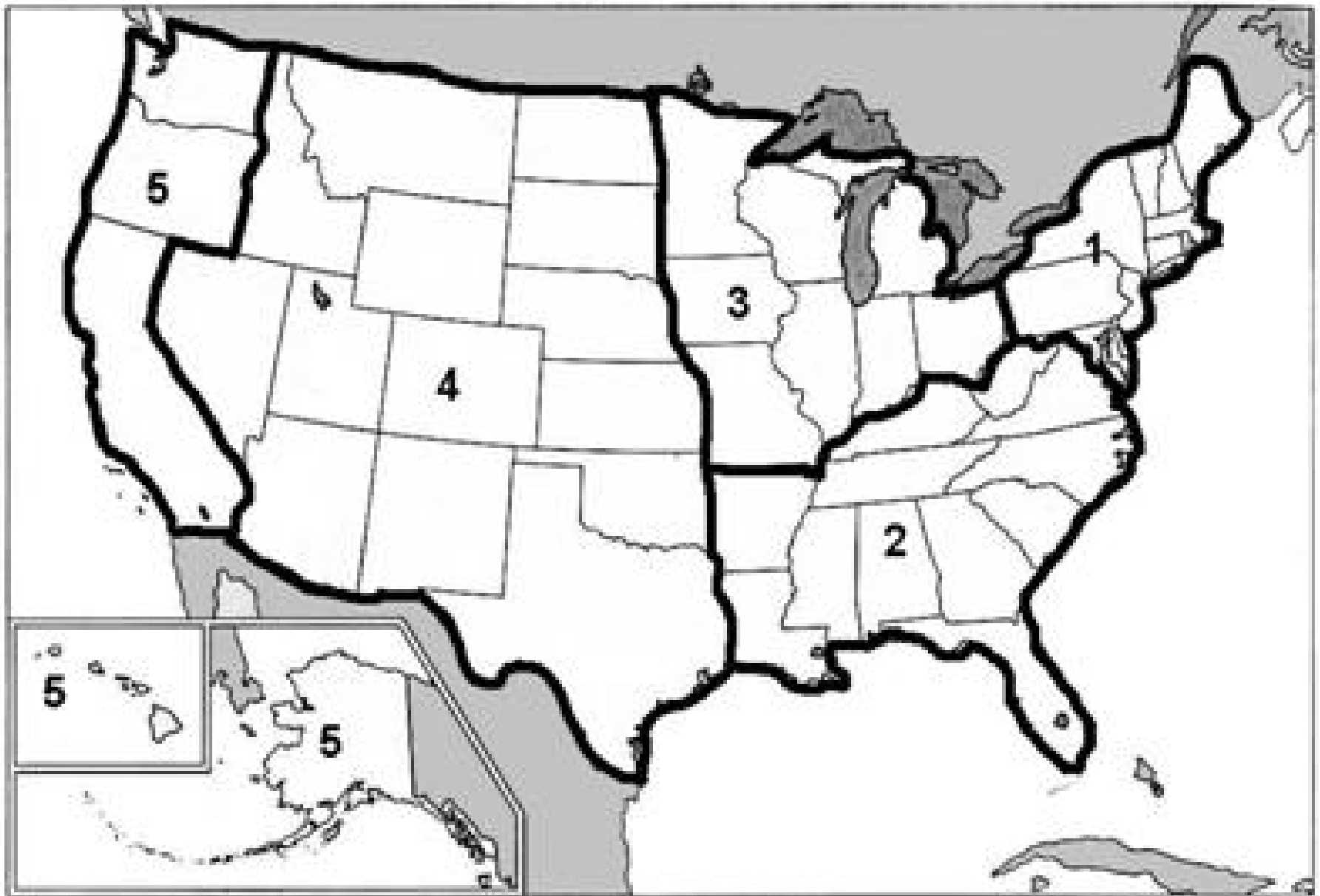
- September 2009
- Request: Regulate emissions from AFOS under CAA
- EPA response: Wait to see what NAEMS says

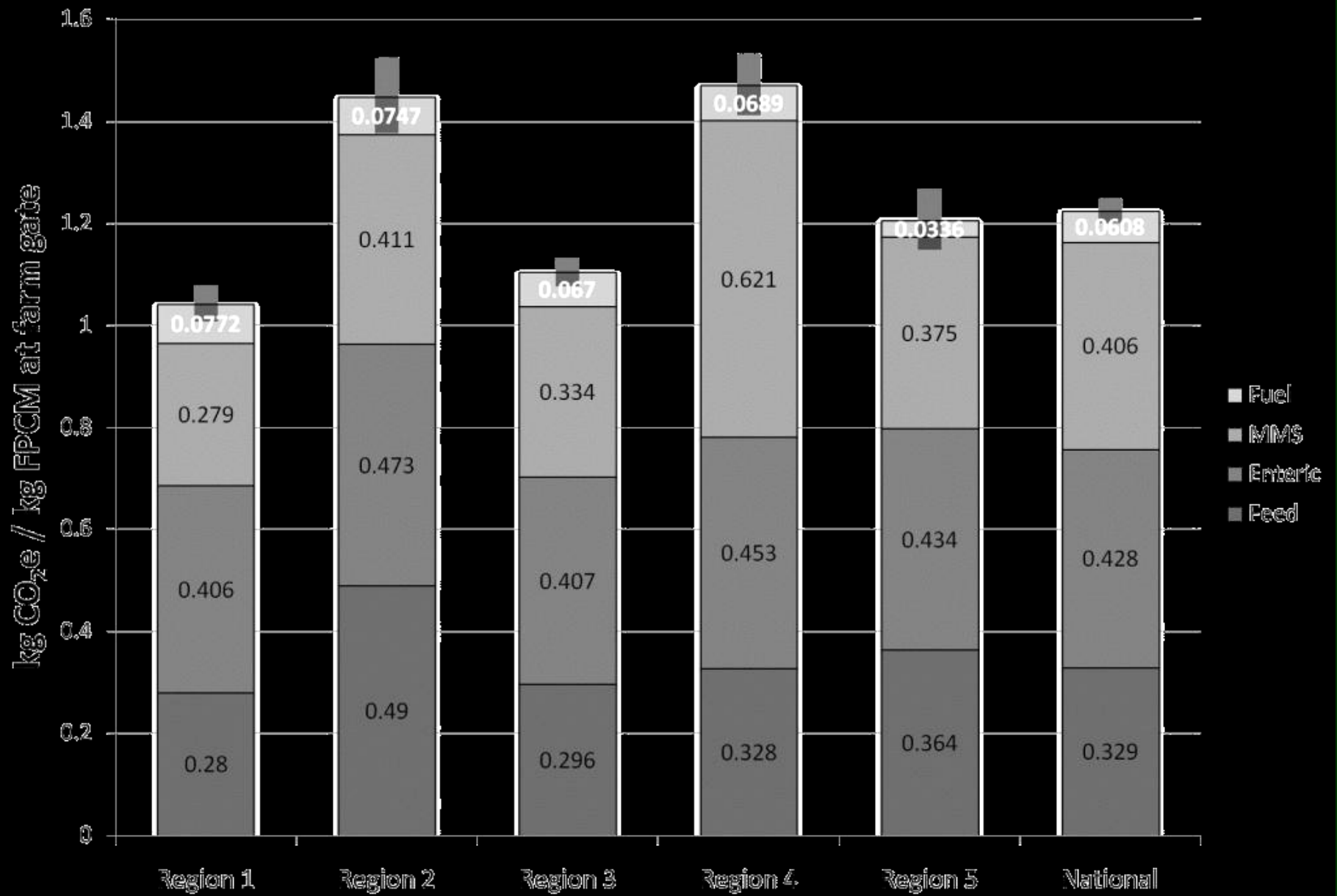
GHG

- Dairy industry commitment (DMI, Dairy Innovation Center): Reduce greenhouse gas emissions for fluid milk by 25 percent by the year 2020

Dairy Footprint

- The carbon footprint of a gallon of milk, from farm to table, is 17.6 pounds of carbon dioxide equivalents (CO₂e) per gallon of milk consumed (University of Arkansas Applied Sustainability Center)
- The single most important factor in explaining differences in GHG emissions across all farms is feed conversion efficiency. This variable alone explains over 50% of the observed variability in the feed and enteric methane contribution to the farm-gate footprint.





Implications for lenders

- Need for equipment or capital investment to address new regs or programs
 - More digesters?
 - Higher fuel costs with lower efficiencies
 - Little to no 'payback'