United States

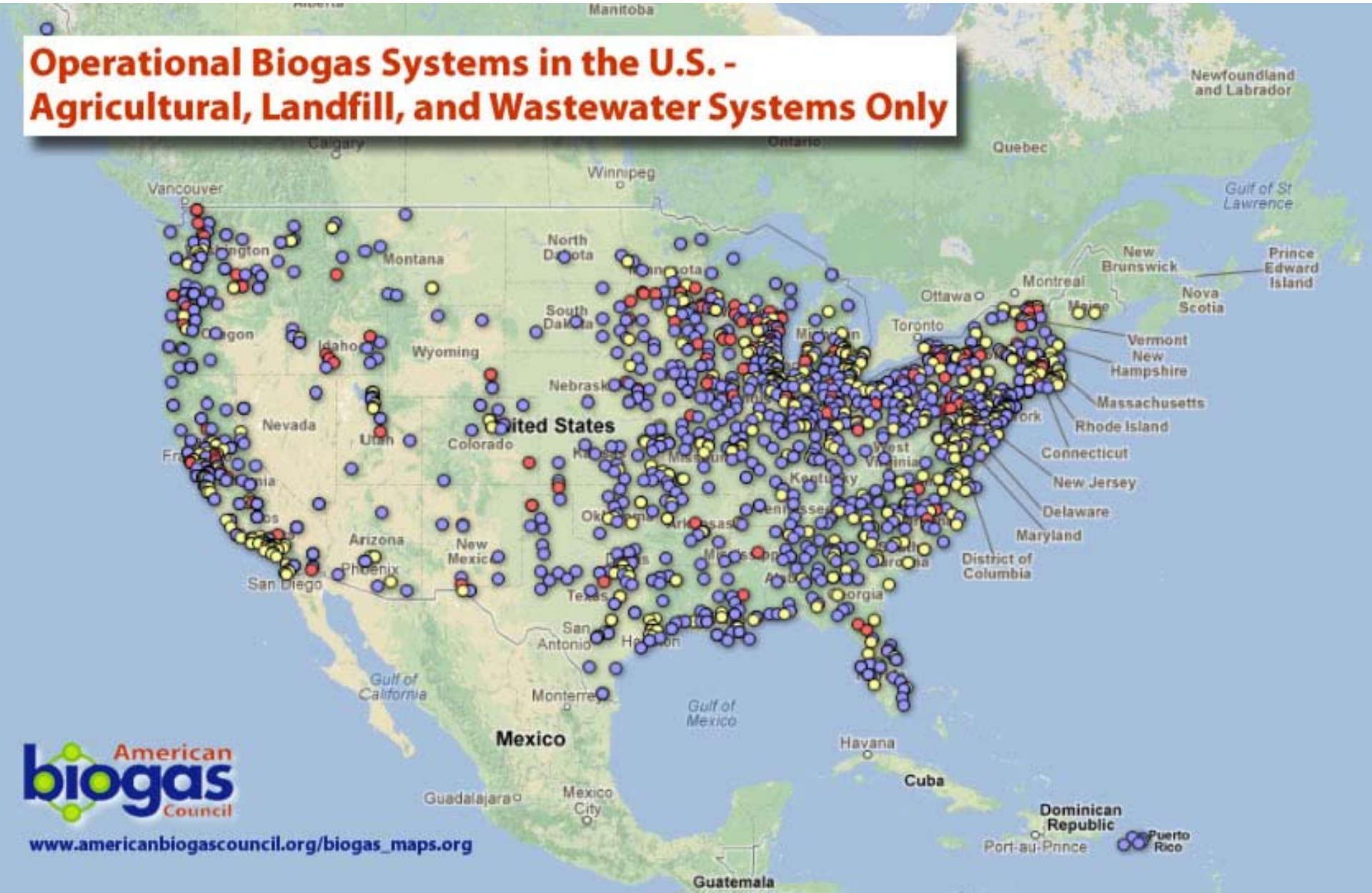
Biogas Update of the Global Methane Initiative (GMI) Tri-Subcommittee Meeting, Florianópolis Brazil

14 March 2014

United States Environmental Protection Agency

Global Methane Initiative

United States Biogas Update



United States Methane Emissions

Sector	U.S. Methane Emissions (2010) (MMTCO2e)	%age of total US anthropogenic emissions
Natural gas systems*	215.4	32.3%
Enteric fermentation	141.3	21.2%
Landfills	**107.8**	**16.2%**
Coal mining**	77.6	11.6%
Manure management	**52.0**	**7.8%**
Municipal Wastewater	**16.3**	**2.4%**

*Natural gas system emissions do not include methane emissions from petroleum systems.
**Coal mining sector emissions includes emissions from abandoned underground coal mines.

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Biogas Project Outlook

- Challenges to Emission Reduction Projects:
  - Inadequate payback/economics
  - Lack of available capital
  - Operations and maintenance complications and concerns
  - Utility interaction
  - Difficulties with air regulations or obtaining air permit
  - Technical merits and concerns
  - Inertia to maintain the status quo

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Biogas Project Outlook

- Overcoming Barriers: National Programs
  - AgSTAR
  - LMOP
  - Combined Heat & Power Partnership
  - Sustainable Infrastructure
  - Food Recovery Challenge
  - Net Zero

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Biogas Project Outlook

- Overcoming Barriers: Policies
  - National Policies:
    - Renewable Fuel Standard
    - Farm Bill Renewable Energy Title
  - State Policies:
    - CT/MA/VT: Organics Diversion Bans
    - CA: AB-32 Climate Change Legislation

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U.S. Goals for GMI Involvement

- Support technology transfer and knowledge sharing.
- Identify potential partners and specific opportunities for emissions reductions.
- Work to identify and remove barriers to methane project development where practicable.

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The National Agriculture Picture

~250 operating facilities out of 8200 potential facilities.
***2.20 MMTCO2e** reductions in 2013.*

U.S. Supported Agriculture Activities

- AgSTAR – national program to reduce methane emissions from livestock farms through use of anaerobic digestion.
- Collaboration with World Bank program in China for improved manure management with anaerobic digestion.
- Continued support for Philippine training with in-country partners.
- Support for profile of Polish agricultural anaerobic digestion opportunities.

- *Agriculture Sector Action Plan revised in February 2013.*

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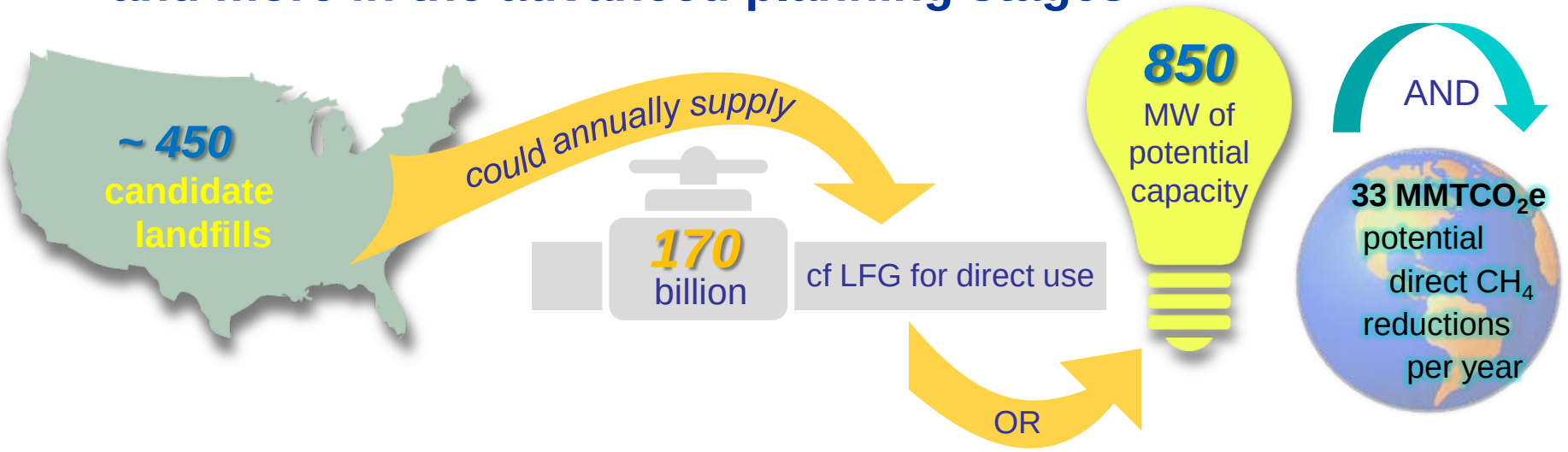
The National MSW Picture

- **Project Snapshot (as of September 2013)**

- **At least 30 projects under construction for '13/14 and more in the advanced planning stages**



U.S. Supported Municipal Solid Waste Activities

- Launched CCAC MSW Initiative with key lead partners
- Strong presence at the GMI Expo in Vancouver (31 posters + technical sessions)
- Convened first MSW CCAC Steering group meeting (Vancouver)
- Initiated partnerships in three CCAC cities and conducted outreach to two additional cities.
- MSW Subcommittee webinar in December 2013
- Provided the Subcommittee with pertinent information on biogas production and other issues related to anaerobic digestion of MSW
- Direct Use packet completed
- Awarded eight MSW grants – Brazil, Chile, Ghana, Nigeria, Poland, Turkey, Ethiopia and Serbia
- Advanced GMI mission in priority countries including Brazil, Indonesia, Mexico, China, and Turkey

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Forward Thinking - MSW

- Continue to provide information on anaerobic digestion of MSW based on Subcommittee feedback and direction
- Continue support of waste NAMA and action plan development
- Continue development of landfill inventories for Partner countries and provide site-specific technical support and analysis such as LFG generation models
- Leverage GMI resources to support and complement CCAC MSW initiatives in key GMI countries
- Leverage institutional relationships with partner agencies (ISWA, UNEP-IETC, C40, IGES)

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The National Wastewater Picture

3%	Approximate percent of U.S. electricity production used by water and wastewater operations (~100 billion kWh annually)
35%	Amount of municipal energy consumption used by water/wastewater systems
~17,000	WWTFs in the U.S.
40,000,000,000	Gallons of wastewater treated in the U.S. every day
8,000,000	Approximate amount of dry tons of biosolids generated per year by U.S. WWTFs
~57%	Approximate percent of WWTFs >1MGD without anaerobic digestion
>400 MW	Estimate of new biogas-based electricity generating capacity potential
3 MMTCO2e	Potential emissions reductions associated with biogas-based electricity potential

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U.S. Supported Wastewater Activities

- Development of national methane resource assessment in Chile, Mexico and Indonesia.
- Biogas recovery prefeasibility study development at existing WWTPs in Mexico, China and Chile.
- Technical training and capacity building for WWTP operators in Mexico.

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Forward Thinking - Wastewater

- Outreach / Action Planning
  - Help to develop tools and resources such as: biogas modeling tools, case studies, training activities, and pre-feasibility studies.
  - Finalize U.S. Wastewater Sector Action plan.
- Technical Assistance
  - Continue support of international GMI wastewater projects focused on technical assistance and training to overcome technical, institutional, and financial barriers to project development.
  - Provide assistance to developing countries to develop or refine their methane action plans.
- Collaboration
  - Identify and seek ways to better collaborate with Partner Countries; the private sector; and multilateral organizations.

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- AgSTAR 2014 National Workshop: April 7 in San Diego, CA

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