

NGF  
National Green Fuels, LLC

Presentation  
to  
Virginia's  
Executive Order 57 Workgroup

October 31, 2016

Tom Reardon

Chief Operating Officer

National Green Fuels, LLC.

# Introduction

## National Green Fuels, LLC

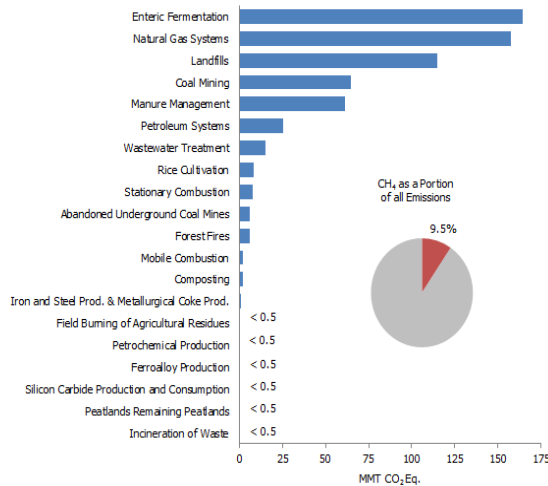
- Thomas Reardon
  - Chief Operating Officer, NGF
- ~ 30 years of experience
- Former Director of SWANA's WtE Technical Division
- Contact Information
  - Phone – (703) 508-9738
  - E-mail – [treardonofva@Verizon.net](mailto:treardonofva@Verizon.net)



# Major Greenhouse Gasses

## ➤ Major Sources of Green House Gasses Impacting VA

1. CO<sub>2</sub> Emissions from Electric Generating Units (EGU's)
2. Methane (CH<sub>4</sub>) emissions from landfills
3. CO<sub>2</sub> emissions from transportation



Source: U.S. EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks

## ➤ Why focus on CO<sub>2</sub> when Methane's significantly worse?

- Methane is second largest greenhouse gas behind CO<sub>2</sub>
- Landfills are the third largest source of anthropogenic methane (CH<sub>4</sub>)
- Methane (CH<sub>4</sub>) is 25 times as effective as CO<sub>2</sub> at trapping heat in the atmosphere (IPCC 2007)

# Municipal Solid Waste (MSW)

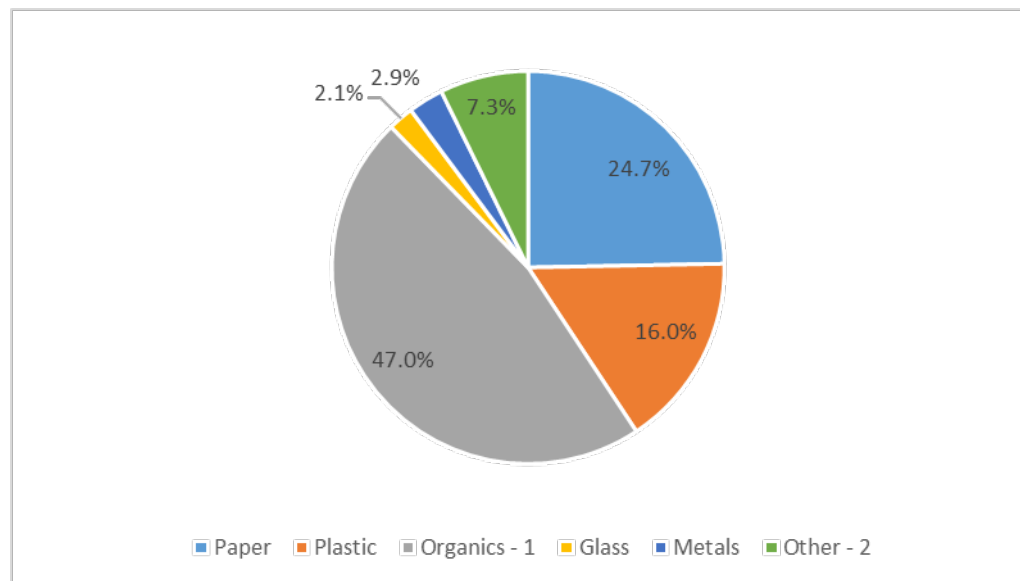
## MSW In the United States

- Approximately 254 million tons generated in 2013<sup>1</sup>
- Approximately 2,000 active MSW landfills in the United States

## Virginia<sup>2</sup>

- Landfilled approximately 7.4 million tons of MSW in 2014
- Currently has approximately 50 permitted and active landfills

## Northern Virginia County Findings by Material



Source: Prince William County Waste Composition Study, Summary of 2013-2014 Results

- Approximately 90% of the materials listed can be processed for recycling recovery and converted to mixed alcohols if MSW were diverted.

Notes 1 - Organics material includes food waste, organics and yard waste.  
 2 - Other materials Includes construction and demolition debris, electronics, household hazardous waste and miscellaneous materials such as carpet and mattresses.

Sources: 1 - U.S. EPA  
 2 - Waste Managed in Virginia During Calendar Year 2014

## Diversion of MSW

- Diversion of MSW from landfills for conversion to mixed alcohols will:
  - Eliminate approximately 6 tons of methane CO<sub>2</sub> equivalent (CO<sub>2</sub>E) per ton of waste diverted annually;
  - Not increase CO<sub>2</sub> from other sources such as transportation, since waste collection systems remain unchanged;
  - Minimize landfill usage for biogenic waste materials, therefore extending their life; and
  - Reduce reliance on fossil fuel, since the conversion to mixed alcohol utilizes the energy value contained within the MSW, which would otherwise be lost when landfilled.
- MSW Diverted from landfills will be processed through a three phase process consisting of waste processing, gasification to syngas and conversion to mixed alcohols an alternative liquid transportation fuel.

# Carbon Offsets

- Current Status
  - Tradable Carbon Offsets are currently only available when landfill methane is used to generate electricity.
  - Currently only available within the electric generation sector.
  - There is no credit for eliminating methane generation.
- Why They're Important
  - Tradable Carbon Offsets created from the diversion of MSW for conversion to an alternative liquid transportation fuel are needed to finance the multi-million dollar MSW to mixed alcohol conversion facilities

# Moving Forward and What's Accomplished

## Moving Forward

- Holistic and Multisector approach to GHG reductions where:
  - Virginia Implements regulations diverting MSW from landfills for the conversion to an alternative transportation fuel.
  - Virginia creates tradable Carbon Offsets for the elimination of methane emissions.

## What's Accomplished

- Achieves **significantly** more GHG reductions than closing coal fired EGU's and improvements in energy efficiencies.
- Improves vehicle tailpipe emissions when the mixed alcohols are blended with other liquid transportation fuels.
- Enables financing for the MSW conversion facilities by allowing them as an offset to CO<sub>2</sub> emissions from coal-fired EGU's

Note: Replacing coal fired EGU's with natural gas EGU's still utilizes a fossil fuel and generates CO<sub>2</sub> emissions.

## Solution Summary

### Executive Order 57 Objective

- Develop carbon reduction strategies while considering factors such as;
  - Impact on the reliability of the electric system;
  - Impact on electric rates;
  - Economic impact.

### The Solution

- The diversion of MSW, including food and organic wastes, for conversion to an EPA registered alternative liquid transportation fuel (mixed alcohols) fits within EO57 mission and will:
  - Eliminate ~ **48 million tons** of methane CO<sub>2</sub> equivalent in period 1 as compared to the **31 million ton** goal set by the EPA for the period;
  - Provide the Commonwealth with a significant economic development opportunity; and
  - Minimize electric system reliability impacts and rate increases within Virginia.
- Creates ~ 48 million tradable Carbon Offsets



# Impact on Virginia

- When Implemented the diversion of MSW from landfills and the creation of tradable Carbon Offsets will:
  - Minimize the use of landfills for the disposal of post-recycled MSW;
  - Increase recycling within the Commonwealth;
  - Minimize electrical generation system impacts and costs;
  - Contribute to the Commonwealth's low carbon future;
  - Provide the Commonwealth with compliance flexibility;
  - Require no public financing; and
  - Establish the Commonwealth as a national leader in Greenhouse Gas reduction, including reducing tailpipe emissions when mixed alcohols produced from MSW are used in automobiles.

# Questions and Discussions

Thank You