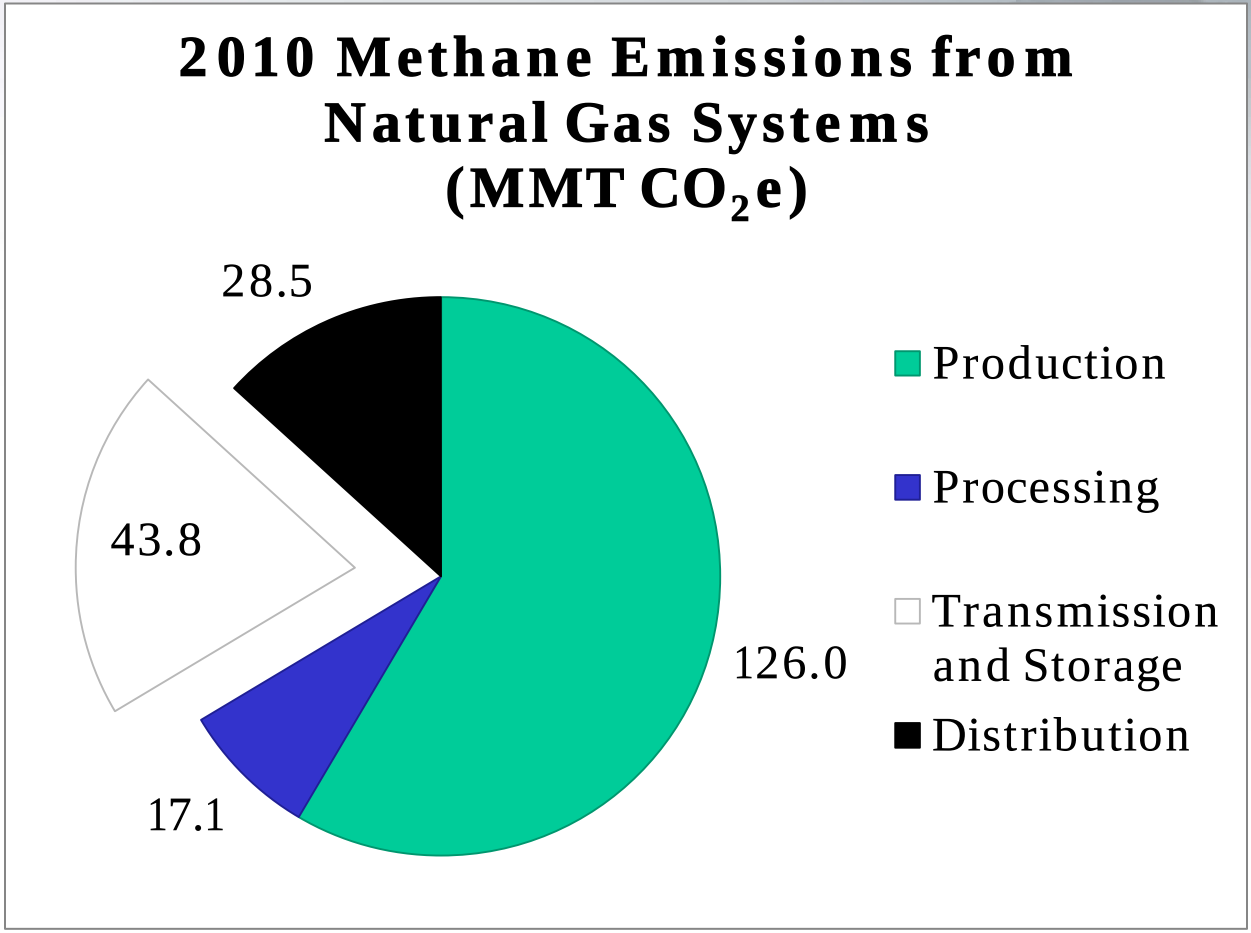
Transmission and Storage Sector

September 14, 2012

*This presentation contains minor corrections to slides presented at the workshop.

Transmission and Storage Sector

- 43.8 MMT CO_2e
- 20.3% of total natural gas systems emissions



Background

Transmission and Storage Sector – Sources associated with natural gas transmission, underground storage, liquefied natural gas (LNG) storage, and LNG import and export.

2012 Inventory Transmission and Storage Emissions (MMT CO_2e)

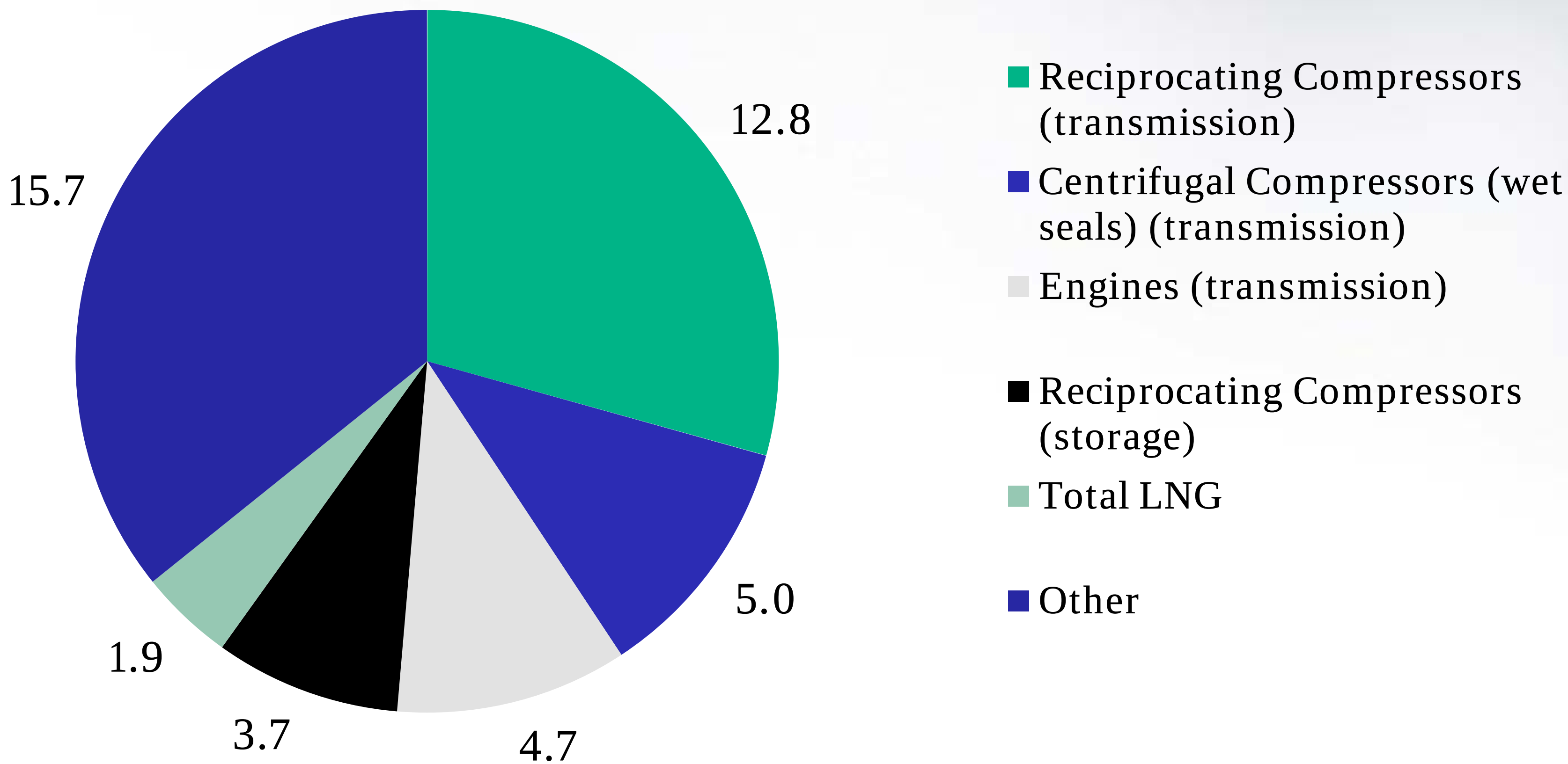
	1990	1995	2000	2005	2010
Calculated Potential	49.2	51.3	52.1	51.9	53.0
Voluntary Reductions	0.0	-(2.5)	-(5.4)	-(10.5)	-(9.2)
Regulatory Reductions	N/A	N/A	N/A	N/A	N/A
Net Emissions	49.2	48.7	46.7	41.4	43.8

Transmission and Storage Emission Sources

LNG (details in slides)	Dehydrator vents (Transmission)
Pipeline Leaks	Dehydrator vents (Storage)
Station (transmission)	Engines (Transmission)
Recip Compressor (transmission)	Turbines (Transmission)
Centrifugal Compressor (wet seals) (transmission)	Engines (Storage)
Centrifugal Compressor (dry seals) (transmission)	Turbines (Storage)
Station (storage)	Generators (Engines)
Recip Compressor (storage)	Generators (Turbines)
Centrifugal Compressor (wet seals) (storage)	Pneumatic Devices Trans
Centrifugal Compressor (dry seals) (storage)	Pneumatic Devices Storage
Wells (Storage)	Pipeline venting
M&R (Trans. Co. Interconnect)	Station Venting Transmission
M&R (Farm Taps + Direct Sales)	Station Venting Storage

Top Transmission and Storage Emission Sources

2010 Methane Emissions (2012 Inventory), $MMTCO_2e$



Top Transmission and Storage Emissions Sources

- **Reciprocating compressors (transmission)**: fugitive and vented emissions from reciprocating compressor related equipment at transmission compressor stations.
  - 12.8 MMT CO_2e, or 29.2% of Transmission and Storage emissions
- **Centrifugal compressors (wet seals) (transmission)**: fugitive and vented emissions from centrifugal compressor related equipment with wet seals at transmission compressor stations.
  - 5.0 MMT CO_2e, or 11.4% of Transmission and Storage emissions
- **Compressor engines (transmission)**: methane emissions result from the incomplete combustion of the natural gas which allows some of the methane in the fuel to exit in the exhaust stream.
  - 4.7 MMT CO_2e or 10.7% of Transmission and Storage emissions
- **Reciprocating compressors (storage)**: fugitive and vented emissions from reciprocating compressor related equipment at storage compressor stations.
  - 3.7 MMT CO_2e, or 8.4% of Transmission and Storage emissions
- **Liquefied Natural Gas (LNG)** (details on the following slide)
  - 1.9 MMT CO_2e, or 4.3% of Transmission and Storage emissions

LNG

- Emissions from LNG Import/Export Terminals and Storage are 1.9 MMT CO_2e
  - LNG Import/Export Terminals 0.4 MMT CO_2e
  - LNG Storage 1.5 MMT CO_2e
- Sources include (for both Terminals and Storage)
  - Station Fugitives (0.2 MMT CO_2e)
  - Station venting (0.1 MMT CO_2e)
  - LNG Compressor Exhaust (Turbines) (<0.1 MMT CO_2e)
  - Reciprocating Compressors (1.0 MMT CO_2e)
  - Centrifugal Compressors (0.3 MMT CO_2e)
  - LNG Compressor Exhaust (Engines) (0.2 MMT CO_2e)

Calculating Net Emissions Transmission and Storage

- Voluntary reduction activities include:
  - Use of turbines at compressor stations
  - Replace wet compressor seals with dry seals
  - Use composite wrap repair
  - Use hot taps for in-service pipeline connections
  - Reduce/downgrade system pressure
  - Directed inspection and maintenance at compressor stations
  - Install vapor recovery units on pipeline liquid/condensate tanks
- No current regulatory activities identified

2010 Emissions from Transmission and Storage (2012 Inventory), MMT CO_2e

Potential Methane	Voluntary Reductions	Regulatory Reductions	Emissions (MMT CO_2e)
53.0	- 9.2	N/A	= 43.8

Questions for Stakeholders

- Are more recent data sources available?
  - Activity data
  - Emission factors

- Suggestions for updates to presentation of transmission and storage sector information in the GHG Inventory?

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