#### El Paso Corporation



### Road to Climate Action Leader™: **Process & Fugitive Emissions**

Fiji C. George Manager, Corporate Strategy & Development CCAR Annual Members Meeting

> October 7, 2008 Sacramento, CA

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### **Overview of El Paso Corporation**



### **Our Greenhouse Gas Commitment**

- "Assess, engage and act"
  - Commitment statement http://elpaso.com/profile/mainneighbor.shtm
- Carbon Disclosure Project (CDP) 5 & 6 participant
- California Climate Action Registry (CCAR)
  - First company in CCAR history to certify without significant errors
  - First company to achieve Climate Action Leader<sup>™</sup> for 2007
  - ---- First natural gas company to join CCAR
- Reported third party verified entity wide emissions to DoE's 1605(b) program in 2007
- Serves on Advisory Committee—The Climate Registry (TCR)
  - El Paso Natural Gas and Colorado Interstate Gas are TCR "Founding Reporters"
- Coalition for Emission Reduction Projects (CERP)
- 2008 Southern Gas Association (SGA) Environmental Excellence Award for leadership on GHG matters

## 2005 Emissions Profile for the Natural Gas Sector

U.S. GHG Emissions by Fuel/Source—2005		(Million to	onnes of CO <sub>2e</sub> )	CO <sub>2</sub>	CH4	Other Gases	Total CO <sub>2e</sub>
Oil 1% (Power)		Production		47.8	35.2	_	83.0
		Processing		41.1	11.9	—	53.0
		Transmissior	and Storage	32.0	36.8	—	68.8
		Distribution			27.4	_	27.4
		Gas Indus	try Total	120.9	111.1	_	232.2
CO2 from Transportation 26%	Coal 28% (Power)	U.S. Total		6,089.5	539.3	631.6	7260.4
CO2 from Industrial Combustion 12% CO2 from Commercial Combustion 3% CO2 from Residential Combustion 5% Non-Er		Gas Industry	y Share of U.S.	2.0%	<b>20.6%</b>	0.0%	3.2%
	Ga HF N20 (So Comb 7 Methane (Landfill, Mining, Ag, Gas) 2 from ess and hergy Use 4%	as (Power) 4% C, PFC, SF6 2% il Mgmt, ustion) %	<ul> <li>Relative to total U.S. CO<sub>2eq</sub> emissions</li> <li>Natural Gas combustion ~ 17%</li> <li>Natural Gas Industry Share ~ 3%</li> <li>Methane emissions ~ 1.5%</li> </ul>				

Methane emissions from the gas sector are a small fraction of the total U.S. emissions

## 2006 El Paso's GHG Emissions

#### Total Emissions by Emission Category\*

Emission Category	Emissions MMT CO <sub>2</sub> e	Contribution	
Stationary Combustion	6.58	42.3%	
Process & Fugitive	8.21	52.8%	
Mobile Combustion	0.05	0.3%	
Indirects	0.71	4.6%	
Total	15.56	100%	



#### Total Emissions by Gas\*

GHG	Emissions MMT CO <sub>2</sub> e	Contribution	
CH <sub>4</sub>	8.70	55.9%	
CO <sub>2</sub>	6.72	43.2%	
N <sub>2</sub> O	0.14	0.9%	
HFCs	0.001	0.01%	
Total	15.56	100%	



\*As reported to 1605(b), does not include ANR

### GHG Emission Categories and Sources: Natural Gas Transmission

#### Vast number of discrete but "small sources"

#### **Direct Emissions**

- Stationary Combustion
  - ---> Reciprocating IC engines
  - ----> Turbines
  - ----> Process heaters
  - ----> Process boilers
  - ---- LNG vaporizers
  - ----> Flares/Thermal Oxidizers
- Mobile combustion
  - ···→ Vehicle fleet
  - ---- Aviation fleet
- Process/Vented
  - → NG blowdowns
  - → Dehydrators
  - ---> Amine units
  - ---> Pneumatic devices
  - → Gas-assisted pumps
  - → Work-over & Completion Venting
  - → Storage Tanks

#### ▲ Fugitive

- → Transmission and Gathering Pipelines
- Transmission/Storage Station Piping Components
- → Reciprocal and Centrifugal Compressors
- → M&R Stations
- → Storage Wells
- → Vehicle Fleet A/C Systems
- → Process Plant piping & components

#### **Indirect Emissions**

- ▲ Generation of electricity used by:
  - ---> Stations/office buildings
  - ----> Electric driven compressors
  - Electric driven pumps (pump-jacks)

# Road to Climate Action Leader<sup>™</sup> Lessons Learned (Technical)

- Relative to electric sector, GHG inventorying is a "new" technical challenge
  - ---- 100% of the emissions non directly measured (non CEMS)
- Several thousand emission sources for a single company
- ▲ Over 50% of the emissions profile is methane
- High uncertainty of fugitive methane factors
  - ---- Outdated and unrepresentative
    - Not "cap-and-trade" quality
- Frequent acquisition/divestiture activity
- Complex ownership
- Remotely located
  - ---> Data collection issue



## **Emission Factor Improvements: Policy Recommendations**

- Emission Factors are outdated and needs improvement for voluntary or mandatory reporting
- There are thousands of fugitive components even for a single company
  - ---→ 80/20 rule
- Fugitive Emissions Reported are <u>not</u> cap & trade quality
  - AB 32 and WCI regulations should consider phased in regulations for fugitives
- Incentivize companies by providing "offsets" for fugitive sources for couple of compliance periods
  - Focus on 20% of components contributing to 80% of the emissions
  - ---- Offsets demand high quality <u>component level</u> measurements
  - Provides a statistical basis to provide comprehensive factors for entity wide reporting for cap and trade
  - ---- CCAR to be the offset protocol development entity and registry for offset data
  - Funding for industry-government partnership to conduct multi-year surveys improve emission factors
- Innovation
  - Market demand will drive innovation for new and improved components
- Offsets and industry-government partnerships are two policy instruments that will be needed if fugitives are to be regulated under a mandatory program

# Road to Climate Action Leader™: GHG Estimates and Uncertainty

- Accuracy of emission estimates depends on
  - ---> Calculation methodology/tier
    - Availability of equipment detail information (engine combustion cycle, etc.)
  - Accuracy of activity data (e.g., fuel usage, blowdown volumes, component count, electric usage)
  - ----> Accuracy of emission factors



### Road to Climate Action Leader™: Uncertainty Issues—Vented

- Activity data
  - ---> Blowdown volumes
  - ---> Component count
  - ---> Vented gas composition
  - ---- Operational time
- Emission factors
  - ---> Calculations based on mass balance (blowdowns)
  - ---> Industry factors for pneumatic devices/pumps
- Uncertainty issues
  - ---> Good information on vented gas quality
  - May not capture all small blowdowns
  - ---> Unknown actual count of pneumatic devices and/or pumps
  - ---> Outdated emission factors
    - May not represent current industry standards
    - May not reflect component improvements



## Road to Climate Action Leader™: Uncertainty Issues—Fugitives

- Activity data
  - --- Component count
  - Gas composition differences at each component category
- Emission factors
  - ---> Industry emission factors
  - ---> Site specific emission factors
- Uncertainty issues
  - Assumptions on operating time/mode
  - ----> Industry factors do not reflect component manufacturing improvements
  - Industry factors developed more than a decade ago, do not represent current industry standards



## Road to Climate Action Leader™: Emission Factor Improvement

- Calculation methodology/tier
  - → Use a higher "tier"
- Accuracy of activity data
  - Third-party auditable documentation of fuel usage
  - Define thermodynamic or measurement criteria to estimate blow down volumes
  - Accuracy of emission factors
    - Allow companies to develop company specific fugitive emission factors.
    - Companies factors should follow acceptable statistical calculation equations



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