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# GAS RECOVERY
# Optical Fugitive Emission Pilot Study

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# Overview

- Background
- Pilot Study Scope
- Summary of Findings
  - Source Data
  - Facility Comparison
  - Economics
- Path Forward

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# Fugitive Emissions

**Losses (leaks) of HC product**
**(methane, propane, VOC's)**

**UNINTENTIONAL FUGITIVES**

- normal wear and tear / damage
- improper or incomplete assembly of components
- inadequate material specification
- manufacturing defects

**INTENTIONAL FUGITIVES**

- venting (tanks, controllers, comp. seals, stacks, etc.)

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**“Why worry about some little leaks?”**

**“What is the Problem?”**
Gas leaks are *invisible*, *unregulated* and *go unnoticed*

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# Background

## Study Objective

- evaluate new leak detection and measurement technology and determine actual facility fugitive emission rates

## Drivers

- Increase production & reduce costs by recovering lost gas
- CAPP Fugitive Emission Management BMP
- Increase operations Health & Safety
- Reduce GHG emissions / Carbon Credits
- Part of CPC E/E, Gas Star Program, and BIC Initiative

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# Background

## Detection Technology

- **GasfindIR - optical emission technology**
  - infrared video camera with hydrocarbon/VOC filter
  - provides visible images of a HC gas emissions in real-time

**Benefits :**

- Rapid, accurate and safe detection
- Scan hard-to-reach components from a distance
- Assessments performed without interruption of operations
- Inspection times are minimal, which can keep costs down.
- With exact leak source info, repairs are less time consuming and less expensive.
- Cost-effectively scan hundreds of components simultaneously

**Approx. Cost:**

$75,000.00USD

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# Background

## Measurement Technology

- **HiFlow Sampler – volumetric leak measurement**
  - vacuum flow rate detection uses dual-element hydrocarbon (methane) detector
  - measures hydrocarbon concentrations in the captured air stream and determines the leak flow rate (+- 10%)

**Benefits :**

- offers a much higher accuracy of measurement (compared to conventional methods)
- allows an objective cost-benefit analysis of each repair opportunity

**Approx. Cost:**

$14,000 USD

# SCOPE

- Evaluate 22 facilities (9 gas plants and 13 comp. stns.) from various asset areas
- Obtain fugitive emission data
- Complete repair cost/benefit analysis
- Create recommendations for applying a Canada-wide program (CAPP BMP)

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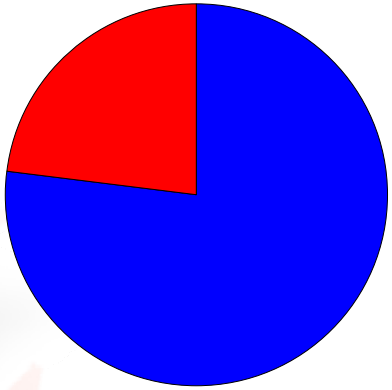
# SOURCE INFO

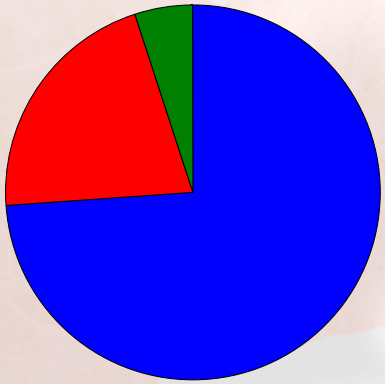
## # of Sources

- **77%** leaking components (111)
- **23%** other fugitive emission sources (33)
- **92%** economical to repair (133)



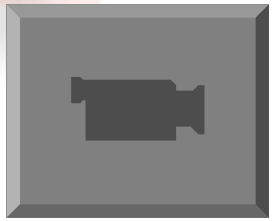
## Composition

- **75%** Process gas (108)
- **21%** Fuel gas (30)
- **4%** Propane (6)



## Location

- 72% Compressor Buildings
- 20% Process Buildings
- 4% Outside piping
- 4% Tanks



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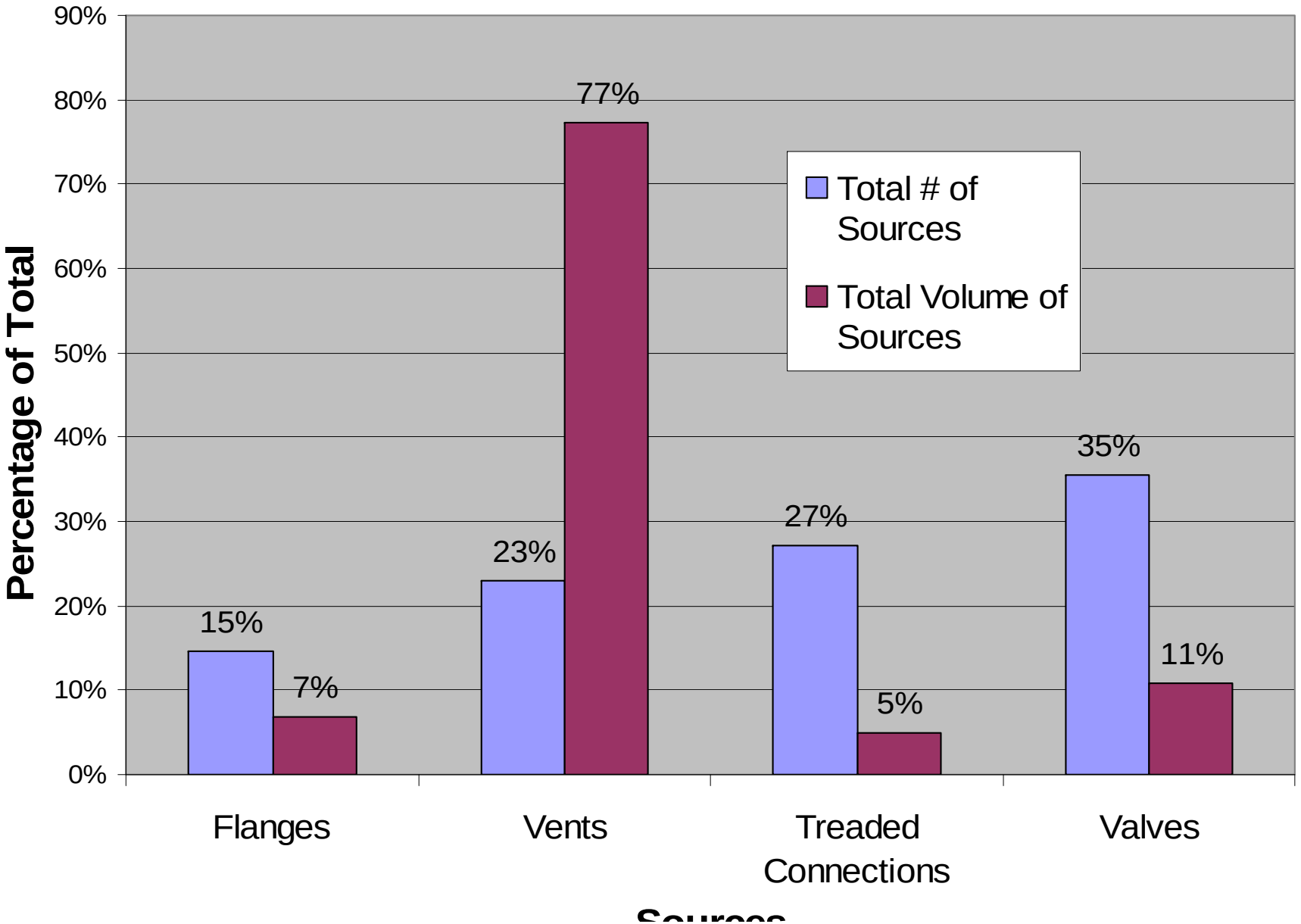
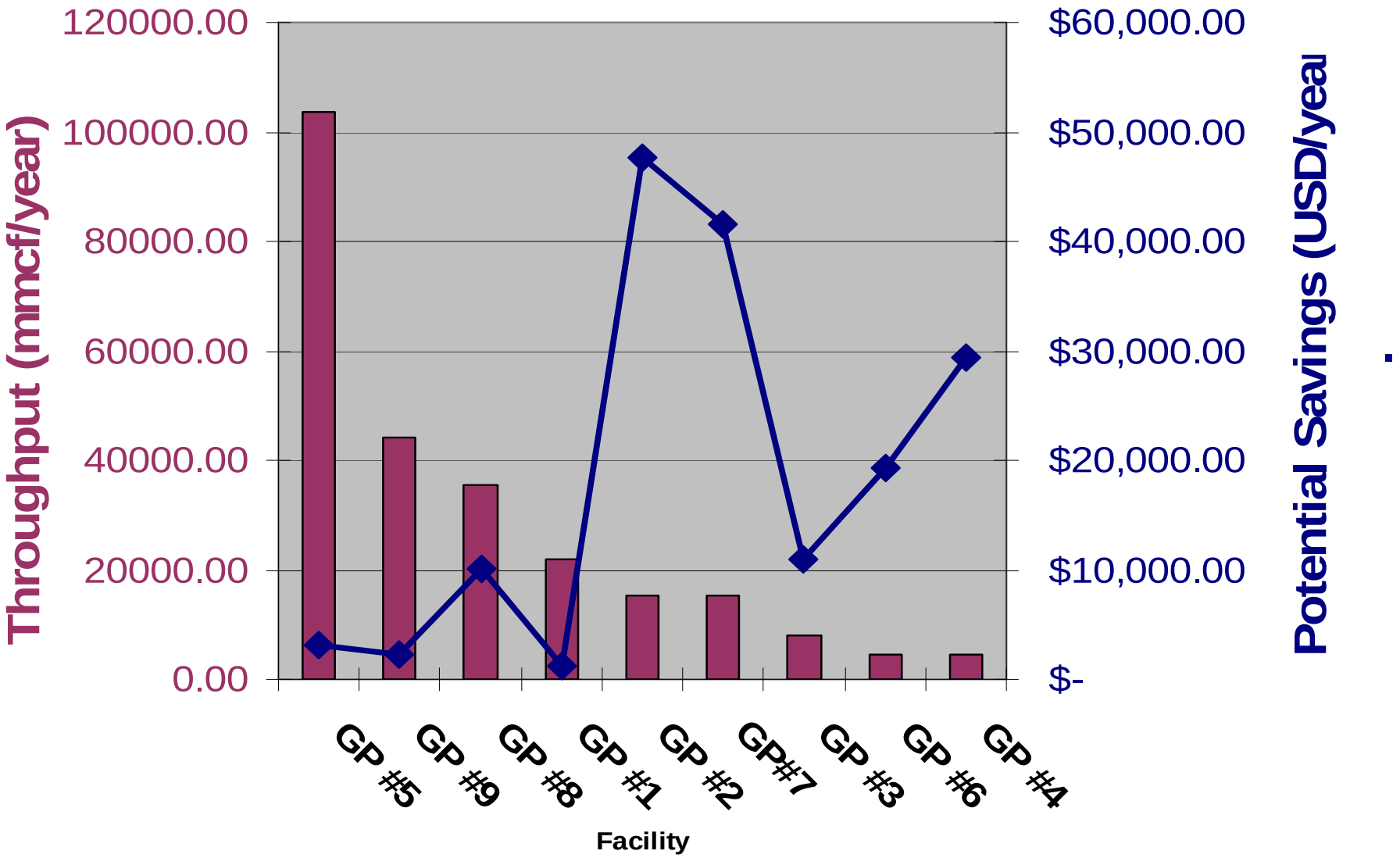
# SOURCE TYPES



# GAS PLANT COMPARISON



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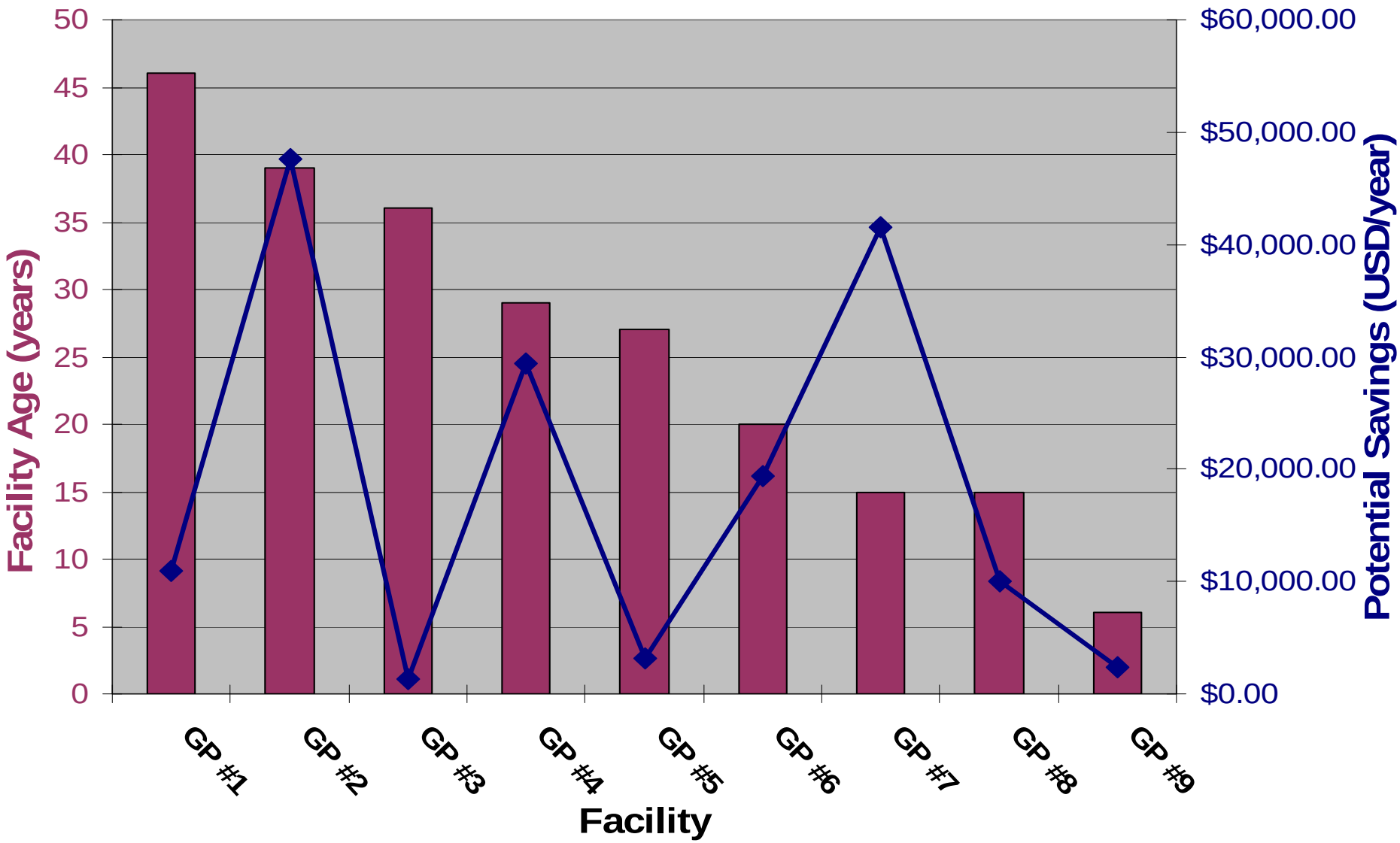

# ECONOMICS

| | |
|---|---|
| **Average Yearly Savings/Facility (US$/year)** | **$16,300.00** |
| **Average Total Cost/Facility (US$/year)** **(assessment and repairs)** | **$8,000.00** |
| **Average Est. Payout Period (years)** | **0.50** |
| **Total Gross Est. Annual Savings (US$/year)** | **$10,400,000.00** |
| **Total Est. NPV (US$/year)** | **$35,000,000.00** |
| **CO2e/year Reduction (tonnes)** | **630,000** |
| **$CO_2e$ Credit Value (US$)** | **$15,750,000.00** |

* Using $5.50 USD/mmbtu and $25.00 USD/tonne CO2e

# CAPP BMP CONTROL STRATEGY

- **Fugitive Assessment Schedule**
  - Company-wide assessment of all facilities
- **Fugitive Maintenance Plan**
  - Operating procedures and performance objectives for minimizing fugitive emissions
  - Directed Inspection & Maintenance (DI&M) Program
    - Prioritize inspections to target high potential processes and components
  - Influence facility design (i.e. flow meters, low bleed, vapour recovery, etc.)

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**Table 1. Proposed schedule for implementation of this fugitive**

| Type | | | | |
|---|---|---|---|---|
| Gas P | | | | |
| | | | | two |
| Comp Statio | | | | |
| | | | | two |
| Group Batte Single Batteries | | | | |

## Initial 4-year Schedule

- ~150 Facilities/ year
  - Majority of GP in 1st year
- ~ 70 assessment days/year
- Coordinate with turn-arounds when possible

## After 4 years

- 2 year maintenance-phase schedule
- Average assessment times drop due to leak rates decline
- Leak-prone facilities will require a higher priority/rate of assessment
- Operators request assessments based on fugitive maintenance findings

# PATH FORWARD

- **Set schedule to follow CAPP BMP guideline**
- **Evaluate pipeline opportunities**
- **Decide on resources**
  - i.e. third party, in-house, cost/benefit evaluation
- **Develop Fugitive Maintenance Plan**
  - Imbed Fugitive Management into Operations and Facility Design
- **Education / Knowledge Sharing**

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# QUESTIONS?

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