Petroleum Technology Alliance Canada welcomes you to the Methane Emissions Reduction Forum Merging Policy, Science, and Technology

Soheil Asgarpour, Ph.D., FCAE, FCIM, P.Eng.
November 27, 2018
THANK YOU
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Petroleum Technology Alliance Canada
PTAC Methane Emission Reduction Network
A unique innovation ecosystem aiming to significantly improve the environmental, safety, and financial performance of the oil and gas sector through the facilitation of innovative, collaborative research and technology development in the Canadian hydrocarbon energy industry.
On behalf of all the participants of the 2018 Methane Emissions Reduction Forum, PTAC has made a donation to have 500 trees planted in Western Canada. This donation translates into a contribution that equals 45 days of zero carbon emissions per forum attendee.
According to the IPCC:

We have just 12 years to limit devastating global warming effects.
Synthetron – Important Findings

**Biggest barriers:**
- **Motivators**
  There is no financial motivation. Industry is slow / avoids action.
- **Stakeholders**
  The government moves too slowly. The ecosystem is fragmented and does not have effective coordination.
- **Technology/Innovation**
  Solutions that are available are not getting deployed.

**Largest Enablers:**
- **Technology/Innovation**
  Good technology is out there; innovation is happening.
- **Stakeholders**
  Investors are creating opportunities.
  The producers have started coming together to share facilities to test measurement and conversion technologies.
- **Mobilize**
  ‘Start now – don’t wait for regulation’ – attitude.

**Critical Action:**
- **Information need**
  Fill in the information gaps in requirements, measurement and reporting
- **Regulation** is 100% a critical action to move forward.
Helping Industry Embrace A New Era: What is New?

- Methane Emission Reduction Network
  Response to the fragmented Innovation Ecosystem

- Test Facilities focused on finding economic solutions to reduce methane emissions.

- Applied Research
  To expatiate development of smart policies and regulations via large research projects via AUPRF)

- Large Deployment
  in response to the challenge that available solutions are not deployed
PTAC Proudly Announces
Methane Emission Reduction Network

- The network serves as a hub and an overarching umbrella to connect people, projects, organizations, capital, resources, ideas, etc. towards the goal of reducing methane emissions from the oil and gas activities by 45% by 2025.
Methane Emission Reduction Network Ecosystem

Desired Outcome: Increase Technology Capacity to Reduce Methane Emissions by 45% by 2025
Applied Research
AUPRF: An Example of Value Realized

A unique collaborative platform between Industry, Government & Regulators

Improving Environmental Performance & Creating Value

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Invested</td>
<td>25.3</td>
</tr>
<tr>
<td>Leveraged</td>
<td>122.7</td>
</tr>
<tr>
<td>Total Cost</td>
<td>148</td>
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412 AUPRF Projects Launched to Date

Life Cycle: Protecting the Asset Base

Liability Mgmt

4. Remediation Reclamation

5. Well Abandonment

Access to Resource

Social License

Resource Exploration  Production  Retirement

1. AIR

2. BIODIVERSITY

3. WATER

Value $Million

445 $Million Invested 25.3

Leveraged 122.7

Total Cost 148

Applied Research AUPRF: An Example of Value Realized

Life Cycle: Protecting the Asset Base
Fugitive Emissions Management Program Effectiveness Assessment (FEMP EA) Project Overview:

- World’s First-of-its-kind methane detection, quantification and repair applied research project.
  - Study area = 2500 Square Kms
  - 190 facilities (a total of 30 operators).
  - 100% voluntary participation from operators.

- “it is the most important applied research project happening in the methane space globally”.
TRL 5-7: Test Facilities
Consortium of Methane Emission Test Facilities

Members:

- SRC Facilities (Centre for Development of Emission Reduction (CeDER))
- CMC Research Institutes, Inc. (“CMCRI”) Facilities
- CanmetENERGY Facilities
- InnoTech Alberta - Vegreville Facilities
- Western Canadian Oil and Gas Operators Facilities
- Colorado Facility (near Fort Collins)
- U of C, U of A, SAIT, NAIT, Carleton University.
- PTAC as the Consortium Administrator/Facilitator/Manager

PTAC is planning to apply for $16M under CCITF, and NRCan proposal to dedicate to this facility (see the attached PowerPoint presentation).
**TRL 8-10: Large Deployment**

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<thead>
<tr>
<th>TRL 0-2</th>
<th>TRL 2-4</th>
<th>TRL 5-7</th>
<th>TRL 8-10</th>
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<tbody>
<tr>
<td>✔️ Intelligent Methane Monitoring and Mitigation System (IM3S)</td>
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<td>✔️ Waste Methane Capture Program (WMCP)</td>
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<td>✔️ Systematic Third-party Validation of Environmental and Economic Performance of Methane Reduction Technologies (STV)</td>
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<tr>
<td>✔️ Affordable Zero-Emission Fail-Safe Electric Dump Valve Actuator (DVA)</td>
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<tr>
<td>✔️ Energy Efficiency Alberta Methane Reduction program</td>
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REMVue Slipstream

One example of many new PTAC technologies successfully delivering results.

**Current Benefits**
- 130,000/year cars off road
- $15 Million/year value creation

**Full Industry Uptake**
- 1.6 Million/year cars off the road
- $160 Million/year value creation
Methane Emission Reduction Initiatives
PTAC’s Goal

Increase Canada’s Oil and Gas technology capacity to reduce methane GHG emissions by:

- 30% by 2017
- 45% by 2020
- 80% by 2025
- 85% by 2030
collaboration is everything