



ONBOARD
DYNAMICS

Advancing Cleaner Energy for Our Environment

About Onboard Dynamics

We support the natural gas ecosystem in reducing global GHG emissions safely and reliably through innovative and practical commercial solutions.



Listening to Our Customers Leads to New Innovations

Mitigate and reduce methane emissions across multiple natural gas vertical applications.

Products for CNG/RNG refueling that do not need electricity for power:



(2018)

(2020)

GoFLO® CNG/RNG Compressor
Easy access for natural gas refueling

GoFILL® CNG/RNG Refueler
Self contained refueling station

Products for performing natural gas capture, recovery, and measurement to prevent methane releases into the atmosphere during pipeline evacuations:



(2021)

GoVAC® FLEX System
Natural gas pipeline evacuation and CNG/RNG refueling



(2023)

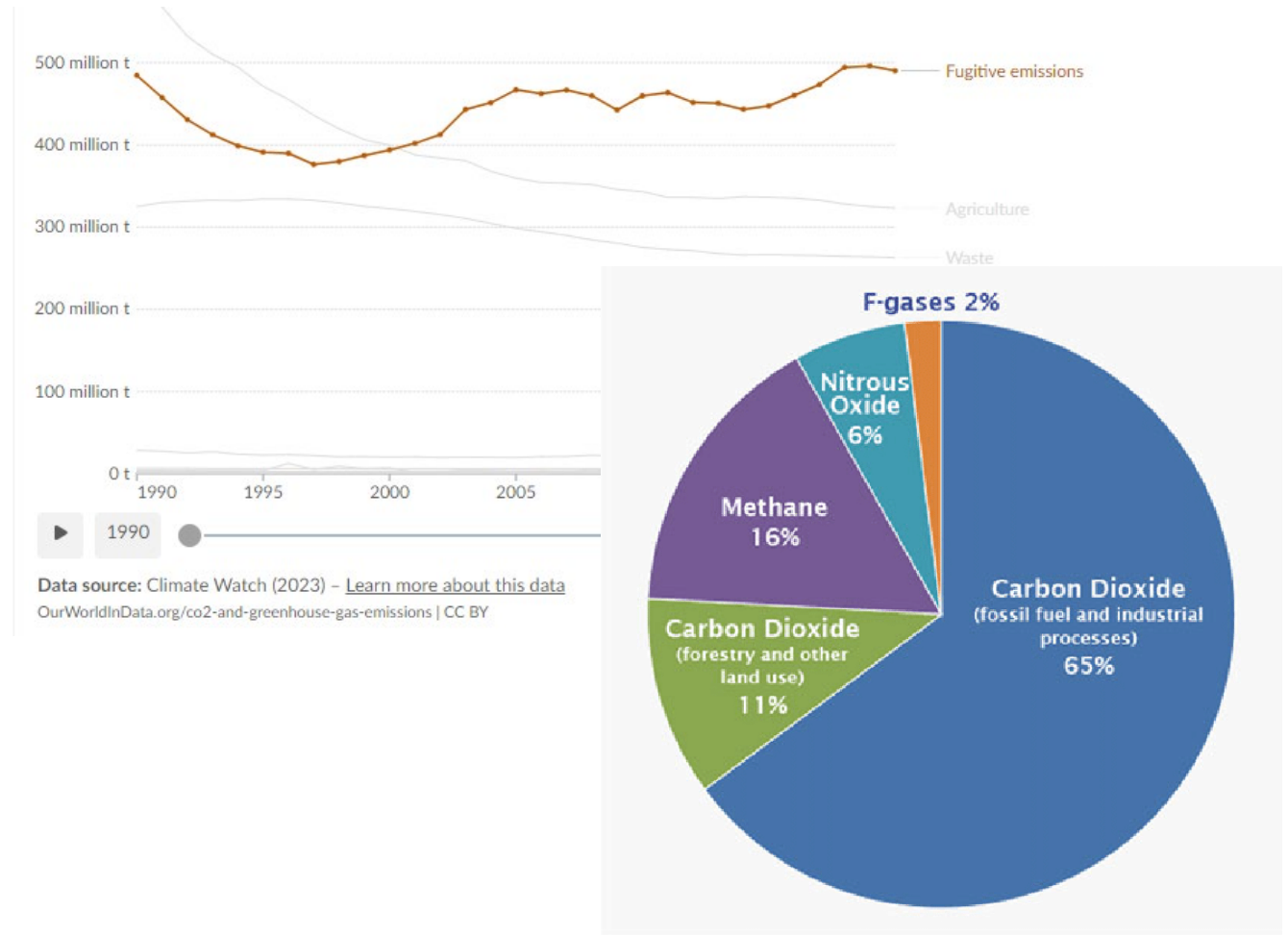
GoVAC® MAX System
Natural gas compression for larger projects and faster flow rates

Why the Concern Over Methane

Methane traps 28x more radiation than Carbon Dioxide.

Methane is responsible for around 30% of the current rise in global temperature

Methane is responsible for about 16% of greenhouse gases (GHGs) released globally



Keeping Well-maintained Pipeline Infrastructure



- **Natural gas pipelines need to be evacuated or purged for several reasons, including:**
 - Safety
 - Maintenance
 - Pipeline integrity testing
- **Overall, evacuating natural gas pipelines is an essential step that ensures they operate safely and efficiently.**

Issues with Venting and Flaring

Venting or flaring natural gas from a pipeline is generally not a preferred practice due to several reasons.

- Permitting or not allowed
- Environmental impact
- Waste of resources
- Public perception/social costs
- Regulatory restrictions
- Safety concerns



Regulations to Reduce Carbon Emissions

- The European Union has taken steps to reduce flaring and venting of natural gas through regulations such as the EU Emissions Trading System (ETS), which puts a price on carbon emissions and encourages companies to reduce their greenhouse gas emissions.



Natural Gas Pipeline Evacuation Systems

Natural gas pipeline evacuation systems are being used to avoid venting and flaring.



Introducing the GoVAC[®] FLEX System



Clean
Environmental
Profile



Operational
Benefits and
Advantages

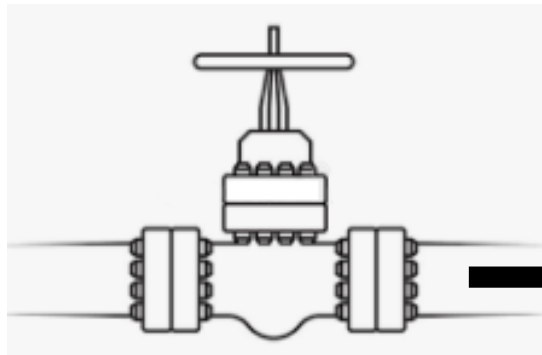


Compliant with
Regulatory Standards
and Requirements

- Safe and Simple to Operate
- No External Power Required
- Easy to Set Up and Deploy
- Self-contained
- Automated Data Capture
- Remote Monitoring and Reporting
- Metric Gauging
- CE Pending

The GoVAC[®] FLEX for Pipeline Evacuation

The GoVAC FLEX can draw a pipeline down to near zero PSIG using the natural gas in the pipeline as its source of power.

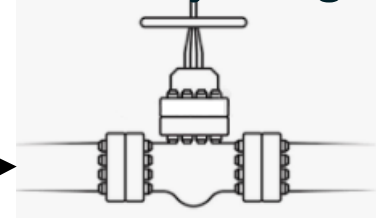


Pipeline inlet



Recover the natural gas and either:

- 1 Transfer into an adjoining pipeline.



-or-

- 2 Compress it up to 3600 PSIG into a tube trailer for transport.



Near-zero Emissions / No Diesel Required

Solution Benefits



Clean Environmental Profile

- Runs on natural gas
- No external electricity or diesel required
- Low noise pollution when operating in sound sensitive areas



Operational Advantages

- Cost effective, especially for short repair segments
- Portable, self-contained, small footprint
- Easy to deploy and operate
- Remote monitoring and environmental reporting



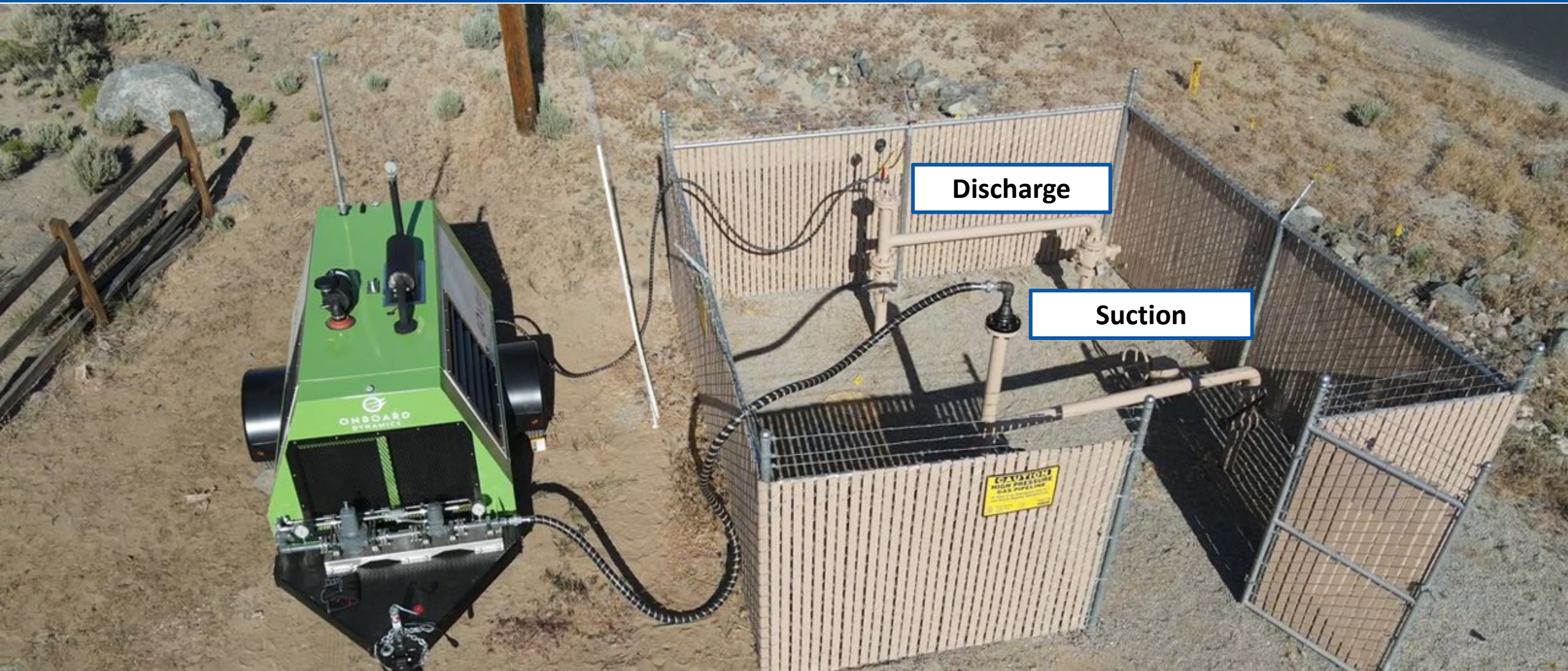
Regulatory Compliance

- NFPA, EPA, SCAQMD, CSA, Conformité Européenne (CE) Pending

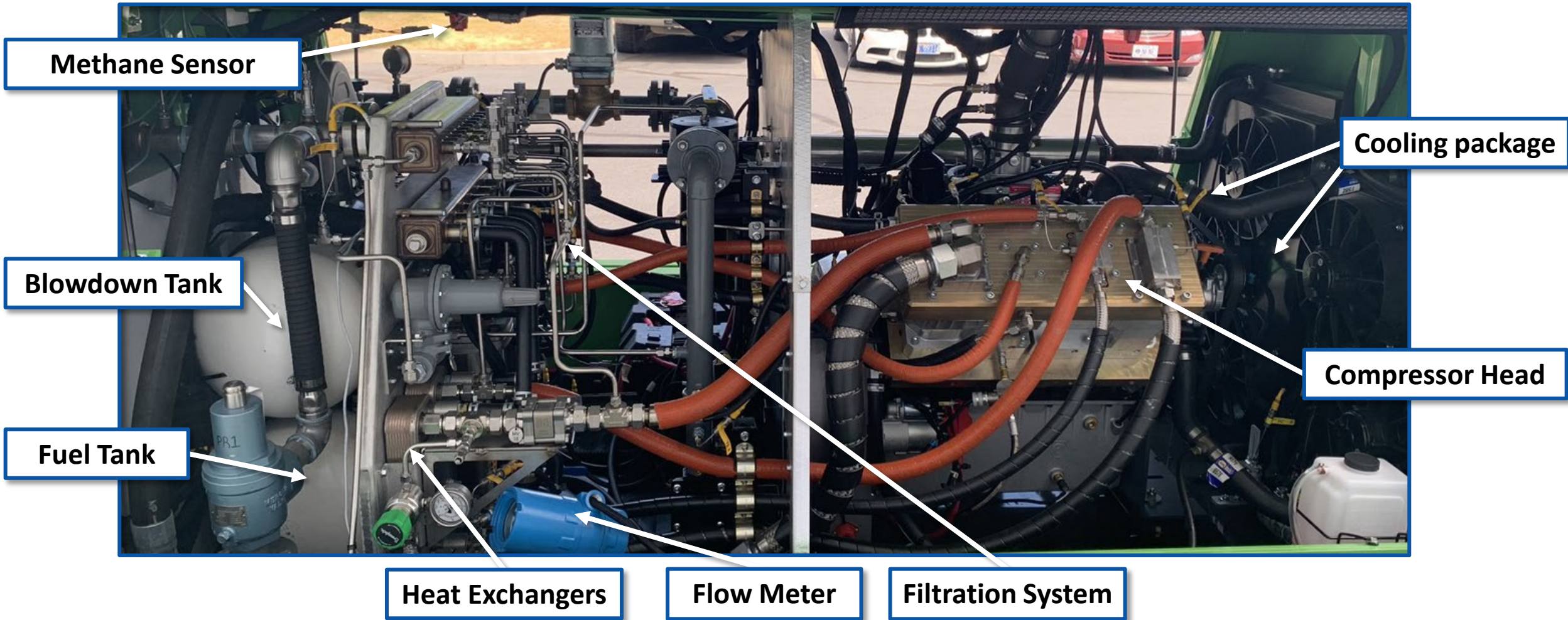
The GoVAC® FLEX System Specifications

Average Flow Rate:	Up to 110 scfm (3.11 Nm ³ /min)	Operational Control:	Sophisticated but simple controls and telemetry
Inlet (Suction) Pressures:	1250 psig (86 barg)	Remote Monitoring:	Via two-way cellular communications
Outlet (Discharge) Pressures:	Up to 3600 psig (248 barg)	Data Management:	Emissions reporting with automated data collection
Fuel Consumption:	~6-8% based on project parameters	Hazardous Area Compliant:	Class 1 Div 2 – Can safely operate near pipelines (similar to ATEX Zone 2)
Fuel Quality:	Range: 900 – 1200 Btu/scf (33.5 to 44.7 MJ/m ³)	Length:	16' (4.88 m)
Emissions Profile:	>99% net methane capture	Width:	7'10" (2.39 m)
Operating Temperatures:	-20°F to 113°F (-29°C to 45°C)	Height:	8'1" (2.46 m) to top of exhaust
Sound Rating:	< 85 dba @ 10 ft (3 meters)	Weight:	~5,800 lbs. (2635 kg)

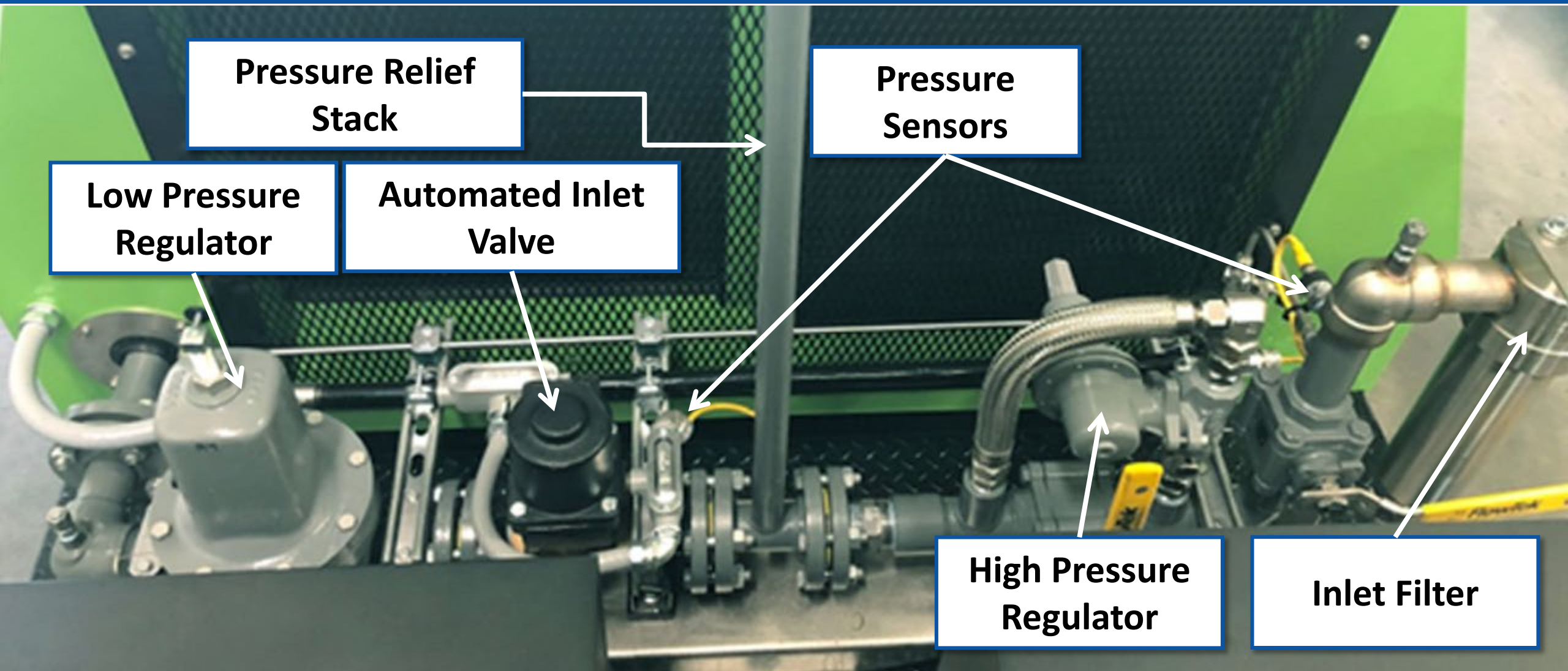
Following The Flow of Natural Gas



Under The Hood



Suction Gas Train



Suction Gas Train



**High Pressure
Regulator**

**Low Pressure
Regulator**

**Automated Inlet
Valve**

1 ½" Suction Inlet

Inlet Filter

Side Interface Panel

1/2" Outlet Connection
(Both Sides)

Other Interfaces:

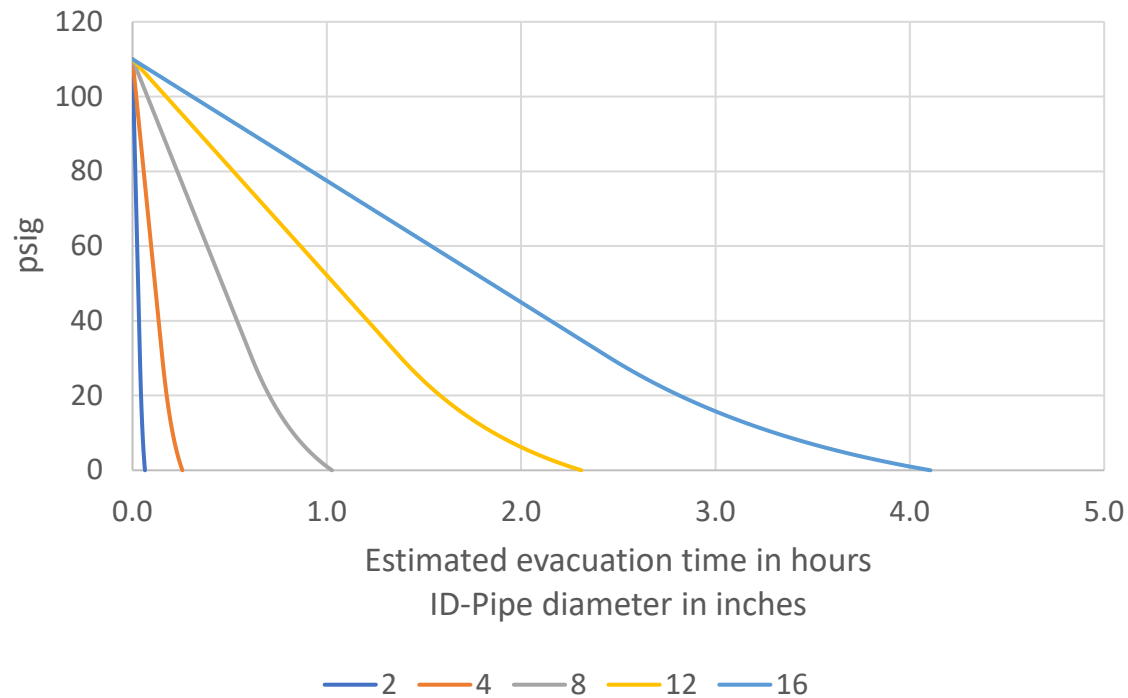
- Optional Fuel Sources:
 - External CNG
 - External LPG
- External Controls
 - E-Stop
 - Pressure Sensor
 - Auto Start



The GoVAC® FLEX System Performance - Validated

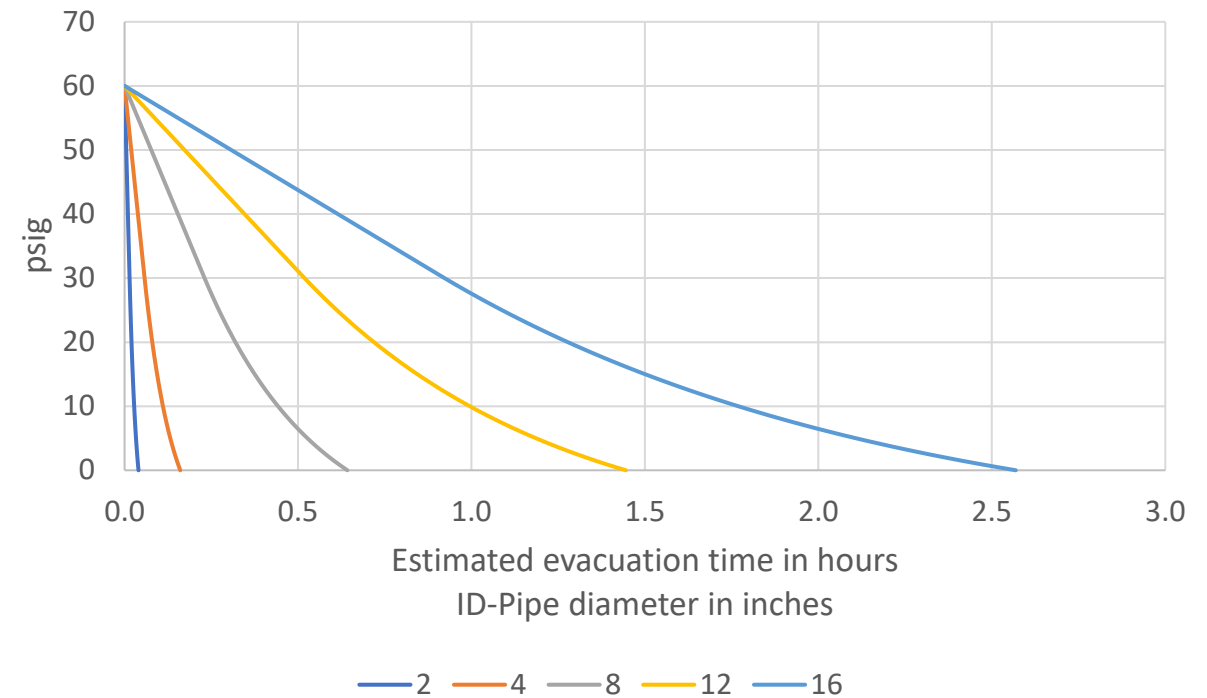
Project Scope:

- Pipeline length: 2,000 ft (610 meters)
- Pipe diameter: 2" – 16" (50.8 mm – 406.4 mm)
- Starting pressure: **110 psig (7.6 barg)**
- Final pressure: 1 psig (.07 barg)



Project Scope:

- Pipeline length: 2,000 ft (610 meters)
- Pipe diameter: 2" – 16" (50.8 mm – 406.4 mm)
- Starting pressure: **60 psig (4.1 barg)**
- Final pressure: 1 psig (.07 barg)



The GoVAC® FLEX System Example Project

Project Scope:

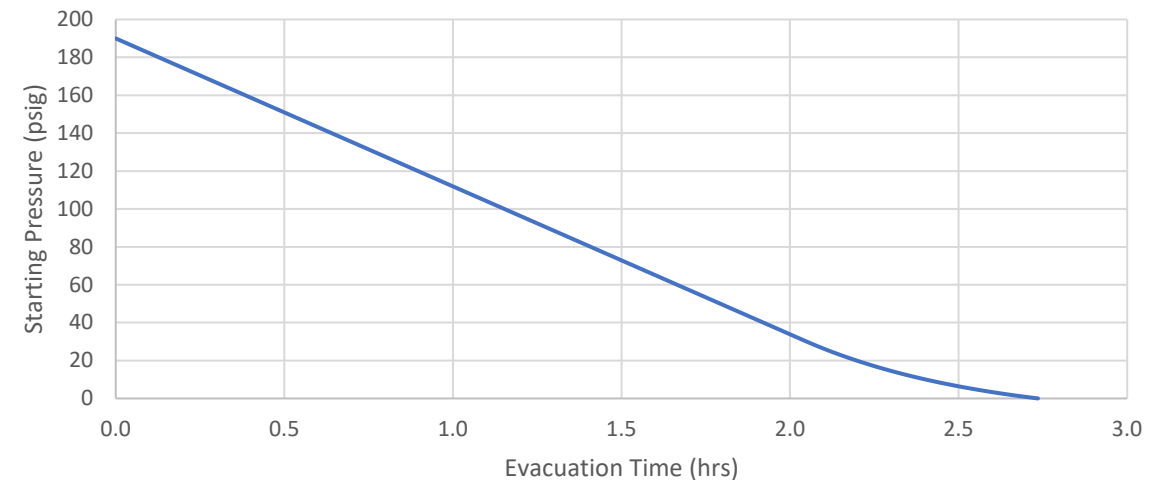
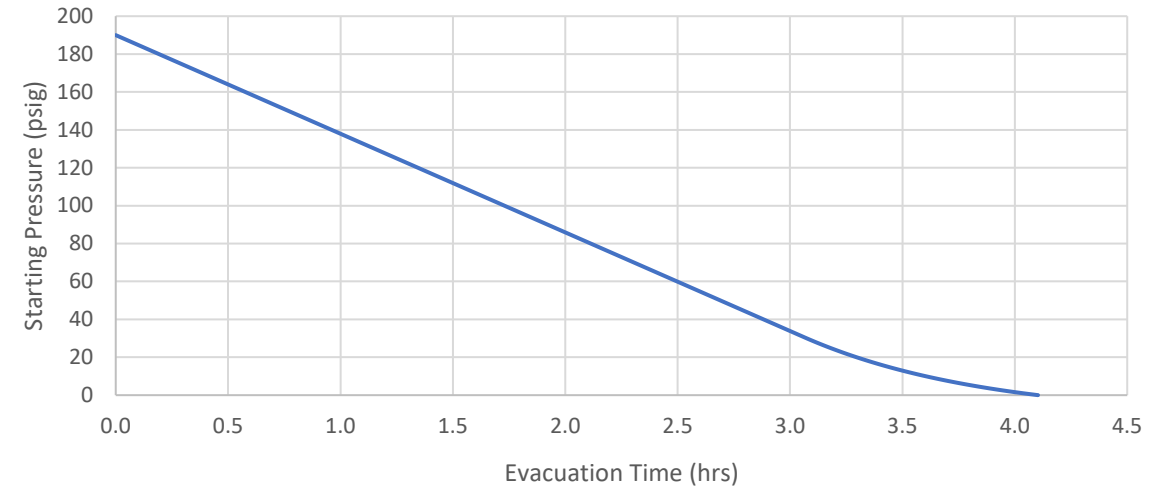
- Pipeline length: 10,000 ft (3,048 meters)
- Pipe diameter: 8" (203.2 mm)
- Starting pressure: 190 psig (13.1 barg)
- Final pressure: 1 psig (.07 barg)
- Outlet pressure: 190 psig (13.1 barg)



**Two units:
4.04 Hours**



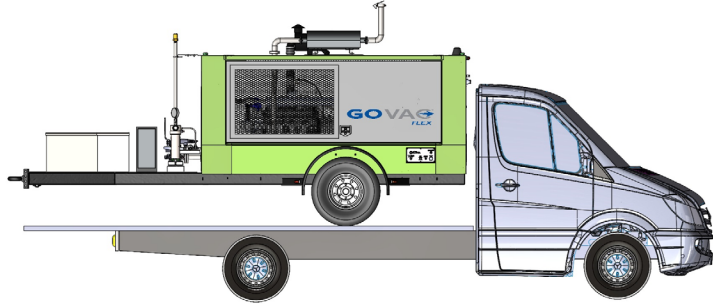
**Three units:
2.69 Hours**



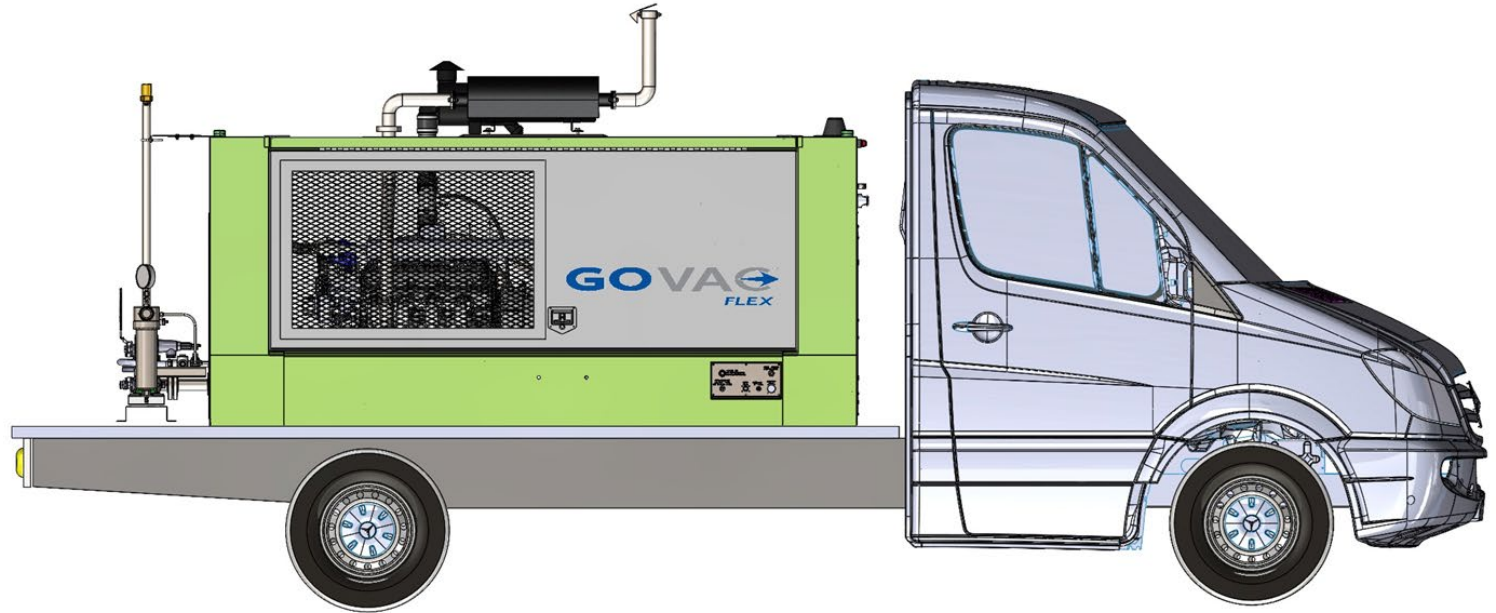
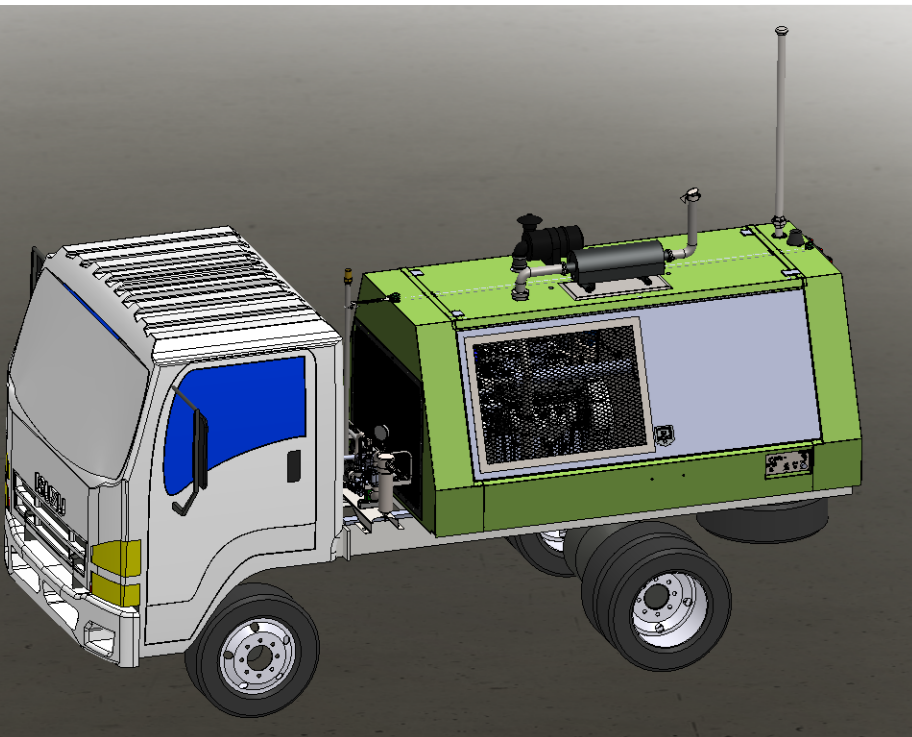
Additional Applications:

- Evacuating pig launchers and receivers
- Evacuating filtration and compressor units
- Refueling vehicles at jobsites

Truck-mounted Concept



Direct mounting onto truck or skid mounted is feasible if preferred by customer.

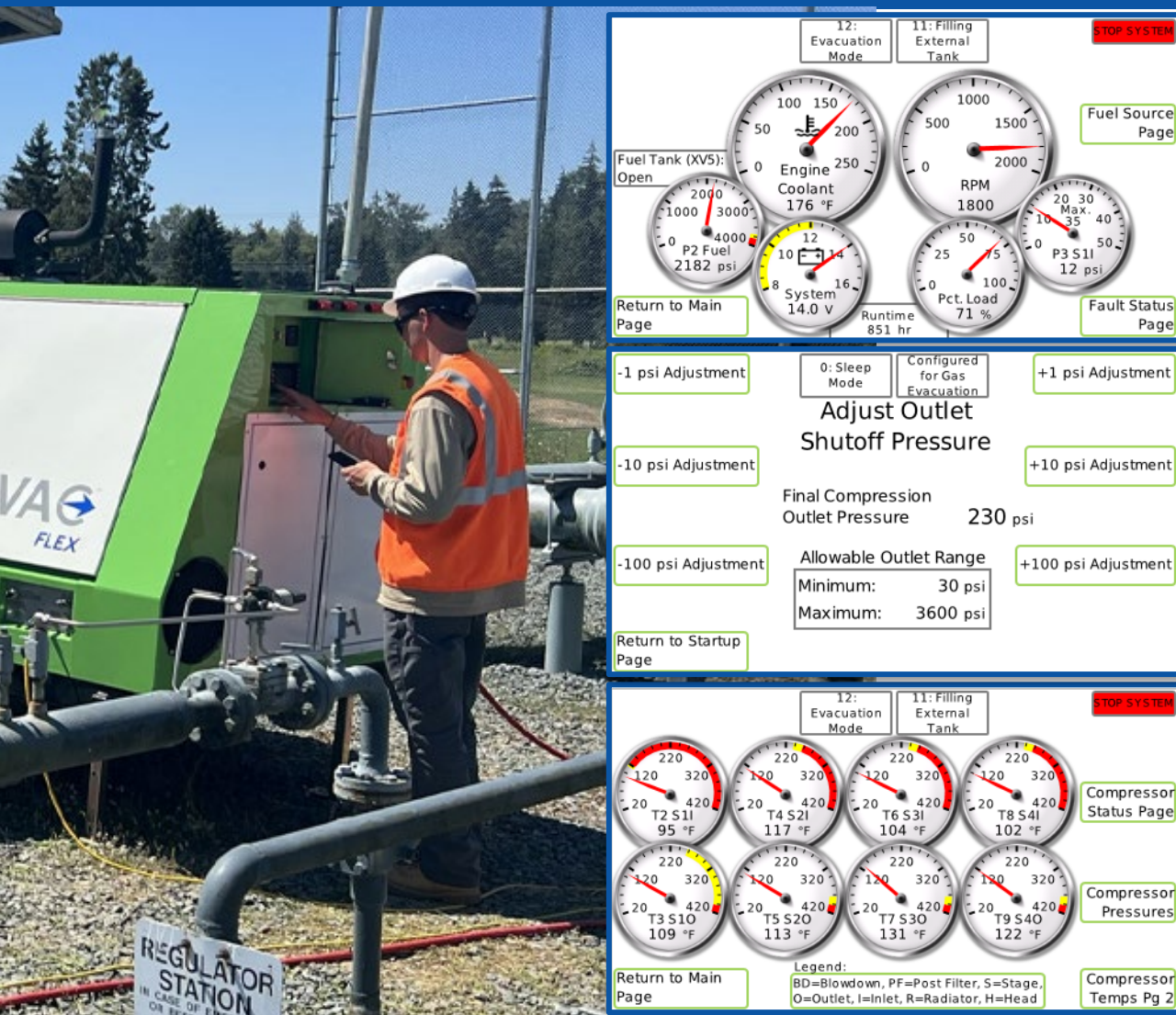


GoVAC Controls And Safety Features

- Class 1 Division 2, hazardous location compliant
- Manual Emergency Stop button
- Status indicator light with audio pre-start alarm
- Two layers of failure protection
 - ✓ Controls automation via sensor array (pressure, temperature, methane)
 - ✓ Mechanical: pressure relief valves throughout the system
- Clear readable HMI for control and monitoring
- Automated start and stop pressure settings (to prevent external vessel over pressurization)
- Remote monitoring to ensure project operation is progressing as planned
- Remote sensor for use with pipelines or other external pressure vessels
- All Field Service Technicians Operational Qualification (OQ) certified



Sophisticated Yet Simple Technology for Safe Operations



- **Reliable and accurate control with automated systems**
 - ✓ Configurable pressure setpoints through the control panel
 - ✓ Automatic stop based on inlet and outlet pressures
- **Telematics with two-way communications**
 - ✓ All data collected is stored in the cloud
 - ✓ Remote monitoring capabilities
 - ✓ Environmental and operational reports available

Conversion to Metric Pending

The Environmental Impact Report



GOVAC® PROJECT ENVIRONMENTAL IMPACT REPORT

Project Information

Company

Project Date

Project Location

Environmental Impact in CO₂e

Total Natural Gas Evacuated

GoVAC Natural Gas Fuel Consumption

GoVAC Emissions from Operations

93,198 SCF

7,288 SCF

874.56 Lbs. CO₂e

Net Natural Gas Recovered

44.30 MT CO₂e

Project Estimates

Pipeline Length

Pipeline Diameter

Pipeline Starting Pressure

23,760 ft

16 in

49 psig

Project Metrics

GoVAC Final Inlet Pressure

GoVAC Outlet Pressure

Total Evacuation Time

3 psig

297-303 psig

13 Hours, 47 Minutes

Digitized Reporting of Natural Gas Capture, Recovery and Transfer

Accurate project results with the option of third-party certification.

The GoVAC® technology digitally records the environmental attributes associated with pipeline evacuations and monitors the natural gas that moves through the system. The control system communicates up to the cloud securely for accurate real-time data collection. A combination of algorithms and protocols ensures data integrity when producing this environmental report, which enables traceability, transparency, and compliance at scale.





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Decarbonization-as-a-Service™ Certificate of Gas Recovery



DaaS™

Certificate

Digital Twin

Trusted end-to-end data integrity backed by direct measurement-based quantification, and cryptographically secured distributed ledger technology, providing an immutable verifiable chain of custody

- ✓ Third-party Digital Notary certification of metrics as witnessed by KPMG
- ✓ This PDF has a blockchain-secured digital twin
- ✓ Immutable blockchain-backed proof provided to project
- This data has been measured and monitored along its end-to-end flowpath
- This data has been secured in any way
- The data created and presented here was digitally signed by verified identities

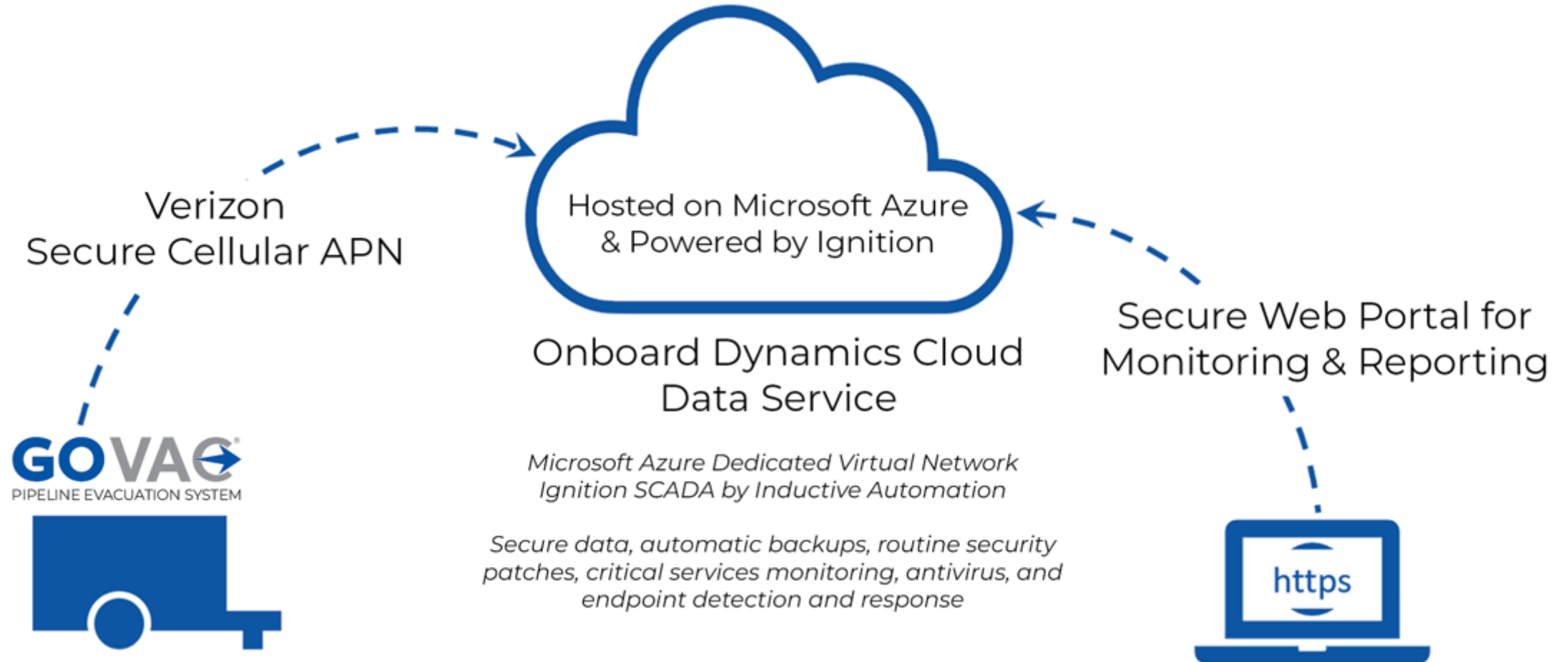


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Context Labs

How it Comes Together



Case Study: Pipeline Evacuation Project

- Four GoVAC[®] FLEX systems
- Two evacuation projects
 - >99,000 m³ of natural gas captured
 - ~74 MT of methane (CH₄)
 - ~1,802 MT of CO₂e



A satellite view of Earth at night, showing the curvature of the planet and the glowing lights of cities and continents. The text is overlaid on this image.

Smart Technology for a Transition to Clean Energy

Methane emissions reduction has world focus.

Practical, scalable, and economical options are limited in the natural gas industry.

Our innovative technology is the smart answer.



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Thank You!

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