Optical Methane Emissions Detection System
EPA has released unprecedented federal regulations on the oil & gas industry to reduce methane emissions though the entire supply chain. Regulations require bi-annual inspection of every new component throughout the supply chain.

Annually the US Oil & Gas Industry releases more than 7.3 million metric tons of fugitive methane emissions at a loss of nearly $2 billion.

**Remote Assets on Supply Chain**

- 500,000 gas wells in production
- 305,000 miles of pipelines
- 1,400 compressor stations
- 11,000 delivery points
- 400 gas storage facilities

**Current Detection Methods – Industry Standard**

- Methane Gas “Sniffers”
- Thermal Detection
- Manual Recording

**Bi-Annual Manual Inspection**

Industry average cost $12K to $18K per site annually
Real-Time Continuous Methane Monitoring
RemoteMonitor CH4

Problem: The system cannot identify the source of the emissions
OMEDS System Overview
Optical Methane Emissions Detection System

Dispersion Wireless Methane Sensor
• 5 PPM methane detection resolution
• Detects up to 20% LEL
• Wireless transmission range 1Km
• Battery/Solar powered

OMEDS Base Station
• Real-Time wireless data transmission
• Custom hardware solution
• Weather station integration
• OMEDS Optics (Color & Thermal Cameras)
• Battery/Solar powered
OMEDS Optics
Dual High Res Color & Thermal Cameras

Example thermal methane emissions

**FLIR LWIR Thermal Sensor**
- Uncooled microbolometer
- 7.5-12um spectral range
- Video output
- Low power
- Cost: $1,000

**OMEDS Optics**
- Pan-Tilt Stage
- Waterproof enclosure

**Thermal IR Illuminator**
- 7-9um range
- Low power
- 2M range/Illuminator
- Cost $20 each

**Color Camera**
- 2MP – 5MP
- Low power
- Cost: $50

Total Cost ~$2K. Cost saving of 98% over MWIR sensors.
Industry Pain-Points Solved

**Cost Savings**
- More effective and less expensive method to comply with pending federal regulations and current state regulations
- Reduce labor charges by 40-70% over current methods
- ROI 6-12 month

**Real-Time Notification**
- Real-time visual notification of emission source
- Data archiving of continuous data stored on cloud
- Notification of battery & signal issues for preventative maintenance

**Fast Response**
- Real-time notifications lead to fast response time to repair leaks

**Limit Liability**
- Limit public health concerns, liability issues, and product loss

**Automated Reporting**
- Automatic report generation with customized options for regulated compliance
Market Segments

**Fugitive Methane Emissions**
Primary focus to provide continuous methane monitoring for Oil & Gas companies with assets in the upstream and midstream supply chain to comply with EPA regulations.

**Stray Gas & Abandoned/Orphan Wells**
Provide continuous methane monitoring products for the stray methane gas emissions caused by wellbore integrity issue & monitor abandoned/orphan gas wells within a given radius of unconventional gas well.

**Landfill Emissions**
Municipal solid waste landfills are currently regulated under the EPA’s “Clean Air Act Guidelines and Standards for Waste Management”. Current monitoring procedures are labor intensive.
Market Segment Size

Fugitive Methane Emissions

- Total Available US Market: $500M - $1B
- Target Market: $15M - $50M
- EPA estimates ~$560M in monitoring cost with over $600M saving of product loss
- Industry projects $600M to $1B in annual monitoring costs

Stray Gas Migration

- Total Available US Market: $25M - $100M
- Target Market: $2.5M - $10M
- Current successful pilots with major energy operators
- PA DEP requires all structures within 2,500’ from well pad be monitored including abandoned & orphan natural gas wells.

Landfill Monitoring

- Total Available US Market: $100M - $200M
- Target Market: $1M - $2M
- Current successful paid pilots landfill business partner
### Pricing/Margins

**Direct Sales Model:**
- COGS: $850
- OpEx: $65
- Profit: $2,085
- Profit Margin: 70%
- Customer Cost: $3,000

**Sales Rep Model @ 10%:**
- COGS: $850
- OpEx: $65
- Reseller: $300
- Profit: $1,785
- Profit Margin: 60%
- Customer Cost: $3,000

**Recurring Data Revenue:**
- COGS: $2.75
- Profit: $17.20
- Profit Margin: 86%
- Customer Cost: $19.95/mo
Market Projections

Total Methane Monitoring Markets

Yearly Sensor Sales (3-5 years)

5,000 sensors X $3,000/sensor = $15M
(416 sensors/mo)

Recurring Data Telemetry Revenue

5,000 sensor X ($19.95/mo - $2.75 carrier charge) = $86K/mo
$86K/mo x 12 mo = $1M/yr

Recurring Cloud Data Service Revenue

???
(Data Analytics)
Distributor Channels

ProSight Specialty Insurance offers insurance to the oil & gas industry. They are providing insurance policies for the fugitive methane emissions regulations for companies using continuous monitoring and has selected PixController, Inc. as an exclusive industry partner.

Currently installing tank level and flow sensors in oil & gas industry. Interested in adding the PixController methane monitoring solution to their current product line for meeting EPA fugitive methane regulations market.

Environmental Protection Agency

The Environmental Protection Agency (EPA) is issuing this request for information to the public to obtain information about monitoring, detection of fugitive emissions, and alternative mitigation approaches in the oil and natural gas sector.
Natural Gas: Stray methane gas experts

- Helped establish stray gas regulations and protocols
- Master Service Agreements (MSA) with most Appalachian Basin Energy Companies
- Teaches seminars on stray gas to industry
- Respected in scientific community & publishes papers

Landfill: Stray methane gas experts

- Developed dispersion algorithms
- Specializing in automated monitoring and web based visualization of sensor network
- ASTM International Committee - “Continuous Soil Gas Measurements: Worst Case Risk Parameters”
PixController, Inc. has been part of the Verizon Partner Program (VPP) for the past 4 years. The relationship is an integral part of the overall value a solution provider seeks in vendor. Access to a sales force of 120K people for market position in many different vertical markets by generating leads in our sales portal.

Looking for IoT partners in the oil & gas industry. Winner in the 2015 AT&T Fast Pitch IoT Evolutions Contest which connected our methane monitor product solutions with their Innovation Laboratory in San Francisco.
Business & Revenue Model

Product Sales
- Direct product sales
- Lease packages including installation, and data & cloud services
- Oil & Gas product distributors & service companies
- Environmental monitoring company sales
- Cloud software license

Recurring Revenue Streams
- Reselling wireless data bandwidth (Cellular/Satellite)
- Cloud data storage & dashboard services
- Data analytics
- System service & maintenance packages

Manufacturing and Scaling
- CSE Corporation manufacturing (sensor partner)
- Explore Contract Manufacturing if needing to scale
- ORBCOMM, Inc. – data plan management for all carriers
- Expedient – scaling cloud servers
Risk Management

Early Technology Adopters

- Risk of early adopters could lead to slower future growth until mainstream acceptance of this technology.
- How long to cross the chasm?

Production Scale Up

- Limit risk potential where sales are constrained by capacity to manufacture products.
- Manage cash flow and finances to inventory long-lead production items.
- R&D need time to refine the product design to meet market needs and changes.
PixController, Inc. has filed several provisional patents including the OMEDS System. Traditionally PixController has protected our IP through Trade Secrets in the form of:

- Hardware Development
- Firmware Development
- Wireless Protocols
- Cloud Software
Product Applications of OMEDS Optics

- On-Demand Streaming Video
- Integrated into Handheld Gas Detectors
- Attach to Drones for Pipeline Surveys
# Competitive Landscape

<table>
<thead>
<tr>
<th>Product</th>
<th>Target Market</th>
<th>System Specs</th>
<th>Battery</th>
<th>Price</th>
</tr>
</thead>
</table>
| RemoteMonitor CH4      | Oil & Gas Fugitive Emissions, Stray Gas Monitoring, Landfills, Sewer Gas | • Detects to 100% volume  
• Ultra-low power  
• Wired sensor w/ atmospheric  
• Cellular & WiFi telemetry | 2+ years      | $3,000         |
| GDS GASMAX TX          | Oil & Gas: Industrial emissions     | • Detects to LEL (5% volume)  
• Mesh network CH4 sensors  
• Cellular gateway | 6 months      | $12,000+       |
| TekSolv TEKNET         | Oil & Gas: Drilling rig monitoring, environmental | • Detects to LEL (5% volume)  
• Mesh network CH4 sensors  
• Only sends alarms at LEL  
• Satellite gateway in trailer | 45 days       | $10,000/mo. lease |
| Loci Controls          | Landfill: Methane gas recovery      | • Detects to 70% volume  
• Mesh network CH4 sensors  
• CDMA Cellular only | 2-3 weeks      | (not on market) NSF SBIR Phase II |
PixController, Inc. specializing Internet of Things (IoT) solutions for outdoor, self-contained battery operated, wireless surveillance cameras and environmental monitoring systems. Founded in 1999 incorporated in 2004.

Currently PixController, Inc. sub-leases 3,000 sq/ft from CSE Corporation 70,000 sq/ft manufacturing & R&D Facility in Murrysville, PA.